

# **Great Yarmouth Third River Crossing**

## **Application for Development Consent Order**

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### **Document 6.2: Environmental Statement Volume II: Technical Appendix 16A: Legislation, Policy and Guidance**

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#### **Planning Act 2008**

#### **The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) (“APFP”)**

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# 1 Legislation, Policy and Guidance

1.1.1 Table 1.1 to 1.3 summarises the applicable legislation, policy and guidance to Chapter 16: Geology and Soils.

*Table 1.1: Summary of Legislation*

Legislation	Summary	Chapter Reference
<b>The Environmental Protection Act 1990 (Ref 16A.1)</b>	<p>The Environmental Protection Act 1990 defines, within England, Wales and Scotland, the fundamental structure and authority for waste management and control of emissions into the environment. The Act was intended to strengthen pollution controls and support enforcement with heavier penalties.</p> <p>Part 2A of the Environmental Protection Act 1990 was inserted into that Act by s57 of the Environment Act 1995 and contains a regulatory regime for the identification and remediation of contaminated land. In addition to the requirements contained in the primary legislation, operation of the regime is subject to regulations and statutory guidance.</p> <p>The main objective underlying the introduction of the Part 2A contaminated land regime was to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment, assessed in the context of the current use and circumstances of the land.</p> <p>It also works alongside planning rules to help ensure that this land is made suitable for use following development.</p> <p>Development of land will have to take into account Part 2A because a change in the use of the land may bring the development inside the statutory definition of contaminated land by creating new or different receptors and/or</p>	<p>This Chapter addresses the needs of the Environmental Protection Act 1990 through the ground investigation, human health risk assessments and preparation of a conceptual site model to assess source of contamination, receptors and pathways, culminating in an assessment of contaminant linkages. See Sections 16.3, 16.6, 16.7, 16.8 and Appendices 16B, 16C, 16D.</p>

Legislation	Summary	Chapter Reference
	pathways, resulting in new contaminant linkages.	
<b>Water Act 2003 (Ref 16A.2)</b>	The Water Resources Act 1991 replaced the corresponding sections of the Water Industry Act 1989. The Act sets out the responsibilities of the Environment Agency in relation to water pollution, resource management, flood defence, fisheries, and in some areas, navigation.	This Chapter addresses the needs of the Water Act 2003 by assessing the potential for water pollution in the risk assessments in Appendix 16C and Appendix 16D.
<b>The Construction (Design &amp; Management) Regulations (CDM 2015) (Ref 16A.3)</b>	The Construction (Design & Management) Regulations (CDM 2015) are the main set of regulations for managing the health, safety and welfare of construction projects (this includes the risks posed by contamination to construction workers and others who may be affected by the construction activities such as the general public and adjacent site users). CDM applies to all building and construction work and includes new build, demolition, refurbishment, extensions, conversions, repair and maintenance.	This Chapter addresses the needs of the CDM Regulations 2015 through assessing the risks posed by contaminants to construction workers and others who may be affected by the construction activities. See Appendices 16B and 16C.
<b>Environmental Permitting (England and Wales)</b>	The Environmental Permitting Regulations 2016 replace those parts of the Water Resources Act that relate to the regulation of discharges to controlled waters. Under the	This Chapter addresses the needs of the Environmental

Legislation	Summary	Chapter Reference
<b>Regulations 2016 (Ref 16A.4)</b>	regulations, groundwater activities relate to inputs of pollutants to groundwater.	Permitting Regulations through the assessment of contamination and the controlled waters risk assessment which feeds into assessing input of pollutants to groundwater. See section 16.8 Appendix 16C and Appendix 16D

Table 1.2: Summary of Policy

Policy	Summary	Chapter Reference
<b>National Planning Policy Framework (Ref 16A.5)</b>	The NPPF Section 15 provides guidance on conserving and enhancing the natural environment and paragraphs 170 and 178 to 180 specifically reference contaminated land. Sub-sections (e) and (f) of Paragraph 170 of the NPPF states that: <i>“Planning policies and decisions should contribute to and enhance the natural and local environment by: e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant</i>	This Chapter conforms to the policy framework by assessing soil and water pollution and land instability and proposing remediation / mitigation where appropriate. This Chapter assess whether the Principal

Policy	Summary	Chapter Reference
	<p><i>information such as river basin management plans; and</i></p> <p><i>f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate”.</i></p> <p>Paragraph 178 of the NPPF states that:  <i>“Planning policies and decisions should ensure that:</i></p> <p><i>a) site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);</i></p> <p><i>b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990; and</i></p> <p><i>c) adequate site investigation information, prepared by a competent person, is available to inform these assessments”.</i></p> <p>Paragraph 179 of the NPPF states that:  <i>“Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner”.</i></p> <p>Paragraph 180 of the NPPF states that:  <i>“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development”.</i></p>	<p>Application Site is suitable for the proposed use (in the context of this chapter) and the remediation proposed will result in the site not being capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990. Adequate site investigation is available and has been used to inform these assessments. The Chapter assesses the likely effects of pollution on health and the natural environment and also assesses the impacts to the site and wider area from the development. See Sections</p>

Policy	Summary	Chapter Reference
		16.6, 16.7, 16.8, 16.9 and 16.11
<b>National Networks National Policy Statement (Ref 16A.6)</b>	<p>The NPS NN provides some guidance on assessing geology, soils and contamination in relation to biodiversity and ecological conservation, coastal change, noise and vibration, water quality and resources, land use and sets out how the impacts should be considered.</p> <p>Paragraph 5.168 of the NPS NN states:  <i>“For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination and how it is proposed to address this”.</i></p>	<p>This Chapter conforms with the policy statement by assessing the likely significant effects on designated geological sites. It also assesses risks posed by land contamination (ground investigation and human health and controlled waters risk assessments) and includes remedial options for addressing the identified contamination. Land stability is also assessed. See Sections 16.6, 16.7, 16.8, 16.9 and 16.11</p>
<b>National Policy Statement for</b>	<p>The NPS for Ports, in Paragraph 5.13.8, likewise advises that developments on:</p>	<p>This Chapter conforms with the policy</p>

Policy	Summary	Chapter Reference
<b>Ports (Ref16A.7)</b>	<p><i>“... previously developed land.....should ensure that they have considered the risk posed by land contamination”.</i></p>	<p>statement by considering the risks posed by land contamination through ground investigation and human health and controlled waters risk assessments. See Sections 16.6, 16.7, 16.8, 16.9, 16.11</p>
<b>Great Yarmouth Borough Wide Local Plan (Ref 16A.8)</b>	<p>Policy INF18: In considering proposals involving hazardous development, in the vicinity of hazardous installations, or the development of contaminated sites, as shown on the proposals map, account will be taken of the amount, type and location of hazardous substances present, and the need for special precautions or restrictions to protect future users of the site and any other protected land.</p>	<p>This Chapter conforms to the requirements of the local plan by taking account of the amount, type and location of hazardous substances and the need for special precautions to protect future users of the site. See Sections 16.6 16.7, 16.8, 16.9 and 16.11 and Appendix 16B and</p>



Policy	Summary	Chapter Reference
		Appendix 16C.

Table 1.3: Summary of Guidance

Guidance	Summary	Chapter Reference
<b>Design Manual for Roads and Bridges, Volume 11, Section 3, Part 11, Geology and Soils. (Ref 16A.9)</b>	Part 11 of DMRB details the assessment of geology and soils in the context of road schemes which can have an impact on both the geology and the soils of an area. It is therefore important that the potential impacts of development on both the soil and the underlying rocks are fully considered. The converse also applies in that existing soil conditions of a site can impose constraints on a proposed development for example, where land which has been contaminated by wastes from some previous industrial use.	This Chapter conforms to the requirements of DMRB through assessment of the underlying geology and soils and contamination through the ground investigation and human health and controlled waters risk assessments. See Appendix 16B and Appendix 16C.
<b>BS 10175:2011 Code of Practice for the Investigation of Contaminated Land. (Ref 16A.10)</b>	This British Standard provides recommendations and guidance on how to investigate potentially contaminated land, or land with naturally elevated concentrations of potentially harmful substances, to determine or manage any risks. It allows users to:  Set the objectives of an investigation;	The ground investigation presented in Appendix 16C was undertaken in accordance with the

Guidance	Summary	Chapter Reference
	<p>Develop a strategy for the investigation;</p> <p>Identify risks arising from the presence of contamination;</p> <p>Design the different phases of the investigation;</p> <p>Carry out sampling, field testing and laboratory analysis;</p> <p>Conduct risk assessment of a potentially contaminated site.</p>	<p>requirements of BS10175.</p>
<p><b>Model Procedures for the Management of Land Contamination. (Ref 16A.11)</b></p>	<p>The Model Procedures for the Management of Land Contamination, CLR 11, have been developed to provide the technical framework for applying a risk management process when dealing with land affected by contamination. The process involves identifying, making decisions on, and taking appropriate action to deal with, land contamination in a way that is consistent with government policies and legislation within the UK.</p>	<p>The Desk Study Report (Appendix 16B) and the Ground Investigation Report, including the human health risk assessment (Appendix 16C) were undertaken in accordance with the requirements of CLR11.</p>
<p><b>Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination. (Ref 16A.12)</b></p>	<p>Assessment methodology for undertaking groundwater risk assessments.</p>	<p>The controlled waters risk assessment presented in Appendix 16C was undertaken in accordance</p>

Guidance	Summary	Chapter Reference
		with the requirements of the Remedial Targets Methodology document.
<b>Assessing risks posed by hazardous ground gases to buildings. (Ref 16A.13)</b>	Guidance on assessing the risks posed by hazardous ground gases, primarily methane and carbon dioxide to buildings. It consolidates good practice in investigation, the collection of relevant data and monitoring programmes in a risk-based approach to gas contaminated land. Two semi-quantitative methods are set out for the assessment of risk; one for low rise housing and one for all other development types.	The ground gas risk assessment in Appendix 16C was undertaken in accordance with CIRIA C665 by collecting and assessing ground gas monitoring data and calculating gas screening values. See Appendix 16C
<b>Guidance on the classification and assessment of waste (Ref 16A.14)</b>	Technical guidance on how to assess and classify waste.	A waste classification section within Appendix 16C presents the assessment of waste classification undertaken in accordance with Technical Guidance

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Guidance	Summary	Chapter Reference
		WM3. Chapter 15 specifically deals with waste materials.

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## 2 References

Ref 16A.1: The Environment Protection Act (1990). The Stationary Office 1990.

Ref 16A.2: The Water Act (2003). The Stationary Office 2003.

Ref 16A.3: The Construction (Design & Management) Regulations (2015). The Stationary Office 2015.

Ref 16A.4: The Environmental Permitting (England and Wales) Regulations (2016). The Stationary Office 2016.

[http://www.legislation.gov.uk/ukxi/2016/1154/pdfs/ukxi\\_20161154\\_en.pdf](http://www.legislation.gov.uk/ukxi/2016/1154/pdfs/ukxi_20161154_en.pdf)

Ref 16A.5: Ministry of Housing, Communities & Local Government (2019). National Planning Policy Framework.

Ref 16A.6: Department for Transport (2015). National Policy Statement for National Networks.

Ref 16A.7: Department for Transport (2012). National Policy Statement for Ports.

Ref 16A.8: Great Yarmouth Borough Council (2016). Current status (January 2016) of policies from the 2001 Great Yarmouth Borough-Wide Local Plan.

Ref 16A.9: Highways Agency (1993). Design Manual for Roads and Bridges, Volume 11, Section 3, Part 11, Geology and Soils.

Ref 16A.10: British Standards Institution (2011). BS 10175:2011 Code of Practice for the Investigation of Contaminated Land.

Ref 16A.11: The Environment Agency (2004). Model Procedures for the Management of Land Contamination. Contaminated Land Report 11.

Ref 16A.12: Environment Agency (2006) Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination.

Ref 16A.13: CIRIA (2007). Assessing risks posed by hazardous ground gases to buildings. C665.

Ref 16A.14: Technical Guidance WM3 (2018). Guidance on the classification and assessment of waste (1st Edition v1.1).

# **Great Yarmouth Third River Crossing**

## **Application for Development Consent Order**

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### **Document 6.2: Environmental Statement Volume II: Technical Appendix 16B: Interpretative Environmental Desk Study Report**

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**Planning Act 2008**

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) (“APFP”)**

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# 1 Introduction

## 1.1 Terms of Reference

1.1.1 WSP Ltd were commissioned by Norfolk County Council ('The Applicant') to prepare an Interpretative Environmental Desk Study in relation to the Great Yarmouth Third River Crossing ('the Scheme') to assess the potential environmental risks, constraints and liabilities associated with the Scheme. The first revision of this report dated July 2017 was prepared in advance of the Order Limits and the Scheme description being finalised and the construction Contractor being appointed. This version dated March 2019 updates these aspects and wholly supersedes the report dated July 2017.

## 1.2 Scheme Description

1.2.1 The Scheme involves the construction, operation and maintenance of a new crossing of the River Yare in Great Yarmouth. The Scheme consists of a new dual carriageway road, including a road bridge across the river, linking the A47 at Harfrey's Roundabout on the western side of the river to the A1243 South Denes Road on the eastern side. The Scheme would feature an opening span double leaf bascule (lifting) bridge across the river, involving the construction of two new 'knuckles' extending the quay wall into the river to support the bridge. The Scheme would include a bridge span over the existing Southtown Road on the western side of the river, and a bridge span on the eastern side of the river to provide an underpass for existing businesses, enabling the new dual carriageway road to rise westwards towards the crest of the new crossing.

1.2.2 If constructed, the Scheme would comprise the following principal elements:

- A new dual carriageway road, crossing the River Yare in an east-west orientation, comprising:
  - A new double-leaf bascule bridge providing an opening span to facilitate vessel movement within the river. This would include structures to support and accommodate the operational requirements of the bridge-opening mechanism, including counterweights below the level of the bridge deck. The bridge would be supported on driven piles;
  - New substructures, supported by driven piles, to support the double leaf bascule bridge within the existing quays either side of the river and within the river itself, requiring new permanent

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- “knuckle” walls, creating cofferdams in the waterway to accommodate their construction;
- A new five-arm roundabout connecting the new dual carriageway road with Suffolk Road, William Adams Way and the western end of Queen Anne’s Road. Sections of the new five arm roundabout would be supported on driven piles where deep soft ground is encountered;
  - A single-span bridge over Southtown Road, with reinforced earth embankments joining that bridge to the new roundabout at William Adams Way. Southtown Road bridge and the reinforced earth embankments would be supported on driven piles;
  - A single-span bridge to provide an underpass on the eastern side of the river, with reinforced earth embankments joining that single span bridge to South Denes Road. The underpass and reinforced earth embankments would be supported on driven piles;
  - A new signalised junction connecting the new road with A1243 South Denes Road; and
- The closure of Queen Anne’s Road, at its junction with Suffolk Road, and the opening of a new junction onto Southtown Road providing vehicular and pedestrian access to residential properties and the MIND Centre and Grounds at the eastern end of Queen Anne’s Road;
  - Revised access arrangements for existing businesses onto the local highway network;
  - Dedicated provision for cyclists and pedestrians which ties into existing networks;
  - Implementation of part of a flood defence scheme along Bollard Quay that is proposed to be promoted by the Environment Agency, and works to integrate with the remainder of the flood defence scheme;
  - A control tower structure located immediately south of the crossing on the western side of the river. The control tower would facilitate the 24/7 operation of the opening span of the new double-leaf bascule bridge;
  - A plant room located on the eastern side of the river for the operation of the opening span of the new double-leaf bascule bridge;
  - The demolition of an existing footbridge on William Adams Way;
  - Associated changes, modifications and/or improvements to the existing local highway network;
  - Additional signage, including Variable Message Signs (VMS) at discrete locations, to assist the movement of traffic in response to network conditions and the openings / closings of the double-leaf bascule bridge;

- The relocation of existing allotments to compensate for an area to be lost as a result of the Scheme and other works, including those at the MIND Centre and Grounds; and
- New public realm, landscape, ecology and sustainable drainage measures;

**1.2.3** The Scheme also includes works to facilitate the construction, operation and maintenance of the above elements including:

- Creation of temporary construction sites and accesses from the public highway;
- Provision of new utilities and services and the diversion of existing utilities;
- Provision of drainage infrastructure, lighting and landscaping;
- Demolition of a number of existing residential and commercial / business properties; and
- Provision of small vessel waiting facilities to the north and south of the new crossing, either as floating pontoons or additional fendering to the existing berths, including any dredging and quay strengthening works that may be required.

## **1.3 Legislative Context**

**1.3.1** The presence of contaminants which may pose a risk to human health or the environment is a material planning consideration. In determining the application for development consent, the Examining Authority will consider whether the site is suitable for its new use. The responsibility for securing a safe development (including cumulative effects of pollution on human health receptors (identified in Table 3.2 below) and the potential sensitivity of the proposed development to adverse effects from pollution) rests with the developer and/or landowner. The Examining Authority is concerned with the site's proposed use rather than its current use.

**1.3.2** Section 57 of the Environment Act 1995, adds Part 2A (ss.78A-78YC) (Ref 16B.1) to the Environmental Protection Act 1990 (Ref 16B.2) and contains the legislative framework for identifying and dealing with contaminated land. Where development is undertaken on land which may be affected by contamination, the National Planning Policy Framework, paragraphs 170 and 178 to 180 considers pollution and remediation (Ref 16B.3).

## 1.4 Scope of Report

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1.4.1 The objective of this study is to assess the potential environmental risks, constraints and liabilities associated with the Study Area (see Section 2.1 below) in respect of the Scheme.

1.4.2 The scope of work comprises:

- A site walkover undertaken by a suitably qualified Geo-Environmental Scientist;
- An interpretation of the information obtained from a Groundsure Report;
- A preliminary assessment of potential geo-environmental risks following the methodology of CLR11 (Ref 16B.4); and
- Recommendations for further investigation/actions if required.

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## 2 Desk Study Research

### 2.1 Site Location

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- 2.1.1** The irregular shaped Principal Application Site is located either side of the River Yare, immediately south of Great Yarmouth Town Centre. The Order Limits are presented on Drawing GYTRC-WSP-EGN-XX-DR-EN-0003 Figure 1.1 Site Location Plan (Regulation 5(2)(a)).
- 2.1.2** The Study Area for this desk study report is presented on Drawing GYTRC-WSP-EGN-XX-DR-EN-0128 Figure 16.1 Interpretative Environmental Desk Study – Study Area Boundary (Regulation 5(2)(a)) and comprises an area larger than the Order Limits for the Principal Application Site. This was to encompass a suitable Rochdale Envelope in the early stages of the project. A buffer of approximately 500m (not shown on Drawing GYTRC-WSP-EGN-XX-DR-EN-0128 Figure 16.1 Interpretative Environmental Desk Study – Study Area Boundary (Regulation 5(2)(a)) was also included to capture potential Sites of Special Scientific Interest (SSSI's) and other sensitive receptors as well as landfills and other potentially contaminative current and historical uses in the surrounding area that could influence the Principal Application Site.
- 2.1.3** The Satellite Application Sites have not been included within this study as they are existing highway and developed areas and do not include significant excavations or ground penetration which could influence / affect geology and soils.

### 2.2 Site Setting and Description

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- 2.2.1** A walkover was undertaken by a qualified WSP Geo-Environmental Engineer on 12th July 2017. Photographs and a photograph location plan are presented in Annex A.
- 2.2.2** The Study Area is split into two unequal parts by the River Yare which flows from north to south through the Study Area. For the purposes of this report, reference is made to eastern and western areas to distinguish information related to the eastern side of the River Yare and the western side of the River Yare.
- 2.2.3** The eastern area is densely developed and includes:

- commercial / industrial properties including oil / gas storage sites (including ASCO Ltd (Annex A, photograph 5) and Butler Fuels Ltd on the quayside,
- Barrack Road gas works (Annex A, photograph 1 and photograph 2) site adjacent to the eastern boundary),
- an operating port facility with associated hard standing and warehouses / depots (Annex A, photograph 9),
- residential properties (predominantly in the northern part of the area),
- a petrol filling station,
- car dealership.

**2.2.4** The western area includes:

- hard standing quayside,
- the major A47 dual carriageway,
- William Adams Way highway,
- residential properties (Annex A, photograph 4),
- commercial properties including car and caravan sales,
- a petrol station, oil and gas storage facilities (ASCO Ltd within the quayside close to William Adams Way – Annex A, photograph 9),
- docks and port facilities,
- military properties (air training corps),
- community facilities and public open space (Annex A, photograph 11 and 13),
- Allotments (Annex A photograph 13).

**2.3 Adjacent Land Use**

**2.3.1** Table 2.1 below summarises the adjacent land uses.

*Table 2.1: Summary of Adjacent Land Uses*

Direction	Surrounding Land Use
<b>North</b>	Predominantly commercial / industrial with some residential properties on the west side of the river and predominantly residential properties with a few

Direction	Surrounding Land Use
	commercial properties on the east side of the river.
<b>East</b>	Predominantly residential properties with occasional commercial properties and a community centre.
<b>South</b>	Commercial / industrial properties on the east side of the river and residential properties, commercial properties and a recreation ground on the west side of the river.
<b>West</b>	Commercial / industrial properties.

## 2.4 Environmental Designations and Ecology

- 2.4.1 The Study Area is wholly located within a nitrate vulnerable zone. Two other environmentally sensitive areas are located within 500m of the Study Area;
- Outer Thames Estuary, approximately 465m to the east of the Study Area; and
  - Broads, approximately 390m to the west of the Study Area.

## 2.5 Site History

- 2.5.1 The history of the Study Area has been assessed from a review of historical Ordnance Survey maps from the GroundSure report presented in Annex B. A summary is presented below. A more detailed history, including the adjacent and surrounding land is presented in Annex C.

### Eastern Area

- 2.5.2 The earliest map provided by GroundSure dated 1883 indicates the eastern area of the Study Area to be densely developed predominantly with commercial / industrial properties including a gasworks, boat building yard and an icehouse. Some residential properties were marked but generally the area is dominated by industry. This eastern area has generally remained a commercial / industrial area up to the present day. Various industries have been present including fish canning, oilskin production, chemical factory and unspecified depots, warehouses and factories.



## Western Area

- 2.5.3** The earliest map provided by GroundSure dated 1883 indicates the western area of the Study Area to be less developed than the eastern area. The majority of the development was present adjacent to the River Yare and comprised a mix of residential properties and commercial / industrial sites such as an iron works, rope walk, gas works and malhouses. Beyond, towards the western boundary was agricultural land.
- 2.5.4** By 1906, a railway line running north-south was constructed towards the western boundary and by 1926 / 1927, formal gardens and allotments are present towards the centre of the Study Area. A shoe factory is marked adjacent to Queen Anne's Road in 1949 and by 1966 is relabelled as a printing works.
- 2.5.5** By 1978, the railway line had been dismantled and commercial / industrial units had started to be developed in the far west of the Study Area and beyond. By 1988, the former rail route had started to be redeveloped as a dual carriageway and by 2002 the current major highway routes had been established.

## 2.6 Geology

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### Superficial

- 2.6.1** The British Geological Survey (BGS) website ([www.bgs.ac.uk](http://www.bgs.ac.uk)) indicates the Study Area is underlain by a variety of superficial deposits;
- South west - peat of the Breydon Formation,
  - North – clay and silt of the Breydon Formation,
  - Eastern part beyond the River Yare – sand and gravel of the North Denes Formation.
  - Within the River Yare - Clay and silt tidal river or creek deposits.

### Solid

- 2.6.2** The BGS website ([www.bgs.ac.uk](http://www.bgs.ac.uk)) indicates the bedrock underlying the Study Area is sand and gravel of the Crag Group.

### Ground Workings

- 2.6.3** GroundSure records a number of historical ground workings within the Study Area, all associated with the quay / wharf immediately adjacent to the River Yare.

## BGS Boreholes

2.6.4 GroundSure reports 107 borehole records within the Study Area but some are confidential and cannot be viewed on the BGS website – [www.bgs.ac.uk](http://www.bgs.ac.uk). A summary of the locations within the Study Area is presented in Table 2.2 below.

Table 2.2: Summary of Historical BGS Boreholes

Borehole Ref	Location	Summary
<b>TG50NW27</b>	Close to junction between William Adams Way and Suffolk Road.	Made ground to 2m depth overlying silt, sand and clay.
<b>TG50NW164</b>	Close to junction between William Adams Way and Suffolk Road.	Ash fill to approximately 4ft 6' depth overlying clay (with peat layers) sand and gravel.
<b>TG50NW429</b>	Close to junction between William Adams Way and Suffolk Road.	Fill to 1.05m depth overlying clay, sand, silt and peat.
<b>TG50NW26</b>	Close to junction between William Adams Way and Suffolk Road.	Made ground to 1,2m depth overlying silt, sand, clay (with peat) and gravel.
<b>TG50NW185</b>	Close to junction between William Adams Way and Suffolk Road.	Made ground to approximately 1ft depth overlying clay, silt, sand, peat and gravel.
<b>TG50NW28</b>	Close to junction between William Adams Way and Suffolk Road.	Topsoil overlying clay, peat and sand.
<b>TG50NW472</b>	William Adams Way close to A12 roundabout	Topsoil overlying clay, sand, silt and peat.
<b>TG50NW29</b>	Close to junction of Suffolk Road and Queen Annes Road.	Topsoil overlying clay, sand, silt and peat.
<b>TG50NW184</b>	Junction of Queen Annes Road and Suffolk Road.	Made ground to approximately 3ft 6 depth overlying clay, sand, silt , peat and gravel.
<b>TG50NW4</b>	Adjacent to Suffolk Road, north of Queen Annes Road	Made ground to 1.07m depth overlying clay, sand, silt, peat and gravel.

Borehole Ref	Location	Summary
<b>TG50NW582</b>	Southtown Road, adjacent to the River Yare.	300mm thickness of asphalt and concrete over made ground to 2.2m depth. Underlying natural strata is sand and gravel,
<b>TG50NW587</b>	Southtown Road, adjacent to the River Yare.	300mm thickness of asphalt and concrete over made ground to 3.0m depth. Underlying natural strata is silt, sand and gravel
<b>TG50NW581</b>	Southtown Road, adjacent to the River Yare.	200mm thickness of asphalt and concrete over made ground to 2.2m depth. Underlying natural strata is sand and gravel.
<b>TG50NW586</b>	Southtown Road, adjacent to the River Yare.	400mm thickness of asphalt and concrete over made ground to 2.2m depth. Underlying natural strata is silt (with peat), sand and gravel
<b>TG50NW368</b>	Quayside on the eastern side of the River Yare.	180mm thickness of reinforced concrete over made ground to 1.2m depth. Underlying natural strata is sand and silt.
<b>TG50NW342</b>	Quayside on the eastern side of the River Yare.	300mm thickness of reinforced concrete over made ground to 6.6m depth. Underlying natural strata is sand and gravel.
<b>TG50NW344</b>	Quayside on the eastern side of the River Yare.	300mm thickness of reinforced concrete over made ground to 1.0m depth. Underlying natural strata is sand and gravel.

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## 2.7 Hydrogeology

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- 2.7.1 The superficial deposits underlying the Study Area to the east of the River Yare are classified as a Secondary (A) Aquifer with permeable layers. These are defined by the Environment Agency as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
- 2.7.2 The superficial deposits underlying the Study Area to the west of the River Yare are classified as unproductive.
- 2.7.3 The underlying bedrock is classified as a Principal Aquifer. These are defined by the Environment Agency as layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
- 2.7.4 The GroundSure report (Annex B) indicates the Study Area is not within a Source Protection Zone.
- 2.7.5 There are no groundwater abstraction points within the Study Area but there is one approximately 71m from the north-west corner of the Study Area as follows: Licence no. AN/034/0015/020 expires in 2030 and is authorised for a maximum daily volume of 210m<sup>3</sup> and an annual volume of 60,000m<sup>3</sup>. The abstraction is authorised for laundry use.

## 2.8 Hydrology

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- 2.8.1 The River Yare is the only watercourse recorded in the Study Area and within 500m of the Study Area.
- 2.8.2 There are no active surface water abstraction licences within 2km of the Study Area. There is one historical abstraction licence 443m to the north of the Study Area that expired in 2015 (licence no. AN/034/0015/013).
- 2.8.3 There are no potable water abstraction licences within 2km of the Study Area.

## 2.9 Waste Management Facilities

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- 2.9.1 No active Environment Agency landfill sites are present within 1km of the Study Area.
- 2.9.2 One historic Environment Agency landfill site is present within 1km of the Study Area; Site reference WD709a, approximately 450m to the west of the Study Area. Licenced to accept inert, industrial, commercial and household

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waste and operated by Great Yarmouth Council. The last record of the site held by GroundSure is dated 1974.

- 2.9.3** No BGS/DoE non-operational landfill sites are present within 1km of the Study Area.
- 2.9.4** No Local Authority recorded landfill sites within 1km of the Study Area.
- 2.9.5** GroundSure records one Environment Agency licensed waste site in the Study Area and eight sites within 250m of the Study Area (although there are multiple records for each):
- Within the Study Area (south west corner) - waste management licence 71429; EA/EPR/CP3094NZ/V003. Household, commercial and industrial waste transfer station for between 25,000t and 75,000t, operated by Thurtle Walter.
  - 13m from the south west corner of the Study Area – waste management licence 71417; EA/EPR/FP3394NJ/A001. Household, commercial and industrial waste transfer station for less than 25,000t, operated by Folkes Plant and Aggregate Ltd.
  - 53m from the south west corner of the Study Area – waste management licence 70532; EA/EPR/YP3229NB/A001. Special waste transfer station for greater than 75,000t, operated by Paul Clements.
  - 108m from the south east corner of the Study Area – waste management licence 71491; EA/EPR/AB3801UE/S002. Asbestos waste transfer station. Licence surrendered in 2016.
  - 150m from the south west corner of the Study Area – waste management licence 103802; EA/EPR/EB3535AM/V002. Inert and excavation waste

transfer and treatment for less than 25,000t, operated by E E Green and Son Ltd.

- 163m from the north west corner of the Study Area – waste management licence 70505; EA/EPR/KP3898VU/V002. Special waste transfer station for less than 25,000t, operated by Biffa Waste Services Ltd.
- 183m from the north west corner of the Study Area – waste management licence 70536; EA/EPR/YP3799NF/V002. Special waste transfer station for less than 25,000t, operated by C+L Waste Oil Collection.
- 229m from the north west corner of the Study Area – waste management licence 70535; EA/EPR/YP3199NQ/S004. Special waste transfer station. Licence surrendered in 2007.

## 2.10 Environmental Permits, Incidents and Registers

2.10.1 Records of active environmental permits or registers within the Study Area and within 250m are detailed below.

### Part A(1) And IPPC Authorised Activities

2.10.2 No records within the Study Area, but there are three active records within 250m of the Study Area each with multiple entries:

- 167m from the north west corner of the Study Area – Great Yarmouth Wm Resource Centre, EPR/zp3637rm. Operated by Augean North Sea Services Ltd. Records are present for three different processes – disposal or recovery of hazardous waste; disposal of greater than 50t/day of non-hazardous waste involving physio-chemical treatment; and temporary storage of hazardous waste.
- 187m from the northern boundary of the Study Area – Great Yarmouth Oil Reclamation Facility, EPR/np3038mb, WP3437RY. Operated by C&L Waste Oil Collection. Records are present for two different processes - disposal or recovery of hazardous waste; and temporary storage of hazardous waste.

### List 2 Dangerous Substances Inventory Sites

2.10.3 No active records within the Study Area but one active record within 250m of the Study Area is reported by GroundSure (see Annex B): 44m from the north west corner – UK Waste Management Ltd, authorised for chromium, copper, lead, nickel, zinc discharged to the North Sea.

### Part A(2) and Part B Activities and Enforcements

2.10.4 Three current permits are recorded within the Study Area and five current permits within 250m of the Study Area:

- 
- Part B permit - L J Steward for unloading of petrol into storage at service station, South Quay Service Station Southgate Road.
  - Part B permit - L J Steward for unloading of petrol into storage at service station, Southtown Road Service Station Southtown Road.
  - Part B permit – CEBO (UK) Ltd for use of bulk cement at Gas House, Quay North, Malthouse Lane.

2.10.5 There are a further five permits within 250m of the Study Area for various processes – use of bulk cement (four permits) and one permit for ‘other metal process’.

### Licensed Discharge Consents

2.10.6 There are four active consents within the Study Area for discharge to the River Yare and three consents within 250m of the Study Area for discharge to the River Yare. A number of revoked records are reported by GroundSure but these are not listed here:

- Three records within the Study Area relate to water company discharge - sewage discharge from storm overflow (two records) and sewage discharge pumping station (one record).
- One record within the Study Area relates to a trade discharge for site drainage (contaminated surface water).
- Two records outside the Study Area – 41m east and 189m south east relate to sewage discharge for final / treated effluent (not water company related).
- One record 203m to the south east of the Study Area relates to water company sewage discharge from storm overflow.

### Water Industry Referrals

2.10.7 Two records within the Study Area (Weatherford UK Ltd and Great Yarmouth Port Company) and two records within 250m (Total Reclaim Systems Ltd 13m south east of the Study Area and Biffa Waste Services Ltd 167m north of the Study Area) are reported by GroundSure.

### Planning Hazardous Substance Consents and Enforcements

2.10.8 One approved record is reported within the Study Area for Transco Plc. No further details are provided.

### COMAH and NIHHS Sites

2.10.9 There are two records within the Study Area and one record outside the Study Area:



- British Gas Historical Notification of Installations Handling Hazardous Substances ‘NIHHS’ site located on the east side of the Study Area.
- ASCO UK Ltd Current Control of Major Accident Hazards (COMAH) site located within the Study Area close to the southern boundary adjacent to the River Yare.
- ASCO UK Ltd current COMAH site located 15m to the south of the Study Area adjacent to the east bank of the River Yare.

### National Incidents Recording System, List 2

2.10.10 Three pollution incidents within the Study Area and one incident within 250m of the Study Area are recorded:

- The three incidents within the Study Area related to pollution from food and drink (minor water impact), inorganic chemical or product (no impact) and tyres (minor land impact).
- The incident 230m to the south of the Study Area related to solvents (minor air impact).

## 2.11 Natural Ground Hazards

2.11.1 Table 2.3 below summarises the natural ground subsidence findings presented in the GroundSure report.

*Table 2.3: Summary of Natural Ground Hazards*

Natural Hazard	Hazard Potential
<b>Shrink Swell Clay</b>	Negligible – majority of the Study Area.  Low – narrow corridor in the centre of the Study Area associated with the River Yare.
<b>Landslides</b>	Very Low
<b>Dissolution of Soluble Rocks</b>	Negligible
<b>Compressible Ground</b>	Very Low – majority of the Study Area.



Natural Hazard	Hazard Potential
	<p>Moderate - narrow corridor in the centre of the Study Area associated with the River Yare.</p> <p>Negligible – far eastern part of the Study Area.</p> <p>High – Two distinct areas on the southern boundary to the west of the River Yare.</p>
<b>Collapsible Deposits</b>	Negligible
<b>Running Sand</b>	<p>Very Low - majority of the Study Area.</p> <p>Moderate – narrow corridor in the centre of the Study Area associated with the River Yare.</p>

## 2.12 Mining, Extraction and Natural Cavities

2.12.1 The Study Area is not in an area likely to be affected by historical mining, coal mining, non-coal mining, natural cavities, brine extraction, gypsum extraction, tin mining or clay mining.

## 2.13 Radon

2.13.1 The GroundSure report indicates the Study Area is not in a radon affected area and any new buildings if required as part of the proposed development do not require radon protection measures.

## 2.14 Part 2A Determination

2.14.1 GroundSure does not record any sites determined as contaminated land under Part2A of the Environmental Protection Act 1990.

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## 2.15 Unexploded Ordnance

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2.15.1 A review of the potential for unexploded ordnance (UXO) has been obtained from Zetica Ltd and is presented in Annex D. The assessment indicates the Great Yarmouth area is a high bomb risk. Any intrusive works should take the potential for UXO into consideration when planning and undertaking works.

## 2.16 Existing Reports

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2.16.1 WSP Ltd has not been made aware of any existing reports within the Study Area related to contaminated land.

## 2.17 Ground Model

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2.17.1 The Study Area is generally level and densely developed. Published geology indicates superficial deposits comprise peat (south west), clay and silt (north), sand / gravel (east) and clay / silt tidal river / creek deposits within the River Yare. Bedrock underlying the Study Area is sand and gravel of the Crag Group.

2.17.2 Historical mapping indicates the Study Area, particularly either side of the River Yare, has been developed by industry since at least 1883. Some residential properties have been present and the far western area was developed later compared to the eastern part of the Study Area. Identified historical industry includes three gasworks, boat building, icehouse, iron works, railways, maltings, rope walk, saw mill / timber yard, allotments, oilskin works, fish caning, various unspecified depots, warehouses and factories, numerous unspecified sites with tanks, shoe factory and printing works. Many of these historical uses could have resulted in potentially significant sources of contamination being present.

## 2.18 Potential Contaminant Linkages

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### Potential Sources

2.18.1 Table 2.4 below summarises the potential sources of contamination.

**Table 2.4: Potential Sources**

Ref.	Primary Source	Expected Distribution	Likely Contaminants
<b>S1</b>	Potentially Contaminated Made Ground	Made ground is expected site wide, but contamination is likely to be in discontinuous pockets associated with differing historic industrial uses.	Heavy metals, asbestos, hydrocarbons, polychlorinated biphenyls, organotins and organochloride pesticides, ammonia, polyaromatic hydrocarbons, volatile and semi-volatile organic compounds.
<b>S2</b>	Potentially Contaminated Silt	Within the River Yare or immediately adjacent within the historic quayside area. Potential for mobilisation during the construction works or scoured due to changes in waterflow post construction.	Heavy metals, organotins, polychlorinated biphenyls, hydrocarbons, organochloride pesticides, ammonia, polyaromatic hydrocarbons, volatile and semi-volatile organic compounds.

### Potential Receptors

2.18.2 Table 2.5 below details the potential receptors.

**Table 2.5: Potential Receptors**

Ref.	Receptor	Description
<b>R1</b>	Site users	Pedestrians and maintenance workers
<b>R2</b>	Adjacent site users	Residents (including children) and users of nearby properties (visitors and employees)
<b>R3</b>	Controlled waters	Principal and Secondary (A) aquifers and surface watercourses
<b>R4</b>	On site infrastructure / ecology	Buildings, foundations, buried services and ecology (eg trees and plants in landscaping areas)
<b>R5</b>	Marine ecology	Vertebrates and invertebrates within the River Yare and the adjacent sea.

### Potential Pathways

2.18.3 Table 2.6 below details the potential pathways.

**Table 2.6: Potential Pathways**

Ref.	Pathway	Description
<b>P1</b>	Direct contact	Soil contaminants could come into direct contact with the site users.
<b>P2</b>	Ingestion	Soil derived contaminants could be ingested.
<b>P3</b>	Inhalation of fugitive dust	During dry dusty conditions, contaminated dust could be inhaled by site users and adjacent site users.
<b>P4</b>	Leaching and vertical / lateral migration of contaminants	Contaminants could leach and migrate into the underlying aquifers and the surface watercourse including as a result of construction activities such as piling.
<b>P5</b>	Migration and inhalation of landfill / ground gas	Ground / landfill gas could be generated by fill materials

## 2.19 Risk Evaluation

- 2.19.1** Each potential contaminant linkage is identified in Table 3.3 below. This assumes redevelopment with no remediation. An evaluation of the risk that each contaminant linkage poses to the Scheme has been undertaken in general accordance with CIRIA guidance document (Ref 16B.5). Risk classification matrices are presented in Annex E.
- 2.19.2** The evaluation and the resultant actions identified are based on the available information presented within this report.

**2.19.3** During construction, there is a potential for short term risk to site users and adjacent site users (including construction workers and the general public). These should be assessed and mitigated by the construction Contractor under the CDM 2015 Regulations (Ref 16B.6).

**2.19.4** Table 2.7 below details the potential pathways.

*Table 2.7: Summary of Potential Contaminant Linkages*

1. Hazard Identification		2. Hazard Assessment		3. Risk Estimation		4. Risk Evaluation	5. Managing the Risks
Contaminant Source	Receptor	Pathway	Consequence of Risk Being Realised	Probability of Risk Being Realised	Classification	Discussion / Action Required	
<b>S1. Potentially Contaminated Made Ground</b>	R1. Site Users	P1. Direct Contact	Medium	Unlikely	Low	Due to the previous uses across the Study Area, an environmental ground investigation was undertaken to assess the potential contaminant linkages identified in this table.	
		P2. Ingestion	Medium	Unlikely	Low		
		P3. Inhalation of Fugitive Dust	Medium	Low	Moderate		
		P5. Migration and Inhalation of Landfill / Ground Gas	Minor	Unlikely	Very Low		
	Minor		Unlikely	Very Low			
	R2. Adjacent Site Users	P3. Inhalation of Fugitive Dust	Medium	Low	Moderate		
			R3. Controlled Waters	P4. Leaching and Vertical / Lateral Migration of Contaminants	Severe		Likely
	R4. Site Infrastructure	P1. Direct Contact	Mild	Likely	Moderate / Low		
R5. Marine Ecology	Severe		Likely	High			
	P2. Ingestion	Severe	Likely	High			

1. Hazard Identification		2. Hazard Assessment		3. Risk Estimation		4. Risk Evaluation	5. Managing the Risks
Contaminant Source	Receptor	Pathway	Consequence of Risk Being Realised	Probability of Risk Being Realised	Classification	Discussion / Action Required	
		P4. Leaching and Vertical / Lateral Migration of Contaminants	Severe	Likely	High		
<b>S2. Potentially Contaminated Silt</b>	R3. Controlled Waters	P4. Leaching and Vertical / Lateral Migration of Contaminants	Severe	Likely	High		
	R4. Site Infrastructure	P1. Direct Contact	Mild	Low	Low		
	R5. Marine Ecology		Severe	Likely	High		
		P2. Ingestion	Severe	Likely	High		
		P4. Leaching and Vertical / Lateral Migration of Contaminants	Severe	Likely	High		



## **2.20 Potential Waste and Sustainability Considerations**

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**2.20.1** Surplus soils may be generated during the Scheme construction works. It is possible that these would need to be disposed of offsite to a suitably licensed facility if they cannot be proven to meet the requirements for re-use within The Scheme under a Materials Management Plan (to be secured as part of a CoCP (document reference 6.16) under Requirement 5 of the DCO (document reference 3.1).

## **2.21 Safety, Health and Environmental Considerations**

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**2.21.1** With respect to any further ground investigation, the Study Area should be classified in accordance with the “Guideline Notes for the Safe Investigation by Drilling of Landfills and Contaminated Land” (Ref 16B.7). This document makes recommendations for carrying out site investigation on landfills and potentially contaminated ground. Appendix IV of the guidance sets out a record of assessment for potentially contaminated sites, to be completed as part of the ground investigation contract.

**2.21.2** Site personnel involved with any intrusive works, including site investigations, construction or maintenance works should be appropriately qualified with experience of working on potentially contaminated sites. Those working in close proximity to fill materials should wear appropriate personal protective equipment. A reasonable standard of hygiene should be maintained.

## **2.22 Ground Investigation**

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**2.22.1** A ground investigation was recommended in the July 2017 version of this report. This was subsequently undertaken in 2017 / 2018 to inform the baseline assessment for the Geology and Soils Chapter 16 of the Environmental Statement (document reference 6.1). The ground investigation included sampling and chemical testing of the major strata encountered together with gas and groundwater monitoring. The findings are presented in the Interpretative Environmental Ground Investigation Report dated March 2019 presented as Appendix 16C of the Environmental Statement.

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## 3 Conclusions

### 3.1 Key Findings

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- 3.1.1 The desk study has indicated that the Study Area was reasonably well developed by the late 1800's with some residential properties but mostly commercial / industrial development, particularly the area immediately bounding the River Yare.
- 3.1.2 The Study Area is expected to be underlain by demolition and fill material which could be contaminated. Ground gas / landfill gas may be generated by the fill material and could migrate to impact adjacent site users and infrastructure.
- 3.1.3 From the information reviewed above, contaminated made ground is expected but is unlikely to be sufficiently contaminated or sufficiently widespread to pose a significant constraint for an infrastructure project such as this.
- 3.1.4 Due to the potential for contaminated made ground and / or silts to be present within the Study Area derived from a variety of former industrial uses, the potential for environmental liabilities are considered to be; **high** for controlled waters and marine ecology receptors and in the range **Moderate** to **Very Low** for site users, adjacent site users and infrastructure receptors. The high risks are associated with the controlled waters and marine ecology receptors. It is unknown if historic remedial works occurred during redevelopment at any of the potentially contaminative sites such as the iron works or the gas works and this could reduce the potential for environmental liabilities.

## 4 Limitations

- 4.1.1 Only publicly accessible areas were assessed during the walkover.
- 4.1.2 This report is presented to Norfolk County Council in respect of the Scheme and may not be used or relied on by any other person or by the client in relation to any other matters not covered specifically by the scope of this Report.
- 4.1.3 Notwithstanding anything to the contrary contained in the report, WSP Limited is obliged to exercise reasonable skill, care and diligence in the performance of the services required by Norfolk County Council and WSP Limited shall not be liable except to the extent that it has failed to exercise reasonable skill, care and diligence, and this report shall be read and construed accordingly.
- 4.1.4 This report has been prepared by WSP Limited. No individual is personally liable in connection with the preparation of this report. By receiving this report and acting on it, the client or any other person accepts that no individual is personally liable whether in contract, tort, for breach of statutory duty or otherwise.
- 4.1.5 The brief includes an assessment of the previous site usage by review of the sources identified in this report. These effectively provide snapshots of the site through time and although a consistent sequence of site usage has been deduced from these records, the possibility of some activity carried out on the site not being identified on these records cannot be excluded.
- 4.1.6 New information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

## 5 References

- Ref 16B.1: The Environment Act (1995). The Stationary Office 1995  
[https://www.legislation.gov.uk/ukpga/1995/25/pdfs/ukpga\\_19950025\\_en.pdf](https://www.legislation.gov.uk/ukpga/1995/25/pdfs/ukpga_19950025_en.pdf)
- Ref 16B.2: The Environment Protection Act (1990). The Stationary Office 1990  
[https://www.legislation.gov.uk/ukpga/1990/43/pdfs/ukpga\\_19900043\\_en.pdf](https://www.legislation.gov.uk/ukpga/1990/43/pdfs/ukpga_19900043_en.pdf)
- Ref 16B.3: Ministry of Housing, Communities & Local Government (2019). National Planning Policy Framework.
- Ref 16B.4: The Environment Agency (2004). Model Procedures for the Management of Land Contamination. Contaminated Land Report 11.
- Ref 16B.5: CIRIA (2001). Contaminated Land Risk Assessment – A guide to good practice. C552.
- Ref 16B.6: The Construction (Design & Management) Regulations (2015). The Stationary Office 2015.  
[http://www.legislation.gov.uk/uksi/2015/51/pdfs/uksi\\_20150051\\_en.pdf](http://www.legislation.gov.uk/uksi/2015/51/pdfs/uksi_20150051_en.pdf)
- Ref 16B.7: Site investigation in Construction (1993). Guidelines for the Safe Investigation by Drilling of Landfills and Contaminated Land (Site Investigation in Construction) Pt.4. Institute of Civil Engineers.

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## Annex A: Photographs

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GREAT YARMOUTH THIRD CROSSING  
PHOTOGRAPH LOG

Photograph 1 – Barrack Road Gasworks



Photograph 2 – Barrack Road Gasworks





GREAT YARMOUTH THIRD CROSSING  
PHOTOGRAPH LOG

Photograph 3 – Electricity Substation on Southgates Road



Photograph 4 – Residential Properties on Admiralty Road



GREAT YARMOUTH THIRD CROSSING  
PHOTOGRAPH LOG

Photograph 5 – ASCO Ltd storage tanks



Photograph 6 – Commercial Industrial properties on Southgates Road





GREAT YARMOUTH THIRD CROSSING  
PHOTOGRAPH LOG

Photograph 7 – Entrance to quayside properties off South Denes Road



Photograph 8 – Access to Butler Fuels and quayside properties from South Denes Road



GREAT YARMOUTH THIRD CROSSING  
PHOTOGRAPH LOG

Photograph 9 – Quayside adjacent to Southtown Road



Photograph 10 – Peterson Ltd storage yard off South Denes Road with gasholder beyond.





GREAT YARMOUTH THIRD CROSSING  
PHOTOGRAPH LOG

Photograph 11 – Southtown common recreation ground



Photograph 12 – Salthouse Lane



GREAT YARMOUTH THIRD CROSSING  
PHOTOGRAPH LOG

Photograph 13 – Residential properties and MIND allotments adjacent to William Adams Way



Photograph 14 – William Adams Way





GREAT YARMOUTH THIRD CROSSING  
PHOTOGRAPH LOG

Photograph 15 – Roundabout – Junction of William Adams Way and A47.



Photograph 16 – Queen Anne's Road

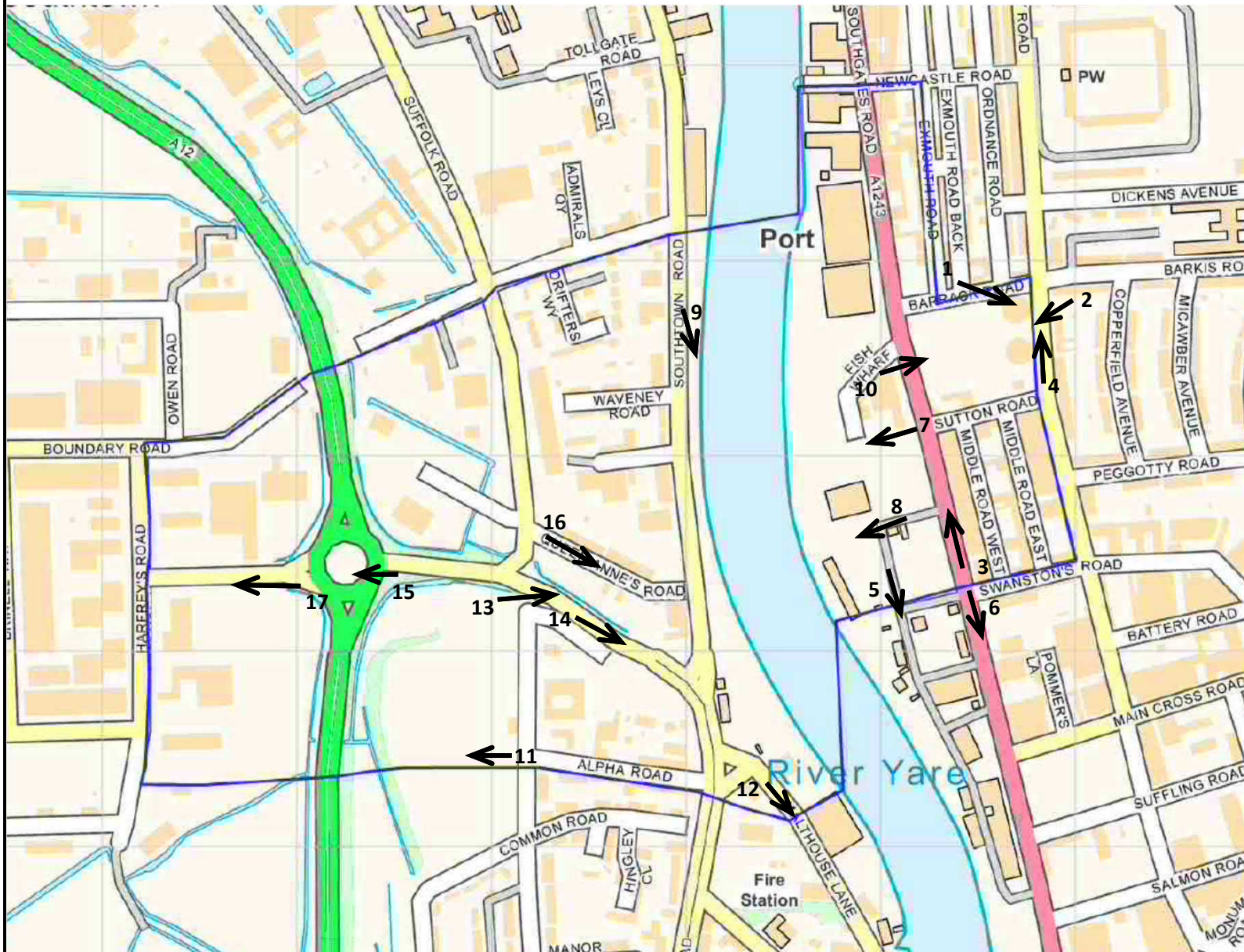



GREAT YARMOUTH THIRD CROSSING  
PHOTOGRAPH LOG

Photograph 17 – William Adams Way







 STUDY AREA BOUNDARY

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DATE: 24/7/17	AS-BUILT	
SUITABILITY		

CLIENT



AGENT



SCHEME NAME  
Great Yarmouth Third Crossing

DRAWING TITLE  
Photograph Location Drawing

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SCHEME REF No. 62230375

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PROJECT	ORIGINATOR	A
		VOLUME

LOCATION	TYPE	ROLE	NUMBER
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## Annex B: Groundsure Report

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CENTREMAPS  
Open Space, Upper Interfields,  
Worcester, WR14 1UT

Groundsure Reference: CMAPS-CM-636391-16287-030717EDR

Your Reference: 16287

Report Date 3 Jul 2017

Report Delivery Method: Email - pdf

## Enviro Insight

Address: ,

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

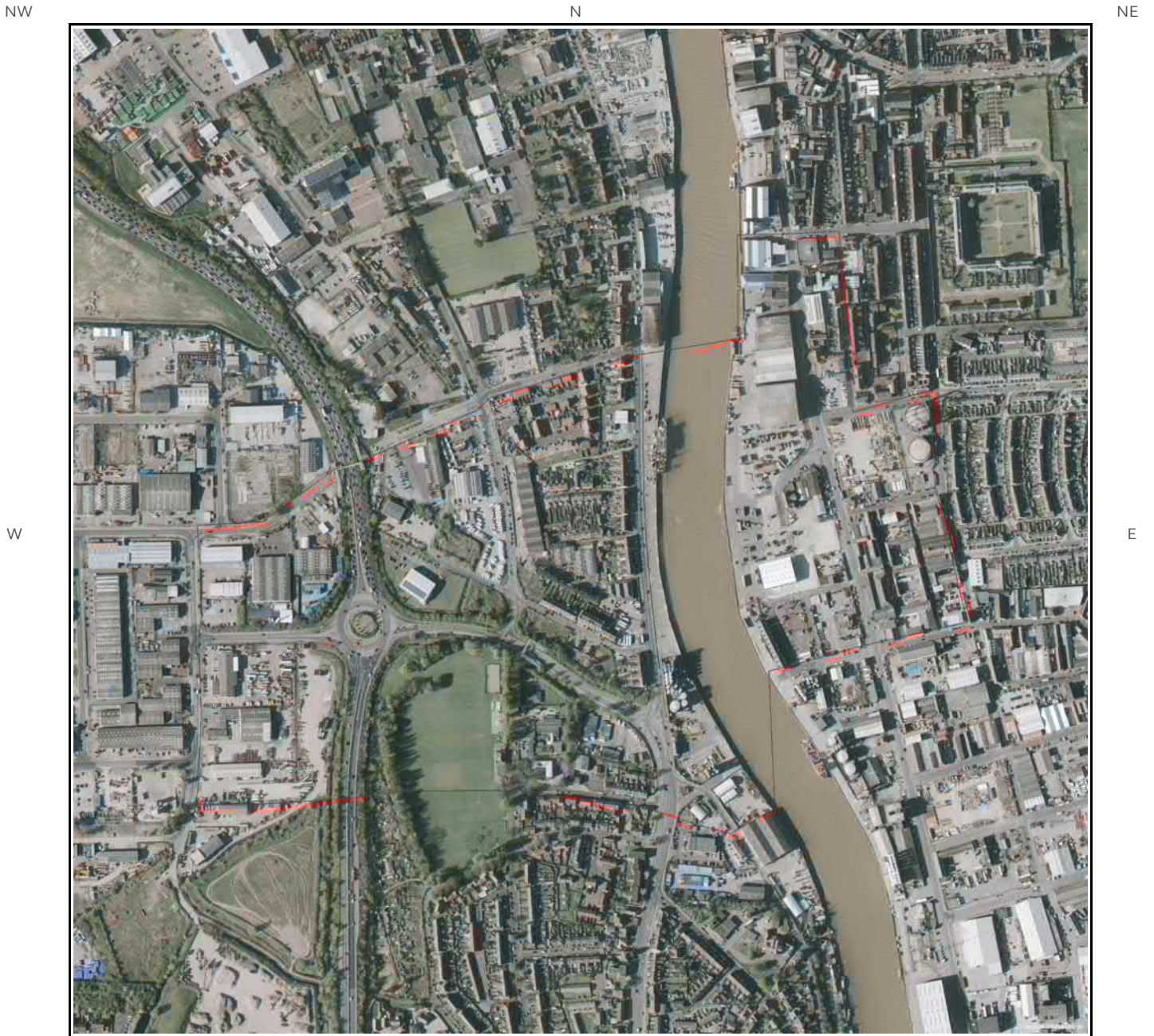
If you need any further assistance, please do not hesitate to contact our helpline on 01886 832972 quoting the above CENTREMAPS reference number.

Yours faithfully,

CENTREMAPS

Enc.  
Groundsure Enviroinsight

Address: ,  
Date: 3 Jul 2017  
Reference: CMAPS-CM-636391-16287-030717EDR  
Client: CENTREMAPS



Aerial Photograph Capture date: 16-Apr-2014  
Grid Reference: 652320,306005  
Site Size: 43.58ha

Report Reference: CMAPS-CM-636391-16287-030717EDR  
Client Reference: 16287

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# Overview of Findings

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<b>Section 1: Historical Industrial Sites</b>	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	104	25	64	92
1.2 Additional Information – Historical Tank Database	176	28	71	93
1.3 Additional Information – Historical Energy Features Database	92	33	37	53
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	28	2	30	8
1.6 Potentially Infilled Land	23	2	18	38

<b>Section 2: Environmental Permits, Incidents and Registers</b>	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	21	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	1	0	0	1
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	2	2	5
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	3	2	5	6
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	1	0
2.1.8 Records of Licensed Discharge Consents	15	3	8	15
2.1.9 Records of Water Industry Referrals	2	1	1	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	1	0	1	0
2.2 Records of COMAH and NIHHS sites	2	1	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	3	0	1	9
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
<b>3.1 Landfill Sites</b>						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	1	0	1
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
<b>3.2 Landfill and Other Waste Sites Findings</b>						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	2	0	11	1	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	2	3	15	5	5	5

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	106	47	167	Not searched
4.2 Records of Petrol and Fuel Sites	2	0	0	1
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	Yes
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m					
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes					
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	1	0	0	1
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	1	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	2	0	0	1	Not searched	Not searched

## Section 6: Hydrogeology and Hydrology

0-500m

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	No	No	No	No
6.10 Detailed River Network entries within 500m of the site	1	0	0	0	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	Yes	Yes	Not searched	Not searched	Not searched

## Section 7: Flooding

7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	Yes					
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	Yes					
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	High					
7.4 Are there any Flood Defences within 250m of the study site?	No					
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No					
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No					
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Limited potential					
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Low					

## Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	3
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	1	0	1
8.5 Records of Ramsar sites	0	0	0	0	0	1
8.6 Records of Ancient Woodlands	0	0	0	0	0	0
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	1
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	1	0	1



Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	1	1
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	1	0	0	0	0	1
8.14 Records of Green Belt land	0	0	0	0	0	0

## Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	High
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Low
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	High
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
9.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Moderate
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

## Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?	No
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	No
10.3 Are there any brine affected areas within 75m of the study site?	No

# Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

## 1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

## 2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

## 3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

## 4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

## 5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

## 6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

## 7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

## 8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

## 9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

## 10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

## 11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

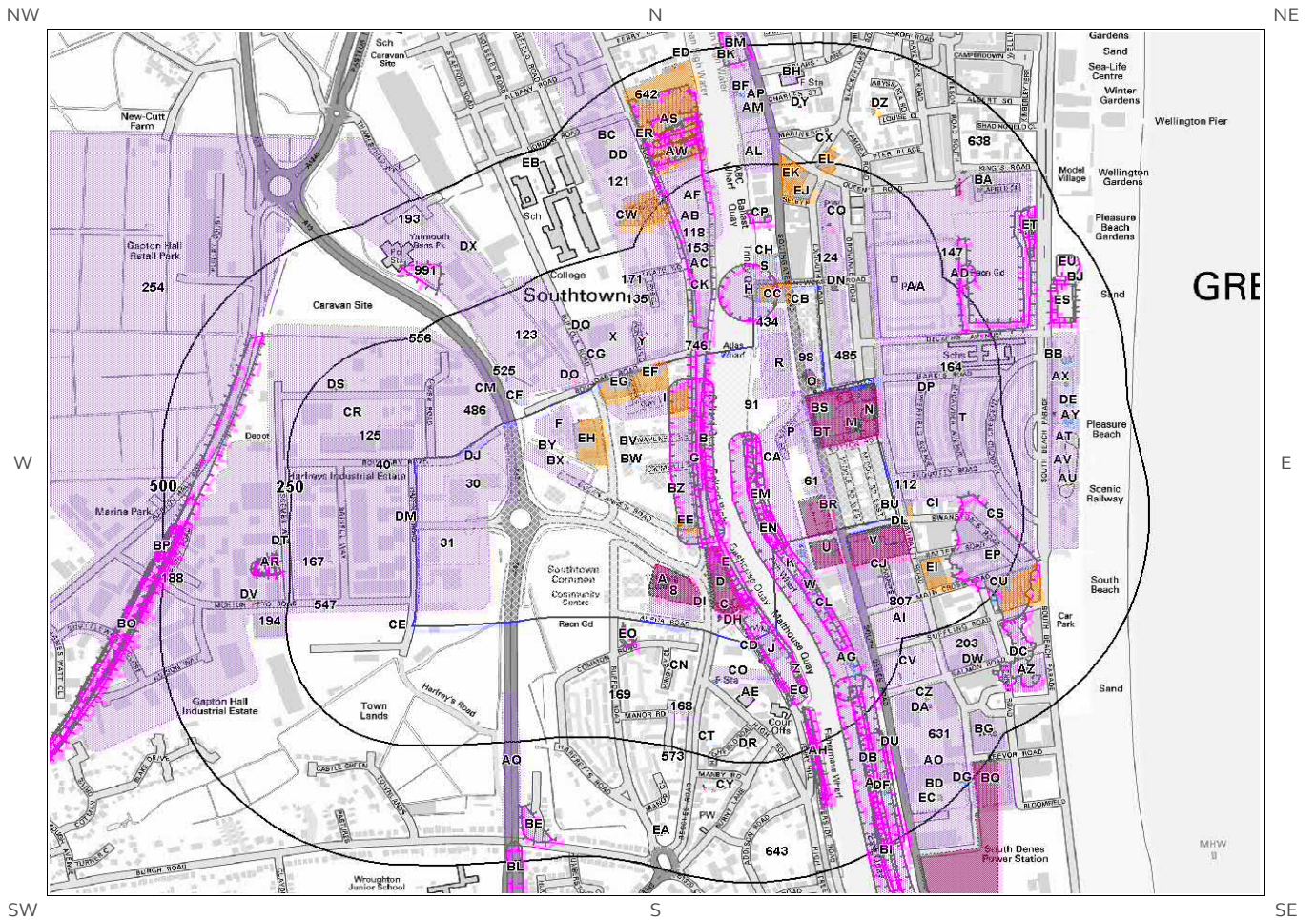
### Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

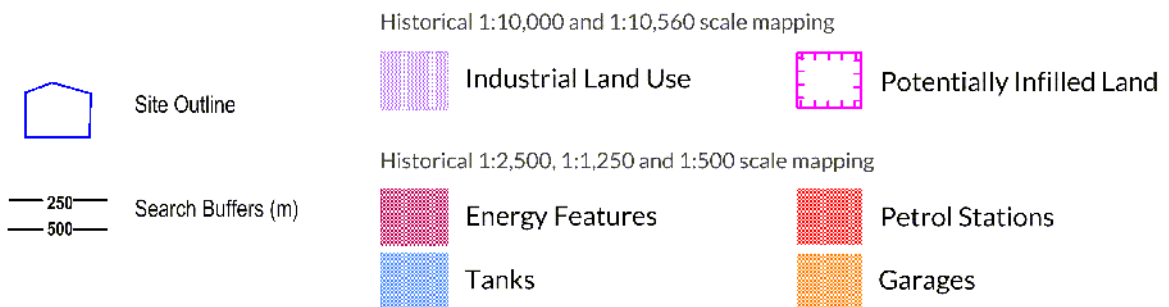
Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

# 1. Historical Land Use



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# 1. Historical Industrial Sites

## 1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 285

ID	Distance [m]	Direction	Use	Date
1F	0	On Site	Unspecified Depot	1978
2BX	0	On Site	Sawmills	1904
3A	0	On Site	Unspecified Tank	1952
4A	0	On Site	Unspecified Tank	1978
5A	0	On Site	Unspecified Tank	1988
6A	0	On Site	Unspecified Tank	1938
7A	0	On Site	Gasometer	1904
8	0	On Site	Unspecified Commercial/Industrial	1978
9B	0	On Site	Quay	1978
10B	0	On Site	Quay	1988
11B	0	On Site	Quay	1952
12C	0	On Site	Unspecified Tank	1952
13C	0	On Site	Unspecified Tank	1884
14C	0	On Site	Unspecified Tanks	1946
15C	0	On Site	Gasometer	1904
16C	0	On Site	Unspecified Tanks	1938
17D	0	On Site	Unspecified Commercial/Industrial	1938
18C	0	On Site	Gasometer	1884
19D	0	On Site	Gas Works	1904
20D	0	On Site	Unspecified Commercial/Industrial	1946
21C	0	On Site	Unspecified Tank	1952
22D	0	On Site	Unspecified Commercial/Industrial	1952
23D	0	On Site	Gas Works	1884
24D	0	On Site	Quay	1904
25D	0	On Site	Quay	1946
26E	0	On Site	Quay	1988
27E	0	On Site	Quay	1978
28F	0	On Site	Unspecified Depot	1988
29I	0	On Site	Iron Works	1884
30	0	On Site	Unspecified Factory	1978
31	0	On Site	Unspecified Works	1978
32A	0	On Site	Gas Holder Station	1988



33EN	0	On Site	Unspecified Wharf	1988
34D	0	On Site	Quay	1938
35B	0	On Site	Quay	1938
36D	0	On Site	Quay	1938
37B	0	On Site	Quay	1938
38G	0	On Site	Quay	1946
39G	0	On Site	Quay	1904
40	0	On Site	Industrial Estate	1988
41H	0	On Site	Quay	1978
42H	0	On Site	Quay	1988
43I	0	On Site	Iron Works	1901
44C	0	On Site	Gasometers	1901
45D	0	On Site	Gas Works	1901
46J	0	On Site	Quay	1938
47J	0	On Site	Quay	1938
48J	0	On Site	Malthouses	1884
49J	0	On Site	Unspecified Works	1988
50J	0	On Site	Quay	1978
51J	0	On Site	Malthouse	1904
52J	0	On Site	Malthouse	1946
53K	0	On Site	Unspecified Wharf	1946
54K	0	On Site	Unspecified Wharf	1904
55K	0	On Site	Fish Wharf	1938
56L	0	On Site	Railway Sidings	1938
57DK	0	On Site	Unspecified Wharf	1978
58L	0	On Site	Railway Sidings	1904
59L	0	On Site	Railway Sidings	1946
60BR	0	On Site	Railway Sidings	1946
61	0	On Site	Unspecified Depot	1988
62EM	0	On Site	Unspecified Wharf	1884
63M	0	On Site	Unspecified Tank	1946
64M	0	On Site	Gasometer	1904
65M	0	On Site	Unspecified Tank	1938
66M	0	On Site	Unspecified Tank	1952
67M	0	On Site	Unspecified Tank	1884
68M	0	On Site	Gasometer	1901
69M	0	On Site	Unspecified Commercial/Industrial	1946
70M	0	On Site	Gas Works	1904
71N	0	On Site	Unspecified Tank	1988
72N	0	On Site	Unspecified Tank	1978
73M	0	On Site	Unspecified Commercial/Industrial	1938
74P	0	On Site	Unspecified Depot	1988
75M	0	On Site	Gas Works	1884
76M	0	On Site	Unspecified Commercial/Industrial	1952

77M	0	On Site	Gas Works	1901
78M	0	On Site	Unspecified Depot	1988
79M	0	On Site	Gas Holder Station	1978
80O	0	On Site	Unspecified Tanks	1946
81O	0	On Site	Gasometers	1904
82P	0	On Site	Railway Sidings	1952
83P	0	On Site	Railway Sidings	1978
84O	0	On Site	Unspecified Tanks	1938
85O	0	On Site	Unspecified Tank	1952
86O	0	On Site	Unspecified Tank	1952
87O	0	On Site	Gasometer	1884
88O	0	On Site	Gasometer	1901
89O	0	On Site	Unspecified Tank	1988
90O	0	On Site	Unspecified Tank	1978
91	0	On Site	Ice House	1901
92Q	0	On Site	Unspecified Tank	1904
93Q	0	On Site	Unspecified Tank	1946
94Q	0	On Site	Unspecified Tank	1938
95Q	0	On Site	Unspecified Tank	1884
96Q	0	On Site	Unspecified Tanks	1901
97Q	0	On Site	Unspecified Tank	1884
98	0	On Site	Unspecified Commercial/Industrial	1901
99R	0	On Site	Unspecified Warehouse	1978
100R	0	On Site	Boat Building Yard	1884
101R	0	On Site	Unspecified Warehouse	1988
102R	0	On Site	Boat Building Yards	1901
103J	0	On Site	Malthouses	1901
104S	0	N	Unspecified Stores	1901
105S	2	N	Unspecified Stores	1884
106DN	3	N	Rope Walk	1901
107T	5	E	Militia Barracks	1901
108N	5	E	Drill Shed	1901
109W	6	E	Unspecified Commercial/Industrial	1988
110T	7	E	Barracks	1904
111N	7	E	Drill Shed	1884
112	8	E	Hospital	1904
113U	10	S	Unspecified Works	1978
114U	10	S	Unspecified Works	1988
115X	10	N	Timber Yard	1988
116V	11	S	Unspecified Commercial/Industrial	1946
117V	12	S	Unspecified Depot	1978
118	12	N	Unspecified Mill	1952
119V	13	S	Unspecified Commercial/Industrial	1938

120V	15	S	Unspecified Works	1952
121	16	N	Barracks	1901
122CJ	17	S	Electric Works	1904
123	18	NW	Unspecified Depot	1978
124	20	E	Rope Walk	1884
125	25	N	Unspecified Warehouses	1978
126W	42	E	Fish Wharf	1952
127X	42	N	Engine House	1904
128Y	42	N	Engine House	1946
129Y	45	N	Engine House	1938
130AB	52	N	Dock	1946
131CO	53	S	Malthouse	1978
132CK	55	N	Sawmills	1884
133W	67	E	Railway Sidings	1884
134W	70	E	Unspecified Tank	1988
135	70	N	Rope Walk	1901
136Z	73	SE	Quay	1946
137Z	73	SE	Quay	1904
138AA	76	N	Hospital	1904
139AA	76	N	Hospital	1946
140AA	79	N	Hospital	1938
141AC	79	W	Sawmills	1904
142CL	80	E	Unspecified Tanks	1988
143AB	81	W	Sawmills	1938
144AC	81	W	Sawmills	1946
145AC	81	W	Sawmills	1901
146AA	81	N	Hospital	1884
147	82	N	Naval Hospital	1901
148AD	84	N	Hospital	1988
149AD	84	N	Hospital	1978
150AD	84	N	Hospital	1952
151AE	98	S	Fire Station	1978
152AE	98	S	Fire Station	1988
153	99	NW	Timber Yard	1884
154AC	100	NW	Timber Yard	1901
155AF	100	NW	Timber Shed	1978
156AF	100	NW	Timber Shed	1988
157AB	108	NW	Timber Yard	1904
158EP	117	E	Sand Pit	1884
159AG	119	E	Unspecified Commercial/Industrial	1988
160AB	121	NW	Timber Yard	1901
161EQ	124	SE	Quay	1988
162CP	127	N	Dry Docks	1904
163AB	130	NW	Timber Yard	1884
164	131	E	Barracks	1884

165AQ	146	S	Railway Sidings	1938
166AG	150	SE	Unspecified Tanks	1988
167	158	W	Unspecified Warehouses	1978
168	160	S	Corn Mill	1884
169	162	S	Corn Windmill	1901
170AJ	164	SE	Quay	1946
171	167	N	Rope Walk	1884
172AH	169	SE	Quay	1978
173AH	169	SE	Quay	1988
174AH	170	SE	Unspecified Quay	1901
175AH	172	SE	Quay	1904
176AH	172	SE	Quay	1946
177AF	174	NW	Boat Building Yard	1901
178AI	175	S	Unspecified Depot	1988
179AI	175	S	Unspecified Factory	1978
180AF	185	NW	Boat Building Yard	1884
181DB	188	SE	Quay	1978
182AJ	188	SE	Quay	1952
183AK	203	NE	Unspecified Ground Workings	1938
184AK	203	NE	Unspecified Ground Workings	1938
185CV	205	E	Unspecified Depot	1988
186AH	230	SE	Quay	1938
187AH	230	SE	Quay	1938
188	236	W	Industrial Estate	1988
189AL	239	N	Timber Yard	1901
190AW	240	NW	Unspecified Commercial/Industrial	1901
191AL	240	N	Timber Yard	1884
192AD	249	NE	Unspecified Pit	1901
193	250	N	Unspecified Depot	1978
194	252	W	Unspecified Warehouse	1978
195AM	258	N	Unspecified Commercial/Industrial	1988
196AM	258	N	Unspecified Commercial/Industrial	1978
197AN	259	N	Railway Sidings	1978
198AN	259	N	Railway Sidings	1988
199AO	261	SE	Unspecified Factory	1988
200AO	261	SE	Unspecified Factory	1978
201AP	264	N	Railway Sidings	1988
202AP	264	N	Railway Sidings	1978
203	266	S	Unspecified Factory	1952
204AR	269	W	Unspecified Pit	1901
205AQ	270	S	Railway Station	1938
206AQ	271	S	Railway Station	1946



207AQ	271	S	Railway Station	1904
208DF	277	SE	Quay	1988
209AR	279	W	Unspecified Pit	1884
210AR	280	W	Unspecified Pit	1904
211AR	280	W	Unspecified Pit	1946
212AR	291	W	Unspecified Heap	1938
213AR	291	W	Unspecified Heap	1938
214AS	295	N	Dry Dock	1988
215AS	295	N	Dry Dock	1978
216DU	296	SE	Paddock	1901
217AR	298	W	Unspecified Pit	1952
218AT	301	E	Unspecified Commercial/Industrial	1952
219AT	301	E	Unspecified Commercial/Industrial	1988
220AT	301	E	Unspecified Commercial/Industrial	1978
221AV	302	E	Railway Sidings	1946
222DC	303	SE	Refuse Heap	1884
223AU	311	E	Railway Sidings	1988
224AU	311	E	Railway Sidings	1978
225AV	311	E	Railway Sidings	1952
226AS	316	N	Dry Docks	1938
227AS	316	N	Dry Docks	1938
228AW	317	NW	Ice House	1901
229AS	329	N	Dry Docks	1904
230AS	329	N	Dry Docks	1946
231AX	332	E	Railway Sidings	1938
232AX	332	E	Unspecified Commercial/Industrial	1938
233AS	345	N	Unspecified Works	1952
234BB	351	E	Unspecified Tank	1938
235AS	362	NW	Timber Yard	1884
236AS	364	NW	Timber Yard	1901
237BP	367	W	Cuttings	1884
238AY	371	E	Unspecified Tank	1978
239AY	371	E	Unspecified Tank	1988
240BA	371	NE	Telegraph House	1901
241AZ	373	SE	Unspecified Works	1952
242AZ	373	SE	Unspecified Works	1978
243AZ	373	SE	Unspecified Works	1988
244BA	374	NE	Telegraph House	1884
245BB	375	E	Unspecified Tanks	1978
246BB	375	E	Unspecified Tanks	1988
247BC	378	NW	Unspecified Works	1978
248BC	378	NW	Unspecified Works	1988
249BD	379	SE	Ice Factory	1946

250BD	380	SE	Unspecified Factory	1952
251BD	381	SE	Ice Factory	1938
252BE	382	S	Unspecified Pit	1904
253BE	382	S	Unspecified Pit	1946
254	387	W	Marshes	1901
255BK	390	N	Railway Sidings	1884
256BF	394	N	Unspecified Tanks	1988
257BF	394	N	Unspecified Tanks	1978
258ET	397	NE	Unspecified Heap	1952
259BG	416	SE	Unspecified Works	1988
260BG	416	SE	Unspecified Works	1978
261BH	418	N	Fire Station	1978
262BH	418	N	Fire Station	1988
263BI	436	SE	Quay	1938
264BI	436	SE	Quay	1938
265BO	436	W	Cuttings	1901
266BJ	442	NE	Boat House	1938
267BJ	444	NE	Boat House	1946
268BK	448	N	Railway Sidings	1988
269BK	448	N	Railway Sidings	1978
270BM	448	N	Railway Sidings	1938
271BL	458	S	Unspecified Heap	1978
272BL	458	S	Unspecified Heap	1988
273BN	461	N	Quay	1904
274BM	461	N	Railway Sidings	1946
275BN	461	N	Quay	1946
276BM	461	N	Railway Sidings	1904
277BO	463	W	Cuttings	1938
278BO	464	W	Cuttings	1904
279BO	464	W	Cuttings	1946
280BP	469	W	Cuttings	1952
281BQ	474	SE	Net Works	1946
282BQ	475	SE	Net Works	1938
283BK	476	N	Railway Building	1938
284BQ	477	SE	Unspecified Works	1952
285BO	496	W	Cuttings	1952

## 1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary:

368

ID	Distance (m)	Direction	Use	Date
286BR	0	On Site	Tanks	1949
287BR	0	On Site	Tanks	1949
288M	0	On Site	Unspecified Tank	1927
289O	0	On Site	Unspecified Tank	1927
290O	0	On Site	Unspecified Tank	1949
291O	0	On Site	Unspecified Tank	1949
292O	0	On Site	Unspecified Tank	1966
293M	0	On Site	Unspecified Tank	1949
294M	0	On Site	Unspecified Tank	1949
295M	0	On Site	Unspecified Tank	1963
296M	0	On Site	Unspecified Tank	1927
297M	0	On Site	Unspecified Tank	1966
298M	0	On Site	Tanks	1949
299M	0	On Site	Tanks	1963
300M	0	On Site	Tanks	1949
301O	0	On Site	Gasometer	1887
302O	0	On Site	Unspecified Tank	1927
303O	0	On Site	Gasometer	1966
304O	0	On Site	Gasometer	1949
305O	0	On Site	Gasometer	1949
306O	0	On Site	Gasometer	1963
307O	0	On Site	Unspecified Tank	1927
308N	0	On Site	Tanks	1966
309N	0	On Site	Unspecified Tank	1966
310M	0	On Site	Gasometer	1887
311M	0	On Site	Unspecified Tank	1927
312M	0	On Site	Gasometer	1949
313M	0	On Site	Gasometer	1966
314M	0	On Site	Gasometer	1949
315M	0	On Site	Gasometer	1963
316M	0	On Site	Unspecified Tank	1927
317M	0	On Site	Unspecified Tank	1949
318M	0	On Site	Unspecified Tank	1963
319M	0	On Site	Unspecified Tank	1949
320N	0	On Site	Unspecified Tank	1949
321BT	0	On Site	Unspecified Tank	1966
322Q	0	On Site	Unspecified Tank	1966
323BS	0	On Site	Unspecified Tank	1966
324Q	0	On Site	Unspecified Tank	1927
325Q	0	On Site	Gasometers	1887
326L	0	On Site	Unspecified Tank	1949

327L	0	On Site	Unspecified Tank	1957
328L	0	On Site	Unspecified Tank	1949
329Q	0	On Site	Unspecified Tank	1966
330BS	0	On Site	Unspecified Tank	1963
331BS	0	On Site	Unspecified Tank	1949
332BT	0	On Site	Unspecified Tank	1949
333BT	0	On Site	Unspecified Tank	1963
334BT	0	On Site	Unspecified Tank	1949
335Q	0	On Site	Unspecified Tank	1963
336Q	0	On Site	Unspecified Tank	1949
337BS	0	On Site	Unspecified Tank	1949
338BS	0	On Site	Unspecified Tank	1963
339BS	0	On Site	Unspecified Tank	1949
340Q	0	On Site	Unspecified Tank	1963
341L	0	On Site	Unspecified Tank	1958
342Q	0	On Site	Unspecified Tank	1949
343N	0	On Site	Unspecified Tank	1963
344N	0	On Site	Unspecified Tank	1949
345O	0	On Site	Unspecified Tank	1927
346O	0	On Site	Gasometer	1966
347O	0	On Site	Gasometer	1949
348BS	0	On Site	Gas Works	1887
349O	0	On Site	Gas Holder	1996
350O	0	On Site	Gasometer	1963
351O	0	On Site	Gasometer	1949
352M	0	On Site	Gasometer	1966
353M	0	On Site	Gas Holder	1996
354N	0	On Site	Unspecified Tank	1949
355N	0	On Site	Unspecified Tank	1963
356BS	0	On Site	Gas Works	1963
357N	0	On Site	Gas Holder Station	1996
358BS	0	On Site	Gas Works	1949
359M	0	On Site	Gas Works	1966
360BU	0	On Site	Unspecified Tank	1968
361BU	0	On Site	Unspecified Tank	1968
362Q	0	On Site	Unspecified Tank	1949
363Q	0	On Site	Unspecified Tank	1949
364BS	0	On Site	Gas Works	1949
365N	0	On Site	Unspecified Tank	1949
366E	0	On Site	Unspecified Tank	1990
367BZ	0	On Site	Unspecified Tank	1990
368BW	0	On Site	Tanks	1990
369BV	0	On Site	Unspecified Tank	1990
370BV	0	On Site	Unspecified Tank	1990
371BW	0	On Site	Tanks	1990
372N	0	On Site	Gas Holder Station	1984

373M	0	On Site	Gas Holder	1984
374O	0	On Site	Gas Holder	1984
375N	0	On Site	Gas Holder Station	1990
376O	0	On Site	Gas Holder	1990
377M	0	On Site	Gas Holder	1990
378Q	0	On Site	Gasometers	1883
379O	0	On Site	Gasometer	1883
380O	0	On Site	Gas Works	1883
381M	0	On Site	Gasometer	1883
382O	0	On Site	Unspecified Tank	1905
383M	0	On Site	Unspecified Tank	1905
384BX	0	On Site	Unspecified Tank	1949
385BX	0	On Site	Unspecified Tank	1951
386BX	0	On Site	Unspecified Tank	1963
387BY	0	On Site	Unspecified Tank	1949
388BY	0	On Site	Unspecified Tank	1951
389BY	0	On Site	Unspecified Tank	1963
390BX	0	On Site	Unspecified Tank	1963
391BX	0	On Site	Unspecified Tank	1949
392BX	0	On Site	Unspecified Tank	1951
393BV	0	On Site	Unspecified Tank	1996
394BV	0	On Site	Unspecified Tank	1975
395BW	0	On Site	Tanks	1996
396BW	0	On Site	Tanks	1975
397A	0	On Site	Gasholder	1949
398A	0	On Site	Unspecified Tank	1958
399A	0	On Site	Gasholder	1968
400A	0	On Site	Unspecified Tank	1927
401A	0	On Site	Gasholder	1949
402A	0	On Site	Gasholder	1976
403A	0	On Site	Gasholder	1967
404BZ	0	On Site	Unspecified Tank	1976
405BZ	0	On Site	Unspecified Tank	1996
406E	0	On Site	Unspecified Tank	1968
407E	0	On Site	Unspecified Tank	1967
408E	0	On Site	Unspecified Tank	1996
409E	0	On Site	Unspecified Tank	1949
410E	0	On Site	Unspecified Tank	1949
411D	0	On Site	Tanks	1949
412D	0	On Site	Tanks	1949
413E	0	On Site	Unspecified Tank	1968
414E	0	On Site	Unspecified Tank	1967
415D	0	On Site	Unspecified Tank	1968
416D	0	On Site	Unspecified Tank	1967
417C	0	On Site	Gasometer	1949
418D	0	On Site	Unspecified Tank	1968

419D	0	On Site	Unspecified Tank	1967
420C	0	On Site	Tanks	1927
421C	0	On Site	Gasometers	1887
422D	0	On Site	Gas Works	1887
423C	0	On Site	Gasometer	1949
424C	0	On Site	Tanks	1958
425C	0	On Site	Gasometers	1949
426C	0	On Site	Gasometers	1968
427C	0	On Site	Gasometers	1967
428D	0	On Site	Gas Works	1949
429D	0	On Site	Gas Works	1968
430D	0	On Site	Gas Works	1949
431D	0	On Site	Gas Works	1967
432H	0	On Site	Unspecified Tank	1949
433H	0	On Site	Unspecified Tank	1963
434	0	On Site	Unspecified Tank	1966
435CA	0	On Site	Unspecified Tank	1949
436CA	0	On Site	Unspecified Tank	1966
437CA	0	On Site	Unspecified Tank	1963
438CA	0	On Site	Unspecified Tank	1949
439CB	0	On Site	Unspecified Tank	1963
440BR	0	On Site	Unspecified Tank	1949
441BR	0	On Site	Unspecified Tank	1958
442BR	0	On Site	Unspecified Tank	1957
443BR	0	On Site	Unspecified Tank	1949
444BY	0	On Site	Unspecified Tank	1949
445BX	0	On Site	Unspecified Tank	1949
446BX	0	On Site	Unspecified Tank	1949
447CB	0	On Site	Unspecified Tank	1949
448BZ	0	On Site	Unspecified Tank	1986
449A	0	On Site	Gas Holder Station	1986
450A	0	On Site	Gas Holder	1986
451BW	0	On Site	Tanks	1986
452BV	0	On Site	Unspecified Tank	1986
453C	0	On Site	Gasometers	1883
454D	0	On Site	Gas Works	1883
455CB	0	On Site	Unspecified Tank	1927
456CB	0	On Site	Unspecified Tank	1966
457CB	0	On Site	Unspecified Tank	1949
458H	0	On Site	Unspecified Tank	1928
459H	0	On Site	Unspecified Tank	1949
460CC	0	On Site	Unspecified Tank	1928
461CC	0	On Site	Unspecified Tank	1905
462CD	9	S	Unspecified Tank	1968
463CD	10	S	Unspecified Tank	1968
464K	21	S	Tanks	1990

465K	22	S	Tanks	1984
466K	24	S	Tanks	1990
467CE	30	W	Unspecified Tank	1990
468CE	30	W	Unspecified Tank	1985
469CF	30	NW	Tanks	1996
470CF	30	NW	Unspecified Tank	1990
471CF	30	NW	Unspecified Tank	1990
472V	32	S	Unspecified Tank	1949
473V	33	S	Unspecified Tank	1949
474CF	38	NW	Unspecified Tank	1986
475V	38	S	Tanks	1958
476U	39	S	Tanks	1968
477CF	39	NW	Unspecified Tank	1975
478U	39	S	Tanks	1968
479V	39	S	Tanks	1957
480CF	40	NW	Unspecified Tank	1990
481CF	40	NW	Unspecified Tank	1990
482U	40	S	Tanks	1981
483U	40	S	Tanks	1990
484U	40	S	Tanks	1984
485	44	E	Unspecified Tank	1966
486	44	NW	Unspecified Tank	1980
487CG	46	N	Tanks	1996
488CG	47	N	Tanks	1990
489CG	47	N	Tanks	1990
490S	53	N	Tanks	1996
491S	55	N	Tanks	1966
492S	55	N	Tanks	1984
493S	55	N	Tanks	1990
494CH	62	N	Unspecified Tank	1949
495CH	62	N	Unspecified Tank	1949
496CH	62	N	Unspecified Tank	1963
497CI	70	E	Tanks	1949
498CE	70	SW	Unspecified Tank	1964
499CE	70	SW	Unspecified Tank	1955
500CI	70	E	Tanks	1949
501W	71	E	Tanks	1990
502CE	71	SW	Unspecified Tank	1978
503CE	73	SW	Unspecified Tank	1990
504CE	73	SW	Unspecified Tank	1985
505CM	73	NW	Unspecified Tank	1978
506CJ	74	S	Unspecified Tank	1927
507CK	79	W	Tanks	1951
508CK	79	W	Tanks	1963
509CK	80	W	Unspecified Tank	1949
510CK	80	W	Unspecified Tank	1949



511CK	80	W	Unspecified Tank	1949
512CL	80	E	Tanks	1990
513CL	80	E	Tanks	1984
514CM	82	NW	Unspecified Tank	1975
515CJ	87	S	Tanks	1958
516CJ	87	S	Tanks	1968
517CJ	87	S	Tanks	1949
518CJ	87	S	Tanks	1949
519CJ	87	S	Tanks	1968
520CJ	87	S	Tanks	1957
521CN	87	S	Unspecified Tank	1958
522CN	87	S	Unspecified Tank	1949
523CN	88	S	Unspecified Tank	1949
524CO	90	S	Unspecified Tank	1968
525	91	NW	Unspecified Tank	1975
526CO	91	S	Unspecified Tank	1967
527CO	91	S	Unspecified Tank	1976
528CL	94	E	Tanks	1990
529CI	107	E	Unspecified Tank	1957
530CI	107	E	Unspecified Tank	1968
531CI	107	E	Unspecified Tank	1949
532CI	107	E	Unspecified Tank	1949
533CI	107	E	Unspecified Tank	1968
534CI	107	E	Unspecified Tank	1958
535CP	111	N	Unspecified Tank	1949
536CP	112	N	Unspecified Tank	1963
537CP	112	N	Unspecified Tank	1949
538CJ	112	S	Unspecified Tank	1968
539CJ	112	S	Unspecified Tank	1968
540CJ	112	S	Unspecified Tank	1981
541CJ	113	S	Unspecified Tank	1984
542CQ	145	N	Tanks	1966
543CQ	145	N	Tanks	1975
544CR	149	NW	Unspecified Tank	1980
545CR	149	NW	Unspecified Tank	1985
546AG	150	SE	Tanks	1990
547	170	W	Unspecified Tank	1990
548AG	174	SE	Unspecified Tank	1990
549CS	191	E	Unspecified Tank	1981
550CS	191	E	Unspecified Tank	1990
551CS	191	E	Unspecified Tank	1984
552CS	191	E	Unspecified Tank	1968
553CS	192	E	Unspecified Tank	1968
554CT	215	S	Unspecified Tank	1927
555CT	215	S	Unspecified Tank	1905
556	230	NW	Unspecified Tank	1985

557CU	244	SE	Unspecified Tank	1968
558CU	244	SE	Unspecified Tank	1968
559CU	248	SE	Tanks	1968
560CU	248	SE	Tanks	1968
561CU	251	SE	Unspecified Tank	1958
562CU	251	SE	Unspecified Tank	1949
563CU	252	SE	Unspecified Tank	1957
564CU	252	SE	Unspecified Tank	1949
565CV	258	E	Tanks	1981
566CV	259	E	Tanks	1968
567CV	259	E	Tanks	1949
568CV	259	E	Tanks	1958
569CV	259	E	Tanks	1957
570CV	259	E	Tanks	1968
571CV	259	E	Tanks	1949
572CV	260	E	Tanks	1984
573	276	S	Unspecified Tank	1927
574CU	283	SE	Unspecified Tank	1968
575CU	283	SE	Unspecified Tank	1964
576CU	283	SE	Unspecified Tank	1971
577CW	285	NW	Unspecified Tank	1928
578CW	285	NW	Unspecified Tank	1887
579CW	285	NW	Unspecified Tank	1905
580CV	286	E	Unspecified Tank	1958
581CV	286	E	Unspecified Tank	1949
582CV	287	E	Unspecified Tank	1957
583CV	287	E	Unspecified Tank	1949
584CX	292	N	Unspecified Tank	1975
585CX	292	N	Unspecified Tank	1966
586CX	292	N	Unspecified Tank	1990
587CX	292	N	Unspecified Tank	1990
588CY	304	S	Unspecified Tank	1968
589CY	304	S	Unspecified Tank	1972
590CY	304	S	Unspecified Tank	1968
591CY	304	S	Unspecified Tank	1990
592CY	311	S	Unspecified Tank	1949
593CY	314	S	Unspecified Tank	1949
594CY	314	S	Unspecified Tank	1953
595CY	314	S	Tanks	1972
596CZ	321	SE	Unspecified Tank	1981
597CZ	322	SE	Unspecified Tank	1984
598DA	326	SE	Tanks	1967
599DA	326	SE	Tanks	1968
600CZ	328	SE	Unspecified Tank	1981
601CZ	330	SE	Unspecified Tank	1984
602AM	358	N	Tanks	1928

603DB	364	SE	Unspecified Tank	1927
604DB	366	SE	Unspecified Tank	1967
605AY	367	E	Unspecified Tank	1970
606DC	371	SE	Unspecified Tank	1981
607DC	371	SE	Unspecified Tank	1990
608DC	371	SE	Unspecified Tank	1984
609DD	373	NW	Tanks	1968
610DD	374	NW	Tanks	1987
611DD	374	NW	Tanks	1987
612BB	374	E	Unspecified Tank	1963
613BB	374	E	Unspecified Tank	1949
614BB	375	E	Unspecified Tank	1949
615DE	376	E	Unspecified Tank	1949
616AX	376	E	Unspecified Tank	1990
617DE	376	E	Unspecified Tank	1963
618DE	376	E	Unspecified Tank	1949
619AX	377	E	Unspecified Tank	1963
620AX	377	E	Unspecified Tank	1949
621DD	377	NW	Tanks	1968
622DD	377	NW	Tanks	1968
623AX	377	E	Unspecified Tank	1949
624AX	377	E	Unspecified Tank	1970
625BB	388	E	Tanks	1990
626BB	389	E	Unspecified Tank	1970
627BF	392	N	Tanks	1968
628DD	393	NW	Unspecified Tank	1968
629DD	394	NW	Unspecified Tank	1987
630DD	394	NW	Unspecified Tank	1987
631	395	SE	Unspecified Tank	1990
632DF	398	SE	Tanks	1976
633BF	412	N	Unspecified Tank	1987
634BF	412	N	Unspecified Tank	1987
635AJ	416	SE	Tanks	1976
636AJ	416	SE	Tanks	1976
637BF	422	N	Unspecified Tank	1968
638	429	NE	Unspecified Tank	1905
639BH	438	N	Unspecified Tank	1954
640BH	438	N	Unspecified Tank	1966
641BH	439	N	Unspecified Tank	1963
642	439	NW	Unspecified Tank	1968
643	445	S	Unspecified Tank	1905
644BD	467	SE	Unspecified Tank	1949
645EC	467	SE	Unspecified Tank	1949
646BD	468	SE	Tanks	1968
647BD	472	SE	Tanks	1990
648BD	477	SE	Tanks	1949

649BD	478	SE	Tanks	1949
650DG	479	SE	Tanks	1968
651DG	479	SE	Tanks	1967
652BQ	487	SE	Tanks	1967
653ED	493	N	Unspecified Tank	1968

### 1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary:

215

ID	Distance (m)	Direction	Use	Date
654DH	0	On Site	Electricity Substation	1976
655DH	0	On Site	Electricity Substation	1968
656DH	0	On Site	Electricity Substation	1967
657DH	0	On Site	Electricity Substation	1986
658DH	0	On Site	Electricity Substation	1976
659DH	0	On Site	Electricity Substation	1949
660DH	0	On Site	Electricity Substation	1968
661D	0	On Site	Gas Works	1949
662D	0	On Site	Gas Works	1967
663D	0	On Site	Gas Works	1949
664D	0	On Site	Gas Works	1968
665C	0	On Site	Gasometers	1887
666C	0	On Site	Gasometers	1967
667C	0	On Site	Gasometer	1949
668C	0	On Site	Gasometers	1968
669C	0	On Site	Gasometers	1949
670C	0	On Site	Gasometer	1949
671DI	0	On Site	Electricity Substation	1996
672A	0	On Site	Gas Distribution Station	1996
673DI	0	On Site	Electricity Substation	1976
674A	0	On Site	Gas Distribution Station	1976
675DI	0	On Site	Electricity Substation	1967
676A	0	On Site	Gas Distribution Station	1990
677A	0	On Site	Gas Holder Station	1986
678DI	0	On Site	Electricity Substation	1990
679DI	0	On Site	Electricity Substation	1968
680A	0	On Site	Gasholder	1949
681A	0	On Site	Gasholder	1967
682A	0	On Site	Gasholder	1976
683A	0	On Site	Gas Holder	1986

684A	0	On Site	Gasholder	1949
685A	0	On Site	Gasholder	1968
686D	0	On Site	Electricity Substation	1996
687D	0	On Site	Electricity Substation	1990
688L	0	On Site	Electricity Works	1968
689L	0	On Site	Electricity Works	1968
690L	0	On Site	Electricity Works	1981
691L	0	On Site	Electricity Works	1984
692DJ	0	On Site	Electricity Substation	1980
693DJ	0	On Site	Electricity Substation	1978
694M	0	On Site	Gas Works	1887
695DH	0	On Site	Electricity Substation	1986
696DH	0	On Site	Electricity Substation	1996
697DH	0	On Site	Electricity Substation	1990
698N	0	On Site	Gas Holder Station	1996
699M	0	On Site	Gasometer	1887
700DH	0	On Site	Electricity Substation	1967
701DH	0	On Site	Electricity Substation	1949
702D	0	On Site	Gas Works	1887
703DI	0	On Site	Electricity Substation	1986
704F	0	On Site	Electricity Substation	1986
705F	0	On Site	Electricity Substation	1996
706M	0	On Site	Gas Holder	1996
707N	0	On Site	Electricity Substation	1996
708O	0	On Site	Gasometer	1887
709O	0	On Site	Gasometer	1949
710O	0	On Site	Gasometer	1966
711O	0	On Site	Gasometer	1949
712O	0	On Site	Gas Holder	1996
713O	0	On Site	Gasometer	1949
714O	0	On Site	Gasometer	1966
715O	0	On Site	Gasometer	1963
716O	0	On Site	Gasometer	1949
717Q	0	On Site	Gasometers	1887
718M	0	On Site	Gas Works	1963
719M	0	On Site	Gas Works	1966
720M	0	On Site	Gasometer	1963
721M	0	On Site	Gasometer	1949
722M	0	On Site	Gasometer	1949
723M	0	On Site	Gasometer	1966
724M	0	On Site	Gasometer	1966
725F	0	On Site	Electricity Substation	1990
726O	0	On Site	Gasometer	1963
727M	0	On Site	Gas Holder	1984
728O	0	On Site	Gas Holder	1984
729C	0	On Site	Gasometers	1883

730N	0	On Site	Gas Holder Station	1990
731O	0	On Site	Gas Holder	1990
732M	0	On Site	Gas Holder	1990
733N	0	On Site	Electricity Substation	1990
734D	0	On Site	Gas Works	1883
735DJ	0	On Site	Electricity Substation	1985
736M	0	On Site	Gas Works	1949
737M	0	On Site	Gas Works	1949
738Q	0	On Site	Gasometers	1883
739O	0	On Site	Gasometer	1883
740O	0	On Site	Gas Works	1883
741M	0	On Site	Gasometer	1883
742F	0	On Site	Electricity Substation	1990
743N	0	On Site	Gas Holder Station	1984
744N	0	On Site	Electricity Substation	1984
745DJ	0	On Site	Electricity Substation	1978
746	10	N	Electricity Substation	1951
747DK	13	S	Electricity Substation	1981
748DK	13	S	Electricity Substation	1990
749DK	13	S	Electricity Substation	1984
750V	13	S	Electricity Works	1949
751DL	13	S	Electricity Substation	1949
752U	14	S	Electricity Works	1968
753DL	14	S	Electricity Works	1968
754DL	14	S	Electricity Works	1968
755U	14	S	Electricity Works	1968
756DL	15	S	Electricity Works	1981
757DL	15	S	Electricity Works	1984
758V	15	S	Electricity Works	1949
759DL	15	S	Electricity Substation	1949
760U	15	S	Electricity Works	1981
761U	15	S	Electricity Works	1984
762U	15	S	Electricity Works	1990
763DM	18	W	Electricity Substation	1978
764DM	20	W	Electricity Substation	1985
765DM	20	W	Electricity Substation	1990
766DN	28	E	Electricity Substation	1996
767DN	29	E	Electricity Substation	1990
768DN	29	E	Electricity Substation	1984
769DO	34	NW	Electricity Substation	1996
770DO	35	NW	Electricity Substation	1986
771DO	35	NW	Electricity Substation	1990
772DO	35	NW	Electricity Substation	1990
773DO	35	NW	Electricity Substation	1975
774DO	35	NW	Electricity Substation	1968
775CO	39	SE	Electricity Substation	1968

776CO	39	SE	Electricity Substation	1968
777CO	39	SE	Electricity Substation	1984
778CO	39	SE	Electricity Substation	1981
779Y	59	N	Electricity Substation	1986
780Y	59	N	Electricity Substation	1990
781Y	64	N	Electricity Substation	1975
782Y	67	N	Electricity Substation	1996
783DP	98	E	Electricity Substation	1990
784DP	98	E	Electricity Substation	1984
785DP	99	E	Electricity Substation	1949
786DP	99	E	Electricity Substation	1996
787DP	99	E	Electricity Substation	1949
788CQ	110	N	Electricity Substation	1990
789CQ	110	N	Electricity Substation	1984
790DQ	112	N	Electricity Substation	1986
791DQ	112	N	Electricity Substation	1990
792DQ	112	N	Electricity Substation	1990
793DQ	113	N	Electricity Substation	1996
794CQ	118	N	Electricity Substation	1996
795CQ	120	N	Electricity Substation	1975
796CQ	120	N	Electricity Substation	1990
797CQ	120	N	Electricity Substation	1990
798AC	120	W	Electricity Substation	1949
799AC	121	W	Electricity Substation	1949
800AC	121	W	Electricity Substation	1975
801AC	121	W	Electricity Substation	1951
802AC	121	W	Electricity Substation	1968
803AC	124	W	Electricity Substation	1986
804AC	124	W	Electricity Substation	1990
805AC	124	W	Electricity Substation	1990
806AC	125	W	Electricity Substation	1996
807	180	S	Electricity Substation	1990
808DS	210	NW	Electricity Substation	1978
809DR	214	S	Electricity Substation	1968
810DR	214	S	Electricity Substation	1990
811DR	214	S	Electricity Substation	1967
812DR	214	S	Electricity Substation	1976
813DS	215	NW	Electricity Substation	1978
814DS	215	NW	Electricity Substation	1980
815DS	215	NW	Electricity Substation	1985
816DT	267	W	Electricity Substation	1985
817DT	267	W	Electricity Substation	1990
818DU	290	SE	Electricity Substation	1990
819DU	291	SE	Electricity Substation	1968
820DU	291	SE	Electricity Substation	1976
821DU	291	SE	Electricity Substation	1967



822CY	308	S	Electricity Substation	1972
823CY	312	S	Electricity Substation	1990
824BA	327	NE	Electricity Substation	1949
825DV	328	W	Electricity Substation	1985
826DV	328	W	Electricity Substation	1990
827DV	328	W	Electricity Substation	1978
828BA	328	NE	Electricity Substation	1975
829BA	328	NE	Electricity Substation	1954
830BA	331	NE	Electricity Substation	1949
831BA	333	NE	Electricity Substation	1990
832BA	333	NE	Electricity Substation	1990
833CZ	333	SE	Electricity Substation	1976
834DW	335	SE	Electricity Substation	1968
835DW	335	SE	Electricity Substation	1981
836DW	335	SE	Electricity Substation	1984
837DW	335	SE	Electricity Substation	1990
838DW	336	SE	Electricity Substation	1968
839AY	349	E	Electricity Substations	1970
840AY	349	E	Electricity Substation	1949
841AY	349	E	Electricity Substation	1949
842AM	358	N	Electricity Substation	1954
843AM	359	N	Electricity Substation	1949
844AM	359	N	Electricity Substation	1949
845DX	361	NW	Electricity Substation	1978
846DX	361	NW	Electricity Substation	1980
847DX	361	NW	Electricity Substation	1985
848DY	366	N	Electricity Substation	1975
849DY	366	N	Electricity Substation	1990
850DY	366	N	Electricity Substation	1990
851ER	368	NW	Electricity Substation	1968
852AS	370	NW	Electricity Substation	1987
853AS	370	NW	Electricity Substation	1987
854AS	370	NW	Electricity Substation	1990
855AS	381	NW	Electricity Substation	1987
856AS	381	NW	Electricity Substation	1987
857AS	381	NW	Electricity Substation	1990
858DZ	383	N	Electricity Substation	1990
859DZ	383	N	Electricity Substation	1975
860EA	426	S	Electricity Substation	1972
861EA	426	S	Electricity Substation	1990
862EB	466	N	Electricity Substation	1990
863EB	466	N	Electricity Substation	1987
864EB	466	N	Electricity Substation	1987
865EC	470	SE	Electricity Substation	1990
866	476	SE	Electricity Works	1990
867ED	479	N	Electricity Substation	1990

## 1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

## 1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 68

ID	Distance (m)	Direction	Use	Date
869I	0	On Site	Garage	1963
870EE	0	On Site	Garage	1976
871EE	0	On Site	Garage	1967
872EE	0	On Site	Garage	1986
873EF	0	On Site	Garage	1975
874EF	0	On Site	Garage	1968
875EG	0	On Site	Garage	1975
876EG	0	On Site	Garage	1968
877EE	0	On Site	Garage	1990
878I	0	On Site	Garage	1951
879I	0	On Site	Garage	1949
880I	0	On Site	Garage	1986
881I	0	On Site	Garage	1990
882I	0	On Site	Garage	1975
883I	0	On Site	Garage	1968
884EE	0	On Site	Garage	1968
885EF	0	On Site	Garage	1986
886EF	0	On Site	Garage	1968
887EH	0	On Site	Garage	1996
888I	0	On Site	Garage	1996
889CC	0	On Site	Garage	1996
890EE	0	On Site	Garage	1996
891EH	0	On Site	Garage	1986
892EH	0	On Site	Garage	1990
893EH	0	On Site	Garage	1990

894CC	0	On Site	Garage	1966
895CC	0	On Site	Garage	1990
896CC	0	On Site	Garage	1984
897BU	15	E	Motor Repair Works	1968
898BU	16	E	Motor Repair Works	1968
899EI	93	SE	Garage	1958
900EI	93	SE	Boat Repair Yard	1968
901EI	94	SE	Boat Repair Yard	1968
902EI	126	SE	Garage	1957
903EI	126	SE	Garage	1949
904EJ	170	N	Garage	1990
905EJ	172	N	Garage	1975
906EJ	172	N	Garage	1966
907EK	177	N	Garage	1975
908EK	177	N	Garage	1954
909EK	189	N	Garage	1966
910EK	193	N	Garage	1949
911EK	194	N	Garage	1990
912EK	194	N	Garage	1990
913EK	199	N	Garage	1949
914EK	200	N	Garage	1963
915CW	219	NW	Garage	1963
916CW	223	NW	Garage	1987
917CW	223	NW	Garage	1987
918EL	227	N	Garage	1966
919EL	227	N	Garage	1954
920EL	228	N	Garage	1990
921EL	232	N	Garage	1963
922CW	232	NW	Garage	1949
923CW	232	NW	Garage	1968
924CW	232	NW	Garage	1957
925CU	234	SE	Garage	1971
926CU	235	SE	Garage	1990
927CU	241	SE	Garage	1964
928CU	241	SE	Garage	1968
929EL	261	N	Garage	1990
930EL	261	N	Garage	1990
931AS	286	N	Shipbuilding and Repairing Yard	1987
932AS	286	N	Shipbuilding and Repairing Yard	1987
933AS	286	N	Shipbuilding and Repairing Yard	1990
934DZ	365	N	Garage	1954
935DZ	365	N	Garage	1949
936DZ	365	N	Garage	1963

## 1.6 Potentially Infilled Land

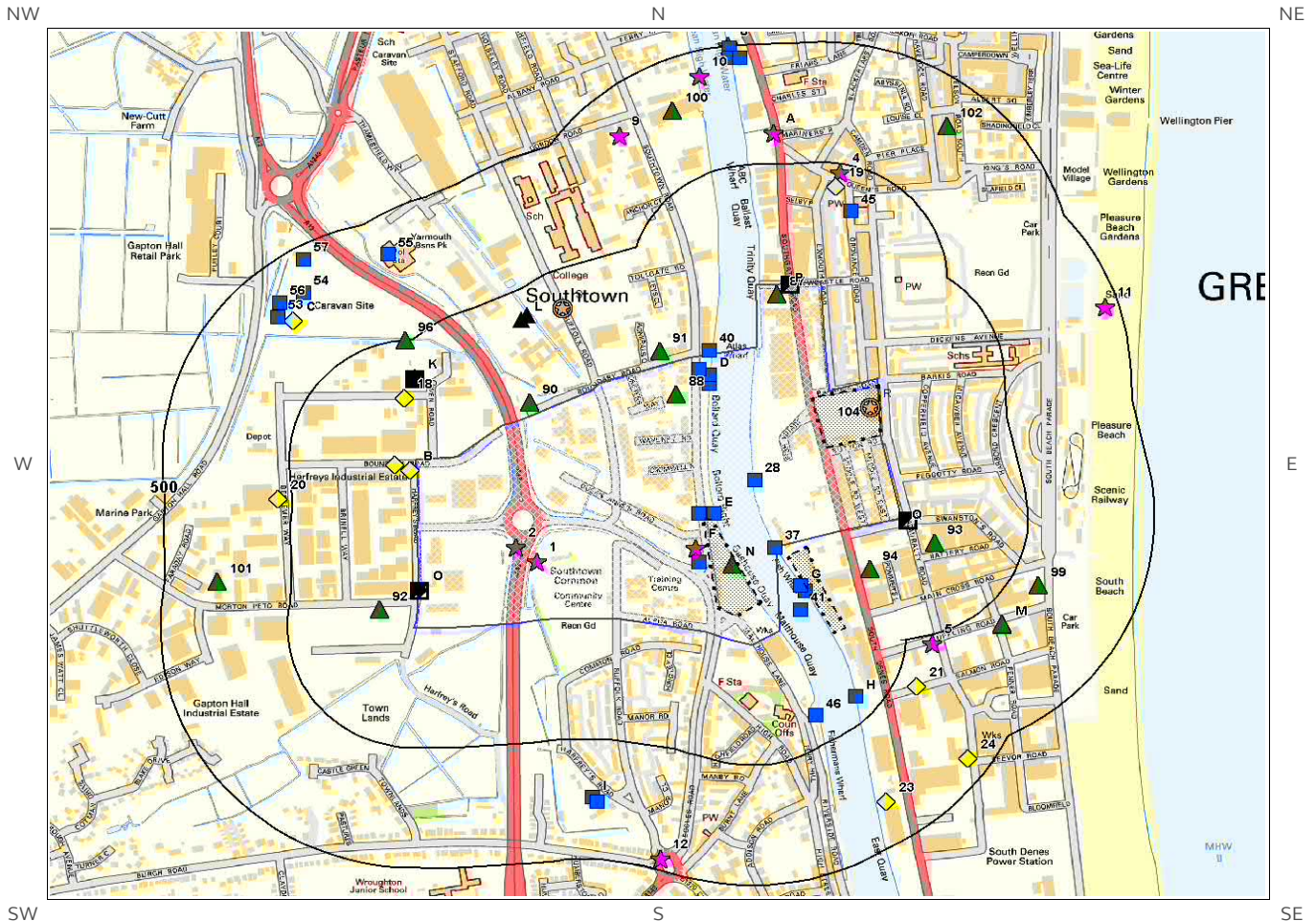
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 81

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
937J	0	On Site	Quay	1938
938J	0	On Site	Quay	1938
939K	0	On Site	Unspecified Wharf	1946
940J	0	On Site	Quay	1978
941DK	0	On Site	Unspecified Wharf	1978
942D	0	On Site	Quay	1904
943D	0	On Site	Quay	1946
944E	0	On Site	Quay	1978
945E	0	On Site	Quay	1988
946D	0	On Site	Quay	1938
947D	0	On Site	Quay	1938
948EM	0	On Site	Unspecified Wharf	1884
949B	0	On Site	Quay	1952
950EN	0	On Site	Unspecified Wharf	1988
951B	0	On Site	Quay	1988
952B	0	On Site	Quay	1978
953B	0	On Site	Quay	1938
954B	0	On Site	Quay	1938
955G	0	On Site	Quay	1946
956K	0	On Site	Unspecified Wharf	1904
957G	0	On Site	Quay	1904
958H	0	On Site	Quay	1978
959H	0	On Site	Quay	1988
960EO	15	S	Pond	1884
961EO	15	S	Pond	1901
962AB	52	N	Dock	1946
963Z	73	SE	Quay	1946
964Z	73	SE	Quay	1904
965EP	117	E	Sand Pit	1884
966EQ	124	SE	Quay	1988
967CP	127	N	Dry Docks	1904
968AJ	164	SE	Quay	1946
969AH	169	SE	Quay	1988
970AH	169	SE	Quay	1978
971AH	172	SE	Quay	1904
972AH	172	SE	Quay	1946
973AJ	188	SE	Quay	1952
974DB	188	SE	Quay	1978

975AK	203	NE	Unspecified Ground Workings	1938
976AK	203	NE	Unspecified Ground Workings	1938
977AH	230	SE	Quay	1938
978AH	230	SE	Quay	1938
979AD	249	NE	Unspecified Pit	1901
980AR	269	W	Unspecified Pit	1901
981DF	277	SE	Quay	1988
982AR	279	W	Unspecified Pit	1884
983AR	280	W	Unspecified Pit	1904
984AR	280	W	Unspecified Pit	1946
985AR	291	W	Unspecified Heap	1938
986AR	291	W	Unspecified Heap	1938
987AS	295	N	Dry Dock	1988
988ER	295	N	Dry Dock	1978
989AR	298	W	Unspecified Pit	1952
990DC	303	SE	Refuse Heap	1884
991	306	NW	Pond	1952
992ER	316	N	Dry Docks	1938
993ER	316	N	Dry Docks	1938
994AS	329	N	Dry Docks	1904
995AS	329	N	Dry Docks	1946
996BP	367	W	Cuttings	1884
997ES	371	E	Pond	1938
998ES	372	E	Pond	1946
999BE	382	S	Unspecified Pit	1946
1000BE	382	S	Unspecified Pit	1904
1001ES	385	E	Pond	1988
1002ES	385	E	Pond	1978
1003ET	397	NE	Unspecified Heap	1952
1004EU	421	NE	Boating Lake	1988
1005EU	421	NE	Boating Lake	1978
1006BI	436	SE	Quay	1938
1007BI	436	SE	Quay	1938
1008BO	436	W	Cuttings	1901
1009BL	458	S	Unspecified Heap	1988
1010BL	458	S	Unspecified Heap	1978
1011BN	461	N	Quay	1904
1012BN	461	N	Quay	1946
1013BO	463	W	Cuttings	1938
1014BO	464	W	Cuttings	1946
1015BO	464	W	Cuttings	1904
1016BP	469	W	Cuttings	1952
1017BO	496	W	Cuttings	1952

# 2. Environmental Permits, Incidents and Registers Map



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- Site Outline
- Search Buffers (m)
  - 250
  - 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements



# 2. Environmental Permits, Incidents and Registers

## 2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

### 2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

### 2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

21

The following Part A(1) and IPPC Authorised Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
113K	167	N	651840 306180	Operator: Biffa Waste Services Ltd Installation Name: Great Yarmouth Wm Resource Centre Epr/rp3636sr Process: DISPOSAL OR RECOVERY OF HAZARDOUS WASTE WITH A CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING PHYSICO-CHEMICAL TREATMENT Permit Number: JP3336EE Original Permit Number: RP3636SR EPR Reference: - Issue Date: 15/1/2014 Effective Date: 15/1/2014 Last date noted as effective: 2017-04-01 Status: Superseded
114K	167	N	651840 306180	Operator: Biffa Waste Services Ltd Installation Name: Great Yarmouth Wm Resource Centre Epr/rp3636sr Process: DISPOSAL OR RECOVERY OF HAZ WASTE WITH CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING BLENDING OR MIXING PRIOR TO SUBMISSION TO ANY OF THE OTHER ACTIVITIES LISTED IN THIS SECTION OR IN SECTION 5.1 Permit Number: JP3336EE Original Permit Number: RP3636SR EPR Reference: - Issue Date: 15/1/2014 Effective Date: 15/1/2014 Last date noted as effective: 2017-04-01 Status: Superseded
115K	167	N	651840 306180	Operator: Biffa Waste Services Ltd Installation Name: Great Yarmouth Wm Resource Centre Epr/rp3636sr Process: DISPOSAL OF > 50 T/D NON-HAZARDOUS WASTE (> 100 T/D IF ONLY AD) INVOLVING PHYSICO-CHEMICAL TREATMENT Permit Number: JP3336EE Original Permit Number: RP3636SR EPR Reference: - Issue Date: 15/1/2014 Effective Date: 15/1/2014 Last date noted as effective: 2017-04-01 Status: Superseded

ID	Distance (m)	Direction	NGR	Details
116K	167	N	651840 306180	Operator: Biffa Waste Services Ltd Installation Name: Great Yarmouth Wm Resource Centre Epr/rp3636sr Process: TEMPORARY STORAGE OF HAZ WASTE NOT UNDER S 5.2 PENDING ACTIVITIES LISTED IN S 5.1, 5.2, 5.3 AND PARAGRAPH (B) OF THIS SECTION WITH A TOTAL CAPACITY > 50 TONNES, EXCL TEMP STORAGE WHERE GENERATED Permit Number: JP3336EE Original Permit Number: RP3636SR EPR Reference: - Issue Date: 15/1/2014 Effective Date: 15/1/2014 Last date noted as effective: 2017-04-01 Status: Superseded
117K	167	N	651840 306180	Operator: Biffa Waste Services Ltd Installation Name: Great Yarmouth Wm Resource Centre Epr/rp3636sr Process: ASSOCIATED PROCESS Permit Number: JP3336EE Original Permit Number: RP3636SR EPR Reference: - Issue Date: 15/1/2014 Effective Date: 15/1/2014 Last date noted as effective: 2017-04-01 Status: Superseded
118K	167	N	651840 306180	Operator: Biffa Waste Services Ltd Installation Name: Great Yarmouth Wm Resource Centre Epr/rp3636sr Process: DISPOSAL OR RECOVERY OF HAZARDOUS WASTE WITH A CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING PHYSICO-CHEMICAL TREATMENT Permit Number: JP3336EE Original Permit Number: RP3636SR EPR Reference: - Issue Date: 15/1/2014 Effective Date: 15/1/2014 Last date noted as effective: 2017-04-01 Status: Superseded
119K	167	N	651840 306180	Operator: Biffa Waste Services Ltd Installation Name: Great Yarmouth Wm Resource Centre Epr/rp3636sr Process: OTHER WASTE DISPOSAL; WASTE OILS >10 T/D Permit Number: RP3636SR Original Permit Number: RP3636SR EPR Reference: - Issue Date: 29/6/2006 Effective Date: 29/6/2006 Last date noted as effective: 2017-04-01 Status: Superseded
120K	167	N	651840 306180	Operator: Biffa Waste Services Ltd Installation Name: Great Yarmouth Wm Resource Centre Epr/rp3636sr Process: OTHER WASTE DISPOSAL; NON-HAZARDOUS WASTE >50T/D BY PHYSICO-CHEMICAL TREATMENT Permit Number: RP3636SR Original Permit Number: RP3636SR EPR Reference: - Issue Date: 29/6/2006 Effective Date: 29/6/2006 Last date noted as effective: 2017-04-01 Status: Superseded
121K	167	N	651840 306180	Operator: Biffa Waste Services Ltd Installation Name: Great Yarmouth Wm Resource Centre Epr/rp3636sr Process: OTHER WASTE DISPOSAL; HAZARDOUS WASTE >10T/D Permit Number: RP3636SR Original Permit Number: RP3636SR EPR Reference: - Issue Date: 29/6/2006 Effective Date: 29/6/2006 Last date noted as effective: 2017-04-01 Status: Superseded
122K	167	N	651840 306180	Operator: Biffa Waste Services Ltd Installation Name: Great Yarmouth Wm Resource Centre Epr/rp3636sr Process: OTHER WASTE DISPOSAL; HAZARDOUS WASTE >10T/D Permit Number: RP3636SR Original Permit Number: RP3636SR EPR Reference: - Issue Date: 29/6/2006 Effective Date: 29/6/2006 Last date noted as effective: 2017-04-01 Status: Superseded

ID	Distance (m)	Direction	NGR	Details
123K	167	N	651840 306180	<p>Operator: Augean North Sea Services Limited            Installation Name: Great Yarmouth Wm Resource Centre Epr/zp3637rm            Process: DISPOSAL OR RECOVERY OF HAZ WASTE WITH CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING BLENDING OR MIXING PRIOR TO SUBMISSION TO ANY OF THE OTHER ACTIVITIES LISTED IN THIS SECTION OR IN SECTION 5.1</p> <p>Permit Number: ZP3637RM            Original Permit Number: ZP3637RM            EPR Reference: -            Issue Date: 28/4/2016            Effective Date: 28/4/2016            Last date noted as effective: 2017-04-01            Status: Transfer Effective</p>
124K	167	N	651840 306180	<p>Operator: Augean North Sea Services Limited            Installation Name: Great Yarmouth Wm Resource Centre Epr/zp3637rm            Process: DISPOSAL OF &gt; 50 T/D NON-HAZARDOUS WASTE (&gt; 100 T/D IF ONLY AD) INVOLVING PHYSICO-CHEMICAL TREATMENT</p> <p>Permit Number: ZP3637RM            Original Permit Number: ZP3637RM            EPR Reference: -            Issue Date: 28/4/2016            Effective Date: 28/4/2016            Last date noted as effective: 2017-04-01            Status: Transfer Effective</p>
125K	167	N	651840 306180	<p>Operator: Augean North Sea Services Limited            Installation Name: Great Yarmouth Wm Resource Centre Epr/zp3637rm            Process: TEMPORARY STORAGE OF HAZ WASTE NOT UNDER S 5.2 PENDING ACTIVITIES LISTED IN S 5.1, 5.2, 5.3 AND PARAGRAPH (B) OF THIS SECTION WITH A TOTAL CAPACITY &gt; 50 TONNES, EXCL TEMP STORAGE WHERE GENERATED</p> <p>Permit Number: ZP3637RM            Original Permit Number: ZP3637RM            EPR Reference: -            Issue Date: 28/4/2016            Effective Date: 28/4/2016            Last date noted as effective: 2017-04-01            Status: Transfer Effective</p>
126K	167	N	651840 306180	<p>Operator: Augean North Sea Services Limited            Installation Name: Great Yarmouth Wm Resource Centre Epr/zp3637rm            Process: ASSOCIATED PROCESS</p> <p>Permit Number: ZP3637RM            Original Permit Number: ZP3637RM            EPR Reference: -            Issue Date: 28/4/2016            Effective Date: 28/4/2016            Last date noted as effective: 2017-04-01            Status: Transfer Effective</p>
127K	167	N	651840 306180	<p>Operator: Augean North Sea Services Limited            Installation Name: Great Yarmouth Wm Resource Centre Epr/zp3637rm            Process: DISPOSAL OR RECOVERY OF HAZARDOUS WASTE WITH A CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING PHYSICO-CHEMICAL TREATMENT</p> <p>Permit Number: ZP3637RM            Original Permit Number: ZP3637RM            EPR Reference: -            Issue Date: 28/4/2016            Effective Date: 28/4/2016            Last date noted as effective: 2017-04-01            Status: Transfer Effective</p>
128L	187	NW	652050 306300	<p>Operator: C &amp; L Waste Oil Collection Limited            Installation Name: Great Yarmouth Oil Reclamation Facility Epr/np3038mb            Process: DISPOSAL OR RECOVERY OF HAZARDOUS WASTE WITH A CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING PHYSICO-CHEMICAL TREATMENT</p> <p>Permit Number: WP3437RY            Original Permit Number: NP3038MB            EPR Reference: -            Issue Date: 27/4/2016            Effective Date: 27/4/2016            Last date noted as effective: 2017-04-01            Status: Effective</p>

ID	Distance (m)	Direction	NGR	Details
129L	187	NW	652050 306300	<p>Operator: C &amp; L Waste Oil Collection Limited            Installation Name: Great Yarmouth Oil Reclamation Facility Epr/np3038mb            Process: TEMPORARY STORAGE OF HAZ WASTE NOT UNDER S 5.2            PENDING ACTIVITIES LISTED IN S 5.1, 5.2, 5.3 AND PARAGRAPH (B) OF THIS SECTION WITH A TOTAL CAPACITY &gt; 50 TONNES, EXCL TEMP STORAGE WHERE GENERATED</p> <p>Permit Number: WP3437RY            Original Permit Number: NP3038MB            EPR Reference: -            Issue Date: 27/4/2016            Effective Date: 27/4/2016            Last date noted as effective: 2017-04-01            Status: Effective</p>
130L	192	NW	652060 306310	<p>Operator: C &amp; L Waste Oil Collection Limited            Installation Name: C &amp; L Waste Oil Collection            Process: RECOVERY OF WASTE; CLEANING/REGENERATING CARBON ETC BY REMOVING SCHEDULED SUBSTANCES</p> <p>Permit Number: NP3038MB            Original Permit Number: NP3038MB            EPR Reference: -            Issue Date: 17/10/2007            Effective Date: 17/10/2007            Last date noted as effective: 2011-08-08            Status: Effective</p>
131L	192	NW	652060 306310	<p>Operator: C &amp; L Waste Oil Collection Limited            Installation Name: Great Yarmouth Oil Reclamation Facility Epr/np3038mb            Process: TEMPORARY STORAGE OF HAZ WASTE NOT UNDER S 5.2            PENDING ACTIVITIES LISTED IN S 5.1, 5.2, 5.3 AND PARAGRAPH (B) OF THIS SECTION WITH A TOTAL CAPACITY &gt; 50 TONNES, EXCL TEMP STORAGE WHERE GENERATED</p> <p>Permit Number: FP3934ER            Original Permit Number: NP3038MB            EPR Reference: -            Issue Date: 10/12/2013            Effective Date: 10/12/2013            Last date noted as effective: 2017-04-01            Status: Superseded</p>
132L	192	NW	652060 306310	<p>Operator: C &amp; L Waste Oil Collection Limited            Installation Name: Great Yarmouth Oil Reclamation Facility Epr/np3038mb            Process: OTHER WASTE DISPOSAL; WASTE OILS &gt;10 T/D</p> <p>Permit Number: NP3038MB            Original Permit Number: NP3038MB            EPR Reference: -            Issue Date: 17/10/2007            Effective Date: 17/10/2007            Last date noted as effective: 2017-04-01            Status: Superseded</p>
133L	192	NW	652060 306310	<p>Operator: C &amp; L Waste Oil Collection Limited            Installation Name: Great Yarmouth Oil Reclamation Facility Epr/np3038mb            Process: DISPOSAL OR RECOVERY OF HAZARDOUS WASTE WITH A CAPACITY EXCEEDING 10 TONNES PER DAY INVOLVING PHYSICO-CHEMICAL TREATMENT</p> <p>Permit Number: FP3934ER            Original Permit Number: NP3038MB            EPR Reference: -            Issue Date: 10/12/2013            Effective Date: 10/12/2013            Last date noted as effective: 2017-04-01            Status: Superseded</p>

### 2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

### 2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

2

The following List 1 Dangerous Substance Inventory Site records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
14O	0	On Site	651850 305740	Name: Weatherford Uk Limited Status: Not Active Receiving Water: Na	Authorised Substances: Mercury (other), Cadmium
15C	376	NW	651600 306300	Name: Biffa Waste Services Ltd Status: Active Receiving Water: Na	Authorised Substances: Mercury (other), Cadmium, Carbon tetrachloride, Aldrin, Dieldrin, Endrin, Hexachlorobenzene, Hexachlorobutadiene, Trichlorobenzene, Total DDT

### 2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

9

The following List 2 Dangerous Substance Inventory Site records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
16B	15	W	651830 305990	Name: Great Yarmouth Cardboard Box Company Status: Not Active Receiving Water: Na	Authorised Substances: pH
17B	44	W	651800 306000	Name: U K Waste Management Limited Status: Active Receiving Water: North Sea	Authorised Substances: Chromium, Copper, Lead, Nickel, Zinc
18	129	N	651820 306140	Name: Edeco Petroleum Services Ltd Status: Not Active Receiving Water: Na	Authorised Substances: pH
19	200	N	652670 306580	Name: Blackfriars Brewery Status: Not Active Receiving Water: Na	Authorised Substances: pH
20	278	W	651570 305930	Name: Superior Linen Service Ltd Status: Not Active Receiving Water: Na	Authorised Substances: pH
21	294	SE	652830 305540	Name: Asco Uk Ltd Status: Not Active Receiving Water: Na	Authorised Substances: pH

ID	Distance (m)	Direction	NGR	Details	
22C	376	NW	651600 306300	Name: Biffa Waste Services Ltd Status: Active Receiving Water: Na	Authorised Substances: Arsenic, Chromium, Copper, Cyanide, Dichlorvos, Lead, Nickel, pH, Tributyltin, Triphenyltin, Zinc, Atrazine & Simazine, Azinphos-methyl, Endosulphan, Fenitrothion, Malathion, Trifluralin, Phenol
23	414	SE	652770 305300	Name: Co-operative Cleaners Ltd Status: Active Receiving Water: Na	Authorised Substances: pH
24	456	SE	652930 305390	Name: C-mac Microcircuits Limited Status: Not Active Receiving Water: Na	Authorised Substances: pH

### 2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

16

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
87	0	On Site	652554 306353	Address: L J Steward, South Quay Service Station, Southgate Road, N1 3HU Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
88	0	On Site	652355 306146	Address: L J Steward, Southtown Road Service Station, Southtown Road, NR31 0JZ Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
89N	0	On Site	652465 305791	Address: CEBO (UK) Ltd, Gas House Quay North, Malthouse Lane, Gorleston, Norfolk, NR31 0GY Process: Use of Bulk Cement Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
90	24	NW	652066 306129	Address: Cemex UK Materials Ltd, Boundary Road, NR31 0LW Process: Use of Bulk Cement Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
91	26	N	652324 306236	Address: Jewson, Boundary Road, Great Yarmouth, Norfolk, NR31 0JY Process: timber process Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
92	74	W	651771 305697	Address: C & H Quickmix Ltd, Morton Peto Road, Great Yarmouth, Norfolk, NR31 0LT Process: Use of Bulk Cement Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified



ID	Distance (m)	Direction	NGR	Details	
93	86	SE	652865 305835	Address: British Metal Treatments Ltd, 40 Battery Road, Great Yarmouth, NR30 3NN Process: Other Metal Processes Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
94	94	S	652738 305781	Address: Haliburton Manufacturing & Services Ltd, Berth 1A, South Denes Road, Great Yarmouth, NR30 3PF Process: Use of Bulk Cement Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
95K	165	N	651839 306178	Address: UK Waste Management, Bessemer Way, Great Yarmouth, Norfolk, NR31 0LX Process: waste oil burning process Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
96	245	N	651821 306257	Address: Hope Construction Materials, Harfreys Industrial Estate, Bessemer Way, Great Yarmouth, NR31 0LX Process: Use of Bulk Cement Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
97M	299	SE	652998 305667	Address: East Bilney Coachworks Ltd, Fenner Road, Great Yarmouth, Norfolk, NR30 3PS Process: Respraying of Road Vehicles process Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
98M	300	SE	652998 305666	Address: Halls Group Ltd, Operate at Fenner Road, Great Yarmouth, NR30 3PS Process: Respraying of Road Vehicles process Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
99	305	SE	653069 305748	Address: Constitution Motors Ltd, South Beach Parade, Great Yarmouth, NR30 3QN Process: Waste oil Burner Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
100	395	NW	652348 306736	Address: Yeoman Bulk Cargoes, Yeoman Wharf, Southtown Road, Great Yarmouth, Norfolk, NR31 0JJ Process: bulk handling of coal Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
101	398	W	651449 305756	Address: Coastground Ltd, Morton Peto Road, Great Yarmouth, Norfolk, NR31 0LT Process: Metal coating process Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
102	405	NE	652889 306703	Address: Baldwin, Albert Road, Great Yarmouth, NR30 3HP Process: waste oil burning process Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified

### 2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

1

The following RAS Licence (3 or 4) records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
134K	167	N	651840 306180	Tube Care Inspection Ltd, Bessemer Way,harfeys Industrial Estate, Great Yarmouth, Norfolk, NR31 0LX	Tube Care Inspection Ltd	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	BS0329	Date of Approval:20/5/2002 Effective from:20/5/2002 Last date of update:2015-01-01	Revoked/cancelled

### 2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

41

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
25D	0	On Site	652420 306190	Address: BOUNDARY RD PS SSO, BOUNDARY RD, GREAT YARMOUTH, NR31 Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AW4TS1735 Permit Version: 2 Receiving Water: River Yare Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 13/12/1991 Effective Date: 13-Dec-1991 Revocation Date: 15/10/1999
26D	0	On Site	652420 306170	Address: BOUNDARY ROAD STORM PUMPING STATION, GREAT YARMOUTH, NORFOLK, NR31 0JY Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: AEETS12173 Permit Version: 1 Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 15/10/1999 Effective Date: 15-Oct-1999 Revocation Date: -
27D	0	On Site	652420 306170	Address: BOUNDARY ROAD STORM PUMPING STATION, GREAT YARMOUTH, NORFOLK, NR31 0JY Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS03291/12173 Permit Version: 1 Receiving Water: RIVER YARE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 21/10/2002 Effective Date: 16-Oct-2002 Revocation Date: 16/10/2002
28	0	On Site	652510 305970	Address: SUTTON ROAD OUTFALL, GREAT YARMOUTH Effluent Type: SEWAGE DISCHARGES - UNSPECIFIED - WATER COMPANY Permit Number: AW4TS1389 Permit Version: 1 Receiving Water: River Yare T Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 14/10/1987 Effective Date: 14-Oct-1987 Revocation Date: 30/06/1994

ID	Distance (m)	Direction	NGR	Details	
29E	0	On Site	652430 305900	Address: SOUTHTOWN/COBHAM OUTFALL, SOUTHTOWN ROAD, GREAT YARMOUTH, NORFOLK, NR31 0LF Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS03293/12171 Permit Version: 1	Receiving Water: R.YARE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 21/02/2003 Effective Date: 27-Jan-2003 Revocation Date: 01/04/2005
30E	0	On Site	652430 305900	Address: SOUTHTOWN/COBHAM OUTFALL, SOUTHTOWN ROAD, GREAT YARMOUTH, NORFOLK, NR31 0LF Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AEETS12171 Permit Version: 2	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 24/03/2005 Effective Date: 01-Apr-2005 Revocation Date: -
31E	0	On Site	652430 305900	Address: SOUTHTOWN/COBHAM OUTFALL, SOUTHTOWN ROAD, GREAT YARMOUTH, NORFOLK, NR31 0LF Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS12171 Permit Version: 2	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 24/03/2005 Effective Date: 01-Apr-2005 Revocation Date: -
32E	0	On Site	652430 305900	Address: SOUTHTOWN/COBHAM OUTFALL, SOUTHTOWN ROAD, GREAT YARMOUTH, NORFOLK, NR31 0LF Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS03293/12171 Permit Version: 1	Receiving Water: R.YARE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 21/02/2003 Effective Date: 27-Jan-2003 Revocation Date: 01/04/2005
33E	0	On Site	652430 305900	Address: SOUTHTOWN/COBHAM OUTFALL, SOUTHTOWN ROAD, GREAT YARMOUTH, NORFOLK, NR31 0LF Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS12171 Permit Version: 1	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 15/10/1999 Effective Date: 15-Oct-1999 Revocation Date: 31/03/2005
34E	0	On Site	652400 305900	Address: SOUTHTOWN COMMON OUTFALL DRAINAGE S, GREAT YARMOUTH, NR31 Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: AW4TS348X Permit Version: 1	Receiving Water: River Yare Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 25/01/1963 Effective Date: 25-Jan-1963 Revocation Date: 07/06/1991
35E	0	On Site	652430 305900	Address: SOUTHTOWN/COBHAM OUTFALL, SOUTHTOWN ROAD, GREAT YARMOUTH, NORFOLK, NR31 0LF Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS12171 Permit Version: 1	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 15/10/1999 Effective Date: 15-Oct-1999 Revocation Date: 31/03/2005
36E	0	On Site	652430 305900	Address: SOUTHTOWN/COBHAM OUTFALL, SOUTHTOWN ROAD, GREAT YARMOUTH, NORFOLK, NR31 0LF Effluent Type: SEWAGE DISCHARGES - UNSPECIFIED - WATER COMPANY Permit Number: AW4TS1387 Permit Version: 1	Receiving Water: River Yare T Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 14/10/1987 Effective Date: 14-Oct-1987 Revocation Date: 22/03/2002
37	0	On Site	652550 305830	Address: FISH WHARF OUTFALL, GREAT YARMOUTH Effluent Type: SEWAGE DISCHARGES - UNSPECIFIED - WATER COMPANY Permit Number: AW4TS1385 Permit Version: 1	Receiving Water: River Yare T Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 14/10/1987 Effective Date: 14-Oct-1987 Revocation Date: 16/02/1998

ID	Distance (m)	Direction	NGR	Details	
38F	0	On Site	652400 305800	Address: GT YARMOUTH CORPORATION, BOUNDARY ROAD Effluent Type: SEWAGE DISCHARGES - UNSPECIFIED - WATER COMPANY Permit Number: AW4TS721X Permit Version: 1	Receiving Water: River Yare Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 09/07/1971 Effective Date: 09-Jul-1971 Revocation Date: 16/02/1998
39D	0	On Site	652400 306200	Address: YEOMAN WHARF, SOUTHTOWN RD, GREAT YARMOUTH, NORFOLK, NR31 OJX Effluent Type: TRADE DISCHARGES - SITE DRAINAGE (CONTAM SURFACE WATER, NOT WASTE SIT Permit Number: PRETS8519 Permit Version: 1	Receiving Water: tidal River Yare Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 25/10/1993 Effective Date: 25-Oct-1993 Revocation Date: -
40	8	N	652420 306240	Address: BOUNDARY ROAD PS SSO, BOUNDARY ROAD, GREAT YARMOUTH, NR31 Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: AW4TS1735 Permit Version: 1	Receiving Water: River Yare Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 08/11/1988 Effective Date: 08-Nov-1988 Revocation Date: 12/12/1991
41	41	E	652600 305700	Address: SOUTH DENES RD, GT.YARMOUTH, NORFOLK (FERRY STEPS PLANT) Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PR4TS385 Permit Version: 1	Receiving Water: Tidal River Yare Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 24/03/1986 Effective Date: 24-Mar-1986 Revocation Date: -
42G	43	E	652600 305750	Address: YARMOUTH MARINE BASE, SOUTH DENES, GT YARMOUTH, NR30 3LX Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: PRETS4620 Permit Version: 1	Receiving Water: Tidal River Yare Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 16/12/1991 Effective Date: 16-Dec-1991 Revocation Date: -
43G	53	E	652610 305740	Address: FISH WHARF PS, GREAT YARMOUTH Effluent Type: MISCELLANEOUS DISCHARGES - EMERGENCY DISCHARGES Permit Number: AEETS2306 Permit Version: 1	Receiving Water: Tidal R Yare Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 02/01/1990 Effective Date: 02-Jan-1990 Revocation Date: 30/04/1992
44G	53	E	652610 305740	Address: FISH WHARF PS, GREAT YARMOUTH Effluent Type: MISCELLANEOUS DISCHARGES - EMERGENCY DISCHARGES Permit Number: AEETS1650 Permit Version: 1	Receiving Water: - Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 15/09/1990 Effective Date: 15-Sep-1990 Revocation Date: 08/04/1991
45	159	N	652700 306530	Address: SALMON ROAD, GREAT YARMOUTH, NR30 3QS Effluent Type: SEWAGE DISCHARGES - UNSPECIFIED - WATER COMPANY Permit Number: AW4TS1374 Permit Version: 1	Receiving Water: River Yare T Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 14/10/1987 Effective Date: 14-Oct-1987 Revocation Date: 16/02/1998
46	189	SE	652630 305480	Address: FISHERMEN'S QUAY, GORLESTON, GT.YARMOUTH. Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PR4TS137 Permit Version: 1	Receiving Water: The Tidal River Yare Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 23/04/1985 Effective Date: 23-Apr-1985 Revocation Date: -

ID	Distance (m)	Direction	NGR	Details	
47H	203	SE	652710 305520	Address: SUFFLING ROAD PUMPING STATION, SUFFLING ROAD, GREAT YARMOUTH, NORFOLK, NR30 3PQ Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS12169 Permit Version: 1	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 15/10/1999 Effective Date: 15-Oct-1999 Revocation Date: 22/02/2002
48H	203	SE	652710 305520	Address: SUFFLING ROAD PUMPING STATION, SUFFLING ROAD, GREAT YARMOUTH, NORFOLK, NR30 3PQ Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AEETS12169 Permit Version: 2	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 23/02/2002 Effective Date: 23-Feb-2002 Revocation Date: -
49H	203	SE	652710 305520	Address: SUFFLING ROAD PUMPING STATION, SUFFLING ROAD, GREAT YARMOUTH, NORFOLK, NR30 3PQ Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS12169 Permit Version: 2	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 23/02/2002 Effective Date: 23-Feb-2002 Revocation Date: -
50H	203	SE	652710 305520	Address: SUFFLING ROAD PUMPING STATION, SUFFLING ROAD, GREAT YARMOUTH, NORFOLK, NR30 3PQ Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS12169 Permit Version: 1	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 15/10/1999 Effective Date: 15-Oct-1999 Revocation Date: 22/02/2002
51I	371	S	652190 305310	Address: ATCHIN TAN, HARFREYS ROAD, GORLESTON, GT. YARMOUTH, NORFOLK Effluent Type: UNSPECIFIED Permit Number: PRELF03747 Permit Version: 1	Receiving Water: - Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 30/10/1990 Effective Date: 30-Oct-1990 Revocation Date: 01/10/1996
52I	381	S	652200 305300	Address: HARFREYS ROAD, GT YARMOUTH, NORFOLK Effluent Type: UNSPECIFIED Permit Number: PR4LF268 Permit Version: 1	Receiving Water: Soakaway Status: PRE NRA LEGISLATION WHERE ISSUE DATE < 01-SEP-89 (HISTORIC ONLY) Issue date: 27/09/1985 Effective Date: 27-Sep-1985 Revocation Date: 01/10/1996
53	403	NW	651570 306310	Address: GAPTON HALL TRAVELLERS SITE, GAPTON HALL ROAD, GREAT YARMOUTH, NORFOLK, NR31 0NL Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PRENF19844 Permit Version: 1	Receiving Water: DITCH TRIB OF TIDAL R. YARE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 24/02/2006 Effective Date: 24-Feb-2006 Revocation Date: -
54	412	NW	651620 306360	Address: CVAN SITE GAPTONHALL RD, GREAT YARMOUTH, NORFOLK Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: PRENF07708 Permit Version: 1	Receiving Water: Trib River Yare Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 06/02/1991 Effective Date: 06-Feb-1991 Revocation Date: -

ID	Distance (m)	Direction	NGR	Details	
55	422	NW	651787 306440	Address: POLICE CUSTODY CENTRE, THAMESFIELD WAY, GREAT YARMOYTH, ,, NORFOLK, NR31 0DH Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: EPREP3120GR Permit Version: 1	Receiving Water: TRIB OF THE RIVER YARE Status: NEW ISSUED UNDER EPR 2010 Issue date: 12/08/2010 Effective Date: 12-Aug-2010 Revocation Date: -
56	423	NW	651574 306340	Address: GAPTON HALL ROAD & LAND OF A12, GREAT YARMOUTH, NORFOLK, NR31 0LZ Effluent Type: SEWAGE & TRADE COMBINED - UNSPECIFIED Permit Number: PRENF20271 Permit Version: 1	Receiving Water: TRIB RIVER YARE Status: NEW CONSENT, (WATER INDUSTRY ACT 1991, SECTION 166) Issue date: 31/08/2006 Effective Date: 31-Aug-2006 Revocation Date: -
57	473	NW	651620 306430	Address: GAPTON HALL TRAVELLERS SITE, GAPTON HALL ROAD, GREAT YARMOUTH, NORFOLK, NR31 0NL Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PRENF19845 Permit Version: 1	Receiving Water: DITCH TRIB OF TIDAL R. YARE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 24/02/2006 Effective Date: 24-Feb-2006 Revocation Date: -
58J	474	N	652480 306850	Address: BRYANTS QUAY SPS, GREAT YARMOUTH Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AW4TS1408 Permit Version: 1	Receiving Water: River Yare T Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 14/10/1987 Effective Date: 14-Oct-1987 Revocation Date: 22/03/2002
59J	475	N	652460 306850	Address: BRYANTS QUAY OUTFALL, GREAT YARMOUTH Effluent Type: SEWAGE DISCHARGES - UNSPECIFIED - WATER COMPANY Permit Number: AW4TS1388 Permit Version: 1	Receiving Water: River Yare T Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 14/10/1987 Effective Date: 14-Oct-1987 Revocation Date: 22/03/2002
60J	495	N	652460 306870	Address: BRYANTS QUAY PUMPING STATION, SOUTH QUAY, GREAT YARMOUTH, NORFOLK, NR30 2RW Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS12175 Permit Version: 2	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 11/01/2000 Effective Date: 11-Jan-2000 Revocation Date: -
61J	495	N	652460 306870	Address: BRYANTS QUAY PUMPING STATION, SOUTH QUAY, GREAT YARMOUTH, NORFOLK, NR30 2RW Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: AEETS12175 Permit Version: 2	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 11/01/2000 Effective Date: 11-Jan-2000 Revocation Date: -
62J	495	N	652460 306870	Address: BRYANTS QUAY PUMPING STATION, SOUTH QUAY, GREAT YARMOUTH, NORFOLK, NR30 2RW Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS12175 Permit Version: 1	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 15/10/1999 Effective Date: 15-Oct-1999 Revocation Date: 10/01/2000



ID	Distance (m)	Direction	NGR	Details	
63J	495	N	652460 306870	Address: BRYANTS QUAY PUMPING STATION, SOUTH QUAY, GREAT YARMOUTH, NORFOLK, NR30 2RW Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS12175 Permit Version: 1	Receiving Water: TIDAL RIVER YARE Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 15/10/1999 Effective Date: 15-Oct-1999 Revocation Date: 10/01/2000
64J	495	N	652460 306870	Address: BRYANTS QUAY PUMPING STATION, SOUTH QUAY, GREAT YARMOUTH, NORFOLK, NR30 2RW Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS03290/12175 Permit Version: 1	Receiving Water: RIVER YARE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 01/10/2002 Effective Date: 05-Sep-2002 Revocation Date: 01/10/2002
65J	495	N	652460 306870	Address: BRYANTS QUAY PUMPING STATION, SOUTH QUAY, GREAT YARMOUTH, NORFOLK, NR30 2RW Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AEETS03290/12175 Permit Version: 1	Receiving Water: RIVER YARE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 01/10/2002 Effective Date: 05-Sep-2002 Revocation Date: 01/10/2002

## 2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

4

The following Water Industry Referral records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	Address	Permission reference	Local Authority	First Date Received	Last Date Received	Status
135 O	0	On Site	WEATHERFORD UK LIMITED, HARFREY'S ROAD, HARFREY'S IND EST, GREAT YARMOUTH, NORFOLK, NR31 0LS	CA3653	GREAT YARMOUTH BOROUGH COUNCIL	01-Jul-2010	08-Oct-2016	EFFECTIVE
136 P	0	On Site	GREAT YARMOUTH PORT COMPANY, ATLAS TERMINAL, SOUTHGATES ROAD, GREAT YARMOUTH, NORFOLK, NR30 3LL	SCE0092C 2	NORFOLK	01-Jan-2015	08-Oct-2016	EFFECTIVE
137 Q	13	SE	TOTAL RECLAIM SYSTEMS LIMITED, TOTAL RECLAIM HOUSE, ADMIRALTY ROAD, GREAT YARMOUTH, NORFOLK, NR30 3PU	SCE0097C 2	NORFOLK	04-Jan-2013	08-Oct-2016	EFFECTIVE
138 K	167	N	BIFFA WASTE SERVICES LTD, BESSEMER WAY, HARFEYS IND EST, GREAT YARMOUTH, NORFOLK, NR31 0LX	BL8830	GREAT YARMOUTH BOROUGH COUNCIL	01-Jun-2003	08-Oct-2016	EFFECTIVE

## 2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

2

The following records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	Application Reference Number	NGR	Application Status	Application Date	Address	Details	Details of Enforcement Action
139R	0	On Site	No Details	652738 306121	Approved	No Details	Transco Plc, Southgates Road, Great Yarmouth, NR30 3DR	No Details	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified
140S	171	NW	HSC/0001	652131 306327	Historical Consent	20/06/1994	Ventureforth Estates Ltd, Ventureforth House, Great Yarmouth Business Park, Suffolk Road, Great Yarmouth	Storage of ammonium nitrate.	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified

## 2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

3

The following COMAH & NIHHS Authorisation records provided by the Health and Safety Executive are represented as polygons or buffered points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	Company	Address	Operational Status	Tier
104	0	On Site	British Gas	British Gas, Southgates Road, Great Yarmouth	Historical NIHHS Site	-
105N	0	On Site	Asco UK Limited	Asco UK Limited, Gas House Quay, Southtown Road, Great Yarmouth, Norfolk, NR30 3LX	Current COMAH Site	COMAH Lower Tier Operator
106G	15	S	ASCO UK Limited	ASCO UK Limited, Great Yarmouth, South Denes, Great Yarmouth, Norfolk, NR30 3LX	Current COMAH Site	COMAH Lower Tier Operator

## 2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

### 2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

13

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1	0	On Site	652080 305800	Incident Date: 23-Mar-2002 Incident Identification: 67348 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Food and Drink	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
2	0	On Site	652038 305831	Incident Date: 17-Sep-2003 Incident Identification: 190491 Pollutant: Inorganic Chemicals/Products Pollutant Description: Other Inorganic Chemical or Product	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
3F	0	On Site	652393 305828	Incident Date: 22-Aug-2003 Incident Identification: 184276 Pollutant: Specific Waste Materials: Specific Waste Materials Pollutant Description: Tyres: Vehicles and Vehicle Parts	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
4	230	N	652677 306610	Incident Date: 19-Jul-2003 Incident Identification: 175140 Pollutant: Organic Chemicals/Products Pollutant Description: Solvents	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
5	268	S	652860 305630	Incident Date: 03-Nov-2002 Incident Identification: 118445 Pollutant: Sewage Materials Pollutant Description: Storm Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
6A	314	N	652546 306692	Incident Date: 22-Nov-2001 Incident Identification: 44483 Pollutant: Atmospheric Pollutants and Effects: Contaminated Water Pollutant Description: Smoke: Firefighting Run-Off	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
7A	314	N	652546 306692	Incident Date: 22-Nov-2001 Incident Identification: 44483 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
8A	314	N	652546 306692	Incident Date: 22-Nov-2001 Incident Identification: 44483 Pollutant: Contaminated Water Pollutant Description: Firefighting Run-Off	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
9	412	NW	652242 306687	Incident Date: 05-Apr-2002 Incident Identification: 69833 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Animal and Vegetable Oil	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
10	447	N	652400 306810	Incident Date: 10-Jan-2002 Incident Identification: 51678 Pollutant: Oils and Fuel Pollutant Description: Gas and Fuel Oils	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

ID	Distance (m)	Direction	NGR	Details	
11	471	E	653200 306330	Incident Date: 21-Nov-2002 Incident Identification: 122176 Pollutant: Oils and Fuel Pollutant Description: Mixed/Waste Oils	Water Impact: Category 1 (Major) Land Impact: Category 1 (Major) Air Impact: Category 4 (No Impact)
12	477	S	652323 305182	Incident Date: 11-Sep-2001 Incident Identification: 30255 Pollutant: Agricultural Materials and Wastes Pollutant Description: Solid Manure	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
13J	500	N	652457 306874	Incident Date: 16-Nov-2002 Incident Identification: 121239 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

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### 2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

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### 2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

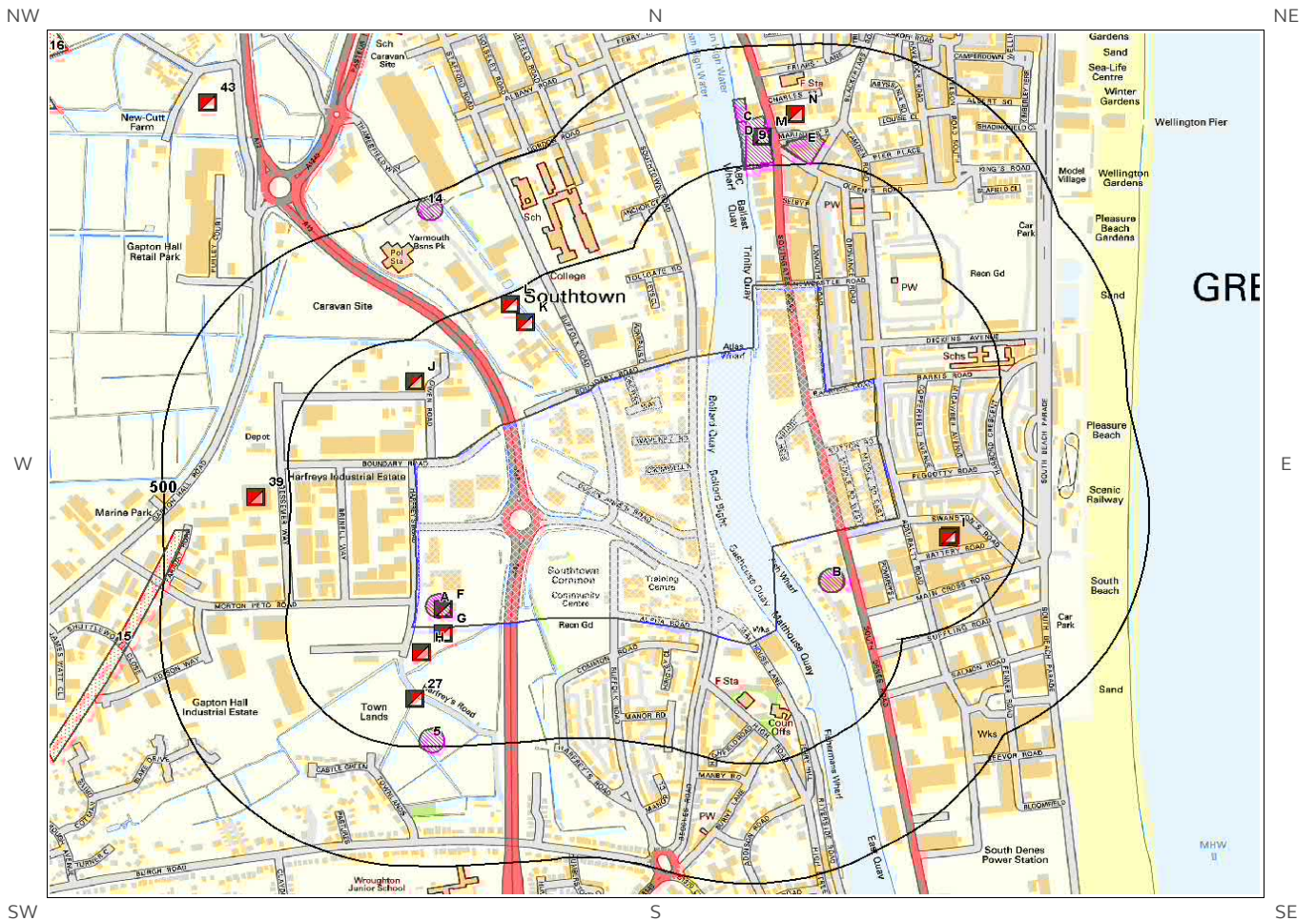
How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

0










Database searched and no data found.

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# 3. Landfill and Other Waste Sites Map



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-  Site Outline
-  250 Search Buffers (m)
-  500 Search Buffers (m)
-  EA/NRW Active Landfill
-  EA/NRW Historic Landfill
-  BGS / DoE Survey Landfill
-  Historic and Planned Waste Sites
-  EA/NRW Licensed Waste Site
-  Local Authority/Historical Mapping Landfill Records



# 3. Landfill and Other Waste Sites

## 3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

2

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
15	451	W	651200 305600	Site Address: Gapton Hall Site, Between Harfeys Road and Burgh Road, Great Yarmouth Waste Licence: - Site Reference: WD 709a Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: County Council Licence Holder: Great Yarmouth Council First Recorded: 30-Jun-1973 Last Recorded: 31-Dec-1974
16	1020	NW	650900 307300	Site Address: Cobholm Tip, Farm Lane, Humberstone, Great Yarmouth, Norfolk Waste Licence: Yes Site Reference: WD 506, WR 764, NFK/LS/060/0 Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: AZ1/L/VIN001	Licence Issue: 02-Jan-1974 Licence Surrendered: Licence Holder Address: Humberstone Farm, Southtown, Great Yarmouth, Norfolk Operator: Gt Yarmouth Borough Council Licence Holder: W H Vincent First Recorded: 31-May-1905 Last Recorded: 31-Dec-1995

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

### 3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

## 3.2 Other Waste Sites

### 3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

14

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details		
1A	0	On Site	651890 305707	Type of Site: Waste Recycling Centre Site Address: East Coast Waste, Harfreys Road, Harfreys Industrial Estate, GREAT YARMOUTH, Norfolk, NR31 0LS	Planning Application Reference: 06/07/0901/F Date: -	Further Details: Scheme comprises raise roof of waste recycling centre. An application (ref: 06/07/0901/F) for detailed planning permission was granted by Great Yarmouth B.C. Planning decision obtained Data Source: Historic Planning Application Data Type: Point
2A	0	On Site	651890 305707	Type of Site: Waste Recycling Centre Site Address: East Coast Waste, Harfreys Road, Harfreys Industrial Estate, GREAT YARMOUTH, Norfolk, NR31 0LS	Planning Application Reference: 06/07/0901/F Date: -	Further Details: Scheme comprises raise roof of waste recycling centre. An application (ref: 06/07/0901/F) for detailed planning permission was granted by Great Yarmouth B.C. Planning decision obtained Data Source: Historic Planning Application Data Type: Point

ID	Distance (m)	Direction	NGR	Details	
3B	74	S	652669 305759	Type of Site: Waste Transfer Station Site Address: 52 South Denes Road, GREAT YARMOUTH, Norfolk, NR30 3PR	Planning Application Reference: 6/95/593/F Date: -  Further Details: Comprises the installation of four new tanks totalling 82,000 gals for a new waste transfer station. Scheme comprises the installation of four new tanks totalling 82,000 gals for a new waste transfer station to control waste and cleaning within a containment area. This will include security fencing, loading areas and bollards. NEW INFORMATION: We are now advised that the land will be sold with the advantage of planning approval. An application (ref: 6/95/593/F) for Detailed Planning permission was submitted to Great Yarmouth B.C. on 3rd July 1995. Data Source: Historic Planning Application Data Type: Point
4B	74	S	652670 305759	Type of Site: Waste Transfer Station Site Address: ASCO UK Ltd, South Denes Road, GREAT YARMOUTH, Norfolk, NR30 3QF	Planning Application Reference: 06/98/0582/F Date: 01/05/1999  Further Details: Construction of a waste transfer station. The work will involve the construction of a waste transfer station which will include a recycling centre. Also included is a main storage building with roller shutters, laboratory, changing rooms, mess and powerwash bays, portable buildings, toilets, offices and storage tanks. An application (ref: 06/98/0582/F) for Detailed Planning permission was granted by Great Yarmouth B.C. on 4th September 1998. Data Source: Historic Planning Application Data Type: Point

ID	Distance (m)	Direction	NGR	Details		
5	212	S	651877 305425	Type of Site: Waste Transfer Station Site Address: Harfreys Road Industrial Site, GREAT YARMOUTH, Norfolk, NR30	Planning Application Reference: 98/0011 Date: 01/05/1998	Further Details: Improvements to works included 4 bulk storage tanks 2 x 5,000 gallons and 1 x 10,000 gallons and 1 x 12,000 gallons. Relocation of canopy tent and re-concreting of part of the yard with a new drainage system. Improvements to works included 4 bulk store tanks 2 x 5,000 gallons and 1 x 10,000 gallons and 1 x 12,000 gallons. Relocation of canopy tent and re-concreting of part of the yard with a new drainage system. NEW INFORMATION: Detailed plans approved by Norfolk County Council on the 3rd March, 1998. An application (ref: 98/0011) for Detailed Planning permission was granted by Great Yarmouth B.C. on 3rd March 1998. Data Source: Historic Planning Application Data Type: Point
6D	242	N	652491 306670	Type of Site: Scrap Iron Works Site Address: N/A	Planning Application Reference: N/A Date: 1967	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
7C	242	N	652495 306663	Type of Site: Scrap Iron Works Site Address: N/A	Planning Application Reference: N/A Date: 1987	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
8C	242	N	652495 306663	Type of Site: Scrap Iron Works Site Address: N/A	Planning Application Reference: N/A Date: 1987	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
9	242	N	652527 306675	Type of Site: Scrap Iron Works Site Address: N/A	Planning Application Reference: N/A Date: 1975	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
10D	242	N	652527 306675	Type of Site: Scrap Iron Works Site Address: N/A	Planning Application Reference: N/A Date: 1966	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
11E	249	N	652613 306663	Type of Site: Scrap Metal & Paper Merchants Site Address: N/A	Planning Application Reference: N/A Date: 1954	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
12E	249	N	652613 306663	Type of Site: Scrap Metal & Paper Merchants Site Address: N/A	Planning Application Reference: N/A Date: 1966	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
13E	250	N	652613 306663	Type of Site: Scrap Metal & Paper Merchants Site Address: N/A	Planning Application Reference: N/A Date: 1963	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon

ID	Distance (m)	Direction	NGR	Details	
14	450	N	651873 306538	Type of Site: Recycling Centre (Conversion) Site Address: Premier Recycling, Thamesfield Way, Great Yarmouth Business Park, GREAT YARMOUTH, Norfolk, NR31 0DN	Planning Application Reference: 06/06/0399/F Date: -  Further Details: Scheme comprises change of use to allow for metal recycling operations to be included into allowed uses. An application (ref: 06/06/0399/F) for Detailed Planning permission was submitted to Great Yarmouth B.C. on 5th May 2006. Data Source: Historic Planning Application Data Type: Point

### 3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

35

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
17F	0	On Site	651900 305700	Site Address: Lindgreat Yard, Harfreys Road, Great Yarmouth, Norfolk, NR31 0LS Type: Household, Commercial & Industrial Waste T Stn Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: THU005 EPR reference: - Operator: Thurtle Walter Waste Management licence No: 71429 Annual Tonnage: 25000.0	Issue Date: 08/04/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Lindgreat Yard Correspondence Address: Mr Gary Thurtle, Lindgreat Yard, Harfreys Road, Great Yarmouth, Norfolk, NR31 0LS
18F	0	On Site	651900 305700	Site Address: W T Waste, Harfreys Road, Harfreys Ind Est, Great Yarmouth, Norfolk, NR31 0LS Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: THU005 EPR reference: EA/EPR/CP3094NZ/V003 Operator: Thurtle Walter Waste Management licence No: 71429 Annual Tonnage: 25000.0	Issue Date: 08/04/2005 Effective Date: - Modified: 27/10/2014 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: W T Waste Correspondence Address: -
19G	13	S	651900 305650	Site Address: Folkes Plant And Aggregate, Harfrey's Road, Harfrey's Industrial Est, Great Yarmouth, Norfolk, NR31 0LS Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: FOL001 EPR reference: EA/EPR/FP3394NJ/A001 Operator: Folkes Plant & Aggregate Ltd Waste Management licence No: 71417 Annual Tonnage: 24999.0	Issue Date: 13/07/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Folkes Plant And Aggregate Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details
20G	13	S	651900 305650	<p>Site Address: Land Off Harfreys Road, Harfreys Indus Est, Great Yarmouth, Norfolk, NR31 9PY</p> <p>Type: 75kte HCl Waste TS + treatment Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: FOL001 EPR reference: EA/EPR/FP3394NJ/V002 Operator: Folkes Plant &amp; Aggregates Limited</p> <p>Waste Management licence No: 71417 Annual Tonnage: 24999.0</p> <p>Issue Date: 13/07/2005 Effective Date: - Modified: 22/10/2014 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified</p> <p>Site Name: Folkes Transfer Station Correspondence Address: -</p>
21G	13	S	651900 305650	<p>Site Address: Harfrey's Road, Harfrey's Industrial Est, Great Yarmouth, Norfolk, NR31 0LS</p> <p>Type: Household, Commercial &amp; Industrial Waste T Stn Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: FOL001 EPR reference: - Operator: Folkes Plant &amp; Aggregate Limited</p> <p>Waste Management licence No: 71417 Annual Tonnage: 24999.0</p> <p>Issue Date: 13/07/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued</p> <p>Site Name: Folkes Plant And Aggregate Correspondence Address: W. A. S. Ltd, P O Box 151, Lowestoft, Suffolk, NR32 3ZQ</p>
22H	53	S	651857 305610	<p>Site Address: Hafreys Industrial Estate, Hafreys Road, Great Yarmouth, Norfolk, NR31 0JR</p> <p>Type: Special Waste Transfer Station Size: &gt;= 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: MRP001 EPR reference: - Operator: Clements P</p> <p>Waste Management licence No: 70532 Annual Tonnage: 0.0</p> <p>Issue Date: 04/01/1990 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued</p> <p>Site Name: Great Yarmouth Correspondence Address: 74, Southdown Road, Great Yarmouth, Norfolk, NR31 0JR</p>
23H	53	S	651857 305610	<p>Site Address: Harfreys Industrial Estate, Harfreys Road, Great Yarmouth, Norfolk, NR31 0LS</p> <p>Type: Special Waste Transfer Station Size: &gt;= 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: MRP001 EPR reference: EA/EPR/YP3299NB/A001 Operator: Clements Paul</p> <p>Waste Management licence No: 70532 Annual Tonnage: 62500.0</p> <p>Issue Date: 04/01/1990 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued</p> <p>Site Name: Great Yarmouth Correspondence Address: -</p>
24I	108	SE	652900 305850	<p>Site Address: Hendee House, Battery Road, Great Yarmouth, Norfolk, NR30 3NN</p> <p>Type: Asbestos Waste Transfer Station Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: EAS147 EPR reference: EA/EPR/AB3801UE/S002 Operator: East Coast Insulations Limited</p> <p>Waste Management licence No: 71491 Annual Tonnage: 0.0</p> <p>Issue Date: 10/11/2006 Effective Date: 14/11/2013 Modified: 17/03/2011 Surrendered Date: 03/05/2016 Expiry Date: - Cancelled Date: - Status: Surrendered</p> <p>Site Name: Hendee House Correspondence Address: -</p>



ID	Distance (m)	Direction	NGR	Details
25I	108	SE	652900 305850	<p>Site Address: Hendee House, Battery Road, Great Yarmouth, Norfolk, NR30 3NN</p> <p>Type: Asbestos Waste Transfer Station Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: LEA002 EPR reference: EA/EPR/VP3494NV/V002 Operator: Mr Rodney John Lear And Mrs Pamela Margaret Lear Waste Management licence No: 71491 Annual Tonnage: 3650.0</p> <p>Issue Date: 10/11/2006 Effective Date: - Modified: 17/03/2011 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Hendee House Correspondence Address: -</p>
26I	111	E	652905 305855	<p>Site Address: Hendee House, Battery Road, Great Yarmouth, Norfolk, NR30 3NW</p> <p>Type: Special Waste Transfer Station Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: LEA002 EPR reference: VP3494NV/A001 Operator: R J Lear And P M Lear Waste Management licence No: 71491 Annual Tonnage: 3650.0</p> <p>Issue Date: 10/11/2006 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Hendee House, Battery Road Correspondence Address: -</p>
27	150	S	651843 305513	<p>Site Address: Hafrey's Road Transfer Station, Hafrey's Road, Townlands, Great Yarmouth, Norfolk, NR31 8JL</p> <p>Type: Inert &amp; excavation Waste TS + treatment Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: GRE397 EPR reference: EA/EPR/EB3535AM/V002 Operator: E E Green &amp; Son Ltd Waste Management licence No: 103802 Annual Tonnage: 74999.0</p> <p>Issue Date: 23/01/2012 Effective Date: - Modified: 01/05/2015 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Hafrey's Road Transfer Station Correspondence Address: -</p>
28J	163	N	651844 306177	<p>Site Address: Unit 2, Bessemer Way, Hafreys Industrial Estate, Great Yarmouth, NR31 0LX</p> <p>Type: Special Waste Transfer Station Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: UKW001 EPR reference: - Operator: U K Waste Management Ltd Waste Management licence No: 70505 Annual Tonnage: 0.0</p> <p>Issue Date: 01/05/1992 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Great Yarmouth Correspondence Address: Head Office, Coronation Road, Cressex, High Wycombe, HP12 3TZ</p>
29J	163	N	651844 306177	<p>Site Address: Unit 2, Bessemer Way, Hafreys Industrial Estate, Great Yarmouth, Norfolk, NR31 0LX</p> <p>Type: Special Waste Transfer Station Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: UKW003 EPR reference: EA/EPR/KP3898VU/V002 Operator: Biffa Waste Services Ltd Waste Management licence No: 70505 Annual Tonnage: 4999.0</p> <p>Issue Date: 01/05/1992 Effective Date: - Modified: 02/04/2012 Surrendered Date: 0 Expiry Date: - Cancelled Date: - Status: Modified Site Name: Biffa Waste Services Ltd Correspondence Address: -</p>

ID	Distance (m)	Direction	NGR	Details
30J	163	N	651844 306177	<p>Site Address: Unit 2, Bessemer Way, Hafeys Industrial Estate, Great Yarmouth, Norfolk, NR31 0LX</p> <p>Type: Special Waste Transfer Station Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: AUG012 EPR reference: EA/EPR/EB3001TS/T001 Operator: Augean North Sea Services Limited</p> <p>Waste Management licence No: 70505 Annual Tonnage: 4999.0</p> <p>Issue Date: 01/05/1992 Effective Date: 19/04/2016 Modified: 02/04/2012 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred</p> <p>Site Name: Great Yarmouth Waste Management Resource Centre Correspondence Address: -</p>
31K	183	NW	652062 306301	<p>Site Address: Yarmouth Business Park, Suffolk Road, Great Yarmouth, Norfolk, NR31 0ER</p> <p>Type: Special Waste Transfer Station Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: MIT001 EPR reference: EA/EPR/YP3799NF/V002 Operator: Mitchell Cliff</p> <p>Waste Management licence No: 70536 Annual Tonnage: 5000.0</p> <p>Issue Date: 03/09/1991 Effective Date: - Modified: 26/01/2006 Surrendered Date: 0 Expiry Date: - Cancelled Date: - Status: Modified</p> <p>Site Name: C + L Waste Oil Collection Correspondence Address: -</p>
32K	183	NW	652062 306301	<p>Site Address: Yarmouth Business Park, Thamesfield Way, Great Yarmouth, Norfolk, NR31 0DN</p> <p>Type: Special Waste Transfer Station Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: MIT001 EPR reference: EA/EPR/YP3799NF/V003 Operator: Mitchell C B</p> <p>Waste Management licence No: 70536 Annual Tonnage: 5000.0</p> <p>Issue Date: 03/09/1991 Effective Date: - Modified: 10/05/2016 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified</p> <p>Site Name: Great Yarmouth Oil Reclamation Facility Correspondence Address: -</p>
33L	229	NW	652033 306339	<p>Site Address: Yarmouth Business Park, Suffolk Road, Great Yarmouth, Norfolk, NR31 0ER</p> <p>Type: Special Waste Transfer Station Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: MRE001 EPR reference: - Operator: Brown E W</p> <p>Waste Management licence No: 70535 Annual Tonnage: 0.0</p> <p>Issue Date: 03/09/1991 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued</p> <p>Site Name: Great Yarmouth Correspondence Address: Brookfields Business Centre, Cottenham, Cambridge, CB4 8PS</p>
34L	229	NW	652033 306339	<p>Site Address: Yarmouth Business Park, Suffolk Road, Great Yarmouth, Norfolk, NR31 0ER</p> <p>Type: Special Waste Transfer Station Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: MA001 EPR reference: - Operator: Malary Environmental Services Ltd</p> <p>Waste Management licence No: 70535 Annual Tonnage: 0.0</p> <p>Issue Date: 03/09/1991 Effective Date: 01/07/2004 Modified: 01/07/2004 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified</p> <p>Site Name: Yarmouth Business Park Correspondence Address: D Stapleton, Brookfield Business Centre, Unit B1, Twenty Pence Road, Cottenham, Cambridge, CB4 8PS</p>

ID	Distance (m)	Direction	NGR	Details
35L	229	NW	652033 306339	<p>Site Address: Yarmouth Business Park, Suffolk Road, Great Yarmouth, Norfolk, NR31 0ER Type: Special Waste Transfer Station Size: &lt; 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MAL001 EPR reference: EA/EPR/YP3199NQ/S004 Operator: Malary Ltd Waste Management licence No: 70535 Annual Tonnage: 0.0</p> <p>Issue Date: 03/09/1991 Effective Date: 23/11/2006 Modified: 01/07/2004 Surrendered Date: 14/03/2007 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Yarmouth Business Park Correspondence Address: -</p>
36L	229	NW	652033 306339	<p>Site Address: Yarmouth Business Park, Suffolk Road, Great Yarmouth, Norfolk, NR31 0ER Type: Special Waste Transfer Station Size: &lt; 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MA001 EPR reference: - Operator: Malary Environmental Services Ltd Waste Management licence No: 70535 Annual Tonnage: 0.0</p> <p>Issue Date: 03/09/1991 Effective Date: 01/07/2004 Modified: 01/07/2004 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Yarmouth Business Park Correspondence Address: Brookfield Business Centre, Unit B1, Twentypence Road, Cottenham, Cambridge, CB4 8PS</p>
37M	310	N	652531 306688	<p>Site Address: 132b, South Quay, Great Yarmouth, Norfolk, NR30 3LD Type: Metal Recycling Site (mixed MRS's) Size: &gt;= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MAY001 EPR reference: EA/EPR/AP3999NE/V002 Operator: Mayer Parry ( East Anglia ) Ltd Waste Management licence No: 70493 Annual Tonnage: 78000.0</p> <p>Issue Date: 23/08/1993 Effective Date: - Modified: 11/12/1992 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Great Yarmouth Correspondence Address: -</p>
38M	310	N	652531 306688	<p>Site Address: South Quay, Great Yarmouth, Norfolk, NR30 3LD Type: Metal Recycling Site (mixed MRS's) Size: &gt;= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MAY001 EPR reference: - Operator: Mayer Parry East Anglia Ltd Waste Management licence No: 70493 Annual Tonnage: 0.0</p> <p>Issue Date: 23/08/1993 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Great Yarmouth Correspondence Address: 111, Fordham Road, Snailwell, Newmarket, Suffolk, CB8 7ND</p>
39	319	W	651529 305936	<p>Site Address: Bessemer Way, Hafreys Industrial Estate, Great Yarmouth, Norfolk, NR31 0LX Type: Household, Commercial &amp; Industrial Waste T Stn Size: &lt; 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: TRA001 EPR reference: EA/EPR/YP3699NT/S002 Operator: Transmit Containers Ltd Waste Management licence No: 70534 Annual Tonnage: 432.0</p> <p>Issue Date: 06/12/1990 Effective Date: - Modified: - Surrendered Date: 14/11/2003 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Great Yarmouth Correspondence Address: -</p>

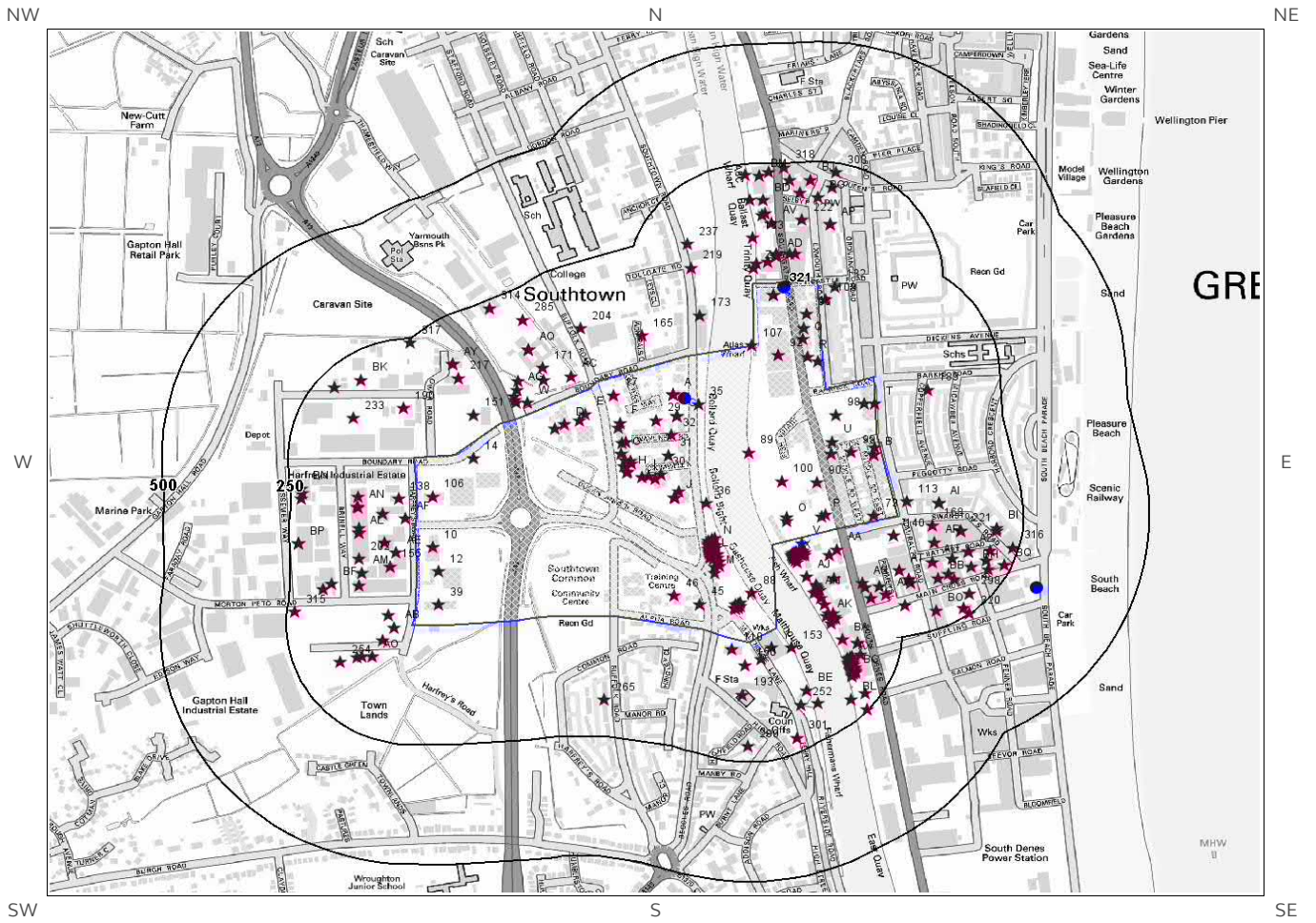
ID	Distance (m)	Direction	NGR	Details
40N	354	N	652597 306735	<p>Site Address: G A Car Spares, 127/129, South Quay, Great Yarmouth, Norfolk, NR30 3LD</p> <p>Type: Vehicle Depollution Facility &lt;5000 tps</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ALL136</p> <p>EPR reference: EA/EPR/JB3537RX/A001</p> <p>Operator: Allard Michael</p> <p>Waste Management licence No: 104491</p> <p>Annual Tonnage: 4999.0</p> <p>Issue Date: 31/07/2012</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: G A Car Spares</p> <p>Correspondence Address: -</p>
41N	354	N	652597 306735	<p>Site Address: G &amp; A Car Spares, 127 - 129, South Quay, Great Yarmouth, Norfolk, NR30 3LD</p> <p>Type: Vehicle Depollution Facility &lt;5000 tps</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: GAC002</p> <p>EPR reference: EA/EPR/CB3702FS/V002</p> <p>Operator: G &amp; A Car Spares Limited</p> <p>Waste Management licence No: 104491</p> <p>Annual Tonnage: 4999.0</p> <p>Issue Date: 31/07/2012</p> <p>Effective Date: 06/06/2015</p> <p>Modified: 18/08/2016</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: G &amp; A Car Spares</p> <p>Correspondence Address: -</p>
Not shown	766	W	651080 305911	<p>Site Address: D&amp;j Metals, Vanguard Road, Gapton Hall Ind Est, Great Yarmouth, Norfolk, NR31 0NT</p> <p>Type: Metal Recycling Site (mixed MRS's)</p> <p>Size: &gt;= 25000 tonnes &lt; 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: DOU001</p> <p>EPR reference: EA/EPR/RP3099NN/A001</p> <p>Operator: Mr Douglas Victor Gray And Mr John Gray</p> <p>Waste Management licence No: 70504</p> <p>Annual Tonnage: 24999.0</p> <p>Issue Date: 22/02/1995</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Great Yarmouth</p> <p>Correspondence Address: -</p>
43	853	NW	651432 306761	<p>Site Address: Land / Premises At, High Mill Link Road, Cobholm, Great Yarmouth, Norfolk, NR31 0DL</p> <p>Type: Metal Recycling Site (Vehicle Dismantler)</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: DOC001</p> <p>EPR reference: EA/EPR/KP3694NT/A001</p> <p>Operator: Docwra Mike</p> <p>Waste Management licence No: 71385</p> <p>Annual Tonnage: 2499.0</p> <p>Issue Date: 25/11/2004</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Mike Docwra Car Breakers</p> <p>Correspondence Address: -</p>
Not shown	874	W	650971 305888	<p>Site Address: Vanguard Road, Gapton Hall Ind Est, Great Yarmouth, Norfolk, NR31 0NT</p> <p>Type: Metal Recycling Site (mixed MRS's)</p> <p>Size: &gt;= 25000 tonnes &lt; 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: DOU001</p> <p>EPR reference: -</p> <p>Operator: D &amp; J Metals</p> <p>Waste Management licence No: 70504</p> <p>Annual Tonnage: 0.0</p> <p>Issue Date: 22/02/1995</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Great Yarmouth</p> <p>Correspondence Address: Vanguard Road, Gapton Hall Ind. Est, Great Yarmouth, Norfolk, NR31 0NT</p>

ID	Distance (m)	Direction	NGR	Details
Not shown	874	W	650971 305888	<p>Site Address: Vanguard Road, Gapton Hall Ind Estate, Great Yarmouth, Norfolk, NR31 0NT Type: Household, Commercial &amp; Industrial Waste T Stn Size: &lt; 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GRA001 EPR reference: - Operator: Gray Douglas Victor Waste Management licence No: 71237 Annual Tonnage: 0.0</p> <p>Issue Date: 13/11/1998 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Great Yarmouth Correspondence Address: Vanguard Road, Gapton Hall Ind Estate, Great Yarmouth, Norfolk, NR31 0NT</p>
Not shown	874	W	650971 305888	<p>Site Address: Land / Premises At, Vanguard Road, Gapton Hall Ind Estate, Great Yarmouth, Norfolk, NR31 0NT Type: 75kte HCI Waste TS + asbestos Size: &lt; 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GRA001 EPR reference: EA/EPR/DP3699LH/V003 Operator: Gray Douglas Victor Waste Management licence No: 71237 Annual Tonnage: 24999.0</p> <p>Issue Date: 13/11/1998 Effective Date: - Modified: 19/03/2009 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: D And J Metals Correspondence Address: -</p>
Not shown	1329	SE	653041 304410	<p>Site Address: Technical Waste Management Centre, South Denes Road, Great Yarmouth, Norfolk, NR30 3LY Type: Special Waste Transfer Station Size: &lt; 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ASC002 EPR reference: - Operator: A S C O ( U K ) Ltd Waste Management licence No: 71257 Annual Tonnage: 0.0</p> <p>Issue Date: 24/01/2001 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Great Yarmouth Correspondence Address: Offshore Supply Base, South Denes Road, Great Yarmouth, Norfolk, NR30 3LY</p>
Not shown	1329	SE	653041 304410	<p>Site Address: Technical Waste Management Centre, South Denes Road, Great Yarmouth, Norfolk, NR30 3LY Type: Special Waste Transfer Station Size: &lt; 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ASC002 EPR reference: - Operator: A S C O ( U K ) Ltd Waste Management licence No: 71257 Annual Tonnage: 24999.0</p> <p>Issue Date: 24/01/2001 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Great Yarmouth Correspondence Address: Offshore Supply Base, South Denes Road, Great Yarmouth, Norfolk, NR30 3LY</p>
Not shown	1329	SE	653041 304410	<p>Site Address: Technical Waste Management Centre, South Denes Road, Great Yarmouth, Norfolk, NR30 3LY Type: Special Waste Transfer Station Size: &lt; 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ENV230 EPR reference: EA/EPR/QP3898NL/T002 Operator: Enviroco Ltd Waste Management licence No: 71257 Annual Tonnage: 24999.0</p> <p>Issue Date: 24/01/2001 Effective Date: 13/03/2008 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Great Yarmouth Correspondence Address: -</p>

ID	Distance (m)	Direction	NGR	Details
Not shown	1359	SE	653066 304389	<p>Site Address: Great Yarmouth Technical Waste Management Centre, Berths 2-4, South Denes Road, Great Yarmouth, Norfolk, NR30 3QF</p> <p>Type: Physical Treatment Facility</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ENV230</p> <p>EPR reference: EA/EPR/PP3532UT/V005</p> <p>Operator: Enviroco Limited</p> <p>Waste Management licence No: 71257</p> <p>Annual Tonnage: 24999.0</p> <p>Issue Date: 24/01/2001</p> <p>Effective Date: 13/03/2008</p> <p>Modified: 25/01/2016</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Great Yarmouth Technical Waste Management Centre</p> <p>Correspondence Address: -</p>
Not shown	1359	SE	653066 304389	<p>Site Address: Great Yarmouth Technical Waste Management Centre, Berths 2-4, South Denes Road, Great Yarmouth, Norfolk, NR30 3QF</p> <p>Type: Physical Treatment Facility</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ENV230</p> <p>EPR reference: EA/EPR/PP3532UT/V004</p> <p>Operator: Enviroco Ltd</p> <p>Waste Management licence No: 71257</p> <p>Annual Tonnage: 24999.0</p> <p>Issue Date: 24/01/2001</p> <p>Effective Date: 13/03/2008</p> <p>Modified: 16/05/2013</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Great Yarmouth Technical Waste Management Centre</p> <p>Correspondence Address: -</p>



# 4. Current Land Use Map



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-  Site Outline
-  Current Industrial Sites
-  Electricity Transmission Cables
-  Search Buffers (m)
-  Petrol & Fuel Sites
-  Gas Transmission Pipelines

# 4. Current Land Uses

## 4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 320

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1H	0	On Site	Simpsons Skoda	652263 305982	Simpsons Skoda, Unit 1, Suffolk Road, Great Yarmouth, NR31 0LN	New Vehicles	Motoring
2D	0	On Site	3 Sun Group	652140 306084	3 Sun Group, 3sun House, Boundary Road, Great Yarmouth, NR31 0FB	Electronic Equipment	Industrial Products
3A	0	On Site	Kirkley Tyres & Wheels	652355 306146	Kirkley Tyres & Wheels, 126, Southtown Road, Great Yarmouth, NR31 0JZ	Vehicle Repair, Testing and Servicing	Repair and Servicing
4A	0	On Site	BP Service Station	652355 306146	BP Service Station, 126, Southtown Road, Great Yarmouth, NR31 0JZ	Petrol and Fuel Stations	Road and Rail
5B	0	On Site	Stalwart Signs & Industrial Supplies Ltd	652752 306021	Stalwart Signs & Industrial Supplies Ltd, Anglian House, Admiralty Road, Great Yarmouth, NR30 3DY	Special Purpose Machinery and Equipment	Industrial Products
6B	0	On Site	Discount Sheds & Stables	652752 306021	Discount Sheds & Stables, Anglian House, Admiralty Road, Great Yarmouth, NR30 3DY	Garden Goods	Consumer Products
7F	0	On Site	Suffolk Road Motoring Services	652250 306086	Suffolk Road Motoring Services, Unit 8-9, Suffolk Road, Great Yarmouth, NR31 0LN	Vehicle Repair, Testing and Servicing	Repair and Servicing
8C	0	On Site	J D Moore	652362 306101	J D Moore, 128, Southtown Road, Great Yarmouth, NR31 0LA	Vehicle Repair, Testing and Servicing	Repair and Servicing
9C	0	On Site	Southtown Cars	652362 306101	Southtown Cars, 128, Southtown Road, Great Yarmouth, NR31 0LA	Secondhand Vehicles	Motoring
10	0	On Site	L G Perfect	651878 305826	L G Perfect, Harfreys Road, Great Yarmouth, NR31 0JL	Vehicle Repair, Testing and Servicing	Repair and Servicing
11R	0	On Site	Afordable Cars	652621 306224	Afordable Cars, 41a, Southgates Road, Great Yarmouth, NR30 3LL	Secondhand Vehicles	Motoring
12	0	On Site	Weatherford UK	651890 305776	Weatherford UK, Harfreys Road, Great Yarmouth, NR31 0LS	Special Purpose Machinery and Equipment	Industrial Products
13E	0	On Site	Pumping Station	652180 306105	Pumping Station, NR31	Water Pumping Stations	Industrial Features

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
14	0	On Site	Electricity Sub Station	651959 306013	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
15D	0	On Site	Depot	652121 306075	Depot, NR31	Container and Storage	Transport, Storage and Delivery
16E	0	On Site	Electricity Sub Station	652169 306091	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
17	0	On Site	Mitchells Renault	652238 306144	Mitchells Renault, Suffolk Road, Great Yarmouth, NR31 0LN	Vehicle Repair, Testing and Servicing	Repair and Servicing
18F	0	On Site	Warehouse	652246 306076	Warehouse, NR31	Container and Storage	Transport, Storage and Delivery
19G	0	On Site	Warehouse	652253 306022	Warehouse, NR31	Container and Storage	Transport, Storage and Delivery
20G	0	On Site	Works	652254 306045	Works, NR31	Unspecified Works Or Factories	Industrial Features
21G	0	On Site	Depot	652257 305997	Depot, NR31	Container and Storage	Transport, Storage and Delivery
22G	0	On Site	Warehouse	652260 306010	Warehouse, NR31	Container and Storage	Transport, Storage and Delivery
23G	0	On Site	Tank	652262 306047	Tank, NR31	Tanks (Generic)	Industrial Features
24H	0	On Site	Works	652265 305985	Works, NR31	Unspecified Works Or Factories	Industrial Features
25H	0	On Site	Tank	652271 306007	Tank, NR31	Tanks (Generic)	Industrial Features
26I	0	On Site	Warehouse	652293 305974	Warehouse, NR31	Container and Storage	Transport, Storage and Delivery
27I	0	On Site	Works	652306 305976	Works, NR31	Unspecified Works Or Factories	Industrial Features
28I	0	On Site	Works	652320 305970	Works, NR31	Unspecified Works Or Factories	Industrial Features
29	0	On Site	Works	652322 306092	Works, NR31	Unspecified Works Or Factories	Industrial Features
30	0	On Site	Depot	652330 305980	Depot, NR31	Container and Storage	Transport, Storage and Delivery
31	0	On Site	Works	652345 306019	Works, NR31	Unspecified Works Or Factories	Industrial Features
32	0	On Site	Works	652351 306061	Works, NR31	Unspecified Works Or Factories	Industrial Features
33J	0	On Site	Peter Doidge	652359 305931	Peter Doidge, Southtown Road, Great Yarmouth, NR31 0LA	Vehicle Parts and Accessories	Motoring
34J	0	On Site	Tank	652366 305943	Tank, NR31	Tanks (Generic)	Industrial Features
35	0	On Site	Quay	652406 306126	Quay, NR31	Moorings and Unloading Facilities	Water
36	0	On Site	Quay	652420 305919	Quay, NR31	Moorings and Unloading Facilities	Water
37J	0	On Site	Depot	652358 305931	Depot, NR31	Container and Storage	Transport, Storage and Delivery
38G	0	On Site	Tank	652272 306002	Tank, NR31	Tanks (Generic)	Industrial Features

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
39	0	On Site	East Coast Waste	651890 305707	East Coast Waste, Harfreys Road, Great Yarmouth, NR31 0LS	Construction and Tool Hire	Hire Services
40A	0	On Site	Southtown Service Station	652355 306146	Southtown Service Station, 126, Southtown Road, Great Yarmouth, NR31 0JZ	Petrol and Fuel Stations	Road and Rail
41K	0	On Site	Tank	652479 305698	Tank, NR31	Tanks (Generic)	Industrial Features
42K	0	On Site	Tank	652477 305700	Tank, NR31	Tanks (Generic)	Industrial Features
43K	0	On Site	Tank	652482 305704	Tank, NR31	Tanks (Generic)	Industrial Features
44K	0	On Site	Tank	652489 305704	Tank, NR31	Tanks (Generic)	Industrial Features
45	0	On Site	Electricity Sub Station	652408 305708	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
46	0	On Site	Gas Distribution Station	652358 305726	Gas Distribution Station, NR31	Gas Features	Infrastructure and Facilities
47L	0	On Site	Tank	652428 305809	Tank, NR31	Tanks (Generic)	Industrial Features
48M	0	On Site	Electricity Sub Station	652438 305774	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
49L	0	On Site	Tank	652437 305786	Tank, NR31	Tanks (Generic)	Industrial Features
50M	0	On Site	Tank	652448 305789	Tank, NR31	Tanks (Generic)	Industrial Features
51L	0	On Site	Tank	652447 305798	Tank, NR31	Tanks (Generic)	Industrial Features
52L	0	On Site	Tank	652435 305804	Tank, NR31	Tanks (Generic)	Industrial Features
53L	0	On Site	Tank	652434 305820	Tank, NR31	Tanks (Generic)	Industrial Features
54L	0	On Site	Tank	652428 305805	Tank, NR31	Tanks (Generic)	Industrial Features
55L	0	On Site	Tank	652439 305805	Tank, NR31	Tanks (Generic)	Industrial Features
56L	0	On Site	Tank	652439 305825	Tank, NR31	Tanks (Generic)	Industrial Features
57L	0	On Site	Tank	652425 305831	Tank, NR31	Tanks (Generic)	Industrial Features
58L	0	On Site	Tank	652432 305811	Tank, NR31	Tanks (Generic)	Industrial Features
59L	0	On Site	Tank	652435 305811	Tank, NR31	Tanks (Generic)	Industrial Features
60L	0	On Site	Tank	652439 305812	Tank, NR31	Tanks (Generic)	Industrial Features
61L	0	On Site	Tank	652427 305815	Tank, NR31	Tanks (Generic)	Industrial Features
62L	0	On Site	Tank	652431 305816	Tank, NR31	Tanks (Generic)	Industrial Features
63L	0	On Site	Tank	652425 305824	Tank, NR31	Tanks (Generic)	Industrial Features

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64L	0	On Site	Tank	652429 305825	Tank, NR31	Tanks (Generic)	Industrial Features
65L	0	On Site	Tank	652439 305832	Tank, NR31	Tanks (Generic)	Industrial Features
66L	0	On Site	Tank	652430 305832	Tank, NR31	Tanks (Generic)	Industrial Features
67N	0	On Site	Tank	652433 305836	Tank, NR31	Tanks (Generic)	Industrial Features
68N	0	On Site	Tank	652425 305840	Tank, NR31	Tanks (Generic)	Industrial Features
69N	0	On Site	Tank	652434 305841	Tank, NR31	Tanks (Generic)	Industrial Features
70N	0	On Site	Tank	652437 305846	Tank, NR31	Tanks (Generic)	Industrial Features
71O	0	On Site	Broadland Fuels	652580 305882	Broadland Fuels, Fishwharf, Great Yarmouth, NR30 3LX	Fuel Distributors and Suppliers	Household, Office, Leisure and Garden
72O	0	On Site	Depot	652581 305889	Depot, NR30	Container and Storage	Transport, Storage and Delivery
73	0	On Site	Works	652752 305893	Works, NR30	Unspecified Works Or Factories	Industrial Features
74K	0	On Site	Tank	652485 305706	Tank, NR31	Tanks (Generic)	Industrial Features
75L	0	On Site	Tank	652434 305832	Tank, NR31	Tanks (Generic)	Industrial Features
76K	0	On Site	Tank	652489 305711	Tank, NR31	Tanks (Generic)	Industrial Features
77L	0	On Site	Tank	652426 305819	Tank, NR31	Tanks (Generic)	Industrial Features
78L	0	On Site	Tank	652443 305812	Tank, NR31	Tanks (Generic)	Industrial Features
79N	0	On Site	Tank	652432 305845	Tank, NR31	Tanks (Generic)	Industrial Features
80L	0	On Site	Tank	652443 305805	Tank, NR31	Tanks (Generic)	Industrial Features
81K	0	On Site	Tank	652484 305700	Tank, NR31	Tanks (Generic)	Industrial Features
82L	0	On Site	Tank	652424 305835	Tank, NR31	Tanks (Generic)	Industrial Features
83K	0	On Site	Tank	652484 305710	Tank, NR31	Tanks (Generic)	Industrial Features
84N	0	On Site	Tank	652429 305836	Tank, NR31	Tanks (Generic)	Industrial Features
85P	0	On Site	Works	652649 305892	Works, NR30	Unspecified Works Or Factories	Industrial Features
86P	0	On Site	Electricity Sub Station	652658 305895	Electricity Sub Station, NR30	Electrical Features	Infrastructure and Facilities
87K	0	On Site	Tank	652479 305707	Tank, NR31	Tanks (Generic)	Industrial Features
88	0	On Site	Gashouse Quay	652510 305731	Gashouse Quay, NR31	Moorings and Unloading Facilities	Water
89	0	On Site	Fish Wharf	652506 306025	Fish Wharf, NR30	Moorings and Unloading Facilities	Water



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90	0	On Site	Works	652640 305962	Works, NR30	Unspecified Works Or Factories	Industrial Features
91S	0	On Site	BP Service Station	652554 306353	BP Service Station, Southgates Road, Great Yarmouth, NR30 3LL	Petrol and Fuel Stations	Road and Rail
92	0	On Site	Warehouse	652564 306228	Warehouse, NR30	Container and Storage	Transport, Storage and Delivery
93Q	0	On Site	Depot	652613 306262	Depot, NR30	Container and Storage	Transport, Storage and Delivery
94Q	0	On Site	Score Group Plc	652614 306284	Score Group Plc, 33-36, Southgates Road, Great Yarmouth, NR30 3LL	Seals, Tapes, Taps and Valves	Industrial Products
95	0	On Site	Works	652619 306314	Works, NR30	Unspecified Works Or Factories	Industrial Features
96R	0	On Site	Depot	652643 306215	Depot, NR30	Container and Storage	Transport, Storage and Delivery
97U	0	On Site	Depot	652670 306047	Depot, NR30	Container and Storage	Transport, Storage and Delivery
98	0	On Site	Depot	652678 306104	Depot, NR30	Container and Storage	Transport, Storage and Delivery
99	0	On Site	Factory	652708 306026	Factory, NR30	Unspecified Works Or Factories	Industrial Features
100	0	On Site	Depot	652571 305965	Depot, NR30	Container and Storage	Transport, Storage and Delivery
101T	0	On Site	Electricity Sub Station	652755 306127	Electricity Sub Station, NR30	Electrical Features	Infrastructure and Facilities
102B	0	On Site	Works	652755 306035	Works, NR30	Unspecified Works Or Factories	Industrial Features
103S	0	On Site	South Quay Service Station	652554 306353	South Quay Service Station, Southgates Road, Great Yarmouth, NR30 3LL	Petrol and Fuel Stations	Road and Rail
104T	0	On Site	Gas Holder Station	652734 306128	Gas Holder Station, NR30	Gas Features	Infrastructure and Facilities
105U	0	On Site	H S Fishing 2000 Ltd	652669 306023	H S Fishing 2000 Ltd, Sutton Road, Great Yarmouth, NR30 3NA	Fish, Meat and Poultry Products	Foodstuffs
106	0	On Site	Noritake Itron	651879 305932	Noritake Itron, Vantage House, Harfreys Road, Great Yarmouth, NR31 0LS	Electrical Components	Industrial Products
107	2	N	Atlas Wharf	652511 306249	Atlas Wharf, NR30	Moorings and Unloading Facilities	Water
108V	11	S	Electricity Sub Station	652611 305835	Electricity Sub Station, NR30	Electrical Features	Infrastructure and Facilities
109	13	E	Factory	652657 306344	Factory, NR30	Unspecified Works Or Factories	Industrial Features
110	22	S	C L S Offshore	652471 305612	C L S Offshore, Maltings House, Malthouse Lane, Gorleston, Great Yarmouth, NR31 0GY	Special Purpose Machinery and Equipment	Industrial Products
111A F	23	W	Electricity Sub Station	651824 305887	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
112W	24	NW	Tank	652066 306129	Tank, NR31	Tanks (Generic)	Industrial Features



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113	24	E	Southgates UK	652817 305922	Southgates UK, Oilmar House, Admiralty Road, Great Yarmouth, NR30 3NG	Vehicle Repair, Testing and Servicing	Repair and Servicing
114V	24	S	Tank	652599 305818	Tank, NR30	Tanks (Generic)	Industrial Features
115V	25	S	Tank	652595 305816	Tank, NR30	Tanks (Generic)	Industrial Features
116V	25	S	Tank	652604 305818	Tank, NR30	Tanks (Generic)	Industrial Features
117V	25	S	Tank	652608 305819	Tank, NR30	Tanks (Generic)	Industrial Features
118V	26	S	Tank	652613 305820	Tank, NR30	Tanks (Generic)	Industrial Features
119V	26	S	Tank	652592 305814	Tank, NR30	Tanks (Generic)	Industrial Features
120V	28	S	Tank	652597 305813	Tank, NR30	Tanks (Generic)	Industrial Features
121V	29	S	Tank	652594 305812	Tank, NR30	Tanks (Generic)	Industrial Features
122V	29	S	Tank	652590 305810	Tank, NR30	Tanks (Generic)	Industrial Features
123V	30	S	Tank	652609 305815	Tank, NR30	Tanks (Generic)	Industrial Features
124V	30	S	Tank	652615 305816	Tank, NR30	Tanks (Generic)	Industrial Features
125V	30	S	Tank	652605 305813	Tank, NR30	Tanks (Generic)	Industrial Features
126V	31	S	Tank	652599 305811	Tank, NR30	Tanks (Generic)	Industrial Features
127Y	31	SE	Works	652551 305617	Works, NR31	Unspecified Works Or Factories	Industrial Features
128V	32	S	Tank	652612 305813	Tank, NR30	Tanks (Generic)	Industrial Features
129W	33	NW	Tank	652044 306129	Tank, NR31	Tanks (Generic)	Industrial Features
130Z	33	N	Trinity Quay	652515 306411	Trinity Quay, NR30	Moorings and Unloading Facilities	Water
131X	34	S	Tank	652592 305806	Tank, NR30	Tanks (Generic)	Industrial Features
132	34	E	Electricity Sub Station	652676 306372	Electricity Sub Station, NR30	Electrical Features	Infrastructure and Facilities
133X	35	S	Tank	652610 305810	Tank, NR30	Tanks (Generic)	Industrial Features
134X	35	S	Tank	652616 305811	Tank, NR30	Tanks (Generic)	Industrial Features
135A B	37	W	Tank	651803 305659	Tank, NR31	Tanks (Generic)	Industrial Features
136X	37	S	Tank	652599 305805	Tank, NR30	Tanks (Generic)	Industrial Features
137X	37	S	Tank	652594 305803	Tank, NR30	Tanks (Generic)	Industrial Features

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138	37	W	Fine Line Communications	651811 305928	Fine Line Communications, Logic House, Harfreys Road, Great Yarmouth, NR31 0LS	Radar and Telecommunications Equipment	Industrial Products
139W	38	NW	Tank	652042 306134	Tank, NR31	Tanks (Generic)	Industrial Features
140	38	S	Electricity Sub Station	652793 305851	Electricity Sub Station, NR30	Electrical Features	Infrastructure and Facilities
141A C	39	NW	Electricity Sub Station	652153 306184	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
142A E	41	W	Harfreys Industrial Estate	651806 305816	Harfreys Industrial Estate, NR31	Business Parks and Industrial Estates	Industrial Features
143Y	41	SE	Electricity Sub Station	652529 305593	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
144A A	41	S	Tank	652680 305822	Tank, NR30	Tanks (Generic)	Industrial Features
145X	42	S	Tank	652597 305799	Tank, NR30	Tanks (Generic)	Industrial Features
146Z	42	N	Travelling Crane	652520 306420	Travelling Crane, NR30	Travelling Cranes and Gantries	Industrial Features
147Z	45	N	Trinity House Depot	652542 306423	Trinity House Depot, NR30	Container and Storage	Transport, Storage and Delivery
148X	45	E	Tank	652600 305795	Tank, NR30	Tanks (Generic)	Industrial Features
149W	46	NW	Tank	652040 306142	Tank, NR31	Tanks (Generic)	Industrial Features
150	47	S	Eastern Monitoring Services	652498 305580	Eastern Monitoring Services, Malthouse Lane, Gorleston, Great Yarmouth, NR31 0GW	Electronic Equipment	Industrial Products
151	48	NW	Tank	651959 306104	Tank, NR31	Tanks (Generic)	Industrial Features
152A A	49	S	Works	652665 305810	Works, NR30	Unspecified Works Or Factories	Industrial Features
153	49	SE	Malthouse Quay	652589 305617	Malthouse Quay, NR31	Moorings and Unloading Facilities	Water
154A B	52	W	C A H Quickmix	651791 305685	C A H Quickmix, Morton Peto Road, Great Yarmouth, NR31 0LT	Concrete Products	Industrial Products
155	53	W	S S C S	651794 305786	S S C S, Harfreys Road, Great Yarmouth, NR31 0LS	Lifting and Handling Equipment	Industrial Products
156A C	55	NW	K S D Fabrication Ltd	652099 306177	K S D Fabrication Ltd, Yarmouth Business Park, Thamesfield Way, Great Yarmouth, NR31 0DN	Metals Manufacturers, Fabricators and Stockholders	Industrial Products
157A D	56	N	Tank	652560 306435	Tank, NR30	Tanks (Generic)	Industrial Features
158A G	57	NW	Works	652045 306156	Works, NR31	Unspecified Works Or Factories	Industrial Features
159A D	59	N	Tank	652560 306438	Tank, NR30	Tanks (Generic)	Industrial Features
160A D	61	N	E U	652597 306440	E U, 19, Southgates Road, Great Yarmouth, NR30 3LJ	Vehicle Parts and Accessories	Motoring

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161A D	61	N	Works	652585 306441	Works, NR30	Unspecified Works Or Factories	Industrial Features
162A D	62	N	Tank	652560 306441	Tank, NR30	Tanks (Generic)	Industrial Features
163AJ	63	E	Hardy Craske Fuels	652619 305765	Hardy Craske Fuels, Old Customs House Marine Base, Great Yarmouth, NR30 3LX	Fuel Distributors and Suppliers	Household, Office, Leisure and Garden
164A E	63	W	Atam Group Ltd	651783 305837	Atam Group Ltd, Unit B, Harfreys Road, Great Yarmouth, NR31 0LS	Civil Engineers	Engineering Services
165	67	N	Electricity Sub Station	652293 306269	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
166A B	67	SW	Tank	651779 305633	Tank, NR31	Tanks (Generic)	Industrial Features
167A F	68	W	C & M Hydraulics	651779 305896	C & M Hydraulics, Da Vinci House, Harfreys Road, Great Yarmouth, NR31 0LS	Hydraulic Engineers	Engineering Services
168	72	E	P K M Sign Studios	652869 305873	P K M Sign Studios, 15, Swanston's Road, Great Yarmouth, NR30 3NQ	Signs	Industrial Products
169A G	73	NW	Conveyor	652047 306175	Conveyor, NR31	Conveyors	Industrial Features
170A H	77	E	Tank	652635 305731	Tank, NR30	Tanks (Generic)	Industrial Features
171	79	NW	Mast	652096 306202	Mast, NR31	Telecommunications Features	Infrastructure and Facilities
172A H	80	E	Tank	652638 305733	Tank, NR30	Tanks (Generic)	Industrial Features
173	81	N	Warehouse	652408 306312	Warehouse, NR31	Container and Storage	Transport, Storage and Delivery
174A H	82	E	Tank	652639 305748	Tank, NR30	Tanks (Generic)	Industrial Features
175A H	84	E	Tank	652641 305745	Tank, NR30	Tanks (Generic)	Industrial Features
176A H	84	E	Tank	652642 305735	Tank, NR30	Tanks (Generic)	Industrial Features
177A H	86	E	Tank	652643 305741	Tank, NR30	Tanks (Generic)	Industrial Features
178AI	86	E	Wing Mirrors World	652881 305918	Wing Mirrors World, Unit 9, Swanston's Road, Great Yarmouth, NR30 3NQ	Vehicle Parts and Accessories	Motoring
179AI	86	E	Spray N Go	652881 305918	Spray N Go, Unit 9, Swanston's Road, Great Yarmouth, NR30 3NQ	Vehicle Repair, Testing and Servicing	Repair and Servicing
180A H	87	E	Tank	652645 305737	Tank, NR30	Tanks (Generic)	Industrial Features
181A H	89	E	Tank	652647 305721	Tank, NR30	Tanks (Generic)	Industrial Features
182A R	91	SE	Works	652873 305837	Works, NR30	Unspecified Works Or Factories	Industrial Features
183	96	N	Ballast Quay	652513 306474	Ballast Quay, NR30	Moorings and Unloading Facilities	Water
184A H	97	E	Tank	652656 305707	Tank, NR30	Tanks (Generic)	Industrial Features

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185AJ	99	S	Works	652674 305761	Works, NR30	Unspecified Works Or Factories	Industrial Features
186AK	99	E	Tank	652659 305683	Tank, NR30	Tanks (Generic)	Industrial Features
187AK	102	E	Tank	652662 305688	Tank, NR30	Tanks (Generic)	Industrial Features
188AO	103	SW	J W Munnings Ltd	651759 305598	J W Munnings Ltd, 1 Munnings Court, Harfreys Road, Great Yarmouth, NR31 0LS	Construction and Tool Hire	Hire Services
189	104	E	Electricity Sub Station	652859 306156	Electricity Sub Station, NR30	Electrical Features	Infrastructure and Facilities
190	107	N	Simmons Edeco Europe Ltd	651821 306118	Simmons Edeco Europe Ltd, Bessemer Way, Great Yarmouth, NR31 0LX	Special Purpose Machinery and Equipment	Industrial Products
191AK	107	E	Warehouse	652668 305668	Warehouse, NR30	Container and Storage	Transport, Storage and Delivery
192AK	109	E	Tank	652669 305675	Tank, NR30	Tanks (Generic)	Industrial Features
193	109	S	Gorleston Fire Station	652491 305518	Gorleston Fire Station, High Road, Gorleston, Great Yarmouth, NR31 0PJ	Fire Brigade Stations	Central and Local Government
194AM	109	W	S P P Digital	651738 305773	S P P Digital, Morton Peto Road, Great Yarmouth, NR31 0LT	Published Goods	Industrial Products
195AT	112	S	Nelson Works	652803 305778	Nelson Works, NR30	Unspecified Works Or Factories	Industrial Features
196AK	112	E	Tank	652672 305678	Tank, NR30	Tanks (Generic)	Industrial Features
197AK	112	E	Tank	652672 305688	Tank, NR30	Tanks (Generic)	Industrial Features
198AL	113	W	Maverick Engineering Ltd	651732 305857	Maverick Engineering Ltd, 9-11, Brinell Way, Great Yarmouth, NR31 0LU	Industrial Engineers	Engineering Services
199AL	113	W	L V Shipping Ltd	651732 305857	L V Shipping Ltd, 9-11, Brinell Way, Great Yarmouth, NR31 0LU	Distribution and Haulage	Transport, Storage and Delivery
200AL	113	W	East Coast Pipe	651732 305867	East Coast Pipe, Unit 8, Brinell Way, Great Yarmouth, NR31 0LU	Electrical Equipment Repair and Servicing	Repair and Servicing
201AM	114	W	Survitec Survival Craft	651732 305747	Survitec Survival Craft, Unit 16, Brinell Way, Great Yarmouth, NR31 0LU	Marine Engineers and Services	Engineering Services
202	114	W	Softstart UK	651732 305803	Softstart UK, 14, Brinell Way, Great Yarmouth, NR31 0LU	Electrical Equipment Repair and Servicing	Repair and Servicing
203AK	116	E	Tank	652676 305681	Tank, NR30	Tanks (Generic)	Industrial Features
204	116	N	Electricity Sub Station	652172 306284	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
205AN	118	W	Enterprise Rent-A-Car	651731 305910	Enterprise Rent-A-Car, Units 4-5, Brinell Way, Great Yarmouth, NR31 0LU	Vehicle Hire and Rental	Hire Services
206AK	118	E	Tank	652678 305677	Tank, NR30	Tanks (Generic)	Industrial Features

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207A U	118	SE	Works	652869 305796	Works, NR30	Unspecified Works Or Factories	Industrial Features
208A N	118	W	Applus R T D	651730 305932	Applus R T D, 1-2, Brinell Way, Great Yarmouth, NR31 0LU	Industrial Engineers	Engineering Services
209A N	119	W	Stuga	651730 305911	Stuga, Unit 4, Brinell Way, Great Yarmouth, NR31 0LU	Tools Including Machine Shops	Industrial Products
210A O	120	SW	Hubble	651739 305598	Hubble, 2 Munnings Court, Harfreys Road, Great Yarmouth, NR31 0LS	General Construction Supplies	Industrial Products
211A S	121	S	Regional Scaffolding	652729 305752	Regional Scaffolding, Canada Buildings, South Denes Road, Great Yarmouth, NR30 3PF	Construction and Tool Hire	Hire Services
212A P	122	N	Electricity Sub Station	652667 306502	Electricity Sub Station, NR30	Electrical Features	Infrastructure and Facilities
213A P	123	N	Electricity Sub Station	652667 306503	Electricity Sub Station, NR30	Electrical Features	Infrastructure and Facilities
214A Q	125	NW	Barford Hire Ltd	652068 306240	Barford Hire Ltd, Yarmouth Business Park, Suffolk Road, Great Yarmouth, NR31 0ER	Vehicle Hire and Rental	Hire Services
215A Q	125	NW	Pat's Floorings	652068 306240	Pat's Floorings, Yarmouth Business Park, Thamesfield Way, Great Yarmouth, NR31 0DN	Construction Completion Services	Construction Services
216A V	127	N	Works	652551 306505	Works, NR30	Unspecified Works Or Factories	Industrial Features
217	127	NW	Survitec Group	651930 306180	Survitec Group, Unit 8, Owen Road, Great Yarmouth, NR31 0NA	Workwear	Industrial Products
218A O	128	SW	M D F Transport Ltd	651729 305597	M D F Transport Ltd, 3 Munnings Court, Harfreys Road, Great Yarmouth, NR31 0LS	Distribution and Haulage	Transport, Storage and Delivery
219	128	W	Electricity Sub Station	652391 306411	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
220A R	129	E	Pinstripe Distribution Ltd	652925 305861	Pinstripe Distribution Ltd, Midas Building, Swanston's Road, Great Yarmouth, NR30 3NQ	Distribution and Haulage	Transport, Storage and Delivery
221	129	E	Gold Cockerel Books	652925 305861	Gold Cockerel Books, Midas Building, Swanston's Road, Great Yarmouth, NR30 3NQ	Published Goods	Industrial Products
222	130	N	Works	652610 306511	Works, NR30	Unspecified Works Or Factories	Industrial Features
223A S	130	S	A B Trade Supplies	652734 305743	A B Trade Supplies, Canada Building, South Denes Road, Great Yarmouth, NR30 3PF	General Construction Supplies	Industrial Products
224B A	132	E	Electricity Sub Station	652691 305634	Electricity Sub Station, NR30	Electrical Features	Infrastructure and Facilities
225A T	132	S	Hy-tek Engineering Services Ltd	652821 305760	Hy-tek Engineering Services Ltd, 3, Main Cross Road, Great Yarmouth, NR30 3PD	Precision Engineers	Engineering Services

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226A T	132	S	Toucam Engineers Ltd	652821 305760	Toucam Engineers Ltd, 3, Main Cross Road, Great Yarmouth, NR30 3PD	Fuel Distributors and Suppliers	Household, Office, Leisure and Garden
227A S	136	S	Displaypro	652764 305744	Displaypro, Display House, Main Cross Road, Great Yarmouth, NR30 3NZ	Office and Shop Equipment	Industrial Products
228A U	140	SE	Depot	652909 305803	Depot, NR30	Container and Storage	Transport, Storage and Delivery
229A T	141	S	Works	652826 305753	Works, NR30	Unspecified Works Or Factories	Industrial Features
230B E	142	SE	Crane	652620 305528	Crane, NR31	Travelling Cranes and Gantries	Industrial Features
231A V	144	N	Warehouse	652532 306522	Warehouse, NR30	Container and Storage	Transport, Storage and Delivery
232A V	146	N	S T M Rewinds Ltd	652536 306524	S T M Rewinds Ltd, A B C Wharf, Southgates Road, Great Yarmouth, NR30 3LQ	Vehicle Repair, Testing and Servicing	Repair and Servicing
233	148	NW	Tank	651721 306097	Tank, NR31	Tanks (Generic)	Industrial Features
234B B	153	SE	Warehouse	652881 305762	Warehouse, NR30	Container and Storage	Transport, Storage and Delivery
235A X	153	SE	Tank	652701 305595	Tank, NR30	Tanks (Generic)	Industrial Features
236A W	155	S	Depot	652777 305728	Depot, NR30	Container and Storage	Transport, Storage and Delivery
237	156	NW	Subsea Protection Systems	652383 306461	Subsea Protection Systems, Holmes Wharf 225, Southtown Road, Great Yarmouth, NR31 0JJ	Concrete Products	Industrial Products
238A W	156	S	Warehouse	652748 305720	Warehouse, NR30	Container and Storage	Transport, Storage and Delivery
239A X	156	SE	Tank	652705 305597	Tank, NR30	Tanks (Generic)	Industrial Features
240A Y	157	NW	Survival-one	651919 306209	Survival-one, Performance House Unit 6-7, Owen Road, Great Yarmouth, NR31 0NA	Special Purpose Machinery and Equipment	Industrial Products
241A U	157	SE	Nelson Works	652901 305772	Nelson Works, NR30	Unspecified Works Or Factories	Industrial Features
242A Y	157	NW	P V S Holdings	651919 306209	P V S Holdings, Unit 6 & 7 Owen Road, Great Yarmouth, NR31 0NA	Garden Goods	Consumer Products
243A Z	158	SE	Micro Engineering Ltd	652939 305818	Micro Engineering Ltd, Battery Road, Great Yarmouth, NR30 3NN	Precision Engineers	Engineering Services
244A Z	158	SE	B W Refrigeration & Air Conditioning Ltd	652939 305818	B W Refrigeration & Air Conditioning Ltd, Battery Road, Great Yarmouth, NR30 3NN	Construction Completion Services	Construction Services
245A X	159	SE	Tank	652706 305593	Tank, NR30	Tanks (Generic)	Industrial Features
246A X	159	SE	Tank	652703 305586	Tank, NR30	Tanks (Generic)	Industrial Features
247A X	160	E	Tank	652709 305598	Tank, NR30	Tanks (Generic)	Industrial Features



ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
248A X	162	SE	Tank	652707 305588	Tank, NR30	Tanks (Generic)	Industrial Features
249A X	162	SE	Tank	652704 305582	Tank, NR30	Tanks (Generic)	Industrial Features
250B A	162	E	D P Services & Supplies Ltd	652720 305626	D P Services & Supplies Ltd, Ferry House, South Denes Road, Great Yarmouth, NR30 3PJ	Container and Storage	Transport, Storage and Delivery
251B A	162	E	Ebrex UK Ltd	652720 305626	Ebrex UK Ltd, Ferry House, South Denes Road, Great Yarmouth, NR30 3PJ	Distribution and Haulage	Transport, Storage and Delivery
252	163	SE	Great Yarmouth	652608 305498	Great Yarmouth, A1243 South Denes Road And Riverside Road, Barrack Estate, NR31	Ferries and Ferry Terminals	Water
253A X	163	SE	Tank	652711 305594	Tank, NR30	Tanks (Generic)	Industrial Features
254	163	SW	East Coast Insulations Ltd	651695 305587	East Coast Insulations Ltd, Munnings Court, Harfreys Road, Great Yarmouth, NR31 0LS	Recycling, Reclamation and Disposal	Recycling Services
255A X	165	SE	Tank	652709 305584	Tank, NR30	Tanks (Generic)	Industrial Features
256A X	165	SE	Tank	652706 305578	Tank, NR30	Tanks (Generic)	Industrial Features
257A X	165	SE	Tank	652712 305590	Tank, NR30	Tanks (Generic)	Industrial Features
258A X	168	SE	Tank	652712 305585	Tank, NR30	Tanks (Generic)	Industrial Features
259BF	168	W	D N V Gl	651679 305750	D N V Gl, Cooke House, Morton Peto Road, Great Yarmouth, NR31 0LT	Marine Engineers and Services	Engineering Services
260A X	168	SE	Tank	652707 305575	Tank, NR30	Tanks (Generic)	Industrial Features
261A X	168	SE	Tank	652710 305580	Tank, NR30	Tanks (Generic)	Industrial Features
262A X	170	SE	Tank	652707 305570	Tank, NR30	Tanks (Generic)	Industrial Features
263A X	171	SE	Tank	652714 305581	Tank, NR30	Tanks (Generic)	Industrial Features
264A X	171	SE	Tank	652711 305575	Tank, NR30	Tanks (Generic)	Industrial Features
265	172	S	Advanced Machinery Relocations Ltd	652217 305508	Advanced Machinery Relocations Ltd, 18, Suffolk Road, Gorleston, Great Yarmouth, NR31 0QB	Construction Completion Services	Construction Services
266B B	173	SE	Equipment Supply Co G Y Ltd	652911 305759	Equipment Supply Co G Y Ltd, Nelson Works, Main Cross Road, Great Yarmouth, NR30 3NZ	General Construction Supplies	Industrial Products
267A X	173	SE	Tank	652711 305572	Tank, NR30	Tanks (Generic)	Industrial Features
268B C	174	SE	Tank	652709 305566	Tank, NR30	Tanks (Generic)	Industrial Features
269B C	174	SE	Tank	652715 305576	Tank, NR30	Tanks (Generic)	Industrial Features

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
270BD	175	N	Warehouse	652533 306553	Warehouse, NR30	Container and Storage	Transport, Storage and Delivery
271AX	175	E	Factory	652727 305602	Factory, NR30	Unspecified Works Or Factories	Industrial Features
272BD	175	N	Abc Wharf	652508 306553	Abc Wharf, NR30	Moorings and Unloading Facilities	Water
273BG	175	N	Works	652643 306558	Works, NR30	Unspecified Works Or Factories	Industrial Features
274BE	176	SE	Landing Stage	652643 305502	Landing Stage, NR31	Moorings and Unloading Facilities	Water
275BC	176	SE	Tank	652712 305567	Tank, NR30	Tanks (Generic)	Industrial Features
276AX	177	SE	Tank	652716 305573	Tank, NR30	Tanks (Generic)	Industrial Features
277BC	177	SE	Tank	652710 305562	Tank, NR30	Tanks (Generic)	Industrial Features
278BC	179	SE	Tank	652713 305564	Tank, NR30	Tanks (Generic)	Industrial Features
279BC	179	SE	Tank	652710 305558	Tank, NR30	Tanks (Generic)	Industrial Features
280BH	179	SE	Warehouse	652945 305786	Warehouse, NR30	Container and Storage	Transport, Storage and Delivery
281AX	179	SE	Tank	652717 305569	Tank, NR30	Tanks (Generic)	Industrial Features
282BC	181	SE	Tank	652717 305565	Tank, NR30	Tanks (Generic)	Industrial Features
283AW	185	S	Electricity Sub Station	652814 305705	Electricity Sub Station, NR30	Electrical Features	Infrastructure and Facilities
284BF	185	W	S M S Auto Care Ltd	651661 305738	S M S Auto Care Ltd, Unit 2 Cooke House, Morton Peto Road, Great Yarmouth, NR31 0LT	Vehicle Repair, Testing and Servicing	Repair and Servicing
285	186	NW	C & L Waste Oil Collection Ltd	652057 306302	C & L Waste Oil Collection Ltd, Yarmouth Business Park, Thamesfield Way, Great Yarmouth, NR31 0DN	Recycling, Reclamation and Disposal	Recycling Services
286BG	187	N	J R Pitchers Ltd	652606 306568	J R Pitchers Ltd, 5, Selby Place, Great Yarmouth, NR30 3LG	Vehicle Repair, Testing and Servicing	Repair and Servicing
287BK	195	NW	Tube Care Inspection Ltd	651736 306176	Tube Care Inspection Ltd, Bessemer Way, Great Yarmouth, NR31 0LX	General Construction Supplies	Industrial Products
288AZ	197	E	Kingsway Tyres	652982 305819	Kingsway Tyres, Battery Road, Great Yarmouth, NR30 3NN	Vehicle Parts and Accessories	Motoring
289BI	197	E	Shopkit	652995 305867	Shopkit, Unit 1-3, Swanston's Road, Great Yarmouth, NR30 3NQ	Precision Engineers	Engineering Services
290BH	198	SE	Warehouse	652975 305799	Warehouse, NR30	Container and Storage	Transport, Storage and Delivery
291BI	198	E	Depot	652996 305861	Depot, NR30	Container and Storage	Transport, Storage and Delivery
292BG	199	N	Queen's Road Business Centre	652671 306579	Queen's Road Business Centre, NR30	Business Parks and Industrial Estates	Industrial Features

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
293BL	208	SE	Quay	652707 305509	Quay, NR30	Moorings and Unloading Facilities	Water
294BO	211	S	Depot	652877 305695	Depot, NR30	Container and Storage	Transport, Storage and Delivery
295BH	212	SE	Warehouse	652980 305780	Warehouse, NR30	Container and Storage	Transport, Storage and Delivery
296BJ	213	N	Works	652628 306595	Works, NR30	Unspecified Works Or Factories	Industrial Features
297BJ	215	N	Pertwee & Back Ltd - Ford	652585 306594	Pertwee & Back Ltd - Ford, Southgates Road, Great Yarmouth, NR30 3LF	Vehicle Repair, Testing and Servicing	Repair and Servicing
298	216	SE	Kirklands Ltd	652942 305730	Kirklands Ltd, Kirklands House, Main Cross Road, Great Yarmouth, NR30 3NZ	Workwear	Industrial Products
299	216	S	Electricity Sub Station	652504 305411	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
300BK	218	NW	Electricity Sub Station	651684 306162	Electricity Sub Station, NR31	Electrical Features	Infrastructure and Facilities
301	220	SE	Carl J Harrison Piano Services	652601 305428	Carl J Harrison Piano Services, 3, Ferry Hill, Gorleston, Great Yarmouth, NR31 0PD	Sports and Leisure Equipment Repair	Repair and Servicing
302BL	221	SE	Depot	652736 305522	Depot, NR30	Container and Storage	Transport, Storage and Delivery
303BM	225	N	Warehouse	652525 306603	Warehouse, NR30	Container and Storage	Transport, Storage and Delivery
304BN	228	W	D T S Solutions	651619 305949	D T S Solutions, Unit 17, Bessemer Way, Great Yarmouth, NR31 0LX	Radar and Telecommunications Equipment	Industrial Products
305BM	228	N	Wharf	652498 306605	Wharf, NR30	Moorings and Unloading Facilities	Water
306BN	228	W	Engraphics Ltd	651619 305939	Engraphics Ltd, Unit 16, Bessemer Way, Great Yarmouth, NR31 0LX	Signs	Industrial Products
307BN	230	W	Smart Buy Tools	651619 305928	Smart Buy Tools, Unit 15, Bessemer Way, Great Yarmouth, NR31 0LX	Tools Including Machine Shops	Industrial Products
308	230	N	Great Yarmouth Coach Works	652677 306610	Great Yarmouth Coach Works, 15, Queens Road, Great Yarmouth, NR30 3HT	New Vehicles	Motoring
309BO	232	SE	C & C Sheds & Timber	652931 305700	C & C Sheds & Timber, Suffling Road, Great Yarmouth, NR30 3QP	Garden Goods	Consumer Products
310BM	233	N	Works	652544 306611	Works, NR30	Unspecified Works Or Factories	Industrial Features
311BP	233	W	Securicom Services	651612 305834	Securicom Services, Unit 6, Bessemer Way, Great Yarmouth, NR31 0LX	Electronic Equipment	Industrial Products
312BP	233	W	Id Asbestos Ltd	651612 305834	Id Asbestos Ltd, Unit 6, Bessemer Way, Great Yarmouth, NR31 0LX	Recycling, Reclamation and Disposal	Recycling Services
313BQ	235	SE	Lacons Brewery	653011 305789	Lacons Brewery, The Courtyard, Main Cross Road, Great Yarmouth, NR30 3NZ	Alcoholic Drinks	Foodstuffs

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
314	235	NW	B L I Technologies Ltd	651991 306327	B L I Technologies Ltd, Northland Energy Services UK Limited Yarmouth Business Park, Suffolk Road, Great Yarmouth, NR31 0ER	Distribution and Haulage	Transport, Storage and Delivery
315	236	W	Scantech Offshore	651605 305692	Scantech Offshore, Scantech House, Morton Peto Road, Great Yarmouth, NR31 0LT	Special Purpose Machinery and Equipment	Industrial Products
316	237	E	Yarmouth Rewinds	653027 305826	Yarmouth Rewinds, Swanston's Road, Great Yarmouth, NR30 3NQ	Vehicle Repair, Testing and Servicing	Repair and Servicing
317	241	N	Hopper	651835 306254	Hopper, NR31	Hoppers and Silos	Farming
318	242	N	Nelson Garage	652574 306621	Nelson Garage, Southgates Road, Great Yarmouth, NR30 3LF	Vehicle Repair, Testing and Servicing	Repair and Servicing
319BL	246	SE	Depot	652739 305488	Depot, NR30	Container and Storage	Transport, Storage and Delivery
320	247	SE	Depot	652942 305689	Depot, NR30	Container and Storage	Transport, Storage and Delivery

## 4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

3

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
321	0	On Site	652574 306370	BP	South Quay Service Station, Southgates Road, Southgates Road, Trinity Square, Great Yarmouth, Norfolk, NR30 3LL	No	Open
322A	0	On Site	652377 306137	BP	Southtown Service Station, 126, Southtown Road, Southtown Road, Great Yarmouth, Norfolk, NR31 0JZ	No	Open
323B Q	314	SE	653075 305741	Obsolete	South Beach Service Station, South Beach Parade, South Beach Parade, Great Yarmouth, Norfolk, NR30 3QN	Not Applicable	Obsolete

### 4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

---

### 4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

---

# 5. Geology

## 5.1 Artificial Ground and Made Ground

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

## 5.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
NRD-XSV	NORTH DENES FORMATION	SAND AND GRAVEL
BRYD-P	BREYDON FORMATION	PEAT
BRYD-XCZ	BREYDON FORMATION	CLAY AND SILT
BRYD-XCZ	BREYDON FORMATION	CLAY AND SILT
TRD-XCZ	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT
HPGL-S	HAPPISBURGH GLACIGENIC FORMATION	SAND
BSA-S	BLOWN SAND	SAND

## 5.3 Bedrock and Solid Geology

The database has been searched on site, including a 50m buffer.

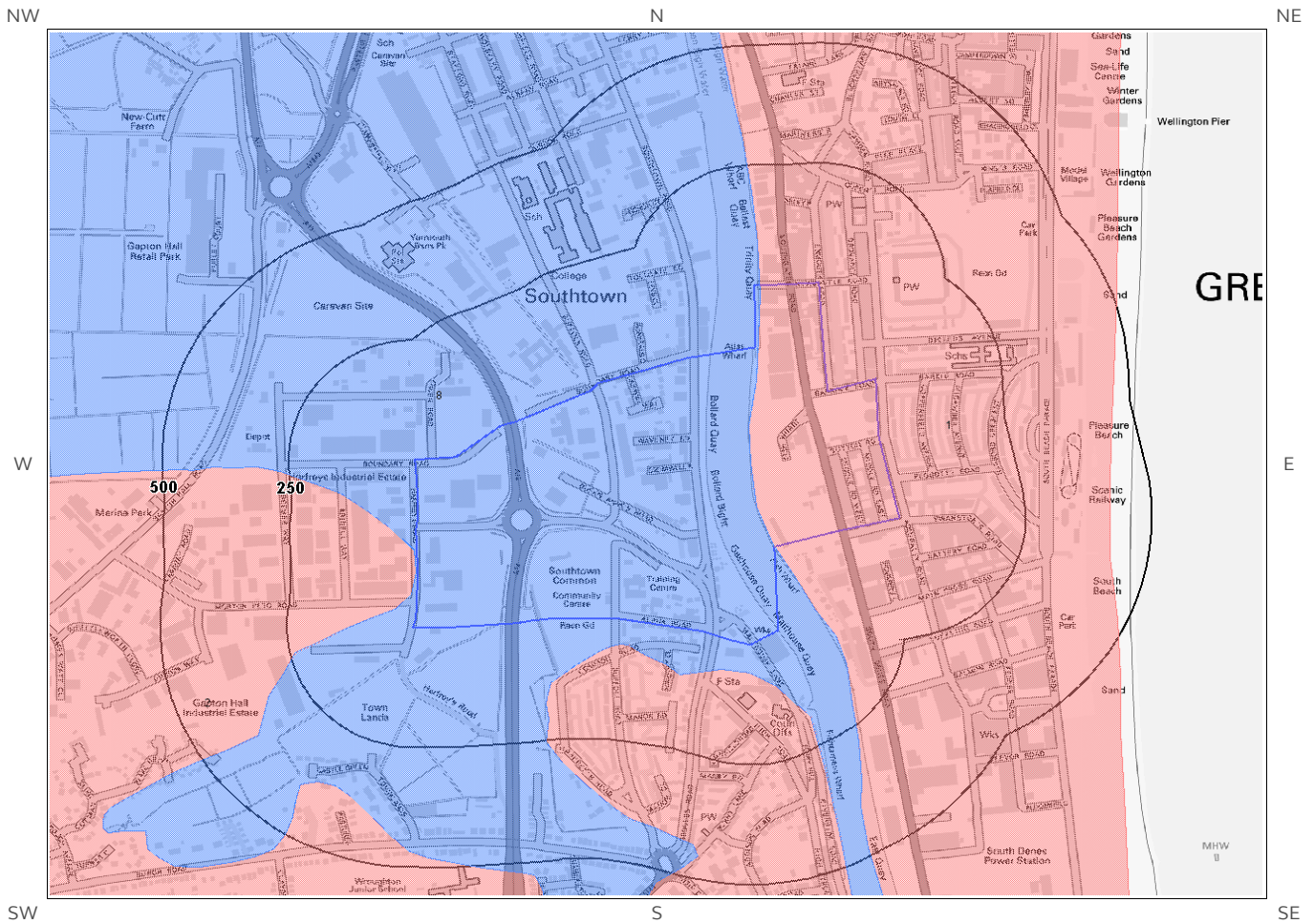
Lex Code	Description	Rock Type
CRAG-XSV	CRAG GROUP	SAND AND GRAVEL

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

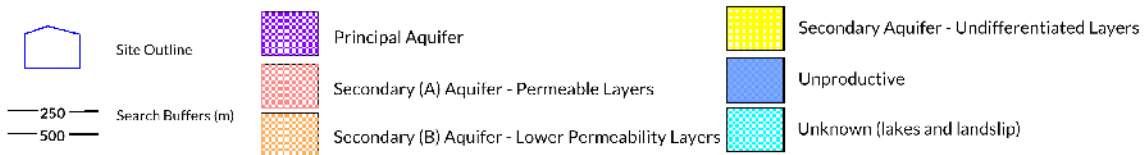


# 6 Hydrogeology and Hydrology

## 6a. Aquifer Within Superficial Geology



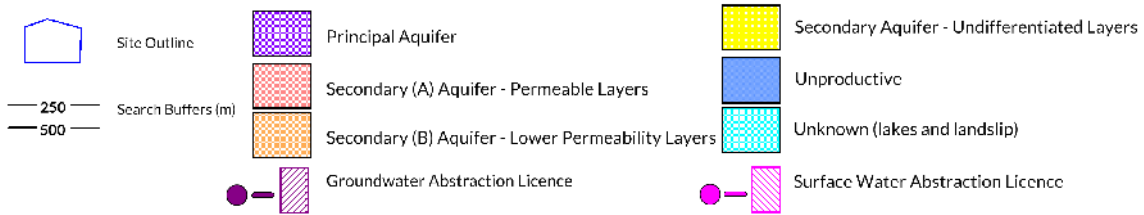
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# 6b. Aquifer Within Bedrock Geology and Abstraction Licenses



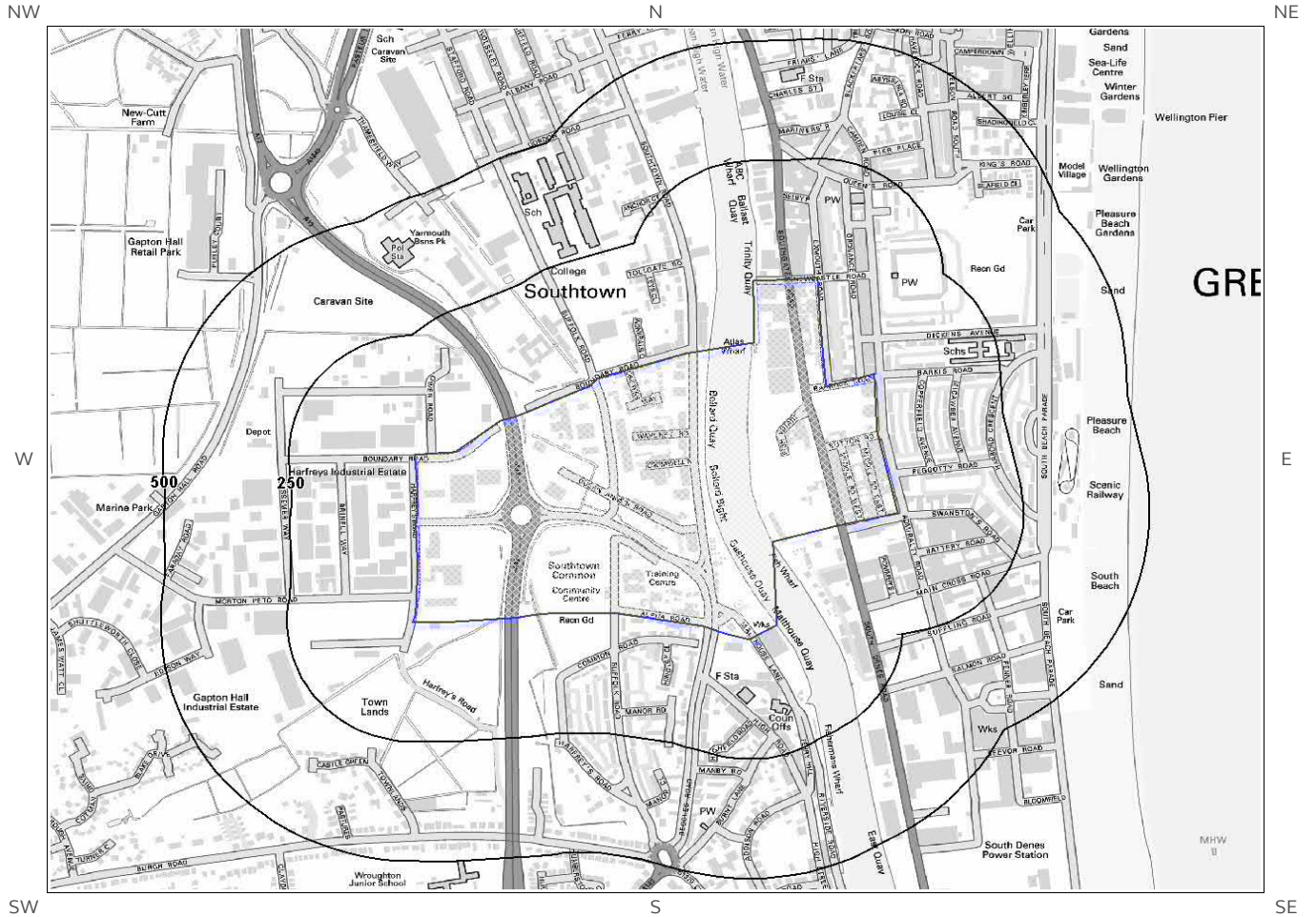
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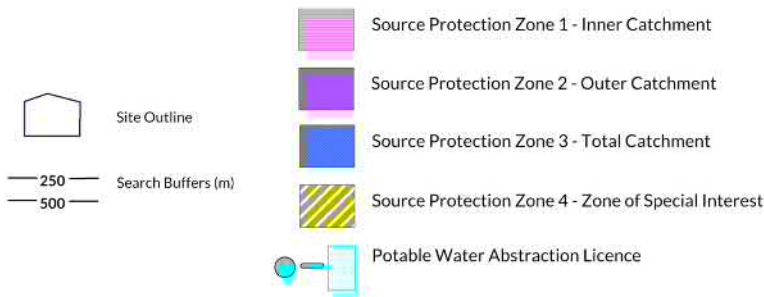




# 6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses

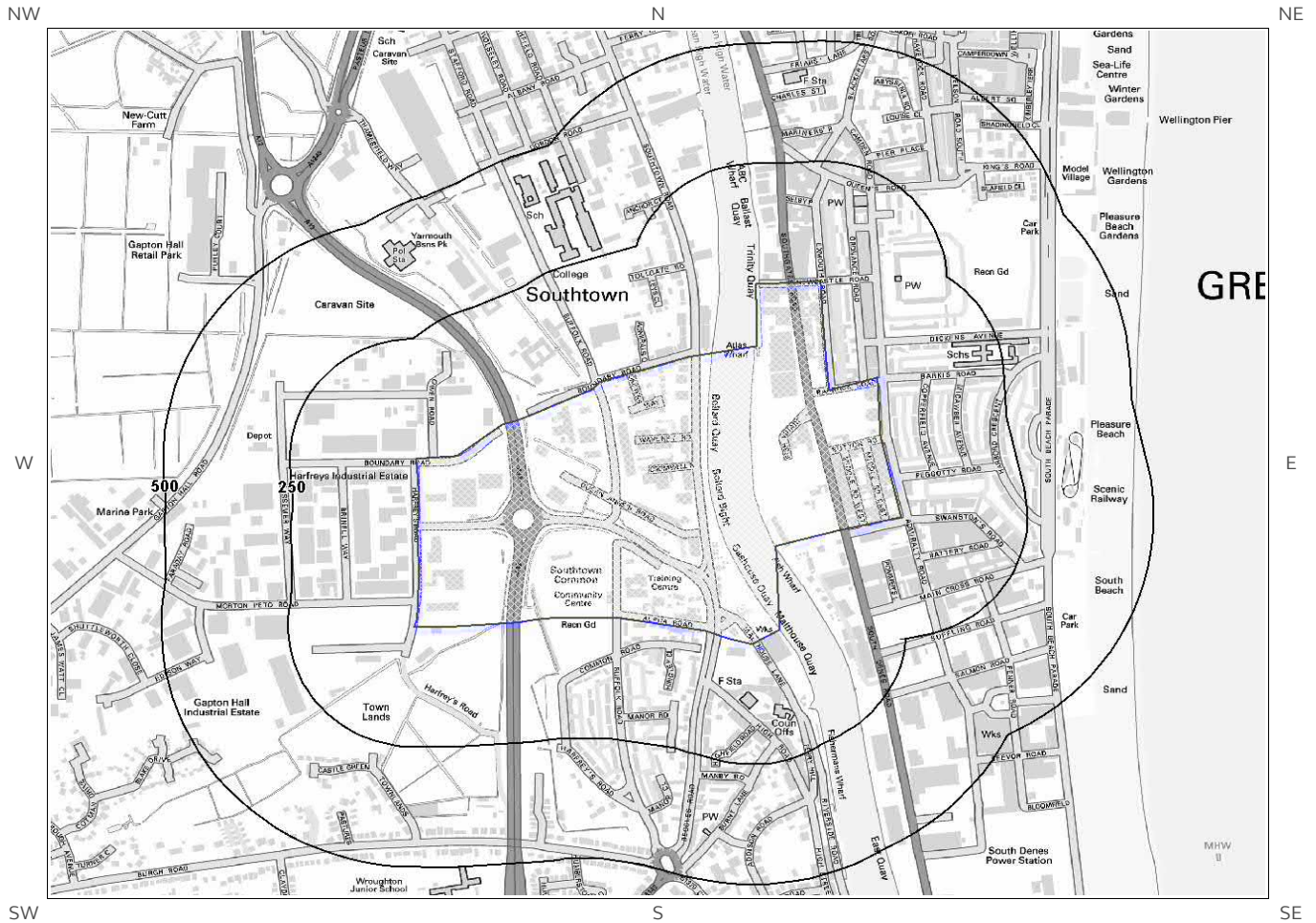


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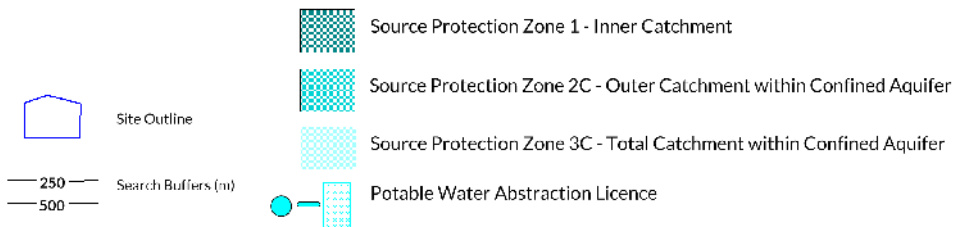




# 6d. Hydrogeology – Source Protection Zones within confined aquifer

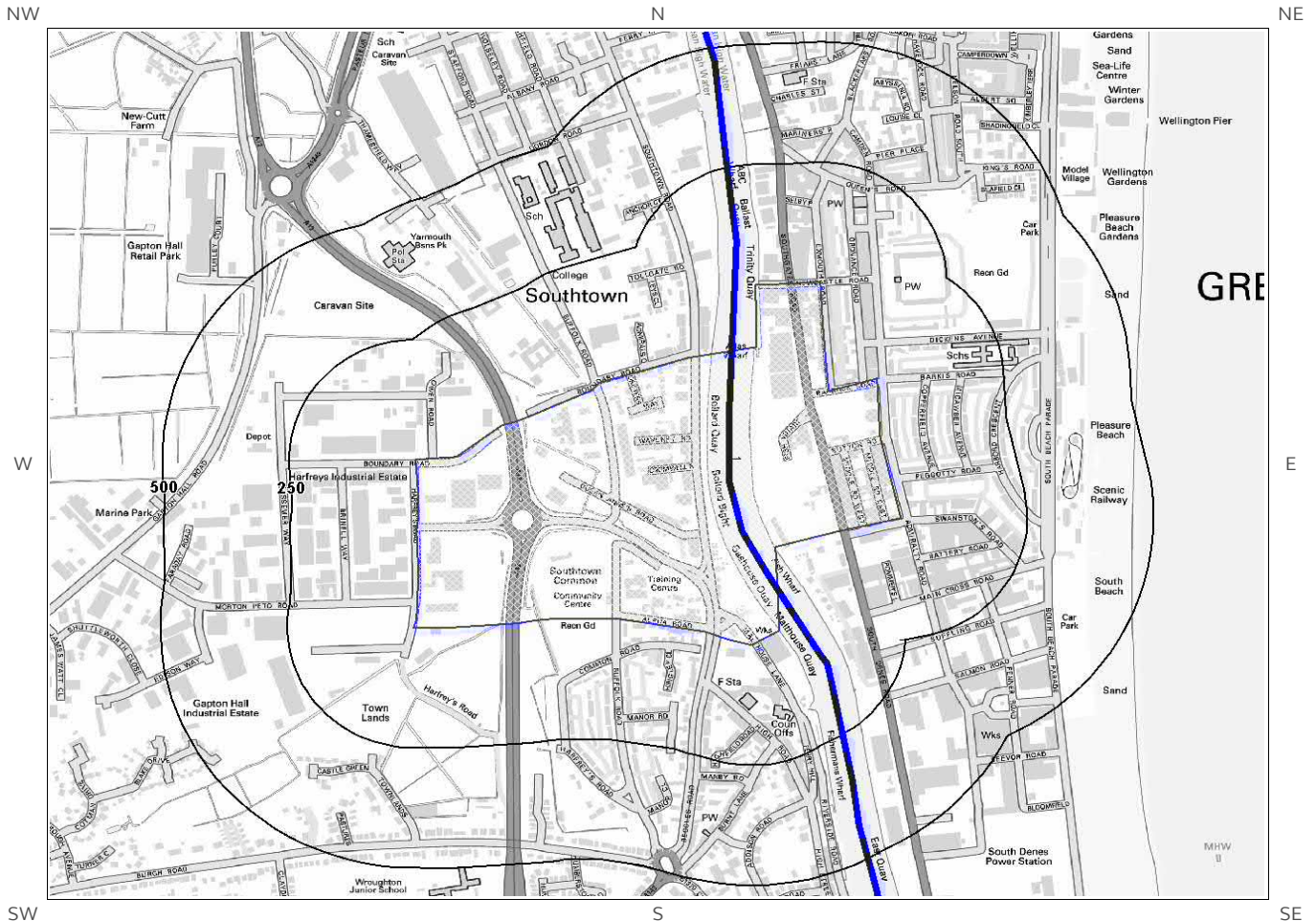


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# 6e. Hydrology – Detailed River Network and River Quality



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- |   |                        |   |                                       |  |                                     |
|---|------------------------|---|---------------------------------------|--|-------------------------------------|
|  | Site Outline           |  | Primary River                         |  | Canal                               |
|  | 250 Search Buffers (m) |  | Secondary River                       |  | Canal Tunnel                        |
|  | 500 Search Buffers (m) |  | Tertiary River                        |  | Culvert                             |
|   |                        |  | Lake/Reservoir                        |  | Multiple Channel Culvert            |
|   |                        |  | Underground River (inferred)          |  | Underground River (Potential Sewer) |
|   |                        |  | General Quality Assessment: Biology   |  | Underground River (local knowledge) |
|   |                        |  | General Quality Assessment: Chemistry |  |                                     |

# 6. Hydrogeology and Hydrology

## 6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
8	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
2	3	W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

## 6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers



## 6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site?

Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details
3	71	N	651820 306080	Status: Active Licence No: AN/034/0015/020 Details: Laundry Use Direct Source: Ground Water Source Of Supply Point: Wellpoints At The Laundry, Portland Lane, Great Yarmouth Data Type: Point Name: Camplings Limited Annual Volume (m <sup>3</sup> ): 60000 Max Daily Volume (m <sup>3</sup> ): 210 Original Application No: NPS/WR/024446 Original Start Date: 1/12/2016 Expiry Date: 31/3/2030 Issue No: 1 Version Start Date: 1/12/2016 Version End Date:
Not shown	1187	NE	653140 307460	Status: Historical Licence No: 7/34/15/*G/0220 Details: Make-Up or Top Up Water Direct Source: Ground Water Source Of Supply Point: Wellpoint At Gt Yarmouth Data Type: Point Name: B & M LEISURE Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Original Application No: - Original Start Date: 1/3/1997 Expiry Date: - Issue No: 100 Version Start Date: 1/3/1997 Version End Date:

## 6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site?

Yes

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details
5	443	N	652372 306914	Status: Historical Licence No: AN/034/0015/013 Details: Hydraulic Testing Direct Source: Surface Water Source Of Supply Point: River Yare At Berth 28, Great Yarmouth Data Type: Line Name: INTERSERVE CONSTRUCTION LIMITED Annual Volume (m <sup>3</sup> ): 4000 Max Daily Volume (m <sup>3</sup> ): 100 Application No: NPS/WR/014706 Original Start Date: 16/12/2013 Expiry Date: 31/3/2015 Issue No: 1 Version Start Date: 16/12/2013 Version End Date:

## 6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site?

No

Database searched and no data found.

## 6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site?

No

Database searched and no data found.

---

## 6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site?

No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

---

## 6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site?

Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
0	On Site	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
487	W	Major Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.

---

## 6.9 River Quality

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?

No

Database searched and no data found.

---

6.9.2 Chemical Quality:

Database searched and no data found.

---

**6.10 Detailed River Network**

Are there any Detailed River Network entries within 500m of the study site? Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details
1	0	On Site	River Name: River Yare Welsh River Name: - Alternative Name: - River Type: Primary River Main River Status: Currently Undefined

---

## 6.11 Surface Water Features

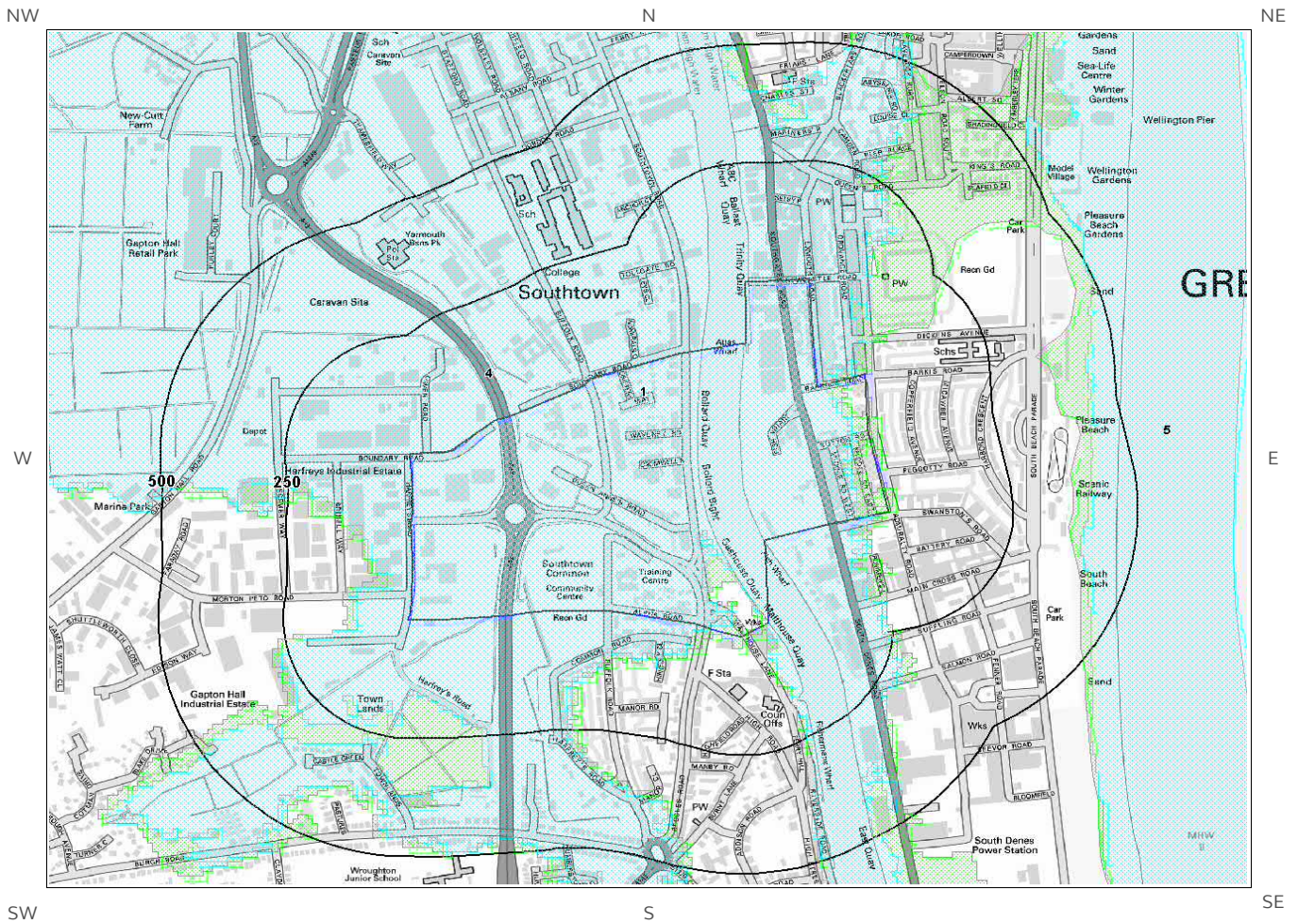
Are there any surface water features within 250m of the study site?

Yes

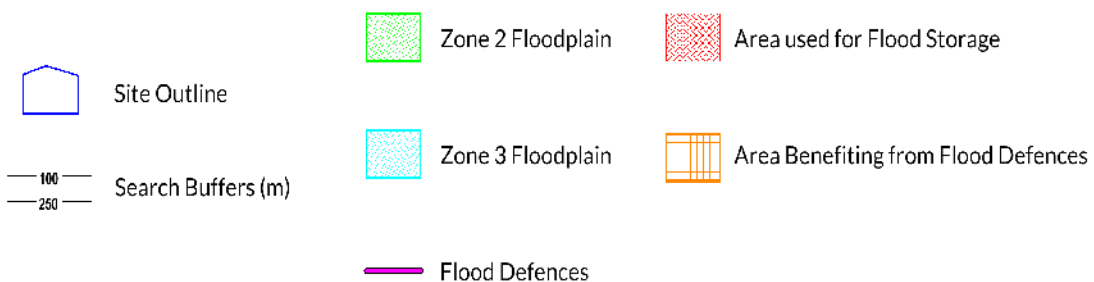
The following surface water records are not represented on mapping:

Distance (m)	Direction
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
17	NW
25	NW
29	N
37	NW
52	NW
74	SW
105	NW
118	S
143	S
158	NW
176	S

# 7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)

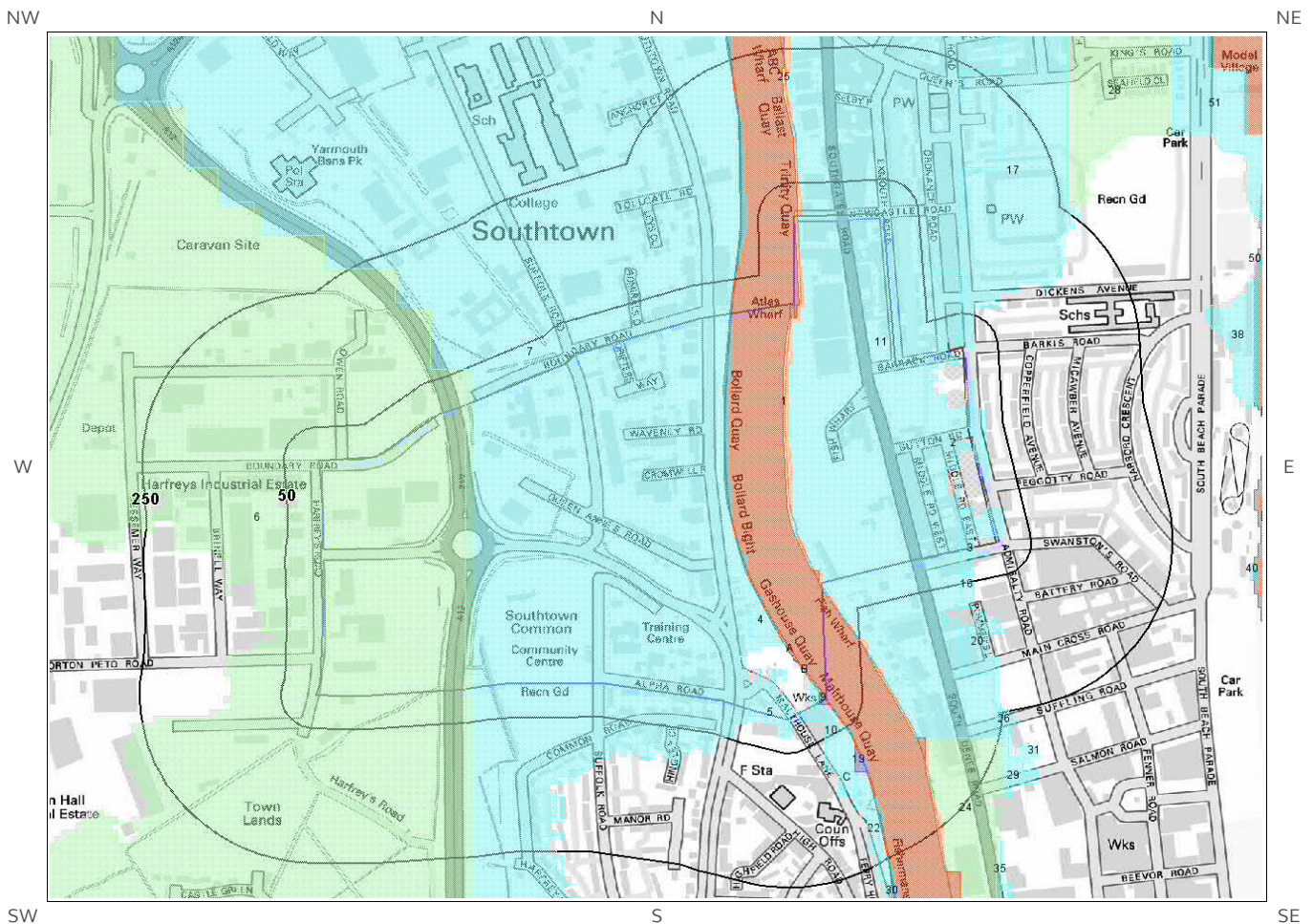


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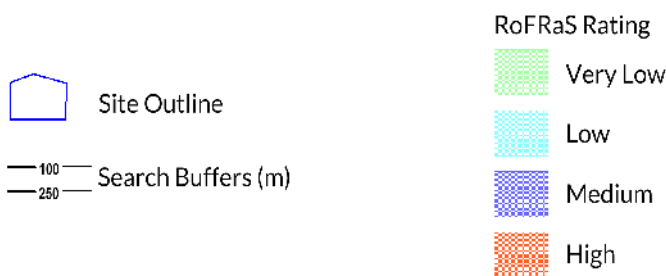




# 7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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# 7 Flooding

## 7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? Yes

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

ID	Distance (m)	Direction	Update	Type
1	0	On Site	19-Jun-2017	Zone 2 - (Fluvial /Tidal Models)

## 7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? Yes

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

ID	Distance (m)	Direction	Update	Type
1	0	On Site	19-Jun-2017	Zone 3 - (Fluvial Models)

## 7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? High

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a High (1 in 30 or greater) chance of flooding in any given year.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRaS flood Risk
1	0.0	On Site	Low
2	0.0	On Site	Low

3	0.0	On Site	Low
4	0.0	On Site	Low
5	0.0	On Site	Low
6	0.0	On Site	Very Low
7	0.0	On Site	Low
8B	0.0	On Site	Low
9	0.0	On Site	Medium
10	0.0	On Site	Low
11	0.0	On Site	Low
12A	0.0	On Site	Medium
13A	0.0	On Site	Medium
14B	0.0	On Site	Medium
15B	0.0	On Site	Medium
16	0.0	On Site	High
17	5.0	E	Low
18	30.0	S	Low

---

## 7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No  
Database searched and no data found.

---

## 7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

---

## 7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

---

## 7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Clearwater Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

### 7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

---

## 7.8 Groundwater Flooding Confidence Areas

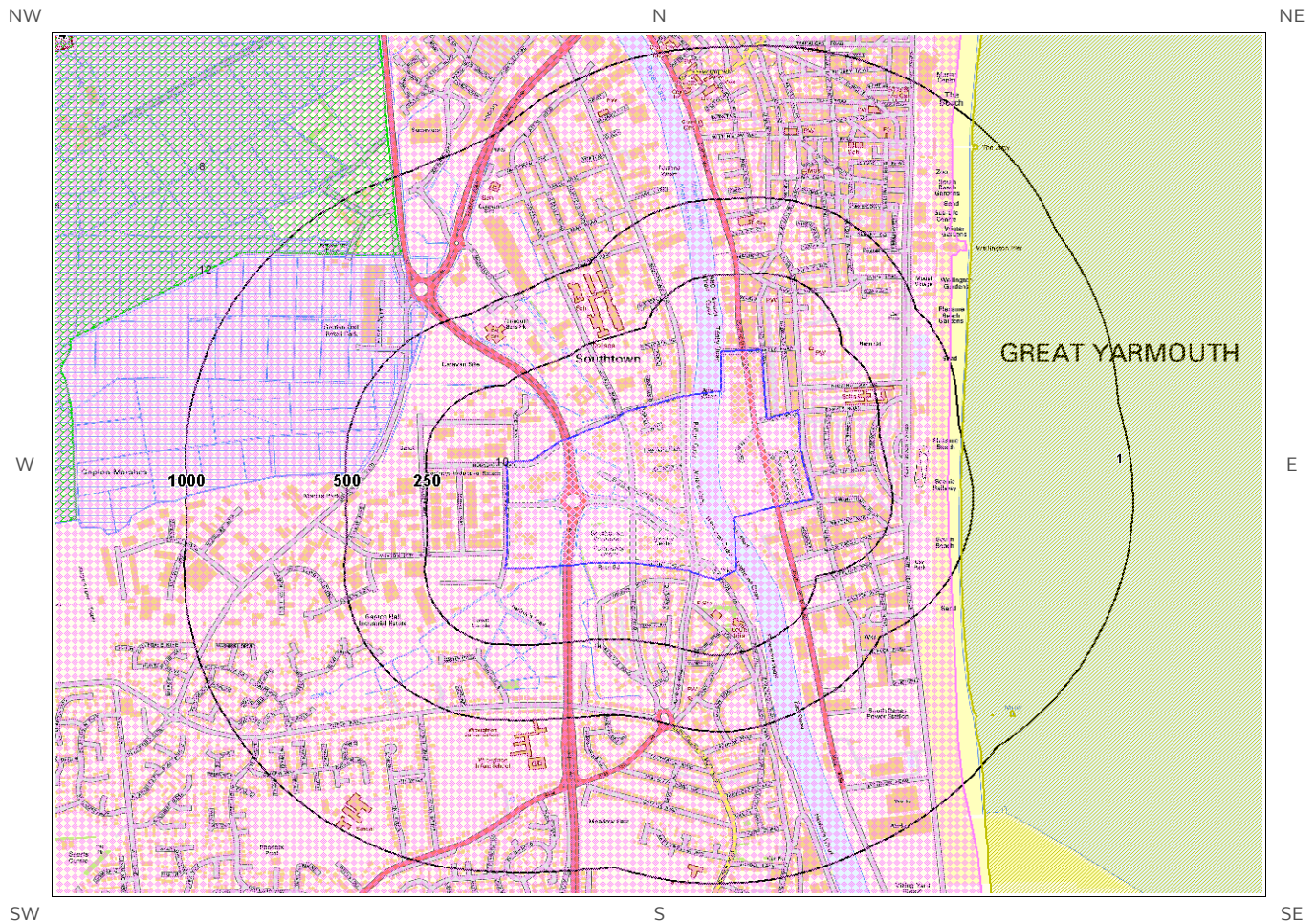
What is the British Geological Survey confidence rating in this result?

Low

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

# 8. Designated Environmentally Sensitive Sites Map



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# 8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

## 8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

3

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
Not shown	1794	NW	Breydon Water	Natural England
4	1848	NW	Breydon Water	Natural England
Not shown	1949	NW	Breydon Water	Natural England

## 8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

## 8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

## 8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

2

The following Special Protection Area (SPA) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SPA Name	Data Source
1	465	E	Outer Thames Estuary	Natural England

ID	Distance (m)	Direction	SPA Name	Data Source
2A	1794	NW	Breydon Water	Natural England

### 8.5 Records of Ramsar sites within 2000m of the study site:

1

The following Ramsar records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ramsar Site Name	Ramsar Site Status	Data Source
6A	1794	NW	Breydon Water	Listed	Natural England

### 8.6 Records of Ancient Woodland within 2000m of the study site:

0

Database searched and no data found.

### 8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

1

The following Local Nature Reserve (LNR) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
7	1797	NW	Breydon Water	Natural England

### 8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.



## 8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

2

The following Environmentally Sensitive Area records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	ESA Name	Data Source
12	392	W	Broads	Natural England
Not shown	1839	W	Broads	Natural England

## 8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

## 8.11 Records of National Parks (NP) within 2000m of the study site:

2

The following National Park records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NP Name	Data Source
8	754	NW	The Broads	Natural England
Not shown	1839	W	The Broads	Natural England

## 8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

### 8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

2

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
10	0	On Site	Existing	DEFRA
Not shown	1839	W	Existing	DEFRA

### 8.14 Records of Green Belt land within 2000m of the study site:

0

Database searched and no data found.

# 9. Natural Hazards Findings

## 9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a **Groundsure Geo Insight**, available from our [website](#). The following information has been found:

### 9.1.1 Shrink Swell

What is the maximum Shrink-Swell\* hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

### 9.1.2 Landslides

What is the maximum Landslide\* hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property no significant increase in insurance risk due to natural slope instability problems.

### 9.1.3 Soluble Rocks

What is the maximum Soluble Rocks\* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

\* This indicates an automatically generated 50m buffer and site.

### 9.1.4 Compressible Ground

What is the maximum Compressible Ground\* hazard rating identified on the study site?

High

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

Very significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Construction may not be possible at economic cost. For existing property probable increase in insurance risk from compressibility especially if water conditions or loading of the ground change significantly.

---

### 9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks\* hazard rating identified on the study site?

Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

---

### 9.1.6 Running Sand

What is the maximum Running Sand\*\* hazard rating identified on the study site?

Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build consider the consequences of soil and groundwater conditions during and after construction. For existing property possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

---

## 9.2 Radon

### 9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?      The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

---



---

\* This indicates an automatically generated 50m buffer and site.

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?  No radon protective measures are necessary.

# 10. Mining

## 10.1 Coal Mining

Are there any coal mining areas within 75m of the study site? No

Database searched and no data found.

---

## 10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary? No

Database searched and no data found.

---

## 10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No  
Guidance: No Guidance Required.

---



# Contact Details

## CENTREMAPS

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Groundsure@centremaps.co.uk  
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## British Geological Survey Enquiries

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Fax: 0115 936 3276.  
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BGS Geological Hazards Reports and general geological enquiries:  
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**Environment Agency**  
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Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)



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Email: [enquiries@phe.gov.uk](mailto:enquiries@phe.gov.uk)  
Main switchboard: 020 7654 8000



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[www.coal.gov.uk](http://www.coal.gov.uk)



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## Local Authority

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Phone: 01493 856 100  
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**Groundsure**

LOCATION INTELLIGENCE



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<https://www.groundsure.com/terms-and-conditions-sept-2016>



CENTREMAPS

Open Space, Upper Interfields,  
Worcester, WR14 1UT

Report Reference: CMAPS-CM-636391-16287-  
030717GEO

Your Reference: 16287

Report Date 3 Jul 2017

Report Delivery Method: Email - pdf

## Geo Insight

Address: ,

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geo Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 01886 832972 quoting the above CENTREMAPS reference number.

Yours faithfully,

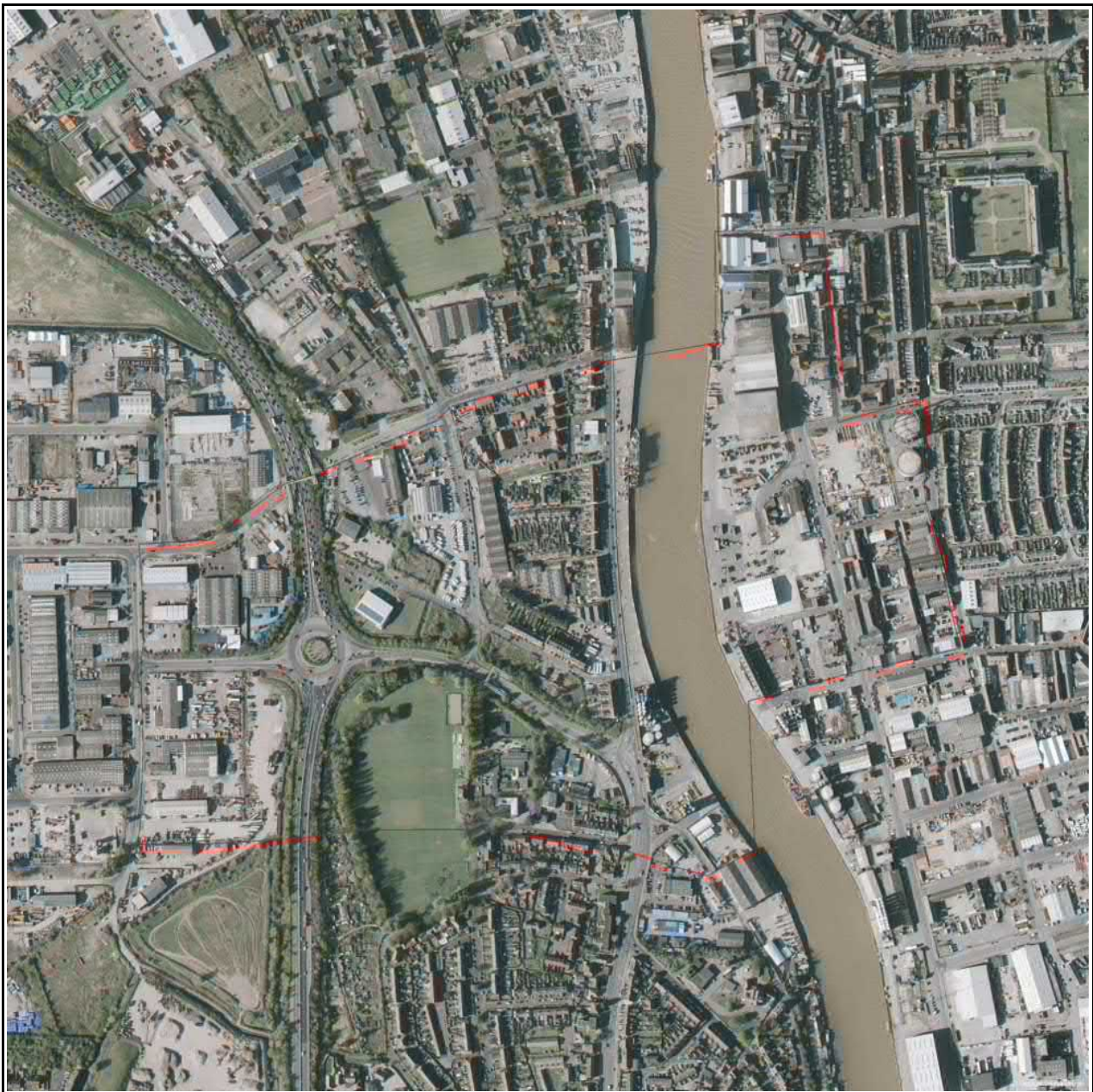
CENTREMAPS

Enc.  
Groundsure Geo Insight

Address: ,  
Date: 3 Jul 2017  
Reference: CMAPS-CM-636391-16287-030717GEO  
Client: CENTREMAPS

NW N NE

W E



SW S SE

Aerial Photograph Capture date: 16-Apr-2014  
Grid Reference: 652320,306005  
Site Size: 43.58ha

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# Overview of Findings

The Groundsure Geo Insight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 and 1:10,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Non-coal mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

## Section 1: Geology 1:10,000 Scale

1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	Yes
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	No
	1.2.2 Are there any records of landslip within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records of faults within 500m of the study site boundary at 1:10,000 scale?	No

## Section 2: Geology 1:50,000 Scale

2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	Yes
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	Yes
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	Yes
	2.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

## Section 2: Geology 1:50,000 Scale

### 2.3 Bedrock, Solid Geology and Faults

2.3.1 For records of Bedrock and Solid Geology beneath the study site\* see the detailed findings section.

2.3.2 Are there any records relating to permeability of bedrock ground within the study site boundary?

Yes

2.3.3 Are there any records of faults within 500m of the study site boundary?

No

## Section 3: Radon

### 3. Radon

3.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

3.2 Radon Protection

No radon protective measures are necessary.

## Section 4: Ground Workings

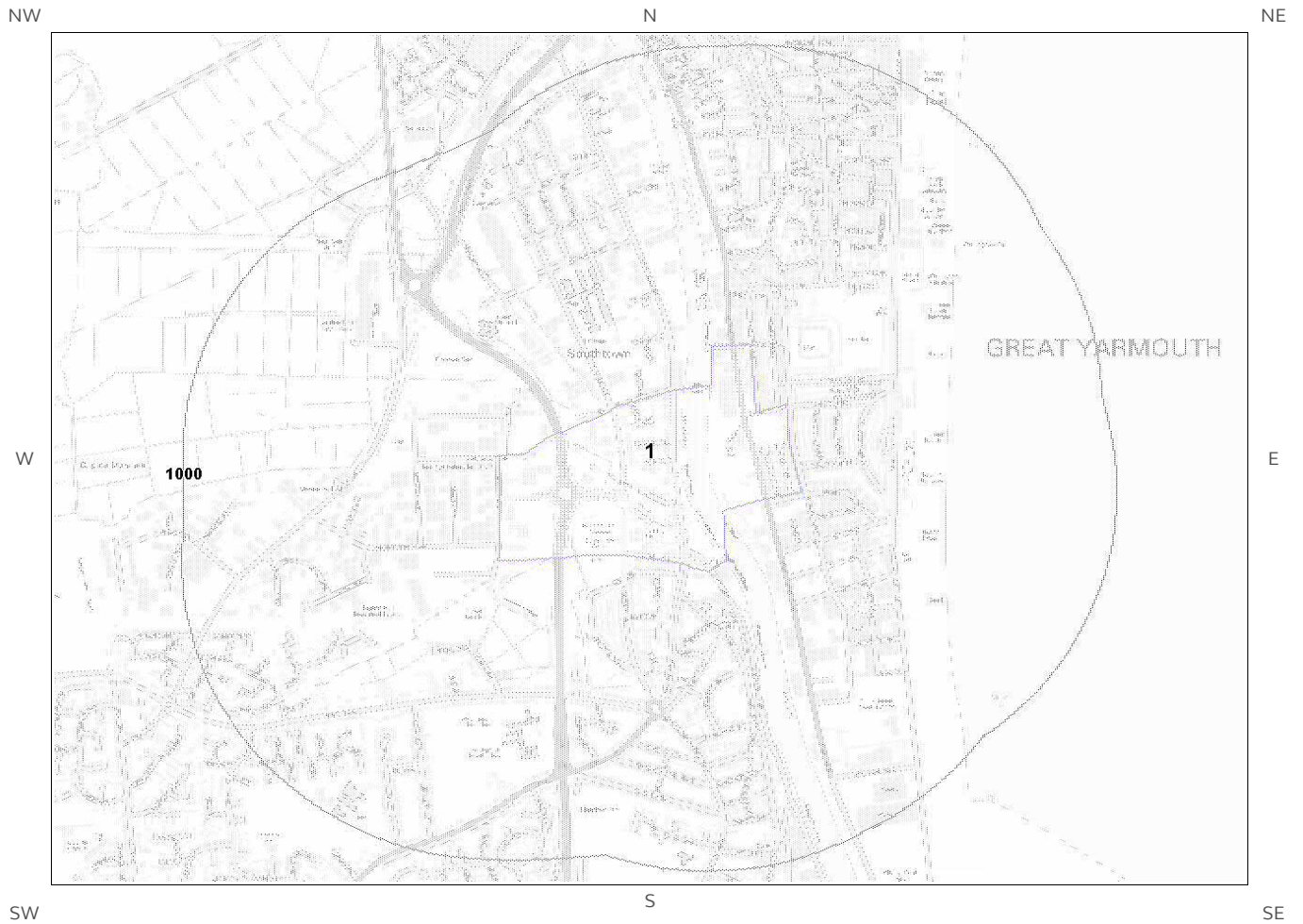
	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	11	1	12	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	1	2	0	1	4

## Section 5: Mining, Extraction & Natural Cavities

	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	0
5.2 Coal Mining	0	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	0	0	0	0	0
5.5 Non-Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

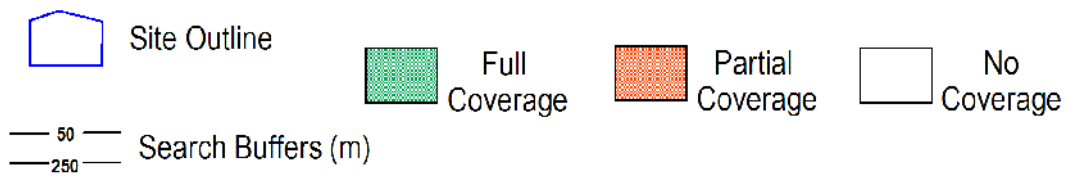
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
<b>Section 6: Natural Ground Subsidence</b>					
6.1 Shrink-Swell Clay	Low				
6.2 Landslides	Low				
6.3 Ground Dissolution of Soluble Rocks	Negligible				
6.4 Compressible Deposits	High				
6.5 Collapsible Deposits	Very Low				
6.5 Running Sand	Moderate				
<b>Section 7: Borehole Records</b>					
7 BGS Recorded Boreholes	107	33	77		
<b>Section 8: Estimated Background Soil Chemistry</b>					
8 Records of Background Soil Chemistry	16	3	0		
<b>Section 9: Railways and Tunnels</b>					
9.1 Tunnels	0	0	0	Not Searched	
9.2 Historical Railway and Tunnel Features	31	6	21	Not Searched	
9.3 Historical Railways	3	0	0	Not Searched	
9.4 Active Railways	0	0	0	Not Searched	
9.5 Railway Projects	0	0	0	0	

# 1:10,000 Scale Availability



1\_10,000 Availability Legend

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# Availability of 1:10,000 Scale Geology Mapping

The following information represents the availability of the key components of the 1:10,000 scale geological data.

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	No deposits are mapped	No coverage	No coverage	No coverage

Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not all themes are mapped or available on every map sheet. Therefore a coverage layer showing the availability of the four themes is presented above.

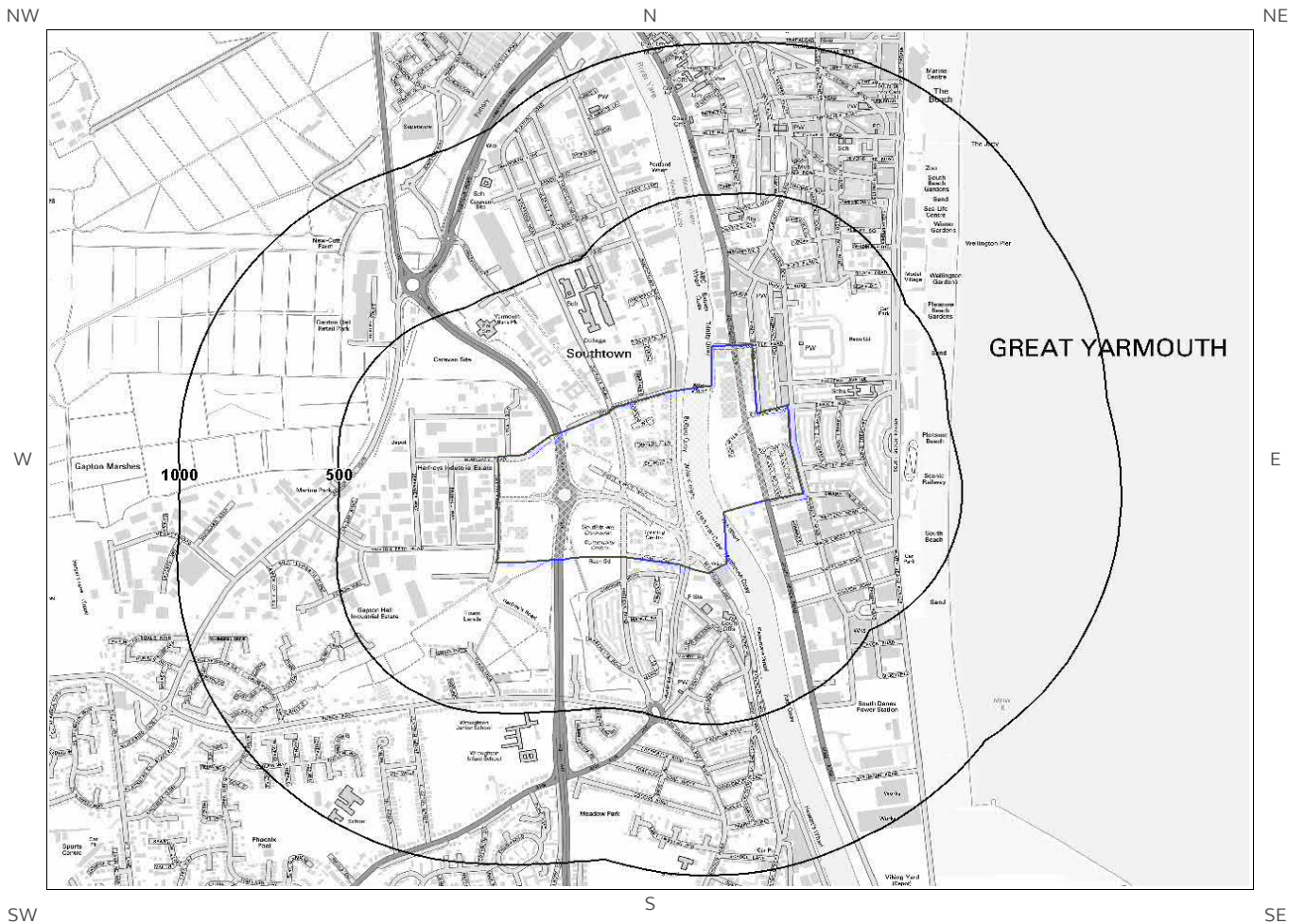
The definitions of coverage are as follows:

Geology	Full Coverage	Partial Coverage	No Coverage
Bedrock	The whole tile has been mapped	Some but not all the tile has been mapped	No coverage
Superficial	The whole tile has been mapped	Some but not all of the tile has been mapped	No coverage
Artificial	Some deposits are mapped on this tile	-	No deposits are mapped
Mass Movement	Some deposits are mapped on this tile	-	No coverage



# 1 Geology (1:10,000 scale).

# 1.1 Artificial Ground Map (1:10,000 scale)



**Artificial Ground Legend**

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# 1. Geology 1:10,000 scale

## 1.1 Artificial Ground

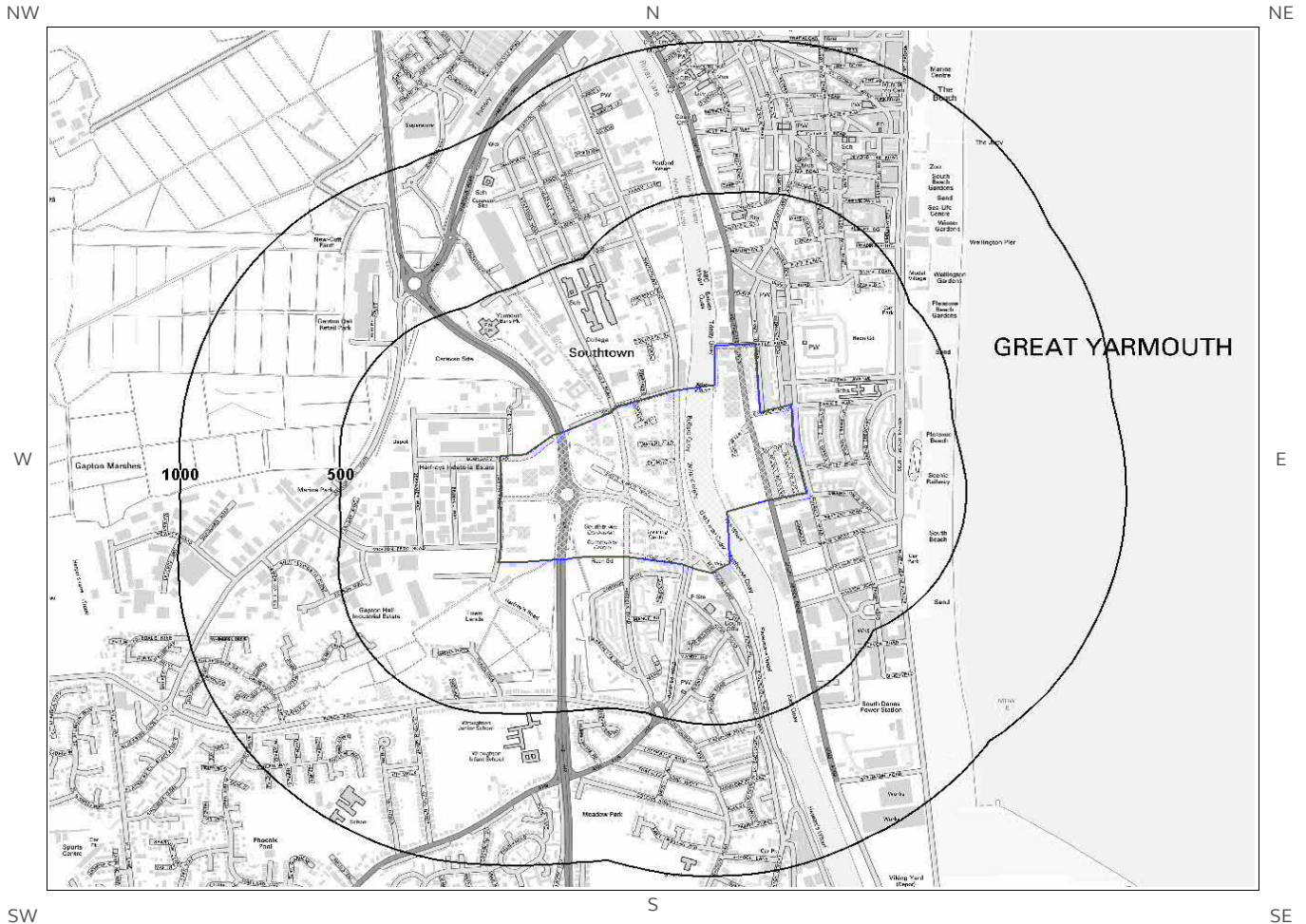
The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.




---

# 1.2 Superficial Deposits and Landslips Map (1:10,000 scale)



Artificial Ground Legend

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-  Site Outline
-  500
-  1000 Search Buffers (m)

# 1.2 Superficial Deposits and Landslips

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping

## 1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

---

## 1.2.2 Landslip

Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

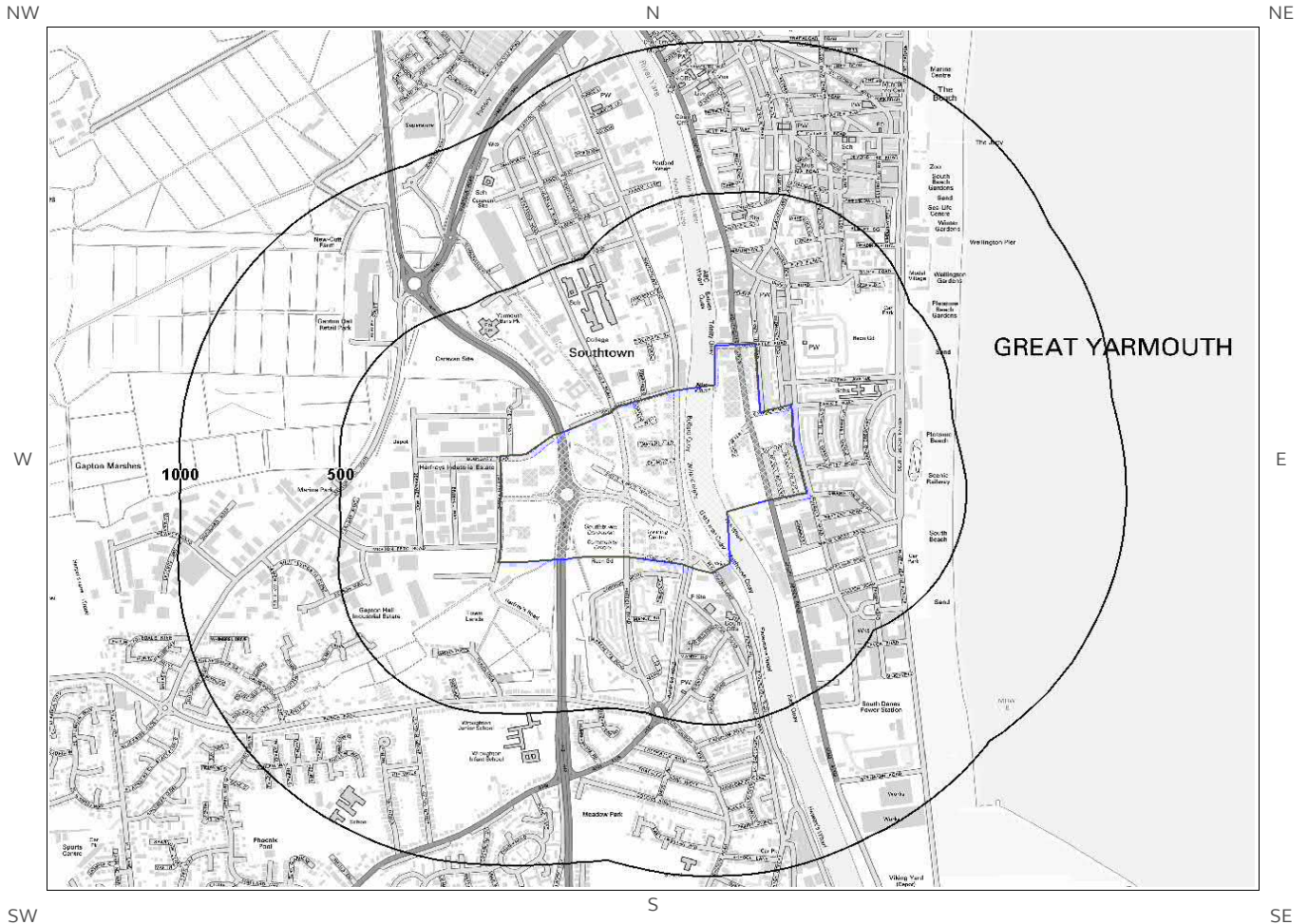
The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

---

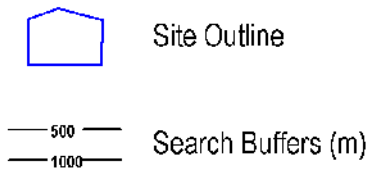


# 1.3 Bedrock and Faults Map (1:10,000 scale)



**Bedrock and Faults Legend**

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## 1.3 Bedrock and Faults

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

### 1.3.1 Bedrock/ Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale.

Database searched and no data found at this scale.

---

### 1.3.2 Faults

Are there any records of Faults within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found at this scale.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

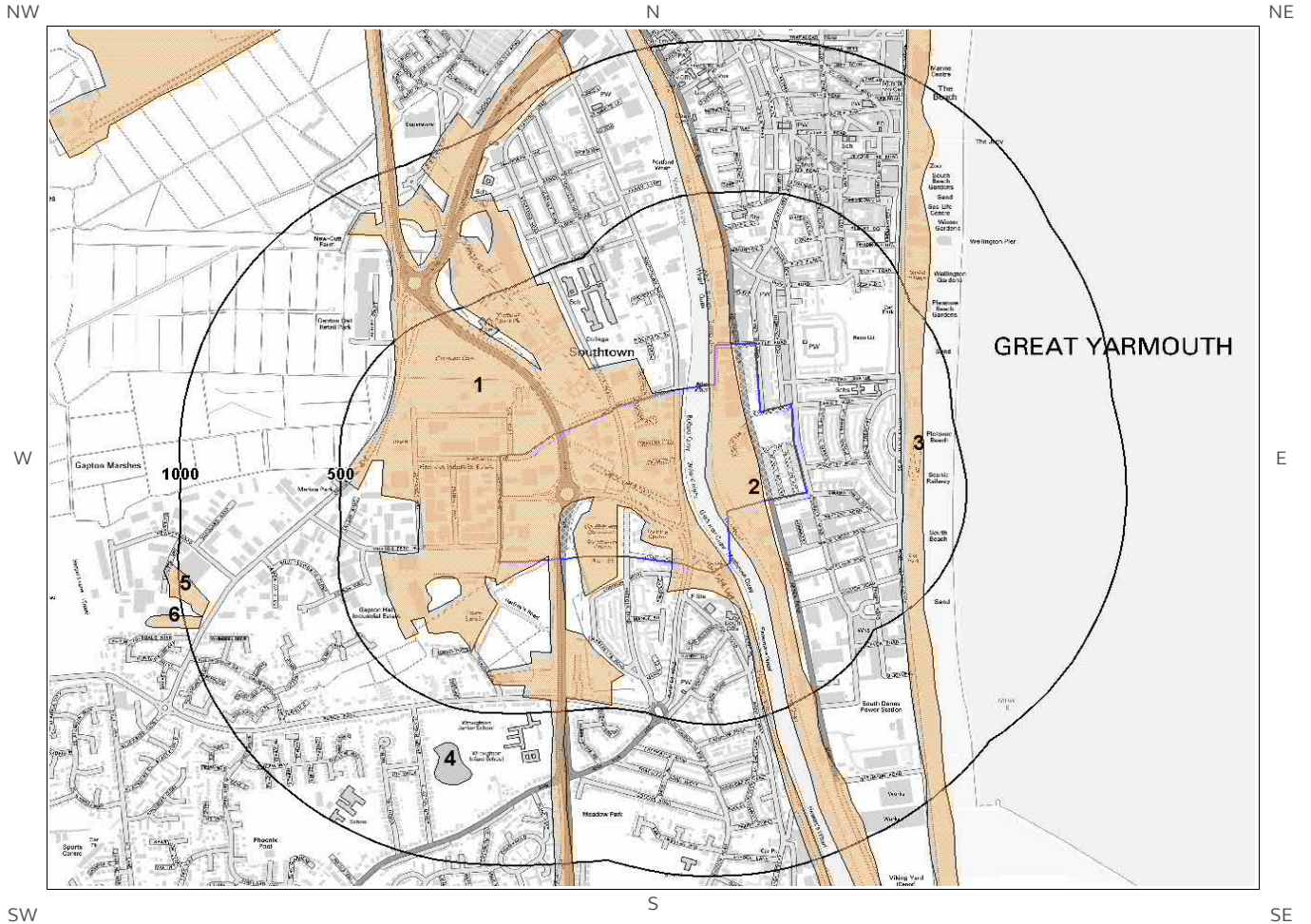
This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

---



# 2 Geology 1:50,000 Scale

## 2.1 Artificial Ground Map



Ground Workings Legend

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## 2. Geology 1:50,000 scale

### 2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 162

#### 2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	0.0	On Site	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
3	300.0	E	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

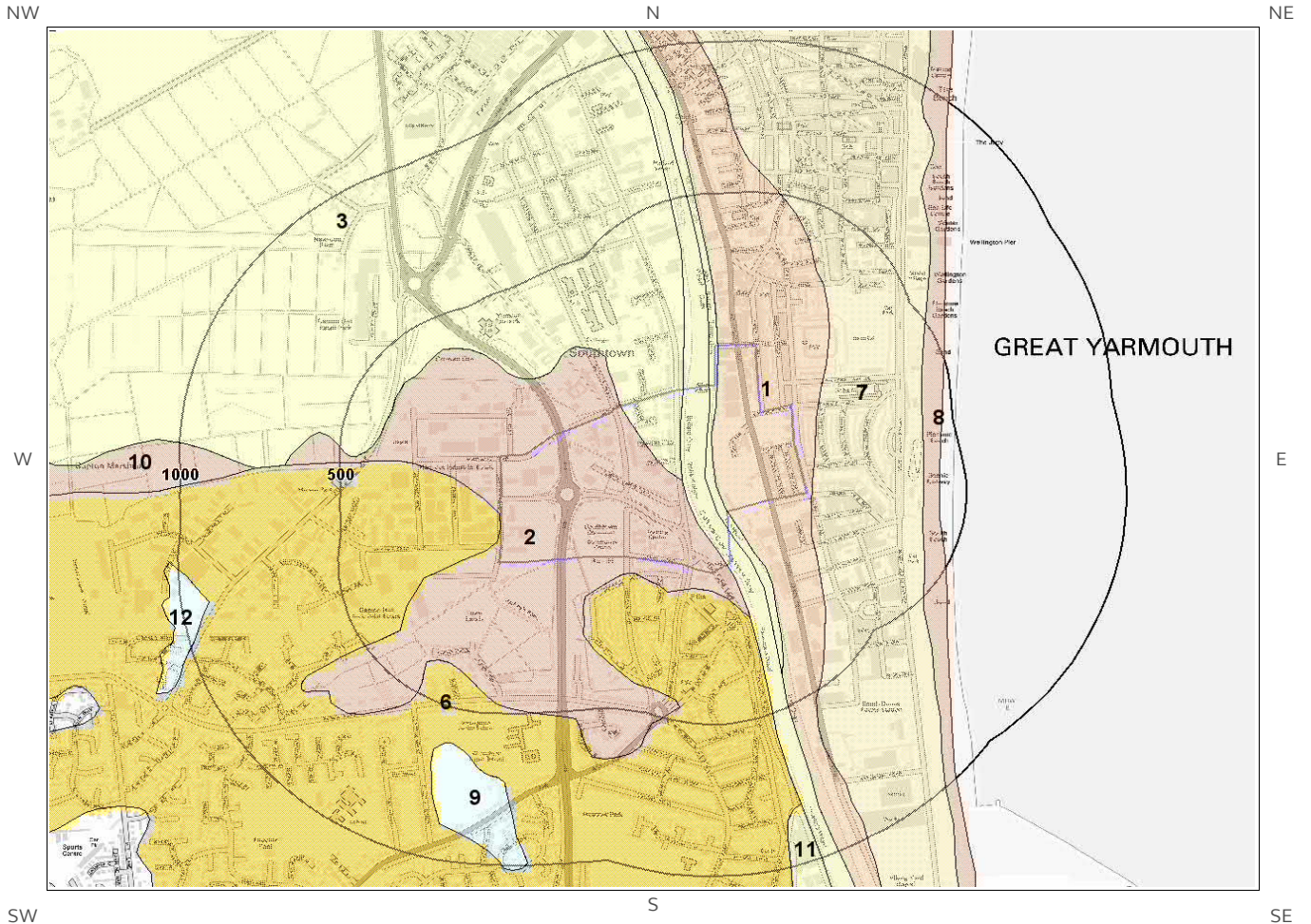
#### 2.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	Very High	Low
0.0	On Site	Mixed	Very High	Low

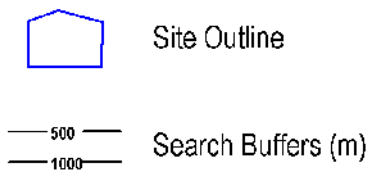


# 2.2 Superficial Deposits and Landslips Map (1:50,000 scale)



**Ground Workings Legend**

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# 2.2 Superficial Deposits and Landslips

## 2.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	NRD-XSV	NORTH DENES FORMATION	SAND AND GRAVEL
2	0.0	On Site	BRYD-P	BREYDON FORMATION	PEAT
3	0.0	On Site	BRYD-XCZ	BREYDON FORMATION	CLAY AND SILT
4	0.0	On Site	BRYD-XCZ	BREYDON FORMATION	CLAY AND SILT
5	0.0	On Site	TRD-XCZ	TIDAL RIVER OR CREEK DEPOSITS	CLAY AND SILT
6	3.0	W	HPGL-S	HAPPISBURGH GLACIGENIC FORMATION	SAND
7	16.0	E	BSA-S	BLOWN SAND	SAND
8	366.0	E	MBD-XSV	MARINE BEACH DEPOSITS	SAND AND GRAVEL

## 2.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	Low	Very Low
0.0	On Site	Intergranular	Low	Very Low
0.0	On Site	Mixed	Low	Very Low
0.0	On Site	Mixed	Low	Very Low
0.0	On Site	Intergranular	Very High	High
3.0	W	Intergranular	High	High
16.0	E	Intergranular	High	High

### 2.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary?

No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

---

### 2.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site boundary?

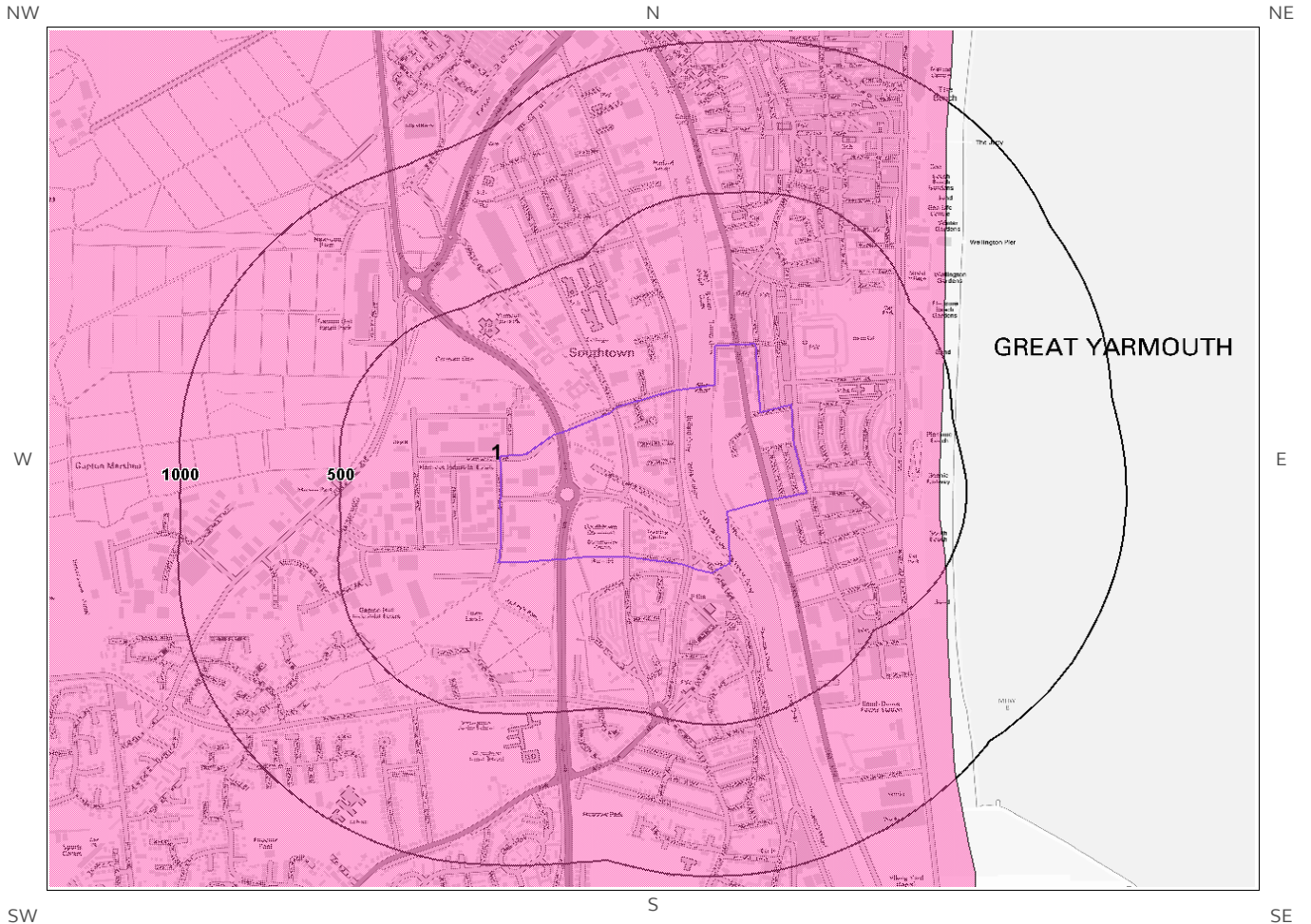
No

Database searched and no data found.

---






# 2.3 Bedrock and Faults Map (1:50,000 scale)



**Ground Workings Legend**

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-  Site Outline
  -  500
  -  1000
- Search Buffers (m)



## 2.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 162

### 2.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	CRAG-XSV	CRAG GROUP - SAND AND GRAVEL	-

### 2.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site boundary? Yes

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Very High	High

### 2.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nation wide coverage.

# 3 Radon Data

## 3.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?      The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

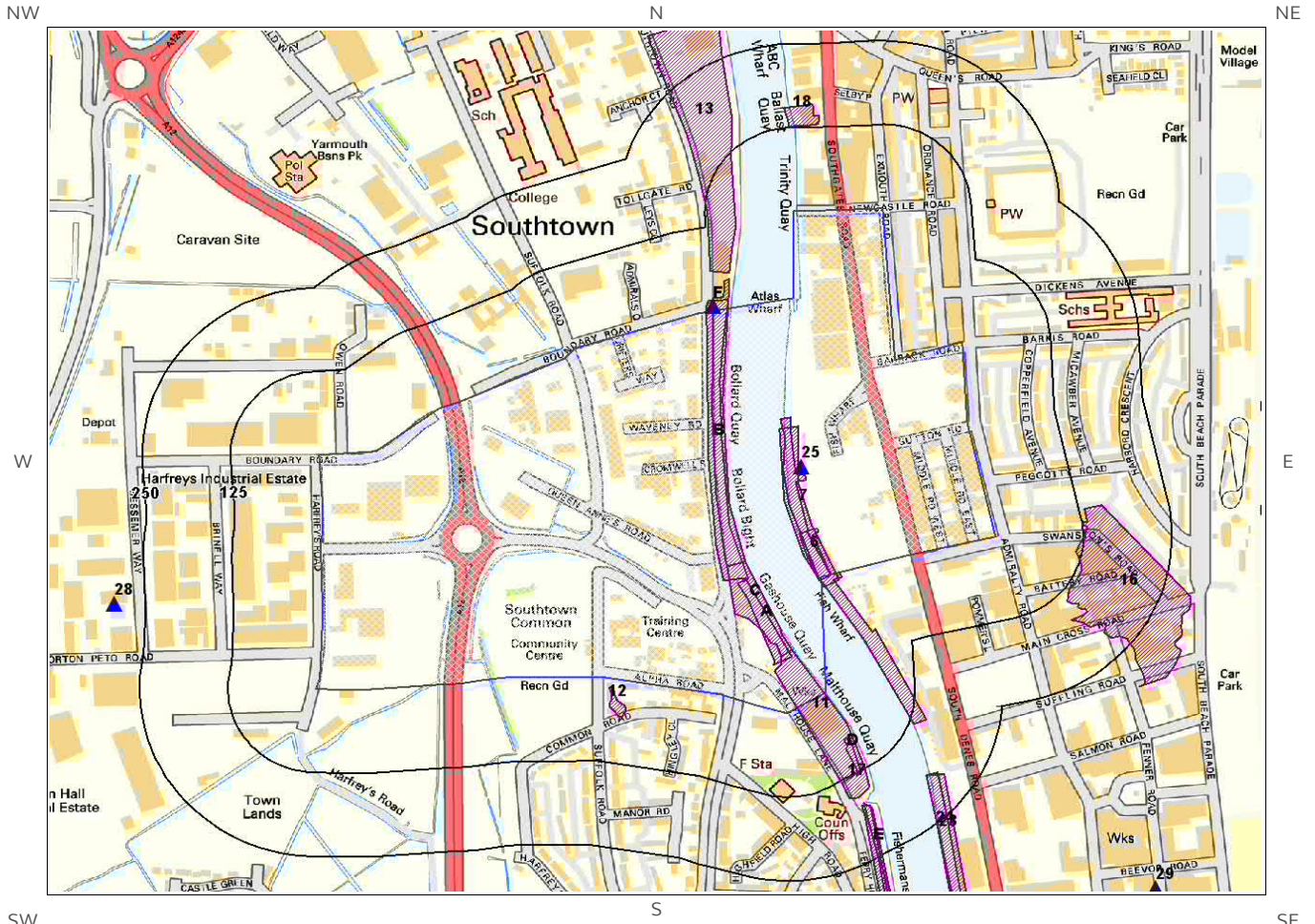
---

## 3.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?      No radon protective measures are necessary.





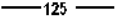

---

# 4 Ground Workings Map



Ground Workings Legend

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-  Site Outline
-  Historic Surface Ground Workings
-  Historic Underground Workings
-  Current Ground Workings
-  Search Buffers (m)
- 

# 4 Ground Workings

## 4.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on Groundsure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping

Are there any Historical Surface Ground Working Features within 250m of the study site boundary?  Yes

ID	Distance (m)	Direction	NGR	Use	Date
1B	0.0	On Site	652403 306035	Quay	1952
2A	0.0	On Site	652474 305764	Quay	1904
3A	0.0	On Site	652474 305764	Quay	1946
4B	0.0	On Site	652408 306062	Quay	1988
5B	0.0	On Site	652408 306062	Quay	1978
6	0.0	On Site	652545 305863	Unspecified Wharf	1988
7	0.0	On Site	652518 305936	Unspecified Wharf	1884
8C	0.0	On Site	652466 305783	Quay	1988
9C	0.0	On Site	652466 305783	Quay	1978
10	0.0	On Site	652556 305840	Unspecified Wharf	1978
11	0.0	On Site	652552 305622	Quay	1978
12	15.0	S	652266 305643	Pond	1884
13	52.0	N	652371 306479	Dock	1946
14D	73.0	SE	652596 305561	Quay	1946
15D	73.0	SE	652596 305561	Quay	1904
16	117.0	E	652990 305803	Sand Pit	1884
17	124.0	SE	652602 305523	Quay	1988
18	127.0	N	652526 306521	Dry Docks	1904
19E	169.0	SE	652639 305395	Quay	1978
20E	169.0	SE	652639 305395	Quay	1988
21E	172.0	SE	652636 305385	Quay	1904

ID	Distance (m)	Direction	NGR	Use	Date
22E	172.0	SE	652636 305385	Quay	1946
23	188.0	SE	652776 305268	Quay	1952
24	188.0	SE	652742 305367	Quay	1978

## 4.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the Groundsure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

## 4.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

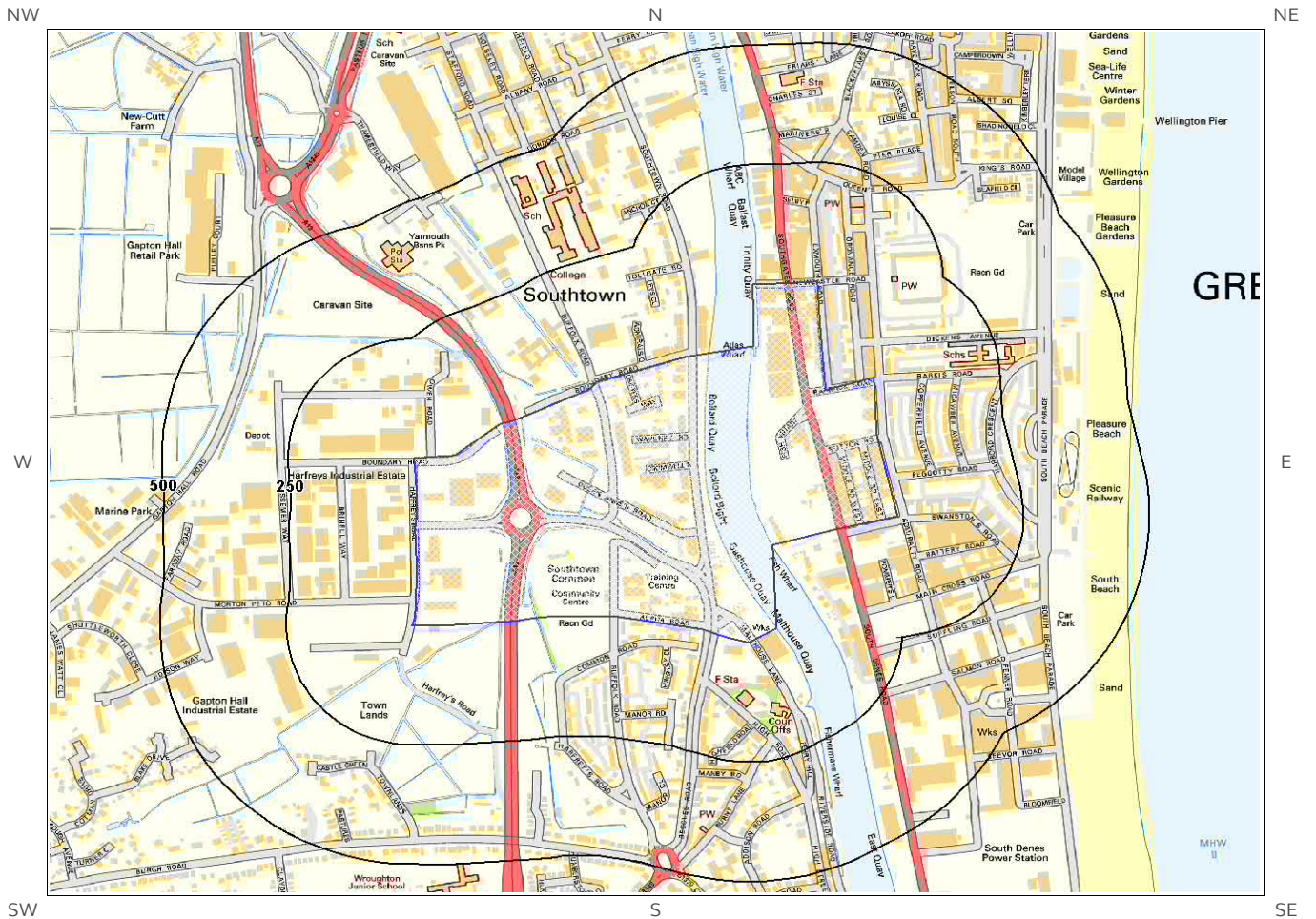
Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
25	0.0	On Site	652525 305995	Crushed Rock	Berth 4 Great Yarmouth Docks	Sea, river or canal wharf where mineral commodities are unloaded and stored	Active
26F	6.0	N	652400 306235	Crushed Rock	Great Yarmouth Wharf	Sea, river or canal wharf where mineral commodities are unloaded and stored	Inactive
27F	6.0	N	652400 306235	Secondary	Great Yarmouth Wharf	Sea, river or canal wharf where mineral commodities are unloaded and stored	Inactive
28	294.0	W	651553 305790	Sand & Gravel	Harfrey's Farm Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
29	549.0	SE	653026 305365	Sand	Nelson Sand Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	686.0	S	651666 304999	Clay & Shale	Lilypit Cottage Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	766.0	S	651860 304897	Clay & Shale	Lily Pit	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	911.0	N	652250 307250	Secondary	Yeoman Wharf	Sea, river or canal wharf where mineral commodities are unloaded and stored	Active



# 5 Mining, Extraction & Natural Cavities Map



Mining, Extraction and Natural Cavities Legend

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# 5 Mining, Extraction & Natural Cavities

## 5.1 Historical Mining

This dataset is derived from Groundsure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

---

## 5.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

---

## 5.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

---

## 5.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

---

## 5.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled “Review of mining instability in Great Britain, 1990” PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

---

## 5.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

---

## 5.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

---

## 5.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

---

## 5.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level..

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

---

This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary?

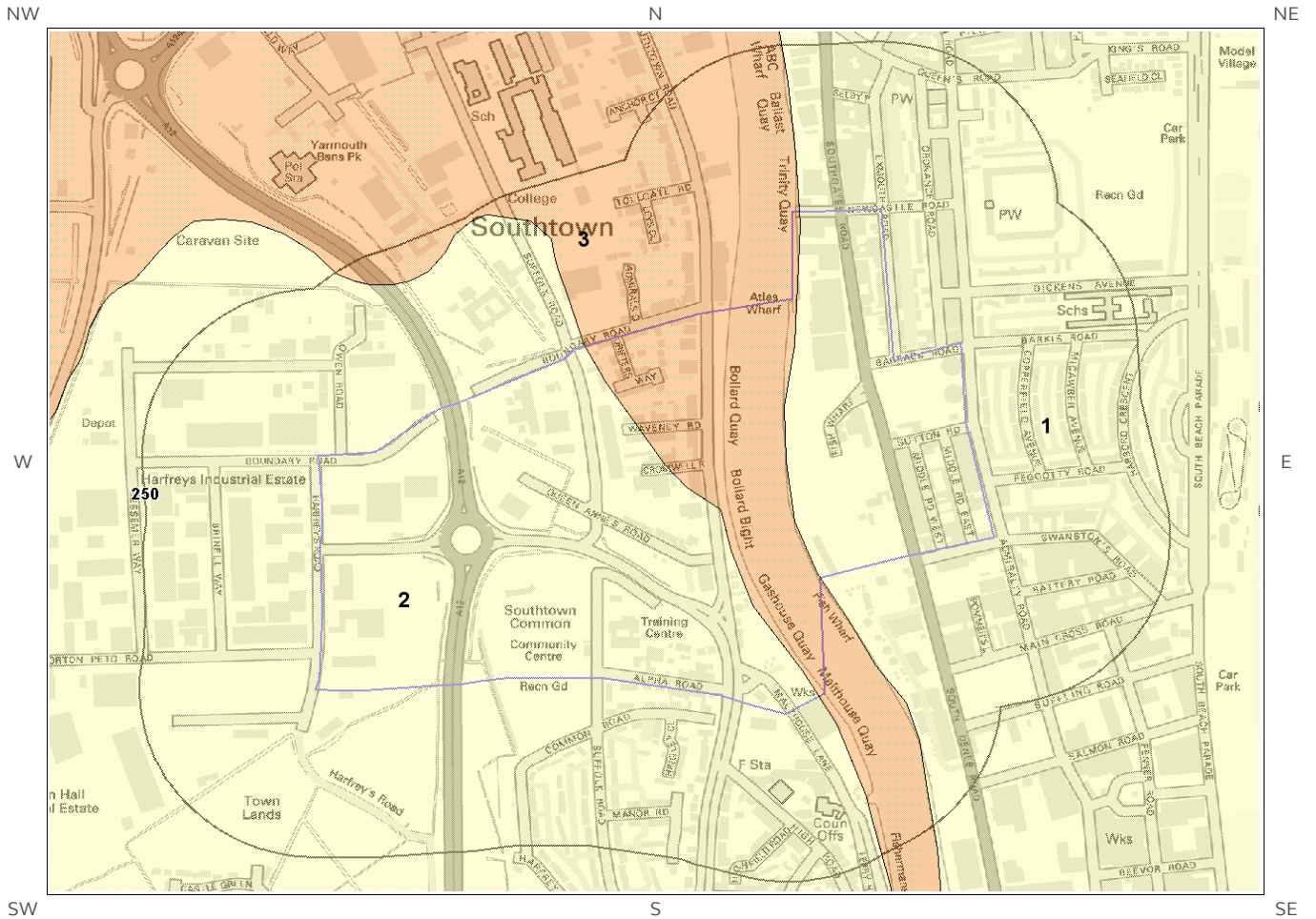
No

Database searched and no data found.

---

# 6 Natural Ground Subsidence

## 6.1 Shrink-Swell Clay Map



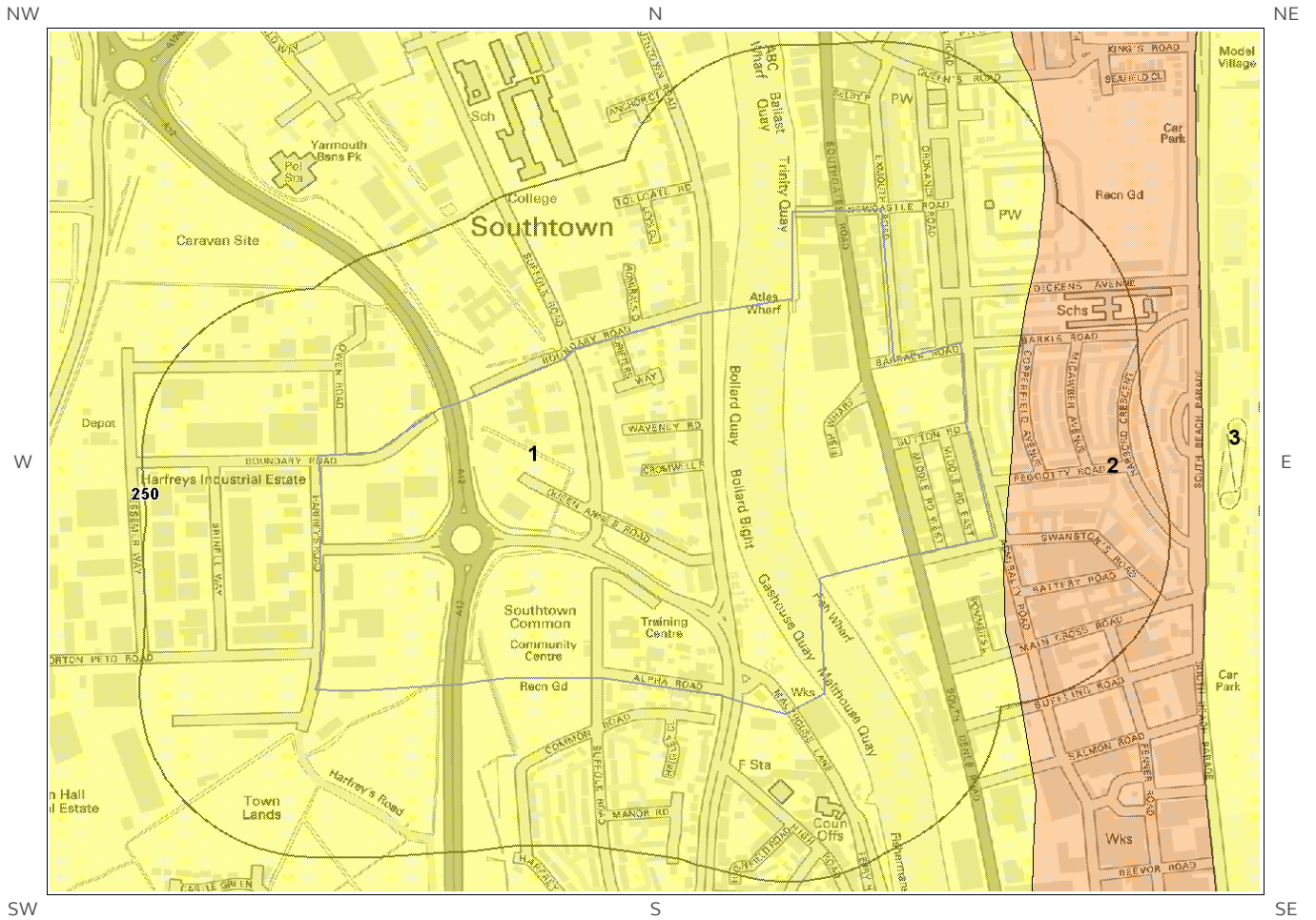
Shrink Swell Clay Legend

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# 6.2 Landslides Map



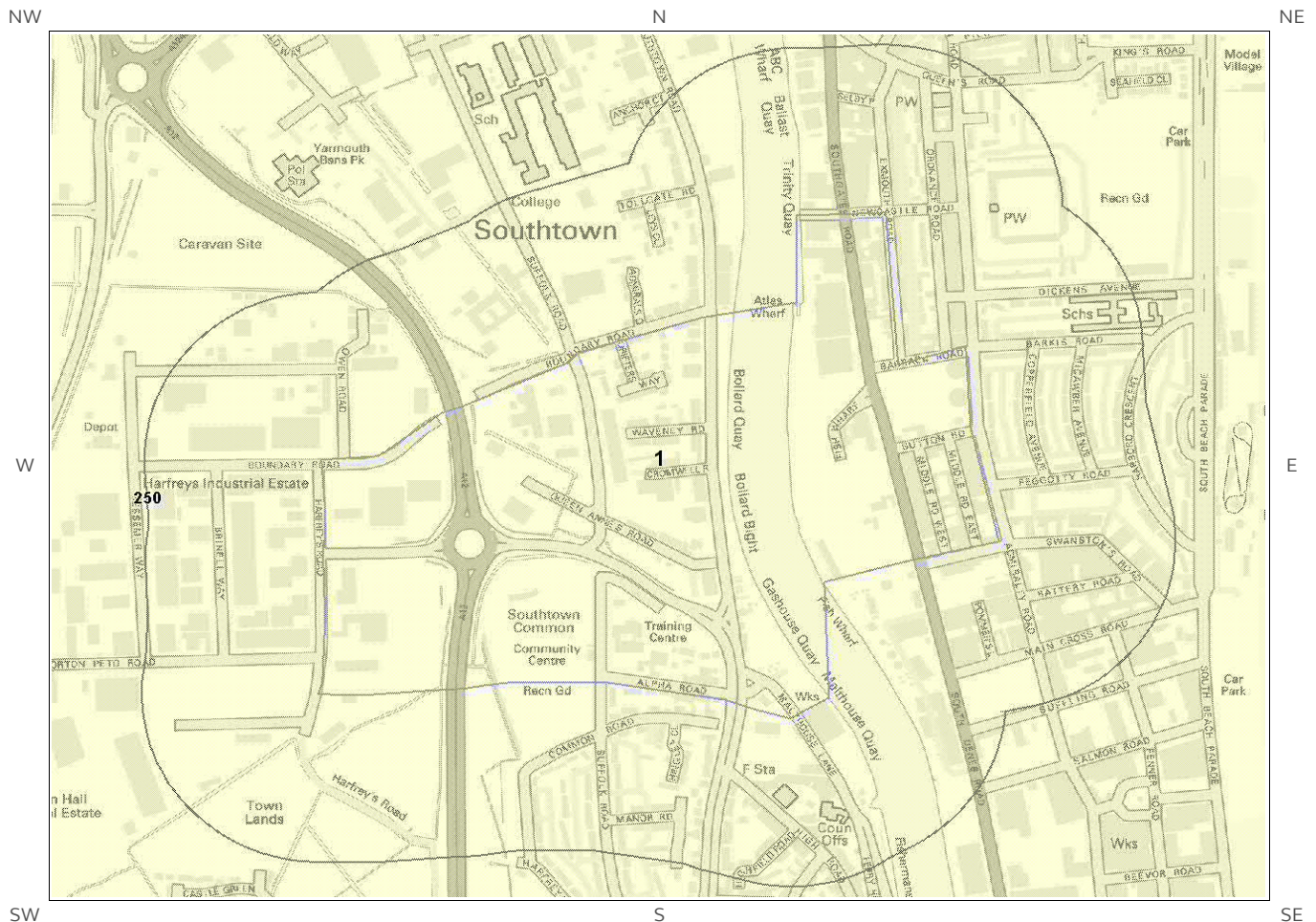
Landslides Legend

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# 6.3 Ground Dissolution of Soluble Rocks Map



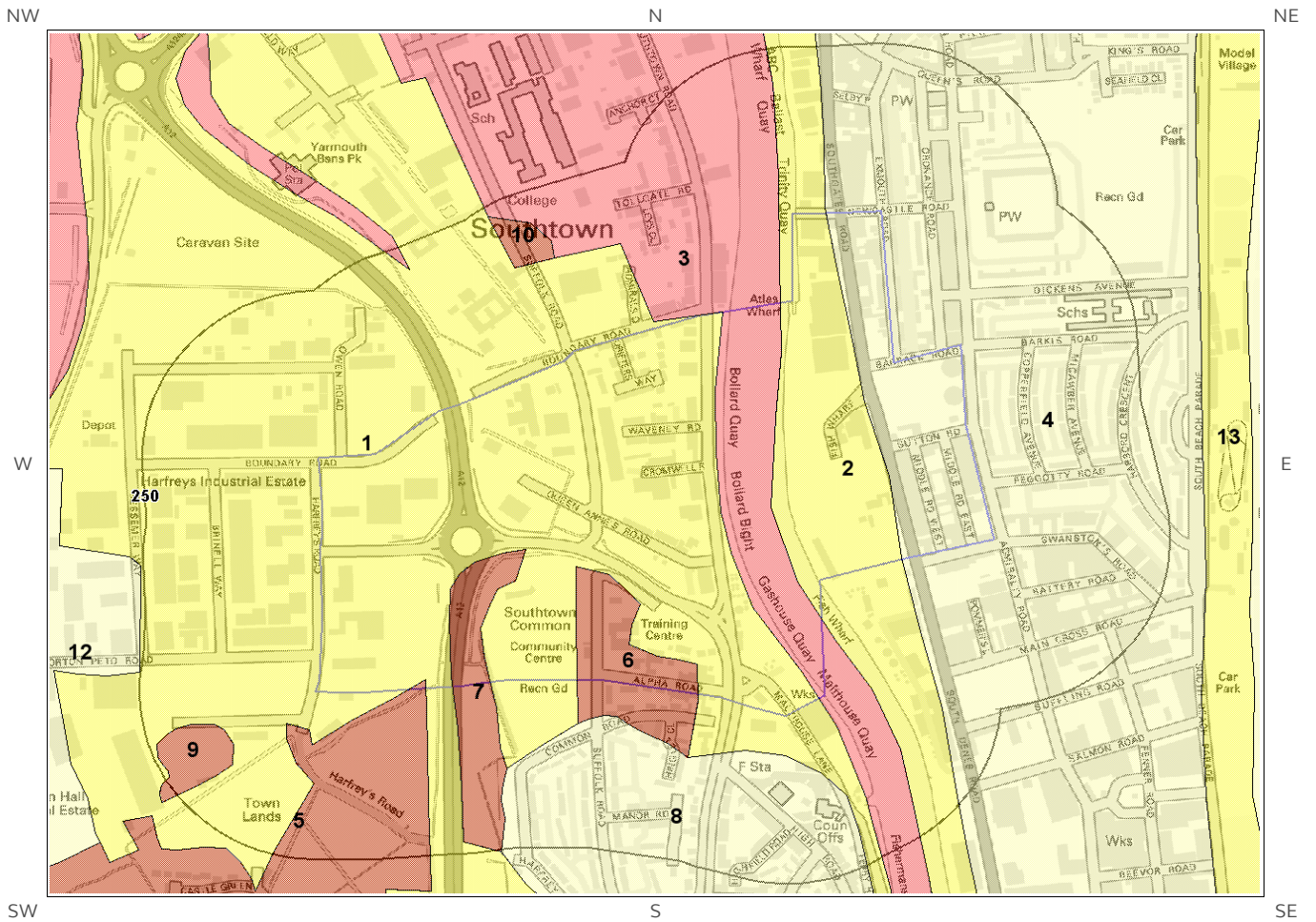
**Ground Dissolution Soluble Rocks Legend**

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# 6.4 Compressible Deposits Map



Compressible Deposits Legend

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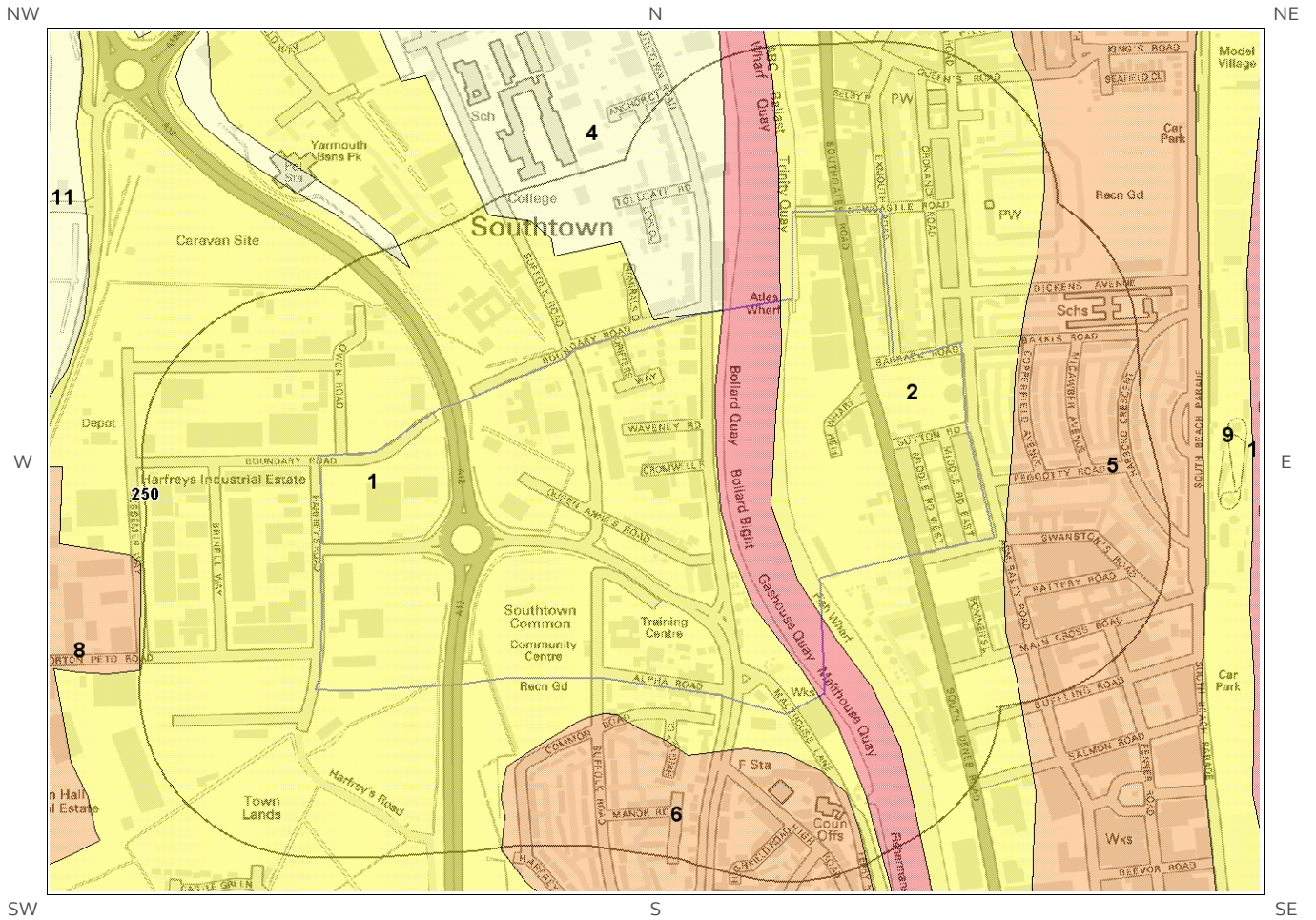








# 6.6 Running Sand Map



Running Sand Legend

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# 6 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site\*\* boundary? High

## 6.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
2	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
3	0.0	On Site	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

\* This includes an automatically generated 50m buffer zone around the site

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
2	16.0	E	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.

### 6.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

### 6.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
2	0.0	On Site	Very Low	Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
3	0.0	On Site	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

ID	Distance (m)	Direction	Hazard Rating	Details
4	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
5	0.0	On Site	High	Very significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Construction may not be possible at economic cost. For existing property - probable increase in insurance risk from compressibility especially if water conditions or loading of the ground change significantly.
6	0.0	On Site	High	Very significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Construction may not be possible at economic cost. For existing property - probable increase in insurance risk from compressibility especially if water conditions or loading of the ground change significantly.
7	0.0	On Site	High	Very significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Construction may not be possible at economic cost. For existing property - probable increase in insurance risk from compressibility especially if water conditions or loading of the ground change significantly.
8	50.0	S	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

## 6.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.
2	3.0	W	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

## 6.6 Running Sands

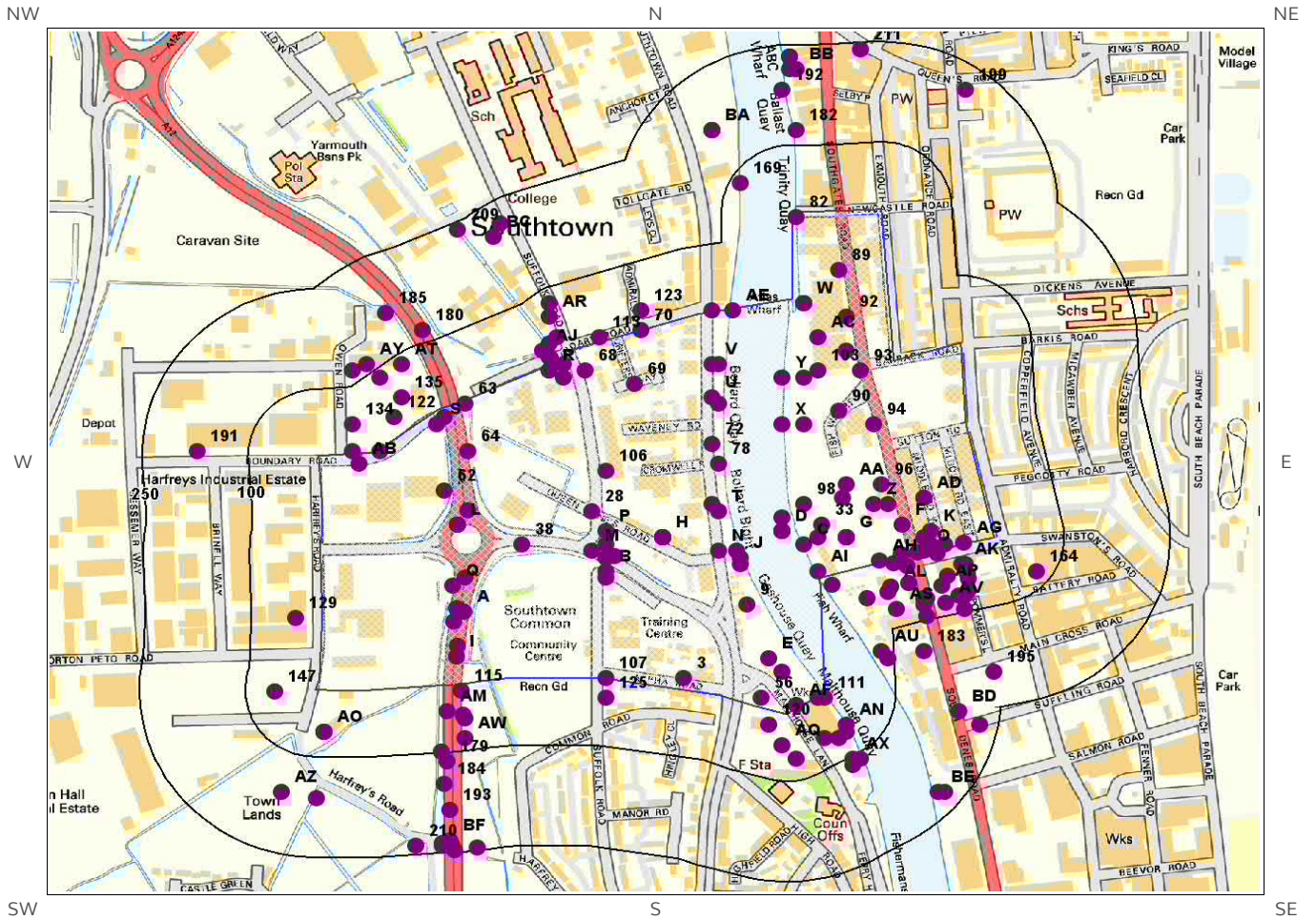
The following Running Sands information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.



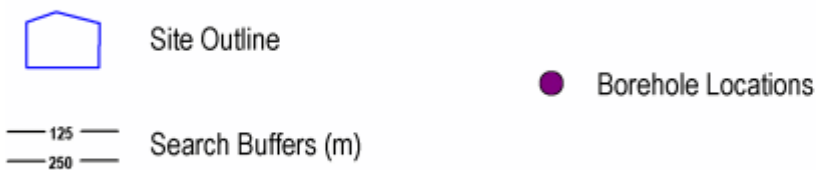
ID	Distance (m)	Direction	Hazard Rating	Details
2	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
3	0.0	On Site	Moderate	Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build - consider the consequences of soil and groundwater conditions during and after construction. For existing property - possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.
4	1.0	N	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
5	16.0	E	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.
6	50.0	S	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.

# 7 Borehole Records Map



Borehole Records Legend

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# 7 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary:

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ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1Q	0.0	On Site	652033 305818	TG50NW45	5.0	A47 GORLESTON RELIEF ROAD
2A	0.0	On Site	652049 305780	TG50NW43	6.2	A47 GORLESTON RELIEF ROAD
3	0.0	On Site	652360 305680	TG50NW332	7.62	GT YAR BOR CNCL ALPHA ROAD 27
4AI	0.0	On Site	652550 305840	TG50NW590	15.0	FISHWHARF ZAPATA QUAY 2
5B	0.0	On Site	652250 305840	TG50NW164	24.38	GT YAR BOROUGH COUNCIL YARE TUNNEL 7
6J	0.0	On Site	652440 305860	TG50NW583	15.5	BOLLARD QUAY 6
7M	0.0	On Site	652230 305870	TG50NW185	6.71	GT YAR BOROUGH COUNCIL DRAINAGE SCHEME 3
8C	0.0	On Site	652530 305880	TG50NW591	15.0	FISHWHARF ZAPATA QUAY 3
9	0.0	On Site	652450 305790	TG50NW840	10.0	GAS QUAY GT YARMOUTH 1
10A	0.0	On Site	652038 305785	TG50NW374	2.3	A12 GORLESTON RELIEF RD GT YAR S BY PASS
11B	0.0	On Site	652250 305830	TG50NW27	12.0	A47 GT YARMOUTH WESTERN BY PASS 237
12C	0.0	On Site	652550 305890	TG50NW592	15.5	FISHWHARF ZAPATA QUAY 4
13H	0.0	On Site	652330 305890	TG50NW1008	18.28	CENTRAL ELECTRICITY BOARD GORLESTON
14D	0.0	On Site	652500 305900	TG50NW892	20.0	SOUTHGATES RD GT YARMOUTH 3
15D	0.0	On Site	652500 305900	TG50NW891	20.0	SOUTHGATES RD GT YARMOUTH 2
16D	0.0	On Site	652500 305900	TG50NW893	20.0	SOUTHGATES RD GT YARMOUTH 4
17A	0.0	On Site	652034 305764	TG50NW32	7.05	A47/A12 GORLESTON RELIEF ROAD
18L	0.0	On Site	652040 305910	TG50NW13	20.12	GORING CEB GREAT YARMOUTH
19I	0.0	On Site	652038 305712	TG50NW386	14.3	A12/A47 GORLESTON RELIEF RD REPORT
20E	0.0	On Site	652480 305710	TG50NW942	8.0	GAS HOUSE QUAY GT YARMOUTH 3
21F	0.0	On Site	652670 305910	TG50NW570	-1.0	FISH QUAY TRIAL PIT PS22

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
22E	0.0	On Site	652500 305690	TG50NW792	10.0	MALTHOUSE QUAY GT YARMOUTH 7
23D	0.0	On Site	652500 305920	TG50NW571	-1.0	FISH QUAY TRIAL PIT PS23
24G	0.0	On Site	652590 305890	TG50NW17/C	17.37	HIPPERSON & SON ELECTRICITY POWER STN
25F	0.0	On Site	652700 305890	TG50NW109	-1.0	CEGB 132 KV TRANSFORMER SITE GT YAR DKM 3
26G	0.0	On Site	652590 305890	TG50NW998	17.1	ELECTRICAL POWER STATION GREAT YARMOUTH NO 1
27H	0.0	On Site	652330 305890	TG50NW995	13.71	CENTRAL ELECTRICITY BOARD GORLESTON
28	0.0	On Site	652230 305930	TG50NW184	7.01	GT YAR BOROUGH COUNCIL DRAINAGE SCHEME 2
29T	0.0	On Site	652410 305930	TG50NW582	15.5	BOLLARD QUAY 5
30K	0.0	On Site	652710 305900	TG50NW108	-1.0	CEGB 132 KV TRANSFORMER SITE GT YAR DKM 2
31I	0.0	On Site	652040 305728	TG50NW44	6.2	A47 GORLESTON RELIEF ROAD
32D	0.0	On Site	652500 305900	TG50NW890	20.0	SOUTHGATES RD GT YARMOUTH 1
33	0.0	On Site	652555 305910	TG50NW162	36.58	GT YAR BOROUGH COUNCIL YARE TUNNEL 5
34O	0.0	On Site	652700 305870	TG50NW110	-1.0	CEGB 132 KV TRANSFORMER SITE GT YAR DKM 4
35N	0.0	On Site	652410 305870	TG50NW588	20.0	BOLLARD QUAY 11
36J	0.0	On Site	652435 305870	TG50NW163	36.58	GT YAR BOROUGH COUNCIL YARE TUNNEL 6
37K	0.0	On Site	652710 305880	TG50NW107	-1.0	CEGB 132 KV TRANSFORMER SITE GT YAR DKM 1
38	0.0	On Site	652130 305880	TG50NW472	15.0	A12 GT YARMOUTH WESTERN BY-PASS 318
39G	0.0	On Site	652590 305890	TG50NW17/B	14.02	HIPPERSON & SON ELECTRICITY POWER STN
40P	0.0	On Site	652250 305900	TG50NW29	10.0	A47 GT YARMOUTH WESTERN BY PASS 239
41L	0.0	On Site	652040 305910	TG50NW1026	17.67	CENTRAL ELECTRICITY BOARD GREAT YARMOUTH
42L	0.0	On Site	652040 305910	TG50NW1005	20.11	CENTRAL ELECTRICITY BOARD GREAT YARMOUTH
43M	0.0	On Site	652250 305860	TG50NW26	11.0	A47 GT YARMOUTH WESTERN BY PASS 236
44N	0.0	On Site	652440 305850	TG50NW180	9.15	GT YAR BOROUGH COUNCIL SEWERAGE WORKS 14
45O	0.0	On Site	652668 305865	TG50NW1057	8.0	ADMIRALTY ROAD GREAT YARMOUTH 210

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
46B	0.0	On Site	652262 305862	TG50NW429	7.6	A12 GT YAR W BY PASS DOT REPORT
47P	0.0	On Site	652250 305880	TG50NW28	11.5	A47 GT YARMOUTH WESTERN BY PASS 238
48Q	0.0	On Site	652050 305830	TG50NW46	4.5	A47 GORLESTON RELIEF ROAD
49L	0.0	On Site	652054 305931	TG50NW428	17.0	A12 GT YAR W BY PASS DOT REPORT
50H	0.0	On Site	652330 305890	TG50NW1009	24.38	CENTRAL ELECTRICITY BOARD GORLESTON
51AH	0.0	On Site	652638 305856	TG50NW1050	17.0	ADMIRALTY ROAD GREAT YARMOUTH 202
52L	0.0	On Site	652040 305910	TG50NW1006	16.76	CENTRAL ELECTRICITY BOARD GREAT YARMOUTH
53G	0.0	On Site	652590 305890	TG50NW17/A	17.07	HIPPERSON & SON ELECTRICITY POWER STN
54H	0.0	On Site	652330 305890	TG50NW12	18.29	GORING CEG GREAT YARMOUTH
55AF	0.0	On Site	652520 305640	TG50NW793	19.0	MALTHOUSE QUAY GT YARMOUTH 8
56	0.0	On Site	652470 305650	TG50NW795	10.5	MALTHOUSE QUAY GT YARMOUTH 10
57K	0.0	On Site	652730 305880	TG50NW1063	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 106
58O	0.0	On Site	652691 305868	TG50NW1053	8.5	ADMIRALTY ROAD GREAT YARMOUTH 205
59AG	0.0	On Site	652757 305882	TG50NW1065	5.0	ADMIRALTY ROAD GREAT YARMOUTH WS 108
60AB	0.0	On Site	651900 306000	TG50NW687	0.9	BGS AUGR HL 162 GAPTON MARSHES
61S	0.0	On Site	652010 306060	TG50NW467	2.5	A12 GT YARMOUTH WESTERN BY-PASS 235
62	0.0	On Site	652020 305960	TG50NW226	11.8	GT YAR BOR CNCL A12 WESTERN BY PASS
63	0.0	On Site	652050 306090	TG50NW466	24.3	A12 GT YARMOUTH WESTERN BY-PASS 234
64	0.0	On Site	652054 306020	TG50NW430	11.3	A12 GT YAR W BY PASS DOT REPORT
65R	0.0	On Site	652170 306140	TG50NW308	-1.0	GT YAR BOR CNCL HIGH MILL RD CPT 11
66R	0.0	On Site	652190 306150	TG50NW181	14.8	GT YAR BOROUGH COUNCIL SEWERAGE WORKS 25
67R	0.0	On Site	652190 306130	TG50NW306	-1.0	GT YAR BOR CNCL HIGH MILL RD CPT 9
68	0.0	On Site	652220 306140	TG50NW183	7.01	GT YAR BOROUGH COUNCIL DRAINAGE SCHEME 1
69	0.0	On Site	652290 306120	TG50NW307	-1.0	GT YAR BOR CNCL HIGH MILL RD CPT 10
70	0.0	On Site	652300 306200	TG50NW310	-1.0	GT YAR BOR CNCL HIGH MILL RD CPT 13
71S	0.0	On Site	652020 306070	TG50NW468	25.0	A12 GT YARMOUTH WESTERN BY-PASS 235A
72	0.0	On Site	652400 306030	TG50NW586	20.0	BOLLARD QUAY 9
73U	0.0	On Site	652400 306100	TG50NW908	25.0	SOUTHTOWN RD GT YARMOUTH 1



ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
74V	0.0	On Site	652400 306150	TG50NW585	15.5	BOLLARD QUAY 8
75T	0.0	On Site	652400 305940	TG50NW587	11.5	BOLLARD QUAY 10
76U	0.0	On Site	652410 306090	TG50NW580	15.5	BOLLARD QUAY 3
77V	0.0	On Site	652410 306150	TG50NW579	15.0	BOLLARD QUAY 2
78	0.0	On Site	652410 306000	TG50NW581	15.0	BOLLARD QUAY 4
79AE	0.0	On Site	652430 306230	TG50NW578	15.5	BOLLARD QUAY 1
80Y	0.0	On Site	652500 306130	TG50NW341	20.5	GREAT YARMOUTH FLOOD DEFENCES 1
81X	0.0	On Site	652500 306060	TG50NW342	22.1	GREAT YARMOUTH FLOOD DEFENCES 2
82	0.0	On Site	652520 306370	TG50NW928	26.0	TRINITY QUAY GT YARMOUTH 2
83W	0.0	On Site	652530 306240	TG50NW934	20.0	SOUTHGATES RD GT YARMOUTH 12
84W	0.0	On Site	652530 306240	TG50NW935	20.0	SOUTHGATES RD GT YARMOUTH 13
85W	0.0	On Site	652530 306240	TG50NW933	20.0	SOUTHGATES RD GT YARMOUTH 11
86X	0.0	On Site	652530 306060	TG50NW344	25.0	GREAT YARMOUTH FLOOD DEFENCES 4
87Y	0.0	On Site	652530 306130	TG50NW343	25.0	GREAT YARMOUTH FLOOD DEFENCES 3
88R	0.0	On Site	652170 306140	TG50NW210	18.5	GT YAR COUNCIL STH TOWN PUMPING STN 2A
89	0.0	On Site	652580 306290	TG50NW276	-1.0	GT YAR BOR CNCL SOUTHGATE ROAD 2047A
90	0.0	On Site	652580 306080	TG50NW573	-1.0	FISH QUAY TRIAL PIT PS25
91AA	0.0	On Site	652590 305970	TG50NW577	-1.0	FISH QUAY TRIAL PIT PP4
92	0.0	On Site	652590 306220	TG50NW279	-1.0	GT YAR BOR CNCL SOUTHGATE ROAD 2047D
93	0.0	On Site	652610 306140	TG50NW277	-1.0	GT YAR BOR CNCL SOUTHGATE ROAD 2047B
94	0.0	On Site	652630 306060	TG50NW572	-1.0	FISH QUAY TRIAL PIT PS24
95Z	0.0	On Site	652630 305940	TG50NW576	-1.0	FISH QUAY TRIAL PIT PP3
96	0.0	On Site	652640 305970	TG50NW574	-1.0	FISH QUAY TRIAL PIT PP1
97Z	0.0	On Site	652650 305940	TG50NW575	-1.0	FISH QUAY TRIAL PIT PP2
98	0.0	On Site	652530 305940	TG50NW368	3.0	GREAT YARMOUTH FLOOD DEFENCES TP 12
99AA	0.0	On Site	652585 305950	TG50NW161	24.38	GT YAR BOROUGH COUNCIL YARE TUNNEL 4
100A D	0.0	On Site	652700 305950	TG50NW996	9.4	SUTTON ROAD GREAT YARMOUTH

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
101A B	0.0	On Site	651930 306020	TG50NW1081	5.0	TRAVIS PERKINS GREAT YARMOUTH WS102
102A C	0.0	On Site	652550 306190	TG50NW1046	30.34	GREAT YARMOUTH (FISHWHARF OFF SOUTH DENES ROAD) 3
103	0.0	On Site	652550 306140	TG50NW1045	30.32	GREAT YARMOUTH (FISHWHARF OFF SOUTH DENES ROAD) 2
104A C	0.0	On Site	652590 306170	TG50NW1044	30.45	GREAT YARMOUTH (FISHWHARF OFF SOUTH DENES ROAD) 1A
105A D	0.0	On Site	652700 305950	TG50NW23	9.45	SUTTON RD GT YARMOUTH
106	0.0	On Site	652250 305990	TG50NW4	7.01	GREAT YARMOUTH NO 4
107	0.0	S	652250 305680	TG50NW331	7.62	SUFFOLK ROAD 26
108A E	1.0	N	652400 306230	TG50NW584	20.0	BOLLUAY QUAY 7
109A F	1.0	SE	652550 305650	TG50NW353	25.0	GREAT YARMOUTH FLOOD DEFENCES 13
110A B	4.0	N	651890 306020	TG50NW1076	20.2	TRAVIS PERKINS GREAT YARMOUTH 101
111	6.0	SE	652560 305650	TG50NW350	20.0	GREAT YARMOUTH FLOOD DEFENCES 10
112A G	6.0	S	652719 305867	TG50NW1048	8.2	ADMIRALTY ROAD GREAT YARMOUTH 102
113	7.0	N	652240 306190	TG50NW309	-1.0	GT YAR BOR CNCL HIGH MILL RD CPT 12
114A H	7.0	S	652658 305852	TG50NW1070	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 201
115	10.0	S	652045 305662	TG50NW41	7.8	A47 GORLESTON RELIEF ROAD
116R	11.0	NW	652170 306160	TG50NW209	15.25	GT YAR COUNCIL STH TOWN PUMPING STN 1A
117R	11.0	NW	652170 306160	TG50NW182	15.25	GT YAR BOROUGH COUNCIL SEWERAGE WORKS 26
118AI	14.0	S	652570 305820	TG50NW281	-1.0	GT YAR BOR CNCL FISH WHARF B12
119O	15.0	S	652676 305848	TG50NW1051	14.4	ADMIRALTY ROAD GREAT YARMOUTH 203
120	23.0	S	652480 305610	TG50NW796	10.0	MALTHOUSE QUAY GT YARMOUTH 11
121AJ	24.0	NW	652160 306170	TG50NW179	18.3	GT YAR BOROUGH COUNCIL SEWERAGE WORKS 11
122	26.0	NW	651950 306070	TG50NW1079	18.5	TRAVIS PERKINS GREAT YARMOUTH 104
123	28.0	N	652300 306230	TG50NW3	10.67	GREAT YARMOUTH NO 3
124AJ	29.0	NW	652170 306180	TG50NW212	15.0	GT YAR COUNCIL SUFFOLK RD SEWERAGE 5
125	30.0	S	652250 305650	TG50NW5	7.62	GREAT YARMOUTH NO 5
126AJ	30.0	NW	652180 306190	TG50NW178	18.3	GT YAR BOROUGH COUNCIL SEWERAGE WORKS 10

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
127A K	31.0	S	652754 305850	TG50NW1067	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 110
128A K	31.0	S	652760 305851	TG50NW1068	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 111
129	38.0	W	651810 305770	TG50NW958	-1.0	HARFREYS ROAD GR T YARMOUTH 1
130AL	39.0	S	652653 305817	TG50NW1054	9.0	ADMIRALTY ROAD GREAT YARMOUTH 207
131A M	40.0	S	652025 305630	TG50NW31	9.5	A47/A12 GORLESTON RELIEF ROAD
132AL	41.0	S	652679 305822	TG50NW1052	13.1	ADMIRALTY ROAD GREAT YARMOUTH 204
133A K	43.0	S	652734 305833	TG50NW1066	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 109
134	44.0	N	651890 306060	TG50NW1080	6.0	TRAVIS PERKINS GREAT YARMOUTH WS101
135	45.0	NW	651960 306100	TG50NW1084	5.0	TRAVIS PERKINS GREAT YARMOUTH WS105
136AL	46.0	S	652649 305809	TG50NW1071	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 202
137A K	46.0	S	652762 305836	TG50NW1069	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 112
138AL	47.0	S	652620 305800	TG50NW287	-1.0	GT YAR BOR CNCL FISH WHARF B22
139A Q	47.0	S	652500 305580	TG50NW797	15.5	MALTHOUSE QUAY GT YARMOUTH 12A
140A M	47.0	S	652048 305625	TG50NW42	8.0	A47 GORLESTON RELIEF ROAD
141A M	52.0	S	652050 305620	TG50NW385	12.0	A12 GORLESTON RELIEF RD GT YAR S BY PASS
142A K	53.0	S	652763 305829	TG50NW1064	1.0	ADMIRALTY ROAD GREAT YARMOUTH WS 107
143A P	56.0	S	652726 305818	TG50NW1047	8.0	ADMIRALTY ROAD GREAT YARMOUTH 101
144A N	56.0	SE	652590 305610	TG50NW349	20.0	GREAT YARMOUTH FLOOD DEFENCES 9
145A N	59.0	SE	652560 305590	TG50NW794	19.0	MALTHOUSE QUAY GT YARMOUTH 9A
146A R	59.0	NW	652170 306220	TG50NW211	27.0	GT YAR COUNCIL SUFFOLK RD SEWERAGE 4
147	59.0	W	651780 305660	TG50NW225	10.7	GT YAR BOR CNCL A12 WESTERN BY PASS
148A O	63.0	S	651850 305600	TG50NW923	20.0	HARFREYS RD GT YARMOUTH 1
149A O	63.0	S	651850 305600	TG50NW924	20.0	HARFREYS RD GT YARMOUTH 2
150A O	63.0	S	651850 305600	TG50NW925	20.0	HARFREYS RD GT YARMOUTH 3
151A O	63.0	S	651850 305600	TG50NW926	20.0	HARFREYS RD GT YARMOUTH 4
152A N	64.0	SE	652590 305600	TG50NW75	1.2	GT YARMOUTH FLOOD DEFENCES POSFORD PAVRY C15
153A P	68.0	S	652700 305800	TG50NW946	20.0	SOUTH DENES ROAD 1
154A P	68.0	S	652700 305800	TG50NW947	15.5	SOUTH DENES ROAD 2

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
155A Q	68.0	S	652520 305560	TG50NW798	10.0	MALTHOUSE QUAY GT YARMOUTH 13
156A N	68.0	SE	652580 305590	TG50NW352	25.0	GREAT YARMOUTH FLOOD DEFENCES 12
157A P	70.0	S	652705 305799	TG50NW1055	8.0	ADMIRALTY ROAD GREAT YARMOUTH 208
158A P	70.0	S	652764 305812	TG50NW1062	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 105
159A S	74.0	S	652662 305783	TG50NW1049	15.35	ADMIRALTY ROAD GREAT YARMOUTH 201
160A P	75.0	S	652750 305804	TG50NW1060	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 103
161A R	76.0	NW	652170 306240	TG50NW177	9.15	GT YAR BOROUGH COUNCIL SEWERAGE WORKS 9
162A P	76.0	S	652758 305804	TG50NW1061	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 104
163A S	77.0	S	652700 305790	TG50NW569	-1.0	FISH QUAY TRIAL PIT PS21
164	79.0	SE	652860 305840	TG50NW589	15.0	FISHWHARF ZAPATA QUAY 1
165A V	81.0	S	652731 305793	TG50NW1059	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 102
166A U	82.0	E	652640 305720	TG50NW871	10.0	FISH WHARF GT YARMOUTH 1
167A W	82.0	S	652050 305590	TG50NW39	5.0	A47/A12 GORLESTON RELIEF ROAD
168A T	85.0	NW	651960 306150	TG50NW1078	16.2	TRAVIS PERKINS GREAT YARMOUTH 103
169	86.0	NW	652440 306420	TG50NW927	22.0	TRINITY QUAY GT YARMOUTH 1
170A T	87.0	NW	651930 306130	TG50NW1082	5.0	TRAVIS PERKINS GREAT YARMOUTH WS103
171A U	91.0	E	652650 305710	TG50NW872	10.0	FISH WHARF GT YARMOUTH 2
172A S	95.0	S	652704 305773	TG50NW1056	8.0	ADMIRALTY ROAD GREAT YARMOUTH 209
173A V	96.0	S	652758 305784	TG50NW1058	4.0	ADMIRALTY ROAD GREAT YARMOUTH WS 101
174A W	100.0	S	652016 305570	TG50NW40	6.1	A47 GORLESTON RELIEF ROAD
175A X	104.0	SE	652600 305560	TG50NW76	2.4	GT YARMOUTH FLOOD DEFENCES POSFORD PAVRY C16
176A X	109.0	SE	652610 305560	TG50NW348	20.0	GREAT YARMOUTH FLOOD DEFENCES 8
177A X	113.0	SE	652600 305550	TG50NW351	25.5	GREAT YARMOUTH FLOOD DEFENCES 11
178A Y	114.0	NW	651910 306150	TG50NW1083	5.0	TRAVIS PERKINS GREAT YARMOUTH WS104
179	115.0	S	652025 305555	TG50NW384	14.7	A12 GORLESTON RELIEF RD GT YAR S BY PASS
180	118.0	N	651990 306200	TG50NW227	11.5	GT YAR BOR CNCL A12 WESTERN BY PASS
181A Y	118.0	NW	651890 306140	TG50NW1077	23.0	TRAVIS PERKINS GREAT YARMOUTH 102
182	122.0	N	652520 306500	TG50NW786	20.0	SOUTHGATES RD GT YARMOUTH 3

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
183	142.0	E	652700 305720	TG50NW568	-1.0	FISH QUAY TRIAL PIT PS20
184	148.0	S	652020 305522	TG50NW30	6.2	A47/A12 GORLESTON RELIEF ROAD
185	161.0	NW	651938 306226	TG50NW431	13.0	A12 GT YAR W BY PASS DOT REPORT
186A Z	161.0	S	651790 305510	TG50NW971	7.7	HARFREYS FARM GT YARMOUTH 13
187A Z	163.0	S	651840 305500	TG50NW959	9.0	HARFREYS FARM GT YARMOUTH 1
188B A	167.0	NW	652400 306500	TG50NW895	2.0	INSPECTORATE QUAY GT YAR' 2
189B A	167.0	NW	652400 306500	TG50NW896	25.0	INSPECTORATE QUAY GT YAR' 2A
190B A	167.0	NW	652400 306500	TG50NW894	25.0	INSPECTORATE QUAY GT YAR' 1
191	173.0	W	651670 306020	TG50NW686	1.2	BGS AUGR HL 161 GAPTON MARSHES
192	183.0	N	652500 306560	TG50NW789	25.7	SOUTHGATES RD GT YARMOUTH 1
193	187.0	S	652028 305483	TG50NW383	12.3	A12 GORLESTON RELIEF RD GT YAR S BY PASS CPT 129
194B D	191.0	E	652750 305630	TG50NW567	-1.0	EAST QUAY TRIAL PIT PS19
195	197.0	S	652800 305690	TG50NW283	-1.0	GT YAR BOR CNCL FISH WHARF B14
196B C	203.0	NW	652090 306340	TG50NW176	9.15	GT YAR BOROUGH COUNCIL SEWERAGE WORKS 8
197B B	212.0	N	652520 306590	TG50NW785	17.3	SOUTHGATES RD GT YARMOUTH 2
198B B	212.0	N	652510 306590	TG50NW784	20.0	SOUTHGATES RD GT YARMOUTH 1
199	214.0	NE	652760 306560	TG50NW196	6.1	GT YAR BOR CNCL MAVERS RD PUMPING STN 23
200B C	215.0	NW	652100 306360	TG50NW213	15.4	GT YAR COUNCIL SUFFOLK RD SEWERAGE 6
201B E	217.0	SE	652720 305510	TG50NW991	25.0	GREAT YARMOUTH SALMON ROAD 4
202B D	224.0	E	652780 305610	TG50NW993	10.5	GREAT YARMOUTH SALMON ROAD 5
203B E	224.0	SE	652730 305510	TG50NW992	25.25	GREAT YARMOUTH SALMON ROAD 4A
204B F	232.0	S	652028 305438	TG50NW388	1.5	A12/A47 GORLESTON RELIEF RD REPORT
205B B	232.0	N	652510 306610	TG50NW790	3.0	SOUTHGATES RD GT YARMOUTH 2
206B B	232.0	N	652510 306610	TG50NW791	26.0	SOUTHGATES RD GT YARMOUTH 2A
207B F	236.0	S	652018 305434	TG50NW37	0.6	A47/A12 GORLESTON RELIEF ROAD
208B F	236.0	S	652030 305434	TG50NW373	0.8	A12 GORLESTON RELIEF RD GT YAR S BY PASS
209	237.0	NW	652040 306350	TG50NW214	15.4	GT YAR COUNCIL SUFFOLK RD SEWERAGE 7



ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
210	237.0	S	651980 305430	TG50NW961	8.0	HARFREYS FARM GT YARMOUTH 3
211	239.0	N	652610 306620	TG50NW274	-1.0	GT YAR BOR CNCL QUEENS RD B18
212B F	239.0	S	652032 305431	TG50NW387	1.8	A12/A47 GORLESTON RELIEF RD REPORT
213B F	240.0	S	652020 305430	TG50NW224	6.4	GT YAR BOR CNCL A12 WESTERN BY PASS DKM2
214B F	240.0	S	652018 305429	TG50NW38	10.0	A47/A12 GORLESTON RELIEF ROAD
215B F	241.0	S	652030 305429	TG50NW401	1.8	A12/A47 GORLESTON RELIEF RD REPORT
216B F	246.0	S	652068 305427	TG50NW389	8.05	A12/A47 GORLESTON RELIEF RD REPORT
217B F	249.0	S	652035 305422	TG50NW372	4.3	A12 GORLESTON RELIEF RD GT YAR S BY PASS

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.



- #1Q: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519577](https://scans.bgs.ac.uk/sobi_scans/boreholes/519577)
- #2A: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519575](https://scans.bgs.ac.uk/sobi_scans/boreholes/519575)
- #3: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519864](https://scans.bgs.ac.uk/sobi_scans/boreholes/519864)
- #4Al: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520122](https://scans.bgs.ac.uk/sobi_scans/boreholes/520122)
- #5B: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519696](https://scans.bgs.ac.uk/sobi_scans/boreholes/519696)
- #6J: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520115](https://scans.bgs.ac.uk/sobi_scans/boreholes/520115)
- #7M: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519717](https://scans.bgs.ac.uk/sobi_scans/boreholes/519717)
- #8C: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520123](https://scans.bgs.ac.uk/sobi_scans/boreholes/520123)
- #9: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520372](https://scans.bgs.ac.uk/sobi_scans/boreholes/520372)
- #10A: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519906](https://scans.bgs.ac.uk/sobi_scans/boreholes/519906)
- #11B: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519559](https://scans.bgs.ac.uk/sobi_scans/boreholes/519559)
- #12C: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520124](https://scans.bgs.ac.uk/sobi_scans/boreholes/520124)
- #13H: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520540](https://scans.bgs.ac.uk/sobi_scans/boreholes/520540)
- #14D: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520424](https://scans.bgs.ac.uk/sobi_scans/boreholes/520424)
- #15D: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520423](https://scans.bgs.ac.uk/sobi_scans/boreholes/520423)
- #16D: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520425](https://scans.bgs.ac.uk/sobi_scans/boreholes/520425)
- #17A: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519564](https://scans.bgs.ac.uk/sobi_scans/boreholes/519564)
- #18L: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519543](https://scans.bgs.ac.uk/sobi_scans/boreholes/519543)
- #19I: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519918](https://scans.bgs.ac.uk/sobi_scans/boreholes/519918)
- #20E: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520474](https://scans.bgs.ac.uk/sobi_scans/boreholes/520474)
- #22E: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520324](https://scans.bgs.ac.uk/sobi_scans/boreholes/520324)
- #24G: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519549](https://scans.bgs.ac.uk/sobi_scans/boreholes/519549)
- #26G: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520530](https://scans.bgs.ac.uk/sobi_scans/boreholes/520530)
- #27H: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520527](https://scans.bgs.ac.uk/sobi_scans/boreholes/520527)
- #28: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519716](https://scans.bgs.ac.uk/sobi_scans/boreholes/519716)
- #29T: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520114](https://scans.bgs.ac.uk/sobi_scans/boreholes/520114)
- #31I: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519576](https://scans.bgs.ac.uk/sobi_scans/boreholes/519576)
- #32D: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520422](https://scans.bgs.ac.uk/sobi_scans/boreholes/520422)
- #33: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519694](https://scans.bgs.ac.uk/sobi_scans/boreholes/519694)
- #35N: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520120](https://scans.bgs.ac.uk/sobi_scans/boreholes/520120)
- #36J: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519695](https://scans.bgs.ac.uk/sobi_scans/boreholes/519695)
- #38: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520004](https://scans.bgs.ac.uk/sobi_scans/boreholes/520004)
- #39G: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519548](https://scans.bgs.ac.uk/sobi_scans/boreholes/519548)
- #40P: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519561](https://scans.bgs.ac.uk/sobi_scans/boreholes/519561)
- #41L: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520558](https://scans.bgs.ac.uk/sobi_scans/boreholes/520558)
- #42L: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520537](https://scans.bgs.ac.uk/sobi_scans/boreholes/520537)
- #43M: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519558](https://scans.bgs.ac.uk/sobi_scans/boreholes/519558)
- #44N: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519712](https://scans.bgs.ac.uk/sobi_scans/boreholes/519712)
- #45O: [scans.bgs.ac.uk/sobi\\_scans/boreholes/18092227](https://scans.bgs.ac.uk/sobi_scans/boreholes/18092227)
- #46B: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519961](https://scans.bgs.ac.uk/sobi_scans/boreholes/519961)
- #47P: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519560](https://scans.bgs.ac.uk/sobi_scans/boreholes/519560)
- #48Q: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519578](https://scans.bgs.ac.uk/sobi_scans/boreholes/519578)
- #49L: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519960](https://scans.bgs.ac.uk/sobi_scans/boreholes/519960)
- #50H: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520541](https://scans.bgs.ac.uk/sobi_scans/boreholes/520541)
- #51AH: [scans.bgs.ac.uk/sobi\\_scans/boreholes/18092181](https://scans.bgs.ac.uk/sobi_scans/boreholes/18092181)
- #52L: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520538](https://scans.bgs.ac.uk/sobi_scans/boreholes/520538)
- #53G: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519547](https://scans.bgs.ac.uk/sobi_scans/boreholes/519547)
- #54H: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519542](https://scans.bgs.ac.uk/sobi_scans/boreholes/519542)
- #55AF: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520325](https://scans.bgs.ac.uk/sobi_scans/boreholes/520325)
- #56: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520327](https://scans.bgs.ac.uk/sobi_scans/boreholes/520327)
- #57K: [scans.bgs.ac.uk/sobi\\_scans/boreholes/18092804](https://scans.bgs.ac.uk/sobi_scans/boreholes/18092804)
- #58O: [scans.bgs.ac.uk/sobi\\_scans/boreholes/18092213](https://scans.bgs.ac.uk/sobi_scans/boreholes/18092213)
- #59AG: [scans.bgs.ac.uk/sobi\\_scans/boreholes/18092809](https://scans.bgs.ac.uk/sobi_scans/boreholes/18092809)
- #60AB: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520219](https://scans.bgs.ac.uk/sobi_scans/boreholes/520219)
- #61S: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519999](https://scans.bgs.ac.uk/sobi_scans/boreholes/519999)
- #62: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519758](https://scans.bgs.ac.uk/sobi_scans/boreholes/519758)



- #63: scans.bgs.ac.uk/sobi\_scans/boreholes/519998
- #64: scans.bgs.ac.uk/sobi\_scans/boreholes/519962
- #66R: scans.bgs.ac.uk/sobi\_scans/boreholes/519713
- #68: scans.bgs.ac.uk/sobi\_scans/boreholes/519715
- #71S: scans.bgs.ac.uk/sobi\_scans/boreholes/520000
- #72: scans.bgs.ac.uk/sobi\_scans/boreholes/520118
- #73U: scans.bgs.ac.uk/sobi\_scans/boreholes/520440
- #74V: scans.bgs.ac.uk/sobi\_scans/boreholes/520117
- #75T: scans.bgs.ac.uk/sobi\_scans/boreholes/520119
- #76U: scans.bgs.ac.uk/sobi\_scans/boreholes/520112
- #77V: scans.bgs.ac.uk/sobi\_scans/boreholes/520111
- #78: scans.bgs.ac.uk/sobi\_scans/boreholes/520113
- #79AE: scans.bgs.ac.uk/sobi\_scans/boreholes/520110
- #80Y: scans.bgs.ac.uk/sobi\_scans/boreholes/519873
- #81X: scans.bgs.ac.uk/sobi\_scans/boreholes/519874
- #82: scans.bgs.ac.uk/sobi\_scans/boreholes/520460
- #83W: scans.bgs.ac.uk/sobi\_scans/boreholes/520466
- #84W: scans.bgs.ac.uk/sobi\_scans/boreholes/520467
- #85W: scans.bgs.ac.uk/sobi\_scans/boreholes/520465
- #86X: scans.bgs.ac.uk/sobi\_scans/boreholes/519876
- #87Y: scans.bgs.ac.uk/sobi\_scans/boreholes/519875
- #88R: scans.bgs.ac.uk/sobi\_scans/boreholes/519742
- #98: scans.bgs.ac.uk/sobi\_scans/boreholes/519900
- #99AA: scans.bgs.ac.uk/sobi\_scans/boreholes/519693
- #100AD: scans.bgs.ac.uk/sobi\_scans/boreholes/520528
- #101AB: scans.bgs.ac.uk/sobi\_scans/boreholes/18403322
- #102AC: scans.bgs.ac.uk/sobi\_scans/boreholes/18062800
- #103: scans.bgs.ac.uk/sobi\_scans/boreholes/18062798
- #104AC: scans.bgs.ac.uk/sobi\_scans/boreholes/18062797
- #105AD: scans.bgs.ac.uk/sobi\_scans/boreholes/519555
- #106: scans.bgs.ac.uk/sobi\_scans/boreholes/519513
- #107: scans.bgs.ac.uk/sobi\_scans/boreholes/519863
- #108AE: scans.bgs.ac.uk/sobi\_scans/boreholes/520116
- #109AF: scans.bgs.ac.uk/sobi\_scans/boreholes/519885
- #110AB: scans.bgs.ac.uk/sobi\_scans/boreholes/18403317
- #111: scans.bgs.ac.uk/sobi\_scans/boreholes/519882
- #112AG: scans.bgs.ac.uk/sobi\_scans/boreholes/18092135
- #114AH: scans.bgs.ac.uk/sobi\_scans/boreholes/18092823
- #115: scans.bgs.ac.uk/sobi\_scans/boreholes/519573
- #116R: scans.bgs.ac.uk/sobi\_scans/boreholes/519741
- #117R: scans.bgs.ac.uk/sobi\_scans/boreholes/519714
- #119O: scans.bgs.ac.uk/sobi\_scans/boreholes/18092183
- #120: scans.bgs.ac.uk/sobi\_scans/boreholes/520328
- #121AJ: scans.bgs.ac.uk/sobi\_scans/boreholes/519711
- #122: scans.bgs.ac.uk/sobi\_scans/boreholes/18403320
- #123: scans.bgs.ac.uk/sobi\_scans/boreholes/519512
- #124AJ: scans.bgs.ac.uk/sobi\_scans/boreholes/519744
- #125: scans.bgs.ac.uk/sobi\_scans/boreholes/519514
- #126AJ: scans.bgs.ac.uk/sobi\_scans/boreholes/519710
- #127AK: scans.bgs.ac.uk/sobi\_scans/boreholes/18092813
- #128AK: scans.bgs.ac.uk/sobi\_scans/boreholes/18092816
- #130AL: scans.bgs.ac.uk/sobi\_scans/boreholes/18092219
- #131AM: scans.bgs.ac.uk/sobi\_scans/boreholes/519563
- #132AL: scans.bgs.ac.uk/sobi\_scans/boreholes/18092184
- #133AK: scans.bgs.ac.uk/sobi\_scans/boreholes/18092811
- #134: scans.bgs.ac.uk/sobi\_scans/boreholes/18403321

#135: scans.bgs.ac.uk/sobi\_scans/boreholes/18403325  
#136AL: scans.bgs.ac.uk/sobi\_scans/boreholes/18092826  
#137AK: scans.bgs.ac.uk/sobi\_scans/boreholes/18092818  
#139AQ: scans.bgs.ac.uk/sobi\_scans/boreholes/520329  
#140AM: scans.bgs.ac.uk/sobi\_scans/boreholes/519574  
#141AM: scans.bgs.ac.uk/sobi\_scans/boreholes/519917  
#142AK: scans.bgs.ac.uk/sobi\_scans/boreholes/18092806  
#143AP: scans.bgs.ac.uk/sobi\_scans/boreholes/18092089  
#144AN: scans.bgs.ac.uk/sobi\_scans/boreholes/519881  
#145AN: scans.bgs.ac.uk/sobi\_scans/boreholes/520326  
#146AR: scans.bgs.ac.uk/sobi\_scans/boreholes/519743  
#147: scans.bgs.ac.uk/sobi\_scans/boreholes/519757  
#148AO: scans.bgs.ac.uk/sobi\_scans/boreholes/520455  
#149AO: scans.bgs.ac.uk/sobi\_scans/boreholes/520456  
#150AO: scans.bgs.ac.uk/sobi\_scans/boreholes/520457  
#151AO: scans.bgs.ac.uk/sobi\_scans/boreholes/520458  
#152AN: scans.bgs.ac.uk/sobi\_scans/boreholes/519607  
#153AP: scans.bgs.ac.uk/sobi\_scans/boreholes/520478  
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#155AQ: scans.bgs.ac.uk/sobi\_scans/boreholes/520330  
#156AN: scans.bgs.ac.uk/sobi\_scans/boreholes/519884  
#157AP: scans.bgs.ac.uk/sobi\_scans/boreholes/18092221  
#158AP: scans.bgs.ac.uk/sobi\_scans/boreholes/18092801  
#159AS: scans.bgs.ac.uk/sobi\_scans/boreholes/18092175  
#160AP: scans.bgs.ac.uk/sobi\_scans/boreholes/18092237  
#161AR: scans.bgs.ac.uk/sobi\_scans/boreholes/519709  
#162AP: scans.bgs.ac.uk/sobi\_scans/boreholes/18092799  
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#165AV: scans.bgs.ac.uk/sobi\_scans/boreholes/18092234  
#166AU: scans.bgs.ac.uk/sobi\_scans/boreholes/520403  
#167AW: scans.bgs.ac.uk/sobi\_scans/boreholes/519571  
#168AT: scans.bgs.ac.uk/sobi\_scans/boreholes/18403319  
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#170AT: scans.bgs.ac.uk/sobi\_scans/boreholes/18403323  
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#172AS: scans.bgs.ac.uk/sobi\_scans/boreholes/18092224  
#173AV: scans.bgs.ac.uk/sobi\_scans/boreholes/18092230  
#174AW: scans.bgs.ac.uk/sobi\_scans/boreholes/519572  
#175AX: scans.bgs.ac.uk/sobi\_scans/boreholes/519608  
#176AX: scans.bgs.ac.uk/sobi\_scans/boreholes/519880  
#177AX: scans.bgs.ac.uk/sobi\_scans/boreholes/519883  
#178AY: scans.bgs.ac.uk/sobi\_scans/boreholes/18403324  
#179: scans.bgs.ac.uk/sobi\_scans/boreholes/519916  
#180: scans.bgs.ac.uk/sobi\_scans/boreholes/519759  
#181AY: scans.bgs.ac.uk/sobi\_scans/boreholes/18403318  
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#184: scans.bgs.ac.uk/sobi\_scans/boreholes/519562  
#185: scans.bgs.ac.uk/sobi\_scans/boreholes/519963  
#186AZ: scans.bgs.ac.uk/sobi\_scans/boreholes/520503  
#187AZ: scans.bgs.ac.uk/sobi\_scans/boreholes/520491  
#188BA: scans.bgs.ac.uk/sobi\_scans/boreholes/520427  
#189BA: scans.bgs.ac.uk/sobi\_scans/boreholes/520428  
#190BA: scans.bgs.ac.uk/sobi\_scans/boreholes/520426  
#191: scans.bgs.ac.uk/sobi\_scans/boreholes/520218  
#192: scans.bgs.ac.uk/sobi\_scans/boreholes/520321  
#193: scans.bgs.ac.uk/sobi\_scans/boreholes/519915





- #196BC: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519708](https://scans.bgs.ac.uk/sobi_scans/boreholes/519708)
  - #197BB: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520317](https://scans.bgs.ac.uk/sobi_scans/boreholes/520317)
  - #198BB: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520316](https://scans.bgs.ac.uk/sobi_scans/boreholes/520316)
  - #199: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519728](https://scans.bgs.ac.uk/sobi_scans/boreholes/519728)
  - #200BC: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519745](https://scans.bgs.ac.uk/sobi_scans/boreholes/519745)
  - #201BE: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520523](https://scans.bgs.ac.uk/sobi_scans/boreholes/520523)
  - #202BD: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520525](https://scans.bgs.ac.uk/sobi_scans/boreholes/520525)
  - #203BE: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520524](https://scans.bgs.ac.uk/sobi_scans/boreholes/520524)
  - #204BF: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519920](https://scans.bgs.ac.uk/sobi_scans/boreholes/519920)
  - #205BB: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520322](https://scans.bgs.ac.uk/sobi_scans/boreholes/520322)
  - #206BB: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520323](https://scans.bgs.ac.uk/sobi_scans/boreholes/520323)
  - #207BF: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519569](https://scans.bgs.ac.uk/sobi_scans/boreholes/519569)
  - #208BF: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519905](https://scans.bgs.ac.uk/sobi_scans/boreholes/519905)
  - #209: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519746](https://scans.bgs.ac.uk/sobi_scans/boreholes/519746)
  - #210: [scans.bgs.ac.uk/sobi\\_scans/boreholes/520493](https://scans.bgs.ac.uk/sobi_scans/boreholes/520493)
  - #212BF: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519919](https://scans.bgs.ac.uk/sobi_scans/boreholes/519919)
  - #213BF: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519756](https://scans.bgs.ac.uk/sobi_scans/boreholes/519756)
  - #214BF: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519570](https://scans.bgs.ac.uk/sobi_scans/boreholes/519570)
  - #215BF: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519933](https://scans.bgs.ac.uk/sobi_scans/boreholes/519933)
  - #216BF: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519921](https://scans.bgs.ac.uk/sobi_scans/boreholes/519921)
  - #217BF: [scans.bgs.ac.uk/sobi\\_scans/boreholes/519904](https://scans.bgs.ac.uk/sobi_scans/boreholes/519904)
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# 8 Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary:

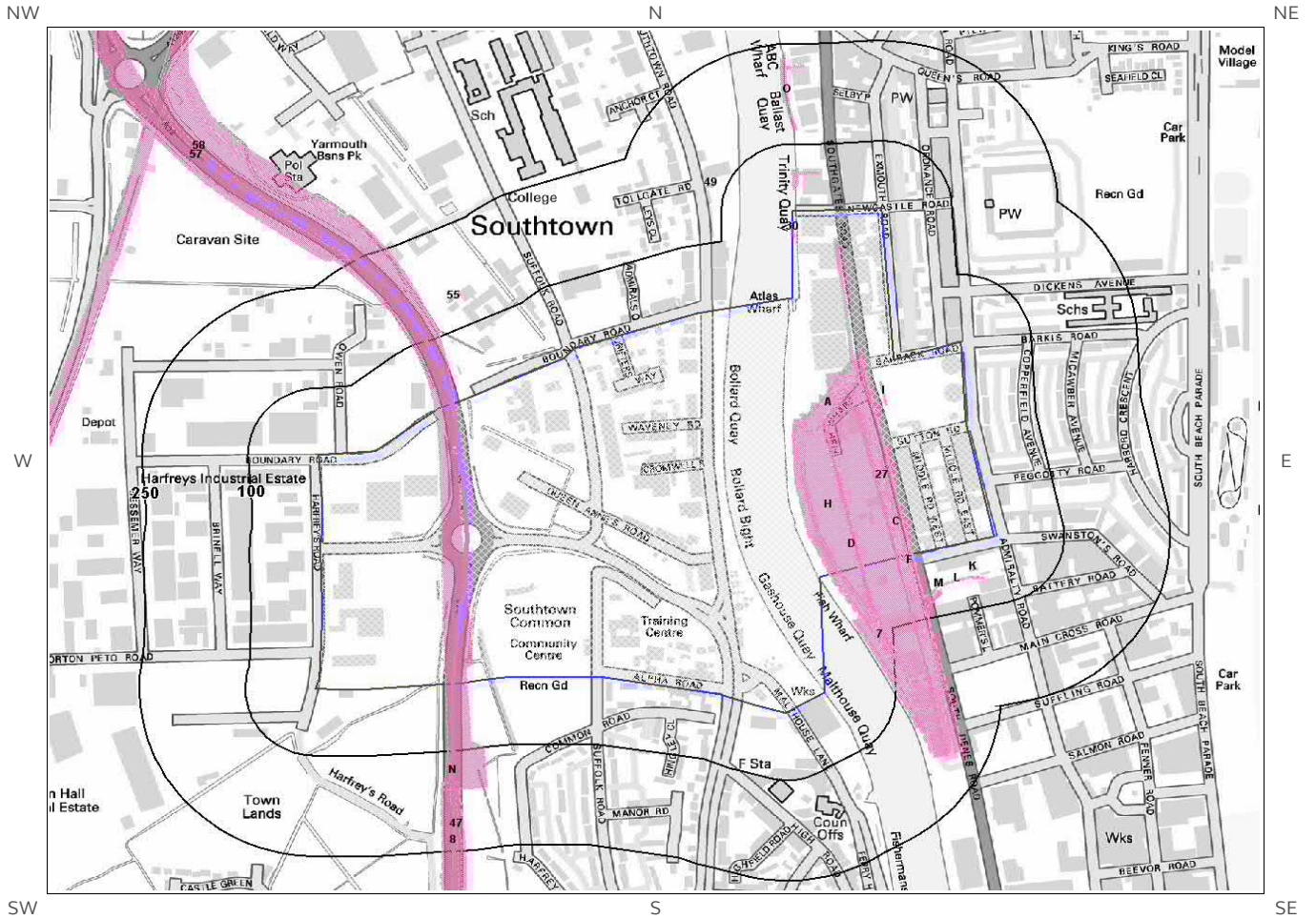
19

For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geo Insight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	25 - 35 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	25 - 35 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	25 - 35 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	25 - 35 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	20 - 40 mg/kg	<15 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	25 - 35 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	25 - 35 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	20 - 40 mg/kg	<15 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	25 - 35 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	25 - 35 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	25 - 35 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
3.0	W	RuralSoil	<15 mg/kg	<1.8 mg/kg	20 - 40 mg/kg	<15 mg/kg	<100 mg/kg
16.0	E	RuralSoil	<15 mg/kg	<1.8 mg/kg	20 - 40 mg/kg	<15 mg/kg	<100 mg/kg
48.0	E	RuralSoil	<15 mg/kg	<1.8 mg/kg	20 - 40 mg/kg	<15 mg/kg	<100 mg/kg

\*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

# 9 Railways and Tunnels Map



**Railways and Tunnels Legend**

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	Underground or Partially Underground Railway / Subway System		Railway Track (OpenStreetMap)
	Site Outline		High Speed 2
	Search Buffers (m)		High Speed 2 Revised Proposed Route
	Abandoned or Dismantled Railway (OpenStreetMap)		Crossrail 1
	Railway Tunnel (OS Mapping)		Railway and/or Tunnel Feature from Historical Mapping
	Railway Track (OS Mapping)		

# 9 Railways and Tunnels

## 9.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

*Any records that have been identified are represented on the Railways and Tunnels Map.*

---

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

*Any records that have been identified are represented on the Railways and Tunnels Map.*

---

## 9.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? Yes

Have any historical railway or tunnel features been identified within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Details	Date
1D	0	On Site	652582 305858	Railway Sidings	1946
2B	0	On Site	652582 305860	Railway Sidings	1904
3A	0	On Site	652564 306095	Railway Sidings	1978
4C	0	On Site	652661 305900	Railway Sidings	1946
5A	0	On Site	652564 306095	Railway Sidings	1952
6	0	On Site	652583 305858	Railway Sidings	1938

ID	Distance (m)	Direction	NGR	Details	Date
9E	0	On Site	652580 305840	Railway Sidings	1958
10F	0	On Site	652683 305838	Railway Sidings	1958
11B	0	On Site	652626 305950	Railway Sidings	1927
12C	0	On Site	652662 305924	Railway Sidings	1981
13D	0	On Site	652558 305882	Railway Sidings	1981
14H	0	On Site	652540 306032	Railway Sidings	1887
15G	0	On Site	652567 306085	Railway Sidings	1966
16E	0	On Site	652580 305840	Railway Sidings	1949
17E	0	On Site	652580 305840	Railway Sidings	1968
18E	0	On Site	652580 305839	Railway Sidings	1957
19E	0	On Site	652580 305839	Railway Sidings	1949
20E	0	On Site	652580 305839	Railway Sidings	1968
21F	0	On Site	652683 305838	Railway Sidings	1968
22F	0	On Site	652683 305837	Railway Sidings	1968
23F	0	On Site	652683 305837	Railway Sidings	1957
24F	0	On Site	652683 305838	Railway Sidings	1949
25F	0	On Site	652683 305837	Railway Sidings	1949
26G	0	On Site	652567 306085	Railway Sidings	1949
27	0	On Site	652641 305980	Railway Sidings	1905
28I	0	On Site	652643 306106	Railway Sidings	1949
29H	0	On Site	652585 305922	Railway Sidings	1883
30	0	On Site	652515 306351	Railway Sidings	1905
31	0	On Site	n/a	Railway	1946
32I	0	On Site	652643 306106	Railway Sidings	1963
33I	0	On Site	652643 306106	Railway Sidings	1949
34J	33	N	652516 306425	Railway Sidings	1928
35J	37	N	652521 306429	Railway Sidings	1949
36K	40	S	652771 305842	Railway Sidings	1958
37K	40	S	652771 305842	Railway Sidings	1949

ID	Distance (m)	Direction	NGR	Details	Date
38K	42	S	652772 305841	Railway Sidings	1949
39K	42	S	652772 305841	Railway Sidings	1957
40L	51	S	652777 305830	Railway Sidings	1958
41L	51	S	652777 305830	Tramway Sidings	1949
42K	52	S	652777 305829	Railway Sidings	1957
43K	52	S	652777 305829	Railway Sidings	1949
44M	54	S	652722 305817	Tramway Sidings	1949
45M	54	S	652718 305816	Railway Sidings	1957
7	67	E	652638 305740	Railway Sidings	1884
46N	97	S	652033 305537	Railway Sidings	1958
47	111	S	652044 305396	Railway Sidings	1927
48N	112	S	652033 305529	Railway Sidings	1905
49	117	W	652398 306417	Railway Sidings	1928
50	117	E	652706 305621	Railway Sidings	1905
51O	122	N	652505 306558	Railway Sidings	1966
52O	122	N	652505 306558	Railway Sidings	1975
53O	122	N	652505 306558	Railway Sidings	1954
54O	127	N	652505 306558	Railway Sidings	1949
55	141	NW	652035 306248	Railway Sidings	1968
8	146	S	652035 305381	Railway Sidings	1938
56	163	N	652500 306574	Railway Sidings	1928
57	235	N	n/a	Railway	1906
58	243	N	n/a	Railway	1906

*Any records that have been identified are represented on the Railways and Tunnels Map.*



### 9.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? Yes

Have any historical railway lines been identified within 250m of the study site boundary? Yes

Distance (m)	Direction	Status
0	On Site	Abandoned
0	On Site	Abandoned
0	On Site	Dismantled

Multiple sections of the same track may be listed in the detail above  
*Any records that have been identified are represented on the Railways and Tunnels Map.*

### 9.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above  
*Any records that have been identified are represented on the Railways and Tunnels Map.*

### 9.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project? No

Is the study site within 500m of the route of the Crossrail 1 rail project? No

*Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a Groundsure HS2 and Crossrail 1 Report.*

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Please note that this assessment takes account of both the original Phase 2b proposed route and the amended route proposed in 2016. As the Phase 2b route is still under consultation, Groundsure are providing information on both options until the final route is formally confirmed. Practitioners should take account of this uncertainty when advising clients.

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133-155 Waterloo Road, London, SE1 8UG  
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Website: <http://www.peterbrett.com/home>

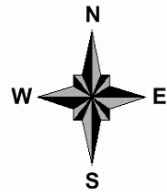
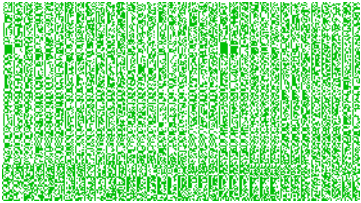
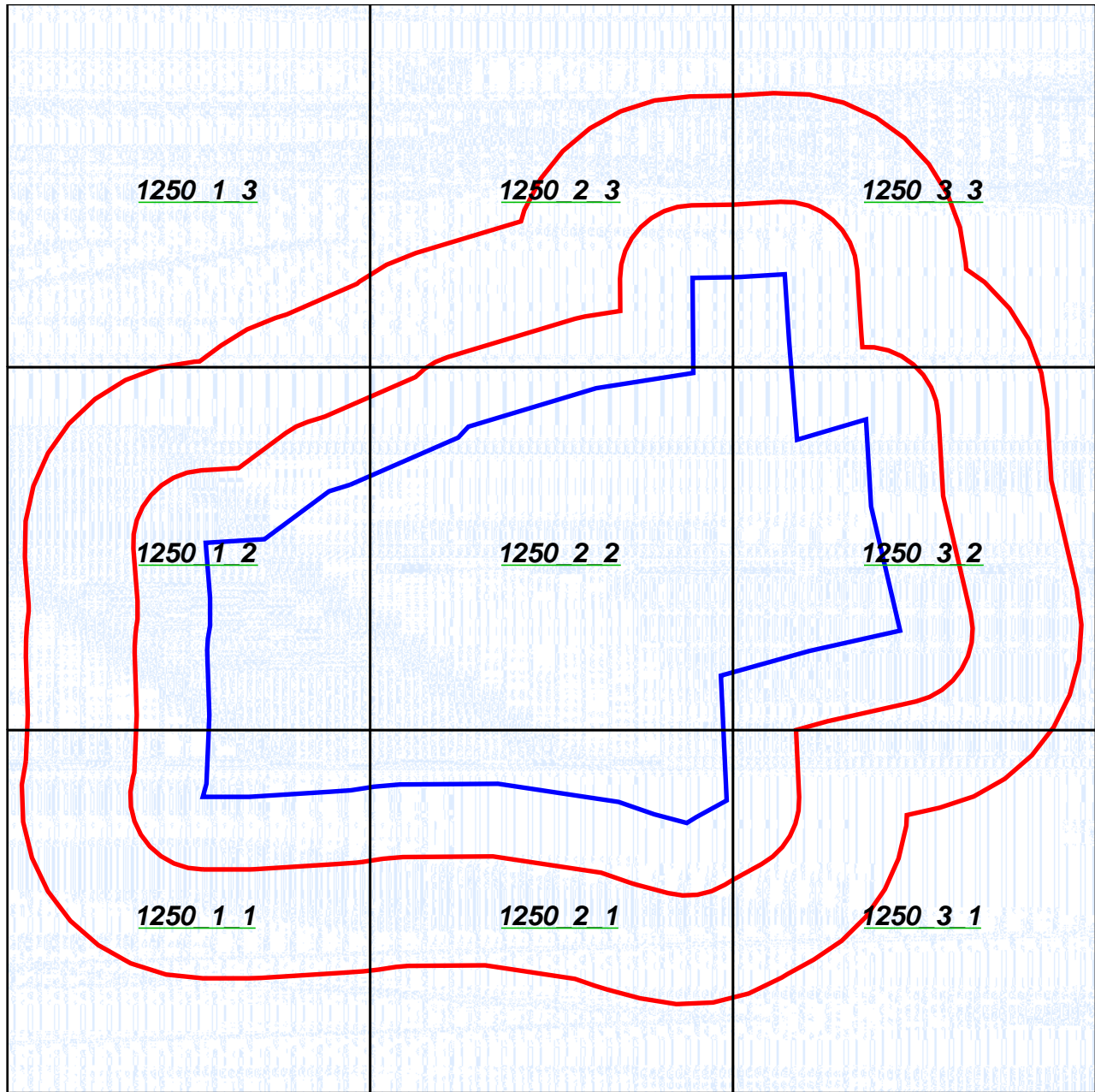


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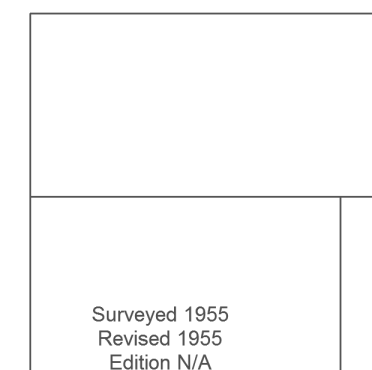
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Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 651819, 305504

Map Name: National Grid

Map date: 1953-1955

Scale: 1:1,250

Printed at: 1:2,000



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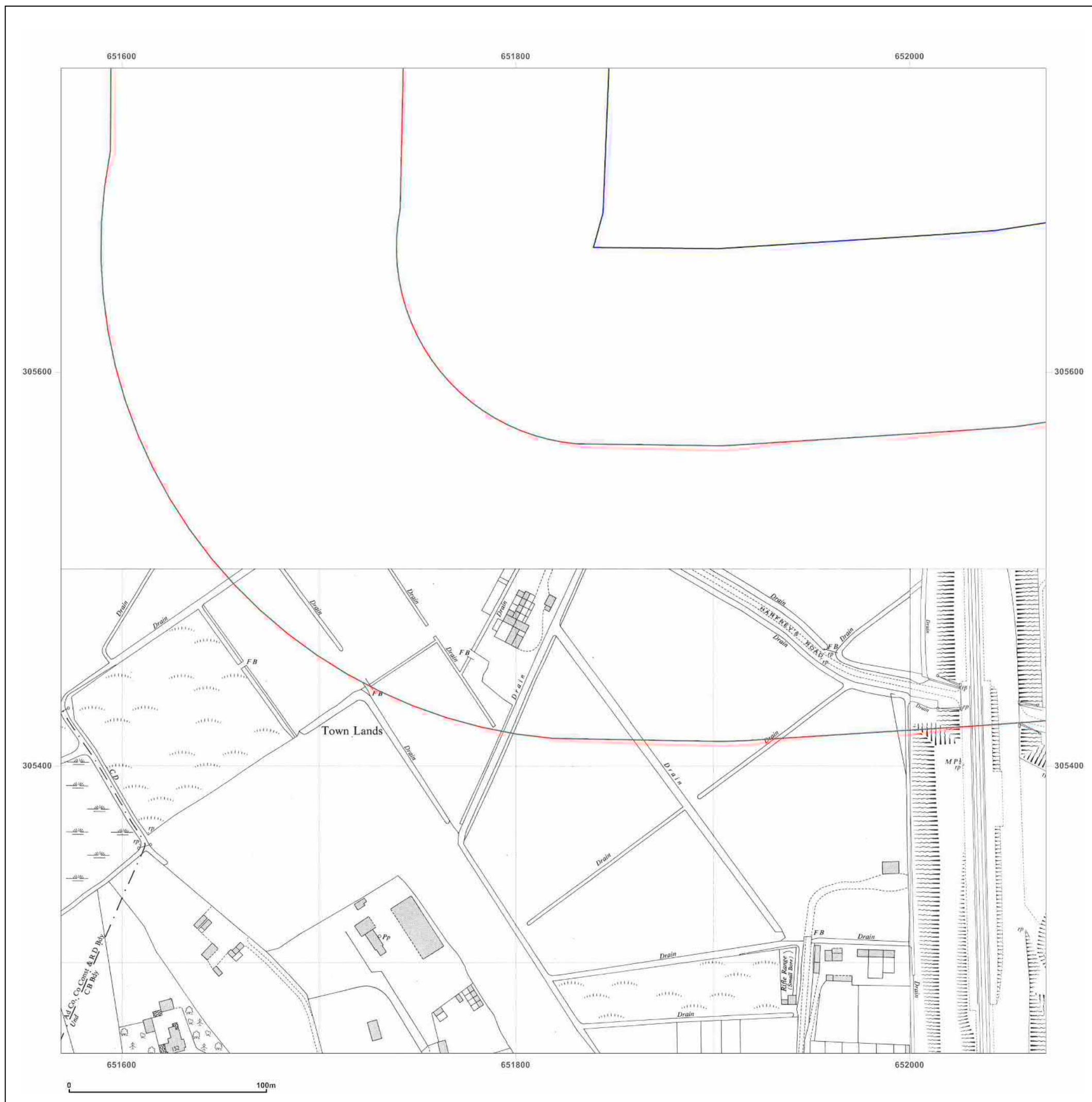


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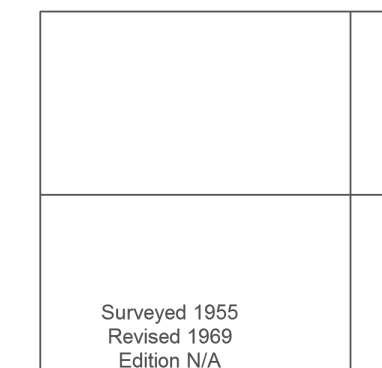
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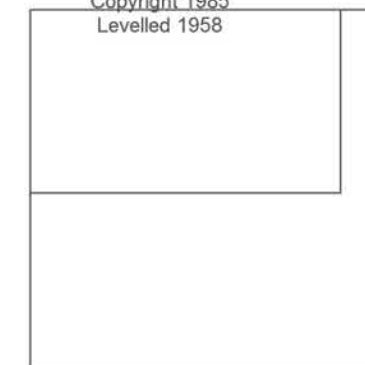
Map date: 1985

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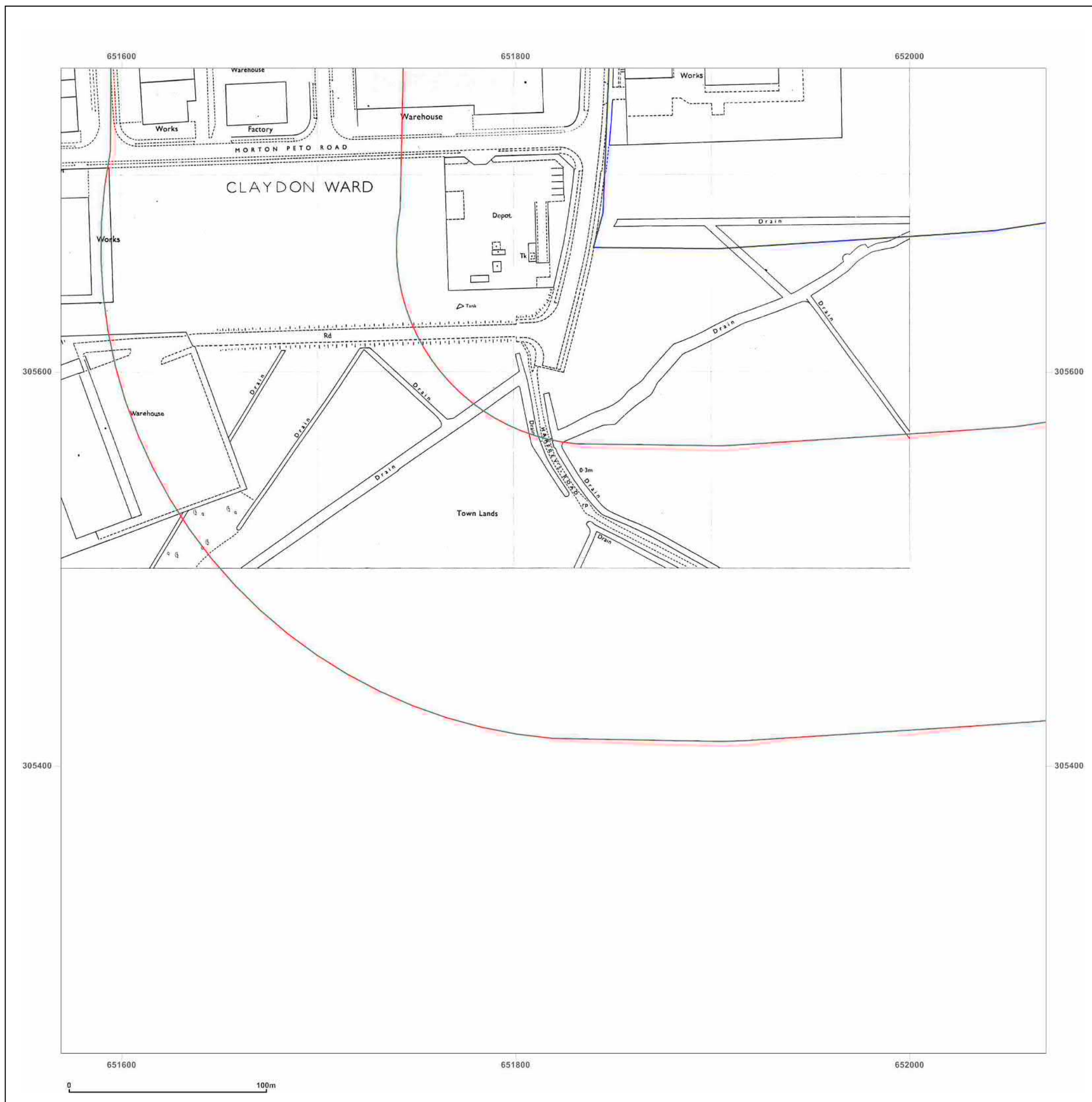


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**Map Name:** National Grid

**Map date:** 1975-1978

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**Map date:** 1985-1990

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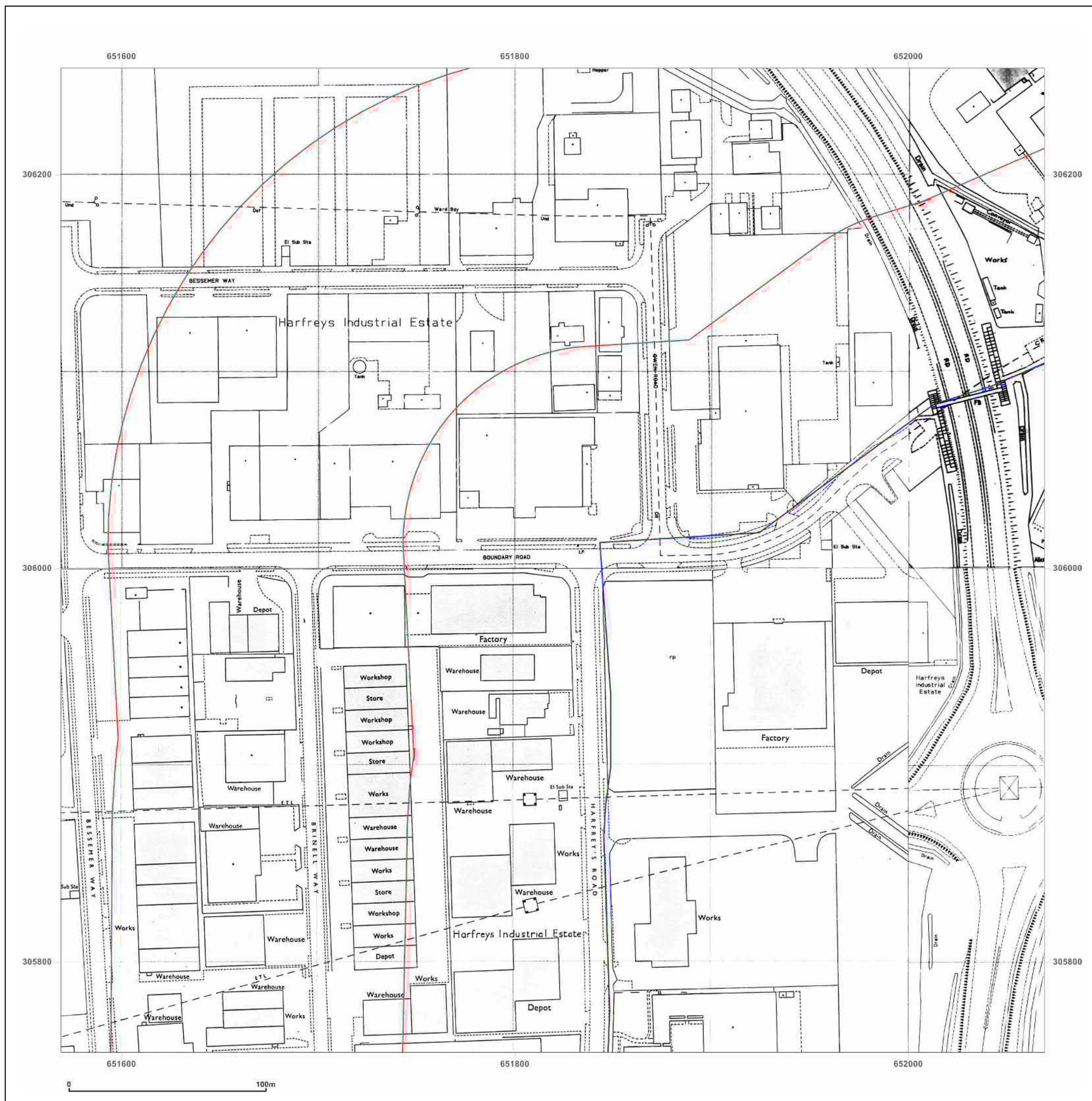


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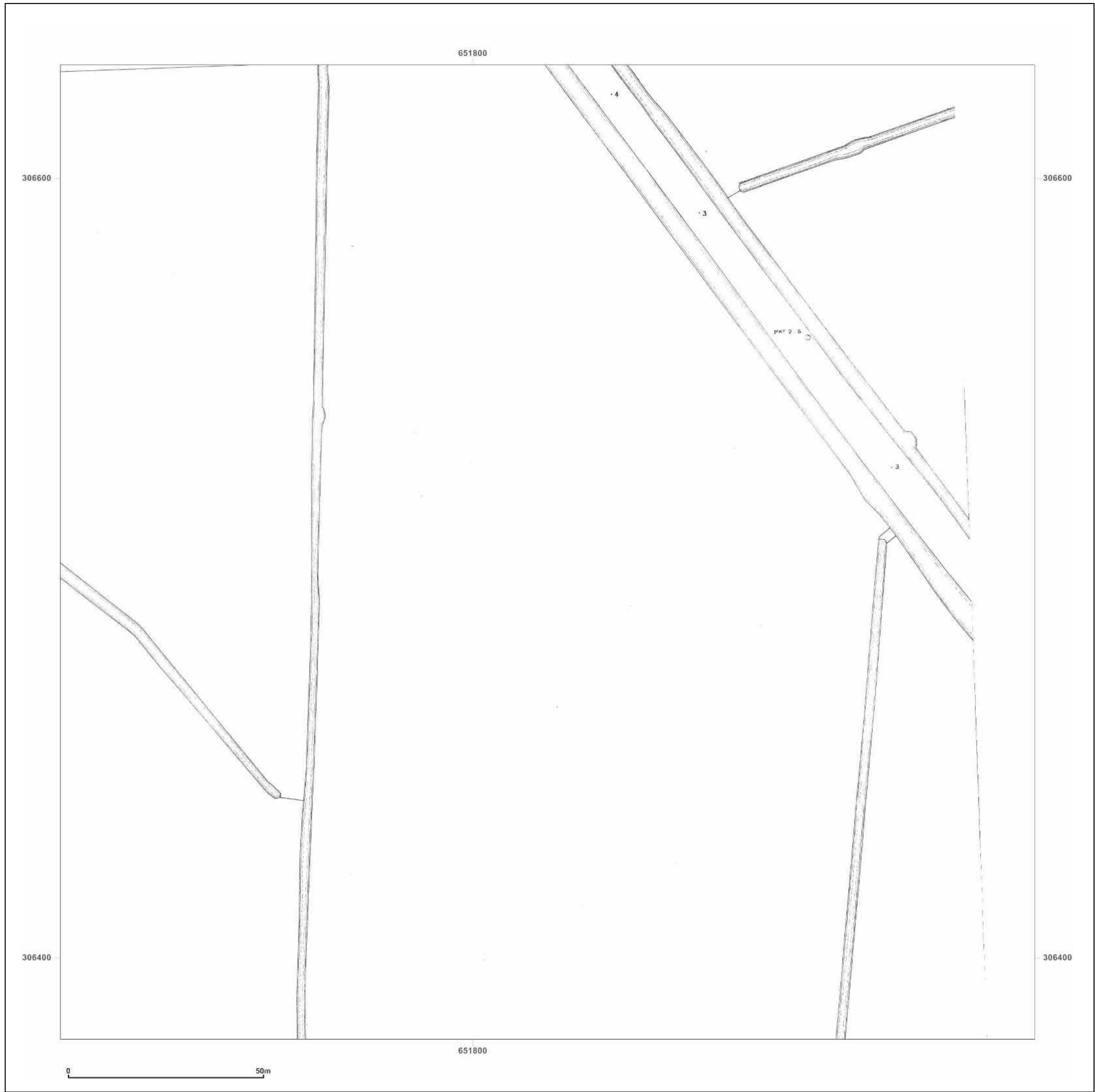
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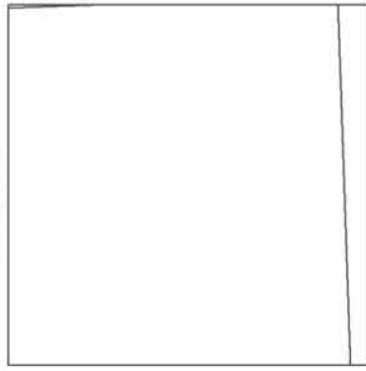
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**Map date:** 1884-1885  
**Scale:** 1:500  
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Map Name: National Grid

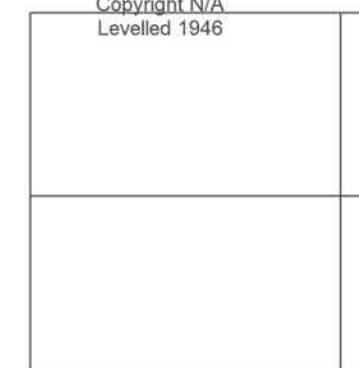
Map date: 1951

Scale: 1:1,250

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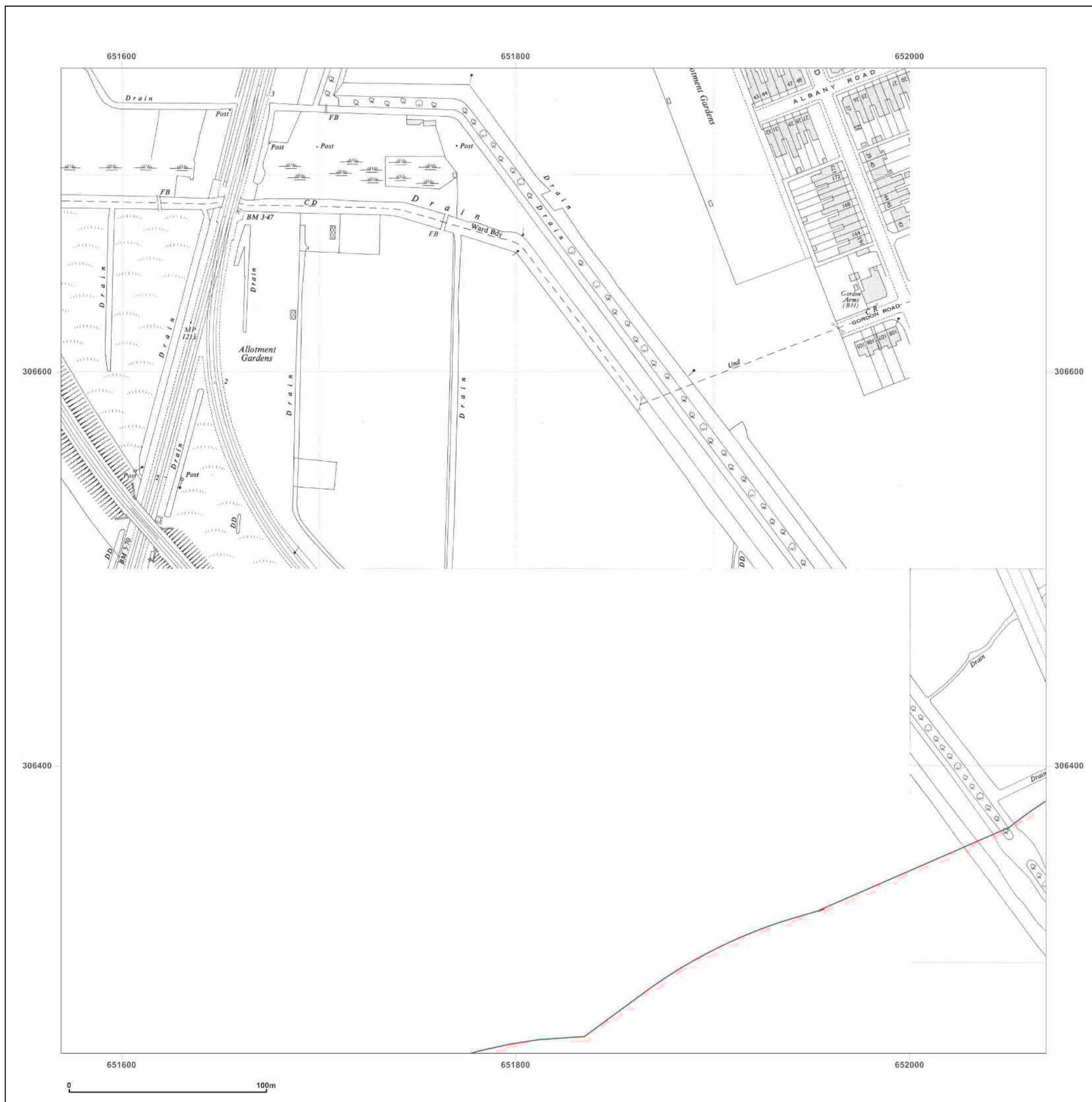


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Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 651819, 306504

Map Name: National Grid

Map date: 1975-1978

Scale: 1:1,250

Printed at: 1:2,000



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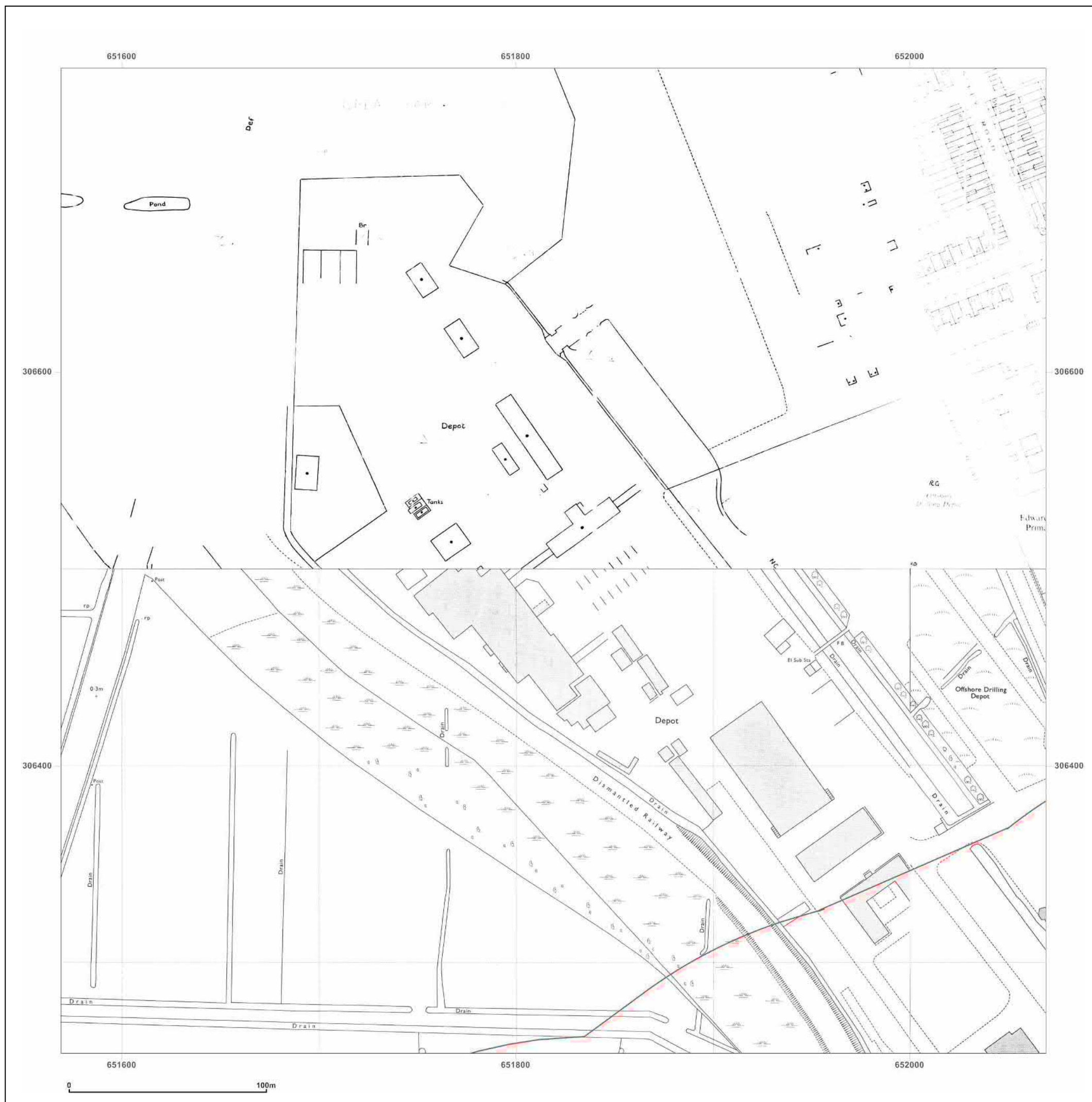


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**Site Details:**

**Client Ref:** 16287  
**Report Ref:** CMAPS-CM-636391-16287-030717HIS\_1250scale  
**Grid Ref:** 651819, 306504

**Map Name:** National Grid

**Map date:** 1994

**Scale:** 1:1,250

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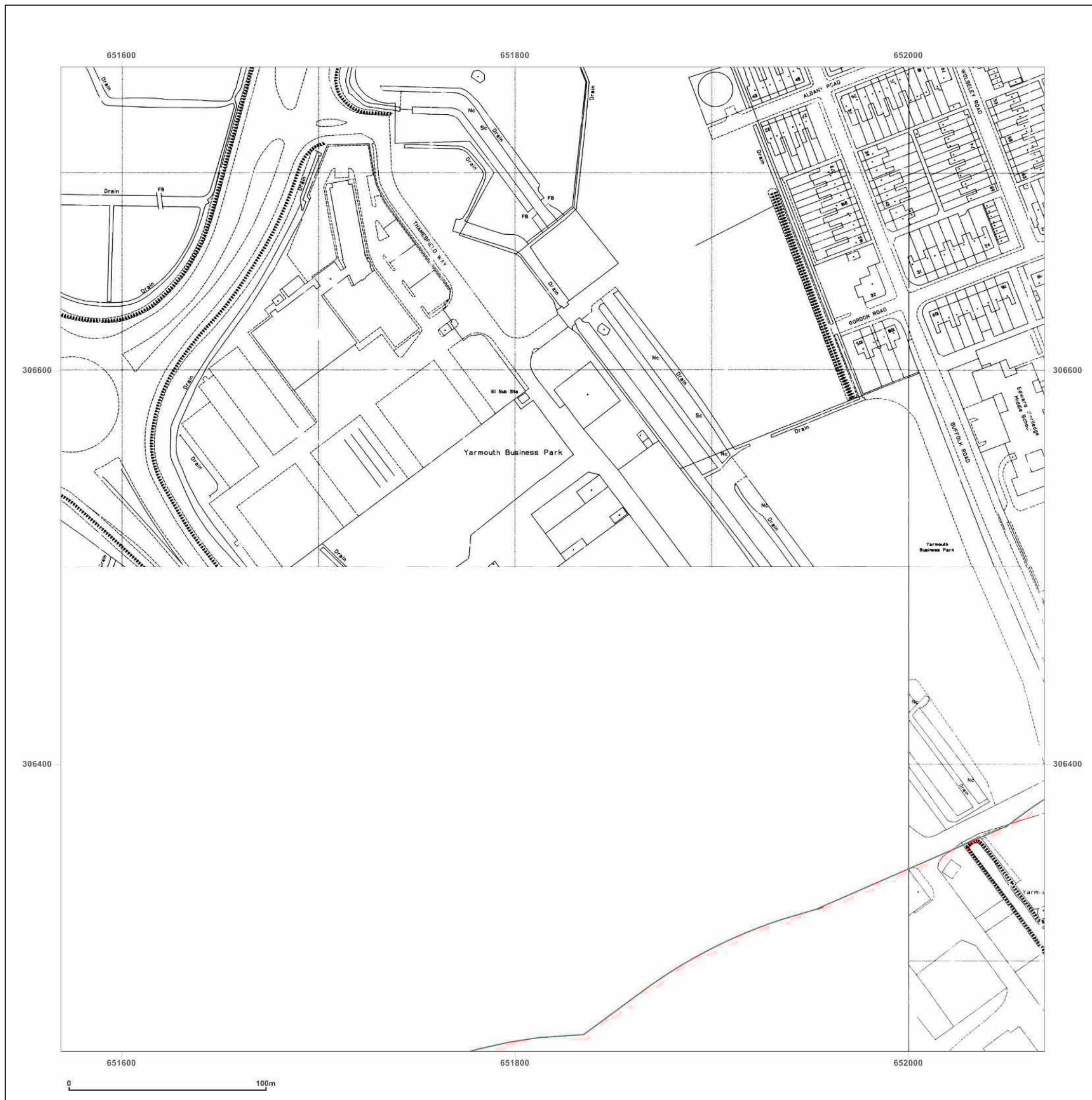


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 305504

Map Name: National Grid

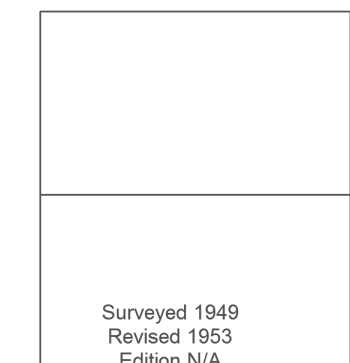
Map date: 1953-1957

Scale: 1:1,250

Printed at: 1:2,000



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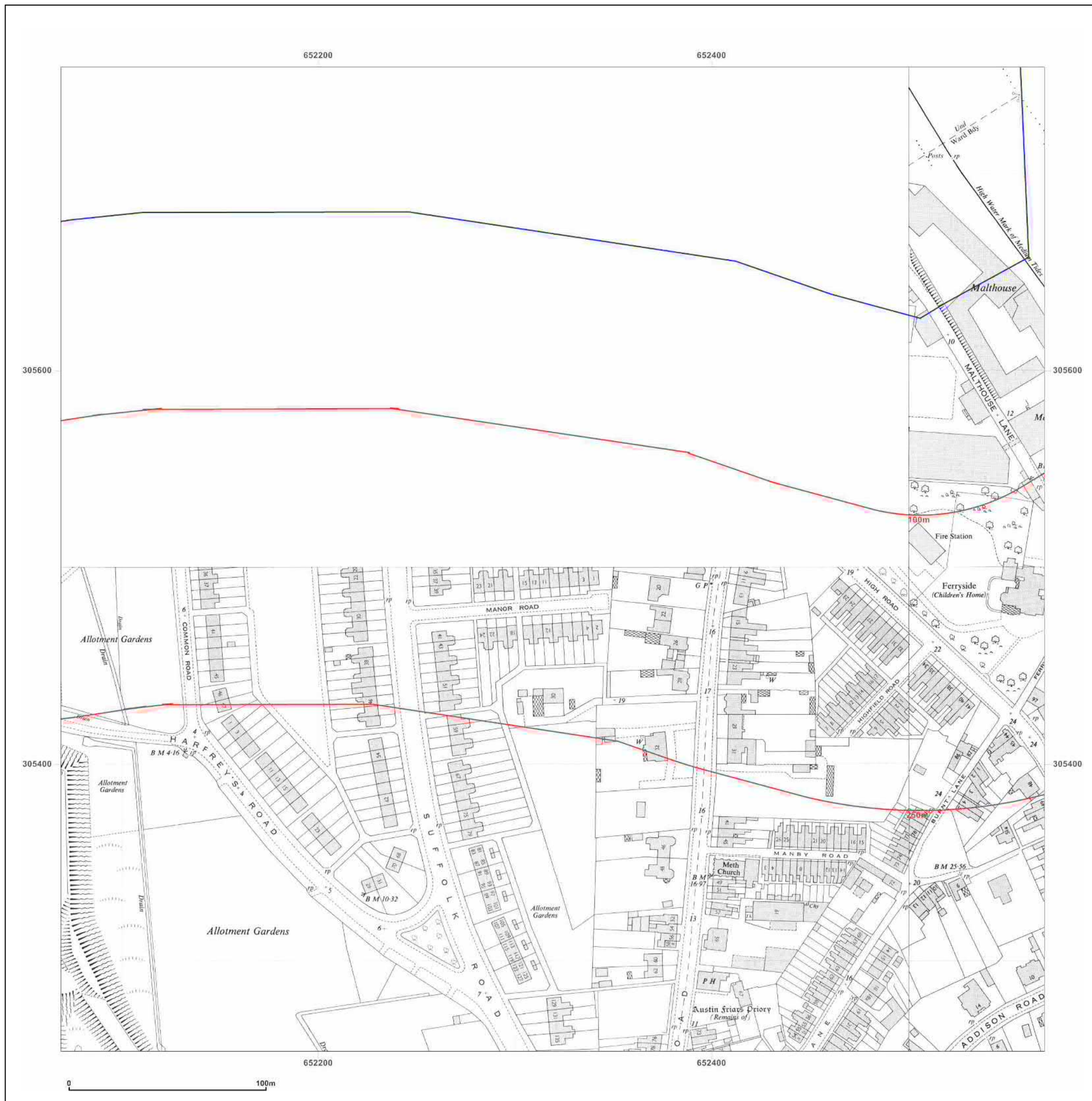


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 305504

Map Name: National Grid

Map date: 1967-1968

Scale: 1:1,250

Printed at: 1:2,000



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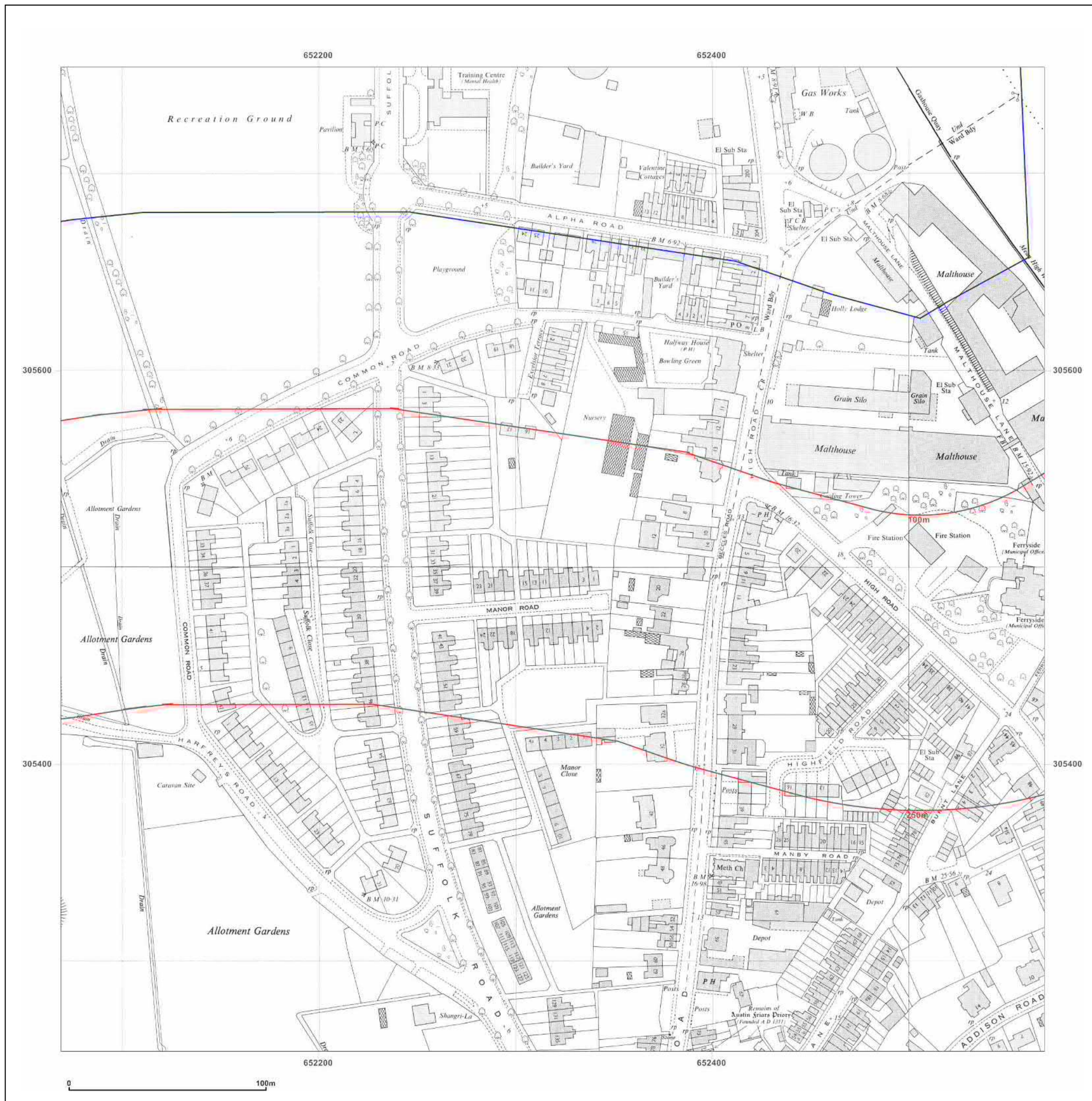


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Site Details:

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Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 305504

Map Name: National Grid

Map date: 1975-1977

Scale: 1:1,250

Printed at: 1:2,000



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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 305504

Map Name: National Grid

Map date: 1984-1986

Scale: 1:1,250

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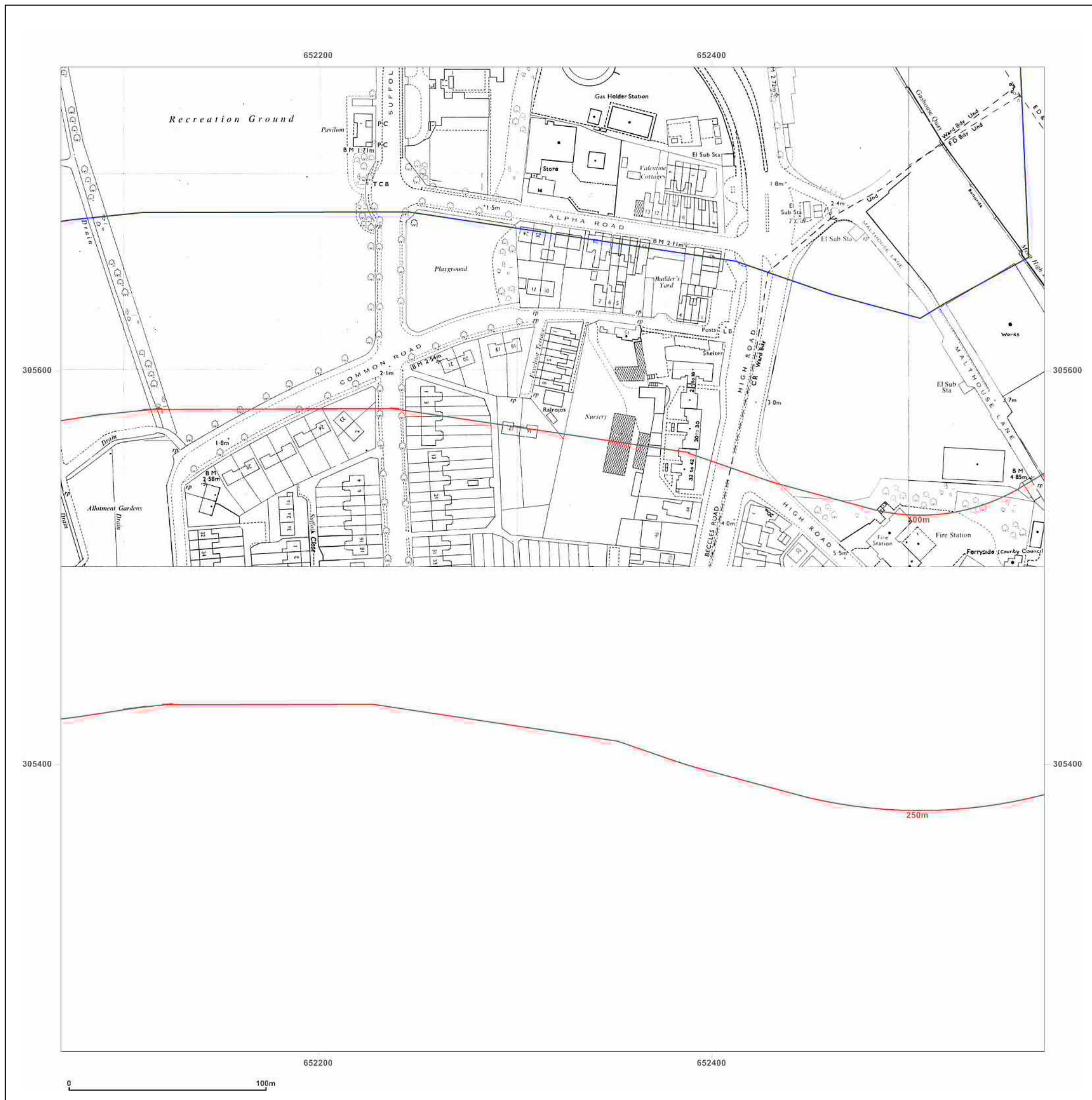


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Site Details:

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Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 305504

Map Name: National Grid

Map date: 1994

Scale: 1:1,250

Printed at: 1:2,000



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Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 306004

Map Name: County Series Town Plan

Map date: 1885

Scale: 1:500

Printed at: 1:1,000



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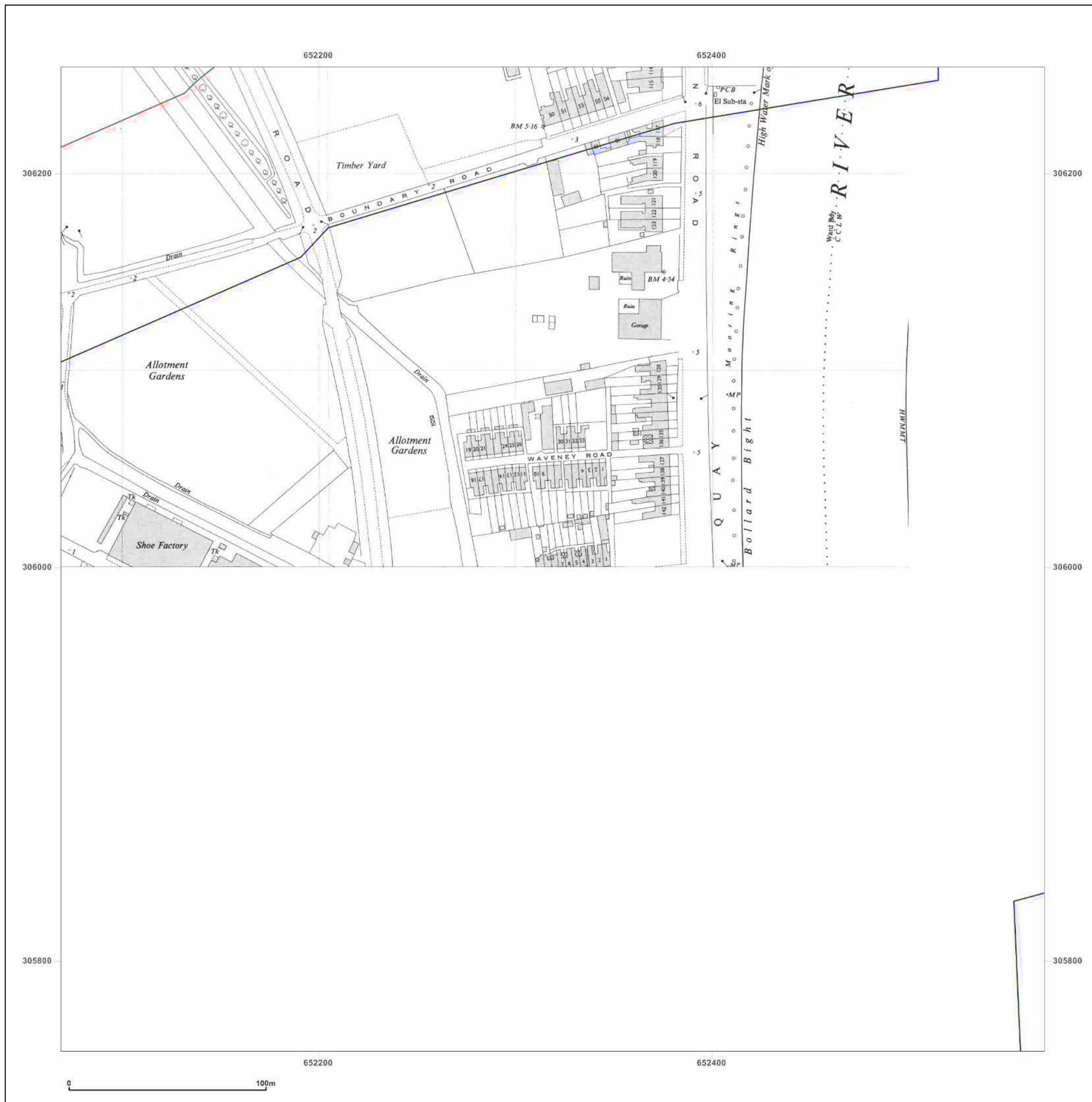
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**Site Details:**

Client Ref: 16287  
 Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
 Grid Ref: 652319, 306004

Map Name: National Grid

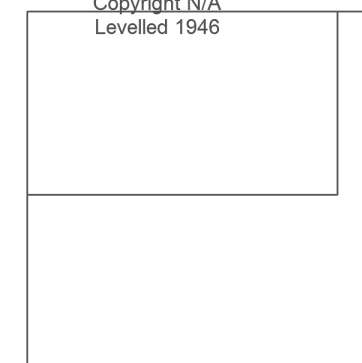
Map date: 1951

Scale: 1:1,250

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Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 306004

Map Name: National Grid

Map date: 1970-1975

Scale: 1:1,250

Printed at: 1:2,000



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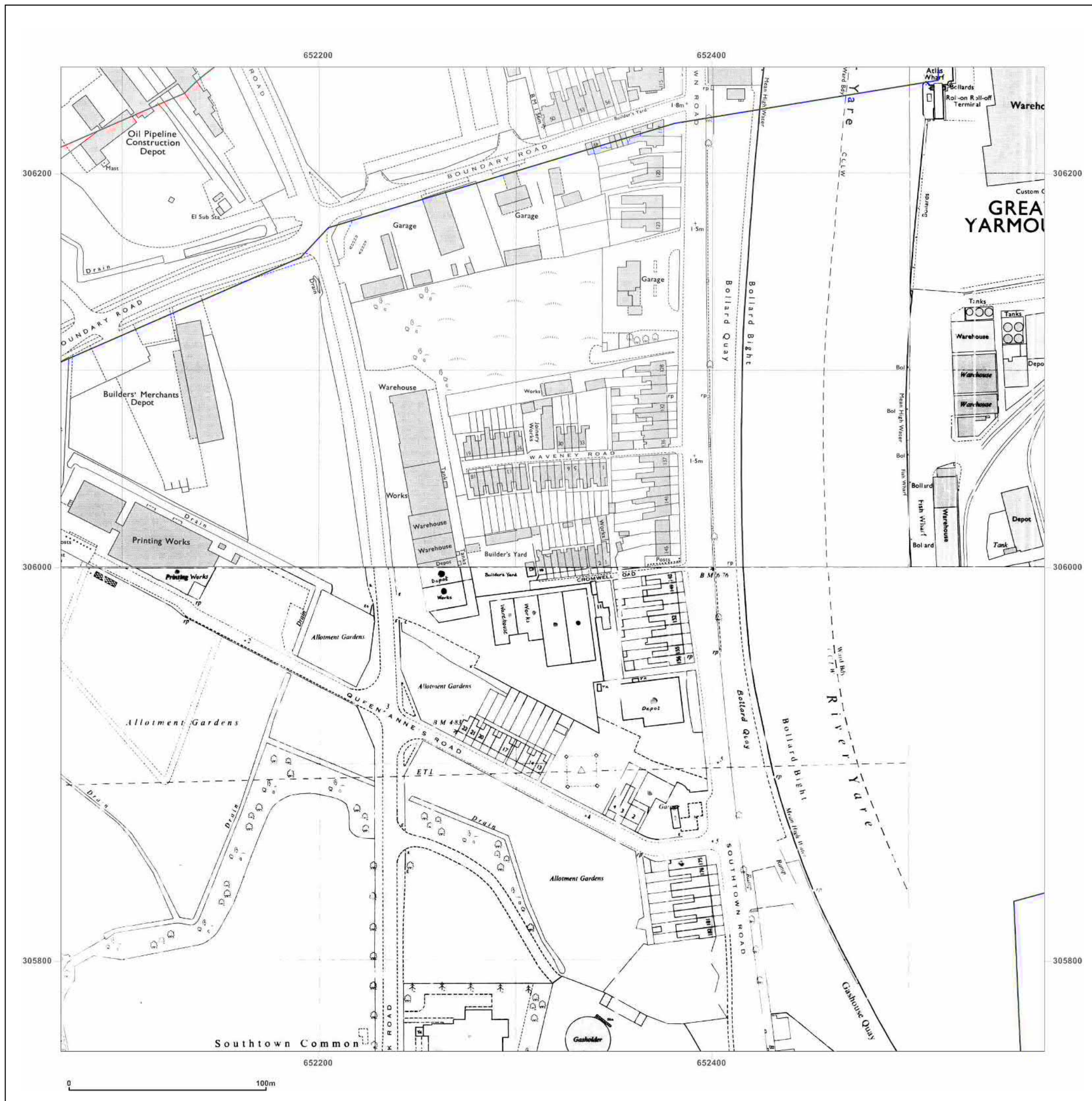


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Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 306004

Map Name: National Grid

Map date: 1984-1986

Scale: 1:1,250

Printed at: 1:2,000



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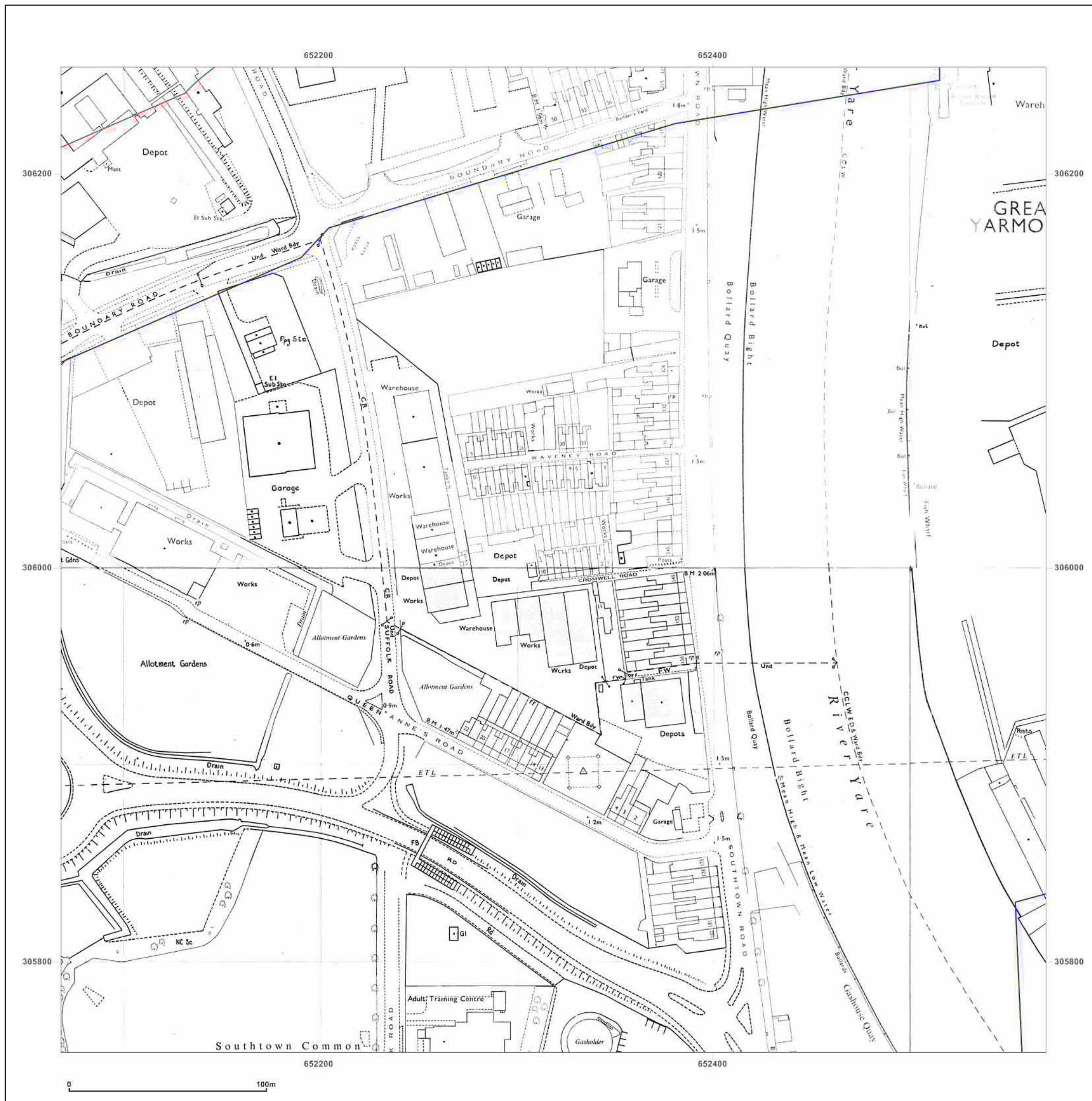


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**Site Details:**

**Client Ref:** 16287  
**Report Ref:** CMAPS-CM-636391-16287-030717HIS\_1250scale  
**Grid Ref:** 652319, 306004

**Map Name:** National Grid

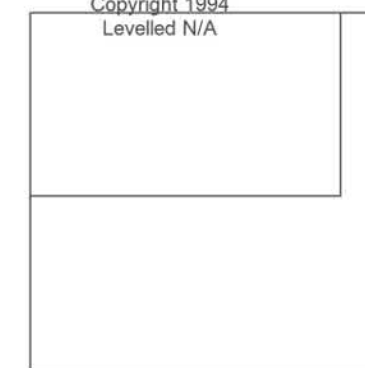
**Map date:** 1994

**Scale:** 1:1,250

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Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 306504

Map Name: National Grid

Map date: 1949

Scale: 1:1,250

Printed at: 1:2,000



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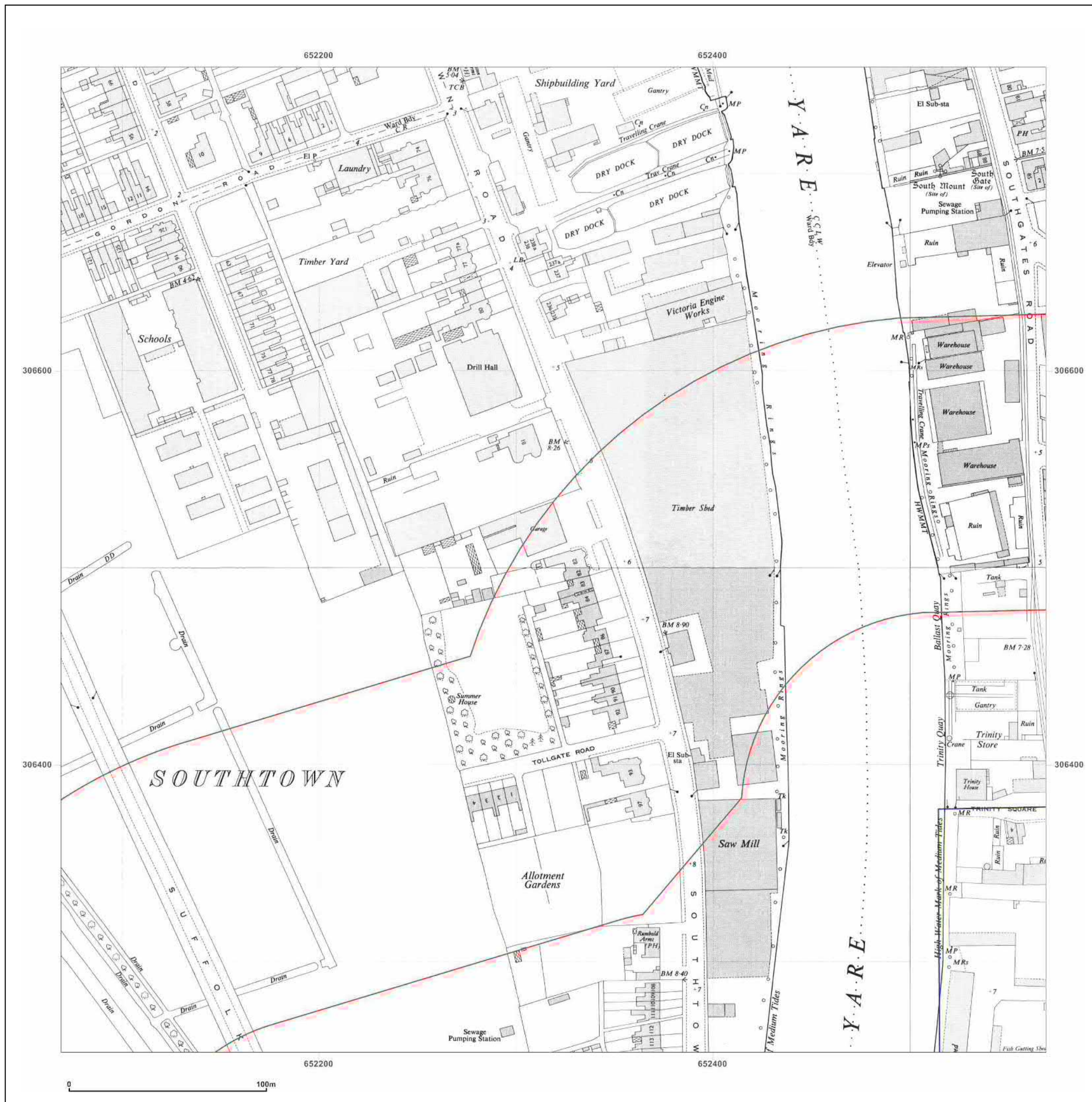


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 306504

Map Name: National Grid

Map date: 1955-1957

Scale: 1:1,250

Printed at: 1:2,000



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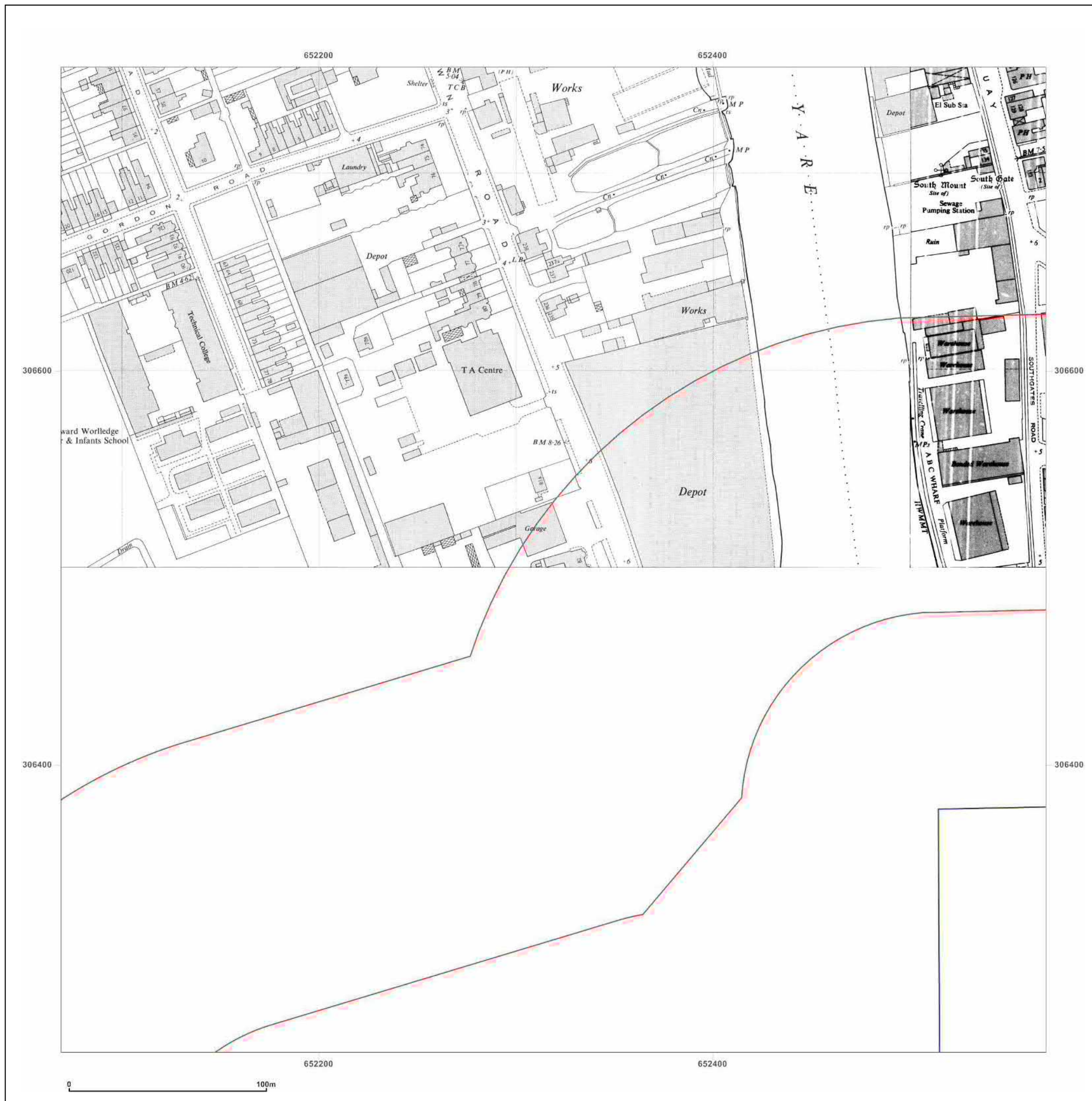


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Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 306504

Map Name: National Grid

Map date: 1966-1968

Scale: 1:1,250

Printed at: 1:2,000



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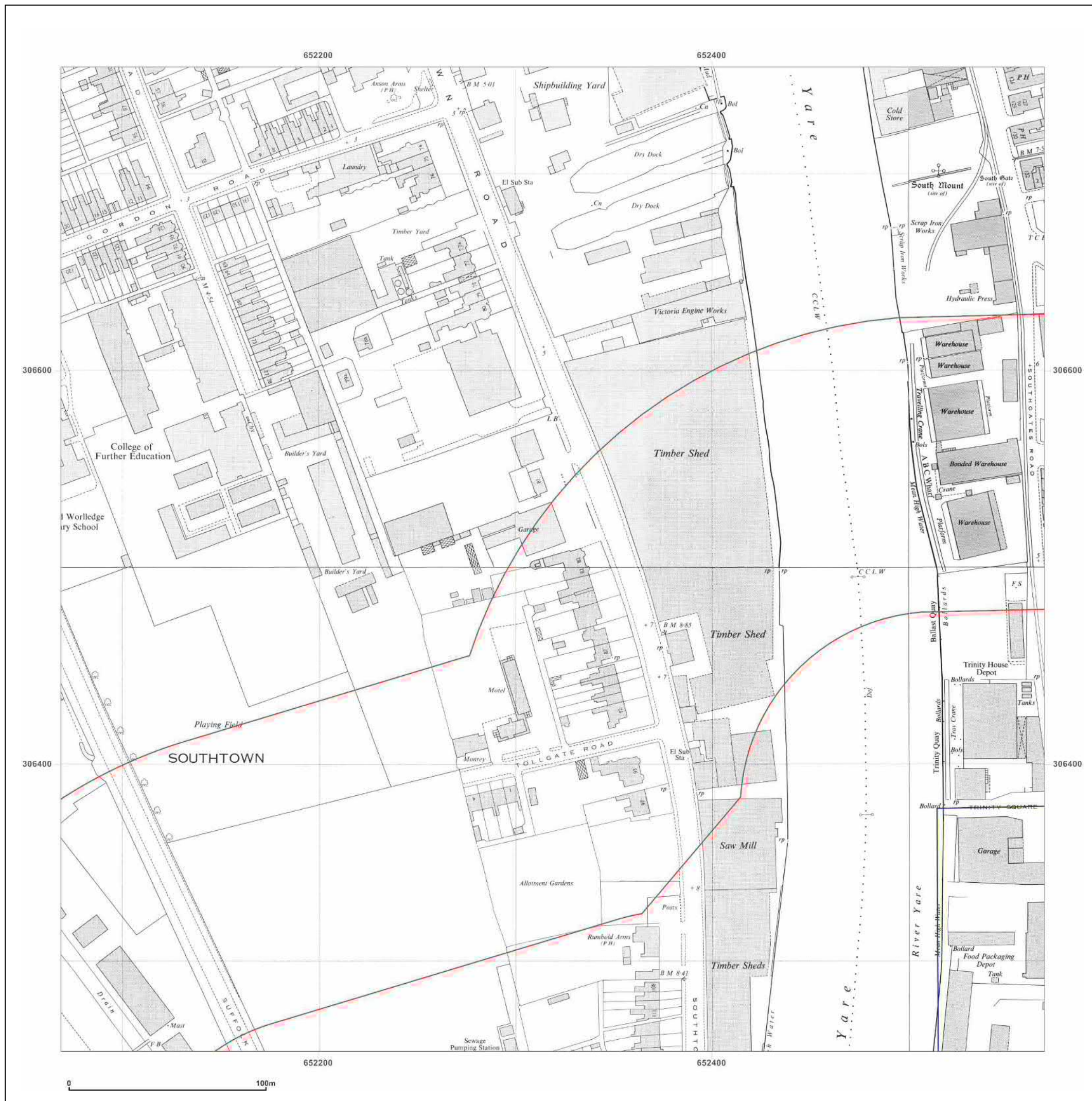


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Grid Ref: 652319, 306504

Map Name: National Grid

Map date: 1975-1978

Scale: 1:1,250

Printed at: 1:2,000



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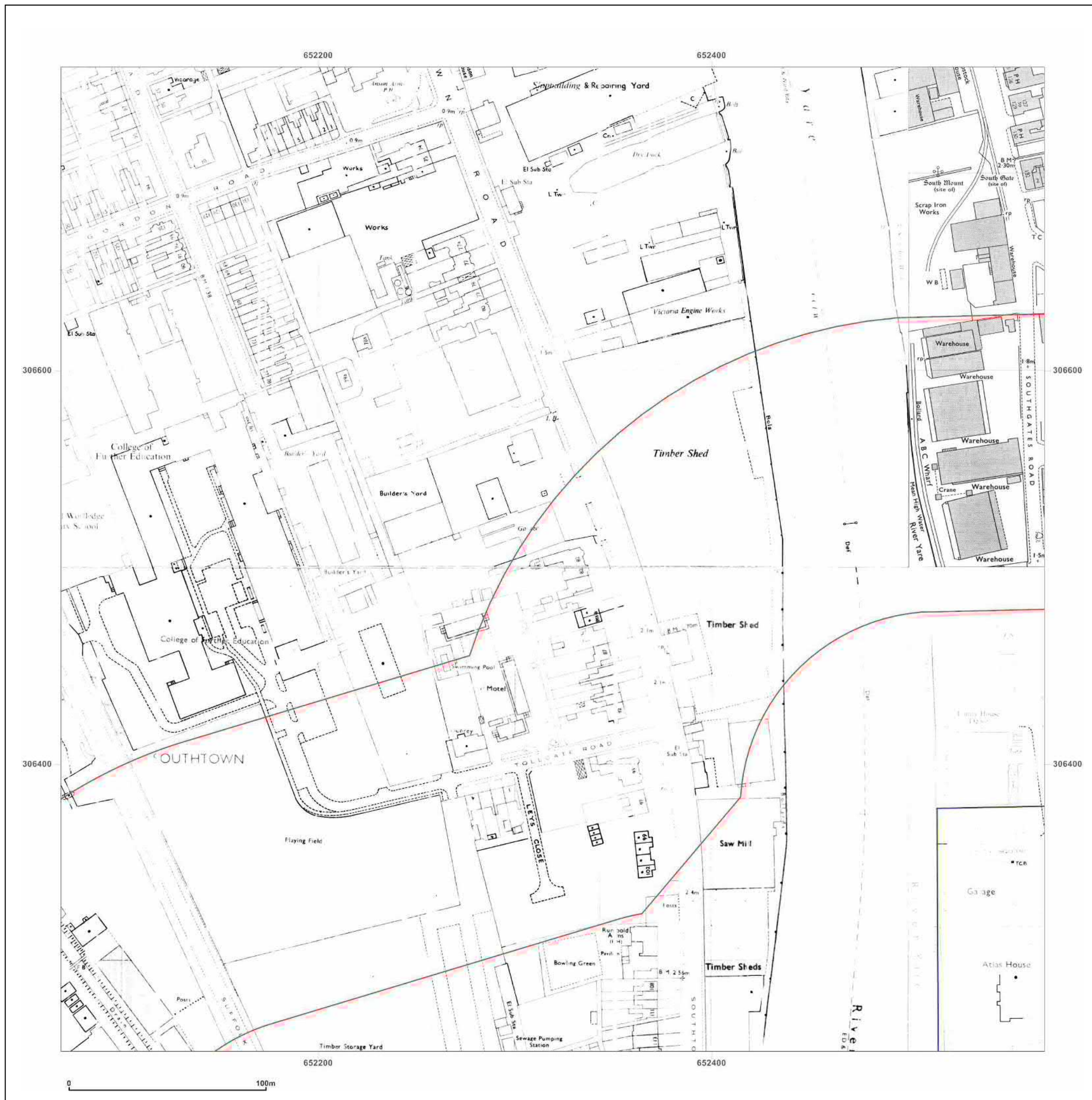


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Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 306504

Map Name: National Grid

Map date: 1984-1990

Scale: 1:1,250

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Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652319, 306504

Map Name: National Grid

Map date: 1994

Scale: 1:1,250

Printed at: 1:2,000



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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 305504

Map Name: County Series Town Plan

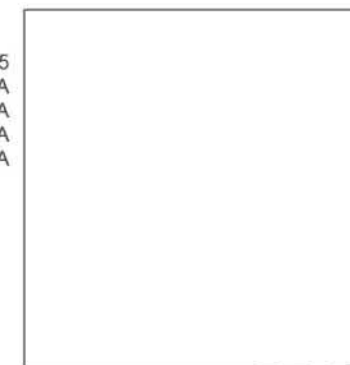
Map date: 1884-1885

Scale: 1:500

Printed at: 1:1,000



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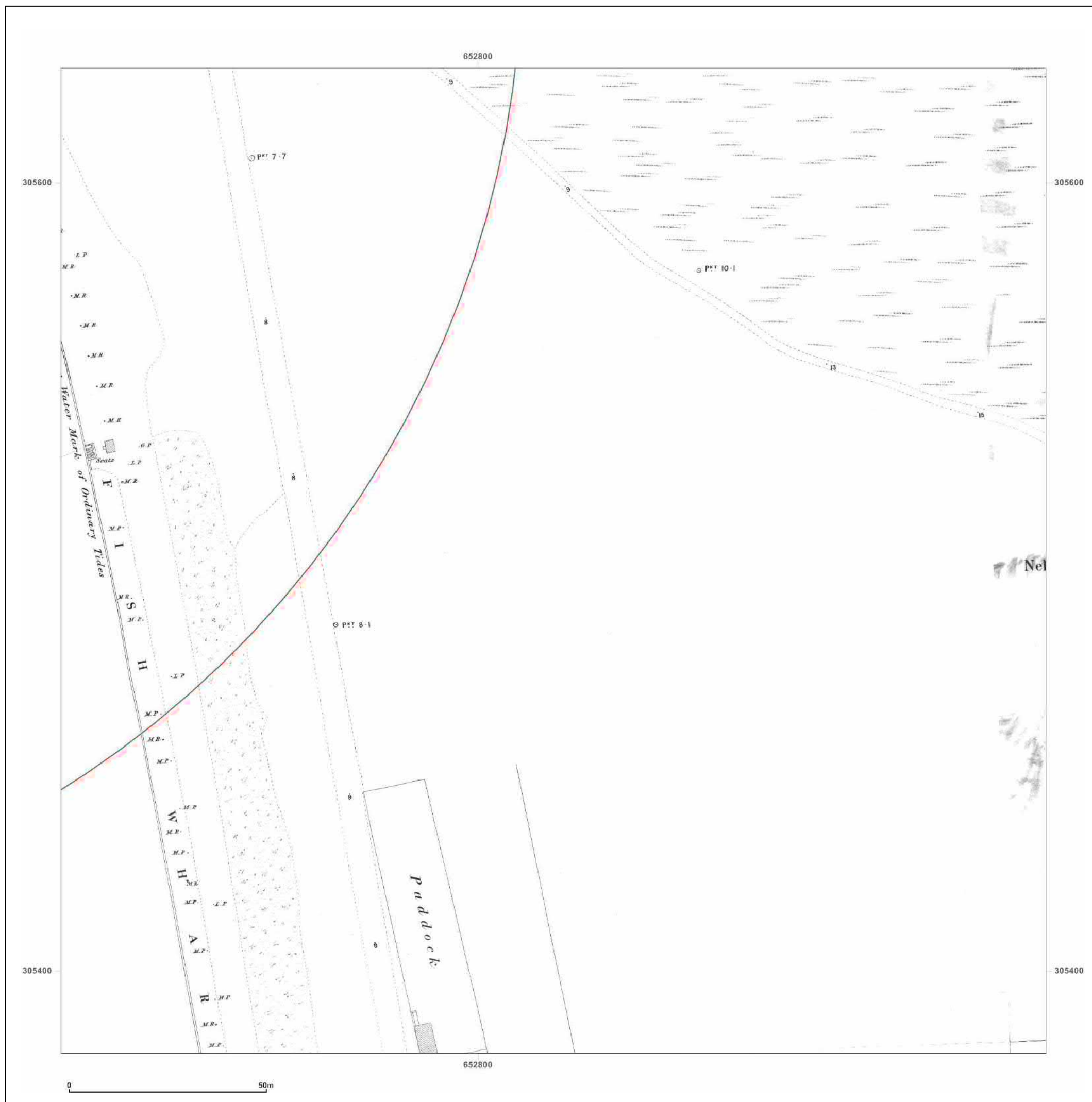


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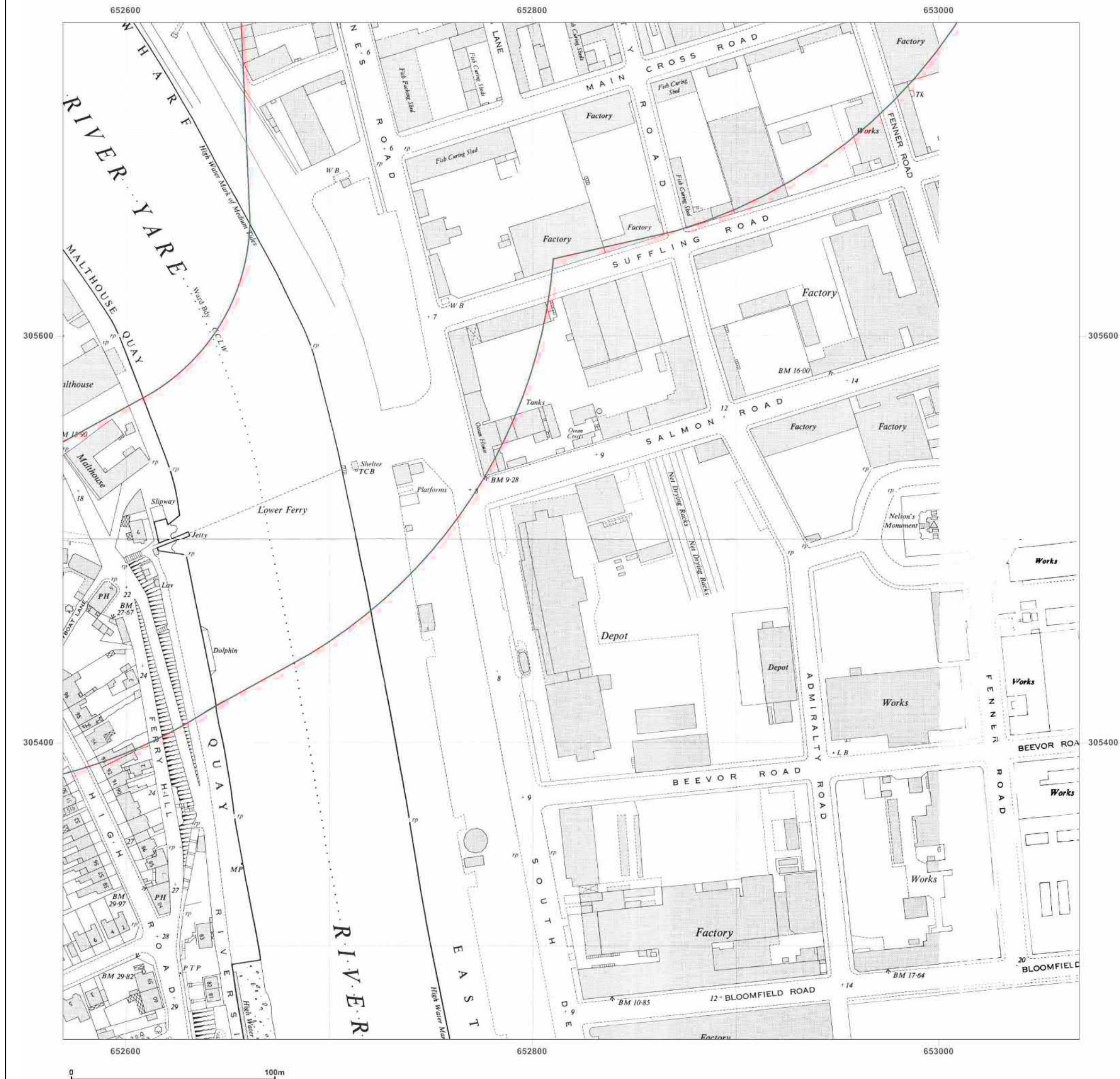
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**Site Details:**

**Client Ref:** 16287  
**Report Ref:** CMAPS-CM-636391-16287-030717HIS\_1250scale  
**Grid Ref:** 652819, 305504

**Map Name:** National Grid

**Map date:** 1957-1958

**Scale:** 1:1,250

**Printed at:** 1:2,000



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Grid Ref: 652819, 305504

Map Name: National Grid

Map date: 1964-1968

Scale: 1:1,250

Printed at: 1:2,000



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Site Details:

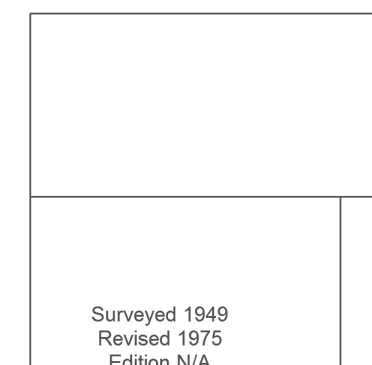
Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 305504

Map Name: National Grid

Map date: 1975-1976

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1949  
Revised 1975  
Edition N/A  
Copyright 1976  
Levelled 1958

Surveyed 1949  
Revised 1975  
Edition N/A  
Copyright N/A  
Levelled 1946



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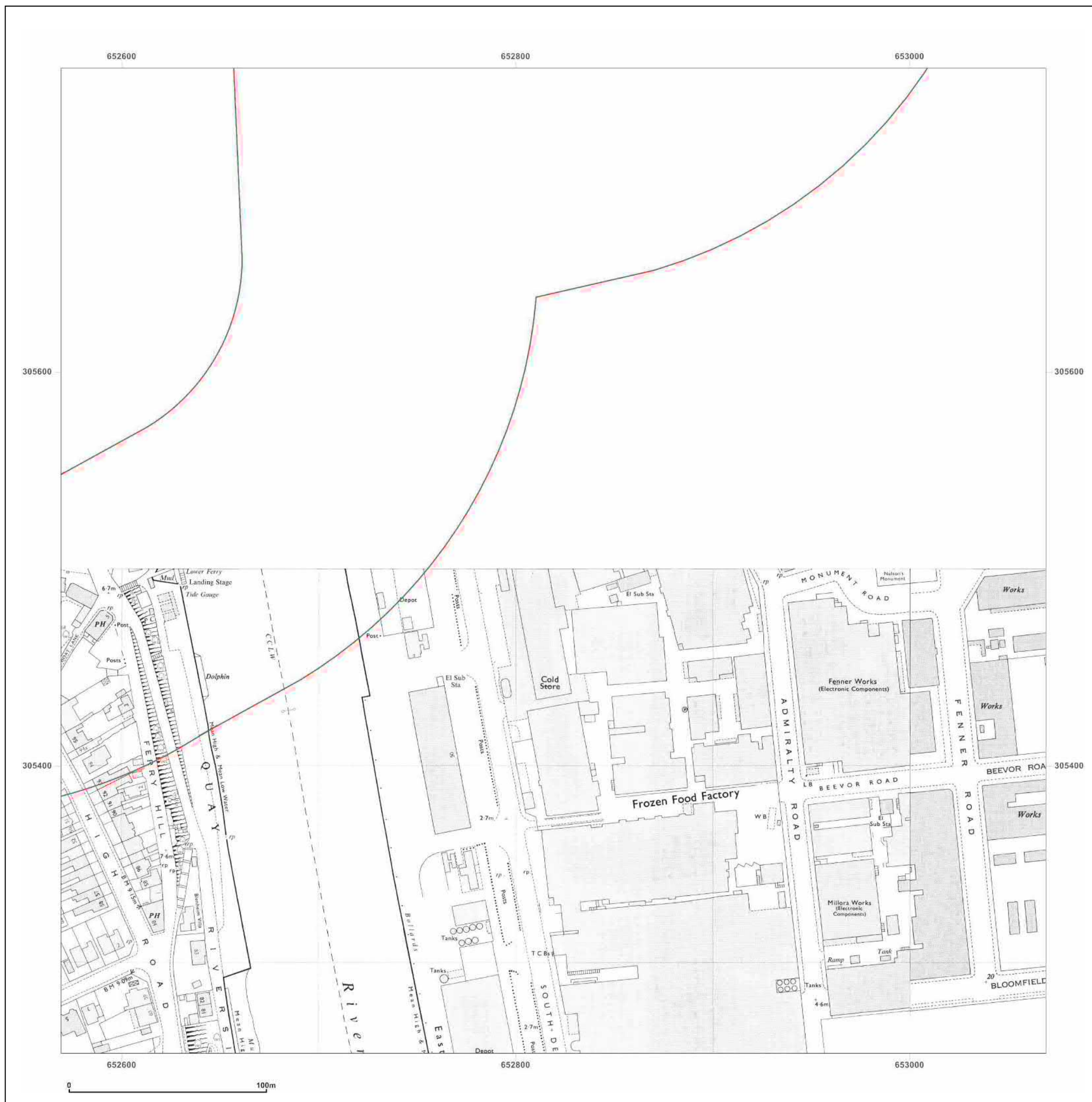


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 305504

Map Name: National Grid

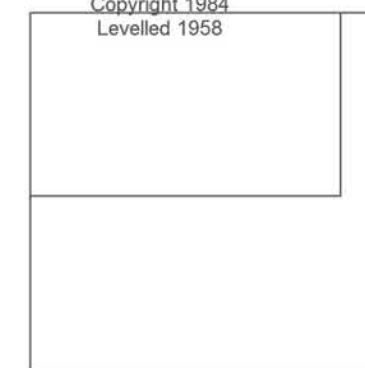
Map date: 1984

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1958  
Revised 1984  
Edition N/A  
Copyright 1984  
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**Site Details:**

**Client Ref:** 16287  
**Report Ref:** CMAPS-CM-636391-16287-030717HIS\_1250scale  
**Grid Ref:** 652819, 305504

**Map Name:** National Grid

**Map date:** 1994

**Scale:** 1:1,250

**Printed at:** 1:2,000



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Revised N/A  
Edition N/A  
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Surveyed N/A  
Revised N/A  
Edition N/A  
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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306004

Map Name: County Series Town Plan

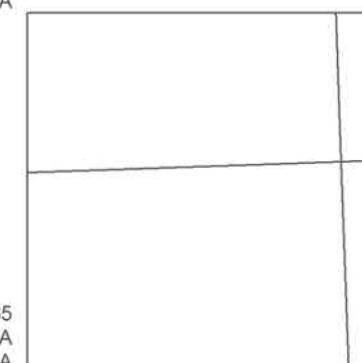
Map date: 1885

Scale: 1:500

Printed at: 1:1,000



Surveyed 1885  
Revised N/A  
Edition N/A  
Copyright N/A  
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Revised N/A  
Edition N/A  
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**Site Details:**

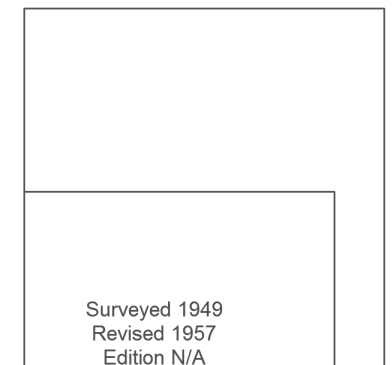
**Client Ref:** 16287  
**Report Ref:** CMAPS-CM-636391-16287-030717HIS\_1250scale  
**Grid Ref:** 652819, 306004

**Map Name:** National Grid

**Map date:** 1957

**Scale:** 1:1,250

**Printed at:** 1:2,000



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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306004

Map Name: National Grid

Map date: 1964-1968

Scale: 1:1,250

Printed at: 1:2,000



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Edition N/A  
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Surveyed 1949  
Revised 1967  
Edition N/A  
Copyright 1968  
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Surveyed 1949  
Revised 1963  
Edition N/A  
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**Site Details:**

**Client Ref:** 16287  
**Report Ref:** CMAPS-CM-636391-16287-030717HIS\_1250scale  
**Grid Ref:** 652819, 306004

**Map Name:** National Grid  
**Map date:** 1978-1981  
**Scale:** 1:1,250  
**Printed at:** 1:2,000



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Surveyed 1958 Revised 1981 Edition N/A Copyright 1981 Levelled 1958



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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306004

Map Name: National Grid

Map date: 1990

Scale: 1:1,250

Printed at: 1:2,000



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Edition N/A  
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Edition N/A  
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Revised N/A  
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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306504

Map Name: County Series Town Plan

Map date: 1885

Scale: 1:500

Printed at: 1:1,000



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Revised N/A  
Edition N/A  
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Revised N/A  
Edition N/A  
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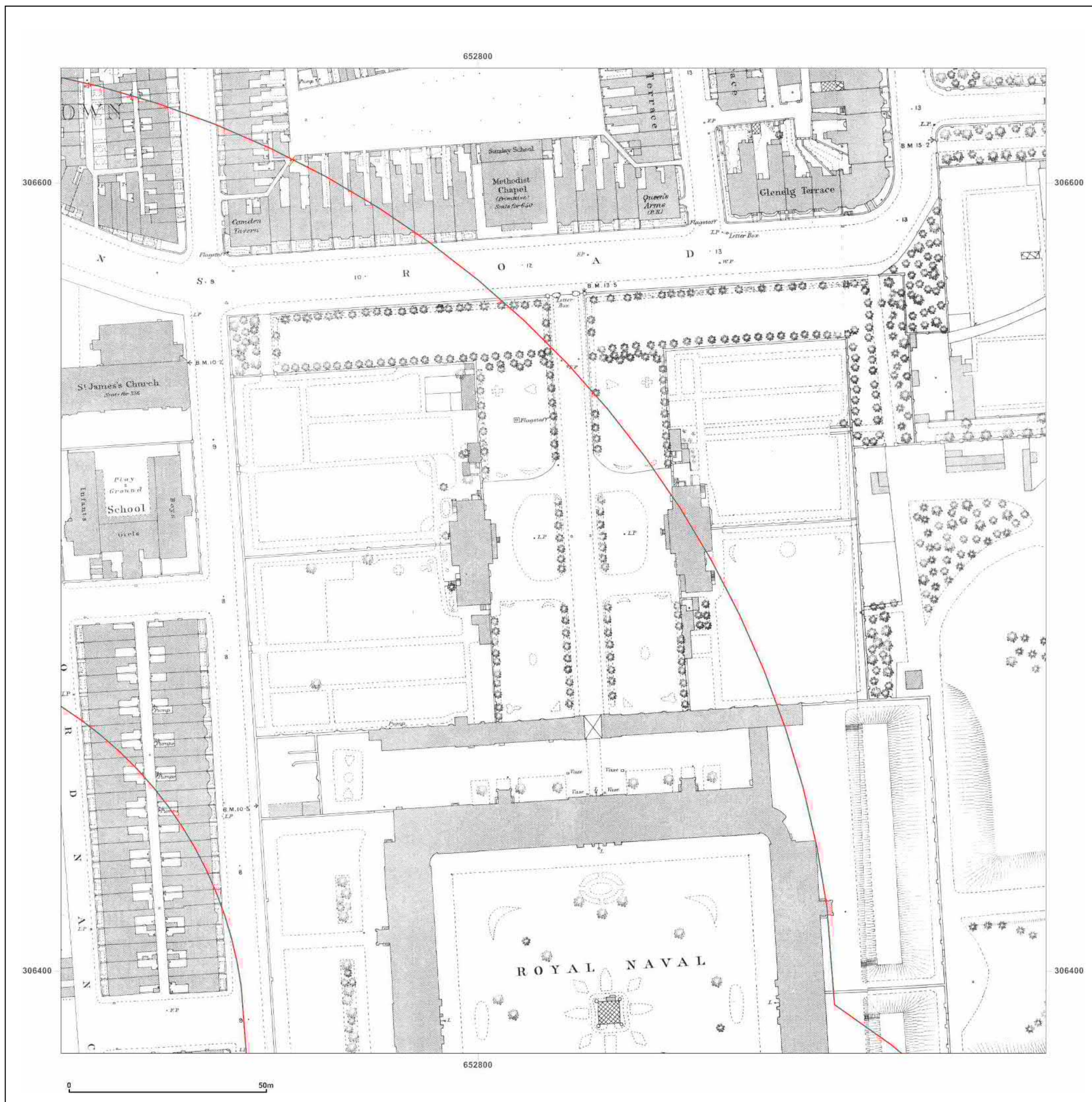


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306504

Map Name: National Grid

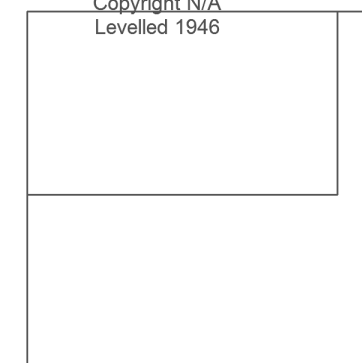
Map date: 1954

Scale: 1:1,250

Printed at: 1:2,000



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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306504

Map Name: National Grid

Map date: 1964-1966

Scale: 1:1,250

Printed at: 1:2,000



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Edition N/A  
Copyright 1964  
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Revised 1964  
Edition N/A  
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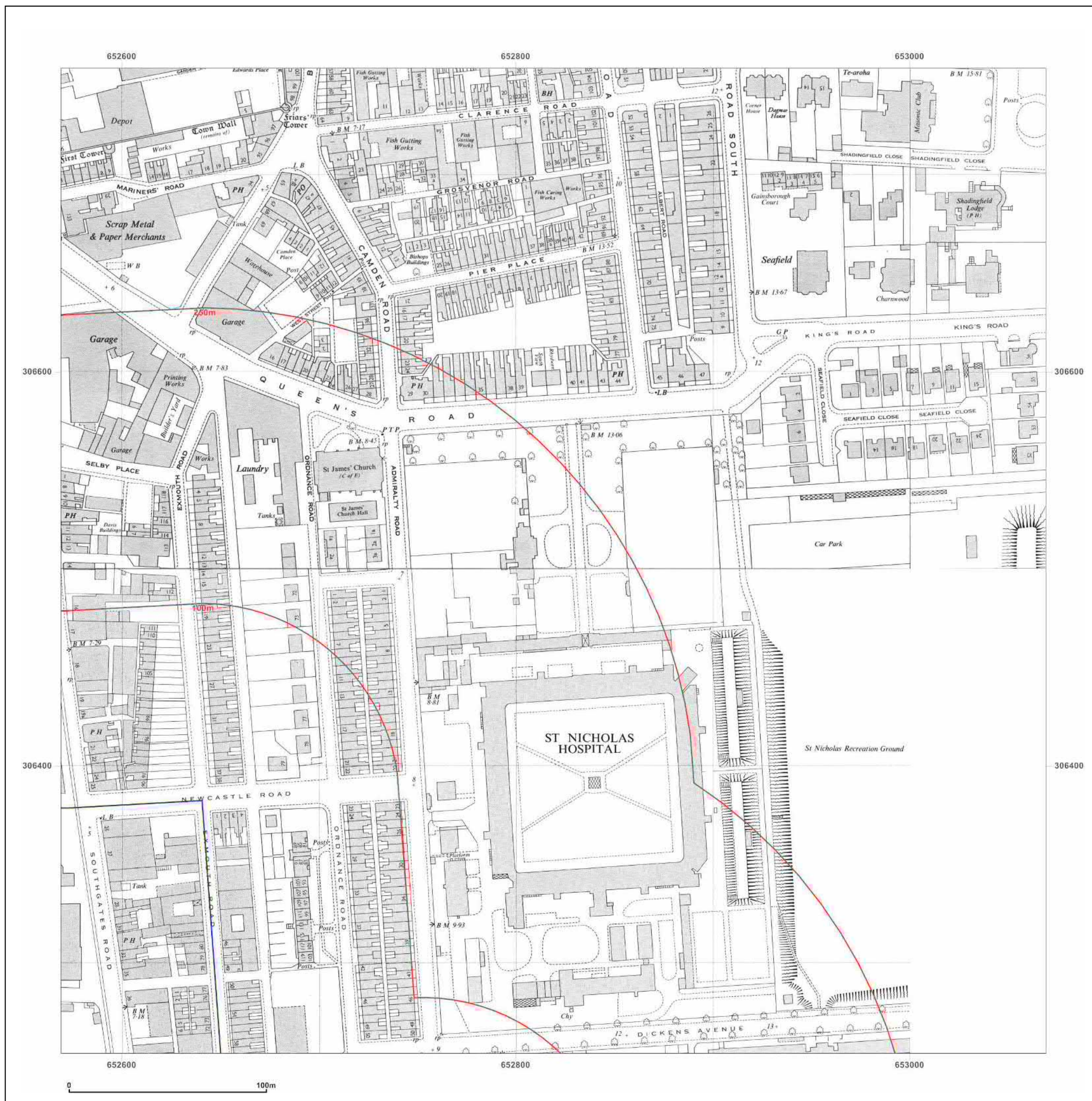


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306504

Map Name: National Grid

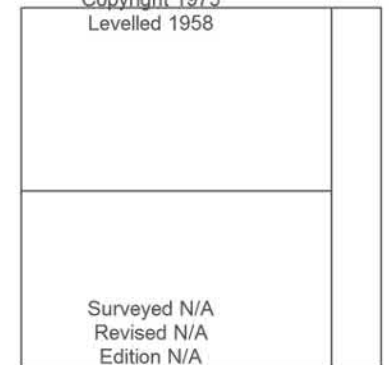
Map date: 1975-1978

Scale: 1:1,250

Printed at: 1:2,000



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Site Details:

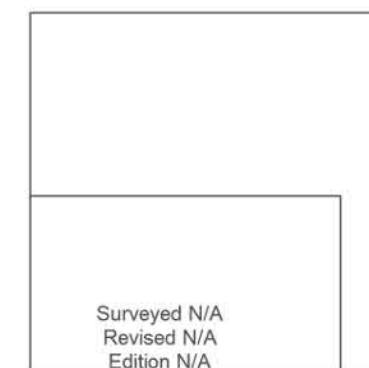
Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306504

Map Name: National Grid

Map date: 1984

Scale: 1:1,250

Printed at: 1:2,000



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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306504

Map Name: National Grid

Map date: 1990-1994

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A  
Revised N/A  
Edition N/A  
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Revised N/A  
Edition N/A  
Copyright 1994  
Levelled N/A

Surveyed N/A  
Revised N/A  
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Edition N/A  
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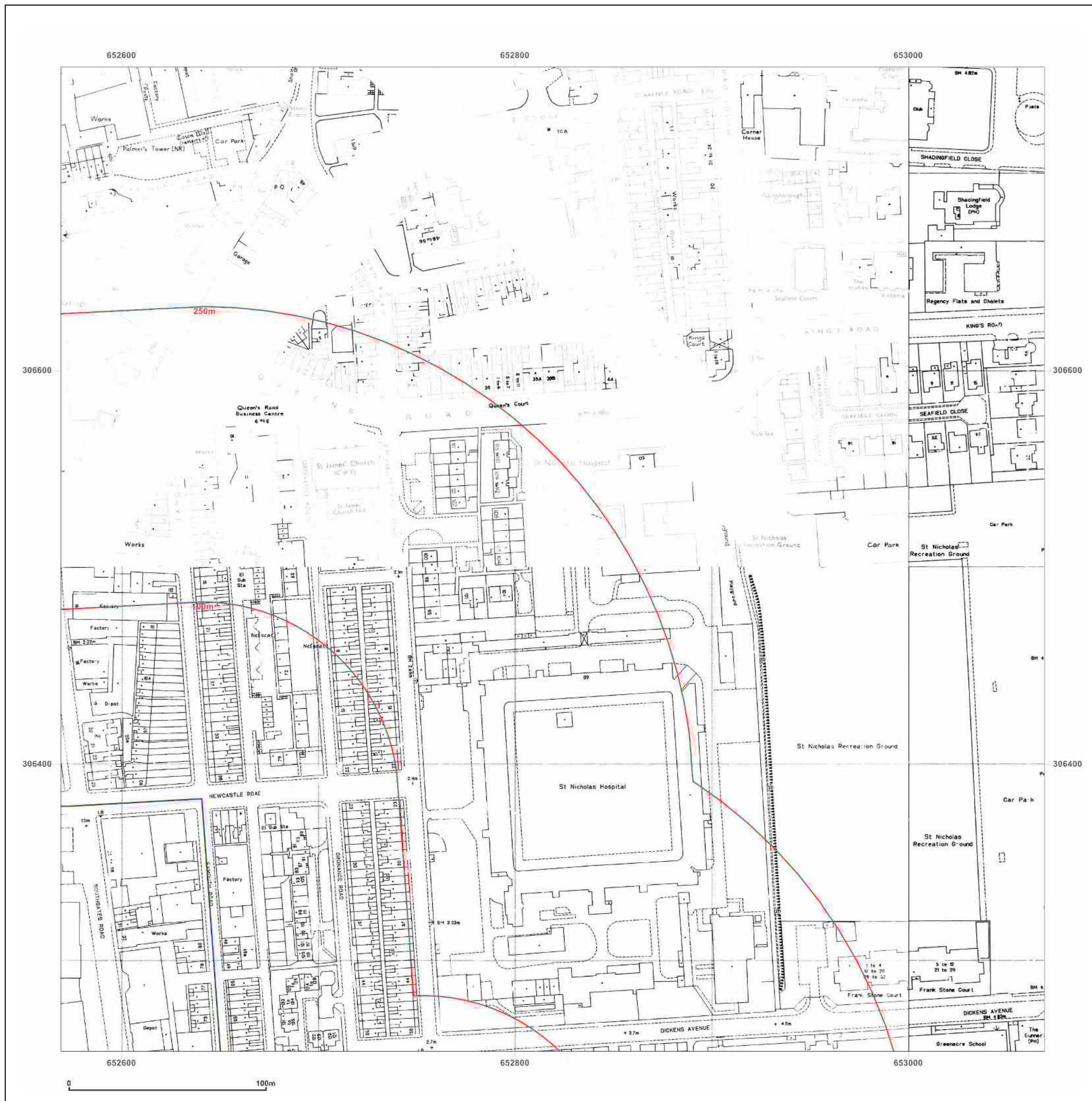


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**Site Details:**

**Client Ref:** 16287  
**Report Ref:** CMAPS-CM-636391-16287-030717HIS\_1250scale  
**Grid Ref:** 652819, 306504

**Map Name:** County Series Town Plan

**Map date:** 1885

**Scale:** 1:500

**Printed at:** 1:1,000



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Revised N/A  
Edition N/A  
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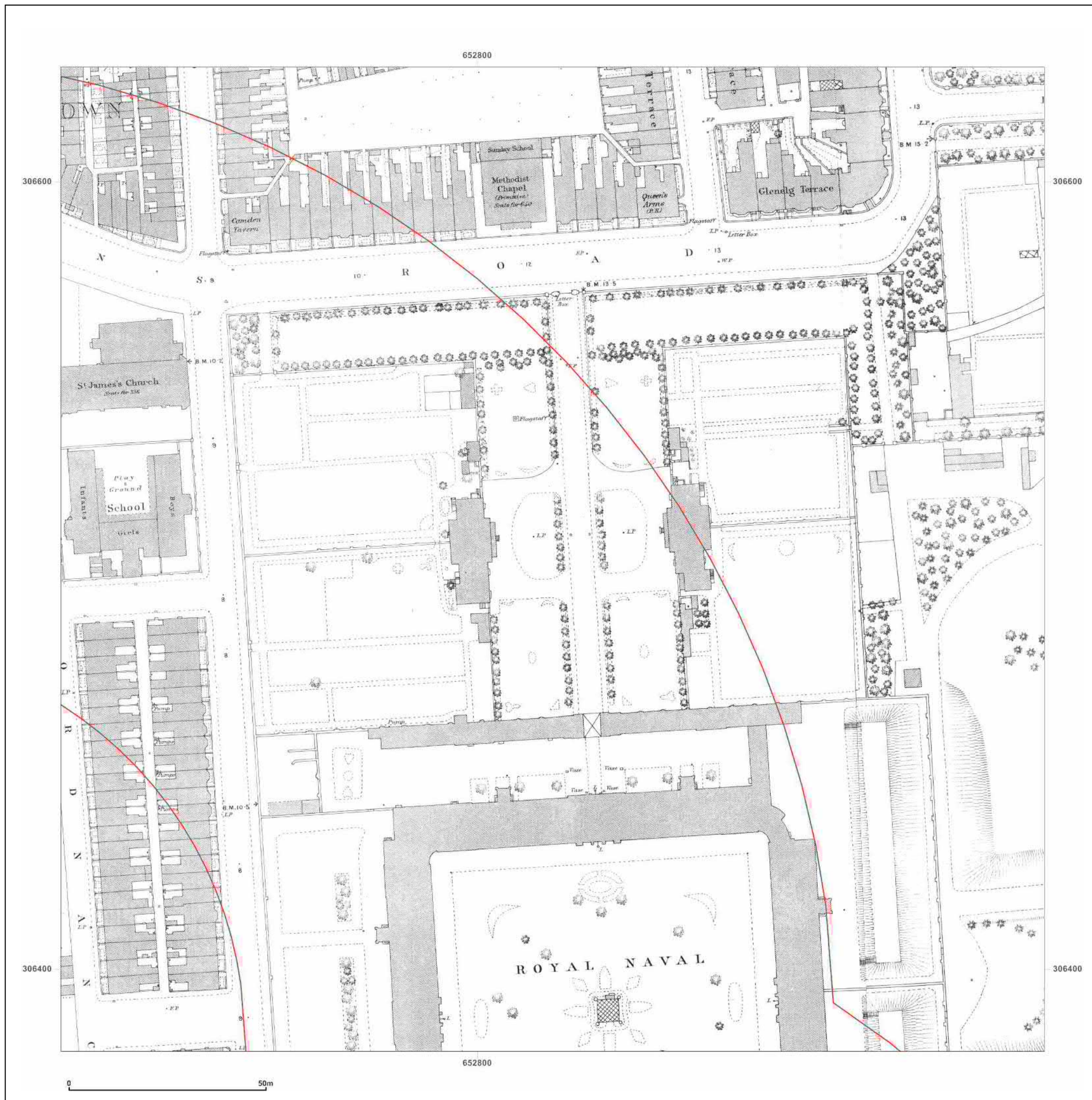


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306504

Map Name: National Grid

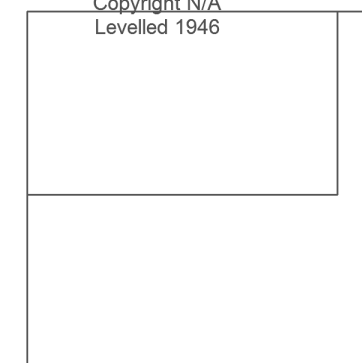
Map date: 1954

Scale: 1:1,250

Printed at: 1:2,000



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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306504

Map Name: National Grid

Map date: 1964-1966

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1949  
Revised 1966  
Edition N/A  
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Surveyed 1949  
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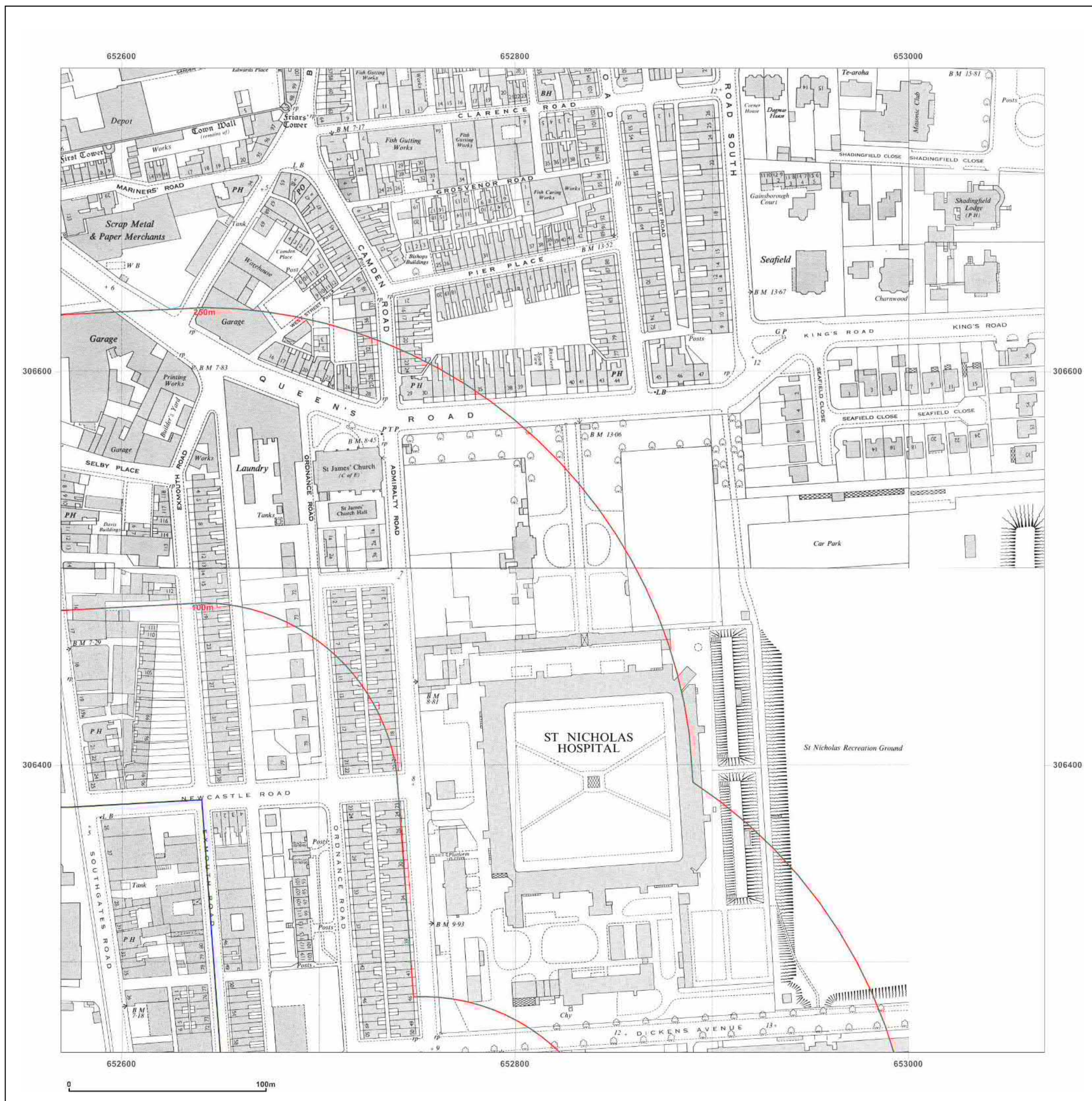


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**Site Details:**

**Client Ref:** 16287  
**Report Ref:** CMAPS-CM-636391-16287-030717HIS\_1250scale  
**Grid Ref:** 652819, 306504

**Map Name:** National Grid

**Map date:** 1975-1978

**Scale:** 1:1,250

**Printed at:** 1:2,000



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Site Details:

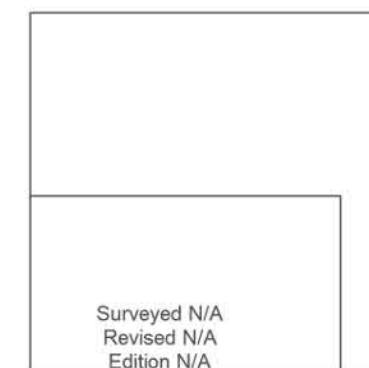
Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306504

Map Name: National Grid

Map date: 1984

Scale: 1:1,250

Printed at: 1:2,000



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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 306504

Map Name: National Grid

Map date: 1990-1994

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A  
Revised N/A  
Edition N/A  
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Surveyed N/A  
Revised N/A  
Edition N/A  
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Revised N/A  
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Revised N/A  
Edition N/A  
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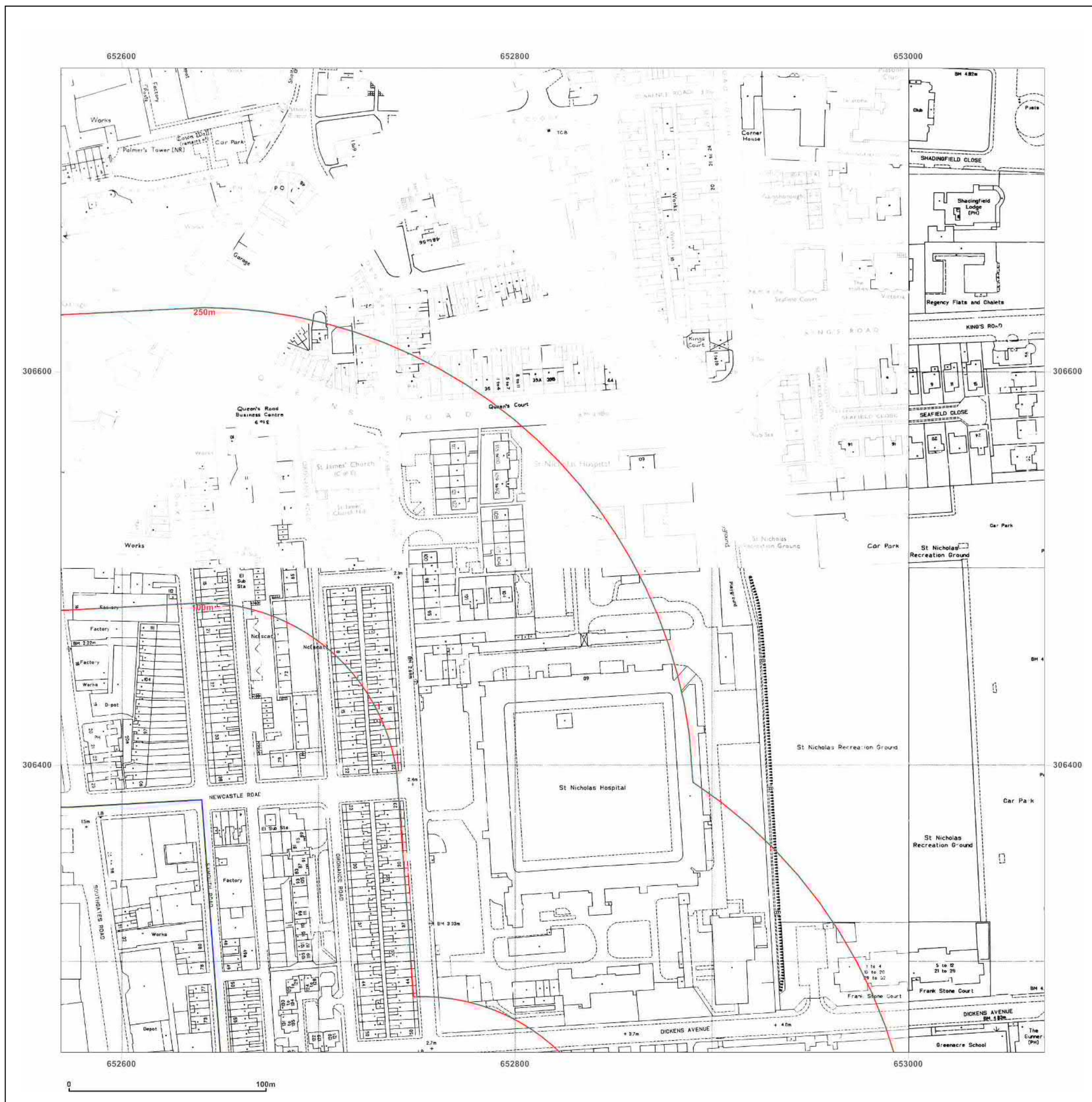


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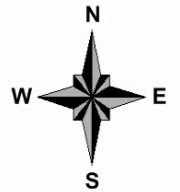
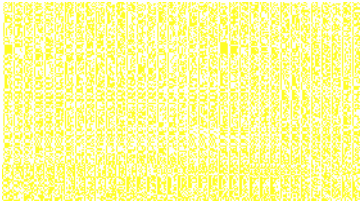
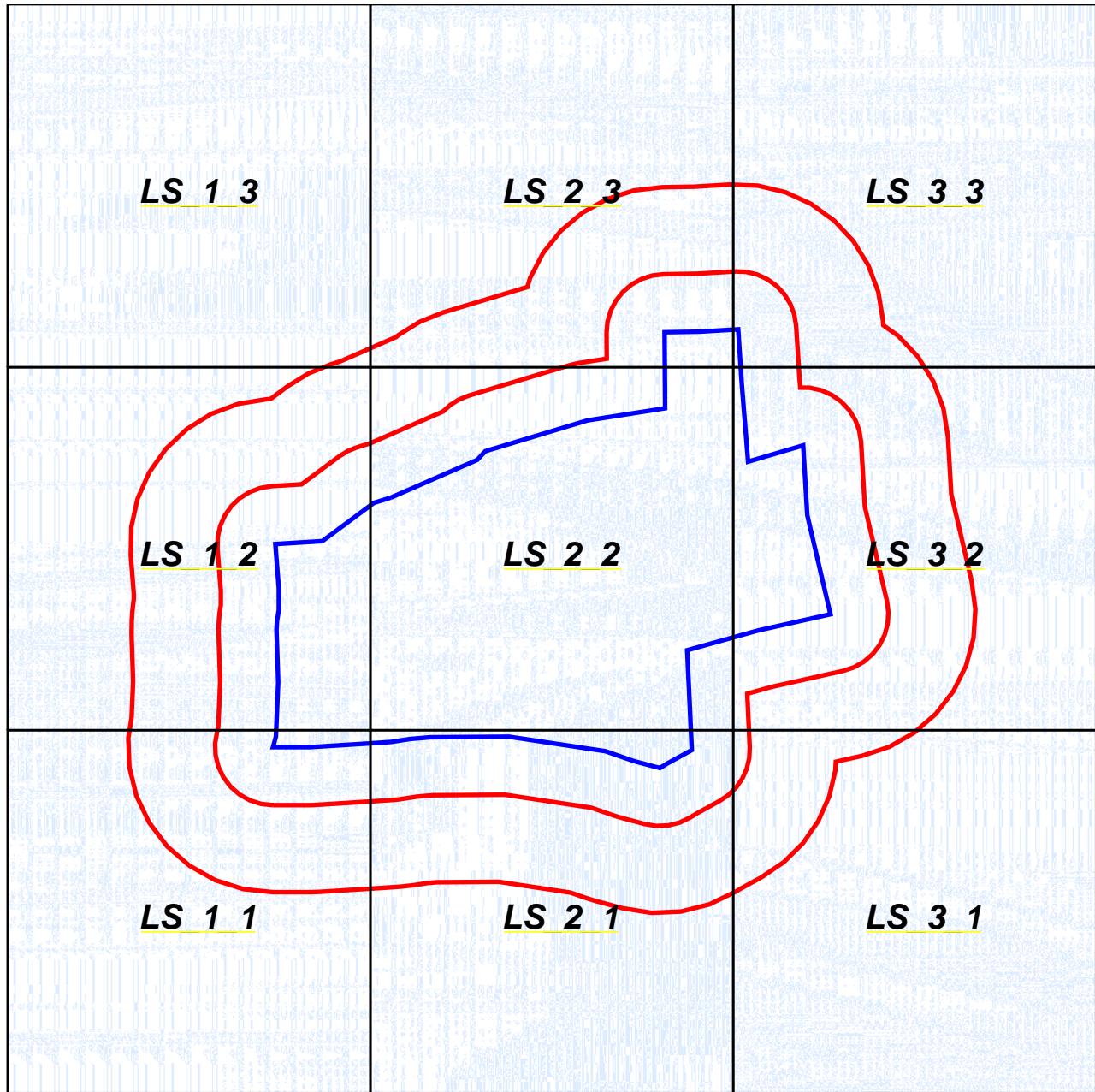
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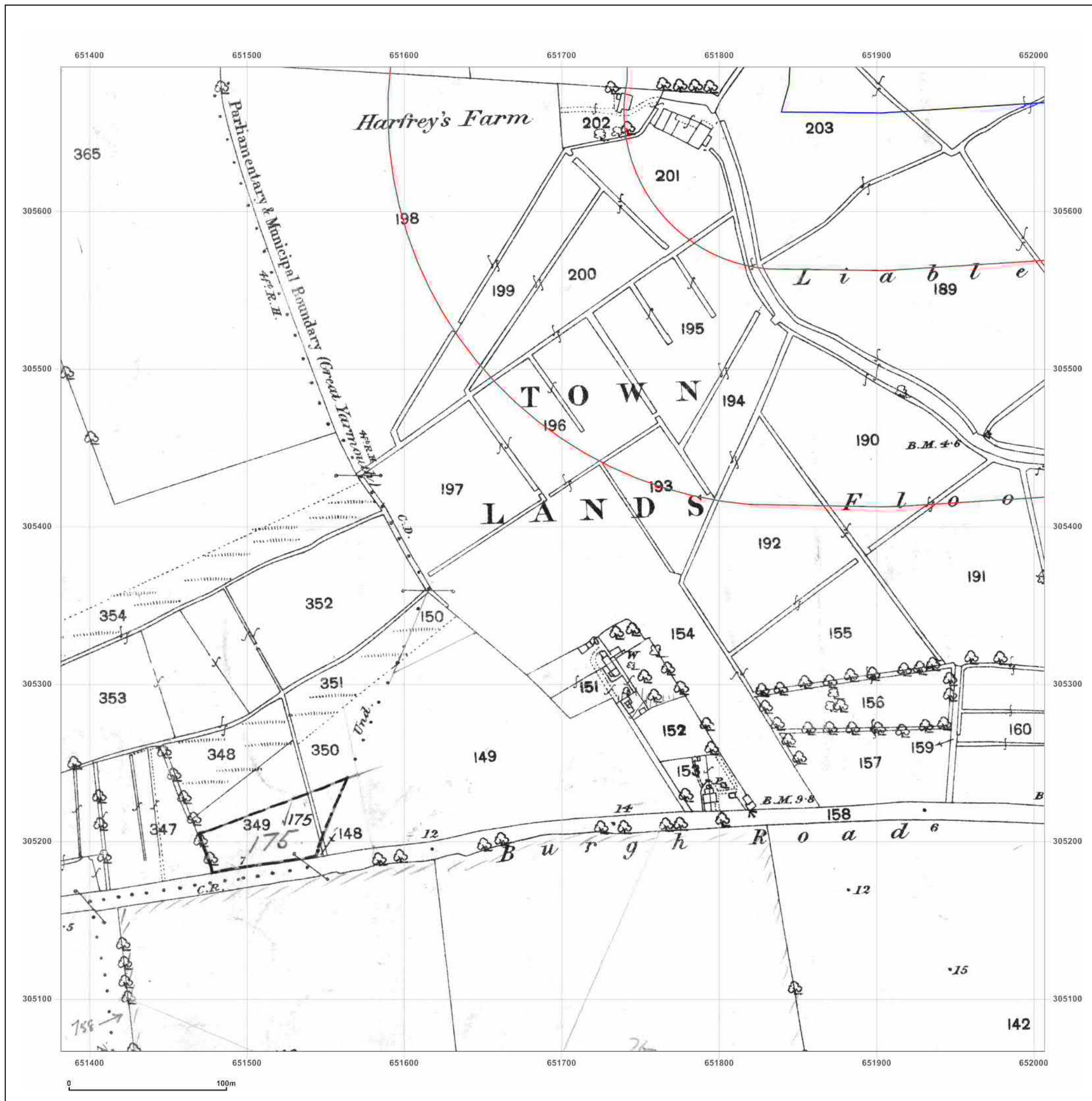
Production date: 03 July 2017

To view map legend click here [Legend](#)





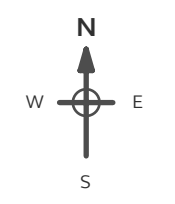




**Site Details:**

Client Ref: 16287  
 Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_1\_  
 Grid Ref: 651694, 305379

Map Name: County Series  
 Map date: 1883  
 Scale: 1:2,500  
 Printed at: 1:2,500



Surveyed 1883  
 Revised 1883  
 Edition N/A  
 Copyright N/A  
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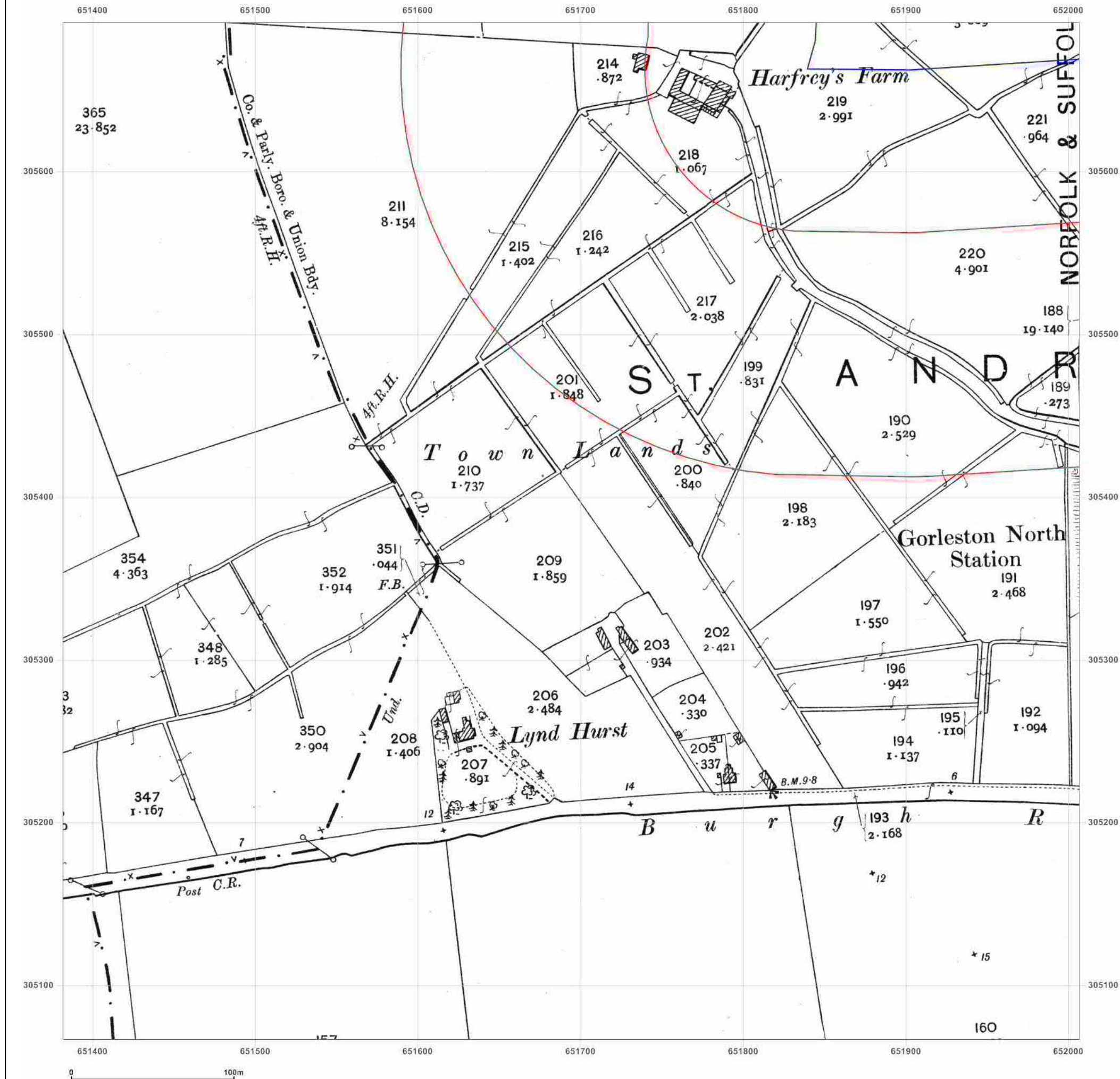
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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_1\_  
Grid Ref: 651694, 305379

Map Name: County Series

Map date: 1906

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1883  
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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_1\_  
Grid Ref: 651694, 305379

Map Name: National Grid

Map date: 1951-1955

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1955  
Revised 1955  
Edition 1957  
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Levelled 1946

Surveyed N/A  
Revised N/A  
Edition N/A  
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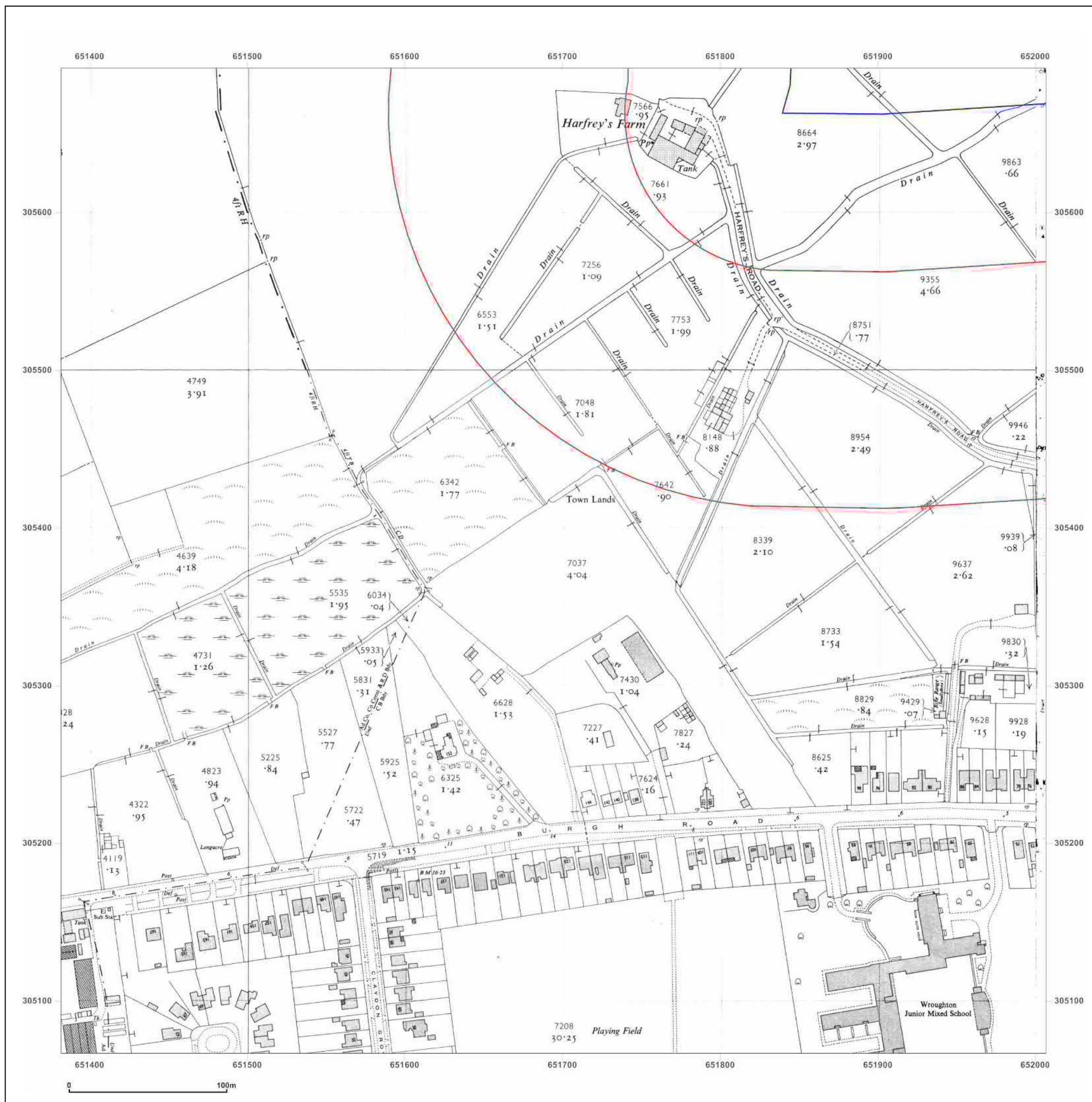


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**Site Details:**

**Client Ref:** 16287  
**Report Ref:** CMAPS-CM-636391-16287-030717HIS\_LS\_1\_  
**Grid Ref:** 651694, 305379

**Map Name:** National Grid

**Map date:** 1964-1968

**Scale:** 1:2,500

**Printed at:** 1:2,500



Surveyed 1964  
Revised 1964  
Edition 1965  
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Levelled 1958

Surveyed 1968  
Revised 1968  
Edition N/A  
Copyright 1969  
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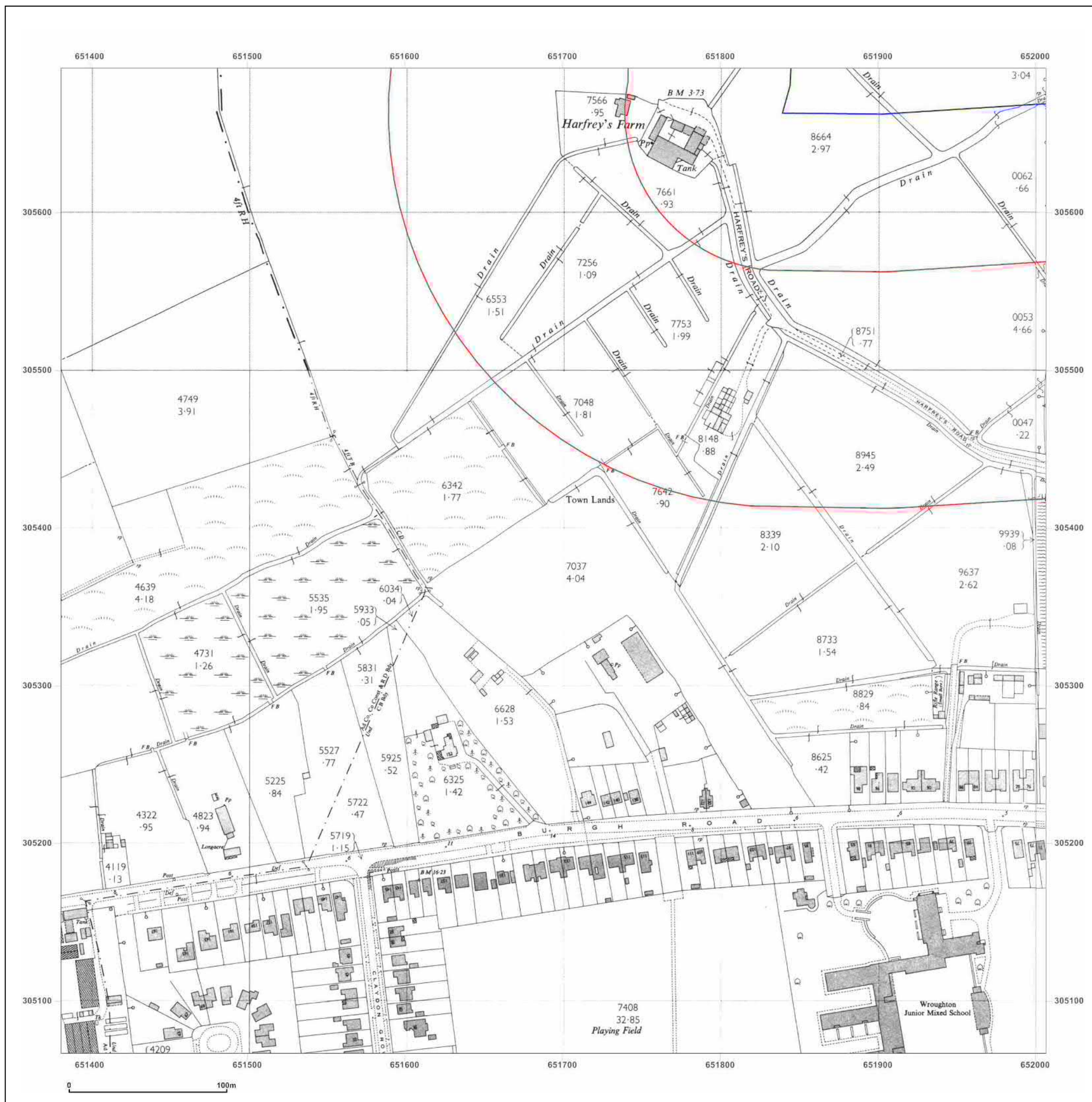


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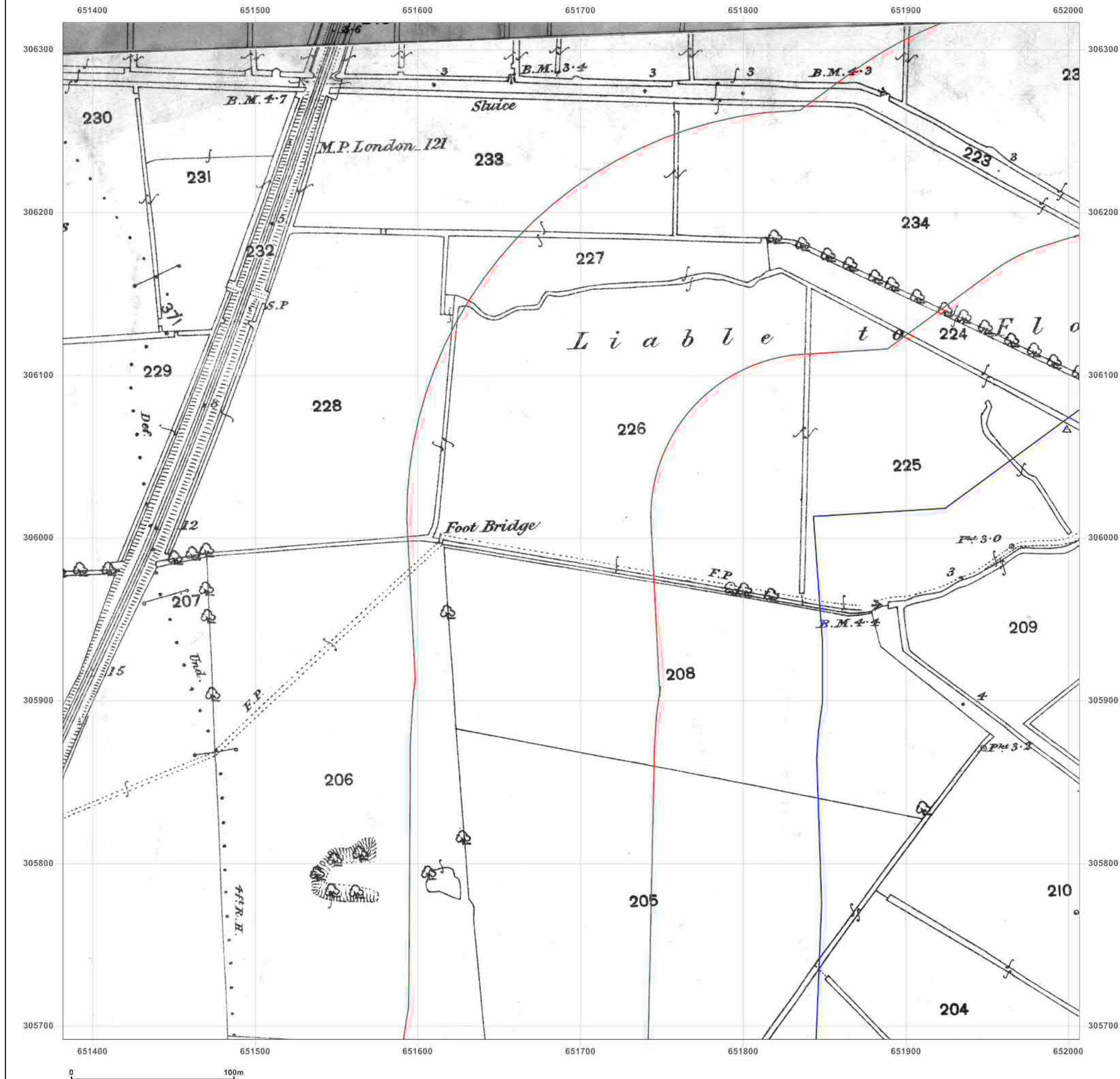
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Production date: 03 July 2017

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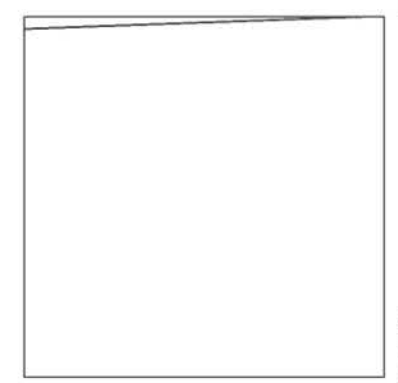
Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_1\_2  
Grid Ref: 651694, 306004

Map Name: County Series  
Map date: 1883  
Scale: 1:2,500  
Printed at: 1:2,500



Surveyed N/A  
Revised N/A  
Edition N/A  
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Levelled N/A



Surveyed 1883  
Revised 1883  
Edition N/A  
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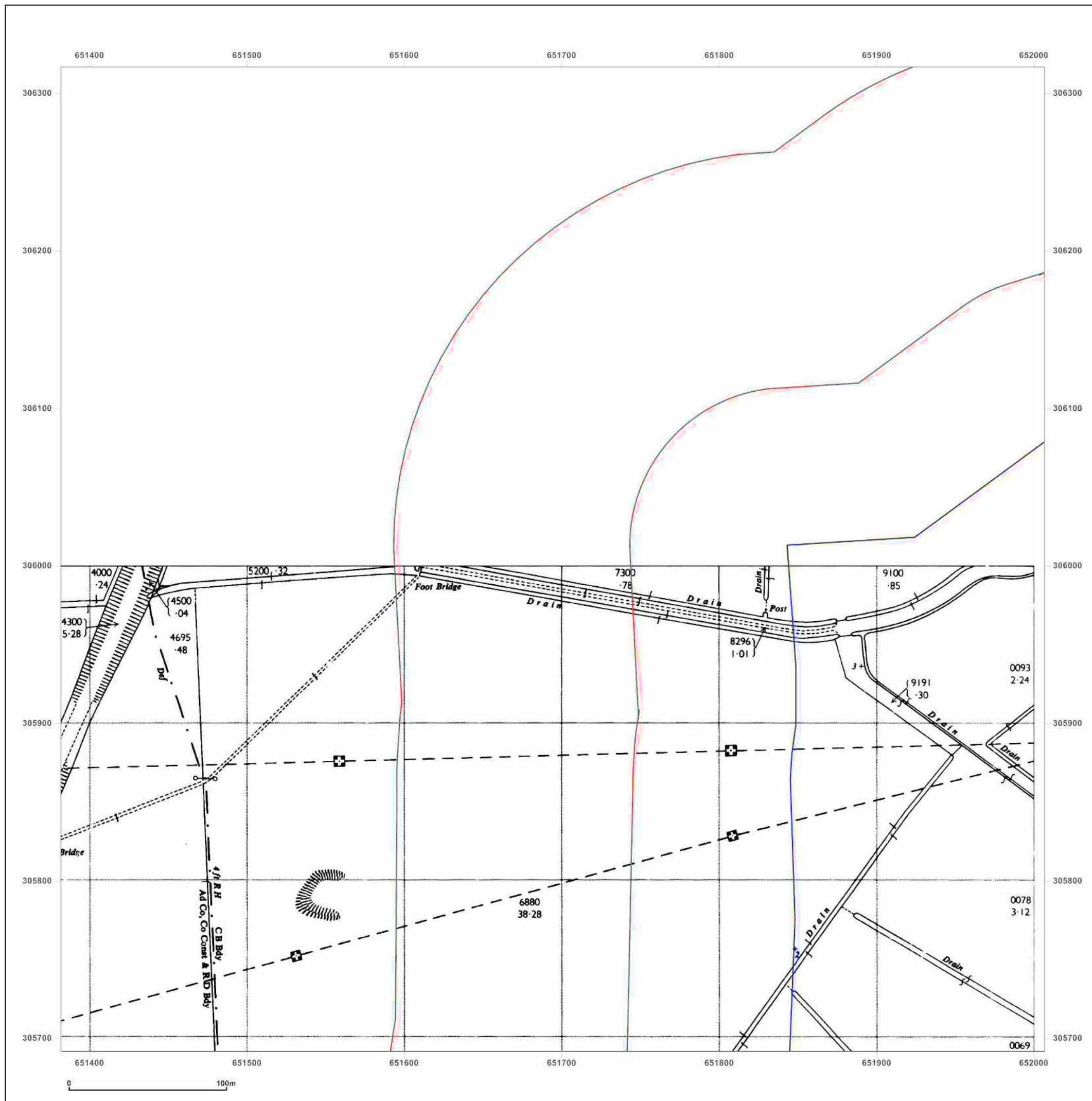
To view map legend click here [Legend](#)







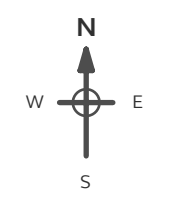




**Site Details:**

Client Ref: 16287  
 Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_1\_2  
 Grid Ref: 651694, 306004

Map Name: National Grid  
 Map date: 1965  
 Scale: 1:2,500  
 Printed at: 1:2,500



Surveyed N/A  
 Revised N/A  
 Edition N/A  
 Copyright N/A  
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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_1\_2  
Grid Ref: 651694, 306004

Map Name: National Grid

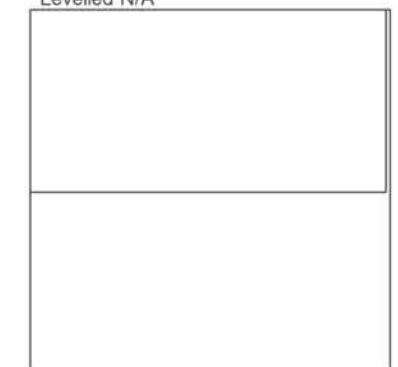
Map date: 1978

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1978  
Revised 1978  
Edition N/A  
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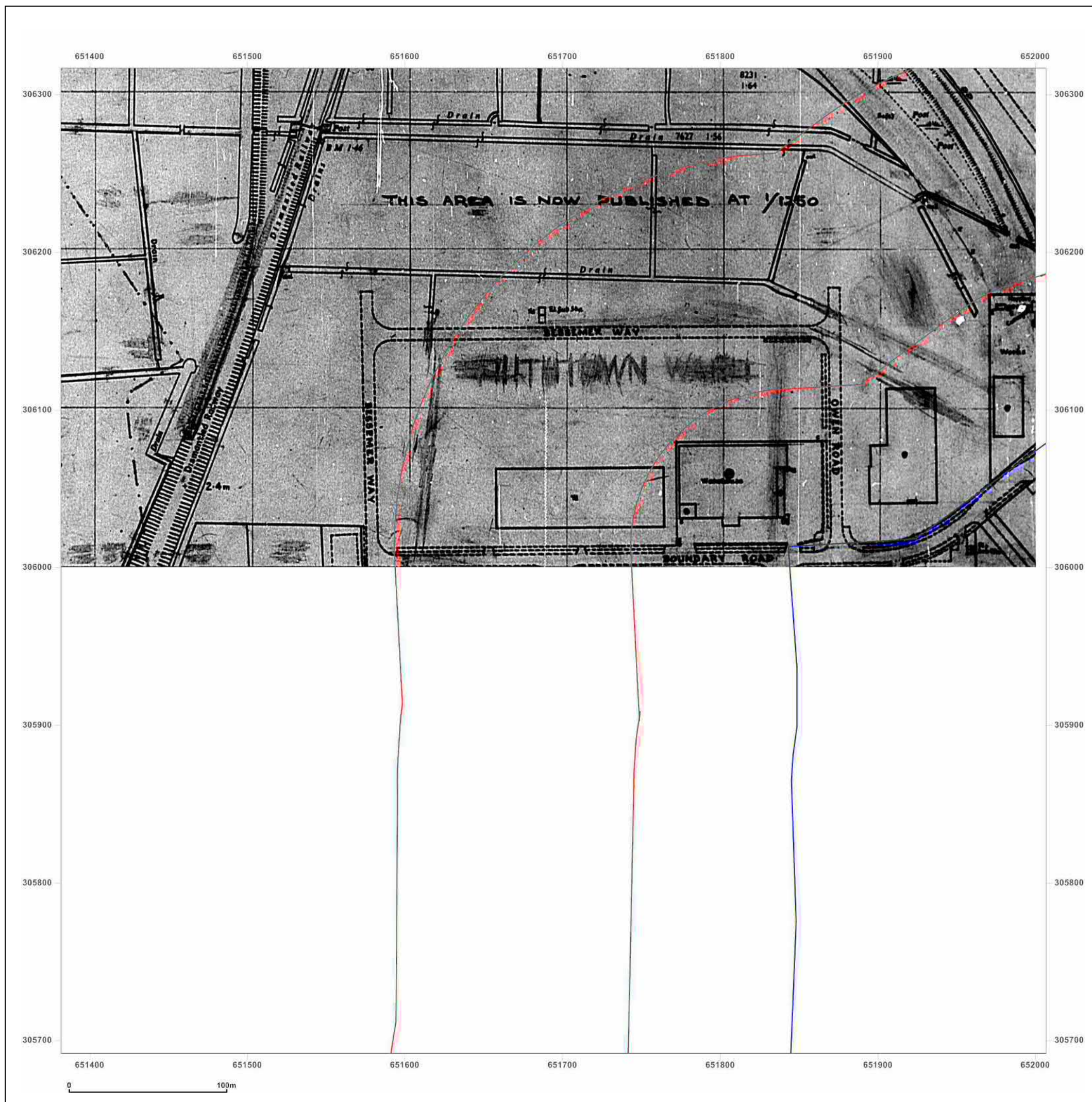


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_1\_3  
Grid Ref: 651694, 306630

Map Name: County Series

Map date: 1883

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A  
Revised N/A  
Edition N/A  
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Levelled N/A

Surveyed 1883  
Revised 1883  
Edition N/A  
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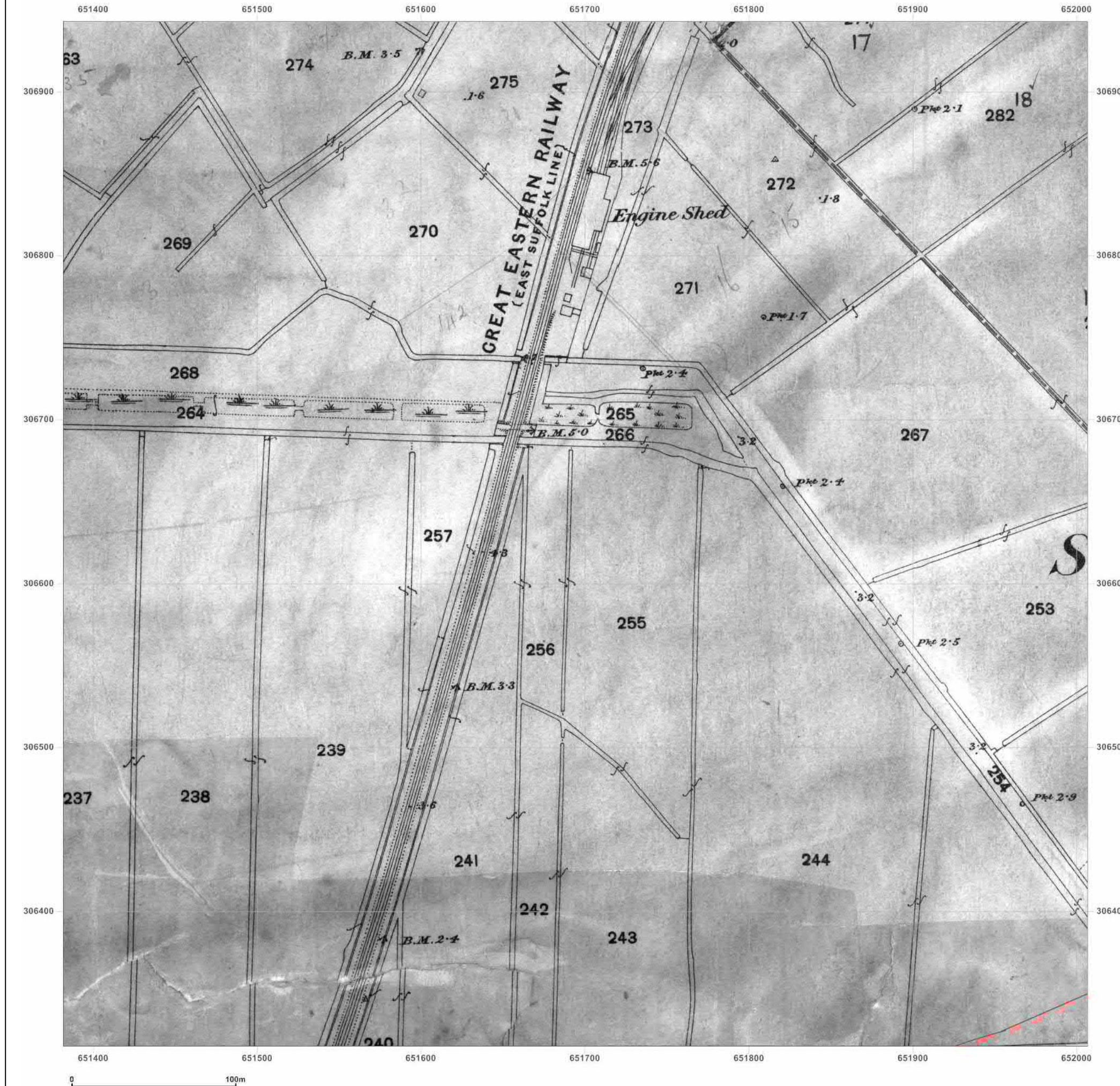


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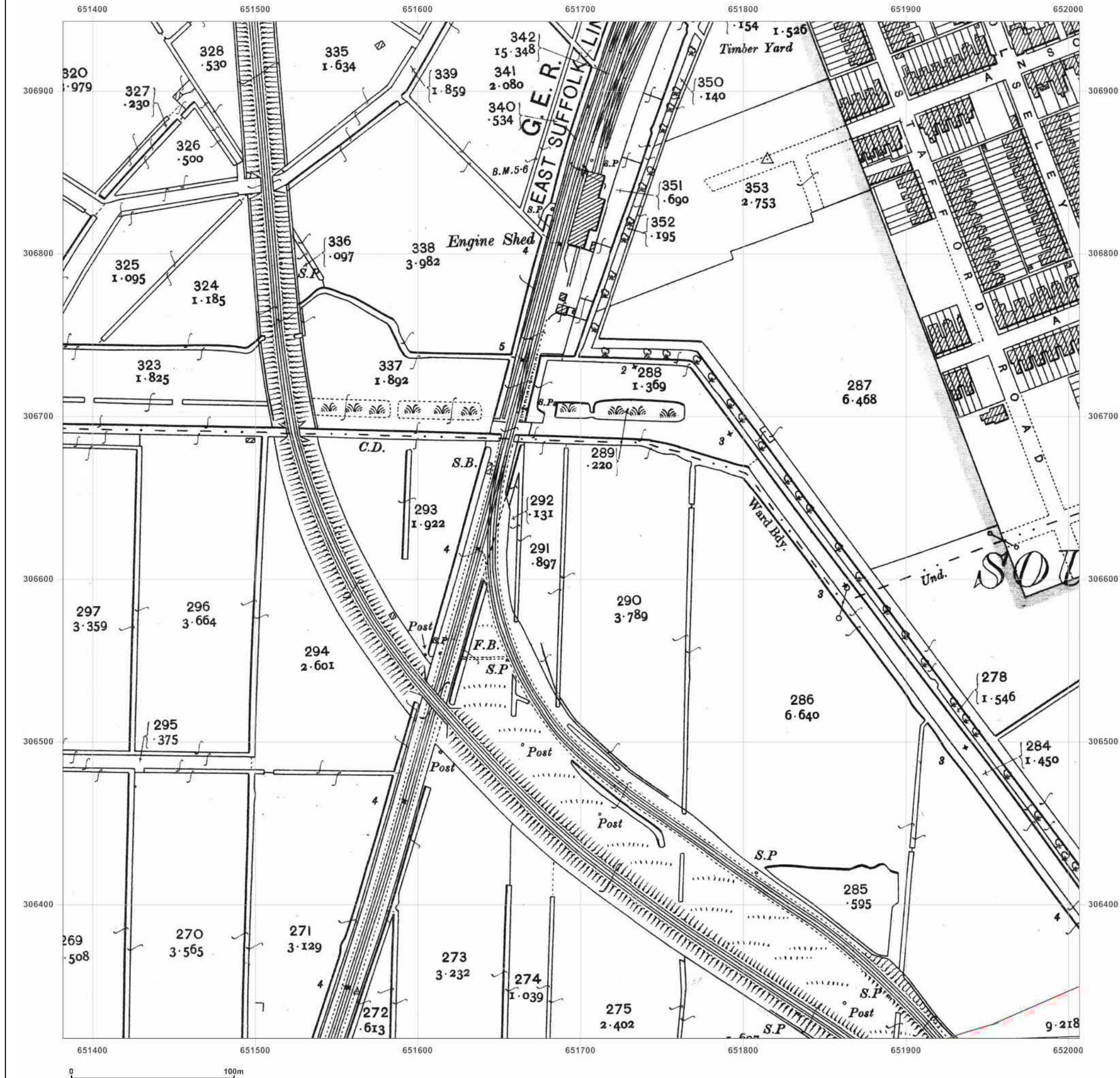
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Production date: 03 July 2017

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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_1\_3  
Grid Ref: 651694, 306630

Map Name: County Series

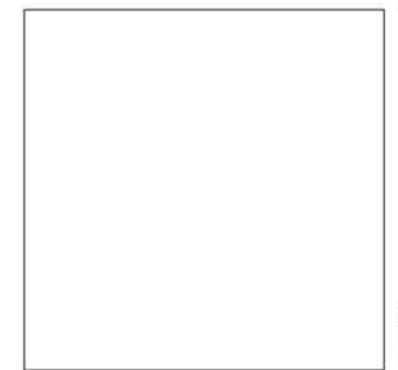
Map date: 1905-1906

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1905  
Revised 1905  
Edition N/A  
Copyright N/A  
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Surveyed 1883  
Revised 1904  
Edition 1906  
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**Site Details:**

**Client Ref:** 16287  
**Report Ref:** CMAPS-CM-636391-16287-030717HIS\_LS\_1\_3  
**Grid Ref:** 651694, 306630

**Map Name:** National Grid

**Map date:** 1962-1963

**Scale:** 1:2,500

**Printed at:** 1:2,500



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Revised 1962  
Edition 1964  
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Surveyed 1963  
Revised 1963  
Edition 1965  
Copyright 1965  
Levelled 1958



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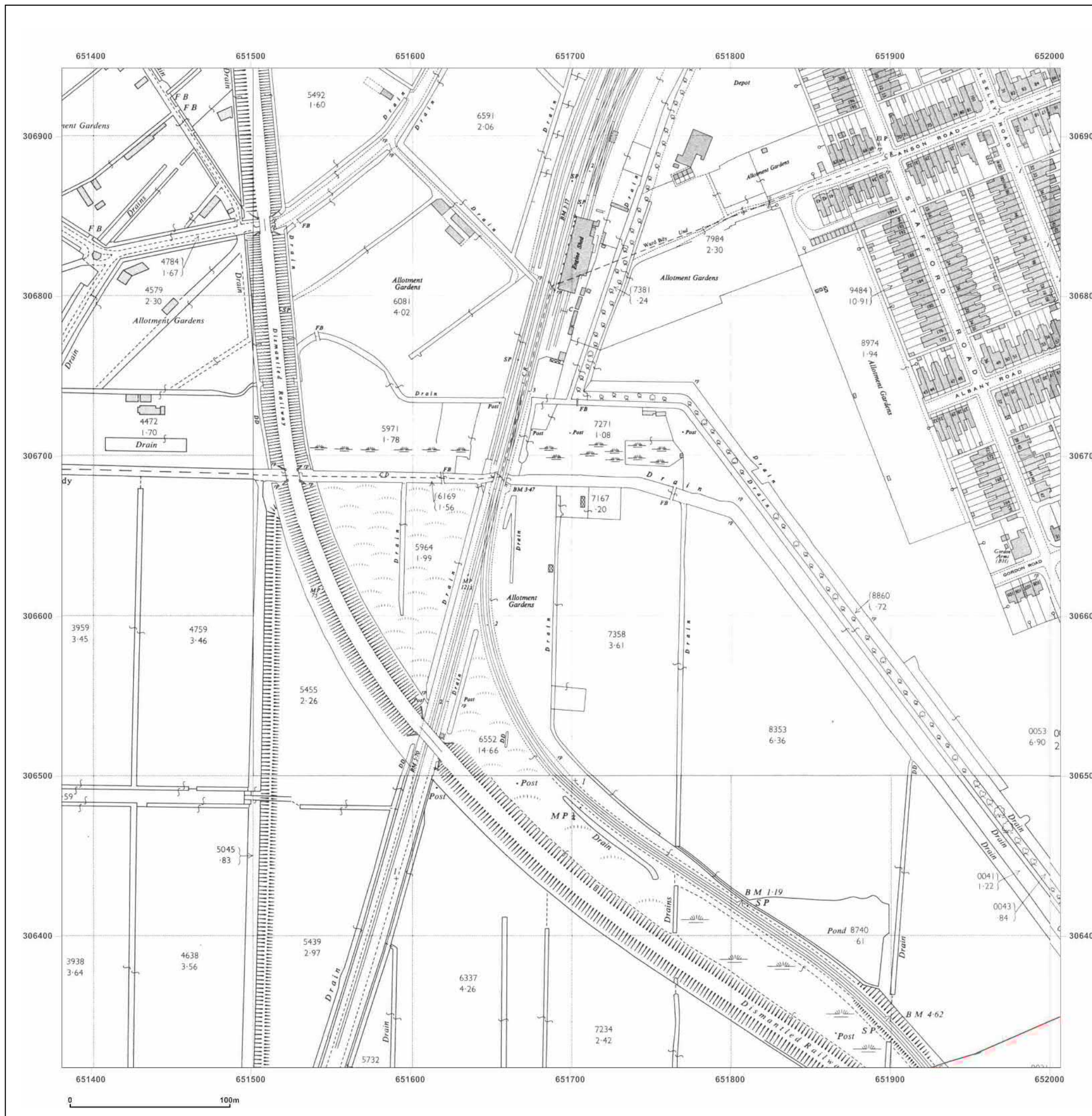


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_1\_3  
Grid Ref: 651694, 306630

Map Name: National Grid

Map date: 1978

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1978  
Revised 1978  
Edition N/A  
Copyright 1978  
Levelled N/A



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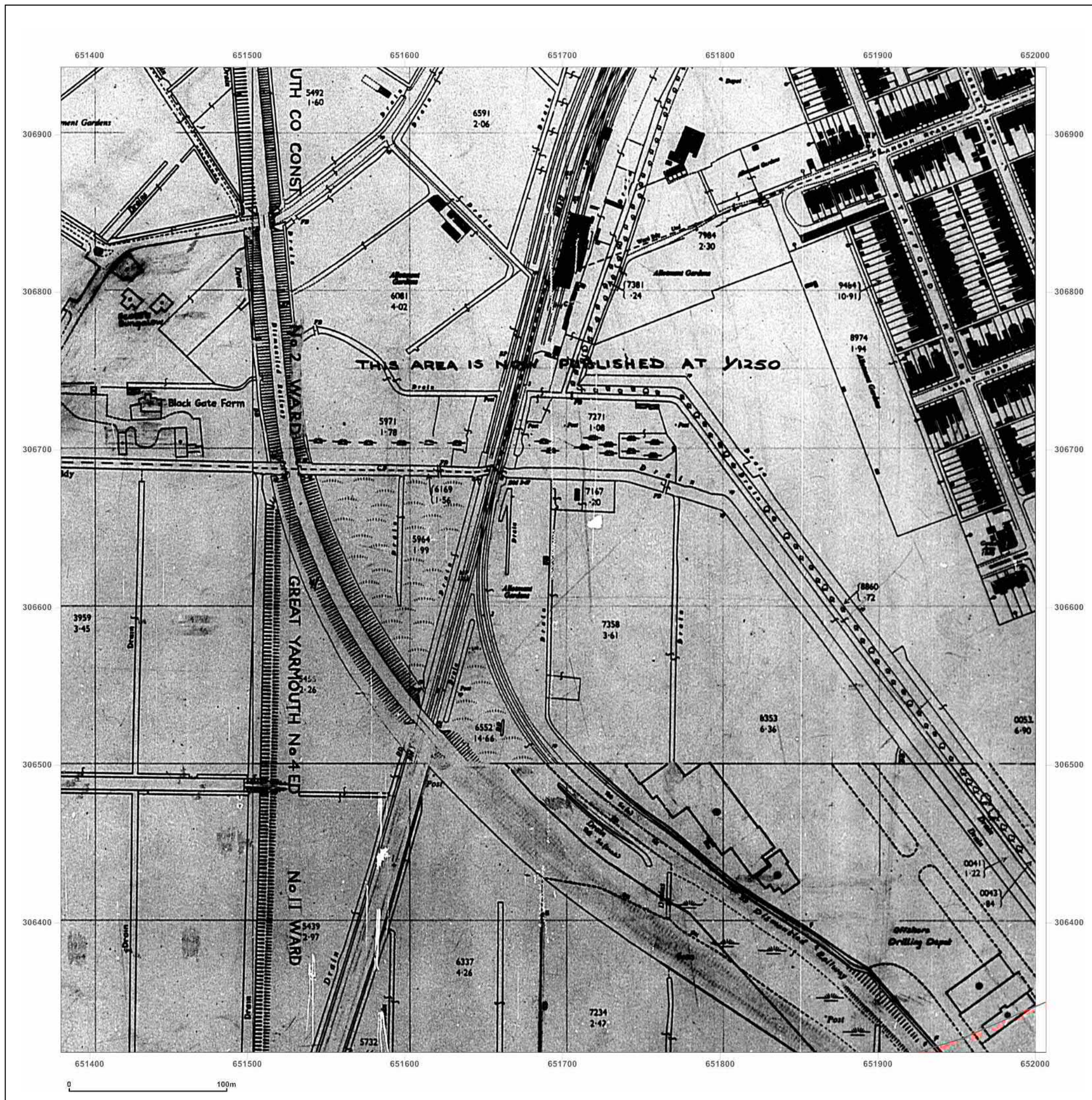


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_2\_1  
Grid Ref: 652319, 305379

Map Name: National Grid

Map date: 1949

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1949  
Revised 1949  
Edition N/A  
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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_2\_1  
Grid Ref: 652319, 305379

Map Name: National Grid

Map date: 1958

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1958  
Revised 1958  
Edition 1960  
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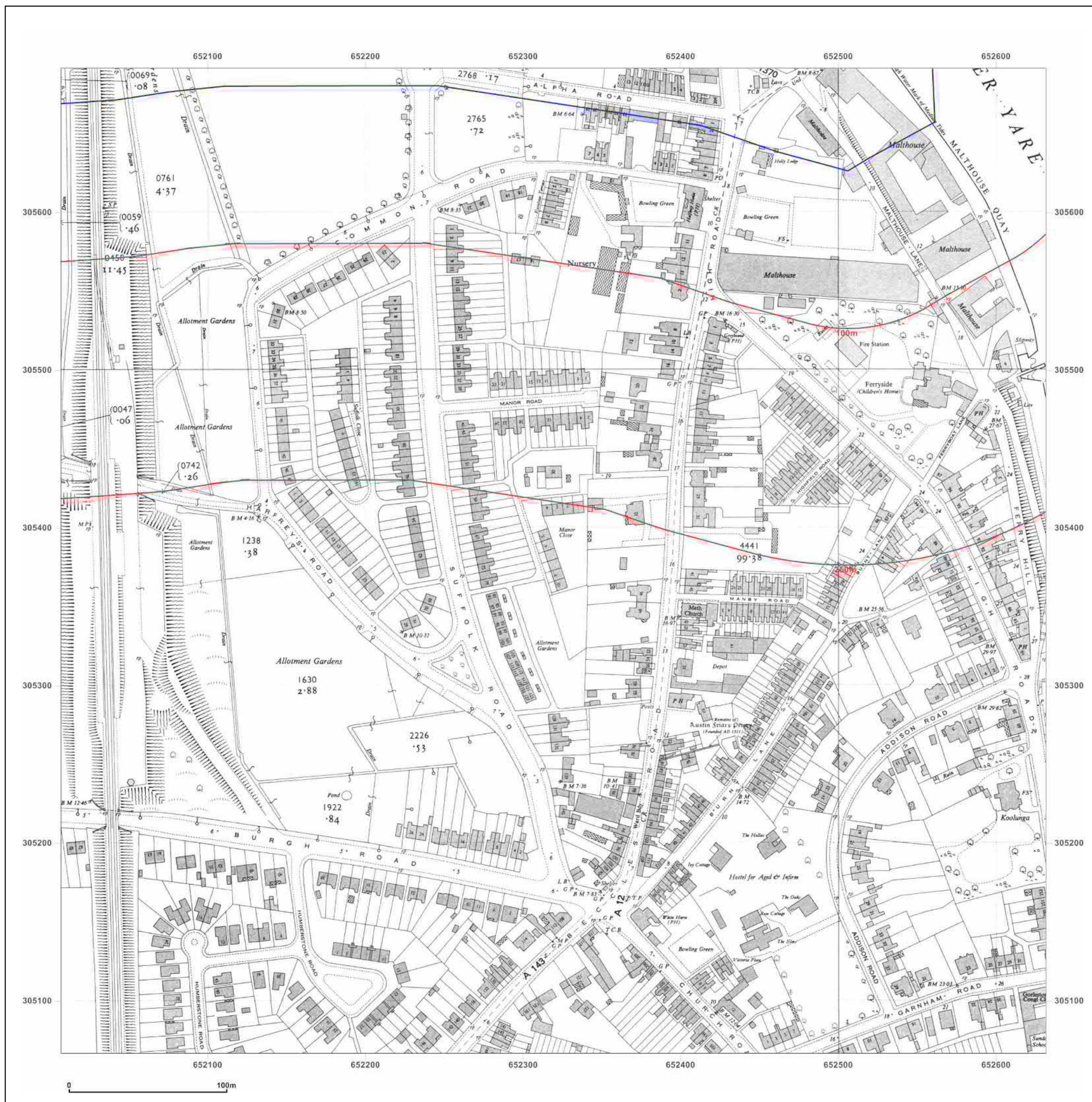


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_2\_2  
Grid Ref: 652319, 306004

Map Name: County Series

Map date: 1883

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1883  
Revised 1883  
Edition N/A  
Copyright N/A  
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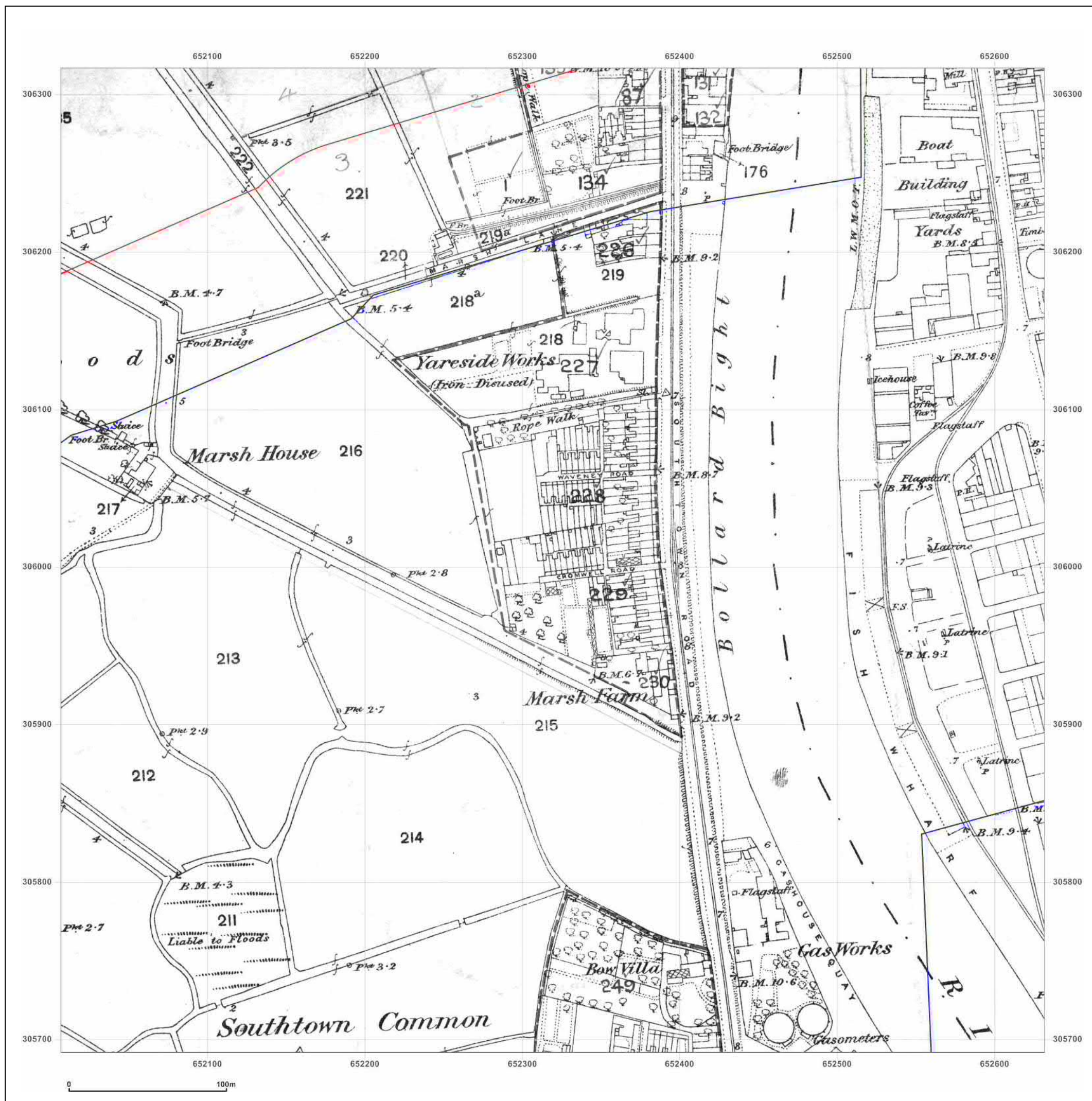


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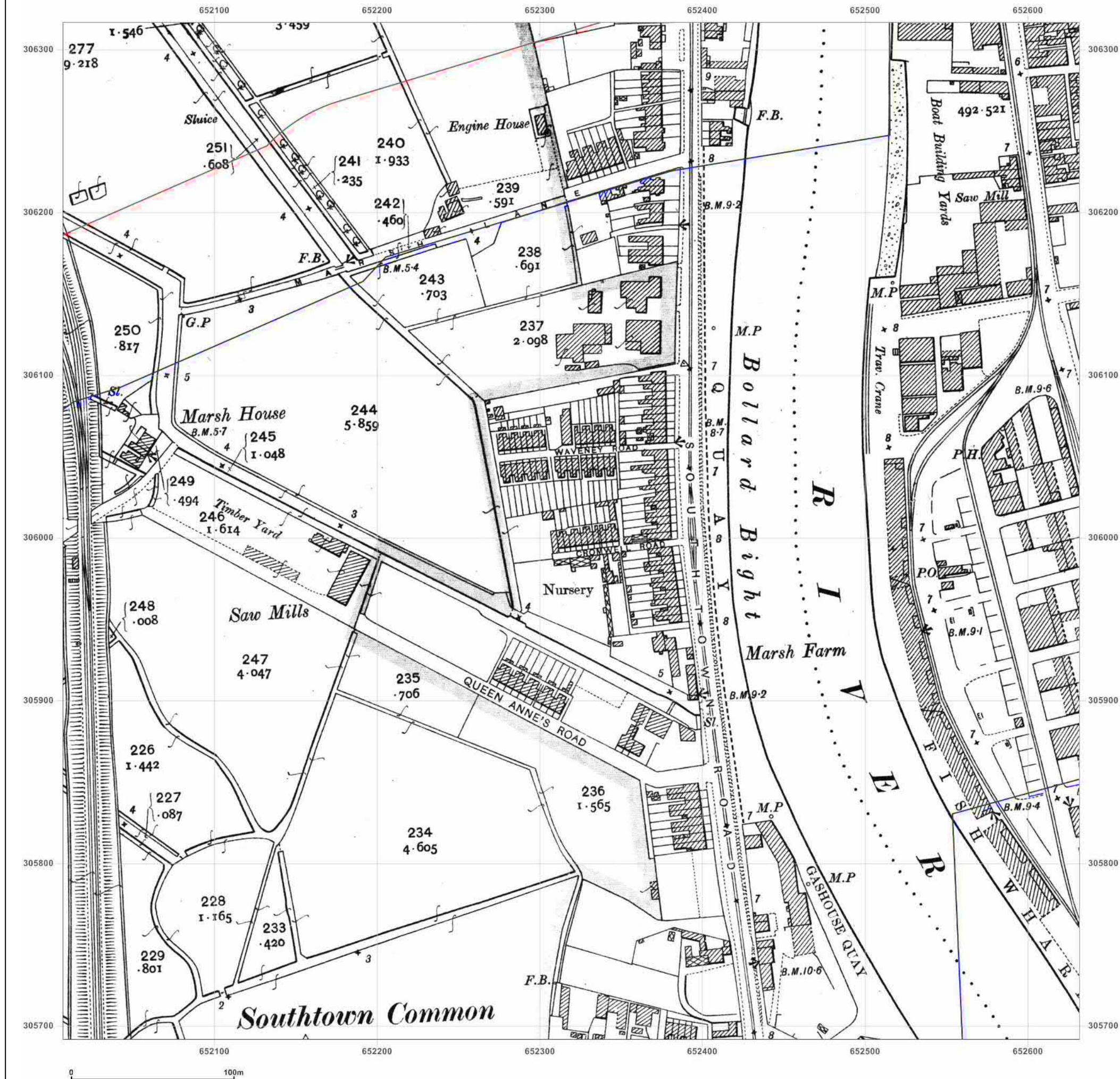
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Production date: 03 July 2017

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**Site Details:**

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_2\_2  
Grid Ref: 652319, 306004

Map Name: County Series  
Map date: 1906  
Scale: 1:2,500  
Printed at: 1:2,500



Surveyed 1883  
Revised 1904  
Edition 1906  
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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_2\_2  
Grid Ref: 652319, 306004

Map Name: National Grid

Map date: 1949

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1949  
Revised 1949  
Edition N/A  
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Surveyed 1949  
Revised 1949  
Edition N/A  
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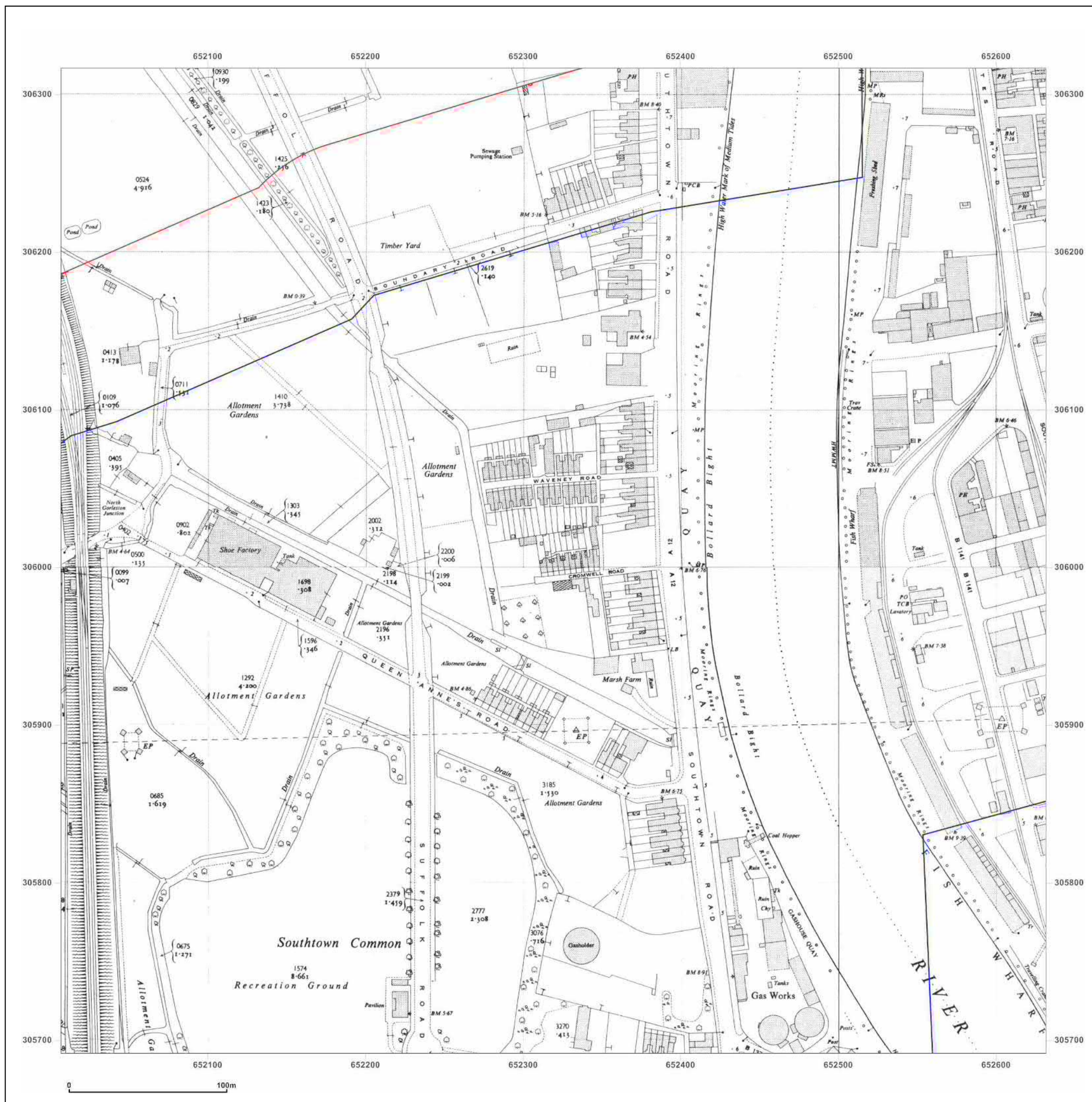


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Site Details:

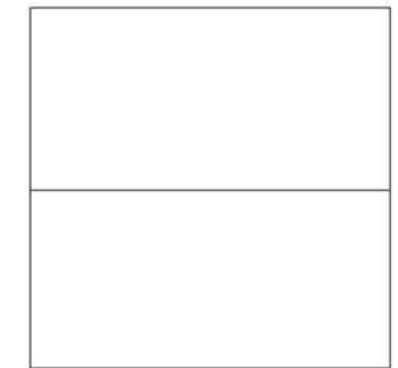
Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_2\_2  
Grid Ref: 652319, 306004

Map Name: National Grid

Map date: 1958

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1958  
Revised 1958  
Edition 1960  
Copyright 1960  
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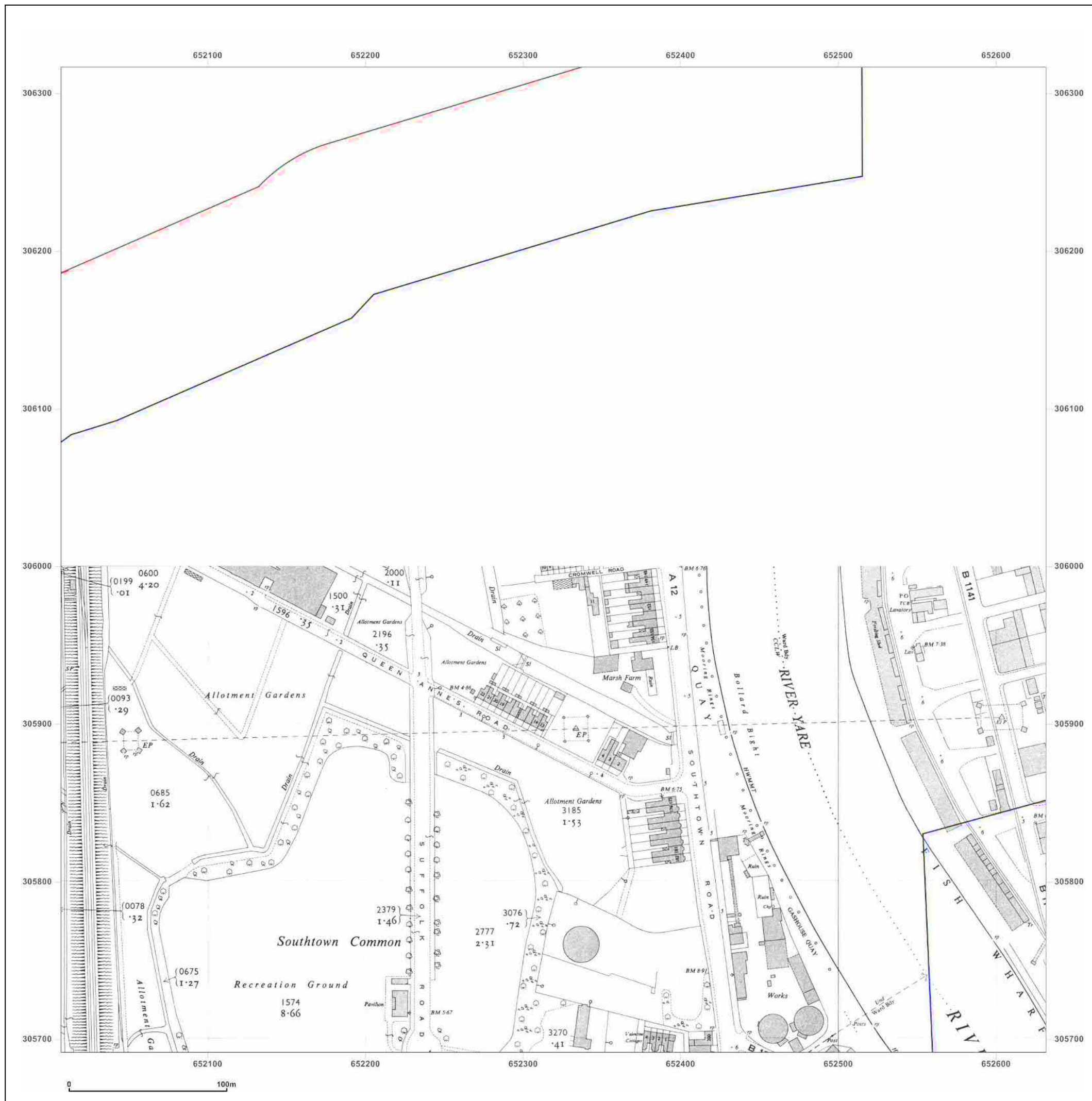


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_2\_2  
Grid Ref: 652319, 306004

Map Name: National Grid

Map date: 1963-1968

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1963  
Revised 1963  
Edition 1965  
Copyright 1965  
Levelled 1958

Surveyed 1968  
Revised 1968  
Edition N/A  
Copyright 1969  
Levelled 1958



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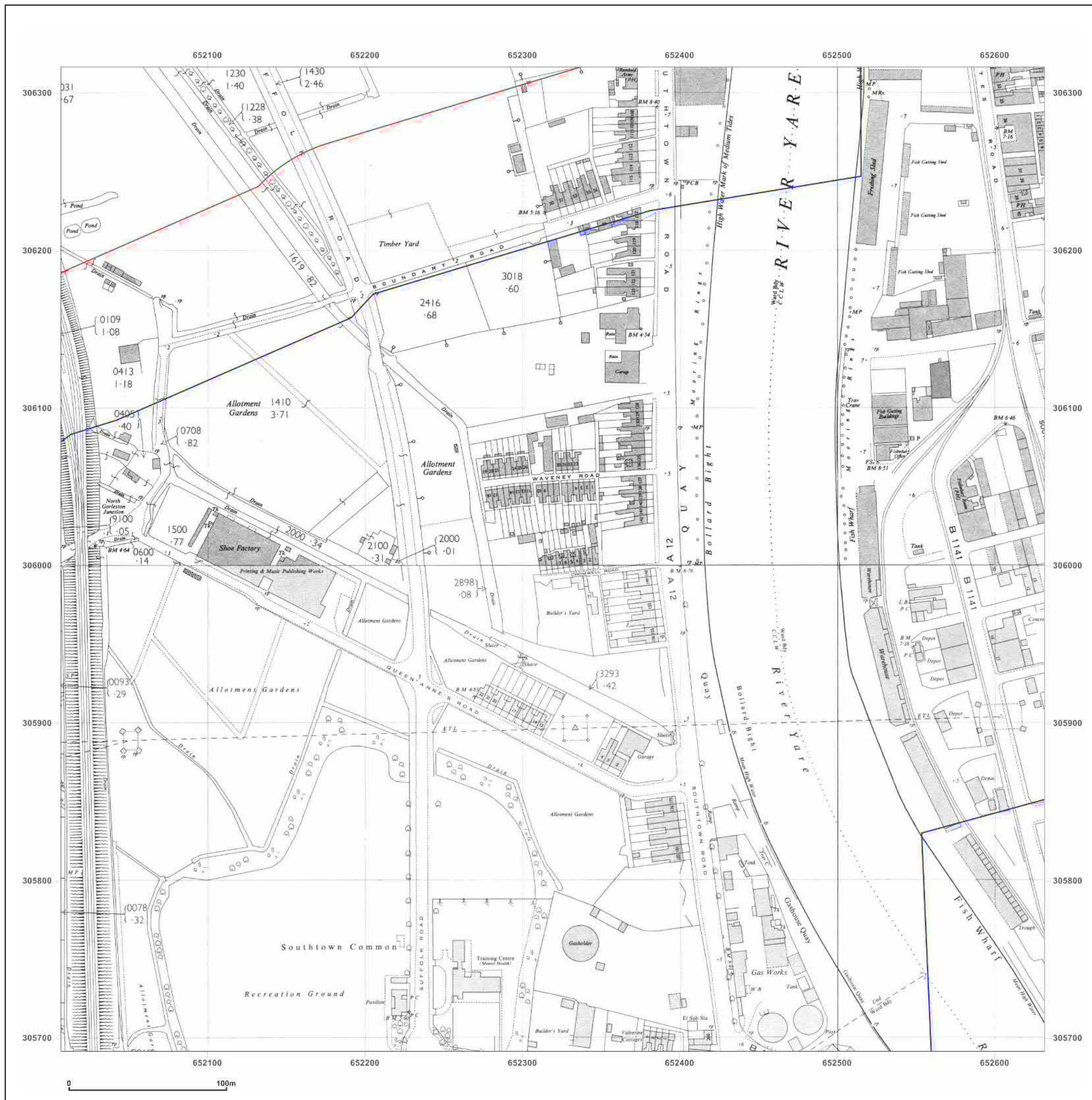


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_2\_3  
Grid Ref: 652319, 306630

Map Name: County Series

Map date: 1883

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A  
Revised N/A  
Edition N/A  
Copyright N/A  
Levelled N/A



Surveyed 1883  
Revised 1883  
Edition N/A  
Copyright N/A  
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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_2\_3  
Grid Ref: 652319, 306630

Map Name: County Series

Map date: 1905-1906

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1905  
Revised 1905  
Edition N/A  
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Surveyed 1883  
Revised 1904  
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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_2\_3  
Grid Ref: 652319, 306630

Map Name: National Grid

Map date: 1949

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1949  
Revised 1949  
Edition N/A  
Copyright N/A  
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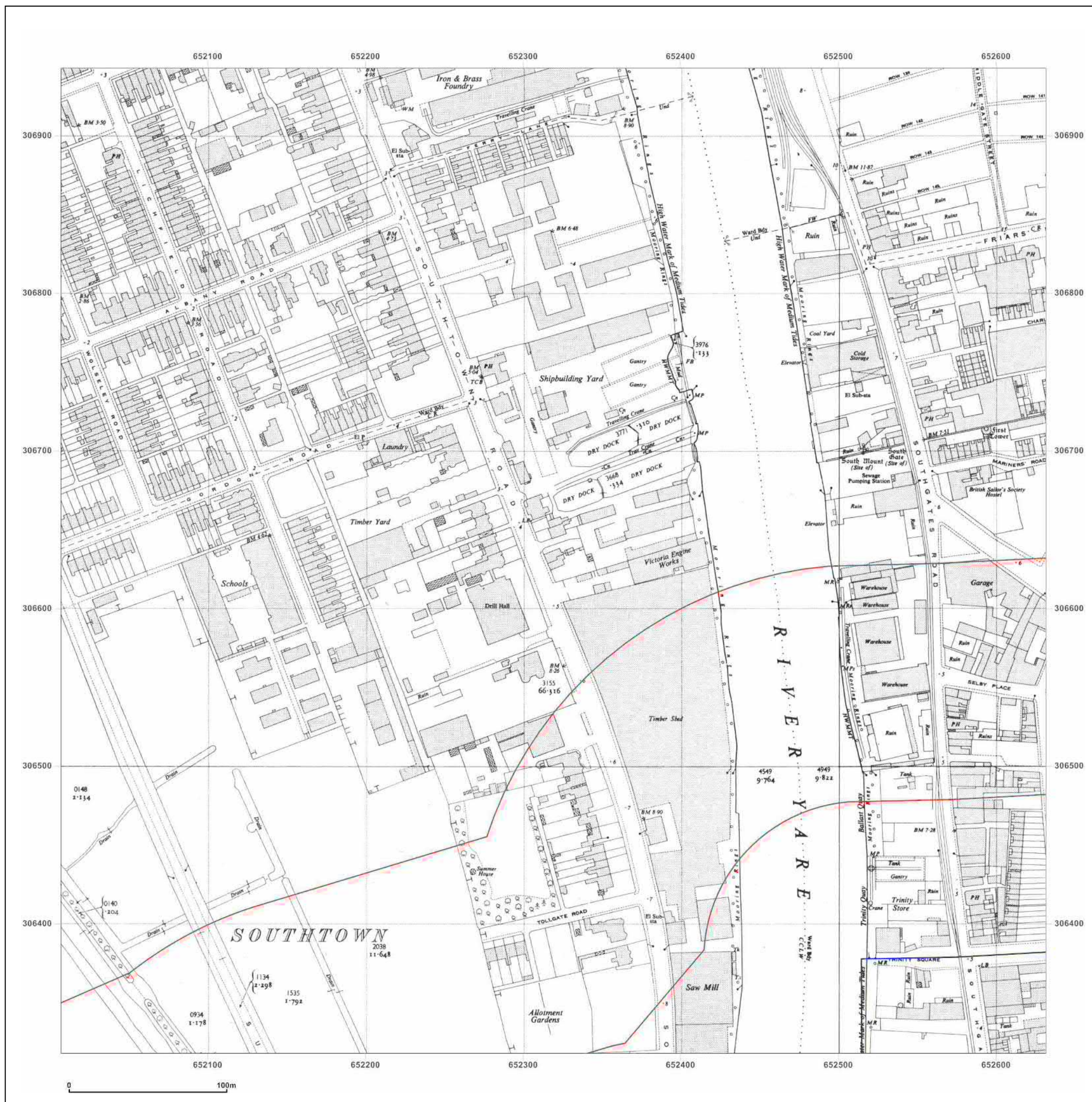


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 305504

Map Name: County Series Town Plan

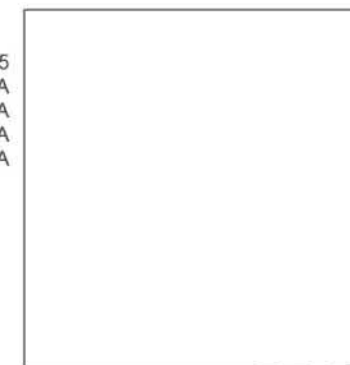
Map date: 1884-1885

Scale: 1:500

Printed at: 1:1,000



Surveyed 1885  
Revised N/A  
Edition N/A  
Copyright N/A  
Levelled N/A



Surveyed 1885  
Revised N/A  
Edition N/A  
Copyright N/A  
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Surveyed 1884  
Revised N/A  
Edition N/A  
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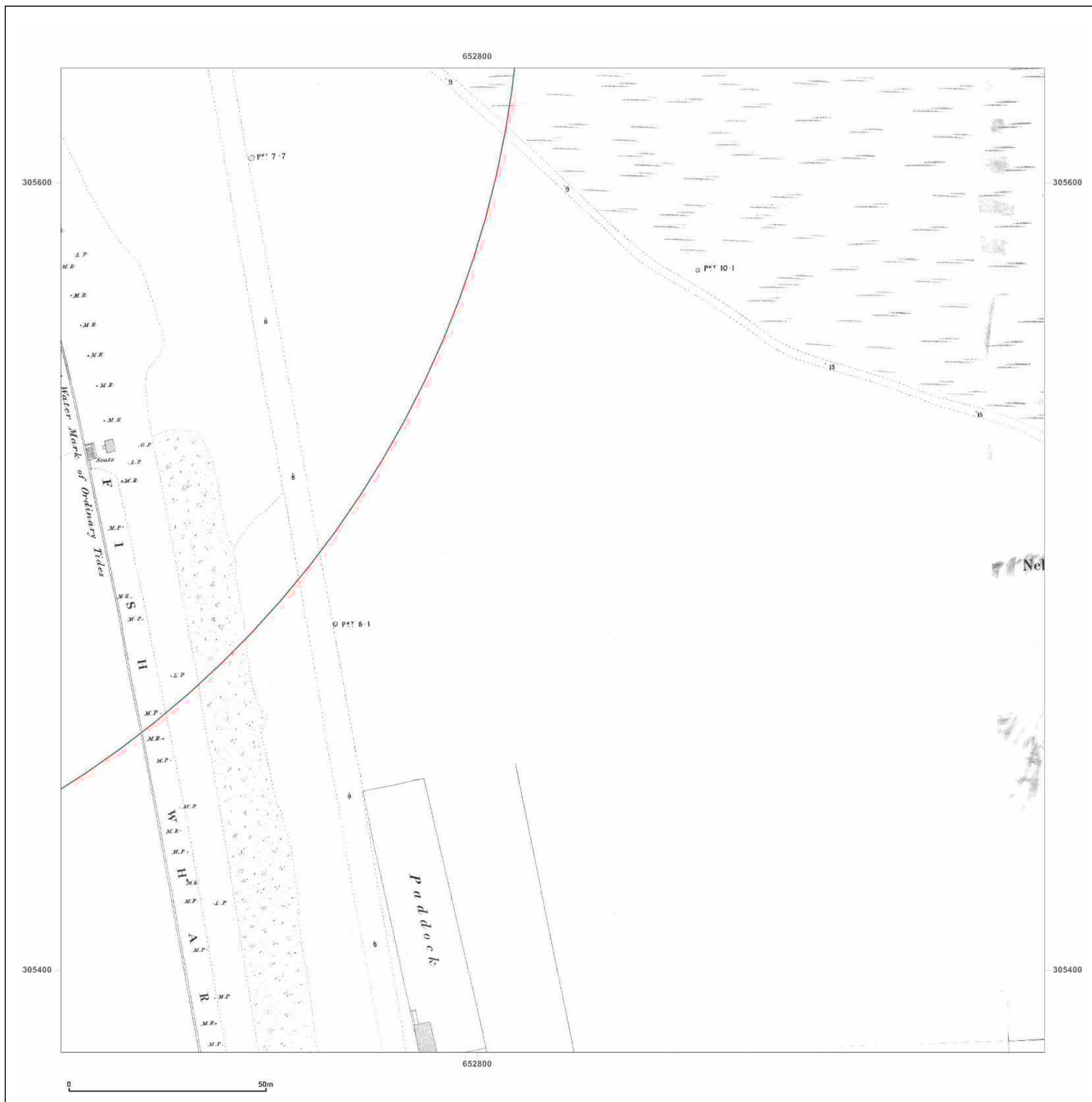


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 305504

Map Name: National Grid

Map date: 1957-1958

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1949  
Revised 1957  
Edition N/A  
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Surveyed 1949  
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Edition N/A  
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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 305504

Map Name: National Grid

Map date: 1964-1968

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1949  
Revised 1967  
Edition N/A  
Copyright 1968  
Levelled 1958

Surveyed 1949  
Revised 1963  
Edition N/A  
Copyright 1964  
Levelled 1958

Surveyed 1949  
Revised 1966  
Edition N/A  
Copyright 1967  
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Surveyed 1967  
Revised 1967  
Edition N/A  
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Site Details:

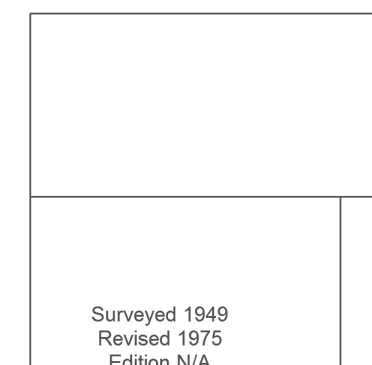
Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 305504

Map Name: National Grid

Map date: 1975-1976

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1949  
Revised 1975  
Edition N/A  
Copyright N/A  
Levelled 1946



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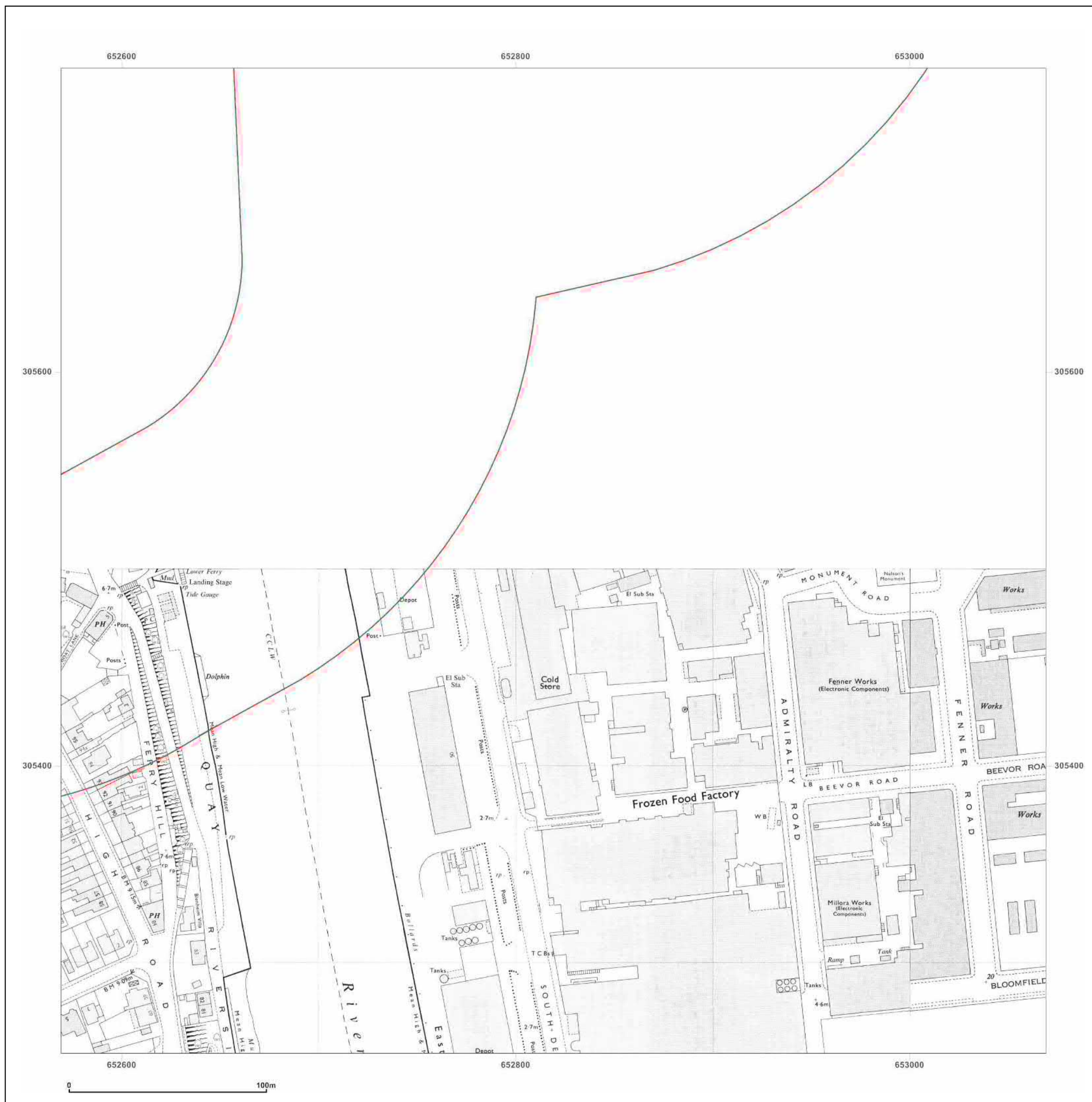


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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 305504

Map Name: National Grid

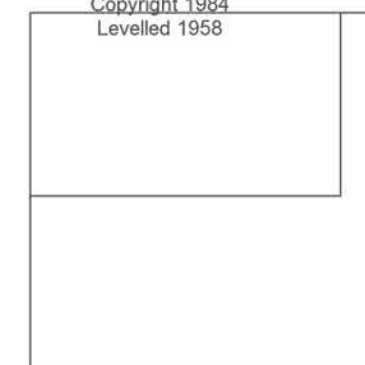
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Report Ref: CMAPS-CM-636391-16287-030717HIS\_1250scale  
Grid Ref: 652819, 305504

Map Name: National Grid

Map date: 1994

Scale: 1:1,250

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Site Details:

Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_3\_2  
Grid Ref: 652945, 306004

Map Name: County Series

Map date: 1883

Scale: 1:2,500

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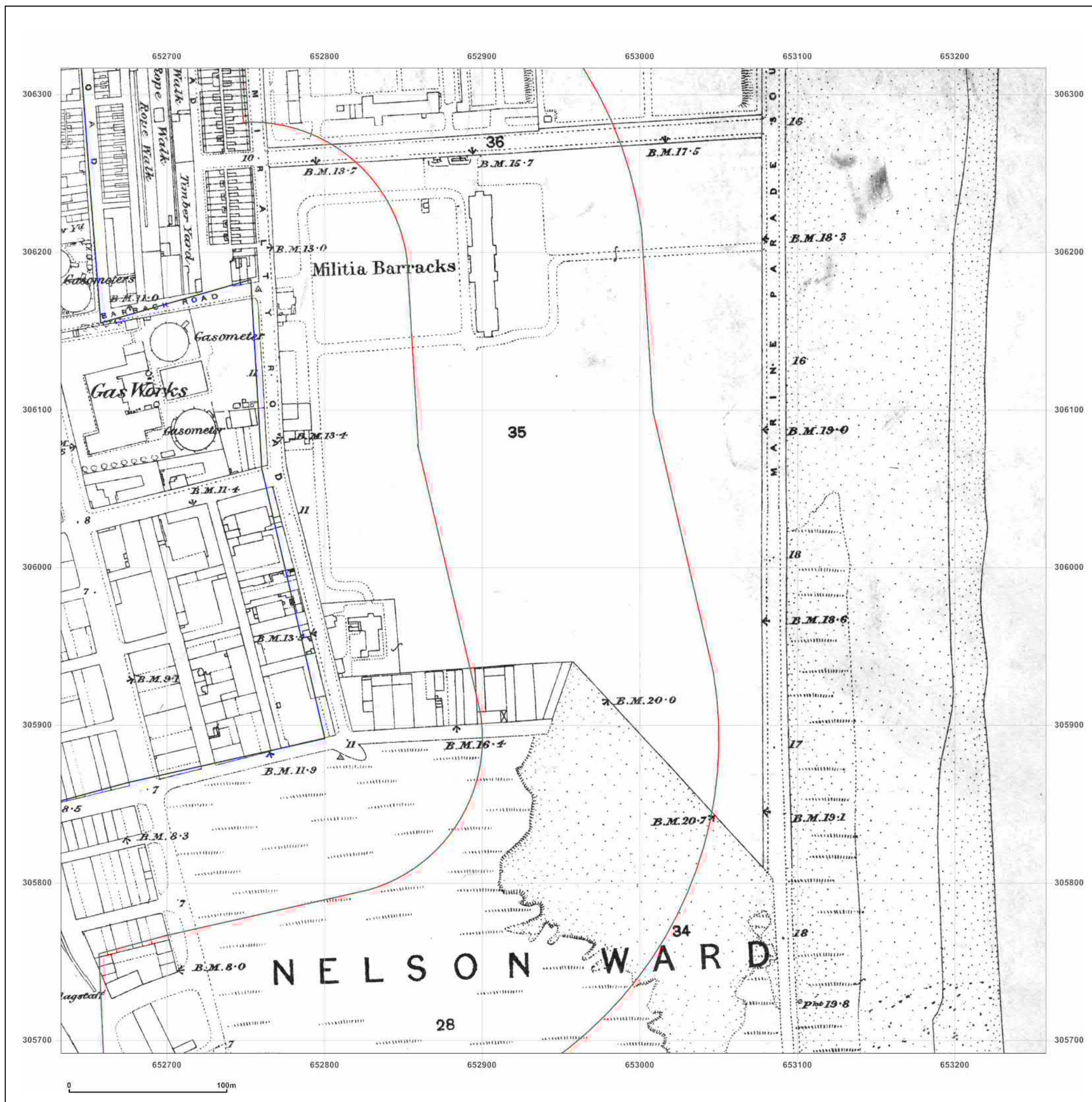


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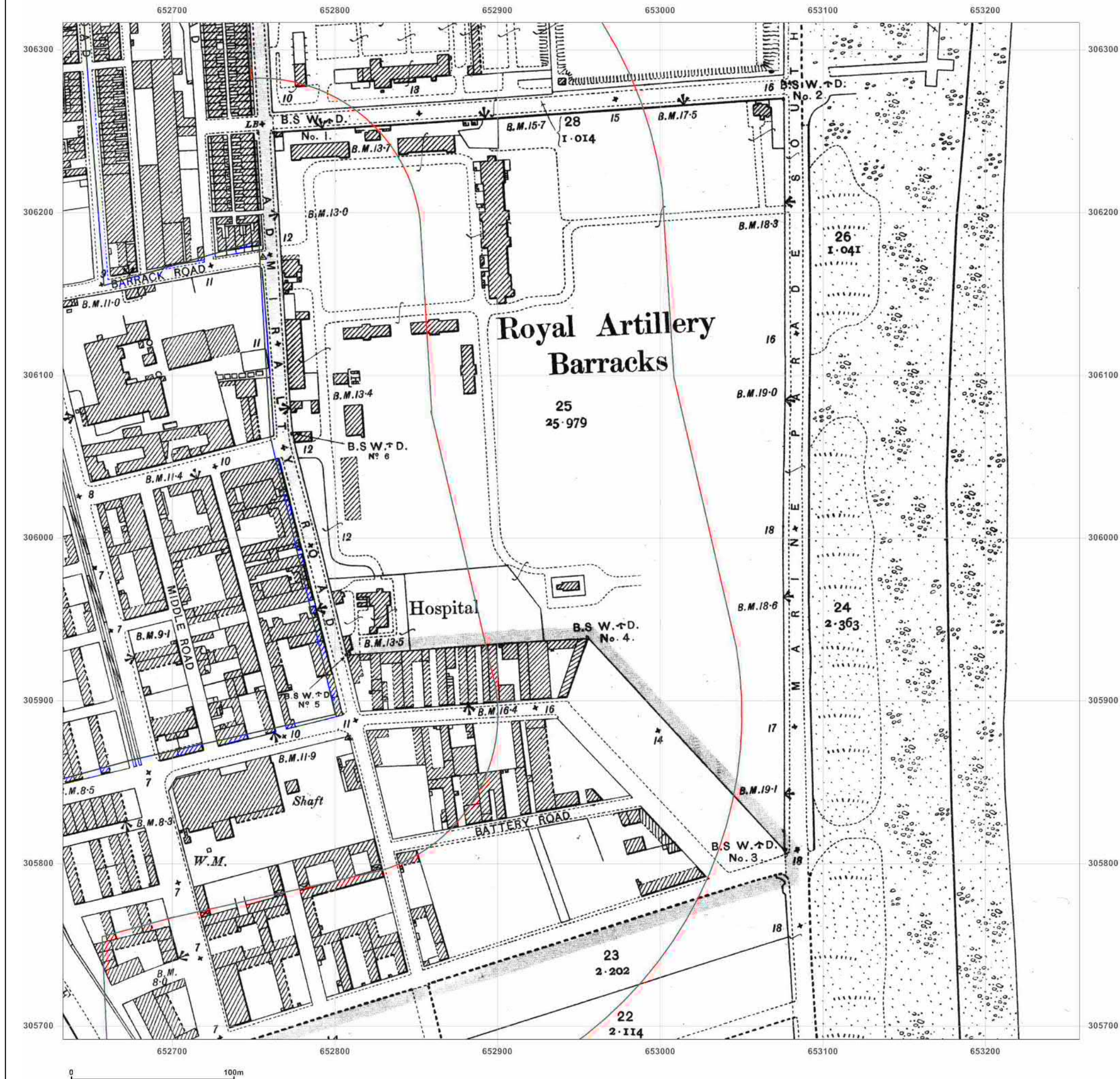
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Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_3\_2  
Grid Ref: 652945, 306004

Map Name: County Series

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Grid Ref: 652945, 306004

Map Name: National Grid

Map date: 1949

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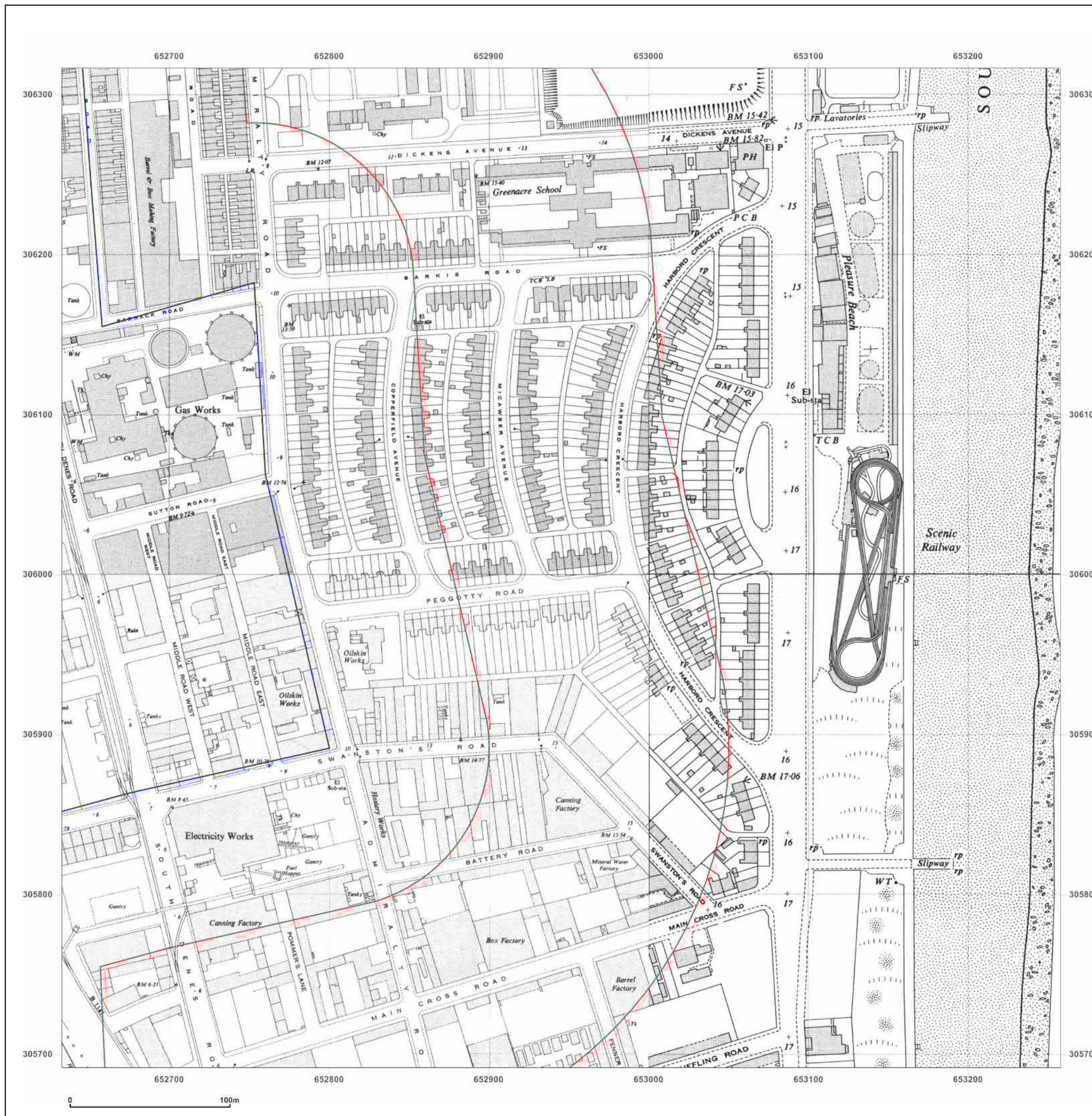


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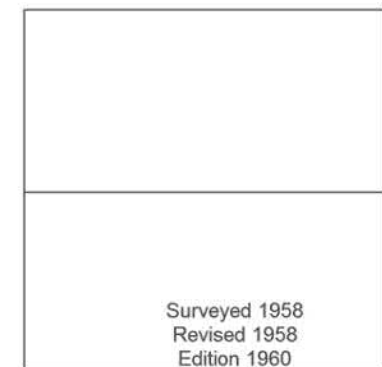
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**Grid Ref:** 652945, 306004

**Map Name:** National Grid

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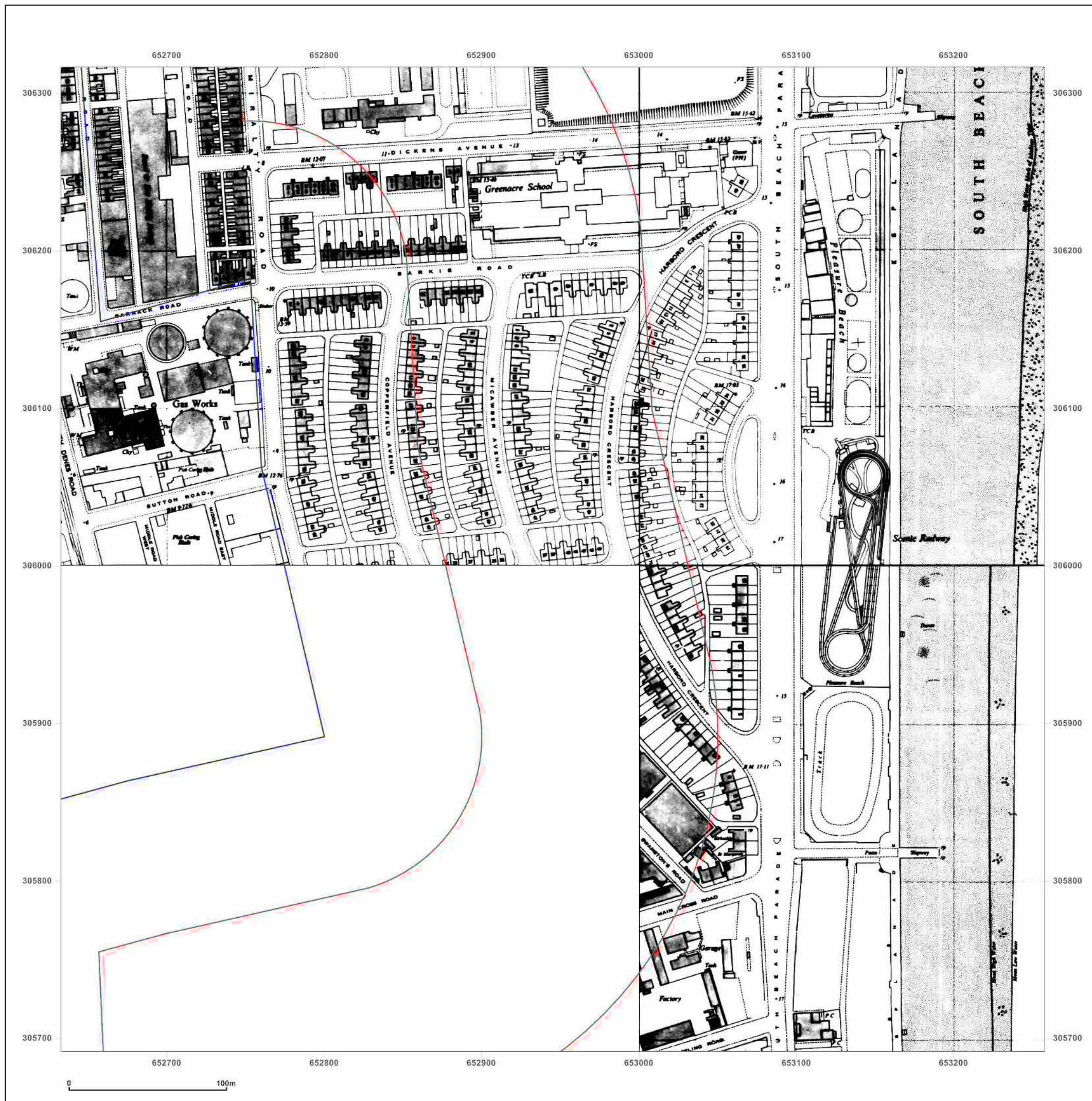
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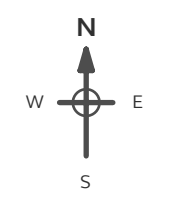




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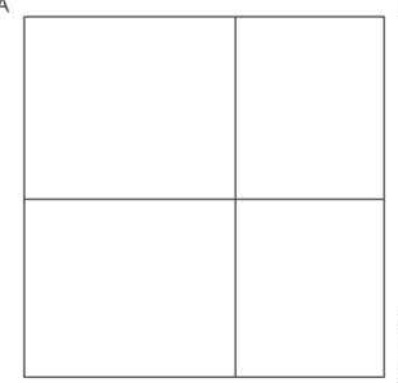
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 Grid Ref: 652945, 306004

Map Name: National Grid  
 Map date: 1965-1969  
 Scale: 1:2,500  
 Printed at: 1:2,500



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Client Ref: 16287  
Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_3\_3  
Grid Ref: 652945, 306630

Map Name: County Series

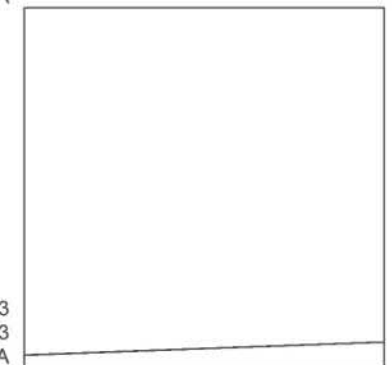
Map date: 1883

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Report Ref: CMAPS-CM-636391-16287-030717HIS\_LS\_3\_3  
Grid Ref: 652945, 306630

Map Name: County Series

Map date: 1905-1906

Scale: 1:2,500

Printed at: 1:2,500



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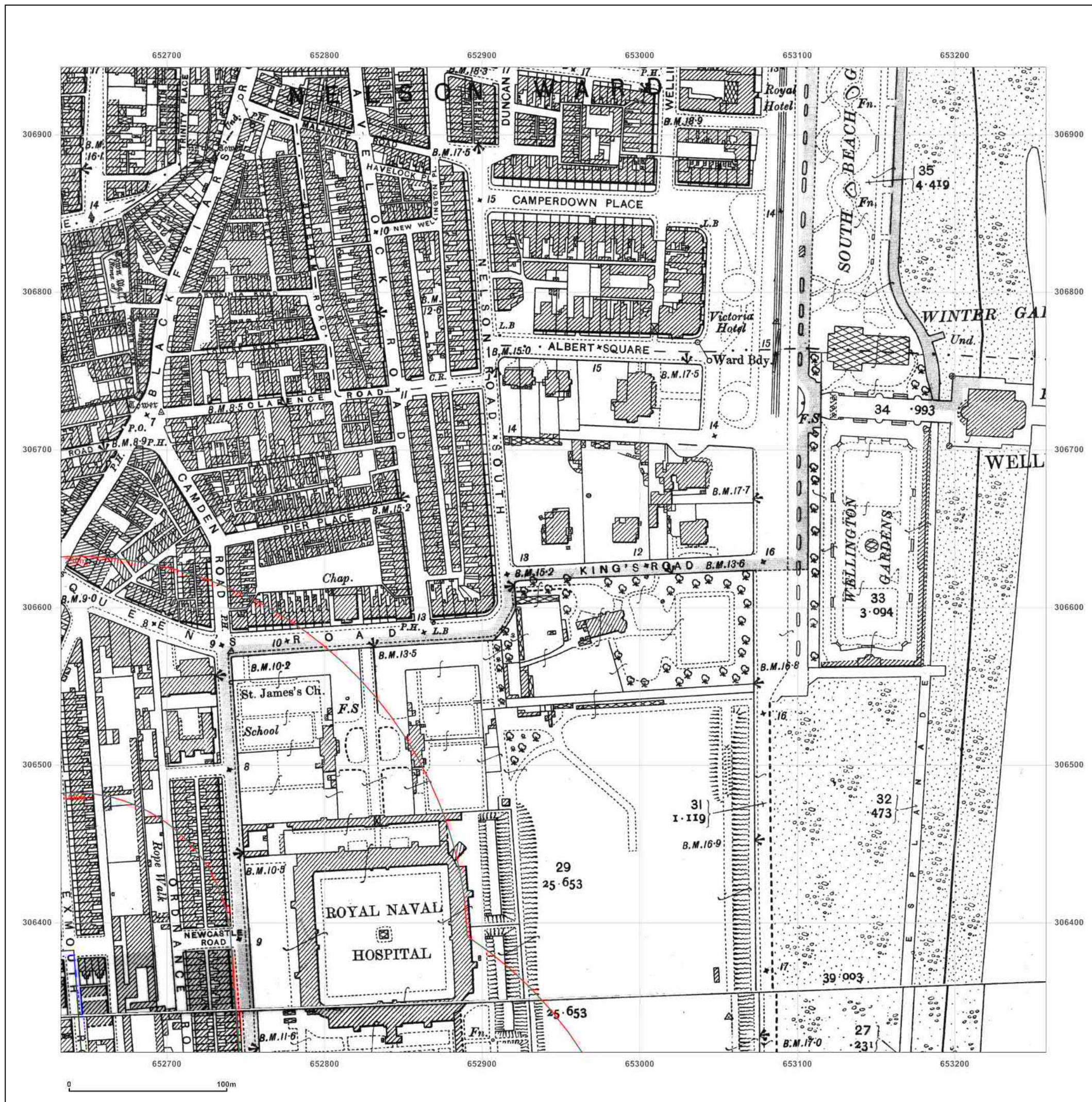


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**Grid Ref:** 652945, 306630

**Map Name:** National Grid

**Map date:** 1949

**Scale:** 1:2,500

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Grid Ref: 652945, 306630

Map Name: National Grid

Map date: 1963

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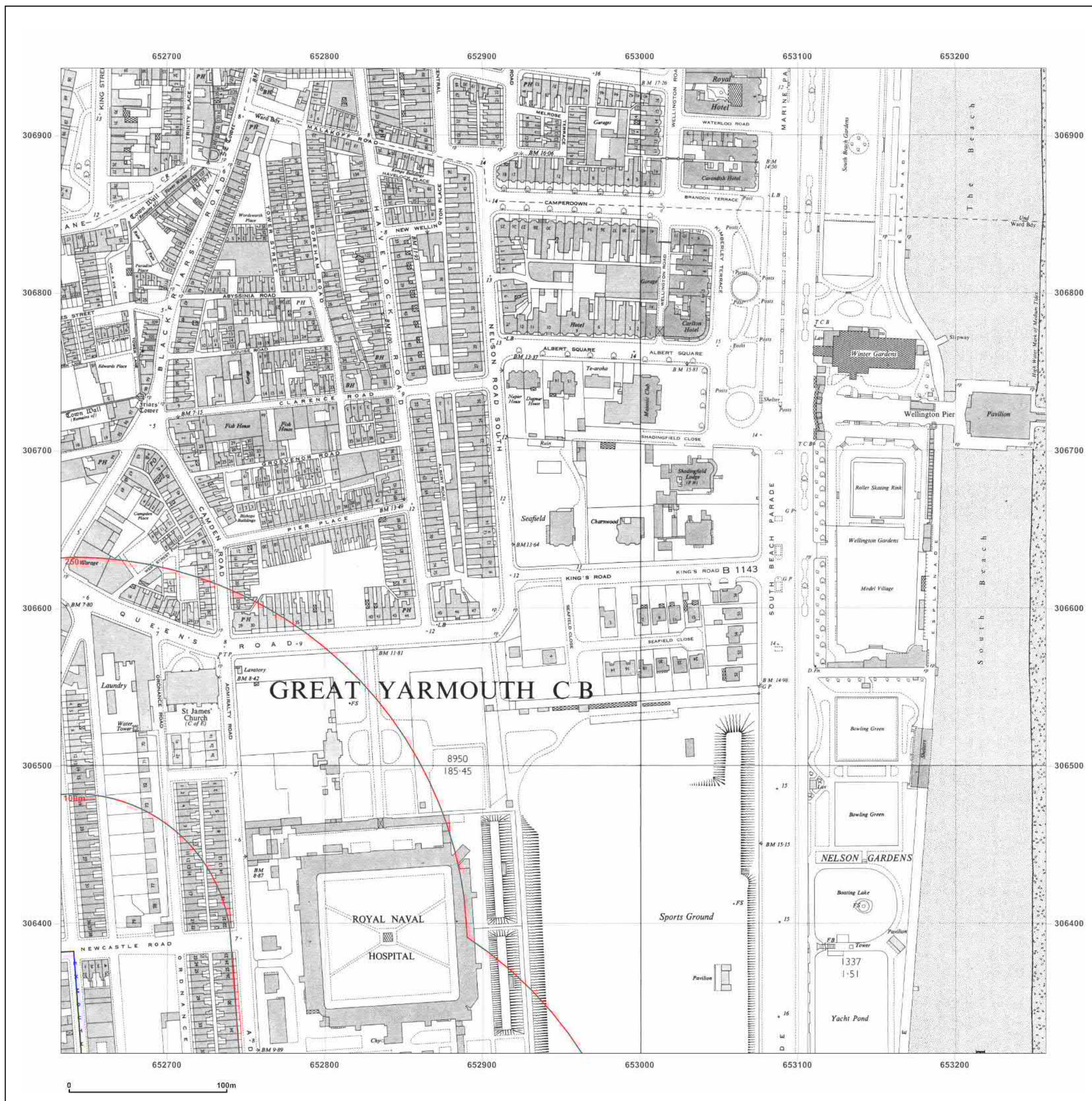


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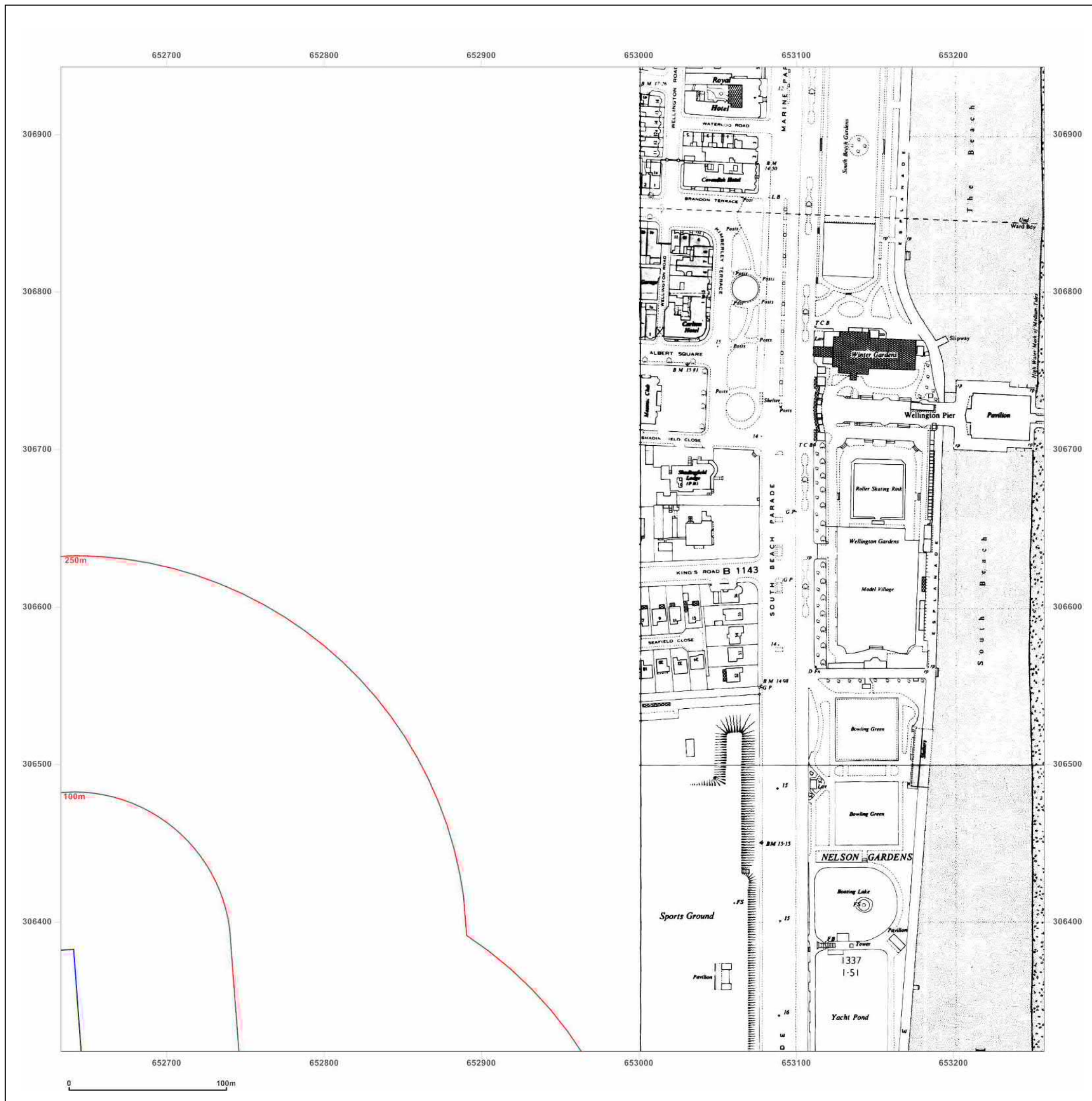
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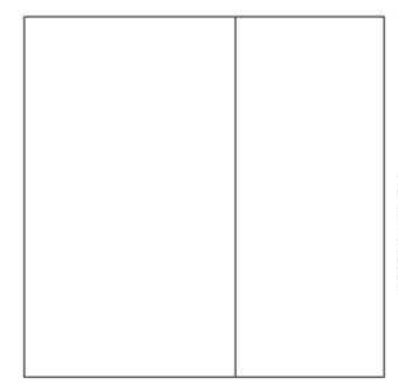
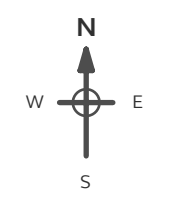




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 Grid Ref: 652945, 306630

Map Name: National Grid  
 Map date: 1965  
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## Annex C: Site History

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Map	Scale.	On Site	Off Site
1958	1:10,560	No significant changes.	No significant changes.
1958	1:2,500	No significant changes.	No significant changes.
1965	1:2,500	Partial coverage. Fish canning factories labelled in the eastern area waterfront.	No significant changes.
1963-1968	1:2,500	In the eastern area, a haulage depot is marked adjacent to the gas works and one of the fish curing factories is now labelled as a chemical factory. In the western area, the shoe factory is partly labelled as a printing and music publishing works.	No significant changes.
1966-1968	1:1,250 / 1:2,000	Along the northern boundary, three garages are marked.	No significant changes.
1970-1975	1:1,250 / 1:2,000	A builders merchants is marked towards the north west corner.	An oil pipeline construction depot is marked close to the north west corner.
1975-1977	1:1,250 / 1:2,000	The two gas holders on the southern boundary gasworks are no longer marked and the site is labelled as a depot.	No significant changes.
1976-1981	1:1,250 / 1:2,000	No significant changes.	No significant changes.
1978	1:10,000	Former boat building yard in the east area is now developed as a warehouse. The gasworks in the west area adjacent to the River Yare is no longer marked but one gas holder is marked nearby. Factory and works have been developed on the western boundary. The railway line towards the western boundary is marked as dismantled.	The hospital has been renamed St Nicholas Hospital. Significant development in most directions; – to the south east development appears to be commercial industrial; to the north a school and depots are now marked and the saw mill is now labelled as a timber shed; to the west a large number of commercial / industrial buildings and now marked with three labelled as warehouses. The railway to the north and south is labelled as dismantled.
1975-1978	1:1,250 / 1:1,2000	Precast concrete works labelled in the north west corner of the site.	At this scale, the commercial / industrial buildings are labelled as factory, warehouse, works, store, workshop and depot. No further indication of use is provided. A works adjacent to the north west corner of the site includes a number of tanks.
1984-1986	1:1,250 / 1:1,2000	No significant changes.	Two large tanks are marked close to the southern boundary of the eastern area.
1988	1:10,000	Some layout changes have occurred in the eastern area and three depots are labelled. Two gas holders are still marked. In the western area, the route of the railway is being developed as a dual carriageway and the large roundabout currently in the centre of the site is marked including the spur roads off to the east and west. Formal gardens are now marked as a recreation ground but do also include an adult training centre.	The commercial / industrial buildings to the west are labelled as Harfreys Industrial Estate and the depots to the north are now marked as Yarmouth Business Park. A dual carriageway follows the route of the former railway offsite to the north west.

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## Annex D: Zetica UXO Risk

# BOMB MAP USERS' GUIDE

## Sources of information and explanation of bomb risk

### Why?

Unexploded bombs (UXB) still present a risk to construction projects long after the end of the Second World War (WWII). UXBs often entered the ground unnoticed at high velocity and penetrated to a depth of several metres. Here they remain – vulnerable to disturbances from construction work. Beyond the depth of shallow excavation work, the greatest risk is to piling, drilling and probing crews. A piling rig could repeatedly hit a UXBs with considerable force before the crew realises an obstruction has been impacted. It could then be up to 72 hours before the detonator activates.

### Who?

The responsibility for avoiding UXB risk usually lies with construction companies or house builders particularly those who are redeveloping urban sites. In addition, project engineering or environmental consultants are expected to advise their clients of a site's history. Other interested parties include those organisations whose employees are physically at most risk from intrusive works, normally piling companies, drillers or probing operators.

### How?

UXB risk should be assessed for every site, but especially those in known heavily bombed areas or those situated near war-time strategic installations that were priority targets for enemy aircraft, for example, airfields. Zetica's regional bomb risk map is therefore a first point of reference from which the relative, potential abundance of UXBs can be judged. Consultants then advise their clients that an ordnance-risk desk study is required, which they may obtain from external sources. Construction companies or house builders who assess their own risk could choose to come direct to Zetica.

### When?

Do not wait for the piling or drilling company to be on site before thinking about UXB risk – it will inevitably cause delays and higher costs. Request the regional bomb risk map from Zetica as soon as a site is being considered, and then use it to help you or your clients to decide if an ordnance-risk desk study is required.

### Where?

Maps can be obtained for any county in England, Scotland, Wales or Northern Ireland – or for any London borough. They can help determine the areas that were most heavily bombed – but no part of the country should be considered 100% safe from UXB risk. Even remote rural areas can have a high risk if, for example, they were locations for decoy airfields or beacons that were lit to fool enemy pilots into thinking they had located a burning city that had been successfully hit by others in the raid.

### How to use this regional map

This map is designed to give you an indication of the potential risk from UXBs in your area. If you are conducting work that involves excavation, piling or other disturbance of the ground, then you should use the map to identify the category of risk for your site.

The risk boundaries are a guide, compiled from data based on the political areas for which records are held; being just outside a high-risk area does not mean there is no UXB risk. You should use the map to assist in your decision of whether to investigate the UXB risk further.

### Information on the regional risk remaining from UXBs in the UK

Zetica has built the largest UXB database of its kind in the UK. It includes a unique digital library of bomb census data, and maps showing key strategic points and bombing densities from the First and Second World Wars. The main sources of information include records from central government (Public Records Office), the Ministry of Defence, and the German Luftwaffe.

Using information from this database, Zetica has published maps of UXB risk on a regional, county and borough scale. The maps indicate relative degrees of UXB risk based on available records for bombing densities and known targeted areas for regions within the UK. The risk is broken down into individual boroughs, towns or cities. The data are based on the historical boroughs and are then overlaid onto the modern map. It is important to note that more-detailed research may be required for individual sites, particularly where proximity to a potential WWII target means the local risk may be higher.

### High risk

Areas designated as high risk are those that show a high density of bombing hits (50+ bombs per 1000 acres) and abundant potential WWII targets. In high-risk regions, further action to mitigate UXB risk is considered essential.

### Moderate risk

Moderate-risk regions are those that show a bomb density of between 11 and 50 bombs per 1000 acres and that may contain potential WWII targets. Action to mitigate the risk is considered essential, albeit more likely that a reduced scope of work is required compared with that needed for high-risk regions.

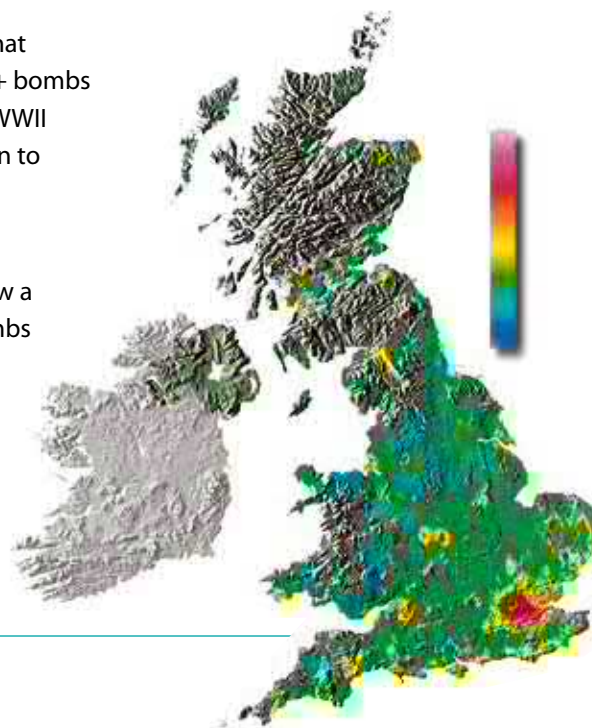
### Low risk

Low-risk regions are those with a bombing density of up to 10 bombs per 1000 acres. These areas are considered to have a significant but low UXB risk. In general, further action to mitigate the risk is considered prudent, although not essential. Care is required when assessing the risk for specific sites where the risk may be higher because of local wartime activity.

### Other WWII targets

Other regions with the risk of UXBs are key strategic points as defined by the government during WWII as representing potential enemy targets. Where these exist outside areas mapped as high, moderate or low risk, a site-specific assessment of the UXB risk may be required.

### Relative UXB risk across UK



### What to do if...

#### ...you have a site that has a potential UXB risk

In the absence of current legislation requiring you to address the risk from UXBs, your responsibilities under health and safety legislation and regulations such as construction design and management require that you address all identified risks. The first stage is to request further advice from a professional adviser such as Zetica, or to gain more site-specific information by commissioning an ordnance-risk desk study. Then a strategy to deal with the risk can be established that is tailored to your proposed work.

#### ...you find a suspect item or require advice

If during site works you find a suspect (ordnance-related) item, it is very important that you do not touch or move it (even if it has already been moved by an excavator). If it is clearly ordnance related, then dial 999 and ask for the police. Ensure that the area around the item is kept as clear as possible without placing yourself at risk. If you are unsure and do not wish to cause undue alarm, or you just require some advice, then you can call Zetica. We have experienced qualified UXB specialists on hand who can offer support and advice during any site works.

More-detailed procedures should be established in advance if you are in an area where the risk of finding a UXB is shown to be significant (moderate to high).

#### Site-specific desktop studies

Zetica is able to provide high-quality, site-specific UXB risk information for any residential, industrial or commercial property in the UK. These desktop studies provide details of the bombing density within an area and for the site itself, in order to indicate the risks of UXBs still being present. A risk assessment is provided to facilitate informed decision making on whether any further risk mitigation measures are required.



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## Annex E: Risk Classification Matrixes

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## Probability of Risk Being Realised (C552 CIRIA, 2001)

Probability of risk being realised	
Classification	Definition
<b>High Likelihood</b>	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
<b>Likely</b>	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the sort term and likely over the long term.
<b>Low Likelihood</b>	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
<b>Unlikely</b>	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

## Risk Classification Matrix (C552 CIRIA, 2001)

Risk classification matrix					
(CIRIA C552, 2001, page 82)		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/Low	Low
	Low Likelihood	Moderate	Moderate/Low	Low	Very Low
	Unlikely	Moderate/Low	Low	Very Low	Very Low

## Risk Classification Definitions (C552 CIRIA, 2001)

Risk classification definitions	
<b>Very High</b>	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
<b>High</b>	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.
<b>Moderate</b>	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
<b>Moderate / Low</b>	
<b>Low</b>	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
<b>Very Low</b>	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

# **Great Yarmouth Third River Crossing Application for Development Consent Order**

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## **Document 6.2: Environmental Statement Volume II: Technical Appendix 16C: Interpretative Environmental Ground Investigation Report**

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**Planning Act 2008**

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure)  
Regulations 2009 (as amended) (“APFP”)**

APFP regulation Number: 5(2)(a)

Planning Inspectorate Reference Number: TR010043

Author: Norfolk County Council

Document Reference: 6.2 – Technical Appendix 16C

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Date: 30 April 2019



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## 1 Introduction

- 1.1.1 An assessment of contaminated land including associated risks, constraints and liabilities has been undertaken to support a DCO application and design of the Great Yarmouth Third River Crossing ('the Scheme').
- 1.1.2 This report has been prepared with the factual ground investigation information available at the time of reporting. The groundwater assessments in Sections 5 and 6, and the gas assessment in Section 6, are based on data collected during monitoring visits between 1st June and 20th December 2018.

### 1.2 Scheme Description

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- 1.2.1 The Scheme involves the construction, operation and maintenance of a new crossing of the River Yare in Great Yarmouth. The Scheme consists of a new dual carriageway road, including a road bridge across the river, linking the A47 at Harfrey's Roundabout on the western side of the river to the A1243 South Denes Road on the eastern side. The Scheme would feature an opening span double leaf bascule (lifting) bridge across the river, involving the construction of two new 'knuckles' extending the quay wall into the river to support the bridge. The Scheme would include a bridge span over the existing Southtown Road on the western side of the river, and a bridge span on the eastern side of the river to provide an accommodation underpass for existing businesses, enabling the new dual carriageway road to rise westwards towards the crest of the new crossing.

### 1.3 Project Scope

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- 1.3.1 To assist in meeting the terms of reference as stated in Section 1.1, the scope of the study in this report comprises:

- 
- Generic quantitative risk assessment (GQRA) of potentially sensitive receptors with respect to ground and groundwater contamination.
  - Refinement of the preliminary conceptual site model (CSM) that was developed in the WSP Ltd Interpretative Environmental Desk Study Report (presented as Appendix 16B to the Environmental Statement).
  - Piling Works Risk Assessment (presented as Appendix 16D to the Environmental Statement).
  - Provision of recommendations with respect to the management and mitigation of potential ground contamination constraints or liabilities which are identified.

1.3.2 A geotechnical assessment has also been undertaken for outline pile foundation and highway design purposes which will be reported separately.

## 1.4 Legislative Context and Guidance

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1.4.1 The project was undertaken in the legislative and policy context of:

- The Planning Act 2008 (Ref 16C.1)
- National Policy Statement for National Networks (Ref 16C.2)
- National Policy Statement for Ports (Ref 16C.3)
- The National Planning Policy Framework (Ref 16C.14)

1.4.2 The following good practice and statutory guidance was considered and the contaminated land assessment was undertaken in general accordance with:

- Environment Agency ‘Model Procedures for the Management of Land Contamination’, CLR11 (2004) (Ref 16C.5);
- British Standard ‘Investigation of Potentially Contaminated Sites – Code of Practice’, BS EN 10175:2011 (Ref 16C.6);
- British Standard ‘Code of Practice for Ground Investigations’, BS 5930:2015 (Ref 16C.7);
- CIRIA ‘Contaminated Land Risk Assessment. A guide to good practice’, C552 (2001) (Ref 16C.8);
- Defra ‘Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance’, PB13735 (2012) (Ref 16C.9); and
- CIRIA ‘Assessing Risks Posed by Hazardous Ground Gases to Buildings’, C665 (2007) (Ref 16C.10).

## 1.5 Sources of information

1.5.1 The following sources of information were used in the production of this report.

*Table 1.1: Sources of Information*

Source	Report
<b>Reports</b>	Factual Report October 2007 prepared by Norfolk Partnership Laboratory. Interpretative Environmental Desk Study Report dated March 2019 (presented as Appendix 16B to the Environmental Statement)
<b>Public Information</b>	British Geological Survey BGS ‘Geology of Britain’ online viewer. Environment Agency website
<b>Notes:</b>	The report contains British Geological Survey materials ©NERC 2018 and Environment Agency information ©Environment Agency and database right.



## 2 Site Description and Current Use

### 2.1 Site Description and Current Use

- 2.1.1** For the purposes of this report, the term Study Area is used to define the area within the Principal Application Site within which the ground investigation was undertaken. No site investigation works were undertaken within the Satellite Application Sites as no significant excavation / construction works are proposed in these areas that would interact / affect soils, geology or contamination.
- 2.1.2** The Principal Application Site is currently occupied by highways, vacant land, residential properties, public space, commercial / industrial businesses and the River Yare. Further details are provided in the Interpretative Environmental Desk Study Report (presented as Appendix 16B of the Environmental Statement).
- 2.1.3** Table 2.1 below summarises the details presented in the WSP Interpretative Environmental Desk Study Report dated March 2019 (Appendix 16B) that are relevant to the contamination assessment. Further details are presented in the Chapter 2: Description of the Scheme in the Environmental Statement (document reference 6.1).

*Table 2.1: Summary of Site Details*

Detail	Comment
<b>Principal Application Site Description and Current Use</b>	<p>The flat site is split into two parts by the River Yare which flows from north to south through the Principal Application Site.</p> <p>The eastern part of the Principal Application Site is densely developed, predominantly with commercial / industrial properties including oil / gas storage sites, an operating port facility with associated hard standing and warehouses / depots. Other uses include residential properties (predominantly in the northern part of the area), a petrol filling station and car dealership.</p> <p>The western part of the Principal Application Site includes a hard</p>

Detail	Comment
	standing quayside, the major A12 dual carriageway, William Adams Way highway, residential properties, commercial properties including car and caravan sales, a petrol station, oil and gas storage facilities, docks and port facilities; military properties (air training corps), community facilities and public open space and allotments.
<b>Setting and Surrounding Area</b>	<p>North; Predominantly commercial / industrial with some residential properties on the west side of the river and predominantly residential properties with a few commercial properties on the east side of the river.</p> <p>East; Predominantly residential properties with occasional commercial properties and a community centre.</p> <p>South; Commercial / industrial properties on the east side of the river and residential properties, commercial properties and a recreation ground on the west side of the river.</p> <p>West; Commercial / industrial properties.</p>
<b>Topography and Ground Cover</b>	The Principal Application Site is generally flat and is largely hard standing predominantly associated with quayside in the eastern areas and roads and properties in the western area.
<b>Drainage &amp; Flooding</b>	<p>The River Yare is recorded as a Primary River.</p> <p>Much of the Principal Application Site is within the Zone 3 floodplains. Away from the River Yare the risk of flooding from the</p>

Detail	Comment
	river and the sea is generally low and then very low at the western end of the Principal Application Site.
<b>Embankments &amp; Slopes</b>	None of any significance.
<b>Trees &amp; Vegetation (including invasive species)</b>	<p>The only vegetation recorded during the walkover were landscaping hedges and bushes / scrubs.</p> <p>No invasive species were confirmed during the walkover, although due to access restrictions at some locations, not all of the Principal Application Site was accessible. Ecological surveys have been undertaken and are reported in Chapter 8: Nature Conservation within the Environmental Statement (document reference 6.1).</p>
<b>Foundations, Retaining Walls &amp; Basements</b>	There is the significant possibility of foundations, retaining walls and basements being present due to current and former buildings.
<b>Visual Observations of Contamination or Ground Subsidence</b>	No visual signs of contamination were noted during the walkover although petrol stations and oil / gas storage facilities were observed and could include contamination.
<b>Geology</b>	The regional BGS 1:50,000 geological map and information available on the BGS on-line Geology of Britain Viewer ( <a href="http://www.bgs.ac.uk">www.bgs.ac.uk</a> ) indicates the Superficial Geology immediately underlying the Principal Application Site within the Order Limits boundary varies as follows:



Detail	Comment
	<ul style="list-style-type: none"> <li>• South west of the River Yare - peat of the Breydon Formation,</li> <li>• North west of the River Yare – clay and silt of the Breydon Formation,</li> <li>• East of the River Yare – sand and gravel of the North Denes Formation.</li> <li>• Within the River Yare - clay and silt Tidal River or Creek Deposits.</li> </ul> <p>The BGS 1:50,000 geological map indicates that the Crag Group (sand and gravel) comprises the underlying geology across the Principal Application Site.</p>
<b>Hydrogeology and Hydrology</b>	<p>The River Yare splits the Order Limits in two and is recorded as a Primary River. At this point it is estuarine and is not separated from the sea by any locks. No other surface water features are present.</p> <p>No surface water or potable surface water abstractions are present within 2km of the Order Limits.</p> <p>The North Denes Formation superficial deposits underlying the Principal Application Site to the east of the River are classified as a Secondary (A) Aquifer with permeable layers. These are defined by the Environment Agency as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.</p>

Detail	Comment
	<p>The peat and clay / silt superficial deposits underlying the Principal Application Site to the west of the River Yare are classified as unproductive.</p> <p>The underlying bedrock is classified as a Principal Aquifer. These are defined by the Environment Agency as layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.</p> <p>The nearest active groundwater abstraction is approximately 71m to the north west of the Principal Application Site and is for laundry use.</p>

## 2.2 Site History

2.2.1 The following site history summary has been taken from the Interpretative Environmental Desk Study Report (Appendix 16.B of this Environmental Statement) which includes a more detailed site history.

2.2.2 For simplicity, for the purposes of this report, the Principal Application Site has been split into two areas – east of the River Yare and west of the River Yare.

### Eastern Area

2.2.3 The earliest map provided by GroundSure dated 1883 indicates the eastern area of the Principal Application Site to be densely developed predominantly with commercial / industrial properties including a gasworks, boat building yard and an icehouse. Some residential properties were present but generally the area is dominated by industry. This eastern area of the Principal Application Site has generally remained a commercial / industrial area up to the present day. Various industries have been present including fish canning, oilskin production, chemical factory and unspecified depots, warehouses and factories.

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## Western Area

- 2.2.4** The earliest map provided by GroundSure dated 1883 indicates the western area of the Principal Application Site to be less developed than the eastern area. The majority of the development was present adjacent to the River Yare and comprised a mix of residential properties and commercial / industrial sites such as an iron works, rope walk, gas works and malhouses. Beyond, towards the western boundary of the study area.
- 2.2.5** By 1906, a railway line running north south was constructed towards the western boundary and by 1926 / 1927, formal gardens and allotments are present towards the centre of the Principal Application Site. A shoe factory is marked adjacent to Queen Anne's Road in 1949 and by 1966 is relabelled as a printing works.
- 2.2.6** By 1978, the railway line had been dismantled and commercial / industrial units had started to be developed in the far west of the Principal Application Site and beyond. By 1988, the former rail route had started to be redeveloped as a dual carriageway and by 2002 the current major highway routes had been established.

## 2.3 Surrounding Land Uses

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- 2.3.1** Surrounding land uses as detailed in the Interpretative Environmental Desk Study Report (Appendix 16B of this Environmental Statement) are as follows:
- North - Predominantly commercial / industrial with some residential properties on the west side of the river and predominantly residential properties with a few commercial properties on the east side of the river.
  - East - Predominantly residential properties with occasional commercial properties and a community centre.
  - South - Commercial / industrial properties on the east side of the river and residential properties, commercial properties and a recreation ground on the west side of the river.
  - West - Commercial / industrial properties.



## 2.4 Potential Sources of Contamination

### On-Site Contamination Sources

2.4.1 The following potential historical on-site sources of contamination have been identified with anticipated contaminants derived in accordance with site-specific interpretation of Department of Environment Industry Profiles:

*Table 2.2: Areas of Potential Contamination (APC)*

APC No.	APC Type	Anticipated Contaminants in Soil & / or Groundwater
<b>APC1</b>	Former railway lines, sidings and depots	Metals and metalloids, cyanides, ammonia, nitrates, sulphates and sulphides involved in a range of chemical processes formerly taking place on site. It is likely these contaminants are present within the soil although some compounds are soluble and therefore may also be present within the groundwater and soil leachate samples.  Petroleum hydrocarbons (TPH), PCBs, benzene, toluene, ethylbenzene, xylene (BTEX), polyaromatic hydrocarbons (PAH), Volatile Organic Compounds (VOC) and semi-VOC (SVOC), phenolic compounds, resins arising from fuel spillages and former onsite chemical processes. It is likely these compounds if present will be found within groundwater and leachate samples. Some of the volatile compounds such as solvents may be present as mobile gases.  Made ground associated with the development of the Principal Application Site for its former industrial uses resulting in potential ground gas contaminants (methane and carbon dioxide). Ground gases are considered likely in the former landfill areas.  Made ground also has the potential to contain asbestos.  The presence of buried former structures and foundations may also be a source of contaminants.
<b>APC2</b>	Former gasworks	
<b>APC3</b>	Former boat building yards, quayside and travelling crane	
<b>APC4</b>	Former iron works	
<b>APC5</b>	Former icehouse	
<b>APC6</b>	Former allotments	
<b>APC7</b>	Former rope walk	
<b>APC8</b>	Former depots	
<b>APC9</b>	Potentially contaminated silts	
<b>APC10</b>	Former oilskin works	
<b>APC11</b>	Former fish canning factories	
<b>APC12</b>	Former tanks on unlabelled sites	
<b>APC13</b>	Various former factories: chemical, shoe, printing and publishing works,	
<b>APC14</b>	Concrete works	

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## Off-Site Contamination Sources

2.4.2 Within the surrounding area, the following potential sources of contamination are identified in the GroundSure report (Annex B of the Interpretative Environmental Desk Study Report) and has the potential to migrate onto the Principal Application Site:

- Former and current shipbuilding and dock works surrounding the River Yare
- Former saw mills, timber yard, boat building, icehouse and malthouse immediately adjacent to the river
- Former military barracks
- Former rope walk
- Former oilskin works
- Former barrel and box making factories
- Former electricity works
- Former oil pipeline construction depot
- Commercial / industrial buildings including tanks
- Contaminated silts within the River Yare
- Hospital

## 2.5 2006 Ground Investigation

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2.5.1 The Applicant undertook an intrusive ground investigation partly within the Principal Application Site in 2006 and prepared a Factual Report dated October 2007. A copy of the 2007 report is presented in Annex B.3.

2.5.2 Where data from the 2006 ground investigation has been used in the assessments in Sections 5 to 8 of this interpretative report it is referenced where necessary to distinguish it from data from the 2017/2018 ground investigation.

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2.5.3 The fieldwork was undertaken between the 7 August and 19 September 2006 and comprised the following:

- Nineteen cable percussion boreholes were carried out to a maximum depth of 40m.
- Eight window sample holes were carried out to a maximum depth of 5m.
- Three trial pits were carried out to a maximum depth of 3.5m.

2.5.4 In addition, samples were taken for both geotechnical and environmental testing. Standard Penetration Tests were also carried out within the boreholes and piezometers and combined water / gas monitoring installations were installed in seventeen cable percussion holes.

2.5.5 These locations were within the Principal Application Site - BH101, BH102, BH103, BH105, BH106, BH108, BH109, TP101, TP104, WS107 and WS108.

2.5.6 The following locations are immediately adjacent to the Principal Application Site and are therefore also considered - BH104, BH107 and BH110.

2.5.7 The following are sufficiently far from the Principal Application Site that they are unlikely to provide anything other than useful background information and are generally not considered further in this summary - BH111, BH111A, BH111B, BH112, BH113, BH114, BH115, BH116, BH117, WS103, WS104, WS105, WS106, WS110, WS111 and TP109.

### **Ground Conditions Encountered**

2.5.8 The following ground conditions were noted from the Engineers logs presented in the October 2007 Factual Report.

#### Made Ground

2.5.9 Asphalt and concrete (often reinforced with steel) were recorded at the surface at a number of locations up to 0.35m thick. Made ground was recorded at all locations from 0.3m thick (BH109) to 3m thick (WS108) and was heterogenous across the Principal Application Site but generally comprised a sand matrix with cobbles and man-made inclusions of concrete, brick, ash, metal and plastic.

#### Tidal River or Creek Deposits

2.5.10 Tidal River and Creek deposits were recorded underlying made ground in the eastern area up to 3.9m thick (BH105) as clay, silt or sand. It was not recorded in the western area.



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### Breydon Formation

- 2.5.11 Peat, silt clay or sand of the Breydon Formation underlies made ground in the eastern area in the absence of the Tidal or River Creek Deposits and was not recorded in the western area. The Breydon peat was recorded as a soft dark grey amorphous peat up to 1.1m thick (BH101). The silts, clay and sand strata were recorded up to 5m thick (BH110) and always overlying the North Denes Formation.

### North Denes Formation

- 2.5.12 The North Denes Formation was recorded across most of the site as a sand with varying proportions of gravel. Thickness ranges from 3.95m on BH106 to 14m in BH107. Densities varied from loose to very dense.

### Corton Formation

- 2.5.13 The 2007 Factual Report discusses Corton Sand (recorded in the western area only) separately from the Corton Formation but does not include an explanation to clarify this.
- 2.5.14 The Corton Formation was only encountered in the western area where it was recorded as fine and medium sand between 0.3m thick (TP109) to 6.7m thick (BH110) and was underlain by the Crag Formation. Densities varied between medium dense and dense.
- 2.5.15 The Corton Sand was also only recorded in the western area between 6.9m thick (BH102) and 9.2m thick (BH104) and was underlain by the Crag Formation. Densities varied from medium dense up to very dense.

### Kesgrave Sand and Gravel

- 2.5.16 The 2007 Factual Report recorded the Kesgrave Sand and Gravel between the North Denes Formation and the Crag Formation. It was recorded as a loose, fine, medium and coarse sand and as a silty sandy clay.

### Crag Formation

- 2.5.17 Crag Formation was recorded in all cable percussion boreholes within the Principal Application Site but the trial pits and window samples did not progress to sufficient depth to encounter the formation.
- 2.5.18 The formation was generally encountered as a fine and medium sand with densities ranging from medium dense to very dense. Laminae, lenses and layers of silty clay and silt were recorded in this strata.

### Visual and Olfactory Evidence of Contamination

**2.5.19** Man-made detritus was recorded in made ground and comprised concrete, brick, metal, plastic.

**2.5.20** In addition, the following evidence of contamination was also recorded.

- TP101 – 1.5m to 1.7m. Base of made ground / top of Breydon Formation. Hydrocarbon and chemical odour – possible spent oxide.
- TP104 – 0.1m to 2.0m. Made ground. Sheets of asbestos
- BH104 – 0.7m to 1.9m. Made ground. Slight oil odour.
- BH110 – 0.1m to 0.2m. Made ground. Chemical odour.
- BH110 – 1.7m to 2.3m. Breydon Formation. Very heavily stained and spent oxide odour.

### Monitoring Wells

**2.5.21** Gas and groundwater monitoring wells are recorded in a number of boreholes and are summarised in the table below. Exact details of each installation are shown on the Engineer’s logs in Annex B.3.

*Table 2.3: Summary of Monitoring Wells*

Borehole ID	BH Depth (m bgl)	Installation Type	Standpipe Depth (m bgl)	Standpipe Response Zone (mbgl)	Target Strata
<b>BH101</b>	20.45	50mm	2.80	1.00-2.80	Made ground / Breydon
		19mm	9.00	6.00-9.00	Corton Sand
<b>BH102</b>	35.00	50mm	3.10	0.50-3.00	Made ground / Breydon
		50mm	28.00	22.00-28.00	Crag
<b>BH103</b>	35.00	50mm	1.50	1.00-1.50	Made ground / Tidal and River Creek Deposits
		19mm	35.00	32.00-35.00	Crag
<b>BH104</b>	30.45	50mm	5.00	0.50-5.00	Made ground / Breydon

Borehole ID	BH Depth (m bgl)	Installation Type	Standpipe Depth (m bgl)	Standpipe Response Zone (mbgl)	Target Strata
<b>BH105</b>	40.00	50mm	30.00	27.00-30.00	Crag
		50mm	3.00	1.00-3.00	Made Ground / Tidal and River Creek Deposits
		19mm	29.00	26.00-29.00	Crag
<b>BH106</b>	30.45	19mm	37.00	34.00-37.00	Crag
		50mm	3.50	0.50-3.50	Made ground / Tidal and River Creek Deposits / North Denes
<b>BH107</b>	30.00	19mm	12.00	9.00-12.00	Kesgrave
		50mm	2.50	0.50-2.50	Made ground / North Denes
<b>BH108</b>	20.00	19mm	10.0	10.00-9.00	North Denes
		50mm	2.20	1.50-2.20	Breydon Peat
<b>BH109</b>	40.00	19mm	20.00	19.00-20.00	Crag
		50mm	1.60	1.00-1.60	Tidal and River Creek Deposits
<b>BH110</b>	31.00	19mm	39.00	36.00-39.00	Crag
		50mm	3.00	0.50-3.00	Made ground / Breydon
		50mm	31.00	28.00-31.00	Crag

### Gas Monitoring

2.5.22 Gas monitoring was undertaken on five occasions from dual and triple installations within BH101 to BH110. The maximum concentration of carbon dioxide recorded was 6.4% (BH107) and the maximum methane



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concentration recorded was 0.1%. Maximum flow rate was 0.2 litres per hour (BH101).

- 2.5.23** Significantly depleted oxygen was recorded in BH101, BH102, BH104, BH105, BH108, BH109 and BH110.

### **Groundwater Monitoring**

- 2.5.24** Groundwater monitoring was undertaken on five occasions (26th September 2007, 5th October 2007, 12th October 2007, 19th October 2007 and 22nd October 2007). The results are presented in the Factual Report in Annex B.3.

- 2.5.25** Water levels monitored appear to be generally consistent across all wells indicating a degree of hydraulic continuity between the shallow strata and the deeper Crag Formation.

### **Contamination Testing**

- 2.5.26** For the exploratory holes within or immediately adjacent to the Principal Application Site, chemical testing was undertaken on 40 samples from 13 exploratory hole locations for the following determinands, although not all samples were tested for all determinands:

- total sulphate;
- boron;
- arsenic;
- barium;
- beryllium;
- cadmium;
- chromium;
- copper;
- lead;
- mercury;
- nickel;
- selenium;

- 
- vanadium;
  - zinc;
  - ammonium as NH<sub>4</sub>;
  - nitrate;
  - sulphide;
  - total cyanide;
  - free cyanide;
  - complex cyanide;
  - asbestos;
  - speciated petroleum hydrocarbons including MTBE; and
  - speciated polyaromatic hydrocarbons.

**2.5.27** Water samples were taken on one occasion from six exploratory holes within or immediately adjacent to the Principal Application Site and tested for the following determinands, although not all samples were tested for all determinands:

- arsenic;
- barium;
- beryllium;
- boron;
- cadmium;
- chromium;
- copper;
- lead;
- nickel;
- selenium;
- vanadium;
- zinc;
- mercury;
- nitrate;

- 
- sulphate;
  - sulphide;
  - total cyanide;
  - free cyanide;
  - complex cyanide;
  - sulphur;
  - pH;
  - extractable petroleum hydrocarbons (EPH); and
  - speciated polyaromatic hydrocarbons.



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## 3 2017 Ground Investigation

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### 3.1 Preliminary Conceptual Site Model

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3.1.1 The preliminary conceptual site model (CSM) from the Interpretative Environmental Desk Study Report identified a number of potential contaminant sources which are summarised in Section 2.4. The preliminary CSM also identified a number of plausible contaminant linkages (PCLs) that, without necessary protection and/or remediation, could put the following identified receptors at risk of significant exposure:

- Site users - Future site users, visitors and maintenance workers,
- Adjacent site users - Residents and users of nearby properties,
- Controlled waters - Principal and Secondary (A) aquifers and surface watercourses,
- On site infrastructure - Buildings, foundations and buried services,
- Marine Ecology - Vertebrates and invertebrates within the River Yare.

### 3.2 Rationale and Scope

---

3.2.1 The rationale for the site investigation scope was to provide geotechnical and geo-environmental information for design and to inform the DCO application. The scope was developed to also provide information to refine the preliminary Conceptual Site Model outlined in the Interpretative Environmental Desk Study Report presented as Appendix 16B to the Environmental Statement.

3.2.2 The main ground investigation works were land based but ten boreholes were also drilled in the River Yare itself and for distinction are referred to as marine investigation works.

3.2.3 Further details on the scope of works are presented in Annex A and Annex B.1.

#### Land Based Ground Investigation

3.2.4 The land based ground investigation was undertaken by the Applicants appointed Contractor, Norfolk Partnership Laboratory (NPL) between 18th September 2017 and 27th March 2018 and comprised the following:

- 25 Cable percussion boreholes;
- 16 Window Samples;
- Installation of gas and groundwater monitoring wells in 14 selected boreholes;
- Soil sampling from the boreholes and window samples for the purpose of chemical testing;
- Gas and groundwater monitoring and groundwater sampling and chemical testing following completion of the intrusive works; and
- It had been proposed to undertake machine excavated trial pits but these were changed to window samples due to access restrictions.

**3.2.5** In addition to the above, static cone penetration tests (CPT), dynamic cone penetrometer tests (DCP) and standard penetration tests (SPT) were also undertaken for the purposes of geotechnical assessment and will be reported separately by the WSP Ltd Geotechnical team.

**3.2.6** The as-built exploratory hole locations are presented on Drawing GYTRC-WSP-HGT-DR-GE-0001(AB) within the WSP Factual Report presented in Annex B.1. Exploratory hole locations are also presented on Drawing GYTRC-WSP-EGN-XX-DR-EN-0047 Figure 16.2 Exploratory Hole Locations (Regulation 5(2)(a)).

**3.2.7** Table 3.1 presents the scope of geo-environmental intrusive works undertaken.

*Table 3.1: Summary of Ground Investigation Intrusive Works*

Exploratory Hole Type	Depth	Purpose
<b>25 Cable Percussion Boreholes</b>	5m – 50.45m	General site conditions and also targeting deeper ground conditions.
<b>16 Window Samples plus.</b>	1.1m – 6.0m	General site conditions where deep ground condition information is not required. Three additional window samples targeting previously identified hydrocarbon odour.

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**3.2.8** The scope of the field works and chemical testing suites are discussed in further detail in Annex A. Factual information provided by NPL comprising chemical test results and Engineer's logs is presented in the WSP Factual Report presented in Annex B.1.

**3.2.9** The findings of the ground investigation are discussed in Sections 4 to 7 and inform the refined CSM which is presented in Section 8.

### **Marine Based Sampling**

**3.2.10** The marine based sampling was carried out by NPL between 11th June 2018 and 14th July 2018. This work was primarily to inform the bridge abutment design but was also used to facilitate sampling of the river bed sediments to ascertain the contamination status in order to inform potential disposal routes for any excavated sediments. The marine sampling comprised the following:

- Six cable percussion boreholes to a nominal 25m depth (three on each side of the river) located close to the quayside
- Four cable percussion boreholes to a nominal 40m depth (two on each side of the river) located away from the quayside at the outer edge of the proposed abutments.

**3.2.11** Two locations were terminated at shallow depth and moved. MB01 was terminated due possible Unexploded Ordnance and MB04 was terminated due to a concrete obstruction.

**3.2.12** The as-built exploratory hole locations are presented on Drawing GYTRC-WSP-HGT-DR-GE-0006, within the WSP Factual Report presented in Annex C.

**3.2.13** In addition to the above, standard penetration tests (SPT) and pressure meter testing were also undertaken for the purposes of geotechnical assessment and will be reported separately by the WSP Ltd Geotechnical team.

**3.2.14** The scope of the marine based sampling works and chemical testing suites are discussed in further detail in Annex A. Factual information provided by NPL comprising chemical test results and Engineer's logs is presented in the WSP Factual Report presented in Annex C.

**3.2.15** The findings of the ground investigation are discussed in Sections 4 to 7 and inform the refined CSM which is presented in Section 8.



## 4 Ground Conditions Assessment

### 4.1 Ground Conditions Encountered On-Site

4.1.1 The findings summarised below generally confirm the anticipated strata identified in the Interpretative Environmental Desk Study Report (presented as Appendix 16B to the Environmental Statement). The findings are also similar to the findings from the 2006 ground investigation detailed in Section 2.5 above.

#### Made Ground Eastern Area

4.1.2 Made ground was recorded at almost all exploratory hole locations (absent from BH15) and varied in thickness from 0.55m to 4.8m. The thickness of made ground varied across the Principal Application Site with the thicker made ground generally recorded close to the quay wall.

4.1.3 The made ground was generally granular and heterogeneous in nature and included detritus comprising brick, wood, concrete, porcelain, asphalt, ceramics and metal. However, BH12A and BH13A both recorded brick / concrete within natural strata at depth (5.9m and 3.5m respectively) indicating this material may be reworked rather than being in-situ natural strata.

#### Made Ground Western Area

4.1.4 Made ground was recorded at almost all exploratory hole locations (absent from WS8) and varied in thickness from 0.4m to at least 4.2m, although the base of the made ground was not encountered in WS2 at 2m depth and therefore may be deeper.

4.1.5 The thickness of made ground varied across the western area and although thick made ground was recorded close to the quay wall, the thickest made ground was not recorded in this area.

4.1.6 The made ground was generally granular and heterogeneous in nature and included detritus comprising; concrete, asphalt, tile, brick, ceramic, pottery, wood, ash, leather, metal, glass, plastic, mortar and slag. BH5A at 2.0m recorded brick gravel within the Breydon Formation indicating this layer is likely to be made ground rather than in-situ natural strata.

4.1.7 WS4 at 2.3m and WS5 at 1.85m recorded a geogrid structure.

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## Concrete and Underground Structures

- 4.1.8 Solid concrete was recorded at most locations in the eastern area and was recorded up to 0.65m thick. However, only a few locations in the western area recorded concrete up to 0.5m thick.
- 4.1.9 Bitumen up to 0.2m thick was recorded at a few locations in the western area but was absent from the eastern area.
- 4.1.10 No pipes or underground structures were recorded on the Engineer's logs.

## Natural Strata

### Tidal River or Creek Deposits

- 4.1.11 Tidal River or Creek deposits were generally indistinguishable from the underlying Breydon Formation. The Tidal River or Creek Deposits encountered that can be differentiated are located in the eastern area overlying the sand deposits of the North Denes formation. Here, they generally comprised a dark grey to black, silty, variably organic Clay, and a sandy, clayey Silt interbedded with light brown to black, fine to coarse Sand with occasional flint gravel and pockets of organic material.
- 4.1.12 The deposit was generally encountered underlying Made Ground, to the maximum depth of 5.6m in BH14. The thickness of this deposit varied from 0.5m in BH13 to 3.80m in borehole BH14.

### North Denes Formation

- 4.1.13 The North Denes Formation was only encountered in the eastern area where it was found underlying made ground. The Formation was typically described as a very loose to dense yellowish-brown fine to coarse sand with some rare gravels and some rare thin silt and clay bands.
- 4.1.14 The Formation was recorded at a maximum depth of 5.6m below ground level (bgl) (-3.64m above Ordnance Datum (aOD)) in BH14 and was not recorded in the four boreholes undertaken along the edge of the eastern quay wall (BH12, BH12A, BH13, BH13A), where Tidal River or Creek Deposits and the Breydon Formation were encountered within the depth range that the sands of the North Denes Formation were found towards the east.

### Breydon Formation

- 4.1.15 The Breydon Formation was encountered in most boreholes in both the western and eastern areas of the Principal Application Site. In the west the Formation was encountered as either granular, cohesive or peat material.

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The Breydon Peat was encountered predominantly towards the west, but was also found in thinner layers close to the river. The cohesive and granular materials were encountered as interbedded layers of varying thicknesses across the Principal Application Site.

- 4.1.16 The Breydon Formation can be recognised as separate interbedded sub-strata and these are described below.

#### Breydon Peat

- 4.1.17 The Breydon Peat was encountered solely in the western area as soft, dark brown and black, variably fibrous, sometimes clayey amorphous Peat. Occasional wood and reed fragments were observed.
- 4.1.18 The Peat is found to a maximum depth of 11.9m bgl (-10.34m aOD) in BH2, with thickness ranging between 0.25m to 3.66m.
- 4.1.19 Towards the west the Peat was encountered in thicker layers often underlying made ground and overlaying the granular and cohesive Breydon Formation strata.

#### Breydon Clay and Silt

- 4.1.20 The clay component of the Breydon Formation was generally encountered as very soft to soft, dark grey to brown and variably silty, sandy and organic Clay, containing occasional shell fragments, gravel, pockets of peat and rootlets. The silt component contains occasional traces of gravel, organic debris, rootlets and shell fragments. The thickness of the cohesive bands varies from 0.1m to 1.0m in the eastern area and from 0.1m to a maximum of 5.1m in the western area.
- 4.1.21 The silts and clays were encountered between 0.3m and 4.0m bgl (1.19m aOD and -2.44m aOD) in the western area, and between 2.60m and 4.50m bgl (-0.32m aOD and -2.13m aOD) in the eastern area.

#### Breydon Sand and Gravel

- 4.1.22 The granular component comprises predominantly loose to very loose, with some locally dense areas, grey and brown grey silty clayey fine to medium Sand, with some angular to rounded gravels of flint and occasional quartz.
- 4.1.23 The thickness of the sand and gravel varies from 0.15m to 2.0m in the eastern area, with the top being encountered between 4m bgl and 4.95m bgl (-1.72m aOD to -2.58m aOD), and to a maximum depth of 6.50m bgl (-4.22m aOD).



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4.1.24 The granular material in the western area was encountered in layers ranging between 0.10m and 4.00m thick, the top of which is found at depths of 0.85m bgl to 11.40m bgl (1.19m aOD to -9.70m aOD). The base of the strata is found up to a maximum depth of 13.00m bgl (-11.30m aOD).

#### Breydon Formation (Stratum A)

4.1.25 A stratum within the Breydon Formation was encountered as quartz and quartzite gravels within a granular matrix. This material was encountered across both the eastern and western areas and was typically described as a loose to medium dense, grey, slightly silty sand and gravel, where the gravels are fine to medium, angular to rounded flint and quartz with some rare limestone gravels and shells.

4.1.26 It was encountered across both the western and eastern areas at thicknesses ranging between 1.6m to 9.4m. The thickness decreases towards the west away from the river but remains relatively consistent in the eastern area. The top of the strata in the western area was encountered at depths of between 3.00m bgl to 6.00m bgl (-0.49m aOD to -4.23m aOD) and in the eastern area at depths of between 3.20m bgl to 11.70m bgl (-0.82m aOD to -8.50m aOD).

4.1.27 To differentiate it from the other strata within the Breydon Formation, the WSP Geotechnical assessment has labelled this material as Breydon Formation (Stratum A).

#### **Happisburgh Glacigenic Formation**

4.1.28 The Happisburgh Glacigenic Formation was encountered below the Breydon Formation Stratum A in the east. In the western area, it is partly replaced by the granular and cohesive layers of the Breydon Formation.

4.1.29 The Happisburgh Glaciogenic Formation was typically described as a loose to medium dense, light brown to orange-brown, fine to coarse though predominantly medium, variably silty sand with rare fine gravels. The sand contains variable amounts of angular to rounded, fine to coarse flint gravel. Some cohesive deposits were encountered within the strata as firm to stiff orange-brown laminated sandy silt and clay, with olive grey clay banding.

4.1.30 The formation was encountered in the western area at depths ranging between 5.00m bgl to 13.00m bgl (-3.97m aOD to -12.44m aOD) and ranged in thickness between 4.30m to 14.70m. On the eastern area, the formation was encountered deeper than in the west at depths ranging from 10.00m bgl to 18.00m bgl (-7.63m aOD to -16.00m aOD), ranging in thickness between 3.00m and 12.00m.

### Crag Group

- 4.1.31** The Crag Group was encountered across the entire Principal Application Site underlying the Happisburgh Glacigenic Formation as dense to very dense, grey to dark grey, fine to medium grained silty sand with frequent white shell fragments, with some fine gravel and occasional soft to firm silty clay layers.
- 4.1.32** This stratum was encountered at depths ranging between 15.85m bgl and 22.80m bgl (-14.64m aOD to -20.30m aOD) and with thicknesses ranging from 22.30m to 25.65m. Generally, the top of the strata indicated a relatively uniform horizon in both the west and east of the Principal Application Site.

### London Clay

- 4.1.33** London Clay was encountered at depth underlying the Crag Formation as a stiff to very stiff, brown grey, sometimes laminated silty clay. Some rare flint gravels and gypsum crystals were encountered.
- 4.1.34** The London Clay was encountered at depths ranging between 44.00m bgl to 46.50m bgl (-41.63m aOD to -44.00m aOD) and the base was not confirmed in any boreholes.

### Visual and Olfactory Evidence of Contamination

- 4.1.35** Other than the man-made detritus recorded within the made ground, visual and olfactory evidence of contamination was recorded by NPL at the following locations. Further detail is provided on the Engineer's logs presented in Annex B.1.

*Table 4.1: Summary of Visual and Olfactory Evidence of Contamination*

Exploratory Hole Reference	Comment	Strata Type	Impacted Strata Depth (m bgl)
<b>WS21</b>	Hydrocarbon odour	Alluvium (Engineer's Log states Alluvium but is likely to be either Tidal River or Creek Deposits or Breydon Formation)	1.4m – 2.0m
<b>WS21</b>	Hydrocarbon odour		2.5m – 2.95m
<b>BH14</b>	Diesel odour		2.6m
<b>BH14</b>	Slight diesel odour	North Denes Formation	7.6m – 8.0m

Exploratory Hole Reference	Comment	Strata Type	Impacted Strata Depth (m bgl)
<b>BH6</b>	Slight hydrocarbon odour	Made ground	0.4m – 1.2m
<b>BH4BU</b>	Hydrogen sulphide odour	Breydon Formation	2.65m – 2.85m

## 4.2 Marine Sediment

**4.2.1** The Engineer's logs for the marine boreholes presented in Annex C indicate that the shallow sediments within the River Yare comprise gravel, sand, silt and clay and are classified as Tidal River or Creek Deposits. These vary in thickness from 0.8m up to 5.3m. Underlying these sediments are the Happisburg Glacigenic Formation and the Crag Formation, both predominantly comprising sand but layers of silt and clay are also present. London Clay was encountered at depth beneath the Crag Formation at a few locations.



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## 5 Hydrological and Hydrogeological Conditions

### 5.1 Local Hydrology

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#### Surface Water Features

- 5.1.1 The River Yare splits the Principal Application Site in two and is recorded as a Primary River. Other than the sea, no other surface water features are present within 500m of the Principal Application Site.
- 5.1.2 Assessment of surface water is presented in more detail in Chapter 11: Road Drainage and the Water Environment within the Environmental Statement (document reference 6.1).

#### Surface Water Abstractions & Discharges

- 5.1.3 No surface water or potable water abstractions are present within 2km of the Principal Application Site.

### 5.2 Hydrogeology

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#### Geology and Aquifer Status

- 5.2.1 Various superficial deposits were recorded during the ground investigation. Assessment of hydrogeology is presented in more detail in Chapter 11: Road Drainage and the Water Environment within the Environmental Statement (document reference 6.1).
- 5.2.2 The Happisburgh Formation, Breydon Formation and North Denes Formation are classified as Secondary (A) Aquifers which are defined by the Environment Agency as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
- 5.2.3 The Crag Group bedrock (comprising sand with occasional gravel and clay layers) is designated by the Environment Agency as a Principal Aquifer. However, according to the British Geological Survey the Crag Group in the area of Great Yarmouth is recorded as a Secondary (A) Aquifer. For the purposes of this report and Environmental Statement, the worst case scenario is assumed and the Crag Group is considered a Principal Aquifer.
- 5.2.4 The deeper London Clay is classified as classified as unproductive. These are defined by the Environment Agency as rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

### Groundwater Abstractions

**5.2.5** The nearest active groundwater abstraction point is approximately 71m to the north west of the Principal Application Site for laundry use.

### Groundwater Encountered During Investigation

**5.2.6** Groundwater was recorded at a number of locations during the 2017/2018 ground investigation. The details are summarised in the table below. Groundwater strikes during the 2006 ground investigation are presented in the factual report in Annex B.3.

*Table 5.1: Summary of Groundwater Strikes during the 2017/2018 Ground Investigation*

Exploratory Hole Location	Groundwater Level at Strike (mOD)	Strata Type
<b>BH1</b>	-1.1	Sand (Made Ground)
<b>BH1</b>	-9.7	Sand (Breydon Formation)
<b>BH2</b>	-1.54	Sand (Made Ground)
<b>BH4</b>	-1.23	Sand and Gravel (Made Ground)
<b>BH4</b>	-3.73	Peat (Breydon Formation)
<b>BH4A</b>	-1.95	Peat (Breydon Formation)
<b>BH4D</b>	-0.72	Sand (Made Ground)
<b>BH5A</b>	-2.69	Sand (Made Ground)
<b>BH5A</b>	-0.19	Clay (Breydon Formation)
<b>BH6</b>	-1.17	Sand (Breydon Formation)
<b>BH7</b>	-2.67	Sand (Breydon Formation)
<b>BH8</b>	1.09	Sand (Made Ground)
<b>BH9</b>	0.53	Clay (Breydon Formation)
<b>BH10</b>	-1.55	Sand (Breydon Formation)
<b>BH10A</b>	1.15	Sand (either Tidal or River Creek Deposits or Breydon Formation)
<b>BH11</b>	0.06	Gravel (Made Ground)
<b>BH11A</b>	1.20	Sand (Made Ground)
<b>BH12</b>	-0.92	Silt (Alluvium either Tidal or River Creek Deposits or Breydon Formation)

Exploratory Hole Location	Groundwater Level at Strike (mOD)	Strata Type
<b>BH13</b>	0.57	Clay (Made Ground)
<b>BH13A</b>	0.48	Gravel (Breydon Formation)
<b>BH14</b>	0.56	Gravel (Made Ground)
<b>BH15</b>	-0.08	Sand (North Denes Formation)
<b>BH16</b>	0.00	Clay (Alluvium either Tidal or River Creek Deposits or Breydon Formation)
<b>BH17</b>	-0.45	Silt (Alluvium either Tidal or River Creek Deposits or Breydon Formation)
<b>BH18</b>	-0.70	Sand (Alluvium either Tidal or River Creek Deposits or Breydon Formation)
<b>BH4ASU</b>	0.13	Sand and Gravel (Marine Beach Deposits)
<b>BH4ASU</b>	-2.87	Sand (Breydon Formation)
<b>TP1</b>	-4.28	Silt (Breydon Formation)
<b>TP1B</b>	-0.18	Clay (Breydon Formation)
<b>WS1</b>	-0.45	Sand (Marine Beach Deposits)
<b>WS2</b>	-1.15	Sand and Gravel (Made Ground)
<b>WS3</b>	-0.62	Silt (Breydon Formation)
<b>WS4</b>	-0.41	Sand and Gravel (Breydon Formation)
<b>WS6</b>	-1.86	Clay and Silt (Breydon Formation)
<b>WS7</b>	-1.30	Sand (Breydon Formation)
<b>WS9</b>	-0.23	Sand (Made Ground)
<b>WS20</b>	-2.51	Sand (Alluvium either Tidal or River Creek Deposits or Breydon Formation)
<b>WS21</b>	0.96	Sand (Alluvium either Tidal or River Creek Deposits or Breydon Formation)
<b>WS22</b>	-1.00	Sand (Alluvium either Tidal or River Creek Deposits or Breydon Formation)

### Monitored Groundwater Levels

5.2.7 Monitoring of groundwater levels in relation to Ordnance Datum was undertaken on 8 occasion's to-date following the completion of the



2017/2018 intrusive ground investigation works. The details are provided in Annex B.1 and are summarised in the tables below.

- 5.2.8** The tables below do not include the data for BH4A, BH10 or BH12B. The response zones in these wells cross the made ground / natural ground boundary and therefore the exact source of the groundwater cannot be confirmed.

*Table 5.2: Summary of Groundwater Level Monitoring in the Eastern Study Area*

Stratum	Monitoring Well	Minimum (mOD)	Maximum (mOD)	Strata
<b>Made Ground</b>	No standalone monitoring wells within the made ground.			
<b>Natural Ground</b>	BH11	-0.3	0.19	Breydon, North Denes and Crag Formations.
	BH13	0.31	0.66	Breydon and Crag Formations.
	BH15	-0.18	0.66	North Denes Formation.
	WS20	0.23	0.29	Alluvium
	WS21	0.67	0.86	Alluvium
	WS22	1.05	1.14	Alluvium

*Table 5.3: Summary of Groundwater Level Monitoring in the Western Study Area*

Stratum	Monitoring Well	Minimum (mOD)	Maximum (mOD)	Strata
<b>Made Ground</b>	BH4D Shallow	-1.12	-0.12	Made ground
<b>Natural Ground</b>	BH4	-0.33	0.62	Breydon and Crag Formations
	BH4D Deep	-1.13	-0.01	Crag Formation
	BH6	-1.17	-0.21	Crag Formation

- 5.2.9** It should be noted that a monitoring well was also installed in BH7 but an oversight by the Contractor resulted in no monitoring at BH7 until the final visit on 20th December 2018. This does not effect the validity of the assessment undertaken and reported in this Environmental Statement.

- 5.2.10** The water levels recorded during the 2006 ground investigation are broadly similar to those in Tables 5.2 and 5.3 above.

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### Hydraulic Gradient

- 5.2.11 The monitoring data obtained to date appears to indicate the hydraulic gradient is towards the River Yare from both the western area and the eastern area as would be expected. However, it should be noted that the groundwater monitoring data may be subject to tidal fluctuations which could affect the recorded levels.

### Hydraulic Continuity

- 5.2.12 The superficial deposits are likely to be in hydraulic continuity with the Crag Group due to the absence of any continuous low permeability strata separating these aquifers.
- 5.2.13 Similar groundwater quality characteristics across the Principal Application Site and the proximity to the River Yare also indicate the mixing of groundwater within the superficial deposits and the Crag Group is likely to be occurring.
- 5.2.14 The regional Chalk Group aquifer is considered to be protected by the overlying London Clay Formation, which is considered to significantly reduce the potential risks of any groundwater pollution present migrating to the Chalk within the study area. The superficial deposits are considered to be in hydraulic continuity with the Crag Group because no low permeable geologies segregate these aquifers. The mixing of groundwater and similar groundwater quality characteristics, dominated by the proximity to the River Yare, is therefore likely between the two hydrogeological units.

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## 6 Qualitative Risk Assessment

### 6.1 Introduction

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- 6.1.1 In the United Kingdom, the presence of contamination within soil or groundwater at a site is generally only of concern if an actual or potentially unacceptable risk to a sensitive receptor exists.
- 6.1.2 The risk assessment process begins with screening chemical concentrations in soil or groundwater against conservative screening values, a process called Generic Qualitative Risk Assessment (GQRA). GQRA's are performed to assess the potential risks to human health and controlled waters and to identify the presence of contaminants of concern (CoC), which may require further, more detailed assessment.
- 6.1.3 Annex B.1 and Annex B.3 presents the chemical test data and Annex E presents the screening spreadsheets.

### 6.2 Human Health Risk Assessment

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- 6.2.1 Following the tiered approach which is described in Model Procedures for the Management of Land Contamination (Ref 16C.5) published by DEFRA and the Environment Agency, this section provides a GQRA of those contaminant linkages that were determined to be plausible in the refined CSM.
- 6.2.2 DEFRA and the Environment Agency have published a limited number of Soil Guideline Values (SGVs) for a series of generic land use scenarios which follow the Contaminated Land Exposure Assessment (CLEA) methodology. Where SGV's are not available, WSP has derived a set of Generic Assessment Criteria (GAC) for the CLEA generic land use scenarios using the CLEA Workbook v1.071 Excel modelling tool. The CLEA workbook does not currently have the capacity to derive criteria to assess risks from the inhalation of vapours derived from contaminants dissolved in groundwater. Therefore, a set of groundwater GAC's has also been derived using the Johnson & Ettinger (1991, Ref 16C.11) (J&E) approach.
- 6.2.3 The chemical test results have been assessed against screening values for both commercial / industrial and public open space land use scenarios. Further details in the methodologies adopted by WSP Ltd are provided in Annex D. These land use scenarios are also defined in the Environment Agency document 'Updated Technical Background to the CLEA Model' Report SC050021/SR3, January 2009 (Ref 16C.12).



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- 6.2.4 These two scenarios are most appropriate for the proposed highway and landscaping end uses, although both are considered to be reasonably conservative as it is unlikely anyone will be on-site for the duration that either scenario assumes. In the case of public open space this is up to 2 hours per day, up to 170 days per year for a 1-6 year old child. In the case of commercial / industrial, this is 0.7 hours per day up to 230 days per year.
- 6.2.5 The soil chemical data has been compared against end use GAC's for a conservative 1% soil organic matter (SOM) content. The average SOM concentration is 2.07% and therefore the nearest conservative concentration is 1%. Samples that exceed the screen are identified as CoC and are carried forward for further discussion.
- 6.2.6 For an initial assessment, the data has been split into made ground and natural ground averaging areas and then split again into eastern area and western area.
- 6.2.7 For some CoC, direct contact will be the dominant pathway for exposure. Due to the unknown nature of soil excavation and reuse at this stage of the design, it is possible that materials from any depth could be excavated and placed at or near the surface in the final design. In order to advise the development options, human exposure to all unsaturated soils, irrespective of depth, was assumed possible for the purpose of this assessment. This will maximise the information available to the design team on the suitability of all unsaturated material and can support with their materials management options.
- 6.2.8 Potential risks to human health from soil gases are assessed in Section 6.4.

### **Assessment of Results – Public Open Space Land Use Scenario**

- 6.2.9 Evidence of hydrocarbons (diesel) was identified at three locations during the ground investigation as detailed in Table 4.1 above. Two of these three locations were targeted for chemical testing and none of the results exceed the hydrocarbon GAC's. It should be noted that the diesel odour in BH14 was not scheduled for chemical testing by NPL but the area was targeted subsequently at the request of WSP with the three additional window samples WS20, WS21 and WS22. None of the additional samples tested recorded results in excess of the hydrocarbon GAC's.

#### Natural Ground (Eastern Area)

- 6.2.10 The following CoC have been identified from the screening of natural ground in the eastern area:

- Alkaline pH at two locations – BH13A and WS20 – 9.78 and 10.31 respectively compared to a screening value of 9.5.

#### Natural Ground (Western Area)

6.2.11 The following CoC have been identified from the screening of natural ground in the western area:

- Acid pH at one location – TP01 – 5.4 compared to a screening value of 5.5.

#### Made Ground (Eastern Area)

6.2.12 The following CoC have been identified from the screening of made ground in the eastern area:

- Alkaline pH at five locations – BH12A (9.62), BH17 (12.49), BH16 (11.41), BH14 (10.15) and WS21 (11.01) exceeded the GAC of 9.5.

#### Made Ground (Western Area)

6.2.13 The following COC have been identified from the screening of made ground in the western area:

- Asbestos was recorded by the chemical testing laboratory in four samples:
  - BH6 at 0.5m as chrysotile loose fibres;
  - BH6 at 1.0m as chrysotile loose fibres;
  - CPT3 at 0.5m as chrysotile loose fibres; and
  - CPT3 at 1.0m as chrysotile loose fibres.
- Lead at one location – BH5A at 0.5m depth (878mg/kg) compared to a GAC of 808mg/kg;
- Alkaline pH at two locations – BH11A (9.84) and BH10A (11.62) values exceeded the GAC of 9.5; and
- Benzo(a)pyrene at two locations – BH7 at 0.8m depth (510mg/kg) and BH4 at 2.0m depth (13.9mg/kg) compared to a GAC of 11mg/kg.

#### 2006 Ground Investigation Data

6.2.14 The 2006 ground investigation data was also screened against the public open space screening values and only one exceedance was recorded:

- BH110 total cyanide 36mg/kg compared to a screening value of 15mg/kg. This location also recorded evidence of spent oxide on the Engineers log

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and this cyanide exceedance is likely to be further evidence of spent oxide waste.

### **Assessment of Results - Commercial / Industrial Land Use Scenario**

- 6.2.15 Evidence of hydrocarbons (diesel) was identified at three locations during the 2017 ground investigation as detailed in Table 4.1 above. Two of these three locations were targeted for chemical testing and none of the results exceed the hydrocarbon GAC's. It should be noted that the diesel odour in BH14 was not scheduled for chemical testing by NPL but the area was targeted subsequently at the request of WSP with the three additional window samples WS20, WS21 and WS22. None of the additional samples tested recorded results in excess of the hydrocarbon GAC's.

#### Natural Ground (Eastern Area)

- 6.2.16 The following CoC have been identified from the screening of natural ground in the eastern area:
- Alkaline pH at two locations – BH13A and WS20 – 9.78 and 10.31 respectively compared to a screening value of 9.5.

#### Natural Ground (Western Area)

- 6.2.17 The following CoC have been identified from the screening of natural ground in the western area:
- Acid pH at one location – WS TP01 – 5.4 compared to a screening value of 5.5.

#### Made Ground (Eastern Area)

- 6.2.18 The following CoC have been identified from the screening of made ground in the eastern area:
- Alkaline pH at five locations – BH12A (9.62), BH17 (12.49), BH16 (11.41), BH14 (10.15) and WS21 (11.01) exceeded the GAC of 9.5.

#### Made Ground (Western Area)

- 6.2.19 The following CoC have been identified from the screening of made ground in the western area:



- Asbestos was recorded by the chemical testing laboratory in four samples:
  - BH6 at 0.5m as chrysotile loose fibres,
  - BH6 at 1.0m as chrysotile loose fibres,
  - CPT3 at 0.5m as chrysotile loose fibres,
  - CPT3 at 1.0m as chrysotile loose fibres,
- Alkaline pH at two locations – BH11A (9.84) and BH10A (11.62) values exceeded the GAC of 9.5.
- Benzo(a)pyrene at one location – BH7 (510mg/kg) compared to a GAC of 38mg/kg.

#### 2006 Ground Investigation Data

- 6.2.20 The 2006 ground investigation data was also screened against the commercial industrial screening values and no exceedances were recorded.

#### **Discussion**

- 6.2.21 Asbestos has been identified at five shallow locations and is therefore likely to be encountered during the earthworks. Most of the other exceedances are likely to be mitigated from a human health perspective through the presence of hard standing or landscaping inert cover. However, the benzo(a)pyrene exceedance of 510mg/kg in BH7 at 0.8m depth may need further assessment or removal if this material is likely to be disturbed during construction.
- 6.2.22 The area around BH110 from the 2006 ground investigation which recorded elevated cyanide is just outside the Principal Application Site. However, it is approximately 200m to the south of the western bridge abutment and similar made ground could be encountered during excavation of the bascule pit.
- 6.2.23 The MIND charity site will include an area of green space and allotments close to the A47 / William Adams Way junction. In the absence of any suitable topsoil / subsoil identified across the Principal Application Site during the ground investigations, it is considered that construction of the new green space and allotment area will require an appropriate thickness of inert sub-soil and topsoil to be imported to encourage plant growth.
- 6.2.24 Depending upon the final Principal Application Site levels, excavation and placement of material may be required. If, following excavation, made ground remains, a geotextile break layer is likely to be required to separate the made ground from imported subsoil and topsoil.

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## 6.3 Controlled Waters Risk Assessment

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6.3.1 The generic controlled waters risk assessment was conducted in accordance with the principles of the Environment Agency publication 'Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination' 2006 (Ref 16C.13) and the 'prevent and limit' approach of the Water Framework Directive (2000/60.EC). Generic controlled waters risk assessments compare directly measured concentrations with standard assessment criteria. In this case the following assessments were undertaken:

- Level 1 - evaluates the concentrations of chemicals within the pore water in the unsaturated zone of source area soil, in this case soil leachate analysis/using theoretical calculations.
- Level 2 - evaluates the concentrations of chemicals within the saturated zone immediately underlying a source area i.e. taking dilution and attenuation into account, in this case groundwater analysis.

6.3.2 Appropriate Water Quality Standards (WQS) are selected based on both a hierarchy of relevance to England and Wales and the receptor. In this case, the controlled water receptors identified in the CSM are:

- River Yare surface watercourse;
- The underlying Secondary (A) and Principal Aquifers within the superficial and bedrock strata;

6.3.3 The following hierarchies of WQS were therefore considered to be appropriate:

### Aquifers

- UK Drinking Water Quality Standards (DWS) from The Water Supply (Water Quality) Regulations 2000 (amended 2016) (UK DWS) (Ref 16C.14);
- World Health Organisation Drinking Water Guidelines 2017 (WHO DWG 2017) (Ref 16C.15);
- World Health Organisation Petroleum Products in Drinking Water (2008) (WHO 2008) (Ref 16C.16)

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## Surface Waters

- Environmental Quality Standards (EQS) from The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 (WFD 2015) (Ref 16C.17)
- CL:AIRE Petroleum in Groundwater Guidance 2017 (CL:AIRE 2017) (Ref 16C.18),
- R&D Technical Report P2-115/TR4 2002 (Ref 16C.19).

**6.3.4** The following Sections detailing the determinands recording test results in excess of the WQS screening values should be read in conjunction with the screening tables presented in Appendix E.

**6.3.5** It should be noted that two versions of the groundwater screening tables are presented in Annex E. One presented the data per monitoring visit and the other presents the data per geological strata so that a comparison between the different strata can be made.

**6.3.6** NPL undertook water sampling visits to extract water from the monitoring wells for chemical testing on the following occasions. It should be noted that not all monitoring wells were sampled on each visit:

- 1st June 2018
- 21<sup>st</sup> June 2018
- 3<sup>rd</sup> July 2018
- 19<sup>th</sup> July 2018
- 2<sup>nd</sup> August 2018
- 17<sup>th</sup> August 2018
- 30<sup>th</sup> August 2018
- 4<sup>th</sup> October 2018
- 18<sup>th</sup> October 2018
- 1<sup>st</sup> November 2018
- 14<sup>th</sup> November 2018
- 29<sup>th</sup> November 2018
- 11<sup>th</sup> December 2018
- 20<sup>th</sup> December 2018



## Risks to Aquifer

### Soil Leachability Testing

6.3.7 Generic screening of 24 soil leachate test results from the 2017/2018 ground investigation identified exceedances of the WQS screening values for the following determinands:

*Table 6.1: Summary of Soil Leachate Exceedances (Risks to Aquifer)*

Determinand	Exceedance	Screening Value	Source of Screening Value*	Number of Exceedances	Soil Concentrations at Exceedances
<b>Alkaline pH</b>	11.18	10	UK DWS	1	10.31
<b>Acid pH</b>	6.22	6.5	UK DWS	1	8.38
<b>Ammoniacal Nitrogen</b>	5.08mg/l to 0.39mg/l	0.389mg/l	UK DWS	10	71.2mg/kg to 8.6mg/kg
<b>Total cyanide</b>	0.021mg/l to 0.006mg/l	0.005 mg/l	UK DWS	6	2mg/kg to <1mg/kg
<b>Arsenic</b>	23µg/l to 13µg/l	10µg/l	UK DWS	5	12mg/kg to 4mg/kg
<b>Lead</b>	145µg/l to 14µg/l	10µg/l	UK DWS	9	752mg/kg to 14mg/kg
<b>Benzo(a)pyrene</b>	0.13µg/l to 0.03µg/l	0.01µg/l	UK DWS	3	13.9mg/kg to 0.37mg/kg
<b>Sum of four PAH</b>	0.34µg/l to 0.23µg/l	0.1µg/l	UK DWS	2	34.67mg/kg to 1.34mg/kg

6.3.8 It should be noted that the limits of detection for benzo(a)pyrene, bis(2-ethylhexyl)phthalate and hexachlorobutadiene are in excess of the screening values.

### Groundwater Testing

6.3.9 Generic screening of groundwater test results from the fourteen monitoring visits (from the 2017/2018 ground investigation) identified WQS exceedances for the following determinands but not from every sample on every monitoring visit. Discussion of the exceedances is presented in the following sections.

*Table 6.2: Summary of Groundwater Exceedances (Risks to Aquifer)*

Determinand	Exceedance	Screening Value	Source of Screening Value*	Number of Exceedances
<b>Alkaline pH</b>	10.34 to 11.9	10	UK DWS	5
<b>Ammoniacal Nitrogen</b>	0.42mg/l to 12.9mg/l	0.389mg/l	UK DWS	102
<b>Sulphate</b>	282mg/l to 2,720mg/l	250mg/l	UK DWS	54
<b>Free Cyanide</b>	0.006mg/l to 0.033mg/l	0.005mg/l	UK DWS	15
<b>Total Cyanide</b>	0.016mg/l to 0.231mg/l	0.005mg/l	UK DWS	39
<b>Arsenic</b>	11µg/l to 75µg/l	10µg/l	UK DWS	48
<b>Boron</b>	1,010µg/l to 4,920µg/l	1,000µg/l	UK DWS	37
<b>Benzo(a)pyrene</b>	0.02µg/l to 1.87µg/l	0.01µg/l	UK DWS	16
<b>Sum of four PAH</b>	0.11µg/l to 5.46µg/l	0.1µg/l	UK DWS	9
<b>Aromatic C<sub>10</sub>-C<sub>12</sub></b>	97µg/l	90µg/l	WHO 2008	1
<b>Aromatic C<sub>12</sub>-C<sub>16</sub></b>	121µg/l to 163µg/l	90µg/l	WHO 2008	2
<b>Aromatic C<sub>16</sub>-C<sub>21</sub></b>	110µg/l	90µg/l	WHO 2008	1

6.3.10 It should be noted that the limits of detection for bis(2-ethylhexyl)phthalate, vinyl chloride, 1,2-dibromoethane, 1,2-dibromo-3-chloropropane, hexachlorobutadiene are in excess of the screening values.

6.3.11 Most of the exceedances are marginal (less than one order of magnitude) and are unlikely to pose an unacceptable risk to drinking water. However, there are a few exceedances that are one or more orders of magnitude higher than the screening values and these are highlighted below.

6.3.12 Ammoniacal nitrogen exceeds the WQS in most samples by one order of magnitude although occasional samples from BH13, WS20, WS21 and WS22 recorded concentrations two orders of magnitude higher.

- 6.3.13** Sulphate exceeds the WQS by one order of magnitude in a few samples; BH6, BH4D (deep), BH11, BH13 and BH4.
- 6.3.14** Arsenic exceedances are no more than one order of magnitude higher than the WQS and are generally recorded in BH6, BH4D (shallow), BH15, but also in BH4D (deep), BH13, BH11, WS20, WS21 and WS22 on occasions.
- 6.3.15** Exceedances of benzo(a)pyrene were recorded in BH4D, BH4, WS20, WS21, WS22 and are generally less than one order of magnitude higher than the screening value. However, a maximum concentration of 1.87µg/l was recorded in WS22 during visit eight on 4th October 2018.
- 6.3.16** Total PAH exceeded the WQS on only nine occasions and were generally less than one order of magnitude higher than the WQS. However, two samples recorded concentrations greater than one order of magnitude – WS22 – 5.46µg/l on 4th October and WS20 – 1.54µg/l on 29th November.
- 6.3.17** Petroleum hydrocarbons are generally below the screening values apart from WS21 and BH13 in the last two monitoring visits where aromatic C12-C16 hydrocarbons were recorded up to 163µg/l. Test results above the limit of detection were also recorded for aromatic C10-C35 hydrocarbons indicating the possible presence of diesel.

Groundwater Testing – 2006 Ground Investigation

- 6.3.18** Generic screening of groundwater test results from the single monitoring visit from the 2006 ground investigation identified WQS exceedances for the following determinands. Discussion of the exceedances is presented in Sections 6.3.35 to 6.3.43.

*Table 6.3: Summary of Groundwater Exceedances 2006 GI (Risks to Aquifer)*

Determinand	Exceedance	Screening Value	Source of Screening Value*	Number of Exceedances
<b>Arsenic</b>	20µg/l to 35µg/l	10µg/l	UK DWS	4
<b>Boron</b>	1.4mg/l to 3.0mg/l	1mg/l/l	UK DWS	3
<b>Nickel</b>	26µg/l to 47µg/l	20µg/l	UK DWS	3
<b>Selenium</b>	53µg/l to 130µg/l	10µg/l	UK DWS	4



Determinand	Exceedance	Screening Value	Source of Screening Value*	Number of Exceedances
<b>Sulphate</b>	330mg/l to 1600mg/l	250mg/l	UK DWS	5
<b>Total cyanide</b>	0.18mg/l to 3.5mg/l	0.005mg/l	UK DWS	2
<b>Free cyanide</b>	0.94mg/l	0.005mg/l	UK DWS	1
<b>Benzo(a)pyrene</b>	34ng/l	10ng/l	UK DWS	1

**6.3.19** Most exceedances are less than one order of magnitude greater than the screening value. However, selenium and sulphate both exceed by one order of magnitude. The cyanide and benzo(a)pyrene exceedances are recorded in BH110 and TP104 in the southern part of the western area and may be indicative of gasworks waste and / or ash fill.

### Risks to River Yare Surface Water

#### Soil Leachability Testing

**6.3.20** Generic screening of 24 soil leachate test results from the 2017/2018 ground investigation identified the following WQS exceedances:

*Table 6.4: Summary of Soil Leachability Exceedances (Risks to River Yare)*

Determinand	Exceedance	Screening Value	Source of Screening Value*	Number of Exceedances	Soil Concentrations at Exceedances
<b>Cyanide</b>	0.021mg/l to 0.006mg/l	0.001mg/l	WFD 2015	6	2mg/kg to <1mg/kg
<b>Copper</b>	38µg/l to 4µg/l	3.76µg/l	WFD 2015	14	157mg/kg to 3mg/kg
<b>Nickel</b>	11µg/l	8.6µg/l	WFD 2015	1	17mg/kg
<b>Mercury</b>	0.1µg/l	0.07µg/l	WFD 2015	1	<0.17mg/kg
<b>Lead</b>	145µg/l to 2µg/l	1.3µg/l	WFD 2015	19	752mg/kg to 7mg/kg

Determinand	Exceedance	Screening Value	Source of Screening Value*	Number of Exceedances	Soil Concentrations at Exceedances
<b>Zinc</b>	644µg/l to 7µg/l	6.8µg/l	WFD 2015	15	1,900mg/kg to 16mg/kg
<b>Anthracene</b>	0.13µg/l	0.1µg/l	WFD 2015	1	0.02mg/kg
<b>Benzo(a)pyrene</b>	0.13µg/l to 0.03µg/l	0.00017µg/l	WFD 2015	3	13.9mg/kg to 0.37mg/kg
<b>Fluoranthene</b>	0.2µg/l to 0.02µg/l	0.0063µg/l	WFD 2015	16	9.18mg/kg to <0.08mg/kg
<b>Naphthalene</b>	3.75µg/l	2µg/l	WFD 2015	1	0.18mg/kg
<b>Bis(2-ethylhexyl)phthalate</b>	4µg/l	1.3µg/l	WFD 2015	1	<500µg/kg
<b>Aromatic C<sub>12</sub>-C<sub>16</sub></b>	11µg/l	2µg/l	CL:AIRE 2017	1	15.8µg/kg

6.3.21 It should be noted that the limits of detection for cyanide, phenols, cadmium, hexavalent chromium, mercury, benzo(a)pyrene, fluoranthene, 1,2,4-trichlorobenzene, 2,4-dichlorophenol, bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, phenol and aromatic C<sub>5</sub>-C<sub>7</sub>, C<sub>10</sub>-C<sub>12</sub>, C<sub>12</sub>-C<sub>16</sub>, C<sub>16</sub>-C<sub>21</sub> and C<sub>21</sub>-C<sub>35</sub> hydrocarbons are in excess of the screening values.

#### Groundwater Testing

6.3.22 Generic screening of groundwater test results from the 14 monitoring visits (from the 2017/2018 ground investigation) identified WQS exceedances for the following determinands but not from every sample on every monitoring visit.

Table 6.5: Summary of Groundwater Exceedances (Risks to River Yare)

Determinand	Exceedance	Screening Value	Source of Screening Value*	Number of Exceedances
<b>Free cyanide</b>	0.006µg/l to 0.033µg/l	0.001mg/l	WFD 2015	15

Determinand	Exceedance	Screening Value	Source of Screening Value*	Number of Exceedances
<b>Total cyanide</b>	0.016µg/l to 0.231µg/l	0.001mg/l	WFD 2015	39
<b>Arsenic</b>	53µg/l to 75µg/l	25µg/l	WFD 2015	12
<b>Copper</b>	4µg/l to 74µg/l	3.76µg/l	WFD 2015	50
<b>Mercury</b>	0.1µg/l to 0.2µg/l	0.07µg/l	WFD 2015	2
<b>Zinc</b>	7µg/l to 60µg/l	6.8µg/l	WFD 2015	29
<b>Anthracene</b>	0.24µg/l to 0.25µg/l	0.1µg/l	WFD 2015	2
<b>Benzo(a)pyrene</b>	0.01µg/l to 1.87µg/l	0.00017µg/l	WFD 2015	22
<b>Fluoranthene</b>	0.01µg/l to 2.33µg/l	0.0063µg/l	WFD 2015	77
<b>Phenol</b>	13µg/l	7.7µg/l	WFD 2015	1
<b>Trichloroethene</b>	14µg/l to 20µg/l	10µg/l	WFD 2015	5
<b>Aromatic C9-C10</b>	5µg/l to 97µg/l	2µg/l	CL:AIRE 2017	13
<b>Aromatic C10-C12</b>	6µg/l to 163µg/l	2µg/l	CL:AIRE 2017	13
<b>Aromatic C12-C16</b>	6µg/l to 110µg/l	0.1µg/l	CL:AIRE 2017	23
<b>Aromatic C21-C35</b>	16µg/l to 45µg/l	0.00017µg/l	CL:AIRE 2017	5

**6.3.23** Most of the exceedances are marginal (less than one order of magnitude) and are unlikely to pose an unacceptable risk to surface waters. However, there are a few possible patterns that may indicate an impact has previously occurred.

**6.3.24** Trichloroethene and 1,2-dichloroethene are recorded above the limit of detection in BH4 (shallow and deep wells) in most of the monitoring visits. Trichloroethene is recorded above the screening value of 10µg/l in BH4D



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(deep) during each of the first five monitoring visits. The concentrations recorded range from 14µg/l to 20µg/l. 1,2-dichloroethene concentrations only vary from 1µg/l to 12µg/l (compared to a WQS of 50µg/l). This would suggest an impact has occurred in the past but in the absence of significantly elevated concentrations of any other VOC's a significant risk is not considered to exist. This location is on the western side of the river.

- 6.3.25** Hydrocarbons were not recorded above the limit of detection during the first six visits. However, aromatic hydrocarbons were recorded above the limit of detection in wells on the eastern side of the river from visit seven (30th August 2018), particularly BH13, WS20, WS21 and WS22. Until the final two monitoring visits, the concentrations did not exceed 53µg/l. However, the last two monitoring visits recorded an increase in the number of locations recording concentrations above the limit of detection, particularly for aromatic C16 to C21 (up to 97µg/l). WS21 recorded aromatic hydrocarbons up to 163µg/l (C12 to C16).
- 6.3.26** Aliphatic hydrocarbons were generally less than the limit of detection except for a few occasions when BH4D, BH10, WS21 and WS22 recorded speciations above the limit of detection up to 80µg/l.
- 6.3.27** Hydrocarbon odours were recorded in BH14 and WS21 on the eastern side of the river during the drilling works. Elevated hydrocarbon concentrations within the groundwater have also been recorded in a similar area but only during the final two sampling visits. The elevated concentrations are for the aromatic C9 to C35 fractions and have a maximum concentration of 163µg/l and exceed the WQS for these fractions. An impact appears to have occurred but it is unclear why the last two sampling visits recorded exceedances and the previous visit generally did not.
- 6.3.28** Elevated arsenic was recorded in BH15 only up to a maximum concentration of 75µg/l and elevated cyanide was commonly recorded in BH15 and BH4D up to 0.227µg/l.
- 6.3.29** Fluoranthene was recorded in most samples during most visits and the results are generally in the range of 0.01µg/l to 0.05µg/l. However, occasional results for WS20, WS21, WS22, BH12B and BH4D (shallow) are recorded an order of magnitude higher, up to 0.48µg/l. WS22 also recorded a maximum concentration of 2.33µg/l. This same sample from WS22 (4th October 2018) also recorded elevated benzo(a)pyrene (1.87µg/l), the highest recorded during the monitoring as well as the only phenol exceedance and one of two anthracene exceedances (the other being WS20).

### Groundwater Testing – 2006 Ground Investigation

**6.3.30** Generic screening of groundwater test results from the single monitoring visit from the 2006 ground investigation identified WQS exceedances for the following determinands but not from every sample on every monitoring visit.

*Table 6.6: Summary of Groundwater Exceedances 2006 GI (Risks to River Yare)*

Determinand	Exceedance	Screening Value	Source of Screening Value*	Number of Exceedances
<b>Arsenic</b>	33µg/l to 35µg/l	25µg/l	WFD 2015	3
<b>Cadmium</b>	µg/l to µg/l	0.2µg/l	WFD 2015	1
<b>Nickel</b>	µg/l to µg/l	8.6µg/l	WFD 2015	4
<b>Zinc</b>	µg/l to µg/l	µg/l	WFD 2015	4
<b>Total cyanide</b>	µg/l to µg/l	µg/l	WFD 2015	2
<b>Free cyanide</b>	µg/l to µg/l	µg/l	WFD 2015	1
<b>Naphthalene</b>	67µg/l	2µg/l	WFD 2015	1
<b>Anthracene</b>	1.3µg/l	0.1µg/l	WFD 2015	1
<b>Fluoranthene</b>	0.019µg/l to 3.6µg/l	0.0063µg/l	WFD 2015	2
<b>Benzo(a)pyrene</b>	0.034µg/l	0.00017µg/l	WFD 2015	1

**6.3.31** Some exceedances are less than one order of magnitude greater than the screening value. However, zinc, total cyanide, free cyanide, naphthalene, anthracene, fluoranthene and benzo(a)pyrene exceedances are recorded at concentrations one or two orders of magnitude higher than the screening values. BH110 in particular records the most exceedances and may be indicative of gasworks waste and / or ash fill.

### **Discussion**

**6.3.32** The ground investigation recorded some olfactory evidence of hydrocarbons in WS21, BH14 and BH6 from the 2017 ground investigation and in TP101, BH104 and BH110 from the 2006 ground investigation.

**6.3.33** Sampling of groundwater from monitoring well installations (adopting best practice of purging) identified some exceedances of the conservative generic groundwater screening values for metals, inorganics and hydrocarbons. Most of these exceedances are less than one order of magnitude greater

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than the screening values and are therefore not considered to be indicative of significant contamination.

- 6.3.34** However, there is some evidence of organic contamination (polyaromatic hydrocarbons, volatile organic compounds and petroleum hydrocarbons) and to a lesser extent metals and non-metals in the groundwater across the Principal Application Site indicating the groundwater has been impacted previously and has the potential to impact the surface water of the River Yare.
- 6.3.35** The soil leachate WQS exceedances are generally less than one order of magnitude above the screening values and indicate that there is a theoretical potential for an impact to occur. However, the Principal Application Site will be generally hard standing, thus limiting the degree of rainfall percolation through the made ground and hence the concentrations recorded suggest the made ground would not pose a significant risk to Controlled Waters.
- 6.3.36** In view of the above it is considered that the absence of test results that consistently exceed the screening values at each monitoring visit indicates that there is unlikely to be an unacceptable risk to the identified receptors and hence specific remediation to target existing groundwater exceedances is not considered necessary.
- 6.3.37** The groundwater monitoring test data has also been assessed on a strata by strata basis. This has not identified any significant difference in the exceedances between the different strata or from one side of the river to the other. This would suggest there is hydraulic continuity between the different strata.

### **Assessment of Saline Intrusion**

- 6.3.38** The two most recent sets of groundwater testing included results for electrical conductivity in order to make an assessment of saline intrusion. The results indicate that there is some influence from seawater across the Principal Application Site in both shallow and deep groundwater monitoring wells.

## **6.4 Ground Gas Assessment**

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### **Results**

- 6.4.1** To date, nine rounds of ground gas monitoring have been undertaken by NPL on the following dates:



- 17<sup>th</sup> August 2018 – excludes BH7 and window sample locations WS20-WS22;
- 30<sup>th</sup> August 2018 - excludes BH7 and window sample locations WS20-WS22;
- 4<sup>th</sup> October 2018 – excludes BH7;
- 18<sup>th</sup> October 2018 - excludes BH7;
- 1<sup>st</sup> November 2018 - excludes BH7;
- 14<sup>th</sup> November 2018 - excludes BH7;
- 29<sup>th</sup> November 2018 - excludes BH7;
- 11<sup>th</sup> December 2018 - excludes BH7; and
- 20<sup>th</sup> December 2018 – only BH7 was monitored on this occasion.

**6.4.2** It is likely that a control building will be constructed adjacent to the eastern abutment and therefore this gas assessment will inform the design of that building.

**6.4.3** Atmospheric pressure varied as set out in Table 6.7 during the monitoring period.

*Table 6.7: Summary of Atmospheric Pressure Recorded during Gas Monitoring Visits*

Date	Atmospheric Pressure	Trend
<b>17/8/18</b>	1010	Steady
<b>30/8/18</b>	1020	Steady
<b>4/10/18</b>	1022	Steady
<b>18/10/18</b>	1024	Steady
<b>1/11/18</b>	1001	Steady
<b>14/11/18</b>	1022-1021	Falling
<b>29/11/18</b>	1002	Steady
<b>11/12/18</b>	1026	Steady
<b>20/12/18</b>	1003	Steady

**6.4.4** The results of the 2018 gas monitoring are presented in Annex B.2. The table below presents Gas Screening Values (GSV) and the subsequent Characteristic Situation which have been calculated in accordance with CIRIA Guidance C665 (Ref 16C.10) for each gas monitoring well.

*Table 6.8: Summary of Ground Gas Monitoring Results*

Exploratory Hole	Max Flow Rate (l/hr)	Max Methane (% v/v)	Max Carbon Dioxide (% v/v)	Methane GSV	Carbon Dioxide GSV	Characteristic Situation
<b>BH4</b>	0.1	0	4.8	0	0.000048	1
<b>BH4A</b>	0	0	5.1	0	0	1
<b>BH4D Shallow</b>	1.1	0	10.6	0	0.1166	2
<b>BH4D Deep</b>	1.0	0	10.1	0	0.101	2
<b>BH6</b>	0.1	0	0.9	0	0.0009	1
<b>BH7</b>	0	0	4.1	0	0	1
<b>BH10</b>	0.1	0	1.5	0	0.0015	1
<b>BH11</b>	1.1	1.1	6.1	0.0121	0.0671	1
<b>BH12B</b>	0.1	0	3.6	0	0.0036	1
<b>BH13</b>	0.1	0.8	0.3	0.0008	0.0003	1
<b>BH15</b>	0	0	0.5	0	0	1
<b>WS20</b>	0	0	0.1	0	0	1
<b>WS21</b>	0	0	0.1	0	0	1
<b>WS22</b>	0	0	0.2	0	0	1

- 6.4.5** The above GSV's range between zero and 0.1166 and indicate most monitoring wells are classified as Characteristic Situation 1, with two locations (BH4D deep and BH4D shallow) being Characteristic Situation 2. However, BH4A, BH11 and possibly also BH4, BH7 and BH13 exhibit gas concentrations that could classify these as Characteristic Situation 2 should gas flow increase at these locations.
- 6.4.6** No gas protection measures above and beyond standard construction are required for the areas classified as Characteristic Situation 1. However, areas classified as Characteristic Situation 2 may require gas protection measures.
- 6.4.7** The results of the gas monitoring from the 2006 ground investigation (presented in Annex B.3) do not change this assessment of the Characteristic Situation.
- 6.4.8** The control room and plant room are located at an elevated position on the side of the bridge abutments. They will not have any direct contact with the ground and therefore are considered to not require gas protection measures.

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## 6.5 Piling Risk Assessment

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6.5.1 A Piling Works Risk Assessment has been prepared in accordance with the following Environmental Agency guidance and will be presented as Appendix 16D to the Environmental Statement (document reference 6.3);

- Piling in layered ground: risks to groundwater and archaeology. Environment Agency Science Report SC020074/SR (Ref 16C.20);
- Piling into contaminated sites. Environment Agency National Groundwater and Contaminated Land Centres (Ref 16C.21); and
- Piling and penetrative ground improvement methods on land affected by contamination: guidance on pollution prevention. Environment Agency (Ref 16C.22).



## 7 Waste Assessment

### 7.1 Hazardous Properties Assessment

- 7.1.1 A waste classification hazardous properties assessment has been carried out in accordance with the WM3 Technical Guidance (Ref 16C.23), to determine if the site soils contain any hazardous properties.
- 7.1.2 The soil chemical test results from the 2017/2018 ground investigation have been assessed and identified hazardous properties in six samples;
- BH6 at 0.5m bgl,
  - BH7 at 0.8m bgl,
  - WS3 at 0.3m bgl,
  - BH4D at 3.9m bgl,
  - BH10A at 2.9m bgl,
  - BH17 at 0.5m bgl,
- 7.1.3 All of the above are in made ground and exhibit hazardous properties due to elevated either zinc, petroleum hydrocarbons, pH or speciated polyaromatic hydrocarbons or a combination of these.
- 7.1.4 A further 42 samples were highlighted as potentially hazardous due to the petroleum hydrocarbons.
- 7.1.5 Four samples recorded asbestos as loose fibres of chrysotile. Two of these samples underwent quantification testing, recording 0.016% (BH6 at 0.5m bgl) and <0.001% (BH6 at 1.0m bgl). BH6 at 0.5m may therefore also be classified as hazardous waste based on the asbestos content.
- 7.1.6 It may not be possible for material classified as hazardous to be reused in the Order Limits, Waste Catalogue (EWC) as '17 05 03' soil and stones containing dangerous substances.
- 7.1.7 Material classified as not containing hazardous properties is likely to be classified under the EWC as '17 05 04' soil and stones other than those mentioned in '17 05 03'.
- 7.1.8 Further testing will need to be carried out to confirm the waste classification of the material classified as potentially hazardous. No significant effects will occur as the material will have been earmarked for removal from site. The further testing is required to identify the appropriate disposal route.

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## Waste Acceptance Criteria Testing

- 7.1.9** Waste acceptance criteria (WAC) analysis has been carried out on a number of samples in order to assess the acceptability to landfill should offsite disposal be required. Two samples (WS9 at 1.4m and BH4D at 3.9m) recording hazardous or potentially hazardous properties and subjected to WAC testing failed the hazardous waste criteria for loss on ignition (LOI) and total organic carbon (TOC).
- 7.1.10** Seven samples subjected to WAC testing recorded no hazardous properties. Six of these pass the inert waste criteria, but one sample (BH4A at 2.1m) fails the inert waste criteria for sulphate and total dissolved solids (TDS) and may require disposal as non-hazardous waste if the material is surplus to the scheme.
- 7.1.11** In addition, five samples were subjected to WAC testing but without a hazardous properties assessment. Of these, one (BH8 at 1.0m) fails the hazardous waste criteria for total organic carbon and one (WS20 at 3.1m) fails the inert waste criteria for chloride.
- 7.1.12** The construction Contractor will need to make their own assessment of the waste classifications.

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## 8 Refined Conceptual Site Model

### 8.1 Introduction

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- 8.1.1** This section provides a refinement of the preliminary CSM from the Interpretative Environmental Desk Study Report (presented as Appendix 16B within the Environmental Statement). From the information identified during the ground investigation and the risk assessments detailed in Section 6 above, plausible source-pathway-receptor contaminant linkages have been refined in line with industry good practice (principally CLR11 (Ref 16C.5)).
- 8.1.2** The refined CSM provides an updated understanding of the Principal Application Site based on the findings of the site investigation and analytical results and draws on the ground, hydrogeological and contamination models which are presented in Sections 4, 5 and 6. It has been used to inform the quantitative risk assessments undertaken in Section 6 in the context of a future land use comprising a new highway layout, bridge and associated landscaping and hard standing.

### 8.2 Plausible Contaminant Linkages

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- 8.2.1** Table 8.1 provides a revised evaluation of the potential contaminant linkages that were considered to be plausible for the future use of the Principal Application Site. It uses the current site investigation findings to refine the Phase 1 assessment.



Table 8.1: Summary of Plausible Contaminant Linkages

Potential Contaminants	Potential Pathways	Potential Receptors	Comments
<b>Free asbestos fibres in made ground soil</b>	Inhalation of asbestos fibres.	Future site users Future maintenance workers	Extensive hard standing will restrict exposure following construction but exposure during construction and during maintenance works cannot be discounted. The presence of asbestos elsewhere within the made ground cannot be discounted therefore if made ground materials are placed in landscaping areas, a capping layer will also need to be considered to minimise the risk to site users and adjacent site users from inhalation of fibres.
<b>Contaminants in soil</b>	Dermal contact, ingestions and inhalation of contaminated made ground, soil particles and fugitive dust.	Future site users Future maintenance workers	Detected potential contaminants limited to benzo-a-pyrene (2 locations), pH (ten locations) and lead (one location).

Potential Contaminants	Potential Pathways	Potential Receptors	Comments
			Extensive hard standing will restrict exposure at most locations except where landscaping is proposed.
<p><b>Leachable contaminants and contaminants in groundwater</b></p>	<p>Vertical leaching from impacted soil and lateral migration of impacted groundwater derived from on-site sources.</p>	<p>Superficial Secondary (A) aquifers and bedrock Principal Aquifer. River Yare surface water</p>	<p>Groundwater appears to have been impacted slightly by inorganic determinands and at a few locations (principally WS22) by hydrocarbons.</p> <p>There is a theoretical risk to surface waters from leachable contaminants in soil including limited hydrocarbon exceedances.</p> <p>Extensive hard standing will limit rainfall percolation and leachate potential and the identified exceedances of the WQS criteria are generally not significantly elevated.</p> <p>Whilst a potential contaminant linkage has been identified, an unacceptable risk to</p>



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Potential Contaminants	Potential Pathways	Potential Receptors	Comments
			controlled waters is considered unlikely. However, the hydrocarbons identified in WS22 will need to be assessed once all the groundwater monitoring visits are complete.



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## 9 Conclusions

### 9.1 Ground Conditions

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- 9.1.1 The ground investigation encountered made ground across most locations. The encountered underlying Superficial geology comprised clay and silt of the Tidal River or Creek Deposits, sand of the North Denes Formation, granular, cohesive or peat material of the Breydon Formation, sand of the Happisburg Formation. Bedrock geology was encountered at depth and comprised sand of the Crag Group and below that, clay of the London Clay.
- 9.1.2 Made ground was recorded at almost all exploratory locations, varied in proven thickness from 0.4m to 4.8m and was generally granular and heterogeneous in nature.
- 9.1.3 Solid concrete was encountered at most locations in the eastern area and was recorded up to 0.65m thick. However, only a few locations in the western area encountered concrete up to 0.5m thick.
- 9.1.4 Other than the man-made detritus recorded within the made ground, olfactory evidence of contamination was recorded at only a few locations as hydrocarbon odour or sulphurous odour. No hydrocarbon sheen or free phase product was recorded on the Engineer's logs.
- 9.1.5 The ground investigation confirmed the presence of shallow groundwater which is likely to be in hydraulic continuity with the River Yare.

### 9.2 Environmental / Contamination Assessment

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- 9.2.1 The following contamination issues have been identified:
- Asbestos was recorded by the chemical testing laboratory at four locations as loose fibres of chrysotile. The potential for more asbestos containing materials to be present within made ground materials cannot be discounted and the construction Contractor should take necessary precautions to protect their staff, site users and adjacent site users as set out in the Outline Code of Construction Practice (Outline CoCP) (document reference 6.16).
  - Natural ground has recorded exceedances of the human health GAC values for pH.
  - Made ground has recorded exceedances of the human health GAC values for pH benzo(a)pyrene and lead.

- There have been several exceedances (for a number of determinants) of the conservative generic WQS screening values in the groundwater and soil leachate samples tested. The groundwater test results indicate that some impact to controlled waters has already occurred but it is considered unlikely that the proposed scheme will have an adverse impact on controlled waters. The soil leachability results indicate the soils have the theoretical potential to generate leachate but the impact is unlikely to be significant.
- Gas monitoring data indicates ground gas has been recorded at concentrations that may require specific gas protection measures up to Characteristic Situation 2, depending upon the location and design of any control buildings or structures. The control room and plant room are at an elevated location on the side of the bridge abutments and therefore do not have any direct contact with the ground. Gas protection measures are therefore not considered to be necessary for these two spaces.

### 9.3 Outline Remedial Measures

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- 9.3.1** Potential risks to future site users from asbestos within made ground have been identified and the possibility of made ground at the Principal Application Site containing further asbestos cannot be ruled out. If the known asbestos locations are to be exposed / disturbed during construction or will be exposed at the surface in final landscaping areas, further sampling and assessment at these locations will need to be undertaken by the construction Contractor and if necessary, consideration should be given to excavating and removing this material from the Principal Application Site. The same will apply if further presence of asbestos is observed during the construction works. Measures are set out in the interim Outline CoCP (document reference 6.16) and will form part of the full CoCP.
- 9.3.2** Other potential human health risks were identified. These are mitigated to acceptable levels where construction of the road will break the pathway. However, in areas where landscaping or the MIND site allotments are proposed, it is considered that placement of an inert subsoil and topsoil capping underlain by a geotextile (to delineate the made ground / capping interface and to minimise mixing of the soils) may be necessary (in particular in the proposed allotment area). Discussion with the Regulators at detailed design stage will be required to agree the scope of any capping. Measures are set out in the interim Outline CoCP (document reference 6.16) and will form part of the full CoCP.
- 9.3.3** Groundwater extracted from excavations during construction is likely to require treatment prior to discharge and the exact details of this will need to be confirmed by the Contractor depending upon their chosen disposal route.

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Measures are set out in the Outline CoCP (document reference 6.16) and will form part of the full CoCP.

## **9.4 Construction Considerations**

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- 9.4.1** Protection of construction workers, site users and adjacent site users from airborne dust generated from made ground during construction will be required and measures are set out in the Outline CoCP (document reference 6.16) and will form part of the full CoCP.
- 9.4.2** The construction Contractor will need to keep a 'watching brief' for unforeseen contamination including hydrocarbons and asbestos. Hydrocarbon odours were identified during the ground investigation, but chemical testing did not record any elevated concentrations at those locations.

## **9.5 Operation Considerations**

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- 9.5.1** Long term risks associated with contamination are dealt with in the outline remedial measures sub-section above. No additional remedial measures are therefore necessary during operation of the Scheme.



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# **Great Yarmouth Third River Crossing Application for Development Consent Order**

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## **Document 6.2: Environmental Statement Volume II: Technical Appendix 16C – Annex A and B – Part 1**

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**Planning Act 2008**

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure)  
Regulations 2009 (as amended) (“APFP”)**

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## Annex A: 2017/2018 Scope of Works

### Land Based Field Works

#### General Works

The land based ground investigation was undertaken between 18<sup>th</sup> September 2017 and 27<sup>th</sup> March 2018 by NPL who acted as Principal Contractor and were contracted to The Applicant. Envirolab Ltd were sub-contracted by NPL to undertake the chemical testing.

The ground investigation was undertaken in general accordance with techniques outlined in BS5930:2015 and BS1377:2016, as appropriate, at the positions shown on Drawing GYTRC-WSP-HGT-DR-GE-0001(AB). The exploratory hole logs are presented in Annex B.1.

The investigation was monitored part time by a Geotechnical Engineer from WSP Ltd.

#### Gas and Groundwater Monitoring Well Installation

Gas and groundwater monitoring wells were installed in selected boreholes summarised below and were constructed from 50mm perforated plastic pipe with a pea gravel surround and fitted with air tight gas valves. As a minimum requirement, each monitoring well comprised plain pipe from ground level to 1m with a bentonite pellet surround. Exact details of each installation are shown on the Engineer's logs in Annex B.1.

*Table A.1: Summary of Monitoring Wells*

Borehole ID	BH Depth (m bgl)	Installation Type	Standpipe Depth (m bgl)	Standpipe Response Zone (mbgl)	Target Strata
BH4	30.0	50mm Standpipe	9.5	6.5 – 9.5	Breydon and Crag Formations
BH4A	5.0	50mm Standpipe	1.8	0.5 – 1.7	Made ground and Alluvium
BH4D	30.0	50mm Standpipe	3.5	1.0 – 3.5	Made Ground
		50mm Standpipe	11.0	8.0 – 11.0	Crag Formation
BH6	30.0	50mm standpipe	15.0	9.0 – 15.0	Crag Formation
BH7	6.0	50mm Standpipe	6.0	0.3 – 1.15	Made ground and Breydon Formation

Borehole ID	BH Depth (m bgl)	Installation Type	Standpipe Depth (m bgl)	Standpipe Response Zone (mbgl)	Target Strata
<b>BH10</b>	50.0	50mm Standpipe	3.5	0.5 – 3.5	Made ground and alluvium
<b>BH11</b>	50.0	50mm Standpipe	20.5	4.5 – 20.5	Breydon, North Denes and Crag Formations
<b>BH12B</b>	50.0	50mm Standpipe	10.0	4.0 – 10.0	Made ground, alluvium and Breydon Formation
<b>BH13</b>	50.0	50mm Standpipe	14.5	3.5 – 14.5	Breydon Formation and Crag Formation
<b>BH15</b>	30.0	50mm Standpipe	7.0	1.0 – 7.0	North Denes Formation
<b>WS20</b>	5.0	50mm Standpipe	3.0	1.0 – 3.0	Alluvium (probably Tidal River or Creek Deposits)
<b>WS21</b>	5.0	50mm Standpipe	3.0	1.0 – 3.0	Alluvium (probably Tidal River or Creek Deposits)
<b>WS22</b>	6.0	50mm Standpipe	3.0	1.0 – 3.0	Alluvium (probably Tidal or River Creek Deposits)

It should be noted that an oversight by the Contractor resulted in only one gas and groundwater monitoring visit being undertaken for BH7.

#### Groundwater and Gas Monitoring

Boreholes were monitored by NPL for ground gas concentrations on a number of occasions on completion of the GI. Concentrations of methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>), oxygen (O<sub>2</sub>) and trace gases (including carbon monoxide, hydrogen sulphide) were recorded together with gas flow rates. Atmospheric pressures during the monitoring were also noted to enable a

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quantitative gas risk assessment to be carried out if necessary in accordance with current best practice.

The results of the gas and groundwater monitoring are presented in Annex B.1.

### Groundwater Sampling

NPL have undertaken groundwater sampling on a number of occasions to-date after completion of the site works. Prior to each round of groundwater sampling, three well volumes were purged.

Groundwater samples were retained by NPL in containers provided by Envirolab Ltd and transported to the testing laboratory in accordance with Envirolab Ltd sample handling protocols.

### **Marine Sampling Works**

#### General Works

The marine sampling works were undertaken between 11<sup>th</sup> June 2018 and 14<sup>th</sup> July 2018 by NPL who were contracted to The Applicant. The chemical testing suite was developed by WSP Ltd and undertaken by Envirolab who were sub-contracted by NPL.

Samples were stored in appropriate bottles and transported in cooler boxes to the testing laboratory under a chain of custody protocol within 24 hours of being taken.

The WSP Factual Report including sampling locations and test results is presented in Annex C.

### **Testing**

#### Chemical Testing – Soils & Leachate

Selected soil samples were scheduled for chemical analysis by WSP Ltd which was undertaken by Envirolab Ltd under contract to NPL. However, some locations (BH14, BH15, BH16, BH17 and WS20, WS21 and WS22) were scheduled by NPL for the same testing suite as those locations scheduled by WSP Ltd. The results of the contamination testing are presented in Annex B.1. The testing was scheduled as set out in Table A2 below.

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Table A.2: Summary of Chemical Testing for Soils

Strata	Soil Sample Laboratory Analysis (no.)											% Samples in Upper 1m
	Metals	General	TPHCWG	VOC	SVOC	PAH	PCB EC7	PCB WHO 12	WAC	Asbestos	SOM	
<b>Made Ground</b>	32	32	32	32	32	32	16	9	14	25	32	44
<b>Natural Ground</b>	40	40	42	42	42	42	15	17	10		40	7
<b>Key</b>												
<b>Metals</b>	Arsenic, boron, cadmium, chromium (total and hexavalent), lead, mercury, copper, nickel, selenium and zinc											
<b>General</b>	pH, water soluble sulphate, total sulphate, ammonia as N, phenol, free cyanide and total cyanide											
<b>TPHCWG</b>	Speciated TPH (aliphatic and aromatic split and banded) including Benzene, Toluene, Ethyl Benzene and Xylene											
<b>VOC</b>	Volatile Organic Compounds											
<b>SVOC</b>	Semi Volatile Organic Compounds											
<b>PAH</b>	Speciated Poly Aromatic Hydrocarbons											
<b>PCB EC7</b>	PCBs EC7 Congeners											
<b>PCB WHO12</b>	PCBs WHO12 Congeners											
<b>WAC</b>	Total Waste Acceptance Criteria Suite											
<b>Asbestos</b>	Screen only											
<b>SOM</b>	Soil Organic Matter											

Table A.3: Summary of Chemical Testing for Leachate

Strata	Soil Leachate Laboratory Analysis (no.)					% Samples in Upper 1m
	Metals	General	TPHCWG	SVOC	PAH	
<b>Made Ground</b>	11	11	11	11	11	27
<b>Natural Ground</b>	13	13	13	13	13	15
<b>Key</b>						
<b>Metals</b>	Arsenic, boron, cadmium, chromium (total and hexavalent), lead, mercury, copper, nickel, selenium and zinc					
<b>General</b>	pH, water soluble sulphate, ammonia as N, phenol, free cyanide and total cyanide					
<b>TPHCWG</b>	Speciated TPH (aliphatic and aromatic split and banded) including Benzene, Toluene, Ethyl Benzene and Xylene					
<b>SVOC</b>	Semi Volatile Organic Compounds					
<b>PAH</b>	Speciated Polycyclic Aromatic Hydrocarbons					

Chemical Testing - Water

Water Samples were extracted from the monitoring wells on the Principal Application Site on a number of occasions by NPL and submitted for chemical analysis at Envirolab Ltd. The results of the contamination testing are presented in Annex B.1. The testing was carried out as set out in Table A4 below.

*Table A.4: Summary of Chemical Testing for Water (Groundwater and Surface Water)*

Water Body	Laboratory Analysis (no.)						
	Metals	General Suite	TPHCWG	VOC	SVOC	PAH	Enhanced General Suite
<b>Groundwater</b>	112	88	112	88	88	112	24
<b>Key</b>							
<b>Metals</b>	Arsenic, cadmium, chromium (hexavalent and total), lead, mercury, copper, nickel, selenium and zinc),						
<b>General Suite</b>	pH, Sulphate water soluble, Ammonia as N, Cyanide (total and free) and phenol						
<b>TPHCWG</b>	Speciated TPH (aliphatic and aromatic split and banded) including Benzene, Toluene, Ethyl Benzene and Xylene						
<b>VOC</b>	Volatile Organic Compounds						
<b>SVOC</b>	Semi Volatile Organic Compounds						
<b>PAH</b>	Speciated Polyaromatic Hydrocarbons (PAH)						
<b>Enhanced general suite (final two monitoring visits only)</b>	Electrical conductivity, BOD, Alkalinity, Hardness, Total Suspended Solids, Ammonium / Ammoniacal nitrogen as NH <sub>4</sub> , Chloride, Bromine, Fluoride, Nitrite, Nitrate, Nitrate as N, Total Oxidised Nitrogen, Total Nitrogen, Nitrogen (kjeldahl), Phosphate (orthophosphate) as P, Total Phosphorus, Sulphate, DOC, Total Oil & Grease, Calcium, Iron, Manganese, Magnesium, Potassium, Sodium, Ethylene glycol (Monoethylene glycol)						

#### Chemical Testing – River Bed Soil Samples

River bed soil samples were taken by NPL from the 10 marine boreholes within the River Yare and were submitted for chemical analysis at Envirolab Ltd. The results of the contamination testing are presented in Annex C.

The soil testing was scheduled as set out in Table A5 below.



*Table A.5: Summary of Chemical Testing for River Yare Soils*

Strata	Soil Sample Laboratory Analysis (no.)											% Samples in Upper 1m
	Metals	General	TPHCWG	VOC	SVOC	PAH	PCB EC7	PCB WHO 12	WAC	Asbestos	SOM	
<b>Made Ground</b>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Natural Ground</b>	20	20	20	20	20	20	9	13	0	10	20	35
<b>Key</b>												
<b>Metals</b>	Arsenic, boron, cadmium, chromium (total and hexavalent), lead, mercury, copper, nickel, selenium and zinc											
<b>General</b>	pH, water soluble sulphate, total sulphate, ammonia as N, phenol, free cyanide and total cyanide											
<b>TPHCWG</b>	Speciated TPH (aliphatic and aromatic split and banded) including Benzene, Toluene, Ethyl Benzene and Xylene											
<b>VOC</b>	Volatile Organic Compounds											
<b>SVOC</b>	Semi Volatile Organic Compounds											
<b>PAH</b>	Speciated Poly Aromatic Hydrocarbons											
<b>PCB EC7</b>	PCBs EC7 Congeners											
<b>PCB WHO12</b>	PCBs WHO12 Congeners											
<b>WAC</b>	Total Waste Acceptance Criteria Suite											
<b>Asbestos</b>	Screen only											
<b>SOM</b>	Soil Organic Matter											

The soil leachate testing was scheduled as set out in Table A6.

*Table A.6: Summary of Chemical Testing for Leachate (River Bed Soils)*

Strata	Soil Leachate Laboratory Analysis (no.)					% Samples in Upper 1m
	Metals	General	TPHCWG	SVOC	PAH	
<b>Made Ground</b>	0	0	0	0	0	0
<b>Natural Ground</b>	7	7	7	7	7	86
<b>Key</b>						
<b>Metals</b>	Arsenic, boron, cadmium, chromium (total and hexavalent), lead, mercury, copper, nickel, selenium and zinc					
<b>General</b>	pH, water soluble sulphate, ammonia as N, phenol, free cyanide and total cyanide					
<b>TPHCWG</b>	Speciated TPH (aliphatic and aromatic split and banded) including Benzene, Toluene, Ethyl Benzene and Xylene					
<b>SVOC</b>	Semi Volatile Organic Compounds					
<b>PAH</b>	Speciated Polyaromatic Hydrocarbons					

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## Annex B: Land Based Ground Investigation Factual Reports

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## **Annex B.1 2017/2018 Ground Investigation Factual Report**

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Norfolk County Council

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# **GREAT YARMOUTH THIRD RIVER CROSSING**

Onshore Ground Investigation - Factual Report









Norfolk County **Council**

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# **GREAT YARMOUTH THIRD RIVER CROSSING**

## **Onshore Ground Investigation - Factual Report**

**TYPE OF DOCUMENT (VERSION) CONFIDENTIAL**

**PROJECT NO. 70046035**

**OUR REF. NO. GYTRC-WSP-VGT-XX-RP-GE-0001**

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# QUALITY CONTROL

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# 1 INTRODUCTION

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On the instructions and under the supervision of WSP (the Engineer), acting on behalf of Norfolk County Council (the Employer), a site investigation was undertaken by Norfolk Partnership Laboratory (Main Contractor) on land partly by James and Milton and partly by Ground Technology (sub-contractors) at the River Yare crossing in Great Yarmouth.

The Great Yarmouth Third Crossing Project comprises a bridge with a central bascule lifting section located centrally over River Yare, and the associated highway embankments, junctions and infrastructure. The proposed bridge alignment would provide an east-west connection between the Strategic Road Network (A47) and the South Denes Business Park, Enterprise Zone, Great Yarmouth Energy Park and the Outer Harbour, all of which are located on the South Denes peninsula.

This factual report is being produced by WSP on behalf of Norfolk Partnership Laboratory for Norfolk County Council.

The objective of the investigation was to determine the ground, groundwater and ground contamination conditions at the site and to provide information that would assist the geotechnical and geoenvironmental design of the proposed works. The scope of the investigation was determined by the Engineer.

The site work at Great Yarmouth Third River Crossing was carried out between the 18<sup>th</sup> September 2017 and 27<sup>th</sup> March 2018 and comprised:

- Twenty five cable percussion boreholes (four locations terminated early)
- Sixteen dynamic window sampling boreholes
- Five cone penetration tests
- In-situ and laboratory testing

The site plan Drawing Reference GYTRC-WSP-HGT-DR-GE-0001 is included in Appendix A.

## 2 THE SITE AND GEOLOGY

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The irregular shaped site is located on both sides of River Yare, immediately south of Great Yarmouth town centre. The site is approximately bounded to the north by Boundary Road and Newcastle Road, to the east by Exmouth Road and Admiralty Road, to the south by Swanston's Road and William Adams Way, and to the west by Harfrey's Road. The site area is centred on National Grid reference 652320, 306005. The location of the site is shown on the appended site location plan, WSP drawing No. GYTRC-WSP-HGT-DR-GE-0001 included in Appendix A.

Made Ground material is expected to be present and varied in nature and thickness associated to existing infrastructural developments at the site.

The British Geology Survey Map Sheet 162 (British Geological Survey, 1991) for Great Yarmouth indicates that the site is underlain by a variety of superficial deposits:

- South West – peat of the Breydon Formation
- North – clay and silt of the Breydon Formation
- Eastern part beyond the River Yare – sand and gravel of the North Denes Formation
- Within the River Yare – Clay and silt tidal river or creek deposits

Solid geology underlying the site is shown on the BGS website to comprise sand and gravel of the Crag Group, underlain by London Clay.

Groundsure (Groundsure, 2017) records a number of historical ground workings on site, all associated with the quay/ wharf immediately adjacent to the River Yare.

Extract from geological map included in Appendix B

## 3 METHOD OF INVESTIGATION

### 3.1 GENERAL

A Cable Avoidance Tool (CAT) survey was undertaken at the exploratory hole locations. Prior to sinking of the boreholes, dynamic sampler holes and cone penetrometer tests, inspection pits were dug by hand at each location in order to identify the presence of any services.

Details of in-situ sampling and testing carried out, together with the descriptions of the strata encountered, are given on the various exploratory hole records. The investigation was generally carried out in accordance with BS 5930:1999 (British Standard, 1999), BS EN ISO 14688-1:2002 (British Standard, 2002) and BS EN ISO 14689-1:2003 (British Standard, 2003) as appropriate.

Exploratory hole details including depths, surveyed coordinates and installation information are given in Appendix C.

All geotechnical samples were transported to the laboratories and offices of Norfolk Partnership Laboratory (NPL) for examination and testing as scheduled by the NPL and the Engineer. Chemical samples were couriered to the Envirolab laboratory in Cheshire for testing scheduled by the Engineer.

### 3.2 UNEXPLODED ORDNANCE RISK MITIGATION SURVEY

A detailed unexploded ordnance assessment, commissioned by WSP, was undertaken by Dynasafe BACTEC with the report titled 'Explosive Ordnance Desktop Threat Assessment' dated 17th September 2017, Ref. 7307TA. The detailed assessment considers the site to include zones of low, medium and high risk of unexploded ordnance remaining within the site (Dynasafe, 2017).

At each proposed borehole, dynamic sampler and cone penetrometer (CPT) locations, a magnetometer survey was undertaken by MACC, the UXO protection sub-contractor, in order to identify the possible presence of unexploded ordnance (UXO). The testing was carried out by using a magnetic anomaly locator magnetometer or by inspection, in accordance with the guidance provided in CIRIA C681 (CIRIA, 2009). The results of the risk mitigation survey carried out for the ground investigation are given in Appendix D. The MAGNEX 120 LW operates by detecting ferromagnetic objects which are buried underground or underwater. A further important field of use of the Magnex 120 LW lies in the probing of bore holes where magnetic anomalies have been proven at relatively great depths or in detections fields with a lot of surface bound interference.

A total of three borehole locations were terminated before reaching their scheduled depth due to high Magnetometer readings. At these locations scanned depths were increased but readings remained high. The MACC UXO specialist on site advised that the exploratory holes should be terminated immediately following continuous high readings. A summary of the locations terminated due to high magnetometer readings are provided in the Table 1.

**Table 1 - UXO Borehole Termination Summary**

Location	Date	Termination Depth (m BGL)	Note
BH4A	04/12/2017	5.0	Location cancelled
BH5	01/12/2017	5.0	Location moved to BH5A
BH7	30/11/2017	6.0	Location cancelled



### **3.3 CONTAMINATED SITE PROCEDURES**

The site was designated to be in the Institution of Civil Engineers Site Investigation Steering Group Yellow category and appropriate protection measures were undertaken (Site Investigation Steering Group, 1993).

Hand held sampling tools were cleaned after each sample to prevent cross contamination between samples. Samples for chemical contamination testing were taken as appropriate for the intended analyses, as shown on the exploratory hole records.

Each borehole was cased, which was progressively reduced in diameter with depth. Environmental seals of bentonite pellets, adequately hydrated were installed with every change in casing diameter, in order to minimise downward mobilisation of any contaminants within shallow soils or Made Ground.

## 4 FACTUAL INFORMATION

### 4.1 CABLE PERCUSSION BORING

Twenty five boreholes using three diameter casings 300mm, 250mm and 200mm were sunk to depths below ground level (bgl) between 5.0m and 50.0m using light cable tool percussion boring techniques. The borehole records are included in Appendix C.

The cable percussive boreholes are summarised in the table below:

**Table 2 - Borehole Summary**

Borehole ID	Date Completed	Depth (mbgl)	Location	Easting	Northing	Ground Level
BH1	11/12/2017	30.45	West Bank – William Adams Way	652112	305897	1.7
BH2	11/12/2017	30.00	West Bank – William Adams Way	652152	305894	1.56
BH3	-	-	Location Cancelled	-	-	-
BH4	05/12/2017	30.45	West Bank – William Adams Way/ Suffolk Road Junction	652233	305880	1.77
BH4A	05/12/2017	5.00	West Bank – William Adams Way	652315	305800	1.25
BH4D	15/12/2017	30.50	West Bank – William Adams Way	652290	305818	1.38
BH5	01/12/2017	5.00	West Bank – Suffolk Road	652223	305943	0.88
BH5A	15/12/2017	30.50	West Bank – Suffolk Road	652226	305950	0.91
BH6	28/11/2017	30.45	West Bank – Access Road off Suffolk Road	652283	305963	0.93
BH7	30/11/2017	6.00	West Bank – Access Road off Suffolk Road	652307	305946	1.23
BH8	30/01/2018	40.37	West Bank – Southtown Road	652390	305988	1.89
BH9	06/02/2018	40.45	West Bank – Southtown Road	652395	305965	1.83
BH10	06/03/2018	50.45	West Bank – Southtown Road	652407	305990	2.45

Borehole ID	Date Completed	Depth (mbgl)	Location	Easting	Northing	Ground Level
BH10A	27/02/2018	50.00	West Bank – Southtown Road	652414	306010	2.55
BH11	20/02/2018	50.00	West Bank – Southtown Road	652411	305966	2.46
BH11A	20/02/2018	50.00	West Bank – Southtown Road	652418	305947	2.50
BH12	16/03/2018	50.00	East Bank – Fish Warf	652513	306003	2.28
BH12A	19/03/2018	5.95	East Bank – Fish Warf	652504	306025	2.37
BH12B	27/03/2018	50.00	East Bank – Fish Warf	652506	306024	2.33
BH13	14/03/2018	50.00	East Bank – Fish Warf	652516	305980	2.27
BH13A	22/03/2018	50.00	East Bank – Fish Warf	652512	305958	2.38
BH14	22/09/2017	40.00	East Bank – Fish Warf	652536	305983	1.96
BH15	20/21/2017	30.45	East Bank – Fish Warf/ S Denes Road Junction	652637	306021	1.92
BH16	05/10/2017	40.45	East Bank – Fish Warf	652552	306008	2.00
BH17	22/09/2017	40.45	East Bank – Fish Warf	652556	305985	2.05
BH18	28/09/2017	40.45	East Bank – Fish Warf	652532	306006	2.00

Disturbed samples were taken at each change in soil type and at regular vertical intervals during boring in order to identify and give a record of the strata encountered. Environmental disturbed samples were also taken at varying depths within the boreholes which reduced in frequency at deeper depths.

In cohesive soils nominal 100mm diameter general purpose thin-wall driven open tube (UT100) samples were taken and subsequently sealed to preserve their natural moisture contents.

Standard penetration tests (SPT) using a split spoon (S) or a solid 60° cone (C) were carried out in the Made Ground, granular deposits and alternating with UT100 sampling in the cohesive materials. The results of in-situ tests are shown on the borehole records at the relevant depths included in Appendix C.

During the course of boring attention was given to recording any evidence of water inflow in order that the groundwater level beneath the site could be established. Water levels at breaks in boring were recorded where appropriate. Water samples were taken where sufficient water was encountered to allow sampling. Where water was added to facilitate penetration of the soil strata, or to maintain a positive hydrostatic head in the granular strata, this is noted on the borehole records.



Where blowing sand were encountered during drilling, preventative measures were undertaken to reduce the negative effects of the blowing. This was achieved by altering the drilling method to reduce the build up of negative pressures, as well as adding Drilling fluid, i.e. water or a ‘Dandopol’ polymer/water mix to aid drilling.

A total of four locations, including BH4A, BH5, BH7 and BH12A, were terminated before the scheduled depth due to obstructions encountered or detected during drilling. Details of the termination for each borehole are included on the log that are presented in Appendix C.

## 4.2 MARINE CABLE PERCUSSION BORING

No marine cable percussive boreholes are included in this factual report. The Factual report for the 2018 off-shore ground investigation shall be issued separately.

## 4.3 DYNAMIC WINDOW SAMPLING BOREHOLES

Sixteen dynamic sampling boreholes were sunk using the soil sampling (window) system to depths of between 1.10m and 6.00m below ground level (bgl). Penetration of the sampler was obtained by driving up to 128mm diameter windowless tubes, with PVC sleeves, by percussion using a vibrating hammer. Disturbed samples were subsampled from the tubes onsite. The Window Sample records are included in Appendix C.

A total of two trial pit locations from the original scope were undertaken as window samples due to restricted space at each location. An additional two window samples (BH4ASU, BH4BU) were undertaken along William Adams Way at locations that were not accessible by either trial pitting or the cable percussive borehole rig.

The dynamic window sampling boreholes are summarised in the table below:

**Table 3 - Window Sample Summary**

Window Sample ID	Date Completed	Depth (mbgl)	Location	Easting	Northing	Ground Level
WS1	05/12/2017	5.00	West Bank – William Adams Way – Crest of embankment	652125	305895	1.55
WS2	06/12/2017	2.00	West Bank – William Adams Way – Mid slope of embankment	652124	305897	0.85
WS3	06/12/2017	5.00	West Bank – William Adams Way – Toe of embankment	652124	305899	0.18
WS4	05/12/2017	5.00	West Bank – William Adams Way – Crest of embankment	652157	305893	1.59
WS5	04/12/2017	2.00	West Bank – William Adams Way – Mid slope of embankment	652156	305894	1.09
WS6	05/12/2017	5.00	West Bank – William Adams Way – Toe of embankment	652156	305897	0.14

Window Sample ID	Date Completed	Depth (mbgl)	Location	Easting	Northing	Ground Level
WS7	04/12/2017	8.00	West Bank – William Adams Way – Crest of embankment	652204	305885	1.70
WS8	04/12/2017	2.00 (3.00)	West Bank – William Adams Way – Mid slope of embankment	652203	305888	0.87
WS9	04/12/2017	5.00	West Bank – William Adams Way – Toe of embankment	652203	305890	0.27
WS20	11/09/2018	5.00	East Bank – Fish Warf	652545	305995	1.49
WS21	12/09/2018	5.00	East Bank – Fish Warf	652537	305984	1.96
WS22	10/09/2018	6.00	East Bank – Fish Warf	652572	306017	2.00
TP1	07/12/2017	6.00	West Bank – Suffolk Road	652248	305907	0.72
TP1B	13/12/2017	6.00	West Bank – William Adams Way – Eastbound verge	652342	305808	1.82
BH4ASU	13/11/2017	6.00	West Bank – William Adams Way – Eastbound verge	652280	305853	2.13
BH4BU	13/11/2017	5.00	West Bank – William Adams Way – Eastbound verge	652322	305820	1.83

#### 4.4 TRIAL PITTING

No Trial pits were undertaken as part of this ground investigation. Scheduled trial pitting was replaced by window sampling due to space constraints encountered on site, as detailed in Section 4.3.

#### 4.5 INSTRUMENTATION AND MONITORING

Fifteen installations were completed at No.14 locations within the scheme. 50mm diameter HDPE groundwater and gas monitoring standpipes and vibrating wire piezometers were installed within selected boreholes as summarised in the table below:

**Table 4 - Installations Summary**

Borehole ID	BH Depth (m bgl)	Installation Type	Standpipe Depth (m bgl)	Standpipe Response Zone (mbgl)
BH4	30.0	50mm Standpipe	9.5	6.5 – 9.5
BH4A	5.0	50mm Standpipe	1.8	0.5 – 1.7
BH4D	30.0	50mm Standpipe	3.5	1.0 – 3.5
		50mm Standpipe	11.0	8.0 – 11.0
BH5A	30.0	Vibrating Wire	6.5	5.5 – 6.0
BH6	30.0	50mm Standpipe	15.0	9.0 – 15.0
BH7	6.0	50mm Standpipe	1.15	0.3 – 1.15
BH10	50.0	50mm Standpipe	3.5	0.5 – 3.5
BH11	50.0	50mm Standpipe	20.5	4.5 – 20.5
BH12B	50.0	50mm Standpipe	10.0	4.0 – 10.0
BH13	50.0	50mm Standpipe	14.5	3.5 - 14.5
BH15	30.0	50mm Standpipe	7.0	1.0 – 7.0
WS20	5.0	50mm Standpipe	3.0	1.0 – 3.0
WS21	5.0	50mm Standpipe	3.0	1.0 – 3.0
WS22	6.0	50mm Standpipe	3.0	1.0 – 3.0

Groundwater entries were recorded in most boreholes with the exception of boreholes BH5, BH11A, BH12 and BH13. Groundwater entries were recorded in the range 0.90m (BH8) to 11.40m bgl (BH1). The recorded groundwater depths are summarised in the table below.



**Table 5 - Groundwater Records Summary**

<b>Borehole ID</b>	<b>Depth of seepage noted (m bgl)</b>	<b>Depth of water after 20 minutes (m bgl)</b>	<b>Change in water depth (+/- m bgl)</b>	<b>Notes</b>
BH1	2.80	2.80	0.00	Seepage
	11.40	7.00	-4.40	Fast Flow
BH2	3.10	2.70	-0.40	Slow Flow
BH4	3.00	2.24	-0.76	Very Slow Flow
	5.50	3.5	-2.00	Fast Flow
BH4A	3.20	2.90	-0.30	Slow Flow
BH4D	2.10	2.00	-0.10	Medium Flow
BH5A	1.10	1.10	0.00	Seepage
	3.60	3.32	-0.28	Slow Flow
BH6	2.10	1.66	-0.44	Slow Flow
BH7	3.90	3.61	-0.29	Slow Flow
BH8	0.90	0.86	-0.04	Seepage
BH9	1.30	1.25	-0.05	Very Slow Flow
BH10	4.00	3.63	-0.37	Slow Flow
BH10A	1.40	1.26	-0.14	Very Slow Flow
BH11	2.40	2.30	-0.10	Medium Flow
BH13A	1.90	1.85	-0.05	Very Slow Flow
BH14	1.40	-	-	-
BH15	2.00	1.70	-0.30	Very Slow Flow
BH16	2.00	-	-	-

Borehole ID	Depth of seepage noted (m bgl)	Depth of water after 20 minutes (m bgl)	Change in water depth (+/- m bgl)	Notes
BH17	2.00	-	-	-
BH18	2.70	-	-	-
WS1	2.00	1.70	-0.30	Medium Flow
WS2	2.00	1.30	-0.70	Medium Flow
WS3	0.80	0.60	-0.20	Slow Flow
WS4	2.00	1.85	-0.15	Slow Flow
WS5	NA	-	-	-
WS6	2.00	0.65	-1.35	Fast Flow
WS7	NA	-	--	-
WS8	NA	-	-	-
WS9	0.50	0.5	0.00	DNR
WS20	4.00	-	-	-
WS21	1.00	-	-	-
WS22	3.00	-	-	-
TP1	5.00	2.40	-2.60	Fast Flow
BH4ASU	2.00	2.00	0.00	
	5.00	5.00	0.00	
BH4BU	NA			

#### 4.5.1 GROUNDWATER MONITORING

Standpipes were installed as described above in Section 4.5. Details of these installations, and water depth upon completion of the installation are given within Table 5.

At the time of issue of this report a total of fourteen groundwater monitoring and sampling visits had been completed. If further groundwater monitoring is required it will be issued as an addendum to this report.

A summary of the monitoring completed between 01<sup>st</sup> June 2018 and the 20<sup>th</sup> December 2018 are presented in Appendix I. Details of the Piezometer, Methane, Carbon Dioxide Oxygen, flow and atmospheric pressure are presented in the Appendix.

All geoenvironmental testing undertaken from sampling completed during the groundwater monitoring visits are included in Section 6.2 of this report.

## **4.6 SITE SURVEY**

A final topographic survey of the completed exploratory hole location was undertaken on 28<sup>th</sup> March 2018 by surveyors appointed by the Norfolk Partnership Laboratory.



## 5 FIELD TESTING

### 5.1 CONE PENETRATION TEST

A total of 5 No. Static Cone Penetration Tests (CPT) were made using hydraulic penetrometer equipment at locations set out by the Clients Representative on site. Details of the test results and interpretations are presented in Appendix E. The fieldwork was carried out on the 19<sup>th</sup> and 20<sup>th</sup> March 2018.

The cone penetration tests are summarised in the table below:

**Table 6 - Cone Penetration Summary**

Test ID	Date Completed	Depth (mbgl)	Location	Coordinates	Ground Level
CPT 01	20/03/2018	30.0	West Bank – Suffolk Road	652228-305895	1.06
CPT 02	19/03/2018	30.0	West Bank – Suffolk Road	652244-305934	0.73
CPT 03	19/03/2018	32.4	West Bank – Access Road off Suffolk Road	652308-305951	1.17
CPT 04	19/03/2018	36.0	East Bank – Fish Warf	652572-306018	1.49
CPT 05	20/03/2018	30.0	East Bank – Fish Warf	652646-305985	1.83

The static cone penetration tests were made using twenty one tonne capacity hydraulic penetrometer equipment mounted on a truck, ballasted to provide the reaction weight. A 7.5 tonne capacity electric cone was used for each of the tests and during each test, measurements of local side friction were made in addition to cone end resistance. At all test locations measurements of porewater pressure were also made using an electric piezo-cone fitted with a filter and pressure sensor so that the pore water pressure (PWP) could be measured on the shoulder of the cone tip.

All tests were terminated at a depth instructed on site or on the basis of refusal when the maximum safe thrust capacity of the equipment was reached. The method of operation of the piezo-cone is outlined on the piezo-cone operation sheet in Appendix E, together with the Piezo-cone Penetrometer datasheet showing the layout of this type of cone.

The test results have been interpreted to provide the estimated soil types which have also been compared to borehole information from the site. The method of interpretation of the soil type is outlined on the data sheets given in Appendix E.

The results of all tests carried out are presented in the Appendix E and show the records of cone end resistance, local side friction and friction ratio. The results of the piezo-cone penetration tests are presented as separate plots for each test. The plots contains the basic data obtained during the test, i.e. cone resistance, cone sleeve friction and porewater pressure, as well as parameters derived from the basic data, i.e. net cone resistance, excess porewater pressure ratio and friction ratio.

5 pore pressure dissipation tests were carried out at CPT locations using the piezo-cone penetrometer. The test measured the dissipation of excess pore water pressures generated during cone testing. In order to achieve

this, the piezo-cone is advanced to the required test depth, temporarily stopped and the decrease in pore water pressure monitored with time. The results are presented in graphical form in Appendix E.

The cone penetration dissipation test locations are summarised in the table below:

**Table 7 - Dissipation Test Summary**

Test ID	Date Completed	Depth (mbgl)	Location	Coordinates	Ground Level
CPT 01	20/03/2018	3.46	West Bank – Suffolk Road	652228-305895	1.06
CPT 01	20/03/2018	4.00	West Bank – Suffolk Road	652228-305895	1.06
CPT 02	19/03/2018	2.40	West Bank – Suffolk Road	652244-305934	0.73
CPT 03	19/03/2018	4.60	West Bank – Access Road off Suffolk Road	652308-305951	1.17
CPT 04	19/03/2018	30.99	East Bank – Fish Warf	652572-306018	1.49

## 5.2 DYNAMIC CONE PENETROMETER TESTING

A total of seven Dynamic Cone Penetrometer (DCP) tests were undertaken during the fieldwork. Two tests were carried out in conjunction with shallow window sampling completed along the proposed realignment of the William Adams Way to the south at BH4A and BH4B. Three tests were undertaken along the existing embankment to the west of William Adams Way leading to the A12 round about and a single test (WS7DP) was completed to a depth of 15m close to the location of the cancelled BH3. A final DCP test was completed at the location of TP1.

The Dynamic Cone Penetrometer tests are summarised in the table below:

**Table 8 - Dynamic Cone Penetrometer Testing Summary**

Test ID	Date Completed	Depth (mbgl)	Location	Coordinates	Ground Level
BH4AS	14/12/2017	15.0	West Bank – William Adams Way	652284 - 305846	2.13
BH4B	14/12/2017	15.0	West Bank – William Adams Way	652312 - 305826	1.83
WS2DP	07/12/2017	5.00	West Bank – William Adams Way	652124 - 305896	0.85
WS5DP	05/12/2017	6.00	West Bank – William Adams Way	652156 - 305894	1.09
WS7DP	06/12/2017	15.00	West Bank – William Adams Way	652204 - 305884	0.85
WS8DP	07/12/2017	5.00	West Bank – William Adams Way	652203 - 305887	0.87

Test ID	Date Completed	Depth (mbgl)	Location	Coordinates	Ground Level
TP1	07/12/2017	15.0	To be confirmed - West Bank – Suffolk Road	652248 - 305907	0.72

The DCP's carried out as part of this investigation have been undertaken in accordance with TRL Project Report PR/INT/227/04

The results of the DCP tests are included in this report as Appendix F.

### 5.3 STANDARD PENETRATION TESTING

Standard Penetration Tests (SPT's) were carried out using the split spoon (S) or cone (C) attachment within the boreholes. The tests were carried out in accordance with BS EN ISO 22476-3:2005+A1:2011 (British Standard, 2006). The results are included on the appended borehole logs presented in Appendix C. The calibration / efficiency certificates for the relevant drilling rigs are summarised in the table below:

**Table 9 - SPT Efficiency Ratings**

SPT I.D	SPT Rod Type	Calibration Date	SPT Energy Ratio	Boreholes
DT-MGS174	1 ½ Whitworth SPT	06/04/2017	66.76	BH1, BH4, BH5A, BH8, BH9, BH10A, BH11A, BH13A
DT-GT03	1 ½ Whitworth SPT	27/04/2017	73.34	BH2, BH4A, BH4D, BH5, BH6, BH7, BH15
DT-AR1707	1 ½ Whitworth SPT	27/04/2017	70.37	BH10, BH11, BH12A, BH12B,
DT-DT0537	1 ½ Whitworth SPT	13/04/2017	70.68	WS1, WS2, WS3, WS4, WS5, WS6, WS7, WS8, WS9, TP1
J&M – JM03	1 ½ Whitworth SPT	12/11/2016	71.99	BH14, BH18,
J&M – JM04	1 ½ Whitworth SPT	12/11/2016	71.58	BH16, BH17



## 6 LABORATORY TESTING

### 6.1 GEOTECHNICAL LABORATORY TESTING

The laboratory testing schedules for geotechnical tests were prepared by WSP in coordination with Norfolk Partnership Laboratory.

The information included in this report is taken from the results of tests undertaken by the Norfolk Partnership Laboratory at County Hall, Martineau Land Norwich (UKAS accredited testing laboratory No. 0920), Harrison Group Environmental Ltd (UKAS accredited testing laboratory No. 4031) and Terra Tek, UKAS accredited testing laboratory No. 0126. The results of the laboratory tests in this report do not include some of the data required by the documented test procedure. However, all such data has been recorded by the aforementioned laboratories and will be issued on the client's instructions.

The following accredited test procedures were carried out:

- Natural Moisture Content
- Plasticity Index
- Liquid Limit
- Plastic limit
- Particle Size Density (PSD)
- Sedimentation
- Determination of CBR
- Maximum dry density/moisture content relationship
- Triaxial Testing (Quick Undrained Single Stage)
- Consolidation (one dimensional)

Testing was also scheduled and undertaken at the Norfolk Partnership Laboratory for sulphate suite in accordance with BRE Special Digest 1 (BRE, 2005), as listed below:

- Sulphate (total water soluble)
- Sulphur (Total)
- pH

A summary of the scheduled testing is shown in the table below:

**Table 10 - Geotechnical Laboratory Testing Summary**

Test	Number	Standard
Natural Moisture Content	17	BS 1377 : Part 2 :1990 - Section 3
Liquid Limit/ Plasticity Index	129	BS1377-2:1990 CI 4.3 BS1377-2:1990 CI 5

Test	Number	Standard
Particle Size Density	619	BS 1377 : Part 2 :1990 Section 9.1 & 9.4
Determination of CBR	4	BS 1377 : PART 4 : 1990
Determination of Dry Density/ Moisture Content Relationship	1	BS 1377 : Part 4 : 1990 : Section 3
Determination of Undrained Shear Strength - Definitive	65	BS1377 : Part 7 : 1990, Clause 8, Single Specimen
Determination of One Dimensional Consolidation	13	BS1377:Part 5:1990, clause 3

The geotechnical laboratory tests were carried out in the period between the September 2017 to October 2018.

The geotechnical laboratory testing has been carried out in accordance with BS 1377: 1990 (British Standard, 1990) using calibrated equipment specified within the British Standard.

The geotechnical laboratory test results are included in this report as Appendix G. All geotechnical testing will be submitted in AGS format with the electronic version of the report.

## 6.2 CHEMICAL LABORATORY TESTING

Soil samples selected by the Clients Representative were tested against a geo-environmental testing suite as chosen by WSP. The MCERTS accredited testing was undertaken by EnviroLab (UKAS Laboratory No. 1247).

The following accredited chemical testing test procedures were carried out on soil, water and for leachates:

**Table 11 – Chemical Laboratory Testing Summary**

Determinands	Soil	Soil Leachate	Water
Metals (Arsenic, Boron, Cadmium, Chromium (total and hexavalent), Copper, Lead, Mercury, Nickel, Selenium and Zinc)	✓	✓	✓
pH	✓	✓	✓
TPH CWG (GC-MS aliphatic/aromatic split) inc BTEX and MTBC	✓	✓	✓
VOCs by GCMS (including vinyl chloride)	✓		✓

Determinands	Soil	Soil Leachate	Water
SVOCs by GCMS excluding PAHs	✓	✓	✓
speciated PAH (USEPA 16)	✓	✓	✓
Ammonia as N	✓	✓	✓
Phenol	✓	✓	✓
Soil Organic Matter	Selected samples		
Cyanide - total	✓	✓	✓
Cyanide - free	✓	✓	✓
PCB's EC7 Congeners	Selected samples		
PCB's WHO 12 Congeners	Selected samples		
Sulphate - total	✓		
Sulphate - water soluble, 2:1 extract	✓	✓	✓
Asbestos (screen only)	Selected samples		
Total WAC Suite	Selected samples		
Leachate prep		✓	

In addition to the laboratory testing outlined above selected samples was tested against the Waste Acceptance Criteria (WAC) suite of contaminants for classification for potential offsite disposal. The WAC testing was undertaken between December 2017 to October 2018 by EnviroLab.

Details of the standards used and the test results are presented in the Laboratory Test Results included in Appendix H. All chemical testing will be submitted in AGS format with the electronic version of the report.



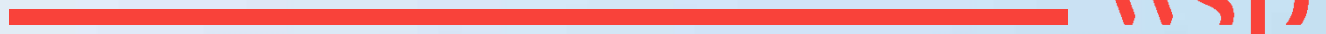
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# Appendix A



**SITE PLAN**



**SURVEY CONTROL POINTS (CP)**

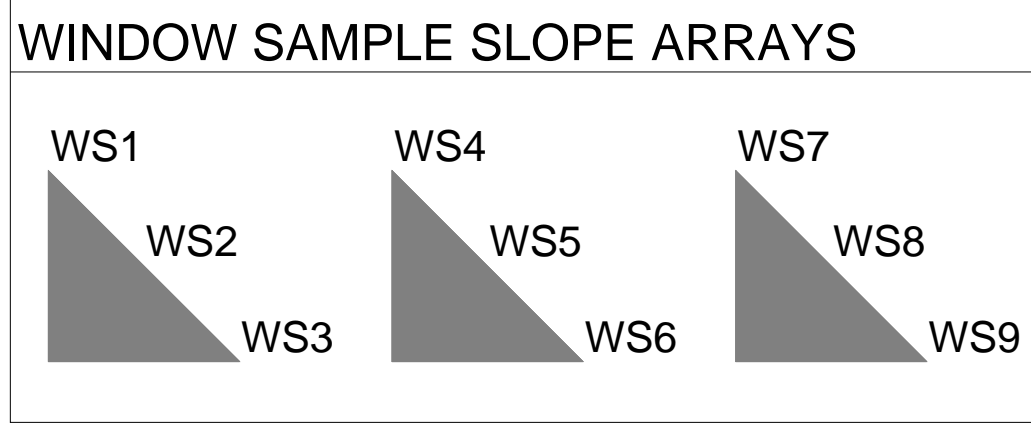
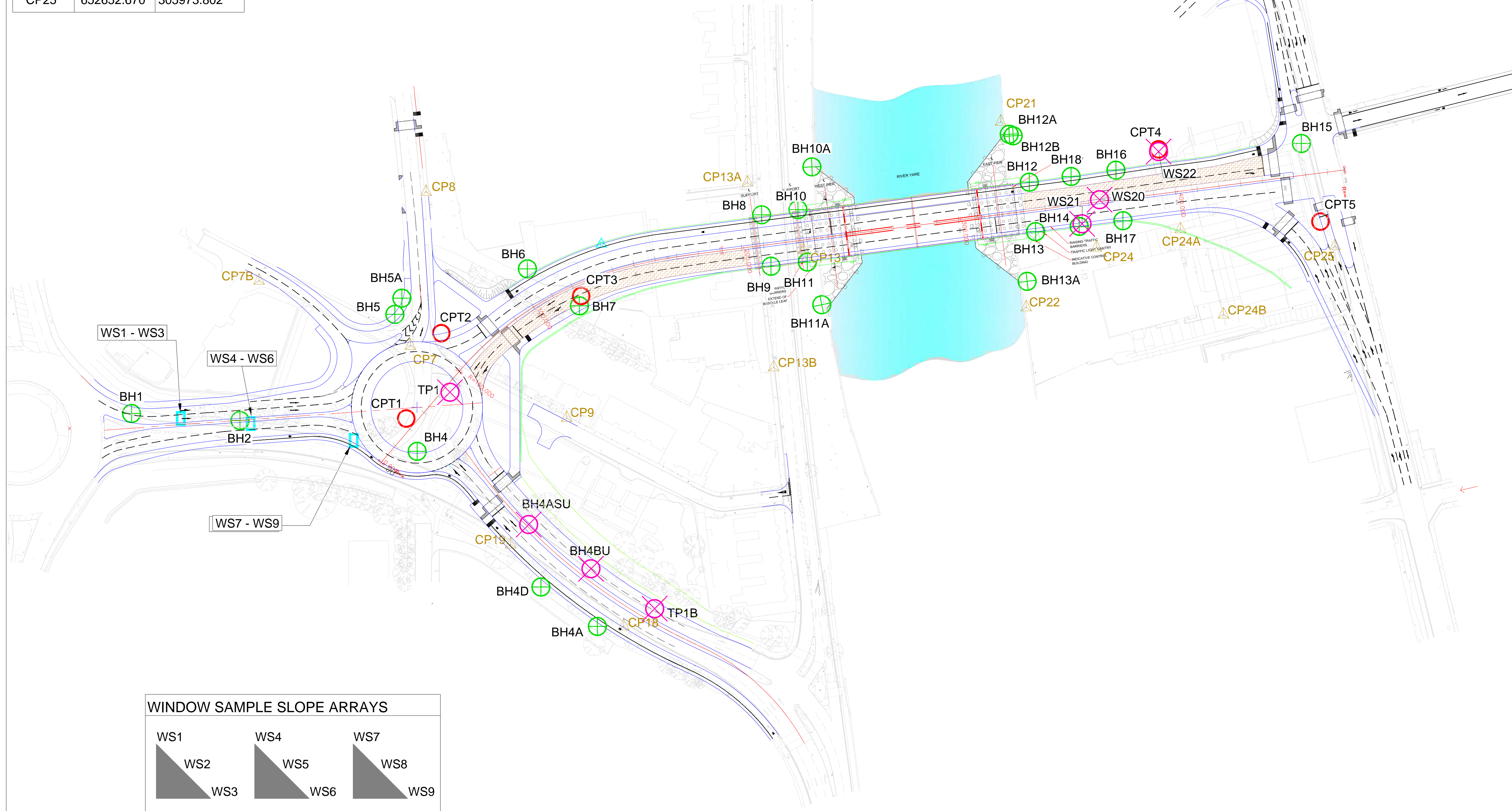
Name	Easting	Northing
CP7	652229.896	305928.238
CP7B	652160.722	305958.012
CP8	652237.071	305998.554
CP9	652301.363	305895.232
CP13	652409.609	305971.955
CP13A	652384.008	306002.816
CP13B	652395.988	305918.419
CP18	652327.431	305800.020
CP19	652275.712	305837.401
CP21	652499.777	306030.621
CP22	652511.485	305945.817
CP24	652543.602	305973.087
CP24A	652582.005	305981.555
CP24B	652601.692	305942.527
CP25	652652.670	305973.802

**KEY**

- CONE PENETRATION TEST
- ⊕ BOREHOLE
- ⊗ WINDOW SAMPLE
- ARRAY OF 3 WINDOW SAMPLES
- △ SURVEY CONTROL POINTS (CP) (APPROX)

**LOCATION CO-ORDINATES**

	REF	EASTING	NORTHING
<b>CONE PENETRATION TEST</b>	CPT1	652228.000	305895.000
	CPT2	652244.000	305934.000
	CPT3	652308.000	305951.000
	CPT4	652572.000	306018.000
	CPT5	652646.000	305985.000
<b>BOREHOLE</b>	BH1	652102.400	305897.300
	BH2	652152.000	305894.100
	BH3	Cancelled	
	BH4	652233.000	305880.000
	BH4A	652315.400	305800.000
	BH4D	652289.600	305818.000
	BH5	652222.800	305942.600
	BH5A	652226.000	305950.000
	BH6	652283.400	305963.400
	BH7	652307.200	305946.500
	BH8	652390.500	305988.100
	BH9	652394.800	305964.600
	BH10	652407.100	305990.500
	BH10A	652413.500	306010.000
	BH11	652411.400	305966.500
	BH11A	652418.000	305947.000
	BH12	652512.900	306003.000
	BH12A	652503.700	306024.900
BH12B	652505.500	306024.200	
BH13	652515.800	305980.400	
BH13A	652511.900	305957.700	
BH14	652535.700	305982.800	
BH15	652637.300	306020.700	
BH16	652552.500	306008.500	
BH17	652555.700	305985.400	
BH18	652532.000	306005.600	
<b>WINDOW SAMPLE</b>	WS1	652124.700	305894.600
	WS2	652124.400	305896.960
	WS3	652124.300	305899.200
	WS4	652156.600	305893.000
	WS5	652156.200	305894.500
	WS6	652156.400	305896.800
	WS7	652203.900	305885.000
	WS8	652202.900	305887.220
	WS9	652203.000	305889.800
	WS20	652545.000	305995.000
	WS21	652537.000	305984.000
	WS22	652572.000	306017.000
TP1	652248.210	305907.290	
TP1B	652341.600	305808.100	
BH4ASU	652283.980	305846.550	
BH4BU	652312.470	305826.350	



**NOTES:**  
 1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.  
 2. DO NOT SCALE FROM THIS DRAWING.

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**DRAWING TITLE**  
 GREAT YARMOUTH THIRD RIVER CROSSING  
 PLAN SHOWING ACTUAL  
 EXPLORATORY HOLE LOCATIONS

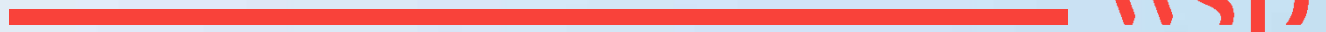
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C	COORDINATE UPDATE	DL	AC	NOV18
B	ADDITIONAL WINDOW SAMPLING ADDED	DL	AC	NOV18
A	FIRST ISSUE	DL	AC	JUL18

DESIGNED BY	INITIALS	DATE	DRAWING No.
DL	DL	JUL 18	GYTRC-WSP-HGT-DR-GE-0001(AB)
CE	CE	JUL 18	PROJECT TITLE
AC	AC	JUL 18	GREAT YARMOUTH THIRD RIVER CROSSING
AC	AC	JUL 18	SCALE 1:1000 @ A1
			FILE No. 0001





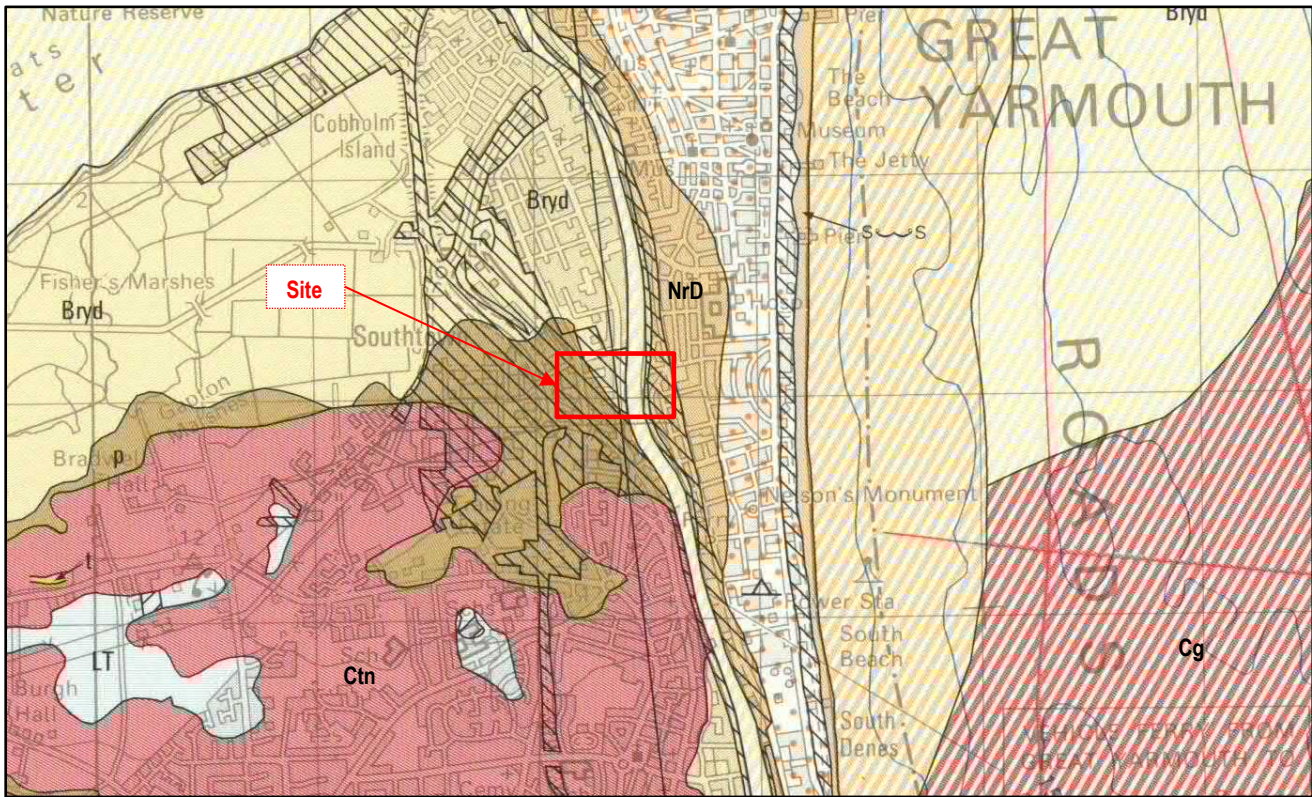
# Appendix B



**GEOLOGICAL MAP**



## APPENDIX B



### Key

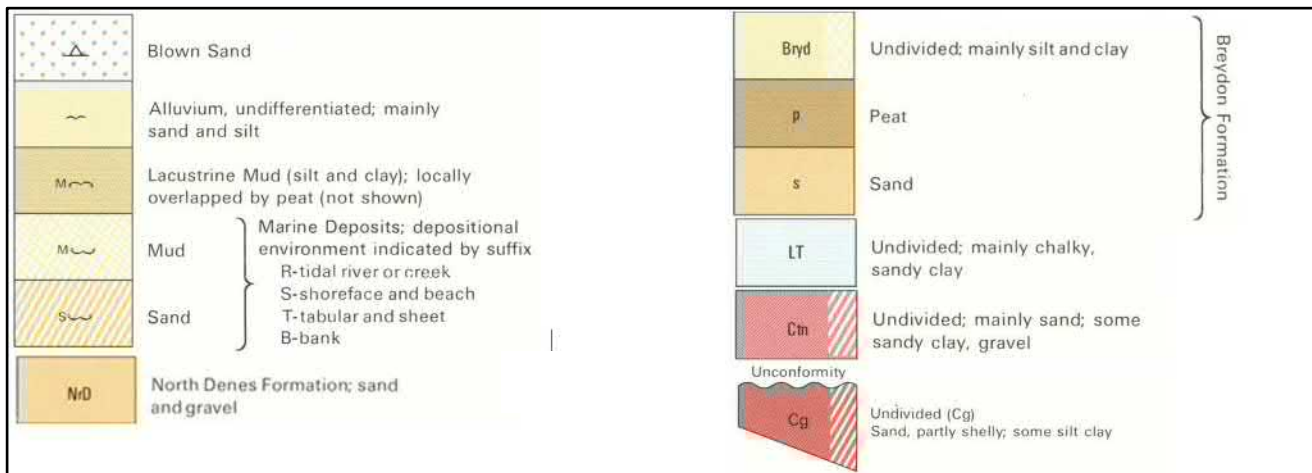


Figure 1- Quaternary and Pre-Quaternary Geology - Map 162 - 1:50,000 (C18/02 British Geological Survey © UKRI. All Rights Reserved 2018).



# Appendix C

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**WSP**  
**EXPLORATORY HOLE RECORDS**





NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 4



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH1		
Carried out for	Community & Environmental Services	Date Started	06/12/2017	Date Finished	08/12/2017		
Remarks:	Inspection pit: Hand dug	Type of Rig	Hand tools+Comacchio MC305+Dando 4000		Logged by	MB	
		Depth (m)	30.45	Ground Level (m AOD)	1.70	Drawn by	RK
		Co-ords	652102 - 305897			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
		200	Black & dark brown fibrous PEAT. H2 B2 F3 R2 W1 Tv1 Th2 A1 P0 BREYDON FORMATION		11.00		●	36 35		359						
			Medium dense grey fine to medium SAND, with numerous lenses of dark grey silty fine SAND. BREYDON FORMATION		11.40		●	39 41	↓ 14							
			<i>Becoming more mottled yellowish brown &amp; grey fine to medium sand, with lenses of grey organic silty fine sand from 12.00m</i>		12.00		●	42	↓							
			Medium dense greyish brown fine to medium SAND, with occasional shell fragments. CRAG		13.00	13.00	●	43 44	↓ 15							
			<i>Becoming laminated grey, brown &amp; orangey brown fine to medium SAND from 14.50m</i>		14.00		●	45 46	↓ 25							
			Medium dense orangey brown fine to medium SAND. CRAG		15.00		●	47 48	↓ 25							
			Medium dense orangey brown gravelly, silty fine SAND. Gravel is fine to medium angular to sub-angular flint. CRAG		15.50		●	49 50	↓ 17							
			Medium dense orangey brown gravelly, silty fine SAND. Gravel is fine to medium angular to sub-angular flint. CRAG		16.40		●	51 52	↓ 21							
			Dense orange fine to medium SAND. CRAG		17.00		●	53	↓							
			<i>Becoming very dense from 19.50 to 21.00m</i>		17.30		●	54 55	↓ 32							
					18.00		●	56 57	↓ 48							
					19.00		●	58 59	↓ 50							

NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 3 of 4



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH1
Carried out for	Community & Environmental Services	Date Started	06/12/2017	Date Finished	08/12/2017
Remarks:	Inspection pit: Hand dug	Type of Rig	Hand tools+Comacchio MC305+Dando 4000	Logged by	MB
		Depth (m)	30.45	Ground Level (m AOD)	1.70
		Co-ords	652102 - 305897		Checked by

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
					21.00		●	60	S ↓ 40							
					22.00		●	63								
			<p><u>Becoming medium dense from 23.00m</u></p>		23.00		●	64	S ↓ 28							
			Dense grey silty fine to medium SAND, with some shell fragments. CRAG		24.20		●	66								
			<p><u>Becoming slightly silty from 25.00m</u></p>		25.00		●	67	S ↓ 43							
			Stiff laminated grey clayey SILT & light grey silty fine to medium SAND, with occasional shell fragments. CRAG		26.10		●	69								
					27.00		●	71		27	39	17	22			
					28.00		●	72								
			Medium dense grey silty fine to medium SAND with thin bed of stiff grey silty CLAY, with some shell fragments. CRAG		28.80		●	73	S ↓ 20							
					29.00		●	74	S ↓ 20							
								75		22	20					





NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 1 of 3



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH2		
Carried out for	Community & Environmental Services	Date Started	06/12/2017	Date Finished	08/12/2017		
Remarks:	Inspection pit: Hand dug. General; trench hole dug to locate service near BH found 0.7m from the road and 0.3m from BH from 8.30am to 9.00am. General; tried piston test at 7.5m failed. General; 250l of water added	Type of Rig	Dando 2000+Hand tools		Logged by	MB	
		Depth (m)	30.00	Ground Level (m AOD)	1.56	Drawn by	RK
		Co-ords	652152 - 305894			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests							
							Type	No.		MC%	LL	PL	MPI	Org.	CBR		
			Dark greyish brown sandy TOPSOIL. TOPSOIL		0.40		●	1									
			Brown slightly silty very gravelly, fine to medium SAND, with lenses of firm sandy, silty CLAY, with roots. Gravel is medium to coarse angular to sub-angular flint & asphalt. MADE GROUND		1.20		●	2									
			Medium dense brown slightly silty, gravelly fine to medium SAND. Gravel is fine to medium sub-angular to sub-rounded flint. MADE GROUND		2.00		●	4	S ↓ 15								
			Medium dense brown very gravelly medium to coarse SAND. Gravel is fine to medium rounded to sub-rounded flint & quartz. MADE GROUND		2.00	W	●	7	S ↓ 13								
			Soft grey sandy, silty CLAY, with lenses of black organic material. BREYDON FORMATION		4.00		●	13	S ↓ 5								
			Soft dark grey very clayey very sandy SILT. BREYDON FORMATION		4.30		●	15	X=	55	56	26	30				
		200	Dark grey gravelly fine to coarse SAND. Gravel is fine sub-angular to sub-rounded flint. BREYDON FORMATION		5.00		●	17									
			<i>Becoming softer from 6.00m</i>		6.00		●	18									
			Dark brown pseudo fibrous PEAT, with lenses of very soft grey silty CLAY & soft brown silty CLAY. H4 B2 F2 R2 W1 Tv0 Th0 A1 P1 BREYDON FORMATION		9.00		●	19	X=	83	67	35	32				
			Black fibrous PEAT. H2 B2 F3 R2 W0 Tv1 Th2 A1 P0 BREYDON FORMATION		9.50		●	21									
			Dark brown pseudo fibrous PEAT.		9.50		●	23									
			Dark brown pseudo fibrous PEAT.		9.00		●	24	S ↓ 6		197						
			Dark brown pseudo fibrous PEAT.		9.00		●	26									
			Dark brown pseudo fibrous PEAT.		9.50		●	28									
										257							

NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 3



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH2		
Carried out for	Community & Environmental Services	Date Started	06/12/2017	Date Finished	08/12/2017		
Remarks:	Inspection pit: Hand dug. General; trench hole dug to locate service near BH found 0.7m from the road and 0.3m from BH from 8.30am to 9.00am. General; tried piston test at 7.5m failed. General; 250l of water added	Type of Rig	Dando 2000+Hand tools		Logged by	MB	
		Depth (m)	30.00	Ground Level (m AOD)	1.56	Drawn by	RK
		Co-ords	652152 - 305894			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests					
							Type	No.		MC%	LL	PL	MPI	Org.	CBR
			H2 B3 F3 R1 W0 Tv0 Th0 A1 P1 BREYDON FORMATION				●	30 29	S ↓ 4						
			Olive silty fine SAND, with lenses of grey very sandy, silty CLAY. BREYDON FORMATION		10.90	11.00	●	31 34	S ↓ 18						
			Dark brown gravelly very sandy amorphous PEAT. Gravel is sub angular to rounded flint. H9 B1 F2 R1 W0 Tv0 Th0 A0 P1 BREYDON FORMATION		11.35		●	32 35							
			Medium dense orange slightly silty fine SAND. CORTON SAND		11.90	12.00	●	36 37	S ↓ 25						
						13.00	●	38	S ↓ 23						
			<i>Becoming olive silty fine sand from 13.50m</i>				●	39							
			Dense orangey brown slightly silty fine to medium SAND. CRAG		14.00	14.00	●	40 41	S ↓ 30						
		200				15.00	●	42	S ↓ 18						
			<i>With lenses of soft brown silty CLAY from 15.50m</i>				●	43	S ↓ 30						
						16.00	●	44							
						17.00	●	45 46	S ↓ 31						
						17.90	●	47							
			Dense orange & brown slightly clayey, slightly silty fine to medium SAND. CRAG			18.00	●	48 49	S ↓ 42						
			<i>With lenses of greyish brown, brown &amp; dark brown silty CLAY from 18.90m</i>			19.00	●	50 51	S ↓ 35						
						19.50	●	52	I						
		150	Very dense greyish brown slightly silty fine to medium SAND, with some shell fragments. CRAG				●	53							



NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 3 of 3



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH2		
Carried out for	Community & Environmental Services	Date Started	06/12/2017	Date Finished	08/12/2017		
Remarks:	Inspection pit: Hand dug. General; trench hole dug to locate service near BH found 0.7m from the road and 0.3m from BH from 8.30am to 9.00am. General; tried piston test at 7.5m failed. General; 250l of water added	Type of Rig	Dando 2000+Hand tools		Logged by	MB	
		Depth (m)	30.00	Ground Level (m AOD)	1.56	Drawn by	RK
		Co-ords	652152 - 305894			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests								
							Type	No.		MC%	LL	PL	MPI	Org.	CBR			
			Very dense greyish brown slightly silty fine to medium SAND, with some shell fragments. CRAG						S ↓ 50									
							21.00			54								
										56								
										57								
							22.00			55	S ↓ 44							
										58								
							23.00											
										59								
							24.00			60	S ↓ 50							
										61								
					25.00													
								62										
					26.00			63	S ↓ 51									
								64										
					27.00	27.00				24	20	15	5					
			Laminated light grey silty fine to medium SAND, light grey sandy SILT & stiff grey silty CLAY . CRAG					65										
										66								
							28.00			67	S ↓ 33	25	30	15	15			
								68										
					29.00													
								69										
								70	S ↓ 45	25	25	15	10					
					30.00													

Becoming stiff grey silty clay & light grey sandy silt from 30.00m

150







# NORFOLK PARTNERSHIP LABORATORY

## Borehole Log

Sheet 3 of 4



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH4		
Carried out for	Community & Environmental Services	Date Started	28/11/2017	Date Finished	01/12/2017		
Remarks:	Inspection pit: Hand dug. General; remove casing and tool string due to sand causing them too jam together. General; 1500 litres water added from 15m to 24m	Type of Rig	Dando 3000+Hand tools+Comacchio MC305		Logged by	MB	
		Depth (m)	30.45	Ground Level (m AOD)	1.77	Drawn by	RK
		Co-ords	652233 - 305880			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests									
							Type	No.		MC%	LL	PL	MPI	Org.	CBR				
							●	61											
							●	62	S	43									
					21.00		▲												
							●	64											
			Becoming medium dense from 22.00m		22.00		●	65											
							●	66	S	27									
			Becoming slightly gravelly with lenses of soft silty clay from 23.00m Gravel is fine sub-rounded flint		23.00		▲												
							●	67											
		150			24.00		●	68	S	23									
			Medium dense grey fine to medium SAND CRAG		24.45		▲												
							●	69											
					25.00		▲												
							●	70											
					26.00		●	71											
			With occasional lenses of soft grey clay & some shell fragments from 26.00m				●	72	S	25									
							▲												
					27.00		●	73											
							▲												
			Dense grey fine to medium SAND, with some shell fragments. CRAG		27.60		●	74											
							▲												
			With laminae of stiff to firm grey silty clay from 28.00m		28.00		●	75											
							▲												
							●	76	S	34									
					29.00		▲												
							●	77											
			Dense firm to stiff laminated & thinly bedded grey CLAY & dark grey clayey SILT & grey silty fine to medium SAND. CRAG		29.50		▲												
							●												
							▲												
											29	33	16	18					











NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 3 of 4



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH4D		
Carried out for	Community & Environmental Services	Date Started	12/12/2017	Date Finished	15/12/2017		
Remarks:	Inspection pit: Hand dug. General; remove casing and tool string due to sand causing them too jam together. General; . General; 1000 litres water added from 15m to 28m	Type of Rig	Dando 2000		Logged by	MB	
		Depth (m)	30.45	Ground Level (m AOD)	0.00	Drawn by	RK
		Co-ords	652290 - 305818			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Dense laminated & thinly bedded greyish brown fine to medium SAND & orange silty fine to medium SAND & reddish brown silty fine SAND. CRAG		21.00		●	47	S ↓ 31							
					22.00		●	48								
			Dense to very dense greyish brown medium SAND, with laminae of soft grey CLAY. CRAG		22.00		●	49								
					23.00		●	50	S ↓ 38							
					24.00		●	51								
					25.00		●	52								
			<i>With occasional shell fragments from 25.00m</i>		25.20		●	53	S ↓ 45							
			Firm laminated grey silty CLAY & light grey sandy SILT. CRAG		25.30		●	54			28	42	20	23		
			Very dense grey slightly silty fine to medium SAND, with laminae of soft grey silty CLAY. CRAG		26.00		●	55	S ↓ 50							
					27.00		●	56								
			<i>Becoming medium SAND</i>		27.90		●	57								
			Firm to stiff grey silty CLAY, with laminae of grey sandy SILT & some shell fragments. CRAG		28.00		●	58			26	41	18	23		
					28.45		●	59								
			Thinly bedded firm grey silty CLAY & grey silty fine to medium SAND. CRAG		28.60		●	60								
			Very dense grey silty medium SAND, with thin beds of soft grey CLAY. CRAG		29.00		●	61								
					30.00		●	62								
		150						63			27	33	16	17		





NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 1 of 1



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH5		
Carried out for	Community & Environmental Services	Date Started	01/12/2017	Date Finished	01/12/2017		
Remarks:	Inspection pit: Hand dug General; Hole terminated at 5m due to high UXO reading.	Type of Rig	Dando 2000+Hand tools		Logged by	MB	
		Depth (m)	5.00	Ground Level (m AOD)	0.88	Drawn by	RK
		Co-ords	652223 - 305943			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests							
							Type	No.		MC%	LL	PL	MPI	Org.	CBR		
			MADEGROUND comprising black topsoil with up to coarse gravel size flint, brick, glass & asphalt gravel. MADE GROUND		0.30		●	1									
			MADEGROUND comprising up to cobble size brick, asphalt, slate in a matrix of dark reddish brown slightly silty fine to medium sand. MADE GROUND				●	3									
			Soft to very soft dark grey very gravelly, very sandy, slightly clayey SILT. Gravel is fine to medium angular brick, concrete, asphalt, flint & wood. MADE GROUND		1.20		●	6		S ↓ 3	26	37	22	15			
			Soft dark grey silty CLAY with lenses of black organic material & thin beds of dark brown pseudo fibrous PEAT, with numerous roots. BREYDON FORMATION		2.00		●	8	7		198	240	140	100			
			Dark brown organic slightly clayey very gravelly fine to coarse SAND. Gravel is fine to medium angular to rounded flint and quartz. BREYDON FORMATION		3.40		●	11	10								
			Soft to firm light grey silty CLAY with laminae of light greyish brown silty fine SAND. BREYDON FORMATION		4.00		●	13	12		17	25					
		200	<i>Becoming very soft &amp; slightly gravelly from 4.40m Gravel is fine to medium angular to rounded flint &amp; quartz</i>		4.40		●	14	14	S ↓ 3							

































NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 3 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH8		
Carried out for	Community & Environmental Services	Date Started	23/01/2018	Date Finished	30/01/2018		
Remarks:	Inspection pit: Hand dug. General; ES17 amended to 2.5m to 2.6m instead of 2.9m to 3m	Type of Rig	Dando 4000+Hand tools		Logged by	MB	
		Depth (m)	40.37	Ground Level (m AOD)	1.89	Drawn by	RK
		Co-ords	652391 - 305988			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests							
							Type	No.		MC%	LL	PL	MPI	Org.	CBR		
			Dense orangey brown fine SAND. CRAG		20.10		●	63									
			Very dense brownish grey slightly silty fine to medium SAND, with numerous shells fragments and lenses of soft grey CLAY. CRAG				●	64	S ↓ 43								
					21.00		●	65									
			Very dense thinly bedded brownish grey fine to medium SAND & grey silty fine SAND, with some shells fragments. CRAG		22.00	22.00	●	66									
							●	67	S ↓ 40								
					23.00		●	68									
			Medium dense grey slightly clayey slightly silty medium SAND, with some shell fragments. CRAG		23.50		●	69									
					24.00		●	70	S ↓ 21								
			<i>Becoming slightly silty from 25.00m</i>		25.00		●	71									
							●	72									
			<i>Becoming very dense from 26.00m</i>		26.00		●	73									
							●	74	S ↓ 46								
			Very stiff laminated grey silty CLAY & dark grey sandy SILT, with some shell fragments. CRAG		27.00	27.00	●	75									
			Medium dense grey medium SAND, with some shell fragments. CRAG		27.70		●	76		28	42	19	23				
			<i>With laminae of silty fine sand from 28.00m</i>		28.00		●	77									
							●	78									
							●	79									
			Laminated and thinly bedded grey silty fine SAND; grey slightly gravelly medium to coarse SAND, gravel is fine rounded to sub rounded flint and stiff grey silty CLAY. Some shell fragments CRAG		29.00	29.00	●	80									
							▲	81		26	40	18	22				



NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 4 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH8		
Carried out for	Community & Environmental Services	Date Started	23/01/2018	Date Finished	30/01/2018		
Remarks:	Inspection pit: Hand dug. General; ES17 amended to 2.5m to 2.6m instead of 2.9m to 3m	Type of Rig	Dando 4000+Hand tools		Logged by	MB	
		Depth (m)	40.37	Ground Level (m AOD)	1.89	Drawn by	RK
		Co-ords	652391 - 305988			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests								
							Type	No.		MC%	LL	PL	MPI	Org.	CBR			
			Laminated and thinly bedded grey silty fine SAND; grey slightly gravelly medium to coarse SAND, gravel is fine rounded to sub rounded flint and stiff grey silty CLAY. Some shell fragments CRAG		30.50		●	82										
			Grey fine SAND, with numerous laminae & thin beds of very stiff grey CLAY. CRAG		31.00		●	83	S	29								
			Laminated and thinly bedded dark grey silty slightly gravelly fine to medium SAND, gravel is fine sub rounded flint & stiff grey CLAY. Some shell fragments. CRAG		31.20		●	84										
			Laminated and thinly bedded dark grey silty slightly gravelly fine to medium SAND, gravel is fine sub rounded flint & stiff grey CLAY. Some shell fragments. CRAG		32.00		●	85										
					32.00		●	86										
					32.00		●	87										
					32.00		●	88	S	19								
			<i>With numerous shell fragments from 32.50m</i>		33.00		●	89										
					34.00		●	90										
					34.00		●	91	S	42								
					35.00		●	92										
			Dense to very dense grey fine SAND with laminae of clayey SILT. CRAG		36.00		●	93										
					36.00		●	94	S	38								
			<i>With laminae of soft grey silty clay &amp; lenses of orangey brown clayey silty fine sand from 36.50m</i>		37.00		●	95										
					38.00		●	96										
					38.00		●	97										
			Very dense grey fine to medium SAND, with some shell fragments. CRAG		38.50		●	98										
					39.00		●	99										
					39.00		●	100										

200









NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 3 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH9		
Carried out for	Community & Environmental Services	Date Started	31/01/2018	Date Finished	06/02/2018		
Remarks:	Inspection pit: Hand dug	Type of Rig	Hand tools+Dando 2000		Logged by	MB	
		Depth (m)	40.45	Ground Level (m AOD)	1.83	Drawn by	RK
		Co-ords	652395 - 305965			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests							
							Type	No.		MC%	LL	PL	MPI	Org.	CBR		
			With thin beds of laminated firm light grey silty CLAY, dark grey silty CLAY & greyish brown gravelly, silty fine to medium SAND. Gravel is fine to medium sub-rounded flint, from 20.00m to 20.45m		21.00		●	58									
					21.80		●	59	S	51							
			Thinly bedded soft grey sandy, silty CLAY & brown silty fine SAND, with some shell fragments. CRAG		22.00		●	60									
			Very dense grey slightly silty fine to medium SAND. CRAG		22.00		●	61					27				
					23.00		●	62									
					24.00		●	63									
					24.00		●	64									
					25.00		●	65	S	19							
			Medium dense grey medium SAND CRAG		25.00		●	66									
					26.00		●	67									
					26.00		●	68									
					27.00		●	69	S	27							
			Thinly bedded greyish brown silty fine to medium SAND with shell fragments, dark grey clayey SILT & stiff grey silty CLAY. CRAG		27.10		●	70									
					28.00		●	71									
			With bed of greyish brown silty fine to coarse SAND with some shell fragments from 28.00m Becoming predominantly sand from 28.00m.		28.00		●	72									
					28.00		●	73					26	28	14	15	
			Becoming bedded firm to stiff grey silty CLAY & greyish brown silty fine to medium SAND from 28.50m		28.00		●	74	S	33							
					29.00		●	75									
			Medium dense laminated grey medium SAND and fine to medium SAND CRAG		29.00		●	76									
					30.00		▲	76					25	40	14	27	

















# NORFOLK PARTNERSHIP LABORATORY

## Borehole Log

Sheet 5 of 6



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH10		
Carried out for	Community & Environmental Services	Date Started	20/02/2018	Date Finished	06/03/2018		
Remarks:	General; Added water from 5.5m to 7m approx 200litres	Type of Rig	Dando 4000		Logged by	MB	
		Depth (m)	50.45	Ground Level (m AOD)	0.00	Drawn by	RK
		Co-ords	652407 - 305991			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests					
							Type	No.		MC%	LL	PL	MPI	Org.	CBR
			Becoming fine to coarse SAND, with numerous shell fragments from 40.00m				●	92	S ↓ 17						
					41.00		●	93							
					42.00		●	94							
					43.00		●	95	S ↓ 11						
					44.00		●	96							
			Becoming very dense & with numerous lenses of soft grey CLAY & light brown SILT from 44.00m		45.00		●	97							
					45.60		●	98	S ↓ 50						
					46.00		●	99							
			Stiff laminated grey slightly gravelly, silty CLAY & dark grey sandy SILT, with some shell fragments. Gravel is medium to coarse sub-rounded to sub-angular flint & pyrite.		45.60		●	100			30	51	28	23	
			LONDON CLAY		46.00		●	101			25	68	32	36	
			Very stiff laminated dark grey & brown CLAY.		46.00		●	102	S ↓ 37						
		200	LONDON CLAY		47.00		●	103							
					48.00		●	104							
			Becoming laminated brown CLAY with some gypsum from 48.00m		48.00		●	105	S ↓ 50		31	88	28	60	
					49.00		●	106							
							●	107							
							●	108							





NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 1 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH10A		
Carried out for	Community & Environmental Services	Date Started	19/02/2018	Date Finished	02/03/2018		
Remarks:	Inspection pit: Hand dug	Type of Rig	Hand tools+Dando 2000		Logged by	MB	
		Depth (m)	50.00	Ground Level (m AOD)	2.55	Drawn by	RK
		Co-ords	652414 - 306010		Checked by	MLB	

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests									
							Type	No.		MC%	LL	PL	MPI	Org.	CBR				
			BRICK WEAVE Cobbles. MADE GROUND CONCRETE. MADE GROUND		0.05														
			MADE GROUND comprising up to cobble size angular to sub-angular concrete, brick & flint in a matrix of brown silty fine to coarse sand. MADE GROUND CONCRETE. MADE GROUND		0.50 0.60 0.75			1 3 2 4 2 6 5											
			MADE GROUND comprising up to cobble size angular to sub-angular concrete, brick & flint in a matrix of dark grey silty fine to coarse sand. MADE GROUND Firm grey sandy, silty CLAY, with some shell fragments. MADE GROUND		1.00 1.10 1.30	1.00	W	7 9 8 10	S 3										
			Brown silty fine to medium SAND, with thin bed of firm grey CLAY. Gravel is fine to coarse angular to sub-angular flint & quartz. ALLUVIUM		2.30	2.00		12 13 14	S 8										
			Brown gravelly silty, clayey, fine to medium SAND. Gravel is fine to coarse angular to sub-angular concrete & flint. ALLUVIUM		3.00	3.00		15 16 17	S 3										
			Black slightly gravelly, slightly clayey, organic fine to medium SAND. Gravel is fine to medium angular to sub-angular flint & brick. BREYDON FORMATION		4.00	4.00		18 19 20 21	S 11	37	23								
			Soft laminated black organic, silty CLAY & brown silty fine to medium SAND. BREYDON FORMATION		4.30	4.30		22 23 24	S 9										
			Dark grey organic fine to medium rounded to sub-rounded flint & quartz GRAVEL & fine to medium SAND. BREYDON FORMATION		5.70	5.70		25 26 27	S 11										
			Loose dark grey gravelly, silty fine to coarse SAND, weathering to brown. Gravel is fine rounded to sub-angular flint & quartz. HAPPISBURGH GLACIGENIC FORMATION		6.60	6.60		28 29 30	S 14										
			Loose brown slightly gravelly medium to coarse SAND, with numerous beds of soft grey silty CLAY. Gravel is fine to medium angular to rounded flint & quartz. HAPPISBURGH GLACIGENIC FORMATION		8.00	8.00		31 32 33 34 35	S 17										
			Loose orangey brown slightly gravelly, silty fine to coarse SAND, with thin beds of soft grey silty CLAY. Gravel is fine to medium sub-angular to rounded flint. HAPPISBURGH GLACIGENIC FORMATION		9.00	9.00		36 37 38	S 24										
					10.00			39		25	31	16	15						





NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 3 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH10A
Carried out for	Community & Environmental Services	Date Started	19/02/2018	Date Finished	02/03/2018
Remarks:	Inspection pit: Hand dug	Type of Rig	Hand tools+Dando 2000	Logged by	MB
		Depth (m)	50.00	Ground Level (m AOD)	2.55
		Co-ords	652414 - 306010		Checked by

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests							
							Type	No.		MC%	LL	PL	MPI	Org.	CBR		
			Medium dense orangey brown silty fine SAND. CRAG				●	63									
			Medium dense laminated brown, grey & reddish brown silty fine SAND. CRAG		20.90	21.00	●	64	S ↓ 26								
			<i>Becoming orangey brown silty fine to medium SAND, with some shell fragments from 22.00m</i>				●	65									
			Medium dense grey slightly gravelly, silty fine to medium SAND, with lenses of soft grey CLAY. Gravel is fine to medium sub-rounded flint & quartz. CRAG		22.40	22.00	●	66	S ↓ 25								
						23.00	●	67									
						24.00	●	69									
						24.00	●	70									
						24.00	●	71	S ↓ 27								
						25.00	●	72									
						26.00	●	73									
						26.00	●	74	S ↓ 30								
						27.00	●	75									
						28.00	●	76									
			Laminated & thinly bedded firm grey silty CLAY, light grey silty fine SAND & dark grey SILT, with occasional shell fragments. CRAG		28.30	28.00	●	77	S ↓ 33								
						29.00	●	78									
							▲										
		250									24	28	13	15			









# NORFOLK PARTNERSHIP LABORATORY

## Borehole Log

Sheet 2 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH11		
Carried out for	Community & Environmental Services	Date Started	12/02/2018	Date Finished	23/02/2018		
Remarks:	General; 2 Ds for 21.5 spt. General; 17:30 waiting for pipe install after grouting.	Type of Rig	Dando 4000		Logged by	MB	
		Depth (m)	50.00	Ground Level (m AOD)	2.46	Drawn by	RK
		Co-ords	652411 - 305967			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Loose olive brown fine to medium SAND. HAPPISBURGH GLACIGENIC FORMATION		10.40		●	36	35	S ↓ 17						
			Loose orangey brown fine to medium SAND. HAPPISBURGH GLACIGENIC FORMATION		11.00	11.00	●	37								
			Medium dense orangey brown fine to medium SAND, with lenses of soft grey CLAY. HAPPISBURGH GLACIGENIC FORMATION		12.00		●	39	38	S ↓ 27						
			<i>With thin bed of brown gravelly fine to medium sand, gravel is fine sub-rounded flint, from 12.50m to 13.50m Becoming dense from 12.50m</i>		13.00		●	41	42	S ↓ 40						
			<i>Becoming very dense from 13.50m</i>		14.00	14.00	●	44	45	S ↓ 47						
			Dense orangey brown slightly silty fine SAND. HAPPISBURGH GLACIGENIC FORMATION		15.00		●	46								
					16.00		●	47	47	S ↓ 37						
					17.00		●	48								
					18.00		●	49	49	S ↓ 33						
					19.00		●	52	52	S ↓ 40						
							●	51	51	S ↓ 40						
							●	53	53	S ↓ 40						
							●	54	55	S ↓ 40						
							●	56	56	S ↓ 40						
			<i>With laminae of soft grey clay from 18.50m</i>				●	57	57	S ↓ 34						
		200					●	58	58	S ↓ 34						
							●	59	60	S ↓ 33						
							●	62	62	S ↓ 33						



# NORFOLK PARTNERSHIP LABORATORY

## Borehole Log

Sheet 4 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH11		
Carried out for	Community & Environmental Services	Date Started	12/02/2018	Date Finished	23/02/2018		
Remarks:	General; 2 Ds for 21.5 spt. General; 17:30 waiting for pipe install after grouting.	Type of Rig	Dando 4000		Logged by	MB	
		Depth (m)	50.00	Ground Level (m AOD)	2.46	Drawn by	RK
		Co-ords	652411 - 305967			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests								
							Type	No.		MC%	LL	PL	MPI	Org.	CBR			
			Laminated & thinly bedded stiff grey silty CLAY, grey very sandy SILT, black sandy silty & light grey silty fine SAND. CRAG				●	81										
			Stiff laminated silty CLAY, with laminae of light grey silty fine SAND. CRAG		31.00	31.00	▼	●	82		24	47	21	26				
							●	86			28	37	17	20				
							▼	84										
							●	85										
							▼			S	16							
							▲											
			Laminated & thinly bedded grey fine SAND & firm grey silty CLAY. CRAG		32.90	33.00	▲	●	87									
							▲	●	88									
							▲	●	89									
							▼			S	27							
							▲	●	90									
							▼											
							▲	●	91									
							▲	●	92									
							▼			S	41							
							▲	●	94									
							▼											
							▲	●	95									
							▲	●	100									
							▼			S	39							
							▲	●	96									
							▼											
							▲	●	93									
							▲	●	97									
							▲	●	101									
							▼			S	50							

With some shell fragments from 34.00m



# NORFOLK PARTNERSHIP LABORATORY

## Borehole Log

Sheet 5 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH11		
Carried out for	Community & Environmental Services	Date Started	12/02/2018	Date Finished	23/02/2018		
Remarks:	General; 2 Ds for 21.5 spt. General; 17:30 waiting for pipe install after grouting.	Type of Rig	Dando 4000		Logged by	MB	
		Depth (m)	50.00	Ground Level (m AOD)	2.46	Drawn by	RK
		Co-ords	652411 - 305967			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests									
							Type	No.		MC%	LL	PL	MPI	Org.	CBR				
		200					●	98											
			Becoming grey medium SAND with shell fragments from 41.00m		41.00		●	99											
					42.00		●	102	S	32									
					43.00		●	103											
					44.00		●	105											
			Dense to very dense grey silty fine to medium SAND, with laminae & thin beds of stiff light grey CLAY. CRAG		44.00		●	104	S	42									
					45.00		●	106											
			Becoming very stiff laminated grey silty CLAY, grey silty CLAY & black sandy SILT from 45.50m		46.00		●	108											
			With grey gravelly silty fine to medium sand, gravel is medium sub-angular to sub-rounded flint, from 46.00m		46.00		●	109	S	46	33	59	25	34					
			Stiff to very stiff grey silty CLAY, with occasional gypsum crystals, weathering to greyish brown. LONDON CLAY		46.45		●	111											
					47.00		●	112			24	69	29	40					
			Becoming very stiff laminated brown silty CLAY with thin beds of light brown SILT from 47.50m		48.00		●	114											
			Very stiff laminated brown silty CLAY. LONDON CLAY		48.00		●	115	S	45	28	63	29	34					
					49.00		●	118											
					50.00		●	119											
							●	120	S	40	32	77	29	48					





NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 3 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH11A		
Carried out for	Community & Environmental Services	Date Started	13/02/2018	Date Finished	20/02/2018		
Remarks:	Type of Rig			Dando 2000+Dando 4000	Logged by	MB	
	Depth (m)		50.00	Ground Level (m AOD)	2.50	Drawn by	RK
	Co-ords			652418 - 305947		Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Medium dense orange brown fine SAND, with laminae of soft grey silty clay. CRAG				●	63	↓ 35							
			Medium dense to dense orangey brown fine to medium SAND, with numerous shell fragments. CRAG		20.90	21.00	●	64	↓							
			<i>With laminae soft light grey CLAY, firm grey silty CLAY &amp; dark grey very sandy SILT from 22.00m</i>				●	65	↓							
			Medium dense greyish brown slightly silty fine to medium SAND, with some shell fragments. CRAG		22.00	22.00	●	66	↓ 41	22	24					
			Medium dense brownish grey fine to medium SAND, with numerous laminae of soft grey CLAY & occasional shell fragments. CRAG		22.80	23.00	●	67	↓							
							●	68	↓ 24							
							●	69	↓							
							●	70	↓ 32							
							●	71	↓							
							●	72	↓							
			Medium dense brownish grey fine to medium SAND, with numerous laminae of soft grey CLAY & occasional shell fragments. CRAG		25.00	25.00	●	73	↓ 26							
							●	74	↓							
							●	75	↓ 29							
							●	76	↓							
			Dense grey fine to medium SAND with numerous laminae of soft grey CLAY, with some shell fragments. CRAG		27.00	27.00	●	77	↓ 41							
							●	78	↓							
							●	79	↓							
			Medium dense greyish brown fine to medium SAND with numerous laminae of firm dark grey very sandy, silty CLAY, some shell fragments. CRAG		28.30	28.00	●	80	↓							
							●	81	↓ 32							
							●	82	↓							
							▲	83		25	30	15	15			



NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 4 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH11A		
Carried out for	Community & Environmental Services	Date Started	13/02/2018	Date Finished	20/02/2018		
Remarks:	Type of Rig			Dando 2000+Dando 4000	Logged by	MB	
	Depth (m)		50.00	Ground Level (m AOD)	2.50	Drawn by	RK
	Co-ords			652418 - 305947		Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
		250	Medium dense greyish brown fine to medium SAND with numerous laminae of firm dark grey very sandy, silty CLAY, some shell fragments. CRAG		30.50		●	84	S ↓ 27							
			Laminated soft grey silty CLAY, grey fine to medium SAND & dark grey clayey SILT. CRAG		31.00		●	85								
			Laminated firm to stiff grey SILT:CLAY CRAG		31.30		●	86								
			Medium dense to dense grey fine to medium SAND, with numerous shell fragments. CRAG		32.00		●	87								
					32.20		●	88	S ↓ 26	26	37	16	22			
					33.00		●	89								
					34.00		●	90								
					35.00		●	91								
					36.00		●	92	S ↓ 39							
					37.00		●	93								
					38.00		●	94								
					39.00		●	95	S ↓ 50							
					40.00		●	96								
					41.00		●	97								
					42.00		●	98	S ↓ 50							
					43.00		●	99								
					44.00		●	100								

Becoming very dense from 36.00m

Becoming grey medium SAND with lenses of soft grey clay from 39.00 to 41.00m





NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH12		
Carried out for	Community & Environmental Services	Date Started	06/03/2018	Date Finished	16/03/2018		
Remarks:	Inspection pit: Hand dug	Type of Rig	Hand tools+Dando 4000		Logged by	MB	
		Depth (m)	50.00	Ground Level (m AOD)	2.28	Drawn by	RK
		Co-ords	652513 - 306003			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Loose brown fine to medium sub-angular to rounded flint & quartz GRAVEL & fine to medium SAND NORTH DENES FORMATION		10.50		31	32	S 31							
			Medium dense laminated orange medium SAND, brown fine SAND, soft grey CLAY & dark brown SILT. NORTH DENES FORMATION		11.00		33	34	S 31							
					11.50		35	36	S 29							
					12.00		37	38	S 29							
			Medium dense olive brown slightly clayey, slightly silty fine SAND, weathering to brown, with some shell fragments. CRAG		12.50		39	40	S 34							
		300	<i>Becoming silty from 13.50m to 15.00m</i>		13.00		41	42	S 34							
					13.50		43	44	S 39							
					14.00		45	46	S 28							
			Medium dense olive brown slightly silty fine SAND, with thin beds of soft brown silty CLAY, weathering to brown. CRAG		15.00		47	48	S 32							
					15.50		49	50	S 33							
					16.00		51	52	S 36							
			<i>Becoming less silty from 18.00m</i>		16.50		53	54	S 36							
					17.00		55	56	S 37							
					17.50		57	58	S 37							
					18.00		59	60	S 36							



NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 3 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH12
Carried out for	Community & Environmental Services	Date Started	06/03/2018	Date Finished	16/03/2018
Remarks:	Inspection pit: Hand dug	Type of Rig	Hand tools+Dando 4000	Logged by	MB
		Depth (m)	50.00	Ground Level (m AOD)	2.28
		Co-ords	652513 - 306003	Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Medium dense olive brown slightly silty fine SAND, with thin beds of soft brown silty CLAY, weathering to brown. CRAG		20.50		●	59	S ↓ 29							
			Medium dense brown fine to medium SAND. CRAG		21.00		●	60								
					22.00		●	61								
			Very dense to dense grey gravelly, fine to medium SAND, with lenses of soft to firm grey clay & numerous shell fragments. Gravel is fine to medium sub-angular to sub-rounded flint. CRAG		22.50		●	62	S ↓ 50							
					23.00		●	63								
					24.00		●	64								
			<i>With less shell fragments from 24.50m to 25.50m</i>		25.00		●	65	S ↓ 34							
					26.00		●	66								
			<i>With more firm clay lenses from 25.50m</i>		27.00		●	67								
					28.00		●	68	S ↓ 50							
			Medium dense light grey fine SAND, with laminae of light grey silty CLAY. CRAG		28.70		●	69								
					29.00		●	70								
			Laminated & thinly bedded firm grey silty CLAY, light grey silty fine SAND & black SILT. CRAG		28.70		●	71	S ↓ 39							
					29.00		●	72								
			<i>Becoming stiff clay laminae from 29.50m</i>				●	73			32	38	17	21		











NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH12B		
Carried out for	Community & Environmental Services	Date Started	20/03/2018	Date Finished	27/03/2018		
Remarks:	Inspection pit: Hand dug. General; adding water from 1.5m so unsure where waterstrike is but water sitting around 3m. General; Bentonite seal from 13m to 12m. General; Added water from 1.5m to 12m approx 1000litres	Type of Rig	Hand tools+Dando 4000		Logged by	MB	
		Depth (m)	50.00	Ground Level (m AOD)	2.37	Drawn by	RK
		Co-ords	652506 - 306024			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Thinly bedded greyish brown very gravelly fine to medium SAND, grey silty CLAY, brownish orange silty CLAY & orangey brown weakly cemented fine to medium SAND. Gravel is fine to medium sub-angular to sub-rounded flint & quartz. BREYDON FORMATION		11.00		33	34	S 7							
			Firm mottled light grey & orangey brown slightly gravelly, slightly sandy, silty CLAY. Gravel is fine to medium angular to sub-angular flint. BREYDON FORMATION		11.60		35	36	S 9							
		300	Medium dense orangey brown fine to medium SAND, with numerous laminae of light grey silty CLAY, black clayey SILT & orange sandy SILT. BREYDON FORMATION		12.20		38	39		23	31					
			<i>With lenses of soft brown CLAY from 13.00m</i>		13.00		40	41	S 29							
			<i>Becoming dense from 14.00m</i>		14.00		42	43	S 32							
			Very dense thinly bedded light brown fine SAND, orangey brown sandy SILT & soft grey silty CLAY. BREYDON FORMATION		15.50		44	45	S 32							
					16.00		47	48	S 44							
					17.00		49	50	S 45							
			Dense laminated olive fine SAND with laminae of orangey brown clayey fine to medium SAND. BREYDON FORMATION		17.50		51	52	S 37							
					18.00		53	54	S 37							
					19.00		55	56	S 32							
			<i>Becoming fine to medium SAND with laminae of soft grey CLAY from 19.50m</i>		19.50		57	58	S 36							
					19.00		59		S 36							

NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 3 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH12B		
Carried out for	Community & Environmental Services	Date Started	20/03/2018	Date Finished	27/03/2018		
Remarks:	Inspection pit: Hand dug. General; adding water from 1.5m so unsure where waterstrike is but water sitting around 3m. General; Bentonite seal from 13m to 12m. General; Added water from 1.5m to 12m approx 1000litres	Type of Rig	Hand tools+Dando 4000		Logged by	MB	
		Depth (m)	50.00	Ground Level (m AOD)	2.37	Drawn by	RK
		Co-ords	652506 - 306024			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests									
							Type	No.		MC%	LL	PL	MPI	Org.	CBR				
			Dense laminated olive fine SAND with laminae of orange brown clayey fine to medium SAND. BREYDON FORMATION																
			Very dense to dense grey medium SAND with laminae of firm grey silty CLAY, numerous shell fragments CRAG		21.00			60											
					21.70			61		S 48									
					22.00			62											
					23.00			63											
			<i>With some shell fragments from 23.50m</i> <i>Becoming medium dense from 23.50m</i>					64		S 32									
					24.00			65											
					25.00			66											
			<i>With occasional shell fragments from 25.00m</i>					67		S 34									
					26.00			68											
					27.00			69											
			Very dense laminated & thinly bedded grey clayey, silty fine to medium SAND & firm grey silty CLAY, with occasional shell fragments. CRAG		27.00			70		S 47									
					28.00			71											
			<i>With lenses of soft grey CLAY from 28.50m</i>					72											
					29.00			73											
		250	Stiff to very stiff laminated grey silty CLAY & light grey SILT. CRAG		29.30			74			28	54	20	34					





NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 5 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH12B		
Carried out for	Community & Environmental Services	Date Started	20/03/2018	Date Finished	27/03/2018		
Remarks:	Inspection pit: Hand dug. General; adding water from 1.5m so unsure where waterstrike is but water sitting around 3m. General; Bentonite seal from 13m to 12m. General; Added water from 1.5m to 12m approx 1000litres	Type of Rig	Hand tools+Dando 4000		Logged by	MB	
		Depth (m)	50.00	Ground Level (m AOD)	2.37	Drawn by	RK
		Co-ords	652506 - 306024		Checked by	MLB	

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests									
							Type	No.		MC%	LL	PL	MPI	Org.	CBR				
			Very dense grey medium SAND. CRAG																
					41.00			90											
					42.00			91 92	S ↓ 50										
					43.00			93											
					44.00	44.00		94 95	S ↓ 50										
			Firm to stiff laminated grey & brown silty CLAY, with some medium rounded to sub-rounded flint gravel. LONDON CLAY		45.00			96											
		200	Very stiff grey & brown SILT:CLAY, with some shell fragments & occasional gypsum crystals. LONDON CLAY		45.70			97 98	S ↓ 36										
					46.00			99											
			Beoming laminated brown CLAY, with occasional mud nodules from 47.00m		47.00			100											
					48.00			101 102	S ↓ 50	30	88	29	59						
					49.00			103 104											
			Beoming laminated dark greyish brown CLAY, with occasional laminae of light grey SILT from 49.00m		50.00			105	S ↓ 50	31	93	29	64						















NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 6



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH13A		
Carried out for	Community & Environmental Services	Date Started	15/03/2018	Date Finished	22/03/2018		
Remarks:	Inspection pit: Hand dug	Type of Rig	Dando 2000+Hand tools		Logged by	MB	
		Depth (m)	50.00	Ground Level (m AOD)	2.38	Drawn by	RK
		Co-ords	652512 - 305958			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Medium dense brown very gravelly medium SAND, with laminae & thin beds of olive very silty fine sand soft grey clay & black silt. Gravel is fine to medium angular to rounded flint & quartz. BREYDON FORMATION		10.80		●	37	S ↓ 29							
			Loose dark grey slightly organic, slightly silty, gravelly fine to medium SAND & orangey brown fine SAND. BREYDON FORMATION		11.00		●	38	S ↓ 14							
			Loose to medium dense olive fine to medium SAND, weathering to brown, with laminae of soft grey CLAY. CRAG		12.00		●	39	S ↓ 15							
					13.00		●	40	S ↓ 23							
					14.00		●	41	S ↓ 20							
					15.00		●	42	S ↓ 21							
					16.00		●	43	S ↓ 26							
					17.00		●	44	S ↓ 30							
					18.00		●	45	S ↓ 28							
					19.00		●	46	S ↓ 19							
					19.50		●	47								
							●	48								
							●	49								
							●	50								
							●	51								
							●	52								
							●	53								
							●	54								
							●	55								
							●	56								
							●	57								
							●	58								
							●	59								
							●	60								
							▲	61								

300

With laminae of orangey brown fine to medium SAND from 14.45m



























NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 3 of 4



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH15		
Carried out for	Community & Environmental Services	Date Started	15/12/2017	Date Finished	20/12/2017		
Remarks:	Inspection pit: Hand dug. General; added 500l of water from 4m to 13m. General; Bentonite seal 19.12.17 from 16.5m to 14.5m	Type of Rig	Hand tools+Dando 2000		Logged by	MB	
		Depth (m)	30.45	Ground Level (m AOD)	1.92	Drawn by	RK
		Co-ords	652637 - 306021			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests								
							Type	No.		MC%	LL	PL	MPI	Org.	CBR			
			<i>Becoming very dense with thin beds of grey clayey silty fine SAND &amp; reddish brown clayey SILT from 20.00m</i>				●	56										
							●	58	S	50								
			Dense brownish grey slightly silty fine to medium SAND, with laminae of grey SILT. CRAG		21.20		●	59										
							●	60										
							●	61	S	39								
			<i>With some fine to medium sub-angular flint gravel from 23.00m to 24.00m</i>				●	62										
							●	63										
							●	64	S	30								
			<i>Becoming light grey silty fine to medium SAND from 25.00m</i>				●	66										
							●	67										
			<i>Becoming very dense from 26.00m</i>				●	68	S	50								
			Medium dense grey fine to medium SAND with numerous lenses of soft grey clay. Occasional shell fragments. CRAG		27.10	27.00	●	69										
			Soft to firm laminated grey sandy CLAY with numerous laminae of greyish brown silty fine sand. CRAG		27.60		●	70			28	33	14	19				
			Soft to firm laminated light greyish brown silty fine SAND & grey clayey SILT. Some shell fragments. CRAG		27.70		●	71										
							●	72	S	44								
			Soft to firm grey clayey sandy SILT. CRAG		29.00	29.00	●	73										
		150									28	39	18	21				































NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH18		
Carried out for	Community & Environmental Services	Date Started	26/09/2017	Date Finished	28/09/2017		
Remarks:	Water strike @ 2.70m	Type of Rig	Dando 3000		Logged by	RK	
		Depth (m)	40.45	Ground Level (m AOD)	2.00	Drawn by	RK
		Co-ords	652532 - 306006			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Dark grey very sandy, clayey SILT, weathering to brown. NORTH DENES FORMATION				●	18	S ↓ 30							
					11.00		●	19	S ↓ 50							
			Very dense orangey grey fine to coarse SAND & greyish brown fine to coarse angular to sub-rounded flint & quartz GRAVEL. NORTH DENES FORMATION		11.70		●	20	↑ ↓							
					12.00		●	21	S ↓ 50							
					13.00		●	22	↑ ↓							
					13.00		●	23	S ↓ 50							
			<i>Becoming very gravelly from 14.00m</i>		14.00		●	24	S ↓ 50							
		250	Very dense yellowish grey very gravelly fine to coarse SAND. Gravel is fine to medium rounded to sub-rounded flint & quartz. CRAG		14.60		●	25	↑ ↓							
					15.00		●	26	S ↓ 50							
					16.00		●	27	S ↓ 50							
			<i>Becoming gravelly from 16.80m</i>		17.00		●	28	↑ ↓							
					17.00		●	29	S ↓ 50							
			Yellowish grey slightly gravelly fine to coarse SAND. Gravel is fine to medium rounded to sub-angular flint & quartz. CRAG		17.80		●	30	↑ ↓							
			Very dense yellowish brown silty fine SAND. CRAG		18.00	18.00	●	31	S ↓ 50							
			Very dense yellowish brown slightly silty fine to medium SAND CRAG		19.00	19.00	●	32	S ↓ 50							
							●	33	↑ ↓							



# NORFOLK PARTNERSHIP LABORATORY

## Borehole Log

Sheet 3 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH18		
Carried out for	Community & Environmental Services	Date Started	26/09/2017	Date Finished	28/09/2017		
Remarks:	Water strike @ 2.70m	Type of Rig	Dando 3000		Logged by	RK	
		Depth (m)	40.45	Ground Level (m AOD)	2.00	Drawn by	RK
		Co-ords	652532 - 306006			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Very dense yellowish brown slightly silty fine to medium SAND CRAG				●	34	S ↓ 50							
			Very dense greyish brown slightly silty fine to medium SAND. CRAG		21.00	21.00	↕	35								
						22.00		●	36	S ↓ 50						
						23.00										
						24.00		●	37	S ↓ 50						
						25.00		↕	38							
						26.00		●	39	S ↓ 50						
						27.00										
						28.00		●	40	S ↓ 50						
						29.00		↕	41							
						30.00										

Becoming grey & silty from 28.00m

# NORFOLK PARTNERSHIP LABORATORY

## Borehole Log

Sheet 4 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	BH18		
Carried out for	Community & Environmental Services	Date Started	26/09/2017	Date Finished	28/09/2017		
Remarks:	Water strike @ 2.70m	Type of Rig	Dando 3000		Logged by	RK	
		Depth (m)	40.45	Ground Level (m AOD)	2.00	Drawn by	RK
		Co-ords	652532 - 306006			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Dark grey slightly sandy SILT, with occasional lenses of firm grey clay. CRAG				●	42	S ↓ 50							
					31.00											
					32.00		●	43	S ↓ 50							
					33.00											
			Firm dark grey slightly silty CLAY, weathering to brown. CRAG		34.00	34.00	●	44	S ↓ 50							
					34.80	35.00	◆	45		26	45	19	26			
			Firm dark grey silty CLAY weathering to brown CRAG			36.00	■	46								
					36.60	37.00	●	47								
			Firm dark grey CLAY. CRAG			38.00	●	48	S ↓ 50	26	52	22	30			
			<i>Becoming firm to stiff from 38.00m</i>			39.00										
			<i>With laminae of grey sandy silt from 39.00m</i>				●	49	↕							
					40.00					31	24					











NORFOLK PARTNERSHIP LABORATORY

Window Sampler Log

Sheet 1 of 2



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	WS No.	TP1
Carried out for	Community & Environmental Services	Date Started	07/12/2017	Date Finished	07/12/2017
Remarks:	General; @ 6m Sand blown up to 2.8m Refusal	Type of Rig	Hand Tools+Terrier+Geotool	Logged by	MB
		Depth (m)	6.00	Ground Level (m AOD)	0.72
		Co-ords	652248 - 305907		Checked by

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			ASPHALT. MADE GROUND MADE GROUND comprising up to cobble sized angular to rounded brick, concrete, asphalt & flint in a matrix of dark brown slightly silty fine to medium sand. MADE GROUND		0.10		●	1								
			<i>With up to cobbles sized wood &amp; concrete and becoming reddish brown from 0.50m</i>				●	4								
			Dark brown gravelly, slightly silty fine to medium SAND. Gravel is fine to medium sub-angular to sub-rounded flint. MADE GROUND		0.90	1.00	●	2								
			Firm to stiff dark grey very sandy, clayey SILT. BREYDON FORMATION		1.20		●	5	1	25	45	27	18			
			Laminated grey & brown sandy clayey SILT, silty fine SAND, & stiff sandy, silty CLAY. BREYDON FORMATION		1.40			6								
			Soft to firm grey very sandy very clayey SILT, with numerous lenses of brown fibrous peat. BREYDON FORMATION		1.85	2.00		7								
			Dark brown fibrous PEAT. H2 W2 F3 C2 W0 Tv1 Th1 A2 P0 BREYDON FORMATION		2.90	3.00		8								
			<i>Becoming more odorous from 4.25m - A3</i>					9								
			Grey slightly silty slightly gravelly fine to medium SAND. Gravel is fine to medium sub-angular to rounded flint & quartz. HAPPISBURGH GLACIGENIC FORMATION		4.60											

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NORFOLK PARTNERSHIP LABORATORY

Window Sampler Log

Sheet 1 of 2



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	WS No.	TP1B		
Carried out for	Community & Environmental Services	Date Started	13/12/2017	Date Finished	19/12/2017		
Remarks:	General; Liners 4 and 5 in bulk bags	Type of Rig	Dando Terrier		Logged by	MB	
		Depth (m)	6.00	Ground Level (m AOD)	1.82	Drawn by	RK
		Co-ords	652342 - 305808			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests							
							Type	No.		MC%	LL	PL	MPI	Org.	CBR		
			Dark brown sandy TOPSOIL. TOPSOIL MADE GROUND comprising fine to coarse gravel size angular to rounded flint, concrete & brick in a matrix of slightly silty fine to medium sand. MADE GROUND		0.10		▲										
			MADE GROUND comprising loose gravelly fine to medium SAND. Gravel is medium angular brick and concrete MADE GROUND		0.50		●	1									
			<i>With less concrete &amp; brick from 0.80m</i>				▼	2									
			Brown very gravelly, slightly silty fine to medium SAND. Gravel is fine to coarse angular to rounded flint, quartz & quartzite. MARINE BEACH DEPOSITS		1.00	1.00	●	3									
			Brown medium to coarse SAND & fine to medium rounded to sub angular flint and quartz GRAVEL. MARINE BEACH DEPOSITS		1.20		▼	4									
			Orangey brown medium SAND. MARINE BEACH DEPOSITS		1.50		●	5			29	52	29	23			
			Stiff dark grey slightly organic, very sandy clayey SILT. BREYDON FORMATION		1.75		▼	6									
			Laminated & thinly bedded grey silty CLAY, with laminae of light grey silty fine SAND. BREYDON FORMATION		1.90	2.00	▼	7			100	130	51	75			
			Soft grey SILT:CLAY BREYDON FORMATION		2.70		▼	8									
			Grey laminated & thinly bedded silty fine to medium SAND, with occasional lenses of dark grey organic material & some roots. BREYDON FORMATION		3.00	3.00	▼	9									
			Grey medium SAND with occasional roots. BREYDON FORMATION		3.60		▼										
			Medium dense grey fine to medium SAND. HAPPISBURGH GLACIGENIC FORMATION		4.00	4.00	▼										
			<i>Becoming grey silty, clayey fine to medium SAND with thin beds of brown amorphous PEAT &amp; grey slightly gravelly fine to medium SAND. Gravel is fine sub-rounded to sub-angular flint &amp; quartz from 4.60m to 5.00</i>				▼										



















NORFOLK PARTNERSHIP LABORATORY

Window Sampler Log

Sheet 1 of 2



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	WS No.	WS7		
Carried out for	Community & Environmental Services	Date Started	06/12/2017	Date Finished	06/12/2017		
Remarks:	WS7 from 1.2-2m. DP from 1.2m	Type of Rig	Dando Terrier+Hand Dug		Logged by	MB	
		Depth (m)	8.00	Ground Level (m AOD)	1.70	Drawn by	RK
		Co-ords	652204 - 305885			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			ASPHALT. MADE GROUND Brown slightly silty, very gravelly fine to medium SAND, with some roots. Gravel is fine to coarse angular to sub-rounded flint & quartz. MADE GROUND		0.10		↑	1								
			Brown gravelly fine to medium SAND, with occasional roots. Gravel is medium to coarse rounded to angular flint. MADE GROUND		0.50		↑	6								
			Light brown slightly gravelly fine to medium SAND, with lenses of soft sandy, silty CLAY. Gravel is fine to medium rounded to angular flint & quartz. MADE GROUND		0.80		↑	7	3							
			Brown fine to coarse angular to sub-rounded flint & quartz GRAVEL & medium to coarse SAND. MARINE BEACH DEPOSITS		1.20		↓									
			Light brown slightly clayey silty fine to medium SAND. MARINE BEACH DEPOSITS		1.55				4							
			<i>With laminae of firm grey silty CLAY from 1.75m</i> Orange slightly gravelly medium to coarse SAND. Gravel is fine sub-angular flint. MARINE BEACH DEPOSITS		1.80											
			Light grey gravelly fine to coarse SAND. Gravel is fine to medium round to sub-rounded flint & quartz. MARINE BEACH DEPOSITS		2.35											
			Dark grey slightly organic, gravelly, clayey, silty medium to coarse SAND. Gravel is fine to medium round to sub-rounded flint & quartz. BREYDON FORMATION		2.80						42	66	32	34		
			<i>Becoming brown fine to medium SAND from 3.10m</i>		3.00											
			Stiff laminated grey slightly sandy CLAY, with numerous lenses black organic material & some roots. Gravel is fine to medium round to sub-rounded flint & quartz. BREYDON FORMATION		3.35				8							
			Firm light grey very clayey fine to coarse SILT, with numerous lenses of black organic material BREYDON FORMATION		3.85						49	54	20	34		
			Laminated firm to stiff grey CLAY & black organic, clayey SILT. BREYDON FORMATION		4.10											
			Soft to firm grey very clayey sandy SILT, with occasional lenses of brown organic material & some shell fragments. BREYDON FORMATION		4.50				9							



















# SPT Calibration Report

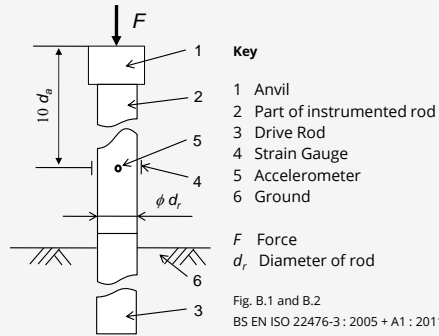
## Hammer Energy Measurement Report

Type of Hammer: SPT HAMMER  
Client: GROUND TECHNOLOGY SERVICES  
Test No: EQU1782

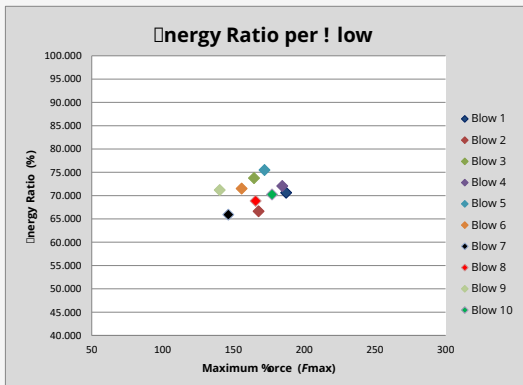
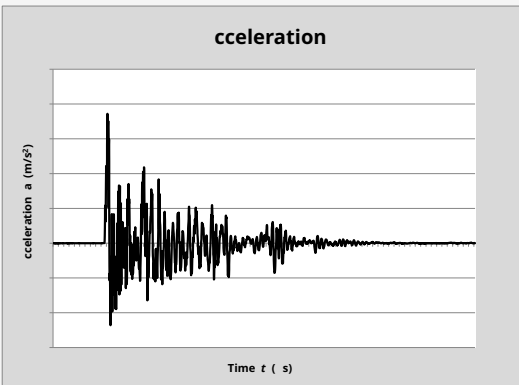
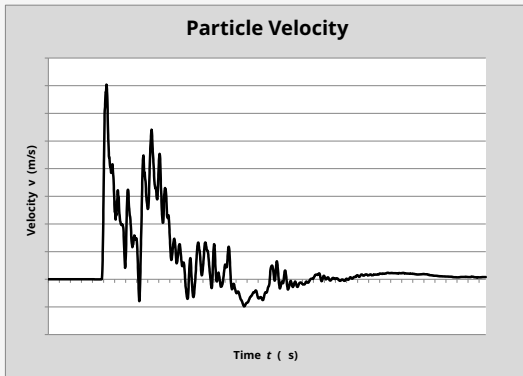
Test Depth (m): 8.20  
Mass of the hammer:  $m = 63.5\text{kg}$   
Falling height:  $h = 0.76\text{m}$   
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

## Characteristics of the instrumented rod

Diameter:  $d_r = 0.052\text{ m}$   
Length of instrumented rod: 0.558 m  
Area:  $A = 11.61\text{ cm}^2$   
Modulus:  $E_o = 206843\text{ MPa}$



TESTED 06 April 2017  
VALID UNTIL 06 April 2018  
MORRIS  
ITS R1707



Observations:  
1.

$E_{\text{meas}} = 0.333\text{ kN-m}$   
 $E_{\text{theor}} = 0.473\text{ kN-m}$

**Energy Ratio =  $\frac{E_{\text{meas}}}{E_{\text{theor}}}$  = 70.37%**  
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Equipe SPT Analyzer Operators: %  
Prepared by: [Redacted] Checked by: [Redacted] Date: 13/04/2017

# SPT Calibration Report

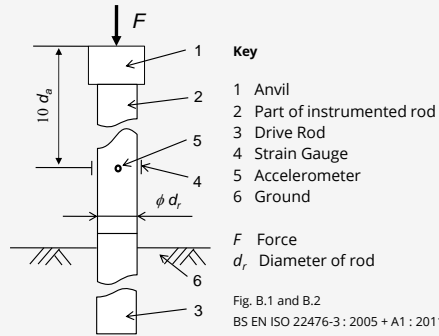
## Hammer Energy Measurement Report

Type of Hammer: SPT HAMMER  
Client: GROUND TECHNOLOGY SERVICES  
Test No: EQU1810

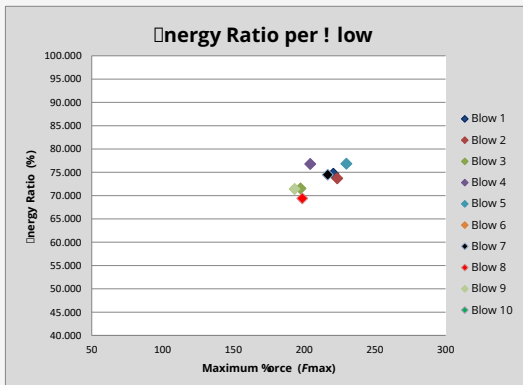
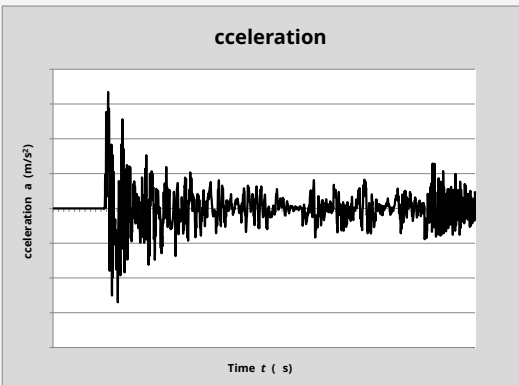
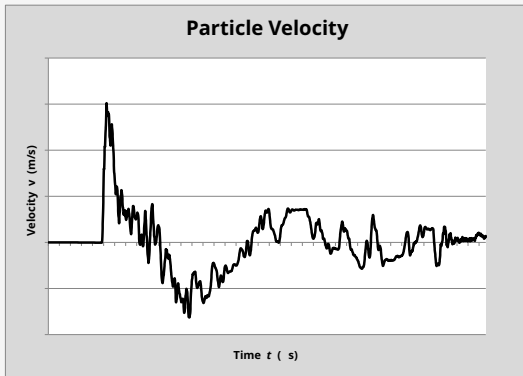
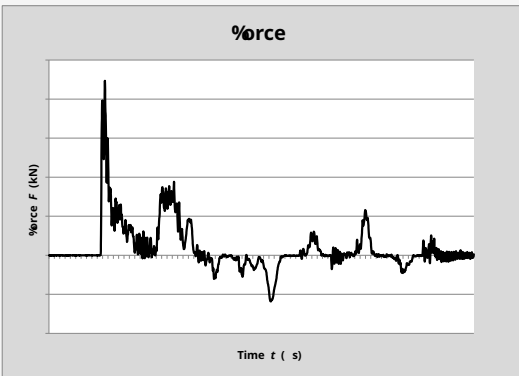
Test Depth (m): 8.50  
Mass of the hammer:  $m = 63.5\text{kg}$   
Falling height:  $h = 0.76\text{m}$   
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

## Characteristics of the instrumented rod

Diameter:  $d_r = 0.052\text{m}$   
Length of instrumented rod: 0.558 m  
Area:  $A = 11.61\text{cm}^2$   
Modulus:  $E_o = 206843\text{MPa}$



TESTED 26 April 2017  
VALID UNTIL 26 April 2018  
MORNING T03



Observations:  
1.

$E_{\text{meas}} = 0.347\text{ kN-m}$   
 $E_{\text{theor}} = 0.473\text{ kN-m}$

Energy Ratio =  $\frac{E_{\text{meas}}}{E_{\text{theor}}}$  = **73.34%**  
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Equipe SPT Analyzer Operators: %  
Prepared by: [Redacted] Checked by: [Redacted] Date: 05/05/2017

# SPT Calibration Report



## Hammer Energy Measurement Report

Type of Hammer: SPT HAMMER  
 Client: JAMES AND MILTON DRILLING LTD  
 Test No: EQU1552  
 Test Depth (m): 8.50  
 Date of Test: 12 November 2016  
 Valid until: 12 November 2017  
 Hammer ID: JM03

Mass of the hammer:  $m = 63.5\text{kg}$   
 Falling height:  $h = 0.76\text{m}$   
 Theoretical energy:  $E_{\text{theor}} = m \times g \times h = 473\text{J}$

### Characteristics of the instrumented rod

Diameter:  $d_r = 0.052\text{ m}$   
 Length of the instrumented rod: 0.558 m  
 Area:  $A = 11.61\text{ cm}^2$   
 Modulus:  $E_\sigma = 206843\text{ MPa}$

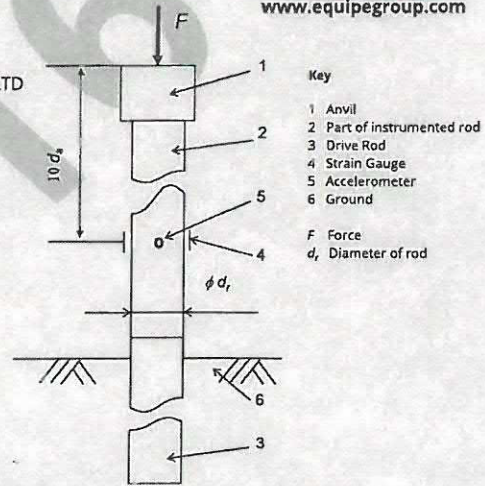
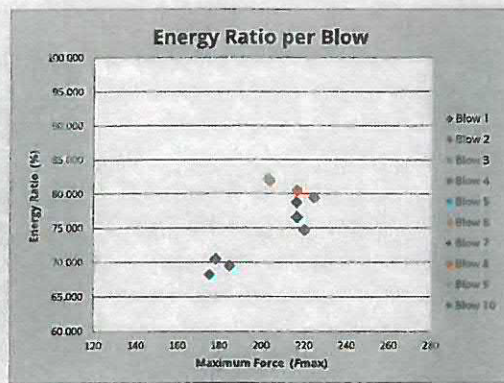
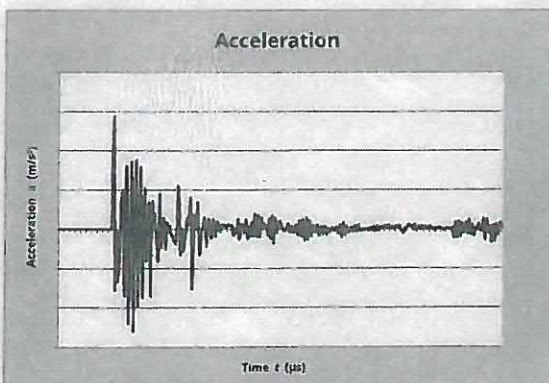
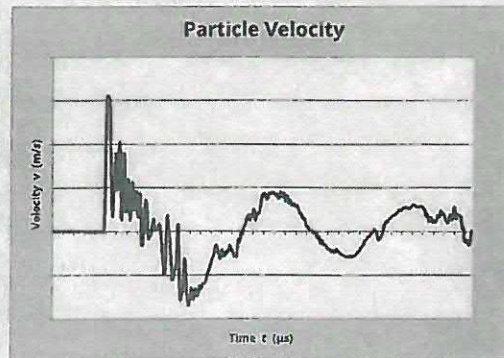
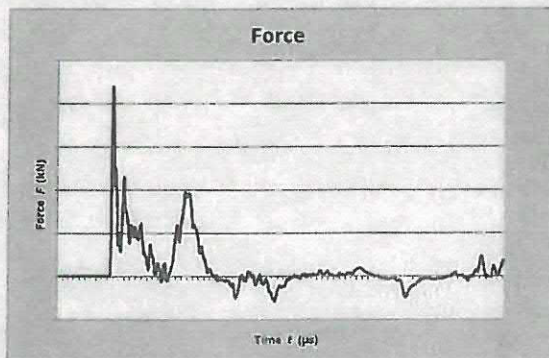


Fig. B.1 and B.2 BS EN ISO 22476-3 : 2005 + A1 : 2011



Observations:

1.

$E_{\text{meas}} = 0.340\text{ kN-m}$

$E_{\text{theor}} = 0.473\text{ kN-m}$

$$\text{Energy Ratio} = \frac{E_{\text{meas}}}{E_{\text{theor}}} = 71.99\%$$

Equipe SPT Analyzer Operator:

MH

Prepared by:

Checked by:

Date

12/11/2016



# SPT Calibration Report



## Hammer Energy Measurement Report

Type of Hammer: SPT HAMMER  
 Client: JAMES AND MILTON DRILLING LTD  
 Test No: EQU1551  
 Test Depth (m): 8.50  
 Date of Test: 12 November 2016  
 Valid until: 12 November 2017  
 Hammer ID: JM04

Mass of the hammer:  $m = 63.5\text{kg}$   
 Falling height:  $h = 0.76\text{m}$   
 $E_{theor} = m \times g \times h = 473\text{J}$   
**Characteristics of the instrumented rod**  
 Diameter:  $d_r = 0.052\text{m}$   
 Length of the instrumented rod:  $0.558\text{m}$   
 Area:  $A = 11.61\text{cm}^2$   
 Modulus:  $E_a = 206843\text{MPa}$

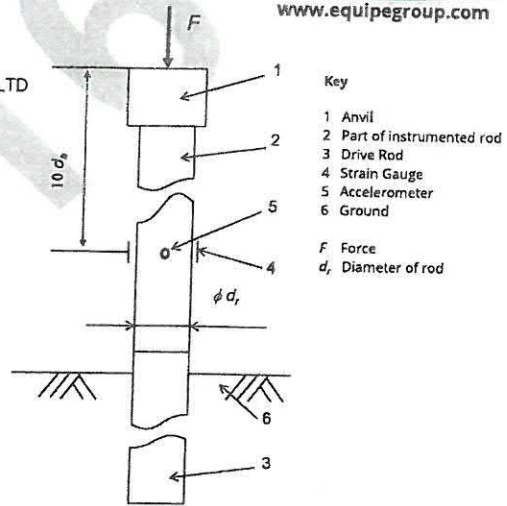
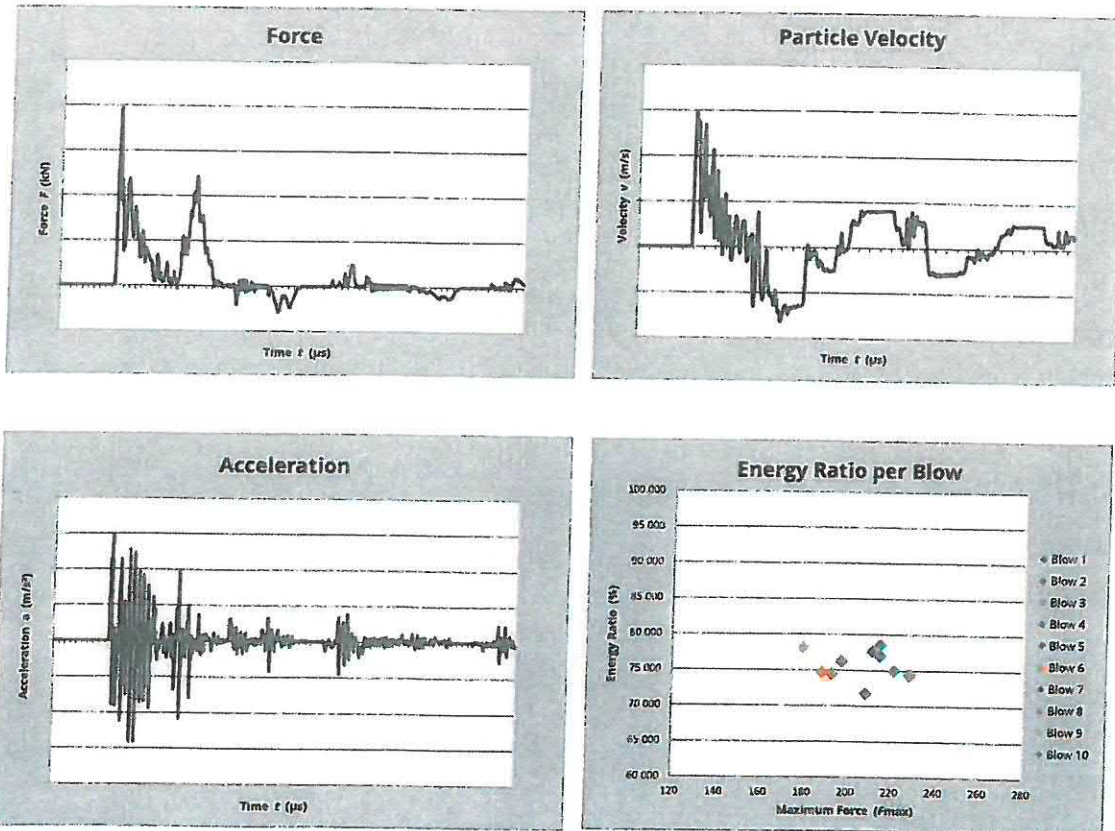


Fig. B.1 and B.2 BS EN ISO 22476-3 : 2005 + A1 : 2011



Observations:  
1.

$E_{meas} = 0.339\text{ kN-m}$   
 $E_{theor} = 0.473\text{ kN-m}$

$$\text{Energy Ratio } (L) = \frac{E_{meas}}{E_{theor}} = 71.58\%$$

Equipe SPT Analyzer Operators: MH  
 Prepared by: [Redacted] Checked by: [Redacted] Date: 12/11/2016



# SPT Calibration Report

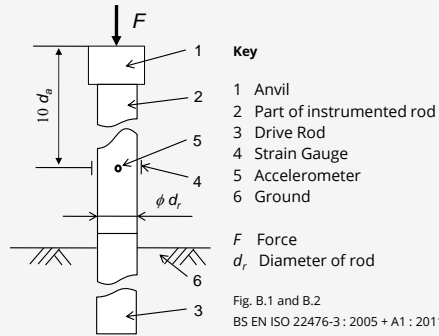
## Hammer Energy Measurement Report

Type of Hammer: SPT HAMMER  
Client: GROUND TECHNOLOGY SERVICES  
Test No: EQU1781

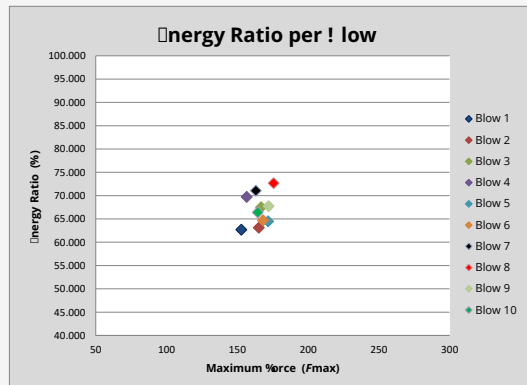
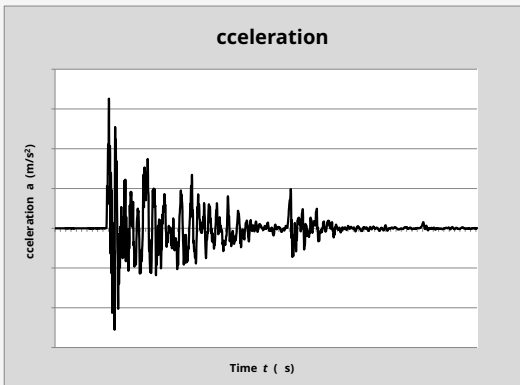
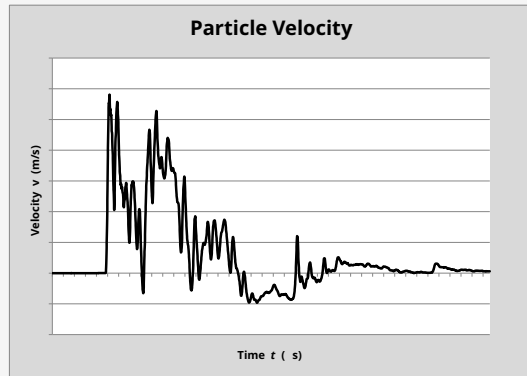
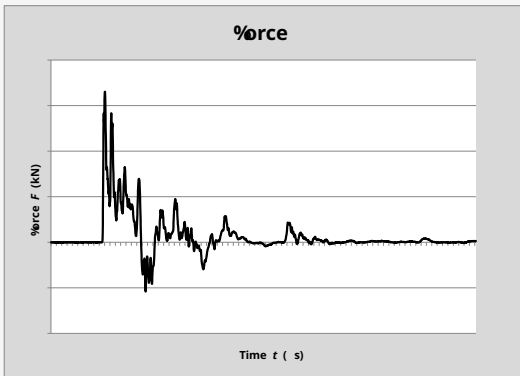
Test Depth (m): 8.00  
Mass of the hammer:  $m = 63.5\text{kg}$   
Falling height:  $h = 0.76\text{m}$   
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

## Characteristics of the instrumented rod

Diameter:  $d_r = 0.052\text{m}$   
Length of instrumented rod: 0.558 m  
Area:  $A = 11.61\text{cm}^2$   
Modulus:  $E_a = 206843\text{MPa}$



TESTED 06 April 2017  
VALID UNTIL 06 April 2018  
MMS 174



Observations:  
1.

$E_{\text{meas}} = 0.316\text{ kN-m}$   
 $E_{\text{theor}} = 0.473\text{ kN-m}$

**Energy Ratio =  $\frac{E_{\text{meas}}}{E_{\text{theor}}}$  = 66.76%**  
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Equipe SPT Analyzer Operators: %  
Prepared by: [Redacted] Checked by: [Redacted] Date: 13/04/2017

# SPT Calibration Report

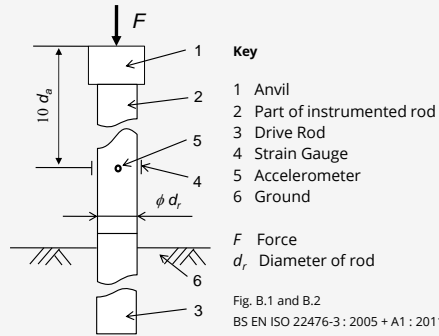
## Hammer Energy Measurement Report

Type of Hammer: TERRIER  
Client: GROUND TECHNOLOGY SERVICES  
Test No: EQU1805

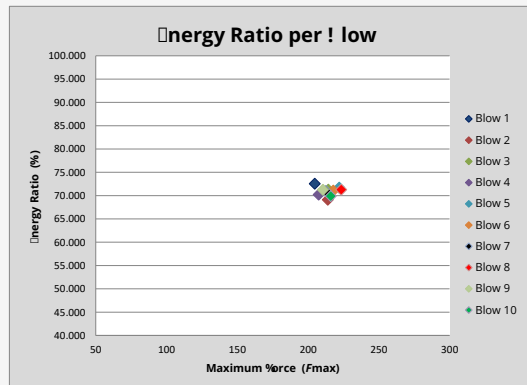
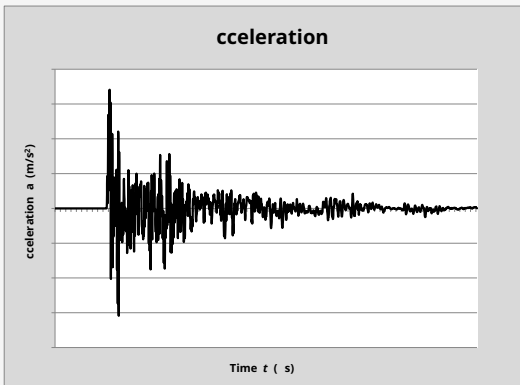
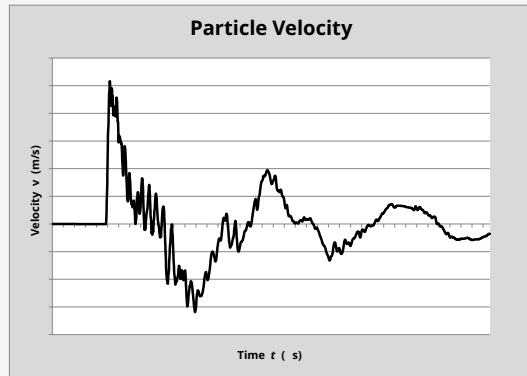
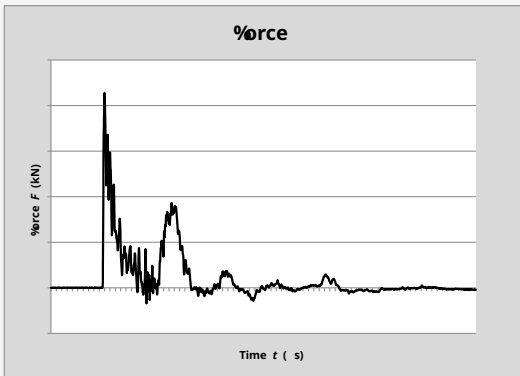
Test Depth (m): 8.50  
Mass of the hammer:  $m = 63.5\text{kg}$   
Falling height:  $h = 0.76\text{m}$   
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

## Characteristics of the instrumented rod

Diameter:  $d_r = 0.052\text{m}$   
Length of instrumented rod: 0.558 m  
Area:  $A = 11.61\text{cm}^2$   
Modulus:  $E_o = 206843\text{MPa}$



TESTED 13 April 2017  
VALID UNTIL 13 April 2018  
MMOR T/0537



Observations:  
1.

$E_{\text{meas}} = 0.334\text{ kN-m}$   
 $E_{\text{theor}} = 0.473\text{ kN-m}$

**Energy Ratio =  $\frac{E_{\text{meas}}}{E_{\text{theor}}}$  = 70.68%**  
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Equipe SPT Analyzer Operators: %  
Prepared by: [Redacted] Checked by: [Redacted] Date: 13/04/2017



# Appendix D

---

**UXO RISK MITIGATION SURVEY**







# Explosive Ordnance Desktop Threat Assessment

Site: Southtown, Great Yarmouth

Client: WSP UK Limited

Ref: 7307TA

Date: 19<sup>th</sup> September 2017

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[www.bactecuxo.com](http://www.bactecuxo.com)

## Glossary of Terms

AAA	Anti-Aircraft Artillery
ARP	Air-raid Precautions
BDO	Bomb Disposal Officer
EOD	Explosive Ordnance Disposal (current term for “bomb” disposal)
HE	High Explosive
HG	Home Guard
IB	Incendiary Bomb
kg	Kilogram
LCC	London County Council
LM	Land Mine
LSA	Land Service Ammunition (includes grenades, mortars, etc.)
Luftwaffe	German Air Force
m bgl	Metres Below Ground Level
MoD	Ministry of Defence
OB	Oil Bomb
PM	Parachute Mine
RAF	Royal Air Force
RN	Royal Navy
SI	Site Investigation
SAA	Small Arms Ammunition (small calibre cartridges used in rifles & machine guns)
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
V-1	“Doodlebug” the first cruise type missile, used against London from June 1944. Also known as ‘Flying Bomb’.
V-2	The first ballistic missile, used against London from September 1944
WWI	First World War (1914 -1918)
WWII	Second World War (1939 – 1945)

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## Executive Summary

**The Site:** The study area, centred on the approximate OS National Grid Reference: TG 52451 05820, is located in Great Yarmouth, approximately 10m north of Southtown Common Recreation Ground. The site is bound to the north by residential properties fronting Waveney Road, to the east by the Petersons Distribution Centre, to the south by residential properties fronting Alpha Road and to the west by the A12 Dual Carriageway

The study area is complex / varied, comprising industrial / commercial properties in the east and residential areas mixed with commercial units in the west, with the River Yare passing north to south through the site. The study area encompasses a number of highways; the A1243, Cromwell Road, Cromwell Crescent, Southtown Road, Queen Anne's Road, William Adams Way, Suffolk Road, Beccles Road and the A12. In the west, there is a variety of soft open ground including allotment gardens, residential gardens, areas of dense vegetation, mature woodland and the periphery of Southtown Common Recreation Ground.

**Proposed Works:** The proposed Site Investigation which shall include both onshore and offshore boreholes to a maximum depth of 50m bgl, CPT boreholes to a maximum depth of 30m bgl, trial pits to 3m bgl, observation trenches to 6m bgl and window samples to 6m bgl.

**Risk Assessment Methodology:** In accordance with CIRIA guidelines this assessment has carried out research, analysed the evidence and considered the risks that the site has been contaminated with unexploded ordnance; that such items remained on site; that they could be encountered during any intrusive works and the consequences that could result. Appropriate risk mitigation measures have been proposed.

**Explosive Ordnance Risk Assessment:** Taking into consideration the findings of this study, Dynasafe BACTEC considers the risk across the route to be heterogeneous and can therefore be divided into **Low**, **Medium** and **High** Risk Zones.

### **German UXO:**

- The site was located within central Great Yarmouth within an area of very high bombing density during WWII, with up to 8 x HE bombs likely to have landed on or adjacent to the site boundary. At least 12 further HE bombs are recorded within a 300m radius of the site. In addition, the site is likely to have been affected by 1kg incendiary bombing.
- The eastern extent of the site, comprising busy commercial / industrial areas would have been accessed on a daily basis thereby decreasing the risk of any UXB strike evidence going unnoticed. In addition, these areas may have been subject to post-raid checks for UXB entry holes.
- The western half of the site was occupied by large areas of ambiguous open ground and allotment gardens which are unlikely to have been accessed as regularly or frequently. Access to the allotments would have varied depending on the season and therefore, a UXB could conceivably have fallen here unobserved.
- Moreover, there are multiple areas of clearance and a ruin apparent on site, suggesting that these areas sustained serious bomb damage. As a result, the affected buildings will have been abandoned for a time, increasing the likelihood of subsequent UXO falling on site unnoticed. Therefore, it can be assumed that, for a time, significant quantities of rubble occupied this area and debris may have been strewn across the site, increasing the likelihood of a UXB remaining on site. However, had a UXB landed within the allotments, open ground soft, rubble, or area of open air storage on site it could have gone undetected. Note, that the entry hole of an SC50 (the most commonly deployed German HE bomb) could be as little as 20cm in diameter and therefore, easily obscured in dense vegetation.
- A UXB landing in the river during a night time raid will have been immediately obscured from view, beneath the waterline. Consequently, it is unlikely to have been observed, reported and mapped.
- A UXB entry hole within the river bank mud on site (revealed at low tide) is unlikely to have persisted; the next high tide filling in the hole with water and sediment. Even if evidence of a UXB was observed here and reported, it is highly unlikely to have been recovered by the local bomb disposal unit due to its insignificant location and the impracticalities of deep buried UXB removal in this environment.

### **British/Allied UXO:**

- Due to its coastal location in south-eastern England, Great Yarmouth was considered vulnerable to German invasion and consequently, was well defended by Army and HG units, with River Yare and beaches fortified with static defences, minefields and gun positions.
- A group of WWII anti-invasion defences, including four pillboxes, a road block and a Spigot Mortar emplacement were present within the northern section of the site on the junction of Queen Anne's Road and

Southtown Road. The central element of the site was a substantial road block, designed to check the progress of tanks rather than act as a check point. Further defences were located within the site boundary, located at the westernmost end of Cromwell Road a Spigot Mortar position and associated Type 24 Pillbox were located.

- Although these defence installations were located on site, it is considered highly likely that the risk of shallow buried UXO has been mitigated on site due to post war development.
- Note, that four HAA batteries were situated within a 5km radius of the site during WWII. For the same reasons as given above, it is quite possible that an unexploded AA shell or rocket could have landed in the river on site and remained there.

**The Risk that Unexploded Ordnance Remains on site: Land** - Within the footprint of post-war ground works, the risk of small, shallow buried UXO (LSA, SAA, AA shells and German 1kg incendiaries) remaining will have been partly mitigated since any such items could have been encountered and removed during soil stripping / levelling, foundations etc.

Only within the volume of any post-war basement level bulk excavations and at the precise locations of any post-war pile foundations / boreholes, will the risk from deeper buried German HE UXBs have been completely mitigated. Therefore, it is conceivable that such a weapon could reside within virgin / untouched geology, beneath and amongst any such post-WWII ground works, down to the maximum bomb penetration depth. The risk from UXO contamination within the eastern extent of the site and pre-war buildings has been assessed as minimal and therefore the risk from UXO remaining is minimal.

**River** - It has been assessed that a HE UXB falling in the river will likely have achieved full burial within the overburden sediment and may also have penetrated the Crag Group bedrock. Consequently, such a UXB will have remained in situ up to the present day, largely unaffected by environmental conditions. Also, any large partially buried UXBs on site are less likely to be affected by environmental conditions as a result of their significant mass.

Tidal riverbed environments are mobile in nature and therefore as a result of water currents, any small items of UXO (British AA shells and German 1kg IBs) residing on or near the riverbed surface could experience migration. This is evidenced by the large quantity of munitions that are washed up on beaches around the UK, every year. The wider River Yare environment will have been subject to the same UXO contamination conditions as the site during WWII and therefore although riverbed UXO could have migrated out of the site since WWII, equally, additional UXO could have migrated into the site.

**Bomb Penetration Assessment:** It has been assessed that a 500kg bomb would have had an approximate maximum bomb penetration depth of between **8-10m** below WWII ground level. Penetration depth could potentially have been greater if the UXB was larger (though only 4% of German bombs used in WWII over Britain were of that size). Note that UXBs may be found at any depth between just below the WWII ground level and the maximum penetration depth.

**Recommended Risk Mitigation Measures:** Dynasafe BACTEC believes the following risk mitigation measures should be deployed to support the proposed works at the Southtown, Great Yarmouth site:

- Site Specific Explosive Ordnance Safety and Awareness Briefings to all personnel conducting intrusive works.
- The Provision of Unexploded Ordnance Site Safety Instructions.
- Explosive Ordnance Disposal (EOD) Engineer presence on site to support shallow intrusive works.
- Handheld Intrusive Magnetometer Survey of all borehole locations down to the maximum bomb penetration depth.
- Non-Intrusive Magnetometer and Side Scan UXO Survey.
- Intrusive Magnetometer Survey - Down-hole Vallon Probing ahead of Marine Boreholes.

**Further Recommended Measures should the Scope of Works Change:**

- Intrusive Magnetometer Survey of all pile / boreholes locations down to the maximum bomb penetration depth.
- Pre-Piling Intrusive Magnetometer Survey: TFG Clearance ahead of Piling.
- Intrusive Magnetometer Survey: Down-hole Vallon Probing ahead of Piling.





**Annexes**

<b>Annex A</b>	Site Location Maps
<b>Annex B</b>	Recent Aerial Photograph
<b>Annex C</b>	Site Plan
<b>Annex D</b>	Historical OS Mapping
<b>Annex E</b>	Great Yarmouth Bomb Plot Map
<b>Annex F</b>	Great Yarmouth Bomb Census Map
<b>Annex G</b>	RAF Aerial Photograph - 1946
<b>Annex H</b>	1kg Incendiary Bomb Penetration Photograph - July 1942
<b>Annex I</b>	German Air-Delivered Ordnance
<b>Annex J</b>	UXO Press Articles – Recent Finds
<b>Annex K</b>	UXO Press Articles – Fatal Incidents at Construction Sites
<b>Annex L</b>	Anti-Aircraft Artillery
<b>Annex M</b>	Recent UXO Incidents - Home Guard Incendiary Grenades
<b>Annex N</b>	Land Service Ammunition
<b>Annex O</b>	Small Arms Ammunition
<b>Annex P</b>	Risk Map

# Explosive Ordnance Threat Assessment

In Respect of

## Southtown, Great Yarmouth

### 1 Introduction

#### 1.1 Background

WSP UK Limited has commissioned Dynasafe BACTEC Limited to conduct an Explosive Ordnance Threat Assessment for the Southtown, Great Yarmouth site.

Unexploded Ordnance (UXO) presents a significant threat to construction projects in parts of the UK as a result of enemy actions during the two 20<sup>th</sup> Century World Wars and historic British and Allied military activity.

It is estimated that over 20% of the UK landmass has been used for military training at some point and between 2006 and 2009, over 15,000 items of mainly British / Allied ordnance (excluding small arms ammunition) were found on UK construction sites.

In addition, one of the legacies of the two World Wars is buried unexploded air-dropped bombs or anti-aircraft projectiles resulting from the failure of a proportion of such weapons to function as designed. It is commonly accepted that the failure rate of these munitions was approximately 10% and, depending on their shape, weight, velocity and ground conditions many penetrated the ground and came to rest at depth.

Intensive efforts were made during and after the war to locate and render safe all UXO but, unsurprisingly, not all were found and dealt with. This is evidenced by the regular, on-going discoveries of UXO during construction-related intrusive ground works.

As a result of a generally increased risk awareness amongst professionals involved in ground engineering works and proactive health and safety measures, the threat to life and limb from UXO has been minimised. However even the simple discovery of a suspected device during on-going works can cause considerable disruption to production and cause unwanted delays and expense.

Such risks can be more fully addressed by a better understanding of the site-specific threat and the implementation of appropriate risk mitigation measures.

### 2 Construction Industry Duties and Responsibilities

#### 2.1 The UK Regulatory Environment

There is no specific legislation covering the management and control of the UXO risk in the UK construction industry but issues regarding health and safety are addressed under a number of regulatory instruments, as outlined below.

In practice, the regulations impose a responsibility on the construction industry to ensure that they discharge their obligations to protect those engaged in ground-intrusive operations (such as archaeology, site investigation, drilling, piling or excavations) from any reasonably foreseeable UXO risk.

## 2.2 The Health and Safety at Work Act, 1974

The Act places a duty of care on an employer to put in place safe systems of work to address, as far as is reasonably practicable, all risks (to employees and the general public) that are reasonably foreseeable.

## 2.3 Construction (Design and Management) Regulations 2015

CDM 2015 ensures that health and safety within the construction industry is continually improved:

- Works are sensibly planned and managed.
- Competent staff are engaged in the works.
- Risks are identified and managed.
- All parties cooperate and coordinate activities.
- Communication flows to those who require it.
- Workers are consulted and engaged about risks and how they are being managed.

In line with CDM 2015 legislation, Dynasafe BACTEC Limited are able to assist parties in their discharge of CDM duties as follows:

- Assist Principal Designers with pre-construction information and risk assessments
- Assist the Designer with the Designer's Risk Assessment.
- Issue UXO risks as have been identified, and manage risks accordingly.
- Assist the Principal Contractor with the construction phase information, in particular risk assessments and mitigation strategies.
- Plan, manage and monitor survey and clearance works under Dynasafe BACTEC Limited's control.

## 2.4 Other Legislation

Other relevant legislation includes the "Management of Health and Safety at Work Regulations 1999" and "The Corporate Manslaughter and Corporate Homicide Act 2007".

# 3 The Role of the Authorities and Commercial Contractors

## 3.1 The Authorities

The Police have the responsibilities for co-ordinating the emergency services in the case of an ordnance-related incident on a construction site. They will make an initial assessment (i.e. is there a risk that the find is ordnance or not?) and if they judge necessary impose a safety cordon and/or evacuation and call the military authorities (JSEODOC - Joint Services Explosive Ordnance Disposal Operations Centre) to arrange for investigation and/or disposal. In the absence of an EOD specialist on site many Police Officers will use the precautionary principle, impose cordon(s)/evacuation and await advice from the JSEODOC.

The priority given to the request by JSEODOC will depend on their judgement of the nature of the threat (ordnance, location, people and assets at risk) and the availability of resources. They will respond immediately or as resources are freed up. Depending on the on-site risk

assessment the item of ordnance may be removed or demolished (by controlled explosion) in situ. In the latter case additional cordons and/or evacuations may be necessary.

Note that the military authorities will only carry out further investigations or clearances in very high profile or high-risk situations. If there are regular ordnance finds on a site, the JSEODOC may not treat each occurrence as an emergency and will encourage the construction company to put in place alternative procedures (i.e. the appointment of a commercial contractor) to manage the situation and relieve pressure from the JSEOD disposal teams.

### **3.2 Commercial Contractors**

In addition to pre-construction site surveys and follow-on clearance work, a commercial contractor is able to provide a reactive service on construction sites. The presence of a qualified EOD Engineer with ordnance recognition skills will avoid unnecessary call-outs to the authorities and the Contractor will be able to arrange for the removal and disposal of low risk ordnance. If high risk ordnance is discovered actions will be co-ordinated with the authorities with the objective of causing the minimum possible disruption to site operations whilst putting immediate, safe and appropriate measures in place.

## **4 This Report**

### **4.1 Aims and Objectives**

The aim of this report is to examine the possibility of encountering any explosive ordnance during any intrusive works at the Southtown, Great Yarmouth site. Risk mitigation measures will be recommended, if deemed necessary, to eliminate or reduce the threat from explosive ordnance during the envisaged works. The report follows the CIRIA Guidelines.

The following issues will be addressed in the report:

- The risk that the site was contaminated with unexploded ordnance.
- The risk that UXO remains on site.
- The risk that ordnance may be encountered during any intrusive works.
- The risk that ordnance may be initiated.
- The consequences of initiating or encountering ordnance.

Risk mitigation measures, appropriate to the assessed level of risk and site conditions, will be recommended if required.

### **4.2 Approach**

In preparing this Explosive Ordnance Threat Assessment Report, Dynasafe BACTEC has considered general and, as far as possible, site specific factors including:

- Evidence of German bombing and delivery of UXBs.
- Site history, occupancy and conditions during WWII.
- The legacy of Allied military activity.
- Details of any known EOD clearance activity.
- The extent of any post war redevelopment.
- Scope of the current proposed works.



### 4.3 Sources of Information

Dynasafe BACTEC has carried out detailed historical research for this Explosive Ordnance Threat Assessment including accessing military records and archived material held in the public domain and in the MoD.

Material from the following sources has been consulted:

- The National Archives.
- Norfolk Record Office.
- Norfolk County Council.
- Landmark Maps.
- Peel Ports Great Yarmouth.
- Council for British Archaeology.
- Available material from 33 Engineer Regiment (EOD) Archive.
- Relevant information supplied by WSP UK Limited.
- Dynasafe BACTEC's extensive archives built up over many years of research and hands-on Explosive Ordnance Disposal activities in the UK.
- Open sources such as published books, local historical records and the internet.

### 4.4 General Considerations

This report is based upon research of historical evidence. Whilst every effort has been made to locate all relevant material Dynasafe BACTEC cannot be held responsible for any changes to the assessed level of risk or risk mitigation measures based on documentation or other information that may come to light at a later date.

The accuracy and comprehensiveness of wartime records is frequently difficult or impossible to verify. As a result, conclusions as to the exact location, quantity and nature of the ordnance threat can never be definitive but must be based on the accumulation and careful analysis of all accessible evidence. Dynasafe BACTEC cannot be held responsible for inaccuracies or gaps in the available historical information.

### 4.5 Bombing Records

During WWII, considerable efforts were expended in recording enemy air raids. Air Raid Precautions (ARP) wardens were responsible for making records of bomb strikes either through direct observation or by post-raid surveys. However, their immediate priority was to deal with casualties and limit damage, so it is to be expected that records are often incomplete and sometimes contradictory. Record keeping in the early days of bombing was not comprehensive and details of bombing in the early part of the war were sometimes destroyed in subsequent attacks. Some reports may cover a single attack, others a period of months or the entire war.

Records of raids that took place on sparsely or uninhabited areas were often based upon third party or hearsay information and are not always reliable; records of attacks on military or strategic targets were often maintained separately from the general records and have not always survived.

## 5 The Site

### 5.1 Site Location

The study area is located in Great Yarmouth, approximately 10m north of Southtown Common Recreation Ground. The site is bound to the north by residential properties fronting Waveney Road, to the east by the Petersons Distribution Centre, to the south by residential properties fronting Alpha Road and to the west by the A12 Dual Carriageway.

The site, centred on the approximate OS National Grid Reference: TG 52451 05820.

Site Location Maps are presented in **Annex A**.

### 5.2 Site Description

The study area is complex / varied, comprising industrial / commercial properties in the east and residential areas mixed with commercial units in the west, with the River Yare passing north to south through the site.

The study area encompasses a number of highways; the A1243, Cromwell Road, Cromwell Crescent, Southtown Road, Queen Anne's Road, William Adams Way, Suffolk Road, Beccles Road and the A12.

In the west, there is a variety of soft open ground including allotment gardens, residential gardens, areas of dense vegetation, mature woodland and the periphery of Southtown Common Recreation Ground.

A Recent Aerial Photograph of the site is presented in **Annex B**.

## 6 Scope of the Proposed Works

The proposed Site Investigation which shall include both onshore and offshore boreholes to a maximum depth of 50m bgl, CPT boreholes to a maximum depth of 30m bgl, trial pits to 3m bgl, observation trenches to 6m bgl and window samples to 6m bgl.

A Site Plan showing the proposed future development of the site is presented in **Annex C**.

## 7 Ground Conditions

Published British Geological Survey (BGS) scale mapping indicates that the western extent of the site is underlain by superficial Breydon Formation (Peat), whilst the River Yare and the eastern extent of the site is underlain with Tidal River or Creek Deposits (Clay and Silt). Whereas the entirety of the site is underlain by Crag Group bedrock.

Data supplied by the WSP UK Limited, for a borehole sunk on land in 2007, records the following shallow geology on site:

- 1m of Made Ground.
- 3m of Sand (Tidal and River Creek Deposits).
- >10m of Sand (dense brown fine medium and coarse Sand – North Denes Formation).

A (marine) log (dated 2007) for a borehole sunk on site records the following shallow geology:

- 1.39m of Sand (shelly Sand with occasional silt/clay).

- >8.21m of Sand (Sand with layers of gravel).

## 8 Site History

Latest available pre-WWII and earliest available post-WWII OS maps were obtained from Landmark Maps. These are presented in **Annex D** and described below:

### 8.1 Pre-WWII

The 1927 (1:2,500 scale) map shows the site split into two halves by the River Yare. The eastern half is occupied by multiple industrial buildings, areas of open ground, unlabelled roadways and part of *Fish Wharf*. A rail siding supplying the Wharf is present in three locations within the eastern half of the site.

The western half of the site is predominantly occupied by residential properties, open ground and *Allotment Gardens*. The western half of the site is crossed by *Southtown Road*, *Queen Anne's Road*, *Cromwell Road* and smaller unlabelled roadways. The southern section of the site occupied the peripheries of *Southtown Common Recreation Ground*.

Note, that a 1927 (1: 2,500 scale) map was reviewed (not annexed) which shows the westernmost section of the site to be occupied by open ground.

### 8.2 Post-WWII

The 1949 (1:2,500 scale) map shows the eastern half of the site to have undergone two small areas of clearance, whilst the south-easternmost section of the site encroaches upon an area of redevelopment. No further major changes have occurred on this part of the site.

The western half of the site has sustained five areas of clearance across the site, whilst a single *Ruin* is located to the centre of the site. Note, the westernmost section of the site remains open ground.

Within the immediate surrounding area, a number of examples of clearance, redevelopment and ruins are noted. Such observations are often indicative of serious bomb damage on early post-WWII OS maps.

## 9 The Threat from German Aerial Bombing and Artillery Shelling

### 9.1 Conflict History of Great Yarmouth

#### 9.1.1 First World War

##### 9.1.1.1 Air Raids

A WWI bomb census map, shows that the town was subject to aerial bombardment. Note however that the map does not allow an accurate assessment of the bomb strike locations in relation to the study area due to the small scale and lack of detail.

Great Yarmouth suffered the first aerial bombardment in the UK, inflicted by Zeppelin L3 on 19<sup>th</sup> January 1915. Humberside is thought to have been the intended target, however, due to navigational difficulties, Great Yarmouth was attacked.

The Zeppelin reportedly dropped 10 bombs across the town; one of which landed outside the First and Last Tavern in Southgate Road by Fish Wharf. No casualties were sustained, the damage was confined to broken windows and a hole in the road. A second bomb landed adjacent to a riverside restaurant at Fish Wharf causing extensive damage, inflicted one

casualty from shattering glass. Therefore, as Fish Wharf occupies the eastern extent of the site it is likely that these bombs landed on site. However, no UXBs were noted.

#### **9.1.1.2 Naval Bombardment**

On the 25<sup>th</sup> April 1916 Lowestoft was attacked by the German Navy. Four large German battle cruisers (SMS Lützow, Derfflinger, Moltke and Von der Tann) supported by U-Boats bombarded the town with 6", 11" and 12" projectiles from a distance of approximately 6.5km. The attack commenced at 04:10 and lasted for 10 minutes.

The secondary target for this raid was to be Great Yarmouth however, the Royal Navy were made aware of the Germans actions and the British fleet engaged the German ships. This, coupled with heavy fog meant that only a few shells were fired at Great Yarmouth before the German warships pulled back.

#### **9.1.1.3 Deductions**

Although this study recognises the threat posed by WWI bombs and shells, it cannot be quantified to the same degree as the WWII threat due to the lack of complete and accurate incident records.

WWI bombs were generally smaller than those used in WWII and were dropped from a lower altitude, resulting in limited UXB penetration depths. Aerial bombing was often such a novelty at the time that it attracted public interest and even spectators to watch the raids in progress.

As only a few shells landed in Great Yarmouth it is unlikely that any failed to explode. Therefore, the risk of a German WWI unexploded bomb or shell landing on site unobserved, and subsequently going unreported, is considered minimal and therefore the risk from German WWI UXO is considered low and will not be further addressed in this report.

### **9.1.2 Second World War**

The Luftwaffe reportedly carried out more bombing raids on Great Yarmouth than any other coastal town, due in part to the presence of an important port with a large fishing fleet and associated industries.

Moreover, due to the town's position on the east coast, where it was difficult to detect an incoming attack en route to the Midlands, it would have been vulnerable to 'tip and run' incidents, whereby an enemy aircraft under heavy AA fire or fighter interception would prematurely jettison its bomb load in order to evade the defences or indiscriminately deposit unused ordnance whilst returning to bases in northern Europe.

Consequently, the town was frequently attacked by German bombers. In a total of 237 properties were destroyed, 1,598 were severely damaged and subsequently demolished, 1,816 were seriously damaged but repairable and 19,818 were slightly damaged.

The available records of bombing incidents for Great Yarmouth are presented in the following sections.

## **9.2 Second World War Bombing Records**

### **9.2.1 Bombing Statistics**

The following table summarises the quantity of German bombs (excluding 1kg incendiaries and anti-personnel bombs) falling on the Municipal Borough of Great Yarmouth (within which the site was historically located) between 1940 and 1945: (source: National Archives)



<b>Record of German Ordnance Dropped on the Municipal Borough of Great Yarmouth</b>	
Area Acreage	3,598
High Explosive Bombs (all types)	910
Parachute Mines	9
Oil Bombs	1
Phosphorus Bombs	8
Fire Pot	10
V1 Flying Bomb	0
V2 Long Range Rocket	0
Total	938
<b>Items Per 1,000 Acres</b>	<b>260.7</b>

Evidence from a secondary source shows the statistics regarding the quantity of UXO dropped on Great Yarmouth<sup>1</sup>:

<b>Record of German UXO Dropped on the Municipal Borough of Great Yarmouth</b>	
High Explosive (all types)	221 (12)
Parachute Mines	7 (2)
Phosphorus Bombs	7 (1)
Fire Pot	10
Oil Bomb	1
V1 Flying Bomb	0
Unclassified HE Bombs	653 (60)

*N.B. Number denoted in brackets are Unexploded Bombs*

Detailed records of the quantity and locations of the 1kg incendiary and anti-personnel bombs were not routinely maintained by the authorities as they were frequently too numerous to record. However, an estimated 1,590 of these IBs were recorded in the Municipal Borough of Great Yarmouth.

Although the incendiaries are not particularly significant in the threat they pose, they nevertheless are items of ordnance that were designed to cause damage and inflict injury and should not be overlooked in assessing the general risk to personnel and equipment. The anti-personnel bombs were used in much smaller quantities and are rarely found today but are potentially more dangerous. This table does not include UXO found during or after WWII.

<sup>1</sup> Bowyer, M. *Air Raid the Emergency air offensive against East Anglia 1939-1945* (1986)

### 9.2.2 Great Yarmouth Bomb Plot Map

This Great Yarmouth Bomb Plot Map (presented in **Annex E**) only records 28 raids between 11/10/1941 and 31/05/1944, taken from the National Archives. It records the closest HE bomb strike to be approximately 115m south-west of the site. Note, this map only depicts a small quantity of the ordnance dropped on the town as Luftwaffe activity was greater between the summers of 1940 and 1941.

### 9.2.3 Great Yarmouth Bomb Census Map

A bomb census map for the wider area included within a publication (*J. P. Foynes 1994*) was reviewed. A section of this small-scale map (presented in **Annex F**) depicts the locations of bombs and mines dropped on Great Yarmouth throughout the duration of WWII.

It records approximately 8 x HE bomb strikes on or within the site boundary and multiple 1kg IBs to have fallen on site.

However, this map has very few geographical indicators and is of poor quality, therefore should not be considered an accurate representation of the distribution of bomb strikes in and around Great Yarmouth. Note, however it is possible to apply some accuracy when plotting the site due to the gas works location immediately to the east of the site.

### 9.2.4 WWII-era RAF Aerial Photography

Historical RAF aerial photography of the site was supplied by Norfolk County Council. A post-WWII image is presented in **Annex F**.

This photography, was taken in 1946, and shows the site in its entirety, much as it appears in the OS Mapping. Although of small scale and low resolution it shows the western half of the site to be occupied by large areas of unused open ground, allotment gardens, hard-surfaced roadways and residential properties.

The eastern half of the site is occupied by a number of industrial buildings and hard-surfaced roadways, which appear to have survived the war intact. Note, that there are two smaller areas set back from the quayside which appear to be occupied by open soft ground which may have been used for the storage of materials during the war. An area of clearance is apparent within the western section of the site as is consistent to post-war OS Mapping, and is likely a result of bomb damage.

Note, no HE bomb craters are visible within the open soft ground, however, such features on worked ground (allotments) are likely to have been infilled during the war. Therefore, a UXB entry hole could have gone unnoticed on site.

### 9.2.5 Abandoned Bombs

A post-air raid survey of buildings, facilities and installations would have included a search for evidence of bomb entry holes. If evidence were encountered, Bomb Disposal Officer teams would normally have been requested to attempt to locate, render safe and dispose of the bomb. Occasionally evidence of UXBs was discovered but due to a relatively benign position, access problems or a shortage of resources the UXB could not be exposed and rendered safe. Such an incident may have been recorded and noted as an Abandoned Bomb.

Given the inaccuracy of WWII records and the fact that these bombs were 'abandoned', their locations cannot be considered definitive, nor the lists exhaustive. The MoD states that 'action to make the devices safe would be taken only if it was thought they were unstable'. It should be noted that other than the 'officially' abandoned bombs, there will inevitably be UXBs that

were never recorded. Dynasafe BACTEC holds no records of officially registered abandoned bombs at or near the site.

### 9.3 Likelihood of Post-raid UXO Detection

Utilising the available historical bombing records as reviewed in *Section 9.2*, it is possible to make an assessment of the likelihood that evidence of UXO would have been noted on a site during the war and the incident dealt with or recorded at the time. Factors such as bombing density, frequency of access, ground cover, damage and failure rate have been taken into consideration.

#### 9.3.1 Density of WWII Bombing

Bombing density is an important consideration for assessing the possibility that UXO remains in an area. A very high density can for example result in increased levels of damage sustained to structures, greater likelihood of errors in record keeping and a higher risk that UXBs fell over the area.

The site was located within an area of very high bombing density during WWII, with up to 8 x HE bombs likely to have landed on or adjacent to the site boundary. At least 12 further HE bombs are recorded within a 300m radius of the site. In addition, the site is likely to have been affected by 1kg incendiary bombing.

#### 9.3.2 Damage

If structures on a site have been subject to significant bomb or fire damage, rubble and debris are likely to have been present; similarly, a HE bomb strike on open ground is likely to have resulted in a degree of soil disturbance. Under such conditions there is a greater risk of the entry holes of UXBs dropped during subsequent raids being obscured and going unnoticed.

A review of the historical resources suggests that many of the buildings on site survived the war largely intact. Note however, the available aerial photograph does not allow for an accurate assessment of bomb damage to all buildings.

Note, there are multiple areas of clearance apparent within the western section of the site, and a single ruin, suggesting that these areas sustained serious bomb damage. As a result, the affected buildings will have been abandoned for a time, increasing the likelihood of subsequent UXO falling on site unnoticed. Therefore, it can be assumed that, for a time, significant quantities of rubble occupied this area and debris may have been strewn across the site.

#### 9.3.3 Frequency of Access

UXO at sites where human access was infrequent would have a higher chance of being overlooked than at those sites which were subject to greater occupancy. The importance of a site or facility to the war effort is also an important consideration as such sites are likely to have been both frequently accessed and are also likely to have been subject to post-raid checks for evidence of UXO.

The eastern extent of the site was occupied by Fish Wharf, comprising quayside areas and associated buildings / structures during the war. Note, however there is an area of open ground that may have possibly been occupied by dense vegetation/bare earth or used for open air storage during the war. Therefore, decreasing the likelihood of regular / frequent access.

These busy commercial / industrial areas would have been accessed on a daily basis thereby decreasing the risk of any UXB strike evidence going unnoticed. In addition, these areas may have been subject to post-raid checks for UXB entry holes.

The western half of the site was occupied by large areas of ambiguous open ground and allotment gardens. These areas are unlikely to have been accessed as regularly or frequently as the developed portion of the site. Access to the allotments would have varied depending on the season and therefore a UXB could conceivably have fallen here unobserved. This is especially pertinent since many of the German air raids over Great Yarmouth took place at night. Furthermore, the undeveloped parts of the site would not have been subject to specific post-raid searches for UXO.

#### 9.3.4 Ground Cover

The degree and type of groundcover present during WWII would have a significant effect on the visual evidence at ground level which may have indicated the presence of buried UXO.

Evidence of German UXO will have been obvious within the developed, undamaged parts of the study area, as a UXB strike to buildings and hard-standing will still have caused significant damage or an obvious, persistent entry hole, even without detonating. Following any such incident, the UXB would have been reported and subsequently exhumed / removed.

However, had a UXB landed within the allotments, open ground soft, rubble, or area of open air storage on site it could have gone undetected. Note, that the entry hole of an SC50 (the most commonly deployed German HE bomb) could be as little as 20cm in diameter and therefore, easily obscured in dense vegetation.

A UXB entry hole within the river bank mud on site (revealed at low tide) is unlikely to have persisted; the next high tide filling in the hole with water and sediment. Even if evidence of a UXB was observed, it is unlikely to have been reported due to its insignificant position.

A UXB striking the water on site will have been immediately obscured from view and therefore, is unlikely to have been observed, reported and mapped.

Also noteworthy is that during WWII German 1kg incendiary bombs were observed to penetrate to a significant depth when dropped into soft ground. The photograph presented in **Annex H** shows how such a sub-munition (known to have been deployed locally), could have remained undetected in the post-war period.

#### 9.3.5 Bomb Failure Rate

There is no evidence to suggest that the bomb failure rate in the vicinity of the site would have been different from the “approximately 10%” figure normally used.

### 9.4 Generic Types of WWII German Air-delivered Ordnance

The nature and characteristics of the ordnance used by the Luftwaffe allows an informed assessment of the hazards posed by any unexploded items that may remain today. Detailed illustrations of German air delivered ordnance are presented at **Annex I**.

- **HE Bombs:** In terms of weight of ordnance dropped, HE bombs were the most frequent weapon deployed. Most bombs were 50kg, 250kg or 500kg (overall weight, about half of which was the high explosive) though large bombs of up to 2,000kg were also used. HE bombs had the weight, velocity and shape to easily penetrate the ground intact if they failed to explode. Post-raid surveys would not always have spotted the entry hole or other indications that a bomb penetrated the ground and failed to explode and contemporary ARP documents describe the danger of assuming that damage, actually caused by a large UXB, was due to an exploded 50kg bomb. Unexploded HE bombs therefore present the greatest risk to present-day intrusive works.



- Blast Bombs/Parachute Mines: Blast bombs generally had a slow rate of descent and were extremely unlikely to have penetrated the ground. Non-retarded mines would have shattered on most ground types, if they had failed to explode. There have been extreme cases when these items have been found unexploded, but this was where the ground was either very soft or where standing water had reduced the impact. BACTEC does not consider there to be a significant threat from this type of munition on land.
- Large incendiary bombs: This type of bomb ranged in size from 36kg to 255kg and had a number of inflammable fill materials (including oil and white phosphorus), and a small explosive charge. They were designed to explode and burn close to the surface but their shape and weight meant that they did have penetration capability. If they penetrated the ground complete combustion did not always occur and in such cases, they remain a risk to intrusive works.
- 1kg Incendiary Bombs (IB): These bombs, which were jettisoned from air-dropped containers, were unlikely to penetrate the ground and in urban areas would usually have been located in post-raid surveys. However, if bombs did not initiate and fell in water or dense vegetation, or became mixed with rubble in bomb damaged areas they could have been overlooked. Some variants had explosive heads and these present a risk of detonation during intrusive works.
- Anti-personnel (AP) Bomblets: AP bombs had little ground penetration ability and should have been located by the post-raid survey unless they fell into water, dense vegetation or bomb rubble.
- Specialist Bombs (smoke, flare, etc): These types do not contain high explosive and therefore a detonation consequence is unlikely. They were not designed to penetrate the ground.

## 9.5 German Air-delivered Ordnance Failure Rate

Based on empirical evidence, it is generally accepted that 10% of the German HE bombs dropped during WWII failed to explode as designed. This estimate is probably based on the statistics of wartime recovered UXBs and therefore will not have taken account of the unknown numbers of UXBs that were not recorded at the time, and is probably an underestimate.

The reasons for failures include:

- Fuze or gain malfunction due to manufacturing fault, sabotage (by forced labour) or faulty installation.
- Clockwork mechanism failure in delayed action bombs.
- Failure of the bomber aircraft to arm the bombs (charge the electrical condensers which supplied the energy to initiate the detonation sequence) due to human error or equipment defect.
- Jettison of the bomb before it was armed or from a very low altitude. Most likely if the bomber was under attack or crashing.

War Office Statistics document that a daily average of 84 bombs which failed to function were dropped on civilian targets in Great Britain between 21<sup>st</sup> September 1940 and 5<sup>th</sup> July 1941. 1 in 12 of these (probably mostly fitted with time delay fuzes) exploded sometime after they fell - the remainder were unintentional failures.

There is no evidence to suggest that the bomb failure rate in the vicinity of the study area would have been different from the “approximately 10%” figure normally used.

From 1940 to 1945 bomb disposal teams dealt with a total of 50,000 explosive items of 50kg and over (i.e. German bombs), 7,000 AAA shells and 300,000 beach mines. These operations resulted in the deaths of 394 officers and men.

Media articles relating to recent German UXB finds on land and underwater are presented in **Annex J**.

## 9.6 Initiation of Unexploded Bombs

Unexploded bombs do not spontaneously explode. All high explosive requires significant energy to create the conditions for detonation to occur. In the case of unexploded German bombs discovered within the construction site environment, there are a number of potential initiation mechanisms:

- Direct impact onto the main body of the bomb: Unless the fuze or fuze pocket is struck, there needs to be a significant impact (e.g. from piling or large and violent mechanical excavation) to initiate a buried iron bomb. Such violent action can cause the bomb to detonate.
- Re-starting the clock timer in the fuze: Only a small proportion of German WWII bombs employed clockwork fuzes. It is probable that significant corrosion has taken place within the fuze mechanism over the last 60 years that would prevent clockwork mechanisms from functioning, nevertheless it was reported that the fuze in a UXB dealt with by 33 EOD Regiment in Surrey in 2002 did re-commence.
- Induction of a static charge, causing a current in an electric fuze: The majority of German WWII bombs employed electric fuzes. It is probable that significant corrosion has taken place within the fuze mechanism over the last 60 years such that the fuze circuit could not be activated.
- Friction impact initiating the (shock-sensitive) fuze explosive: This is the most likely scenario resulting in the bomb detonating.

**Annex K** details UXB incidents where intrusive works have caused UXBs to detonate, resulting in death or injury and damage to plant.

## 10 Unexploded Bomb Penetration

### 10.1 General Considerations

The actual penetration depth of aerial delivered bombs into the ground will have been determined by the mass and shape of the bomb, the velocity and angle of the bomb on impact (dependent on the height of release) and the nature of the ground and ground cover; the softer the ground, the greater the potential penetration. Peat, alluvium and soft clays are easier to penetrate than gravel and sand. Bombs are brought to rest or are commonly deflected by bedrock or large boulders.

### 10.2 The “j” Curve Effect

An air-dropped bomb falling from normal bombing altitude (say 5,000m) into homogeneous ground will continue its line of flight but turn in an upwards curve towards the surface as it comes to rest. This offset from vertical is generally thought to be about one third of the penetration depth, but can be up to 15m depending on ground conditions or the bomb’s angle of impact.

### 10.3 Second World War UXB Land Penetration Studies

During WWII, the Ministry of Home Security undertook a major study on actual bomb penetration depths, carrying out statistical analysis on the measured depths of 1,328 bombs as reported by Bomb Disposal, mostly in the London area. They then came to conclusions as to the likely average and maximum depths of penetration of different sized bombs in different geological strata.

The median penetration of 430 x 50kg German bombs in London Clay was 4.6m and the maximum penetration observed for the SC50 bomb was 9m.

They concluded that the largest common German bomb, 500kg, had a likely penetration depth of 6m in sand or gravel but 8.7m in clay. The maximum observed depth for a 500kg bomb was 10.2m and for a 1,000kg bomb 12.7m. Theoretical calculations suggested that significantly greater penetration depths were probable.

### 10.4 Maximum Bomb Penetration Depth - Land

To assess the maximum bomb penetration depth at the eastern and western (land) extents of the site, the following parameters have been used:

- WWII Geology - 1m of Made Ground, >13m of Sand.
- Impact Angle and Velocity - 80-90° from horizontal and 267 metres per second.
- Bomb Mass and Configuration - The 500kg SC (General Purpose) HE bomb, without retarder units or armour piercing nose. This was the largest of the common bombs used against Britain.

Taking into account the above-mentioned factors it has been assessed that a 500kg bomb would have had an approximate maximum bomb penetration depth of **8-10m** below WWII land level. Penetration depth could potentially have been greater if the UXB was larger (though only 4% of German bombs used in WWII over Britain were of that size). Note that UXBs may be found at any depth between just below the WWII ground level and the maximum penetration depth.

### 10.5 UXB Penetration through Water

UXB penetration of riverbed (through water) provides a more challenging scenario to model. The key considerations are:

- Bombs hit the water at the terminal velocity of air: 267 metres per second.
- Ignoring surface tension there will be an immediate loss of inertia due to rapid energy losses; sound, wave, splash, bubble formation and cavitation.
- The drag force rapidly decelerates the bomb. If there is sufficient water depth then acceleration will become 0m/s<sup>2</sup> and terminal velocity through water will be achieved: 11m/s.
- Once the terminal velocity in water is reached the bomb impacts the riverbed as a free-fall penetrator, not necessarily in a nose down orientation.

Analysis of the air-water-soil regime is complex. The current model assumes that 5m of water is required in order to achieve the terminal velocity in water of a 500kg UXB. Impacts at this speed will cause a penetration of 2.3m assuming a riverbed bearing capacity of 75kPa (*Department of The US Army, TM 5-855-1*). However, the bearing capacity of the riverbed sediment within the site boundary is not known.

In order to assess the bomb penetration depth within the river environment, the extreme water depth scenario must be considered; that is, the deepest point of the river at low tide. A current Admiralty Chart for the site was reviewed. This confirms the deepest Chart Datum water depth within the site boundary to be 4.3m.

As the depth is <5m, it can be assumed that a 500kg German UXB landing at any location within the river, at any time of day will strike the river bed with a force sufficient to impact the river bed in a vertical / nose down orientation. As opposed to the “tumbling” nature of items falling through the water column once the terminal velocity has been achieved.

However, the nature of the river sediment within the site boundary is not known both in terms of its precise composition and thickness. This, coupled with the lack of an accurate mathematical model for bomb behaviour through the water column, makes calculation of a maximum penetration depth value within the river environment impossible.

However, the significant decelerating effect caused by the water column on site indicates that even a large German UXB would not be able to penetrate a substantial distance into the Crag Group bedrock underlying the overburden sediment.

## **11 The Threat from British / Allied Military Ordnance**

### **11.1 General**

The following historical and modern facilities / activities / incidents have been considered:

- Army, Navy and RAF Bases / Installations
- Military Training Areas / Weapons Ranges
- Ordnance / Explosives Factories and Storage Depots
- Sites requisitioned for military use
- Military Fortifications and Coastal Defences
- Locations of Army Explosive Ordnance Clearance Tasks
- WWII Anti-Aircraft Batteries
- WWII Pipe Mined Locations and Beach Minefields

The most likely source of British / Allied ordnance is anti-aircraft fire/Home Guard activity, as discussed below.

### **11.2 Potential Sources of Explosive Ordnance**

#### **11.2.1 Anti-Aircraft Artillery**

At the start of the war two types of AAA guns were deployed: Heavy Anti-Aircraft Artillery (HAA), using large calibre weapons such as the 3.7” QF (Quick Firing) gun and Light Anti-Aircraft Artillery (LAA) using smaller calibre weapons such as 40mm Bofors gun.

During the early war period, there was a severe shortage of AAA available and older WWI 3” and modified naval 4.5” guns were deployed alongside those available 3.7” weapons. The maximum ceiling height of fire at that time was around 11,000m (for the 3.7” gun and less for other weapons). As the war progressed improved variants of the 3.7” gun was introduced and, from 1942, large 5.25-inch weapons began to be brought into service. These had significantly improved ceiling heights of fire reaching over 18,000m.



The LAA batteries were intended to engage fast low flying aircraft and were typically deployed around airfields or strategic installations. These batteries were mobile and could be moved to new positions with relative ease when required. The most numerous of these was the 40mm Bofors gun which could fire up to 120 x 40mm HE shells per minute to over 1,800m.

The HAA projectiles were high explosive shells, usually fitted with a time delay or barometric pressure fuze to make them explode at a pre-determined height. Before the war all the clockwork fuses used by the Royal Artillery had come from Switzerland. When that source of supply was cut off, Britain had been forced to make its own. After four years of war, the country still lacked the engineering skills to produce a reliable fuse.

This resulted in a considerable number of AA projectiles either exploding prematurely, killing the gunners or failing to explode at all; falling to the ground as UXBs. In January 1944 more people in London were killed by HAA shells than by German bombs. Details of the most commonly deployed WWII AAA projectiles are shown below:

Gun type	Calibre	Shell Dimensions	Shell Weight	HE Fill Weight
3.7 Inch	94mm	94mm x 438mm	12.7kg	1.1kg
4.5 Inch	114mm	114mm x 578mm	24.7kg	1.7kg
40mm	40mm	40mm x 311mm	0.84kg	70g

Although the larger unexploded projectiles could enter the ground they did not have great penetration ability and are therefore likely to be found close to WWII ground level. These shells are frequently mistakenly identified as small German air-delivered bombs, but are differentiated by the copper driving band found in front of the base. With a high explosive fill and fragmentation hazard these items of UXO present a significant risk if encountered. The smaller 40mm projectiles are similar in appearance and effect to small arms ammunition and, although still dangerous, present a lower risk.

Four static HAA batteries were operational within 5km of the site during WWII. With four guns per battery, firing up to ten rounds a minute, HAA batteries could expend numerous shells during even short air raids and therefore as the town was frequently attacked by the Luftwaffe, the risk of unexploded HAA shell contamination within study area is elevated.

Numerous unexploded AA shells were recovered during and following WWII, and are still occasionally encountered on sites today. Illustrations of Anti-Aircraft projectiles and rockets are presented in **Annex L**. Any unexploded AA shell landing in the river would have remained there for a time could have become subsequently buried in sediment.

## 11.2.2 Home Guard Activity

The Home Guard (HG) was a defence organisation of the British Army, operational between 1940 and 1944. It comprised 1.5 million local volunteers, otherwise ineligible for military service, and acted as a secondary defence force, in case of enemy invasion which was expected during 1940 and 1941. The HG guarded the coastal areas of Britain and other important facilities such as RAF airfields, weapons factories, explosives stores, radar sites, etc.

Due to its coastal location in south-eastern England, Great Yarmouth was considered vulnerable to German invasion and consequently was well defended by Army and HG units, with River Yare and beaches fortified with static defences, minefields and gun positions.

A group of WWII anti-invasion defences, including four pillboxes, a road block and a Spigot Mortar emplacement were present within the northern section of the site on the junction of

Queen Anne's Road and Southtown Road. The central element of the site was a substantial road block, designed to check the progress of tanks rather than act as a check point.

To the south, the road block was flanked by two pillboxes, a Type 22 on the easternmost extent of site boundary, and a Type 24 or variant pillbox on the north side of Queen Anne's Road. The defences were removed and the road resurfaced in August 1945.

Located at the westernmost end of Cromwell Road a Spigot Mortar position and associated Type 24 Pillbox were located. It can be assumed that the installation was sited to guard trackways and bridges across the drains that lay to the north of Queen Anne's Road.

Today, items of WWII ordnance related to the HG are occasionally encountered by members of the public and the construction industry. Experience has shown that the 'housekeeping' of WWII soldiers was often poor with items of faulty, surplus or expended ammunition often burnt, buried, misplaced or otherwise discarded on civilian land (see *Section 12.2*).

Furthermore, HG personnel are known to have purposefully buried caches of ammunition and weapons in tactical positions, to be exhumed and used in case of invasion. This is substantiated by several recent HG UXO finds (see *Annex M*).

Details of the most commonly encountered WWII-era British ammunition (Land Service Ammunition and Small Arms Ammunition) are presented in *Annex N* and *Annex O* respectively.

## 12 Ordnance Clearance and Post-WWII Ground Works

### 12.1 General

The extent to which any ordnance clearance activities have taken place on site or extensive ground works have occurred is relevant since on the one hand they may indicate previous ordnance contamination but also may have reduced the risk that ordnance remains undiscovered.

### 12.2 EOD Bomb Disposal and Clearance Tasks

Dynasafe BACTEC holds a number of official records of explosive ordnance disposal operations during and following WWII, obtained from the Explosive Ordnance Disposal (EOD) Archive Information Office at 33 Engineer Regiment (EOD), British Army. However, no records could be found to indicate that any Army EOD tasks have taken place on site.

No evidence of Royal Navy EOD divers carrying out any UXO disposal tasks in the River Yare (in close proximity to the site) was found.

Note, however that two gardeners discovered a live grenade at Dicken Court (approximately 330m north-east of the site) during garden maintenance operations. This would have likely been buried by the HG as part of a cache that of weapons in case of invasion, and often occurred within vulnerable coastal areas.

### 12.3 Post War Redevelopment

The eastern half of the site has undergone two phases of post war redevelopment, the first in the 1970's and the second during the 1980's when the site took its current form. Whilst the western half of the site appears to have remained largely untouched since the war, apart from the A12 roundabout and A147 installation during the 1980's and larger commercial properties to the north and east of the site.

Note, that minor dredging works are reported to have occurred on the River Yare in the post-war period. However, the extents of which are unknown at the time of writing this report.

## 13 The Overall Explosive Ordnance Threat Assessment

### 13.1 General Considerations

Taking into account the quality of the historical evidence, the assessment of the overall threat to any intrusive works from UXO must evaluate the following risks:

- That the site was contaminated with unexploded ordnance
- That UXO remains on site
- That such items could be encountered during any intrusive works
- That ordnance may be activated by the works operations
- The consequences of encountering or initiating ordnance

### 13.2 The Risk that the Site was Contaminated with Unexploded Ordnance

For the reasons discussed in *Sections 9 and 11* Dynasafe BACTEC believes that there is a risk that UXO contaminated the study area. This is based on the following:

#### **German UXO:**

- The site was located within central Great Yarmouth within an area of very high bombing density during WWII, with up to 8 x HE bombs likely to have landed on or adjacent to the site boundary. At least 12 further HE bombs are recorded within a 300m radius of the site. In addition, the site is likely to have been affected by 1kg incendiary bombing.
- The eastern extent of the site, comprising busy commercial / industrial areas would have been accessed on a daily basis thereby decreasing the risk of any UXB strike evidence going unnoticed. In addition, these areas may have been subject to post-raid checks for UXB entry holes.
- The western half of the site was occupied by large areas of ambiguous open ground and allotment gardens which are unlikely to have been accessed as regularly or frequently. Access to the allotments would have varied depending on the season and therefore, a UXB could conceivably have fallen here unobserved.
- Moreover, there are multiple areas of clearance and a ruin apparent on site, suggesting that these areas sustained serious bomb damage. As a result, the affected buildings will have been abandoned for a time, increasing the likelihood of subsequent UXO falling on site unnoticed. Therefore, it can be assumed that, for a time, significant quantities of rubble occupied this area and debris may have been strewn across the site, increasing the likelihood of a UXB remaining on site. However, had a UXB landed within the allotments, open ground soft, rubble, or area of open air storage on site it could have gone undetected. Note, that the entry hole of an SC50 (the most commonly deployed German HE bomb) could be as little as 20cm in diameter and therefore, easily obscured in dense vegetation.
- A UXB landing in the river during a night time raid will have been immediately obscured from view, beneath the waterline. Consequently, it is unlikely to have been observed, reported and mapped.
- A UXB entry hole within the river bank mud on site (revealed at low tide) is unlikely to have persisted; the next high tide filling in the hole with water and sediment. Even if evidence of

a UXB was observed here and reported, it is highly unlikely to have been recovered by the local bomb disposal unit due to its insignificant location and the impracticalities of deep buried UXB removal in this environment.

**British/Allied UXO:**

- Due to its coastal location in south-eastern England, Great Yarmouth was considered vulnerable to German invasion and consequently, was well defended by Army and HG units, with River Yare and beaches fortified with static defences, minefields and gun positions.
- A group of WWII anti-invasion defences, including four pillboxes, a road block and a Spigot Mortar emplacement were present within the northern section of the site on the junction of Queen Anne's Road and Southtown Road. The central element of the site was a substantial road block, designed to check the progress of tanks rather than act as a check point. Further defences were located within the site boundary, located at the westernmost end of Cromwell Road a Spigot Mortar position and associated Type 24 Pillbox were located.
- Although these defence installations were located on site, it is considered highly likely that the risk of shallow buried UXO has been mitigated on site due to post war development.
- Note, that four HAA batteries were situated within a 5km radius of the site during WWII. For the same reasons as given above, it is quite possible that an unexploded AA shell or rocket could have landed in the river on site and remained there.

### 13.3 The Risk that Unexploded Ordnance Remains on Site

**Land** - Within the footprint of post-war ground works, the risk of small, shallow buried UXO (LSA, SAA, AA shells and German 1kg incendiaries) remaining will have been partly mitigated since any such items could have been encountered and removed during soil stripping / levelling, foundations etc.

Only within the volume of any post-war basement level bulk excavations and at the precise locations of any post-war pile foundations / boreholes, will the risk from deeper buried German HE UXBs have been completely mitigated. Therefore, it is conceivable that such a weapon could reside within virgin / untouched geology, beneath and amongst any such post-WWII ground works, down to the maximum bomb penetration depth.

The risk from UXO contamination within the eastern extent of the site and pre-war buildings has been assessed as minimal and therefore the risk from UXO remaining is minimal.

**River** - It has been assessed that a HE UXB falling in the river will likely have achieved full burial within the overburden sediment and may also have penetrated the Crag Group bedrock. Consequently, such a UXB will have remained in situ up to the present day, largely unaffected by environmental conditions. Also, any large partially buried UXBs on site are less likely to be affected by environmental conditions as a result of their significant mass.

Tidal riverbed environments are mobile in nature and therefore as a result of water currents, any small items of UXO (British AA shells and German 1kg IBs) residing on or near the riverbed surface could experience migration. This is evidenced by the large quantity of munitions that are washed up on beaches around the UK, every year. The wider River Yare environment will have been subject to the same UXO contamination conditions as the site during WWII and therefore although riverbed UXO could have migrated out of the site since WWII, equally, additional UXO could have migrated into the site.



### 13.4 The Risk that Ordnance may be Encountered during the Works

**Land** - The most likely scenarios under which a UXO could be encountered during construction works is during piling, drilling operations or bulk excavations for basement levels. The overall risk will depend on the extent of the works, such as the numbers of boreholes/piles (if required) and the volume of the excavations.

Since an air-dropped bomb may come to rest at any depth between just below ground level and its approximate penetration depth there is also a chance that such an item could be encountered during shallow excavations (for services or site investigations) into the original WWII ground level.

If the proposed works are due to be undertaken within post war fill material / made ground, the risk of encountering WWII UXBs is low. However, if works are to be undertaken below WWII ground level this risk is significantly higher.

The risk of UXO remaining within the eastern extent of the site and pre-war buildings has been assessed as minimal, therefore the risk from UXO being encountered during the proposed works is minimal.

**River** – Minor dredging works on the River Yare have been identified to have taken place, however it is not known to what extent these would have occurred within the site boundary. Therefore, these activities could have partly mitigated the risk from UXO within the river environment, however it is conceivable that UXO could have subsequently been washed into the site boundary. Therefore, the risk of encountering UXO during the proposed works remains partially unmitigated. The proposed investigatory works will be to a depth beyond the maximum bomb penetration depth, therefore if UXO is situated at the location of the borehole, it will be encountered.

### 13.5 The Risk that Ordnance may be Initiated

The risk that UXO could be initiated if encountered will depend on its condition, how it is found and the energy with which it is struck. The most violent activity on most construction sites is percussive piling. As a result, items that are shallow buried present a slightly lower risk than those that are deep buried, since the force of impact is usually lower and they are more likely to be observed – when immediate mitigating actions can be taken.

### 13.6 The Consequences of Encountering or Initiating Ordnance

Clearly the consequences of an inadvertent detonation of UXO during construction operations would be catastrophic with a serious risk to life, damage to plant and a total site shutdown during follow-up investigations.

Since the risk of initiating ordnance is significantly reduced if appropriate mitigation measures are undertaken, the most important consequence of the discovery of ordnance will be economic. This would be particularly so in the case of high profile locations and could involve the evacuation of the public.

The unexpected discovery of ordnance may require the closing of the site for any time between a few hours and a week with a potentially significant cost in lost time. Note also that the suspected find of ordnance, if handled solely through the authorities, may also involve loss of production since the first action of the Police in most cases will be to isolate the locale whilst awaiting military assistance, even if this turns out to have been unnecessary.

### 13.7 Dynasafe BACTEC's Assessment

Taking into consideration the findings of this study, Dynasafe BACTEC considers the risk on the site to be heterogeneous and can therefore be divided into **Low**, **Medium** and **High** Risk Zones. These are described below and illustrated on a Risk Map, presented in **Annex P**.

#### Low Risk Zone:

- Buildings and hard standing that survived the war intact.

Type of Ordnance	Level of Risk			
	Negligible	Low	Medium	High
German WWII High Explosive Bombs		✓		
German WWII 1kg Incendiary Bombs		✓		
British Anti-Aircraft Shells		✓		
British Small Arms and Land Service Ammunition		✓		

#### Medium Risk Zone:

- Open soft ground that would not have been accessed regularly nor frequently.
- Areas of substantial bomb damage.
- Buffer Area to incorporate the "J-Curve" Buffer Zone.

Type of Ordnance	Level of Risk			
	Negligible	Low	Medium	High
German WWII High Explosive Bombs			✓	
German WWII 1kg Incendiary Bombs			✓	
British Anti-Aircraft Shells			✓	
British Small Arms and Land Service Ammunition			✓	

#### High Risk Zone:

- Occupied by the River Yare.

Type of Ordnance	Level of Risk			
	Negligible	Low	Medium	High
German WWII High Explosive Bombs				✓
German WWII 1kg Incendiary Bombs			✓	
British Anti-Aircraft Shells			✓	
British Small Arms and Land Service Ammunition		✓		

## 14 Proposed Risk Mitigation Strategy

### 14.1 General

Dynasafe BACTEC believes the following risk mitigation measures should be deployed to support the proposed works at the Southtown, Great Yarmouth site.

### 14.2 Scope Specific Risk Mitigation Measures

*All Risk Zones:*

- **Site Specific Explosive Ordnance Safety and Awareness Briefings to all personnel conducting intrusive works:** A specialised briefing is always advisable when there is a possibility of explosive ordnance contamination. It is an essential component of the Health & Safety Plan for the site and conforms to requirements of CDM Regulations 2015. All personnel working on the site should be instructed on the identification of UXB, actions to be taken to alert site management and to keep people and equipment away from the hazard. Posters and information of a general nature on the UXB threat should be held in the site office for reference and as a reminder.
- **The Provision of Unexploded Ordnance Site Safety Instructions:** These written instructions contain information detailing actions to be taken in the event that unexploded ordnance is discovered. They are to be retained on site and will both assist in making a preliminary assessment of a suspect object and provide guidance on the immediate steps to be taken in the event that ordnance is believed to have been found.

*Medium Risk Zones:*

- **Explosive Ordnance Disposal (EOD) Engineer presence on site to support shallow intrusive works:** When on site the role of the EOD Engineer would include; monitoring works using visual recognition and instrumentation and immediate response to reports of suspicious objects or suspected items of ordnance that have been recovered by the ground workers on site; providing Explosive Ordnance Safety and Awareness briefings to any staff that have not received them earlier and advise staff of the need to modify working practices to take account of the ordnance threat, and finally to aid Incident Management which would involve liaison with the local authorities and Police should ordnance be identified and present an explosive hazard.
- **Handheld Intrusive Magnetometer Survey of all borehole locations down to the maximum bomb penetration depth:** As part of the EOD Engineer presence on site, Dynasafe BACTEC can deploy intrusive magnetometry techniques to provide staged clearance ahead of all the borehole locations.

*High Risk Zone:*

- **Non-Intrusive Magnetometer and Side Scan UXO Survey:** A Magnetometer and high-resolution Side Scan Survey should be conducted over the proposed works area to identify any ferrous anomalies (potential UXO) on or near to the riverbed surface. This will provide clear areas for the placement of barge legs or anchors. It also allows for the identification of non-ferrous near surface obstructions which may hamper the proposed works.
- **Intrusive Magnetometer Survey - Down-hole Vallon Probing ahead of Marine Boreholes:** A down-hole Vallon magnetometer is lowered to the estuary bed first to scan a radius for ferrous anomalies. Provided the river bed is clear, boreholing is conducted to 1m. Nonferrous sleeving must be used with the Vallon lowered down the sleeve to clear the next metre ahead of the borehole. This sequence is repeated until bomb penetration depth is reached, then boreholing can continue unrestricted. Sleeving would be expected to extend from the JU Barge deck to river bed to ensure drill bit relocates the borehole each time it is withdrawn.

**14.3 Further Recommended Measures should the Scope of Works Change:**

- **Intrusive Magnetometer Survey of all pile / boreholes locations down to the maximum bomb penetration depth:** Dynasafe BACTEC can deploy a range of intrusive magnetometry techniques to clear ahead of all the pile locations. The appropriate technique is governed by a number of factors, but most importantly the site's ground conditions. The appropriate survey methodology would be confirmed once the enabling works have been completed. A site meeting would be required between BACTEC and the client to determine the methodology suitable for this site. Target investigation or avoidance will be recommended as appropriate.
- **Pre-Piling Intrusive Magnetometer Survey: TFG Clearance ahead of Piling:** A TFG magnetometer survey probe will scan 1m at a time for ferrous anomalies ahead of a rotary drill. This process is repeated down to the max bomb penetration depth. If a ferrous mass is located the TFG survey would have to relocate however, this would clear the way prior to the borehole survey. Having cleared the location, piling can then be conducted on that position unrestricted.
- **Intrusive Magnetometer Survey: Down-hole Vallon Probing ahead of Piling:** A down-hole Vallon magnetometer is lowered to the estuary bed first to scan a radius for ferrous anomalies. Provided the river bed is clear, piling is conducted to 1m. Nonferrous sleeving must be used with the Vallon lowered down the sleeve to clear the next metre ahead of the borehole. This sequence is repeated until bomb penetration depth is reached, then piling can continue unrestricted.

Dynasafe BACTEC Limited

19<sup>th</sup> September 2017



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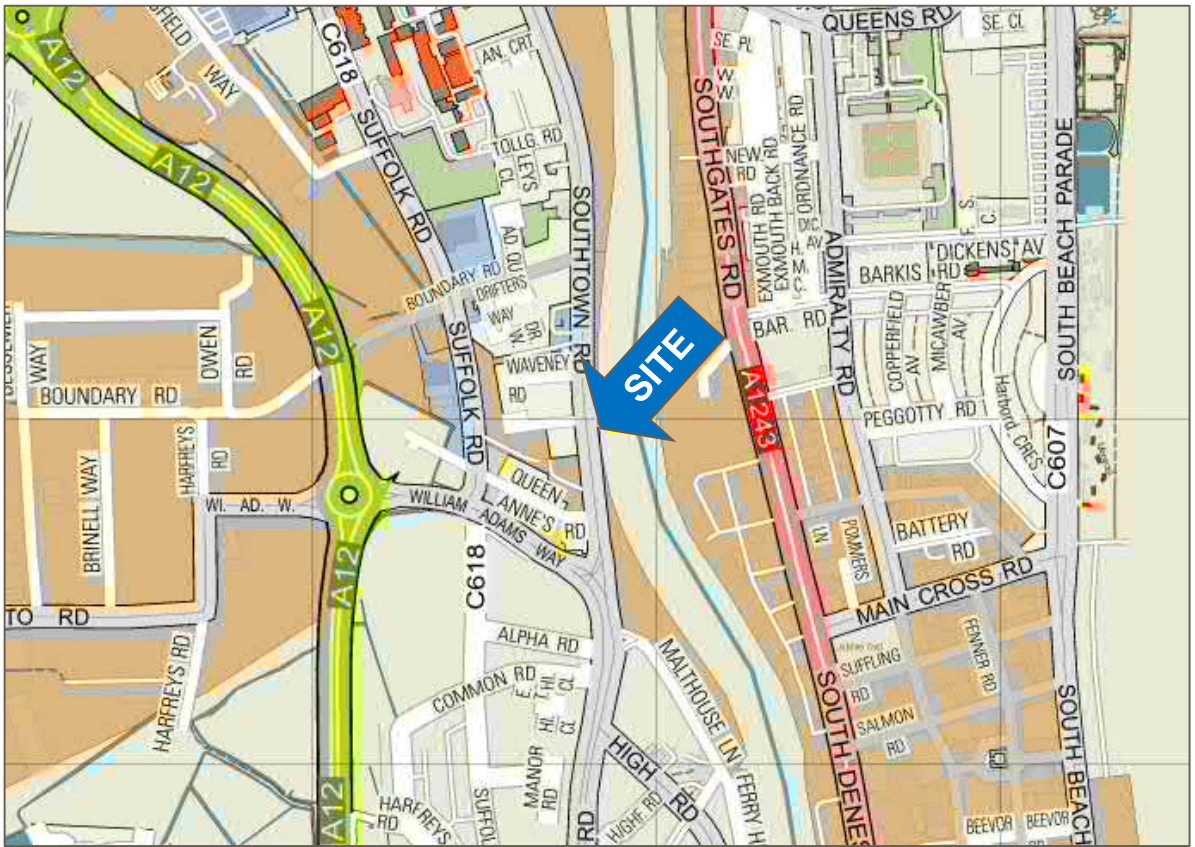
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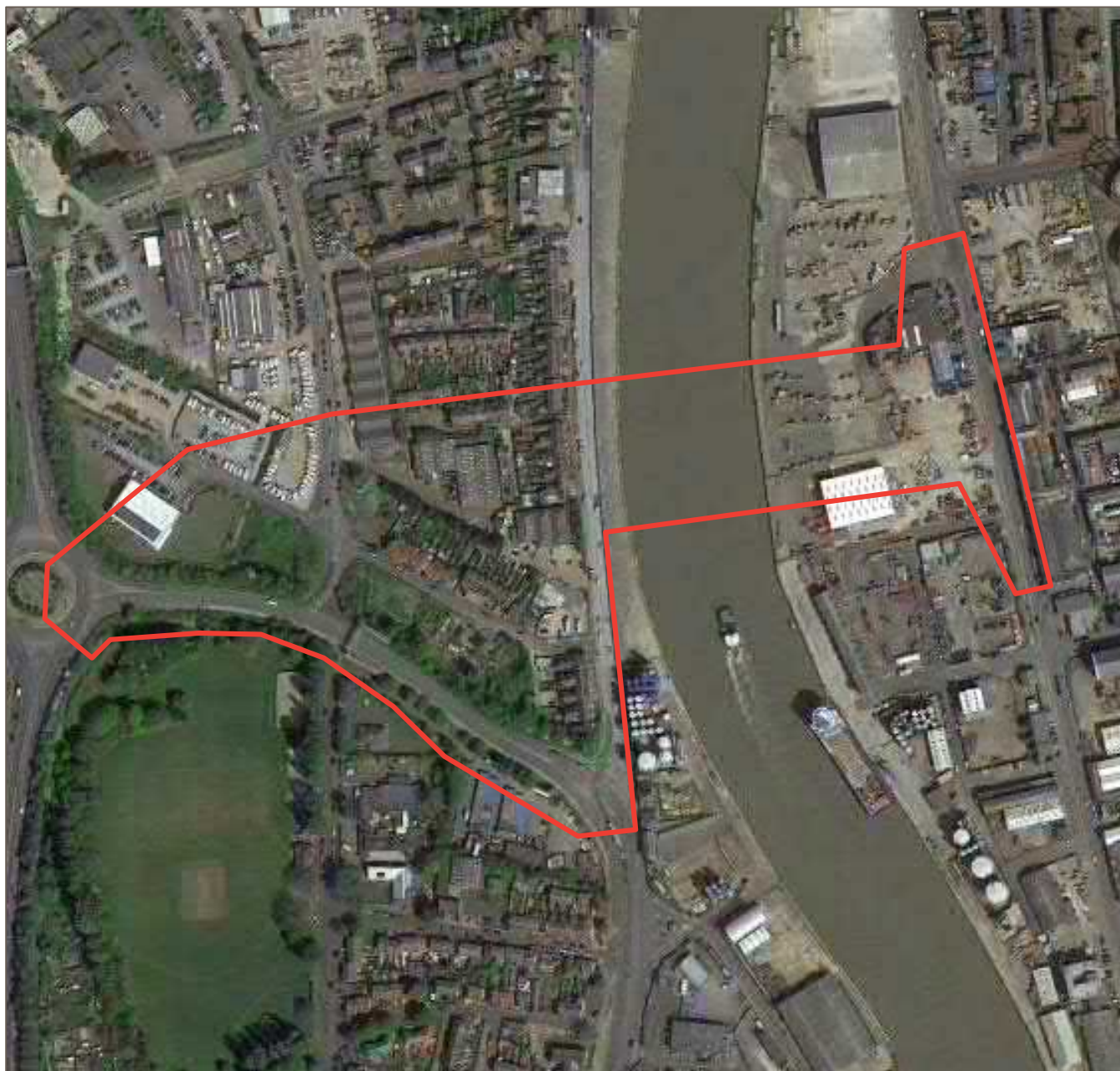


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7307TA

Client:  
WSP UK Limited

Project:  
Southtown, Great Yarmouth





— Approximate site boundary

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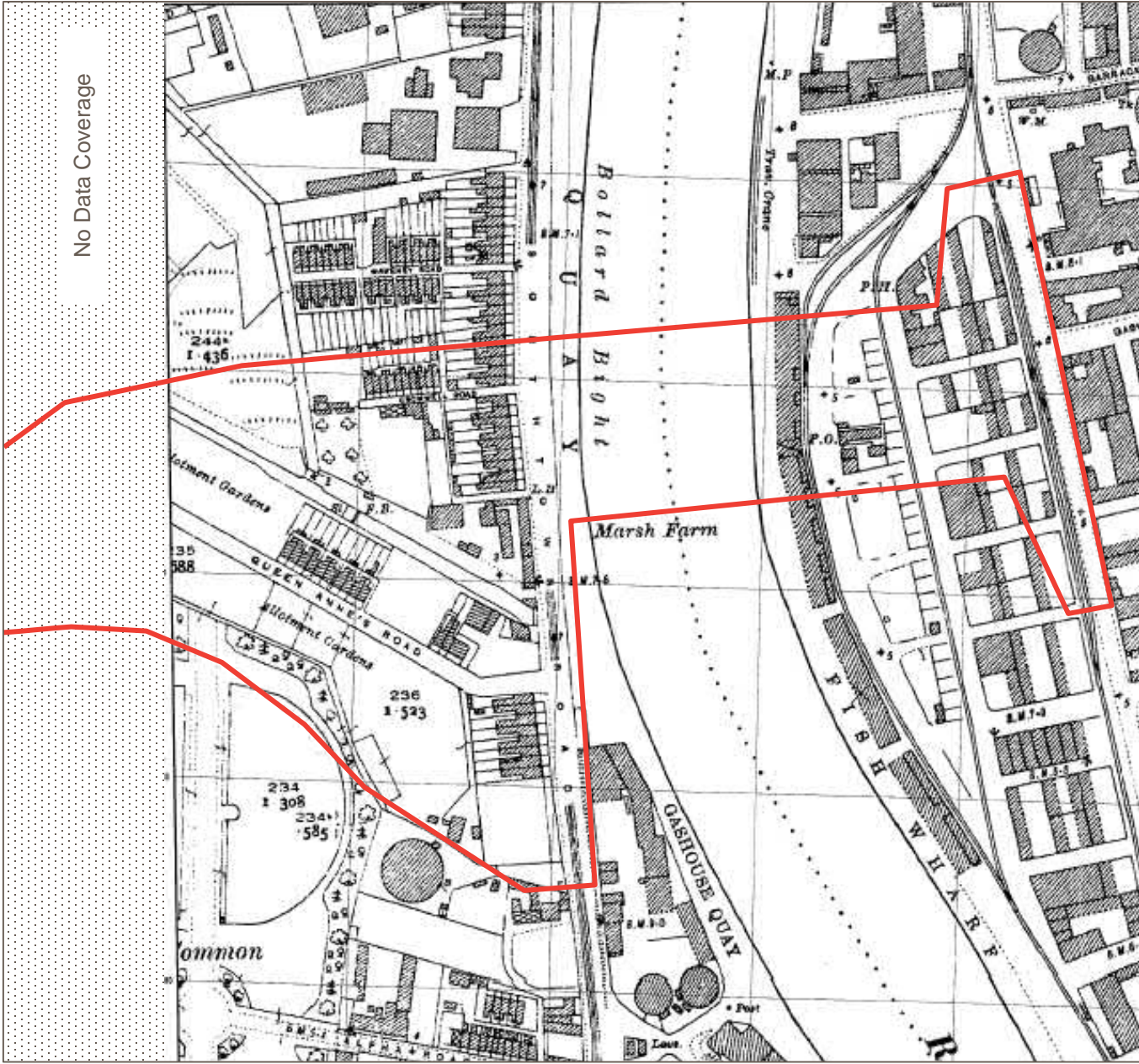


Source: Google Earth™ Mapping Services









— Approximate site boundary

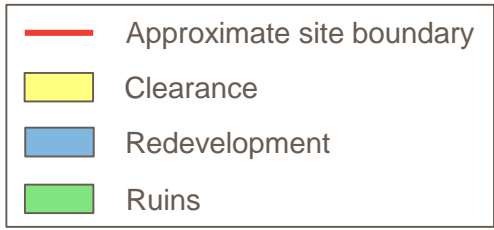
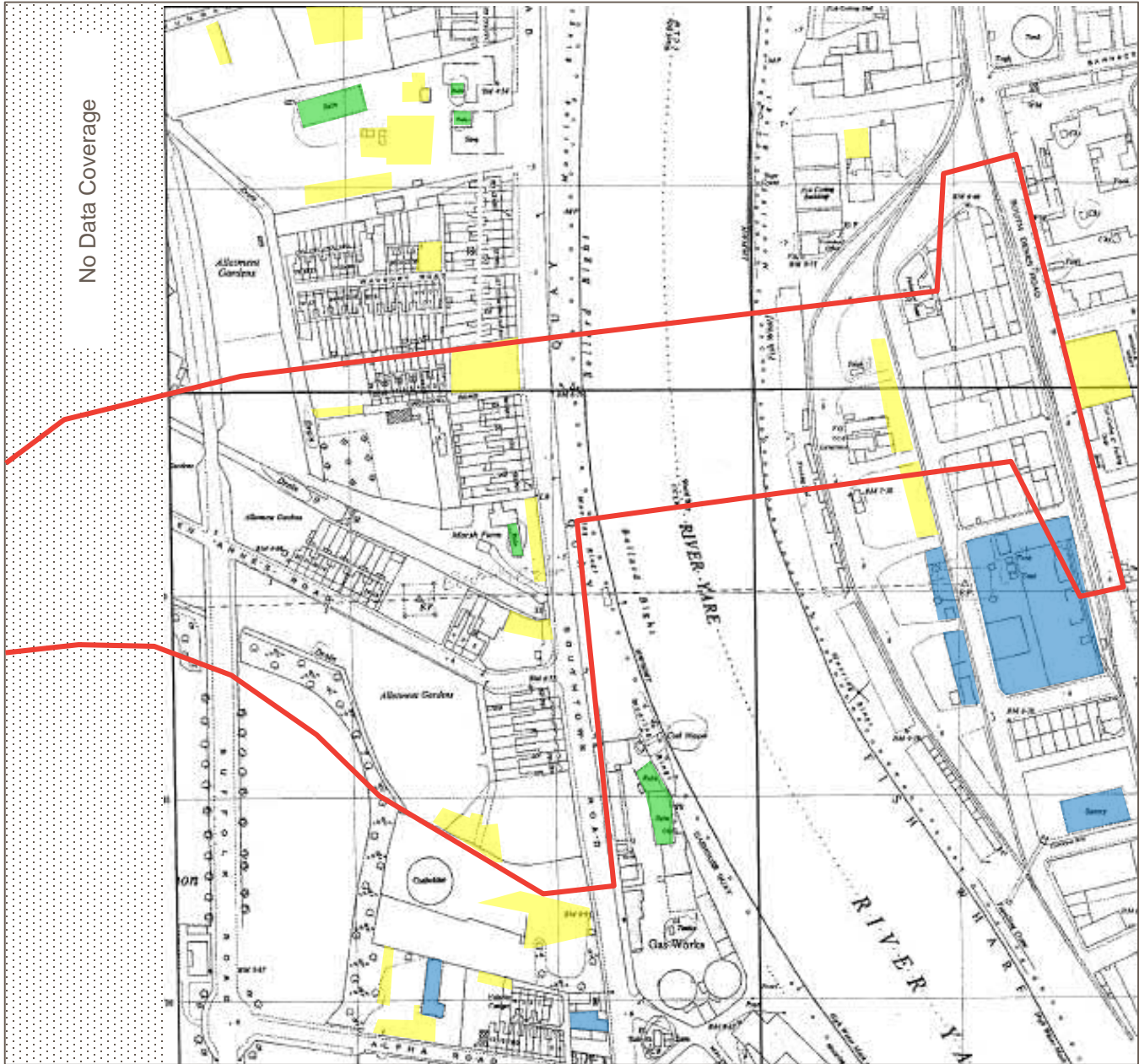
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Source: Landmark Maps



Report Reference:  
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Client:  
Project:

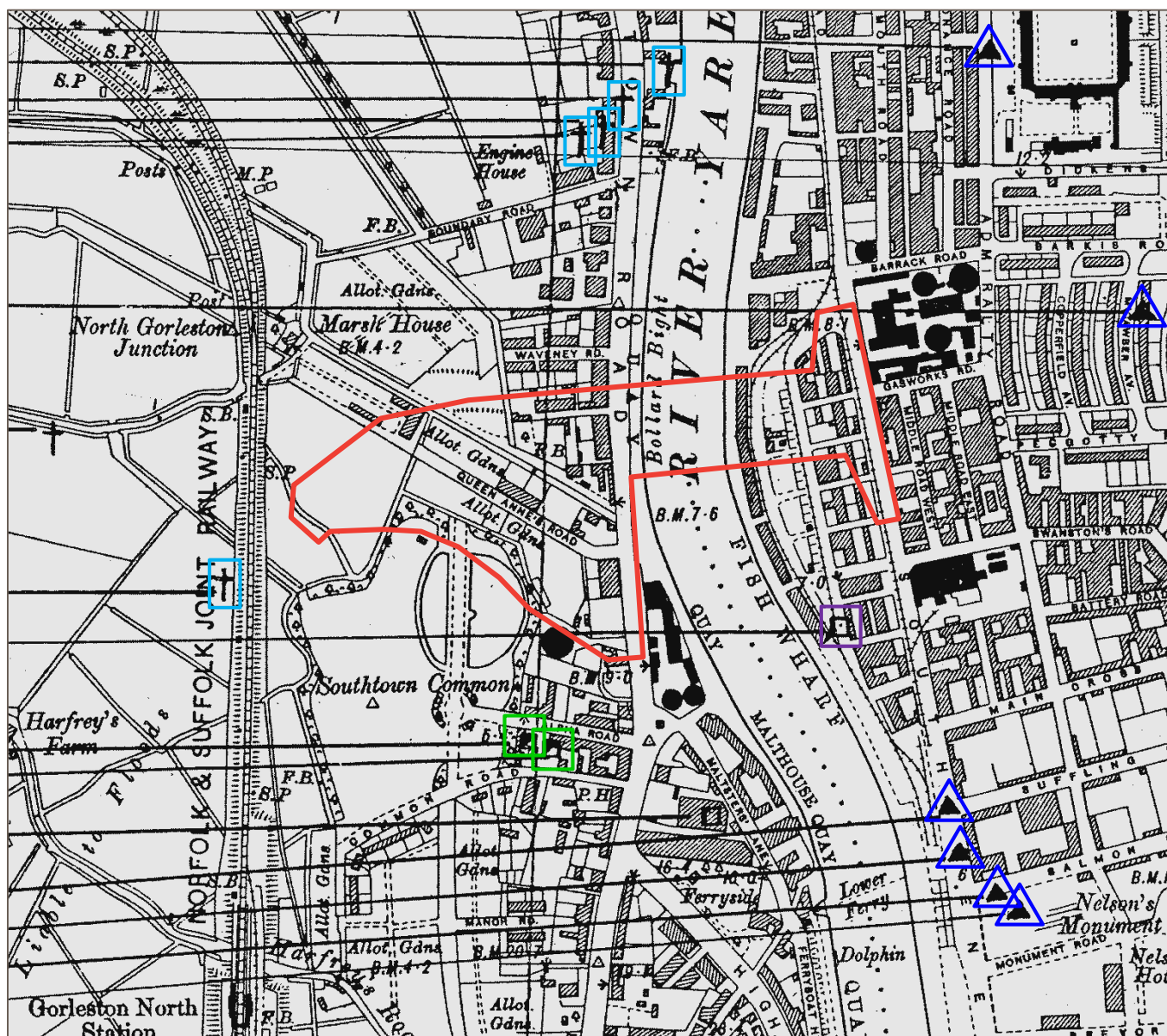
WSP UK Limited

Southtown, Great Yarmouth



Source: Landmark Maps





- Approximate site boundary
- ▲ 250kg HE bomb strike
- 500kg HE bomb strike
- Parachute Mine strike
- Unclassified HE bomb strike

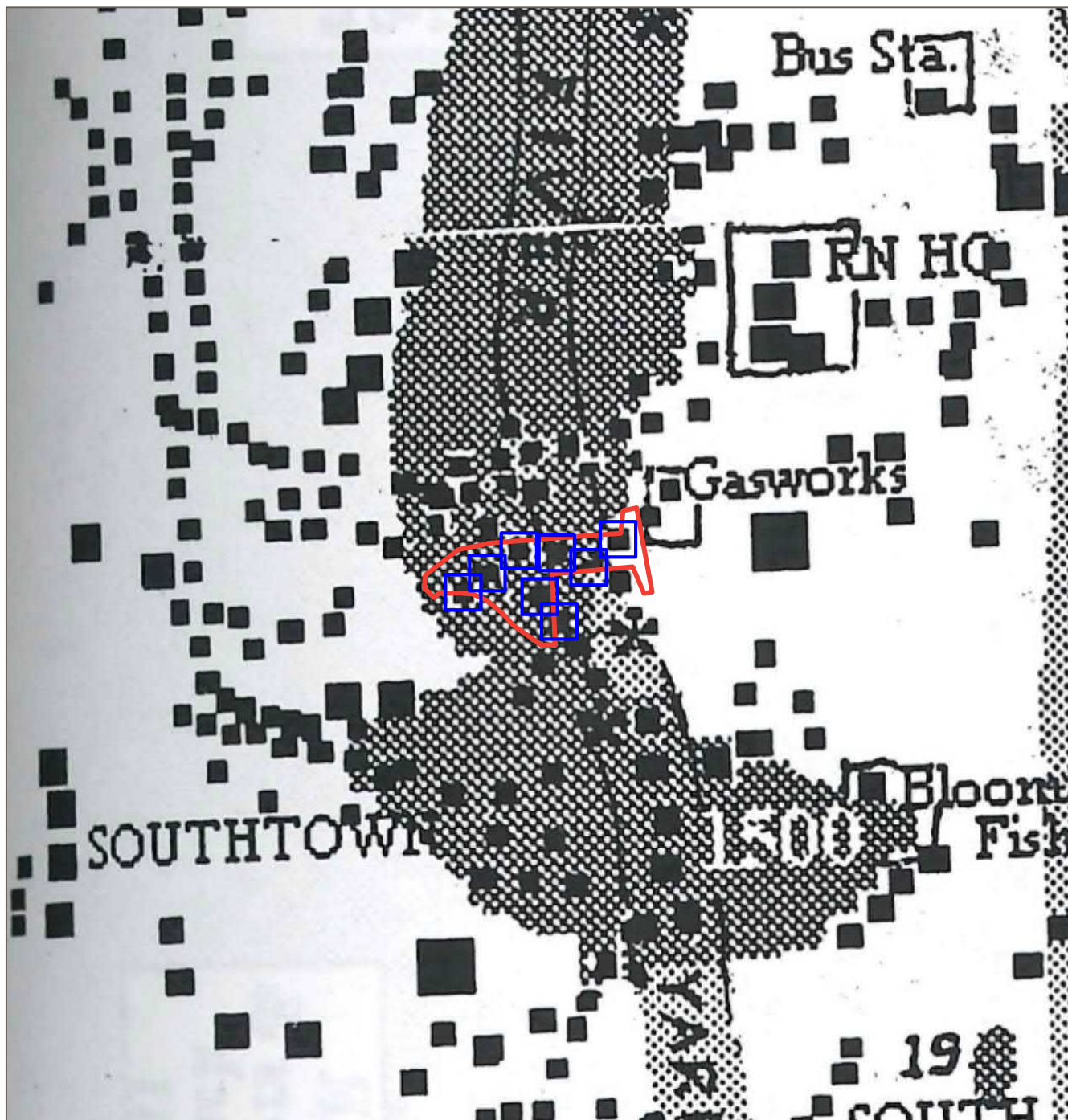
EXPLODED	UNEXPLODED
○ OIL BOMB	◇
● 50 KG.	+
▲ 250 KG.	★
■ 500 KG.	✱
■ 1000 KG.	✱
■ PARA MINE	✱
▼ 1800 KG.	✱
■ 2500 KG. OR LARGER	✱



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 Approximate site boundary  
 HE Bomb Strike

 HE bomb  
 Mine  
 Incendiary bomb cluster (& number)  
 0      1/2      1 mile

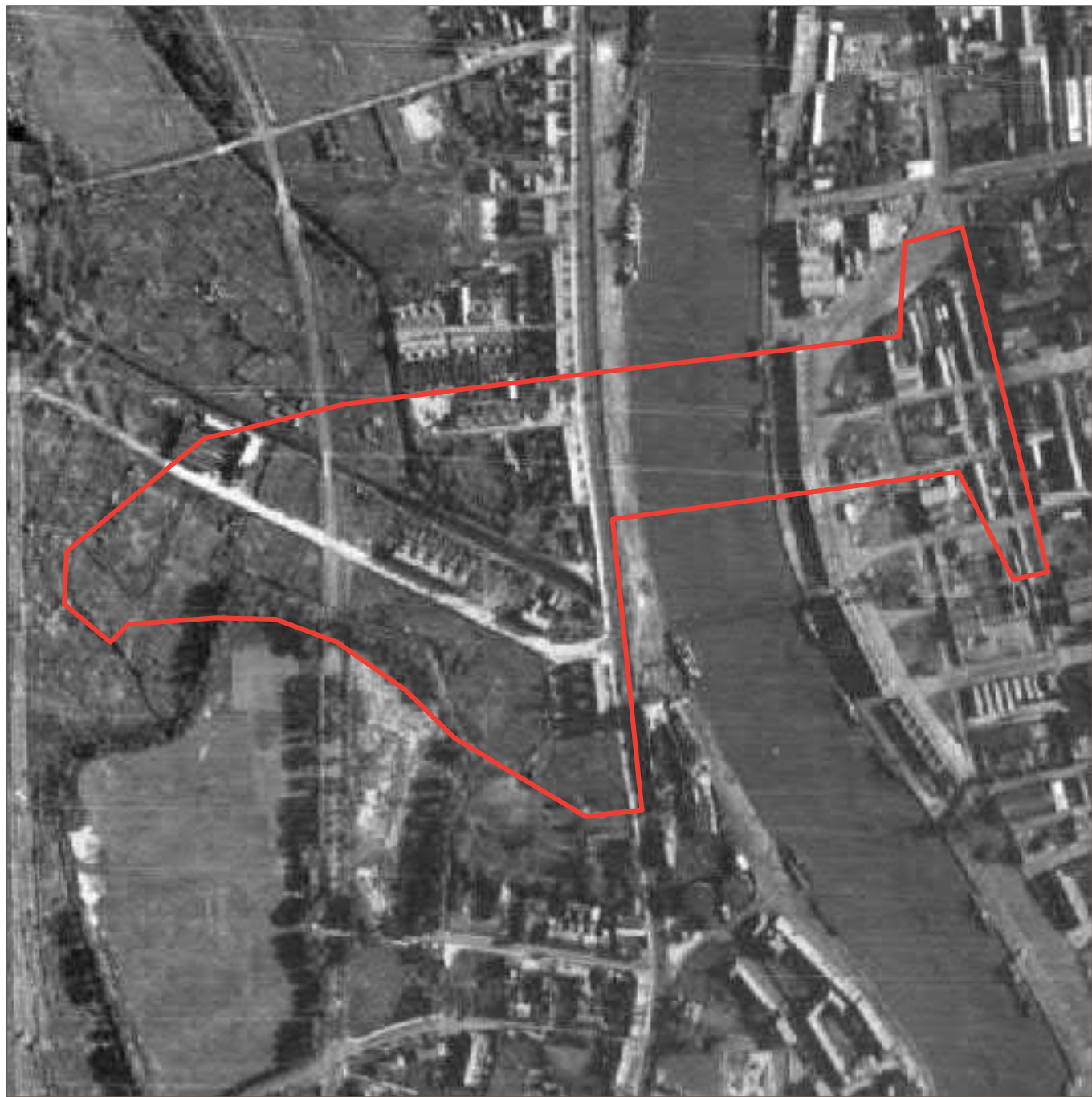
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 Approximate site boundary

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Source: Norfolk County Council



1kg German Incendiary Bomb next to a 30cm ruler

Report Reference:

7307TA

Client:

WSP UK Limited

Project:

Southtown, Great Yarmouth



Source: Heritage-Images

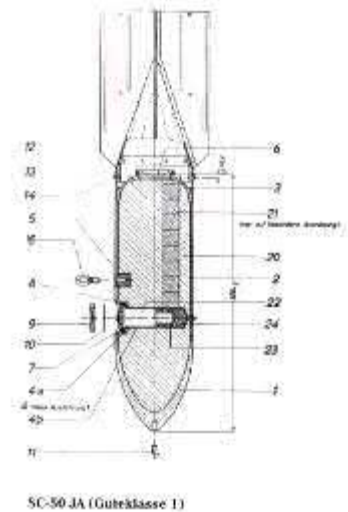
**Most Commonly Deployed German Bombs**

**SC 50**

**Bomb Weight:** 40-54kg (110-119lb)  
**Explosive Weight:** c25kg (55lb)  
**Fuze Type:** Impact fuze/electro-mechanical time delay fuze  
**Bomb Dimensions:** 1,090 x 280mm (42.9 x 11.0in)  
**Body Diameter:** 200mm (7.87in)  
**Use:** Against lightly damageable materials, hangars, railway rolling stock, ammunition depots, light bridges and buildings up to three stories.  
**Remarks:** The smallest and most common conventional German bomb. Nearly 70% of bombs dropped on the UK were 50kg.



50kg bomb, London Docklands



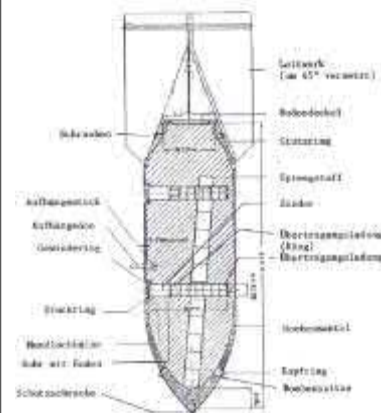
SC-50 JA (Guteklasse 1)

**SC 250**

**Bomb weight:** 245-256kg (540-564lb)  
**Explosive weight:** 125-130kg (276-287lb)  
**Fuze type:** Electrical impact/mechanical time delay fuze.  
**Bomb dimensions:** 1640 x 512mm (64.57 x 20.16in)  
**Body diameter:** 368mm (14.5in)  
**Use:** Against railway installations, embankments, flyovers, underpasses, large buildings and below-ground installations.



250kg bomb, Hawkinge



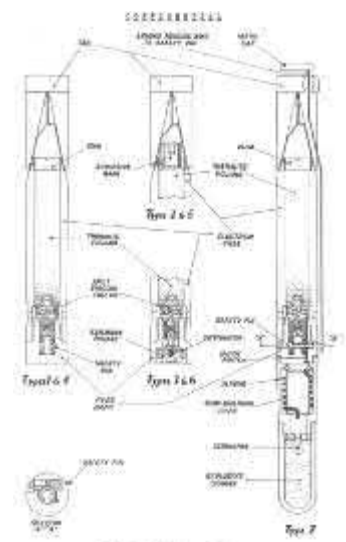
SC-250 JA (Güterboote 1)

**1kg Incendiary Bomb**

**Bomb weight:** 1.0 and 1.3kg (2.2 and 2.87lb)  
**Filling:** 680gm (1.3lb) Thermite  
**Fuze type:** Impact fuze  
**Bomb dimensions:** 350 x 50mm (13.8 x 1.97in)  
**Body diameter:** 50mm (1.97in)  
**Use:** As incendiary – dropped in clusters against towns and industrial complexes  
**Remarks:** Jettisoned from air-dropped containers. Magnesium alloy case. Sometimes fitted with high explosive charge



1. Scaffold pipe
2. Incendiary 1kg bomb
3. Incendiary bomb recently found on site in UK



GERMAN 1kg INCENDIARY & MODIFICATIONS (INCLUDING 1.3 and 2.2 Kg)

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Giant WWII bomb dug up by builders in London

A massive evacuation procedure is carried out in Bermondsey, south London, after the 1,000lb explosive measuring 5ft long was uncovered



Mother-of-two digs up unexploded WWII bomb in garden and casually flings it on the rubbish thinking it was an old exhaust pipe

- Carole Fisher-White, 56, unearthed a mortar shell in her back garden
• It was only when sons said it looked like a bomb that the penny dropped
• Royal Navy bomb disposal team called to defuse the device
• The 29mm Spigot Mortar was an infantry anti-tank weapon
• Also known as the Blacker Bombard it was used by the Home Guard



Unexploded Second World War grenade discovered by a curious dog

Police and Army bomb disposal experts were called to the address in Peckholt Avenue, Heald Green. A dog called Snoopy has sniffed out a suspected Second World War grenade in a backport garden. Police and Army bomb disposal experts were called to the address in Peckholt Avenue, Heald Green. The dog took the grenade to nearby parkland and destroyed it in a controlled explosion.



Page last updated at 14:23 GMT, Thursday, 5 June 2008 15:23 UK BBC

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Unexploded bomb 'started to tick'

An unexploded World War II bomb started to tick and ooze liquid as experts tried to defuse it, police have said.

The large bomb was found in a river at Sugar House Lane, near Bromley-by-Bow Tube station in east London, on Monday.

Rush-hour travel was disrupted as overnight work to make the bomb safe continued into Thursday morning.



"It measures approximately the size and length of a man, and weighs around 1,000kg (2,200lb).



Road closed after German bomb found in Axminster garden

By Exeter Express and Echo | Posted June 22, 2014



A major road in Axminster has been closed after an air-dropped German bomb was found in a garden.

Page last updated at 14:45 GMT, Friday, 22 May 2009 15:45 UK

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Building site WWII bomb exploded



Building site WWII bomb exploded

A controlled explosion has been carried out on a World War II bomb found on a building site in East Sussex.

The 110lb (50kg) SC50 bomb, thought to have been dropped from a German aircraft in 1940 or 1941, was found at the Hollenden House.

Royal Navy clearance divers dispose of 70-year old German bomb

Posted on August 4, 2013



The team of four from the Southern Diving Unit 1 at HM Naval Base Devonport, Plymouth, blew up the air-dropped bomb in-situ in a controlled explosion where it was found by contractors for SW Water laying a mains in a field at St Eval Kart Circuit near Wadebridge, north Cornwall yesterday.

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## WW2 bomb found in Portsmouth harbour

22 February 2017 | Hampshire &amp; Isle of Wight

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A World War Two bomb containing 290lb (131kg) of "high explosives" has been found in Portsmouth harbour.

The ordnance was discovered by a dredger in the water at about 03:00 GMT, the Royal Navy said.

Specialist divers at the scene said the bomb posed a "very serious threat". It was towed out to sea and detonated.

All ferries were stopped and trains between Portsmouth and Southsea station and Portsmouth Harbour were suspended, but have since started running again.

There were also extensive road closures in the area, affecting access to Gunwharf Quays.

The Royal Navy said the device, believed to be a German SC250 that weighs 500lb (227kg), was removed from the harbour before being "safely" blown up in the sea off the Isle of Wight.

Lt Mike St Pierre, the officer leading the bomb disposal team, had said: "Despite being old, these devices can pose a very serious threat."

## MailOnline

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By JOSEPH CURTIS FOR MAILONLINE

PUBLISHED: 17:00, 16 November 2016 | UPDATED: 19:49, 16 November 2016

## Portsmouth harbour is sealed off with hundreds of people evacuated and ferries halted after a 500lb unexploded WWII bomb was found on the sea bed



The Royal Navy today destroyed an unexploded 500lb German World War Two bomb which closed Portsmouth harbour for six hours when dredging workers discovered it on the sea bed.

Contractors completing works ready for the arrival of the Royal Navy's new 65,000 tonne state-of-the-art ship HMS Queen Elizabeth discovered the German UXB torpedo while dredging Portsmouth Harbour, Hampshire, this morning.

Bomb disposal experts rushed to the scene after it was brought to the surface while work was carried out west of Victory Jetty.

The bomb was towed from Portsmouth Harbour, Hants, out to open waters 1.5 miles east of the Isle of Wight.

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Source: [www.dailymail.co.uk](http://www.dailymail.co.uk) / [www.bbc.co.uk](http://www.bbc.co.uk)

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## World War Two bomb removed from River Thames and exploded

© 20 January 2017 | London



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The device was identified as a German SD 50kg bomb

**An unexploded 50kg World War Two bomb found in the River Thames has been removed and exploded.**

The operation by the Royal Navy and Metropolitan Police forced Waterloo Bridge, Westminster Bridge and Victoria Embankment in central London to shut.

A Ministry of Defence spokesman said the WW2 device had been towed along the river to Tilbury, Essex, where it was safely detonated.

Police had been called to the river at 17:15 GMT on Thursday.

The device has been identified as a German SD 50kg bomb, a small armour-piercing ordnance dropped from an aircraft.

The Port of London Authority said the suspected bomb measured 2ft by 1ft (60cm x 30cm).

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Source: [www.bbc.co.uk](http://www.bbc.co.uk)





1994

RESCUE workers search for survivors after a Second World War bomb exploded at a building site in Berlin, killing three people and injuring at least eight others. A fire brigade spokesman said he feared the final death toll could be higher. One worker was still missing, believed to be trapped under a machine. "We've

### Blown up by history

found human remains 100 metres away but we can't tell if they belong to the dead already found," the spokesman said. The blast, set off by drilling work on Frankfurter Allee, one of east Berlin's busiest avenues, trapped

workers under building machinery and sent huge chunks of concrete tumbling through the air. A large office block was being built on the site of the explosion which sent shoppers scrambling for shelter and paralysed

dense afternoon traffic. One eyewitness said: "There was a bang, then silence, and then it started raining stones and dirt." Dozens of cars within a 250-metre radius were wrecked and the top two floors of a nearby apartment block caved in. Radio reports claimed that the total number of injured stood at 14.



2008



2006

### World War II bomb kills three in Germany

Three people have been killed and six injured trying to defuse a World War II bomb in central Germany.

Workers building a sports stadium had earlier unearthed the bomb in the town of Goettingen.

It was not immediately clear why the bomb, reportedly weighing 500kg (1,100lb), had detonated.

Unexploded WWII bombs dropped by Allied planes are frequently found in Germany, though it is unusual for them to explode unexpectedly.

2010



The bomb went off as the machine lifted up earth and debris

A World War Two bomb has exploded at a construction site near a west German town, killing a man and injuring eight others, police say.

The explosion occurred after a digger accidentally struck the device during excavation work in Euskirchen in the state of North Rhine-Westphalia.

The machine's operator died on the spot. Two of those hurt were critically wounded, the dpa news agency reports.

2014



2006

**Top Left:** WWII bomb killed 3 and injured 8 in Berlin – 1994.  
**Middle Left:** WWII bomb killed 3 in Goettingen, Germany – 2010.  
**Bottom Left:** Excavator operator killed by WWII bomb in Euskirchen, Germany – 2014.  
**Top Right:** WWII bomb injures 17 at construction site in Hattingen, Germany - 2008.  
**Middle Right:** A highway construction worker in Germany accidentally struck a WWII bomb, killing himself and wrecking several passing cars - 2006.  
**Bottom Right:** Destroyed piling rig and dump truck after detonation of WWII UXB in Austria - 2006.

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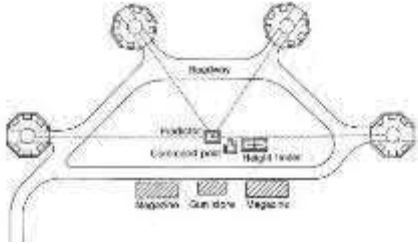


### 3.7 inch Anti-Aircraft Projectile

Weight: 12.7kg (28lb)  
 Dimensions: 94 x 360mm (3.7 x 14.7in)  
 Carriage: Mobile and Static Versions  
 Rate of Fire: 10-20 rounds per minute  
 Ceiling: 9-18,000m (29-59,000ft)  
 Muzzle Velocity: 792m/s (2,598ft/s)  
 Remarks: 4.5 inch projectiles were also commonly utilised



This AA shell was uncovered on a construction site in North London in February 2009.



Layout plan for a typical HAA battery site.



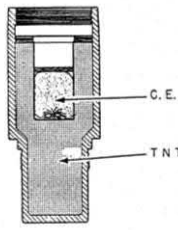
Hyde Park 1939 3.7 Inch QF gun on mobile mounting



3.7 inch AA Projectile Minus Fuze

### Rockets / Unrotating Projectiles

Weight: Overall: 24.5kg (54lb) Warhead: 1.94kg (4.28lb)  
 Dimensions: 1930mm x 82.6mm (76 x 3.25in)  
 Carriage: Mobile – transported on trailers  
 Ceiling: 6770m (22,200ft)  
 Maximum Velocity: 457mps (1,500 fps)



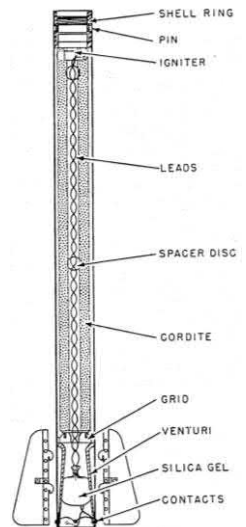
MK II HE Shell (3.5kg)



Rocket Battery in action



Home Guard soldiers load an anti-aircraft rocket at a 'Z' Battery



2" U.P. AA Rocket

### 40mm Bofors Gun Projectile

Weight: 0.86kg (1.96lb)  
 Dimensions: 40mm x 310mm (1.6in x 12.2in)  
 Rate of Fire: 120 rounds per minute  
 Ceiling: 23,000ft (7000m )  
 Muzzle Velocity: 2,890 ft/s (881m/s)  
 Remarks: Mobile batteries – normally few records of where these guns were located



Unexploded 40mm Bofors projectile



40mm Bofors gun and crew at Stanmore in Middlesex, 28 June 1940.



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23 July 2010 Last updated at 18:28

## Covert British troops 'could have buried' WWII devices

**World War II incendiary devices found on a building site in Gloucestershire could have been left by covert British troops, according to researchers.**

More than 20 phosphorus bombs were unearthed in Birdlip after a digger hit one, causing it to burst into flames.

A former worker at the site said he saw a Home Guard officer burying objects there 65 years ago.

The Coleshill Auxiliary Research Team said auxiliary officers often used Home Guard uniforms as cover.



The bombs were put into vats of water to make them safe

Thursday, September 10 2015

**KM KentOnline**  
The UK's fastest-growing regional news network

## Army bomb disposal team called to Blacksole Bridge in Herne Bay

Comments 13

by Aidan Barlow [abarlow@thekmgroupp.co.uk](mailto:abarlow@thekmgroupp.co.uk)

08 July 2015

It was like a scene from Dad's Army when Army bomb disposal experts found wartime explosives made by the Home Guard in makeshift bottles.

A team was called to the Blacksole Bridge in Herne Bay after the wartime bombs were found.

The team from the Royal Logistics Corps set up a 30 metre exclusion zone for pedestrians around the railway embankment after the suspected homemade phosphorous bombs were found.



**MailOnline**

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## Treasure hunter stumbles on deadly Dad's Army bomb cache

By MAIL ONLINE REPORTER  
Last updated at 4:06 PM on 9th July 2010

Comments (0) Add to My Stories

A treasure hunter escaped serious injury when he unearthed a cache of bombs that were buried by the Home Guard during the darkest days of World War 2.

The weapons - primed to go off when they made contact with the air - were secreted on a beach by a Captain Mainwaring of the day.

Loaded with dangerous benzene and phosphorus, the Dad's Army-style team would have used them in battle against Nazi troops in the event of invasion.




'Are you sure that's wise?': The Home Guard's stash of bombs finally goes off, 70 years later

**Eastbourne Herald**

10/09/15 11°C to 21°C Sunny Like us Follow us Place your Ad Subscribe

## VIDEO: Explosion after 80 grenades detonated in Eastbourne



16:31 Monday 13 April 2015

Marked 'AW Bomb 1940' the grenades were thought to have been phosphorus incendiary grenades created as improvised anti-tank weapons when Britain was facing invasion following the army's evacuation from Dunkirk in 1940.

He said, "I remember the grenades being buried. It was part of the Home Guard stash, it was put there in case we were invaded. It had to be in 1943. There were a lot of them [stashes], they were all over the place."

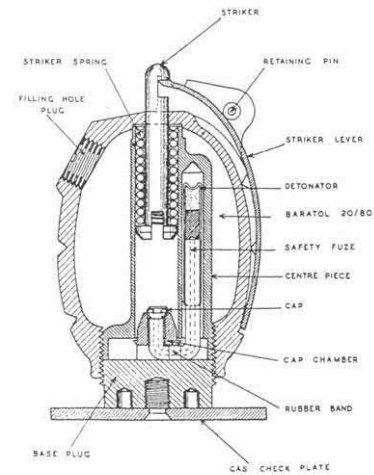
Report Reference: 7307TA	Client: WSP UK Limited
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Source: Various news sources

**No. 36 'Mills' Grenade**

Weight: 0.7kg filled (1lb 6oz)  
 Type: Hand or discharger, fragmentation  
 Dimensions: 95 x 61mm (3.7 x 2.4in)  
 Filling: Alumatol, Amatol 2 or TNT  
 Remarks: 4 second hand-throwing fuse with approximate 30m range. First introduced May 1918.



Grenade, .303 inch rifle, No. 36M, Mark I.

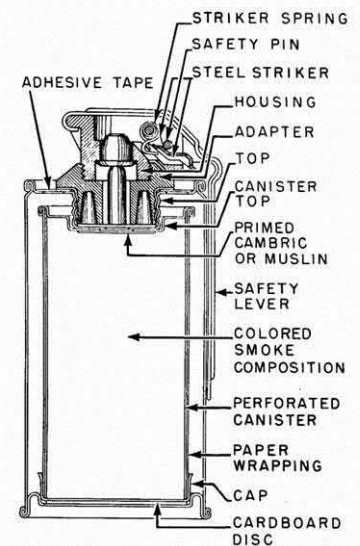
**No. 69 Grenade**

Weight: 0.38kg filled (0.8lb)  
 Type: Percussion/Blast  
 Date Introduced: December 1940  
 Remarks: Black Bakelite body. Blast rather than fragmentation type. After unscrewing the safety cap, a tape is held when throwing the grenade releasing the safety bolt in the throwing motion. Detection is problematic due to its very low metal content.



**Typical Smoke Grenade**

Dimensions: Approx. 65 x 115mm (2.5 x 4.5in)  
 Type: Smoke  
 Date Introduced: Current MoD issue  
 Remarks: Smoke grenades are used as ground-to-ground or ground-to-air signalling devices, target or landing zone marking devices, and screening devices for unit movement.



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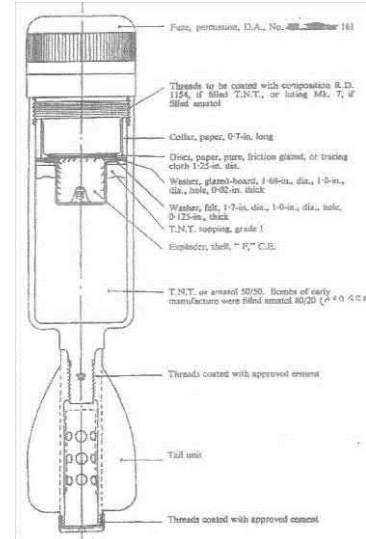
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### Typical 2 inch High Explosive Mortar

- Bomb Weight: 1.02kg (2.25lb)
- Type: High Explosive
- Dimensions: 51 x 290mm (2in x 11.4in)
- Filling: 200g RDX/TNT
- Maximum Range: 457m (500yds)
- Remarks: Fitted with an impact fuze which detonates the fuze booster charge (exploder) and, in turn, the high explosive charge. The main charge shatters the mortar bomb body, producing near optimum fragmentation and blast effect at the target.



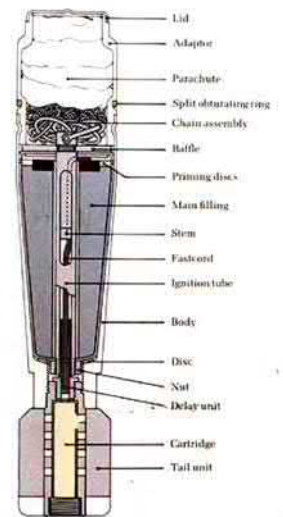
### Typical 3 inch Smoke Mortar

- Type: Smoke
- Dimensions: c490 x 76mm (19.3in x 3in)
- Filling: Typically white phosphorous
- Maximum Range: 2515m (2,750yds)
- Remarks: On impact, the fuze functions and initiates the bursting charge. The bursting charge ruptures the mortar bomb body and disperses the white phosphorous filler. The white phosphorous produces smoke upon exposure to the air.



### Typical 2 inch Illuminating Mortar

- Type: Illum.
- Dimensions: 51 x 290mm
- Filling: Various
- Remarks: The expulsion charge ignites and ejects the candle assembly. A spring ejects the parachute from the tail cone. The parachute opens, slowing the descent of the burning candle which illuminates the target.

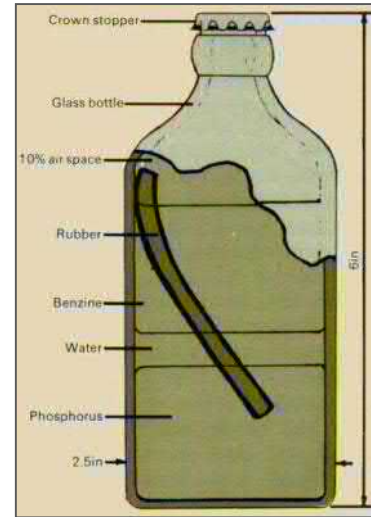


Report Reference: 7307TA	Client: WSP UK Limited
	Project: Southtown, Great Yarmouth



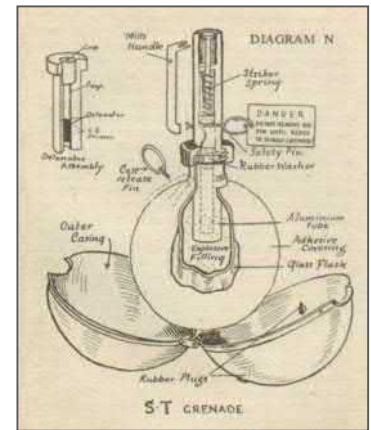
### Self Igniting Phosphorous (SIP) Grenades

**Filling:** White Phosphorous and Benzene  
**Remarks:** The grenade comprised a glass bottle with a total volume of approximately one pint. It was filled with White Phosphorus, benzene, a piece of rubber and water. Over time the rubber dissolved to create a sticky fluid which would self ignite when the bottle broke. Fired by hand or Northover Projector. Sometimes called the "A & W" (Albright & Wilson) grenade.



### No 74 Grenade (Sticky Bomb)

**Remarks:** Designed as an anti-tank grenade and used by the Home Guard. The grenade consisted of a glass ball on the end of a Bakelite (plastic) handle. Inside the glass ball was an explosive filling whilst on the outside was a very sticky adhesive covering. Until used, this adhesive covering was encased in a metal outer casing.



### Flame Fougasse Bomb

**Remarks:** A Flame Fougasse was a weapon in which the projectile was a flammable liquid, typically a mixture of petrol and oil. It was usually constructed from a 40-gallon drum dug into the roadside and camouflaged. Ammonal provided the propellant charge which, when triggered, caused the weapon to shoot a flame 3m (10ft) wide and 27m (30 yards) long. Initially a mixture of 40% petrol and 60% gas oil was used, this was later replaced by an adhesive gel of tar, lime and petrol known as 5B.



Report Reference:  
7307TA

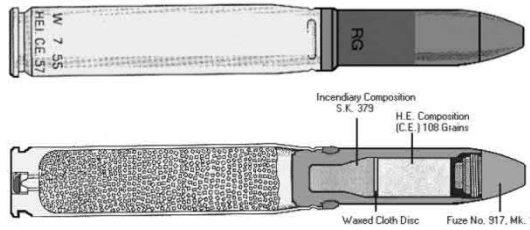
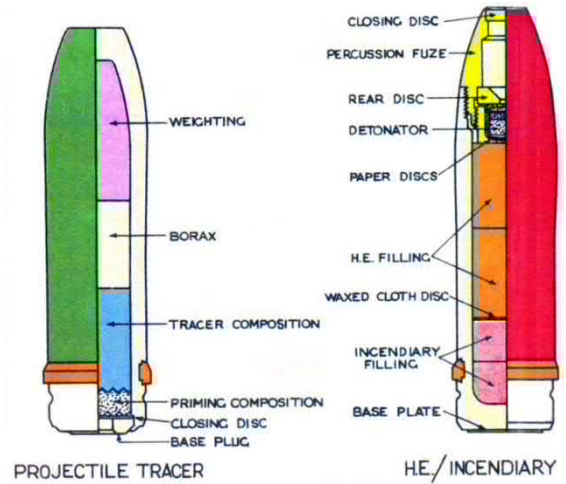
Client:  
WSP UK Limited  
Project:  
Southtown, Great Yarmouth





### 20mm Hispano HEI Ammunition

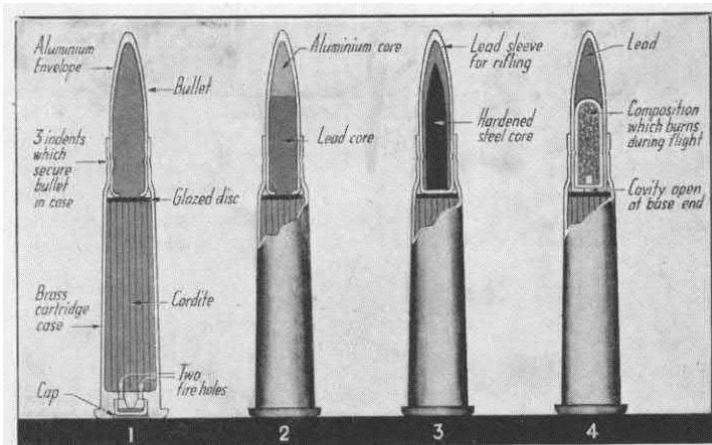
Type: Live canon round  
 Markings: Upper half of projectile painted 'buff' colour, lower half is red.  
 Cartridge Weight: 256 grams  
 Dimensions: Total cartridge / projectile length - 182mm  
 Fuzed: Contact fuze – No.253, No.254 or No.917  
 Filling: 108 grains of contact explosive + 68 grains of SR.379 incendiary composition.  
 Threat: Explosives within unspent cartridge as well as the projectile.  
 Deployment: Royal Navy, RAF and British Army Light Anti-Aircraft guns. Also RAF aircraft canons.  
 Remarks: Cartridges are belted or supplied lose in cartons.



COLOUR IDENTIFICATION		
BRITISH		
NATURE OF SHELL	H.E. FILLING	COLOUR
H.E. TRACER	T.N.T.	Blue
H.E.	T.N.T.	Orange
PROJ. PRACTICE		Purple
PROJ. TRACER		Green
H.E. INCENDIARY	T.N.T.	Red
H.E. INCENDIARY TRACER	T.N.T.	Yellow

### .303" Ammunition

Type: Rifle / machine gun round  
 Markings: Regular round - none. Tracer round – red Primer  
 Bullet Weight: 150 - 180 grams  
 Dimensions: Total cartridge /projectile length - 78mm  
 Filling: Regular round – none. Tracer round - small incendiary fill  
 Threat: Explosive cordite within unspent cartridge  
 Deployment: Royal Navy, RAF and British Army Light Anti-Aircraft guns, machine guns and rifles. Standard British and Commonwealth military cartridge from 1889 until the 1950s.  
 Remarks: Cartridges are belted or supplied lose in cartons.



TYPES OF SMALL ARMS AMMUNITION  
 Fig. 1. Four types of ammunition used by modern infantry. 1 and 2 are ball cartridges, 3 is an armour-piercing bullet, and 4 a tracer bullet which burns and makes its flight visible.

Report Reference: 7307TA	Client: WSP UK Limited
	Project: Southtown, Great Yarmouth







# Appendix E

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**STATIC CONE PENETRATION TEST  
REPORT**

WSP



# IN SITU

SITE INVESTIGATION

## STATIC CONE PENETRATION TEST FACTUAL REPORT

CLIENT  
PROJECT

NORFOLK PARTNERSHIP LABORATORY

GREAT YARMOUTH 3RD RIVER CROSSING



<b>Project</b>	<b>Great Yarmouth 3rd River Crossing</b>
<b>Project No.</b>	<b>1180180</b>
<b>Client</b>	<b>Norfolk Partnership Laboratory</b>
<b>Address</b>	<b>Community and Environmental Services, County Hall Annex, Martineau Lane, Norwich NR1 2SG</b>

**Attention:** Mr Bumstead

Dear Mr Bumstead,

We have pleasure in providing a digital copy of our report and data in AGS format for the above project.

We hope that you are satisfied with the performance of our staff, equipment and reporting on this project. If you should have any queries about any aspect of the works carried out, please do not hesitate to contact us. We look forward to being of service to you in the future.

Yours faithfully,


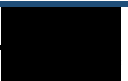
**In Situ Site Investigation Limited**



Darren Ward

Director

### Report Issue

<b>Issue</b>	<b>Date</b>	<b>Description</b>	<b>Prepared</b>	<b>Sign</b>	<b>Checked</b>	<b>Sign</b>
02	19/04/2018	Final	Rachel Cleaver		Darren Ward	

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## 1.0 INTRODUCTION

In Situ Site Investigation Limited (In Situ) was engaged in a geotechnical site investigation at Great Yarmouth 3rd River Crossing at the request of Norfolk Partnership Laboratory (the client). The site investigation consisted of completing 5 *Static Piezocone Penetration Tests (CPTU)* to provide information on the soil conditions and derived geotechnical parameters at:

Fish Wharf

Off South Denes Road

Gt Yarmouth

NR30 3LP

All test locations were provided by the client, as shown on the site map, in *Appendix A.1*. The tests were stopped when they reached the target depth as per the client's technical specifications or for other technical reasons, as detailed in *Appendix A.2* and on each CPTU log.

The fieldwork was carried out from 19/03/2018 to 20/03/2018 as per the client's request.

The work on site and the final factual reporting have been undertaken in accordance with the international technical standard *BS EN ISO 22475-1:2012*.

## 2.0 FIELDWORK

### 2.1 CONE PENETRATION TESTS

The fieldwork activity is summarised in Table 2.1.

Table 2.1 Fieldwork Summary	
CPT Operator/s	Darren Hughes and Andrew Evans
Date Started	19/03/2018
Date Finished	20/03/2018
In Situ S.I. Project Manager	Darren Ward
Main Contractor's Site Manager	Martyn Bumstead

#### 2.1.1 Rig Information

Details of CPTU rig used in this project are shown in Table 2.2. Full data sheet for the rig is presented in *Appendix A.3*.

Table 2.2 Rig Summary	
Rig Name	Rig Description
CPT 010	21 Tonne Wheeled CPT Rig

#### 2.1.2 CPTU Cone

Details of electric CPTU cone (Type TE2) used in this project conforming to the requirements of Application Class 2 of *ISO 22476-1:2012*, are shown in Table 2.3.

Table 2.3 Cone Summary		
Number	Cross-section area	Filter position
P15CFPT <sub>XY</sub> 70080	15cm <sup>2</sup>	u <sub>2</sub>

A full datasheet of the cone used is shown in *Appendix A.4*.

The cone's measured parameters are shown in Table 2.4.

**Table 2.4 Completed Fieldwork Summary**

5 CPTU to a maximum depth of 36.00m. Each test measured Cone Resistance,  $q_c$ , Sleeve Friction,  $f_s$ , Porewater Pressure in the shoulder position,  $u_2$ , Inclination in X and Y axes.

*Provision of factual report with estimated soil type, derived geotechnical parameters and AGS data.*

### 2.1.3 CPTU Cone Calibration

The cone resistance and sleeve friction are recorded by calibrated load cells in the cone. The CPTU load cells and pressure transducers are regularly calibrated in line with ISO 22476-1:2012 standard by the cone manufacturer. The cone calibration certificate for the cone used at this site are presented in *Appendix A.5*.

### 2.1.4 CPTU Cone Saturation

The pore water pressure is recorded using a calibrated pressure transducer located in the piezocone. To ensure pore water pressure measurements are not affected by the presence of air in the measuring transducer, a de-airing procedure is carried out prior to each test. The cone and filter are saturated using a glycerine fluid with a viscosity of 10,000CST.

### 2.1.5 Test Procedure

The tests are carried out in accordance with the *International Standard for Electrical Cone and Piezocone Penetration Test (ISO 22476-1:2012)*.

The final depths of the tests were determined by either completion to the specified test depth or when the maximal safe capacity of the equipment was reached. A schedule of the tests performed is shown in *Appendix A.2*, which has been compiled from the operators' daily progress reports.

The data is transmitted from the digital CPTU through an umbilical cable that runs through the push rods to the data acquisition system. Results are displayed instantaneously on the computer logging screen. The results are recorded on the computer hard disc.

The rate of penetration is kept constant at 2cm/s  $\pm 10\%$  except when penetrating very dense or hard strata. Before each test is carried out zero values are taken of the cone to check if it is within calibration. At the end of each test, zero values are taken again to see if there has been any drift during the test. These values are inspected during the post processing stage. This is a quality check on the data and the testing procedure. Individual test zero values are shown on their corresponding test results in *Appendix B* and *C*.



### 2.1.6 In Situ Pore Pressure ( $u_0$ )

The in situ or hydrostatic pore pressure is required for the calculation of several derived parameters included in this report. These values are presented on the pore pressure plot, *Form 01*, which is included in *Appendix B*. For this report, the values were estimated by our client.

## 2.2 DISSIPATION TESTS

As per the client's request, 5 dissipation tests were performed at the required depth. A summary table of the dissipation tests is presented in *Appendix D*.

The dissipation test is carried out by pausing the penetration at a point when there is excess porewater pressure. This excess pore pressure generated around the cone will then start to dissipate, and the decay of pore pressure with time is recorded. The rate of dissipation depends upon the coefficient of consolidation, which in turn depends on the compressibility and permeability of the soil and on the diameter of the probe. It is common to record the time to reach 50% dissipation,  $t_{50}$ . If the equilibrium pore pressure is required, the dissipation test is continued until no further dissipation is observed. This can occur rapidly in sands, but may take many hours in plastic clays.

The data recorded from the dissipation tests on site is used to calculate the consolidation characteristics, as shown in *Appendix D*.

## 2.3 POSITIONING

Positioning and surveying of all investigated locations was the responsibility of the client. The site map and position of the tests are presented in *Appendix A.1*. All tests coordinates are included in the summary sheet in *Appendix A.2*.

## 3.0 CONE PENETRATION MEASURED PARAMETERS

All measured parameters of tests carried with the CPTU cone are shown in *Appendix B* and all the information about data processing and results are given in sections 3.1, 3.2 and 3.3.

### 3.1 DATA PROCESSING

The measured parameters, cone end resistance,  $q_c$ , sleeve friction,  $f_s$ , porewater pressure measurements with filter in shoulder position,  $u_2$  and inclination for  $x$  and  $y$  axis,  $I_x$ ,  $I_y$ , were recorded for every 10 mm of penetration keeping a constant speed of 20 mm/s  $\pm$  5 mm/s, which may slightly change when the cone is penetrating hard strata.

The measured data from the site works is processed and presented using specialised CPT software. The interpretations on the CPTU results were carried out following the recommendations of *Lunne et al. (1997)*, *Robertson (2015)* and *BS EN ISO 22475-1:2012*. Measured parameters, mentioned in *Sections 3.2* and *3.3*, were used to derive all the geotechnical parameters, which are presented in *Chapter 4.0*. The soil behaviour type method used on this report is *Robertson et al (1986)*, shown in *Figure 3.2*.

#### 3.1.1 Zero Measurements

Before and after each CPTU test, zero measurements are recorded for each channel of the cone. The zero measurements are presented on the logs in *Appendix B* and *C*. This is a routine quality check carried out on site.

### 3.2 MEASURED PARAMETERS

#### 3.2.1 Cone Resistance ( $q_c$ )

Cone resistance,  $q_c$ , is measured as the total force acting on the cone, divided by the projected area of the cone. The results are presented in MPa, on *Log 01*, in *Appendix B*, scale 0-20 MPa with a minor scale printing on the same graph at 0-4 MPa.

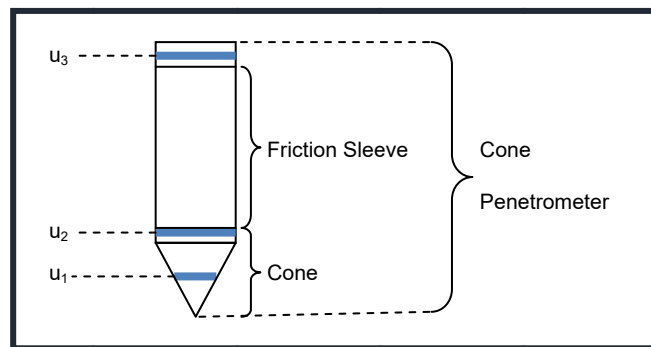
#### 3.2.2 Sleeve Friction ( $f_s$ )

Sleeve friction,  $f_s$ , is measured as the total frictional force acting on the friction sleeve divided by its surface area. The results are presented in kPa, on *Log 01*, in *Appendix B*, using a scale of 0-500 kPa.

### 3.2.3 Porewater pressure ( $u_2$ )

The pore pressure,  $u_2$ , is measured during the test. If the material is free draining and saturation is maintained it will normally measure hydrostatic pore pressure. In materials that are not free draining, it will record the total pore pressure (hydrostatic plus any excess pore pressures generated) created by the cone penetration through this material.

The filter element can be mounted in one of three positions. For all tests carried out in this project the filter was mounted in the  $u_2$  position (see *Figure 3.1*).



**Figure 3.1:** Diagram showing pore pressure filter locations (after Lunne et al., 1997)

### 3.2.4 Inclination ( $I_x, I_y$ )

The CPT rig was set up to obtain a thrust direction as near as possible to vertical. The CPTU cones have inclinometers incorporated to measure the non-verticality of the test. For test depths less than 15 m, significant non-verticality is unusual, provided the initial thrust direction is vertical.

## 3.3 ESTIMATED SOIL BEHAVIOUR TYPE

### 3.3.1 Friction Ratio ( $R_f$ )

The friction ratio,  $R_f$  is the ratio between the sleeve friction and the cone resistance (Lunne et al., 1997).

$$\text{Friction Ratio } (R_f) = \left( \frac{\text{Sleeve Friction } (f_s)}{\text{Cone Resistance } (q_c)} \right) \times 100$$

### 3.3.2 Estimated Soil Behaviour Type (SBT)

The estimation of soil behaviour type, *SBT*, using measurements of cone resistance and sleeve friction is based upon the variations of the friction ratio and cone resistance. The

friction ratio varies depending upon whether the soil is cohesive or granular. The cone resistance varies depending on the strength and densities of the soil.

The interpretation used in this report is *Robertson et al. (1986)*, which is shown in Figure 3.2. The results are presented on *Log 01*, in *Appendix B*.

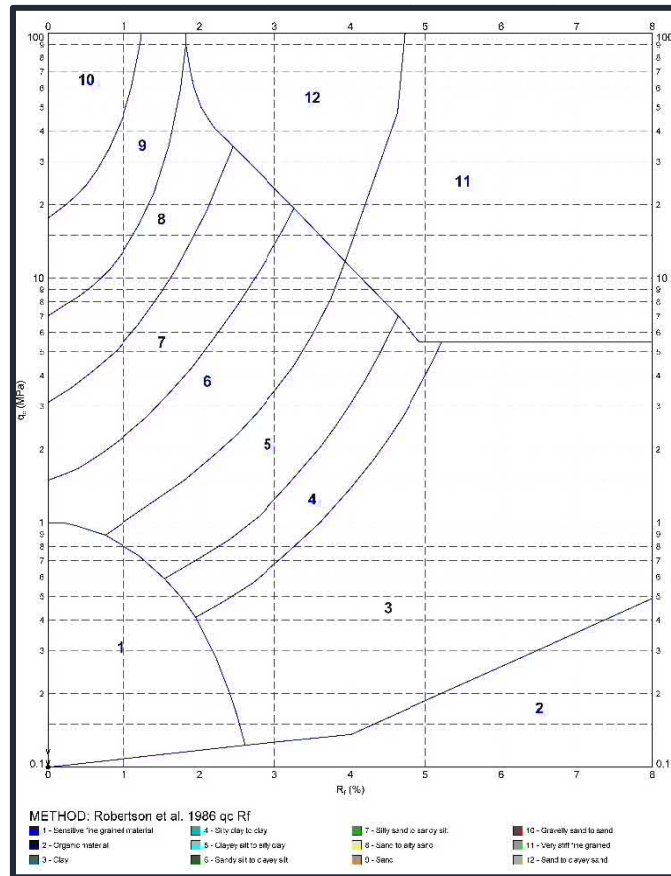


Figure 3.2: Robertson et al., 1986 soil behaviour type chart.

### 3.3.3 Pore Pressure Ratio ( $B_q$ )

Pore pressure ratio,  $B_q$  is the ratio between the measured pore pressure generated during penetration and the corrected cone resistance minus the total overburden stress.

Pore pressure ratio as defined by *Senneset and Janbu (1985)* is defined as:

$$B_q = \frac{u_2 - u_0}{q_t - \sigma_{vo}}$$

where

- $u_2$  is pore pressure measured between the cone and the friction sleeve
- $u_0$  is equilibrium pore pressure
- $\sigma_{vo}$  is total overburden stress
- $q_t$  is cone resistance corrected for unequal end area effects



### 3.4 APPLIED CORRECTIONS

#### 3.4.1 Corrected Cone Resistance ( $q_t$ )

For each penetration test, the measured cone resistance,  $q_c$ , can be corrected for the “unequal area effect” due to the influence of the ambient pore water pressure acting on the cone.

The correction has been applied using the following equation by Lunne et al., 1997:

$$q_t = q_c + [u_2 \cdot (1 - \alpha)]$$

where

$\alpha$  is the cone area ratio

The cone used on this project has a cone area ratio of 0.79. This value is geometrically measured.

#### 3.4.2 Depth Correction

All tests in the report have been corrected for depth difference caused by inclination. This has been calculated using the method described in ISO 22476-1:2012.

To calculate the corrected depth the following formula is used:

$$z = \int_0^l C_{inc} \cdot dl$$

where

$z$  is penetration depth, in  $m$

$l$  is penetration length, in  $m$

$C_{inc}$  is correction factor for the effect of the inclination of the CPTU relative to the vertical axis.

The equation for calculating the correction factor for the influence of the inclination for a bi-axial inclinometer is:

$$C_{inc} = \frac{1}{\sqrt{(1 + \tan^2 \beta_1 + \tan^2 \beta_2)}}$$

where

$\beta_1$  is the angle between the vertical axis and the projection of the axis of the CPTU on a vertical plane, in degrees

$\beta_2$  is the angle between the vertical axis and the projection of the axis of the CPTU on a vertical plane that is perpendicular to the plane of angle  $\beta_1$ , in degrees

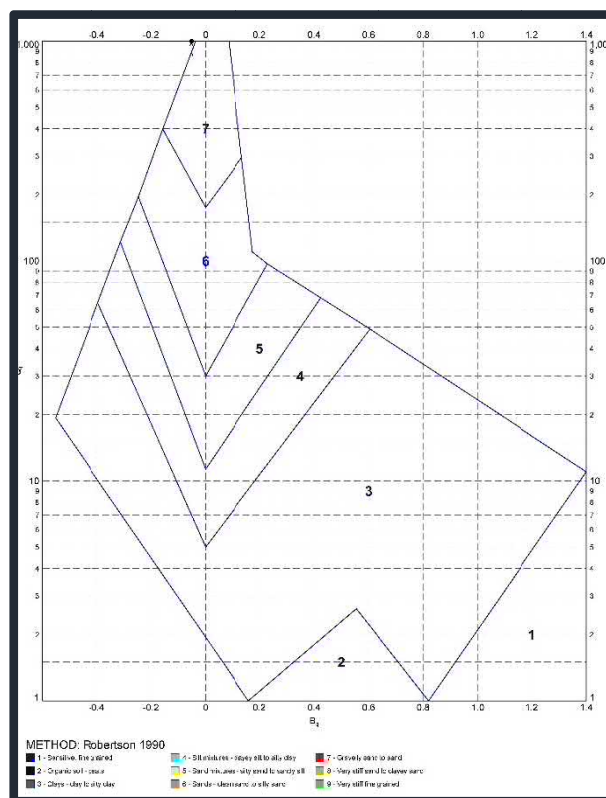
## 4.0 GEOTECHNICAL DERIVED PARAMETERS

A number of empirical correlations can be used to derive geotechnical parameters from CPTU data. This report includes only the parameters which are described in this chapter. The results of all correlations used to obtain the geotechnical derived parameters are presented on *Log 02* and *Log 03* in *Appendix C*.

**Please note that each empirical correlation is derived for a certain type of soil, and may not be appropriate for all the soil types encountered on this project.**

### 4.1 SOIL BEHAVIOUR TYPE INDEX ( $I_c$ )

The soil behaviour type index,  $I_c$ , was derived by *Jefferies and Davies (1991)*, and was created to simplify the application of CPTU SBT chart shown in *Chapter 3, Figure 3.2*. This approach has been modified for use with the *Robertson (1990)* normalised CPT soil classification chart, *Figure 4.1*. The normalised cone parameters  $Q_t$  and  $F_r$  (for definitions see *Appendix A6 Symbol List*) can be combined into one Soil Behaviour Type Index,  $I_c$ , (Lunne et al., 1997).



**Figure 4.1: Robertson 1990 soil behaviour type chart.**

The soil behaviour type index,  $I_c$ , can then be defined using *Robertson (2010)* formula, given below:

$$I_c = ((3.47 - \log Q_t)^2 + (\log F_r + 1.22)^2)^{0.5}$$

where

$Q_t$  is the normalized cone resistance which represents the simple normalization with a stress exponent ( $n$ ) of 1.0, which applies well to clay-like soils

$F_R$  is the normalized friction ratio, in %

The boundaries of soil behaviour type are then given in terms of the index,  $I_c$ , presented in *Table 4.1* below.

The soils behaviour type index does not apply to zones 1, 8 and 9. The profiles of  $I_c$  provide a simple guide to the continuous variation of soil behaviour type in a given soil profile based on CPTU results, with a reliability greater than 80% compared with soil samples (*Robertson, 2015*).

Zone	Soil Behaviour Type	$I_c$
1	Sensitive fine grained	N/A
2	Organic Soils – clay	>3.6
3	Clays – silty clay to clay	2.95 – 3.6
4	Silt mixtures – clayey silt to silty clay	2.60 – 2.95
5	Sand mixtures – silty sand to sandy silt	2.05 – 2.6
6	Sands – clean sand to silty sand	1.31 – 2.05
7	Gravelly sand to dense sand	<1.31
8	Very stiff sand to clayey sand*	N/A
9	Very stiff fine grained *	N/A

\* Heavily overconsolidated or cemented

**Table 4.1:** Normalized CPTU Soil Behaviour Type ( $SBT_n$ ) Index values,  $I_c$ . (*Robertson, 2010*)

## 4.2 N VALUE OF STANDARD PENETRATION TEST (SPT) ( $N_{60}$ )

The derived  $N$  value of SPT,  $N_{60}$ , is strongly and directly related to the cone resistance,  $q_c$ .

In this report the  $N_{60}$  value is derived using the following correlations, developed by *Robertson and Wride (1998)* and *Jefferson and Davies (1998)*

- 1) *Robertson & Wride (1998)*

$$N_{60} = \frac{q_c}{8.5 \cdot p_a \left(1 - \frac{I_c}{4.6}\right)}$$

- 2) *Jefferson and Davies (1993)*

$$N_{60} = \frac{q_c}{0.85 \cdot \left(1 - \frac{I_c}{4.75}\right)}$$

where

- $q_c$  is the cone resistance
- $p_a$  is the atmospheric pressure equal to  $100 \text{ kPa}$
- $I_c$  is the soil behaviour type index calculated as given in *section 4.1*

It is suggested that this method provides a better estimation of the  $N$  value than the actual SPT test, due to its poor repeatability. But in fine grained soil with high sensitivity these methods of estimating  $N_{60}$  may overestimate it (*Jefferies and Davies, 1991*).

## 4.3 RELATIVE DENSITY ( $D_r$ )

Relative density,  $D_r$ , is an intermediate parameter for coarse grained soils, widely used to describe sand deposits. All the research on deriving the relative density from CPTU tests results are carried out for **clean predominantly quartz sands**. The studies have shown that CPTU resistance in granular soils is controlled by sand relative density, in situ effective stresses and compressibility. The more compressible sands tend to give lower penetration resistance for a given relative density than less compressible sands.

In this report relative density is calculated using the methods suggested by *Baldi et al., (1986)*, *Jamiolkowski et al., (2001)* and *Kulhawy and Mayne (1990)* as shown in the equations below:

- 1) *Baldi et al., (1986)*



$$D_r = \frac{1}{C_2} \cdot \ln \left( \frac{q_c \cdot Wehr}{C_1 \cdot (\sigma'_{v0})^{0.55}} \right) \cdot 100$$

where

$C_1$  is a consolidation coefficient which is 157 for normally consolidated soils and 181 for over consolidated soils

$C_2$  is a consolidation coefficient which is 2.41 for normally consolidated soils and 2.46 for over consolidated soils

Wehr is a correction coefficient for calcareous soils

2) Jamilkowski et al., (2001)

$$D_r = 100 \cdot \left[ 0.268 \cdot \ln \left( \frac{q_t / \sigma_{atm}}{\sqrt{\sigma'_{v0} / \sigma_{atm}}} \right) + C_1 \right]$$

where

$C_1$  is a compressibility coefficient which is -0.675 for average compressible soils,  $\leq 1.0$  for high compressible soils and carbonate or calcareous sands and  $\geq -2.0$  for low compressible soils

$q_t$  is corrected cone resistance

$\sigma_{atm}$  is the atmospheric pressure

3) Kulhawy and Mayne, (1990)

$$D_r = \left[ \frac{q_{c1}}{305 \cdot C_1 \cdot OCR^{0.18} \cdot (1.2 + 0.05 \cdot \log(t/100))} \right]^{0.5} \cdot 100$$

where

$q_{c1}$  is the cone resistance corrected for initial vertical effective stress and atmospheric pressure, calculated by the following formula

$$q_{c1} = \frac{q_c}{\sqrt{\sigma'_{v0} \cdot \sigma_{atm}}}$$

where

$q_c$  is the cone resistance in *kPa*

$\sigma'_{v0}$  is the initial vertical effective stress in *kPa*

$C_1$  is a compressibility coefficient which is -0.91 for low compressible sands, 1.0 for medium compressible sands and 1.09 for high compressible sands

$t$  is time in years

#### 4.4 FRICTION ANGLE ( $\phi'$ )

Friction angle,  $\phi'$ , is used to express the shear strength of uncemented, coarse grained soils. In this report friction angle is derived by the correlations of *Mayne and Campanella (2005)*, *Robertson and Campanella (1983)* and *Kulhawy and Mayne (1990)*.

- 1) Mayne and Campanella, (2005)

$$\phi' = 29.5^0 \cdot B_q^{0.121} \cdot [0.256 + 0.336 \cdot B_q + \log Q_t]$$

where

$B_q$  is the pore pressure ratio, calculated as in Session 3.3

$Q_t$  is the normalized cone resistance

- 2) Roberston and Campanella, (1983)

$$\phi' = \tan^{-1} \left( 0.1 + 0.38 \cdot \log \left( \frac{q_t}{\sigma'_{v0}} \right) \right)$$

where

$q_c$  is the cone resistance in *kPa*

$\sigma'_{v0}$  is the initial vertical effective stress in *kPa*

- 3) Kulhawy and Mayne, (1990)

$$\phi' = 17.6^0 + 11.0^0 \cdot \log(q_{t1})$$

where

$q_{t1}$  is the corrected cone resistance corrected for initial vertical effective stress and atmospheric pressure, calculated by the following formula

$$q_{t1} = \frac{q_t}{\sqrt{\sigma'_{v0} \cdot \sigma_{atm}}}$$

The method suggested by *Mayne and Campanella (2005)* will not provide reliable results for heavily overconsolidated soils, fissured geomaterials and highly cemented or structures clays. This approach gives reliable results when pore pressure is positive and varies  $0.1 < B_q < 1.0$ . The correlation suggested by *Robertson and Campanella (1983)* estimates the peak friction angle for uncemented, unaged, moderately compressible, predominately quartz sands. For sands of higher compressibility the method will tend to predict low friction angles. The method suggested by *Kulhawy and Mayne (1990)* is an alternate relationship for clean, rounded, uncemented, quartz sands.

#### 4.5 FINES CONTENT ( $FC$ )

The fines content,  $FC$ , in this report is estimated using two different methods, one from *Robertson and Wride (1998)* and the other, *Suzuki et al (1998)* as presented below:

- 1) Robertson and Wride (1998)

$$I_c < 1.26: FC = 0$$

$$1.26 \leq I_c \leq 3.5: FC(\%) = 1.75I_c^{3.25} - 3.7$$

$$3.5 < I_c: FC = 100\%$$

- 2) Suzuki et al (1998)

$$FC(\%) = 2.8I_c^{2.6}$$

where

$I_c$  is the soil behaviour type index, calculated as in section 4.1

#### 4.6 UNDRAINED SHEAR STRENGTH ( $s_u$ )

Estimation of undrained shear strength,  $s_u$ , from CPTU tests using corrected cone resistance is carried out using the following correlation from *Lunne et al. (1981)*:

$$S_u = \frac{(q_t - \sigma_{v0})}{N_{kt}}$$

where

$N_{kt}$  is the empirical cone factor, which varies from 10 (6 for very soft sensitive fine grained soils) to 20. In this report 3 values are considered: 15, 17.5 and 20.  $N_{kt}$  tends to increase with increasing plasticity and decrease with increasing soil sensitivity. It decreases as  $B_q$  increases. (*Lunne et al., 1997*)

$\sigma_{v0}$  = total overburden stress.

This report only presents the undrained shear strength data on soils with soil behaviour type index,  $I_c$  values greater than 2.60.

The value of undrained shear strength,  $s_u$  to be used in analysis depends on the design problem. In general, the simple shear direction of lading often represents the average undrained strength. For larger, moderate to high risk projects, where high quality field and laboratory data may be available, site specific correlations should be developed based on appropriate and reliable values of  $s_u$ .

## 4.7 SENSITIVITY ( $S_t$ )

The sensitivity,  $S_t$  of clays is defined as the ratio of undisturbed peak undrained shear strength to totally remoulded undrained shear strength.

In this report  $S_t$  is calculated using two correlations developed by *Schmertmann (1978)* and *Mayne (2007)*.

- 1) Schmertmann (1978)

$$S_t = \frac{s_u}{s_{u(rem)}} = \frac{q_t - \sigma_v}{N_{kt}} \left( \frac{1}{f_s} \right)$$

where

$s_{u(rem)}$  is the remoulded undrained shear strength. It can be assumed equal to the sleeve resistance,  $f_s$ .

- 2) Mayne (2007)

$$S_t = \frac{0.073 \cdot (q_t - \sigma_{v0})}{f_s}$$

For relatively sensitive clays,  $S_t > 10$ , the value of  $f_s$  can be very low and not very accurate, hence the estimate of sensitivity should be used as a guide only.

## 4.8 SOIL UNIT WEIGHT ( $\gamma$ )

Soil unit weight,  $\gamma$  in this report is calculated by using one method for sands, considered under dry conditions and two methods for clays, considered under saturated conditions. These relationships are developed by *Mayne (2007)* and the equations are presented below:

- 1) Mayne (2007)

Dry unit weight for sands:

$$\gamma_{dry} = 1.89 \cdot \log(q_{t1}) + 11.82$$

Saturated unit weight for clays method 1

$$\gamma_{sat} = 8.32 \cdot \log(V_s) - 1.61 \cdot \log(z)$$

Saturated unit for clays method 2

$$\gamma_{sat} = 2.60 \cdot \log(f_s) + 15 \cdot G_s - 26.5$$

where

$q_{t1}$  is the corrected cone resistance corrected for initial vertical effective stress and atmospheric pressure, calculated by the following formula:



$$q_{t1} = \frac{q_t}{\sqrt{\sigma'_{v0} \cdot \sigma_{atm}}}$$

$z$  is the depth

$V_s$  is the shear wave velocity, calculated as  $V_s = 118.8 \cdot \log(f_s) + 18.5$

$G_s$  is the specific gravity of solids, typically between 2.40 and 2.90

#### 4.9 STATE PARAMETER ( $\psi$ )

The state parameter,  $\psi$  is defined as the difference between the current void ratio,  $e$  and the void ratio at critical state  $e_{cs}$ , at the same mean effective stress for granular soils.

The problem of evaluating the state parameter from CPTU response is complex and depends on several soil parameters, including shear stiffness, shear strength, compressibility and plastic hardening. (*Jefferis and Been, 2006*)

In this report, the state parameter is calculated based on five methods as follows:

- 1) Been et al. (1987)

$$\psi = -\frac{\ln\left(\frac{Q_p}{k}\right)}{m}$$

and

$$Q_p = \left(\frac{3Q_t}{1 + 2K_0}\right)$$

where

$Q_t$  is the normalized cone resistance

$K_0$  is the coefficient of lateral earth pressure

- 2) Shuttle and Jefferies (1998)

$$\psi = -\frac{\ln\left(\frac{Q_p}{k}\right)}{m}$$

where

$$k = \left( (3.79 + 1.12 \ln(I_r)) (1 + 1.06(M - 1.25)) (1 - 0.30(N - 0.2)) (H/1000)^{0.326} (-1.55(\lambda - 0.01)) \right)^{1.45}$$

$$m = 1.45 (1.04 + 0.46 \ln(I_r)) (1 - 0.4(M - 1.25)) (1 - 0.30(N - 0.2)) (H/100)^{0.15} (1 - 2.21(\lambda - 0.01))$$

where

$Q_t$  is the normalised cone resistance

$I_r$  is rigidity index

$K_0$	is the coefficient of lateral earth pressure
$M$	is critical state ratio
$N$	is dilation parameter
$H$	is plastic hardening modulus;
$\lambda$	is slope CSL line

### 3) Shuttle and Jefferies (1998)

The state parameter calculated according this third method is similar to state parameter calculated as presented in the second method, except for the rigidity index that is calculated as follows:

$$I_r = I_{r100} \left( \frac{P_a}{\sigma'_{v0}} \right)^{0.5}$$

where

$I_{r100}$	is rigidity index in reference pressure
$P_a$	is the reference pressure equal to 100 kPa
$\sigma'_{v0}$	is effective vertical overburden stress

### 4) Plewes (1992)

$$\psi = - \frac{\ln \left( \frac{Q_p / (1 - B_q)}{k'} \right)}{m'}$$

where

$$k' = M \left( 3 + \frac{0.85}{\lambda} \right)$$

$$m' = 11.9 - 13.3\lambda$$

$$\lambda = \frac{F_r}{10}$$

where

$Q_t$	is the normalized cone resistance
$B_q$	is pore pressure ratio
$K_0$	is the coefficient of lateral earth pressure
$F_R$	is normalized friction ratio
$M$	is critical state ration

### 5) Been and Jefferies (1992)

$$\psi = - \frac{\ln \left( \frac{Q_p / (1 - B_q)}{k'} \right)}{m'}$$

where

$$k' = M \left( 3 + \frac{0.85}{\lambda} \right)$$

$$m' = 11.9 - 13.3\lambda$$

$$\lambda = \frac{1}{34 - 10I_c}$$

For high-risk projects a detailed interpretation of CPTU results using laboratory results and numerical modelling can be appropriate (e.g. *Shuttle and Cunning, 2007*), although soil variability can complicate the interpretation procedure. For low risk projects and in the initial screening for high-risk projects there is a need for a simple estimate of soil state.

*Plewes et al (1991)* provided a means to estimate soil state using the normalized soil behaviour type, *SBT<sub>n</sub>* chart suggested by *Jefferies and Davies (1991)*. *Jefferies and Been (2006)* suggested that soils with a state parameters less than -0.05 are dilative at large strains.

#### 4.10 IN SITU STRESS RATIO ( $K_0$ )

There are various estimations to determine in situ stress ratio,  $K_0$ , from CPTU in fine grained soils. In this report the methods suggested by *Mayne (2007)* and *Kulhawy and Mayne (1990)* are used, as given below:

- 1) Mayne (2007)

$$K_0 = (1 - \sin\phi')OCR^{\sin\phi'}$$

$$\text{Max } K_0 = K_p = \frac{(1 + \sin\phi')}{(1 - \sin\phi')}$$

$$K_0 = 0.192\left(\frac{q_t}{\sigma_{atm}}\right)^{0.22}\left(\frac{\sigma_{atm}}{\sigma_{v0}}\right)^{0.22}OCR^{0.27}$$

where

OCR is the overconsolidation ration, calculated as presented in session 4.12

- 2) Kulhawy and Mayne (1990)

$$K_0 = 0.1\left(\frac{q_t - \sigma_{v0}}{\sigma_{v0}'}\right)$$

These approaches are generally limited to mechanically overconsolidated, fine grained soils. As considerable scatter exists in the database used for these correlations, in moderate to high risk projects further tests should be performed and these correlations must be considered only as a guide.

#### 4.11 OVERCONSOLIDATION RATIO (OCR)

Overconsolidation ratio, *OCR* is defined as the ratio of the maximum past effective consolidation stress and the present effective overburden stress:

$$OCR = \frac{\sigma'_p}{\sigma'_{v0}}$$

This definition is appropriate for mechanically overconsolidated soils, where the only change has been the removal of overburden stress. For cemented and aged soils the *OCR* may represent the ratio of the yield stress and the present effective overburden stress.

In this report  $\sigma'_p$  is calculated based on six methods as presented below:

- 1) Mayne (1995)

$$\sigma'_p = 0.33(q_t - \sigma_{v0})$$

- 2) Chen & Mayne (1996)

$$\sigma'_p = 0.53\Delta u$$

- 3) Mayne (2005)

$$\sigma'_p = 0.6(q_t - u_2)$$

- 4) Robertson (2009)

$$\sigma'_p = 0.25(Q_t^{1.25} - \sigma'_{v0})$$

- 5) Mayne (2005)

$$\sigma'_p = \left[ \frac{0.192 \left( \frac{q_t}{\sigma_{atm}} \right)^{0.125}}{(1 - \sin\phi') \left( \frac{\sigma'_{v0}}{\sigma_{atm}} \right)^{0.31}} \right]^{\left( \frac{1}{\sin\phi' - 0.27} \right)} \sigma'_{v0}$$

- 6) Mayne (2007)

$$\sigma'_p = 0.101 \sigma_{atm}^{0.102} (G_0)^{0.478} \sigma'_{v0}{}^{0.420}$$

For larger, moderate to high risk projects, where additional high quality field and laboratory data may be available, site specific correlations should be developed based in consistent and relevant values of *OCR*.

#### 4.12 SMALL STRAIN YOUNG MODULUS ( $E_0$ )

Deriving small strain undrained Young's modulus,  $E_0$ , from CPTU is difficult. There is insufficient data available to make a direct correlation, and it is recommended that  $c_u$  should be derived, then  $E_U$  estimated, as a rough order of value from one of the available correlations between  $E_U$  and  $c_u$  (*Meigh, 1987*).

In this report the small strain Young's modulus is derived as follows:

- 1) Defined from elastic theory:



$$E_0 = 2(1 + \nu)G_0$$

where

$\nu$  is the Poisson ratio, equal to 0.2

$G_0$  is the small strain shear modulus calculated by the formula given below:

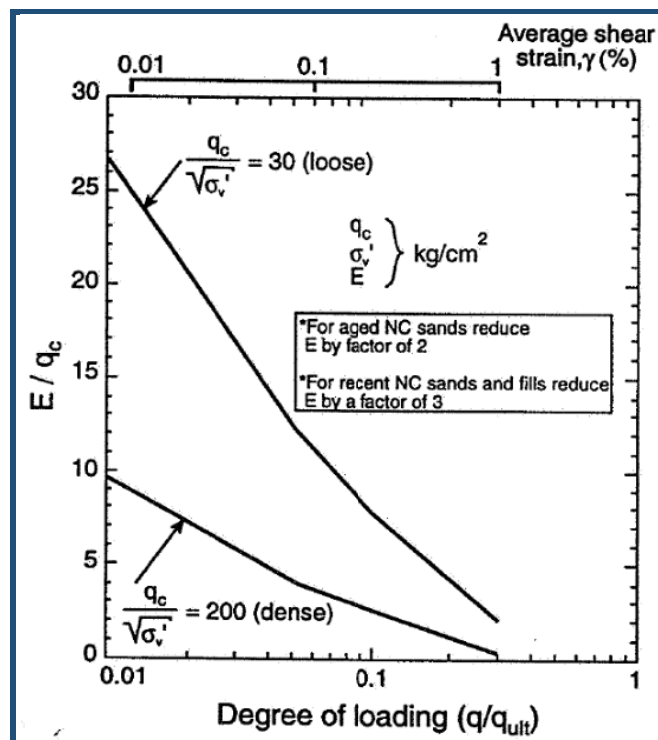
$$G_0 = 1634 \left( \frac{q_c}{\sqrt{\sigma'_{v0}}} \right)^{-0.75} q_c$$

2) Calculated based on the degree of loading,  $q_c$ , effective stress and reduction factor

$$E_0 = \alpha q_c$$

where

$\alpha$  is calculated from degree of loading,  $q_c$ , effective stress and reduction factor, given in *Figure 4.2*



**Figure 4.2:** Estimation of equivalent Young's modulus for sand based on degree of loading (Robertson, 1990)

### 4.13 CONSTRAINED MODULUS (M)

Constrained Modulus,  $M$ , can be estimated by CPTU using the following empirical relationship:

$$M = \alpha_M (q_t - \sigma_{v0})$$

where

$\alpha_M$  varies with soil plasticity and natural water content for a wide range of fine grained soils and organic soils. *Meigh (1987)* suggested that  $\alpha_M$  lies in the range of 2 to 8, whereas *Mayne (2001)* suggested the value of 5.

*Robertson (2001)* suggested that  $\alpha_M$  varies with  $Q_t$ , such that:

When  $I_c > 2.2$  (fine grained soils) use:  $\alpha_M = Q_t$  when  $Q_t < 14$   
 $\alpha_M = 14$  when  $Q_t > 14$

When  $I_c < 2.2$  (coarse grained soils) use:  $\alpha_M = 0.0188[10^{(0.55I_c+1.68)}]$

In this report the Constrained Modulus,  $M$ , is calculated after *Kulhawy and Mayne (1990)* using the equation below:

$$M = 8.25(q_t - \sigma_{v0})$$

Also an alternative method is included in the results, developed by *Burns and Mayne (2002)* using the following relationship:

$$M = 0.02G_0$$

#### 4.13.1 Equivalent Oedometer Coefficient of Compressibility ( $m_v$ )

Equivalent oedometer coefficient of compressibility,  $m_v$  can be calculated directly by the Constrained Modulus,  $M$ , as follows:

$$m_v = \frac{1}{M}$$

## 4.14 SMALL STRAIN SHEAR MODULUS ( $G_0$ )

Elastic theory states that the small strain shear modulus,  $G_0$ , can be determined from the following equation:

$$G_0 = \rho v_s^2$$

where

$\rho$  is the mass density of the soil  
 $v_s$  is the shear wave velocity

In this report the small strain shear modulus,  $G_0$ , will be presented calculated by the three methods shown below, developed by *Rix & Stoke (1992)*, *BE* and *UB Rix & Stoke (1992)*, respectively.

$$G_0 = 1634 \left( \frac{q_c}{\sqrt{\sigma'_{v0}}} \right)^{-0.75} q_c$$

$$G_0 = \frac{\gamma_{bulk}}{g} v_s^2$$

where

- $q_c$  is the net cone tip resistance in kPa
- $\sigma'_{v0}$  is the effective initial vertical stress in kPa
- $\gamma_{bulk}$  is the bulk density of the soil
- $v_s$  is the shear wave velocity

This correlation of  $G_0$  is applicable to all soil types.

#### 4.14.1 Mass Density of Soil ( $\rho$ )

Mass density of soil,  $\rho$ , is defined as:

$$\rho = \frac{\gamma}{g}$$

where

- $\gamma$  is the elastic stiffness of the soils at shear strain less than  $10^{-4}\%$ ,  $\gamma < 10^{-4}\%$ .

#### 4.15 HIDRAULIC CONDUCTIVITY (k)

An approximate estimate of soil hydraulic conductivity of coefficient of permeability,  $k$ , can be made from an estimate of soil behaviour type using the CPTU *SBT chart*, and presented in the table below:

SBT Zone	SBT	Range of k (m/s)	SBT <sub>n</sub> I <sub>c</sub>
1	Sensitive fine grained	$3 \times 10^{-10}$ to $3 \times 10^{-8}$	NA
2	Organic soils-clay	$1 \times 10^{-10}$ to $1 \times 10^{-8}$	$I_c > 3.60$
3	Clay	$1 \times 10^{-10}$ to $1 \times 10^{-9}$	$2.95 < I_c < 3.60$
4	Silt Mixture	$3 \times 10^{-9}$ to $1 \times 10^{-7}$	$2.60 < I_c < 2.95$
5	Sand Mixture	$1 \times 10^{-7}$ to $1 \times 10^{-5}$	$2.05 < I_c < 2.60$
6	Sand	$1 \times 10^{-5}$ to $1 \times 10^{-3}$	$1.31 < I_c < 2.05$
7	Dense sand to gravelly sand	$1 \times 10^{-3}$ to 1	$I_c < 1.31$
8	*Very dense/ stiff soil	$1 \times 10^{-8}$ to $1 \times 10^{-3}$	NA
9	*Very stiff fine grained soil	$1 \times 10^{-9}$ to $1 \times 10^{-7}$	NA

\*Overconsolidated and/ or cemented

**Table 4.2:** Estimated soil permeability (k) based on the CPTU SBT chart by Roberston (2009)

The average relationship between soil permeability,  $k$  and  $SBT_n I_c$ , shown in *Table 4.1*, can be represented by the following relationships:

$$\begin{aligned} \text{When } 1.0 < I_c \leq 3.27 & \quad k = 10^{(0.952-3.04I_c)} \\ \text{When } 3.27 < I_c \leq 4.0 & \quad k = 10^{(-4.52-1.37I_c)} \end{aligned}$$

In this report, the hydraulic conductivity is given using 2 methods, *Robertson et al. (1986)* and *Robertson et al. (1990)*, considering both minimum and maximum values for each method.

The hydraulic conductivity (permeability),  $k$ , values, minimum and maximum, defined after soil behaviour type *Robertson et al. (1986)* are presented in *Table 4.3*, below:

SBT Zone	Soil Behaviour Type (SBT)	Range of hydraulic conductivity, $k$ (m/s)
1	Sensitive fine grained	$3 \times 10^{-9}$ to $3 \times 10^{-8}$
2	Organic soils	$1 \times 10^{-8}$ to $1 \times 10^{-6}$
3	Clay	$1 \times 10^{-10}$ to $1 \times 10^{-9}$
4	Silty CLAY to CLAY	$3 \times 10^{-9}$ to $1 \times 10^{-8}$
5	Clayey SILT to silty CLAY	$1 \times 10^{-8}$ to $1 \times 10^{-7}$
6	Sandy SILT to clayey SILT	$1 \times 10^{-7}$ to $1 \times 10^{-6}$
7	Silty SAND to sandy SILT	$1 \times 10^{-5}$ to $1 \times 10^{-6}$
8	SAND to silty SAND	$1 \times 10^{-5}$ to $1 \times 10^{-4}$
9	SAND	$1 \times 10^{-4}$ to $1 \times 10^{-3}$
10	Gravelly SAND to SAND	$1 \times 10^{-3}$ to 1
11	Very stiff fine grained	$1 \times 10^{-8}$ to $1 \times 10^{-6}$
12	SAND to clayey SAND	$3 \times 10^{-7}$ to $3 \times 10^{-4}$

**Table 4.3:** Estimated soil permeability ( $k$ ) based on SBT chart by *Robertson et al. (1986)*

The hydraulic conductivity (permeability),  $k$ , minimum and maximum values, defined after soil behaviour type by *Robertson et al. (1990)* are presented in *Table 4.4*, here below:

SBT Zone	Soil Behaviour Type (SBT)	Range of hydraulic conductivity, $k$ (m/s)
1	Sensitive fine grained	$3 \times 10^{-9}$ to $3 \times 10^{-8}$
2	Organic soils	$1 \times 10^{-8}$ to $1 \times 10^{-6}$
3	Clay	$1 \times 10^{-10}$ to $1 \times 10^{-9}$
4	Silt Mixture	$3 \times 10^{-9}$ to $1 \times 10^{-7}$
5	Sand Mixture	$1 \times 10^{-7}$ to $1 \times 10^{-5}$
6	Sand	$1 \times 10^{-5}$ to $1 \times 10^{-3}$
7	Gravelly sands to dense sands	$1 \times 10^{-3}$ to 1



8	Very stiff sand to clayey sand	$1 \times 10^{-8}$ to $1 \times 10^{-6}$
9	Very stiff fine grained	$1 \times 10^{-8}$ to $1 \times 10^{-6}$

**Table 4.4:** Estimated soil permeability ( $k$ ) based on SBT chart by Robertson et al. (1990).

#### 4.16 CONSOLIDATION CHARACTERISTICS

All the results of consolidation characteristics calculated using the formulas below are presented in *Appendix D*.

##### 4.16.1 Rigidity Index ( $I_R$ )

The rigidity index,  $I_R$ , for fine materials is defined using the following formula, developed by *Mayne (2001)*:

$$I_R = \exp \left[ \left( \frac{1.5}{M} + 2.925 \right) \left( \frac{q_t - \sigma_{v0}}{q_t - u_2} \right) \right] - 2.925$$

where

$M$  is the Cam Clay constant, slope of the critical state line defined as:

$$M = \frac{6 \sin \phi'}{3 - \sin \phi'}$$

where

$\phi'$  is the internal friction angle.

The second method used to define the rigidity index,  $I_R$ , for fine material is based on plasticity index and overconsolidation ratio,  $OCR$ , and calculated after the relationship developed by *Keaveny and Mitchel (1986)* as follows:

$$I_R = \frac{\exp(0.0435(137 - PI))}{[1 + \ln\{1 + 0.385(OCR - 1)^{3.2}\}]^{0.8}}$$

where

$PI$  is the plasticity index of the soil, equal to 20.

$OCR$  is the overconsolidation ratio of the soil

##### 4.16.2 Coefficients of consolidation ( $c_h, c_v$ )

The coefficient of consolidation is interlinked with the hydraulic conductivity through the formula below:

$$c = \frac{kM}{\gamma_w}$$

where

$M$  is the 1-D constrained modulus relevant to the problem (i.e. unloading, reloading, virgin loading, etc)

$\gamma_w$  is the unit weight of water  
 $k$  is the hydraulic conductivity

In geotechnical practice it is very difficult to measure  $c$  and  $k$ , because due to soil anisotropy  $c$  and  $k$  have different values in the horizontal,  $c_h$  and  $k_h$  and vertical  $c_v$  and  $k_v$  direction. The relevant design values depend on drainage and loading direction.

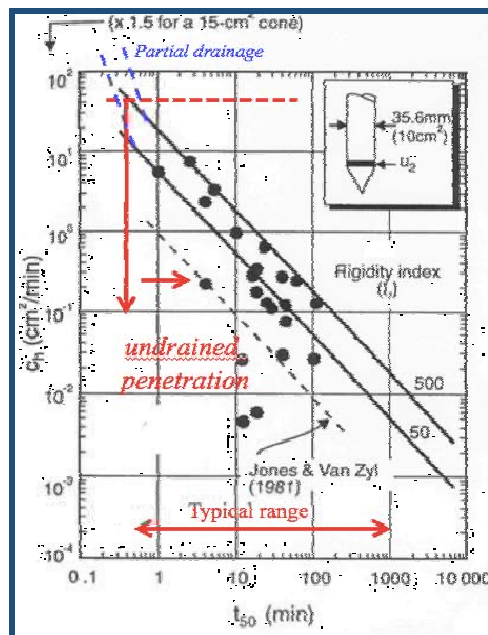
The coefficient of consolidation can be estimated by measuring the dissipation or rate of decay of pore pressure with time after a stop in CPTU penetration. The coefficient of consolidation should be interpreted at 50% dissipation, using the following formula:

$$c = \left(\frac{T_{50}}{t_{50}}\right)r_0^2$$

where

$T_{50}$  is theoretical time factor  
 $t_{50}$  is measured time for 50% dissipation  
 $r_0$  is penetrometer radius

In soils of very low permeability the time for dissipation can be decreased by using smaller diameter probes. A theoretical solution for this cases is given by *Teh and Houlsby (1991)* and it is compared with data from around the world by *Robertson et al. (1992)*, as shown in *Figure 4.3*.



**Figure 4.3:** Average laboratory  $c_h$  values and CPTU results

(after *Robertson et al. 1992*, *Teh and Houlsby theory* shown as solid lines for  $I_R = 50$  and  $I_R = 500$ ).

$c_h$  estimation is controlled by soil stress history, sensitivity, anisotropy, rigidity index (relative stiffness), fabric and history. In overconsolidated soils, the pore pressure behind the cone

tip can be low or negative, results in dissipation data that can initially rise before decreasing to the equilibrium values. Care is required to ensure the dissipation test to end at the right moment of time, not stopped prematurely after the initial rise.

An approximate estimate of the coefficient of consolidation in the vertical direction can be obtained using the ratios of permeability in the horizontal and vertical direction given in the section on hydraulic conductivity, since:

$$c_v = c_h \left( \frac{k_v}{k_h} \right)$$

For relative short dissipations, the dissipation results can be plotted on a square-root time scale. The gradient of the initial straight line in m, where:

$$c_h = \left( \frac{m}{M_T} \right)^2 r^2 I_r^{0.5}$$

where

$M_T$  is 1.15 for  $u_2$  position and 10 cm<sup>2</sup> cone ( $r=1.78$  cm).

#### 4.17.3 Coefficients of permeability (hydraulic conductivity, $k_h$ , $k_v$ )

The horizontal coefficient of permeability can be estimated from the following expression:

$$k_h = \frac{\gamma_w}{2.3\sigma'_{v0}} RR c_h$$

where

RR is the compression ratio in the overconsolidated range. It represents the strain per log cycle of effective stress during recompression and can be determined from laboratory consolidation tests ( $0.5 \times 10^{-2} < RR < 2 \times 10^{-2}$  was recommended by Baligh and Levadoux).

Robertson et al. (1992a) presented a summary of available data from dissipation tests and laboratory determined  $k_h$  values.

Nature of clay	$k_h/k_v$
No macrofabric, or only slightly developed macrofabric, essentially homogeneous deposits	1 to 1.5
From fairly well to well developed macrofabric, e.g. sedimentary clays with discontinuous lenses and layers of more permeable material	2 to 4
Varved clays and other deposits containing embedded and more or less continuous permeable layers	3 to 15

**Table 4.4:** Range of field values of  $k_h/k_v$  for soft clays (from Jamiolkowski et al., 1985).

Estimation of soil permeability from CPTU and dissipation data is subject to much uncertainty and should be used as a guide only.



## 5.0 CPTU RESULTS APPLICATIONS

### 5.1 SOIL PROFILING AND APPLICATIONS IN GEOTECHNICAL DESIGN

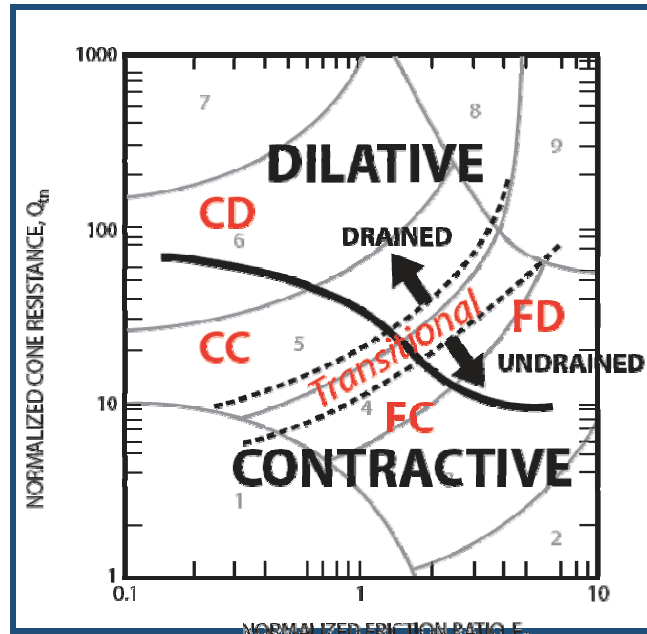
#### 5.1.1 Soil Behaviour Type

The major applications of CPTU are on *soil behaviour type and soil profiling*. Typically, the cone resistance,  $q_c$  is high in sands and low in clays, and the friction ratio,  $R_f = f_s/q_t$  is low in sands and high in clays. The CPTU cannot be expected to provide accurate predictions of soil type based on *physical characteristics*, e.g. *grain size distribution*, but provides a guide to the *mechanical characteristics*, including: *strength, stiffness, and compressibility* of the soils, or the *soil behaviour type, SBT*.

The most commonly used CPTU soil behaviour type chart, suggested by *Robertson et al. (1986)* uses the basic CPTU measured parameters of cone resistance,  $q_c$  and friction ratio,  $R_f$ . The chart is global in nature and can provide reasonable predictions of soil behaviour type for CPTU testing. The expected overlap in some zones is modified in the interpretations of this report somewhat based on previous experience or local knowledge of the site.

Since both the penetration resistance and sleeve resistance increase with depth due to the increase in effective overburden stress, the CPTU data requires normalization for overburden stress for very shallow and/or very deep tests. A popular CPTU soil behaviour chart based on normalized CPTU data is firstly proposed by *Robertson (1990)*. The chart identifies general trends in ground response, such as: *increasing soil density, OCR, age and cementation* for granular soils, and *increasing stress history, OCR and soil sensitivity* for cohesive soils.

A more general normalized CPTU *SBT* chart, using large strain *soil behaviour* descriptions, proposed by *Robertson (2012)* is shown in *Figure 5.1*.



**Figure 5.1:** Normalized CPTU Soil Behaviour Type ( $SBT_n$ ) chart,  $Q_{tn}-F_R$  using general large strain soil behaviour description (Robertson, 2012).

\*

- CD is coarse grained dilative soil-predominately drained CPTU
- CC is coarse grained contractive soil-predominately drained CPTU
- FD is fine grained dilative soil-predominately undrained CPTU
- FC is fine grained contractive soil-predominately undrained CPTU

### 5.1.2 Soil Profiling

CPTU is an excellent test for soil profiling. The continuous monitoring of pore pressure during the cone penetration improves the soil stratigraphy descriptions. The pore pressure develops in response to the soil type being penetrated in the area where the pore pressure element is located. Soft, firm or stiff clays and contractive silts can show very high pore pressure. Very stiff overconsolidated clays and dilative silts can give very low or negative pore pressures same as very dense silty sands.

The thin layers of sand, or silt in a thick layer of clay, or thin layers of clay or silt in a thick layer of sand are easily distinguished during a CPTU test, which will give a response time sufficiently fast to observe pore pressure changes even in the very thin layers of soils (< 5mm), depending on the response of soil to the advancing of cone.

The sandy soils tend to produce high cone resistance and low friction ratio, whereas soft clayey soils tend to produce low cone resistance and high friction ratio. Organic soils such as peat tend to have very low cone resistance and very high friction ratio. Soils with high horizontal stresses (*high OCR*) tend to have higher cone resistance and friction ratio.

CPTU is an excellent tool to classify the soils based on their behaviour type, and not based on grain size distribution. (Douglas and Olser, 1981)

The measurements of sleeve friction,  $f_s$  are often less reliable than the measurements of cone resistance,  $q_c$  (Lunne *et al.*, 1986), but to overpass these problems pore pressure parameter ratio,  $B_q$ , and the classification charts based on it, which are also presented in *Appendix A.9*, are used when necessary.

For more reliability in soil profiling, the soil interpretations in this report are carried out based on three parameters measured on site, cone resistance, sleeve friction and pore pressure and three derived geotechnical parameters soil behaviour type index for all soils, undrained shear strength for cohesive soils and relative density for granular soils.

Generally, soils that fall in zones 8, 9 and 10 of *Robertson et al (1986)* chart (6 and 7 of *Robertson (1990)* chart) represent approximately drained penetration, whereas, soils in zones 1, 2, 3, 4, 5 and 6 of *Robertson et al (1986)* chart (1, 2, 3 and 4 of *Robertson (1990)* chart) represent approximately undrained penetration. Soils in zones 7, 11 and 12 of *Robertson et al (1986)* (5, 8 and 9 of *Robertson (1990)* chart) may represent partially drained penetration. The classification is often influenced by changes in *stress history, in situ stresses, sensitivity, stiffness, mineralogy*, etc. An advantage of pore pressure measurements during cone penetration is the ability to evaluate drainage conditions more directly. (Lunne *et al.*, 1997)

The information about the rate and manner of excess pore pressures during the dissipations significantly helps the accurate classification in the corresponding depths of dissipation tests. In very stiff, overconsolidated clayey soils, the pore pressure behind the cone is very low and sometimes negative of the equilibrium pore pressure,  $u_0$ , whereas the pore pressure on the face of the cone is very large due to the large increase in normal stresses created by the cone penetration. When penetration is stopped in overconsolidated clays, pore pressure recorded behind the cone may initially increase before decreasing to the equilibrium pore pressure. The rise is caused by local equalization of the high pore pressure gradient around the cone.

Cone penetration in fine grained soils, such as clays and silts, is generally undrained. Cone penetration tests under undrained conditions generate high pore pressure and this reading is extremely useful, because it affects both cone resistance and sleeve friction measurements. These parameters should be corrected using the measured pore pressure.

CPTU in coarse grained soils, such as sandy or gravelly soils is generally drained. In these conditions there is no excess pore pressure generated as a result of cone penetration. Relative density has been used as the main parameter for description of sandy deposits.

### 5.1.3 Applications in geotechnical design

CPTU measured parameters are used to derive geotechnical parameters, which are the input in several geotechnical analyses. An alternate approach is to directly apply CPTU results to the geotechnical calculations.

As a guide, *Table 5.1* shows a summary of the applicability of CPTU results for direct design applications. The ratings shown in the table have been assigned based on current experience and represent a qualitative evaluation of the confidence level assessed to each design problem and general soil type. Details of ground conditions and project requirements can influence these ratings.

Type of soil	Pile Design	Bearing Capacity	Settlement	Compaction Control	Liquefaction
Sand	A-B	A-B	B-C	A-B	A-B
Clay	A-B	A-B	B-C	C-D	A-B
Intermediate Soils	A-B	B-C	B-C	B-C	A-B

**Table 5.1:** Perceived applicability of CPTU for various direct design problems.

- A is high
- B is high to moderate
- C is moderate
- D is moderate to low



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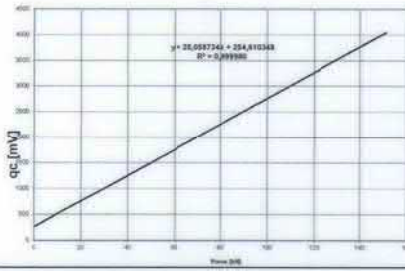
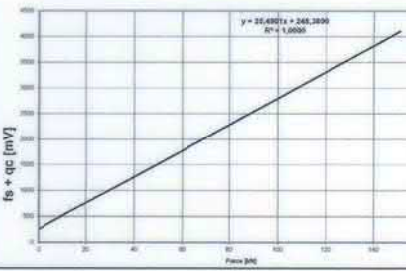


## APPENDIX A

## APPENDIX A1 – Site Map



**APPENDIX A2 – Cone Calibration Certificate**

 WWWGOUDA-GE.COM Down to Earth	Gouda Geo-Equipment B.V. Satellietbaan 8 2181 MH Hillegom The Netherlands  Tel. + 31 (0)715.318.475 E-mail: info@gouda-geo.com
<h2 style="margin: 0;">Certificate of Calibration</h2> <p style="margin: 0;">Certificate No. CMI 18.01.1582</p>	
<b>Instrument</b>	
Instrument Type: Electrical Subtraction Cone Manufacturer: GGE Model No.: DP15 CFPTxy Serial No.: 70080	Calibration Result: Certified  Date Calibrated: 12-1-2018 Next Due Date: 12-7-2018
Used Calibration Procedure: GGCEP004, ISO22476	Location: Hillegom (The Netherlands)
<b>Customer</b>	
In Situ	
<b>Calibration Instruments</b>	
Instrument Type: Volt/mA Loop Calibrator Manufacturer: Fluke Model No.: 715 Serial No.: 9408105 Accuracy: 0.01% + 2 Counts Date Calibrated: December 13, 2017 Next Due Date: December 13, 2018 Calibrated By: Manufacturer Traceability: 1992911	Instrument Type: Load-cell + amplifier Manufacturer: Futek Model No.: LCF500 + IAA100 Serial No.: 668966 + 695054 Accuracy: 0.060% Date Calibrated: December 15, 2017 Next Due Date: December 15, 2018 Calibrated By: Futek Traceability: 1712150070
<b>Calibration Conditions</b>	
Environmental conditions whilst performing the calibration:	Ambient Temperat: 21,6 °C Relative Humidity: 33,9 %
Condition of Calibrated Apparatus when Received: Fair	
<b>Measurement Parameters</b>	
zero value: 256 mV Full scale: 3759 @ 150kN	zero value: 256 mV Full scale: 3822 @ 150kN
	
<b>Remarks</b>	
Data "As Received" = "As Left" unless otherwise noted. Calibration data for this item was derived from one or more of the following sources: the Nederlands Meetinstituut (NMI) or other national laboratory, a natural physical constant, or a ratio technique. The data is on file at the NMI. This calibration is compliant with Gouda Geo-Equipment's internal quality system, internal calibration procedure and meets the requirements of standard ISO22476. The Calibration Interval will vary from customer use and different conditions. All calibrations are verified at a moment in time; and confirmed within controlled temperature and humidity specified standards. Gouda Geo-Equipment is not responsible for future calibrations. Improper use of the apparatus (e.g. dropping) may cause loss of calibration.	
Calibration performed by:	Approved by:
Ing. Johan van Stijn (Senior Engineer)	Ir. Rob Hogervorst (Technical Director)
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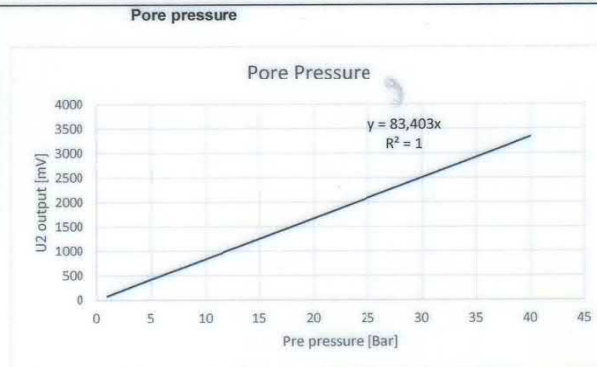
## Certificate of Calibration

Certificate No. CMI 18.01.1582

Instrument		Calibration Result: Certified
Instrument Type:	Electrical Subtraction Cone	
Manufacturer:	GGE	
Model No.:	DP15 CFPTxy	Date Calibrated: 12-1-2018
Serial No.:	70080	Next Due Date: 12-7-2018
Used Calibration Procedure: GGEC004, ISO22476		Location: Hillegom (The Netherlands)

AMB = +/-1Bar = 335mV

U2 [bar]	U2 [mV]
1	77
5	422
10	833
15	1251
20	1665
25	2085
30	2502
35	2919
40	3338



Calibration performed by:

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(Senior Engineer)

Approved by:

Ir. Rob Hogervorst  
(Technical Director)

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Model No.:	DP15 CFPTxy	
Serial No.:	70080	
Used Calibration Procedure: GGCEP004, ISO22476		Location: Hillegom (The Netherlands)

#### Inclinometer

Degrees	Ix [mV]	Degrees	Iy [mV]
20	1436	20	1658
19	1485	19	1698
18	1519	18	1751
17	1563	17	1796
16	1597	16	1844
15	1641	15	1879
14	1680	14	1927
13	1724	13	1977
12	1768	12	2016
11	1812	11	2074
10	1856	10	2113
9	1885	9	2167
8	1934	8	2197
7	1973	7	2250
6	2022	6	2294
5	2066	5	2343
4	2110	4	2397
3	2153	3	2441
2	2187	2	2485
1	2231	1	2524
0	2276	0	2583
-1	2324	-1	2627
-2	2363	-2	2676
-3	2412	-3	2725
-4	2451	-4	2774
-5	2490	-5	2813
-6	2534	-6	2867
-7	2578	-7	2911
-8	2631	-8	2950
-9	2670	-9	3004
-10	2719	-10	3048
-11	2758	-11	3101
-12	2802	-12	3131
-13	2841	-13	3180
-14	2881	-14	3229
-15	2929	-15	3268
-16	2968	-16	3322
-17	3017	-17	3361
-18	3056	-18	3415
-19	3100	-19	3444
-20	3129	-20	3493

Calibration setting X 1270 Y 1376

Calibration performed by:  
Ing. Johan van Stijn  
(Senior Engineer)

Approved by:  
Ir. Rob Hogervorst  
(Technical Director)

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## APPENDIX A3 – Project Summary Sheet

### *CPT Tests Summary Sheet*

<b>HOLE ID</b>	<b>Final Depth (m)</b>	<b>Date of Test</b>	<b>Cone Used</b>	<b>Test Remarks</b>
CPT 01	30.00	20/03/2018	P15-CFPT <sub>xy</sub> 70080	Test completed at target depth.
CPT 02	30.00	19/03/2018	P15-CFPT <sub>xy</sub> 70080	Test completed at target depth.
CPT 03	32.44	19/03/2018	P15-CFPT <sub>xy</sub> 70080	Test refused on total pressure.
CPT 04	36.00	19/03/2018	P15-CFPT <sub>xy</sub> 70080	Test stopped due to buckling rods.
CPT 05	30.01	20/03/2018	P15-CFPT <sub>xy</sub> 70080	Test completed at target depth.

*Dissipation Tests Summary Sheet*

<b>HOLE ID</b>	<b>Dissipation No.</b>	<b>Depth of Dissipation (m)</b>	<b>Cone Used</b>	<b>Filter Position</b>	<b>Remarks</b>
CPT 01	1	3.46	P15-CFPT <sub>xy</sub> 70080	U2	Test OK
CPT 01	2	4.00	P15-CFPT <sub>xy</sub> 70080	U2	Test OK
CPT 02	1	2.40	P15-CFPT <sub>xy</sub> 70080	U2	Test OK
CPT 03	1	4.60	P15-CFPT <sub>xy</sub> 70080	U2	Test OK
CPT 04	1	30.99	P15-CFPT <sub>xy</sub> 70080	U2	Test OK

## APPENDIX A4 – CPT Rig Datasheet

### RIGS

#### 21 TONNE WHEELED RIG (CPT010)

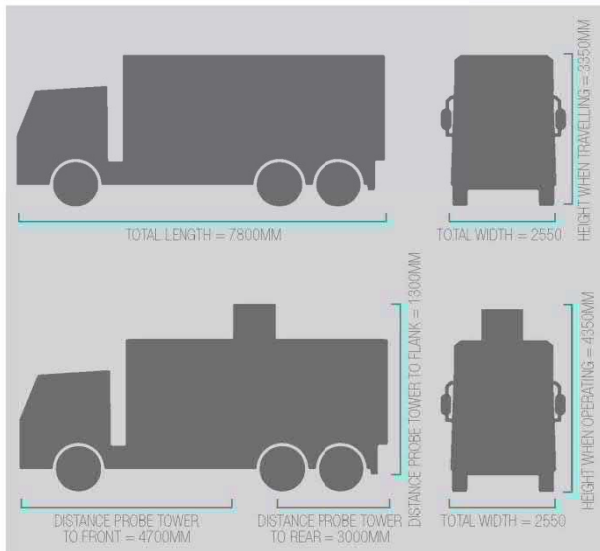
This rig is ideal for geotechnical testing on hardstanding sites such as car parks, motorways and docks. Fitted with reflective yellow and red chevrons, these high visibility rear markings meet the 'Chapter 8' requirements for vehicles working on highways. In addition, there are beacons fitted to the front and strobes to the back corners to ensure further safety and visibility for night work on the motorways. This efficient truck is capable of pushing to a depth of 30 to 40 metres depending on the ground conditions of the site. Furthermore, the interior is large enough to house our MiHpt equipment for environmental testing.

#### CPT RIG DETAILS

<b>DRIVE SYSTEM</b>	6 X 2 WHEELED DRIVE
<b>TOTAL WEIGHT</b>	21 TONNES
<b>GROUND BEARING PRESSURE</b>	75KPA
<b>CPT RAM THRUST CAPACITY</b>	20 TONNES
<b>MAXIMUM PENETRATION</b>	30-40M DEPENDING ON THE GROUND CONDITIONS.
<b>PERFORMANCE RATES</b>	100-150M CF TESTING A DAY, DEPENDING ON ACCESS TO POSITIONS.
<b>TYPICAL SITES FOR THIS RIG</b>	HARDSTANDING SITES E.G. ROADS INCLUDING MOTORWAYS, CAR PARKS, DOCKS. DRY NON HARDSTANDING SITES.



#### CPT RIG DIMENSIONS





## APPENDIX A5 – Symbol List

### English

a	is area ratio of the cone ( $= A_n/A_c$ )
A	is area
$A_c$	is projected area of the cone
$A_n$	is cross sectional area of load cell or shaft
$A_s$	is area of friction sleeve
$A_{sb}$	is bottom end area of friction sleeve
$A_{st}$	is top end area of friction sleeve
$B_q$	is pore pressure parameter ( $= (u_2 - u_0)/(q_t - \sigma_{v0})$ )
$c_h$	is horizontal coefficient of consolidation
$c_v$	is vertical coefficient of consolidation
D	is diameter
$D_r$	is relative density ( $= \frac{e_{max}-e}{e_{max}-e_{min}} \times 100\%$ )
e	is void ratio
$e_{max}$	is maximum void ratio
$e_{min}$	is minimum void ratio
E	is Young's modulus
$f_s$	is unit sleeve friction resistance
$f_t$	is sleeve friction corrected for pore pressure effects
$F_s$	is total force acting on friction sleeve
$F_R$	is normalized friction ratio ( $= f_s/(q_t - \sigma_{v0})$ )
FoS	is factor of safety
FC	is fines content
g	is acceleration due to gravity
$G_0$	is initial or maximum shear modulus, shear stiffness
$I_c$	is soil behavior type index
$I_r$	is rigidity index ( $= G/s_u$ )
$I_p$	is plasticity index
k	is coefficient of permeability
$k_h$	is coefficient of permeability in horizontal direction
$k_v$	is coefficient of permeability in vertical direction
$K_0$	is coefficient of earth pressure at rest ( $= \sigma'_{h0}/\sigma'_{v0}$ )
L	is length
$m_v$	is coefficient of volume change
M	is constrained deformation modulus
M7.5	is earthquake magnitude of 7.5 Richter scale
N	is number of blows of SPT
$N_{60}$	is SPT energy ratio
$N_k$	is cone factor
$N_{ke}$	is cone factor
$N_{kt}$	is cone factor
$N_{\Delta u}$	is cone factor
$p_a$	is reference stress ( $= 100 \text{ kPa}$ )
$q_c$	measured cone resistance
$q_e$	effective cone resistance ( $= q_t - u_2$ )
$q_n$	is net cone resistance ( $= q_t - \sigma_{v0}$ )

$q_t$	is corrected cone resistance ( $= q_c - (1 - a)u_2$ )
$Q_c$	is total force acting on the cone
$Q_t$	is normalized cone resistance ( $= q_t - \sigma_{v0} / \sigma'_{v0}$ )
$R_f$	is friction ratio ( $= (f_t / q_t) \times 100\%$ or alternatively $= (f_t / q_t) \times 100\%$ )
$s_u$	is undrained shear strength
$s_{ur}$	is remoulded undrained shear strength
$S_t$	is sensitivity
$t$	is time
$t_{50}$	is time for 50% dissipation of excess pore water pressure
$T_{50}$	is time factor at $U = 50\%$
$u$	is pore water pressure
$u_0$	is in situ pore pressure
$u_1$	is pore pressure measured on the cone
$u_2$	is pore pressure measured behind the cone
$u_3$	is pore pressure measured behind sleeve friction
$\Delta u$	is excess pore water pressure
$U$	is normalized excess pore pressure
$V_s$	is shear wave velocity
$z$	is depth

### Greek

$\alpha$	is constant
$\alpha$	is cone roughness
$\beta$	is constant
$\beta_1$	is the angle between the vertical axis and the projection of the axis of the CPTU on a vertical plane, in degrees
$\beta_2$	is the angle between the vertical axis and the projection of the axis of the CPTU on a vertical plane that is perpendicular to the plane of angle $\beta_1$ , in degrees
$\gamma$	is unit weight of soil
$\gamma_w$	unit weight of water
$\Delta$	is change
$\Delta u$	is excess pore pressure ( $= u - u_0$ )
$\mu$	is Poisson's ratio
$\rho$	is density
$\psi$	is state parameter
$\sigma, \sigma'$	is normal stress (total, effective)
$\sigma_h, \sigma'_h$	is horizontal stress (total, effective)
$\sigma_v, \sigma'_v$	is horizontal stress (total, effective)
$\sigma_{v0}, \sigma'_{v0}$	is overburden stress (total, effective)
$T_{av}$	average cyclic shear stress
$T_{cy}$	cyclic shear stress
$\varphi'$	effective friction angle

## APPENDIX A6 – Abbreviations

ASTM	is American Society for Testing and Materials
CPTU	Cone Penetration Test with Pore Pressure Measurement (Piezocone Test)
CRR	Cyclic Resistance Ratio
CSR	Cyclic Stress Ratio
GWT	Ground Water Table
NC	Normally Consolidated
OC	Overconsolidated
OCR	Overconsolidation Ratio
PL	Limit Pressure
SDMT	Seismic Dilatometer Marchetti
SPT	Standard Penetration Test
TC	Technical Committee

## APPENDIX A7 – Glossary

### CPT

Cone Penetration Test.

### Cone

The part of the cone penetrometer on which the end bearing is developed.

### Cone Penetrometer

The assembly containing the *cone*, *friction sleeve*, any other sensors and measuring systems, as well as the connections to the *push-rods*.

### Cone resistance, $q_c$

The total force acting on the cone,  $Q_c$ , divided by the projected area of the cone,  $A_c$ .  
 $q_c = Q_c / A_c$

### Corrected cone resistance, $q_t$

The *cone resistance*,  $q_c$  corrected for pore water pressure effects.

### Corrected sleeve friction, $f_t$

The *sleeve friction* corrected for pore water pressure effects on the ends of the *friction sleeve*.

### Data acquisition system

The system used to measure and record the measurements made by the *cone penetrometer*.

### Dissipation Test

A test when the decay of the pore water pressure is monitored during a pause in penetration.

### Filter element

The porous element inserted into the cone penetrometer to allow transmission of the pore water pressure to the pore pressure sensor, while maintaining the correct profile of the *cone penetrometer*.

### Friction ratio, $R_f$

The ratio, expressed as a percentage of the *sleeve friction*,  $f_s$ , to the *cone resistance*,  $q_c$ , both measured at the same depth.

### Friction reducer

A local enlargement on the push-rod surface, placed at a distance above the cone penetrometer, and provided to reduce the friction on the *push-rods*.

### Friction sleeve

The section of the *cone penetrometer* upon which the *sleeve friction* is measured.

### Normalized cone resistance, $Q_c$ or $Q_t$

The *cone resistance* expressed in a non dimensional form and taking account of stress changes *in situ*,  $Q_c = (q_c - \sigma_{v0}) / \sigma'_{v0}$ , or when the *corrected cone resistance* is used  $Q_t =$

$(q_t - \sigma_{v0}) / \sigma'_{v0}$ . Where  $\sigma_{v0}$  and  $\sigma'_{v0}$  are the total and effective vertical stress respectively.

### Net cone resistance, $q_n$

The *corrected cone resistance* minus the vertical total stress.  $q_n = q_t - \sigma_{v0}$



**Normalized friction ratio,  $F_r$** 

The *sleeve friction* normalized by the *net cone resistance*.

**Piezocone**

A *cone penetrometer* containing a pore pressure sensor.

**Pore pressure,  $u$** 

The pore pressure generated during penetration and measured by a pore pressure sensor,  $u_1$  when measured on the cone,  $u_2$  when measured just behind the cone and  $u_3$  when measured just behind the friction sleeve.

**Pore pressure ratio,  $B_q$** 

The *net pore pressure* normalized with respect to the *net cone resistance*.

**Push-rods**

The thick-walled tubes or rods used for advancing the cone penetrometer.

**Rig machine**

The equipment which pushes the cone penetrometer and rods into the ground.

**Sleeve friction,  $f_s$** 

The total frictional force acting on the *friction sleeve*,  $F_s$ , divided by its *surface area*,  $A_s$ .

$$f_s = F_s / A_s$$

## APPENDIX A8 – Soils Description Tables

### GRANULAR SOILS (Sands and Gravels)

Description	Relative Density $D_r$ (%)	SPT N value, $N_{SPT}$
Very Loose	0 – 15	0 - 4
Loose	15 – 35	4 - 10
Medium Dense	35 – 65	10 - 30
Dense	65 – 85	30 - 50
Very Dense	>85	>50

### COHESIVE SOILS (Clays and Silts)

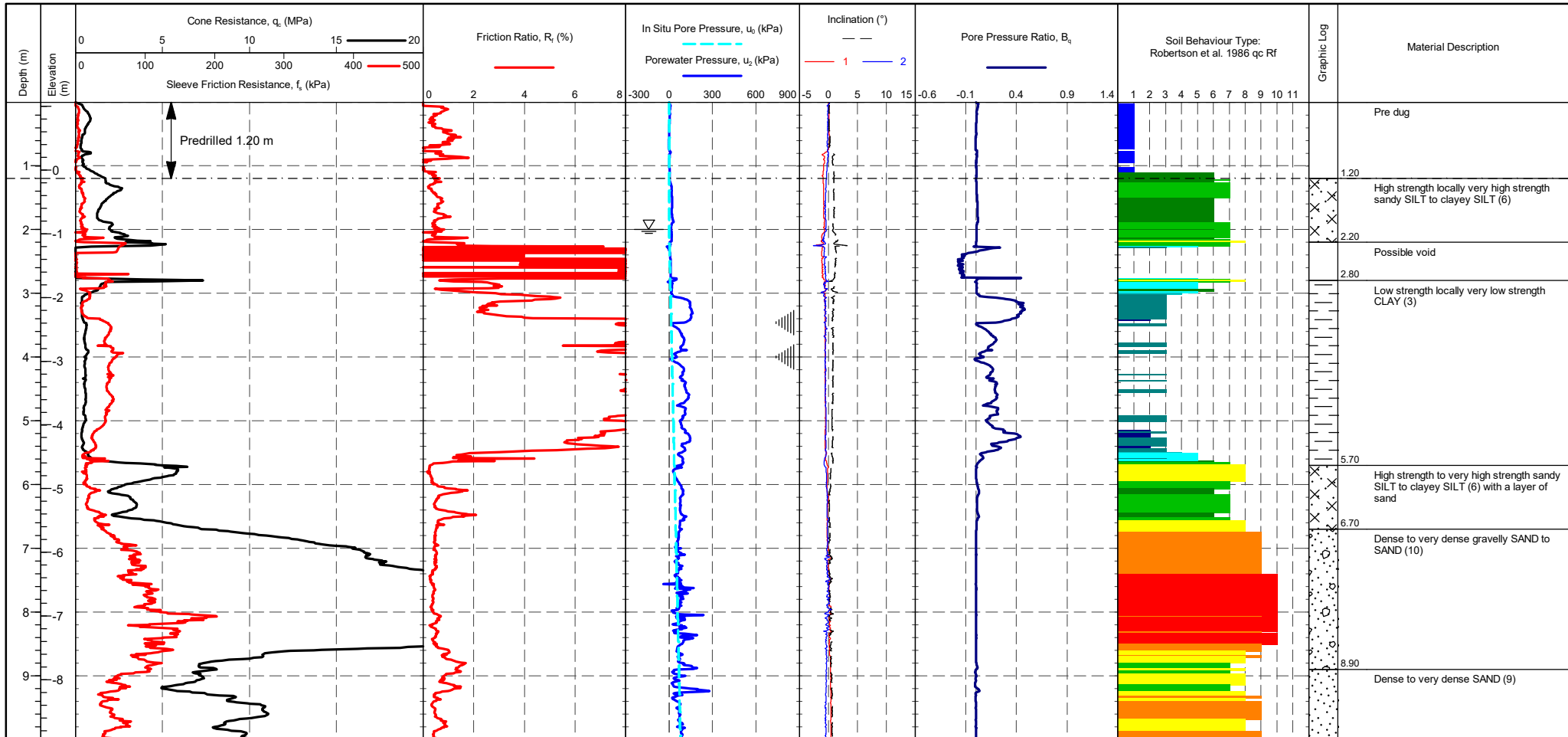
Term based on measurement	Undrained Shear Strength Classification, $s_u$ (kPa)
Extremely low	<10
Very low	10 - 20
Low	20 - 40
Medium	40 - 75
High	75 - 150
Very high	150 - 300
Extremely high	>300

## **APPENDIX B**

### **Cone Penetration Measured Parameters**

PointID : **CPT 01**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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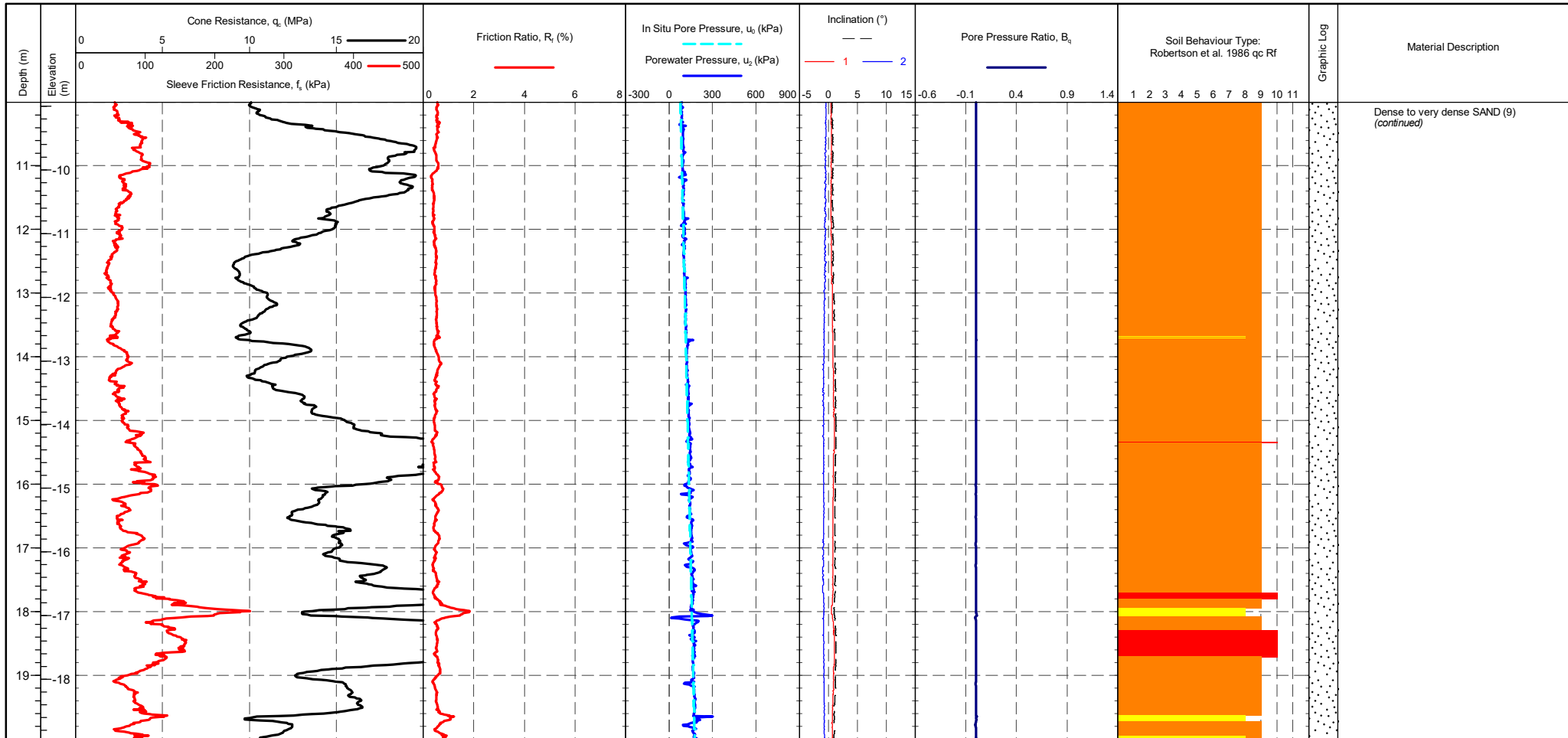


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre      Post      Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID  
**CPT 01**

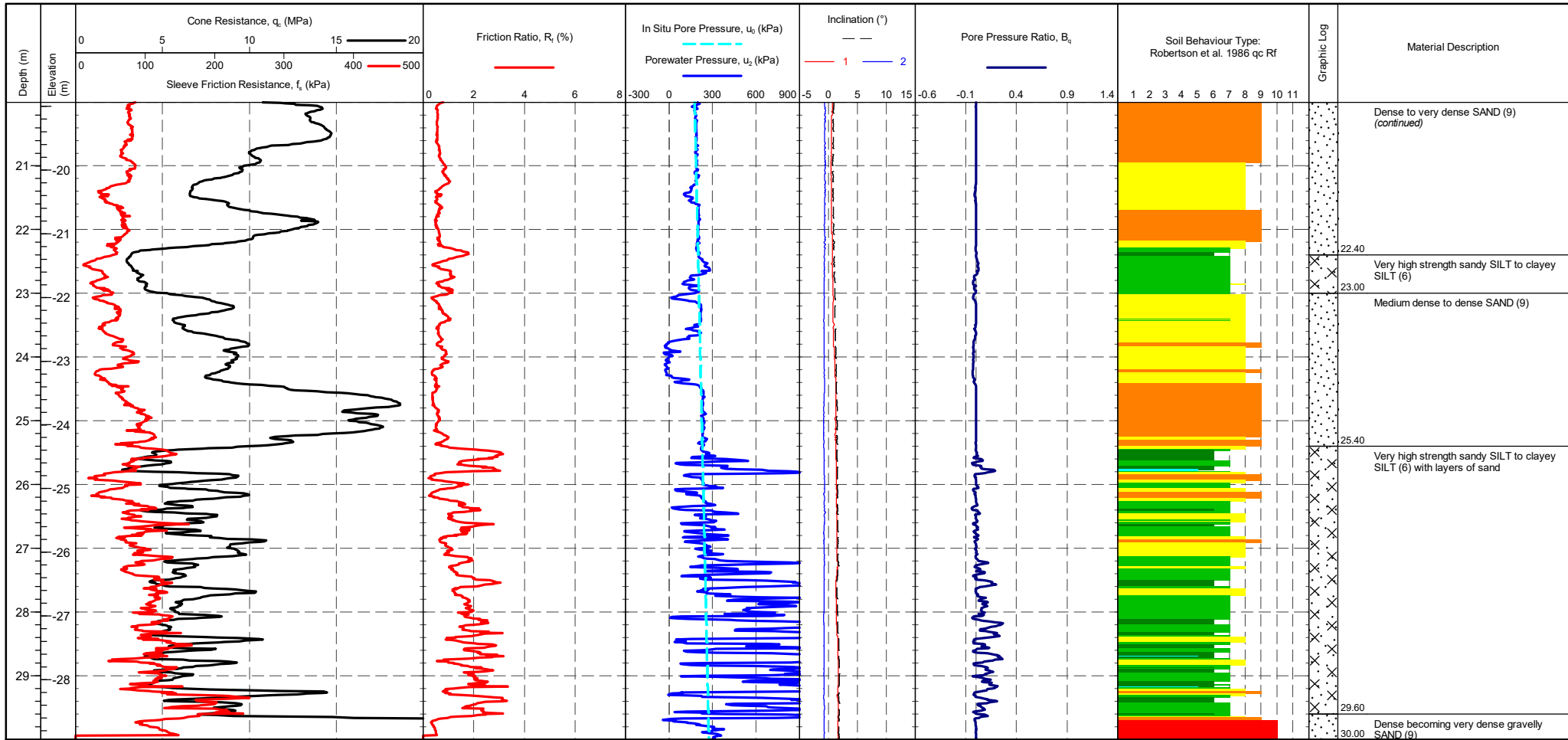
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinator	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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PointID  
**CPT 01**

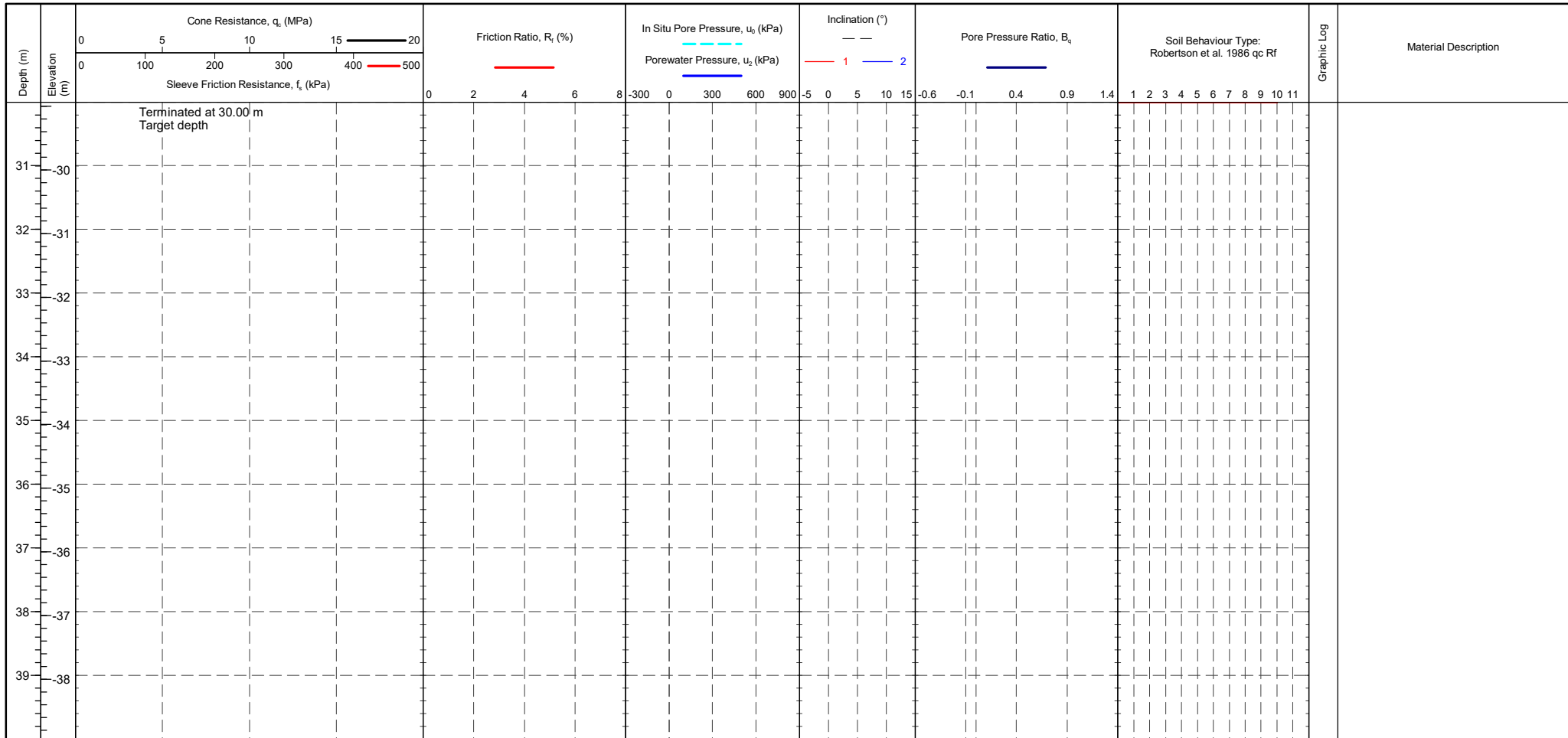
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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PointID  
**CPT 01**

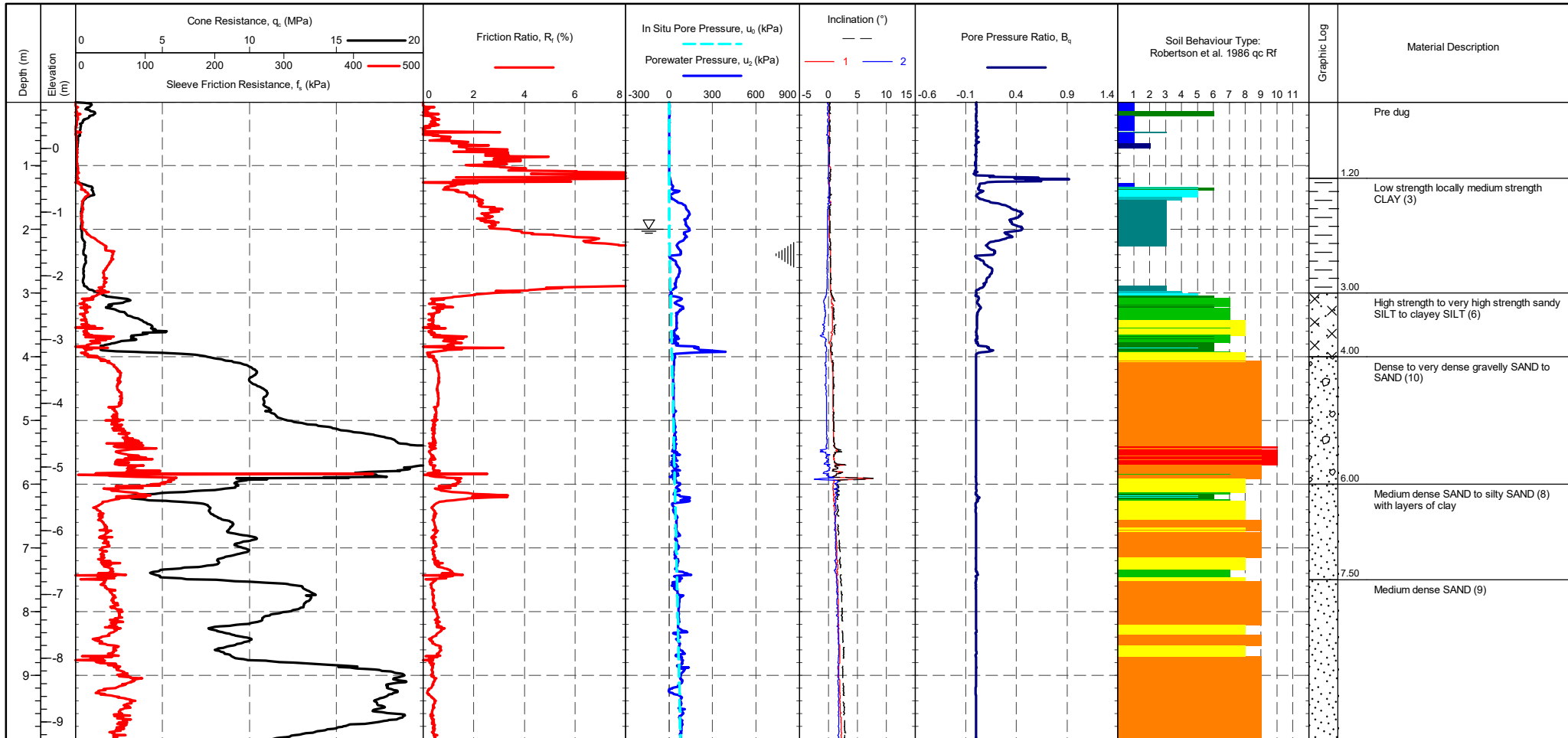
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinator	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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PointID  
**CPT 02**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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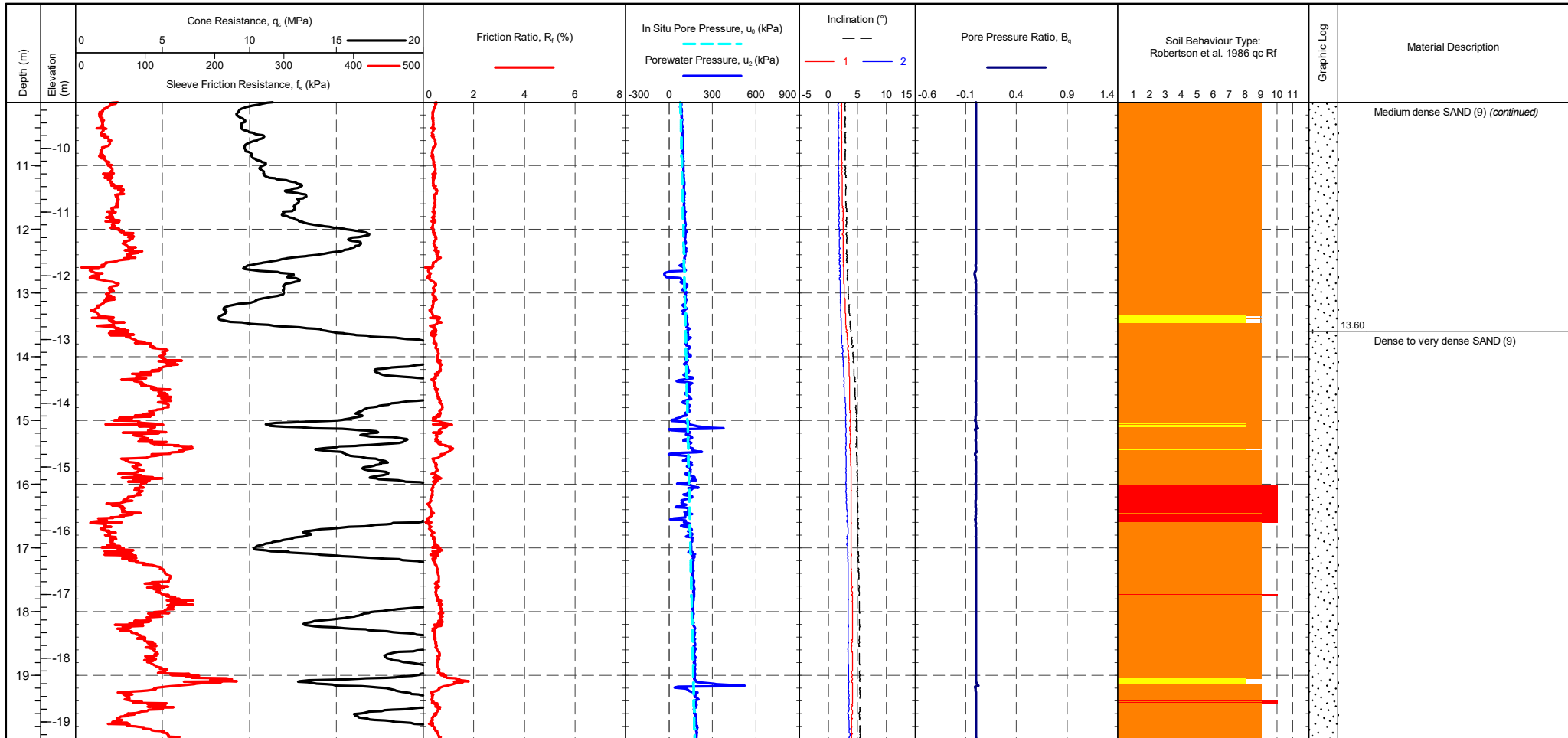


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICITION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre      Post      Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID  
**CPT 02**

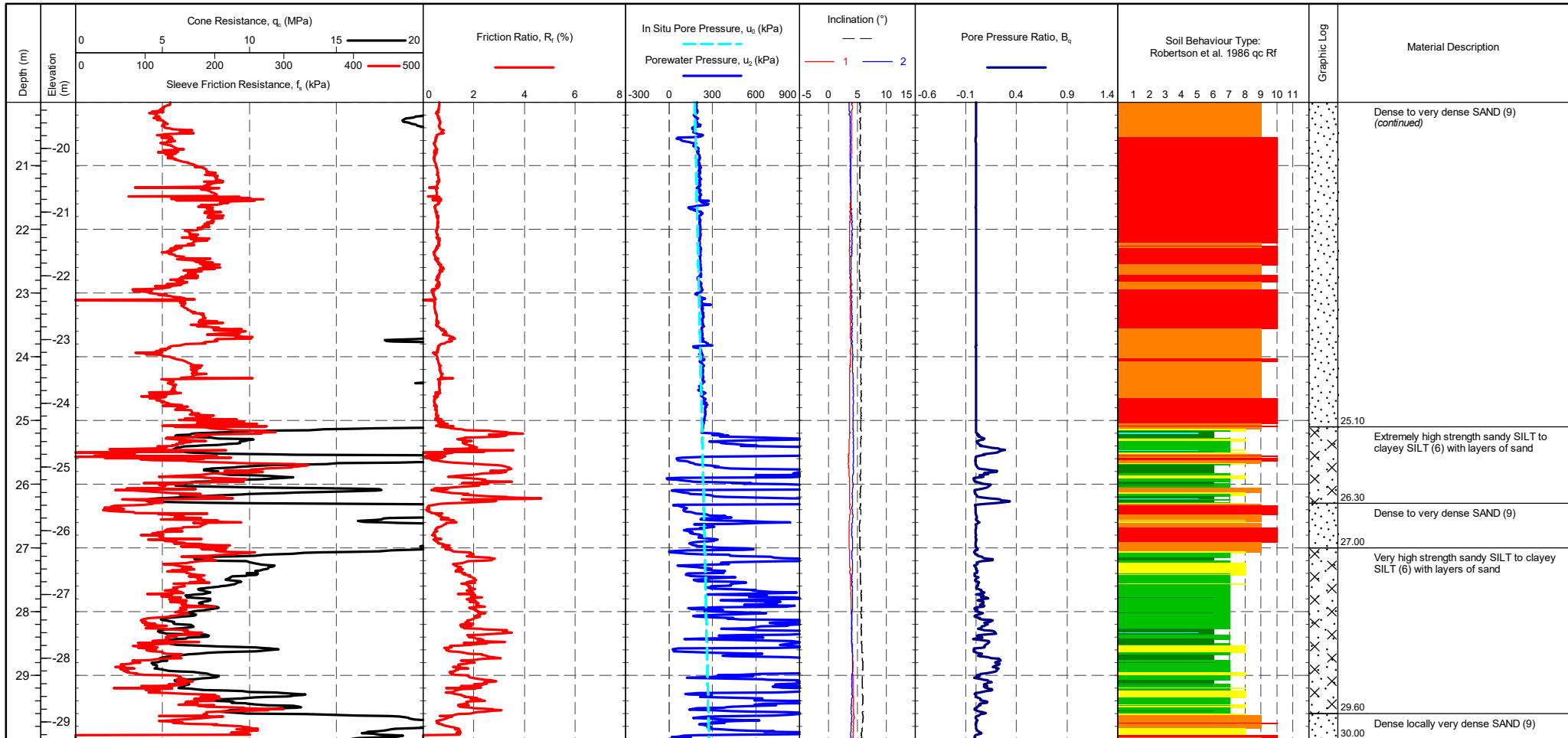
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinator	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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PointID  
**CPT 02**

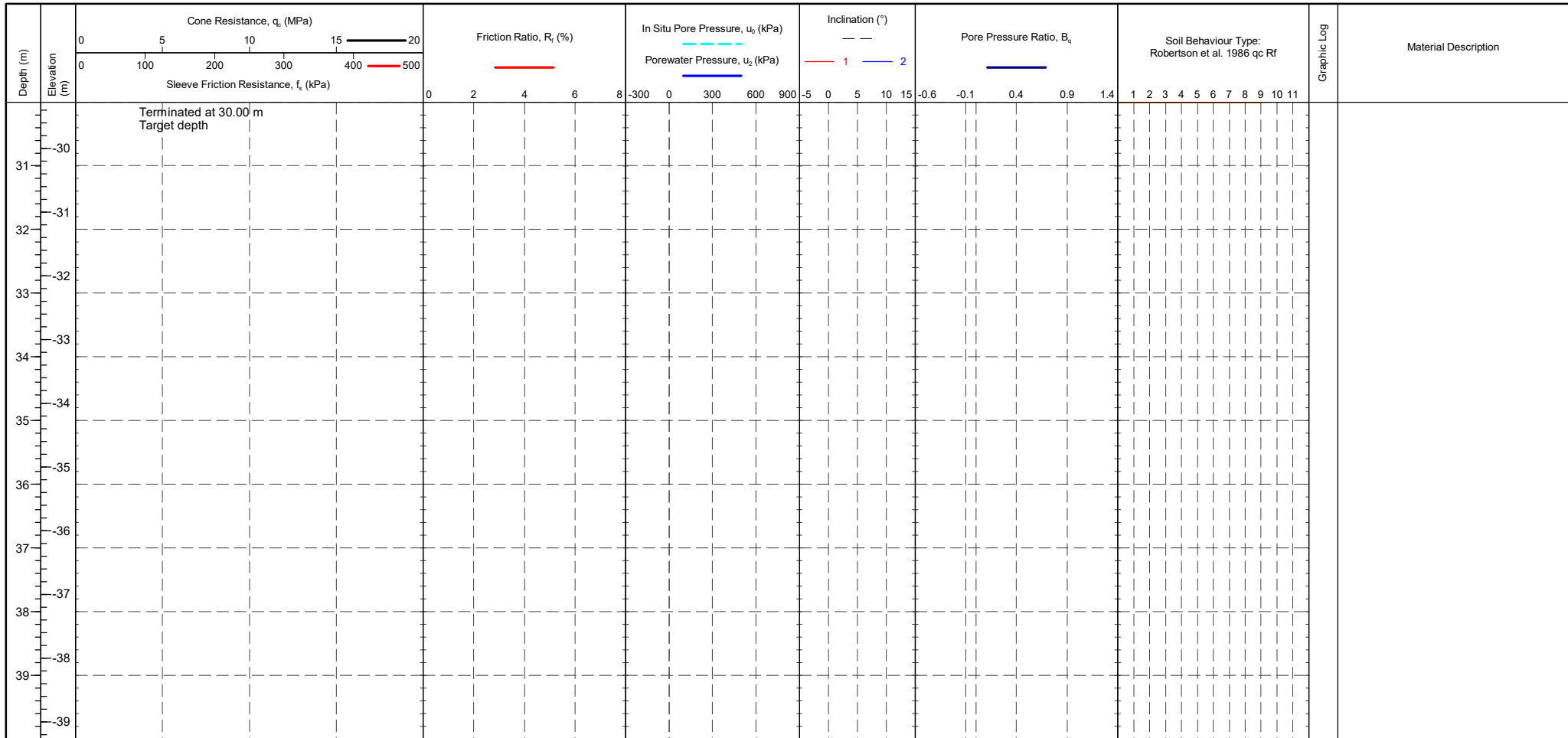
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinator	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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PointID  
**CPT 02**

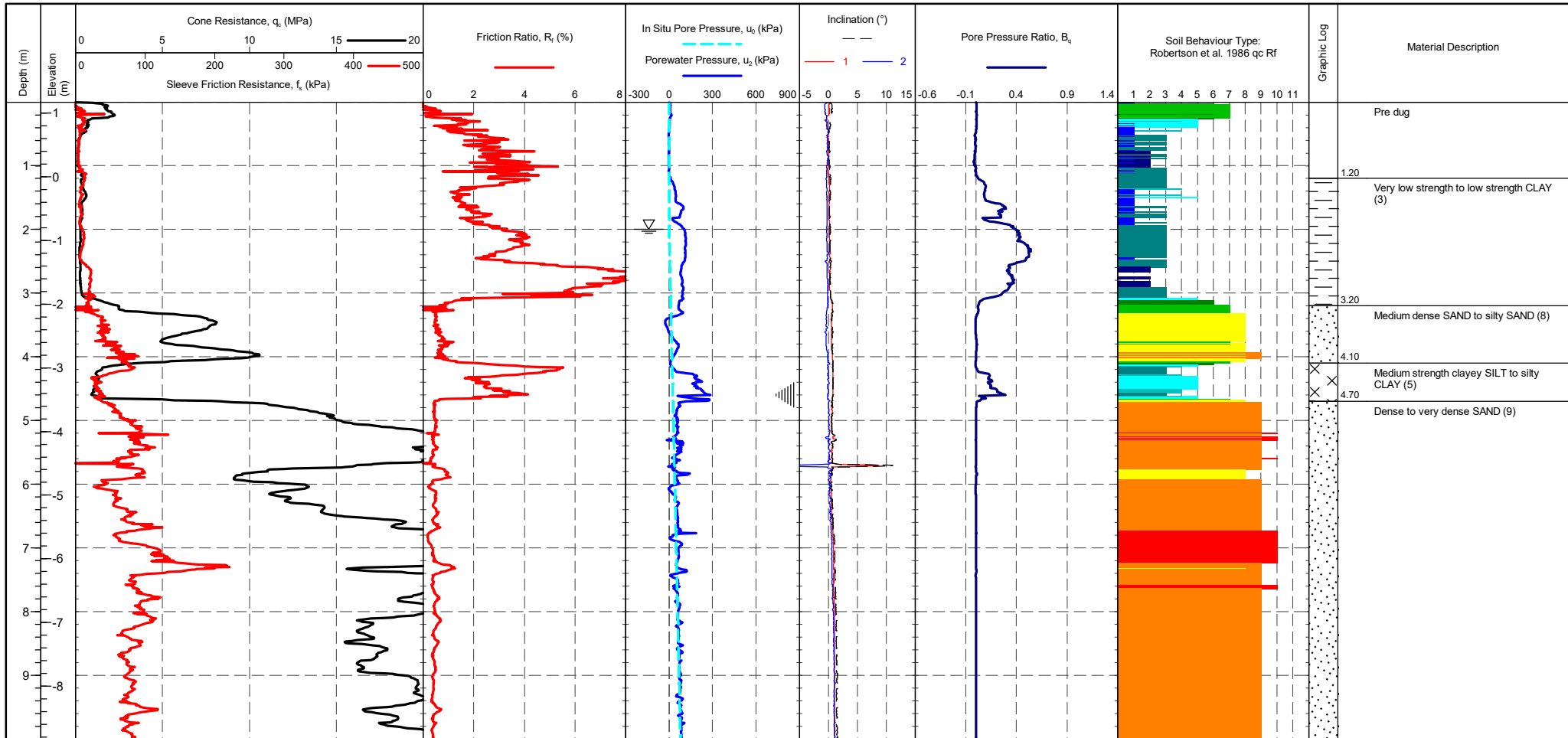
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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PointID  
**CPT 03**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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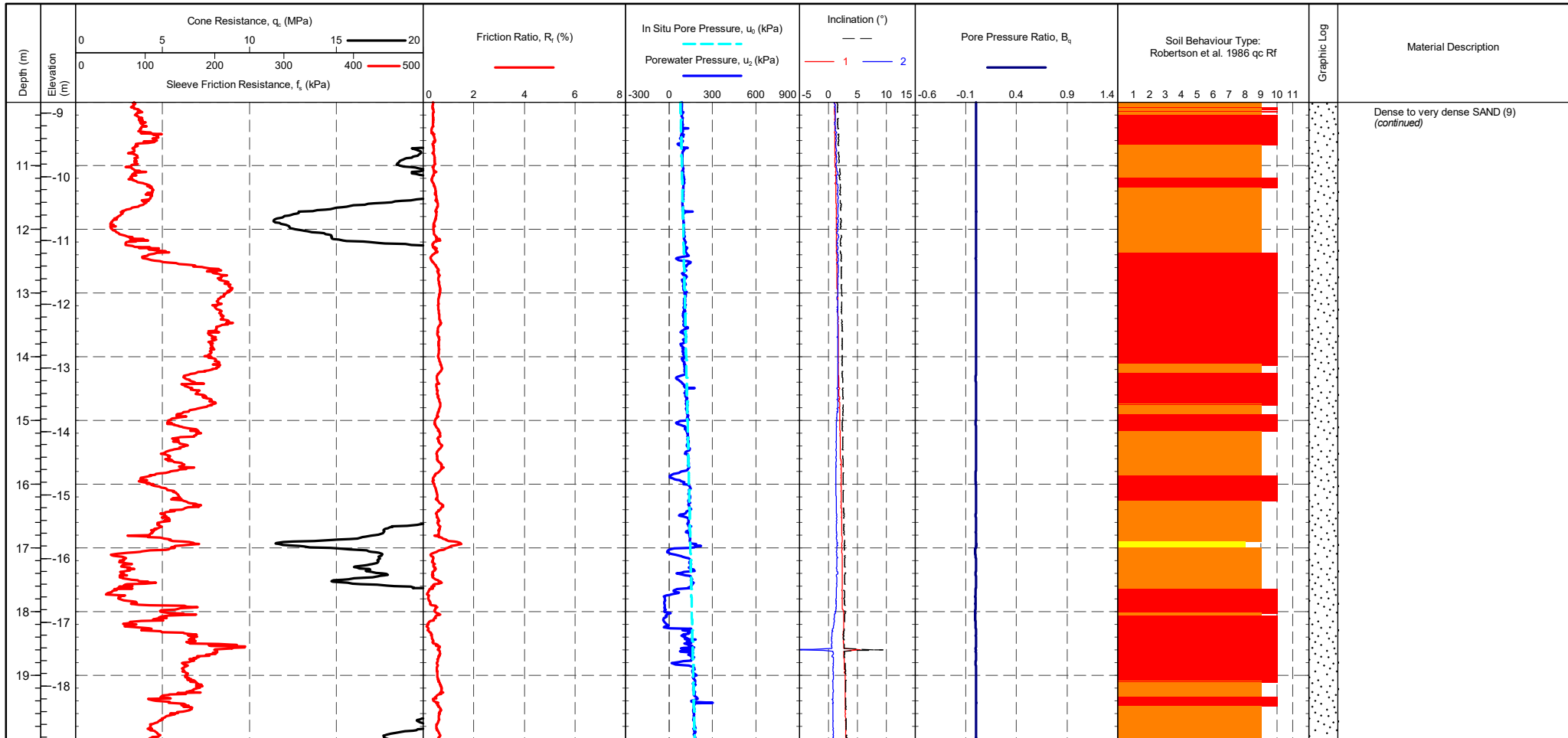


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

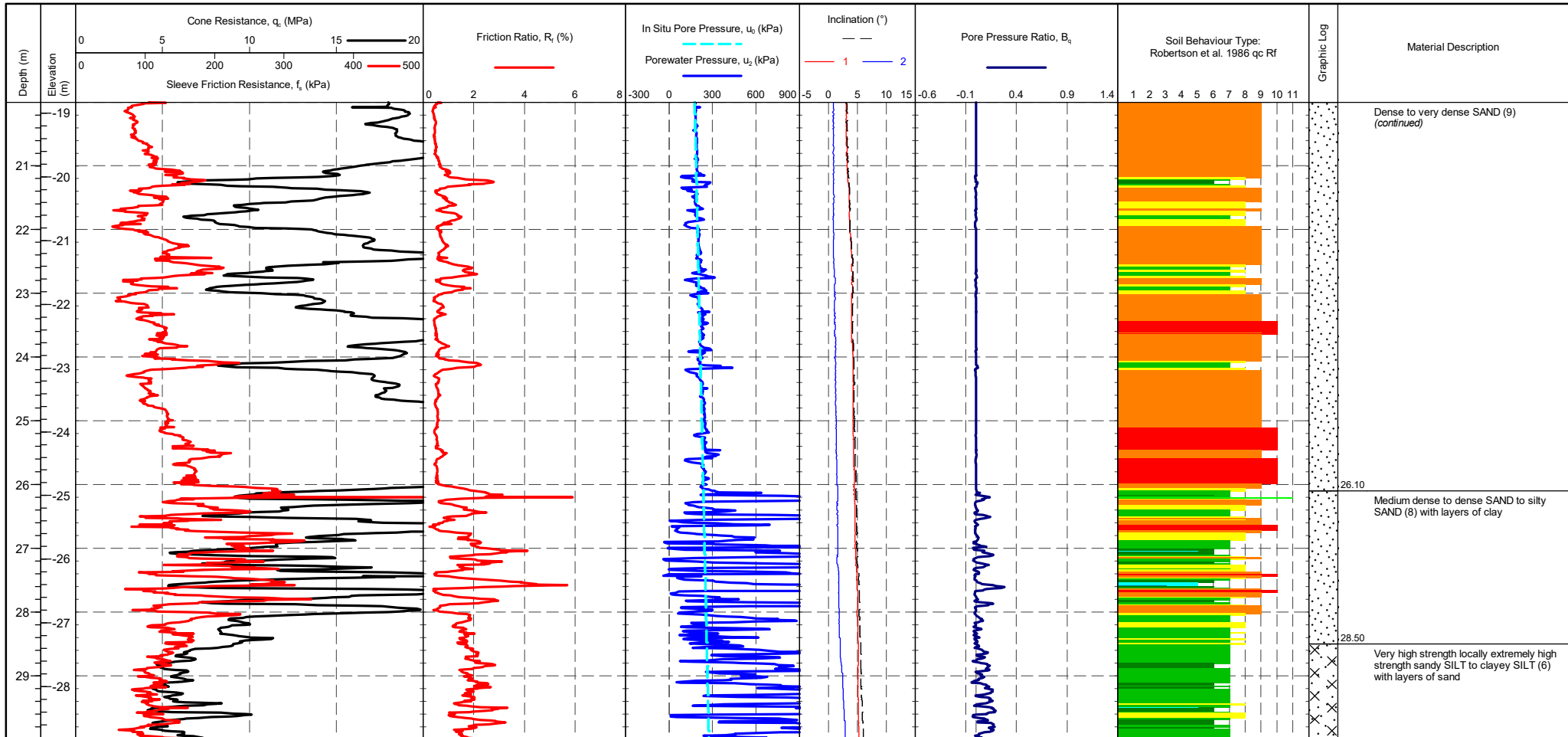
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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PointID  
**CPT 03**

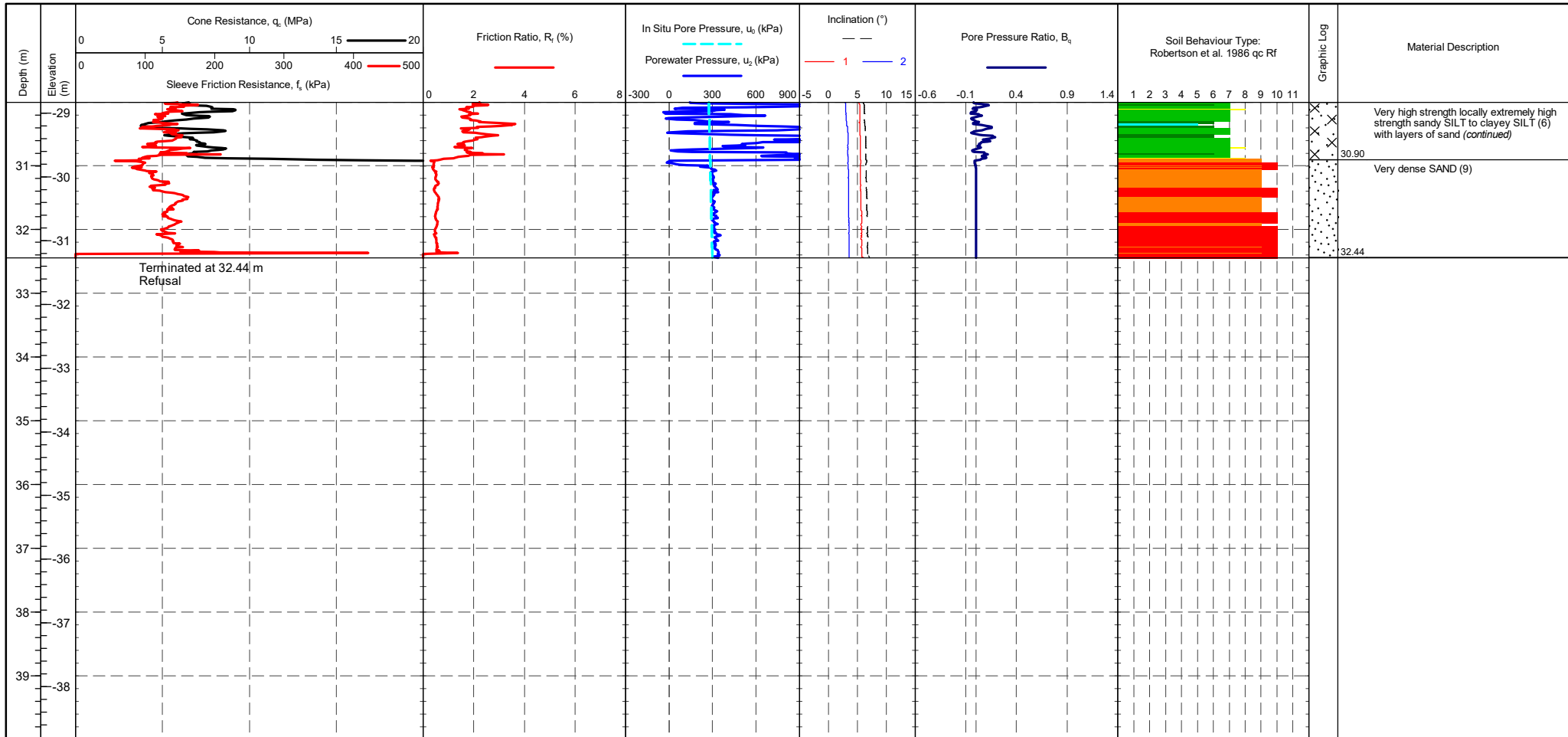
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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PointID  
**CPT 03**

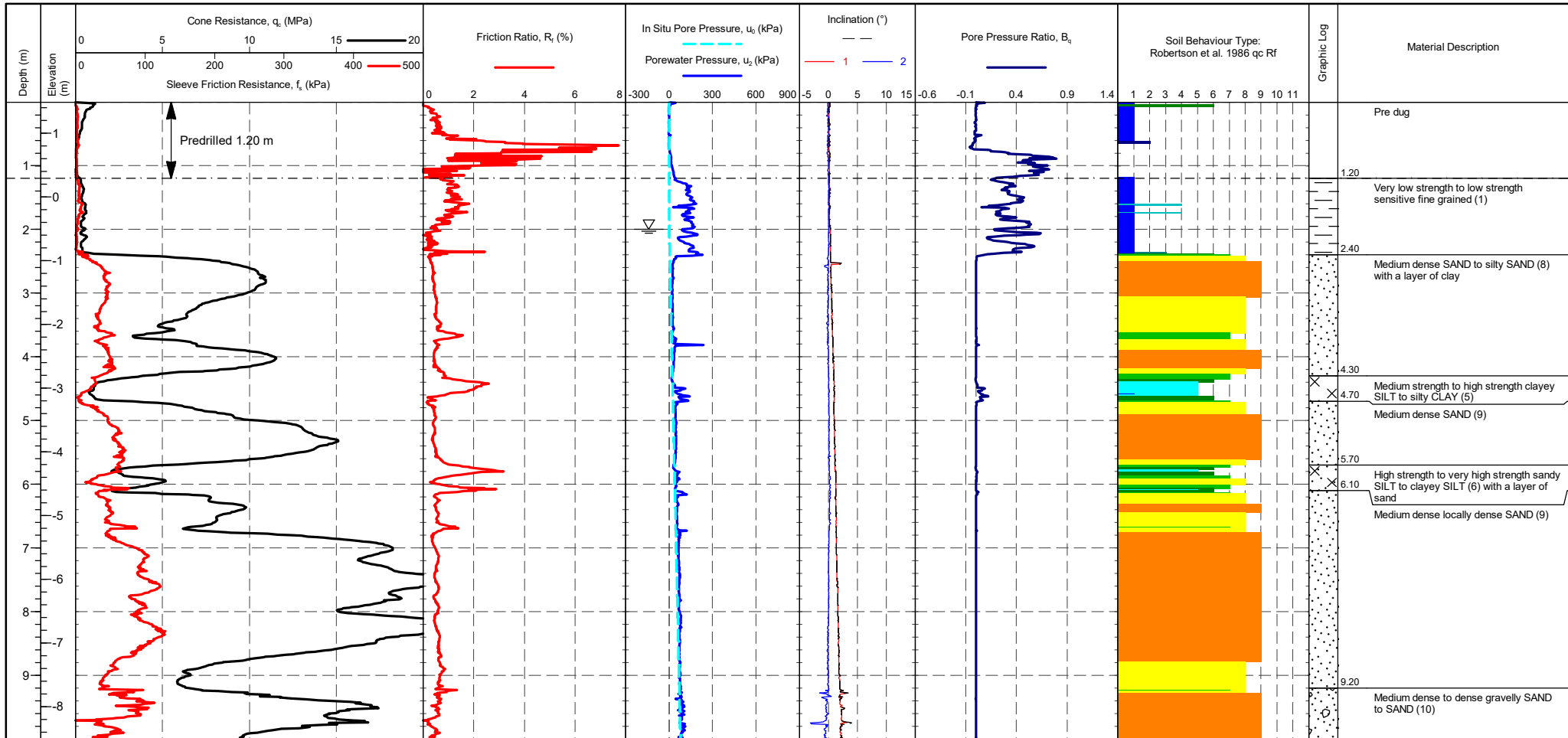
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinator	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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PointID  
**CPT 04**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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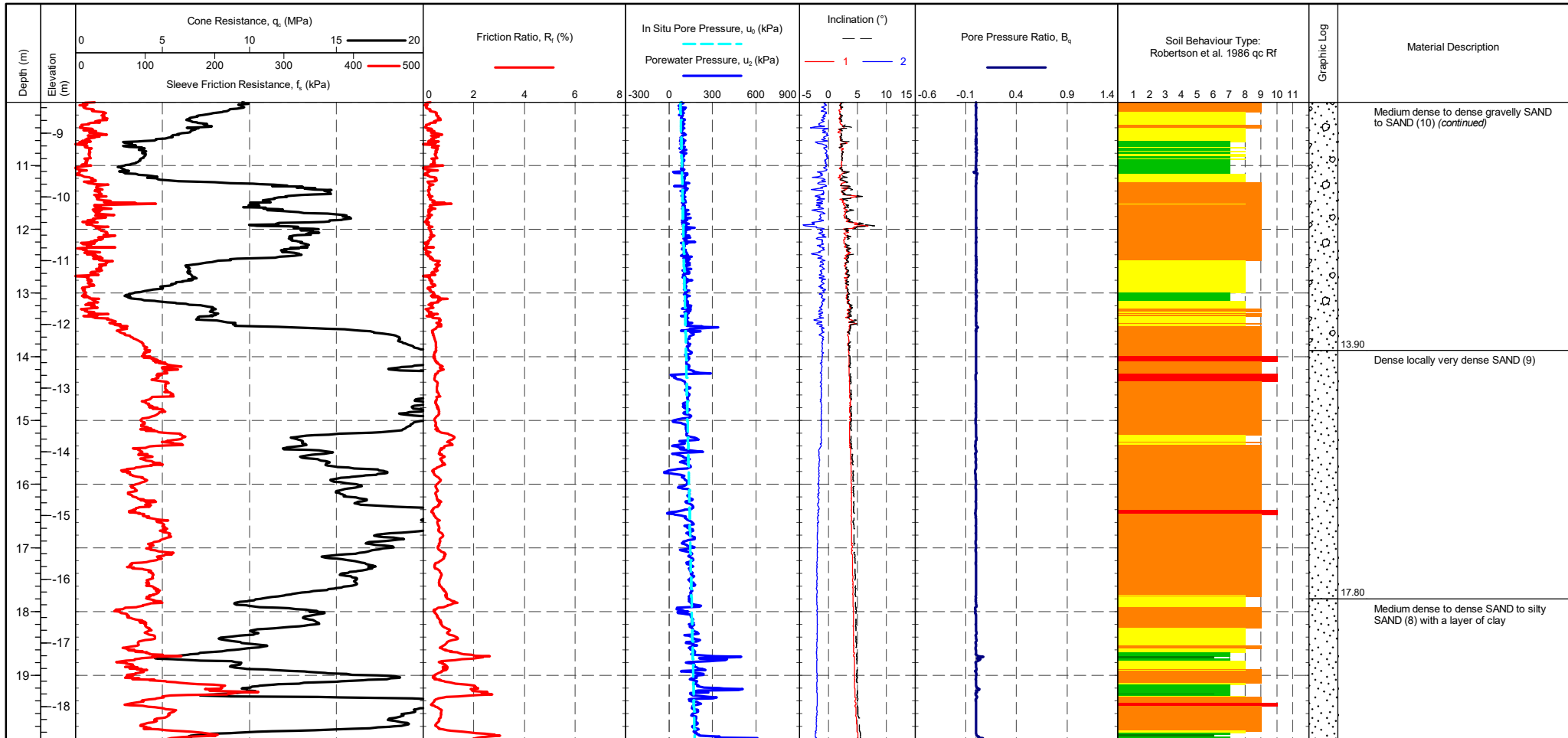


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level   Dissipation Test
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PointID  
**CPT 04**

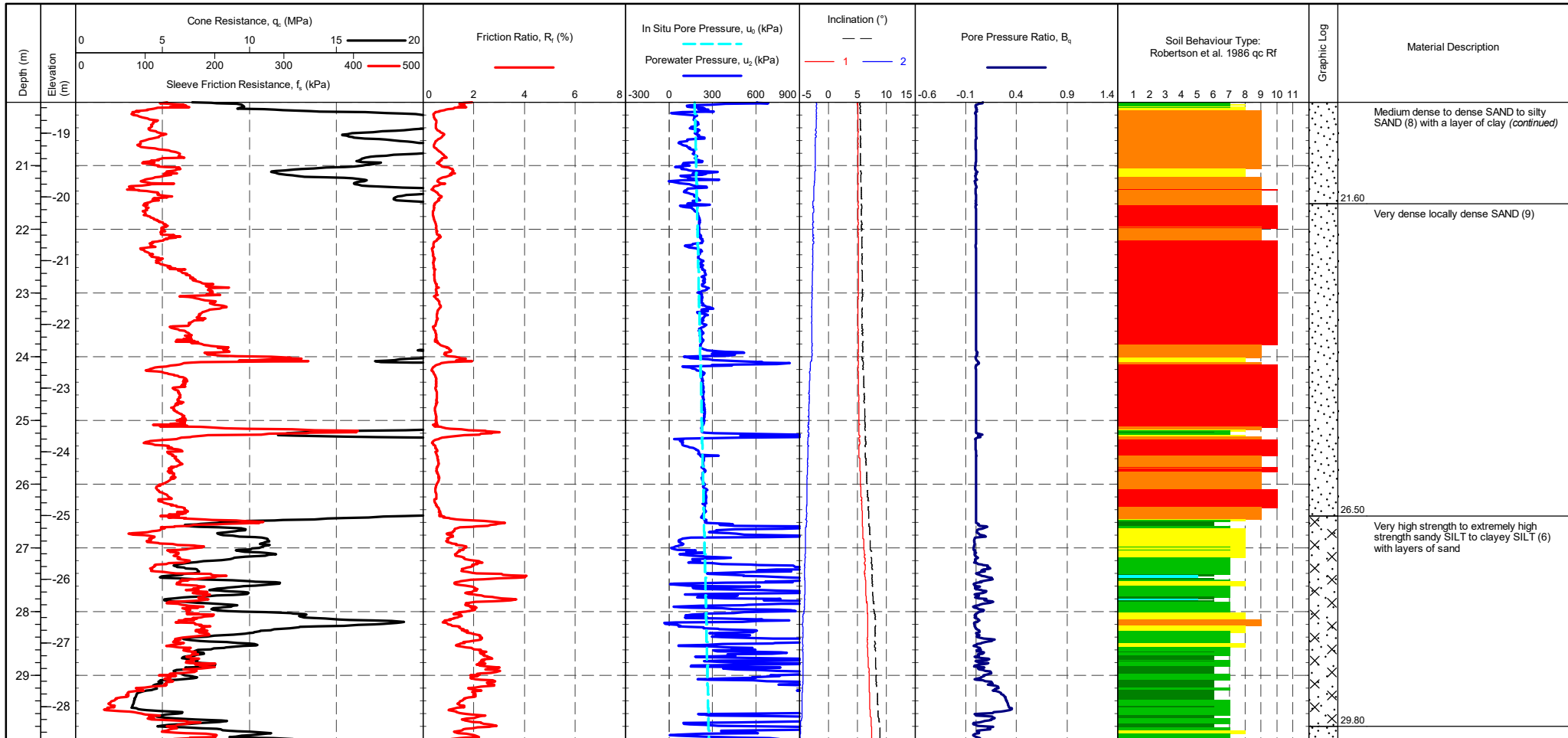
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level   Dissipation Test
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PointID  
**CPT 04**

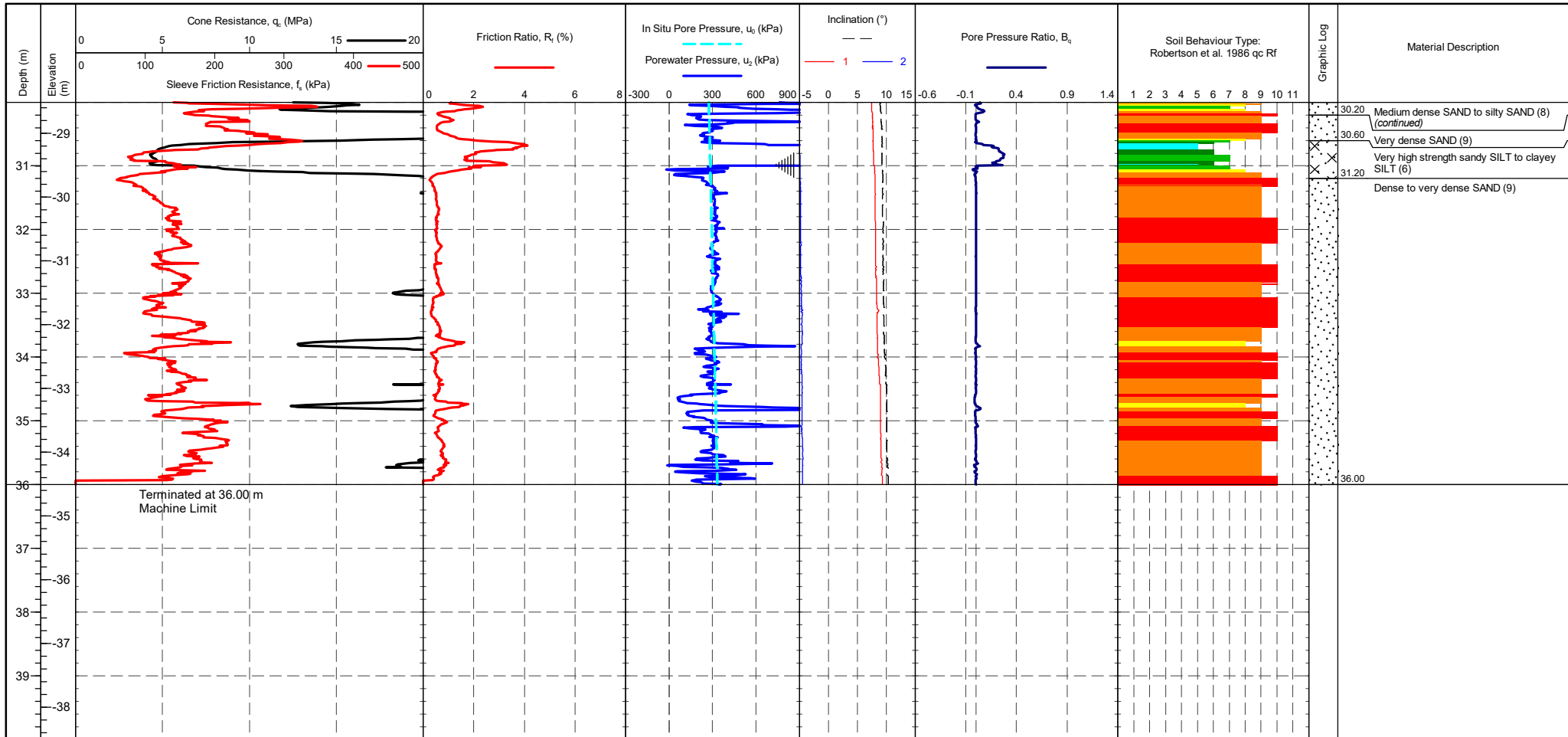
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinator	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level   Dissipation Test
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PointID  
**CPT 04**

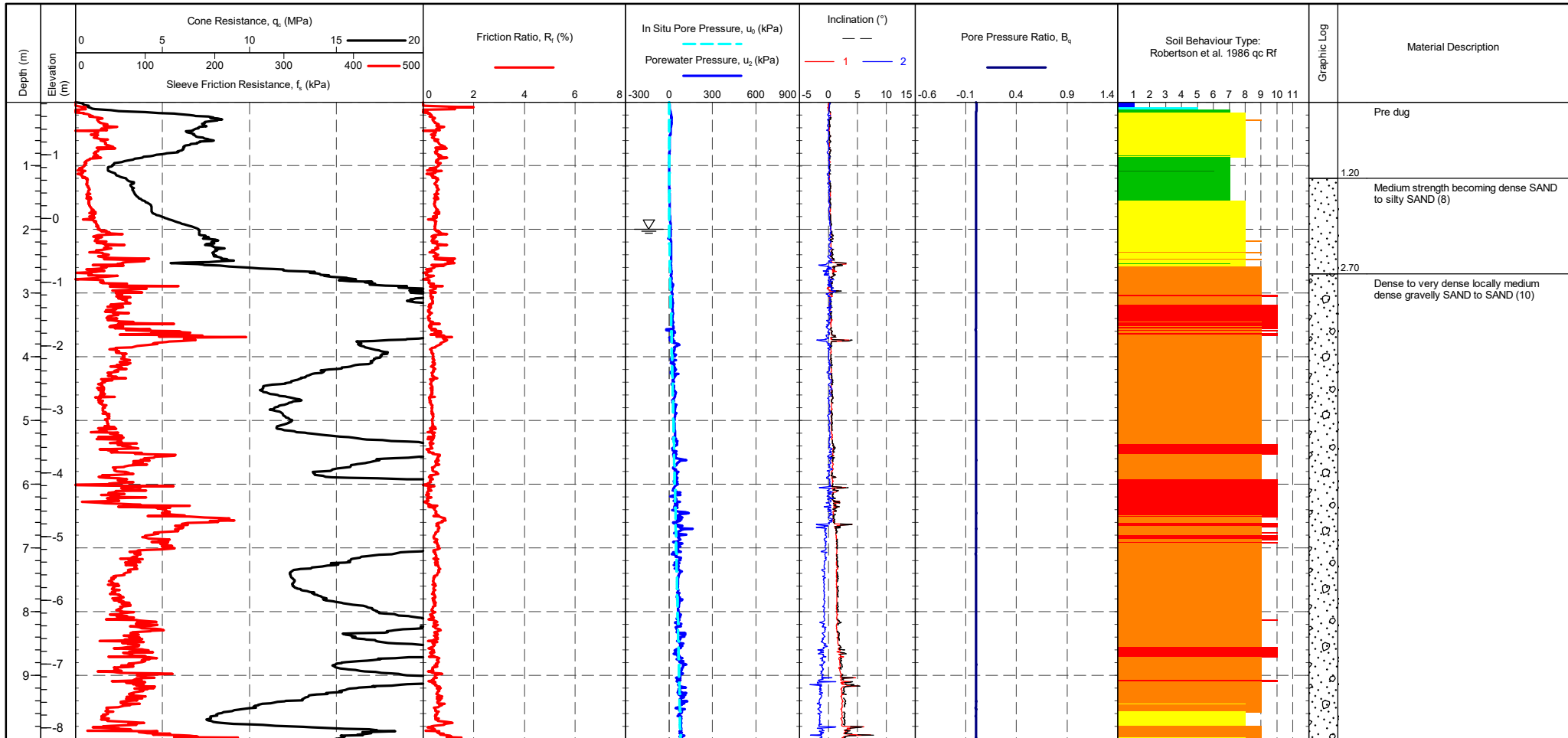
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinator	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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PointID : **CPT 05**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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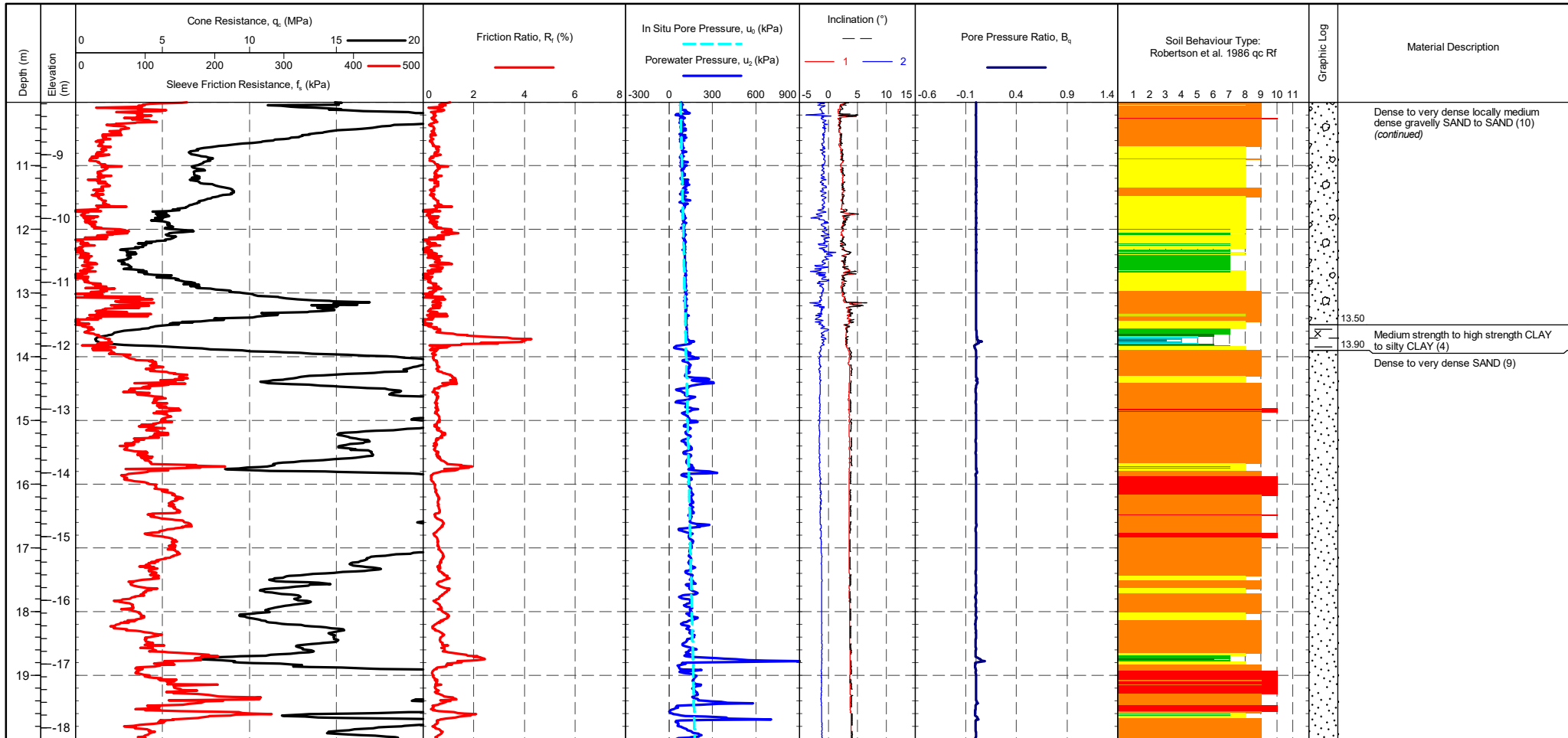


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

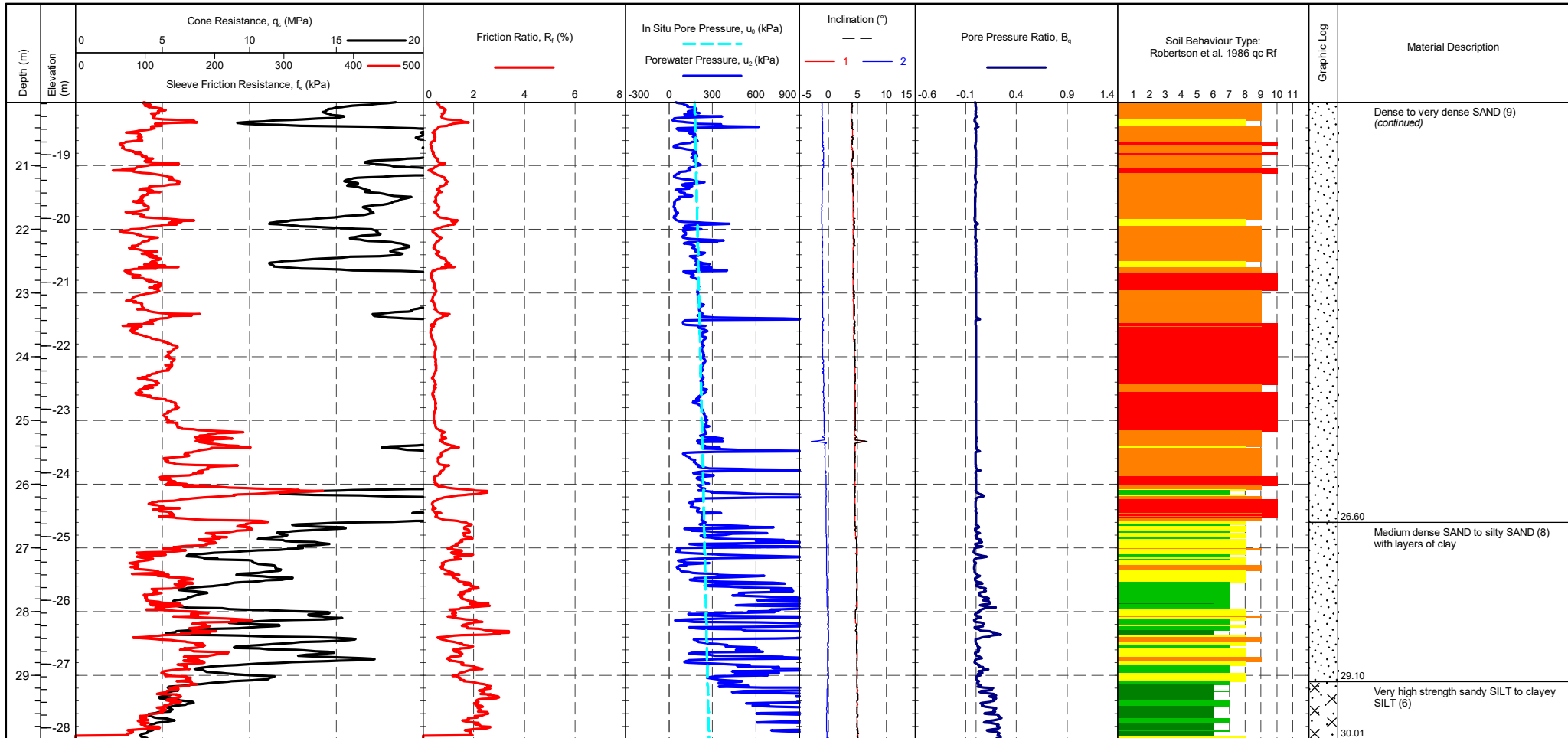
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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PointID  
**CPT 05**

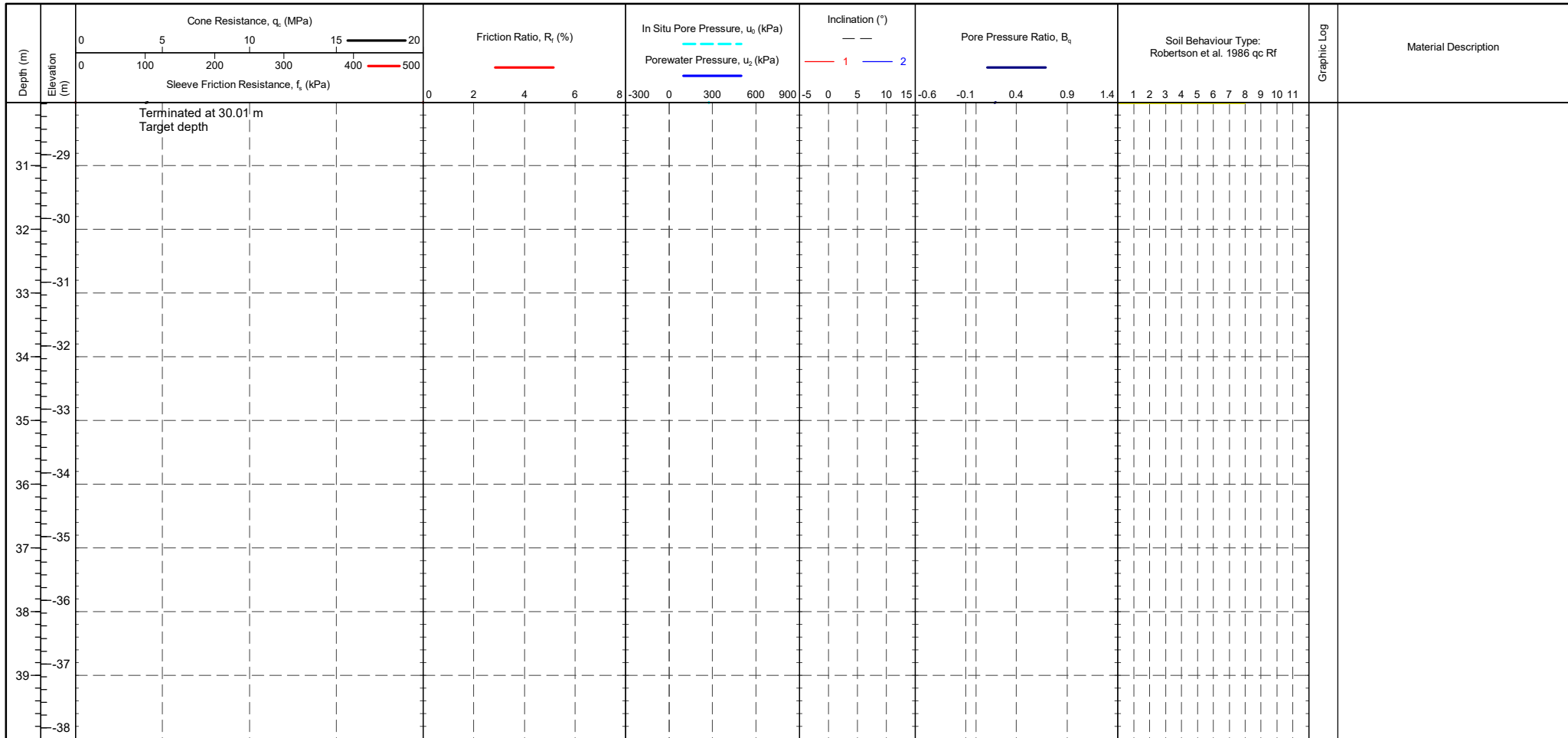
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinator	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level   Dissipation Test
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PointID  
**CPT 05**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinator	<b>CPTU ZERO VALUES</b> Pre Post Difference	<b>METHOD</b> : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	 Groundwater Level  Dissipation Test
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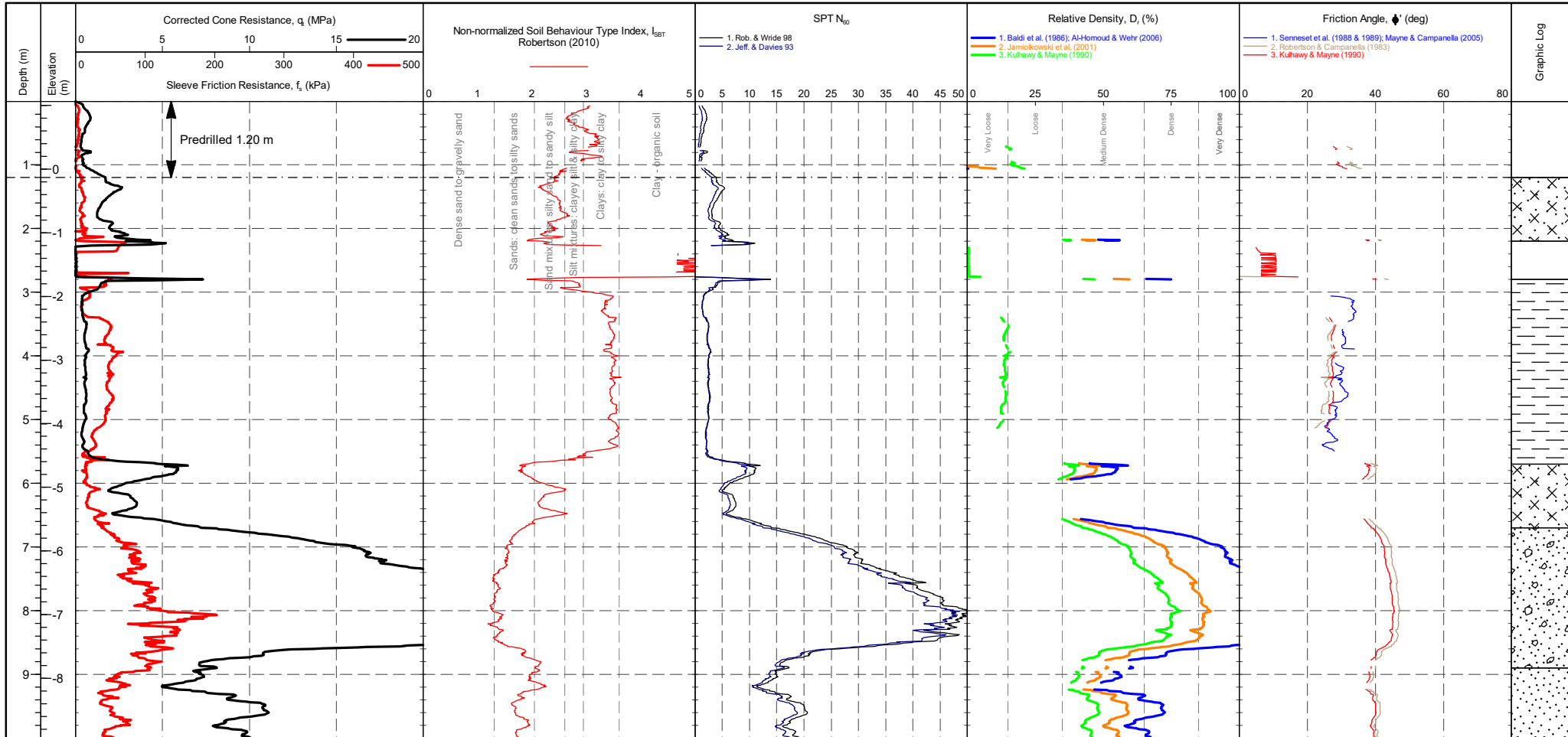
## **APPENDIX C**

### **Geotechnical Derived Parameters**



PointID  
**CPT 01**

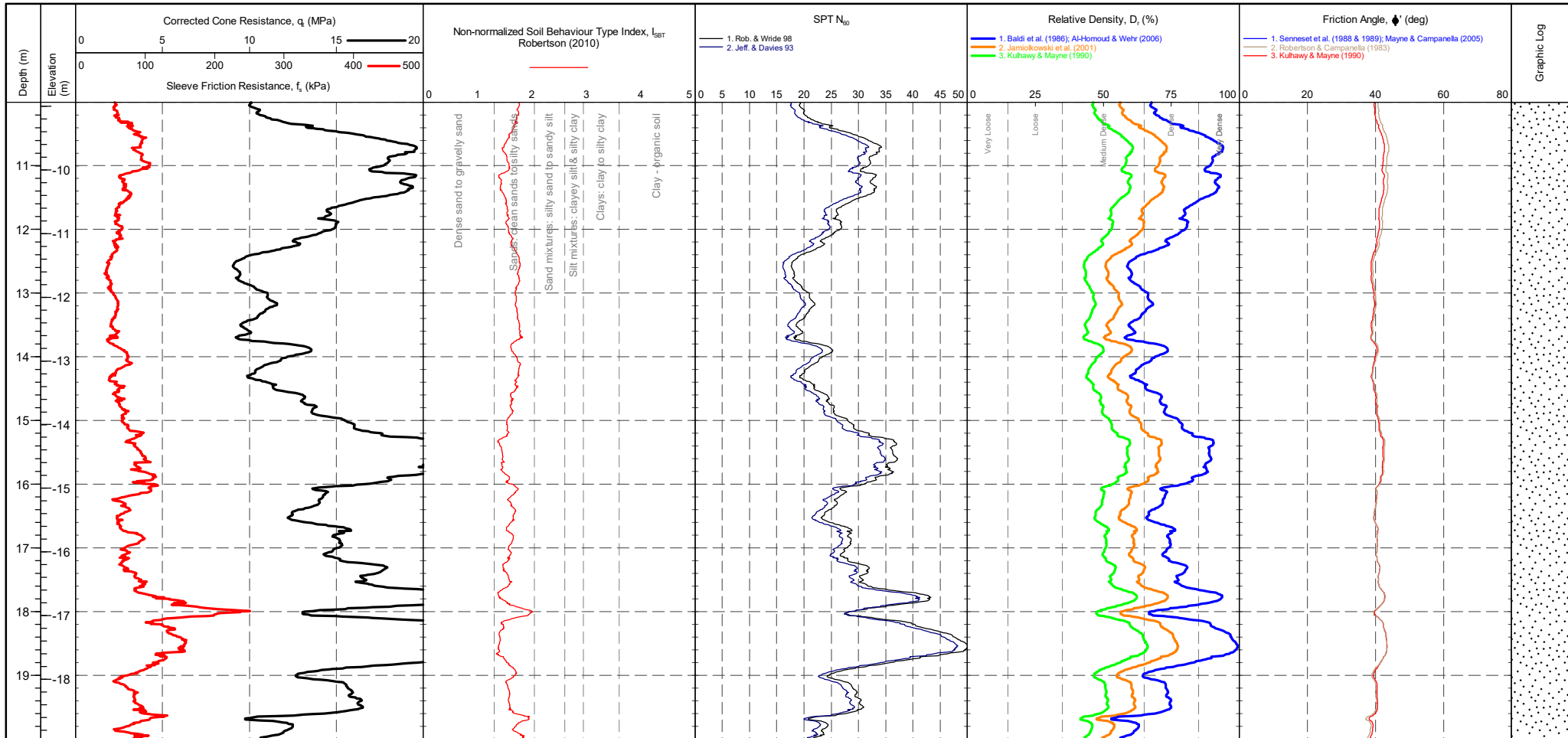
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 01**

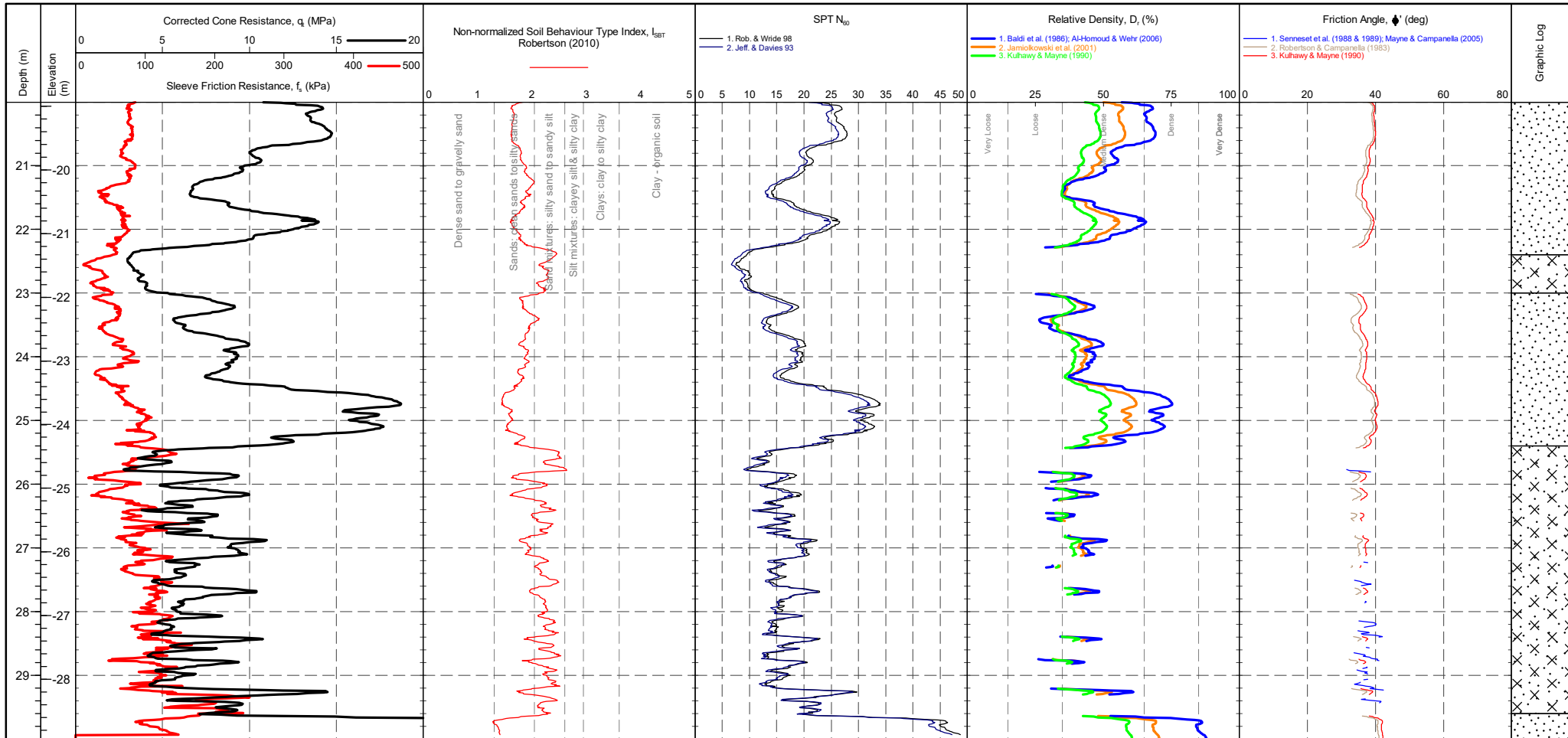
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 01**

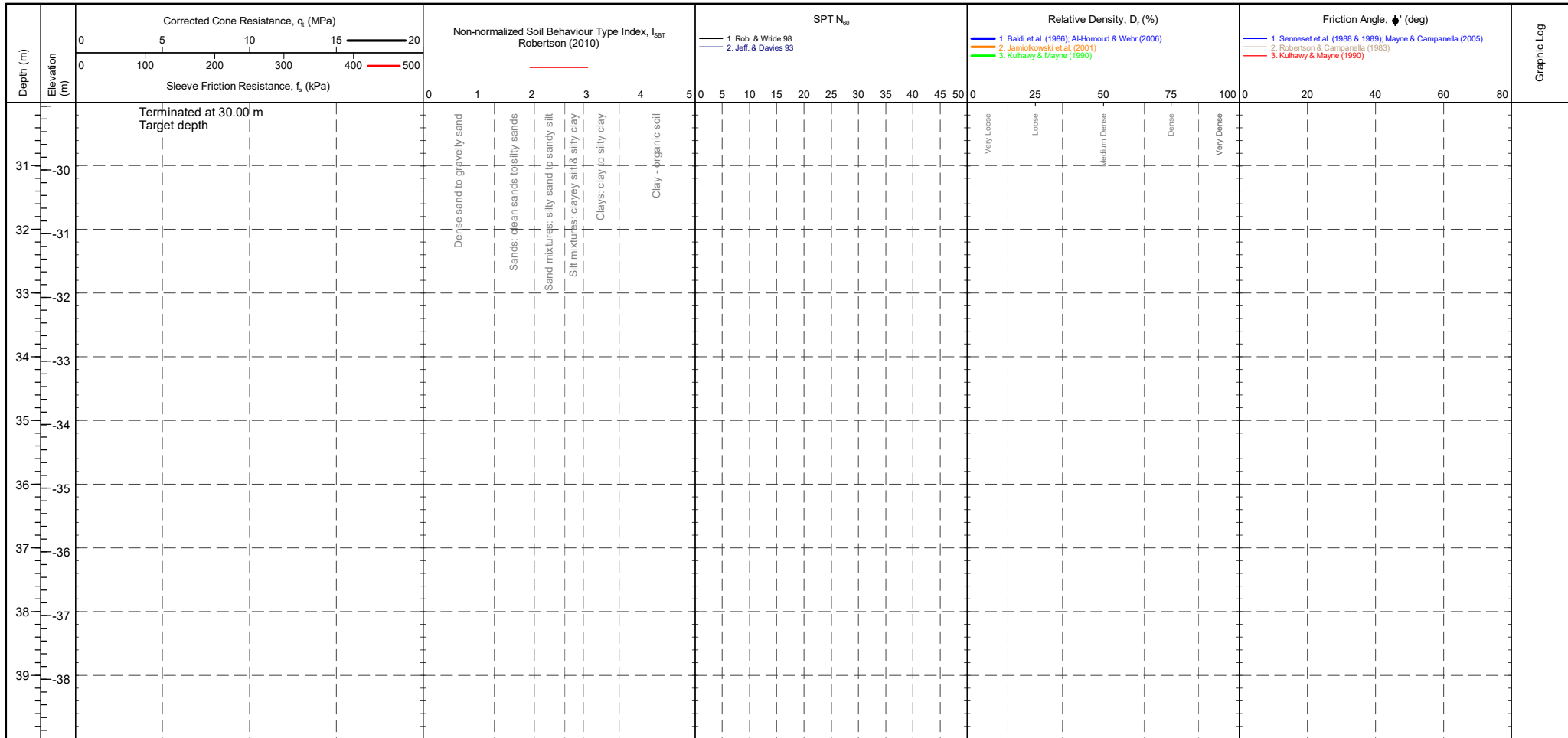
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	Groundwater Level Dissipation Test
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PointID  
**CPT 01**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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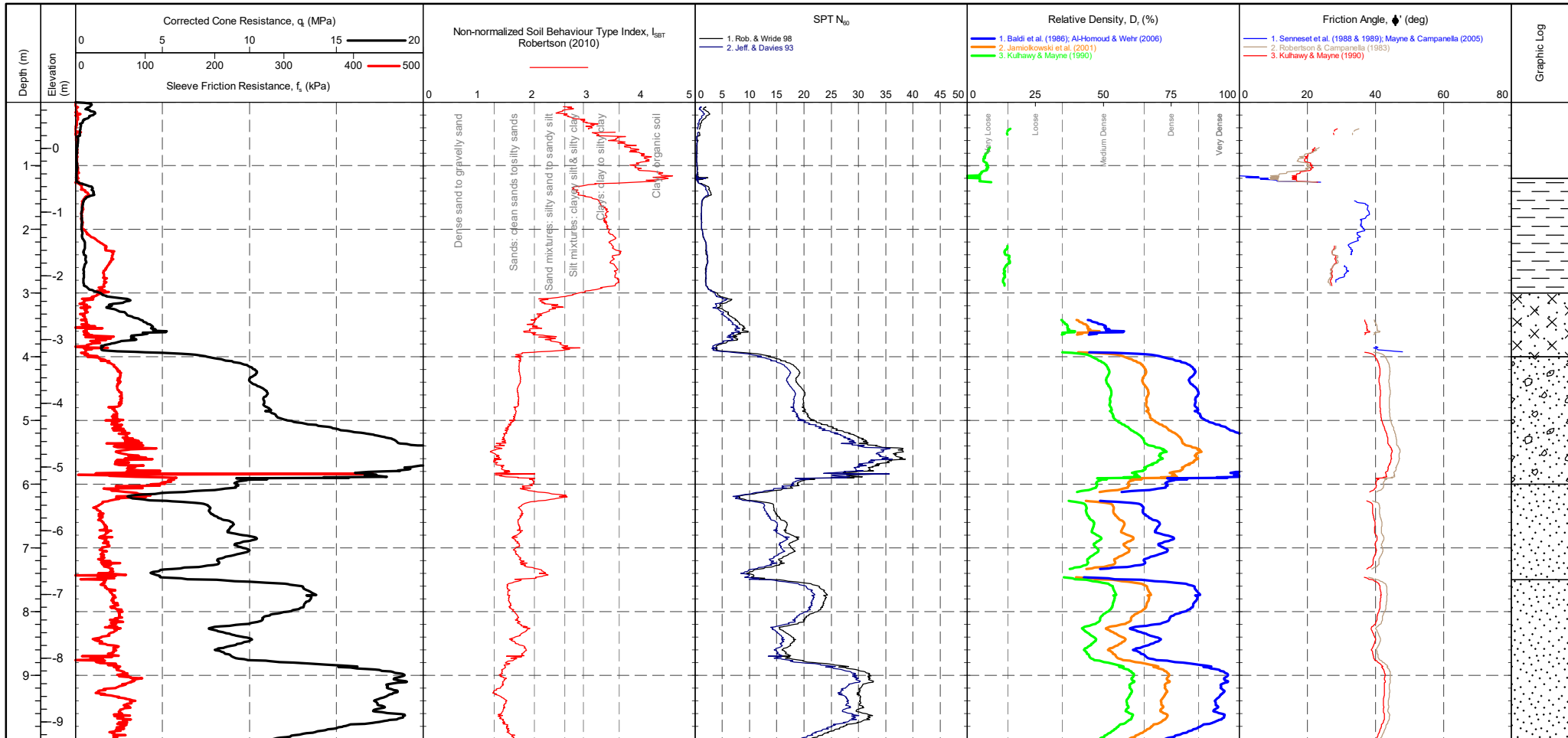


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID : **CPT 02**

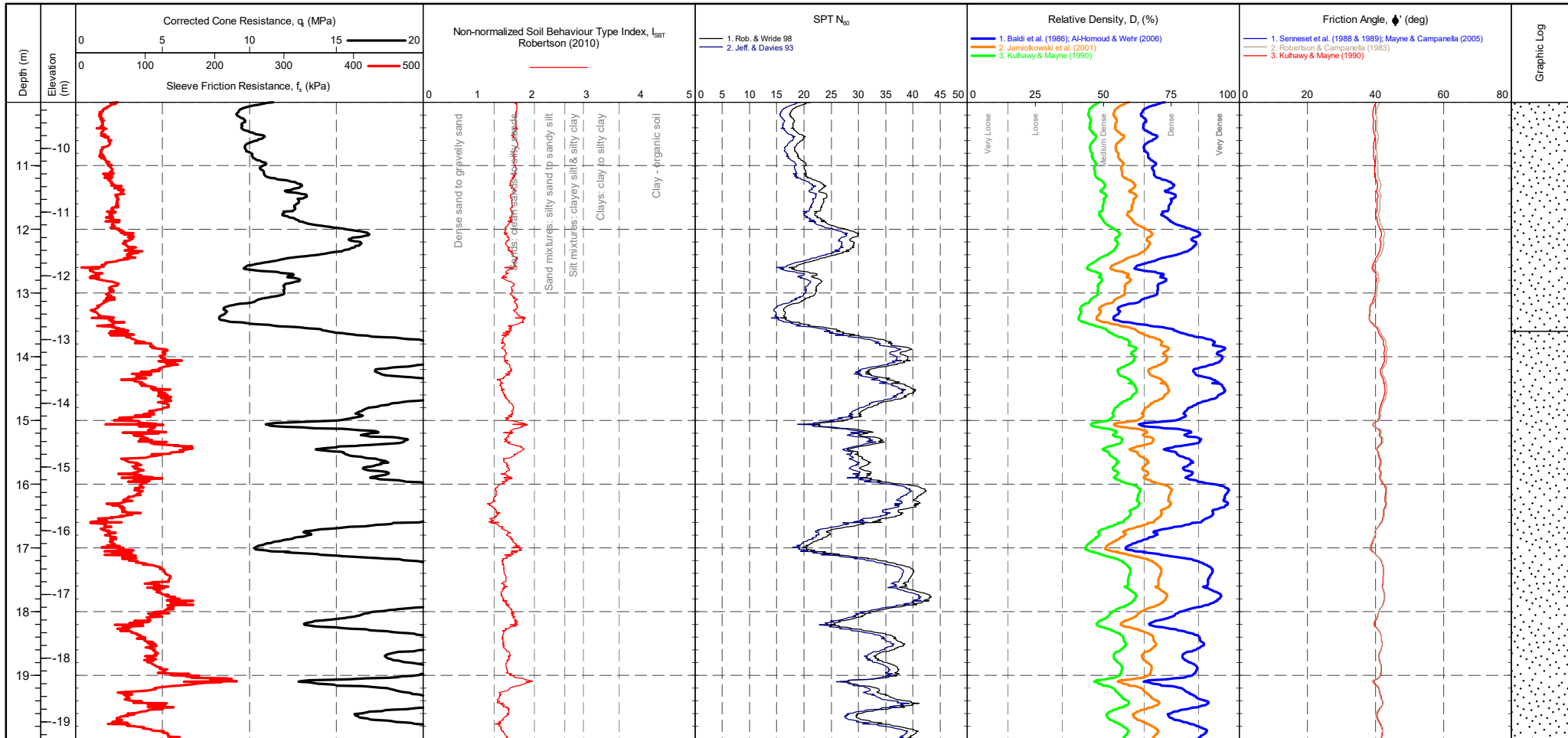
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer : Tip : Sleeve : Pore Pressure 2 : X-Y Inclinometer :	Groundwater Level Dissipation Test
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PointID  
**CPT 02**

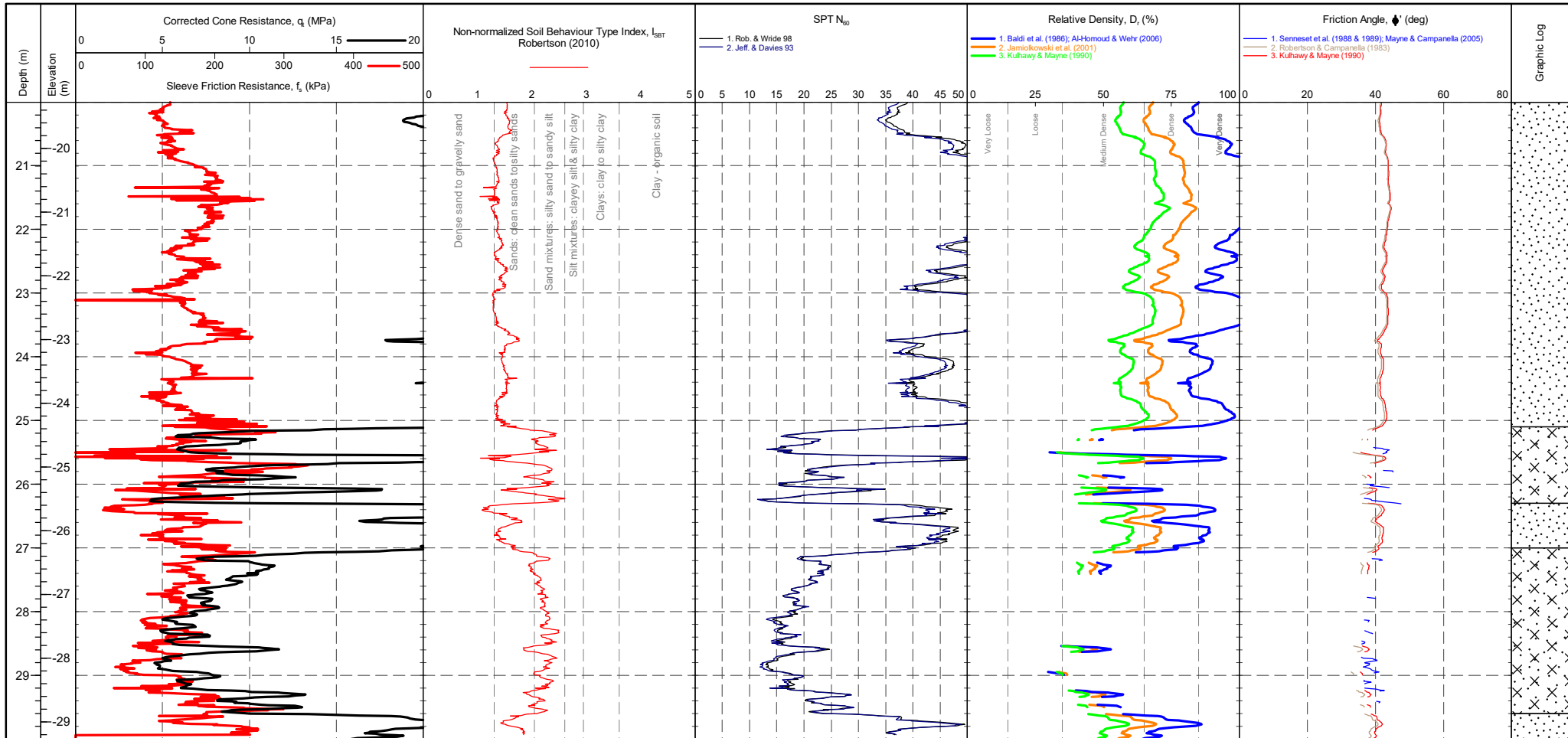
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <thead> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> </thead> <tbody> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip																							
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PointID  
**CPT 02**

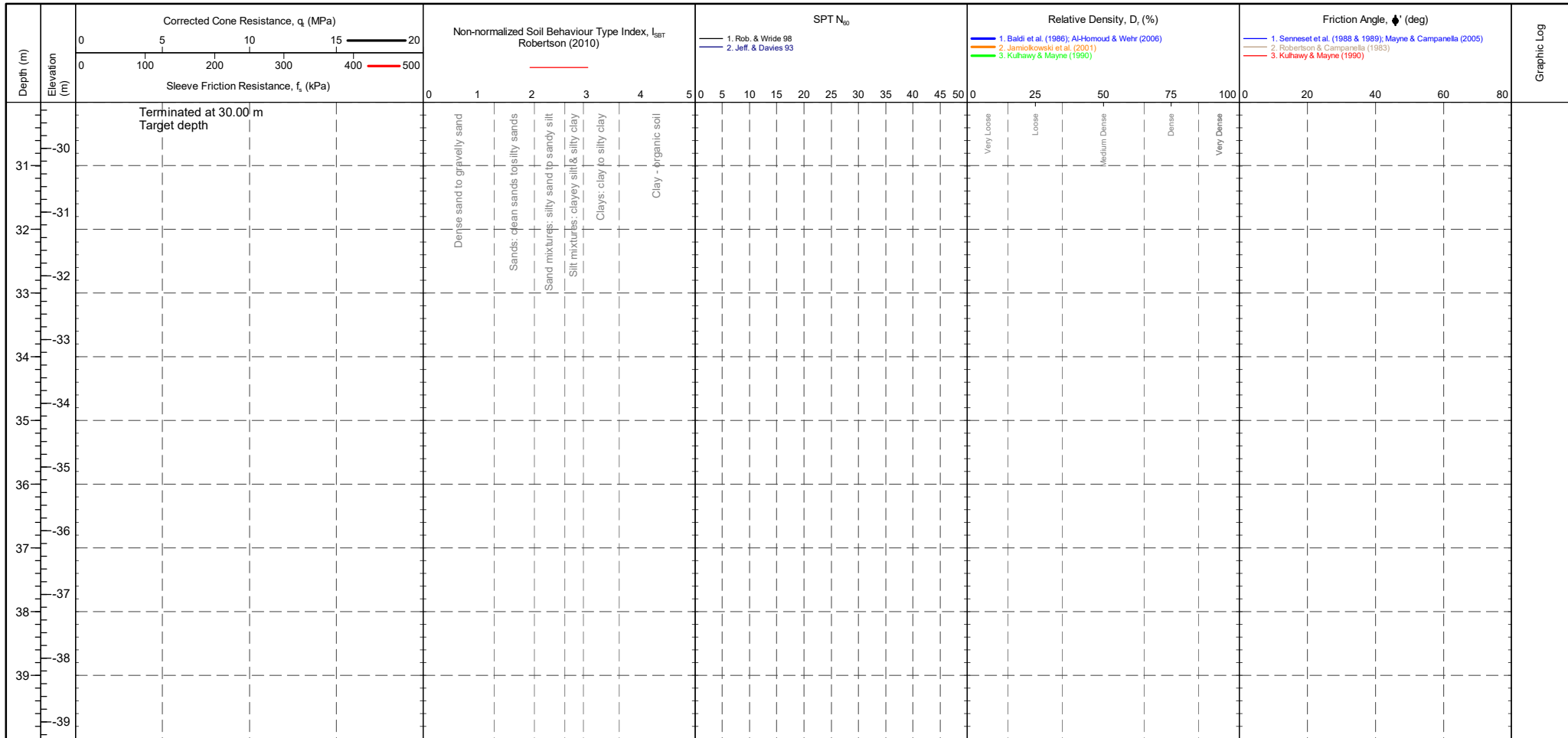
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 02**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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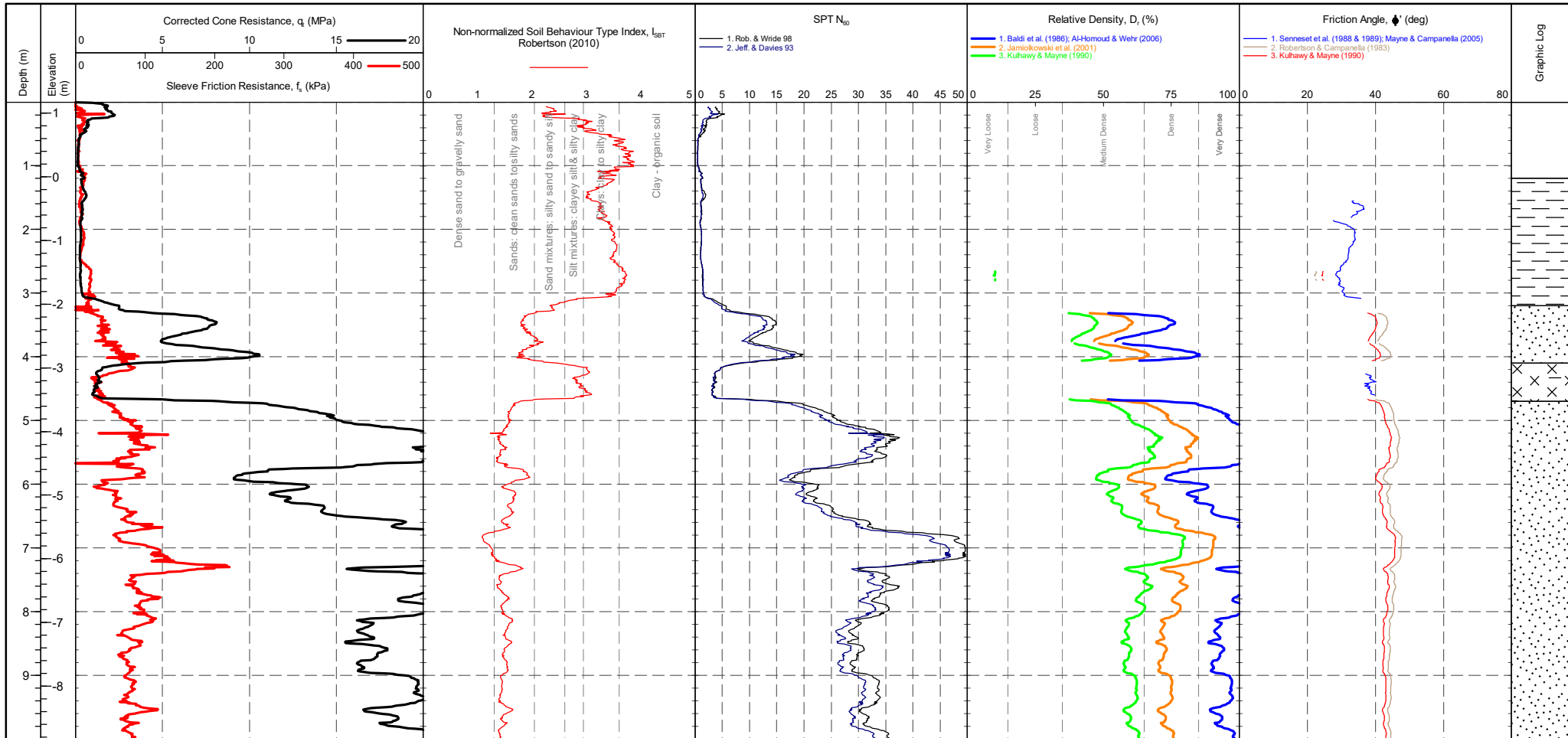


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

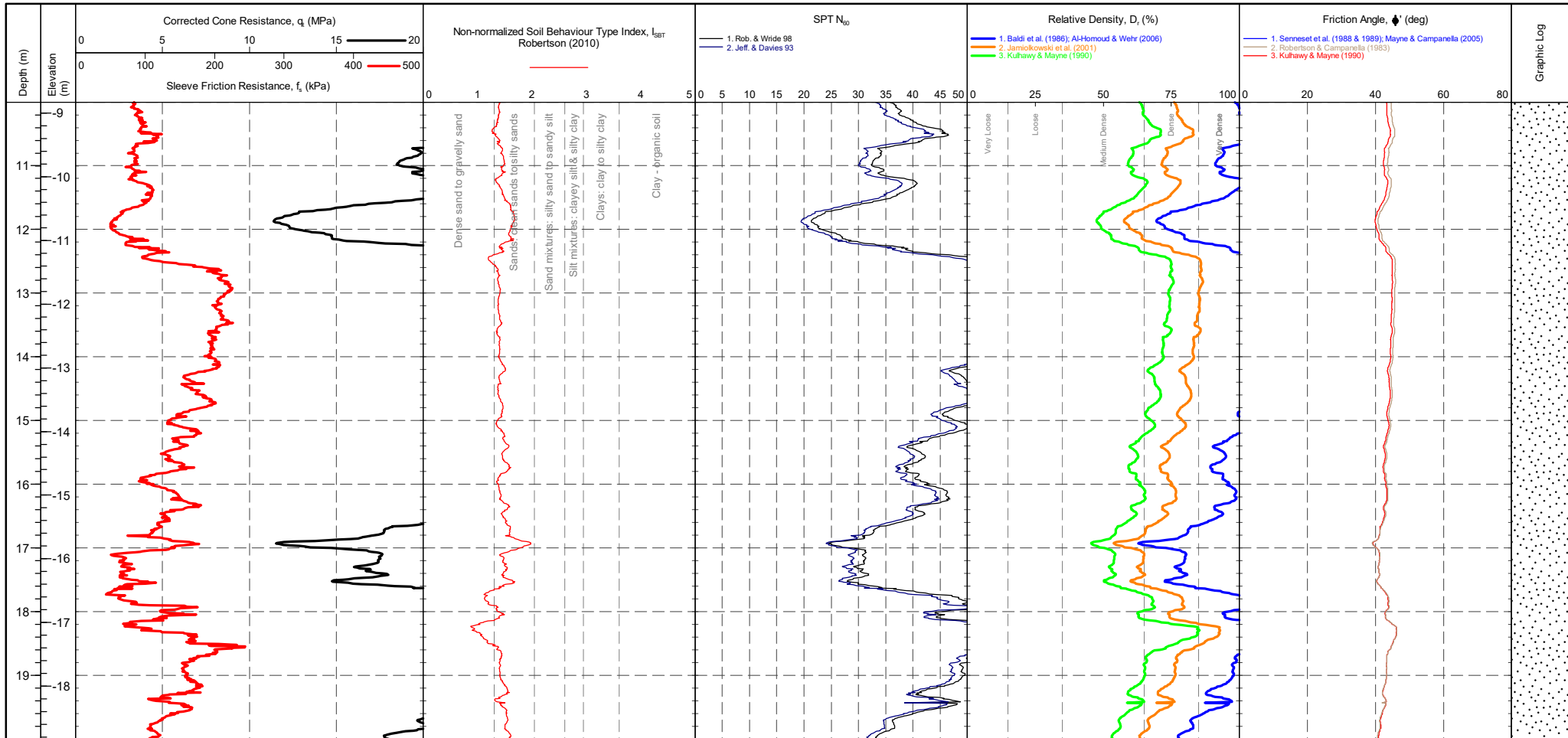
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

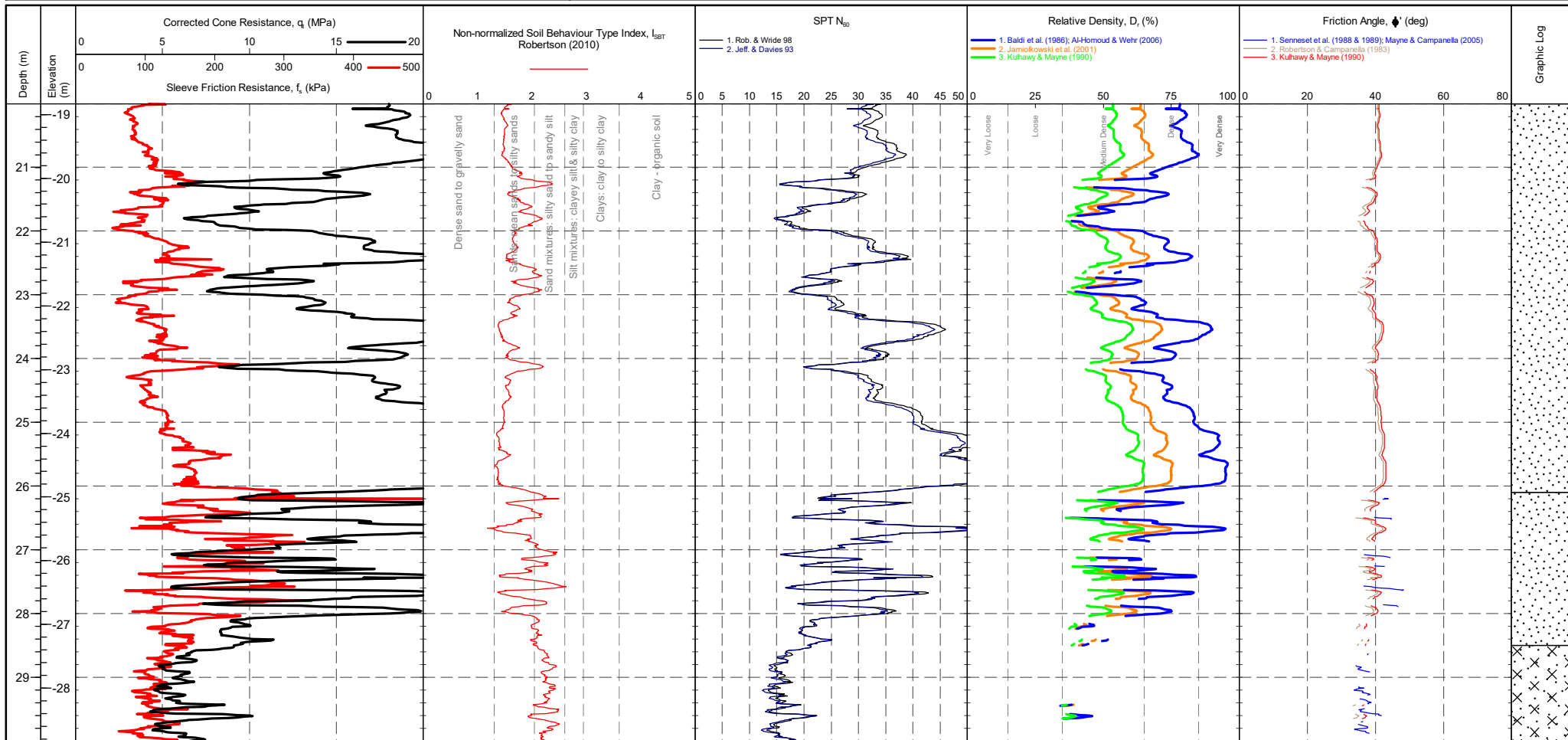
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

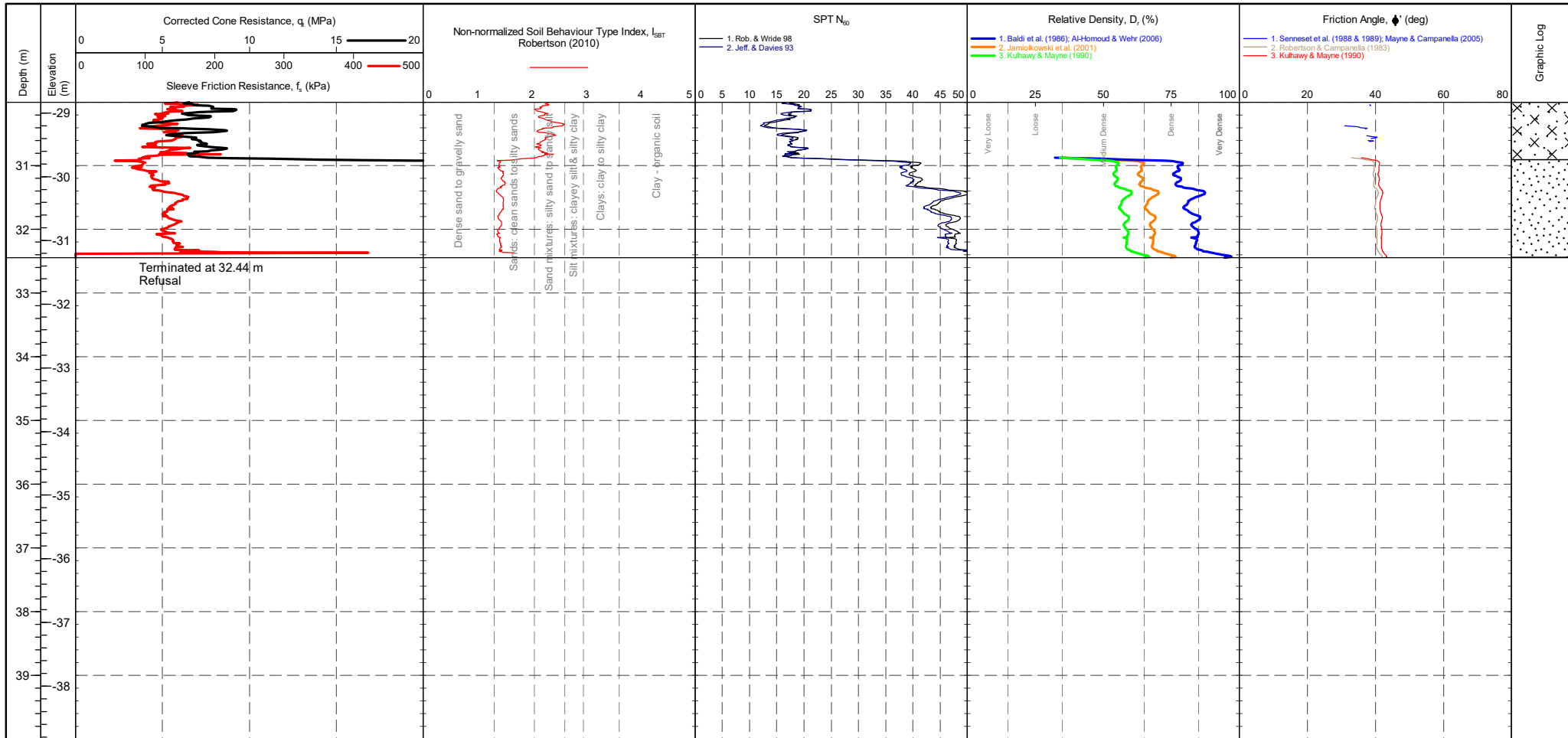
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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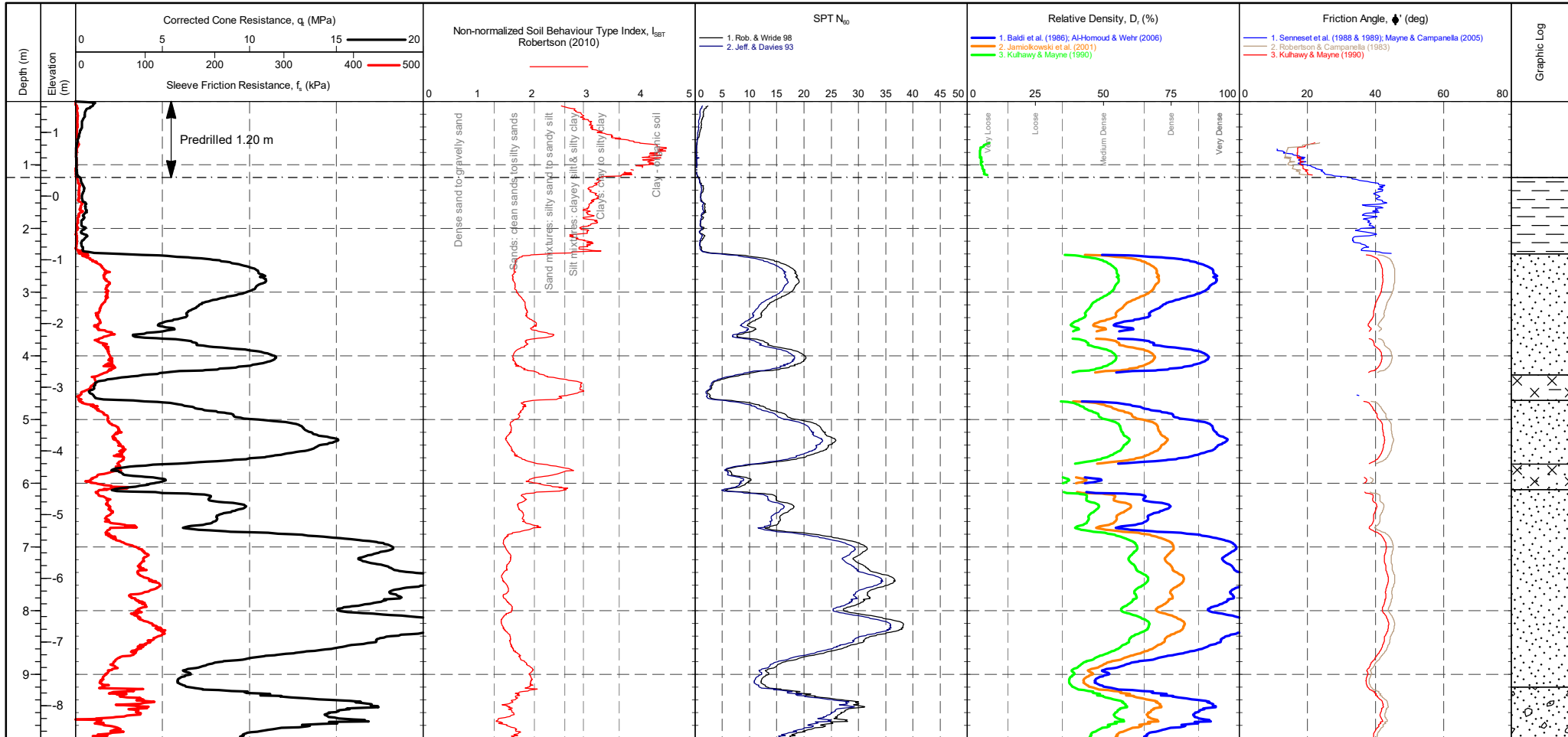


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 04**

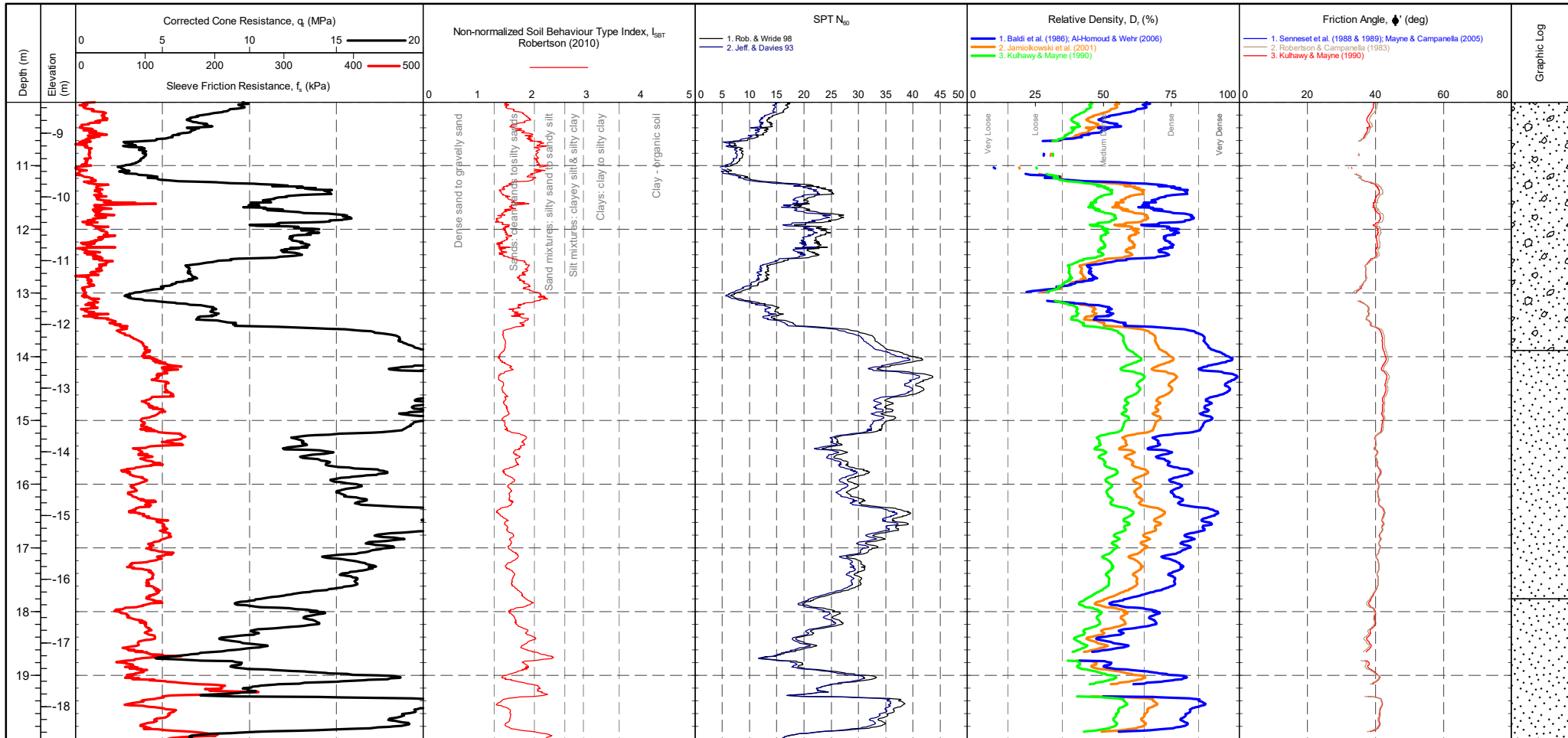
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 04**

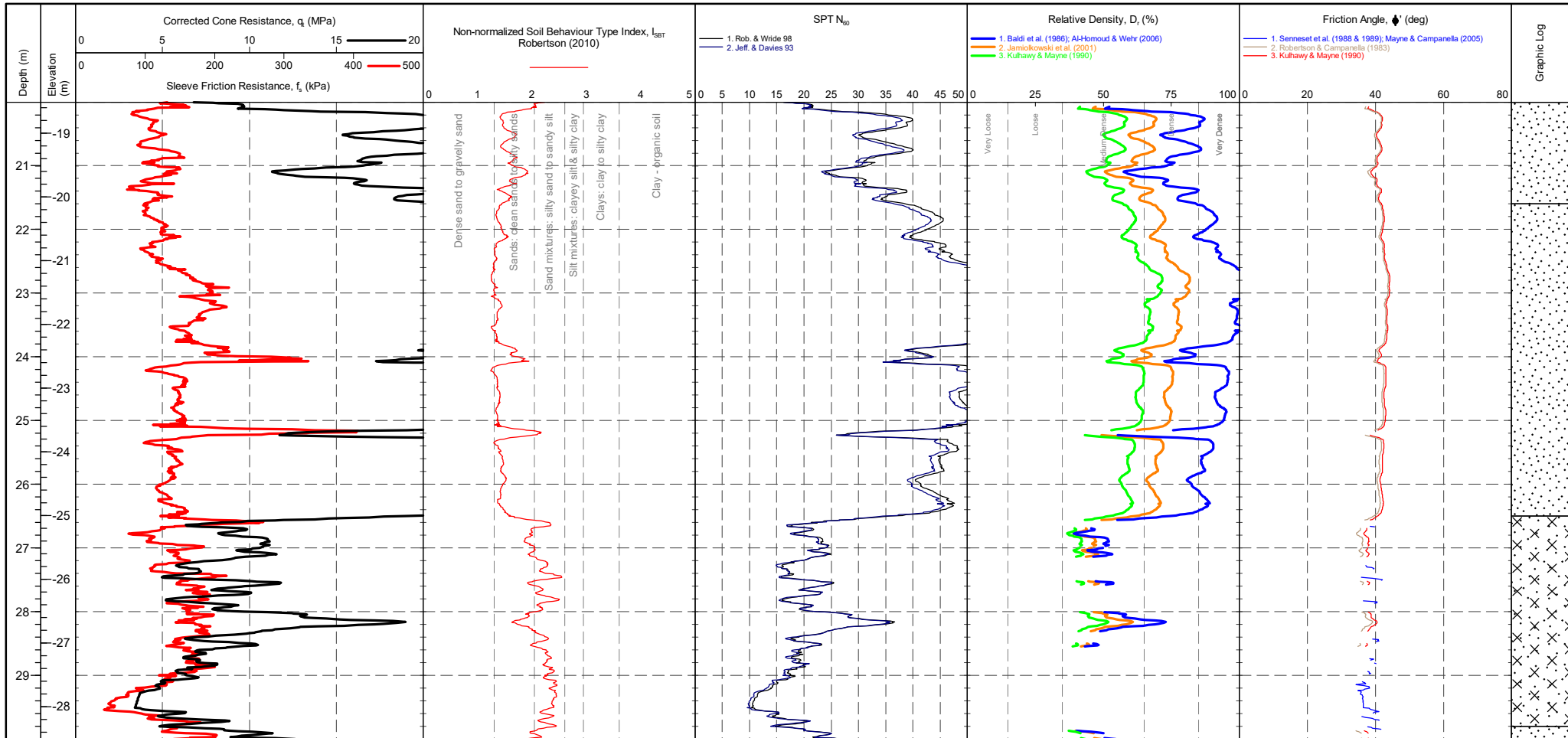
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <thead> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> </thead> <tbody> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
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PointID  
**CPT 04**

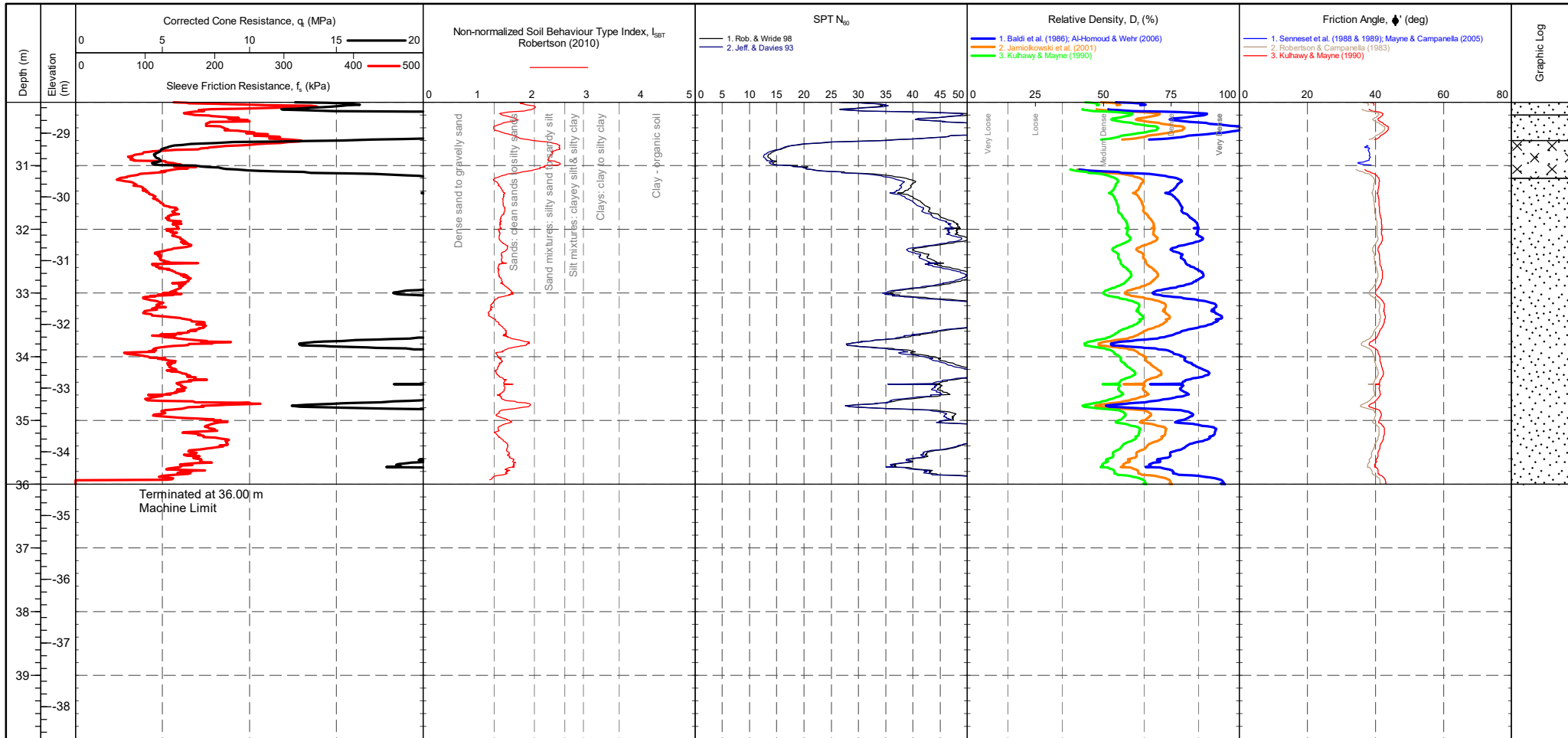
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 04**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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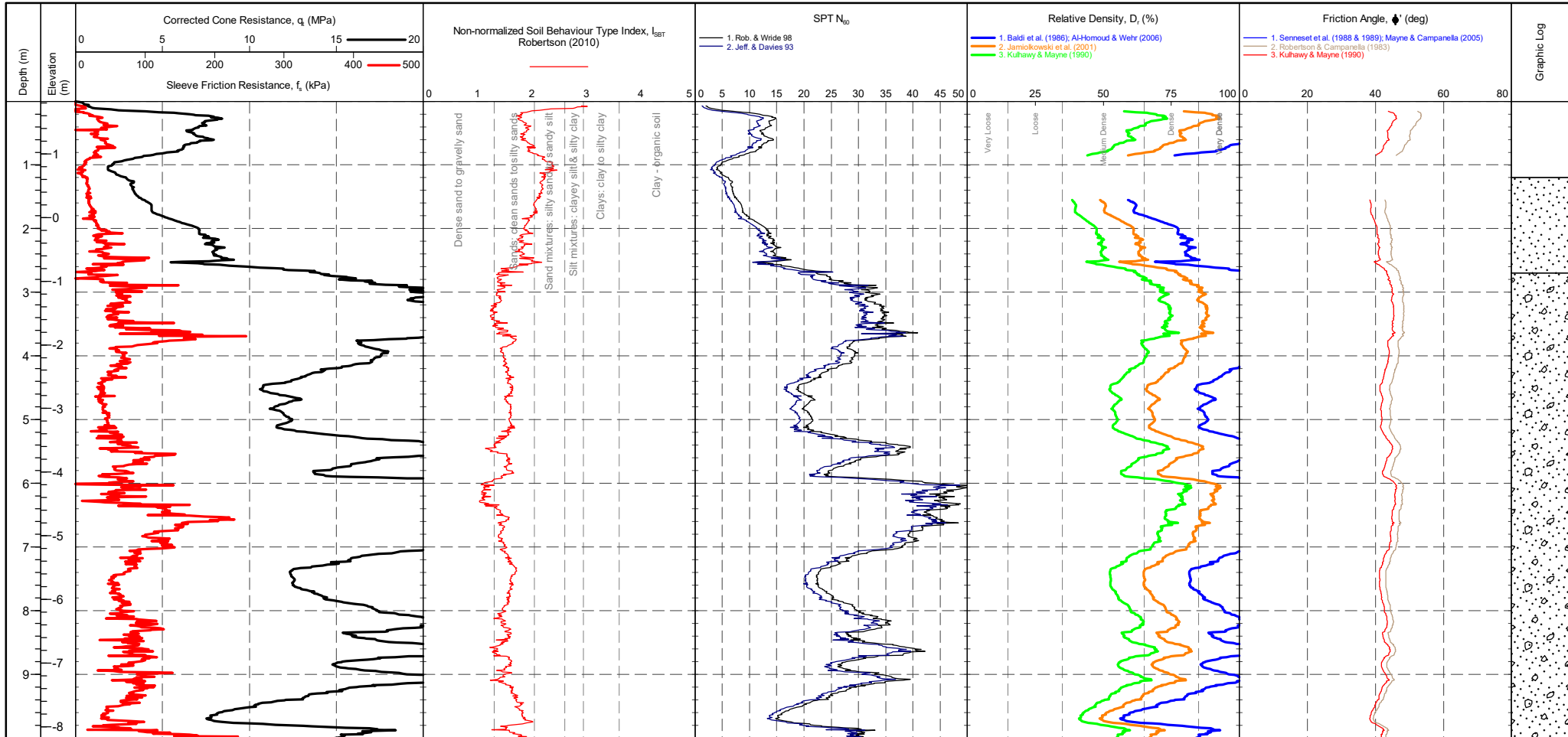


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip																							
Sleeve																							
Pore Pressure 2																							
X-Y Inclinometer																							



PointID : **CPT 05**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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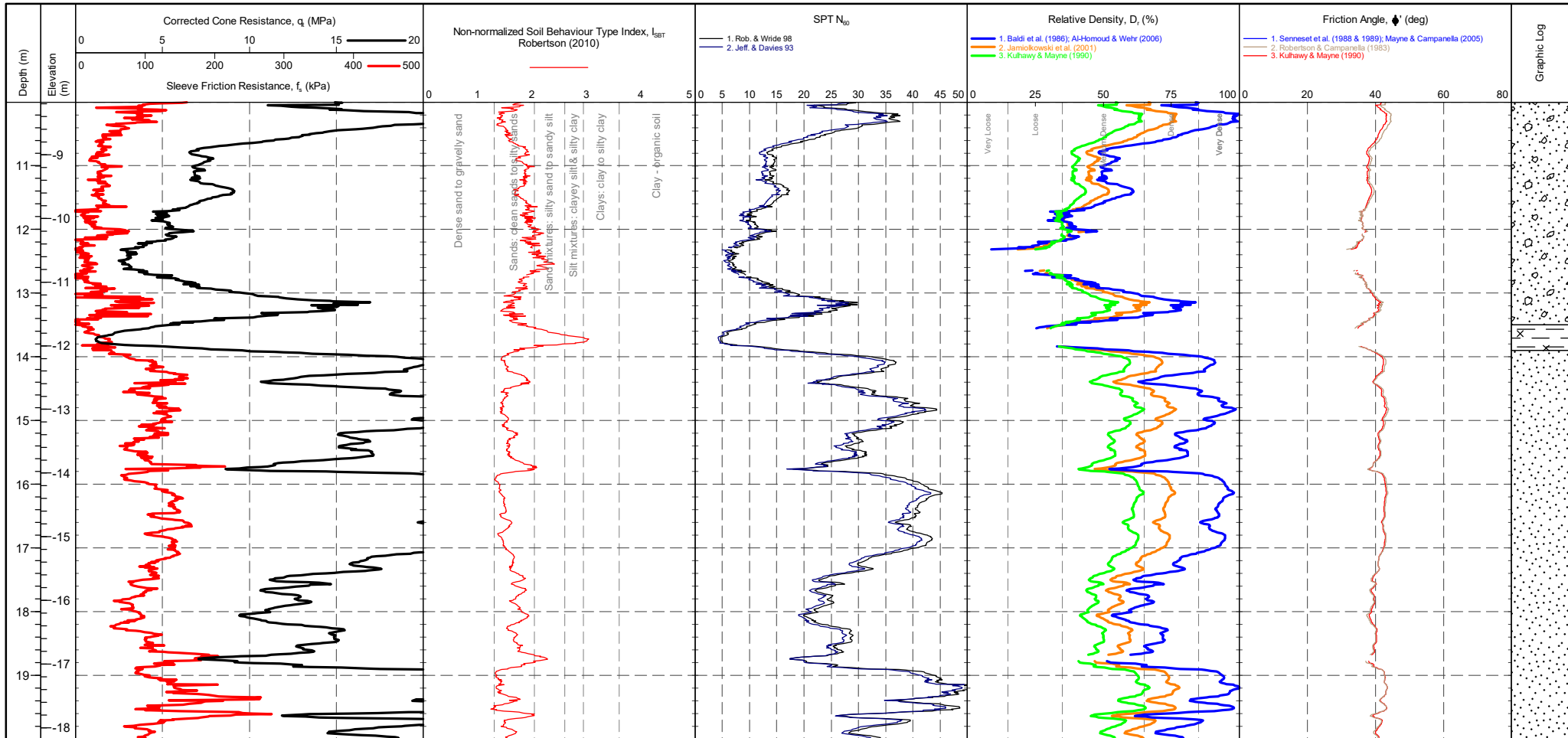


Graphic Log

<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer : Pre Post Difference Tip : Sleeve : Pore Pressure 2 : X-Y Inclinometer :	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

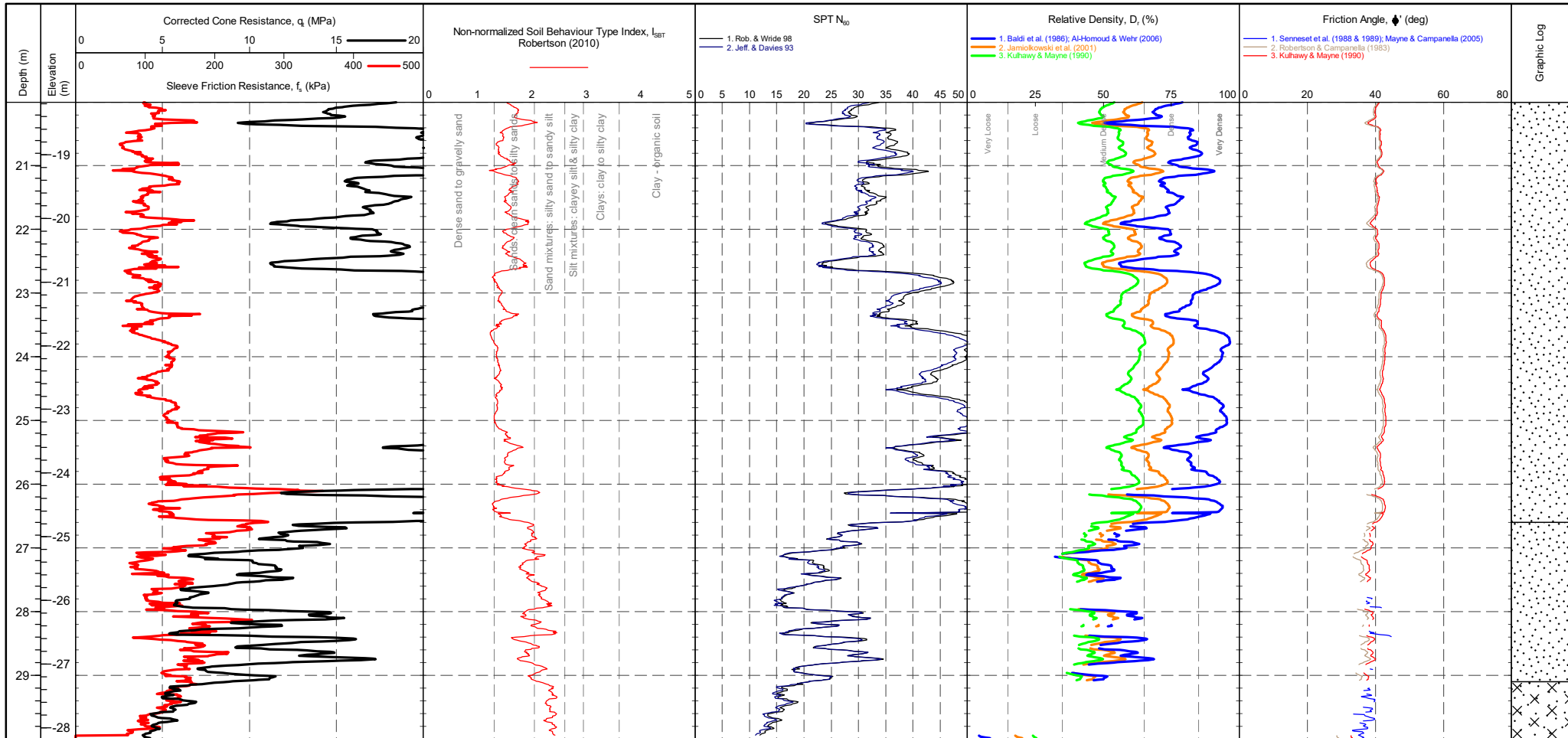
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Pre      Post      Difference	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

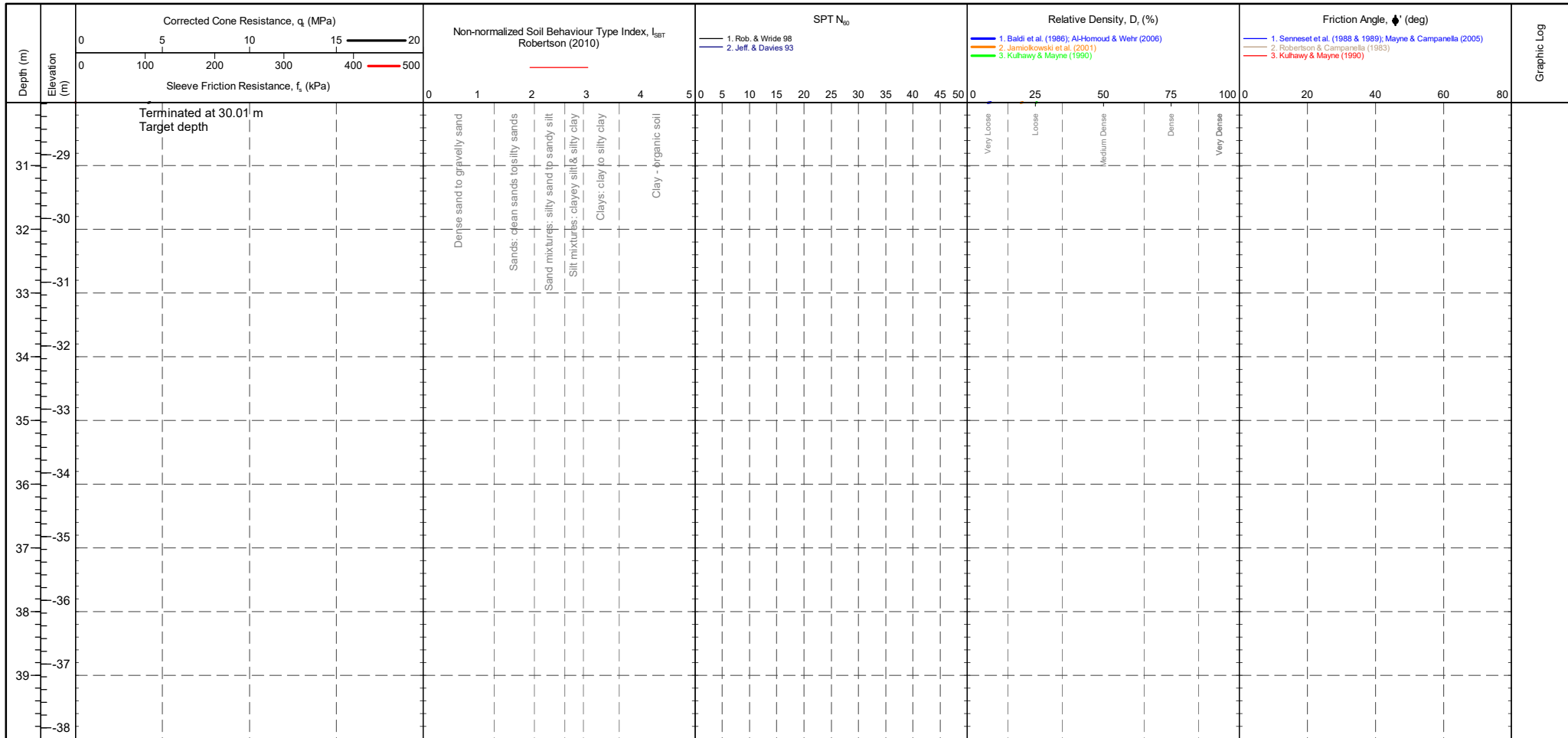
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <thead> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> </thead> <tbody> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip																							
Sleeve																							
Pore Pressure 2																							
X-Y Inclinometer																							

PointID  
**CPT 05**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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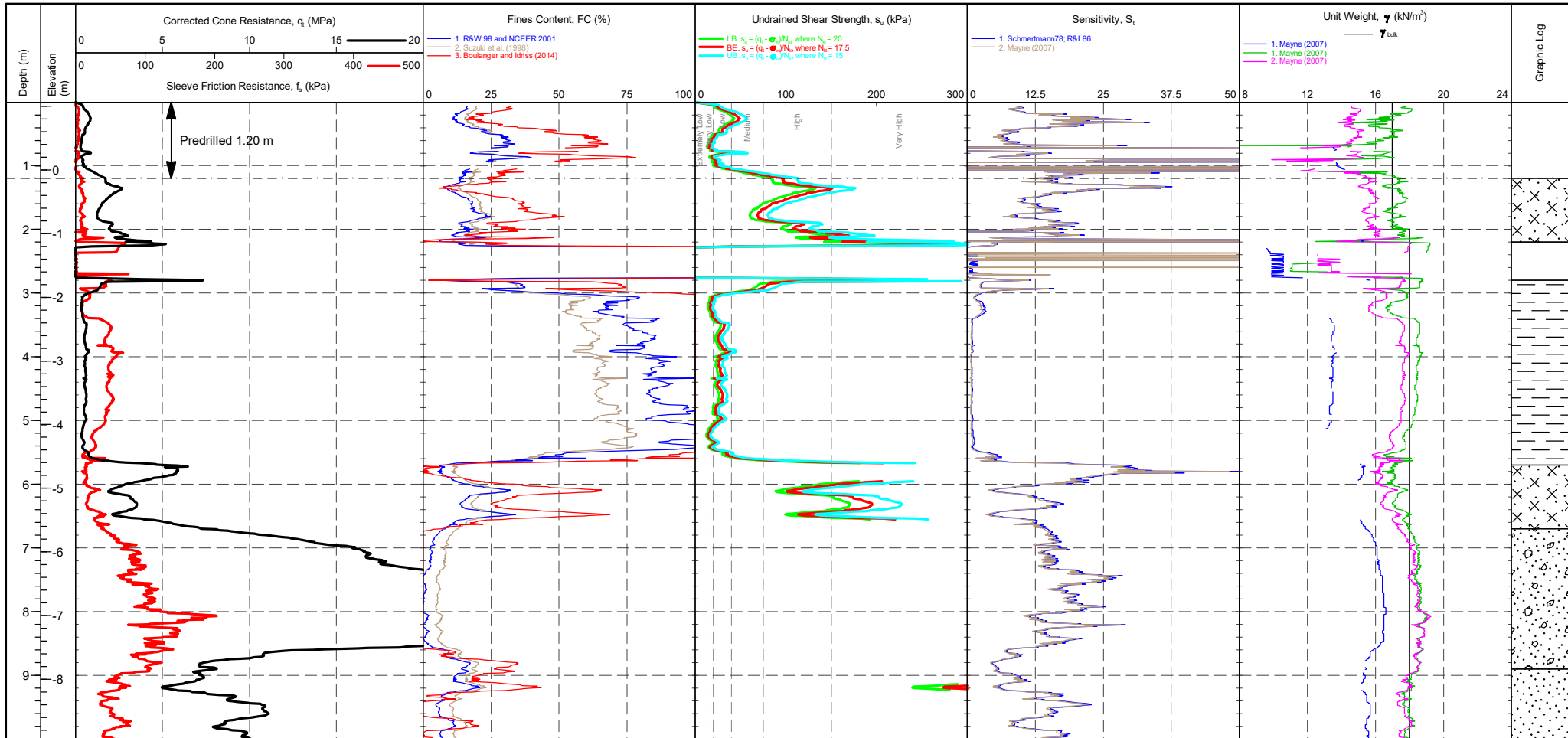


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID : **CPT 01**

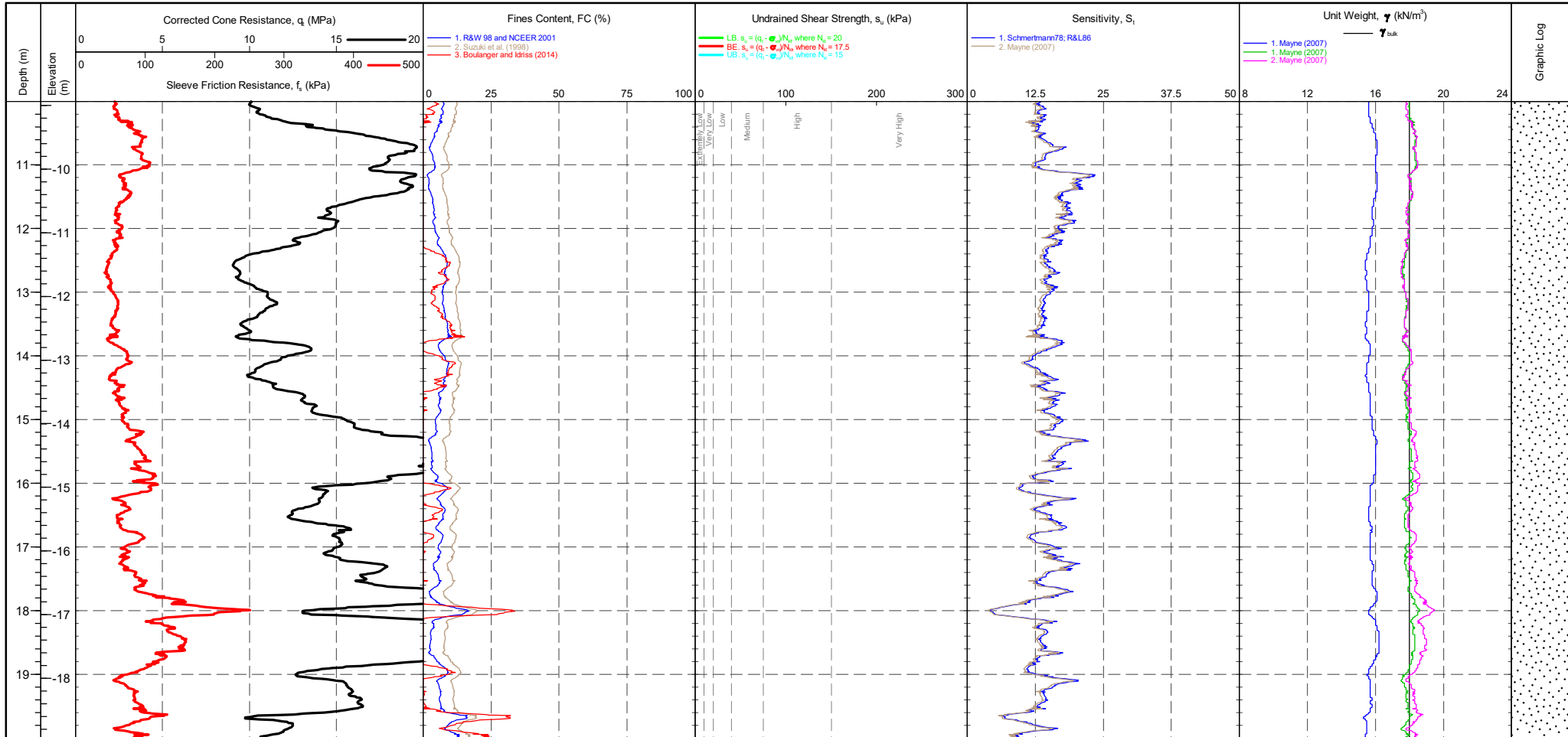
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer : Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 01**

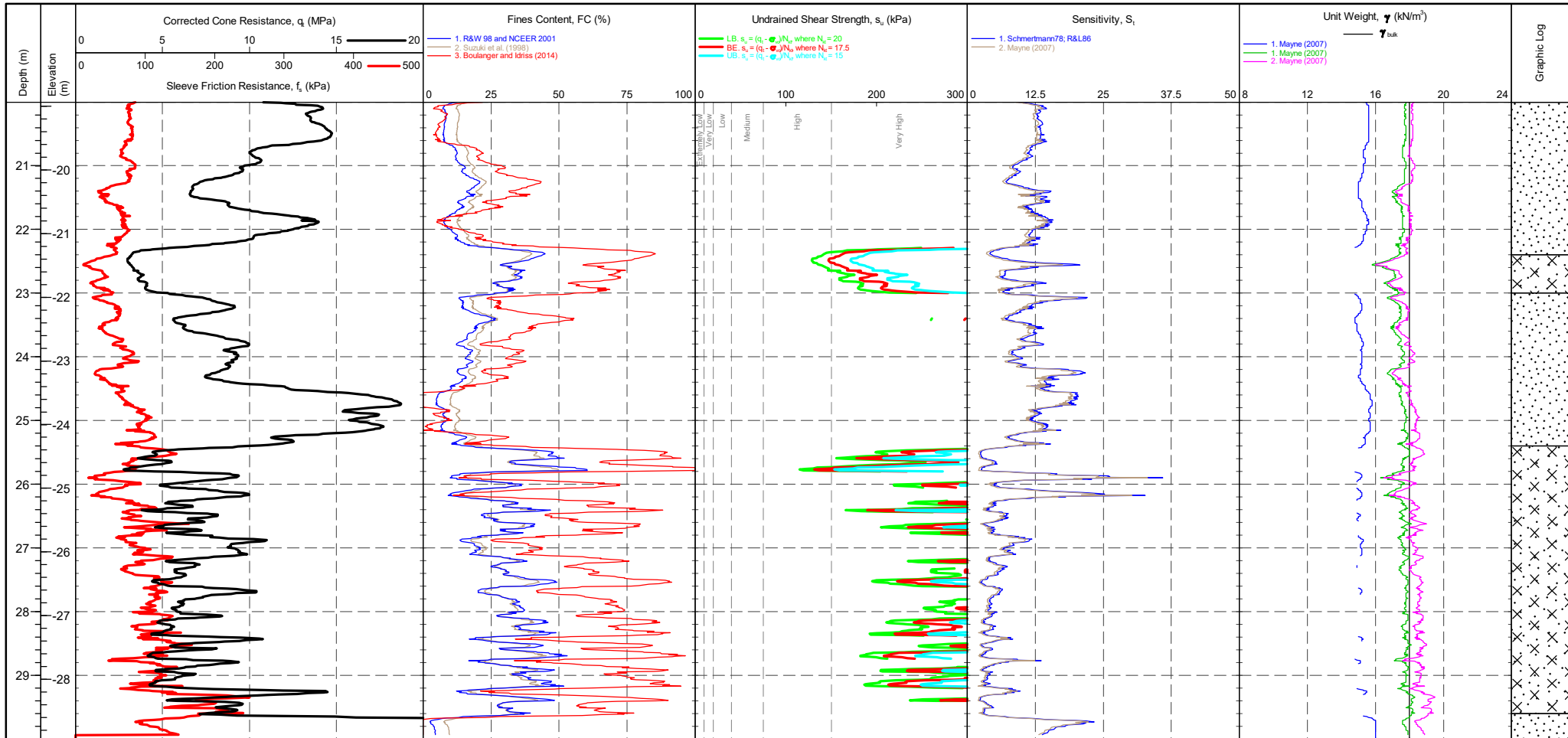
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID : **CPT 01**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	Groundwater Level Dissipation Test
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PointID  
**CPT 01**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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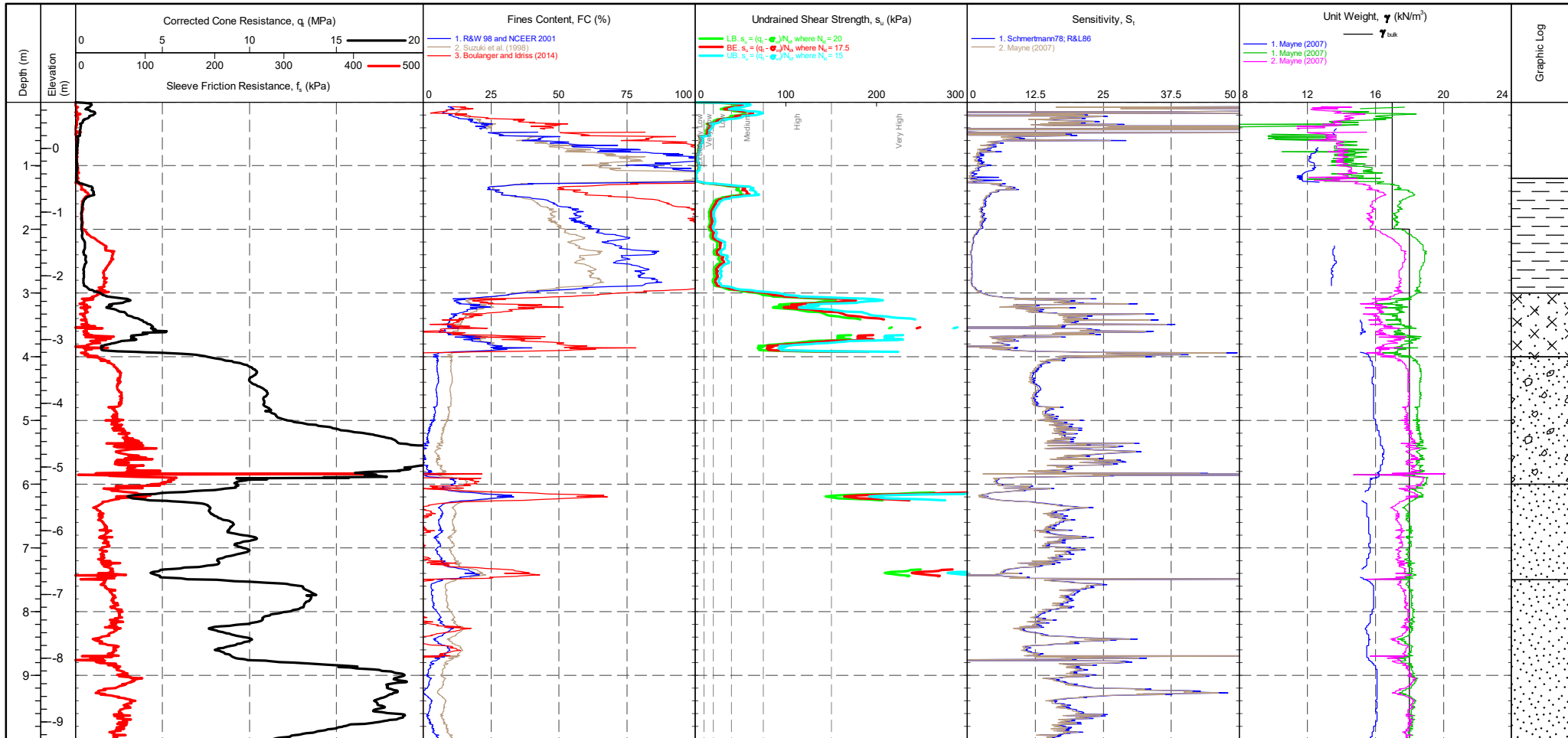


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Waller; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 02**

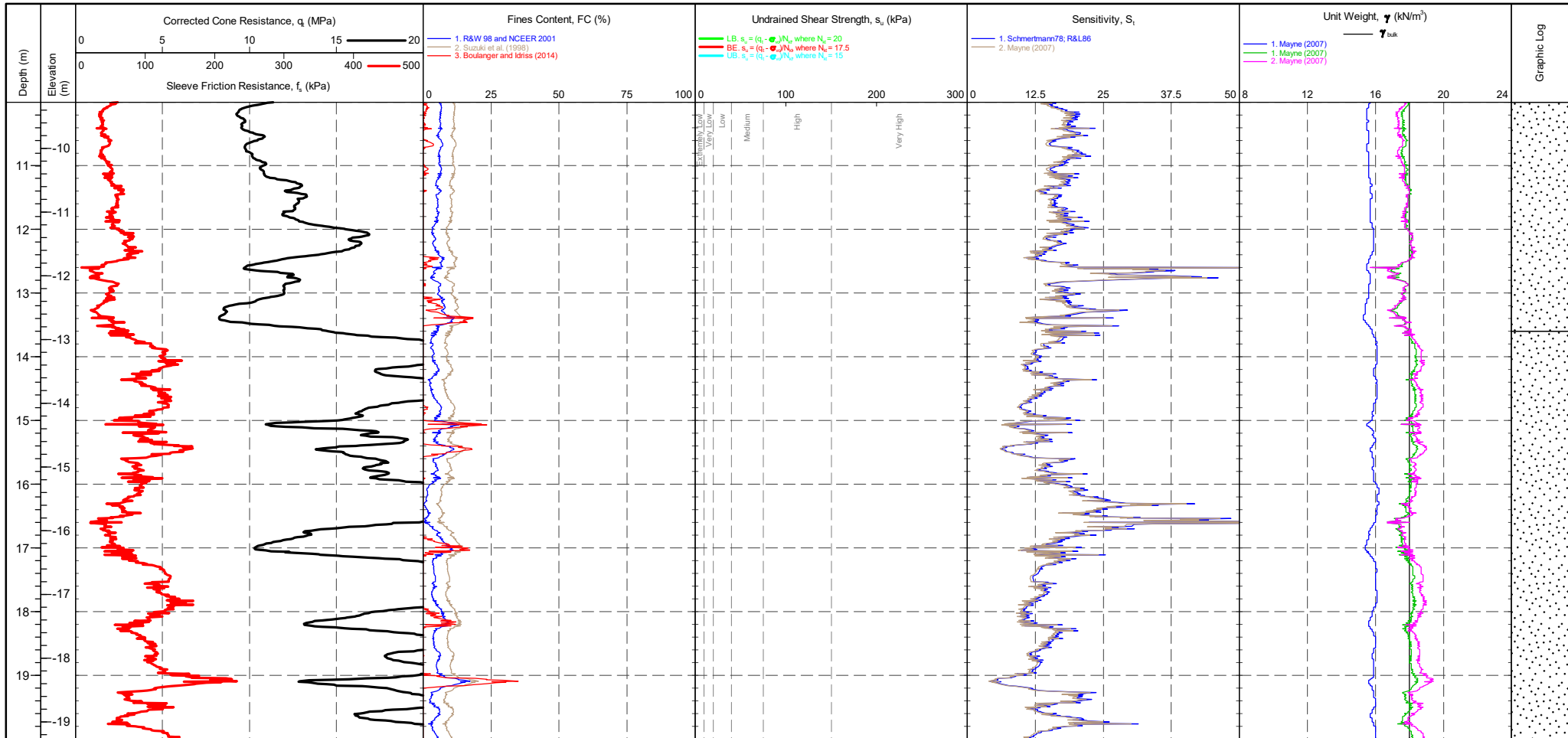
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 02**

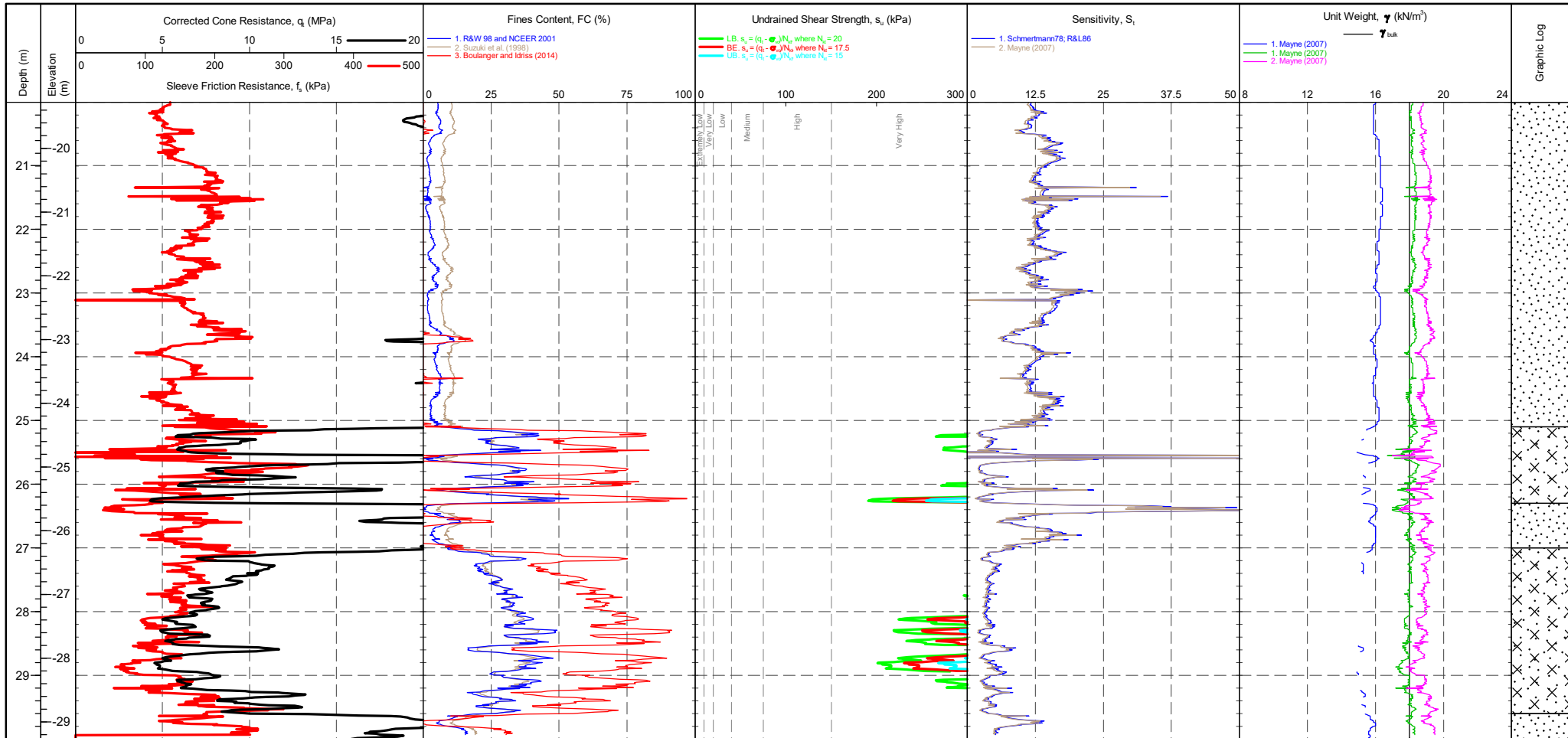
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip																							
Sleeve																							
Pore Pressure 2																							
X-Y Inclinometer																							

PointID  
**CPT 02**

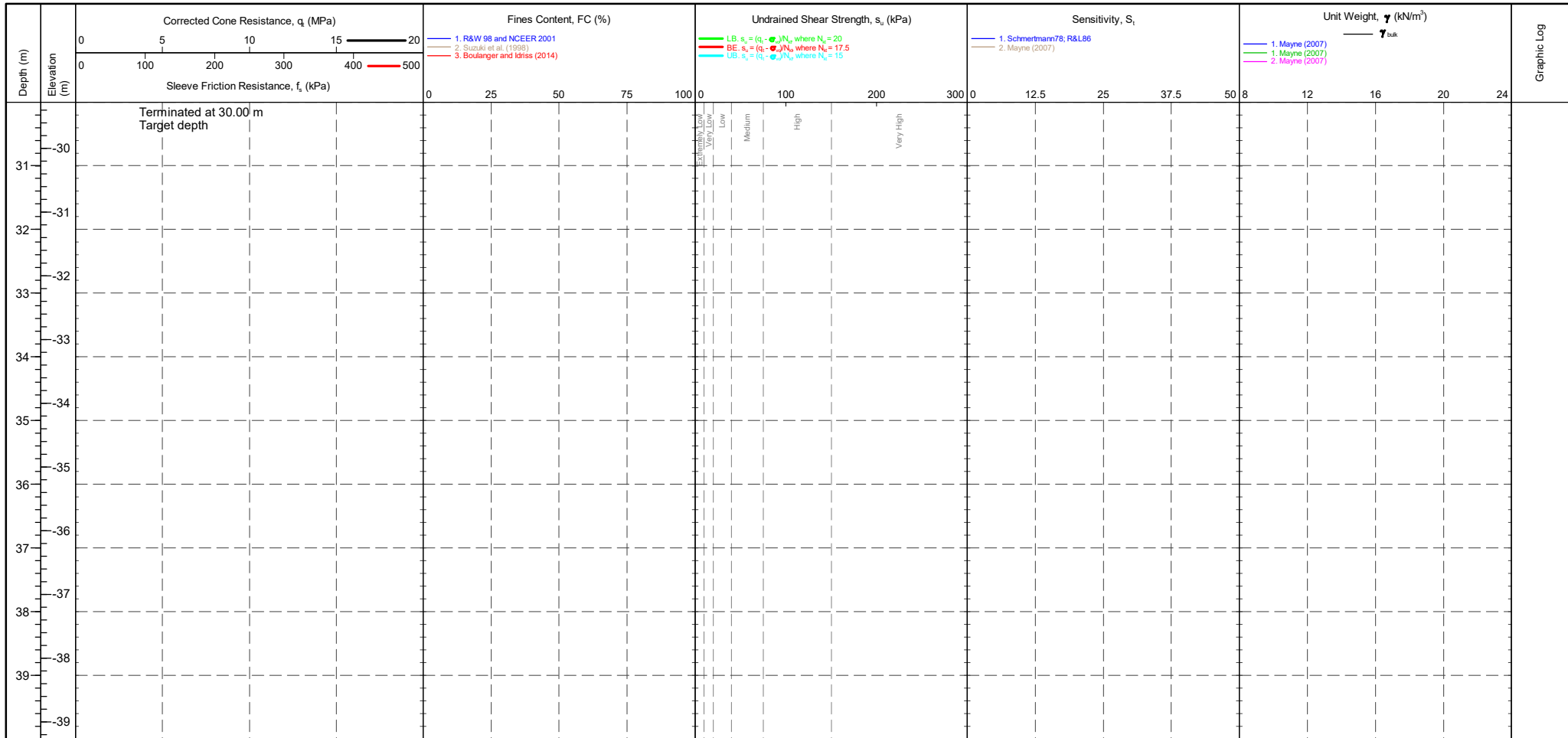
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 02**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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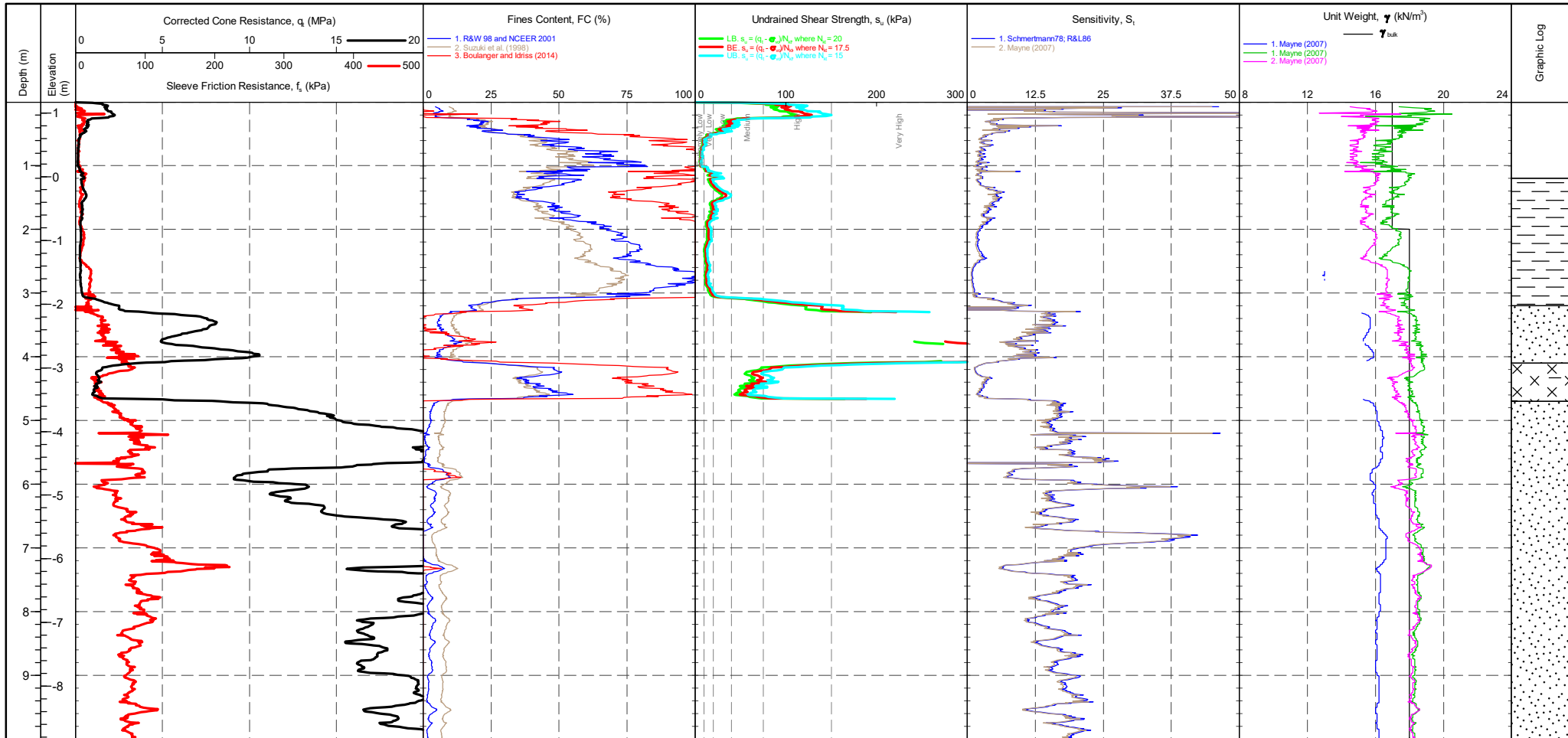


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

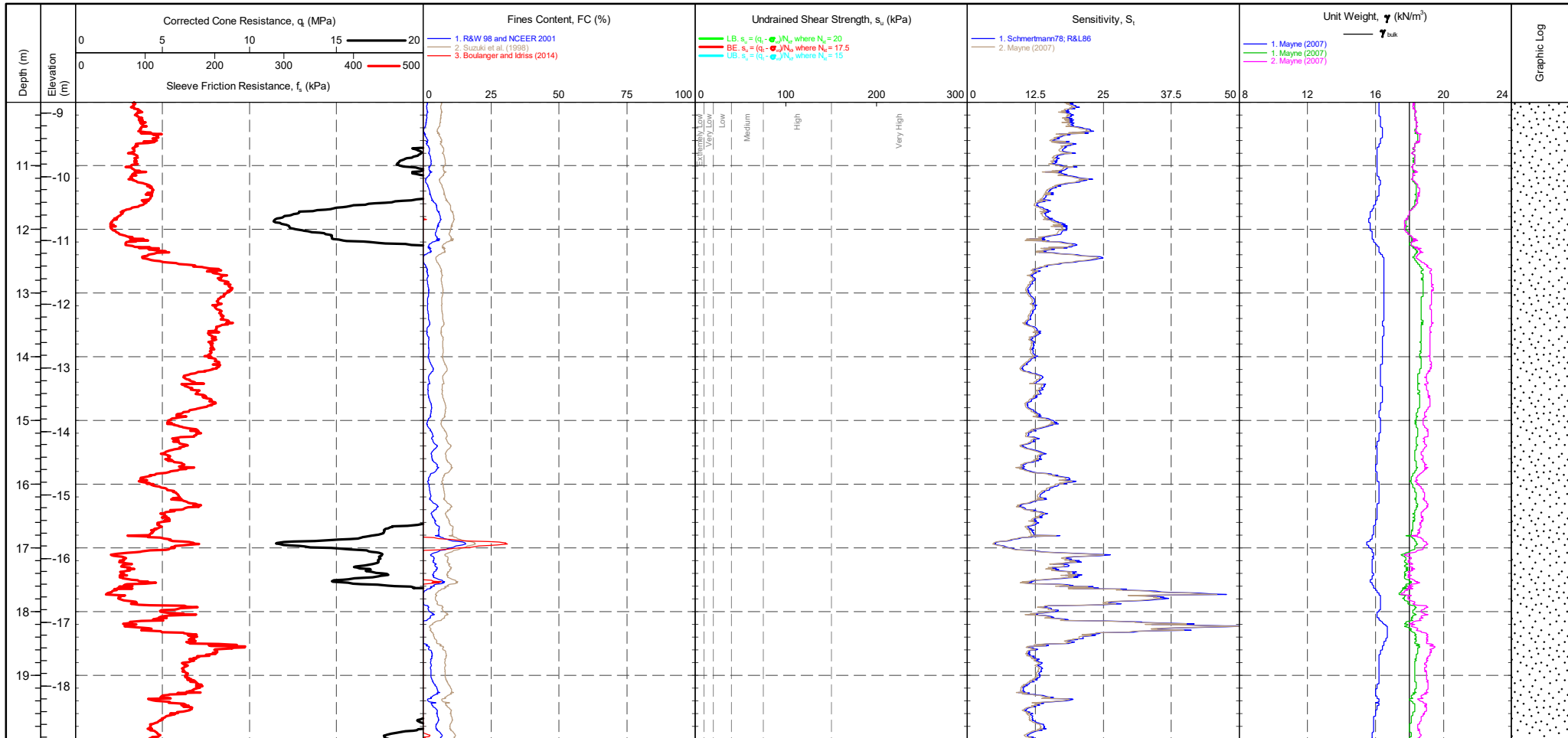
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

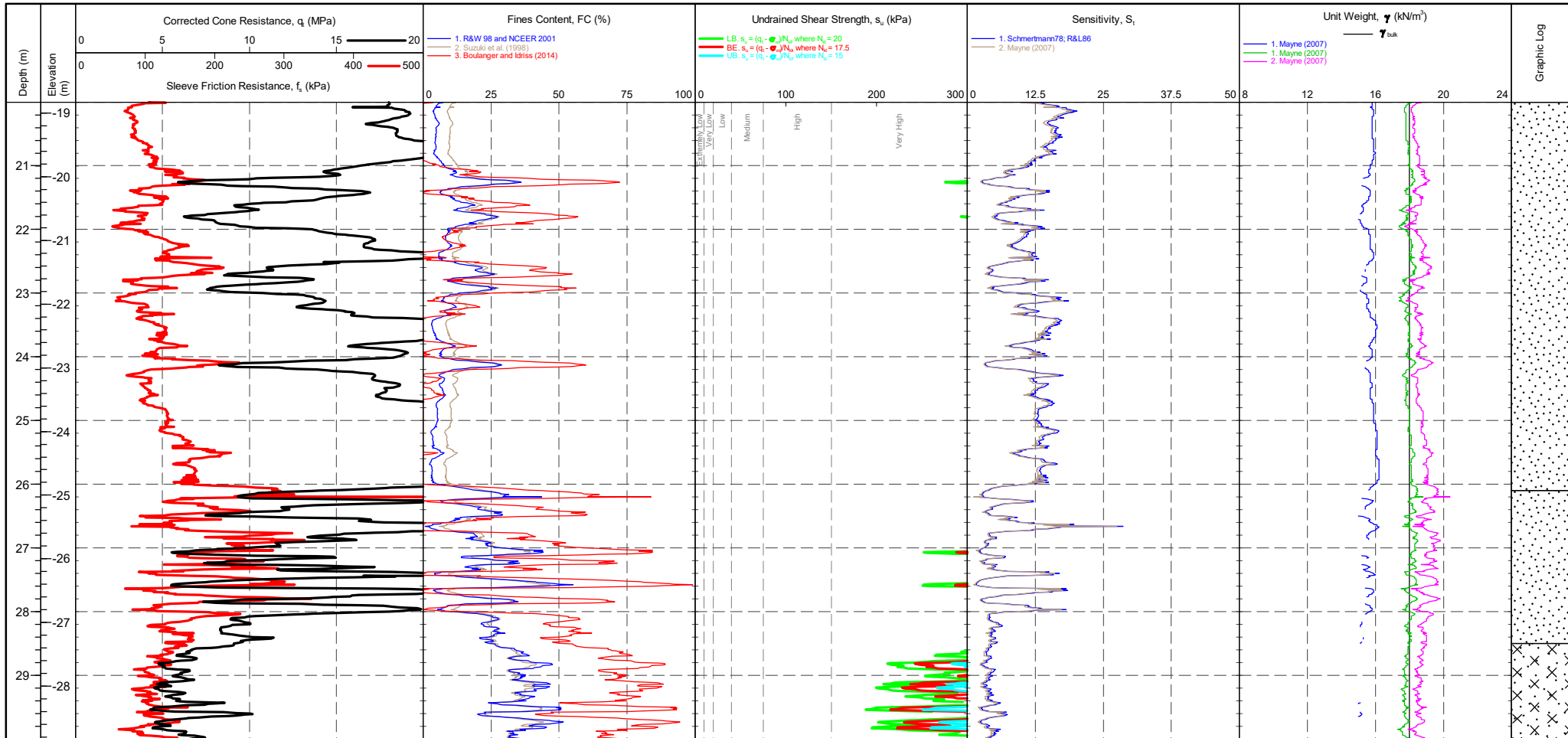
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

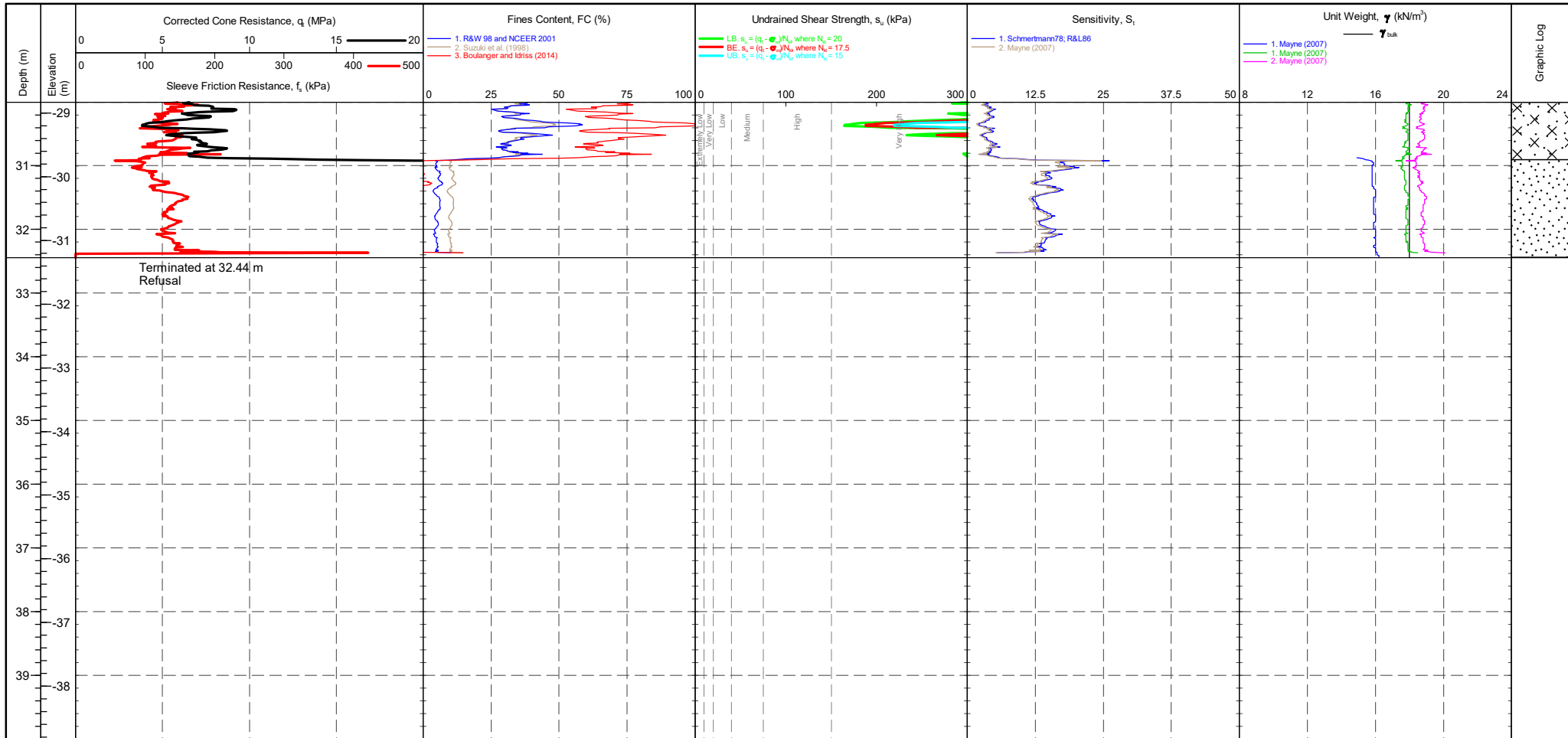
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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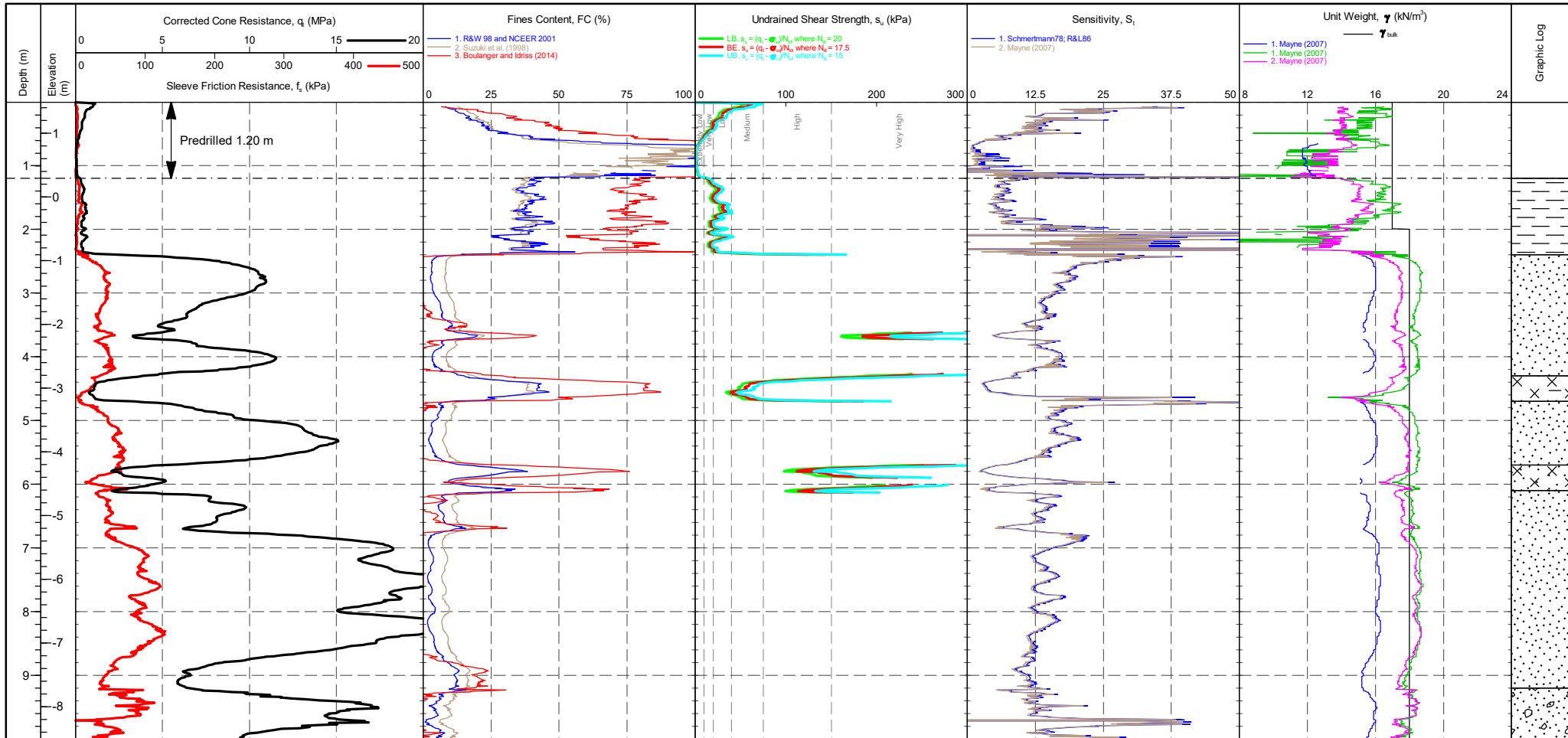


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 04**

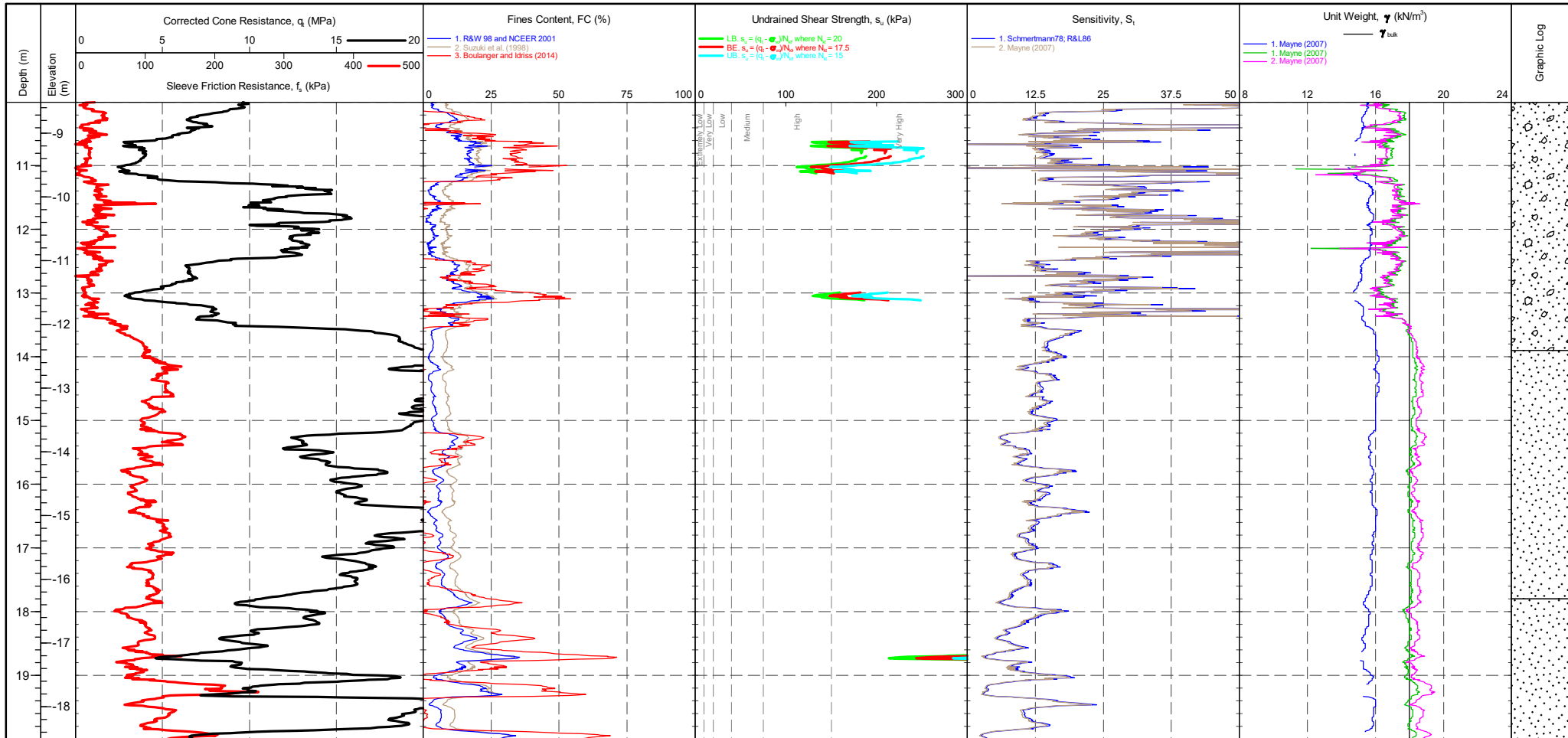
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 04**

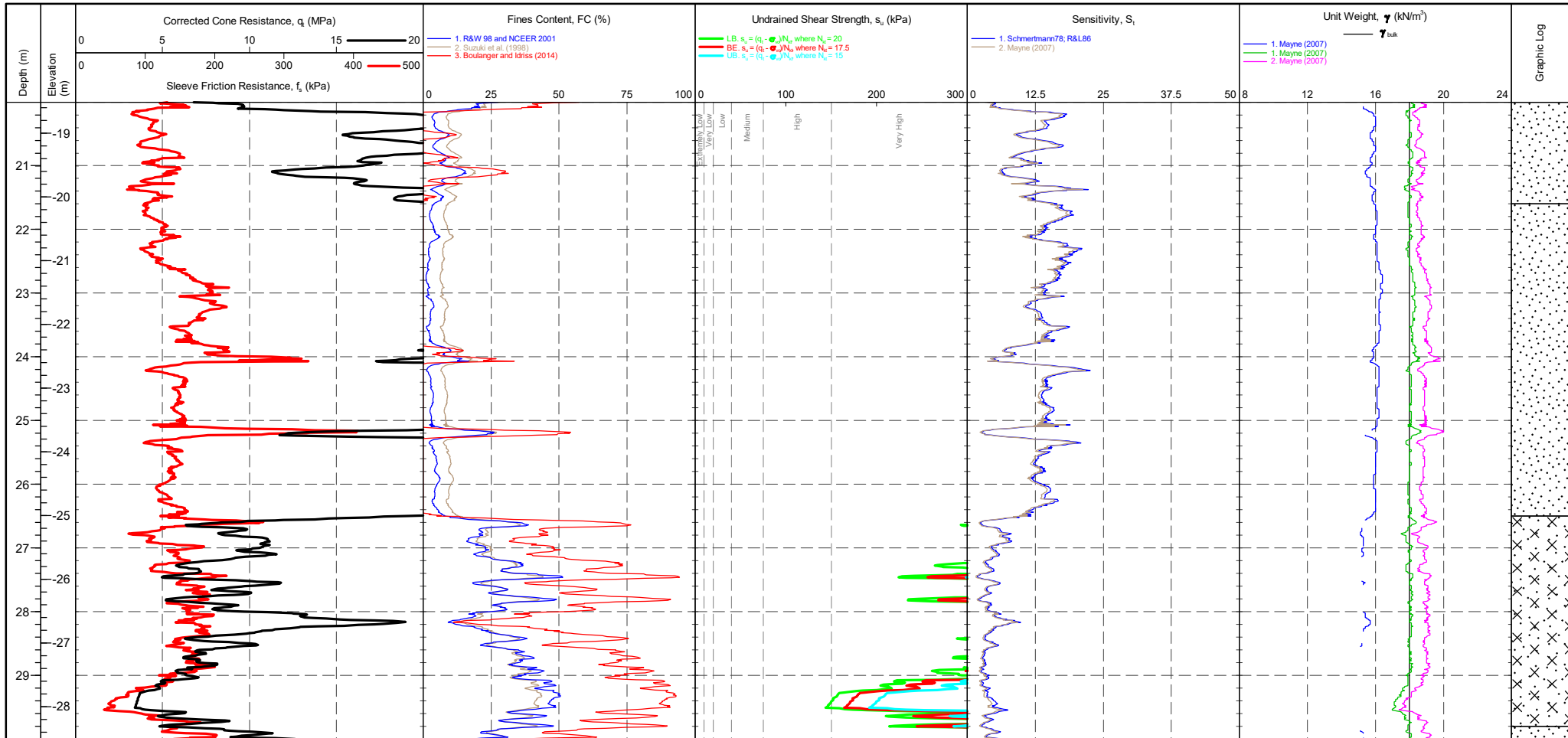
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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



<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <thead> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> </thead> <tbody> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip																							
Sleeve																							
Pore Pressure 2																							
X-Y Inclinometer																							

PointID  
**CPT 04**

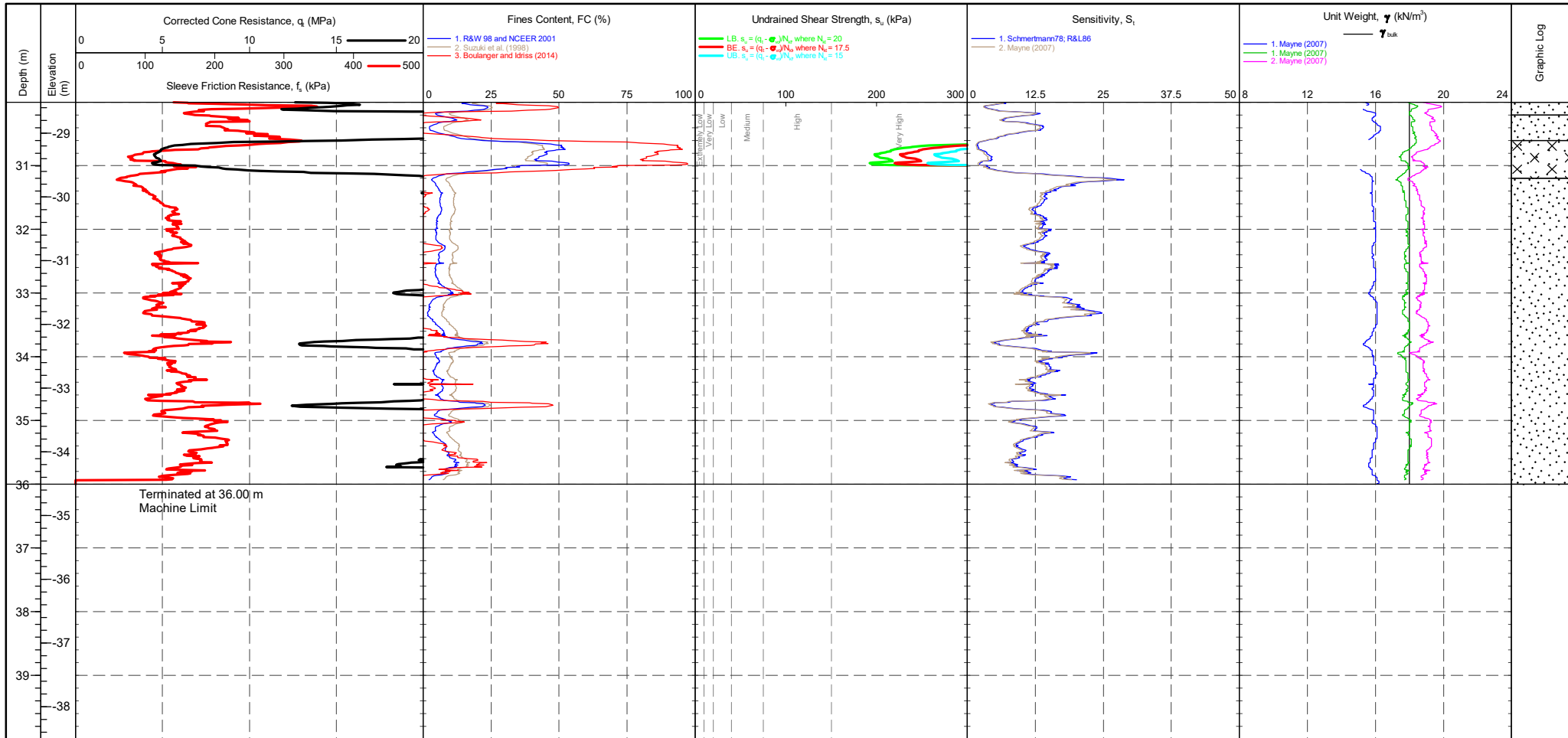
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Pre Post Difference	 Groundwater Level   Dissipation Test
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PointID : **CPT 04**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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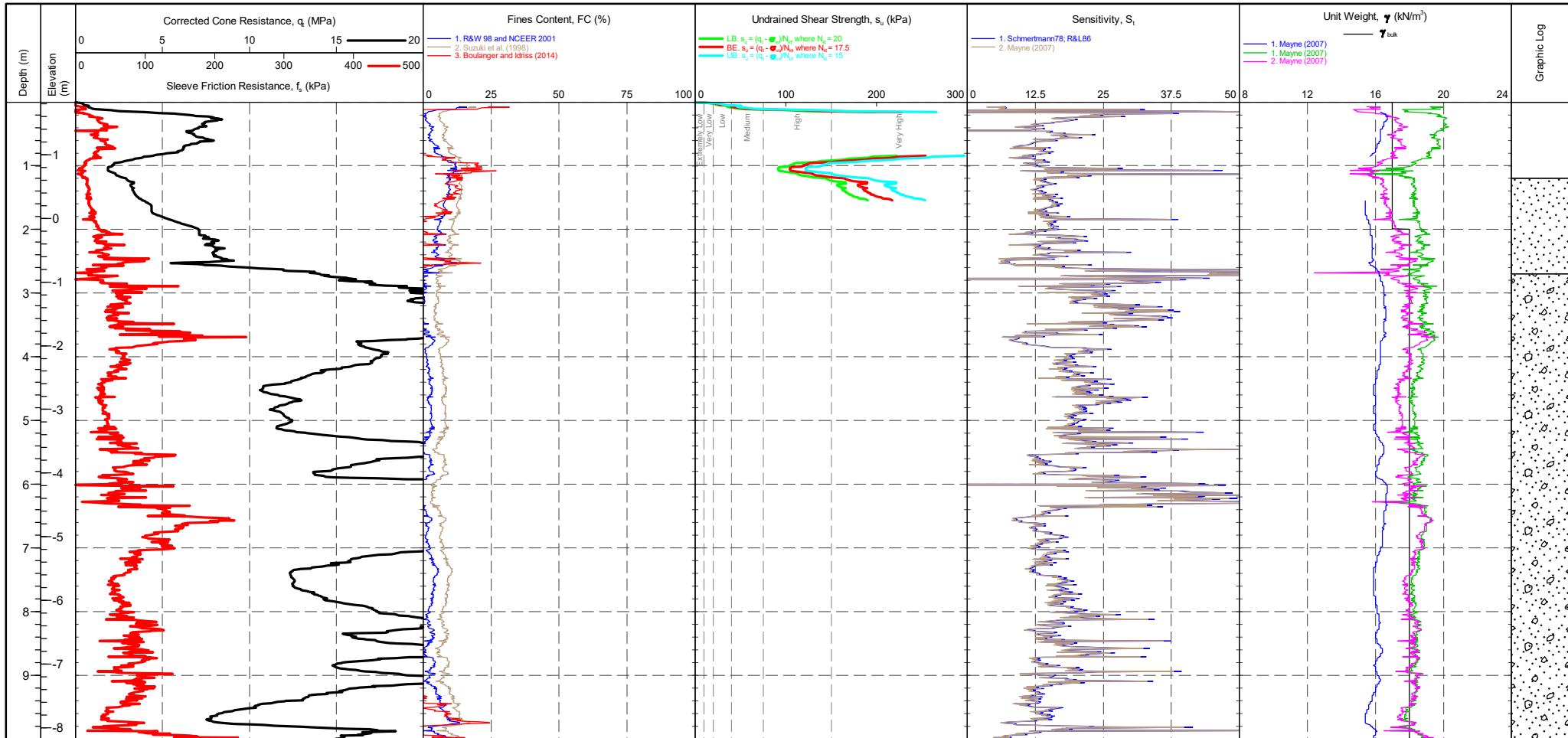


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PointID  
**CPT 05**

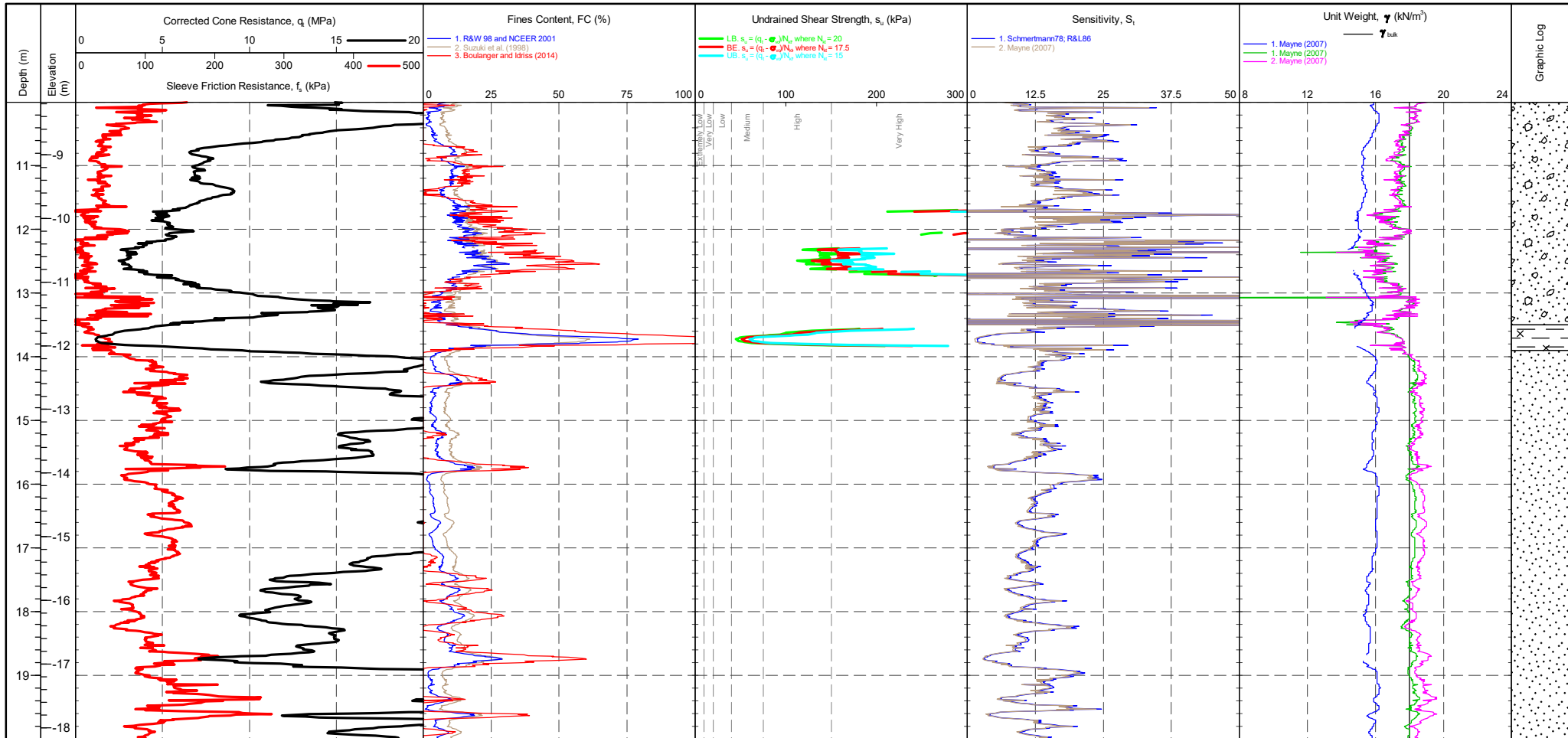
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer      Pre      Post      Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

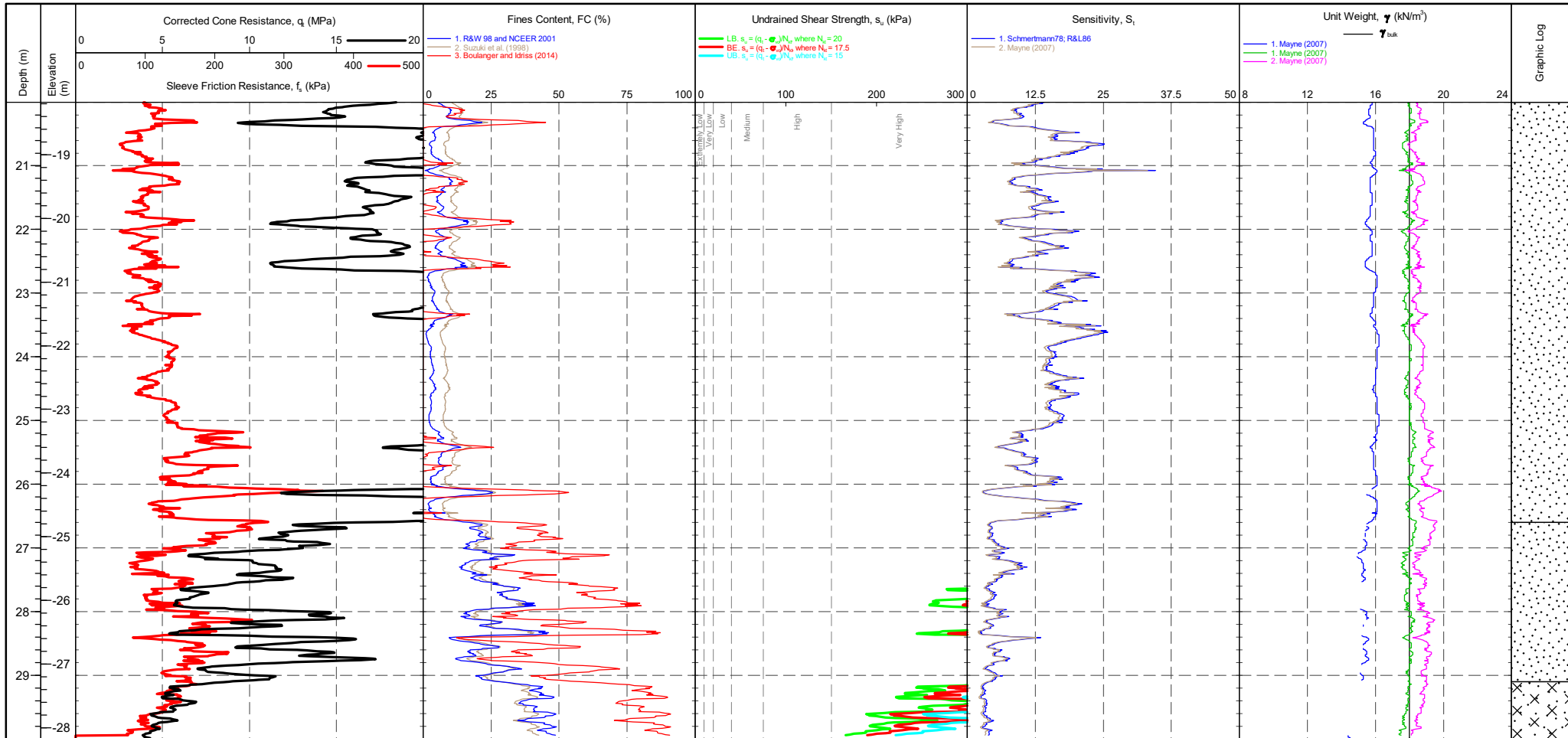
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer      Pre      Post      Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

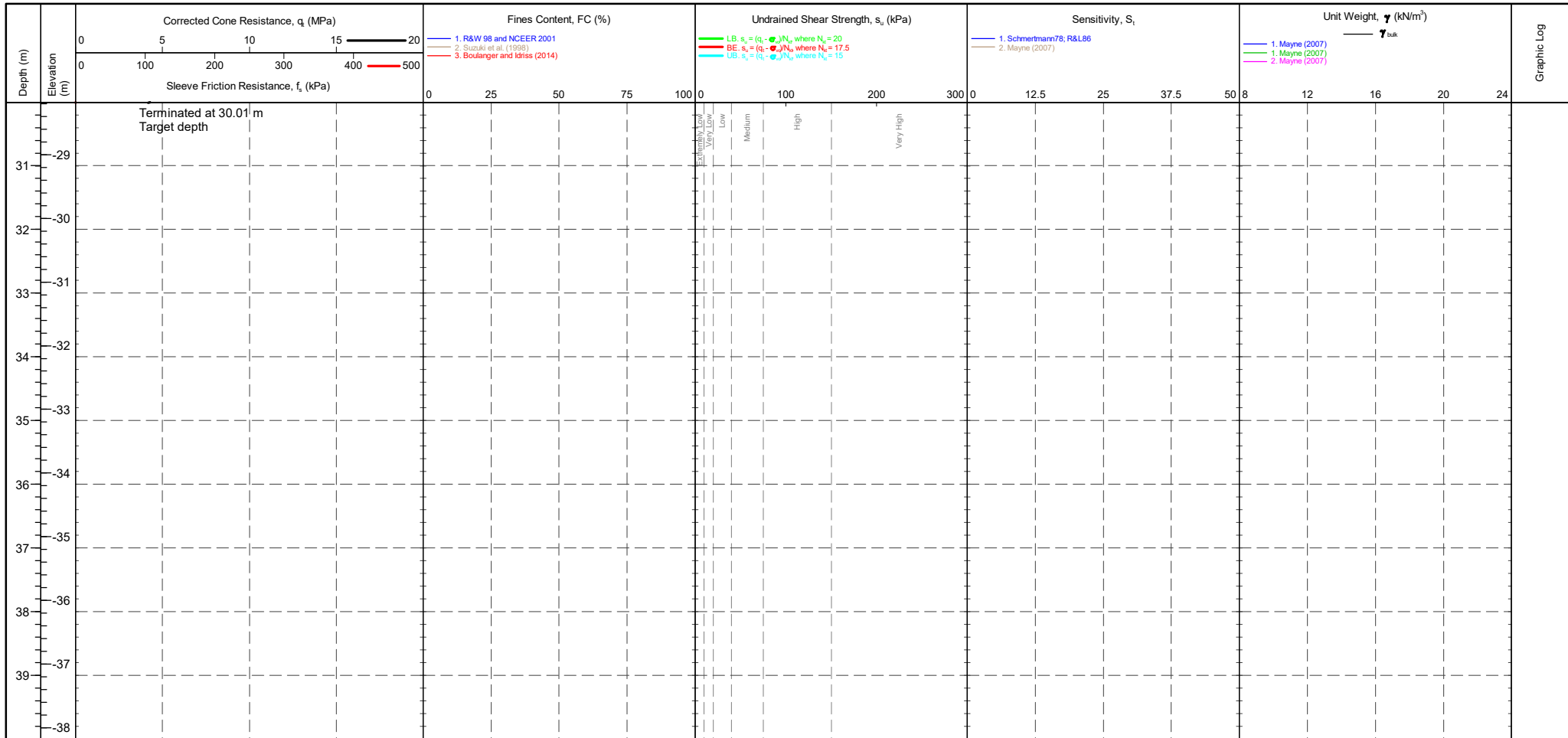
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>Transducer</b> Tip Sleeve Pore Pressure 2 X-Y Inclinometer	<b>CPTU ZERO VALUES</b> Pre Post Difference	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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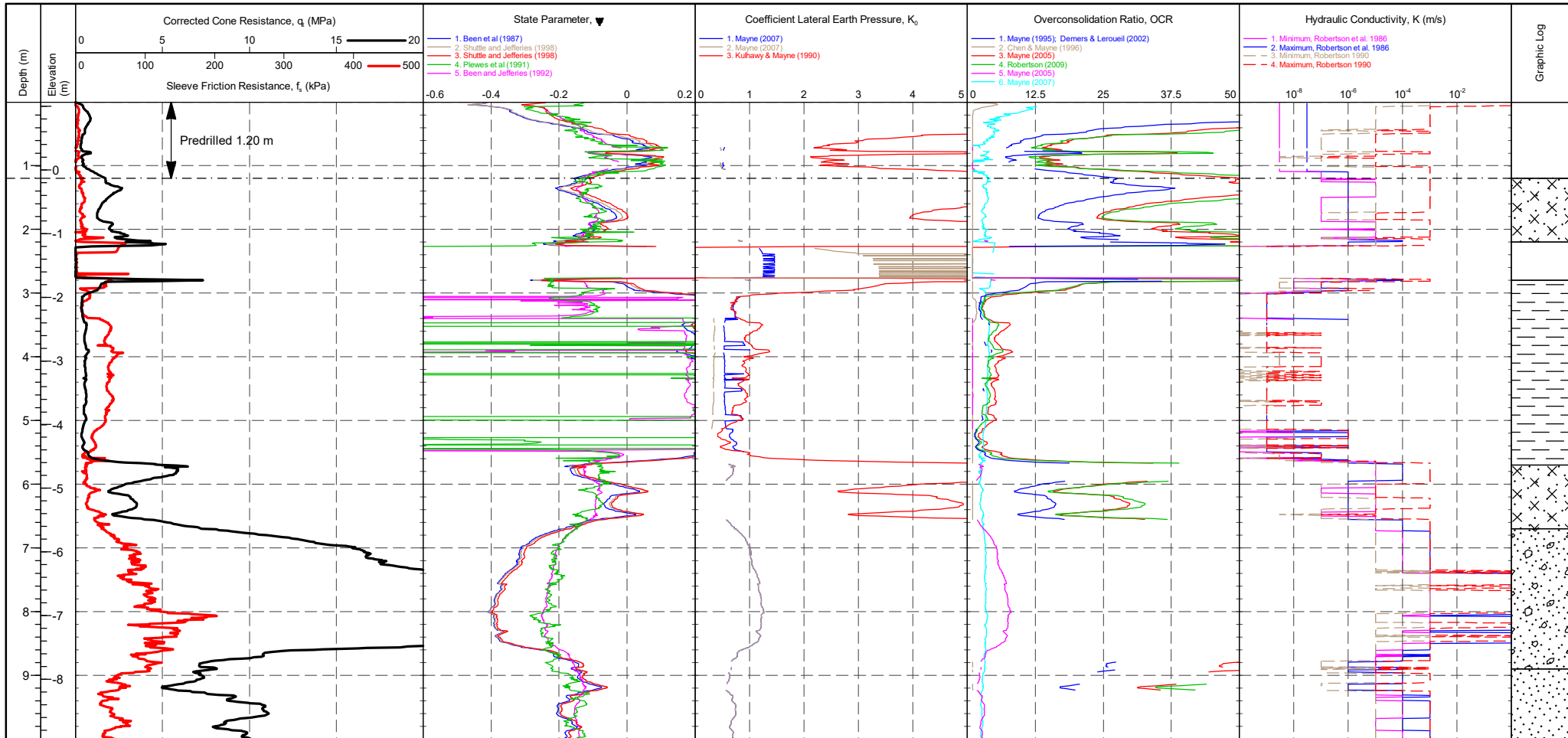


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PointID  
**CPT 01**

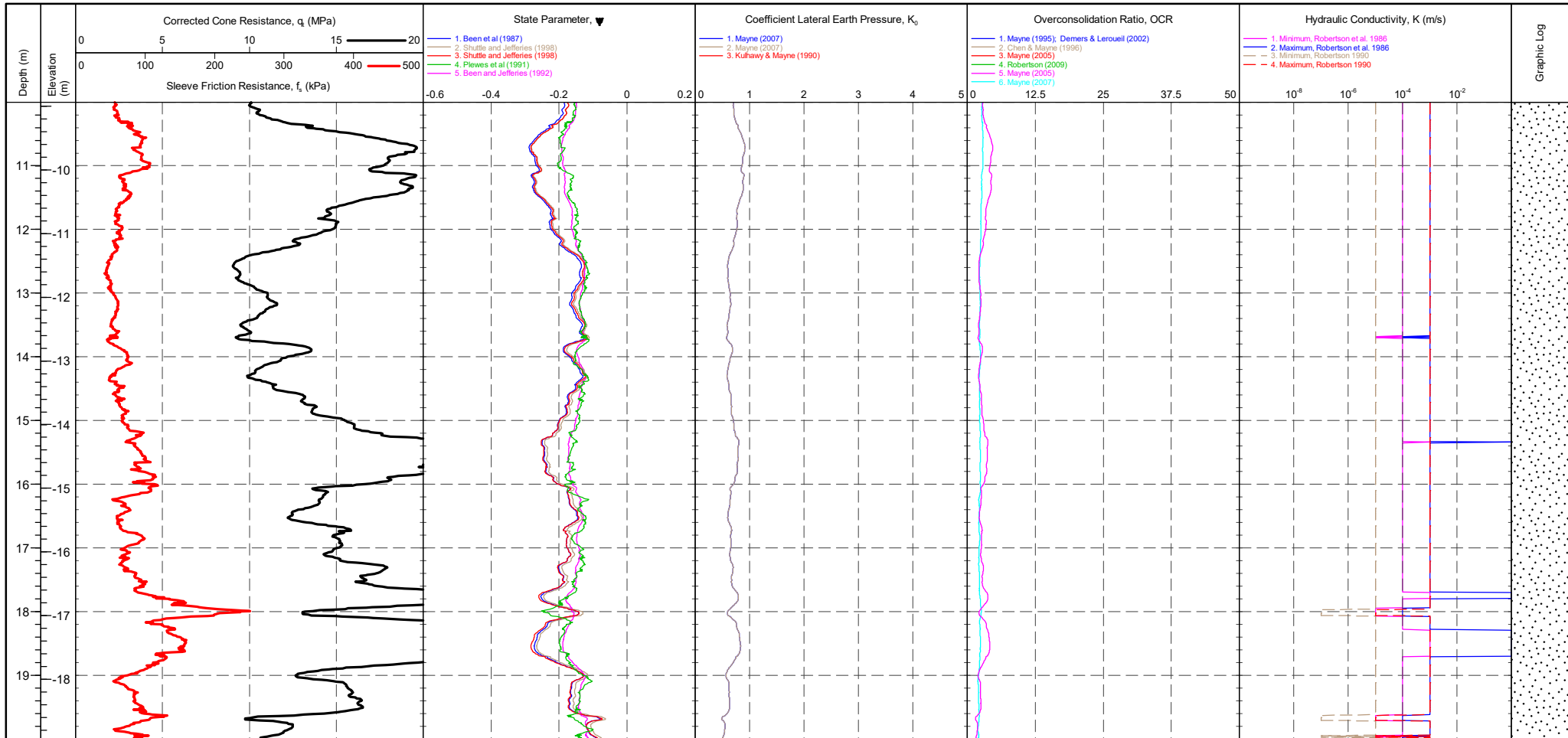
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer : Tip : Sleeve : Pore Pressure 2 : X-Y Inclinometer :	Pre : Post : Difference :	Groundwater Level Dissipation Test
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PointID : **CPT 01**

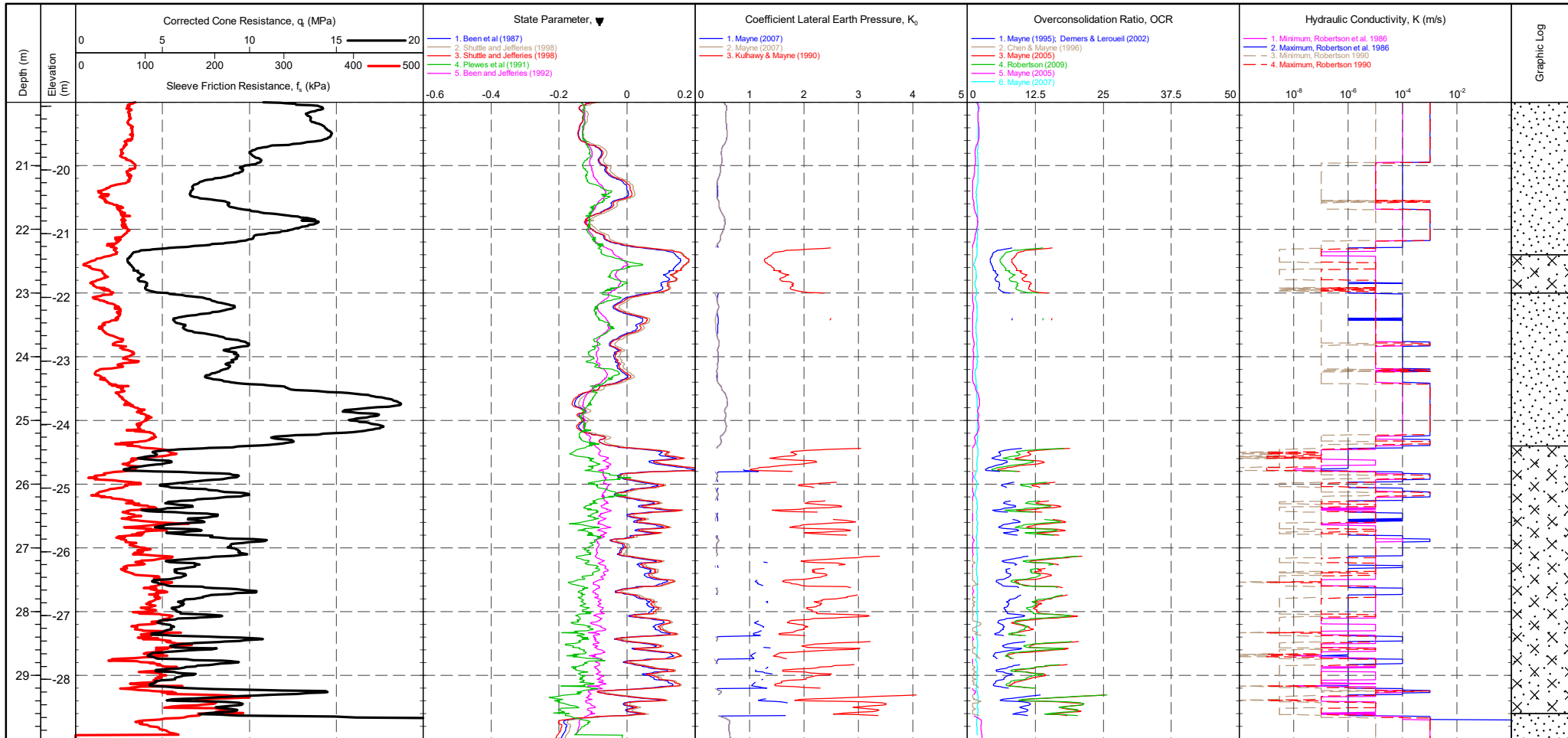
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <thead> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> </thead> <tbody> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
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Tip																							
Sleeve																							
Pore Pressure 2																							
X-Y Inclinometer																							

PointID  
**CPT 01**

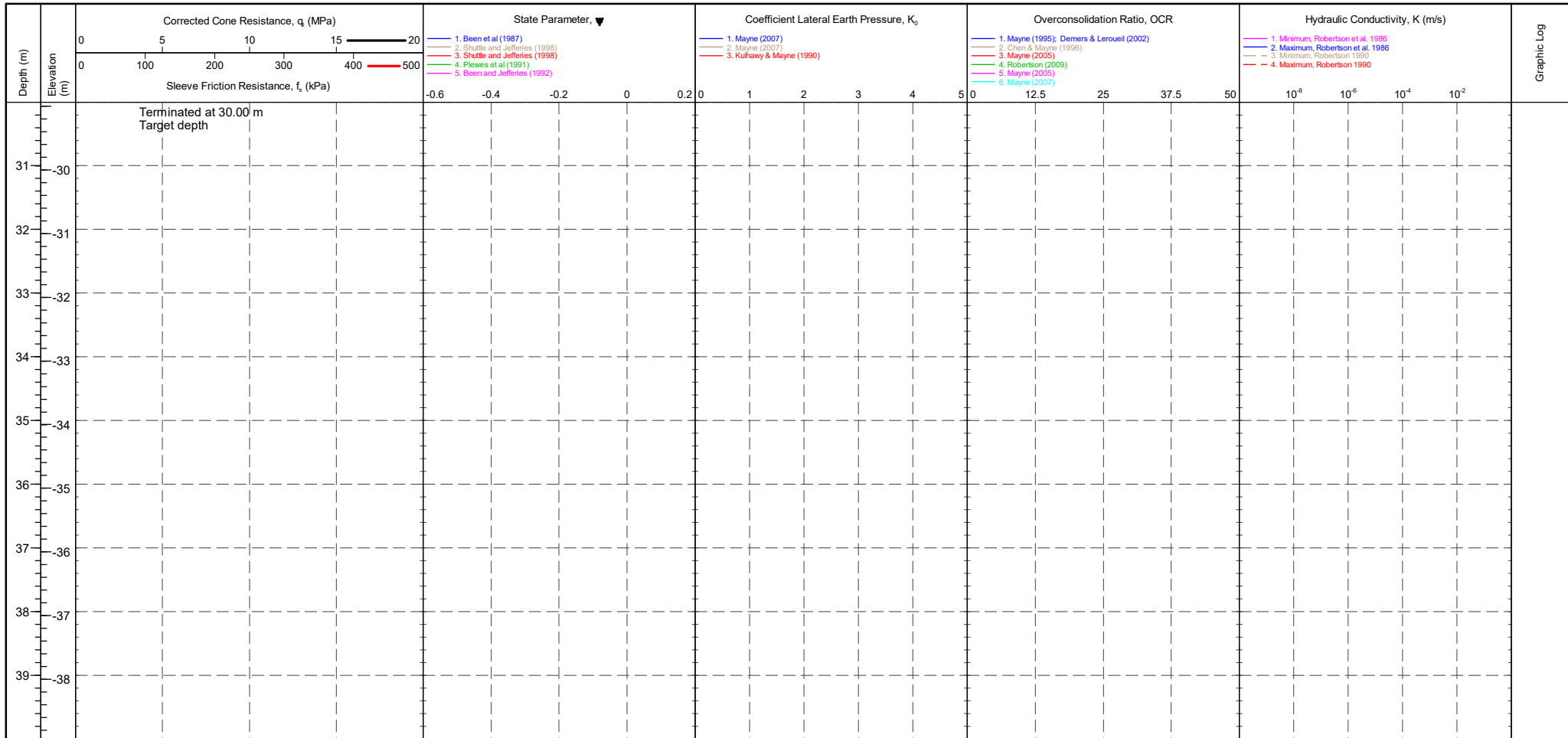
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Pre      Post      Difference	Groundwater Level Dissipation Test
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PointID  
**CPT 01**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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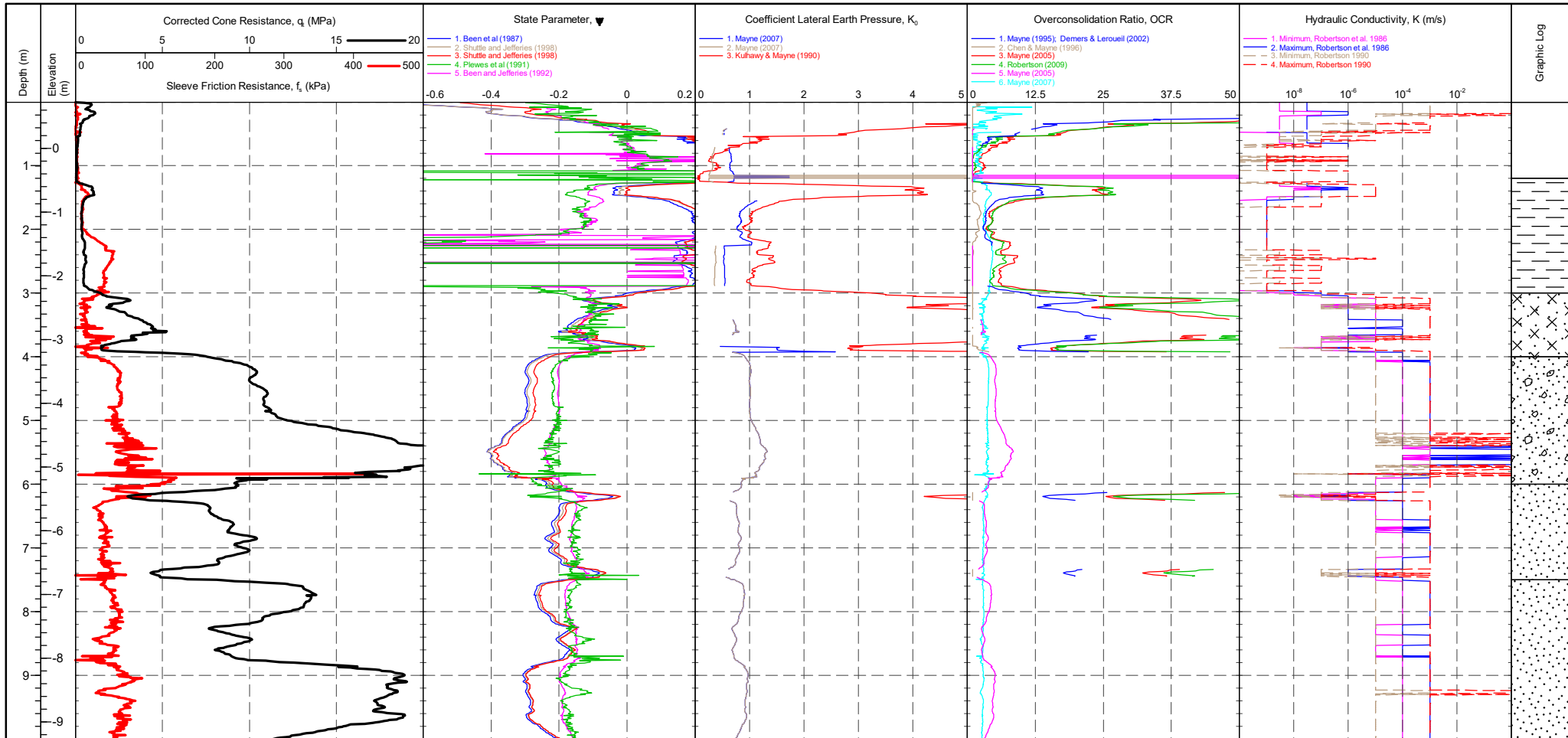


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 02**

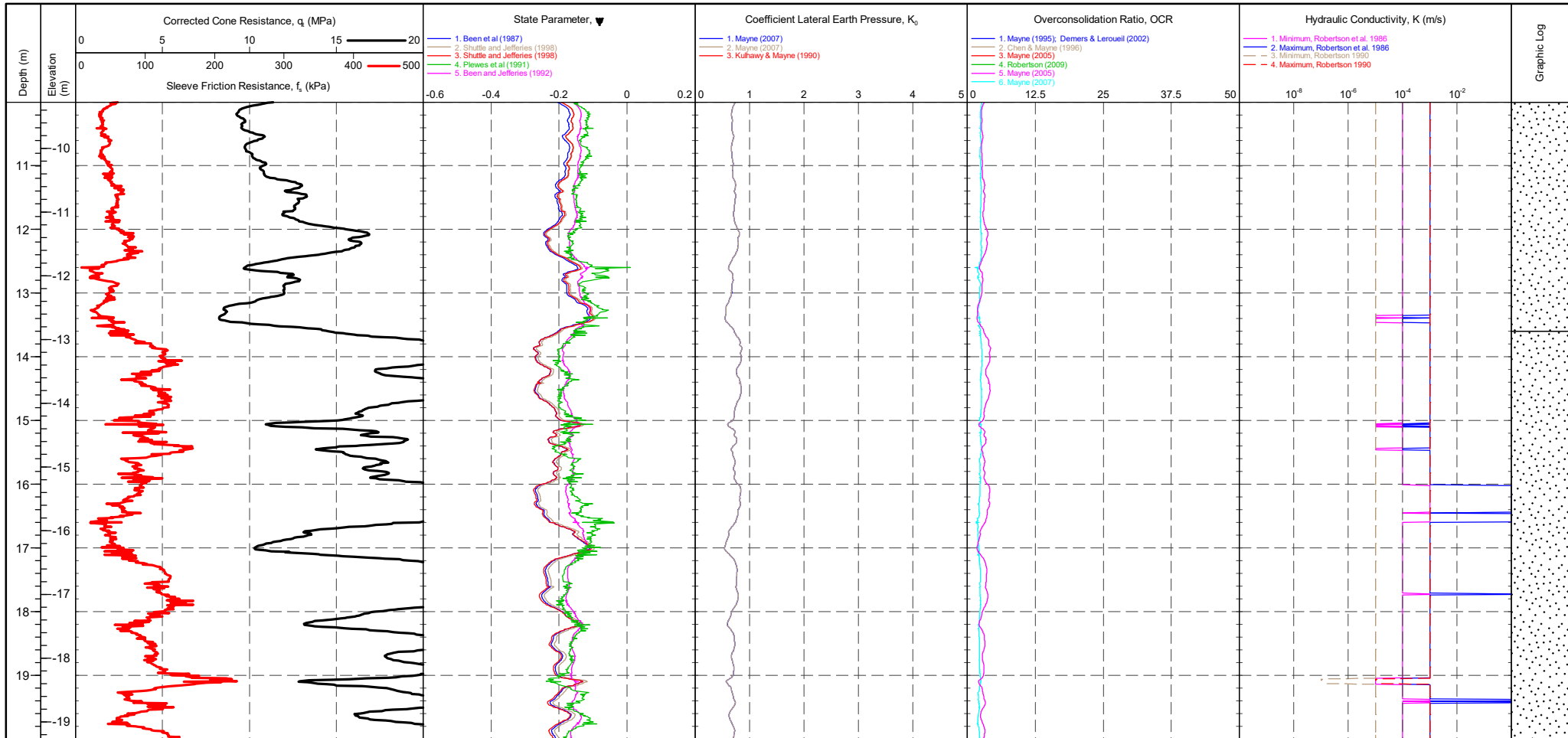
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
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Tip																							
Sleeve																							
Pore Pressure 2																							
X-Y Inclinometer																							

PointID : **CPT 02**

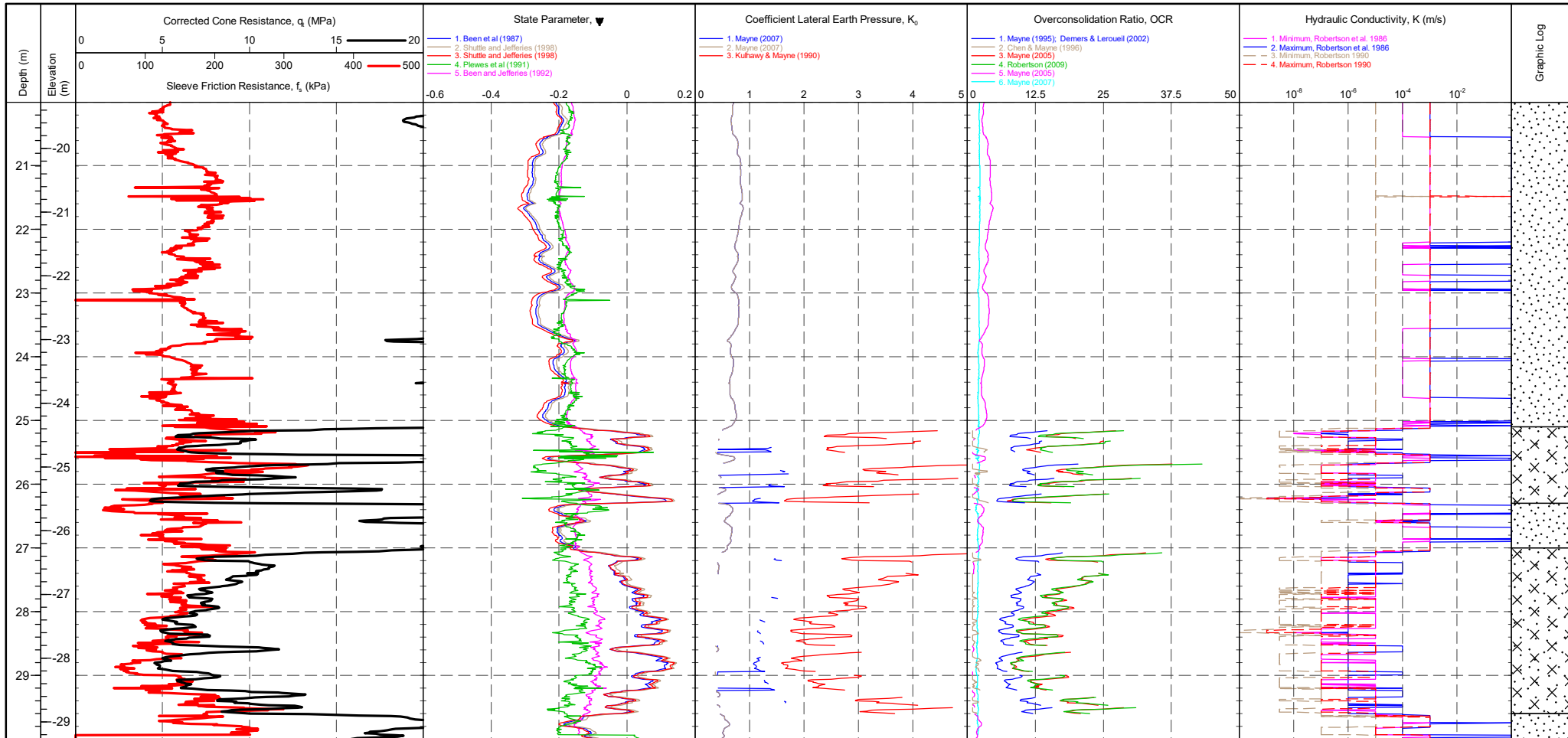
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer : Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 02**

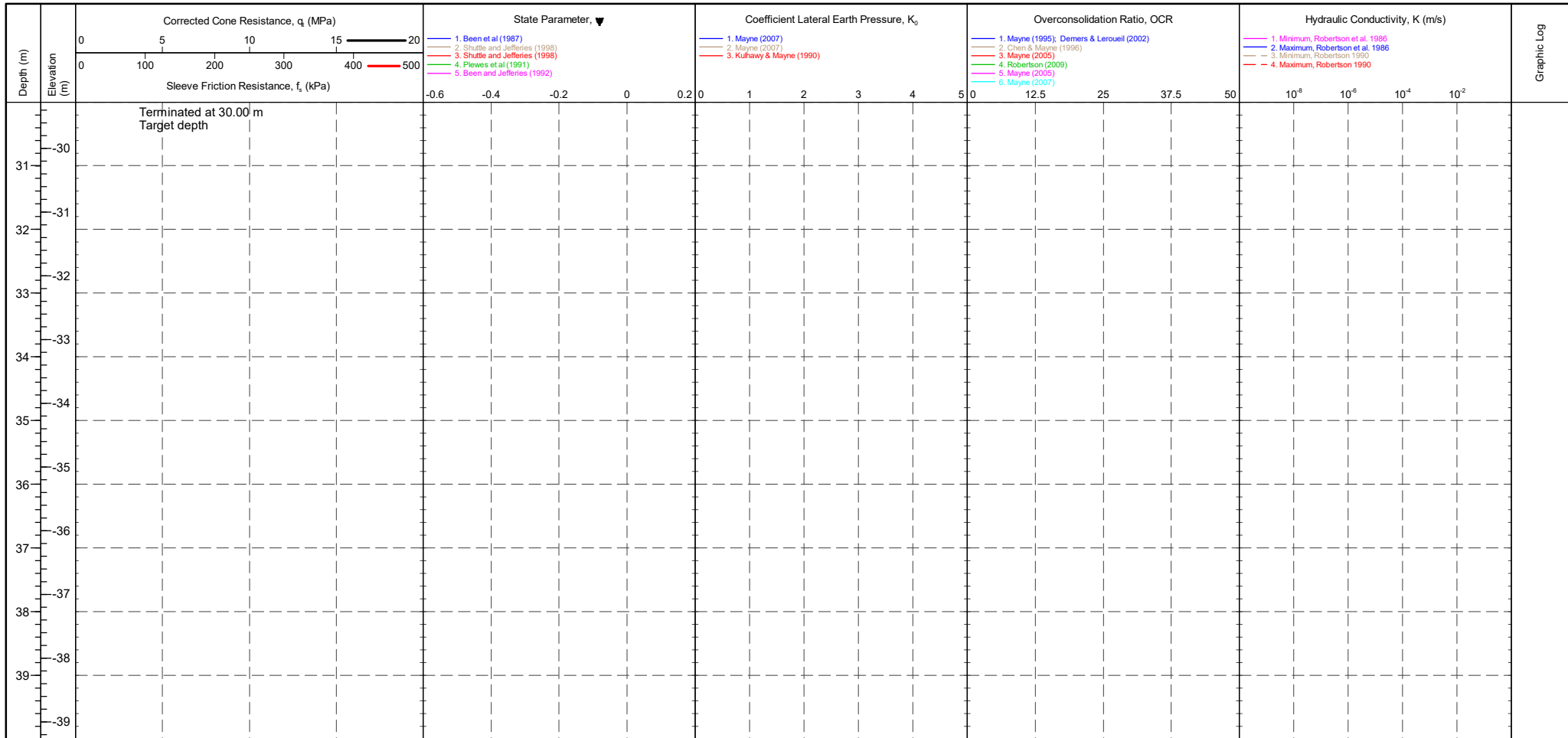
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <thead> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> </thead> <tbody> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
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Tip																							
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PointID  
**CPT 02**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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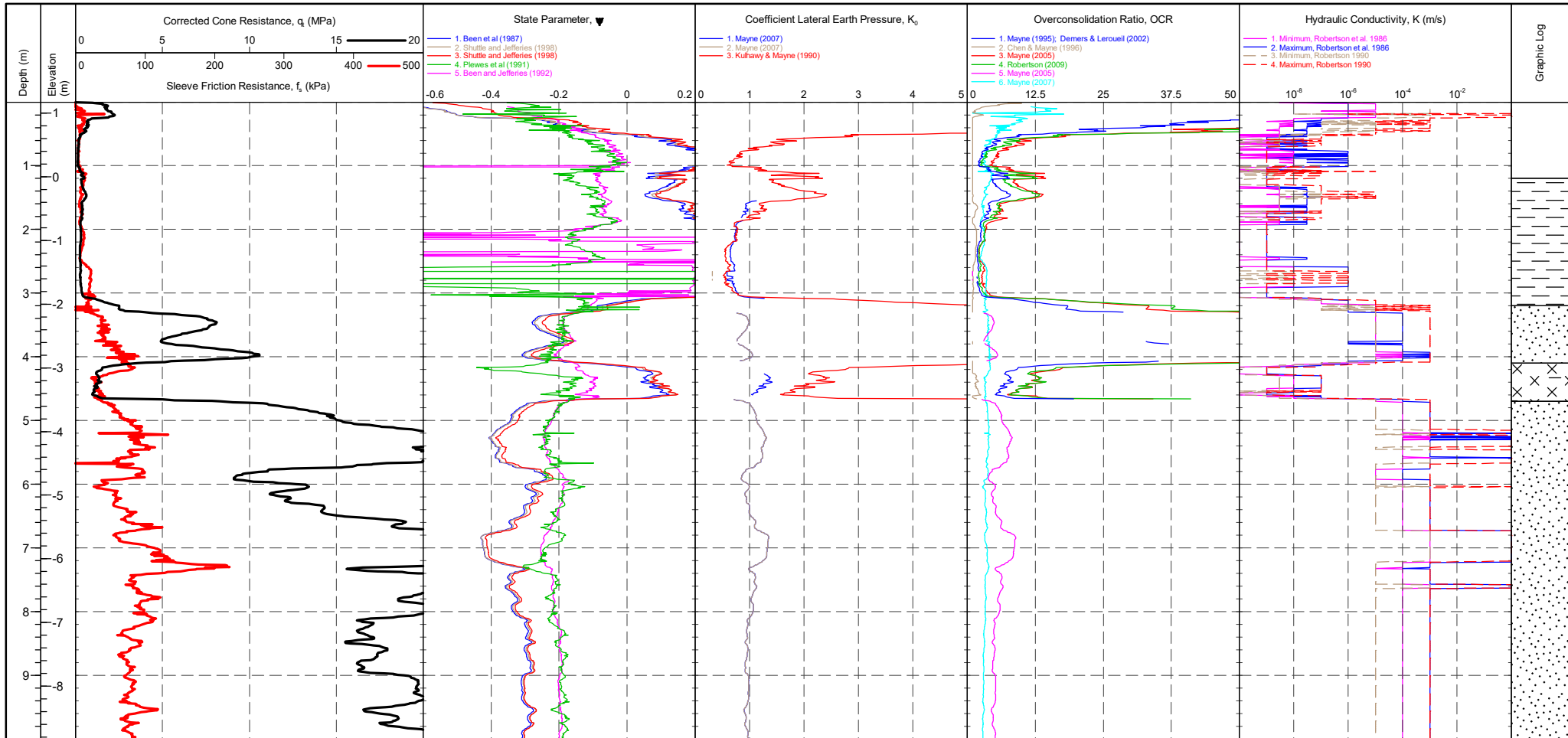


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

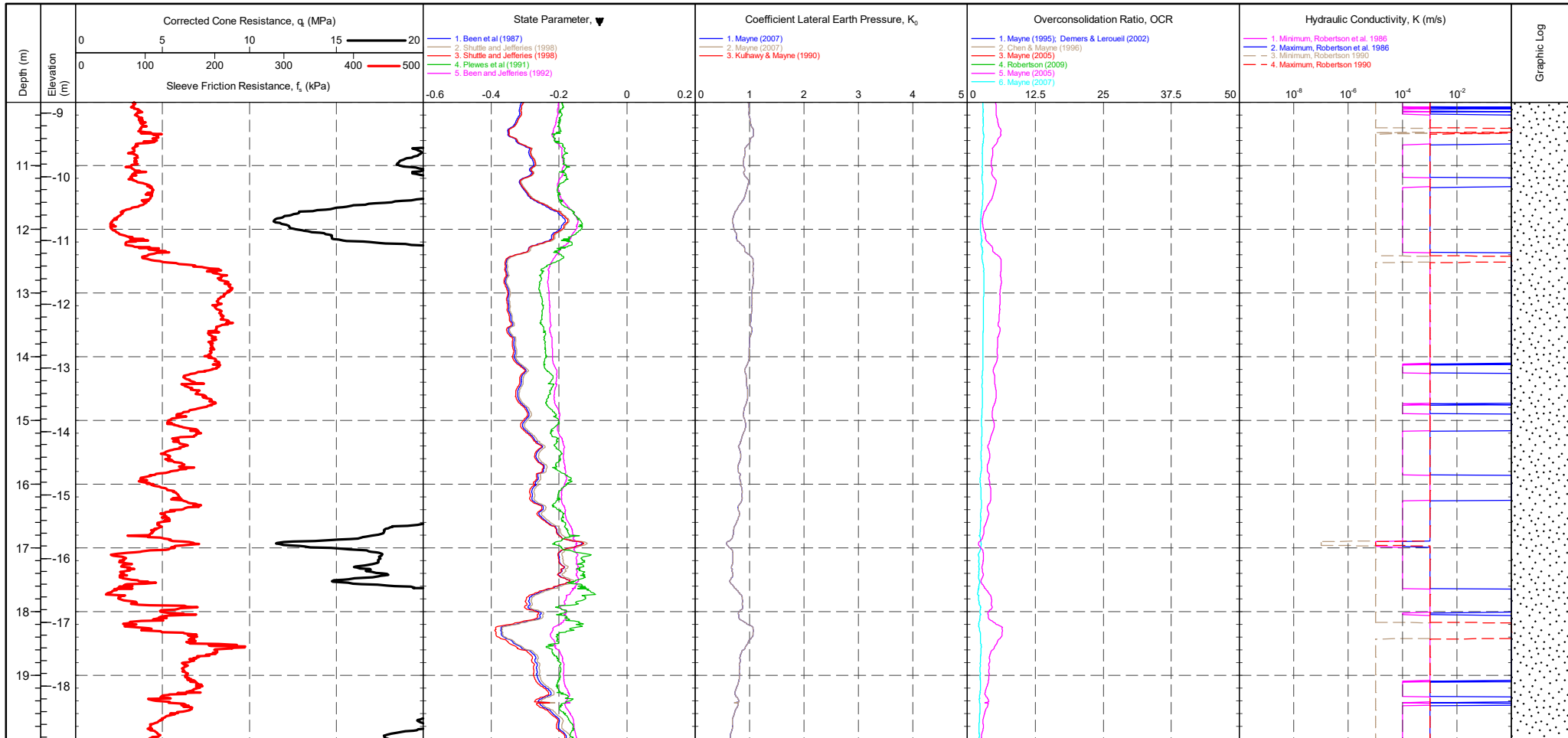
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Pre Post Difference	Groundwater Level Dissipation Test
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PointID : **CPT 03**

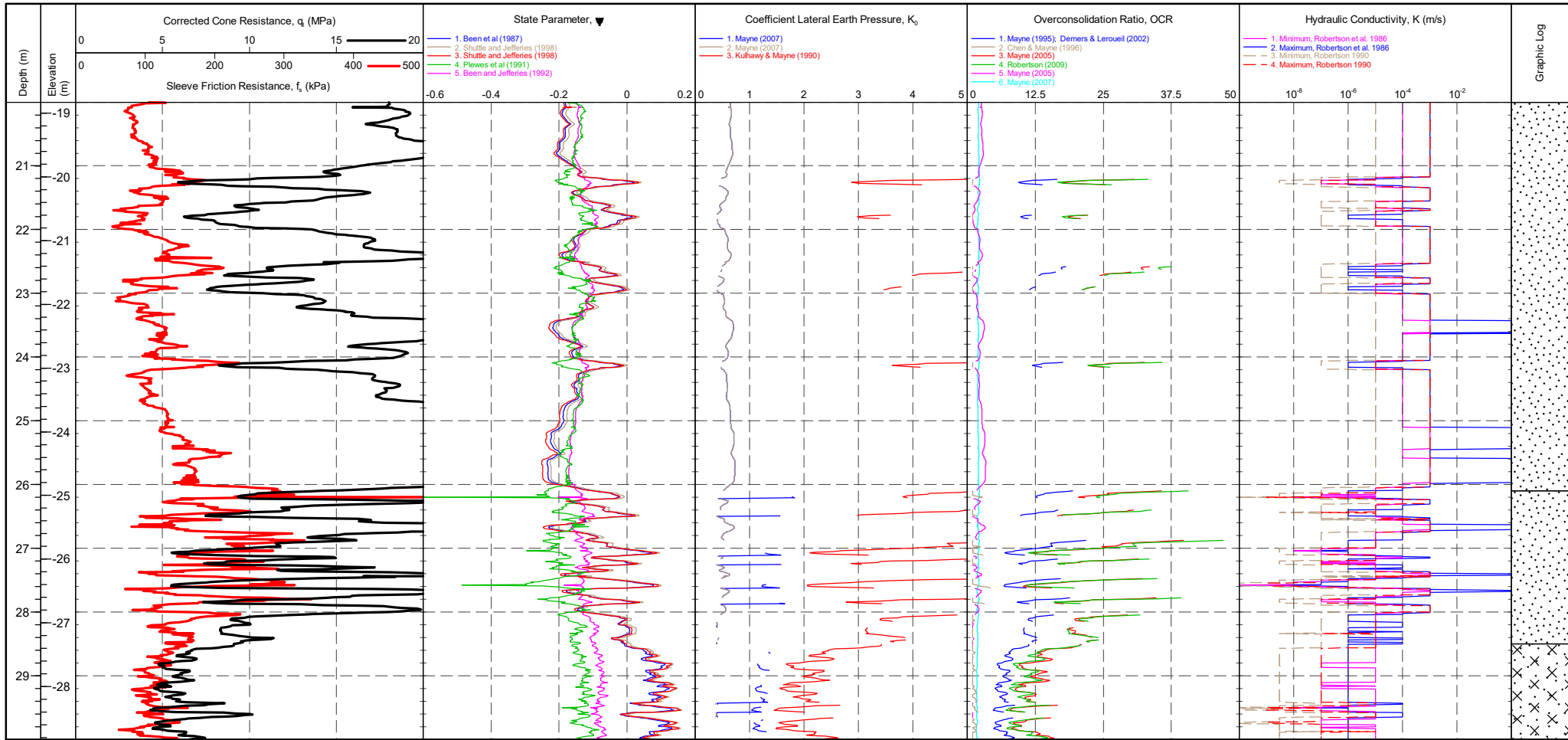
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip																							
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Pore Pressure 2																							
X-Y Inclinometer																							

PointID  
**CPT 03**

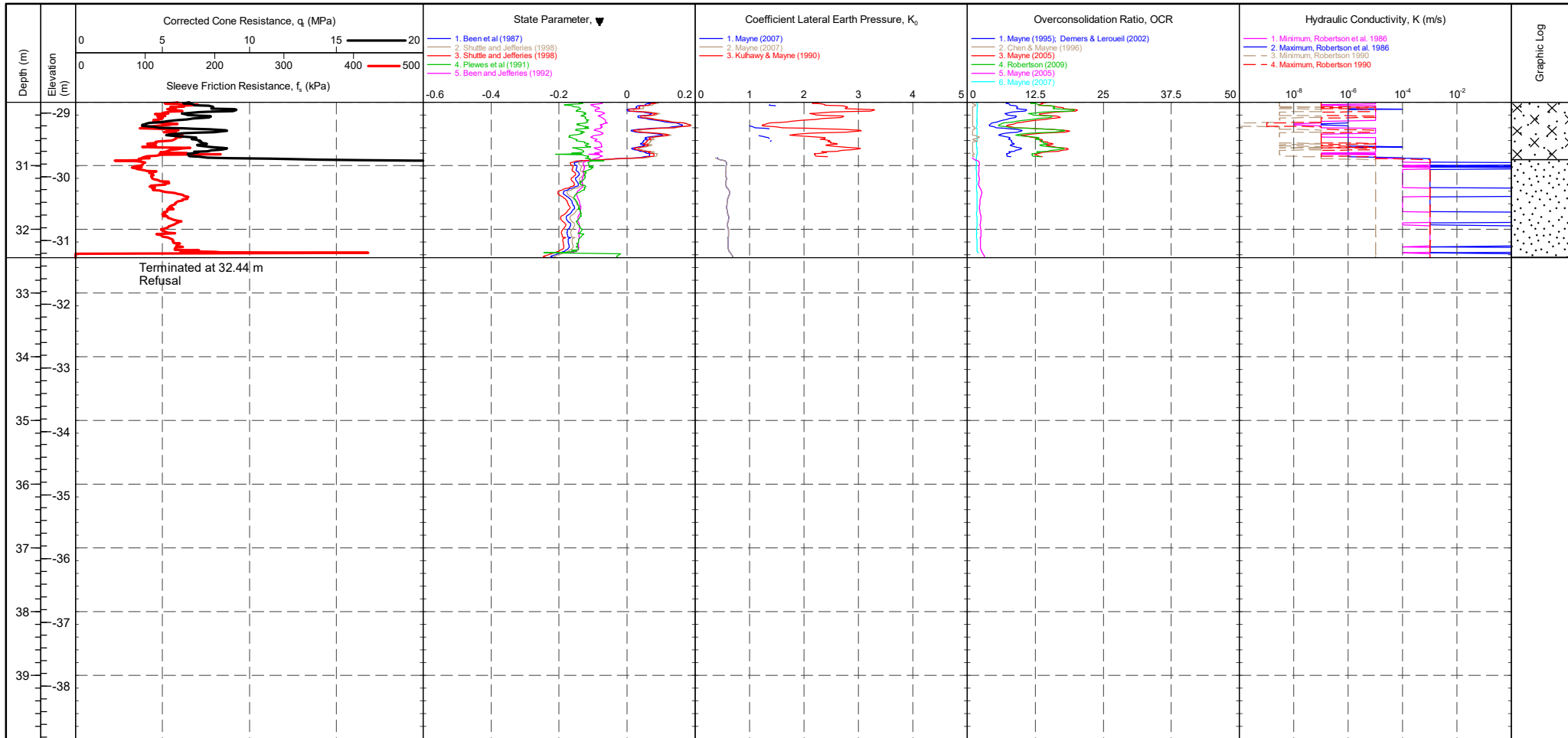
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Pre      Post      Difference	Groundwater Level Dissipation Test
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PointID : **CPT 03**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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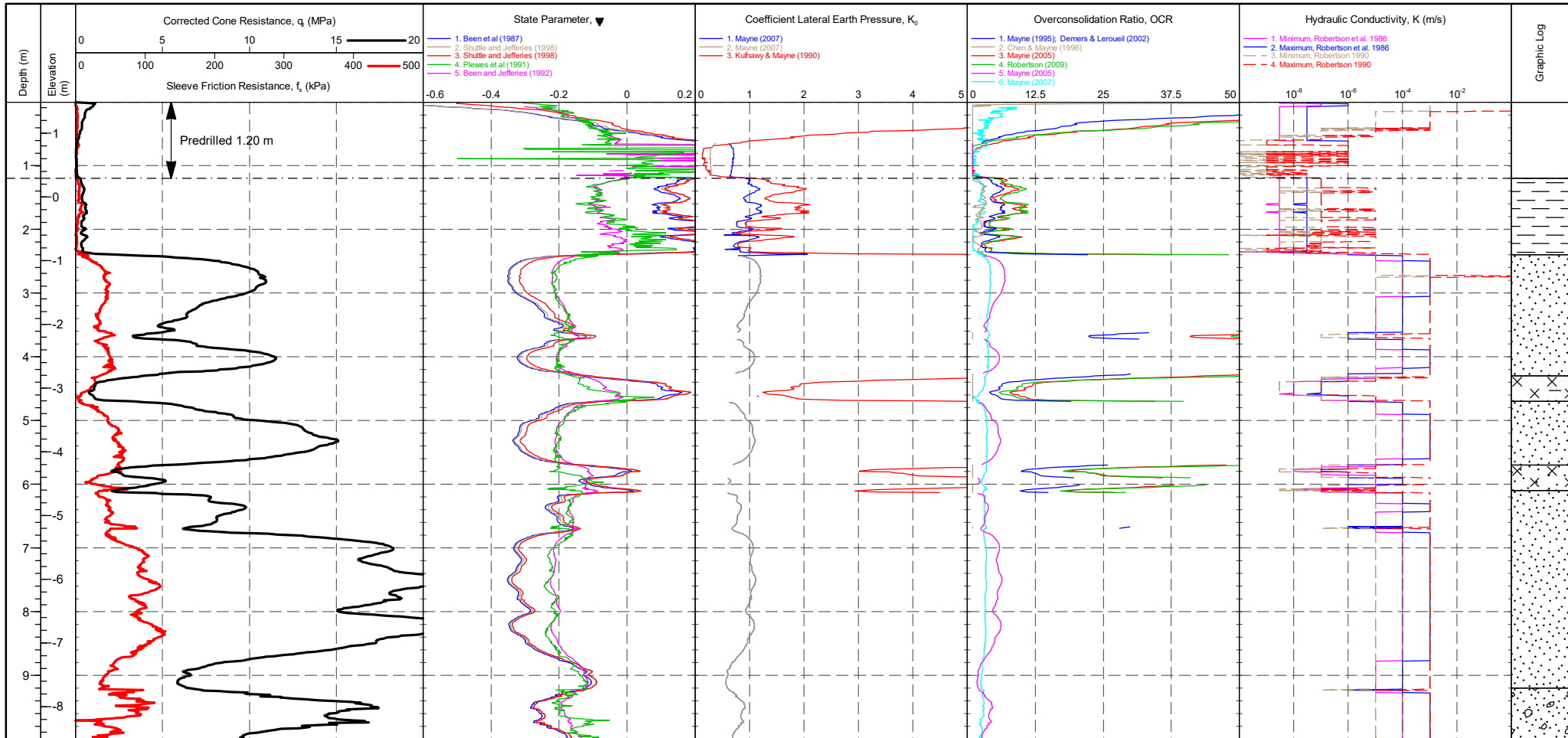


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 04**

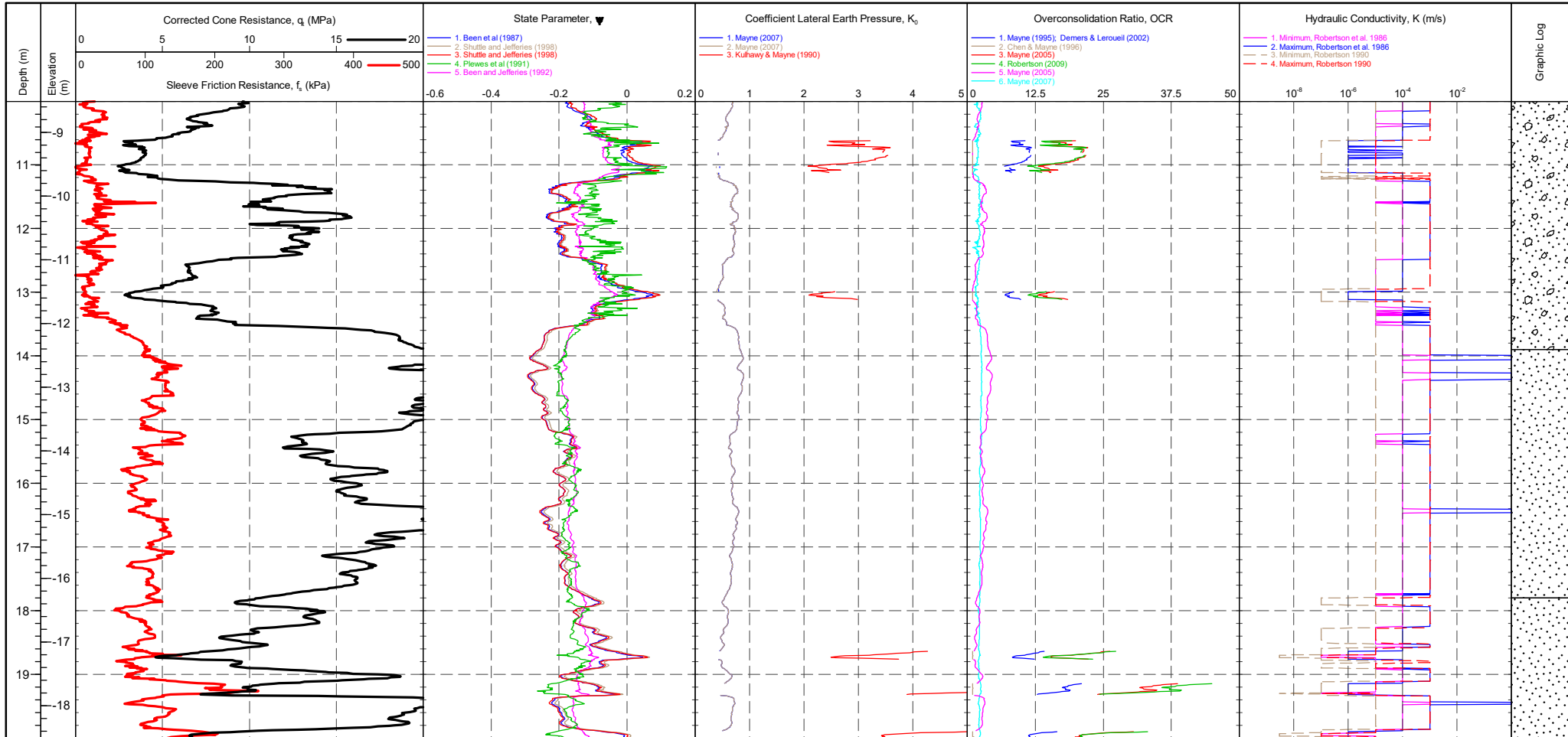
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Pre Post Difference	Groundwater Level Dissipation Test
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PointID : **CPT 04**

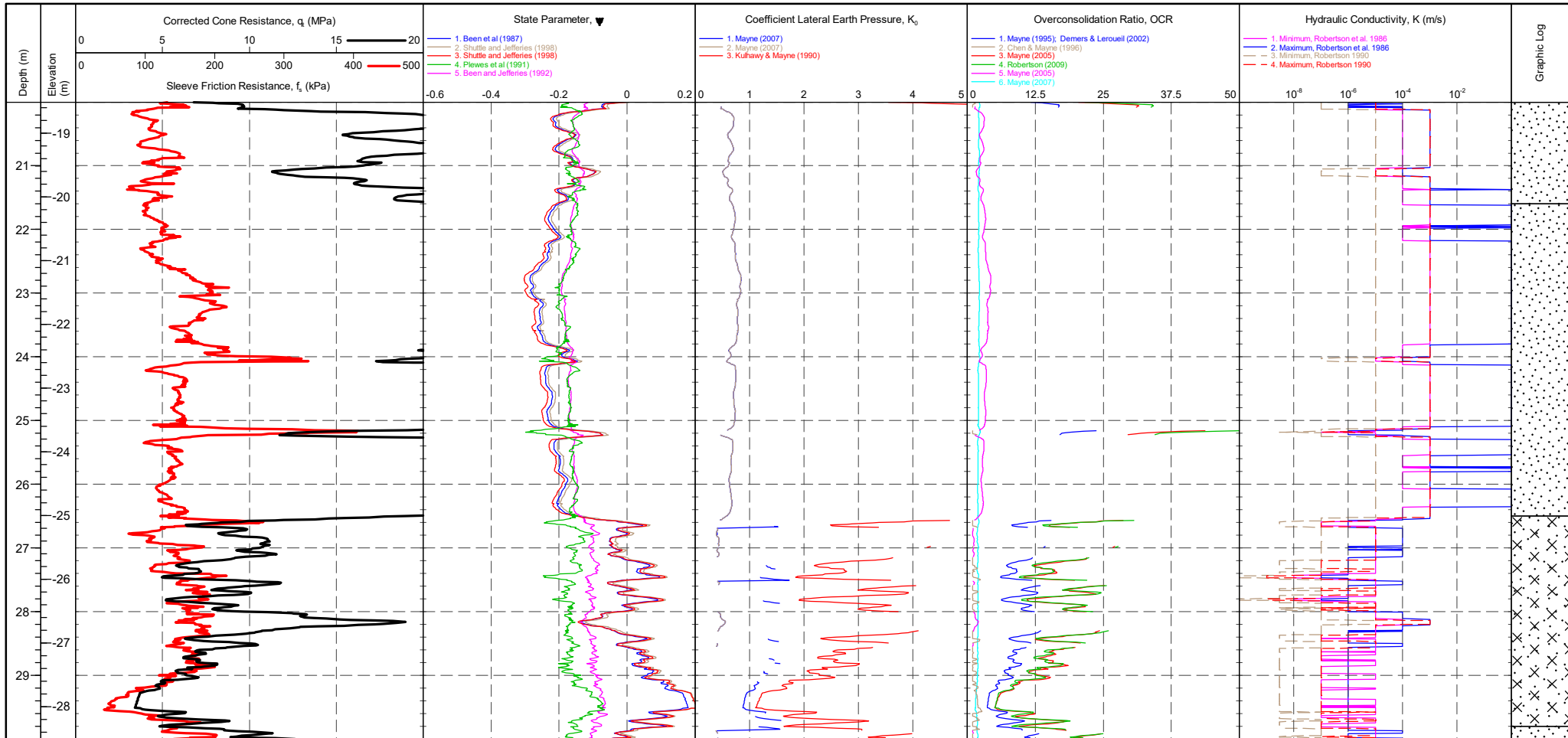
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <thead> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> </thead> <tbody> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
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Sleeve																							
Pore Pressure 2																							
X-Y Inclinometer																							

PointID  
**CPT 04**

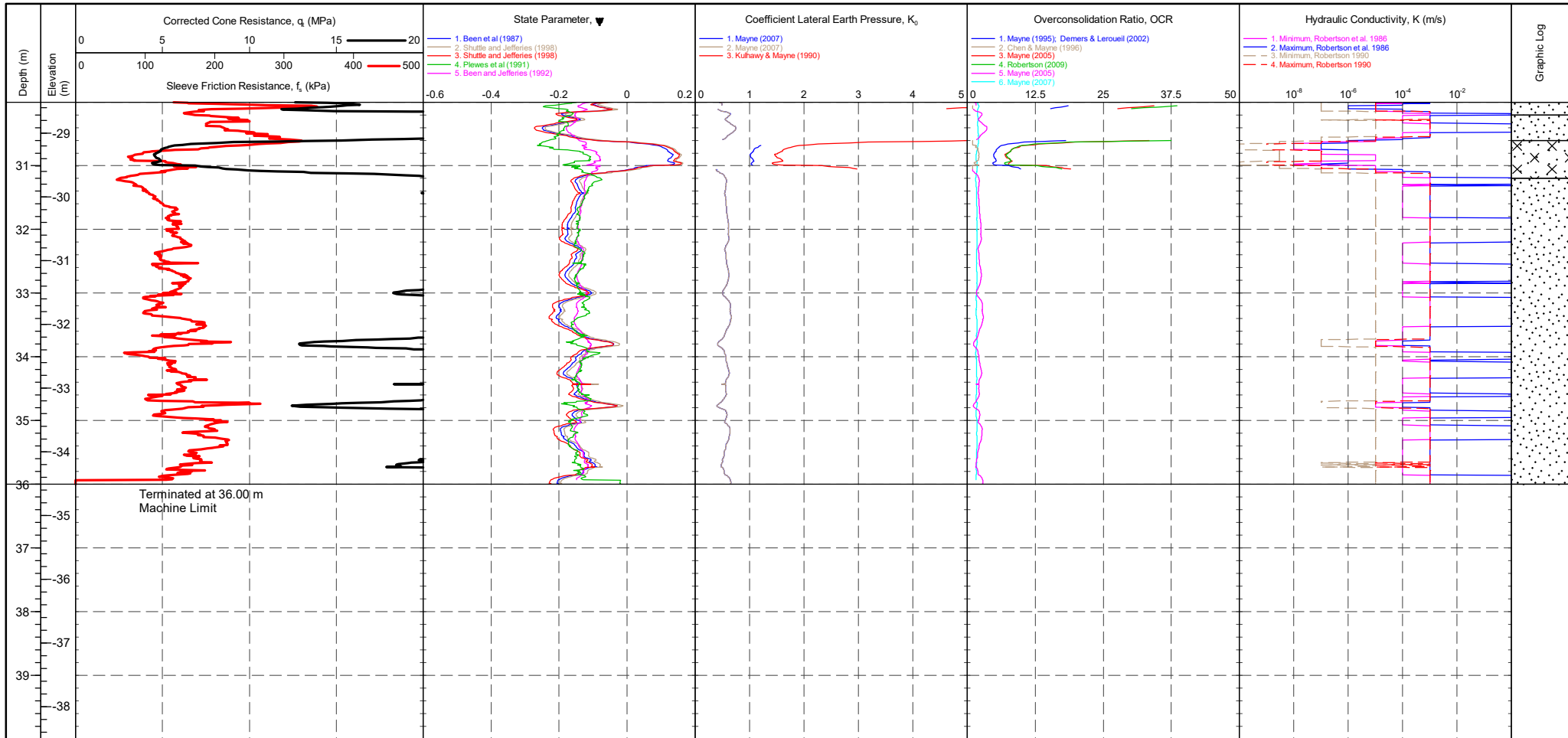
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> <table border="1"> <thead> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> </thead> <tbody> <tr> <td>Tip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sleeve</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pore Pressure 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>X-Y Inclinometer</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Transducer	Pre	Post	Difference	Tip				Sleeve				Pore Pressure 2				X-Y Inclinometer				Groundwater Level Dissipation Test
Transducer	Pre	Post	Difference																				
Tip																							
Sleeve																							
Pore Pressure 2																							
X-Y Inclinometer																							

PointID  
**CPT 04**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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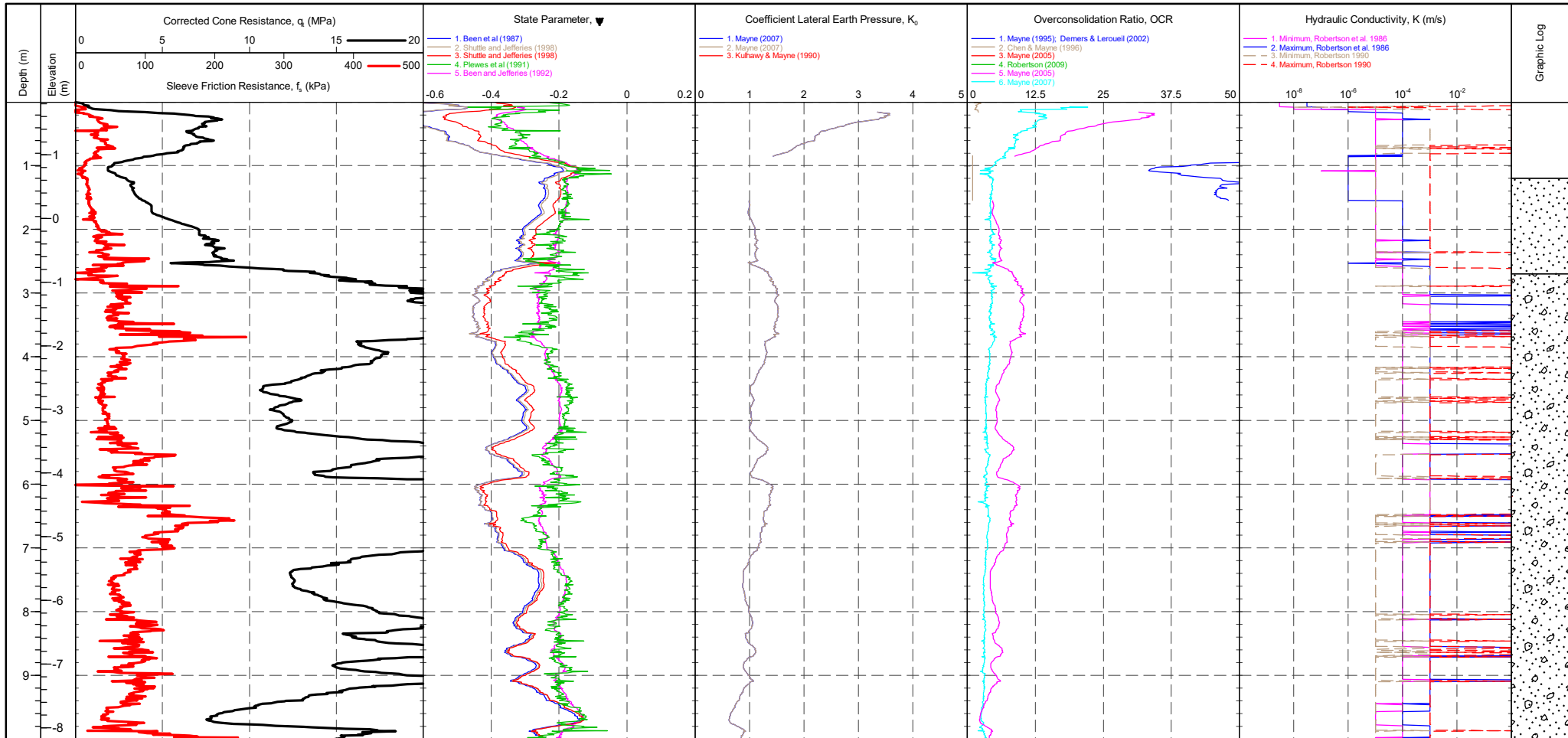


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

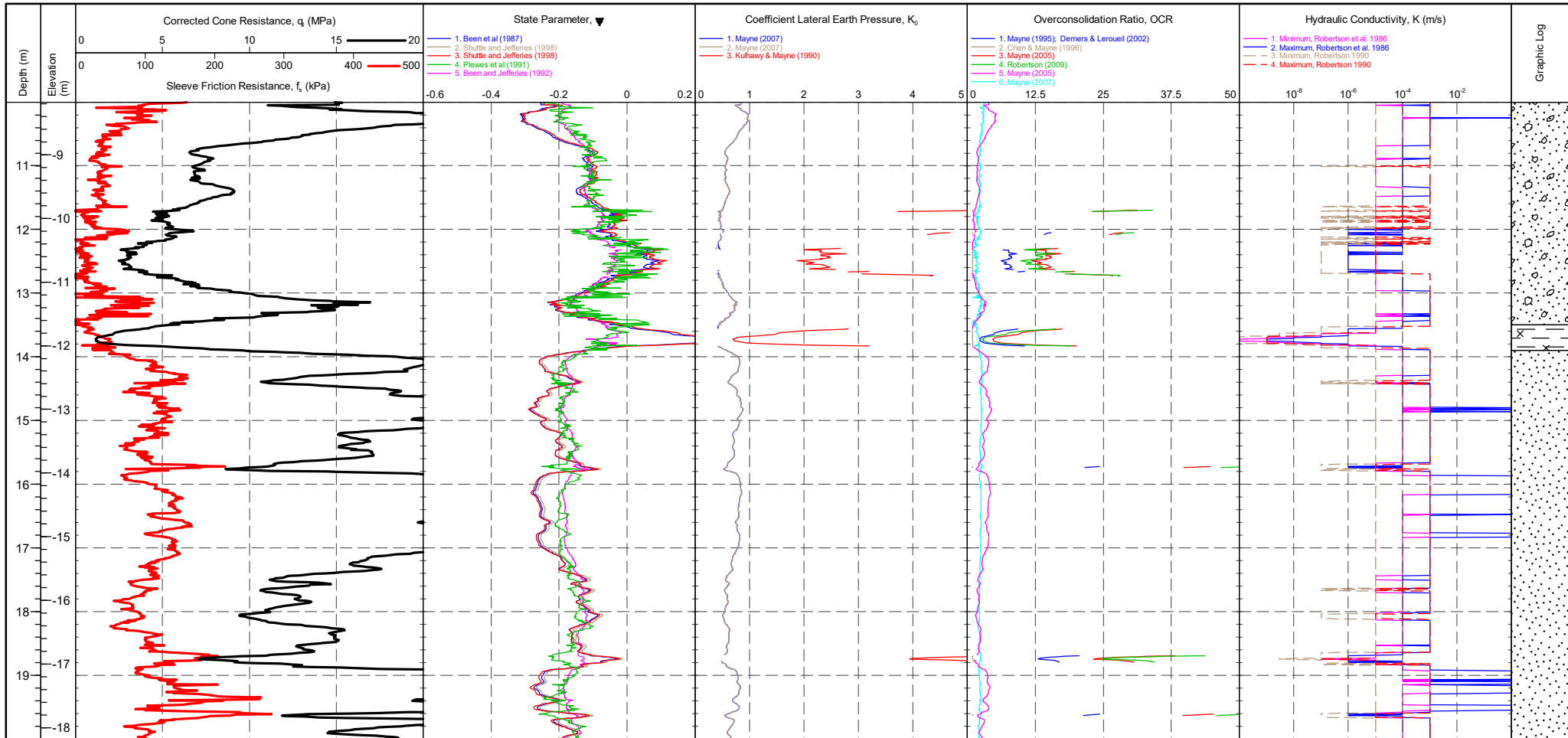
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

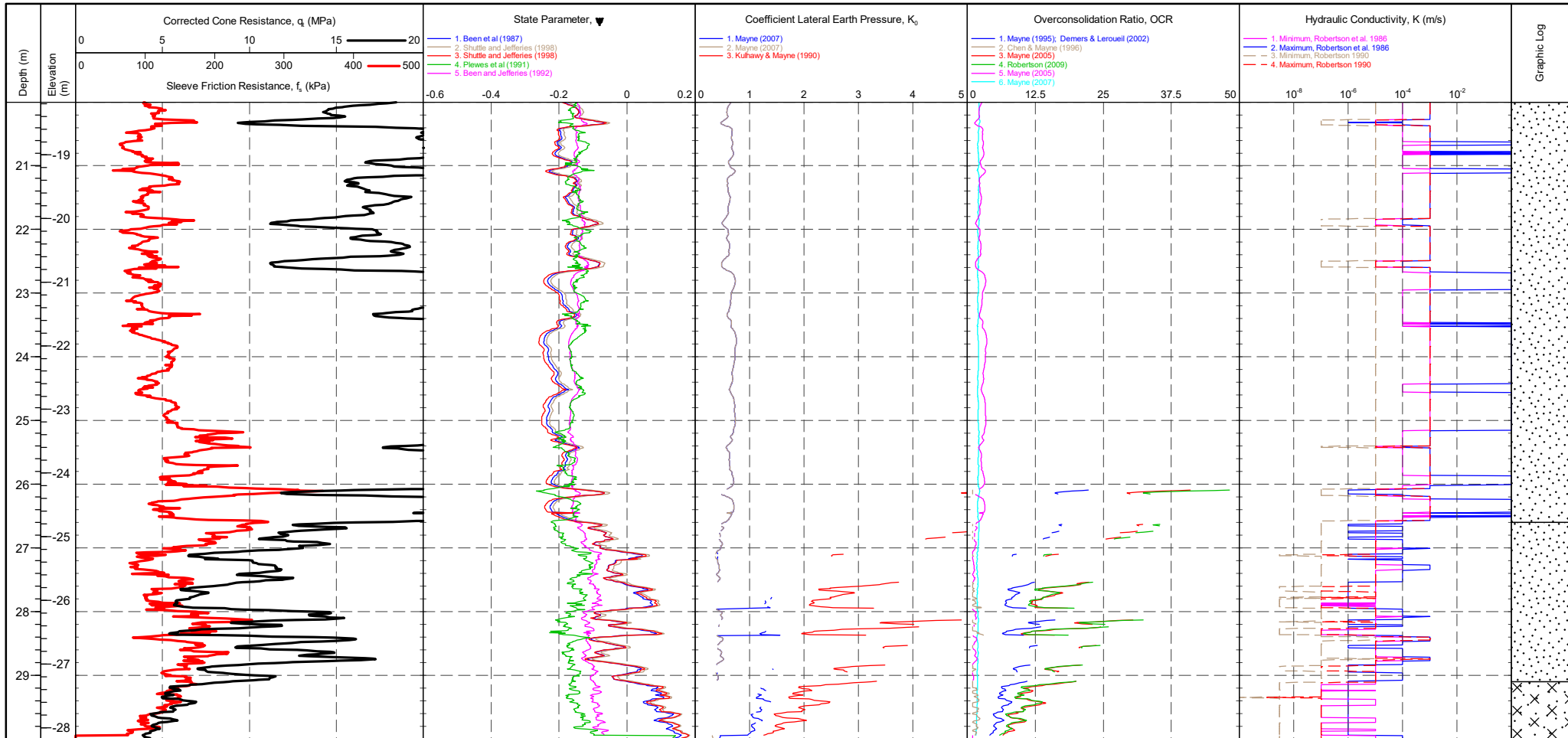
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID : **CPT 05**

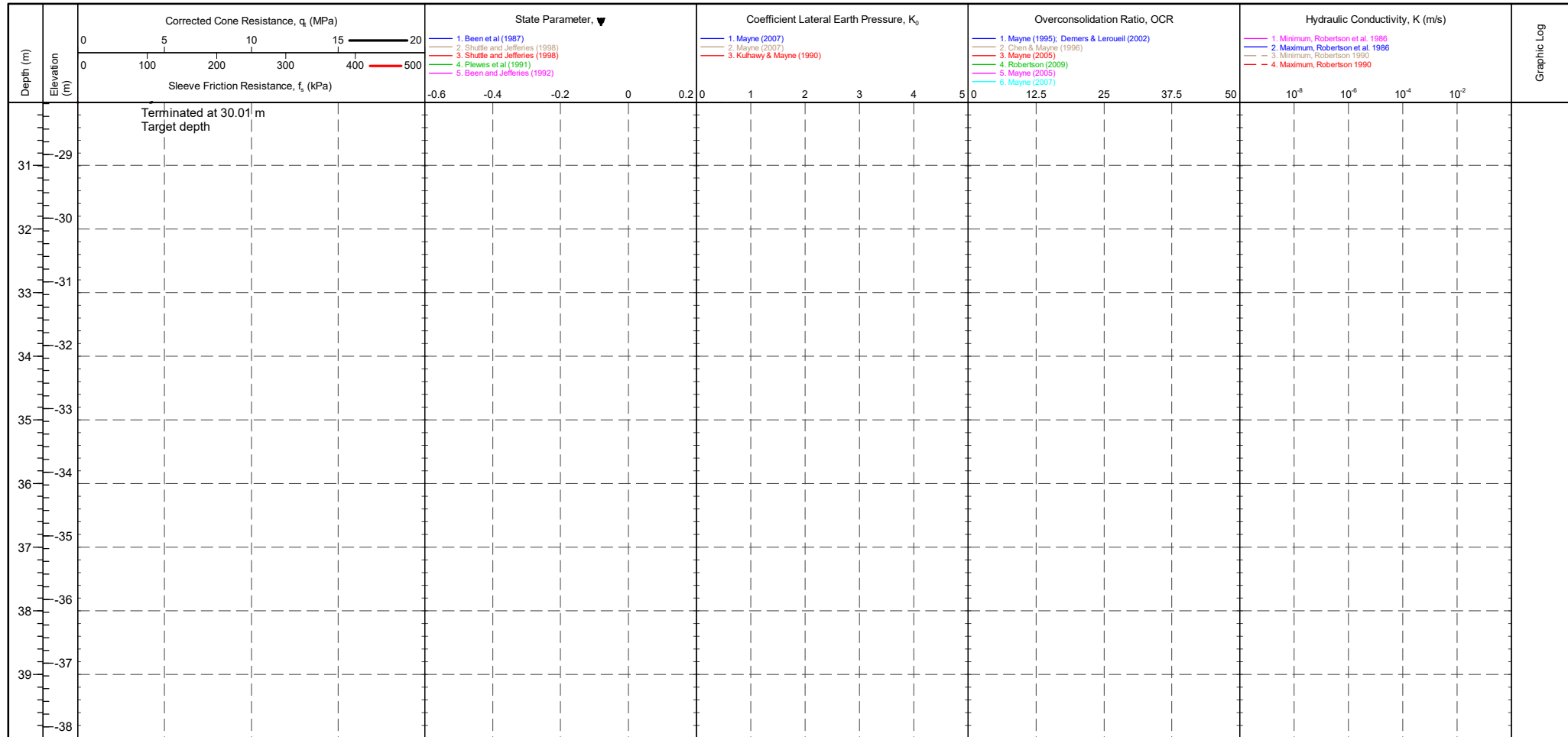
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer : Tip : Sleeve : Pore Pressure 2 : X-Y Inclinometer :	Pre Post Difference	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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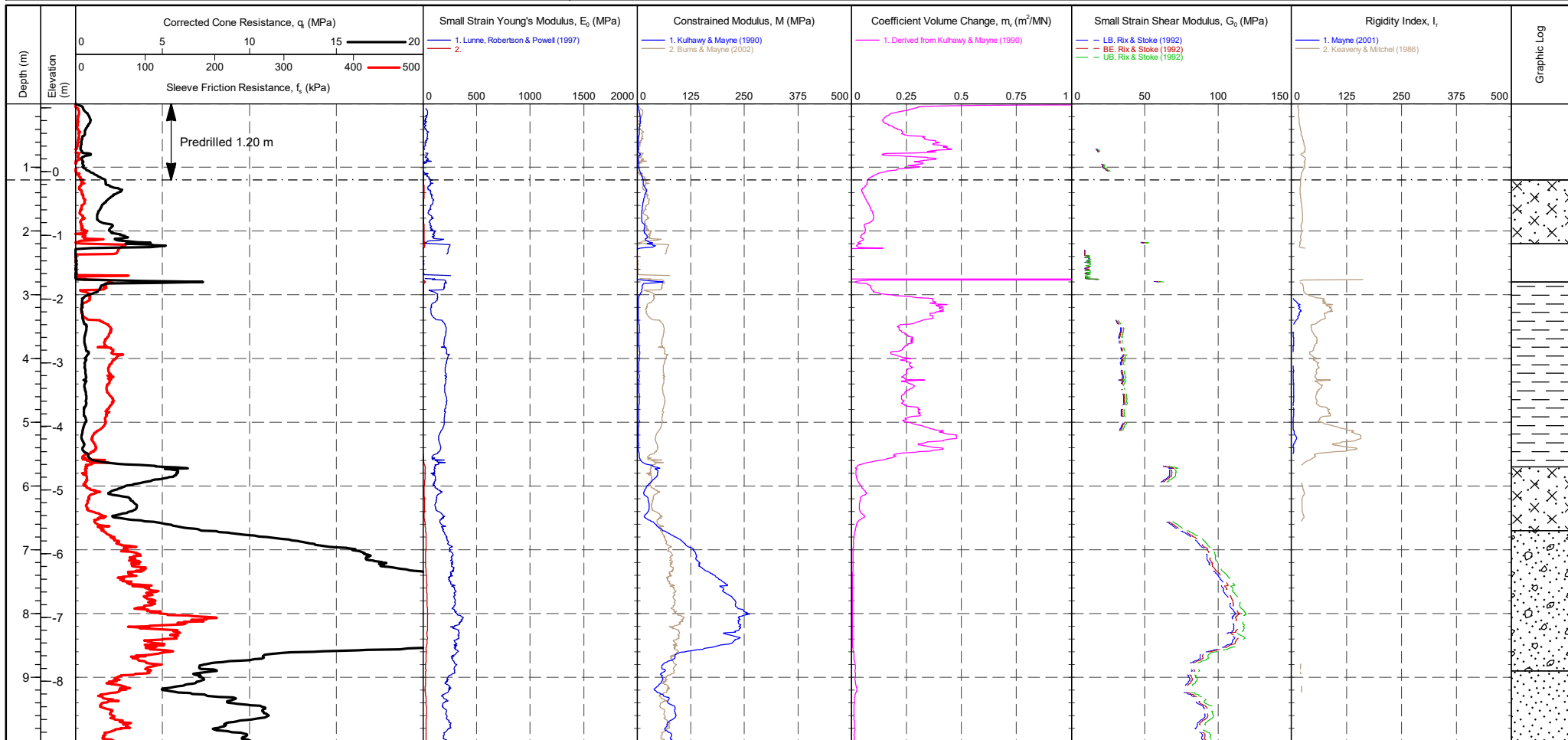


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 01**

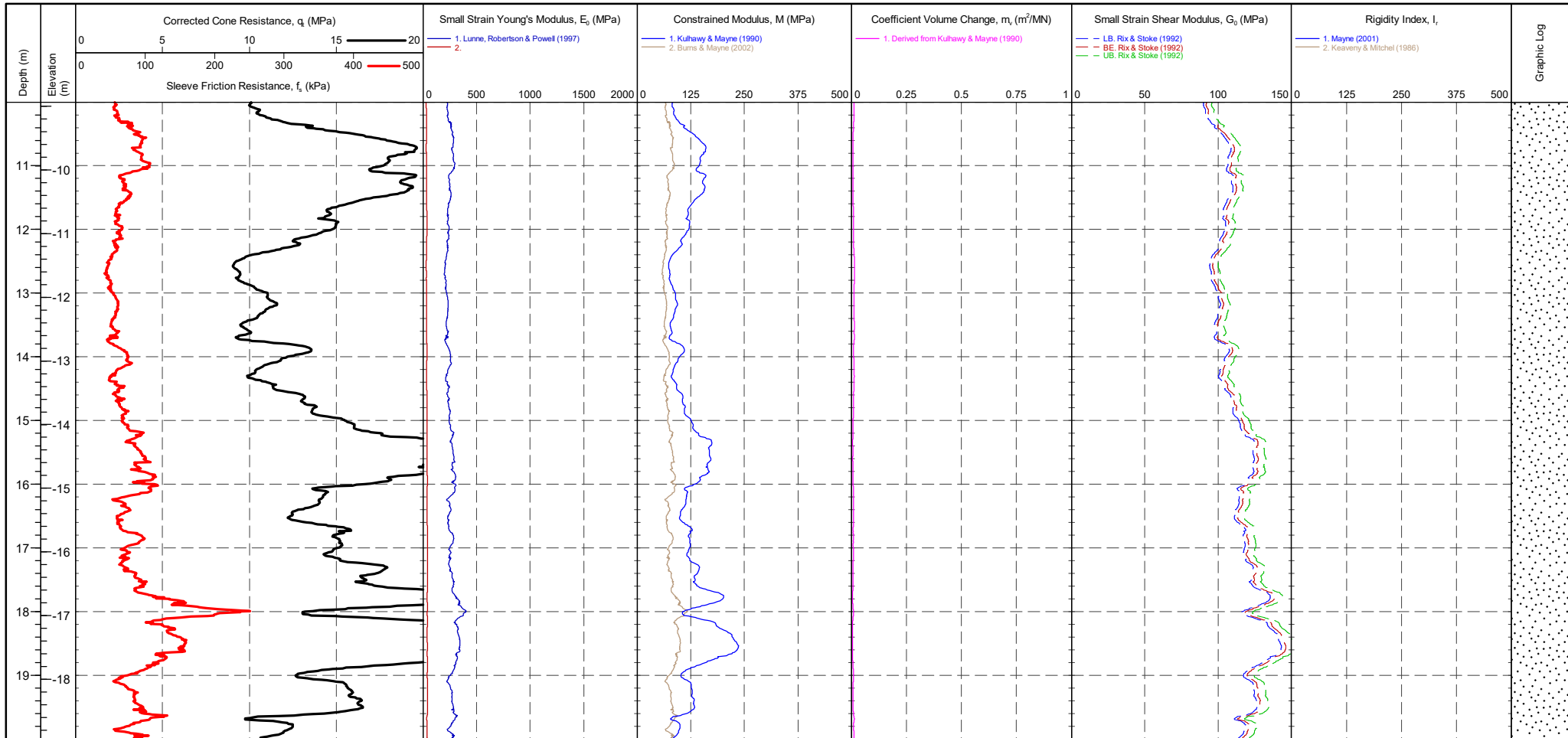
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 01**

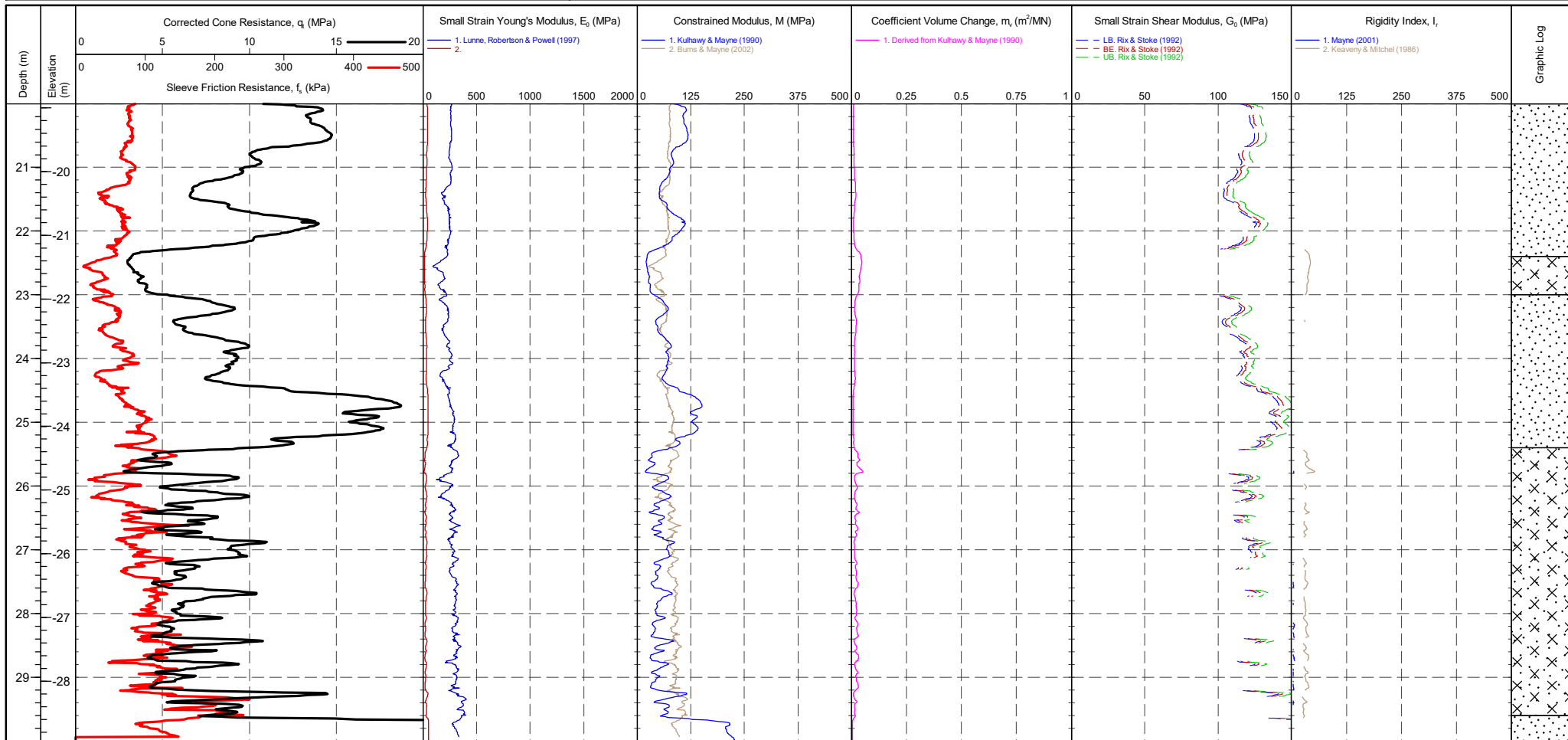
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 01**

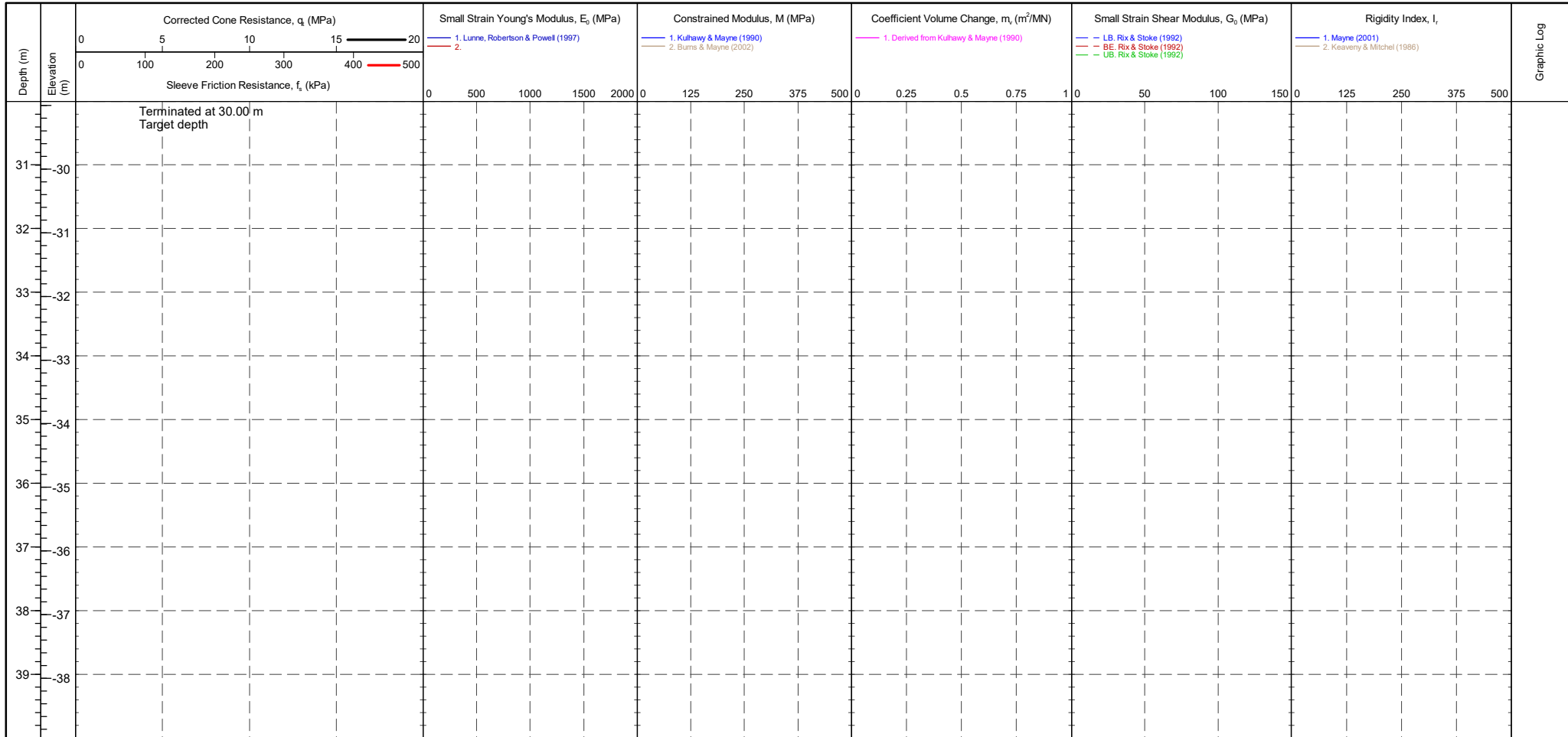
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPT ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 01**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652228.0 m <b>NORTHING</b> : 305894.9 m <b>ELEVATION</b> : 1.06 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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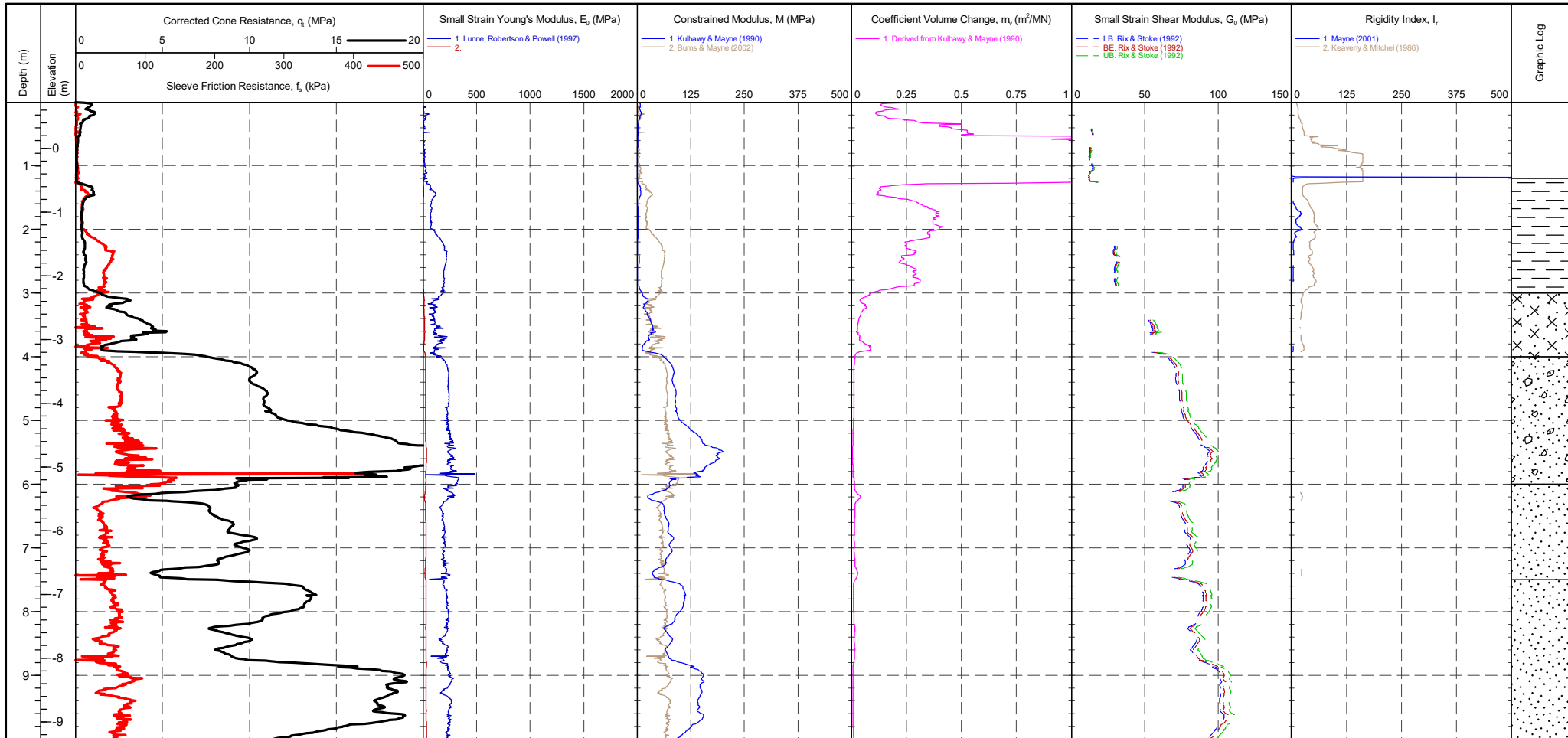


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 01 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 02**

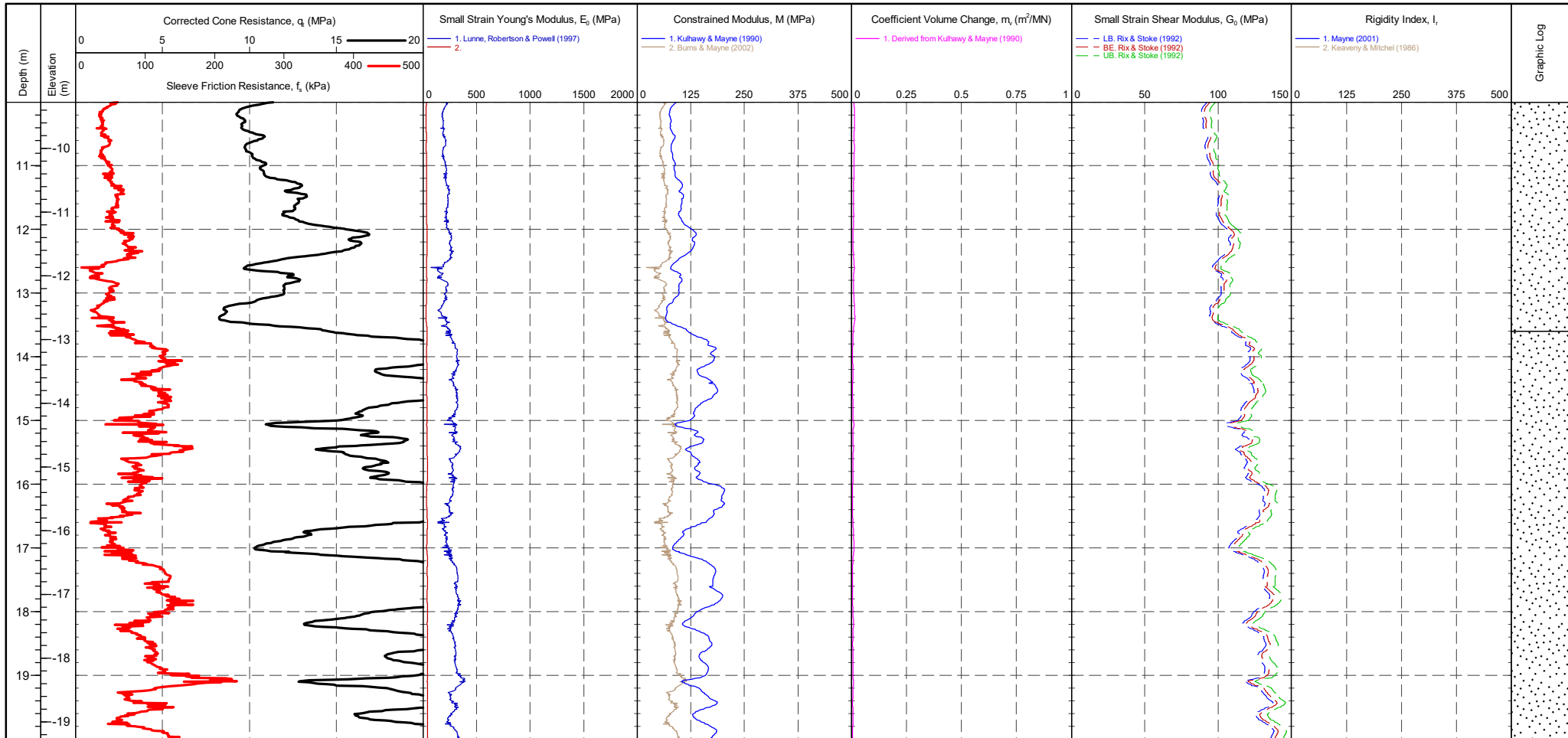
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 02**

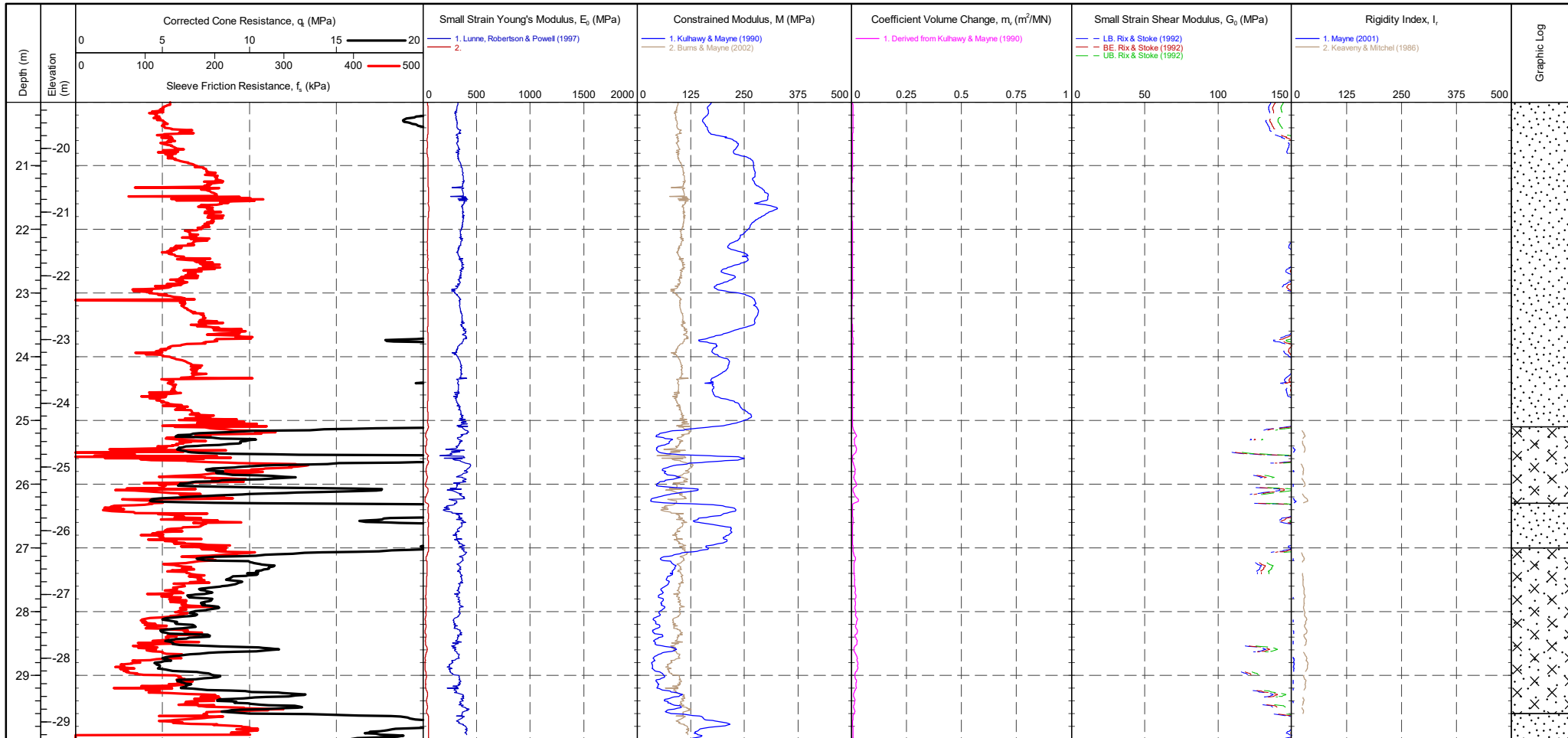
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 02**

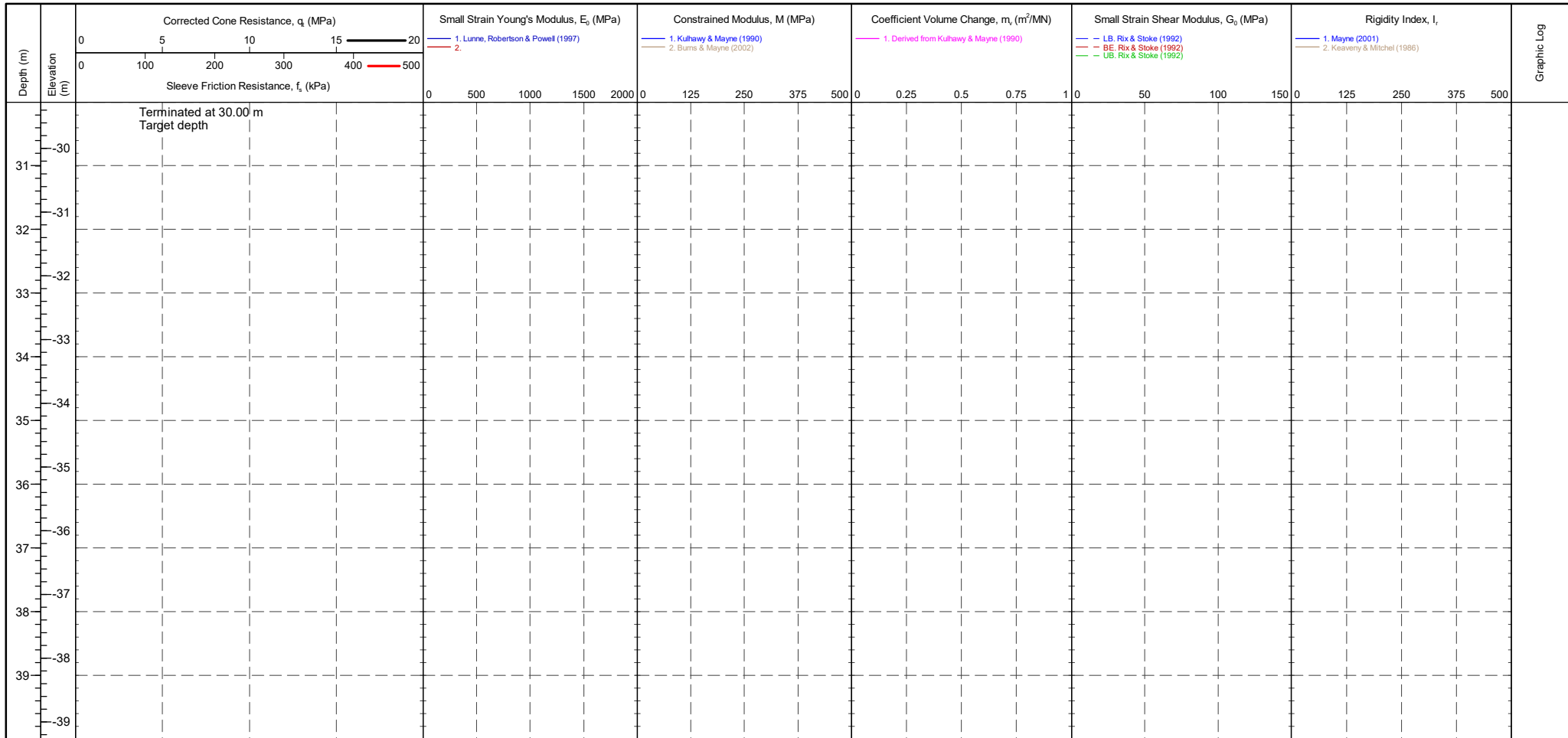
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer      Pre      Post      Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level  Dissipation Test
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PointID  
**CPT 02**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652244.0 m <b>NORTHING</b> : 305934.2 m <b>ELEVATION</b> : 0.73 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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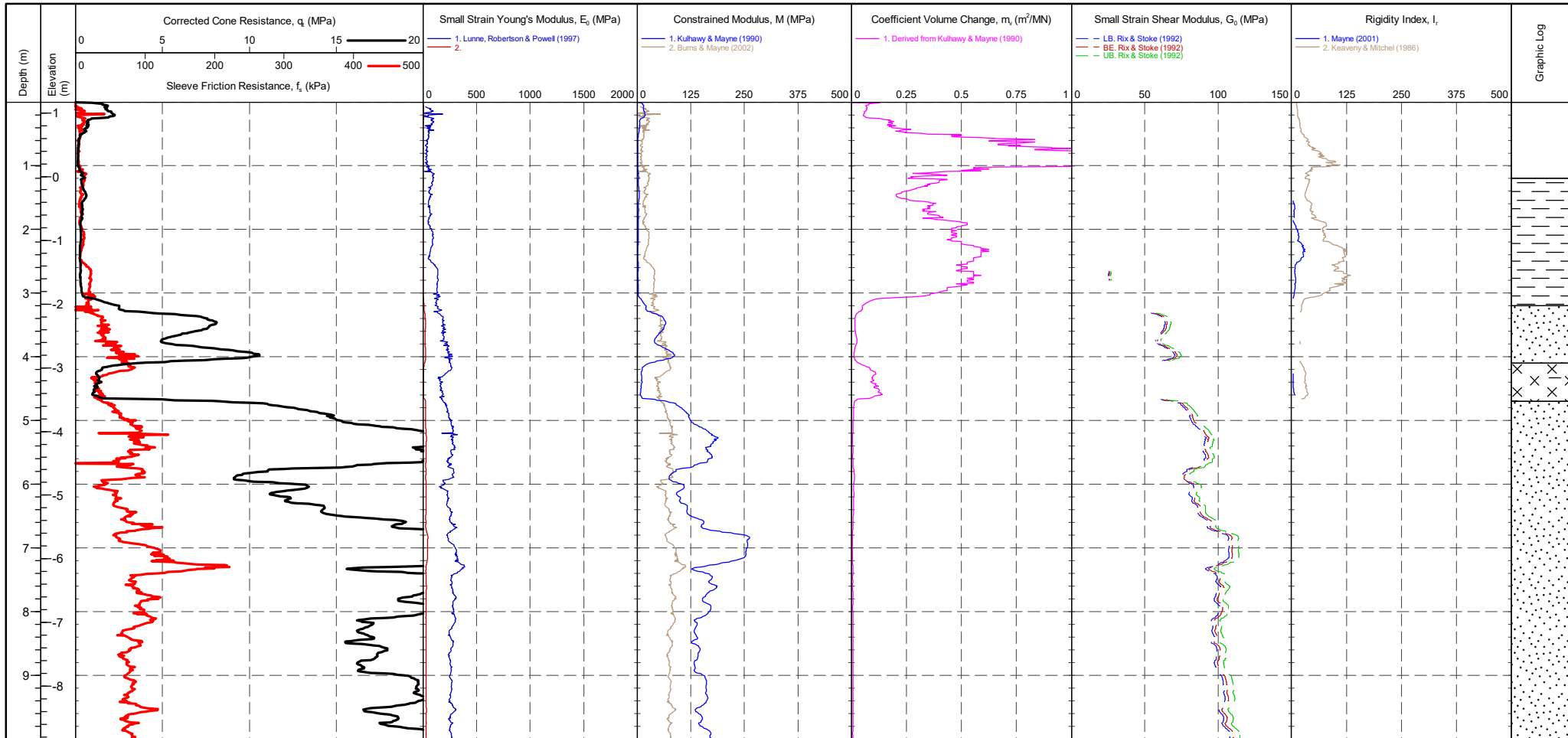


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 02 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

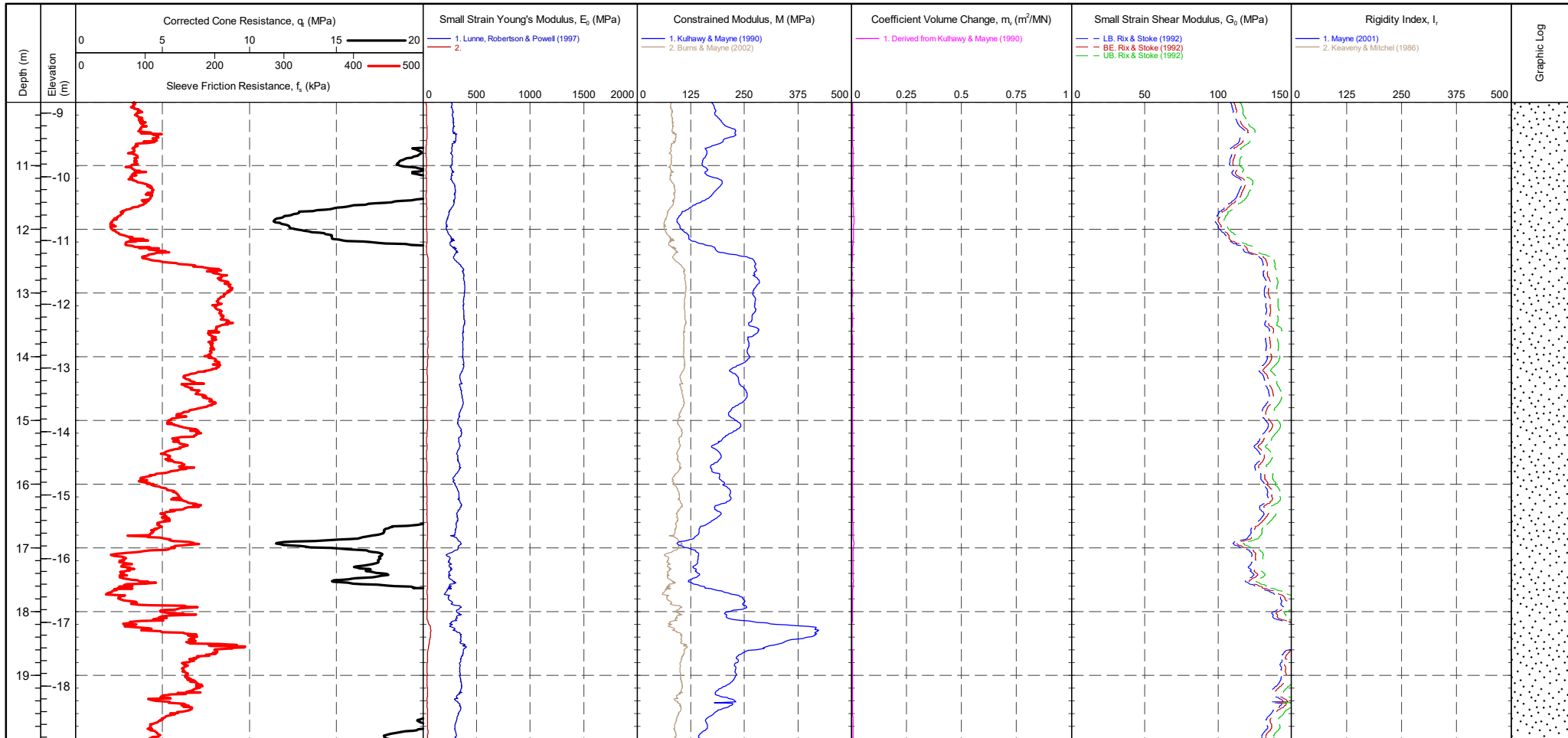
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

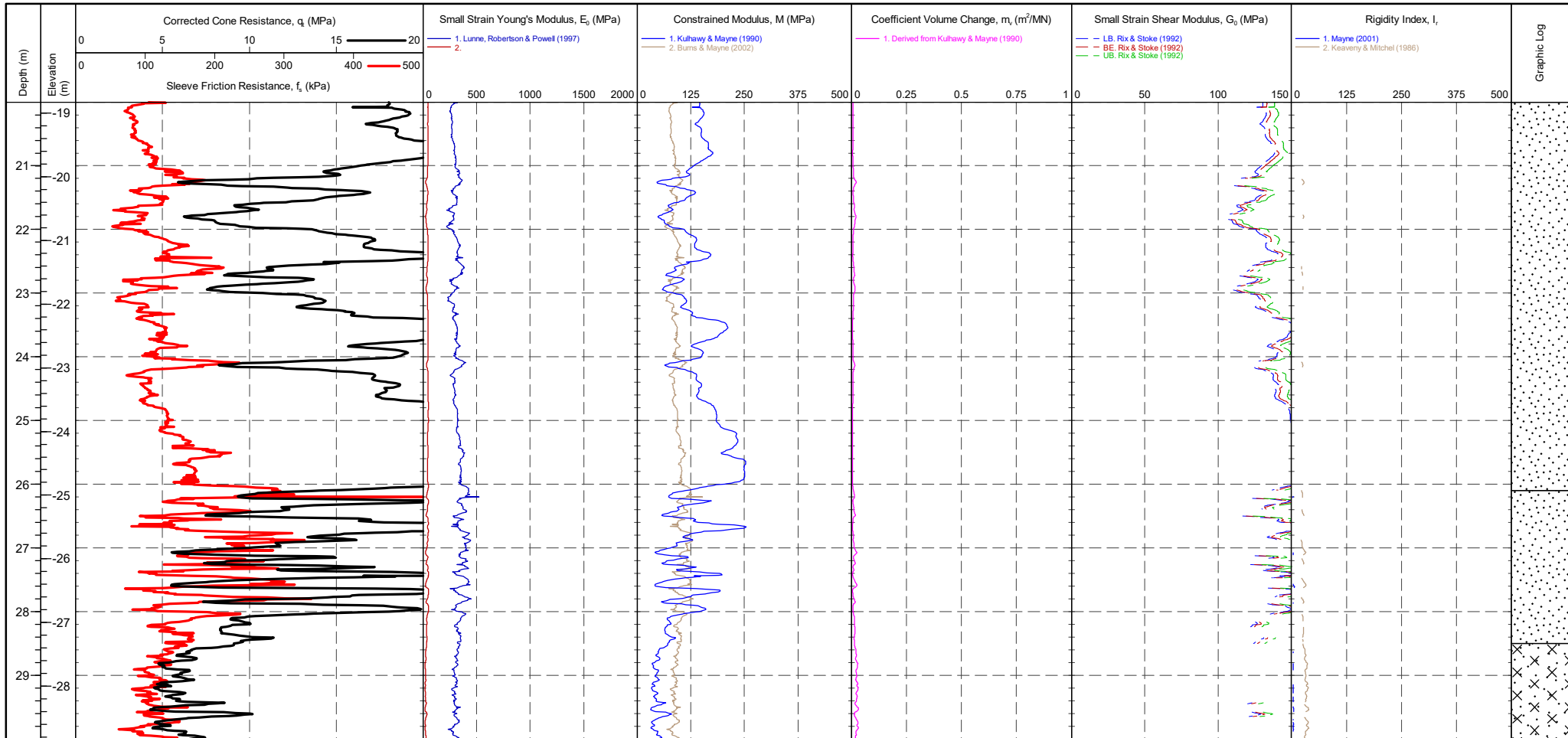
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

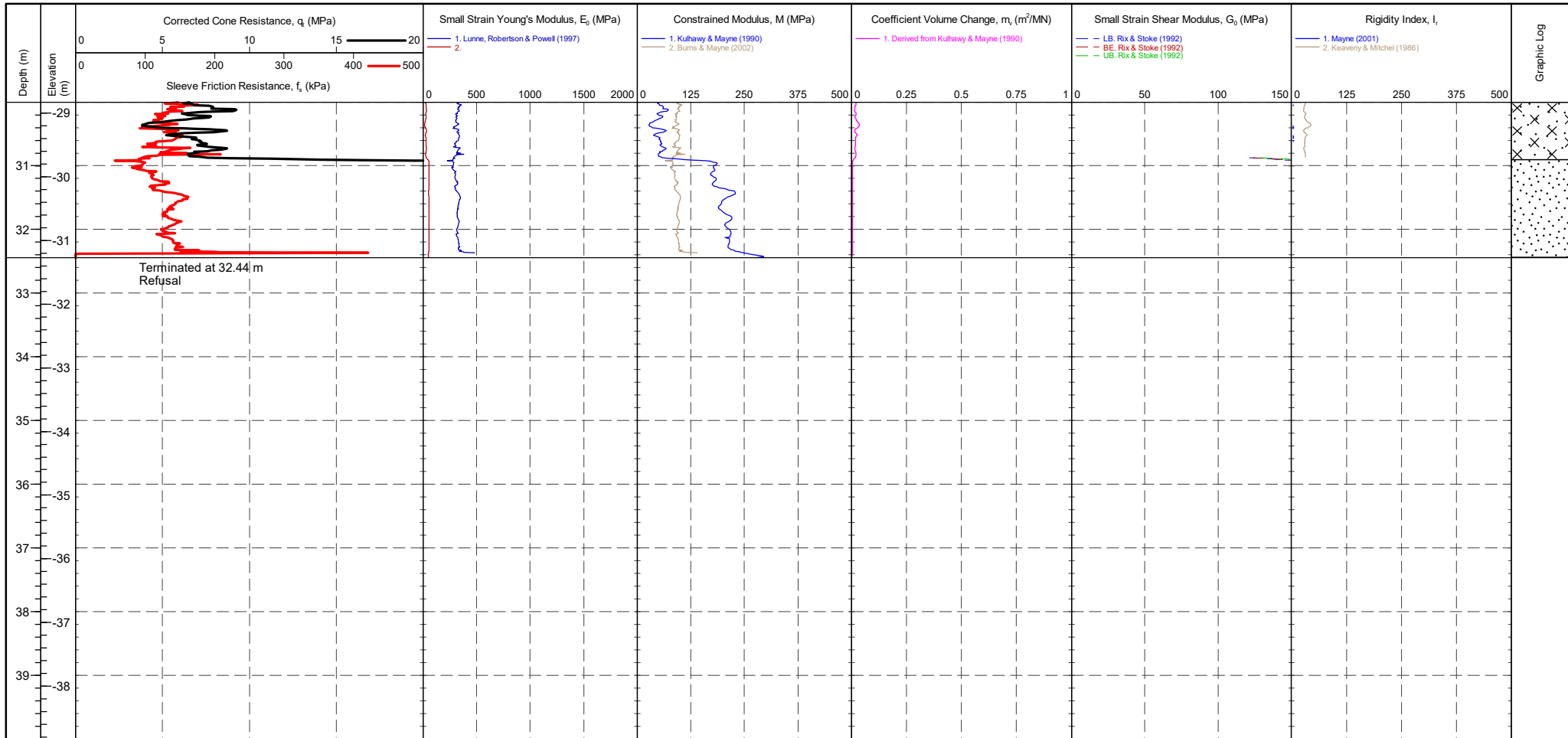
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 03**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652308.0 m <b>NORTHING</b> : 305950.5 m <b>ELEVATION</b> : 1.17 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Refusal	<b>Remark</b> : 1 Test refused on total pressure.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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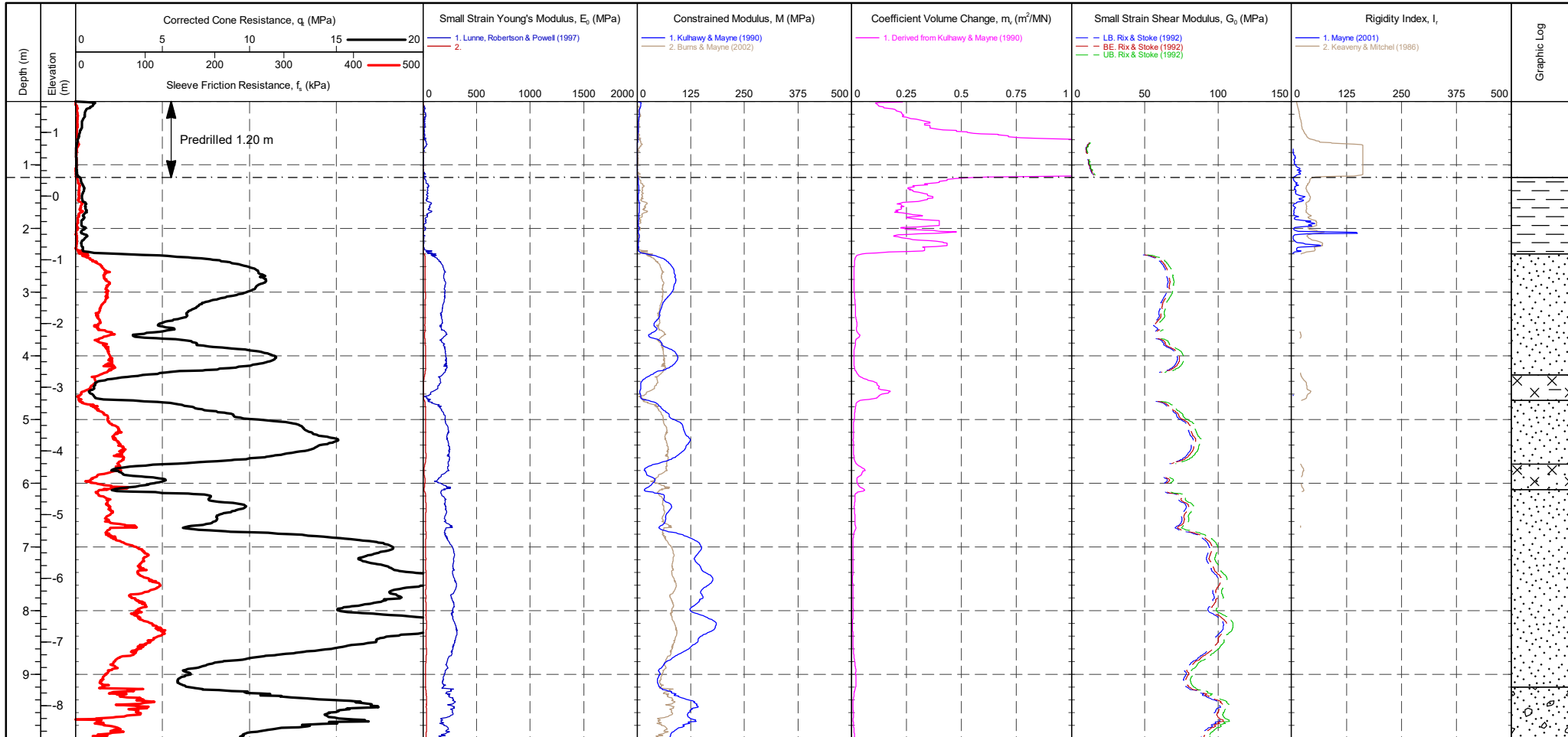


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 03 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 04**

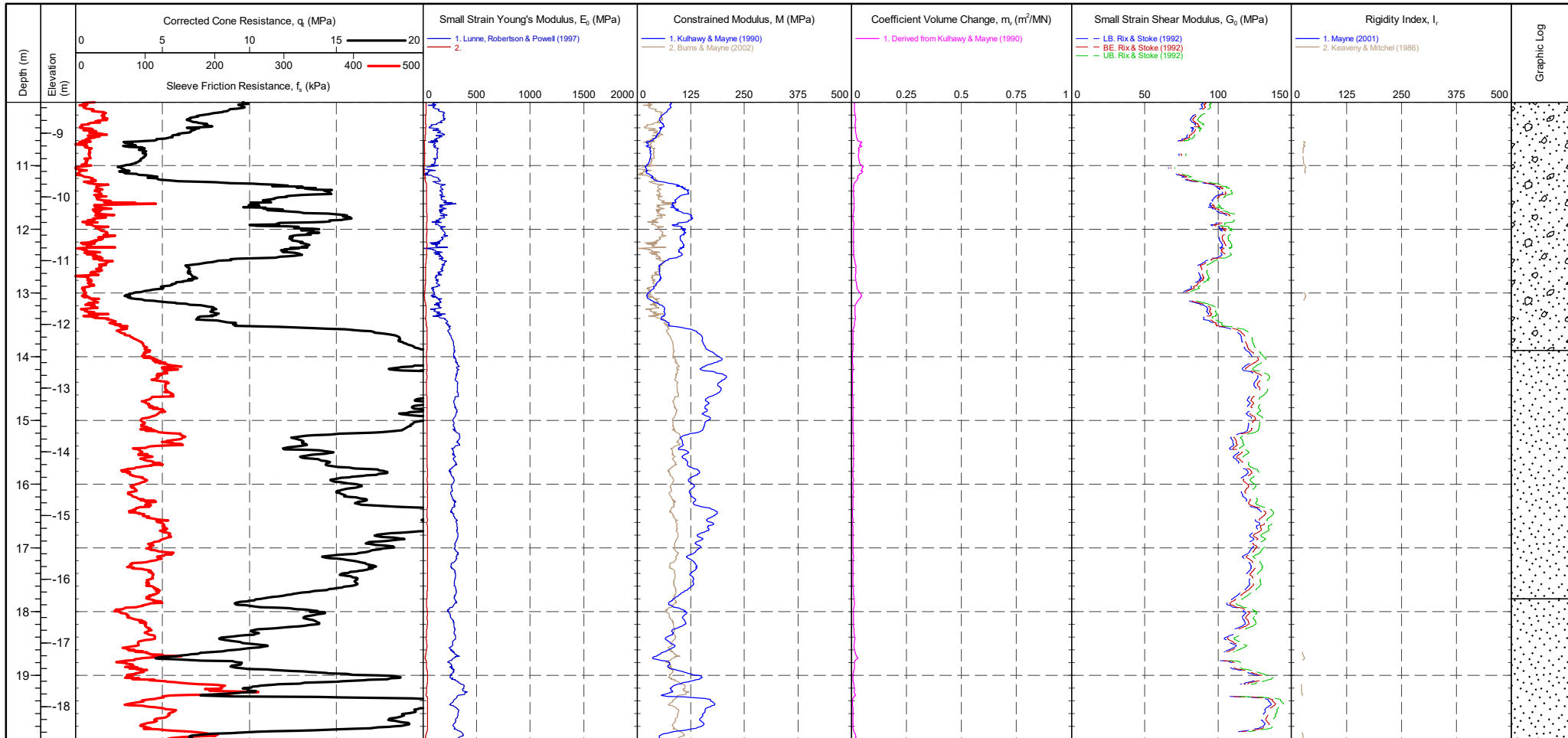
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer      Pre      Post      Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 04**

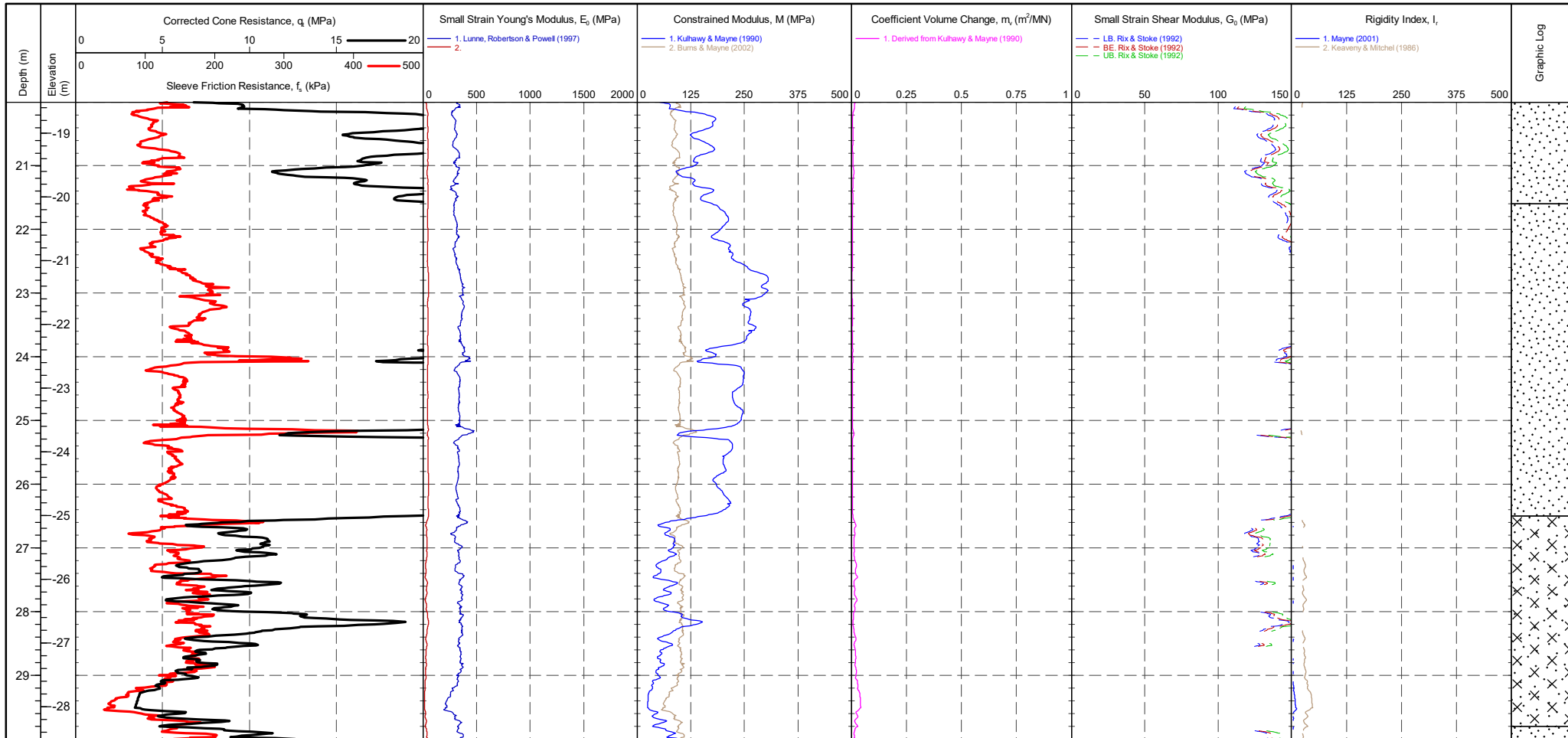
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 04**

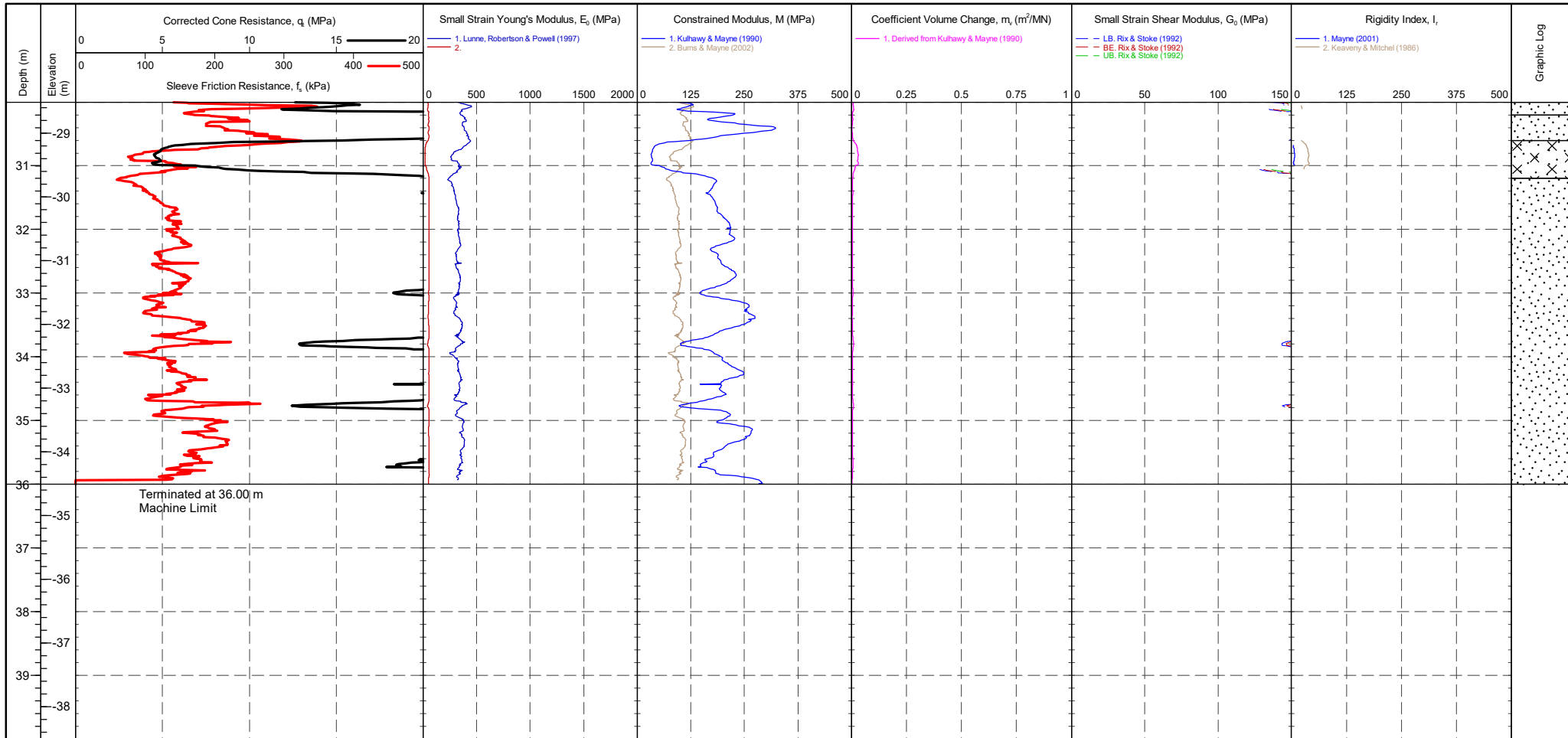
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer      Pre      Post      Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 04**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652571.6 m <b>NORTHING</b> : 306018.0 m <b>ELEVATION</b> : 1.49 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Machine Limit	<b>Remark</b> : 7 Test stopped due to buckling rods.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 19/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1:2012
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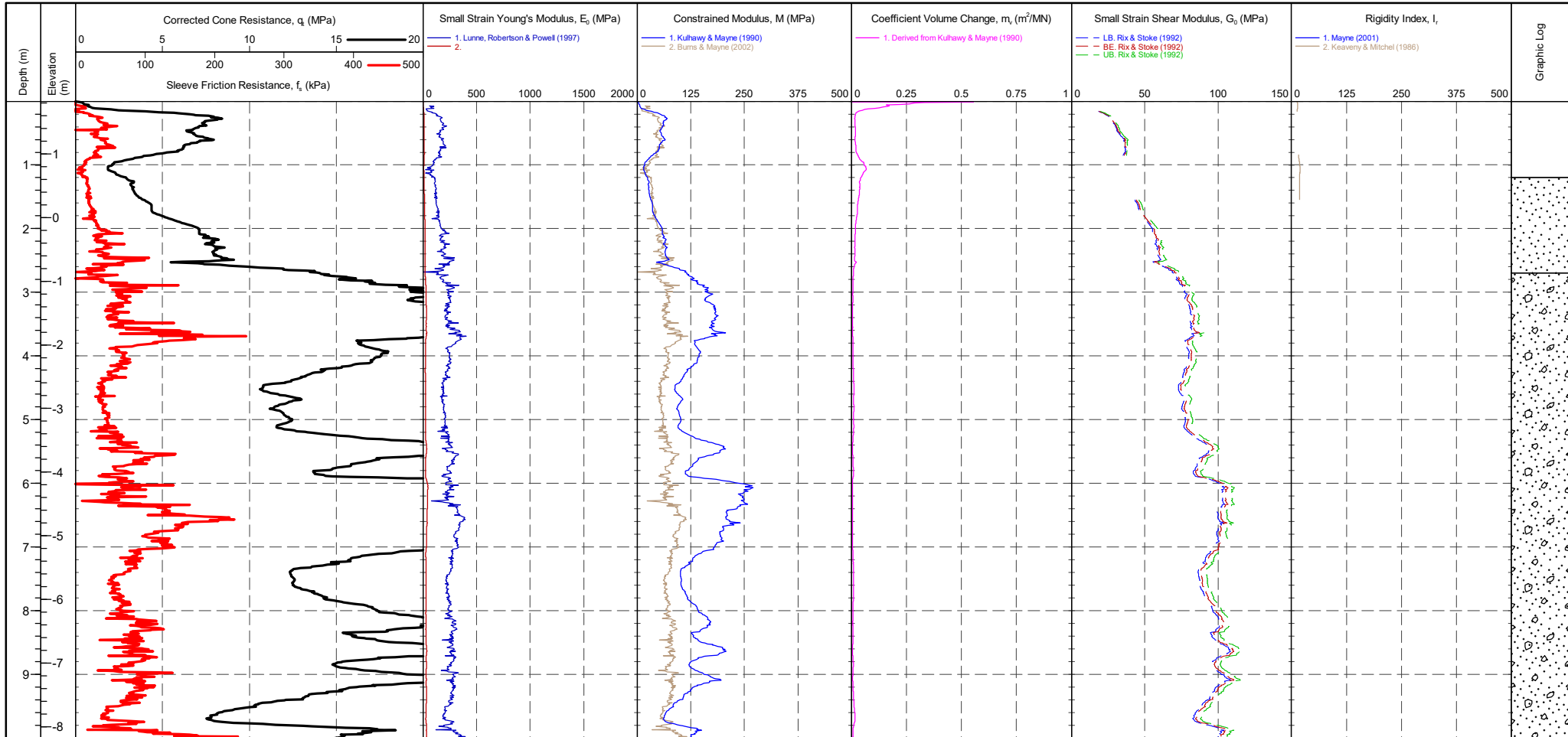


<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 04 <b>WEATHER</b> : Sunny & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

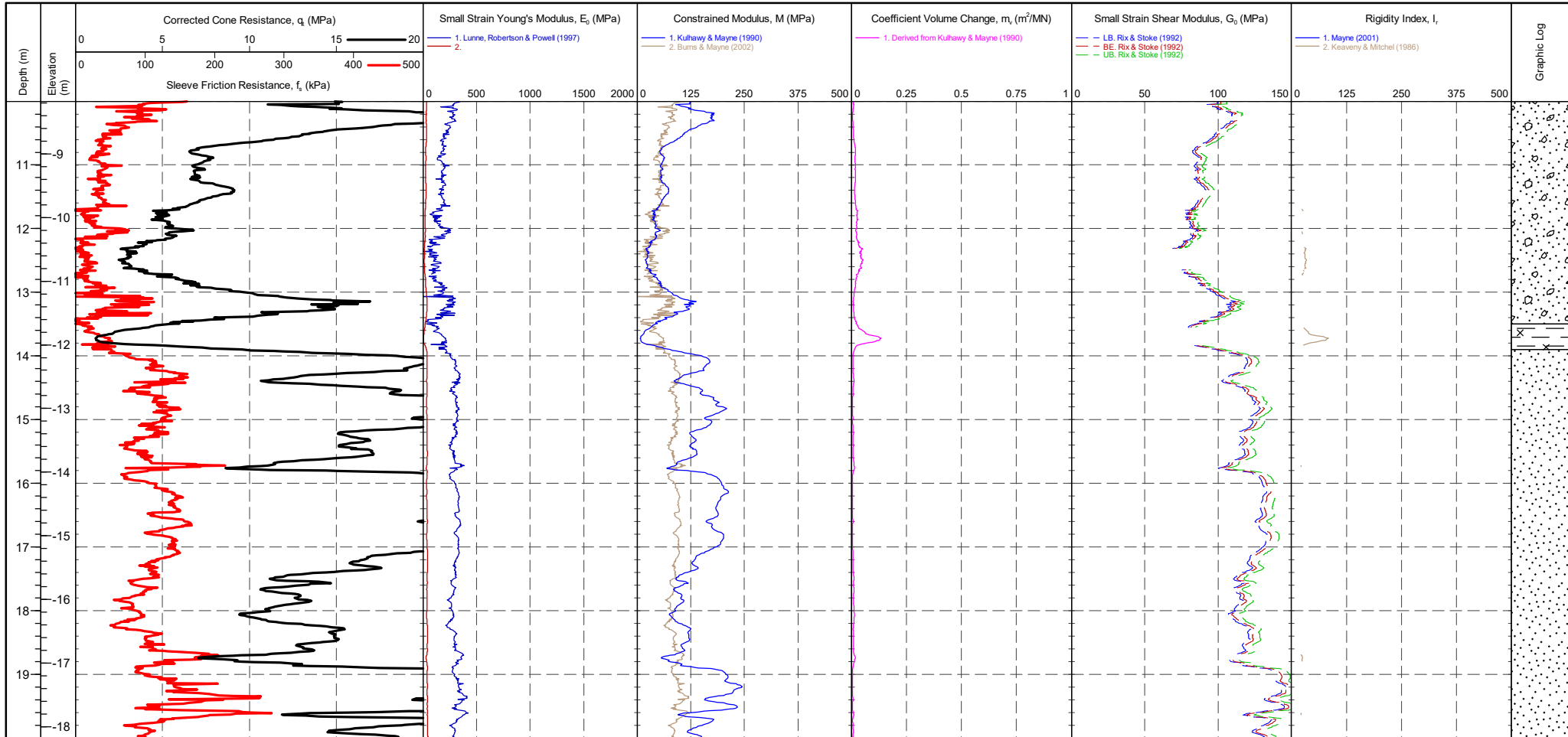
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 1 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

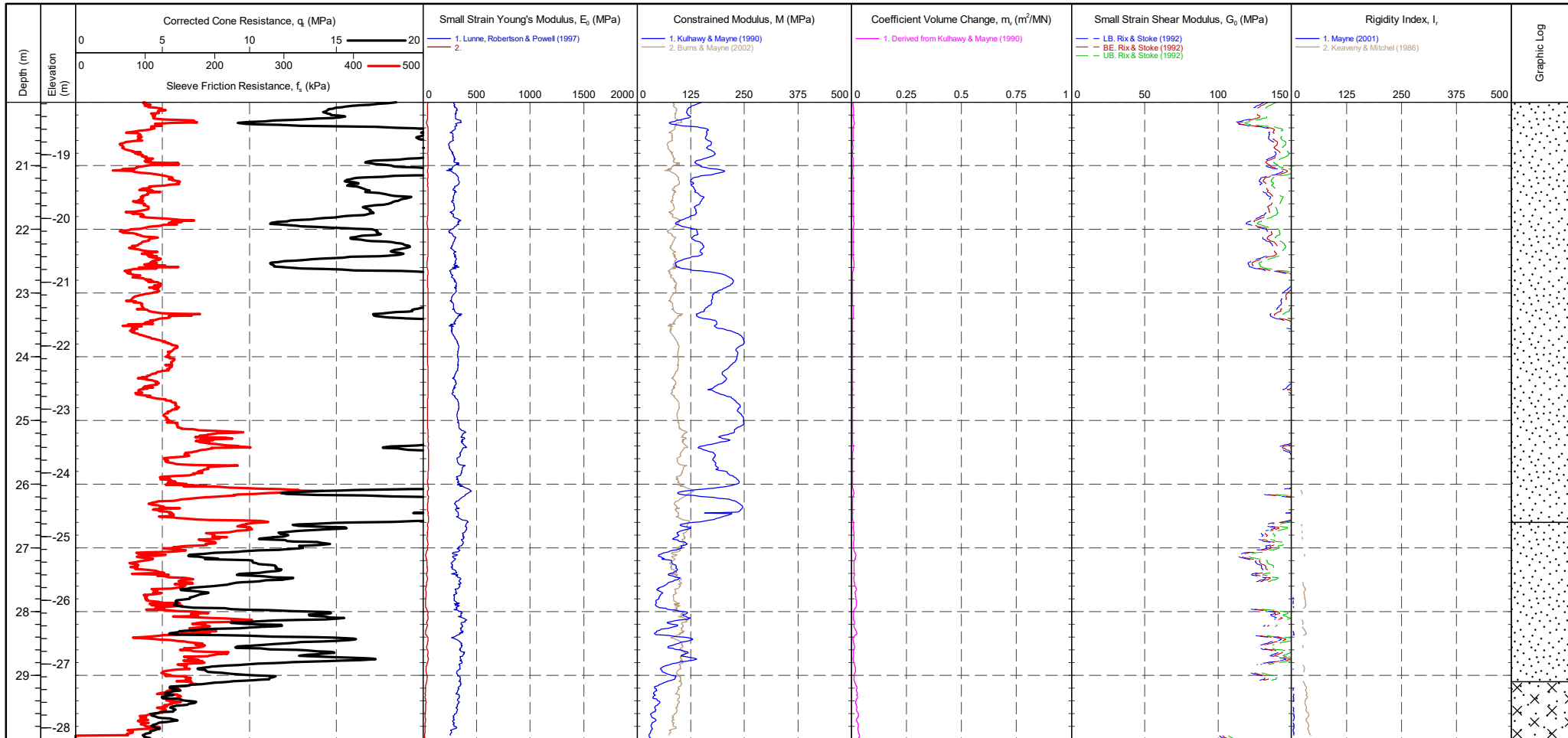
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 2 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer      Pre      Post      Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

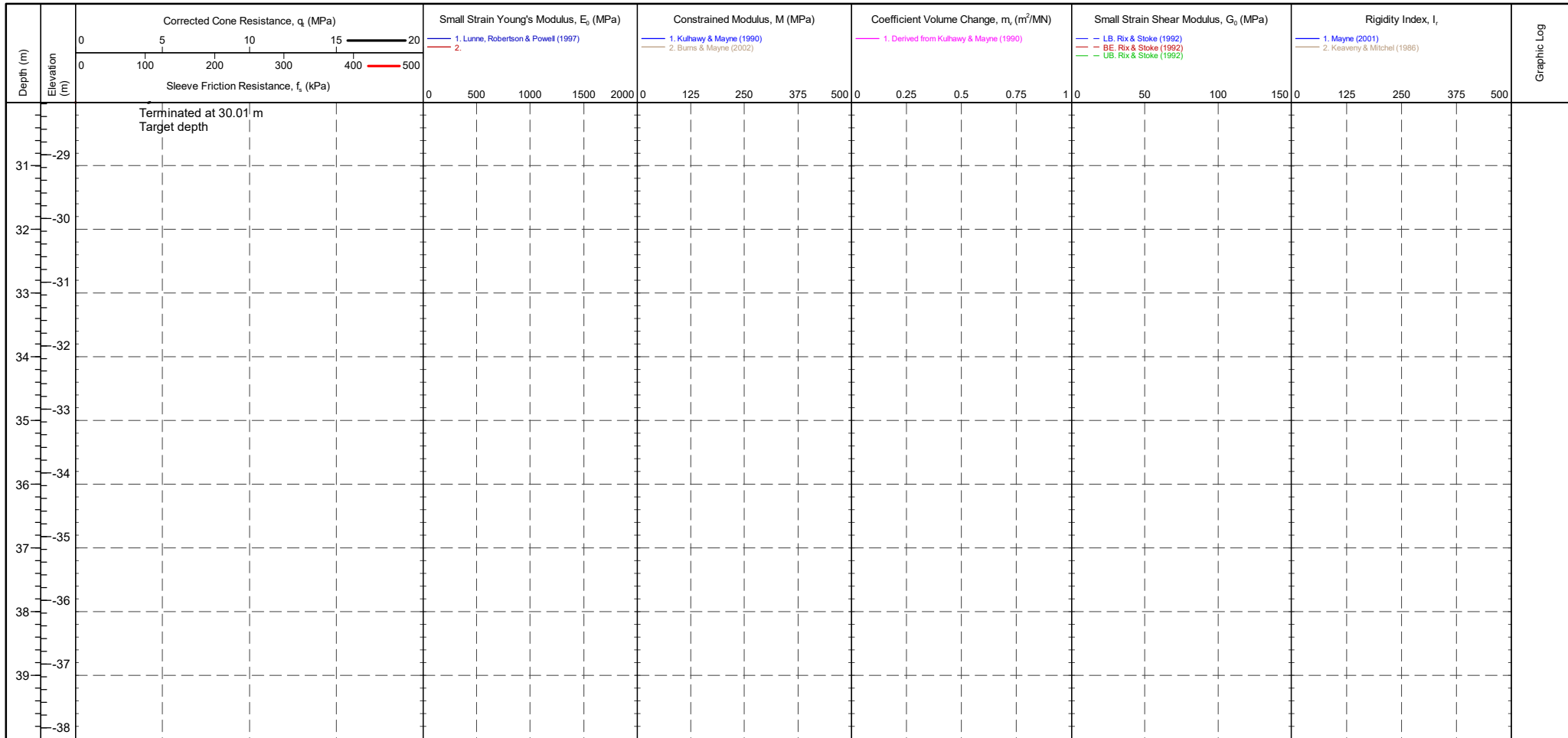
<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 3 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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PointID  
**CPT 05**

<b>CLIENT</b> : Norfolk Partnership Laboratory <b>PROJECT</b> : Great Yarmouth 3rd River Crossing <b>LOCATION</b> : Great Yarmouth <b>PROJECT No.</b> : 1180180	<b>EASTING</b> : 652646.1 m <b>NORTHING</b> : 305984.8 m <b>ELEVATION</b> : 1.83 m <b>CHECKED BY</b> : LD <b>TERMINATION REASON</b> : Target depth	<b>Remark</b> : 0 Test completed at target depth.	<b>SHEET</b> : 4 OF 4 <b>STATUS</b> : Final <b>TEST DATE</b> : 20/03/2018 <b>PLOT DATE</b> : 19/04/2018 <b>METHOD</b> : ISO 22476-1 Application class 3
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<b>CONE ID</b> : P15-CFPTxy.70080 <b>CONE AREA</b> : 15cm <sup>2</sup> <b>CONE AREA RATIO</b> : 0.85 <b>FILTER POSITION</b> : u2 <b>FILTER TYPE</b> : HDPE <b>FRICION REDUCER</b> : None	<b>TEST TYPE</b> : TE2 <b>APPLICATION CLASS</b> : 2 <b>RIG</b> : CPT010 Walter; Truck-based 20 Ton; No anchoring <b>OPERATOR</b> : DH & AE <b>FILE NAME</b> : 1180180-CPT 05 <b>WEATHER</b> : Overcast & Cold	<b>CPTU ZERO VALUES</b> Transducer Pre Post Difference Tip Sleeve Pore Pressure 2 X-Y Inclinometer	Groundwater Level Dissipation Test
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## **APPENDIX D**

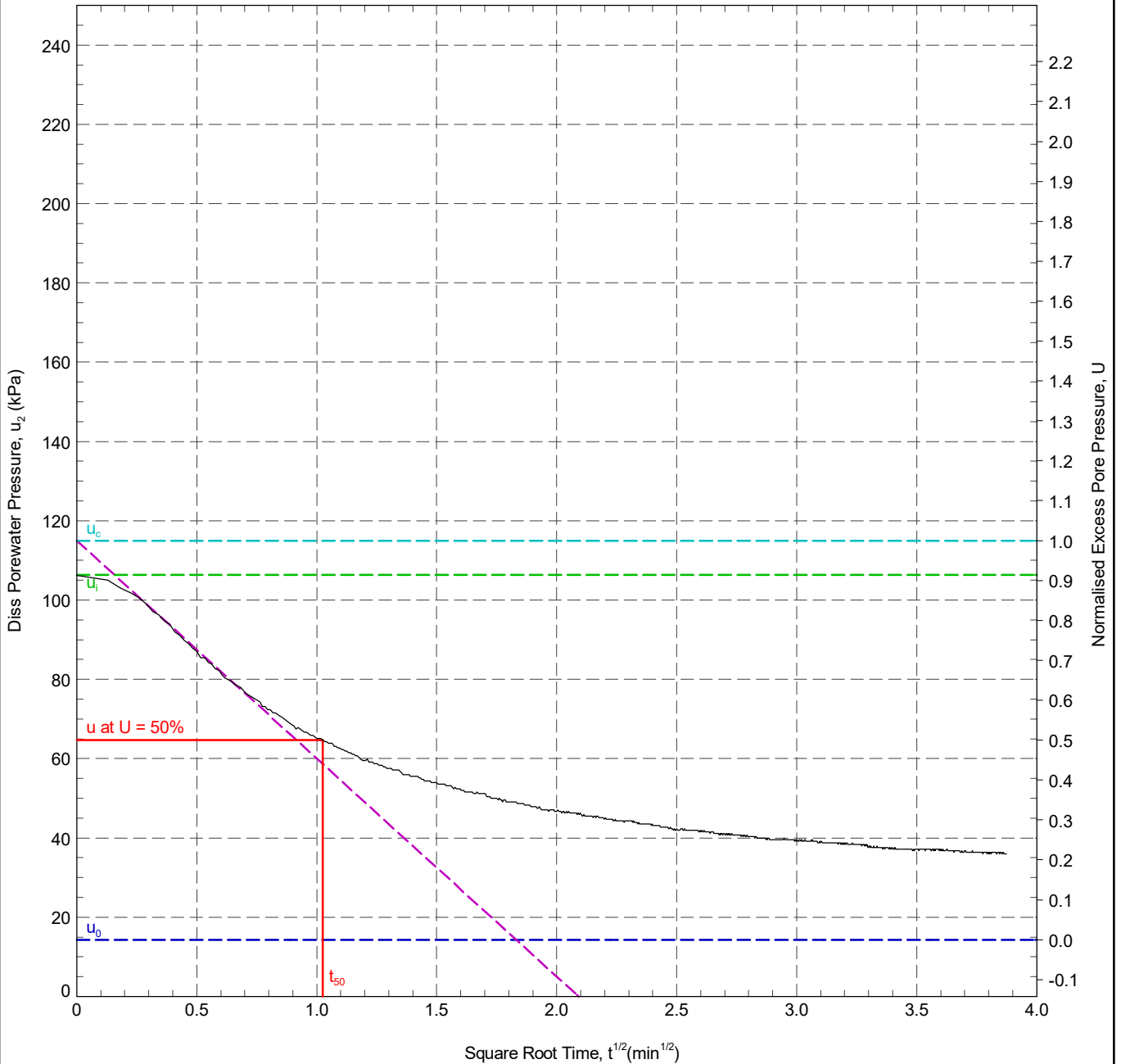
### **Dissipation Tests Results**

Working with:

CLIENT : Norfolk Partnership Laboratory  
 ENGINEER :  
 PROJECT : Great Yarmouth 3rd River Crossing  
 LOCATION : Great Yarmouth  
 PROJECT No. : 1180180

AREA : Great Yarmouth  
 EASTING : 652228.0 m  
 NORTHING : 305894.9 m  
 COORD. SYS.:  
 ELEVATION : 1.06 m

SHEET : 1 OF 1  
 STATUS : Final  
 DATE : 20/03/18



In Situ Pore Pressure, $u_0$ :	14.3 kPa	Rigidity Index, $I_r$ :	5.7
Initial Pore Pressure, $u_i$ :	106.3 kPa	Horizontal Coefficient of Consolidation, $c_h$ :	$1.55 \times 10^2$ m <sup>2</sup> /yr
Final Pore Pressure:	36.0 kPa	Ratio $c_v/c_r$ :	3
Back Extrapolated Pore Pressure, $u_c$ :	115 kPa	Vertical Coefficient of Consolidation, $c_v$ :	$5.16 \times 10^1$ m <sup>2</sup> /yr
Degree of Dissipation:	50%		
Dissipation Pressure:	64.7 kPa		
Time for 50% Dissipation, $t_{50}$ :	1.05 min		

RIG : CPT010 Walter; Truck-based 20 Ton, ~~ANALYSIS BY~~ : LD DATE: 23/03/2018  
 CONE TYPE : P15-CFPT CHECKED BY : LD DATE: 23/03/2018  
 CONE ID : P15-CFPTxy.70080 APPROVED BY : DW DATE: 23/03/2018  
 OPERATOR : DH & AE

REMARK  
Test OK.

**DISSIPATION TEST**



Test ID

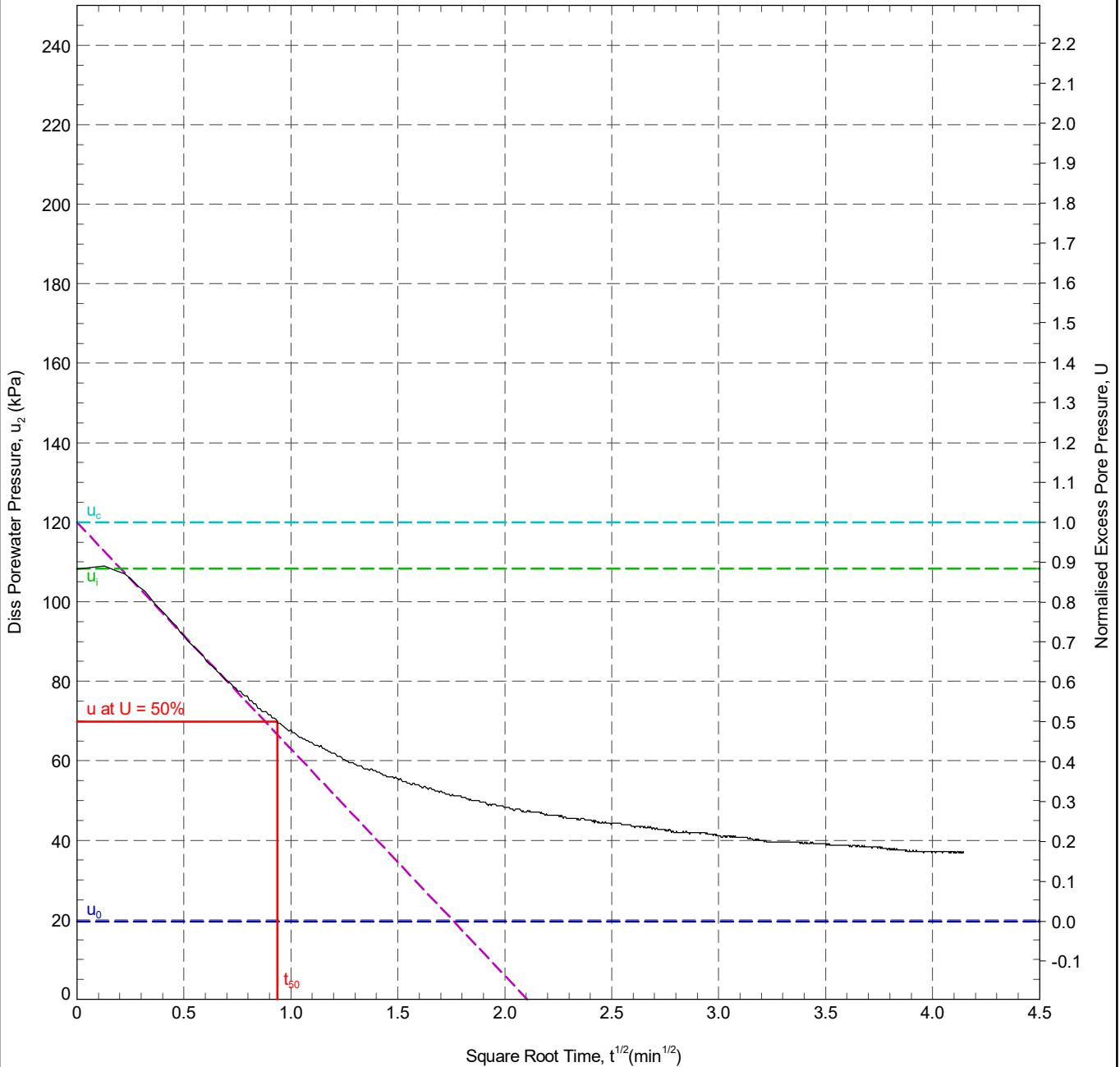
**CPT 01 - 4.00 m**

Working with:

CLIENT : Norfolk Partnership Laboratory  
 ENGINEER :  
 PROJECT : Great Yarmouth 3rd River Crossing  
 LOCATION : Great Yarmouth  
 PROJECT No. : 1180180

AREA : Great Yarmouth  
 EASTING : 652228.0 m  
 NORTHING : 305894.9 m  
 COORD. SYS.:  
 ELEVATION : 1.06 m

SHEET : 1 OF 1  
 STATUS : Final  
 DATE : 20/03/18



In Situ Pore Pressure, $u_0$ :	19.6 kPa	Rigidity Index, $I_r$ :	100
Initial Pore Pressure, $u_i$ :	108.3 kPa	Horizontal Coefficient of Consolidation, $c_h$ :	$7.77 \times 10^2 \text{ m}^2/\text{yr}$
Final Pore Pressure:	37.1 kPa	Ratio $c_r/c_v$ :	3
Back Extrapolated Pore Pressure, $u_c$ :	120 kPa	Vertical Coefficient of Consolidation, $c_v$ :	$2.59 \times 10^2 \text{ m}^2/\text{yr}$
Degree of Dissipation:	50%		
Dissipation Pressure:	69.8 kPa		
Time for 50% Dissipation, $t_{50}$ :	0.88 min		

RIG : CPT010 Walter; Truck-based 20 Ton, ~~Walter~~ ANALYSIS BY : LD DATE: 23/03/2018  
 CONE TYPE : P15-CFPT CHECKED BY : LD DATE: 23/03/2018  
 CONE ID : P15-CFPTxy.70080 APPROVED BY : DW DATE: 23/03/2018  
 OPERATOR : DH & AE

REMARK  
 Test OK.

INSTITUSI 2.02.0.LIB.GLB.Gmph. ISSI DISS. PORE PRESSURE VS. SQR T.A.P. 1180180-GREAT YARMOUTH 3RD RIVER CROSSING.GPJ. <<Drawingfile>> 19/04/2018 18:08 10.0.000 D:\ghl\Lab and In Situ Tool - DGD [Lib: In Situ SI 2.02.0.2017-07-10 Proj: In Situ SI 2.02.0.2017-07-10

# DISSIPATION TEST



Test ID

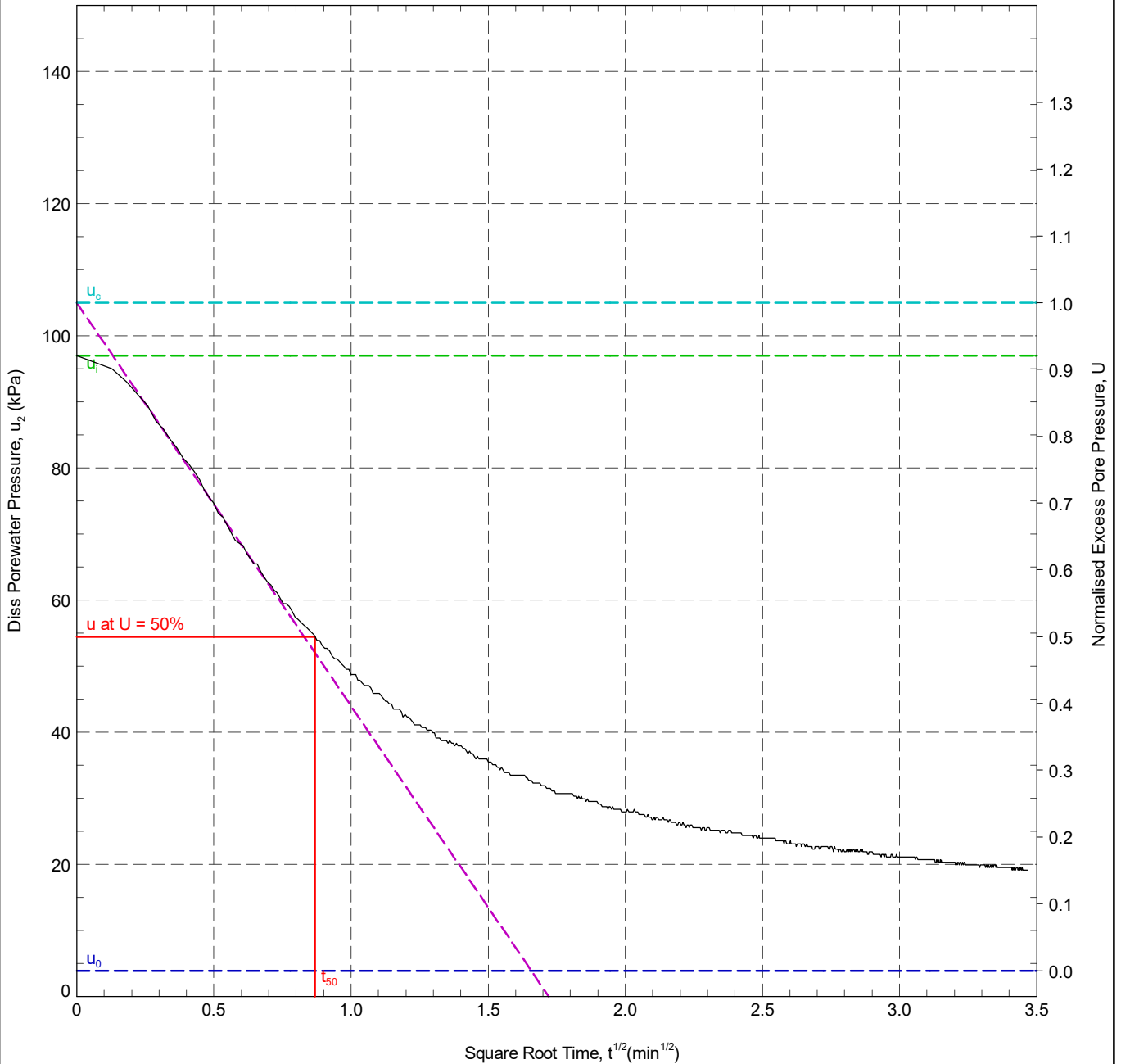
**CPT 02 - 2.40 m**

Working with:

CLIENT : Norfolk Partnership Laboratory  
 ENGINEER :  
 PROJECT : Great Yarmouth 3rd River Crossing  
 LOCATION : Great Yarmouth  
 PROJECT No. : 1180180

AREA : Great Yarmouth  
 EASTING : 652244.0 m  
 NORTHING : 305934.2 m  
 COORD. SYS.:  
 ELEVATION : 0.73 m

SHEET : 1 OF 1  
 STATUS : Final  
 DATE : 19/03/18



In Situ Pore Pressure, $u_0$ :	3.9 kPa	Rigidity Index, $I_r$ :	4.6
Initial Pore Pressure, $u_i$ :	97.0 kPa	Horizontal Coefficient of Consolidation, $c_h$ :	$1.94 \times 10^2 \text{ m}^2/\text{yr}$
Final Pore Pressure:	19.1 kPa	Ratio $c_h/c_v$ :	3
Back Extrapolated Pore Pressure, $u_0$ :	105 kPa	Vertical Coefficient of Consolidation, $c_v$ :	$6.46 \times 10^1 \text{ m}^2/\text{yr}$
Degree of Dissipation:	50%		
Dissipation Pressure:	54.5 kPa		
Time for 50% Dissipation, $t_{50}$ :	0.75 min		

RIG : CPT010 Walter; Truck-based 20 Ton, ~~Walter~~ ANALYSIS BY : LD DATE: 23/03/2018  
 CONE TYPE : P15-CFPT CHECKED BY : LD DATE: 23/03/2018  
 CONE ID : P15-CFPTxy.70080 APPROVED BY : DW DATE: 23/03/2018  
 OPERATOR : DH & AE

REMARK  
 Test OK.

INSTIUSI 2.02.0 LIB.GLB.Gmph ISSI DISS. PORE PRESSURE VS. SQR T.A.P. 1180180-GREAT YARMOUTH 3RD RIVER CROSSING.GPJ <Drawingfile> 19/04/2018 18:08 10.0.000 Dagehl Lab and In Situ Tool - DGD | Lib: In Situ SI 2.02.0 2017-07-10 Proj: In Situ SI 2.02.0 2017-07-10

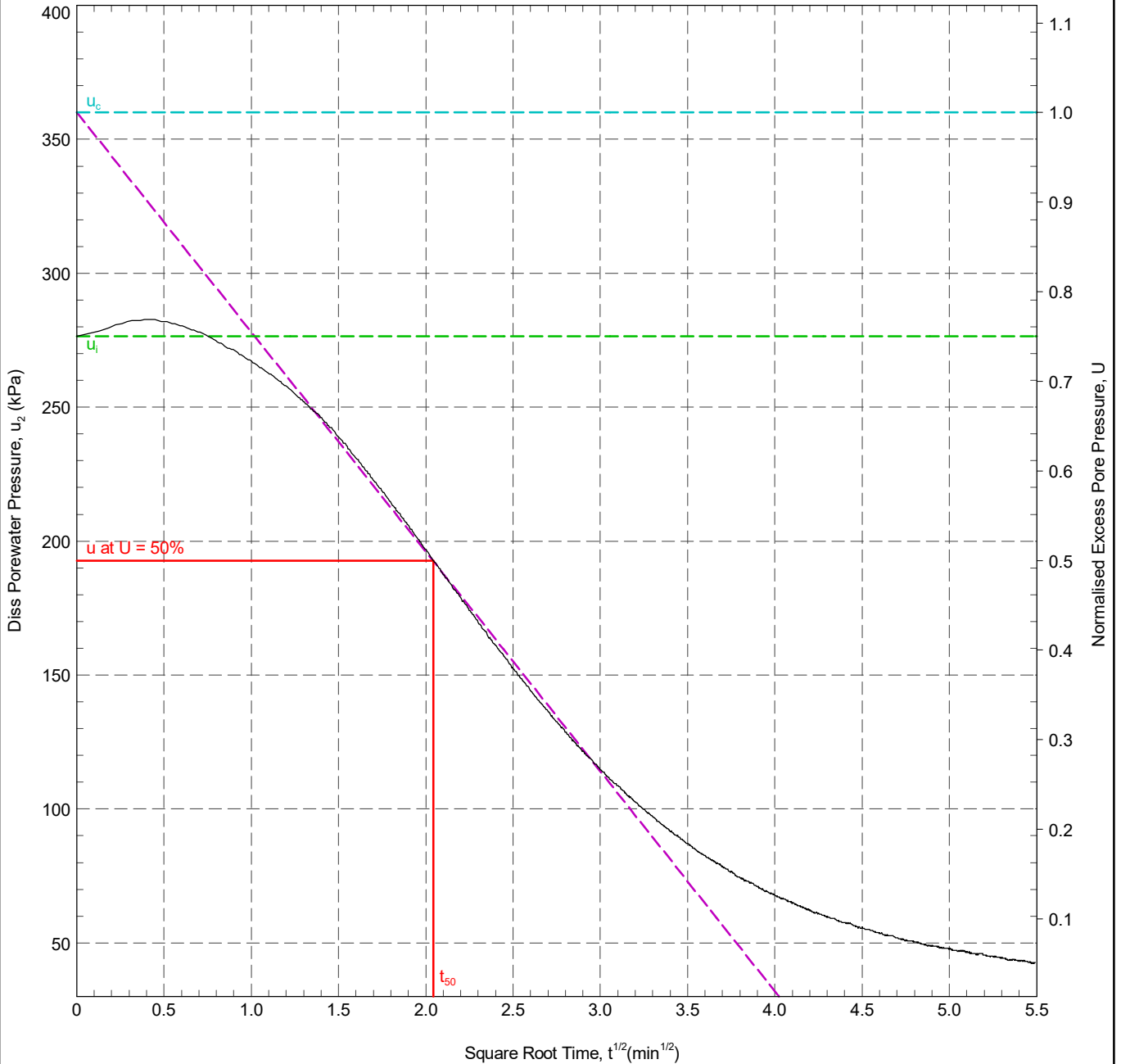


Working with:

CLIENT : Norfolk Partnership Laboratory  
 ENGINEER :  
 PROJECT : Great Yarmouth 3rd River Crossing  
 LOCATION : Great Yarmouth  
 PROJECT No. : 1180180

AREA : Great Yarmouth  
 EASTING : 652308.0 m  
 NORTHING : 305950.5 m  
 COORD. SYS.:  
 ELEVATION : 1.17 m

SHEET : 1 OF 1  
 STATUS : Final  
 DATE : 19/03/18



In Situ Pore Pressure, $u_0$ :	25.5 kPa	Rigidity Index, $I_r$ :	7.9
Initial Pore Pressure, $u_i$ :	276.4 kPa	Horizontal Coefficient of Consolidation, $c_h$ :	$4.59 \times 10^1 \text{ m}^2/\text{yr}$
Final Pore Pressure:	42.7 kPa	Ratio $c_h/c_v$ :	3
Back Extrapolated Pore Pressure, $u_c$ :	360 kPa	Vertical Coefficient of Consolidation, $c_v$ :	$1.53 \times 10^1 \text{ m}^2/\text{yr}$
Degree of Dissipation:	50%		
Dissipation Pressure:	192.7 kPa		
Time for 50% Dissipation, $t_{50}$ :	4.18 min		

RIG : CPT010 Walter; Truck-based 20 Ton, ~~ANALYSIS BY~~ : LD DATE: 23/03/2018  
 CONE TYPE : P15-CFPT CHECKED BY : LD DATE: 23/03/2018  
 CONE ID : P15-CFPTxy.70080 APPROVED BY : DW DATE: 23/03/2018  
 OPERATOR : DH & AE

REMARK  
 Test OK.

Test ID

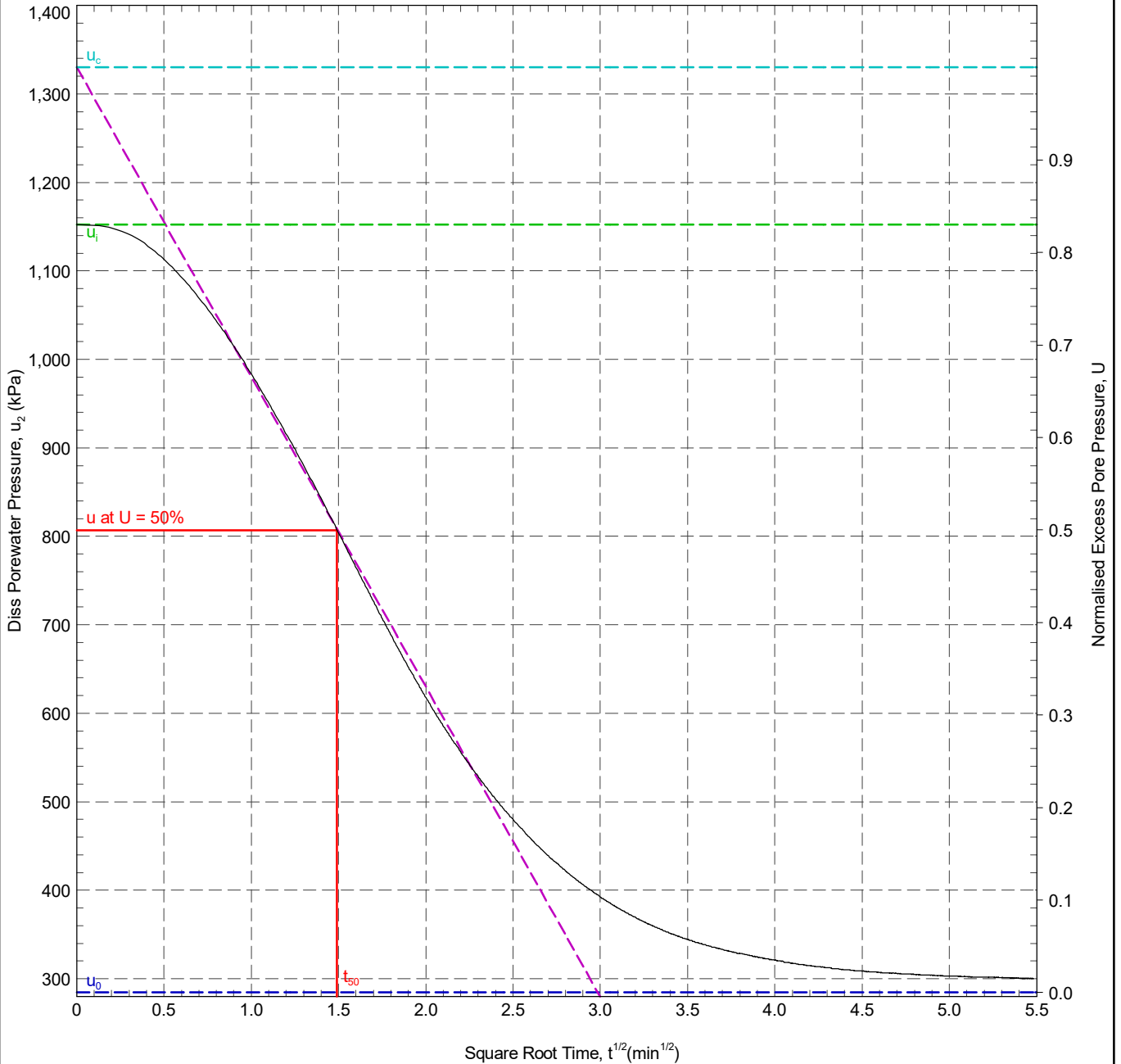
**CPT 04 - 30.99 m**

Working with:

CLIENT : Norfolk Partnership Laboratory  
 ENGINEER :  
 PROJECT : Great Yarmouth 3rd River Crossing  
 LOCATION : Great Yarmouth  
 PROJECT No. : 1180180

AREA : Great Yarmouth  
 EASTING : 652571.6 m  
 NORTHING : 306018.0 m  
 COORD. SYS.:  
 ELEVATION : 1.49 m

SHEET : 1 OF 1  
 STATUS : Final  
 DATE : 19/03/18



In Situ Pore Pressure, $u_0$ :	284.4 kPa	Rigidity Index, $I_r$ :	6.7
Initial Pore Pressure, $u_i$ :	1152.4 kPa	Horizontal Coefficient of Consolidation, $c_{h1}$ :	$7.92 \times 10^1 \text{ m}^2/\text{yr}$
Final Pore Pressure:	300.4 kPa	Ratio $c_{h1}/c_v$ :	3
Back Extrapolated Pore Pressure, $u_c$ :	1330 kPa	Vertical Coefficient of Consolidation, $c_v$ :	$2.64 \times 10^1 \text{ m}^2/\text{yr}$
Degree of Dissipation:	50%		
Dissipation Pressure:	807.1 kPa		
Time for 50% Dissipation, $t_{50}$ :	2.23 min		

RIG : CPT010 Walter; Truck-based 20 Ton, ~~ANALYSIS BY~~ : LD DATE: 23/03/2018  
 CONE TYPE : P15-CFPT CHECKED BY : LD DATE: 23/03/2018  
 CONE ID : P15-CFPTxy.70080 APPROVED BY : DW DATE: 23/03/2018  
 OPERATOR : DH & AE

REMARK  
 Test OK.



*IN SITU SITE INVESTIGATION*

Unit 23 Hastings Innovation  
Centre,  
Highfield Drive  
St. Leonards on Sea, East Sussex,  
TN38 9UH, U.K.

Company No.: 6339499  
VAT No.: 922 3561 41





# Appendix F

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**DCP TEST RESULTS**

WSP

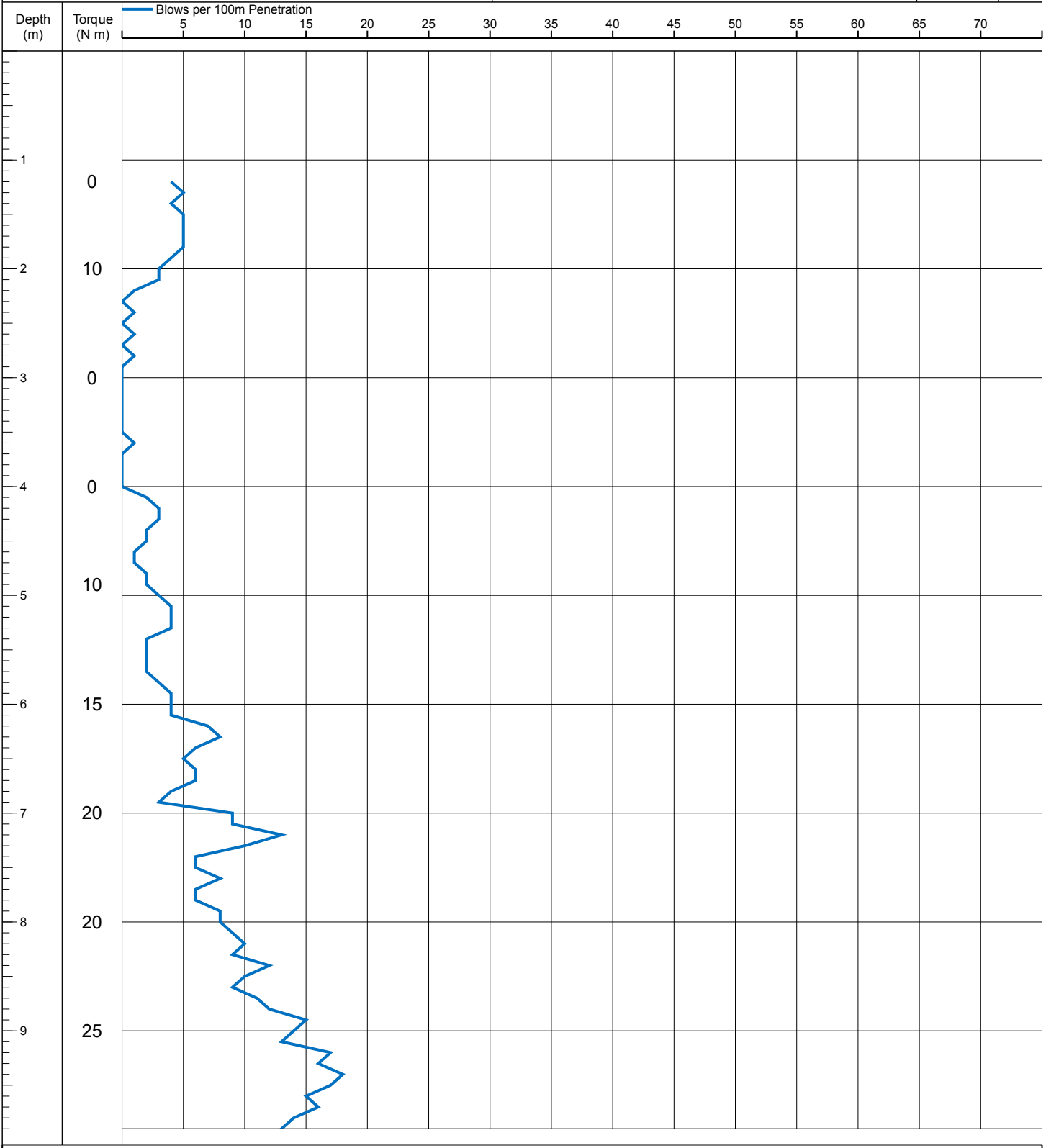
NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 1 of 2



Scheme	Gt Yarmouth 3rd River Crossing		Job No.	PZ1522D1	Borehole No.	BH4AS		
Carried out for	Community & Environmental Services		Date Started	14/12/2017	Date Finished	14/12/2017		
Dimension (mm)	44	Probe Type	DPSH		Type of Rig	Dando Terrier/Terrier		
Remarks:	General; Refuse at 6m sand blowing up		Depth (m)	15.00	Height (m)	2.13	Logged by	RK
			Co-ords	652284 - 305847		Checked by	MLB	



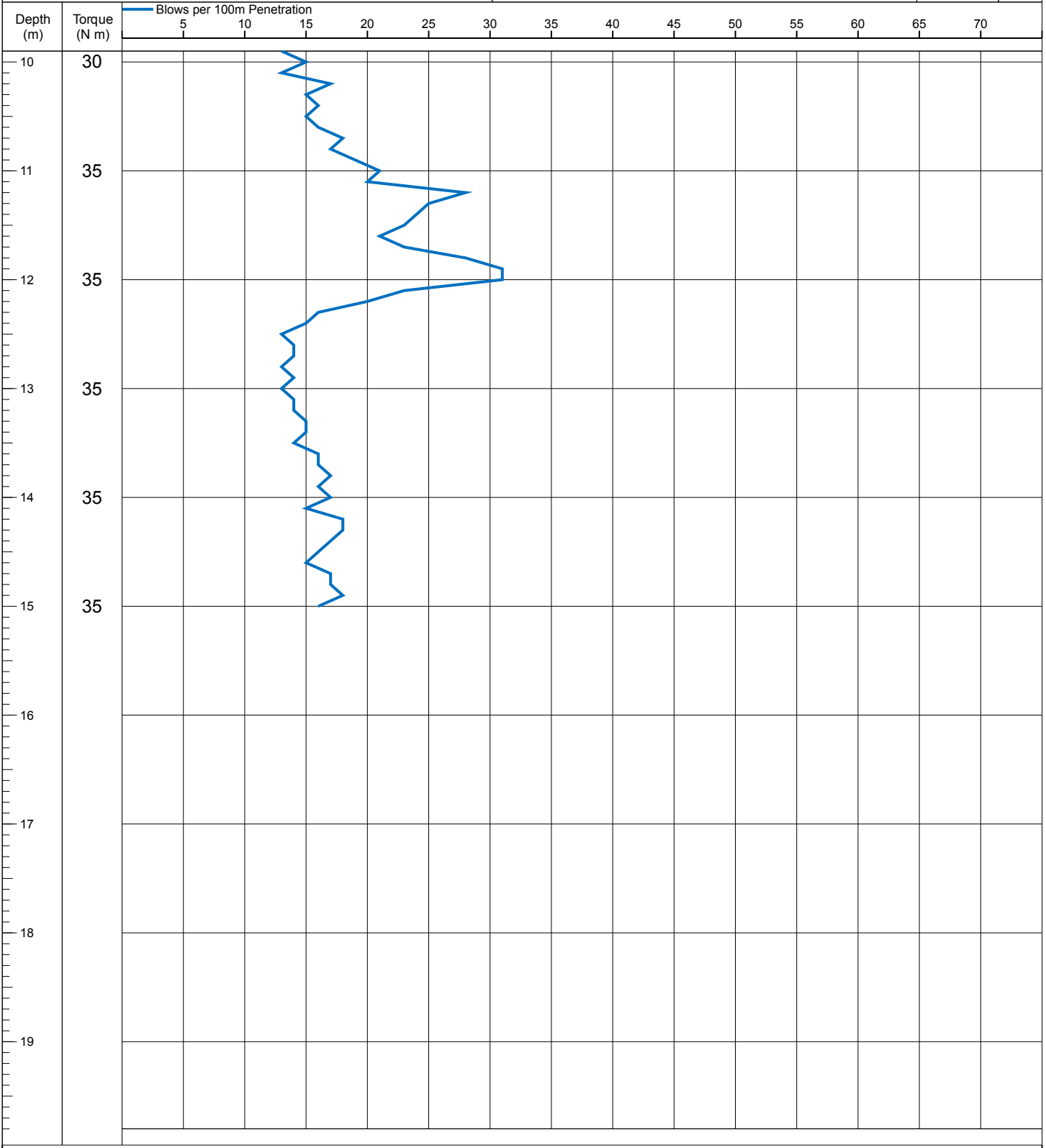
NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 2 of 2



Scheme		Gt Yarmouth 3rd River Crossing		Job No. PZ1522D1		Borehole No. BH4AS						
Carried out for		Community & Environmental Services		Date Started 14/12/2017		Date Finished 14/12/2017						
Dimension (mm)	44	Probe Type	DPSH	Type of Rig			Dando Terrier/Terrier	Logged by	RK			
Remarks:		General; Refuse at 6m sand blowing up		Depth (m)		15.00		Height (m)		2.13	Drawn by	RK
				Co-ords				652284 - 305847		Checked by	MLB	



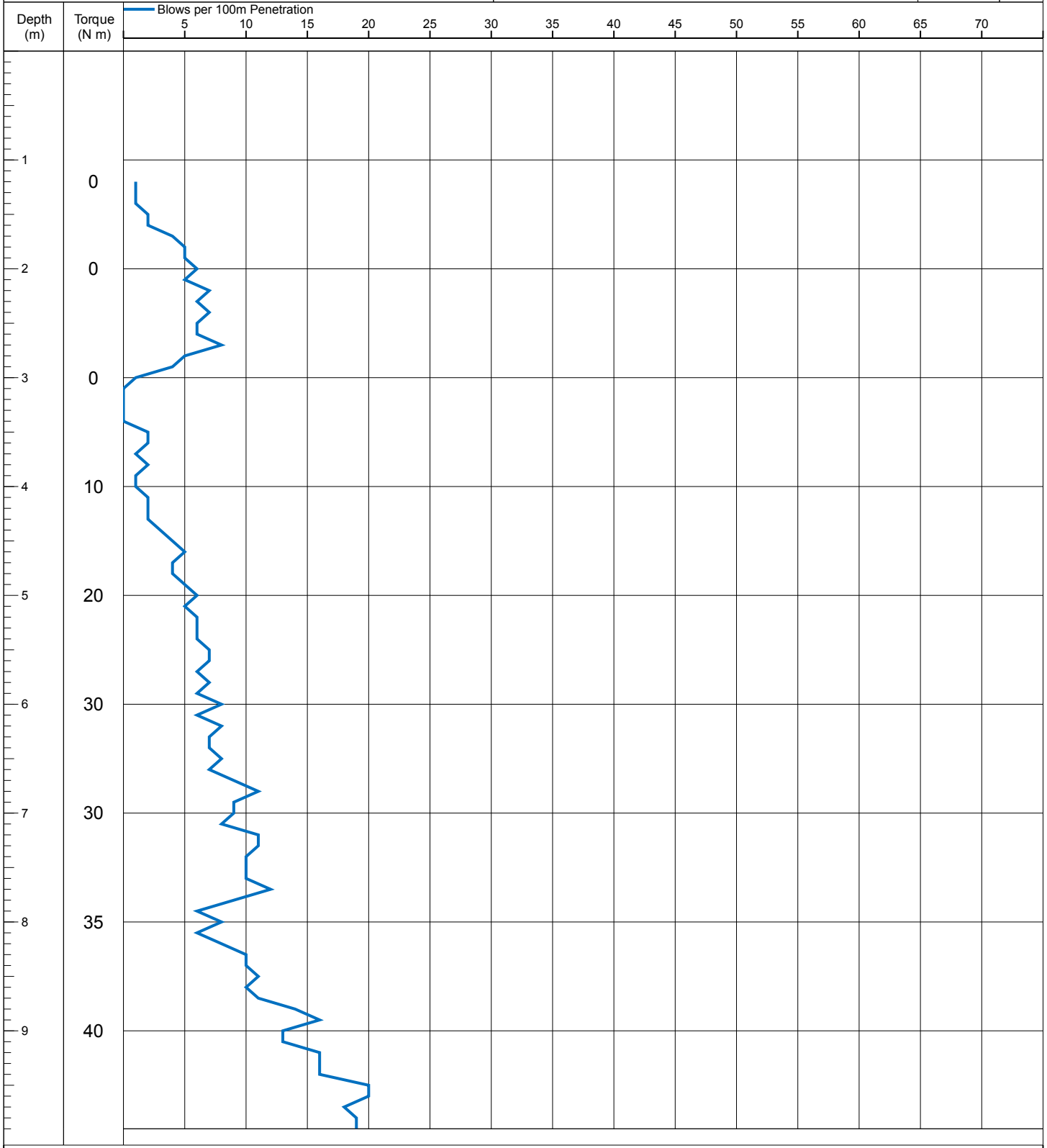
NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 1 of 2



Scheme	Gt Yarmouth 3rd River Crossing		Job No.	PZ1522D1	Borehole No.	BH4B			
Carried out for	Community & Environmental Services		Date Started	14/12/2017	Date Finished	14/12/2017			
Dimension (mm)	44	Probe Type	DPSH	Type of Rig	Dando Terrier/Hand Tools/Terrier		Logged by	RK	
Remarks:	General; Refuse at 5m blowing sand. General; 3-4M liner in bulk bag			Depth (m)	5.00	Height (m)	1.83	Drawn by	RK
				Co-ords	652312 - 305826			Checked by	MLB





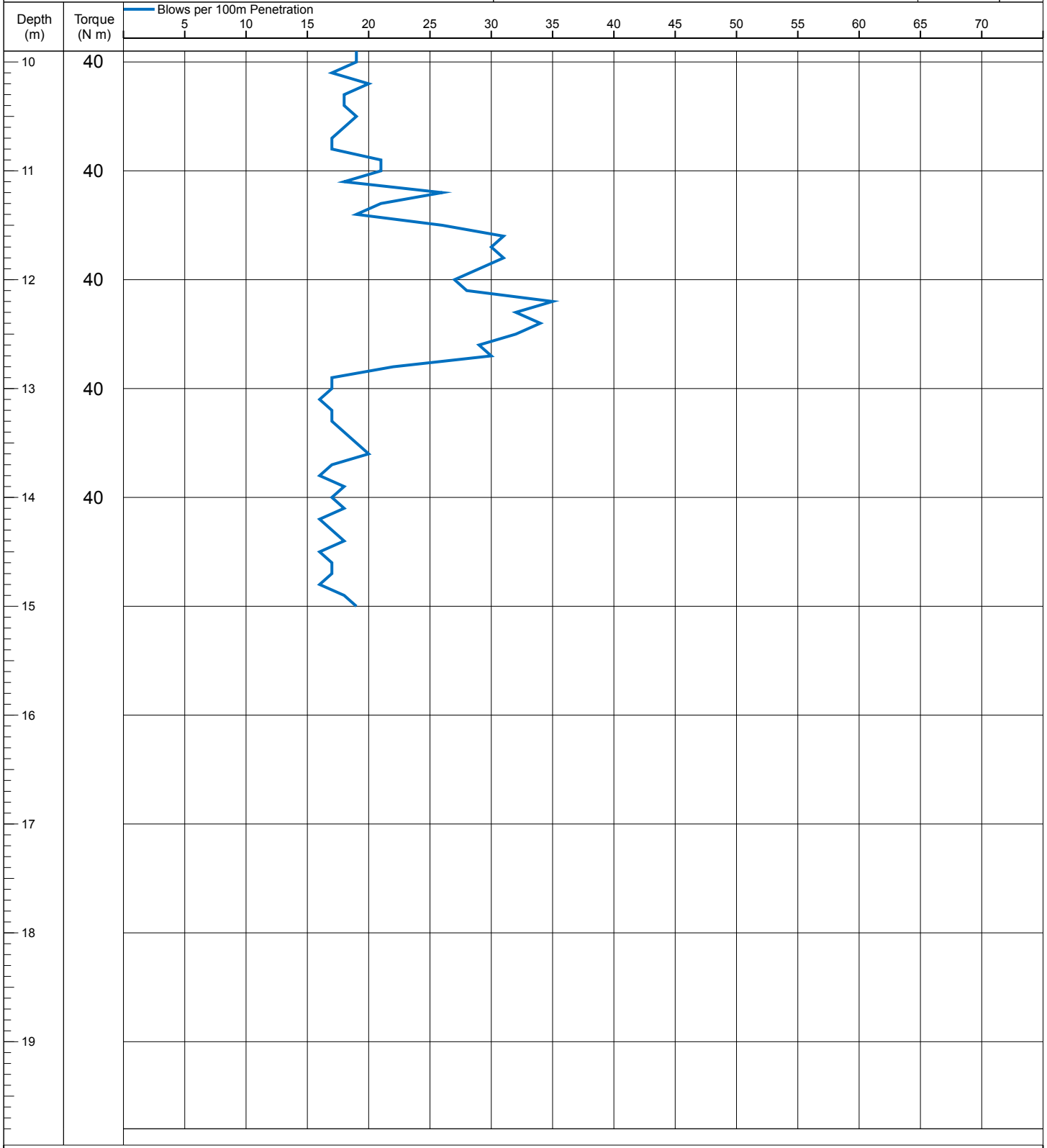
NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 2 of 2



Scheme		Gt Yarmouth 3rd River Crossing		Job No. PZ1522D1		Borehole No. BH4B			
Carried out for		Community & Environmental Services		Date Started 14/12/2017		Date Finished 14/12/2017			
Dimension (mm)	44	Probe Type	DPSH	Type of Rig		Dando Terrier/Hand Tools/Terrier	Logged by	RK	
Remarks:		General; Refuse at 5m blowing sand. General; 3-4M liner in bulk bag		Depth (m)	5.00	Height (m)	1.83	Drawn by	RK
				Co-ords		652312 - 305826		Checked by	MLB



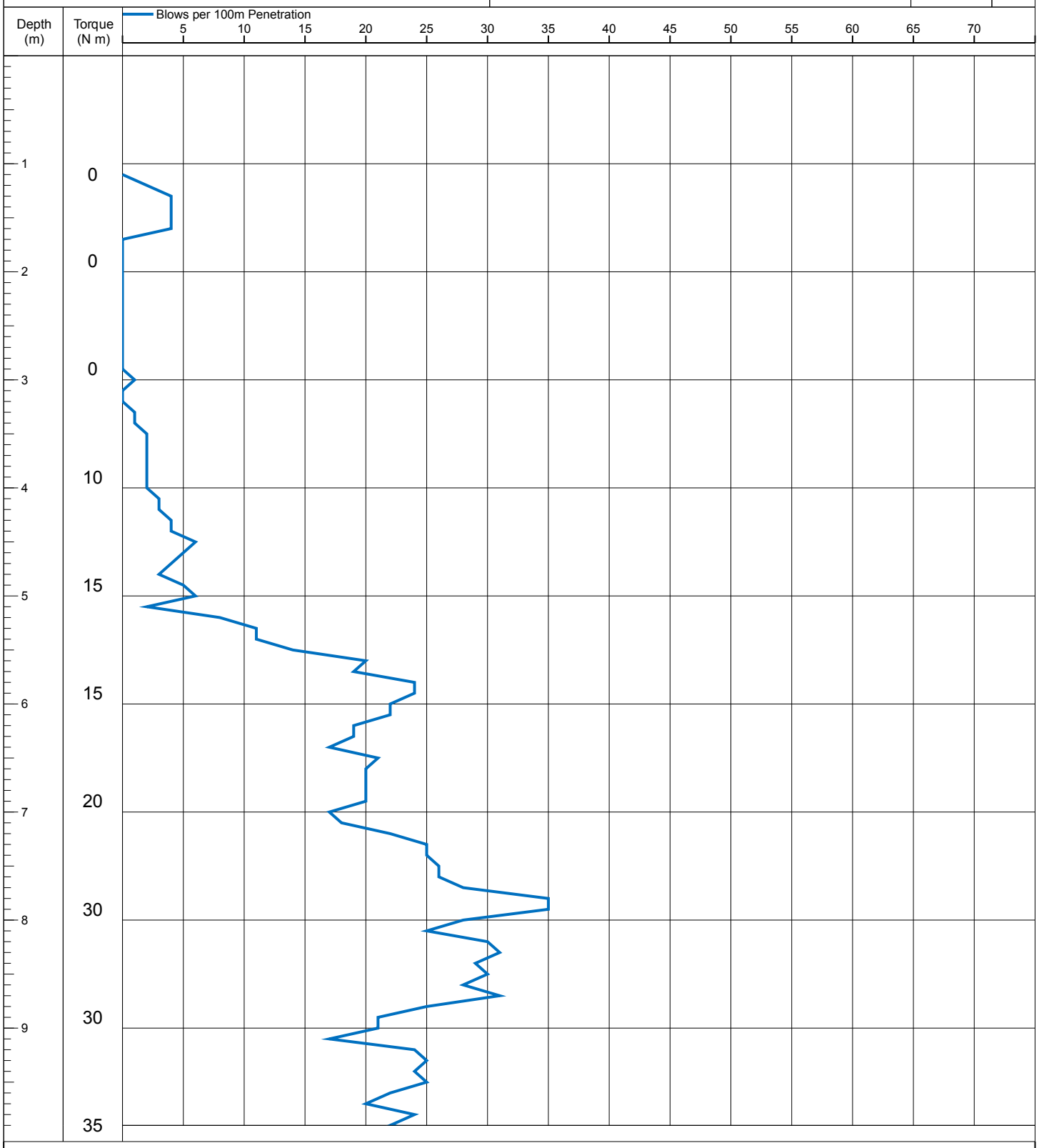
NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 1 of 2



Scheme	Gt Yarmouth 3rd River Crossing		Job No.	PZ1522D1		Borehole No.	TP1DP			
Carried out for	Community & Environmental Services			Date Started	07/12/2017		Date Finished	07/12/2017		
Dimension (mm)	44	Probe Type	DPSH-B		Type of Rig	Terrier		Logged by	MB	
Remarks:	TP1 to 1.2m. DP continue from base of TP.				Depth (m)	15.00	Height (m)	1.55	Drawn by	RK
	Co-ords						652248 - 305907		Checked by	MLB



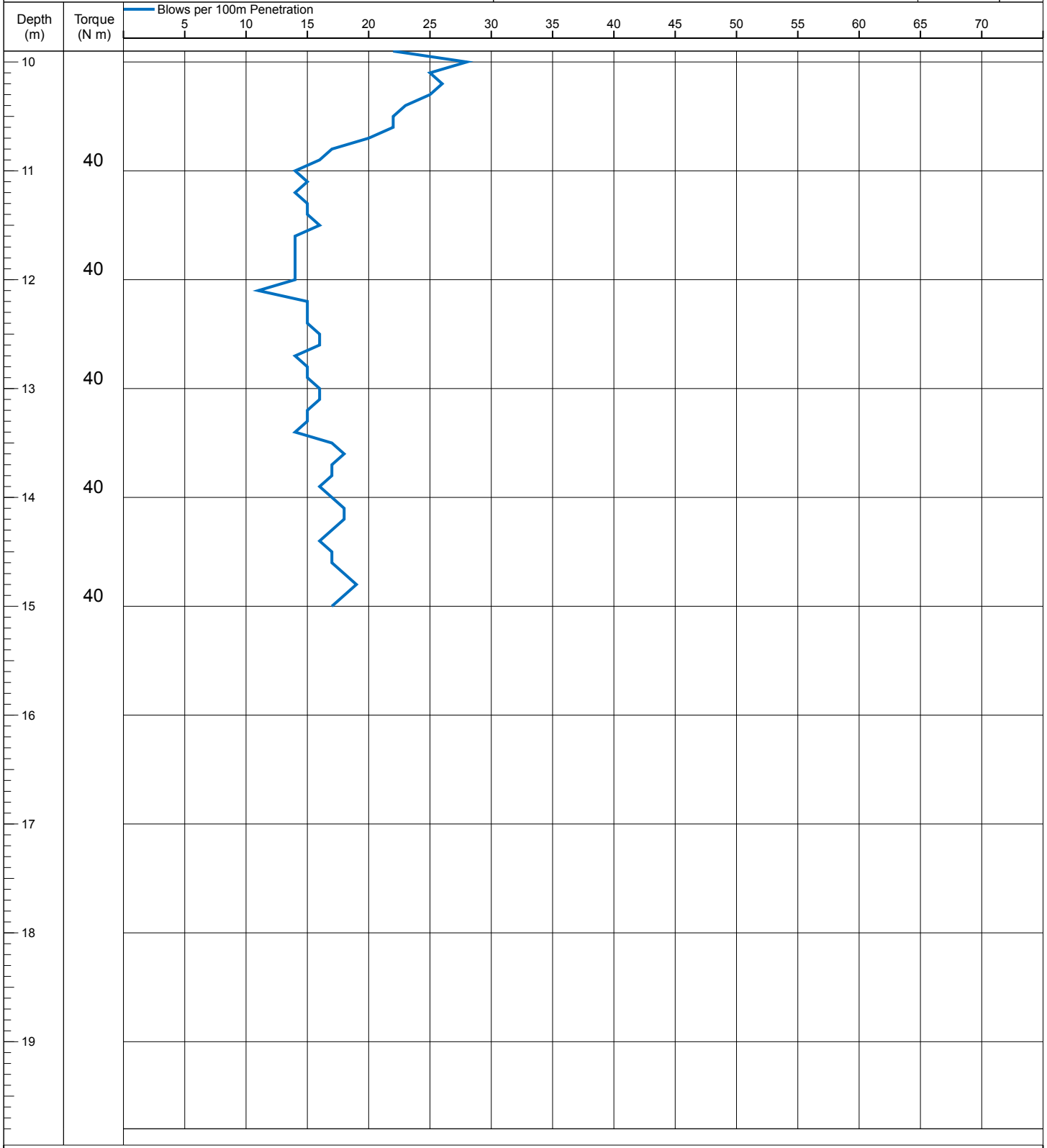
NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 2 of 2



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	TP1DP
Carried out for	Community & Environmental Services	Date Started	07/12/2017	Date Finished	07/12/2017
Dimension (mm)	44	Probe Type	DPSH-B	Type of Rig	Terrier
Remarks:	TP1 to 1.2m. DP continue from base of TP.	Depth (m)	15.00	Height (m)	1.55
		Co-ords	652248 - 305907	Checked by	MLB
				Logged by	MB
				Drawn by	RK



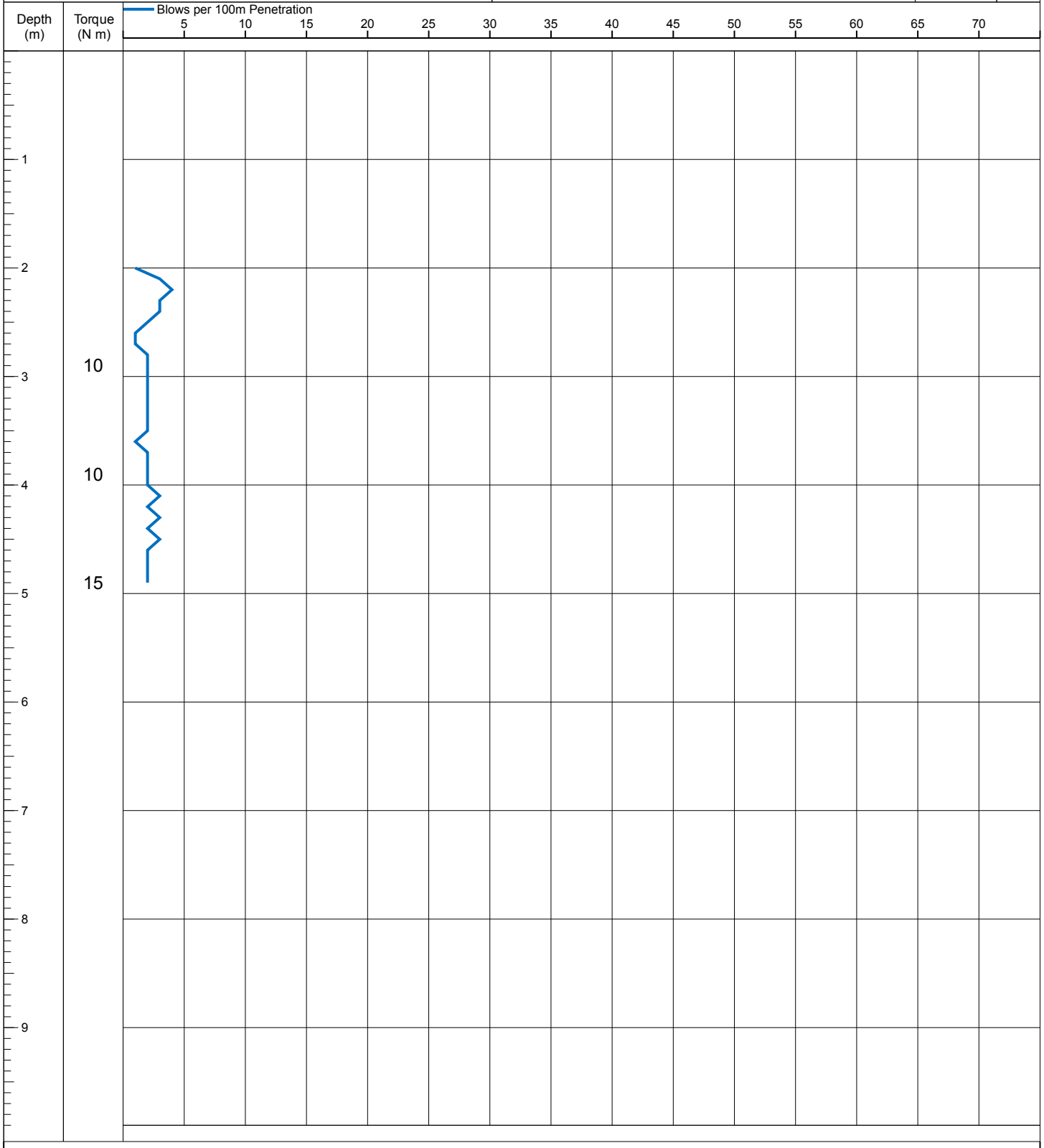
NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 1 of 1



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	WS2DP	
Carried out for	Community & Environmental Services	Date Started	07/12/2017	Date Finished	07/12/2017	
Dimension (mm)	36	Probe Type	DPSH-B	Type of Rig	Geotool	
Remarks:	WS2 from 1.2-2m. DP continue from base of WS.	Depth (m)	5.00	Height (m)	0.85	
		Co-ords	652124 - 305897		Checked by	MLB
		Logged by	MB			Drawn by





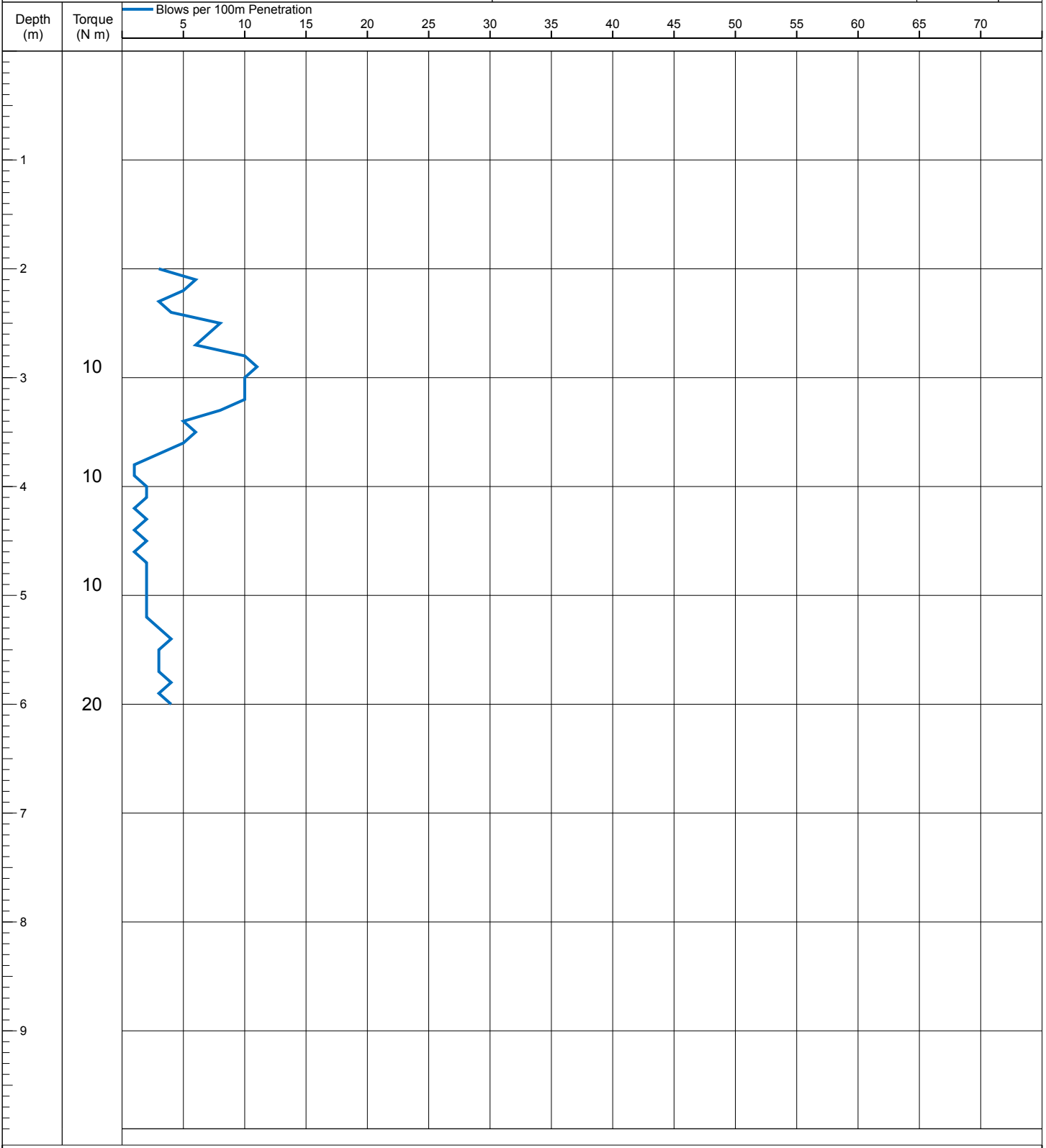
NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 1 of 1



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	WS5DP
Carried out for	Community & Environmental Services	Date Started	04/12/2017	Date Finished	05/12/2017
Dimension (mm)	36	Probe Type	DPH	Type of Rig	Geotool
Remarks:	WS5 probe.	Depth (m)	6.00	Height (m)	1.09
		Co-ords	652156 - 305895	Logged by	MB
				Drawn by	RK
				Checked by	MLB



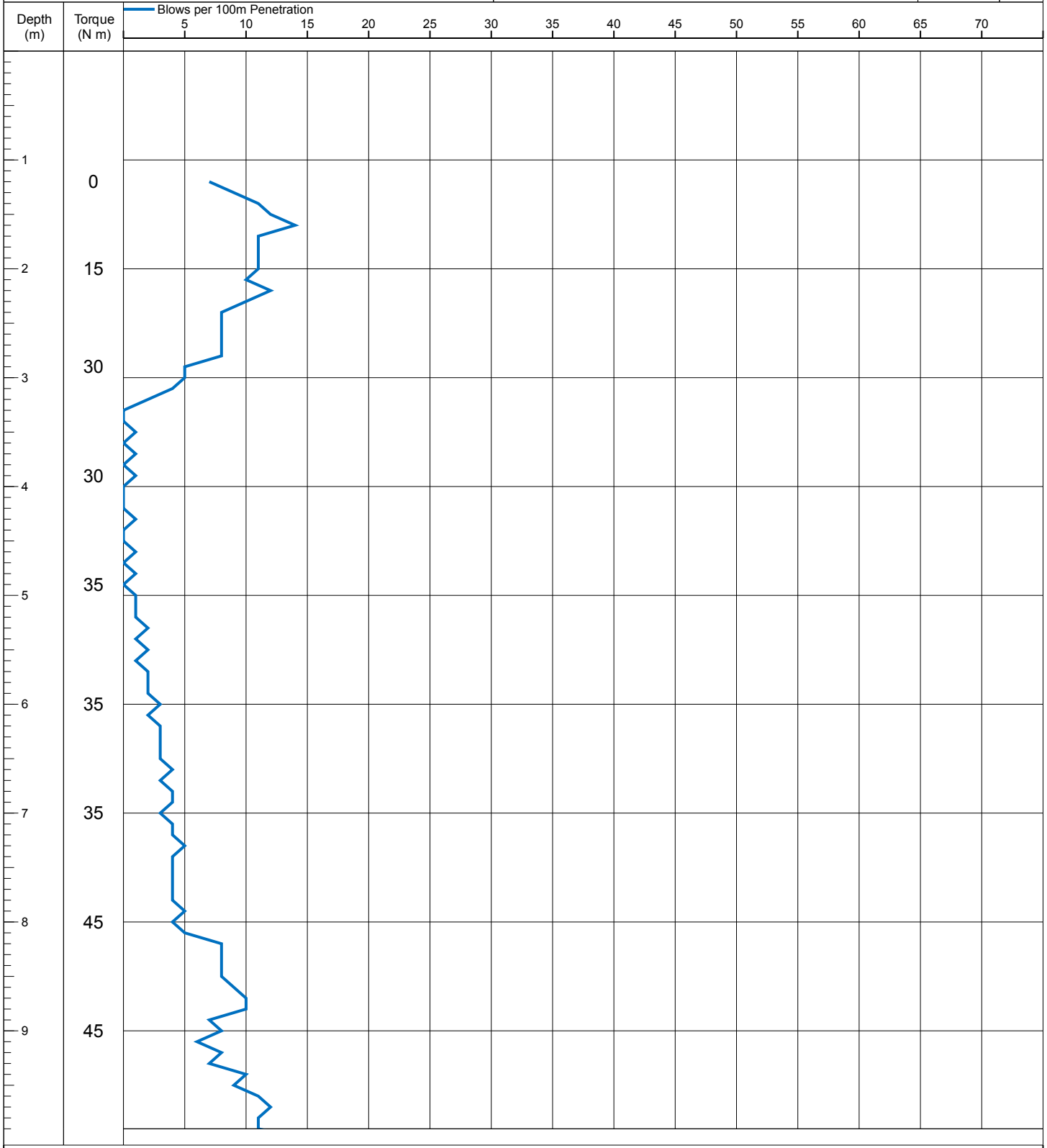
NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 1 of 2



Scheme	Gt Yarmouth 3rd River Crossing		Job No.	PZ1522D1	Borehole No.	WS7DP			
Carried out for	Community & Environmental Services		Date Started	06/12/2017	Date Finished	06/12/2017			
Dimension (mm)	36	Probe Type	DPH	Type of Rig	Dando Terrier/Terrier/Hand Tools		Logged by	MB	
Remarks:	WS7 from 1.2-2m. DP from 1.2m			Depth (m)	15.00	Height (m)	0.85	Drawn by	RK
				Co-ords	652204 - 305885		Checked by	MLB	



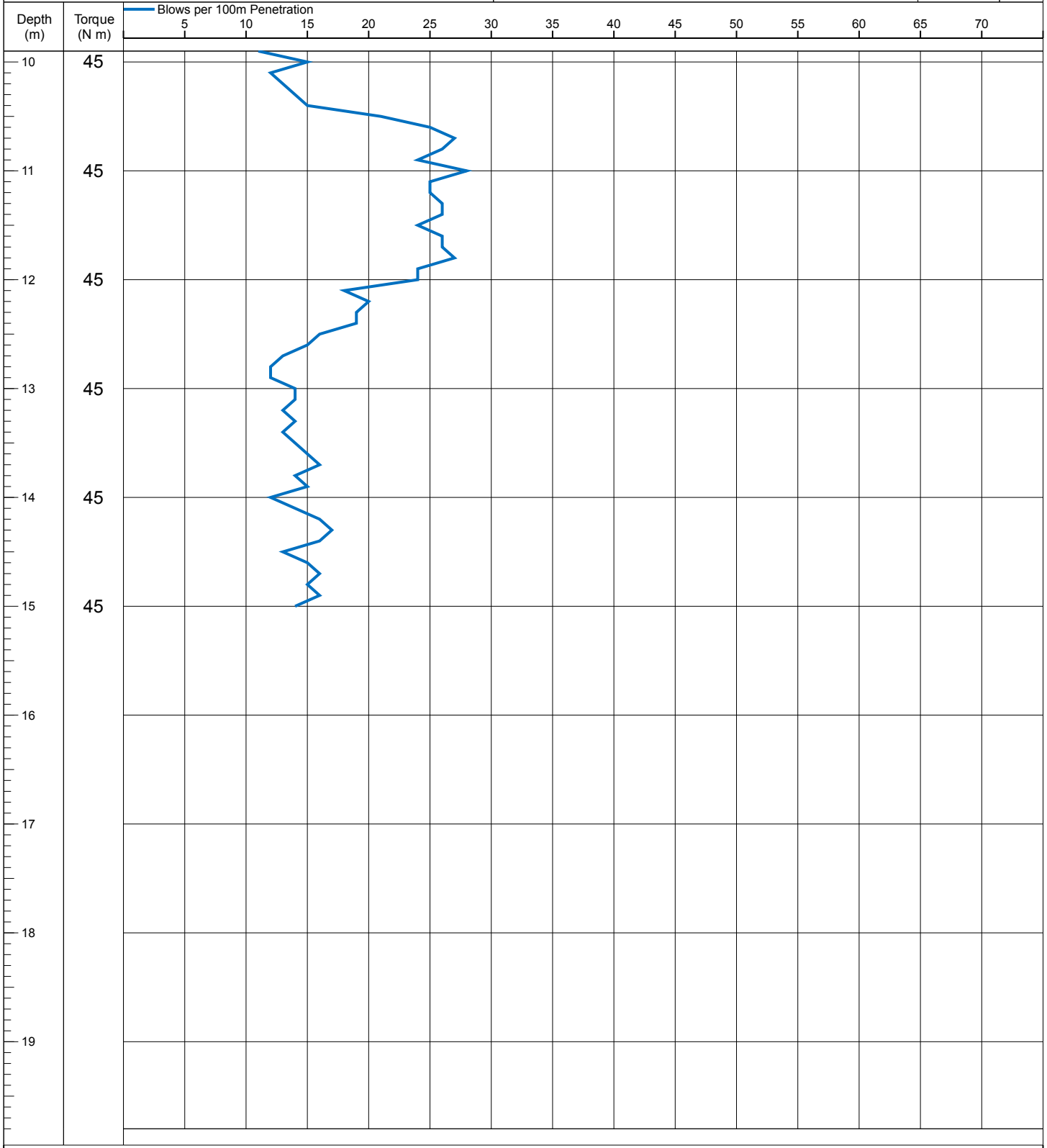
NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 2 of 2



Scheme	Gt Yarmouth 3rd River Crossing		Job No.	PZ1522D1	Borehole No.	WS7DP				
Carried out for	Community & Environmental Services			Date Started	06/12/2017		Date Finished	06/12/2017		
Dimension (mm)	36	Probe Type	DPH		Type of Rig	Dando Terrier/Terrier/Hand Tools		Logged by	MB	
Remarks:	WS7 from 1.2-2m. DP from 1.2m				Depth (m)	15.00	Height (m)	0.85	Drawn by	RK
						Co-ords	652204 - 305885		Checked by	MLB



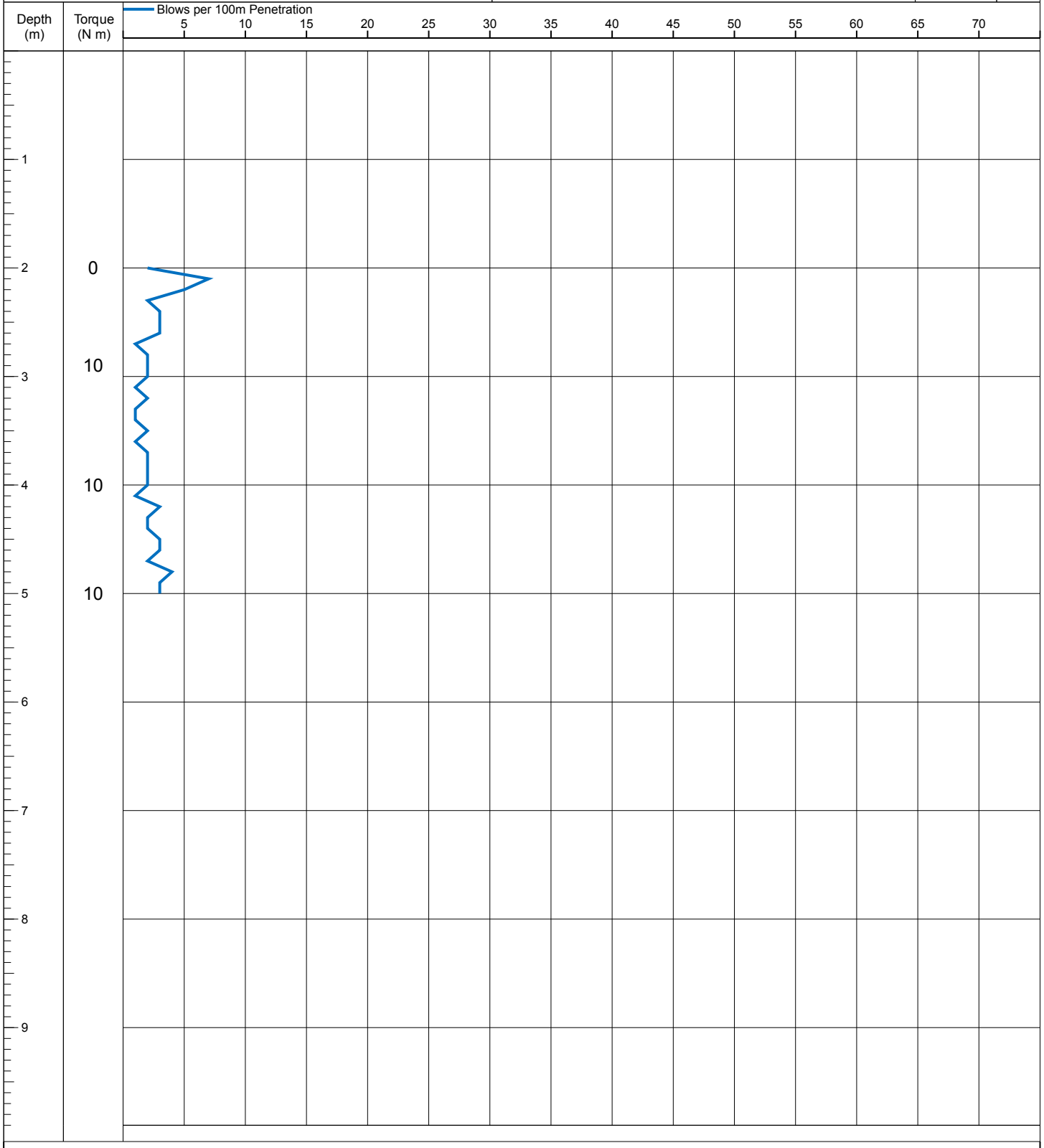
NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 1 of 1



Scheme	Gt Yarmouth 3rd River Crossing		Job No.	PZ1522D1		Borehole No.	WS8DP		
Carried out for	Community & Environmental Services			Date Started	07/12/2017		Date Finished	07/12/2017	
Dimension (mm)	36	Probe Type	DPH		Type of Rig	Geotool		Logged by	RK
Remarks:	WS8 from 1.2-2m probe continue from base of WS.				Depth (m)	5.00		Height (m)	0.87
					Co-ords	652203 - 305887		Checked by	MLB







# Appendix G

---

**WSP**  
**GEOTECHNICAL LABORATORY TEST  
RESULTS**

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:
Client Name:	<b>Community &amp; Environmental Services</b>	<b>PZ1522D1</b>

Location	Depth m	Sample Ref	Sample Description	Water Content %	Remarks
BH1	3.60-3.80	B15	Grey brown sandy clayey SILT	47.7	
BH1	7.00-7.50	B25	Grey slightly gravelly CLAY. Gravel is of flint, chalk and occasional shell fragments	60.0	
BH1	9.50-9.95	D32	Dark brown and black pseudo fibrous PEAT.	335	
BH1	10.95-11.00	D35	Dark brown and black pseudo fibrous PEAT.	359	
BH1	27.45-27.50	D71	Grey slightly gravelly sandy CLAY. Gravel is of flint and occasional shell fragments.	26.9	
BH1	30.00-30.45	D76	Grey slightly clayey silty SAND	21.7	
BH2	4.40-4.80	B15	Grey brown slightly gravelly slightly sandy silty CLAY. Gravel is of flint, quartzite and occasional shell fragments	55.0	
BH2	6.50-7.00	B21	Grey slightly sandy silty CLAY	83.3	
BH2	8.60-9.00	B24	Dark brown and black amorphous PEAT	197	
BH2	10.00-10.45	D29	Dark brown and black amorphous PEAT.	257	

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:
Client Name:	<b>Community &amp; Environmental Services</b>	<b>PZ1522D1</b>

Location	Depth m	Sample Ref	Sample Description	Water Content %	Remarks
BH2	27.00-28.00	B66	Grey brown clayey SAND	23.9	
BH2	27.90-28.35	D67	Grey slightly sandy silty CLAY.	24.5	
BH2	29.55-30.00	D70	Grey sandy CLAY.	24.5	

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	2 of 2



**Norfolk Partnership Laboratory**Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)**Community & Environmental Services****G Broad**  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH**Our Project No** PZ1522D1  
**Our Report and sample No** GTS3171204010-602  
**Our Specimen Ref**  
**Your Project or Order No** PZ1522**Date Report Issued** 11-Jan-18

Page 1 of 1

**Determination of Moisture Content to BS1377 : Part 2 : 1990 : Section 3.2**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH4A	<b>Depth</b>	2.1 m
<b>Date sampled</b>	8-Dec-17	<b>Date received</b>	8-Dec-18
<b>Date tested</b>	2-Jan-18		
<b>Sample type</b>	Bulk Disturbed		
If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Soil		
<b>Description</b>	Dark brown to black fibrous PEAT. Breydon Formation		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex-site

	<b>TEST SPECIMEN</b>
<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable
	<b>PREPARATION DETAILS</b>
<b>Method of Division</b>	
<b>Preparation Method</b>	Oven dried @ 105°C
<b>Natural Moisture Content (%)</b>	211

**Remarks**

Test Code = 602



0920

Simon Holden (Project Technician)

[www.norfolk.gov.uk](http://www.norfolk.gov.uk)

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:
Client Name:	<b>Community &amp; Environmental Services</b>	<b>PZ1522D1</b>

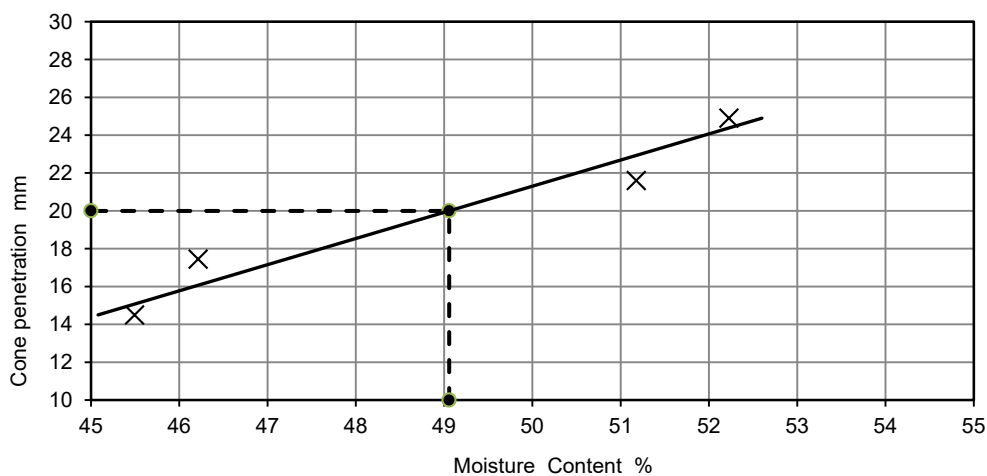
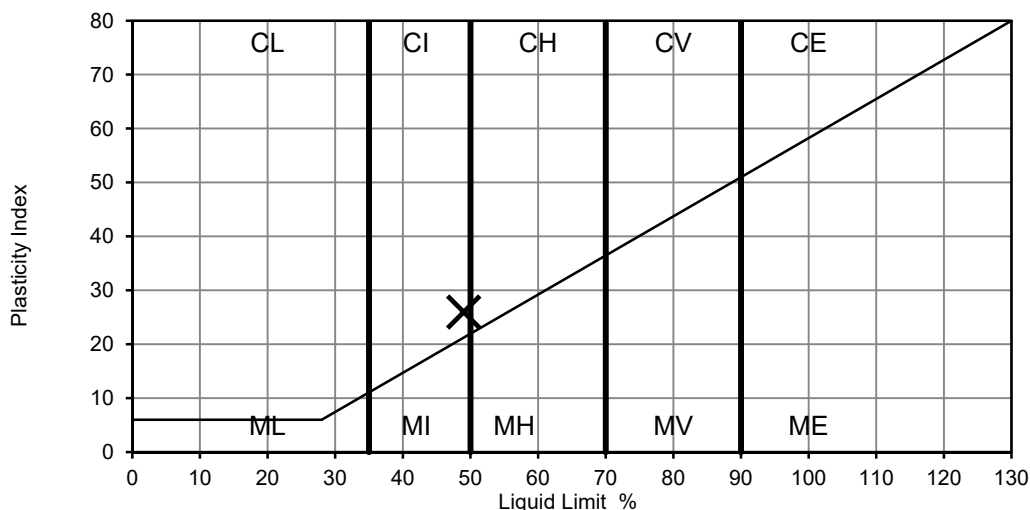
Location	Depth m	Sample Ref	Sample Description	Water Content %	Remarks
BH15	14.30-14.60	B43	Light brown clayey silty SAND	31.3	
BH15	27.60-27.70	D70	Grey slightly sandy silty CLAY	28.3	
BH15	30.00-30.45	D74	Grey mottled dark grey slightly sandy very silty CLAY	28.2	

Remarks	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1

## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey brown sandy clayey SILT	Sample Depth (m)	3.60
		Sample Reference	B15



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 48 %  
 Percentage Passing 425µm sieve: 63 %  
 Liquid Limit: 49 %  
 Plastic Limit: 23 %  
 Plasticity Index: 26

Liquidity Index: 0.96  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 16

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

**Norfolk Partnership Laboratory**

Community &amp; Environmental Services

 Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

 Our reference No. **GTS1171207003-604**  
 Our Project No. **PZ1522D1**  
 Your Sample Ref **B19**  
 Your Project or Order No. **PZ1522**  
 Date Report Issued **14 Mar 2018**

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH1	<b>Depth</b>	5m
<b>Date sampled</b>	07 Dec 2017	<b>Date received</b>	07 Dec 2017
<b>Date tested</b>	16 Feb 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	566

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft dark grey silty, very sandy CLAY, with lenses of black organic matter.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
-----------------	----------------	---------------	---------

**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	11.0	

**Natural MC (%)** 48

**Liquid Limit (%)** 74

**Plastic Limit (%)** 24

**Plasticity Index (%)** 50

**Modified PI \*(%)** 44

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

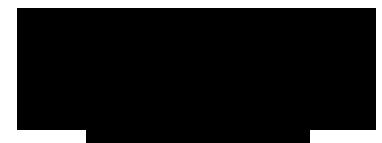
**BS Soil Classification** C V

<b>Remarks</b>	NHBC Volume change potential classification is high.
----------------	--

Test Code = 604



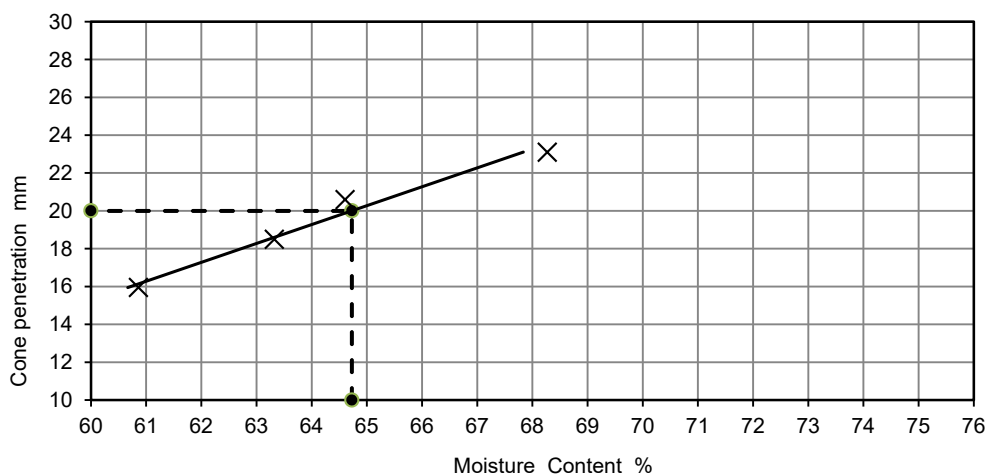
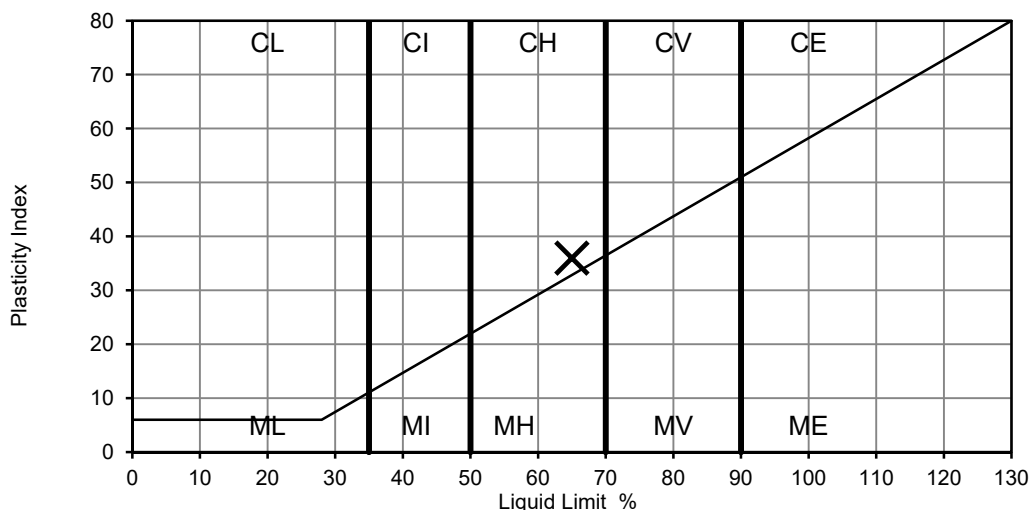
Peter Hardiment (Operations Manager)



## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey slightly gravelly CLAY. Gravel is of flint, chalk and occasional shell fragments	Sample Depth (m)	7.00
		Sample Reference	B25



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 60 %  
 Percentage Passing 425µm sieve: 84 %  
 Liquid Limit: 65 %  
 Plastic Limit: 29 %  
 Plasticity Index: 36

Liquidity Index: 0.86  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 30

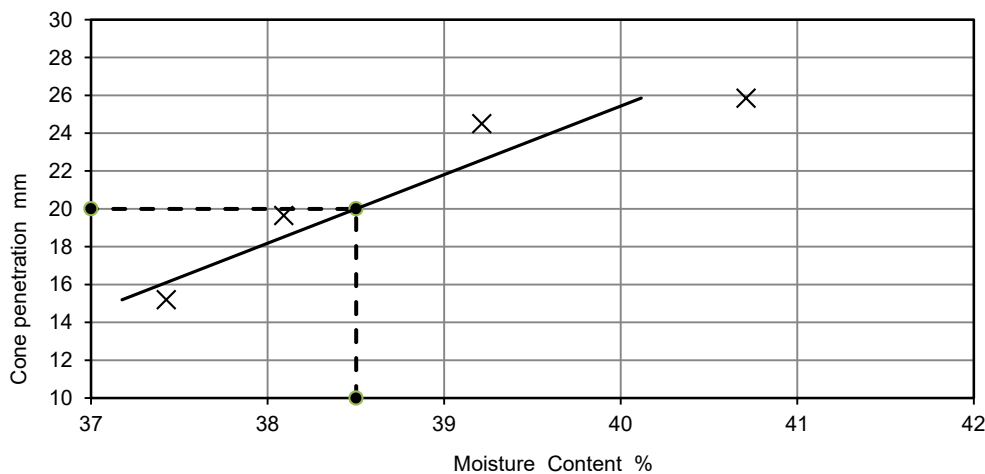
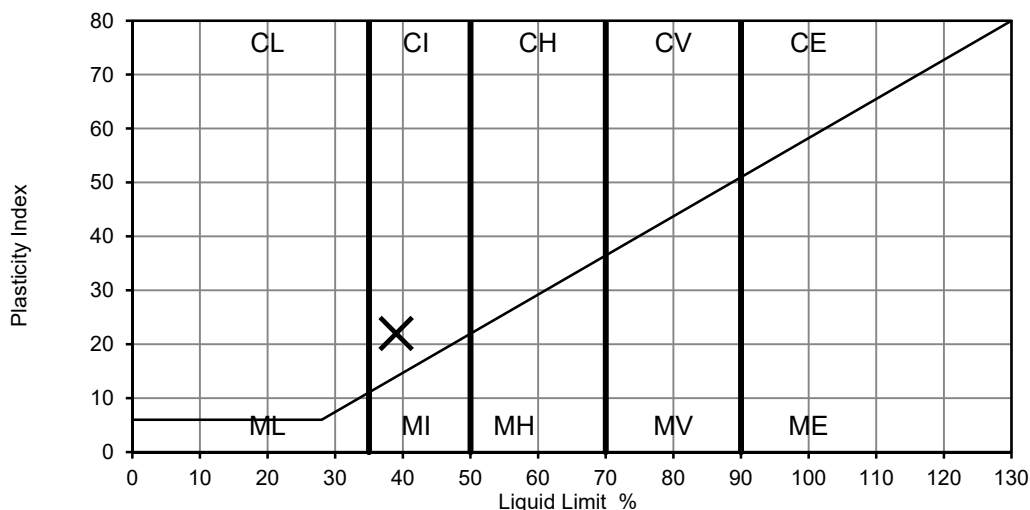
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey slightly gravelly sandy CLAY. Gravel is of flint and occasional shell fragments.	Sample Depth (m)	27.45
		Sample Reference	D71



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 27 %  
 Percentage Passing 425µm sieve: 97 %  
 Liquid Limit: 39 %  
 Plastic Limit: 17 %  
 Plasticity Index: 22

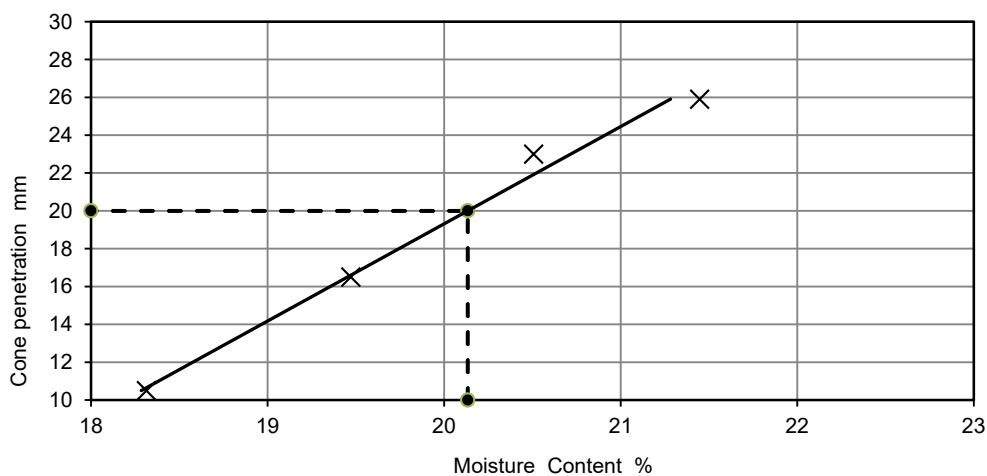
Liquidity Index: 0.45  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 21

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey slightly clayey silty SAND	Sample Depth (m)	30.00
		Sample Reference	D76



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 22 %  
 Percentage Passing 425µm sieve: 94 %  
 Liquid Limit: 20 %  
 Plastic Limit: Non-plastic %  
 Plasticity Index: Non-plastic

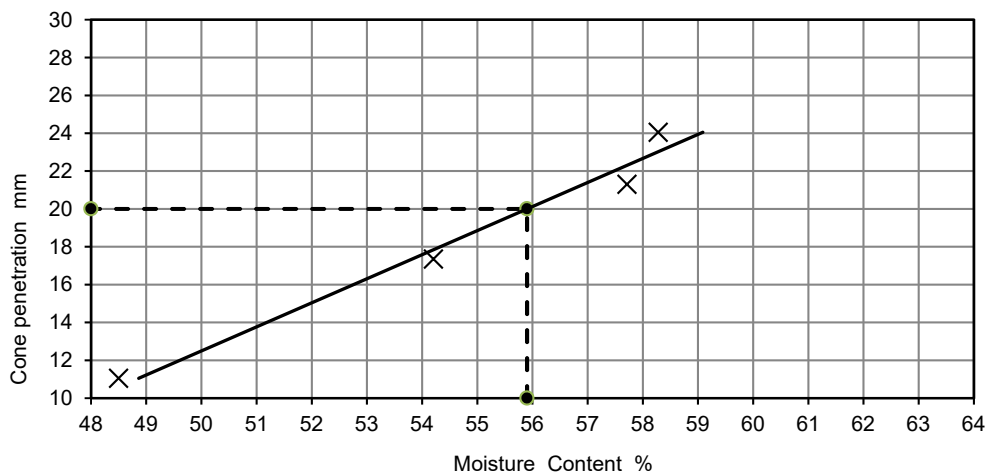
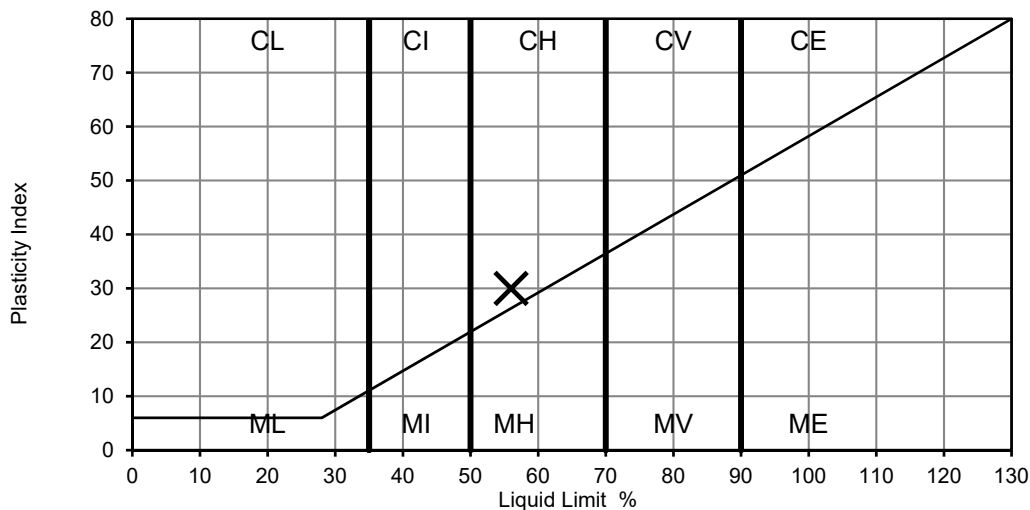
Liquidity Index: Non-plastic  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) Non-plastic

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Grey brown slightly gravelly slightly sandy silty CLAY. Gravel is of flint, quartzite and occasional shell fragments	Sample Depth (m)	4.40
		Sample Reference	B15



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 55 %  
 Percentage Passing 425µm sieve: 89 %  
 Liquid Limit: 56 %  
 Plastic Limit: 26 %  
 Plasticity Index: 30

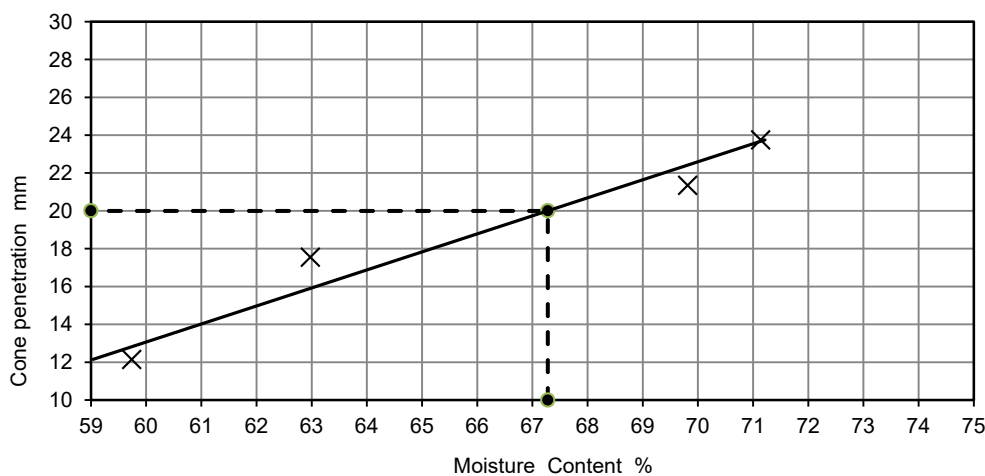
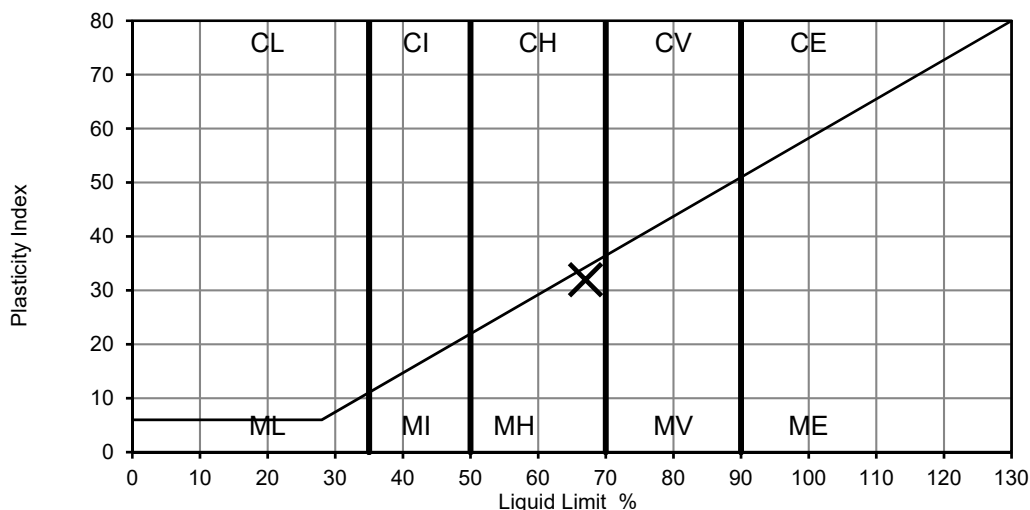
Liquidity Index: 0.97  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 27

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Grey slightly sandy silty CLAY	Sample Depth (m)	6.50
		Sample Reference	B21



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 83 %  
 Percentage Passing 425µm sieve: 91 %  
 Liquid Limit: 67 %  
 Plastic Limit: 35 %  
 Plasticity Index: 32

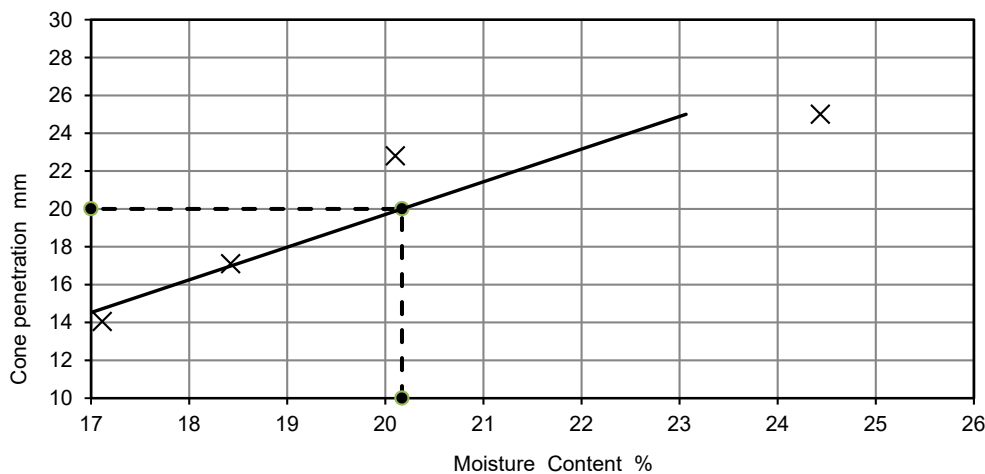
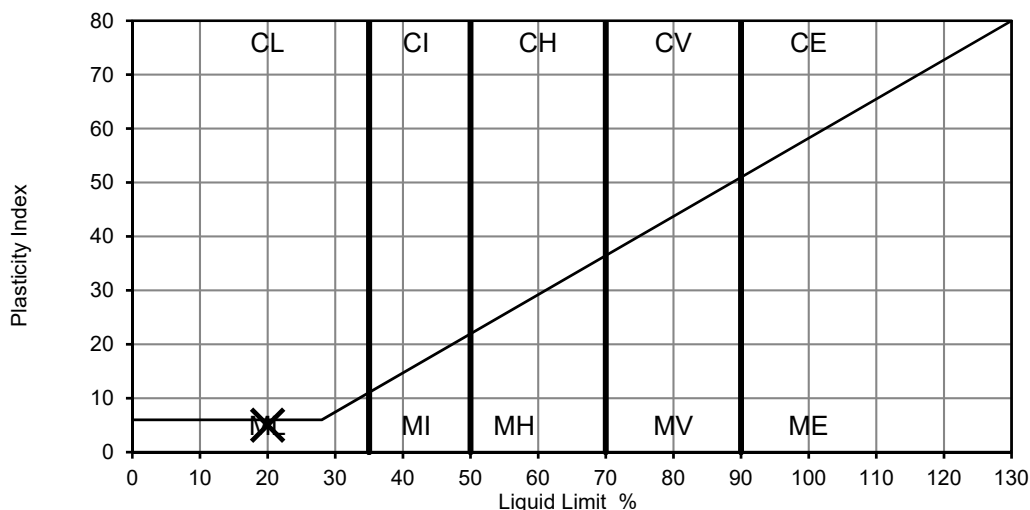
Liquidity Index: 1.50  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 29

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Grey brown clayey SAND	Sample Depth (m)	27.00
		Sample Reference	B66



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 24 %  
 Percentage Passing 425µm sieve: 91 %  
 Liquid Limit: 20 %  
 Plastic Limit: 15 %  
 Plasticity Index: 5

Liquidity Index: 1.80  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 5

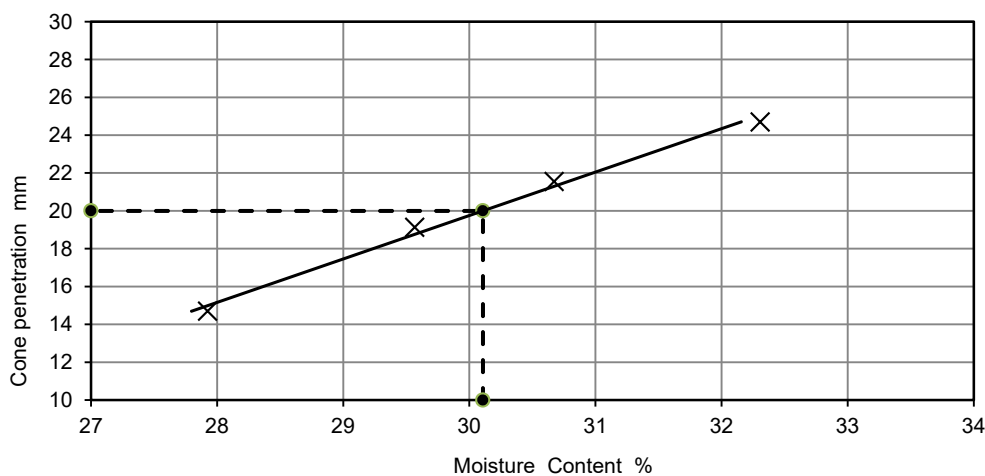
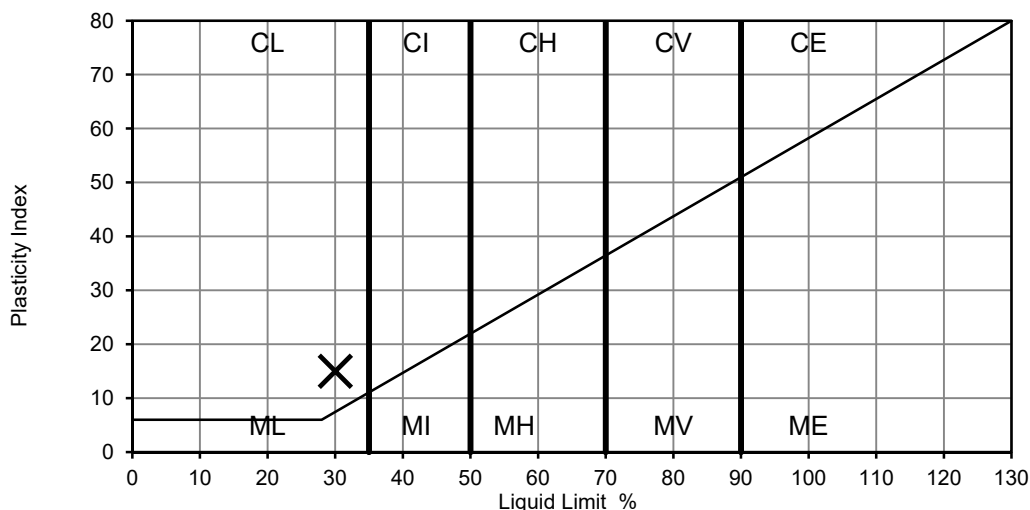
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Grey slightly silty sandy CLAY.	Sample Depth (m)	27.90
		Sample Reference	D67



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 24 %  
 Percentage Passing 425µm sieve: 100 %  
 Liquid Limit: 30 %  
 Plastic Limit: 15 %  
 Plasticity Index: 15

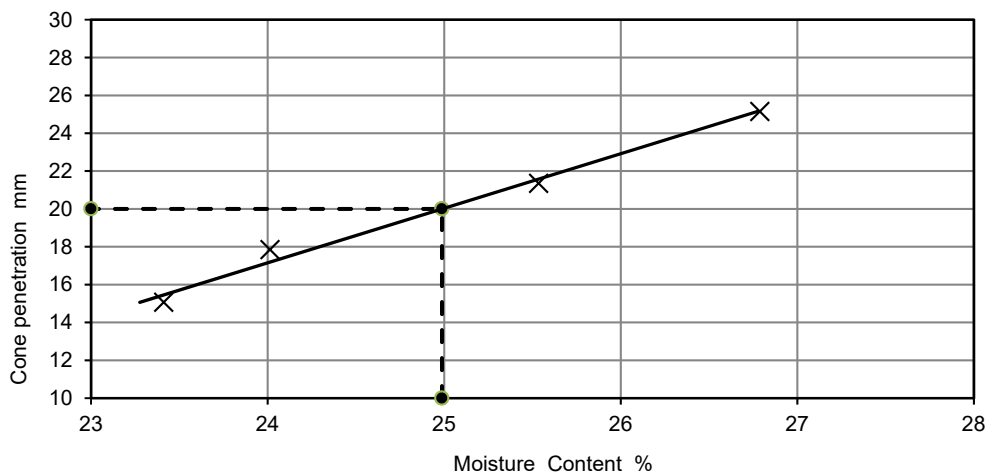
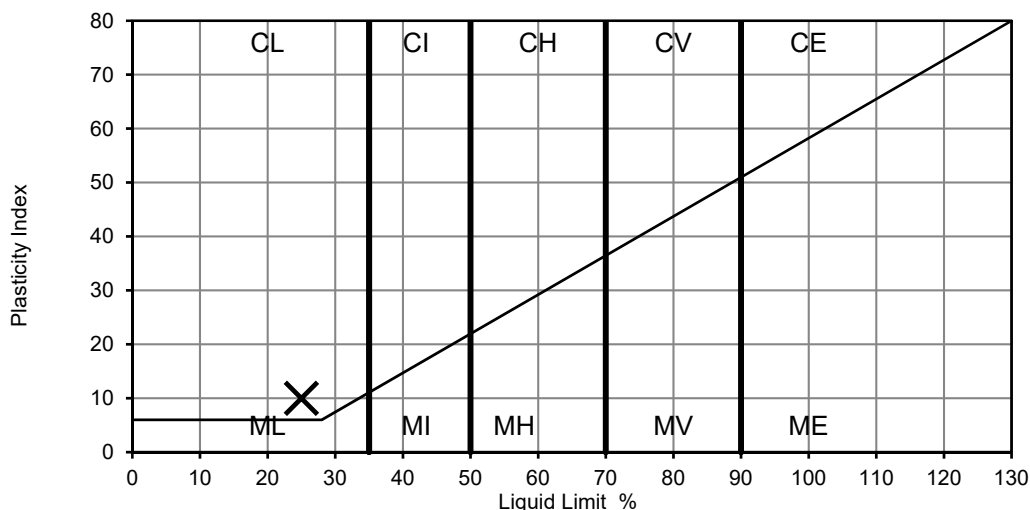
Liquidity Index: 0.60  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 15

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Grey sandy CLAY.	Sample Depth (m)	29.55
		Sample Reference	D70



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 25 %  
 Percentage Passing 425µm sieve: 94 %  
 Liquid Limit: 25 %  
 Plastic Limit: 15 %  
 Plasticity Index: 10

Liquidity Index: 1.00  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 9

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

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**Our reference No.** GTS1171128013-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B13  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 18 Jan 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH4	<b>Depth</b>	2.3m
<b>Date sampled</b>	30 Nov 2017	<b>Date received</b>	
<b>Date tested</b>	29 Dec 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	806

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising soft to firm grey slightly gravelly, silty CLAY. Gravel is fine to medium, angular to sub-angular brick, pottery, flint, asphalt & quartz.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	29.4	

**Natural MC (%)** 39

**Liquid Limit (%)** 40

**Plastic Limit (%)** 21

**Plasticity Index (%)** 19

**Modified PI \*(%)** 14

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our reference No.** GTS1171129002-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B19  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 19 Jan 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH4	<b>Depth</b>	3.3m
<b>Date sampled</b>	29 Nov 2017	<b>Date received</b>	
<b>Date tested</b>	29 Dec 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	735

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Soft to very soft, grey silty, organic, slightly gravelly, CLAY. Gravel is fine and medium, sub-rounded to sub-angular flint.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	5.0	

**Natural MC (%)** 82

**Liquid Limit (%)** 104

**Plastic Limit (%)** 35

**Plasticity Index (%)** 69

**Modified PI \*(%)** 66

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

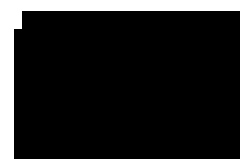
**BS Soil Classification** C E

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our reference No.** GTS5171205011-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D78  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Feb 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH4	<b>Depth</b>	30m
<b>Date sampled</b>	05 Dec 2017	<b>Date received</b>	
<b>Date tested</b>	10 Dec 2017		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	514

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Firm to stiff, laminated & thinly bedded grey CLAY & dark grey, clayey SILT. Few shell fragments.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.7	

**Natural MC (%)** 29

**Liquid Limit (%)** 33

**Plastic Limit (%)** 16

**Plasticity Index (%)** 18

**Modified PI \*(%)** 17

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

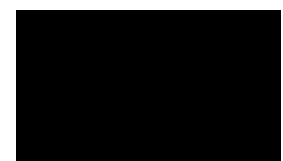
**BS Soil Classification** CL

<b>Remarks</b>	NHBC Volume change potential classification is low.
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Test Code = 604



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**Our reference No.** GTS3171204006-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D5  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 19 Jan 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH4A	<b>Depth</b>	1.2m
<b>Date sampled</b>	04 Dec 2017	<b>Date received</b>	
<b>Date tested</b>			
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	308

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft to firm laminated grey slightly gravelly, sandy, silty CLAY and light brown clayey SILT. Gravel is fine, rounded to sub-angular flint and quartz.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.6	

**Natural MC (%)** 23

**Liquid Limit (%)** 36

**Plastic Limit (%)** 21

**Plasticity Index (%)** 15

**Modified PI \*(%)** 15

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

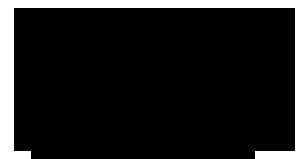
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our reference No.** GTS3171214018-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D63  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Feb 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH4D	<b>Depth</b>	27.9m
<b>Date sampled</b>	14 Dec 2017	<b>Date received</b>	
<b>Date tested</b>	12 Jan 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	527

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Firm, grey silty CLAY, with laminae of grey sandy, silt & some shell fragments.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.0	

**Natural MC (%)** 26

**Liquid Limit (%)** 41

**Plastic Limit (%)** 18

**Plasticity Index (%)** 23

**Modified PI \*(%)** 22

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

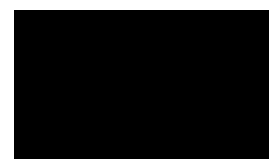
**BS Soil Classification** C I

<b>Remarks</b>	NHBC Volume change potential classification is medium.
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Test Code = 604



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 Our reference No. **GTS3171214022-604**  
 Our Project No. **PZ1522D1**  
 Your Sample Ref **D67**  
 Your Project or Order No. **PZ1522**  
 Date Report Issued **06 Feb 2018**

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH4D	<b>Depth</b>	30m
<b>Date sampled</b>	14 Dec 2017	<b>Date received</b>	
<b>Date tested</b>	12 Jan 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	489

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Firm to stiff grey sandy CLAY, with some shell fragments.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.7	

**Natural MC (%)** 27

**Liquid Limit (%)** 33

**Plastic Limit (%)** 16

**Plasticity Index (%)** 17

**Modified PI \*(%)** 17

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** CL

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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 Our reference No. **NCCL2018030214-604**  
 Our Project No PZ1522D1  
 Your Sample Ref U7  
 Your Project or Order No. PZ1522  
 Date Report Issued 30 Apr 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH4ASU	<b>Depth</b>	2m
<b>Date sampled</b>	14 Dec 2017	<b>Date received</b>	14 Dec 2017
<b>Date tested</b>	11 Apr 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	367

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft dark grey silty CLAY. Trace of fine and medium rounded to sub-angular flint and quartz gravel.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.2	

**Natural MC (%)** 57

**Liquid Limit (%)** 85

**Plastic Limit (%)** 31

**Plasticity Index (%)** 53

**Modified PI \*(%)** 53

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

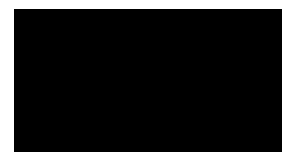
**BS Soil Classification** C V

<b>Remarks</b>	NHBC Volume change potential classification is high.
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Test Code = 604



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 Our reference No. **NCCL2018030221-604**  
 Our Project No PZ1522D1  
 Your Sample Ref U7  
 Your Project or Order No. PZ1522  
 Date Report Issued 30 Apr 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH4BU	<b>Depth</b>	2m
<b>Date sampled</b>	13 Nov 2017	<b>Date received</b>	13 Nov 2017
<b>Date tested</b>	11 Apr 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	471

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Laminated, grey, silty CLAY, black, organic silty CLAY and lightgrey, clayey SILT.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	7.2	

**Natural MC (%)** 73

**Liquid Limit (%)** 81

**Plastic Limit (%)** 33

**Plasticity Index (%)** 49

**Modified PI \*(%)** 45

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C V

<b>Remarks</b>	NHBC Volume change potential classification is high.
----------------	--

Test Code = 604



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**Our reference No.** GTS3171201005-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** U5  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 19 Jan 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH5	<b>Depth</b>	1.2m
<b>Date sampled</b>	01 Dec 2017	<b>Date received</b>	04 Dec 2017
<b>Date tested</b>	02 Jan 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	1027

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising soft to very soft dark grey slightly gravelly, slightly sandy, silty clay. Gravel is fine to medium angular brick, concrete, asphalt, flint & wood.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	34.8	

**Natural MC (%)** 26

**Liquid Limit (%)** 37

**Plastic Limit (%)** 22

**Plasticity Index (%)** 15

**Modified PI \*(%)** 10

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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 Our Project No **PZ1522D1**  
 Your Sample Ref **B9**  
 Your Project or Order No. **PZ1522**  
 Date Report Issued **19 Jan 2018**

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH5	<b>Depth</b>	2m
<b>Date sampled</b>	01 Dec 2017	<b>Date received</b>	04 Dec 2017
<b>Date tested</b>	18 Dec 2017		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	581

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft dark grey silty CLAY with lenses of black organic material & thin beds of dark brown pseudo fibrous PEAT, with numerous roots.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.9	

**Natural MC (%)** 198

**Liquid Limit (%)** 244

**Plastic Limit (%)** 142

**Plasticity Index (%)** 103

**Modified PI \*(%)** 101

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

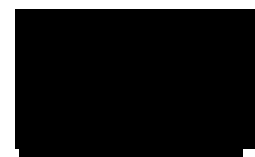
**BS Soil Classification** M E

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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 Our Project No **PZ1522D1**  
 Your Sample Ref **D12**  
 Your Project or Order No. **PZ1522**  
 Date Report Issued **19 Jan 2018**

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH5	<b>Depth</b>	4m
<b>Date sampled</b>	01 Dec 2017	<b>Date received</b>	04 Dec 2017
<b>Date tested</b>	28 Dec 2017		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	408

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Light greyish brown, gravelly, silty fine SAND with laminae of soft to firm light grey, silty CLAY. Gravel is fine and medium rounded to sub-rounded, quartz and flint.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	15.5	

**Natural MC (%)** 17

**Liquid Limit (%)** 25

**Plastic Limit (%)** Non Plastic

**Plasticity Index (%)**

**Modified PI \*(%)**

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

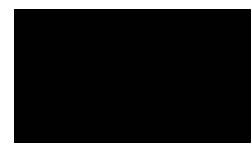
**BS Soil Classification** Non Plastic

Remarks

Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** D9  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Feb 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH5A	<b>Depth</b>	1.7m
<b>Date sampled</b>	12 Dec 2017	<b>Date received</b>	12 Dec 2017
<b>Date tested</b>	08 Jan 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	408

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising soft brownish grey, slightly gravelly, silty clay with lenses of black fibrous peat. Gravel is fine brick.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.7	

**Natural MC (%)** 57

**Liquid Limit (%)** 81

**Plastic Limit (%)** 31

**Plasticity Index (%)** 50

**Modified PI \*(%)** 50

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

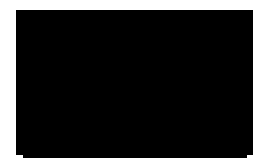
**BS Soil Classification** C V

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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 Our Project No. **PZ1522D1**  
 Your Sample Ref **D18**  
 Your Project or Order No. **PZ1522**  
 Date Report Issued **06 Feb 2018**

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH5A	<b>Depth</b>	4m
<b>Date sampled</b>	13 Dec 2017	<b>Date received</b>	13 Dec 2017
<b>Date tested</b>	08 Jan 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	362

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Firm grey sandy, silty CLAY, with laminae of orange silty fine sand.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	13.6	

**Natural MC (%)** 17

**Liquid Limit (%)** 29

**Plastic Limit (%)** 13

**Plasticity Index (%)** 16

**Modified PI \*(%)** 14

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

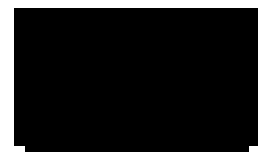
**BS Soil Classification** CL

<b>Remarks</b>	NHBC Volume change potential classification is low.
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Test Code = 604



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**Our reference No.** GTS1171214025-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D72  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Feb 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH5A	<b>Depth</b>	28m
<b>Date sampled</b>	14 Dec 2017	<b>Date received</b>	14 Dec 2017
<b>Date tested</b>	08 Jan 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	397

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Firm to stiff laminated and thinly bedded grey silty CLAY and sandy SILT and brownish grey silty fine to medium SAND with some shell fragments.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	3.9	

**Natural MC (%)** 26

**Liquid Limit (%)** 30

**Plastic Limit (%)** 15

**Plasticity Index (%)** 15

**Modified PI \*(%)** 15

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

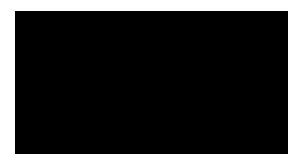
**BS Soil Classification** CL

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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 Our Project No **PZ1522D1**  
 Your Sample Ref **D77**  
 Your Project or Order No. **PZ1522**  
 Date Report Issued **06 Feb 2018**

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH5A	<b>Depth</b>	30.45m
<b>Date sampled</b>	14 Dec 2017	<b>Date received</b>	14 Dec 2017
<b>Date tested</b>	08 Jan 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	506

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Firm to stiff laminated & thinly bedded grey silty CLAY & sandy SILT & brownish grey silty fine to medium SAND, with some shell fragments.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site

**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.5	

**Natural MC (%)** 25

**Liquid Limit (%)** 53

**Plastic Limit (%)** 21

**Plasticity Index (%)** 31

**Modified PI \*(%)** 31

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

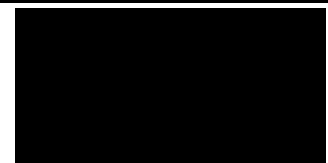
**BS Soil Classification** C H

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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 Our Project No. **PZ1522D1**  
 Your Sample Ref **D60**  
 Your Project or Order No. **PZ1522**  
 Date Report Issued **19 Dec 2017**

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH6	<b>Depth</b>	23m
<b>Date sampled</b>	27 Nov 2017	<b>Date received</b>	
<b>Date tested</b>	30 Nov 2017		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	530

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Very stiff, light grey, very clayey SILT.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	2.4	

**Natural MC (%)** 36

**Liquid Limit (%)** 52

**Plastic Limit (%)** 27

**Plasticity Index (%)** 26

**Modified PI \*(%)** 25

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

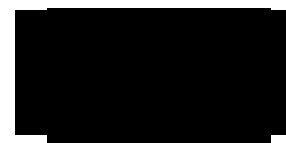
**BS Soil Classification** C H

<b>Remarks</b>	NHBC Volume change potential classification is medium.
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Test Code = 604



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**Our reference No.** GTS3171127022-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D68  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 19 Dec 2017

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH6	<b>Depth</b>	27m
<b>Date sampled</b>	27 Nov 2017	<b>Date received</b>	
<b>Date tested</b>	30 Nov 2017		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	549

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Stiff, grey, slightly sandy, silty CLAY, with laminae of dark grey SILT.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	3.6	

**Natural MC (%)** 28

**Liquid Limit (%)** 46

**Plastic Limit (%)** 20

**Plasticity Index (%)** 26

**Modified PI \*(%)** 25

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

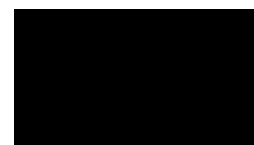
**BS Soil Classification** C I

<b>Remarks</b>	NHBC Volume change potential classification is medium.
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Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** B5  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Feb 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH7	<b>Depth</b>	1m
<b>Date sampled</b>	30 Nov 2017	<b>Date received</b>	01 Dec 2017
<b>Date tested</b>	29 Dec 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	840

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising greyish brown, slightly gravelly, very sity, sandy clay. Gravel is fine and medium , rounded to sub-angular, flint, sandstone, asphalt, brick and quartz.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	10.9	

**Natural MC (%)** 24

**Liquid Limit (%)** 39

**Plastic Limit (%)** 21

**Plasticity Index (%)** 18

**Modified PI \*(%)** 16

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** B7  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Feb 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH7	<b>Depth</b>	1.4m
<b>Date sampled</b>	29 Nov 2017	<b>Date received</b>	30 Nov 2017
<b>Date tested</b>	02 Jan 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	504

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising soft grey, organic, sandy, silty clay with lenses of dark brown amorphous peat. Gravel is fine and medium sub-rounded to sub-angular flint and brick.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	8.4	

**Natural MC (%)** 73

**Liquid Limit (%)** 71

**Plastic Limit (%)** 29

**Plasticity Index (%)** 42

**Modified PI \*(%)** 38

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

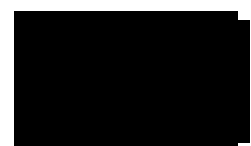
**BS Soil Classification** C V

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS3171129005-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B11  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Feb 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH7	<b>Depth</b>	2m
<b>Date sampled</b>	30 Nov 2017	<b>Date received</b>	01 Dec 2017
<b>Date tested</b>	29 Dec 2017		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	674

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very soft, dark brown, organic, gravelly, very clayey, very sandy SILT with lenses of dark brown pseudo-fibrous peat. Gravel is fine, rounded to sub-angular flint fragments.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	2.1	

**Natural MC (%)** 148

**Liquid Limit (%)** 168

**Plastic Limit (%)** Non Plastic

**Plasticity Index (%)**

**Modified PI \*(%)** \*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** Non Plastic

Remarks

Test Code = 604



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**Our reference No.** GTS3171129008-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B13  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Feb 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH7	<b>Depth</b>	3m
<b>Date sampled</b>	30 Nov 2017	<b>Date received</b>	01 Dec 2017
<b>Date tested</b>	04 Jan 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	483

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Dark brown organic gravelly, silty, clayey, fine and medium SAND with lenses of dark brown peat. Gravel is fine and medium angular flint and quartz.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	15.5	

**Natural MC (%)** 35

**Liquid Limit (%)** 36

**Plastic Limit (%)** Non Plastic

**Plasticity Index (%)**

**Modified PI \*(%)** \*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** Non Plastic

Remarks

Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** D11  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 21 Feb 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH8	<b>Depth</b>	1.8m
<b>Date sampled</b>	23 Jan 2018	<b>Date received</b>	23 Jan 2018
<b>Date tested</b>	05 Feb 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	606

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Soft, dark brown, silty, sandy CLAY with some sub-aangular, fine flint gravel. Some organic matter.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	12.4	

**Natural MC (%)** 31

**Liquid Limit (%)** 43

**Plastic Limit (%)** 22

**Plasticity Index (%)** 21

**Modified PI \*(%)** 19

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

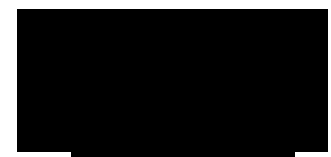
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our reference No.** GTS1180126025-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D76  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 21 Feb 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH8	<b>Depth</b>	27.6m
<b>Date sampled</b>	26 Jan 2018	<b>Date received</b>	26 Jan 2018
<b>Date tested</b>	05 Feb 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	578

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very stiff, laminated, grey, silty CLAY and dark grey, sandy SILT and silty, fine SAND with some shell fragments.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site

**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.7	

**Natural MC (%)** 28

**Liquid Limit (%)** 42

**Plastic Limit (%)** 19

**Plasticity Index (%)** 23

**Modified PI \*(%)** 23

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

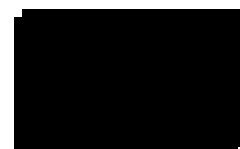
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



Peter Hardiment (Operations Manager)



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**Our reference No.** GTS1180126031-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D82  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 21 Feb 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH8	<b>Depth</b>	30m
<b>Date sampled</b>	26 Jan 2018	<b>Date received</b>	26 Jan 2018
<b>Date tested</b>	05 Feb 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	563

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very stiff, laminated, grey, silty CLAY and dark grey, sandy SILT and silty, fine SAND with some shell fragments.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site

**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.4	

**Natural MC (%)** 26

**Liquid Limit (%)** 40

**Plastic Limit (%)** 18

**Plasticity Index (%)** 22

**Modified PI \*(%)** 21

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** B11  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 14 Mar 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH9	<b>Depth</b>	2.6m
<b>Date sampled</b>	31 Jan 2018	<b>Date received</b>	31 Jan 2018
<b>Date tested</b>	16 Feb 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	986

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising very soft, grey, organic, very sandy, silty, slightly gravelly clay. Gravel is up to cobble sized, rounded to sub-angular, flint, quartz, coal and brick.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	31.6	

**Natural MC (%)** 28

**Liquid Limit (%)** 32

**Plastic Limit (%)** 18

**Plasticity Index (%)** 13

**Modified PI \*(%)** 9

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

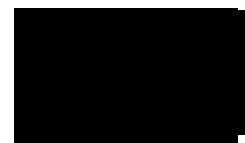
**BS Soil Classification** CL

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our reference No. GTS6180202001-605**
**Our Project No** PZ1522D1

**Your Sample Ref**
**Your Project or Order No.** PZ1522

**Date Report Issued** 04 Jul 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.4 Cone Penetrometer (One Point Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH9	<b>Depth</b>	22m
<b>Date sampled</b>	02 Feb 2018	<b>Date received</b>	
<b>Date tested</b>	07 Feb 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	546.8
If a Sample Certificate was provided it is available for inspection.			
The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Soil		
<b>Description</b>	Grey and light brown silty fine and medium sand with occasional lenses of silty clay.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site

**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole sample	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	37	

**Natural MC (%)** 21

**Liquid Limit (%)** 27

**Plastic Limit (%)** Non Plastic

**Plasticity Index (%)**
**Modified PI \*(%)** \*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*
**BS Soil Classification**
**Remarks**

Test Code = 605



Simon Holden (Project Technician)





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**Our Project No** PZ1522D1  
**Your Sample Ref** D72  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 14 Mar 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH9	<b>Depth</b>	27.95m
<b>Date sampled</b>	02 Feb 2018	<b>Date received</b>	
<b>Date tested</b>	07 Feb 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	611

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Thinly bedded, stiff, grey, silty CLAY and dark grey, clayey silt and greyish brown, silty fine sand with shell fragments.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	7.2	

**Natural MC (%)** 26

**Liquid Limit (%)** 28

**Plastic Limit (%)** 14

**Plasticity Index (%)** 15

**Modified PI \*(%)** 14

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

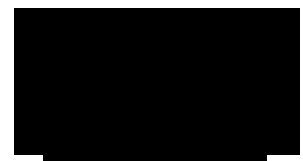
**BS Soil Classification** CL

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** D77  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 14 Mar 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH9	<b>Depth</b>	30m
<b>Date sampled</b>	02 Feb 2018	<b>Date received</b>	02 Feb 2018
<b>Date tested</b>	02 Mar 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	414

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Stiff, laminated, grey, silty, CLAY with laminae of light grey, silty fine sand. Some shell fragments.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.8	

**Natural MC (%)** 25

**Liquid Limit (%)** 40

**Plastic Limit (%)** 14

**Plasticity Index (%)** 27

**Modified PI \*(%)** 26

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C I

<b>Remarks</b>	NHBC Volume change potential classification is medium.
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Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** B79  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 14 Mar 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH9	<b>Depth</b>	31m
<b>Date sampled</b>	02 Feb 2018	<b>Date received</b>	02 Feb 2018
<b>Date tested</b>	16 Feb 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	511

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Stiff, laminated, grey, silty CLAY and light grey, clayey SILT with thin bands of silty fine sand. Trace of fine, sub-angular to sub-rounded, flint, chalk and shell.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.9	

**Natural MC (%)** 28

**Liquid Limit (%)** 48

**Plastic Limit (%)** 18

**Plasticity Index (%)** 30

**Modified PI \*(%)** 30

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

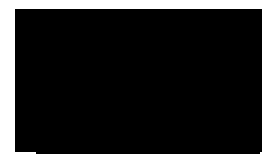
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



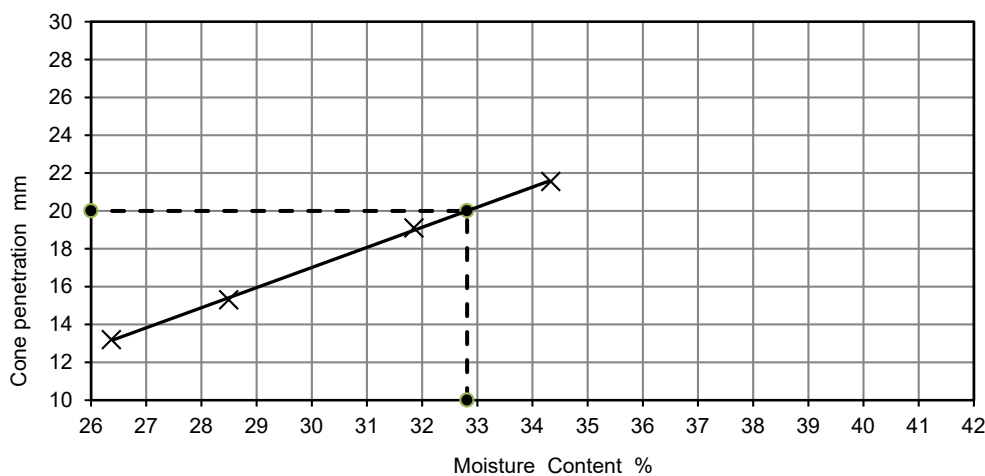
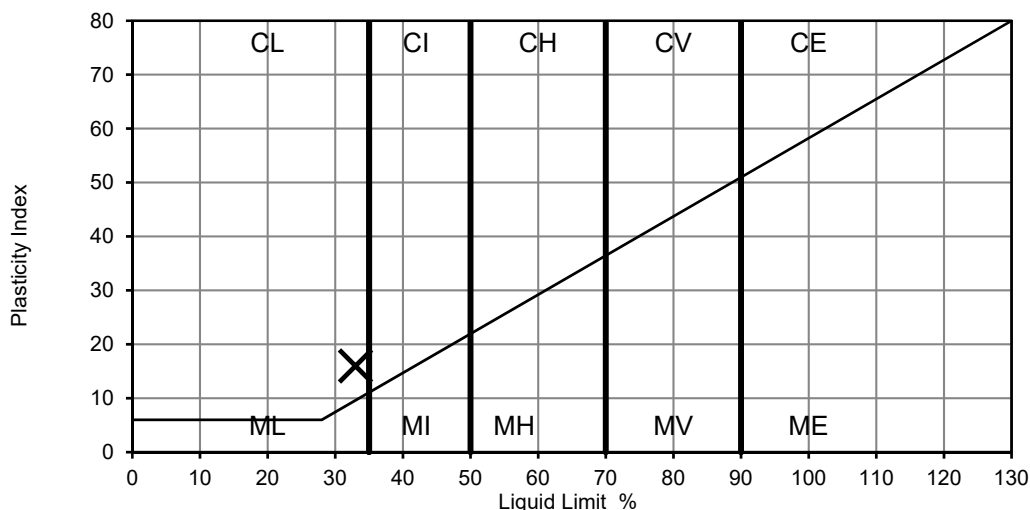
Peter Hardiment (Operations Manager)



## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Dark brown slightly gravelly slightly sandy clayey SILT. Gravel is of flint, quartz and shell fragments	Sample Depth (m)	1.20
		Sample Reference	D5



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 21 %  
 Percentage Passing 425µm sieve: 85 %  
 Liquid Limit: 33 %  
 Plastic Limit: 17 %  
 Plasticity Index: 16

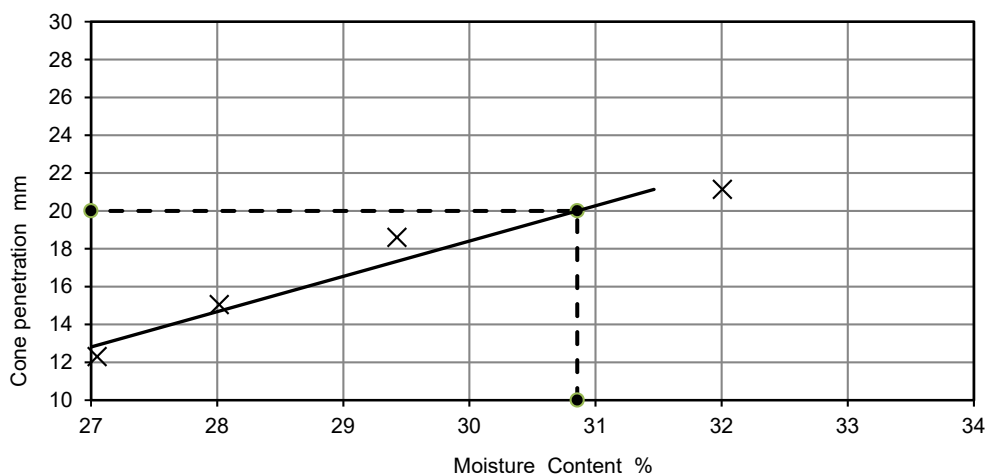
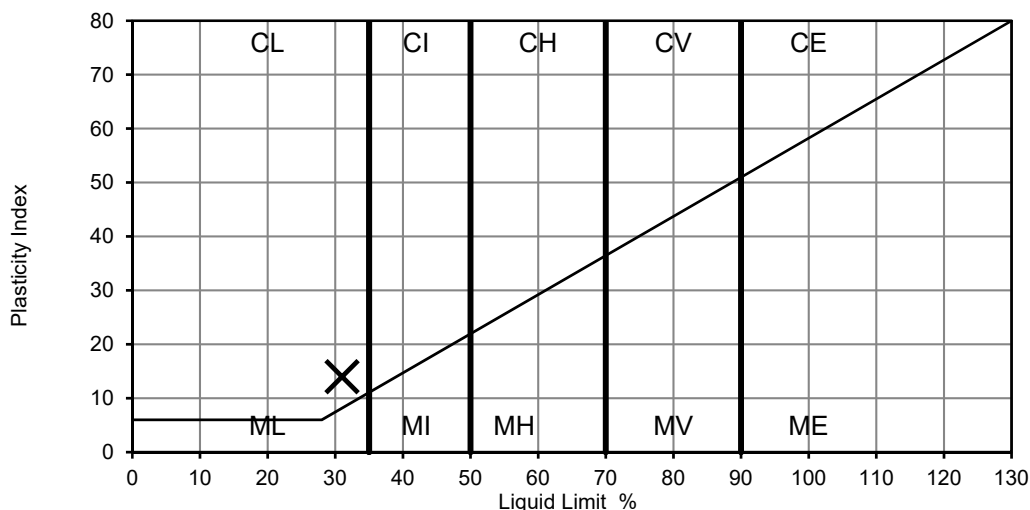
Liquidity Index: 0.25  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 14

Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1

### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey brown mottled dark grey clayey silty gravelly SAND. Gravel is of flint and shell fragments	Sample Depth (m)	2.00
		Sample Reference	D8



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 21 %  
 Percentage Passing 425µm sieve: 77 %  
 Liquid Limit: 31 %  
 Plastic Limit: 17 %  
 Plasticity Index: 14

Liquidity Index: 0.29  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 11

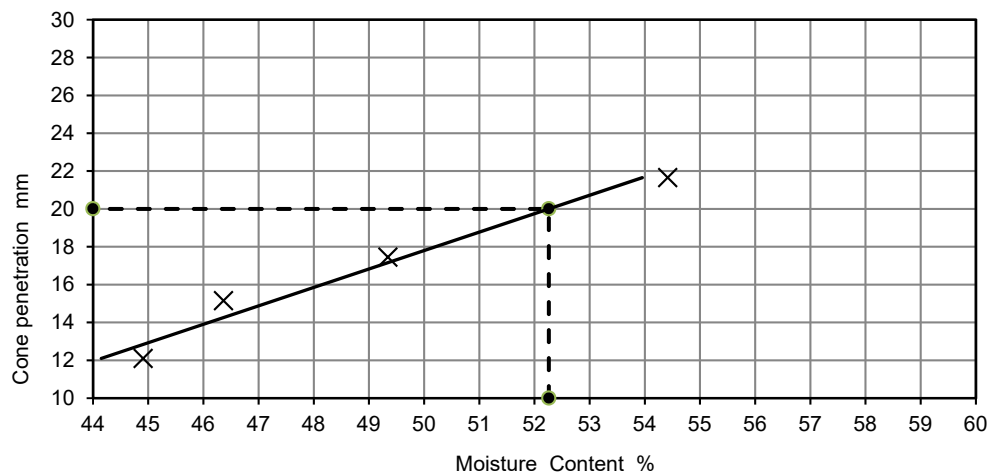
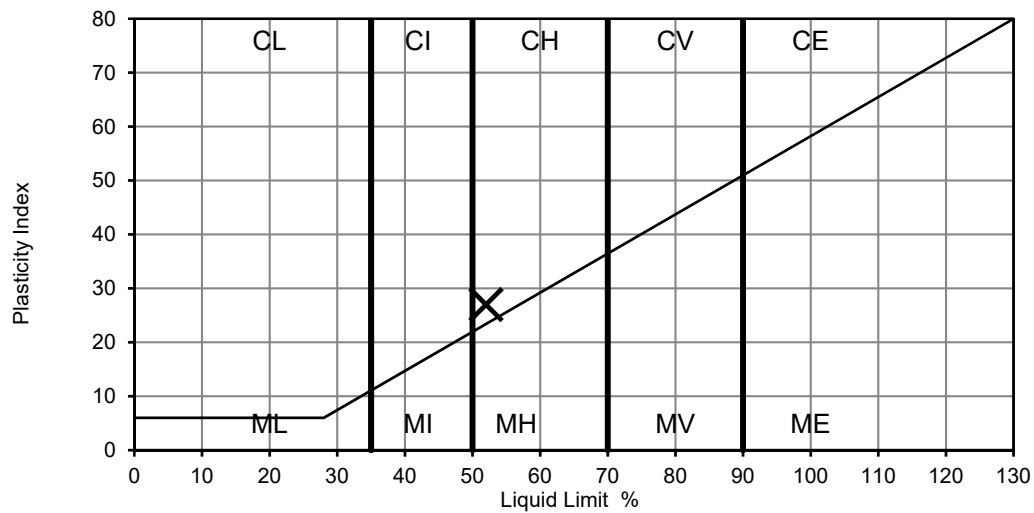
Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1



## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey brown and orange brown slightly gravelly sandy CLAY. Gravel is of sandstone	Sample Depth (m)	11.20
		Sample Reference	B43



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 36 %  
 Percentage Passing 425µm sieve: 75 %  
 Liquid Limit: 52 %  
 Plastic Limit: 25 %  
 Plasticity Index: 27

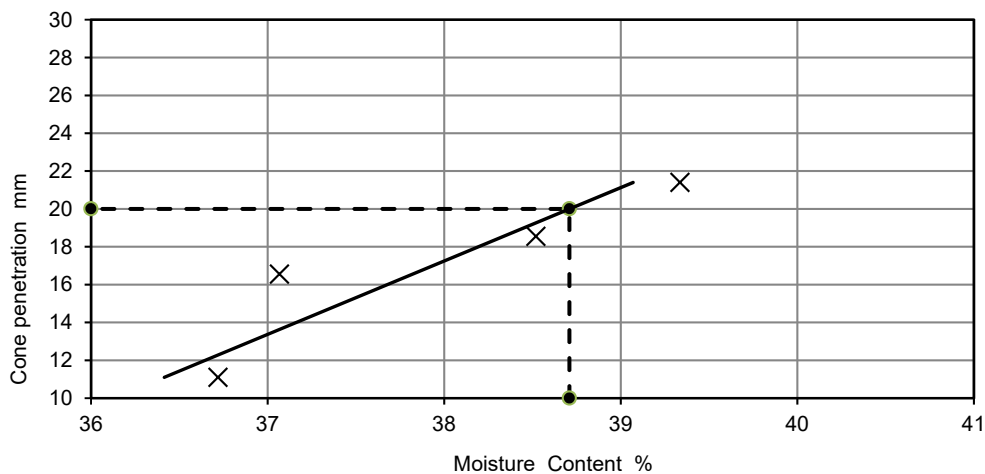
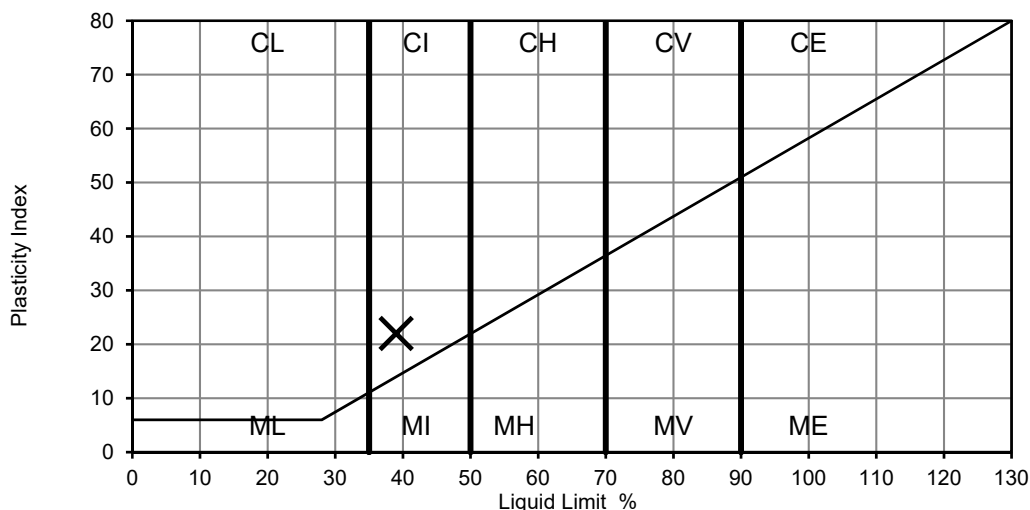
Liquidity Index: 0.41  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 20

Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1

## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Dark grey sandy clayey SILT	Sample Depth (m)	30.00
		Sample Reference	D75



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 25 %  
 Percentage Passing 425µm sieve: 93 %  
 Liquid Limit: 39 %  
 Plastic Limit: 17 %  
 Plasticity Index: 22

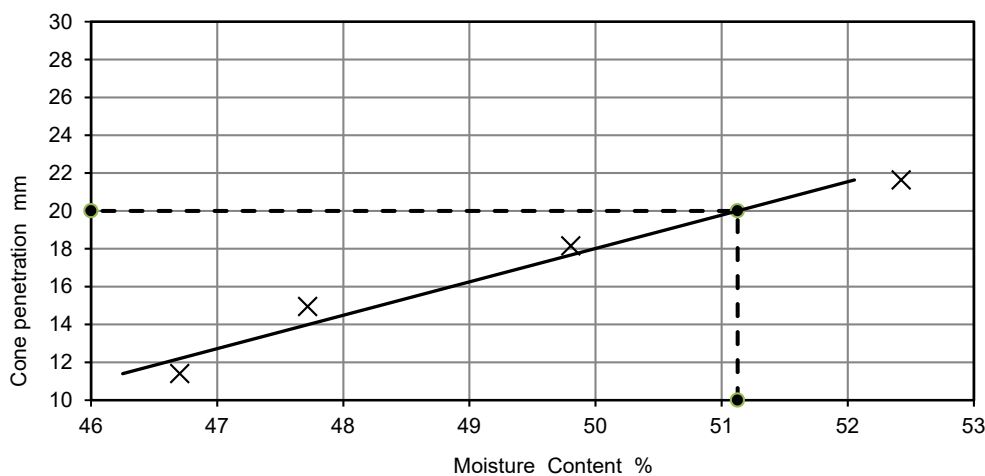
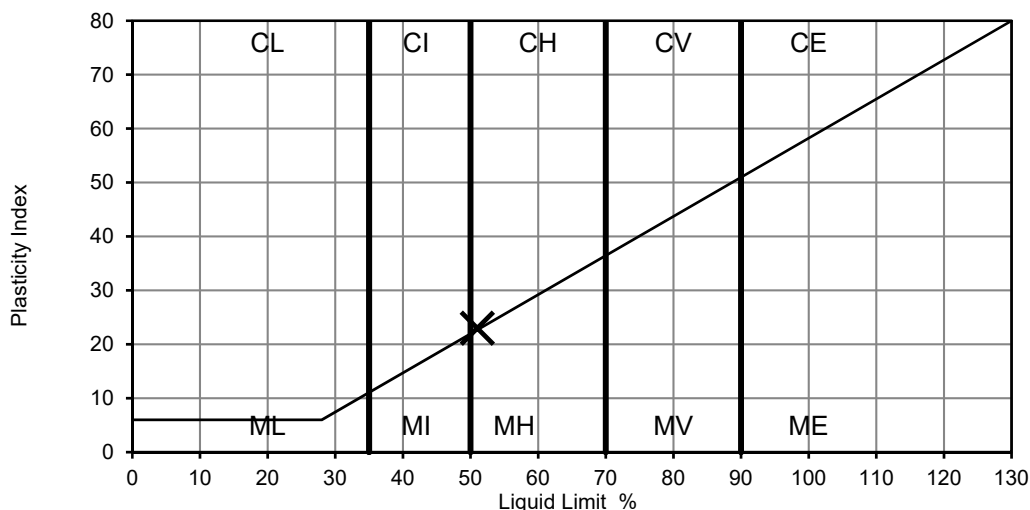
Liquidity Index: 0.36  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 20

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### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey gravelly sandy clayey SILT. Gravel is of flint	Sample Depth (m)	45.60
		Sample Reference	B100



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 30 %  
 Percentage Passing 425µm sieve: 54 %  
 Liquid Limit: 51 %  
 Plastic Limit: 28 %  
 Plasticity Index: 23

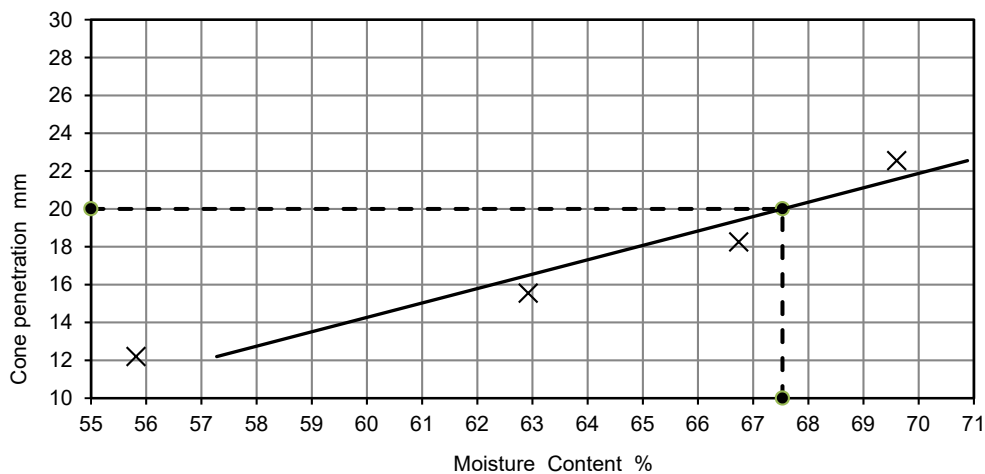
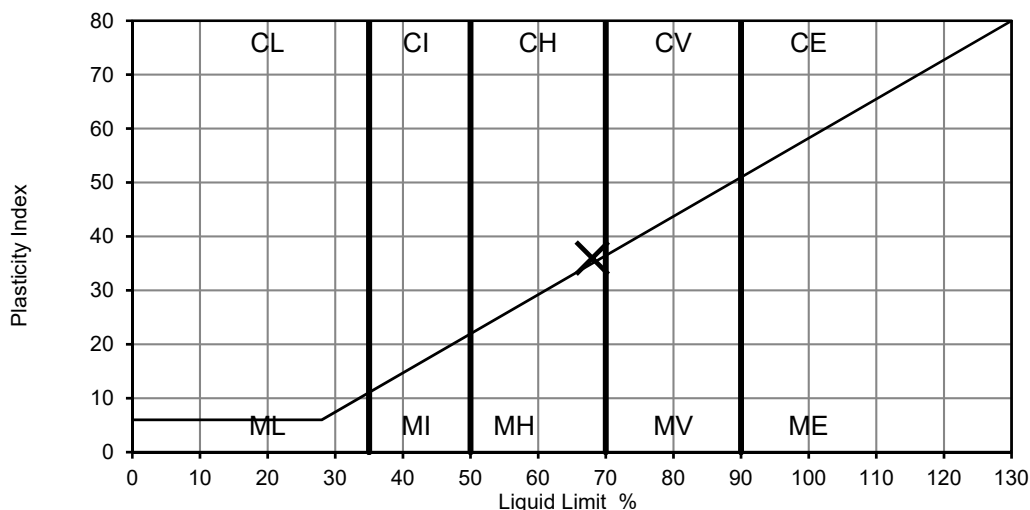
Liquidity Index: 0.09  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 12

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## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Dark grey slightly sandy slightly gravelly CLAY. Gravel is of flint and shell fragments.	Sample Depth (m)	46.00
		Sample Reference	D101



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 25 %  
 Percentage Passing 425µm sieve: 89 %  
 Liquid Limit: 68 %  
 Plastic Limit: 32 %  
 Plasticity Index: 36

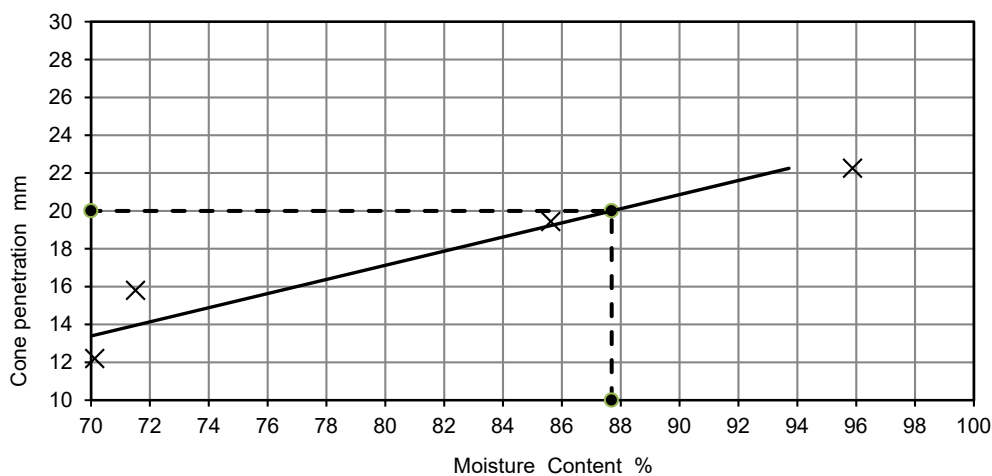
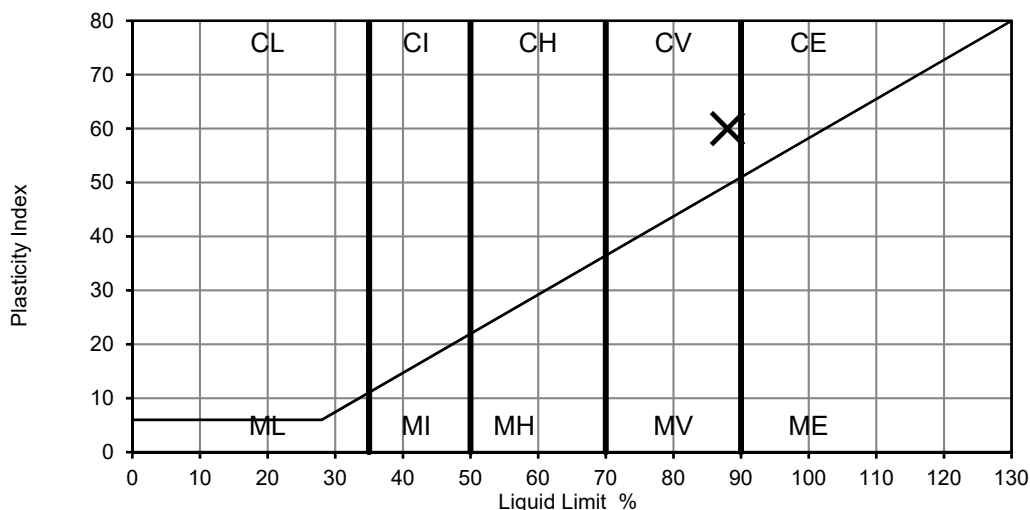
Liquidity Index: -0.19  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 32

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## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey brown slightly sandy CLAY.	Sample Depth (m)	48.00
		Sample Reference	D105



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 31 %  
 Percentage Passing 425µm sieve: 100 %  
 Liquid Limit: 88 %  
 Plastic Limit: 28 %  
 Plasticity Index: 60

Liquidity Index: 0.05  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 60

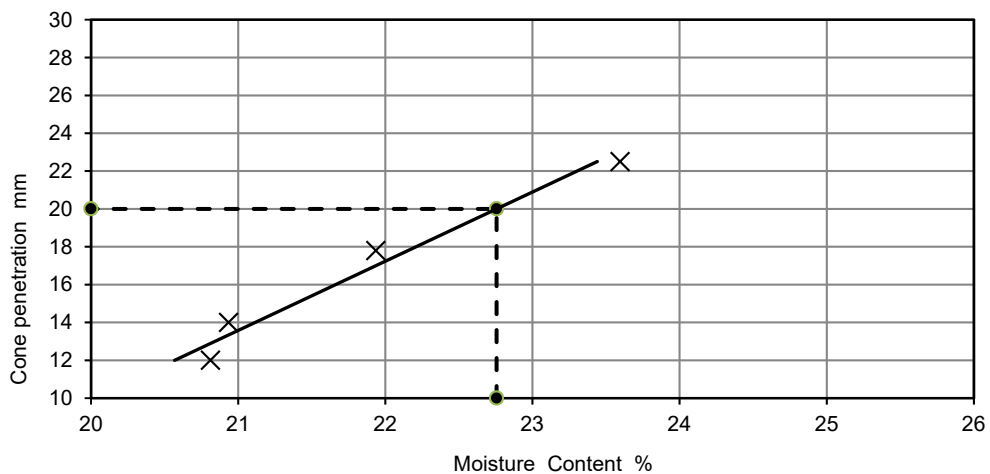
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### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey brown slightly clayey silty SAND	Sample Depth (m)	4.00
		Sample Reference	D19



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 37 %  
 Percentage Passing 425µm sieve: 76 %  
 Liquid Limit: 23 %  
 Plastic Limit: Non-plastic %  
 Plasticity Index: Non-plastic

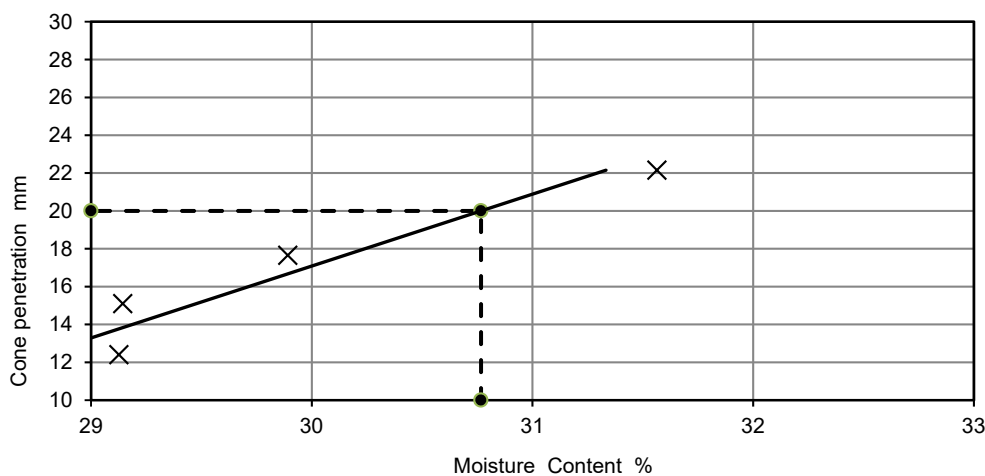
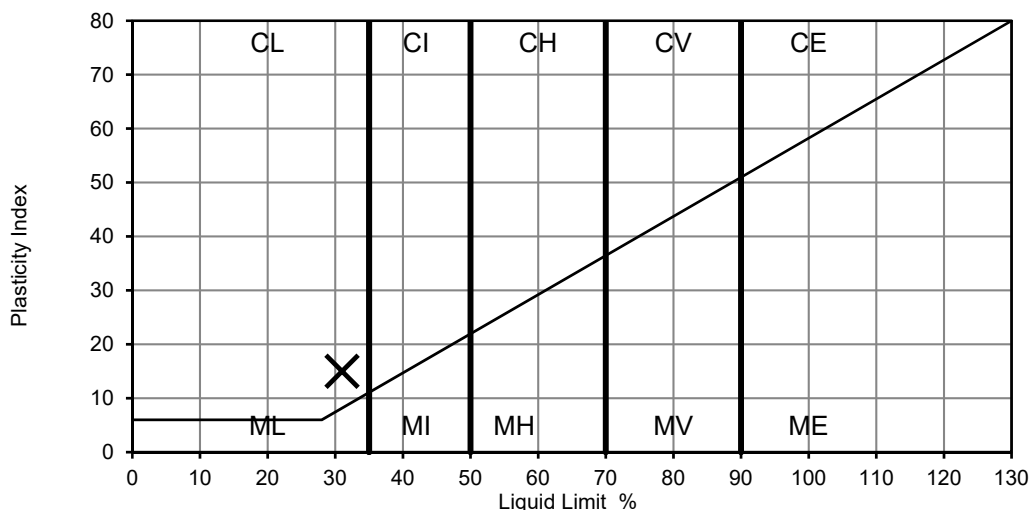
Liquidity Index: Non-plastic  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) Non-plastic

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### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey and brown slightly clayey silty SAND	Sample Depth (m)	10.00
		Sample Reference	D40



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 25 %  
 Percentage Passing 425µm sieve: 96 %  
 Liquid Limit: 31 %  
 Plastic Limit: 16 %  
 Plasticity Index: 15

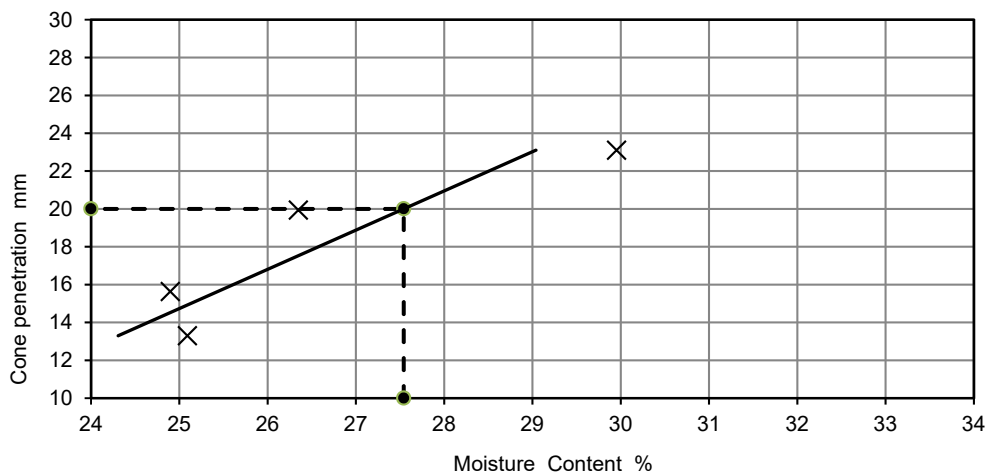
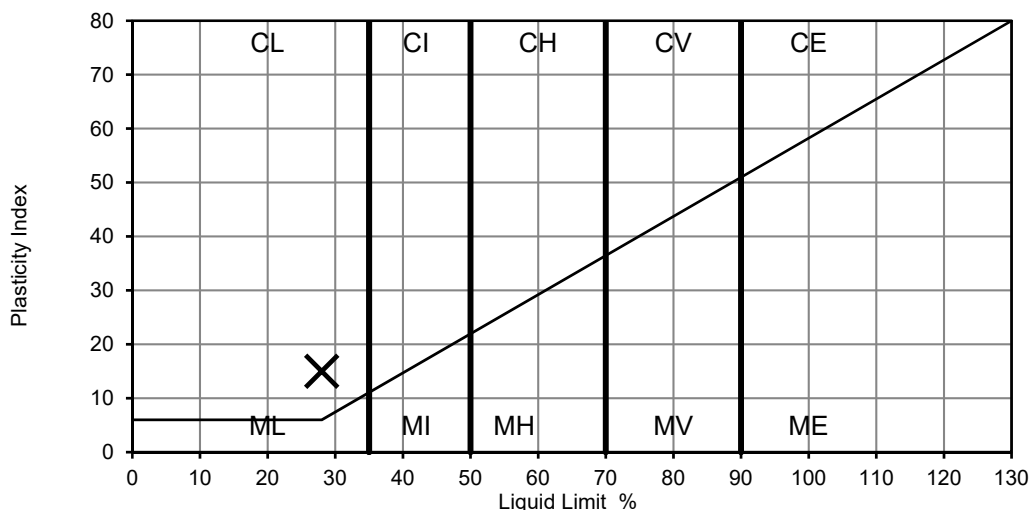
Liquidity Index: 0.60  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 14

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### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey sandy clayey SILT	Sample Depth (m)	30.00
		Sample Reference	D79



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 24 %  
 Percentage Passing 425µm sieve: 100 %  
 Liquid Limit: 28 %  
 Plastic Limit: 13 %  
 Plasticity Index: 15

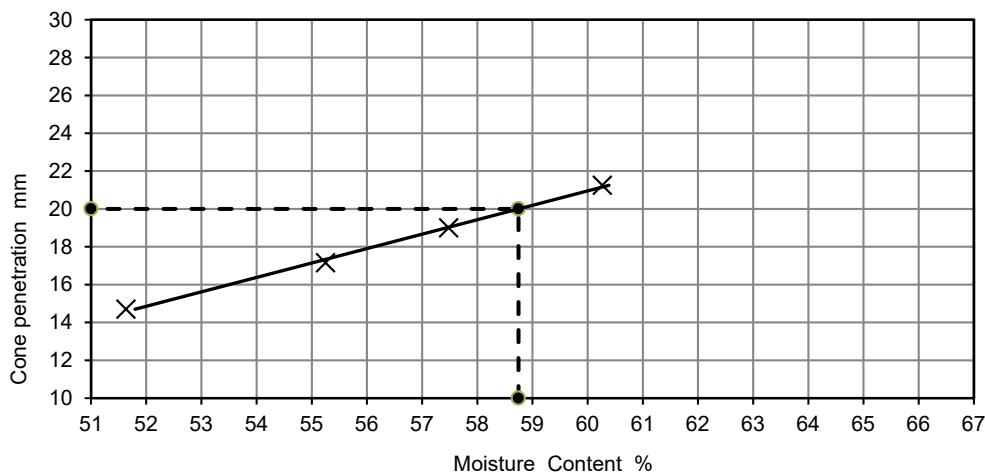
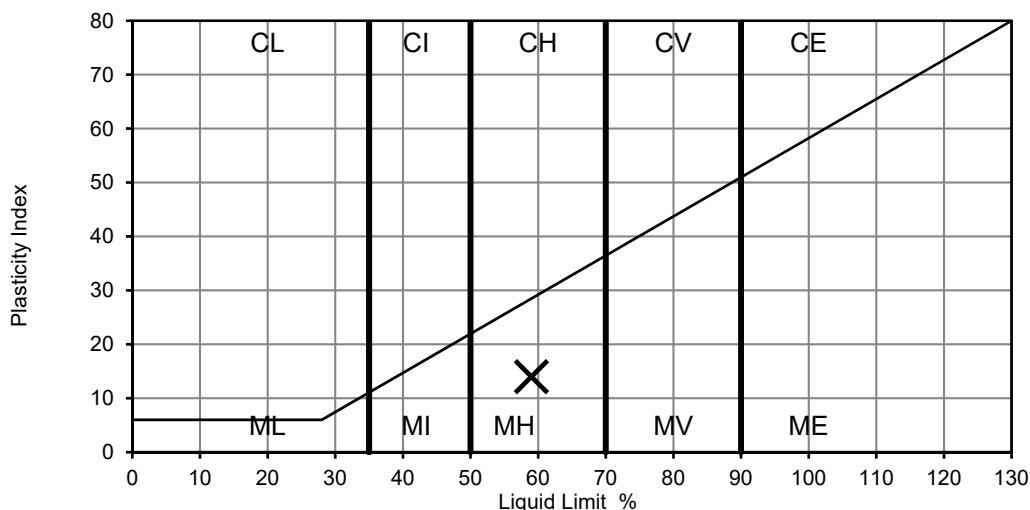
Liquidity Index: 0.73  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 15

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## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey slightly sandy very silty CLAY	Sample Depth (m)	45.60
		Sample Reference	B104



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 37 %  
 Percentage Passing 425µm sieve: 96 %  
 Liquid Limit: 59 %  
 Plastic Limit: 45 %  
 Plasticity Index: 14

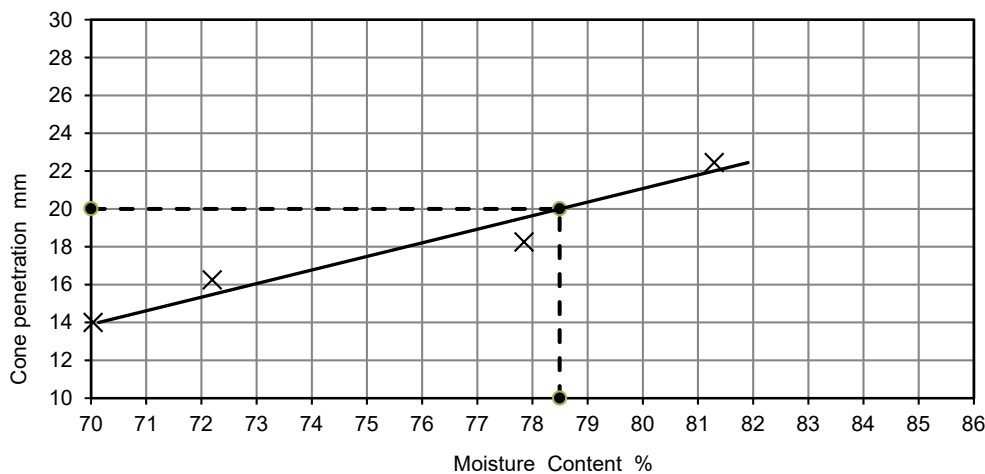
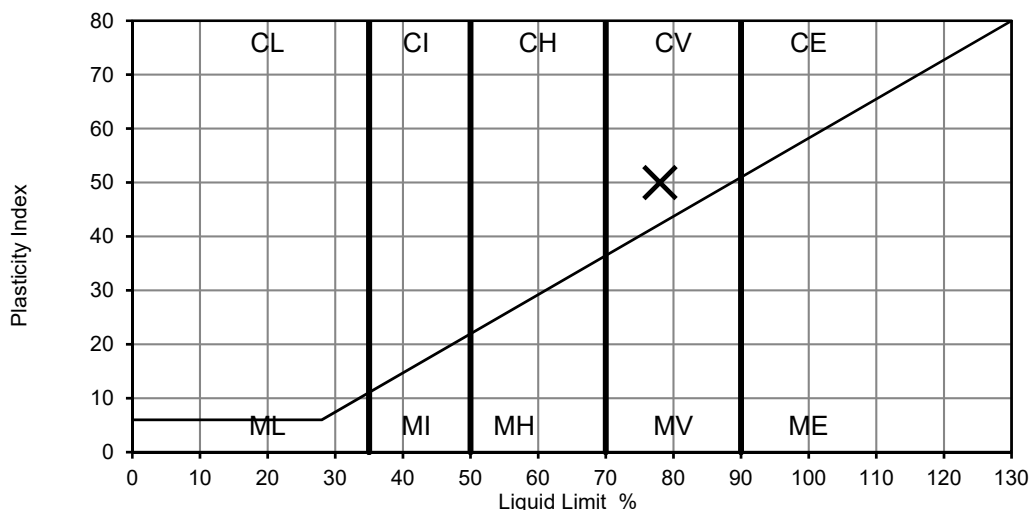
Liquidity Index: -0.57  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 13

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## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey slightly sandy silty CLAY	Sample Depth (m)	46.00
		Sample Reference	D105



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 32 %  
 Percentage Passing 425µm sieve: 93 %  
 Liquid Limit: 78 %  
 Plastic Limit: 28 %  
 Plasticity Index: 50

Liquidity Index: 0.08  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 47

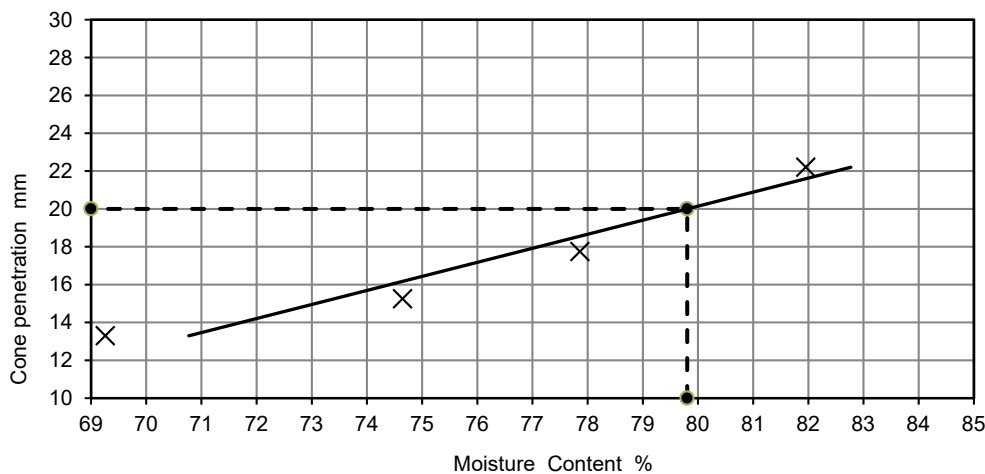
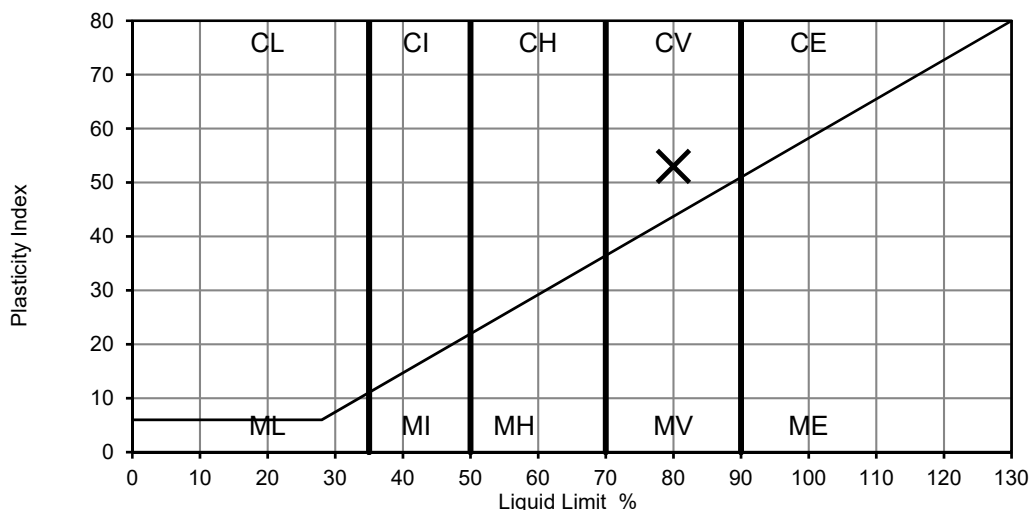
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## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey slightly sandy very silty CLAY	Sample Depth (m)	48.00
		Sample Reference	B110



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 34 %  
 Percentage Passing 425µm sieve: 97 %  
 Liquid Limit: 80 %  
 Plastic Limit: 27 %  
 Plasticity Index: 53

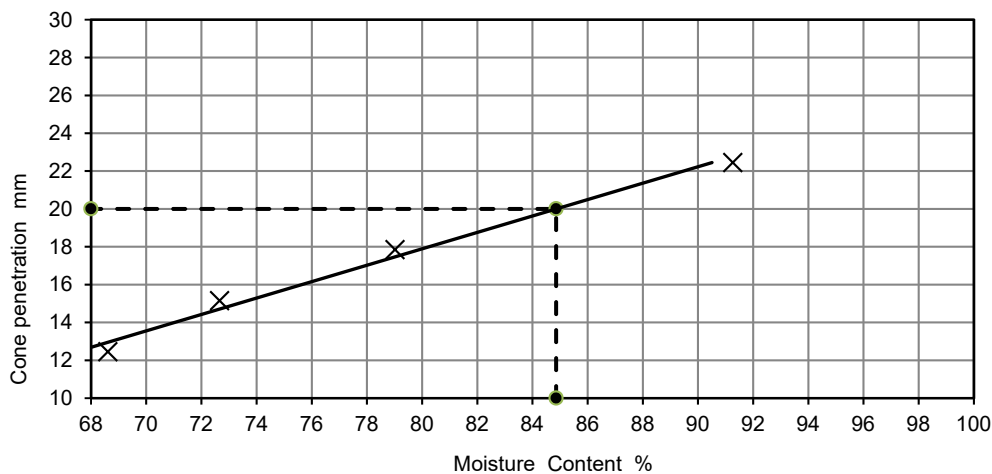
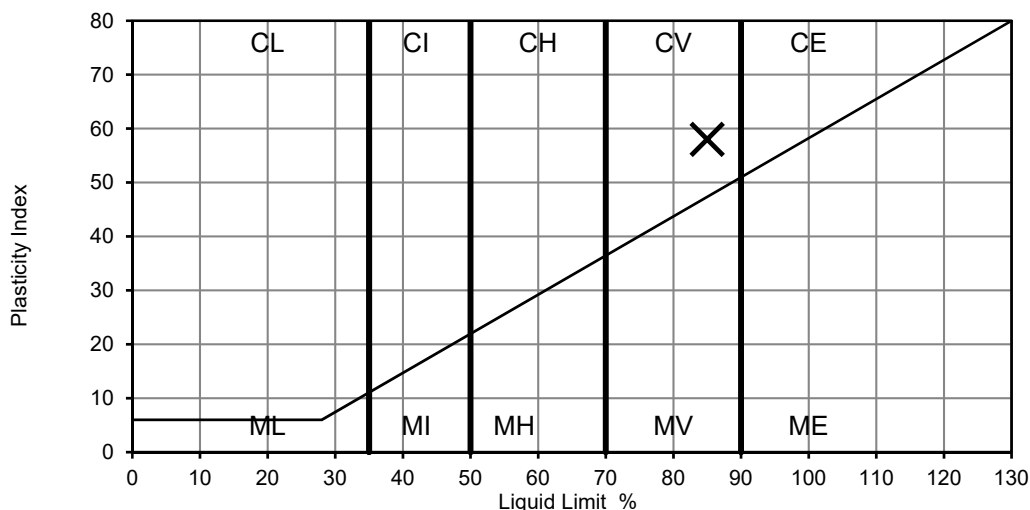
Liquidity Index: 0.13  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 51

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## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey slightly sandy very silty CLAY	Sample Depth (m)	49.50
		Sample Reference	B114



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 37 %  
 Percentage Passing 425µm sieve: 100 %  
 Liquid Limit: 85 %  
 Plastic Limit: 27 %  
 Plasticity Index: 58

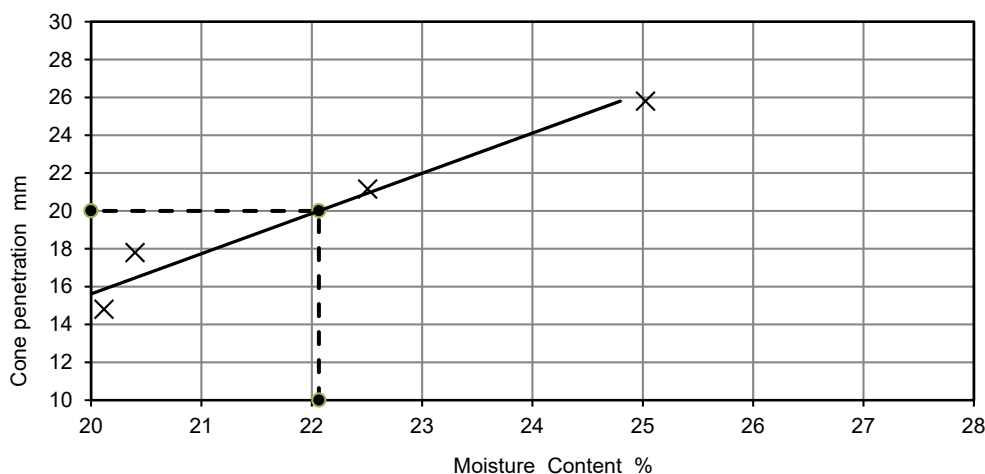
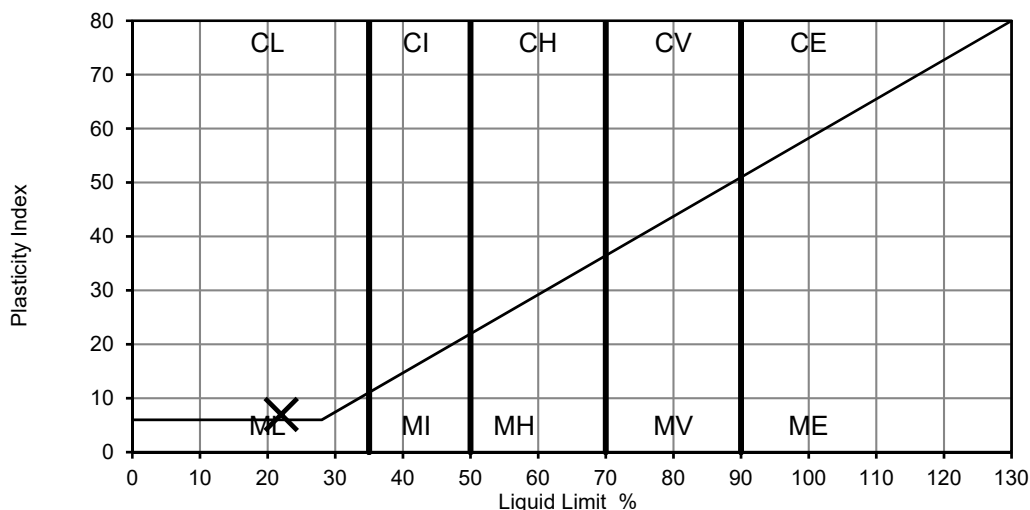
Liquidity Index: 0.17  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 58

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## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark brown slightly sandy slightly gravelly CLAY. Gravel is of flint and shell fragments.	Sample Depth (m)	2.50
		Sample Reference	D10



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 19 %  
 Percentage Passing 425µm sieve: 72 %  
 Liquid Limit: 22 %  
 Plastic Limit: 15 %  
 Plasticity Index: 7

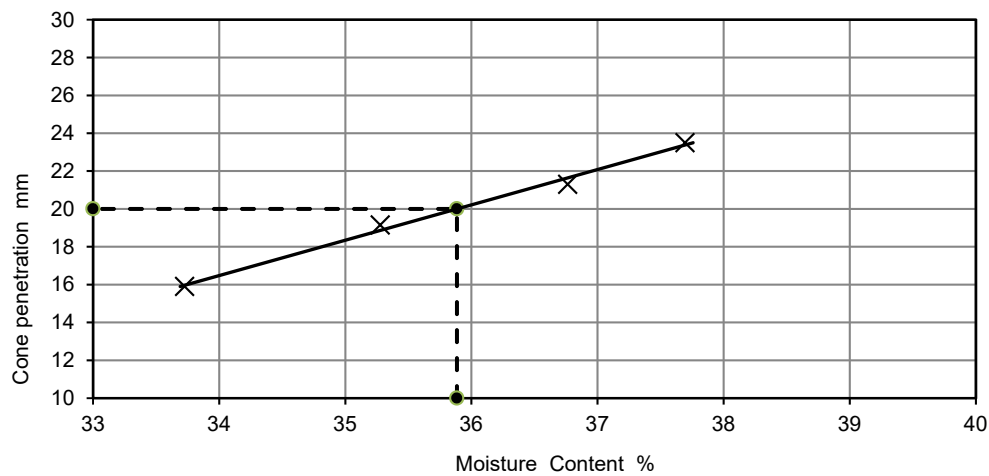
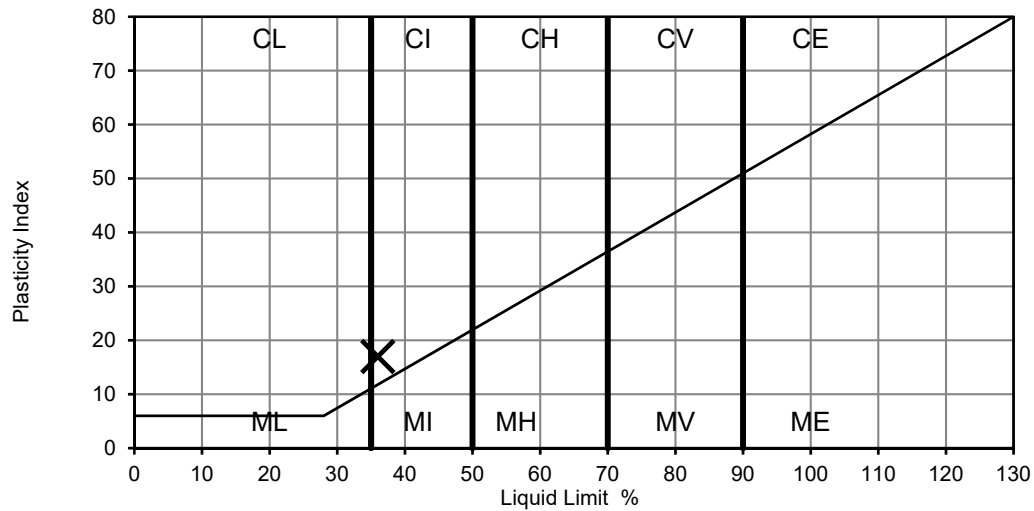
Liquidity Index: 0.57  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 5

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## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark grey and grey clayey very silty SAND / GRAVEL. Gravel is of flint and shell fragments	Sample Depth (m)	3.50
		Sample Reference	B15



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 27 %  
 Percentage Passing 425µm sieve: 51 %  
 Liquid Limit: 36 %  
 Plastic Limit: 19 %  
 Plasticity Index: 17

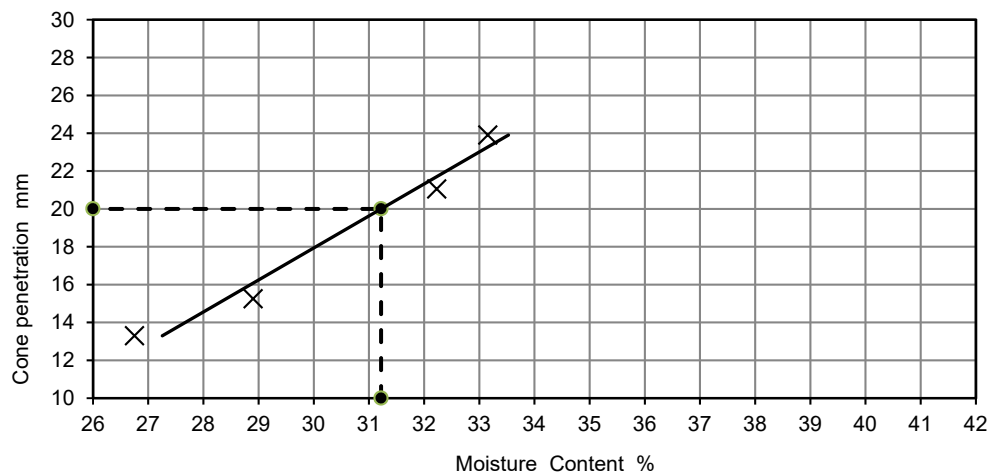
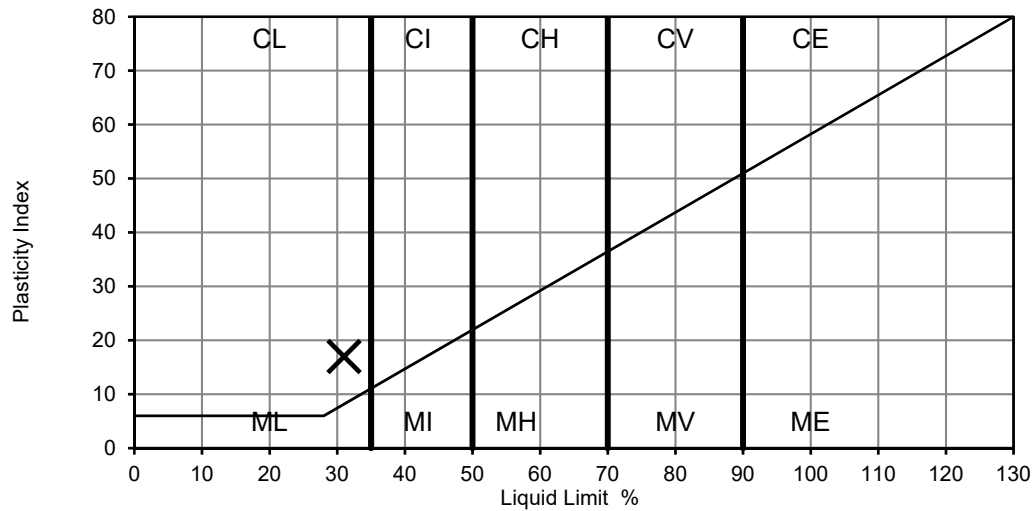
Liquidity Index: 0.47  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 9

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### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark grey slightly sandy CLAY	Sample Depth (m)	29.50
		Sample Reference	D79



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 25 %  
 Percentage Passing 425µm sieve: 100 %  
 Liquid Limit: 31 %  
 Plastic Limit: 14 %  
 Plasticity Index: 17

Liquidity Index: 0.65  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 17

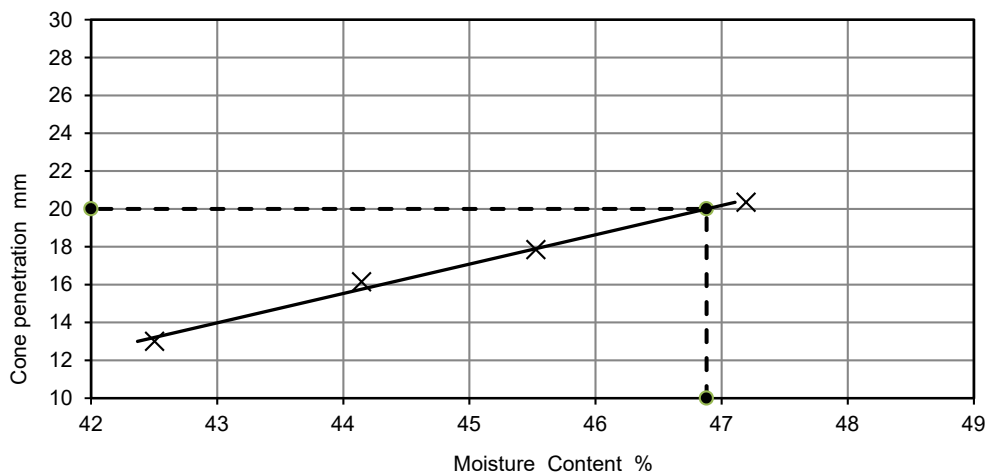
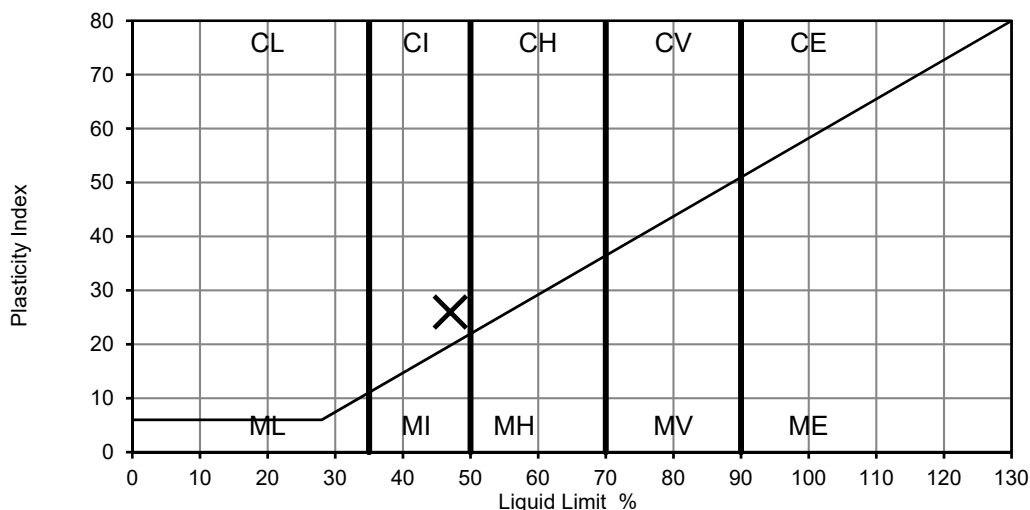
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### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark grey slightly sandy very silty CLAY	Sample Depth (m)	31.00
		Sample Reference	D82



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 24 %  
 Percentage Passing 425µm sieve: 100 %  
 Liquid Limit: 47 %  
 Plastic Limit: 21 %  
 Plasticity Index: 26

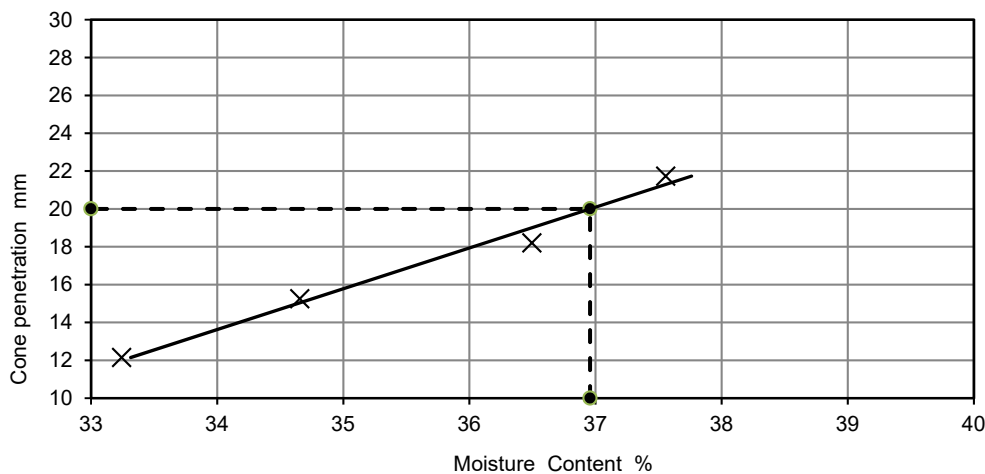
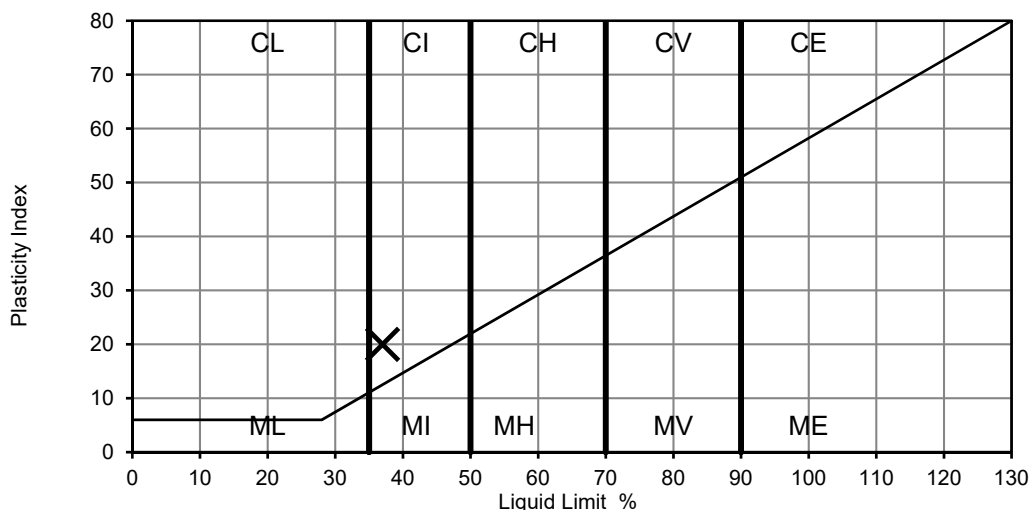
Liquidity Index: 0.12  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 26

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## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark grey slightly sandy very silty CLAY.	Sample Depth (m)	31.55
		Sample Reference	D85



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 28 %  
 Percentage Passing 425µm sieve: 99 %  
 Liquid Limit: 37 %  
 Plastic Limit: 17 %  
 Plasticity Index: 20

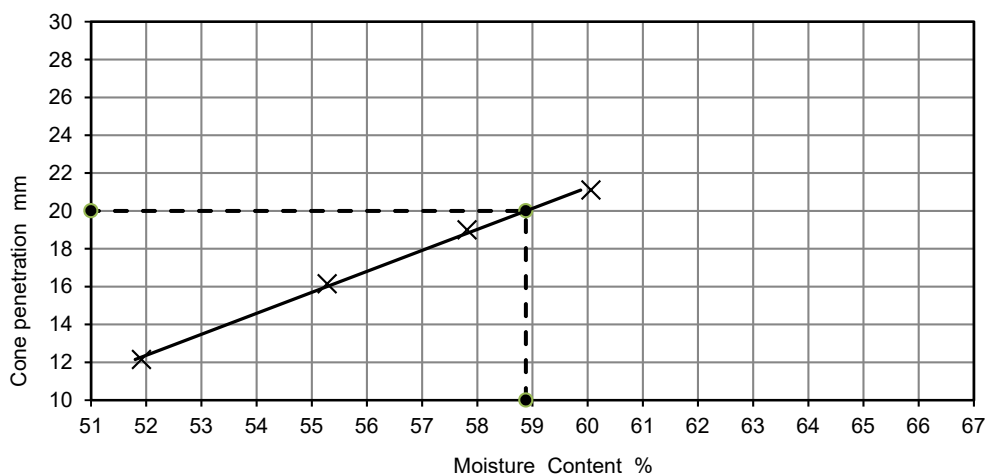
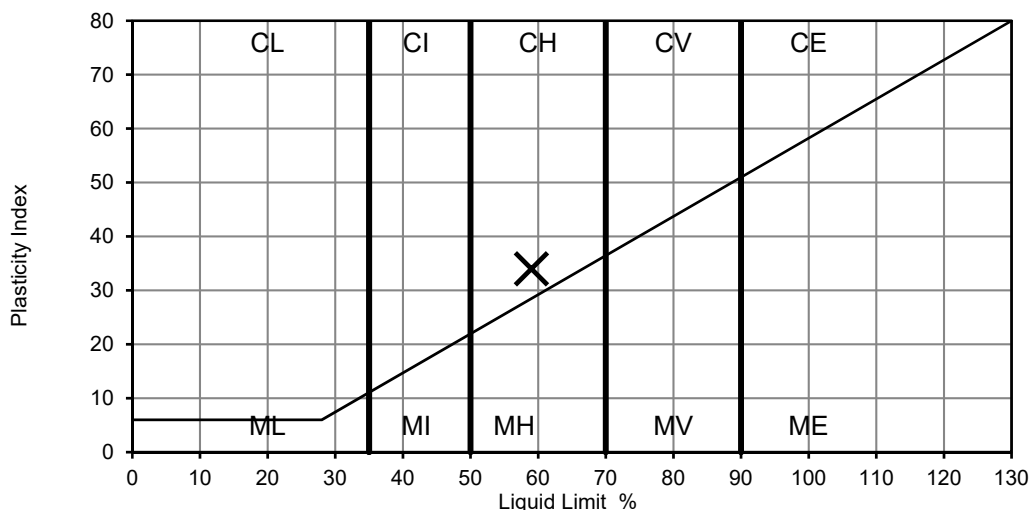
Liquidity Index: 0.55  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 20

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### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey and dark grey slightly sandy very silty CLAY	Sample Depth (m)	45.95
		Sample Reference	D109



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 33 %  
 Percentage Passing 425µm sieve: 98 %  
 Liquid Limit: 59 %  
 Plastic Limit: 25 %  
 Plasticity Index: 34

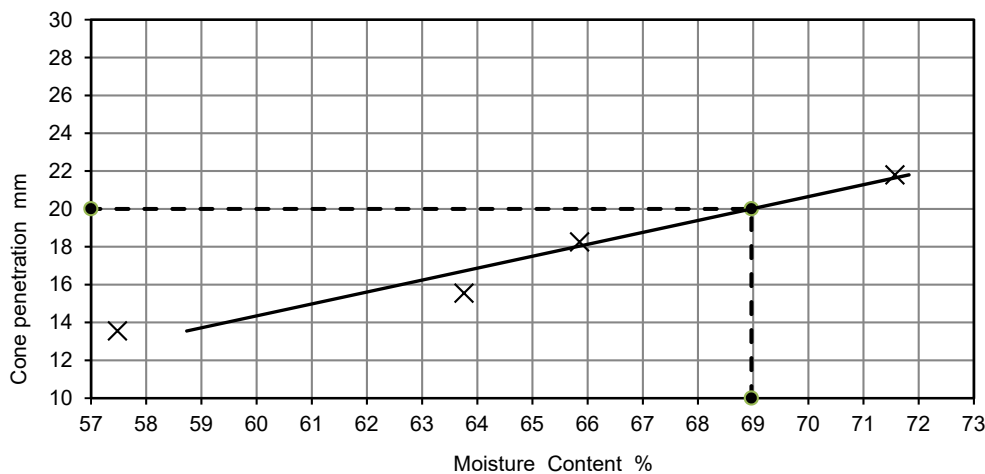
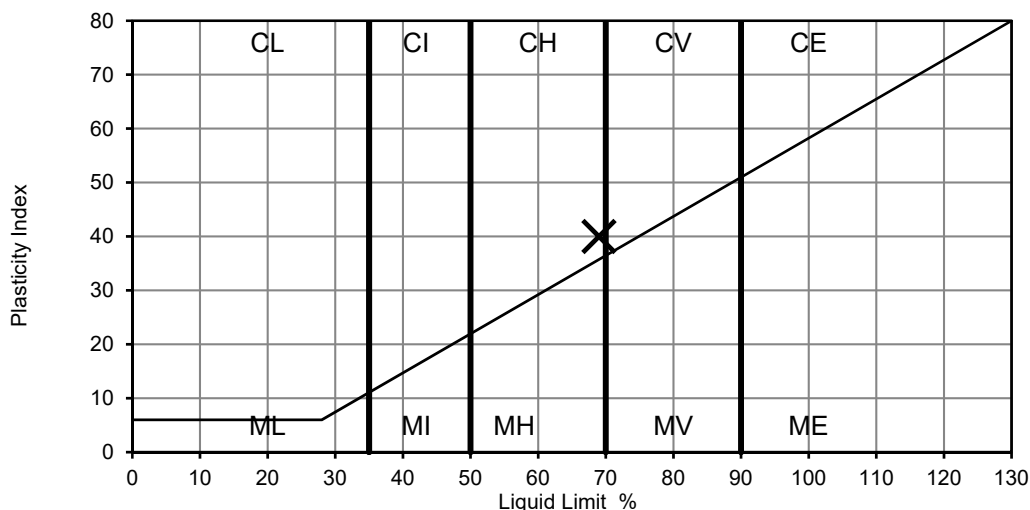
Liquidity Index: 0.24  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 33

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### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark grey slightly sandy clayey SILT	Sample Depth (m)	46.80
		Sample Reference	D112



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 24 %  
 Percentage Passing 425µm sieve: 88 %  
 Liquid Limit: 69 %  
 Plastic Limit: 29 %  
 Plasticity Index: 40

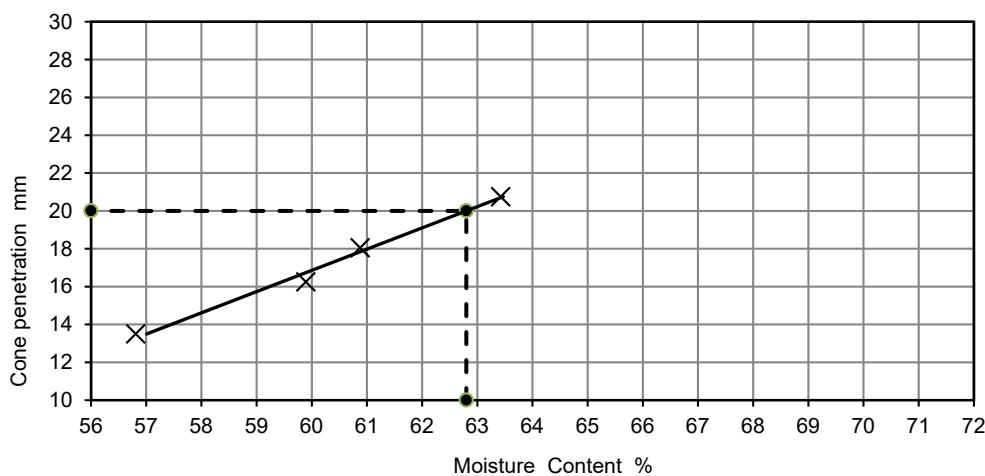
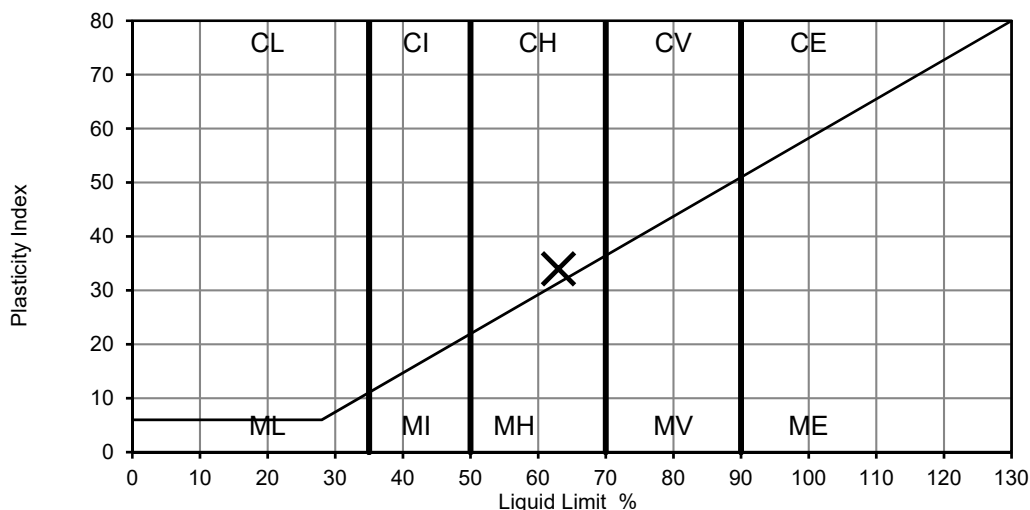
Liquidity Index: -0.13  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 35

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### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark brown slightly sandy silty CLAY	Sample Depth (m)	47.55
		Sample Reference	D115



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 28 %  
 Percentage Passing 425µm sieve: 95 %  
 Liquid Limit: 63 %  
 Plastic Limit: 29 %  
 Plasticity Index: 34

Liquidity Index: -0.03  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 32

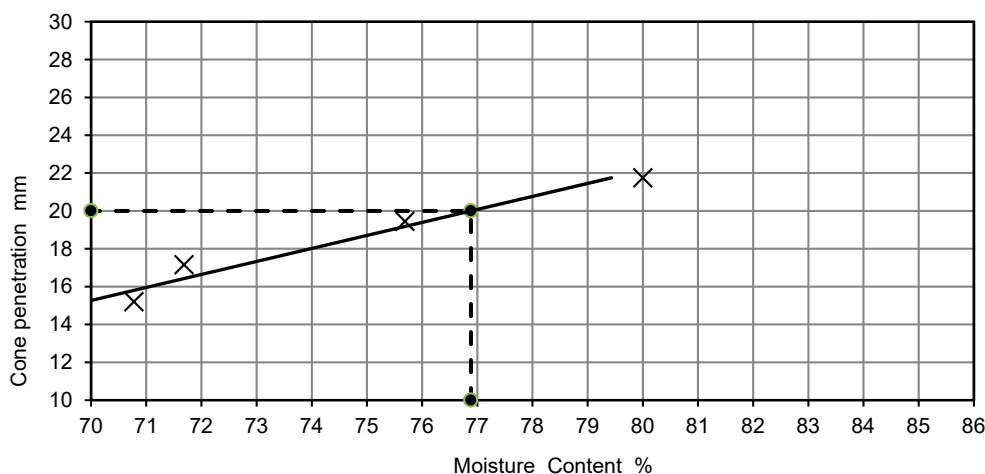
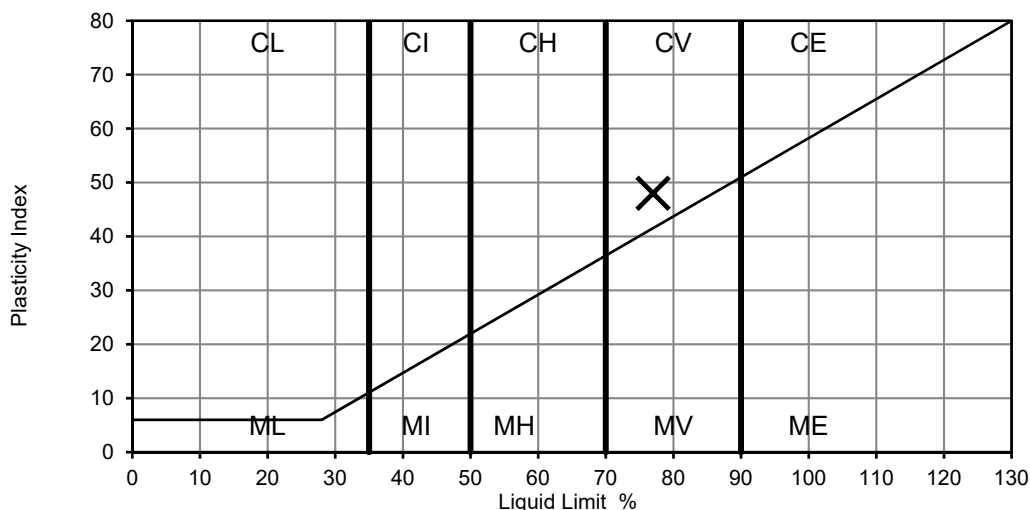
Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1



## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark brown slightly sandy silty CLAY	Sample Depth (m)	49.55
		Sample Reference	D120



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 32 %  
 Percentage Passing 425µm sieve: 96 %  
 Liquid Limit: 77 %  
 Plastic Limit: 29 %  
 Plasticity Index: 48

Liquidity Index: 0.06  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 46

Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1

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**Our reference No.** GTS1180214008-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D66  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Apr 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH11A	<b>Depth</b>	22m
<b>Date sampled</b>	14 Feb 2018	<b>Date received</b>	15 Feb 2018
<b>Date tested</b>	12 Mar 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	843

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Grey and orangey brown, slightly gravelly, shelly, fine, medium and coarse SAND with lenses of silty clay. Gravel is fine and medium flint and shell.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site

**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	6.3	

**Natural MC (%)** 22

**Liquid Limit (%)** 24

**Plastic Limit (%)** Non Plastic

**Plasticity Index (%)**

**Modified PI \*(%)**

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

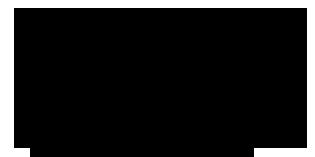
**BS Soil Classification** Non Plastic

**Remarks**

Test Code = 604



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**Our reference No.** GTS1180214026-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D84  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Apr 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH11A	<b>Depth</b>	30m
<b>Date sampled</b>	14 Feb 2018	<b>Date received</b>	15 Feb 2018
<b>Date tested</b>	12 Mar 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	337

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	laminated, soft, grey, silty CLAY, grey, fine and medium SAND and dark grey, clayey SILT.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.3	

**Natural MC (%)** 25

**Liquid Limit (%)** 30

**Plastic Limit (%)** 15

**Plasticity Index (%)** 15

**Modified PI \*(%)** 15

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

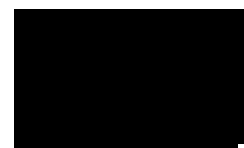
**BS Soil Classification** CL

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our reference No.** GTS1180215004-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D89  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Apr 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH11A	<b>Depth</b>	32.1m
<b>Date sampled</b>	15 Feb 2018	<b>Date received</b>	16 Feb 2018
<b>Date tested</b>	12 Mar 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	491

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Laminated, firm to stiff, silty CLAY and grey, silty fine SAND. Trace of fine shell and flint fragments .

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.8	

**Natural MC (%)** 26

**Liquid Limit (%)** 37

**Plastic Limit (%)** 16

**Plasticity Index (%)** 22

**Modified PI \*(%)** 22

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

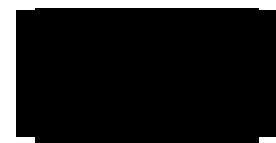
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS1180216004-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D112  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Apr 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH11A	<b>Depth</b>	46.5m
<b>Date sampled</b>	16 Feb 2018	<b>Date received</b>	17 Feb 2018
<b>Date tested</b>	12 Mar 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	294

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Very stiff, laminated, greyish brown, silty CLAY.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.6	

**Natural MC (%)** 40

**Liquid Limit (%)** 88

**Plastic Limit (%)** 26

**Plasticity Index (%)** 62

**Modified PI \*(%)** 61

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

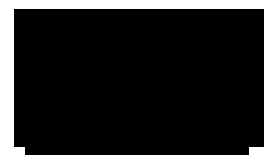
**BS Soil Classification** C V

<b>Remarks</b>	NHBC Volume change potential classification is high.
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Test Code = 604



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**Our reference No.** GTS1180216008-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D116  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Apr 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH11A	<b>Depth</b>	47.5m
<b>Date sampled</b>	16 Feb 2018	<b>Date received</b>	17 Feb 2018
<b>Date tested</b>	12 Mar 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	436

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Very stiff, brown CLAY.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.0	

**Natural MC (%)** 31

**Liquid Limit (%)** 92

**Plastic Limit (%)** 27

**Plasticity Index (%)** 64

**Modified PI \*(%)** 64

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

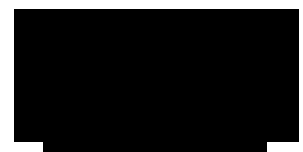
**BS Soil Classification** C E

<b>Remarks</b>	NHBC Volume change potential classification is high.
----------------	--

Test Code = 604



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**Our reference No.** GTS1180216013-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D121  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 06 Apr 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH11A	<b>Depth</b>	49.5m
<b>Date sampled</b>	16 Feb 2018	<b>Date received</b>	17 Feb 2018
<b>Date tested</b>	12 Mar 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	388

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Very stiff, brown CLAY.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.2	

**Natural MC (%)** 34

**Liquid Limit (%)** 92

**Plastic Limit (%)** 28

**Plasticity Index (%)** 63

**Modified PI \*(%)** 63

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C E

<b>Remarks</b>	NHBC Volume change potential classification is high.
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Test Code = 604



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**Our reference No.** GTS3180307007-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B6  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 11 Jun 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH12	<b>Depth</b>	2m
<b>Date sampled</b>	07 Mar 2018	<b>Date received</b>	07 Mar 2018
<b>Date tested</b>	16 May 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	567

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising very soft, dark grey, slightly sandy, silty clay. Gravel is fine and medium, rounded to sub-rounded, flint, chalk and brick.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	6.7	

**Natural MC (%)** 38

**Liquid Limit (%)** 55

**Plastic Limit (%)** 25

**Plasticity Index (%)** 30

**Modified PI \*(%)** 28

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

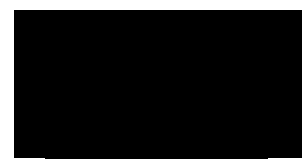
**BS Soil Classification** C H

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS3180312007-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B76  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 11 Jun 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH12	<b>Depth</b>	31.5m
<b>Date sampled</b>	12 Mar 2018	<b>Date received</b>	13 Mar 2018
<b>Date tested</b>	16 May 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	527

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Stiff, grey, slightly sandy, silty CLAY.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.6	

**Natural MC (%)** 24

**Liquid Limit (%)** 50

**Plastic Limit (%)** 20

**Plasticity Index (%)** 31

**Modified PI \*(%)** 30

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

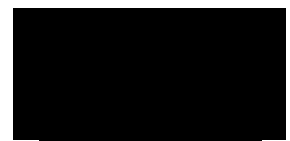
**BS Soil Classification** C H

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS3180313008-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D97  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 11 Jun 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH12	<b>Depth</b>	45.7m
<b>Date sampled</b>	13 Mar 2018	<b>Date received</b>	14 Mar 2018
<b>Date tested</b>	11 May 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	557

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very stiff, laminated, brown CLAY, witha littl fine and medium angular flint gravel.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	6.3	

**Natural MC (%)** 31

**Liquid Limit (%)** 89

**Plastic Limit (%)** 23

**Plasticity Index (%)** 65

**Modified PI \*(%)** 61

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

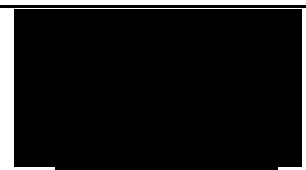
**BS Soil Classification** C V

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our reference No.** GTS3180313012-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D101  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 11 Jun 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH12	<b>Depth</b>	47.5m
<b>Date sampled</b>	13 Mar 2018	<b>Date received</b>	14 Mar 2018
<b>Date tested</b>	11 May 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	483

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very stiff, laminated, brown CLAY, with laminae of light brown and light grey SILT.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.6	

**Natural MC (%)** 30

**Liquid Limit (%)** 91

**Plastic Limit (%)** 29

**Plasticity Index (%)** 62

**Modified PI \*(%)** 62

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

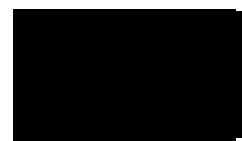
**BS Soil Classification** C E

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our reference No.** GTS3180314001-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D105  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 11 Jun 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH12	<b>Depth</b>	49.5m
<b>Date sampled</b>	14 Mar 2018	<b>Date received</b>	15 Mar 2018
<b>Date tested</b>	11 May 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	490

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very stiff, slightly sandy, laminated, brown CLAY, with laminae of light brown and light grey SILT. Occasional fine gypsum crystals.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.7	

<b>Natural MC (%)</b>	31
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<b>Liquid Limit (%)</b>	84
<b>Plastic Limit (%)</b>	23
<b>Plasticity Index (%)</b>	61
<b>Modified PI *(%)</b>	61

\*BRE Digest 240:1993.

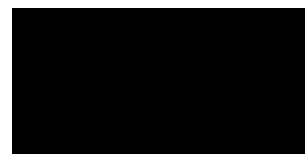
*This calculation is outside the scope of UKAS accreditation.*
**BS Soil Classification** C V

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our reference No.** GTS3180320040-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B39  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 14 Jun 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH12B	<b>Depth</b>	12.4m
<b>Date sampled</b>	20 Mar 2018	<b>Date received</b>	21 Mar 2018
<b>Date tested</b>	25 May 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	595

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Medium dense, orangey brown, silty fine to medium SAND, with laminae of light grey silty CLAY, black clayey SILT and orange sandy SILT.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	4.4	

**Natural MC (%)** 23

**Liquid Limit (%)** 31  
**Plastic Limit (%)** Non Plastic  
**Plasticity Index (%)**  
**Modified PI \*(%)**

\*BRE Digest 240:1993.  
*This calculation is outside the scope of UKAS accreditation.*

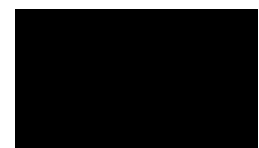
**BS Soil Classification** Non Plastic

**Remarks**

Test Code = 604



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**Our reference No.** GTS3180322006-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D74  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 14 Jun 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH12B	<b>Depth</b>	29.95m
<b>Date sampled</b>	22 Mar 2018	<b>Date received</b>	23 Mar 2018
<b>Date tested</b>	25 May 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	493

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Stiff to very stiff, laminated, grey silty CLAY and light grey SILT.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.0	

**Natural MC (%)** 28

**Liquid Limit (%)** 54

**Plastic Limit (%)** 20

**Plasticity Index (%)** 34

**Modified PI \*(%)** 34

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

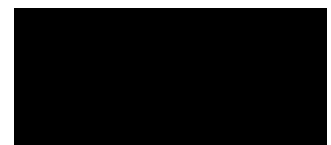
**BS Soil Classification** C H

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS3180323013-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D101  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 14 Jun 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH12B	<b>Depth</b>	47.5m
<b>Date sampled</b>	23 Mar 2018	<b>Date received</b>	26 Mar 2018
<b>Date tested</b>	25 May 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	411

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very stiff, laminated, brown CLAY, with occasional mud nodules.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	5.5	

**Natural MC (%)** 30

**Liquid Limit (%)** 88

**Plastic Limit (%)** 29

**Plasticity Index (%)** 59

**Modified PI \*(%)** 56

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

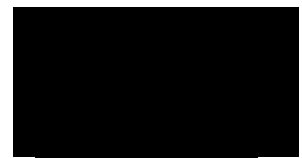
**BS Soil Classification** C V

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our reference No.** GTS3180323017-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D105  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 14 Jun 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH12B	<b>Depth</b>	49.5m
<b>Date sampled</b>	23 Mar 2018	<b>Date received</b>	26 Mar 2018
<b>Date tested</b>	25 May 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	298

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very stiff, laminated, dark greyish brown CLAY, with occasional laminae of light grey silt.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.0	

**Natural MC (%)** 31

**Liquid Limit (%)** 93  
**Plastic Limit (%)** 29  
**Plasticity Index (%)** 64  
**Modified PI \*(%)** 63

\*BRE Digest 240:1993.

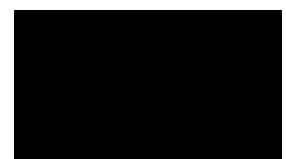
*This calculation is outside the scope of UKAS accreditation.*
**BS Soil Classification** C E

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our reference No.** GTS1180305012-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D12  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 05 Jul 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13	<b>Depth</b>	2m
<b>Date sampled</b>	05 Mar 2018	<b>Date received</b>	06 Mar 2018
<b>Date tested</b>	13 Jun 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	637

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft, brownish grey, sandy, silty CLAY.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	12.3	

**Natural MC (%)** 31

**Liquid Limit (%)** 36

**Plastic Limit (%)** 20

**Plasticity Index (%)** 16

**Modified PI \*(%)** 14

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

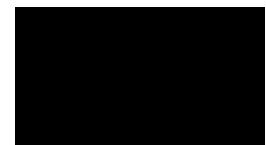
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our reference No.** GTS1180305015-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D15  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 23 May 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13	<b>Depth</b>	2.6m
<b>Date sampled</b>	05 Mar 2018	<b>Date received</b>	06 Mar 2018
<b>Date tested</b>	24 Apr 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	570

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft, black organic very silty CLAY, rapidly weathering to brown with trace of fine and medium flint gravel.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	9.4	

<b>Natural MC (%)</b>	46
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<b>Liquid Limit (%)</b>	41
<b>Plastic Limit (%)</b>	22
<b>Plasticity Index (%)</b>	19
<b>Modified PI *(%)</b>	17

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our reference No.** GTS1180307033-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D80  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 23 May 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13	<b>Depth</b>	28.5m
<b>Date sampled</b>	07 Mar 2018	<b>Date received</b>	08 Mar 2018
<b>Date tested</b>	13 Apr 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	449

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Stiff laminated silty CLAY with numerous laminae of light grey silt.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.2	

**Natural MC (%)** 25

**Liquid Limit (%)** 41

**Plastic Limit (%)** 16

**Plasticity Index (%)** 25

**Modified PI \*(%)** 25

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

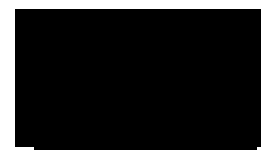
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS1180308002-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D85  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 23 May 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13	<b>Depth</b>	32m
<b>Date sampled</b>	08 Mar 2018	<b>Date received</b>	09 Mar 2018
<b>Date tested</b>	13 Apr 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	616

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Laminated and thinly bedded firm, grey silty CLAY and light grey fine SAND. Trace of fine gravel sized shell fragments.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.8	

**Natural MC (%)** 24

**Liquid Limit (%)** 27

**Plastic Limit (%)** 13

**Plasticity Index (%)** 15

**Modified PI \*(%)** 14

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

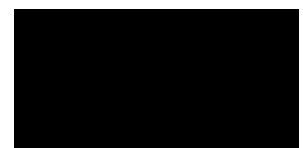
**BS Soil Classification** CL

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our reference No.** GTS1180309008-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B105  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 23 May 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13	<b>Depth</b>	44.8m
<b>Date sampled</b>	09 Mar 2018	<b>Date received</b>	12 Mar 2018
<b>Date tested</b>	24 Apr 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	427

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Thinly bedded, stiff grey silty CLAY with laminae of dark grey, sandy SILT. Trace of fine shell.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.4	

**Natural MC (%)** 35

**Liquid Limit (%)** 60

**Plastic Limit (%)** 24

**Plasticity Index (%)** 36

**Modified PI \*(%)** 36

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

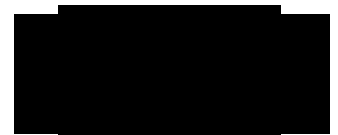
**BS Soil Classification** C H

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS1180309011-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D108  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 23 May 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13	<b>Depth</b>	45.5m
<b>Date sampled</b>	09 Mar 2018	<b>Date received</b>	12 Mar 2018
<b>Date tested</b>	24 Apr 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	290

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Firm to stiff laminated brown, silty CLAY with some fine disseminated gypsum crystals.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.9	

**Natural MC (%)** 30

**Liquid Limit (%)** 88

**Plastic Limit (%)** 27

**Plasticity Index (%)** 61

**Modified PI \*(%)** 60

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C V

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our reference No.** GTS1180309016-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D113  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 23 May 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13	<b>Depth</b>	47.5m
<b>Date sampled</b>	09 Mar 2018	<b>Date received</b>	12 Mar 2018
<b>Date tested</b>	13 Apr 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	324

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very stiff, laminated, brownish grey, silty, gravelly, sandy CLAY. Gravel is fine and medium, rounded to sub-rounded, flint and ironstone.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	10.7	

**Natural MC (%)** 27

**Liquid Limit (%)** 82

**Plastic Limit (%)** 25

**Plasticity Index (%)** 57

**Modified PI \*(%)** 51

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

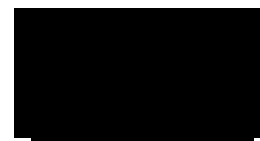
**BS Soil Classification** C V

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our reference No.** GTS1180309020-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D117  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 23 May 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13	<b>Depth</b>	49.5m
<b>Date sampled</b>	09 Mar 2018	<b>Date received</b>	12 Mar 2018
<b>Date tested</b>	13 Apr 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	491

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very stiff laminated brownish grey, silty CLAY. Trace of fine, rounded to sub-angular flint.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.9	

**Natural MC (%)** 32

**Liquid Limit (%)** 89

**Plastic Limit (%)** 27

**Plasticity Index (%)** 62

**Modified PI \*(%)** 60

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

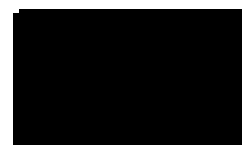
**BS Soil Classification** C V

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



Peter Hardiment (Operations Manager)





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**Our reference No.** GTS1180315011-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D11  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 05 Jul 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13A	<b>Depth</b>	2.7m
<b>Date sampled</b>	15 Mar 2018	<b>Date received</b>	16 Mar 2018
<b>Date tested</b>	31 May 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	520

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising soft to firm, brownish grey, gravelly, very sandy, silty clay. Gravel is fine to coarse angular to sub-angular flint and brick.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	14.7	

**Natural MC (%)** 36

**Liquid Limit (%)** 43

**Plastic Limit (%)** 19

**Plasticity Index (%)** 24

**Modified PI \*(%)** 21

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

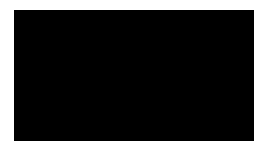
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS1180315017-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D17  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 05 Jul 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13A	<b>Depth</b>	4m
<b>Date sampled</b>	15 Mar 2018	<b>Date received</b>	16 Mar 2018
<b>Date tested</b>	31 May 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	508

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Dark grey, weathering to brown, very silty, organic, gravelly fine to medium SAND. Gravel is fine to medium sub-rounded to sub-angular flint.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	22.4	

**Natural MC (%)** 26

**Liquid Limit (%)** 40  
**Plastic Limit (%)** Non Plastic  
**Plasticity Index (%)**  
**Modified PI \*(%)**

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

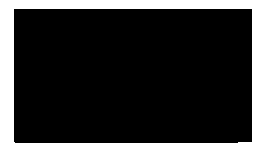
**BS Soil Classification** Non Plastic

**Remarks**

Test Code = 604



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**Our reference No.** GTS1180319025-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D75  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 05 Jul 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13A	<b>Depth</b>	28.45m
<b>Date sampled</b>	19 Mar 2018	<b>Date received</b>	20 Mar 2018
<b>Date tested</b>	31 May 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	510

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Laminated and thinly bedded, soft to firm, grey CLAY and light grey, silty fine SAND.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.1	

**Natural MC (%)** 28

**Liquid Limit (%)** 36

**Plastic Limit (%)** 14

**Plasticity Index (%)** 22

**Modified PI \*(%)** 22

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS1180319029-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D79  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 05 Jul 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13A	<b>Depth</b>	30m
<b>Date sampled</b>	19 Mar 2018	<b>Date received</b>	20 Mar 2018
<b>Date tested</b>	31 May 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	424

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Laminated and thinly bedded, firm to stiff, grey CLAY and light grey, silty fine SAND.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.2	

**Natural MC (%)** 25

**Liquid Limit (%)** 34

**Plastic Limit (%)** 14

**Plasticity Index (%)** 20

**Modified PI \*(%)** 20

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

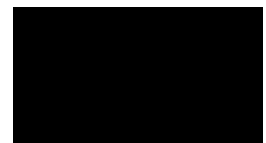
**BS Soil Classification** CL

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS1180321005-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B104  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 05 Jul 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13A	<b>Depth</b>	45.7m
<b>Date sampled</b>	21 Mar 2018	<b>Date received</b>	22 Mar 2018
<b>Date tested</b>	01 Jun 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	509

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Stiff, grey, silty CLAY, with laminae of black SILT and light grey silty, fine SAND.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.4	

**Natural MC (%)** 32

**Liquid Limit (%)** 77

**Plastic Limit (%)** 25

**Plasticity Index (%)** 52

**Modified PI \*(%)** 51

\*BRE Digest 240:1993.

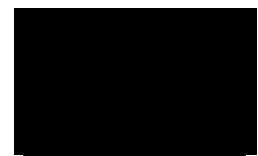
*This calculation is outside the scope of UKAS accreditation.*
**BS Soil Classification** C V

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our reference No.** GTS1180321009-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D108  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 05 Jul 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13A	<b>Depth</b>	47m
<b>Date sampled</b>	21 Mar 2018	<b>Date received</b>	22 Mar 2018
<b>Date tested</b>	31 May 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	488

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very stiff laminated brown CLAY, with some fine gypsum crystals and some nodules of light grey, siltstone.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.4	

**Natural MC (%)** 35

**Liquid Limit (%)** 88

**Plastic Limit (%)** 27

**Plasticity Index (%)** 60

**Modified PI \*(%)** 60

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C V

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our reference No.** GTS1180321014-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D113  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 05 Jul 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH13A	<b>Depth</b>	49m
<b>Date sampled</b>	21 Mar 2018	<b>Date received</b>	22 Mar 2018
<b>Date tested</b>	01 Jun 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	500

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Very stiff laminated brown CLAY, with some fine gypsum crystals and some nodules of light grey, siltstone.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Whole	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.8	

**Natural MC (%)** 25

**Liquid Limit (%)** 75

**Plastic Limit (%)** 23

**Plasticity Index (%)** 51

**Modified PI \*(%)** 51

\*BRE Digest 240:1993.

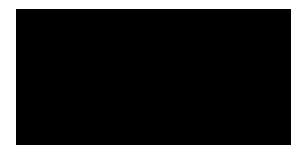
*This calculation is outside the scope of UKAS accreditation.*
**BS Soil Classification** C V

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our reference No.** NCCL201709222-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D5  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 21 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH14	<b>Depth</b>	2.6m
<b>Date sampled</b>	18 Sep 2017	<b>Date received</b>	18 Sep 2017
<b>Date tested</b>	23 Oct 2017		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	565

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND comprising - soft, laminated, light brown and dark grey, very sity, sandy, gravelly clay. Gravel is rounded to sub-angular, flint, quartz, brick, shell and breeze block.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	13.1	

**Natural MC (%)** 24

**Liquid Limit (%)** 36

**Plastic Limit (%)** 20

**Plasticity Index (%)** 16

**Modified PI \*(%)** 14

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

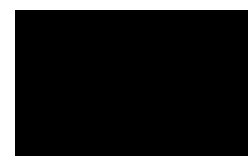
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our reference No.** NCCL201710111-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B37  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 21 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH14	<b>Depth</b>	17.6-18.1m
<b>Date sampled</b>	18 Sep 2017	<b>Date received</b>	18 Sep 2017
<b>Date tested</b>	18 Oct 2017		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	820

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Greyish brown, slightly clayey, silty, fine, medium and coarse SAND. Gravel is fine and medium sub-rounded to sub-angular flint.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	38.1	

**Natural MC (%)** 24

**Liquid Limit (%)** 25

**Plastic Limit (%)** Non Plastic

**Plasticity Index (%)**

**Modified PI \*(%)** \*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

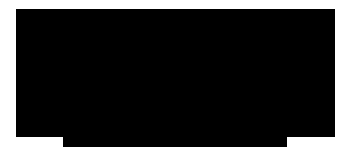
**BS Soil Classification** Non Plastic

**Remarks**

Test Code = 604



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**Our reference No.** NCCL201710112-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B52  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 21 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH14	<b>Depth</b>	32-32.5m
<b>Date sampled</b>	18 Sep 2017	<b>Date received</b>	18 Sep 2017
<b>Date tested</b>	18 Oct 2017		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	525

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Firm, light grey, silty, sandy CLAY with many coarse sand sized shell fragments. Trace of sub-rounded flint and a few woody fragments		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	5.5	

**Natural MC (%)** 34

**Liquid Limit (%)** 45

**Plastic Limit (%)** 19

**Plasticity Index (%)** 26

**Modified PI \*(%)** 25

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

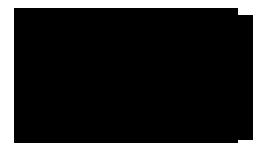
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



Peter Hardiment (Operations Manager)

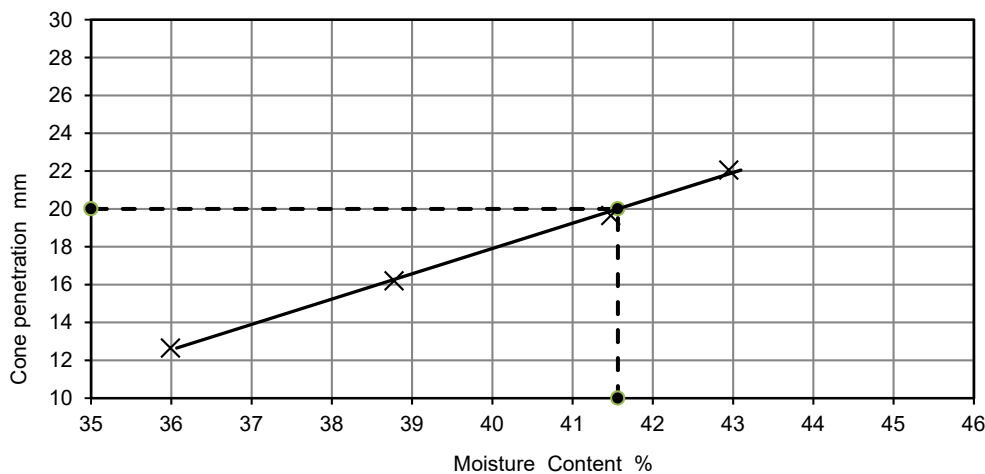
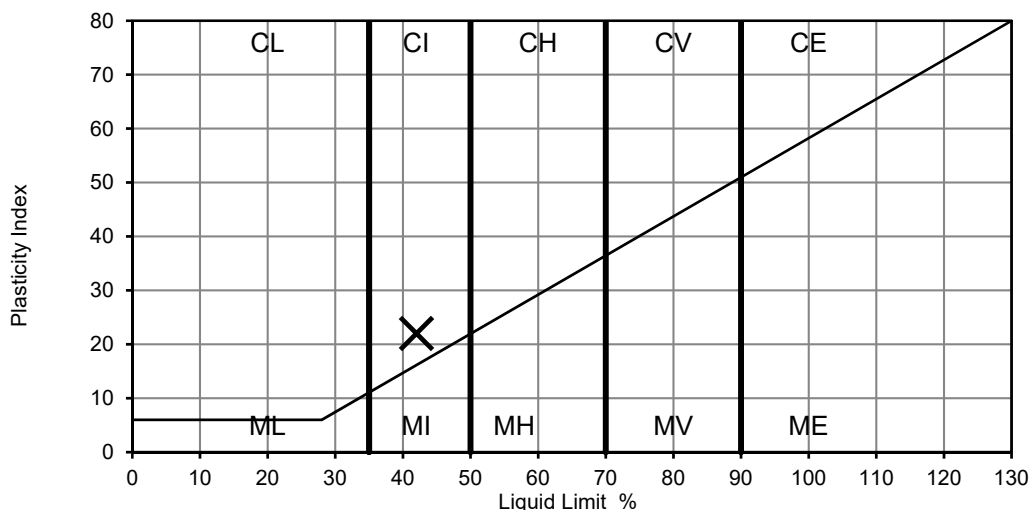




### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Light brown clayey silty SAND	Sample Depth (m)	14.30
		Sample Reference	B43



Preparation: Material was washed and oven dried at below 50°C

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 31 %  
 Percentage Passing 425µm sieve: 96 %  
 Liquid Limit: 42 %  
 Plastic Limit: 20 %  
 Plasticity Index: 22

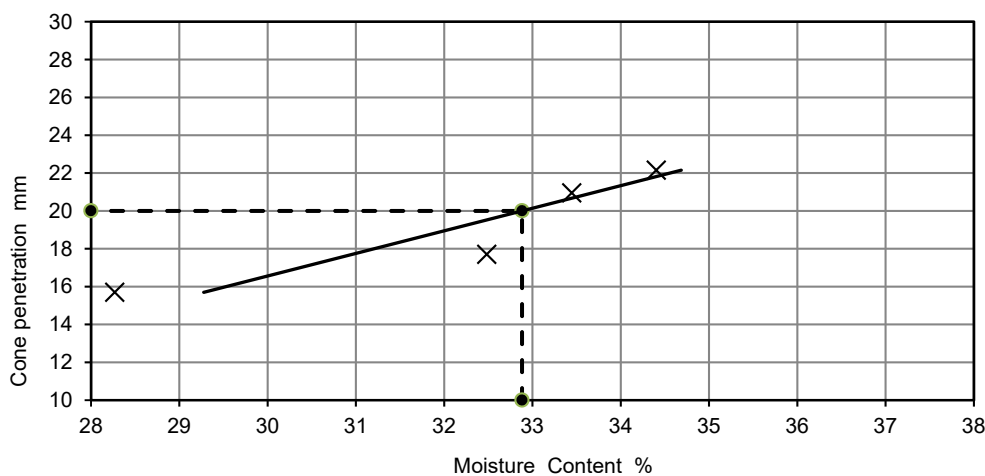
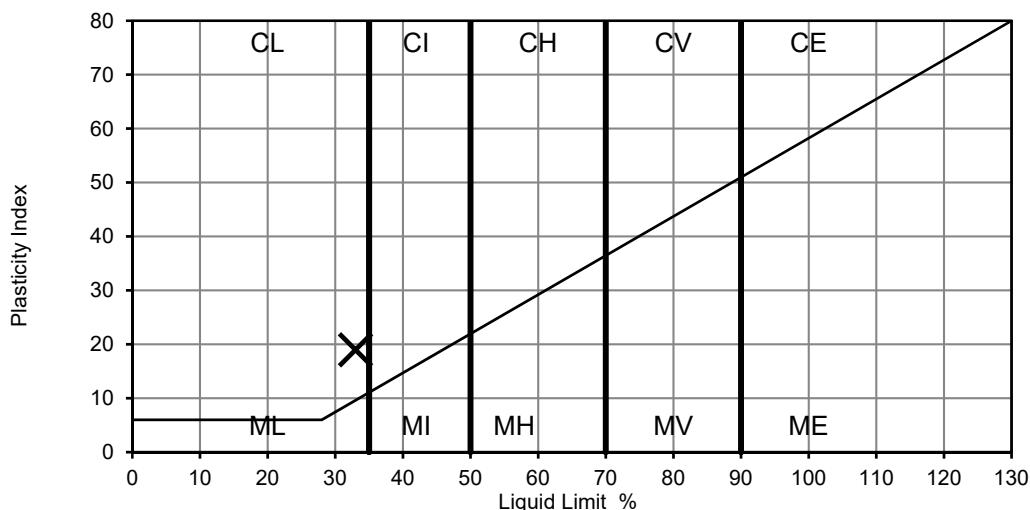
Liquidity Index: 0.50  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 21

Remarks	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1

### LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Grey slightly sandy silty CLAY	Sample Depth (m)	27.60
		Sample Reference	D70



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 28 %  
 Percentage Passing 425µm sieve: 100 %  
 Liquid Limit: 33 %  
 Plastic Limit: 14 %  
 Plasticity Index: 19

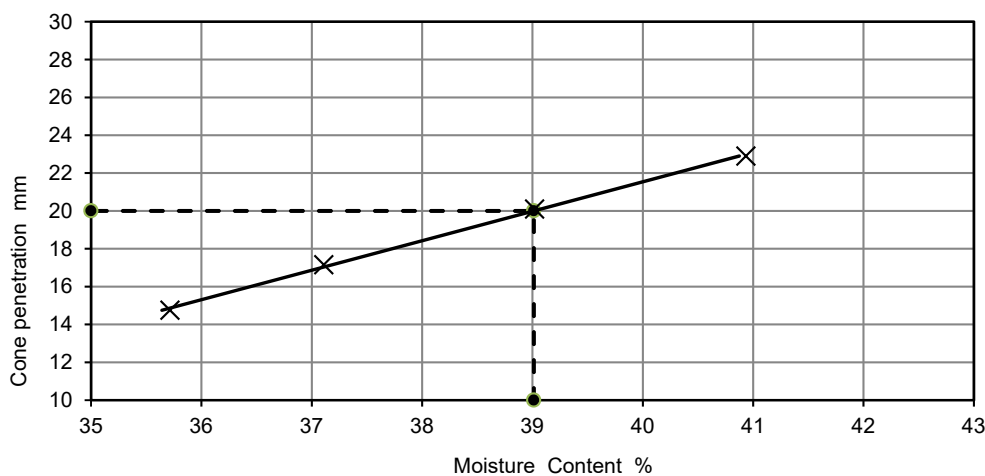
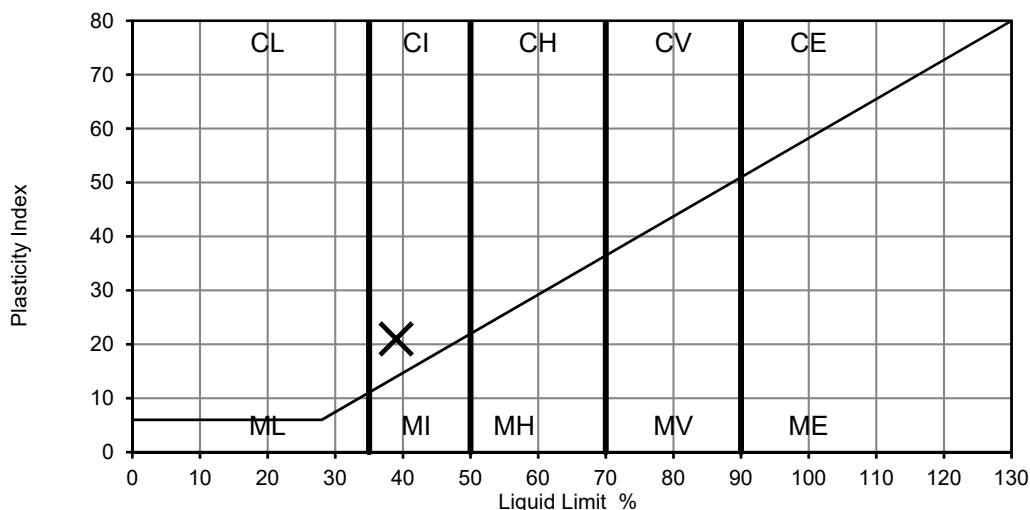
Liquidity Index: 0.74  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 19

Remarks	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1

## LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX, & LIQUIDITY INDEX

BS 1377 : Part 2 : 1990, clause 4.3 and 5

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Grey mottled dark grey slightly sandy very silty CLAY	Sample Depth (m)	30.00
		Sample Reference	D74



Preparation: Material was natural

Results: As Received Moisture Content: (BS1377 : Part 2 : Clause 3 : 1990) 28 %  
 Percentage Passing 425µm sieve: 99 %  
 Liquid Limit: 39 %  
 Plastic Limit: 18 %  
 Plasticity Index: 21

Liquidity Index: 0.48  
 Modified Plasticity Index: (NHBC Standards Chapter 4.2) 21

Remarks	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1

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**Our reference No.** NCCL2017102620-604

**Our Project No** PZ1522D1

**Your Sample Ref** B3

**Your Project or Order No.** PZ1522

**Date Report Issued** 21 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH16	<b>Depth</b>	2-2.5m
<b>Date sampled</b>	25 Oct 2017	<b>Date received</b>	26 Oct 2017
<b>Date tested</b>	06 Nov 2017		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	613

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Very soft to soft brown slightly silty, sandy CLAY.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.3	

**Natural MC (%)** 34

**Liquid Limit (%)** 38

**Plastic Limit (%)** 19

**Plasticity Index (%)** 19

**Modified PI \*(%)** 18

\*BRE Digest 240:1993.

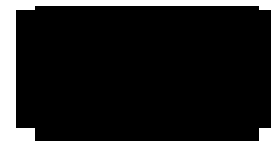
*This calculation is outside the scope of UKAS accreditation.*
**BS Soil Classification** C I

<b>Remarks</b>	NHBC Volume change potential classification is low.
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Test Code = 604



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**Our reference No.** NCCL201710275-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B10275  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 28 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH16	<b>Depth</b>	37-37.5m
<b>Date sampled</b>	25 Oct 2017	<b>Date received</b>	26 Oct 2017
<b>Date tested</b>	06 Nov 2017		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	918

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Soft, dark grey, clayey, silty, fine and medium SAND with some shell fragments.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	2.0	

**Natural MC (%)** 31

**Liquid Limit (%)** 23

**Plastic Limit (%)** 13

**Plasticity Index (%)** 10

**Modified PI \*(%)** 10

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

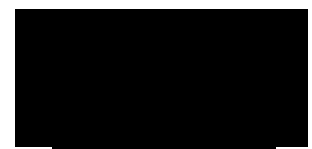
**BS Soil Classification** CL

<b>Remarks</b>	NHBC Volume change potential classification is low.
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Test Code = 604



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**Our reference No.** NCCL2017100329-604

**Our Project No** PZ1522D1

**Your Sample Ref** B6

**Your Project or Order No.** PZ1522

**Date Report Issued** 07 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH17	<b>Depth</b>	2.0-2.5m
<b>Date sampled</b>	18 Sep 2017	<b>Date received</b>	18 Sep 2017
<b>Date tested</b>	23 Oct 2017		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	467

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Soft, greenish grey, clayey, very sandy, medium and coarse SILT.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	3.1	

**Natural MC (%)** 35

**Liquid Limit (%)** 34

**Plastic Limit (%)** 22

**Plasticity Index (%)** 12

**Modified PI \*(%)** 12

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** CL

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our reference No.** NCCL2017100331-604

**Our Project No** PZ1522D1

**Your Sample Ref** D44

**Your Project or Order No.** PZ1522

**Date Report Issued** 03 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH17	<b>Depth</b>	29.5m
<b>Date sampled</b>	18 Sep 2017	<b>Date received</b>	18 Sep 2017
<b>Date tested</b>	26 Oct 2017		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	505

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Firm to stiff, light grey, very sandy, silty CLAY.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.4	

**Natural MC (%)** 40

**Liquid Limit (%)** 44

**Plastic Limit (%)** 17

**Plasticity Index (%)** 27

**Modified PI \*(%)** 27

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

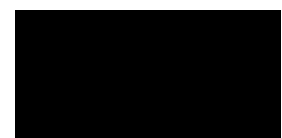
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** NCCL2017100332-604

**Our Project No** PZ1522D1

**Your Sample Ref** D49

**Your Project or Order No.** PZ1522

**Date Report Issued** 03 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH17	<b>Depth</b>	32.6m
<b>Date sampled</b>	18 Sep 2017	<b>Date received</b>	18 Sep 2017
<b>Date tested</b>	26 Oct 2017		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	476

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Stiff, laminated, dark grey, organic CLAY and fine, silty SAND.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.3	

**Natural MC (%)** 25

**Liquid Limit (%)** 54

**Plastic Limit (%)** 23

**Plasticity Index (%)** 31

**Modified PI \*(%)** 31

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

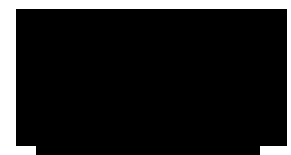
**BS Soil Classification** C H

<b>Remarks</b>	NHBC Volume change potential classification is medium.
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Test Code = 604



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**Our reference No.** NCCL2017101725-604

**Our Project No** PZ1522D1

**Your Sample Ref** B17

**Your Project or Order No.** PZ1522

**Date Report Issued** 28 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH18	<b>Depth</b>	9.6-10.0m
<b>Date sampled</b>	26 Sep 2017	<b>Date received</b>	26 Sep 2017
<b>Date tested</b>	26 Oct 2017		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	543

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Dark grey, clayey, very silty fine and medium SAND, weathering to brown.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.2	

**Natural MC (%)** 38

**Liquid Limit (%)** 35

**Plastic Limit (%)** 18

**Plasticity Index (%)** 17

**Modified PI \*(%)** 17

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

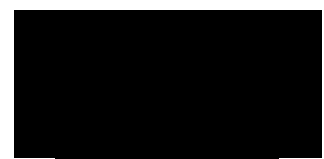
**BS Soil Classification** C I

<b>Remarks</b>	NHBC Volume change potential classification is low.
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Test Code = 604



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**Our reference No.** NCCL2017101726-604

**Our Project No** PZ1522D1

**Your Sample Ref** B45

**Your Project or Order No.** PZ1522

**Date Report Issued** 28 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH18	<b>Depth</b>	34.8-35m
<b>Date sampled</b>	26 Sep 2017	<b>Date received</b>	26 Sep 2017
<b>Date tested</b>	26 Oct 2017		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	530

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Firm dark grey, sandy, very silty CLAY weathering to brown.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.2	

**Natural MC (%)** 26

**Liquid Limit (%)** 45

**Plastic Limit (%)** 19

**Plasticity Index (%)** 26

**Modified PI \*(%)** 26

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

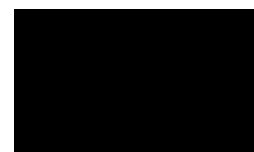
**BS Soil Classification** C I

<b>Remarks</b>	NHBC Volume change potential classification is medium.
----------------	--

Test Code = 604



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**Our reference No.** NCCL2017101727-604

**Our Project No** PZ1522D1

**Your Sample Ref** D48

**Your Project or Order No.** PZ1522

**Date Report Issued** 28 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH18	<b>Depth</b>	38m
<b>Date sampled</b>	26 Sep 2017	<b>Date received</b>	26 Sep 2017
<b>Date tested</b>	26 Oct 2017		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	492

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Firm to stiff, dark grey, very clayey, fine, medium and coarse SILT.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.4	

**Natural MC (%)** 26

**Liquid Limit (%)** 52

**Plastic Limit (%)** 22

**Plasticity Index (%)** 30

**Modified PI \*(%)** 30

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*
**BS Soil Classification** C H

<b>Remarks</b>	NHBC Volume change potential classification is medium.
----------------	--

Test Code = 604



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**Our reference No.** NCCL2017101728-604

**Our Project No** PZ1522D1

**Your Sample Ref** D50

**Your Project or Order No.** PZ1522

**Date Report Issued** 28 Nov 2017

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH18	<b>Depth</b>	40m
<b>Date sampled</b>	26 Sep 2017	<b>Date received</b>	26 Sep 2017
<b>Date tested</b>	26 Oct 2017		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	714

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Dark grey,very clayey, silty fine and medium SAND.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	3.8	

**Natural MC (%)** 31

**Liquid Limit (%)** 24

**Plastic Limit (%)** Non Plastic

**Plasticity Index (%)**

**Modified PI \*(%)** \*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** Non Plastic

**Remarks**

Test Code = 604



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**Our reference No.** GTS2171205030-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** U9  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 14 Mar 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS1	<b>Depth</b>	4m
<b>Date sampled</b>	05 Dec 2017	<b>Date received</b>	05 Dec 2017
<b>Date tested</b>	19 Feb 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	419

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft laminated grey silty CLAY, with numerous lenses & laminae of black organic material.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Hand picking	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.0	

**Natural MC (%)** 69

**Liquid Limit (%)** 82

**Plastic Limit (%)** 28

**Plasticity Index (%)** 54

**Modified PI \*(%)** 54

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C V

<b>Remarks</b>	NHBC Volume change potential classification is high.
----------------	--

Test Code = 604



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 Our reference No. **GTS2171206008-604**  
 Our Project No **PZ1522D1**  
 Your Sample Ref **U8**  
 Your Project or Order No. **PZ1522**  
 Date Report Issued **14 Mar 2018**

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS3	<b>Depth</b>	3m
<b>Date sampled</b>	06 Dec 2017	<b>Date received</b>	
<b>Date tested</b>	06 Mar 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	413

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Soft, grey very silty CLAY with numerous layers of organic matter.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.2	

**Natural MC (%)** 77

**Liquid Limit (%)** 85

**Plastic Limit (%)** 32

**Plasticity Index (%)** 53

**Modified PI \*(%)** 53

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C V

<b>Remarks</b>	NHBC Volume change potential classification is high.
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Test Code = 604



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**Our reference No.** GTS2171206009-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** U9  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 14 Mar 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS3	<b>Depth</b>	4m
<b>Date sampled</b>	06 Dec 2017	<b>Date received</b>	
<b>Date tested</b>	19 Feb 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	656

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Laminated and thinly bedded, black and dark grey-green, silty CLAY.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Hand picking	Oven dried @ 40°C
<b>Retained 425µm (%)</b>		

**Natural MC (%)** 80

**Liquid Limit (%)** 81

**Plastic Limit (%)** 26

**Plasticity Index (%)** 55

**Modified PI \*(%)** 55

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

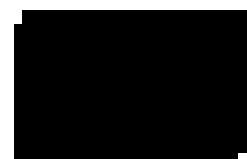
**BS Soil Classification** C V

<b>Remarks</b>	NHBC Volume change potential classification is high.
----------------	--

Test Code = 604



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**Our reference No.** GTS2171205007-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** U6  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 14 Mar 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS6	<b>Depth</b>	1.2m
<b>Date sampled</b>	05 Dec 2017	<b>Date received</b>	
<b>Date tested</b>	26 Feb 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	604

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Firm, brownish grey, sandy, silty CLAY.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.3	

**Natural MC (%)** 21

**Liquid Limit (%)** 33

**Plastic Limit (%)** 18

**Plasticity Index (%)** 15

**Modified PI \*(%)** 14

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** CL

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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 Our Project No **PZ1522D1**  
 Your Sample Ref **B9**  
 Your Project or Order No. **PZ1522**  
 Date Report Issued **14 Mar 2018**

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS6	<b>Depth</b>	2.5m
<b>Date sampled</b>	05 Dec 2017	<b>Date received</b>	
<b>Date tested</b>	26 Feb 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	686

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft, light brown and grey, very organic, CLAY.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.5	

**Natural MC (%)** 65

**Liquid Limit (%)** 74

**Plastic Limit (%)** 29

**Plasticity Index (%)** 44

**Modified PI \*(%)** 44

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

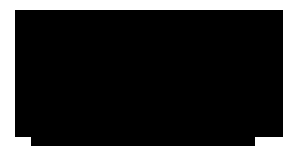
**BS Soil Classification** C V

<b>Remarks</b>	NHBC Volume change potential classification is high.
----------------	--

Test Code = 604



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**Our reference No.** GTS2171206023-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** U8  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 26 Mar 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS7	<b>Depth</b>	3.6m
<b>Date sampled</b>	06 Dec 2017	<b>Date received</b>	08 Feb 2018
<b>Date tested</b>	26 Feb 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	563

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Stiff, laminated, grey, slightly ssandy CLAY with numerous lenses of black organic material and roots.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	4.1	

**Natural MC (%)** 42

**Liquid Limit (%)** 66

**Plastic Limit (%)** 32

**Plasticity Index (%)** 34

**Modified PI \*(%)** 33

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

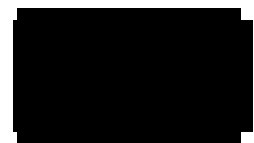
**BS Soil Classification** C H

<b>Remarks</b>	NHBC Volume change potential classification is medium.
----------------	--

Test Code = 604



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**Your Sample Ref** U9  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 26 Mar 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS7	<b>Depth</b>	4.8m
<b>Date sampled</b>	06 Dec 2017	<b>Date received</b>	08 Feb 2018
<b>Date tested</b>	01 Mar 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	427

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Firm to stiff, laminated, grey CLAY and black, organic, clayey SILT. Few shell fragments.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.8	

**Natural MC (%)** 49

**Liquid Limit (%)** 54

**Plastic Limit (%)** 20

**Plasticity Index (%)** 34

**Modified PI \*(%)** 34

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

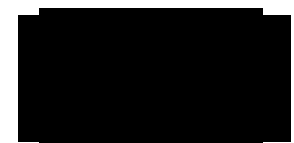
**BS Soil Classification** C H

<b>Remarks</b>	NHBC Volume change potential classification is medium.
----------------	--

Test Code = 604



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**Our reference No.** GTS2171206026-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** U11  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 26 Mar 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS7	<b>Depth</b>	6.2m
<b>Date sampled</b>	06 Dec 2017	<b>Date received</b>	08 Feb 2018
<b>Date tested</b>	26 Feb 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	627

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft to firm, brown, silty CLAY with lenses of black, organic matter.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	2.9	

**Natural MC (%)** 71

**Liquid Limit (%)** 80

**Plastic Limit (%)** 33

**Plasticity Index (%)** 48

**Modified PI \*(%)** 47

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

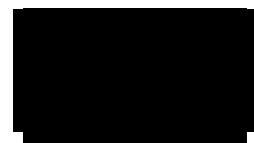
**BS Soil Classification** C V

<b>Remarks</b>	NHBC Volume change potential classification is high.
----------------	--

Test Code = 604



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**Our reference No.** GTS2171204004-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** B4  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 30 Apr 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS9	<b>Depth</b>	0.8m
<b>Date sampled</b>	04 Dec 2017	<b>Date received</b>	04 Dec 2017
<b>Date tested</b>	05 Apr 2018		
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass (g)</b>	655

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND comprising dark grey organic very gravelly, very sandy silty clay. Gravel is fine to medium angular to rounded flint, brick & quartz. Some roots.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	27.2	

**Natural MC (%)** 35

**Liquid Limit (%)** 60

**Plastic Limit (%)** 27

**Plasticity Index (%)** 33

**Modified PI \*(%)** 24

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** C H

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS2171204006-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** U6  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 26 Mar 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS9	<b>Depth</b>	1.7m
<b>Date sampled</b>	04 Dec 2017	<b>Date received</b>	08 Feb 2018
<b>Date tested</b>	26 Feb 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	530

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Stiff, grey, silty CLAY with occasional shell fragments and some roots.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.6	

**Natural MC (%)** 38

**Liquid Limit (%)** 65

**Plastic Limit (%)** 29

**Plasticity Index (%)** 37

**Modified PI \*(%)** 37

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

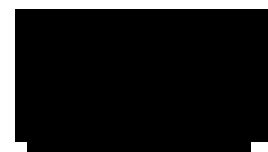
**BS Soil Classification** C H

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our reference No.** GTS2171204008-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** U8  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 26 Mar 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS9	<b>Depth</b>	3.5m
<b>Date sampled</b>	04 Dec 2017	<b>Date received</b>	08 Feb 2018
<b>Date tested</b>	26 Feb 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	382

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft to firm, laminated, grey CLAY with lenses of brown, fibrous peat.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.2	

**Natural MC (%)** 68

**Liquid Limit (%)** 84

**Plastic Limit (%)** 33

**Plasticity Index (%)** 51

**Modified PI \*(%)** 50

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

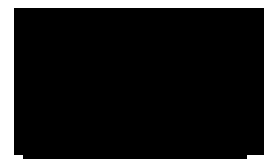
**BS Soil Classification** C V

<b>Remarks</b>	NHBC Volume change potential classification is high.
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Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** D6  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 23 May 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	TP1	<b>Depth</b>	1.2m
<b>Date sampled</b>	07 Dec 2017	<b>Date received</b>	08 Dec 2017
<b>Date tested</b>	27 Apr 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	580

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising firm to stiff dark grey, gravelly, sandy, clayey SILT. Gravel is fine and medium, angular to rounded, flint, coal, glass, brick and quartz.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	8.2	

**Natural MC (%)** 25

**Liquid Limit (%)** 45

**Plastic Limit (%)** 27

**Plasticity Index (%)** 18

**Modified PI \*(%)** 16

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

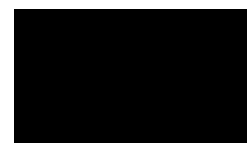
**BS Soil Classification** M I

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our reference No.** GTS2171207008-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D7  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 23 May 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	TP1	<b>Depth</b>	2.3m
<b>Date sampled</b>	07 Dec 2017	<b>Date received</b>	08 Dec 2017
<b>Date tested</b>	11 Apr 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	481

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft to firm grey silty, slightly sandy CLAY, with numerous lenses of brown, fibrous peat. Trace of fine flint gravel.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.7	

<b>Natural MC (%)</b>	30
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<b>Liquid Limit (%)</b>	44
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<b>Plastic Limit (%)</b>	21
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<b>Plasticity Index (%)</b>	24
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<b>Modified PI *(%)</b>	23
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\*BRE Digest 240:1993.

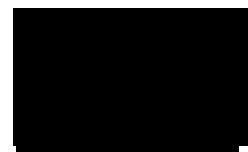
*This calculation is outside the scope of UKAS accreditation.*
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



Peter Hardiment (Operations Manager)





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**Our reference No.** GTS2171214012-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D6  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 23 May 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	TP1B	<b>Depth</b>	1.8m
<b>Date sampled</b>	14 Dec 2017	<b>Date received</b>	15 Dec 2017
<b>Date tested</b>	27 Apr 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	472

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising firm to stiff dark grey slightly organic, slightly gravelly, clayey SILT. Gravel is fine and medium, ash, brick, coal and glass.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	5.9	

**Natural MC (%)** 29

**Liquid Limit (%)** 52

**Plastic Limit (%)** 29

**Plasticity Index (%)** 23

**Modified PI \*(%)** 21

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

**BS Soil Classification** M H

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



Simon Holden (Project Technician)



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**Our reference No.** GTS2171214013-604  
**Our Project No** PZ1522D1  
**Your Sample Ref** D7  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 23 May 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	TP1B	<b>Depth</b>	2m
<b>Date sampled</b>	14 Dec 2017	<b>Date received</b>	15 Dec 2017
<b>Date tested</b>	27 Apr 2018		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass (g)</b>	352

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Soft to firm, dark grey organic, clayey SILT.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	1.6	

**Natural MC (%)** 100

**Liquid Limit (%)** 126

**Plastic Limit (%)** 51

**Plasticity Index (%)** 75

**Modified PI \*(%)** 73

\*BRE Digest 240:1993.

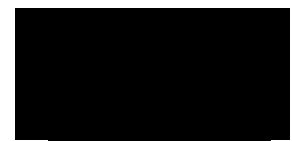
*This calculation is outside the scope of UKAS accreditation.*
**BS Soil Classification** M E

**Remarks** NHBC Volume change potential classification is high.

Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** U2  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 09 Oct 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS20	<b>Depth</b>	1.4m
<b>Date sampled</b>	11 Sep 2018	<b>Date received</b>	11 Sep 2018
<b>Date tested</b>	26 Sep 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	466

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil
<b>Description</b>	Soft, grey sandy, very silty CLAY.

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.3	

**Natural MC (%)** 32

**Liquid Limit (%)** 38

**Plastic Limit (%)** 20

**Plasticity Index (%)** 18

**Modified PI \*(%)** 18

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

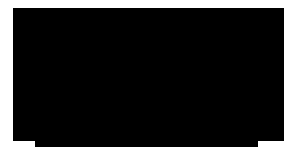
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** U3  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 09 Oct 2018

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**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS20	<b>Depth</b>	2.6m
<b>Date sampled</b>	11 Sep 2018	<b>Date received</b>	11 Sep 2018
<b>Date tested</b>	26 Sep 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	502

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Laminated, black organic very silty CLAY, dark grey SILT and light grey sandy SILT.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.0	

**Natural MC (%)** 50

**Liquid Limit (%)** 52

**Plastic Limit (%)** 28

**Plasticity Index (%)** 25

**Modified PI \*(%)** 25

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

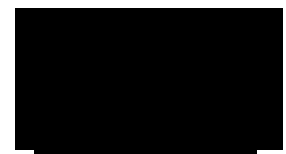
**BS Soil Classification** C H

**Remarks** NHBC Volume change potential classification is medium.

Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** U2  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 09 Oct 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS21	<b>Depth</b>	1.4m
<b>Date sampled</b>	12 Sep 2018	<b>Date received</b>	12 Sep 2018
<b>Date tested</b>	26 Sep 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	502

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	Laminated and thinly bedded soft to firm, grey and greyish brown, silty CLAY, light grey sandy SILT, dark grey slightly organic, sandy SILT and greyish brown silty fine to medium SAND, with slight hydrocarbon odour.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site

**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	0.8	

**Natural MC (%)** 28

**Liquid Limit (%)** 34

**Plastic Limit (%)** 22

**Plasticity Index (%)** 12

**Modified PI \*(%)** 12

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

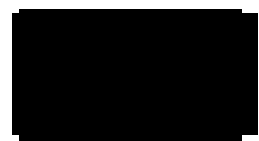
**BS Soil Classification** CL

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



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**Our Project No** PZ1522D1  
**Your Sample Ref** U1  
**Your Project or Order No.** PZ1522  
**Date Report Issued** 09 Oct 2018

Page 1 of 1

**Determination of Liquid Limit to BS1377-2:1990 CI 4.3 Cone Penetrometer (Definitive Method)  
 and Determination of Plasticity Index to BS1377-2:1990 CI 5**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS22	<b>Depth</b>	0.55m
<b>Date sampled</b>	10 Sep 2018	<b>Date received</b>	10 Sep 2018
<b>Date tested</b>	26 Sep 2018		
<b>Sample type</b>	Undisturbed Sample	<b>Sample Mass (g)</b>	511

If a Sample Certificate was provided it is available for inspection.  
 The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising laminated, soft to firm, slightly gravelly, light grey silty clay and dark grey slightly organic, silty clay. Gravel is fine and medium, sub-rounded to angular, flint, quartz and slag.		

<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
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**TEST SPECIMEN**

<b>Location</b>	Not applicable
<b>Orientation</b>	Not applicable

**PREPARATION DETAILS**

<b>Method of Division</b>	Quartering	
<b>Preparation Method</b>	Wet sieving	Oven dried @ 40°C
<b>Retained 425µm (%)</b>	6.9	

**Natural MC (%)** 23

**Liquid Limit (%)** 36

**Plastic Limit (%)** 19

**Plasticity Index (%)** 17

**Modified PI \*(%)** 16

\*BRE Digest 240:1993.

*This calculation is outside the scope of UKAS accreditation.*

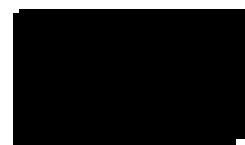
**BS Soil Classification** C I

**Remarks** NHBC Volume change potential classification is low.

Test Code = 604



Peter Hardiment (Operations Manager)

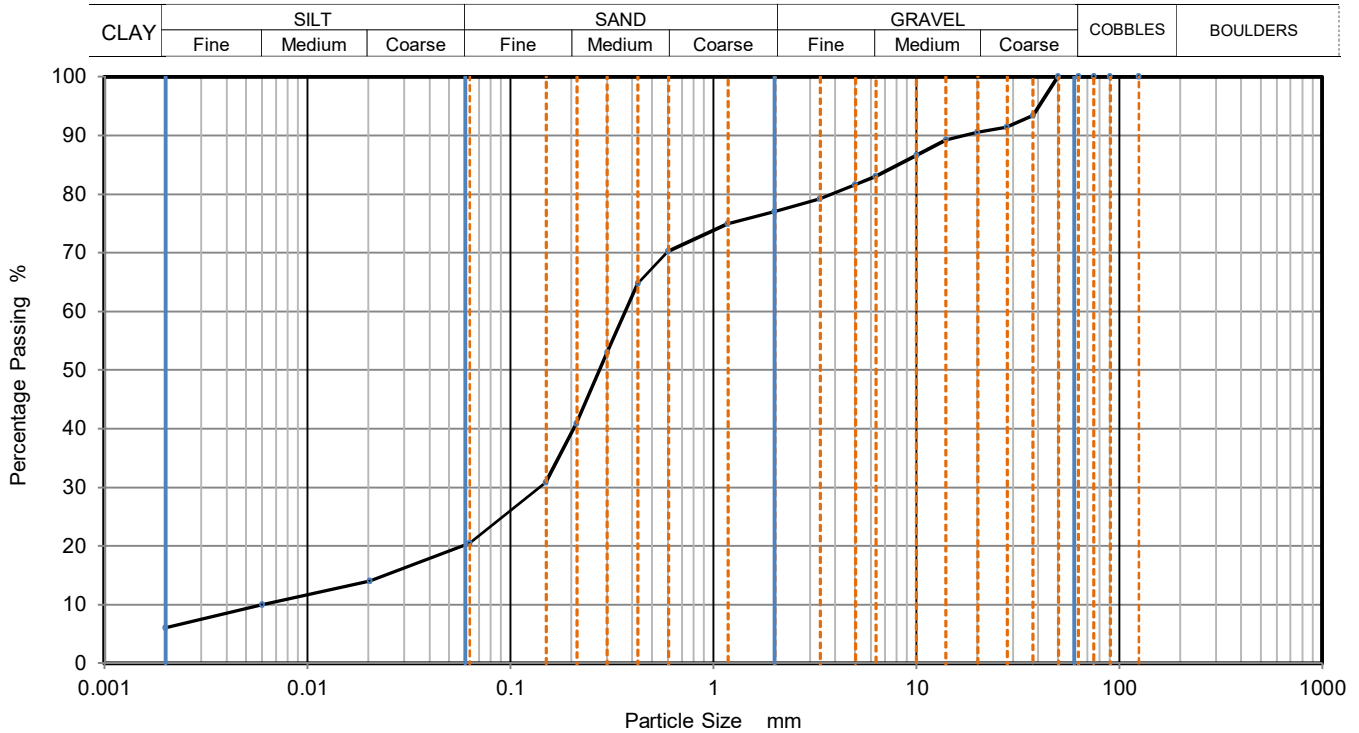




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	MADE GROUND (Brown and dark brown clayey silty very gravelly SAND. Gravel is of flint, quartzite and occasional brick fragments)	Sample Depth (m)	0.30
		Sample Reference	B2



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	14
90	100	0.0060	10
75	100	0.0020	6
63	100		
50	100		
37.5	93		
28	91		
20	91		
14	89		
10	87		
6.3	83		
5	82		
3.35	79		
2	77		
1.18	75		
0.6	70		
0.425	65	Particle density (assumed) 2.65 Mg/m3	
0.3	53		
0.212	41		
0.15	31		
0.063	20		

Sample Proportions	% dry mass
Very coarse	0
Gravel	23
Sand	57
Silt	14
Clay	6

Grading Analysis		
D100	mm	
D60	mm	0.369
D30	mm	0.140
D10	mm	0.006
Uniformity Coefficient		57
Curvature Coefficient		8.2

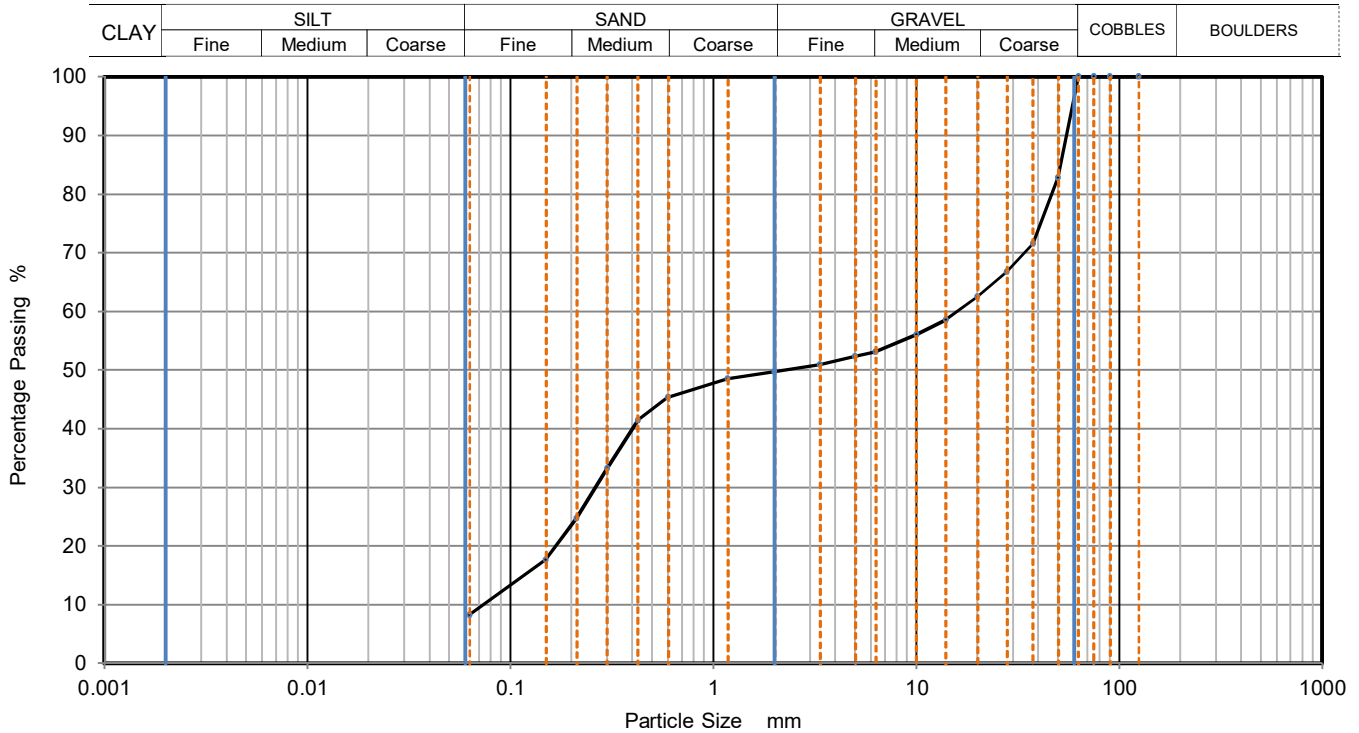
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	MADE GROUND (Brown silty very sandy GRAVEL. Gravel is of flint, quartzite and concrete fragments)	Sample Depth (m)	0.50
		Sample Reference	B4



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	83		
37.5	72		
28	67		
20	63		
14	59		
10	56		
6.3	53		
5	52		
3.35	51		
2	50		
1.18	49		
0.6	45		
0.425	41		
0.3	33		
0.212	25		
0.15	18		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	50
Sand	42
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	16.000
D30	mm	0.263
D10	mm	0.074
Uniformity Coefficient		220
Curvature Coefficient		0.059

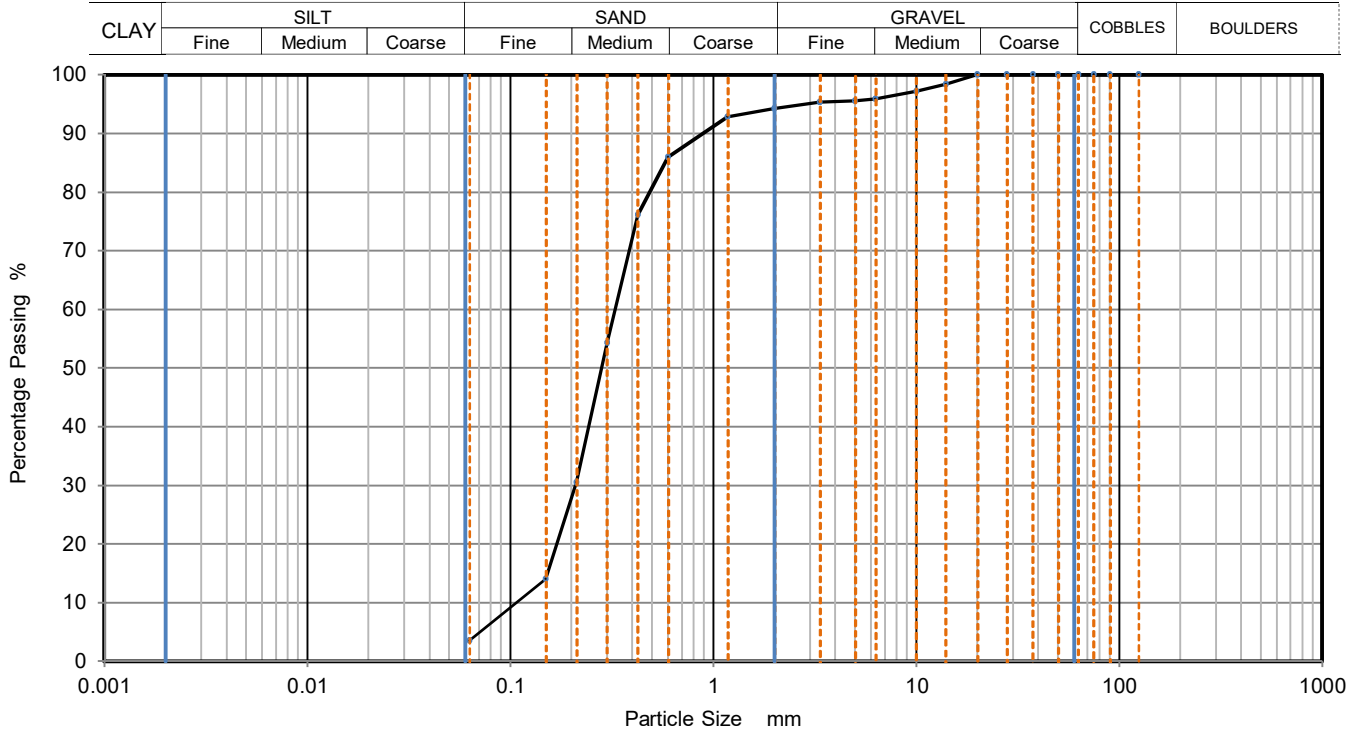
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Light brown slightly silty gravelly SAND. Gravel is of flint and quartzite	Sample Depth (m)	0.90
		Sample Reference	B5



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	98		
10	97		
6.3	96		
5	96		
3.35	95		
2	94		
1.18	93		
0.6	86		
0.425	76		
0.3	54		
0.212	31		
0.15	14		
0.063	4		

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	91
Fines <0.063mm	4

Grading Analysis		
D100	mm	
D60	mm	0.329
D30	mm	0.210
D10	mm	0.107
Uniformity Coefficient		3.1
Curvature Coefficient		1.2

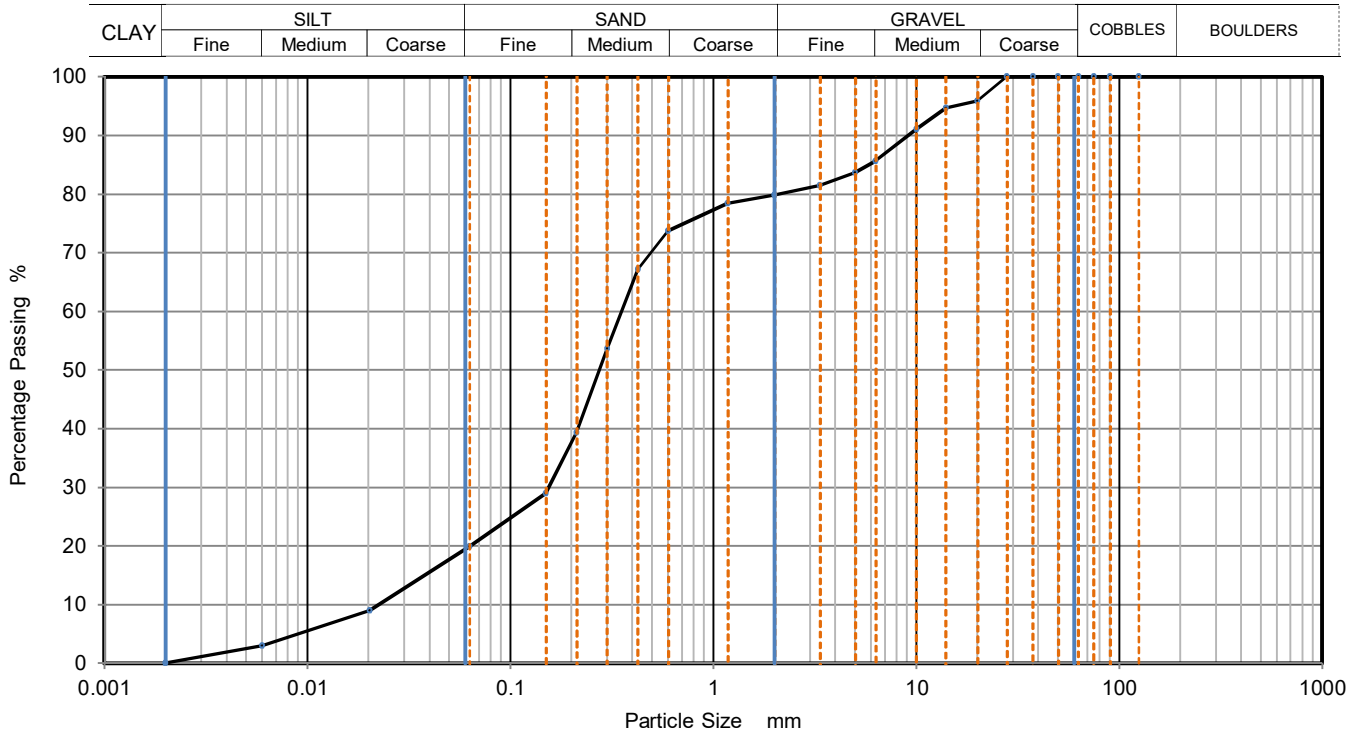
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Brown very silty very gravelly SAND. Gravel is of flint	Sample Depth (m)	1.20
		Sample Reference	B8



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	9
90	100	0.0060	3
75	100	0.0020	0
63	100		
50	100		
37.5	100		
28	100		
20	96		
14	95		
10	91		
6.3	86		
5	84		
3.35	82		
2	80		
1.18	78		
0.6	74		
0.425	67	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	54		
0.212	39		
0.15	29		
0.063	20		

Sample Proportions	% dry mass
Very coarse	0
Gravel	20
Sand	60
Silt	20
Clay	0

Grading Analysis		
D100	mm	
D60	mm	0.353
D30	mm	0.155
D10	mm	0.023
Uniformity Coefficient		16
Curvature Coefficient		3

Remarks	Approved	Date	Sheet No.:
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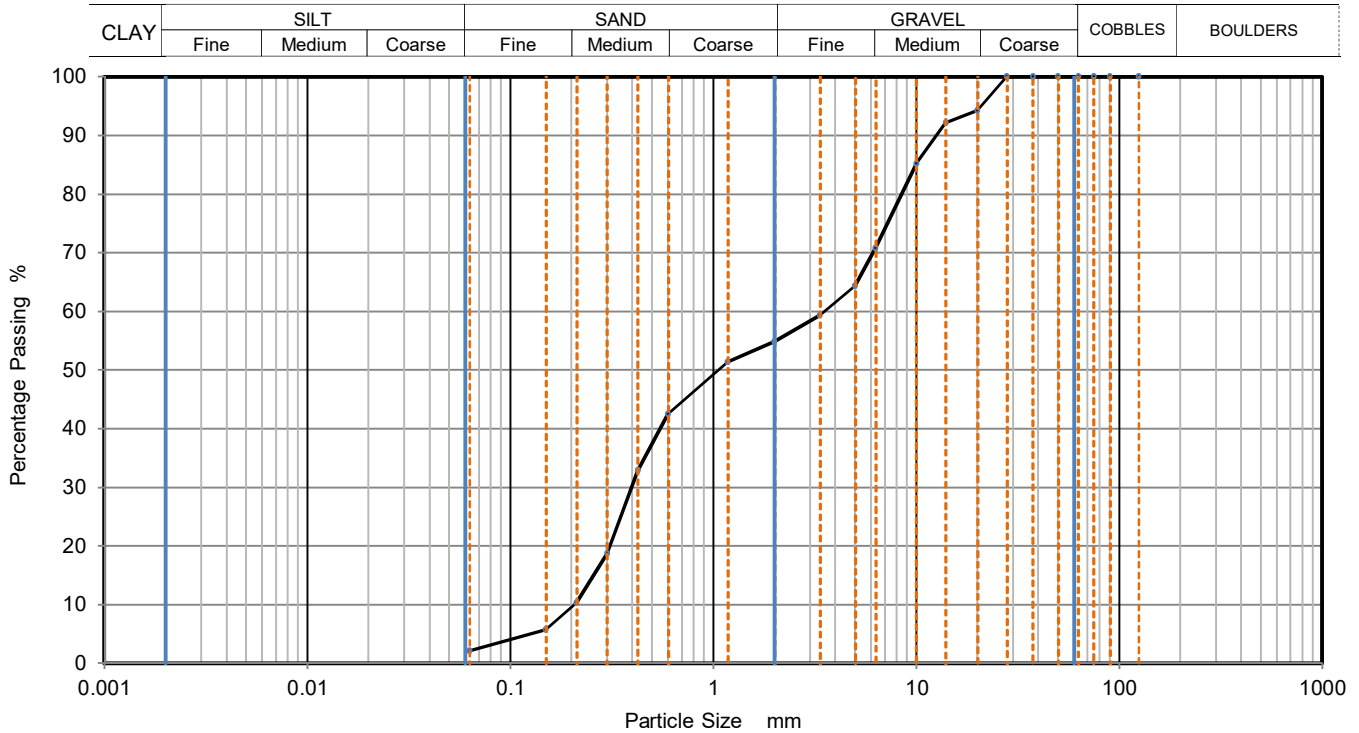




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Light brown slightly silty very gravelly SAND. Gravel is of flint	Sample Depth (m)	2.00
		Sample Reference	B11



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	94		
14	92		
10	85		
6.3	71		
5	64		
3.35	59		
2	55		
1.18	51		
0.6	43		
0.425	33		
0.3	19		
0.212	10		
0.15	6		
0.063	2		

Sample Proportions	% dry mass
Very coarse	0
Gravel	45
Sand	53
Fines <0.063mm	2

Grading Analysis		
D100	mm	
D60	mm	3.540
D30	mm	0.395
D10	mm	0.208
Uniformity Coefficient		17
Curvature Coefficient		0.21

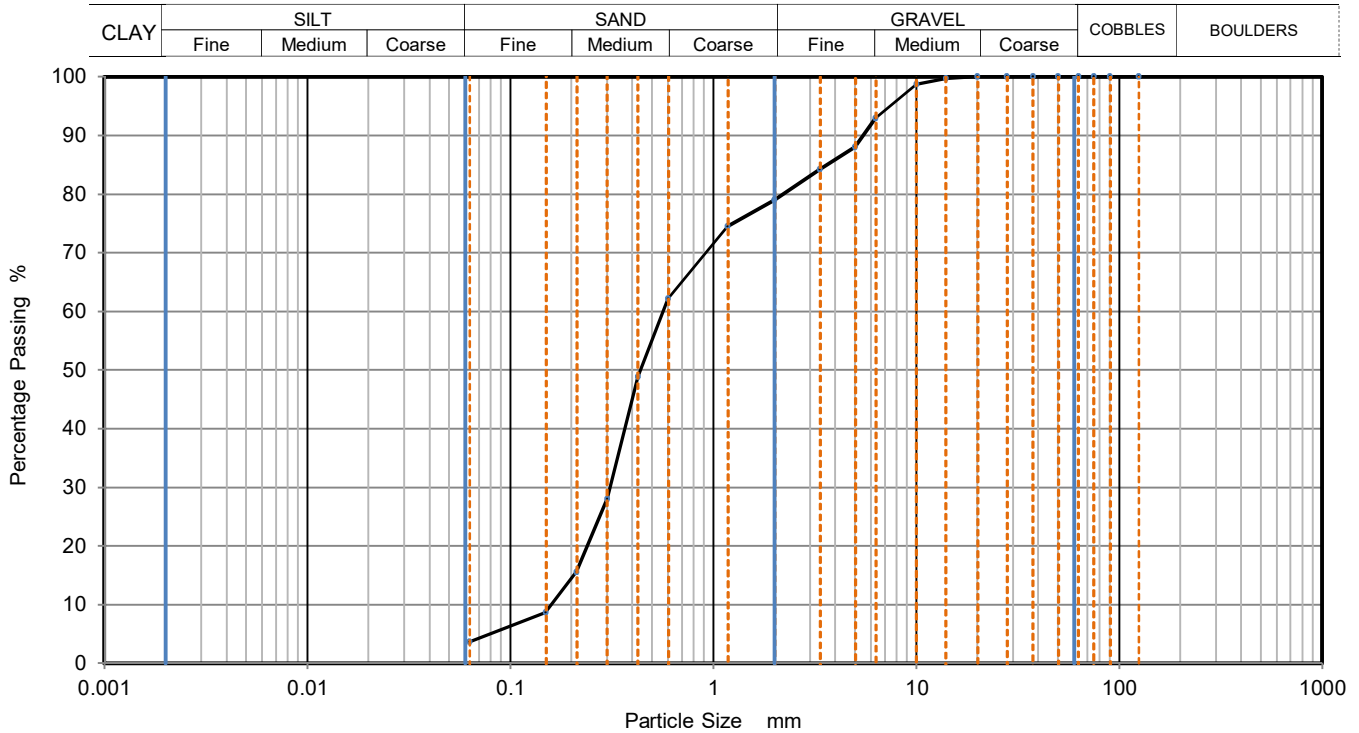
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Brown slightly silty very gravelly SAND. Gravel is of flint, quartzite and occasional shell fragments	Sample Depth (m)	3.00
		Sample Reference	B14



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	93		
5	88		
3.35	84		
2	79		
1.18	75		
0.6	62		
0.425	49		
0.3	28		
0.212	16		
0.15	9		
0.063	4		

Sample Proportions	% dry mass
Very coarse	0
Gravel	21
Sand	75
Fines <0.063mm	4

Grading Analysis		
D100	mm	
D60	mm	0.567
D30	mm	0.310
D10	mm	0.161
Uniformity Coefficient		3.5
Curvature Coefficient		1.1

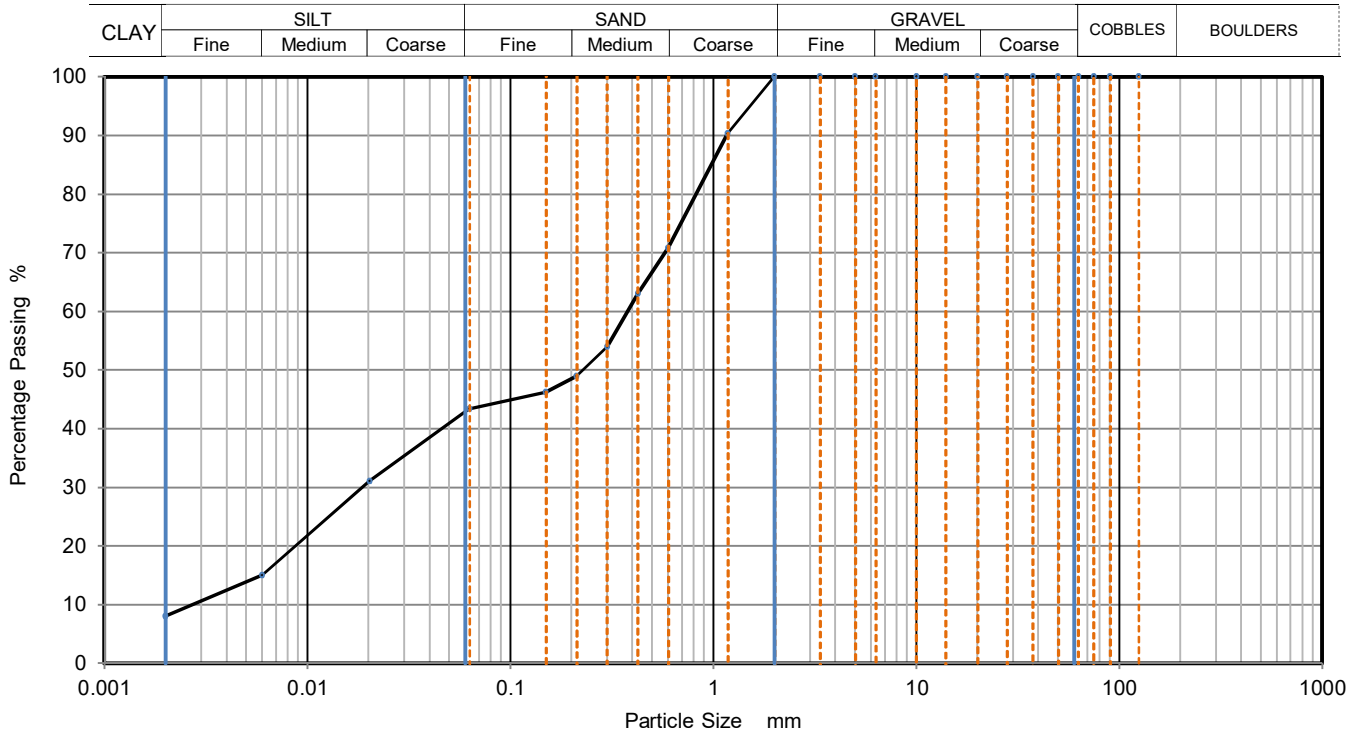
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey brown sandy clayey SILT	Sample Depth (m)	3.60
		Sample Reference	B15



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	31
90	100	0.0060	15
75	100	0.0020	8
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	90		
0.6	71		
0.425	63	Particle density (assumed) 2.65 Mg/m3	
0.3	54		
0.212	49		
0.15	46		
0.063	43		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	57
Silt	35
Clay	8

Grading Analysis		
D100	mm	
D60	mm	0.379
D30	mm	0.019
D10	mm	0.003
Uniformity Coefficient		140
Curvature Coefficient		0.34

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

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NR1 2DH

Our reference No. **GTS1171207003-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **19**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

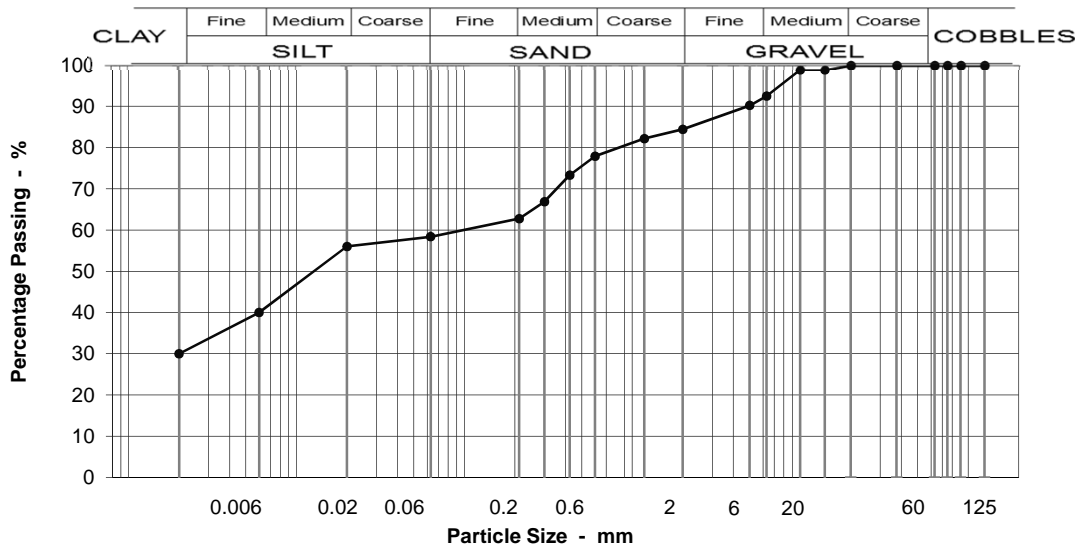
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH1 @ 5 - 6m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	99
6.3	92
5	90
2	84
1.18	82
0.600	78
0.425	73
0.300	67
0.212	63
0.063	58
0.020	56
0.006	40
0.002	30

Specification for Highway Works Classification  
Table 6/2

Moisture content % 52

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	8
Fine GRAVEL	8
Coarse SAND	7
Medium SAND	15
Fine SAND	4
Silt & Clay	58

Grading Analysis	
D100	14
D60	0.12
D10	0.00
Uniformity Coefficient	>10*

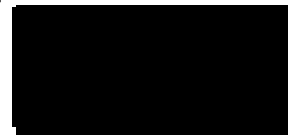
**Description**  
Soft dark grey silty, very sandy CLAY-SILT with lenses of black organic matter.

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)

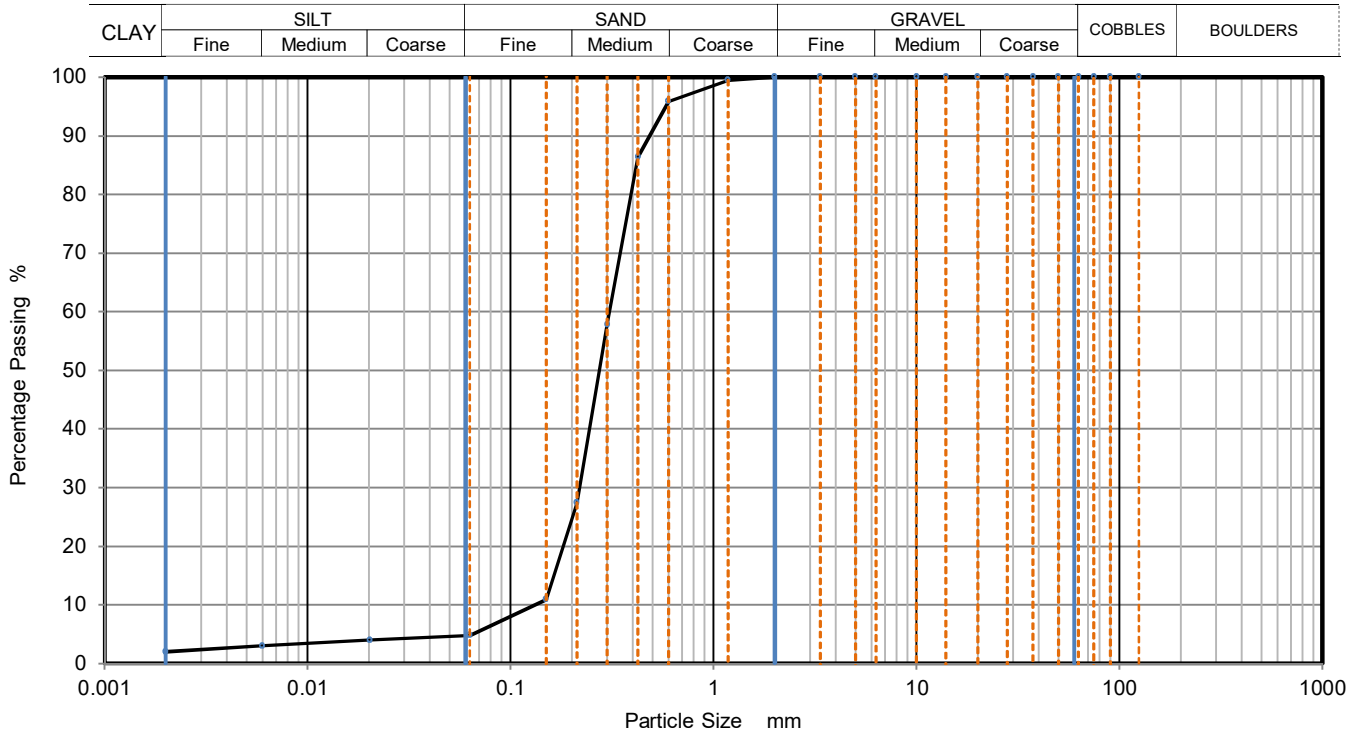




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey slightly clayey slightly silty SAND	Sample Depth (m)	11.50
		Sample Reference	B42



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	4
90	100	0.0060	3
75	100	0.0020	2
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	96	Particle density (assumed)	
0.425	86	2.65	Mg/m3
0.3	58		
0.212	27		
0.15	11		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	95
Silt	3
Clay	2

Grading Analysis		
D100	mm	
D60	mm	0.308
D30	mm	0.218
D10	mm	0.132
Uniformity Coefficient		2.3
Curvature Coefficient		1.2

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

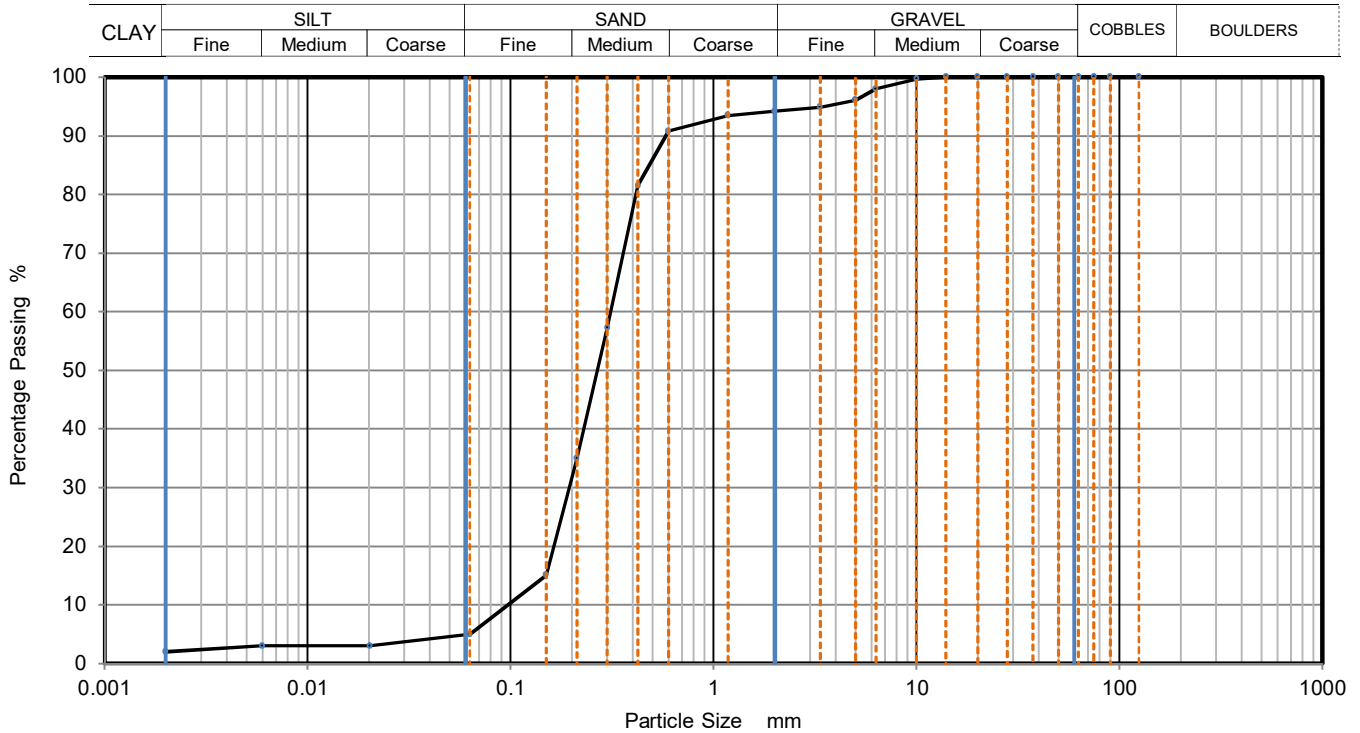




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey slightly clayey slightly silty gravelly SAND. Gravel is of flint and quartzite	Sample Depth (m)	13.50
		Sample Reference	B46



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	3
90	100	0.0060	3
75	100	0.0020	2
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	98		
5	96		
3.35	95		
2	94		
1.18	94		
0.6	91		
0.425	82	Particle density (assumed) 2.65 Mg/m3	
0.3	57		
0.212	35		
0.15	15		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	89
Silt	3
Clay	2

Grading Analysis		
D100	mm	
D60	mm	0.312
D30	mm	0.194
D10	mm	0.097
Uniformity Coefficient		3.2
Curvature Coefficient		1.3

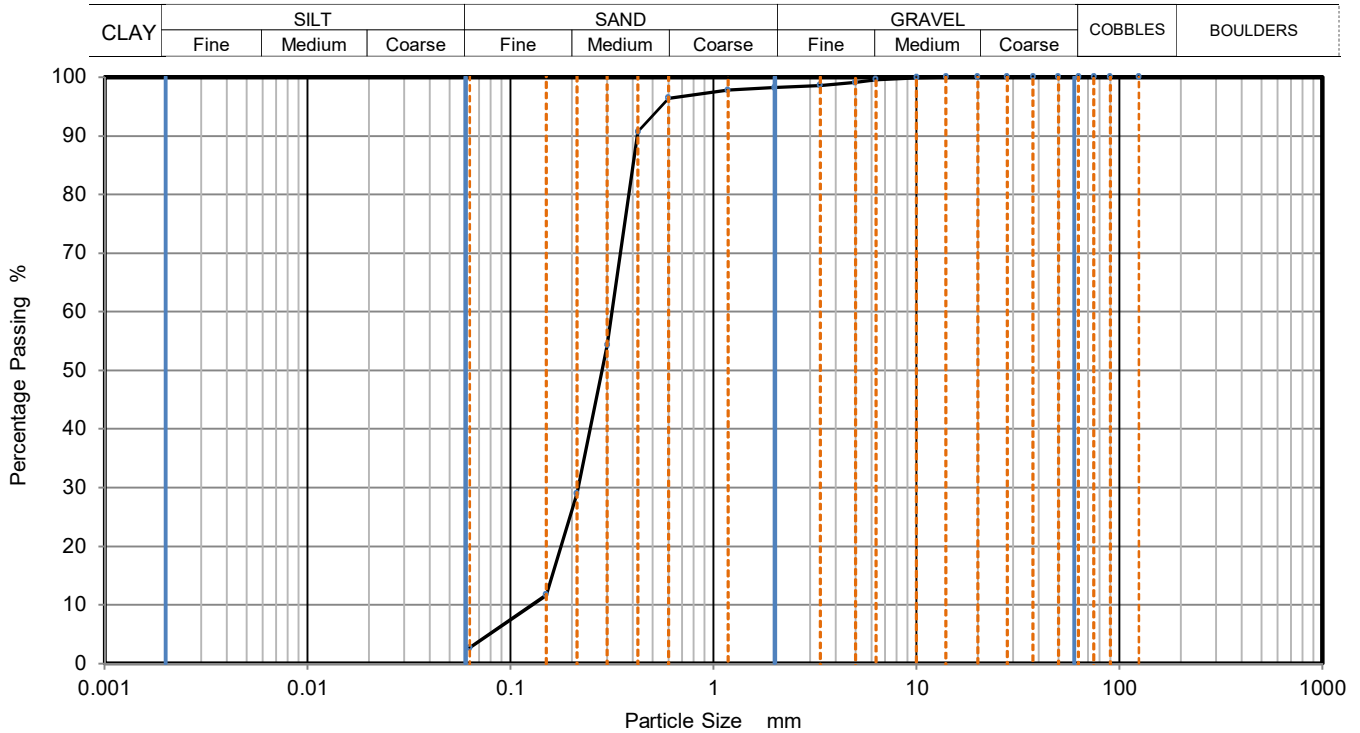
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Brown slightly silty slightly gravelly SAND. Gravel is of flint and shell fragments	Sample Depth (m)	15.50
		Sample Reference	B50



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	99		
2	98		
1.18	98		
0.6	96		
0.425	91		
0.3	54		
0.212	29		
0.15	12		
0.063	3		

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	96
Fines <0.063mm	3

Grading Analysis		
D100	mm	
D60	mm	0.317
D30	mm	0.215
D10	mm	0.127
Uniformity Coefficient		2.5
Curvature Coefficient		1.1

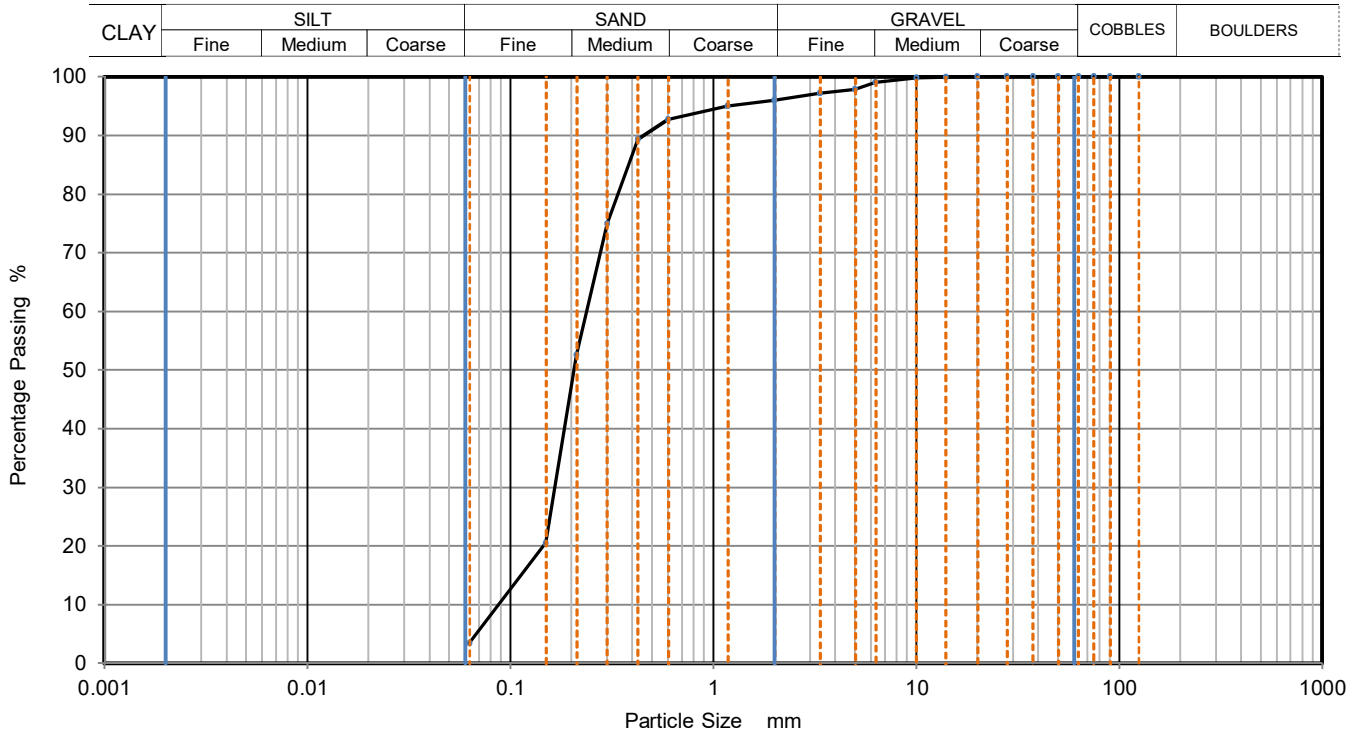
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Brown slightly silty slightly gravelly SAND. Gravel is of quartzite and siltstone	Sample Depth (m)	18.50
		Sample Reference	B57



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	98		
3.35	97		
2	96		
1.18	95		
0.6	93		
0.425	89		
0.3	75		
0.212	53		
0.15	21		
0.063	3		

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	93
Fines <0.063mm	3

Grading Analysis		
D100	mm	
D60	mm	0.238
D30	mm	0.166
D10	mm	0.088
Uniformity Coefficient		2.7
Curvature Coefficient		1.3

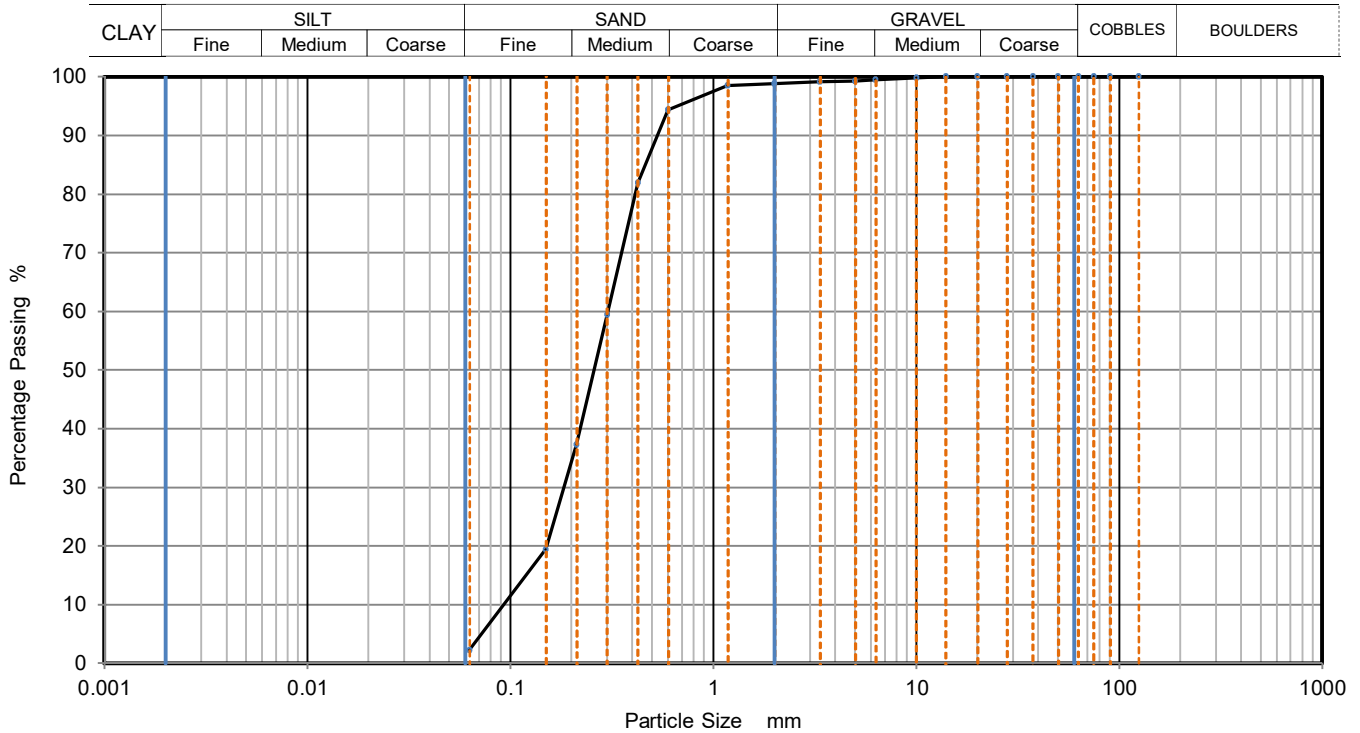
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Brown slightly silty slightly gravelly SAND. Gravel is of flint and quartzite	Sample Depth (m)	23.00
		Sample Reference	B65



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	99		
2	99		
1.18	99		
0.6	94		
0.425	82		
0.3	59		
0.212	37		
0.15	19		
0.063	2		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	97
Fines <0.063mm	2

Grading Analysis		
D100	mm	
D60	mm	0.303
D30	mm	0.184
D10	mm	0.094
Uniformity Coefficient		3.2
Curvature Coefficient		1.2

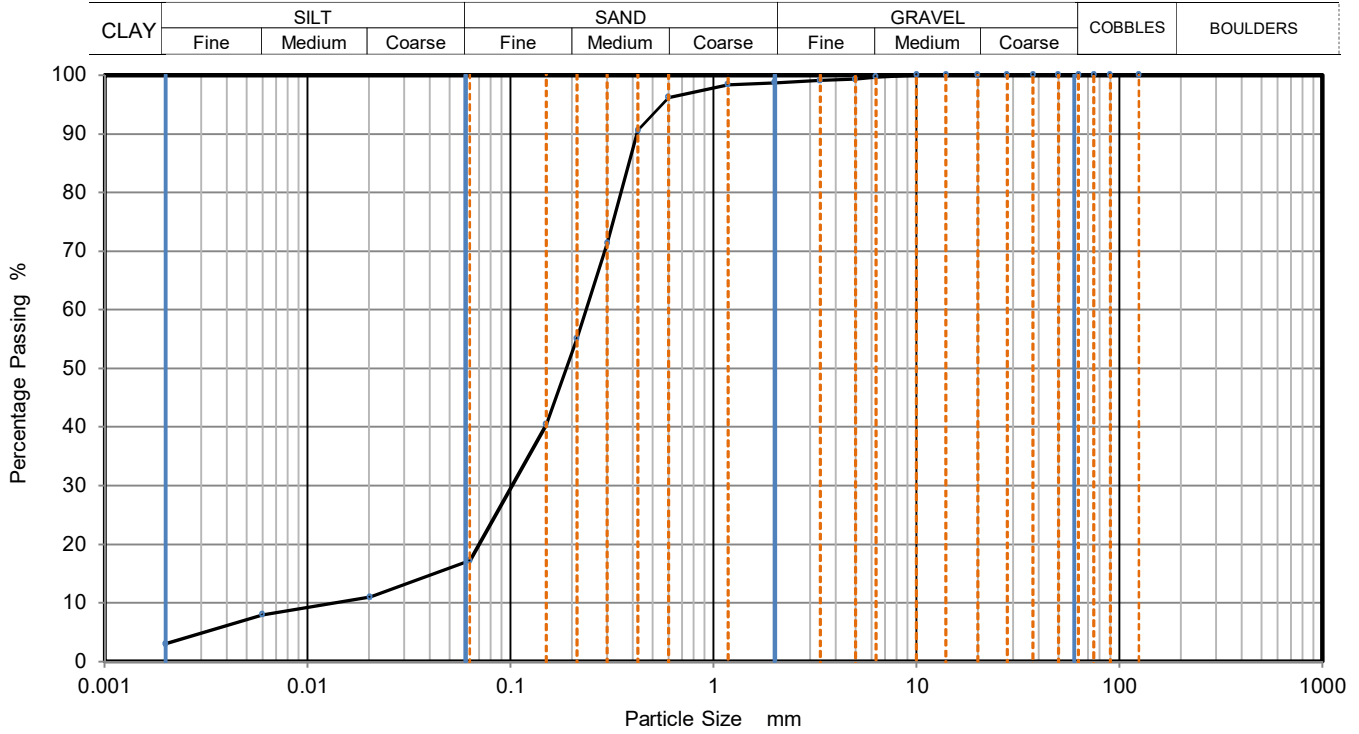
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey slightly clayey silty slightly gravelly SAND. Gravel is of flint	Sample Depth (m)	24.20
		Sample Reference	B66



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	11
90	100	0.0060	8
75	100	0.0020	3
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	99		
2	99		
1.18	98		
0.6	96		
0.425	91	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	71		
0.212	55		
0.15	40		
0.063	17		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	81
Silt	14
Clay	3

Grading Analysis		
D100	mm	
D60	mm	0.235
D30	mm	0.102
D10	mm	0.014
Uniformity Coefficient		16
Curvature Coefficient		3.1

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

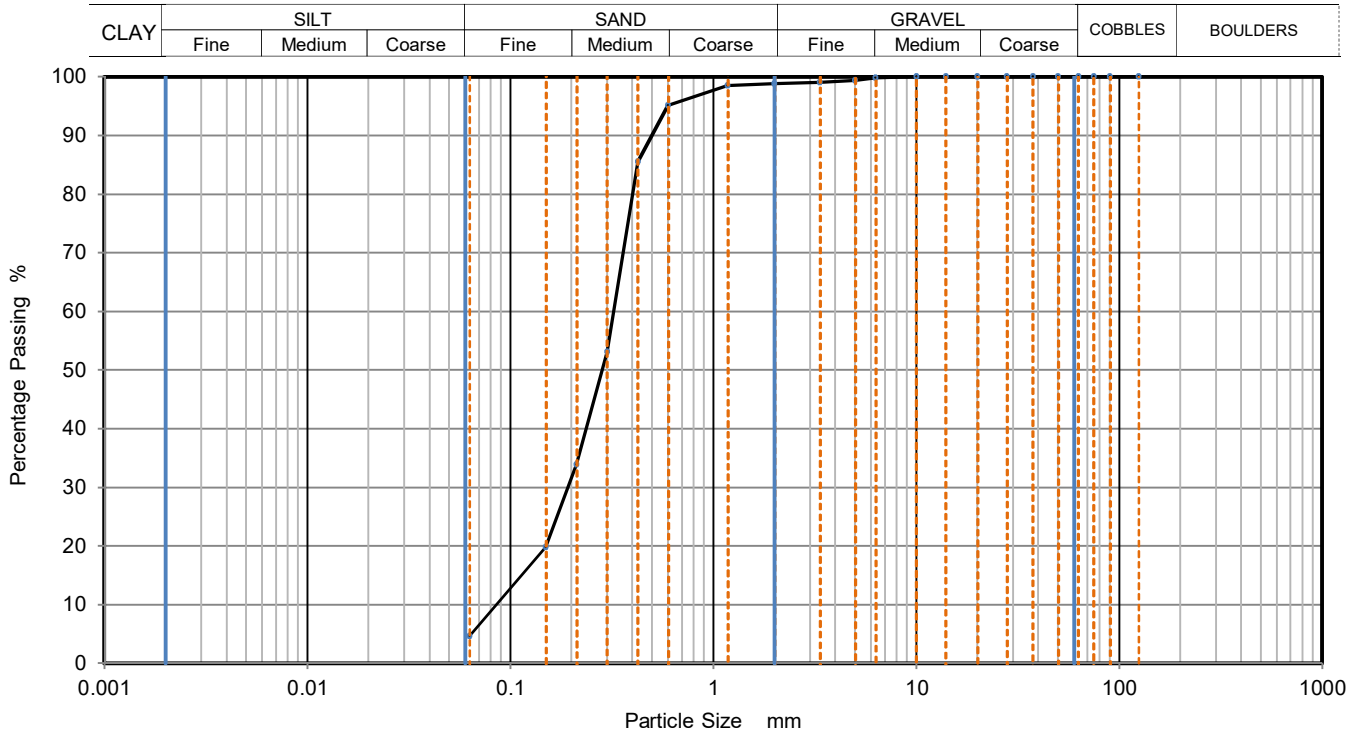




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Brown slightly silty slightly gravelly SAND. Gravel is of flint	Sample Depth (m)	25.00
		Sample Reference	B68



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	99		
2	99		
1.18	99		
0.6	95		
0.425	86		
0.3	53		
0.212	34		
0.15	20		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	94
Fines <0.063mm	5

Grading Analysis		
D100	mm	
D60	mm	0.323
D30	mm	0.193
D10	mm	0.086
Uniformity Coefficient		3.8
Curvature Coefficient		1.3

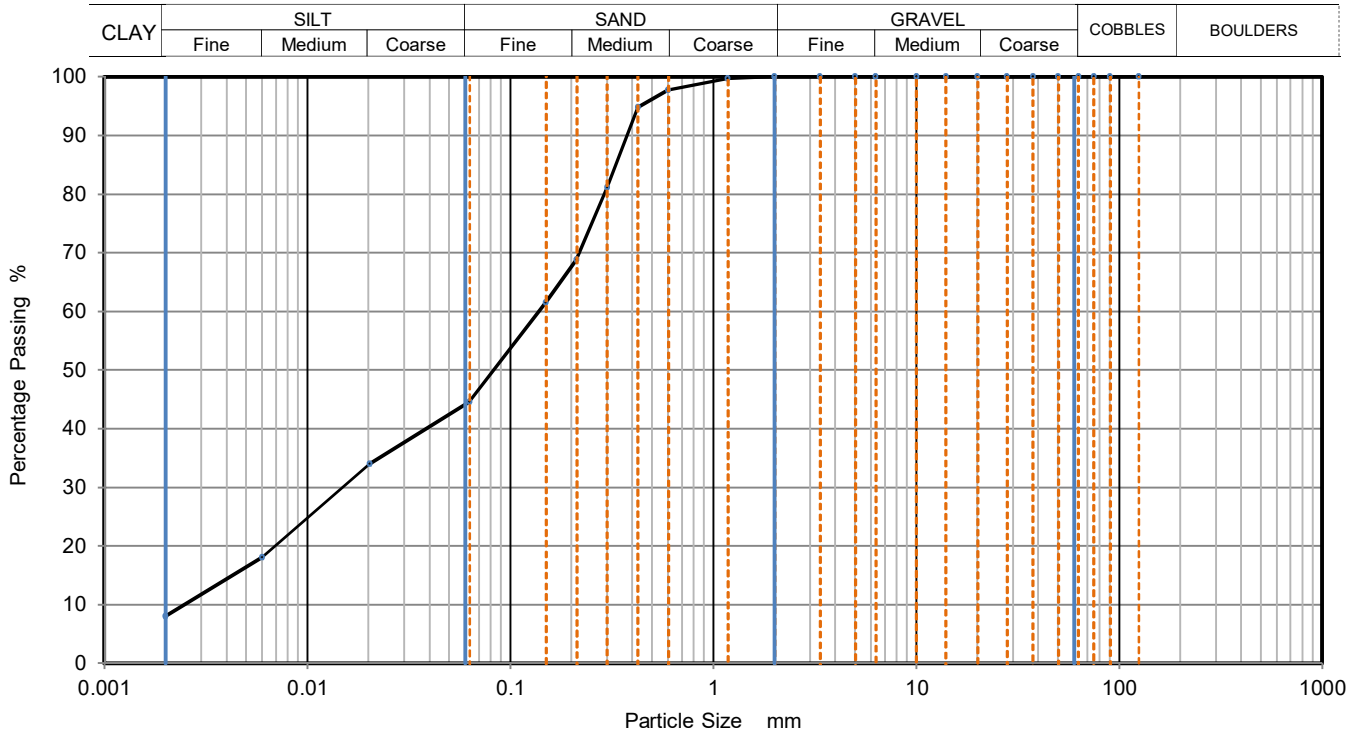
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey sandy clayey SILT	Sample Depth (m)	28.00
		Sample Reference	B72



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	34
90	100	0.0060	18
75	100	0.0020	8
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98	Particle density (assumed)	
0.425	95	2.65	Mg/m3
0.3	81		
0.212	69		
0.15	62		
0.063	45		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	55
Silt	36
Clay	9

Grading Analysis		
D100	mm	
D60	mm	0.139
D30	mm	0.015
D10	mm	0.002
Uniformity Coefficient		58
Curvature Coefficient		0.64

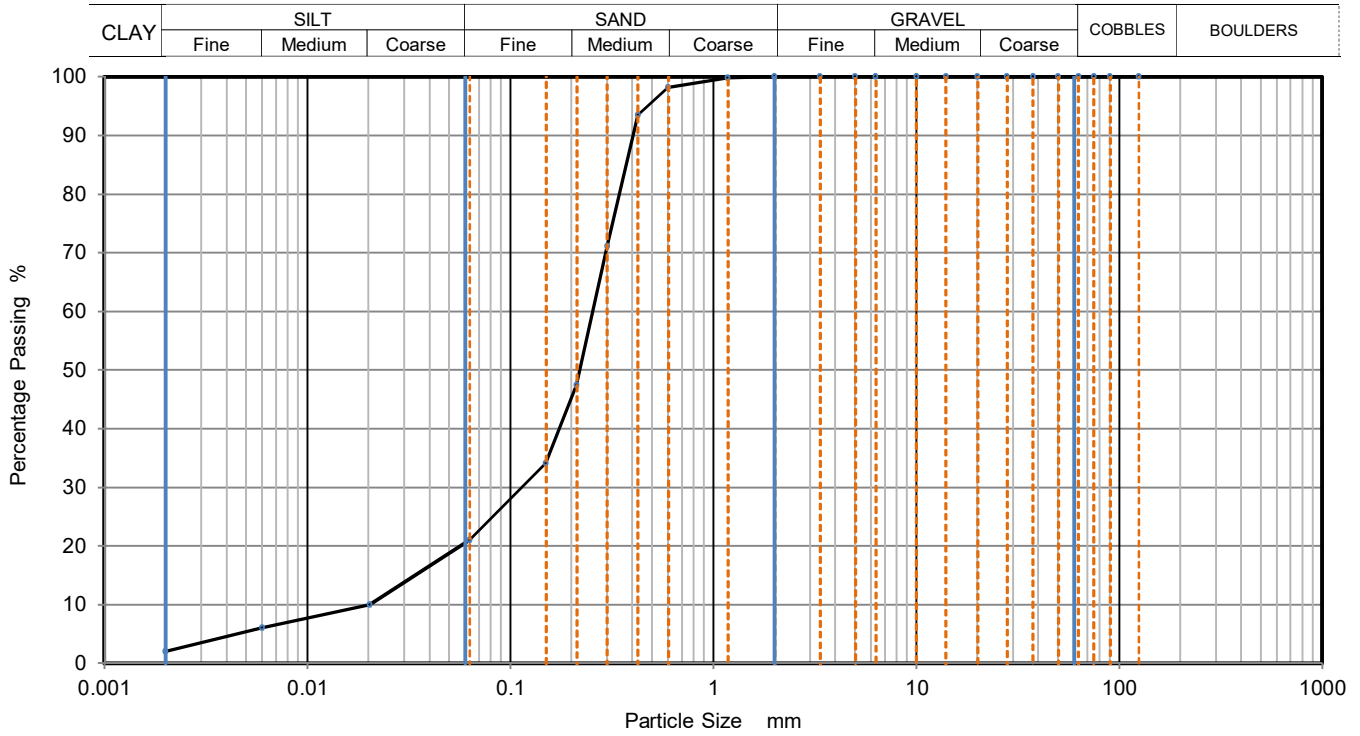
Remarks	Approved	Date	Sheet No.:
	MW	24/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey clayey silty SAND	Sample Depth (m)	30.00
		Sample Reference	D76



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	10
90	100	0.0060	6
75	100	0.0020	2
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98		
0.425	94		
0.3	71		
0.212	47		
0.15	34		
0.063	21		
		Particle density (assumed) 2.65 Mg/m <sup>3</sup>	

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	79
Silt	19
Clay	2

Grading Analysis		
D100	mm	
D60	mm	0.255
D30	mm	0.114
D10	mm	0.021
Uniformity Coefficient		12
Curvature Coefficient		2.4

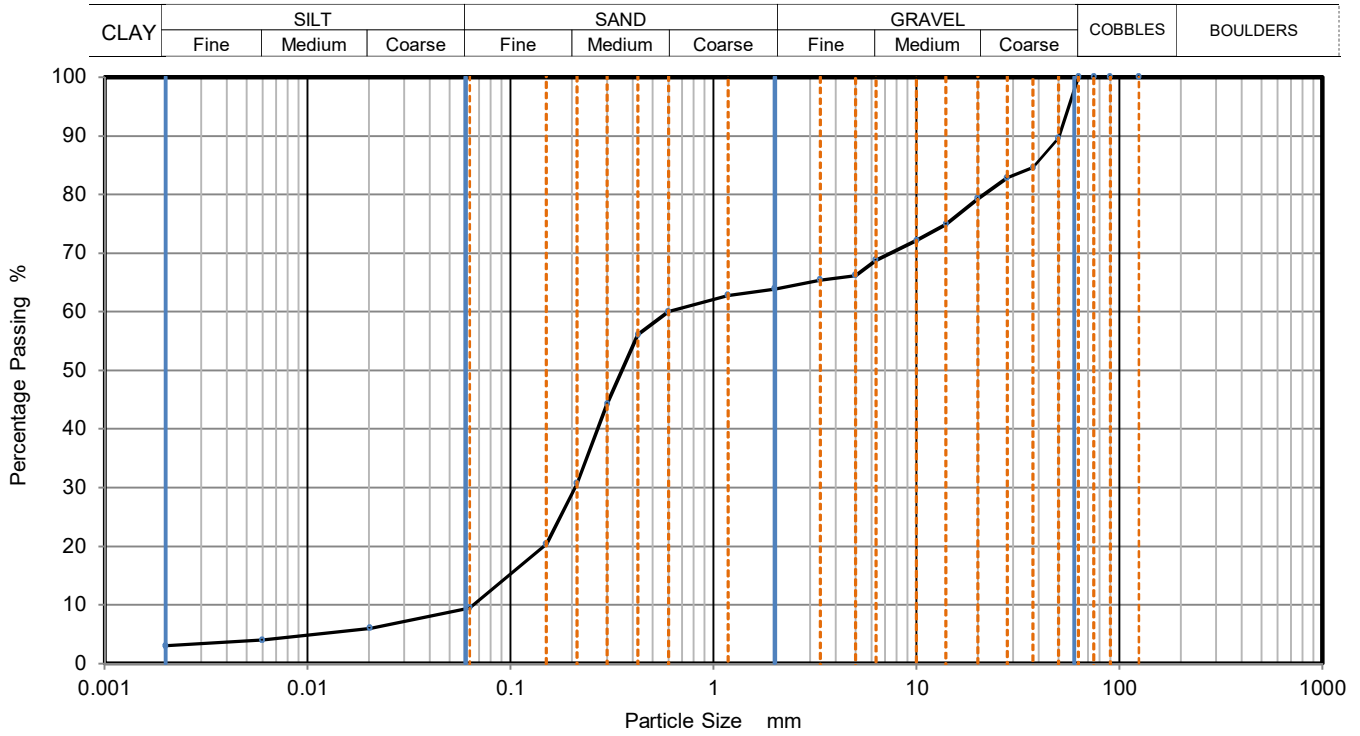
Remarks	Approved	Date	Sheet No.:
	MW	24/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	MADE GROUND (Brown slightly clayey silty very gravelly SAND. Gravel is of flint, quartzite, asphalt and concrete fragments)	Sample Depth (m)	0.50
		Sample Reference	B2



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	6
90	100	0.0060	4
75	100	0.0020	3
63	100		
50	90		
37.5	85		
28	83		
20	79		
14	75		
10	72		
6.3	69		
5	66		
3.35	65		
2	64		
1.18	63		
0.6	60		
0.425	56	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	44		
0.212	31		
0.15	20		
0.063	10		

Sample Proportions	% dry mass
Very coarse	0
Gravel	36
Sand	54
Silt	6
Clay	3

Grading Analysis		
D100	mm	
D60	mm	0.606
D30	mm	0.207
D10	mm	0.066
Uniformity Coefficient		9.2
Curvature Coefficient		1.1

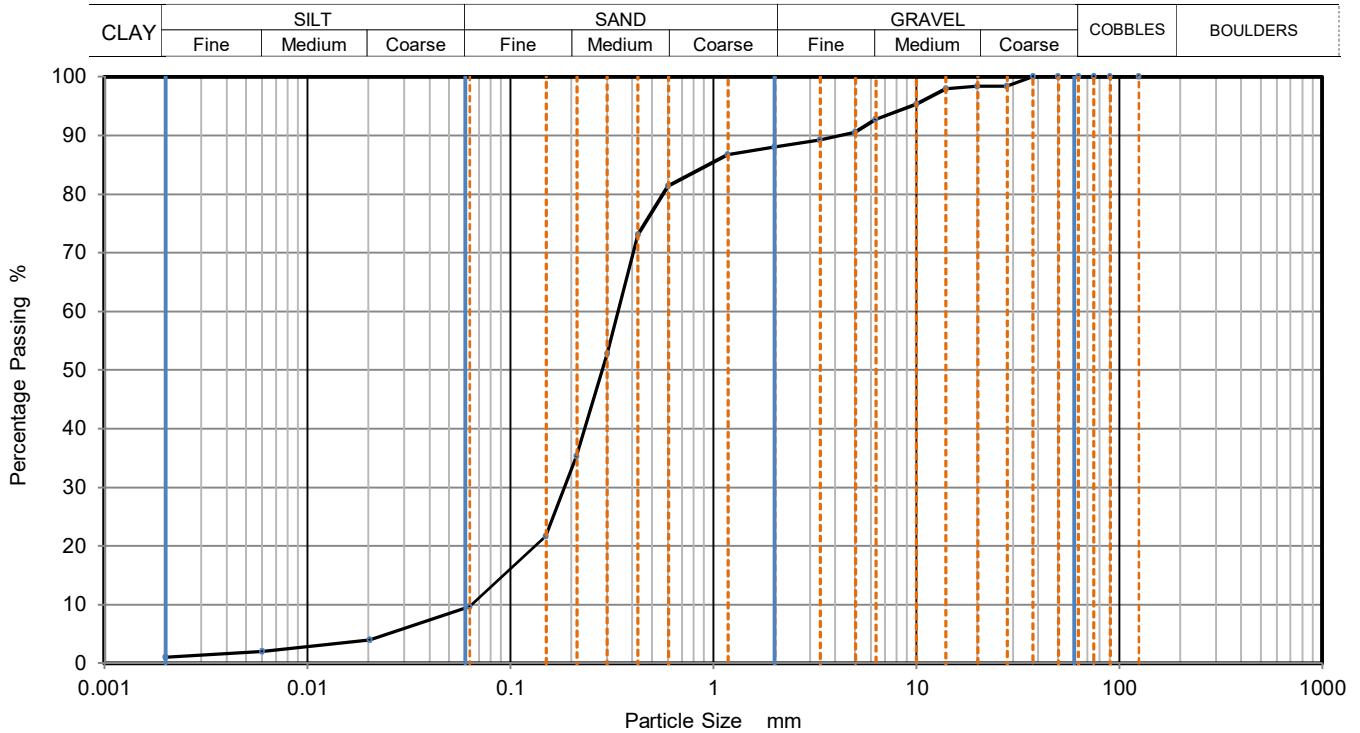
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Dark brown slightly clayey silty gravelly SAND. Gravel is of flint and quartzite	Sample Depth (m)	1.20
		Sample Reference	B6



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	4
90	100	0.0060	2
75	100	0.0020	1
63	100		
50	100		
37.5	100		
28	98		
20	98		
14	98		
10	95		
6.3	93		
5	91		
3.35	89		
2	88		
1.18	87		
0.6	81		
0.425	73	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	53		
0.212	35		
0.15	22		
0.063	10		

Sample Proportions	% dry mass
Very coarse	0
Gravel	12
Sand	78
Silt	9
Clay	1

Grading Analysis		
D100	mm	
D60	mm	0.340
D30	mm	0.186
D10	mm	0.065
Uniformity Coefficient		5.3
Curvature Coefficient		1.6

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

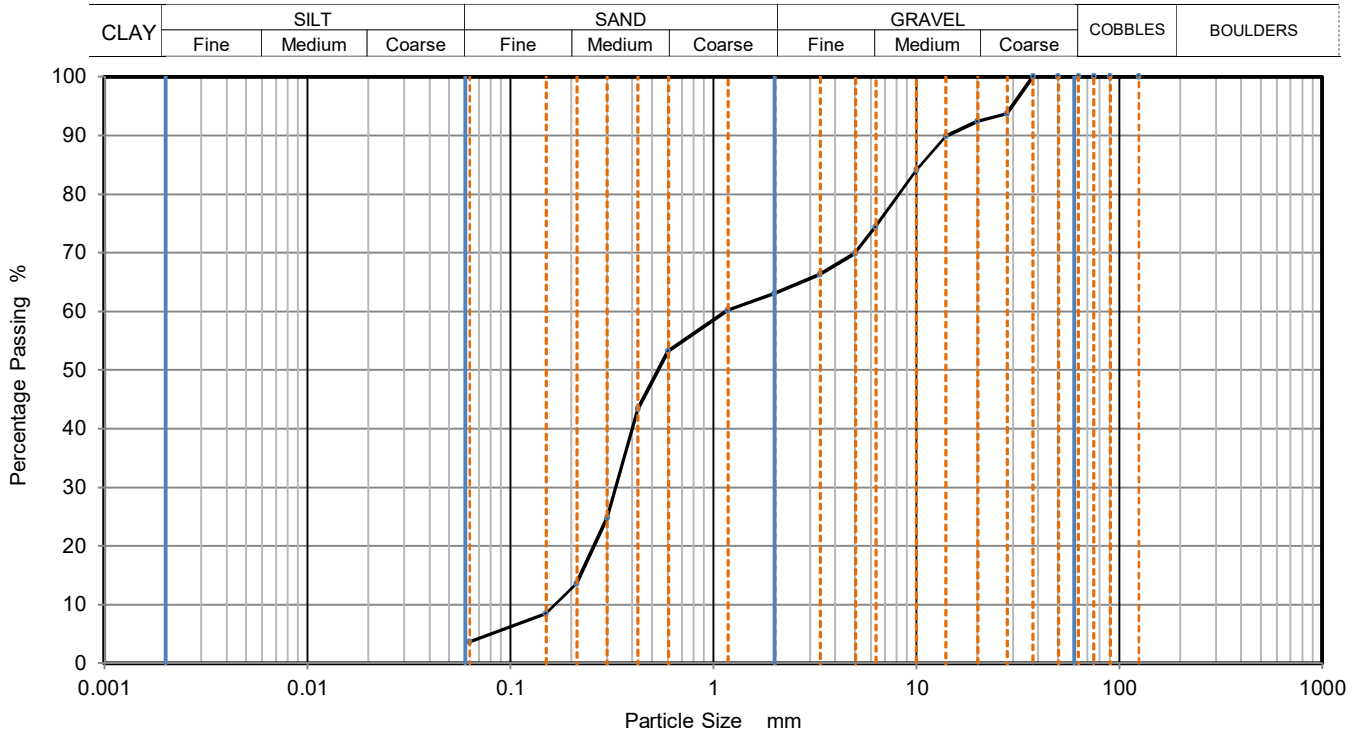




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Dark brown slightly silty very gravelly SAND. Gravel is of flint and quartzite	Sample Depth (m)	2.00
		Sample Reference	B9



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	94		
20	92		
14	90		
10	84		
6.3	74		
5	70		
3.35	66		
2	63		
1.18	60		
0.6	53		
0.425	43		
0.3	25		
0.212	14		
0.15	8		
0.063	4		

Sample Proportions	% dry mass
Very coarse	0
Gravel	37
Sand	59
Fines <0.063mm	4

Grading Analysis		
D100	mm	
D60	mm	1.160
D30	mm	0.331
D10	mm	0.166
Uniformity Coefficient		6.9
Curvature Coefficient		0.57

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171206017-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **17**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-Feb-18**

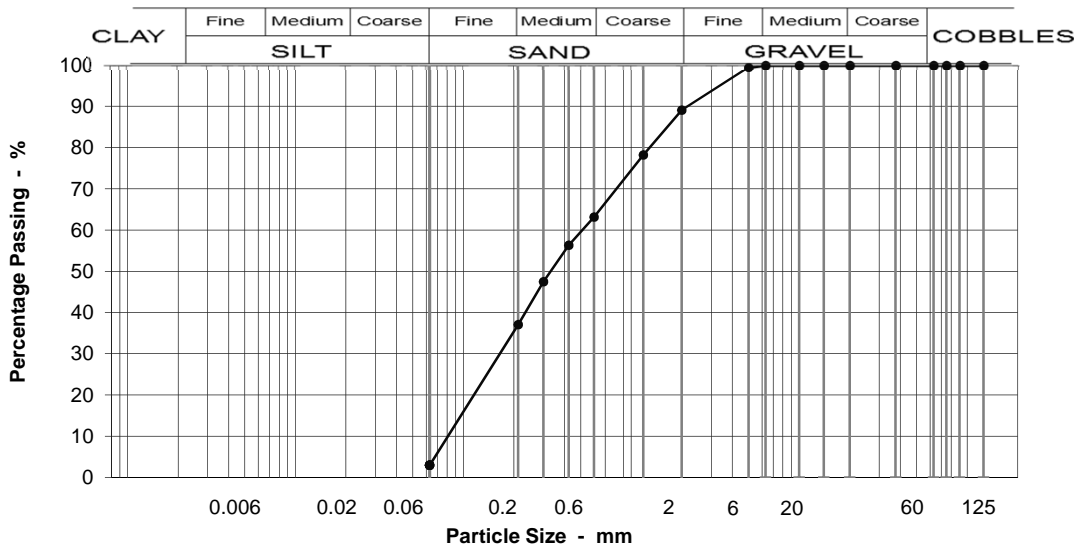
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH2 @ 5 - 5.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	89
1.18	78
0.600	63
0.425	56
0.300	47
0.212	37
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6K, 6M.**

Moisture content % 67

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	11
Coarse SAND	26
Medium SAND	26
Fine SAND	34
Silt & Clay	3

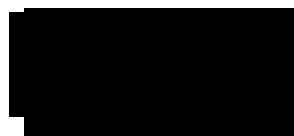
Grading Analysis	
D100	5
D60	0.52
D10	0.09
Uniformity Coefficient	6

**Description**  
Dark grey gravelly fine, medium and coarse SAND. Gravel is fine sub-angular to sub-rounded flint.

Test Code = 610



Simon Holden (Project Technician)

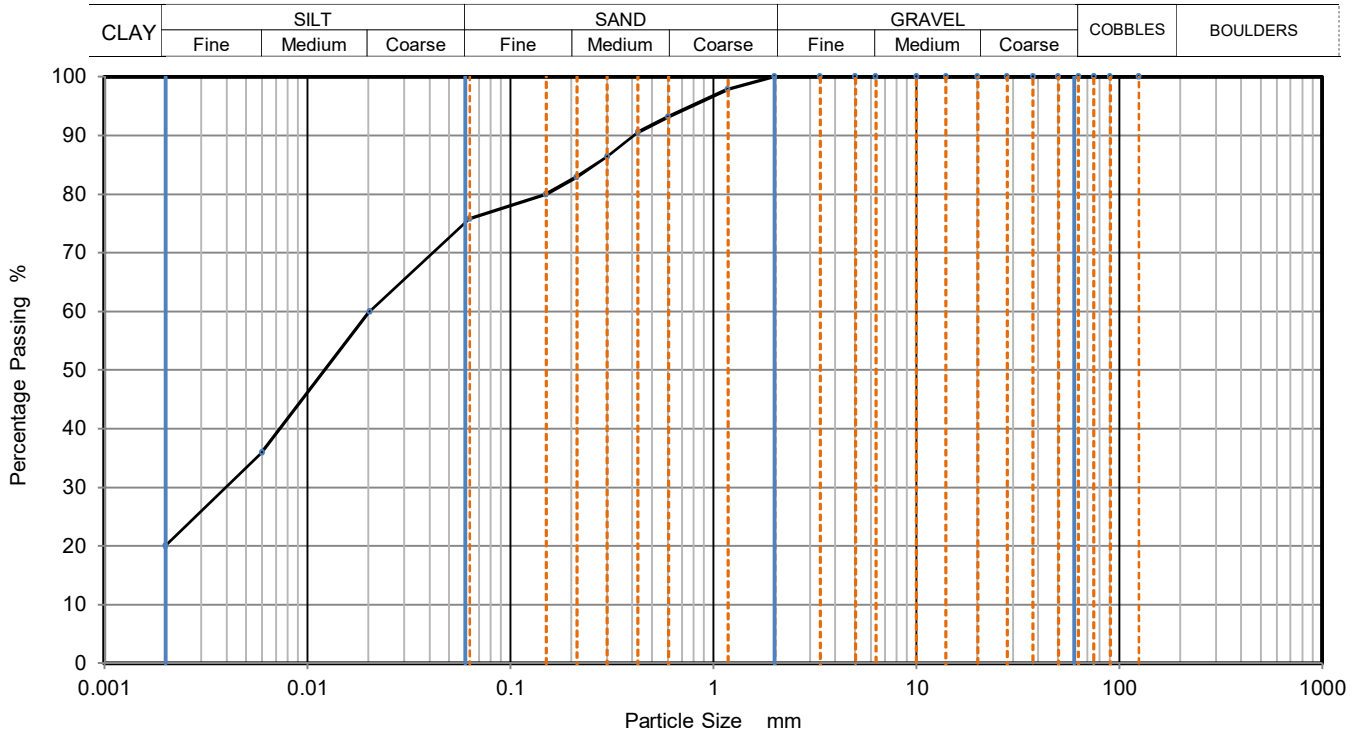




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Grey slightly sandy silty CLAY	Sample Depth (m)	6.50
		Sample Reference	B21



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	60
90	100	0.0060	36
75	100	0.0020	20
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	98		
0.6	93		
0.425	91	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	86		
0.212	83		
0.15	80		
0.063	76		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	24
Silt	56
Clay	20

Grading Analysis		
D100	mm	
D60	mm	0.021
D30	mm	0.004
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

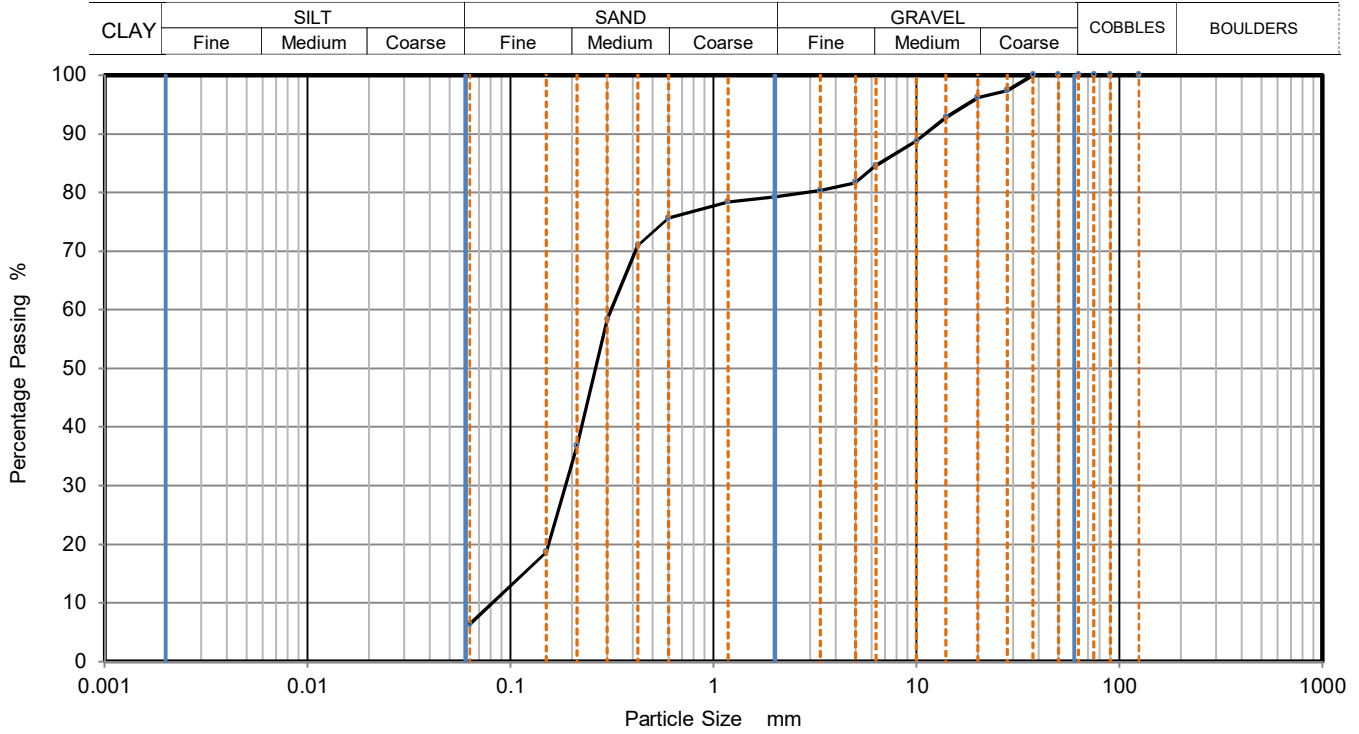
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Dark grey silty very gravelly SAND. Gravel is of flint	Sample Depth (m)	11.50
		Sample Reference	B35



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	97		
20	96		
14	93		
10	89		
6.3	85		
5	82		
3.35	80		
2	79		
1.18	78		
0.6	76		
0.425	71		
0.3	58		
0.212	37		
0.15	19		
0.063	6		

Sample Proportions	% dry mass
Very coarse	0
Gravel	21
Sand	73
Fines <0.063mm	6

Grading Analysis		
D100	mm	
D60	mm	0.314
D30	mm	0.186
D10	mm	0.081
Uniformity Coefficient		3.9
Curvature Coefficient		1.4

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171208010-610**  
Our Project No. PZ1522D1  
Your Sample Ref 37  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

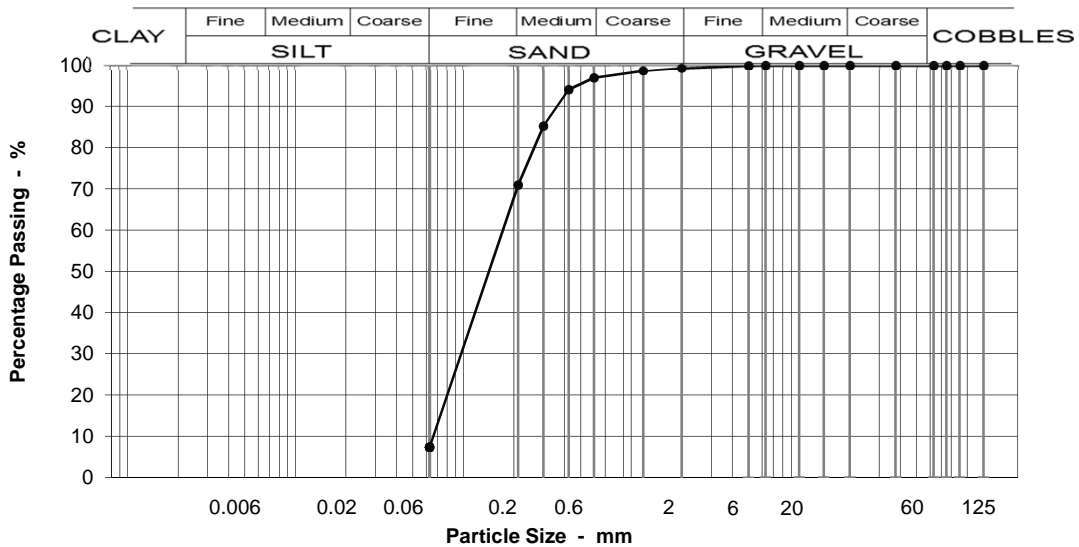
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH2 @ 12.5 - 13m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	94
0.300	85
0.212	71
0.063	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 48

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	26
Fine SAND	64
Silt & Clay	7

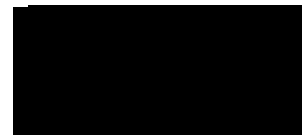
Grading Analysis	
D100	5
D60	0.19
D10	0.07
Uniformity Coefficient	3

Description	
Orange slightly silty fine SAND.	

Test Code = 610



Simon Holden (Project Technician)



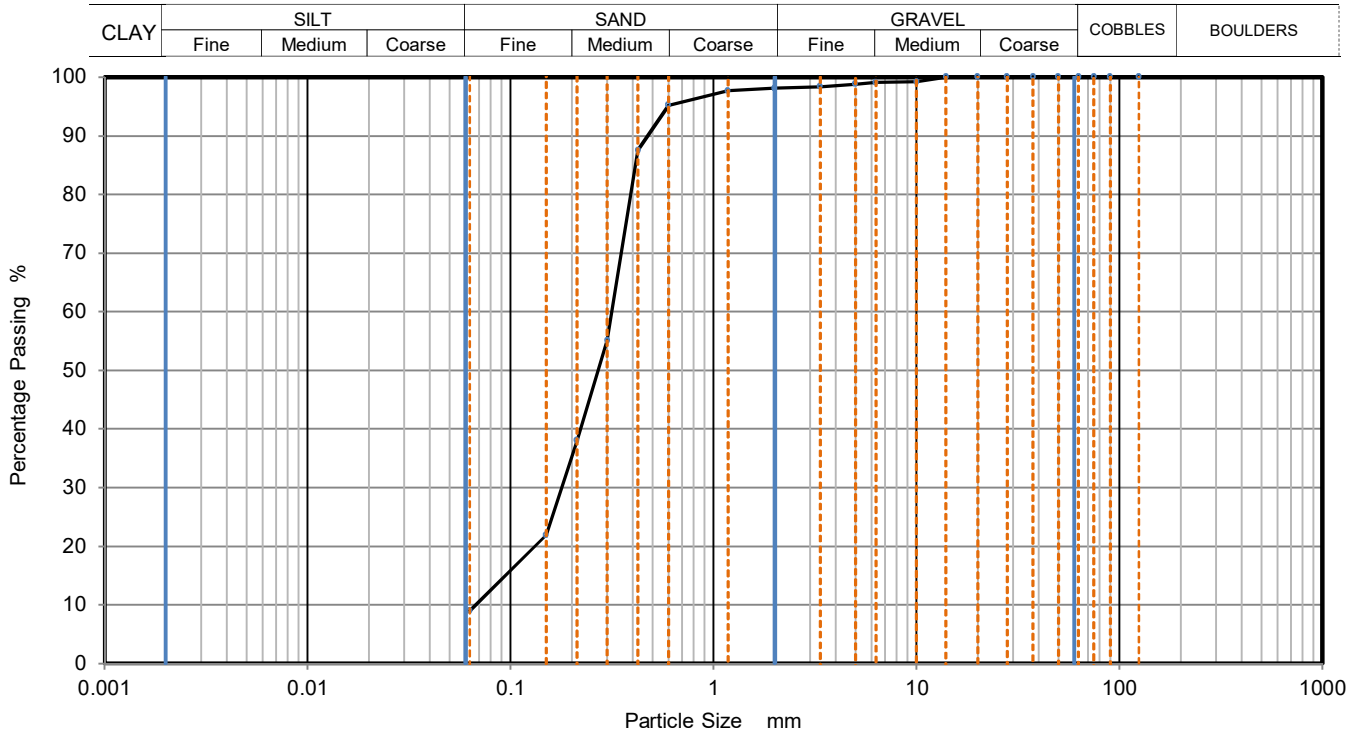




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Brown silty slightly gravelly SAND. Gravel is of flint	Sample Depth (m)	14.90
		Sample Reference	D42



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	99		
5	99		
3.35	98		
2	98		
1.18	98		
0.6	95		
0.425	88		
0.3	55		
0.212	38		
0.15	22		
0.063	9		

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	89
Fines <0.063mm	9

Grading Analysis		
D100	mm	
D60	mm	0.316
D30	mm	0.179
D10	mm	0.067
Uniformity Coefficient		4.7
Curvature Coefficient		1.5

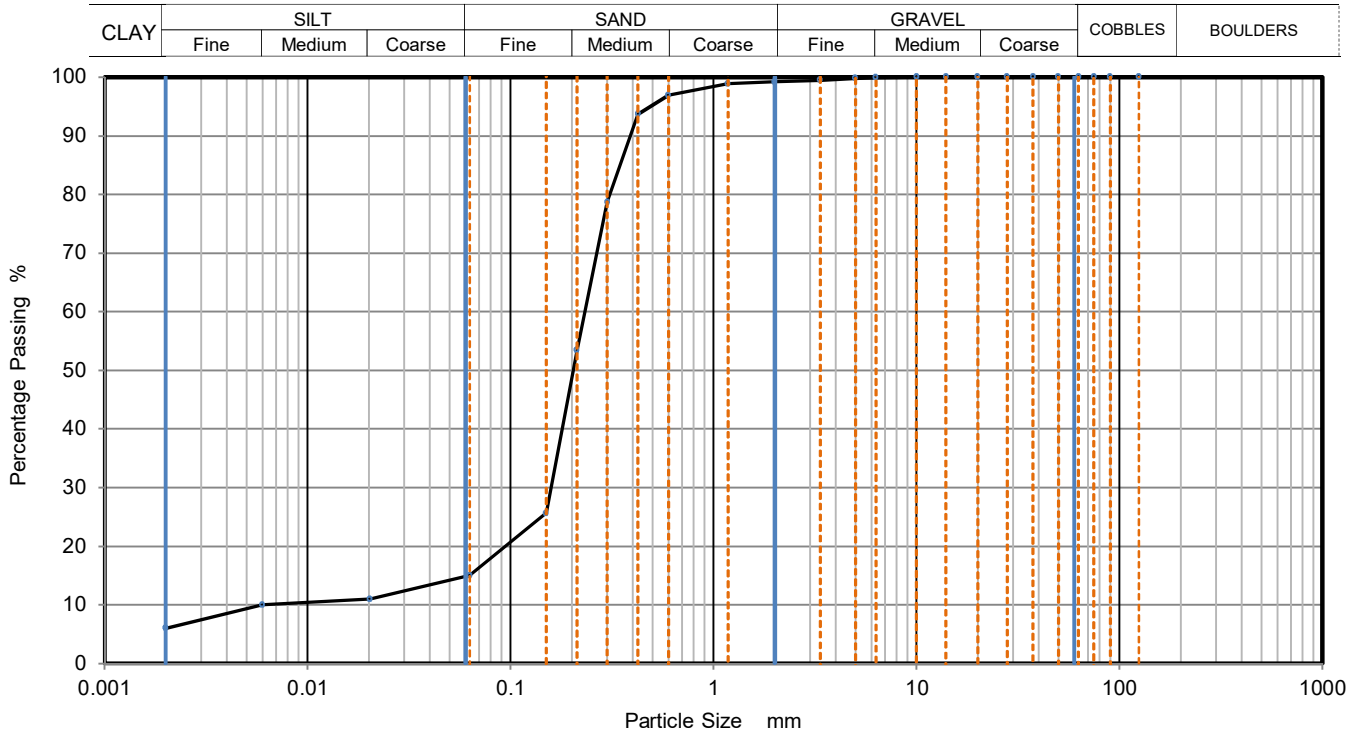
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Brown clayey silty slightly gravelly SAND. Gravel is of flint and occasional siltstone	Sample Depth (m)	15.50
		Sample Reference	B44



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	11
90	100	0.0060	10
75	100	0.0020	6
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	97		
0.425	94	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	79		
0.212	53		
0.15	26		
0.063	15		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	84
Silt	9
Clay	6

Grading Analysis		
D100	mm	
D60	mm	0.232
D30	mm	0.158
D10	mm	0.007
Uniformity Coefficient		33
Curvature Coefficient		16

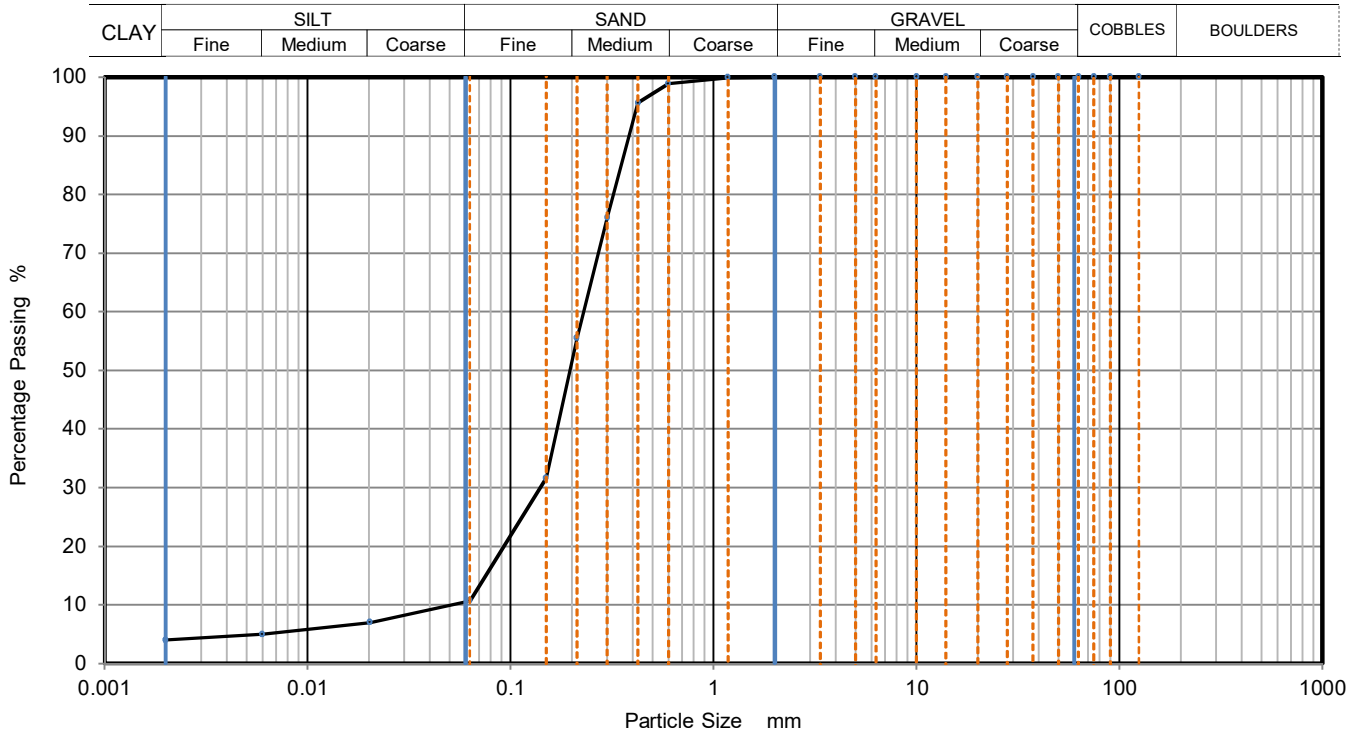
Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Brown slightly clayey silty SAND	Sample Depth (m)	16.90
		Sample Reference	D47



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	7
90	100	0.0060	5
75	100	0.0020	4
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	96	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	76		
0.212	56		
0.15	32		
0.063	11		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	89
Silt	7
Clay	4

Grading Analysis		
D100	mm	
D60	mm	0.229
D30	mm	0.140
D10	mm	0.051
Uniformity Coefficient		4.5
Curvature Coefficient		1.7

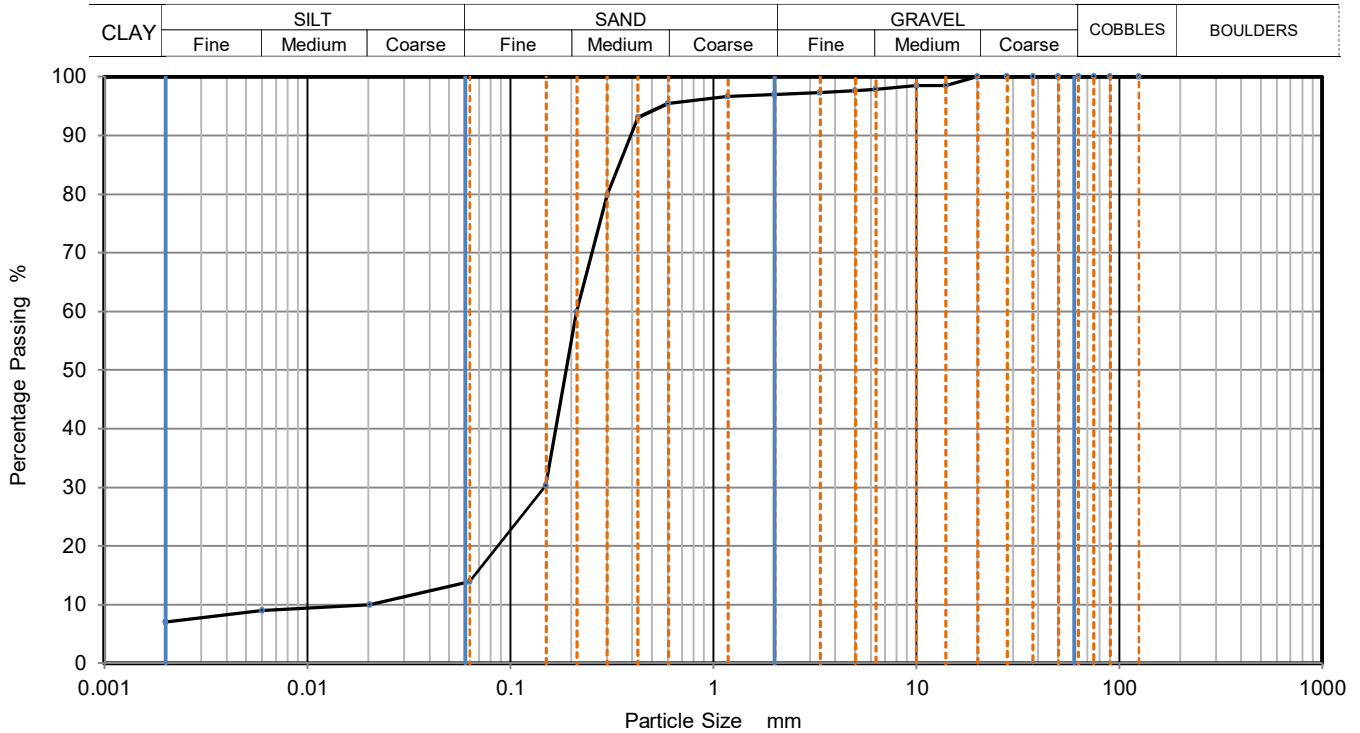
Remarks	Approved	Date	Sheet No.:
	MW	24/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Dark brown clayey silty slightly gravelly SAND. Gravel is of flint	Sample Depth (m)	18.50
		Sample Reference	B50



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	10
90	100	0.0060	9
75	100	0.0020	7
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	98		
5	98		
3.35	97		
2	97		
1.18	97		
0.6	96		
0.425	93	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	80		
0.212	60		
0.15	30		
0.063	14		

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	83
Silt	7
Clay	7

Grading Analysis		
D100	mm	
D60	mm	0.212
D30	mm	0.148
D10	mm	0.022
Uniformity Coefficient		9.6
Curvature Coefficient		4.6

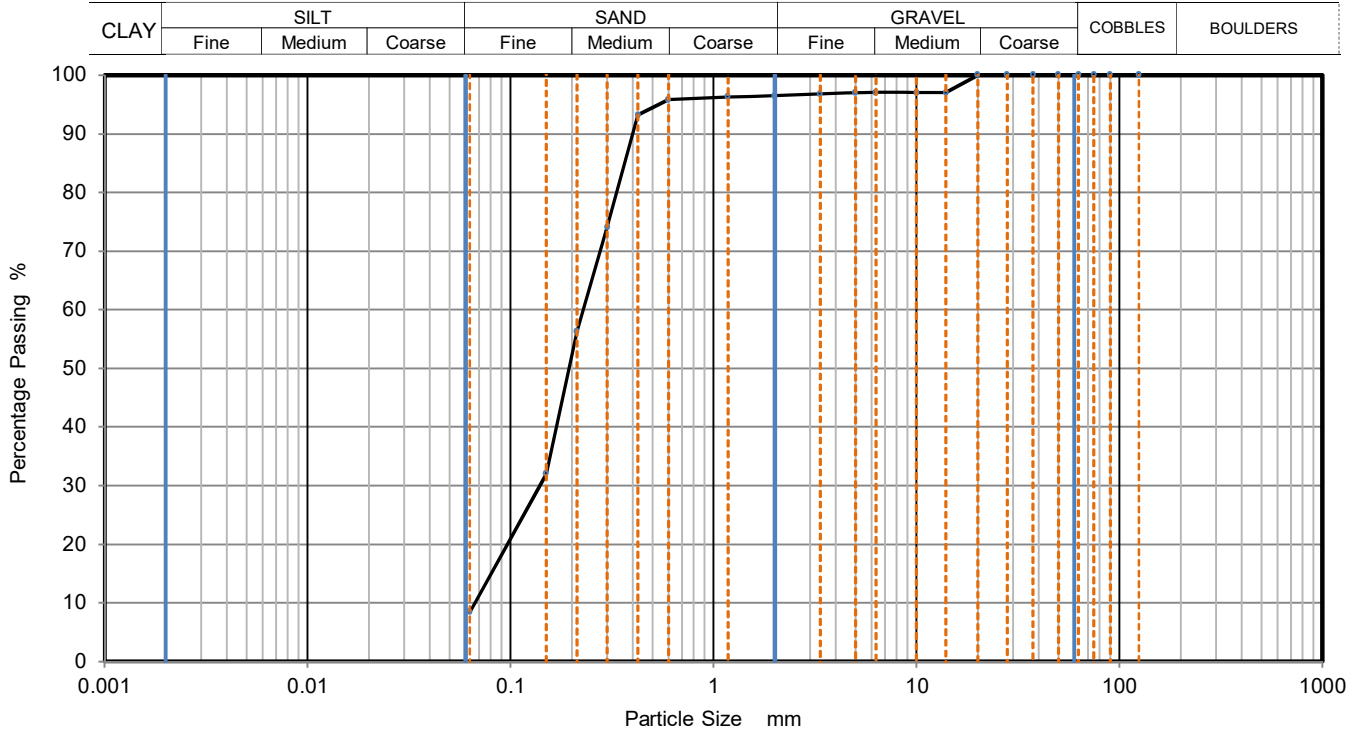
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Dark grey silty slightly gravelly SAND. Gravel is of flint	Sample Depth (m)	18.90
		Sample Reference	D51



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	97		
10	97		
6.3	97		
5	97		
3.35	97		
2	97		
1.18	96		
0.6	96		
0.425	93		
0.3	74		
0.212	56		
0.15	32		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	88
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.228
D30	mm	0.139
D10	mm	0.067
Uniformity Coefficient		3.4
Curvature Coefficient		1.3

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171211004-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **57**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

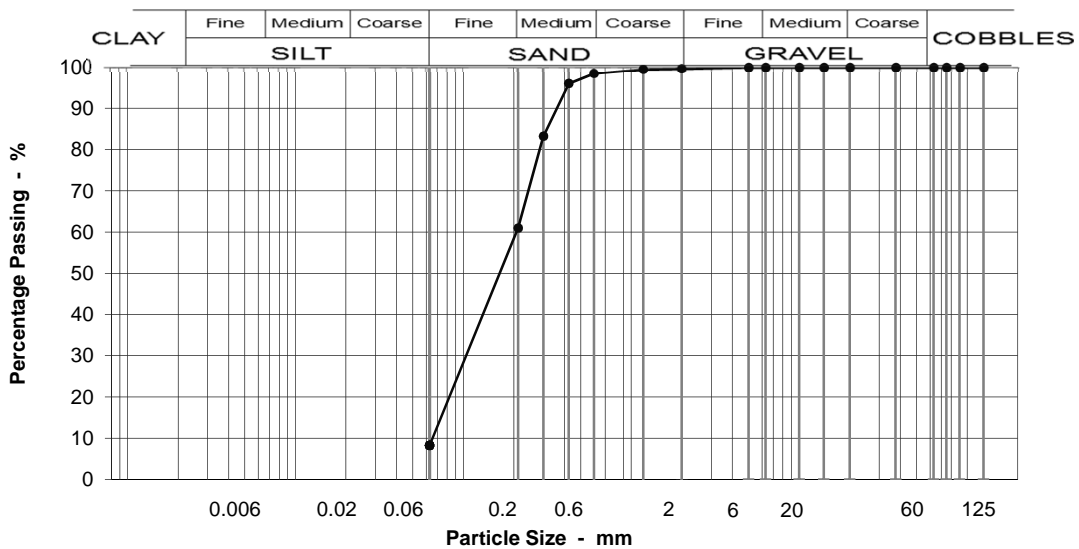
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH2 @ 21 - 22m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	98
0.425	96
0.300	83
0.212	61
0.063	8

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 27

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	37
Fine SAND	53
Silt & Clay	8

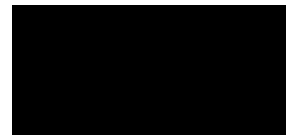
Grading Analysis	
D100	2
D60	0.21
D10	0.07
Uniformity Coefficient	3

**Description**  
Brown slightly silty fine and medium SAND.

Test Code = 610



Simon Holden (Project Technician)

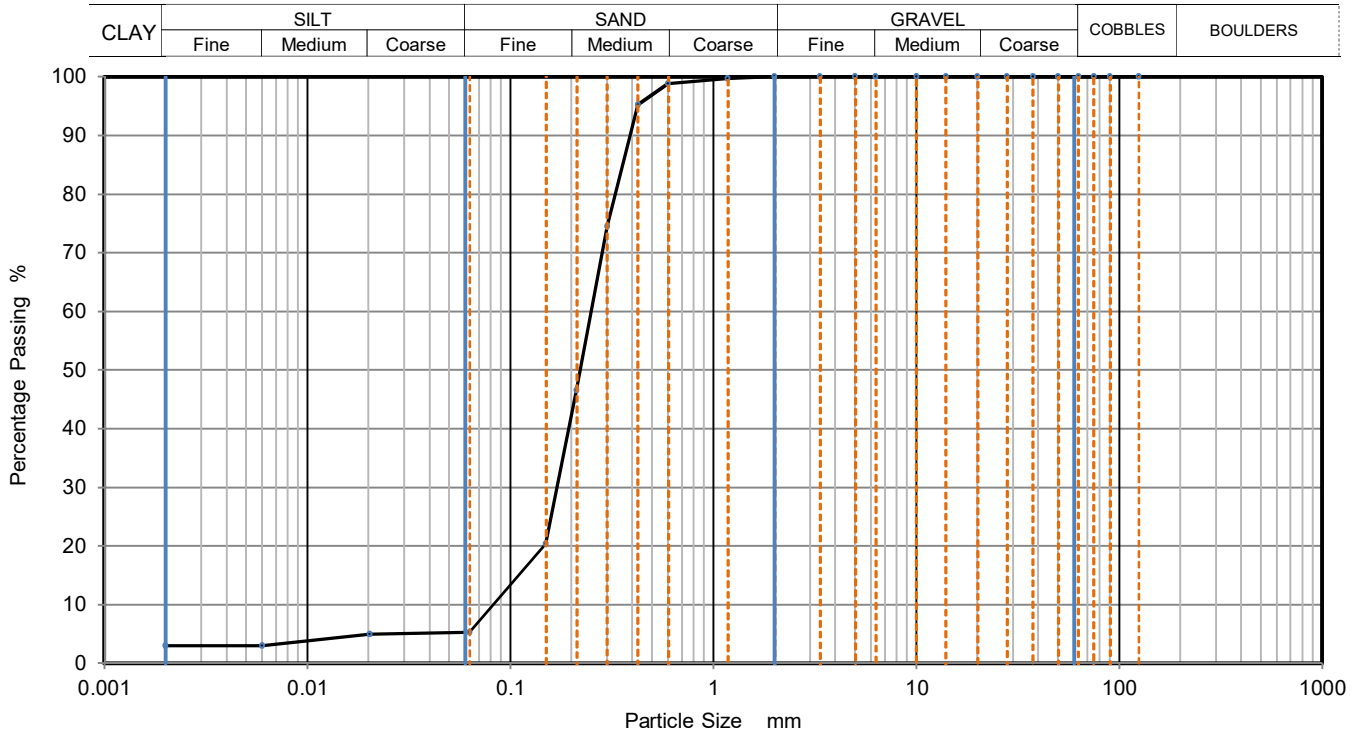




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Brown slightly clayey slightly silty SAND	Sample Depth (m)	23.00
		Sample Reference	B59



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	5
90	100	0.0060	3
75	100	0.0020	3
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	95	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	75		
0.212	47		
0.15	20		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	95
Silt	3
Clay	3

Grading Analysis		
D100	mm	
D60	mm	0.251
D30	mm	0.170
D10	mm	0.083
Uniformity Coefficient		3
Curvature Coefficient		1.4

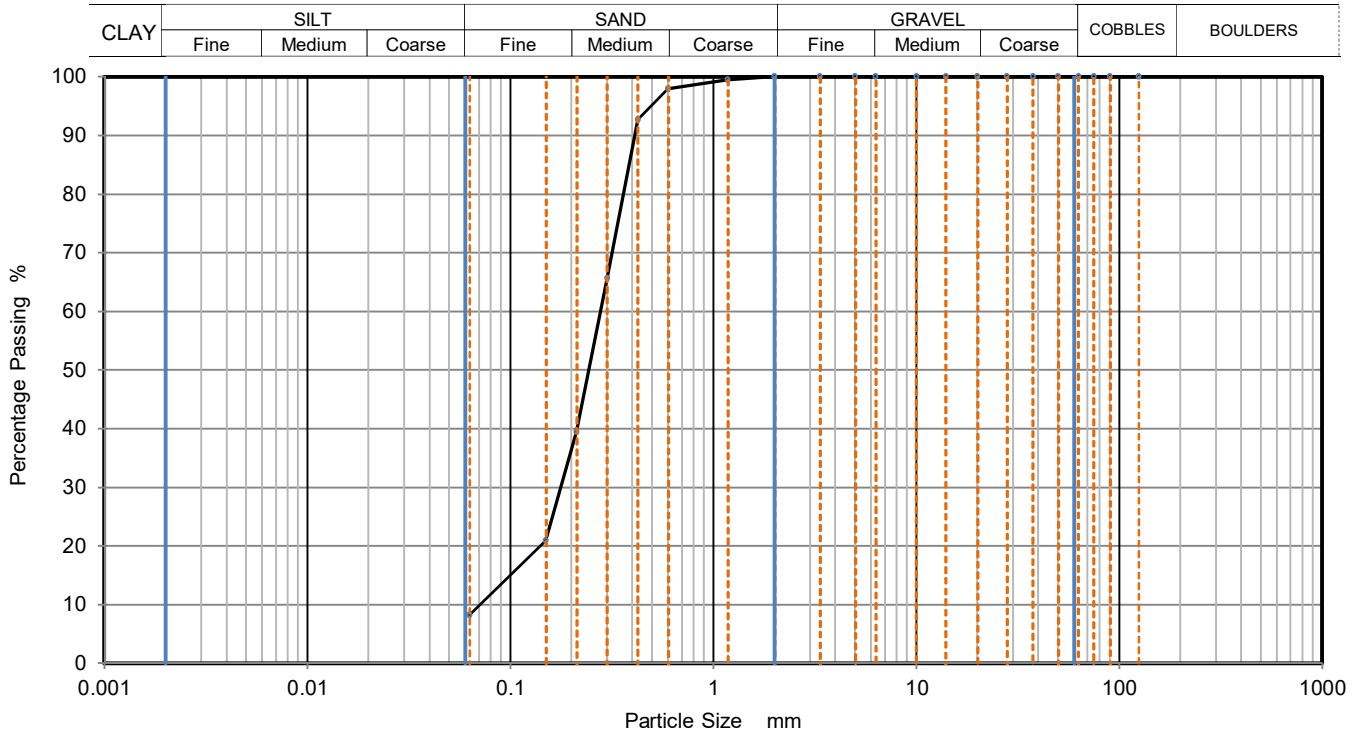
Remarks	Approved	Date	Sheet No.:
			1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Brown and grey silty SAND	Sample Depth (m)	25.90
		Sample Reference	D64



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98		
0.425	93		
0.3	66		
0.212	40		
0.15	21		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	92
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.278
D30	mm	0.178
D10	mm	0.071
Uniformity Coefficient		3.9
Curvature Coefficient		1.6

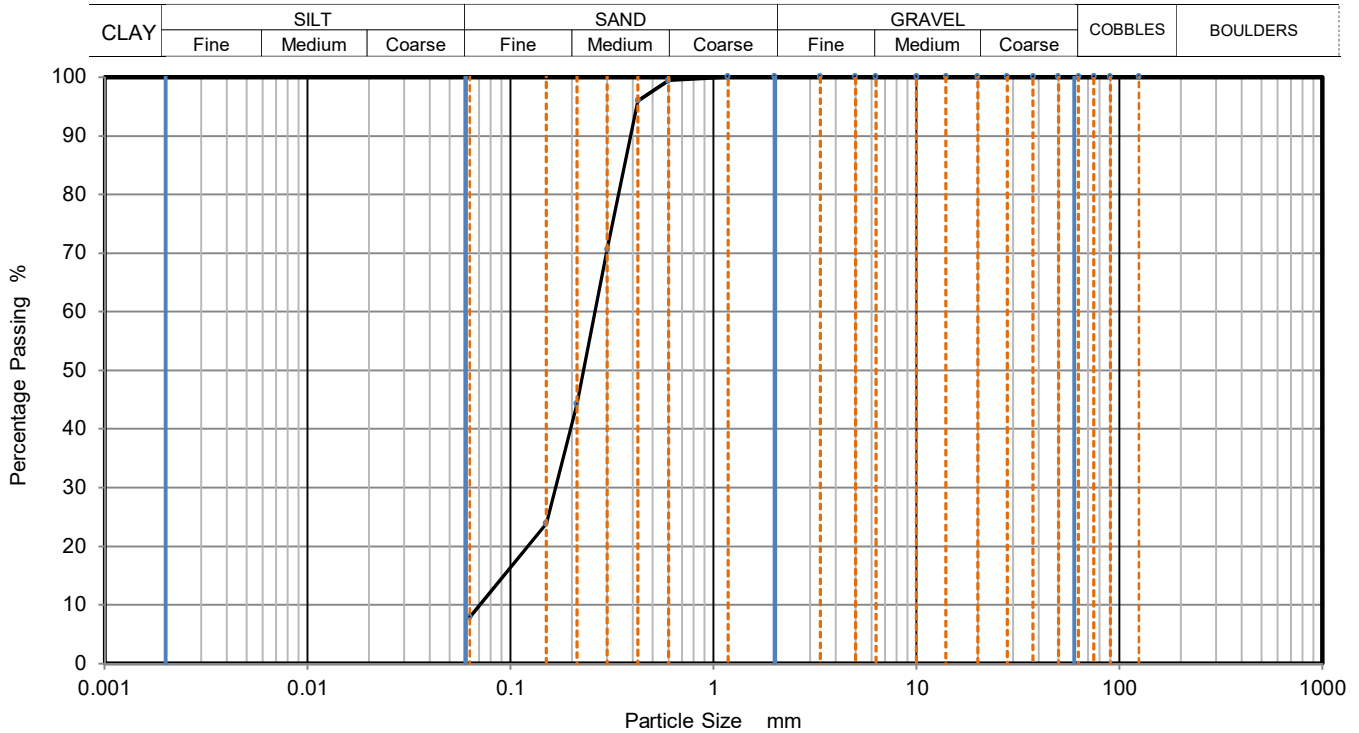
Remarks	Approved	Date	Sheet No.:
	MW	24/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Brown silty SAND	Sample Depth (m)	26.00
		Sample Reference	B65



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	96		
0.3	71		
0.212	44		
0.15	24		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	92
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.261
D30	mm	0.167
D10	mm	0.071
Uniformity Coefficient		3.7
Curvature Coefficient		1.5

Remarks	Approved	Date	Sheet No.:
	MW	25/01/2018	1 of 1

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171128002-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 2  
**Your Project or Order No.** PZ1522  
**Date Tested** 12/12/2017  
**Date Report Issued** 4-Jan-18

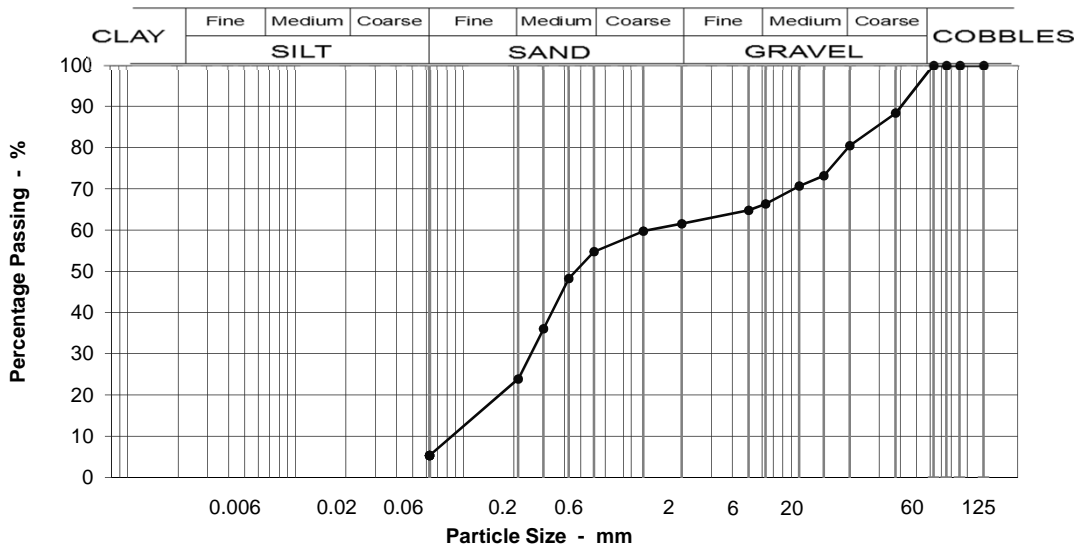
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 0.3 - 0.5m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	88
20	80
14	73
10	71
6.3	66
5	65
2	61
1.18	60
0.600	55
0.425	48
0.300	36
0.212	24
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6I, 6M, 6N.**

Moisture content % 7.8

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	20
Medium GRAVEL	14
Fine GRAVEL	5
Coarse SAND	7
Medium SAND	31
Fine SAND	19
Silt & Clay	5

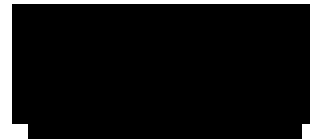
Grading Analysis	
D100	38
D60	1.30
D10	0.10
Uniformity Coefficient	13

**Description**  
Greyish brown very gravelly fine to medium SAND. Gravel is medium to coarse subangular to rounded flint, quartz and concrete.

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171128004-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 4  
**Your Project or Order No.** PZ1522  
**Date Tested** 14/12/2017  
**Date Report Issued** 13-Feb-18

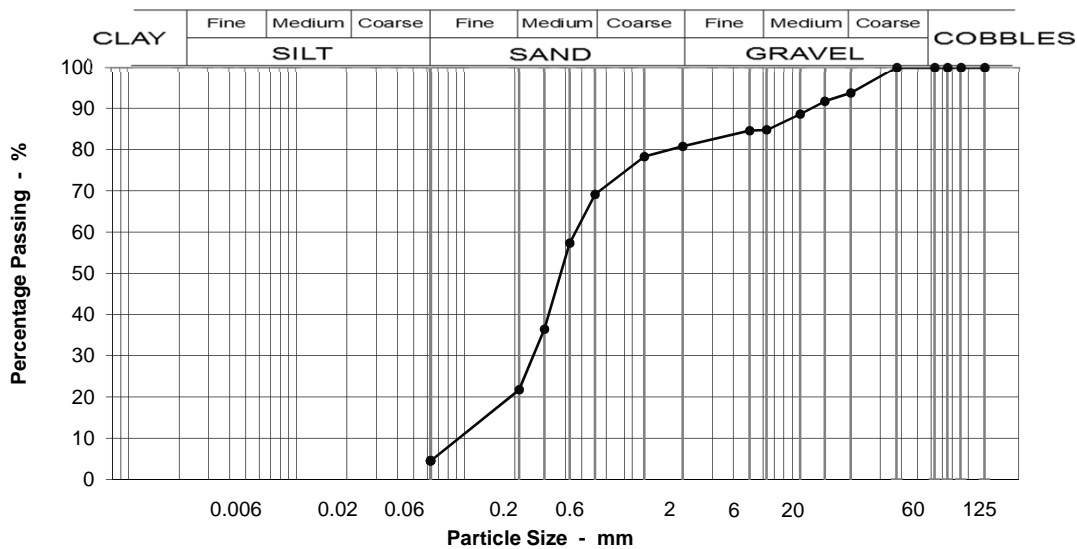
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH4 @ 1 - 1.2m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	94
14	92
10	89
6.3	85
5	85
2	81
1.18	78
0.600	69
0.425	57
0.300	36
0.212	22
0.063	5

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 4.3

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	6
Medium GRAVEL	9
Fine GRAVEL	4
Coarse SAND	12
Medium SAND	47
Fine SAND	17
Silt & Clay	5

Grading Analysis	
D100	20
D60	0.46
D10	0.11
Uniformity Coefficient	4

**Description**  
Brown very gravelly medium SAND. Gravel is medium to coarse subangular to rounded flint, quartz and concrete (MADE GROUND).

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171128008-610**  
Our Project No. PZ1522D1  
Your Sample Ref 8  
Your Project or Order No. PZ1522  
Date Tested 13/12/2017  
Date Report Issued 4-Jan-18

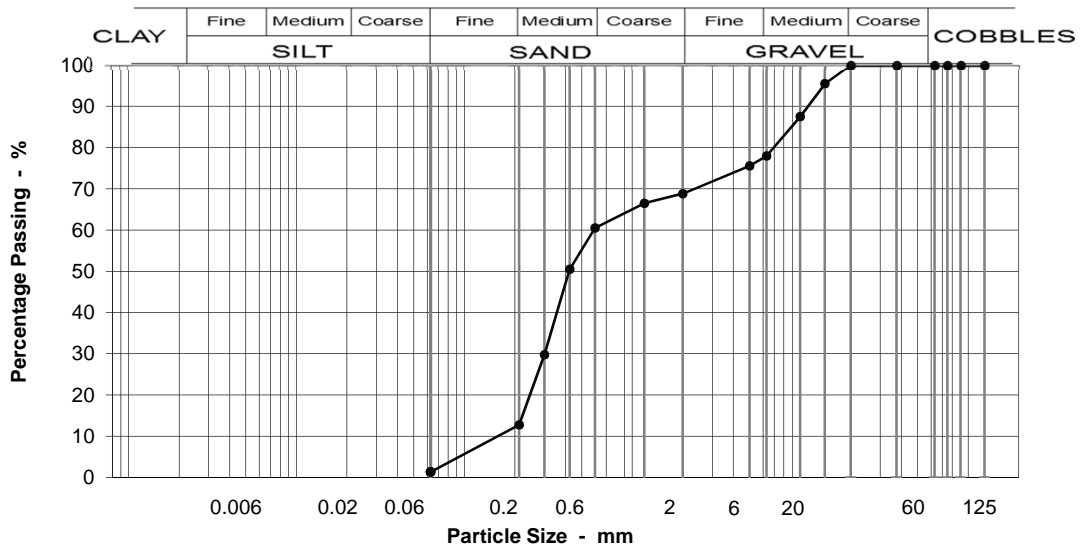
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 1.2 - 1.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	95
10	87
6.3	78
5	76
2	69
1.18	66
0.600	61
0.425	50
0.300	30
0.212	13
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 13

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	22
Fine GRAVEL	9
Coarse SAND	8
Medium SAND	48
Fine SAND	11
Silt & Clay	1

Grading Analysis	
D100	14
D60	0.59
D10	0.18
Uniformity Coefficient	3

**Description**  
Greyish brown very gravelly medium SAND. Gravel is fine and medium sub-angular to sub-rounded flint and quartz.

Test Code = 610



Simon Holden (Project Technician)

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171128009-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **9**  
Your Project or Order No. **PZ1522**  
Date Tested **13/12/2017**  
Date Report Issued **4-Jan-18**

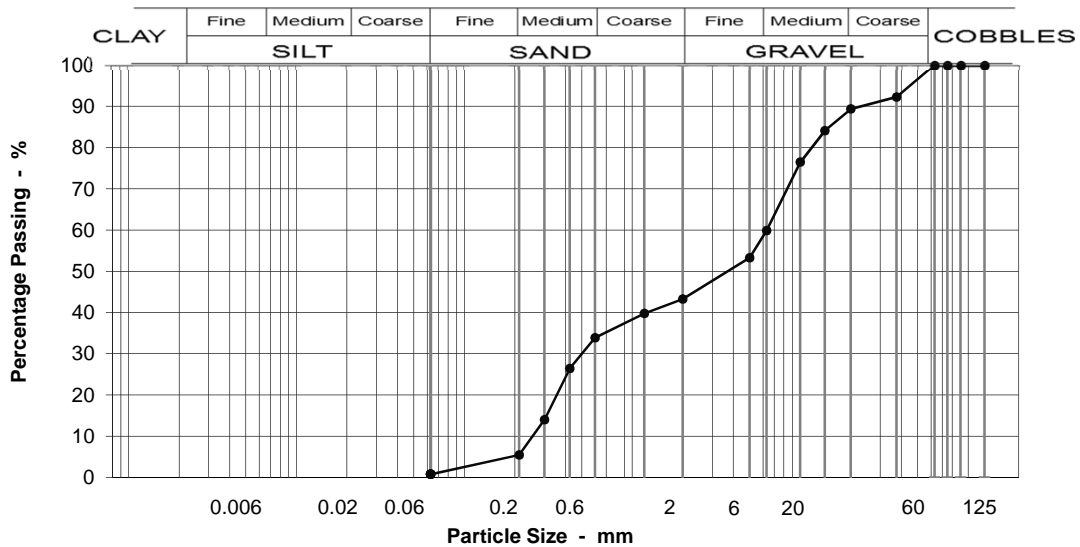
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 1.6 - 2m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	92
20	89
14	84
10	76
6.3	60
5	53
2	43
1.18	40
0.600	34
0.425	26
0.300	14
0.212	5
0.063	1

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 7.9

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	11
Medium GRAVEL	29
Fine GRAVEL	17
Coarse SAND	9
Medium SAND	28
Fine SAND	5
Silt & Clay	1

Grading Analysis	
D100	38
D60	6.33
D10	0.26
Uniformity Coefficient	24

**Description**  
MADE GROUND: comprising greyish-brown fine to coarse angular to rounded flint, quartz, tile and brick gravel and medium sand.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171128012-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 12  
**Your Project or Order No.** PZ1522  
**Date Tested** 14/12/2017  
**Date Report Issued** 4-Jan-18

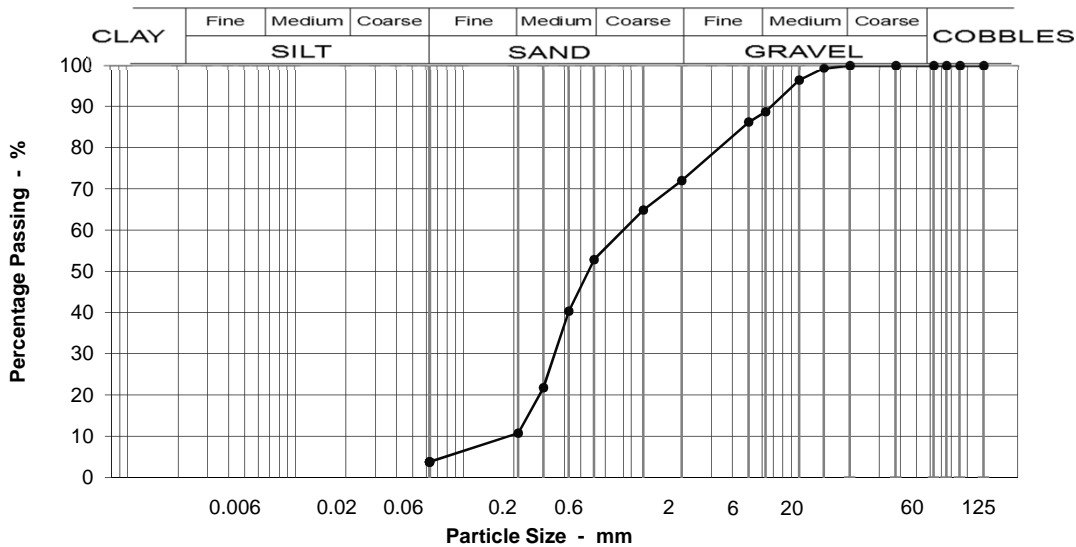
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 2 - 2.3m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	96
6.3	89
5	86
2	72
1.18	65
0.600	53
0.425	40
0.300	22
0.212	11
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	11
Fine GRAVEL	17
Coarse SAND	19
Medium SAND	42
Fine SAND	7
Silt & Clay	4

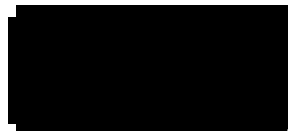
Grading Analysis	
D100	14
D60	0.95
D10	0.20
Uniformity Coefficient	5

**Description**  
MADE GROUND: comprising soft grey gravelly medium to coarse SAND with lenses of soft grey clayey silt. Gravel is fine to coarse angular to subrounded flint, quartz and brick with the occasional shell fragment.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171128013-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **13**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-Feb-18**

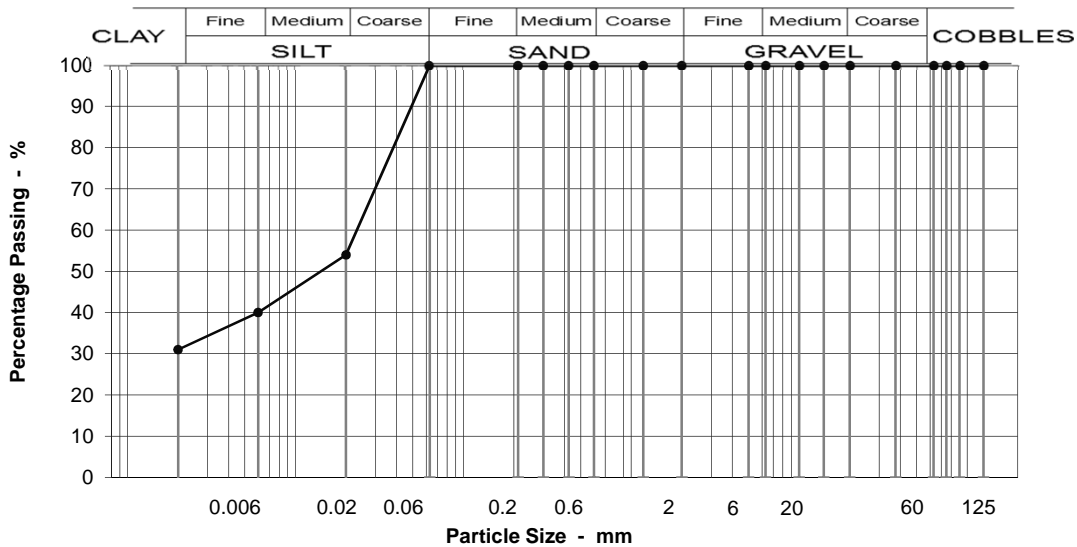
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 2.3 - 2.7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	100
0.063	100
0.020	54
0.006	40
0.002	31

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	0
Fine SAND	0
Silt & Clay	100

Grading Analysis	
D100	0
D60	0.03
D10	0.00
Uniformity Coefficient	>10*

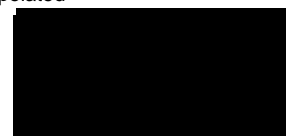
Description	
Soft to firm grey clayey coarse SILT.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171128014-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 14  
**Your Project or Order No.** PZ1522  
**Date Tested** 14/12/2017  
**Date Report Issued** 13-Feb-18

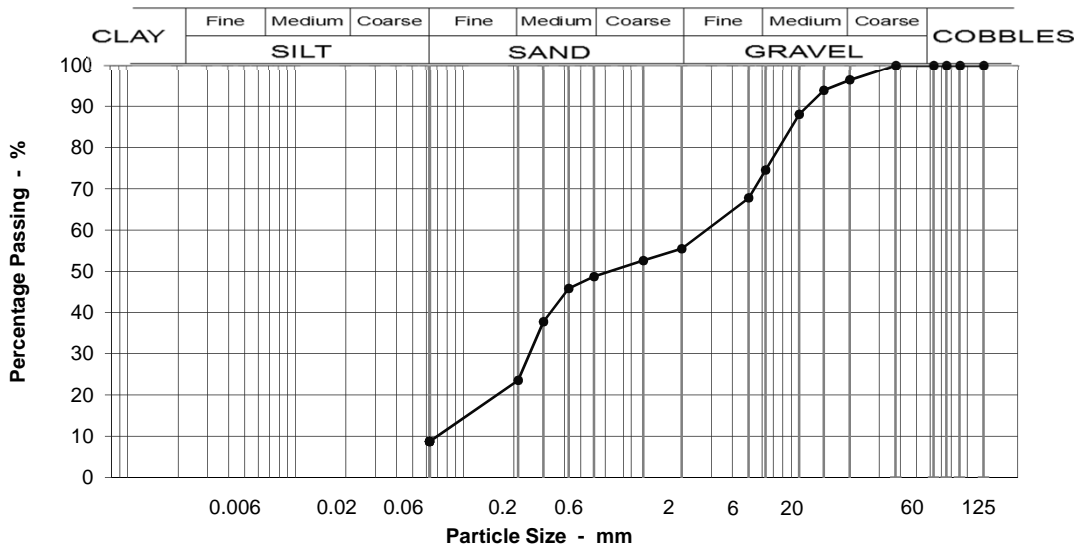
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 2.7 - 3m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	96
14	94
10	88
6.3	75
5	68
2	55
1.18	53
0.600	49
0.425	46
0.300	38
0.212	24
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	4
Medium GRAVEL	22
Fine GRAVEL	19
Coarse SAND	7
Medium SAND	25
Fine SAND	15
Silt & Clay	9

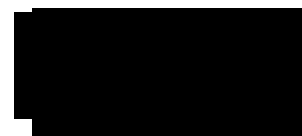
Grading Analysis	
D100	20
D60	3.10
D10	0.08
Uniformity Coefficient	41

Description	
Grey slightly clayey medium SAND and fine to medium flint, quartz, ceramics, pottery and brick GRAVEL.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171129001-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 18  
**Your Project or Order No.** PZ1522  
**Date Tested** 14/12/2017  
**Date Report Issued** 4-Jan-18

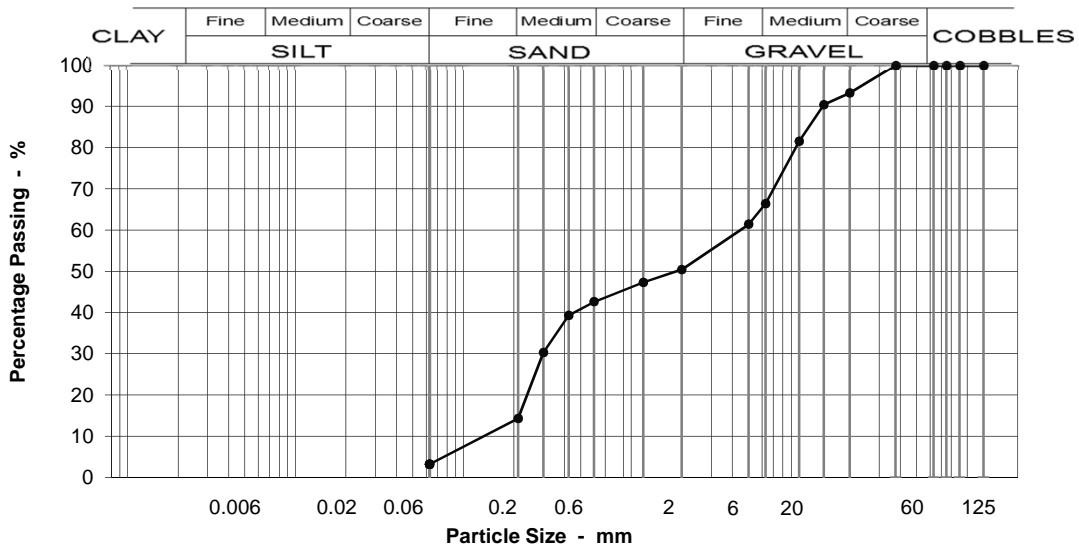
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 3 - 3.3m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	93
14	90
10	82
6.3	66
5	61
2	50
1.18	47
0.600	43
0.425	39
0.300	30
0.212	14
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	7
Medium GRAVEL	27
Fine GRAVEL	16
Coarse SAND	8
Medium SAND	28
Fine SAND	11
Silt & Clay	3

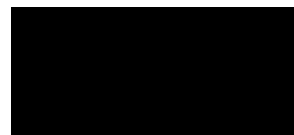
Grading Analysis	
D100	20
D60	4.62
D10	0.15
Uniformity Coefficient	30

**Description**  
MADE GROUND: comprising of greyish brown fine and medium flint, quartz, ceramics, pottery and brick gravel and fine to medium sand.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171129002-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **19**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-Feb-18**

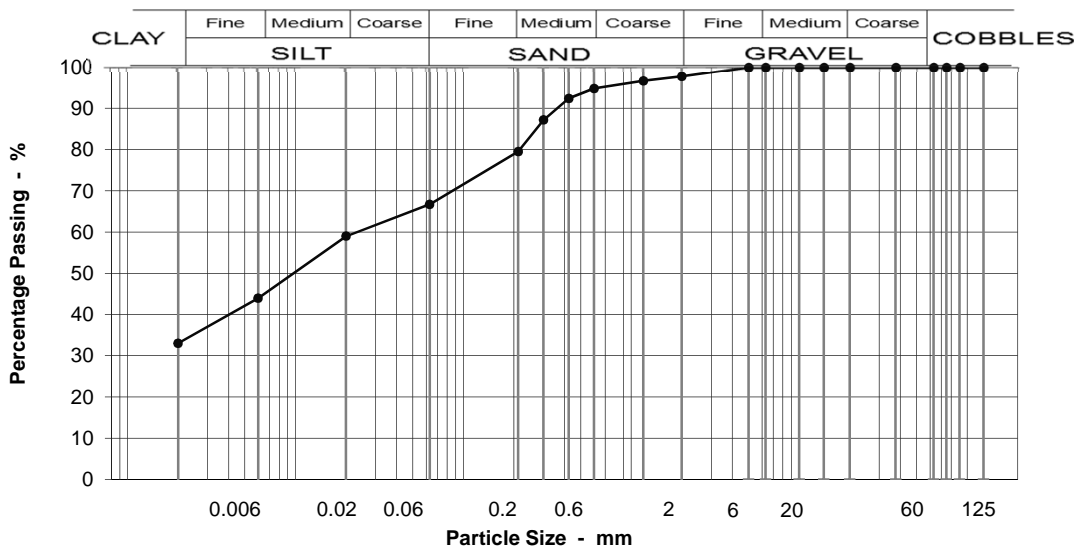
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 3.3 - 3.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	97
0.600	95
0.425	92
0.300	87
0.212	80
0.063	67
0.020	59
0.006	44
0.002	33

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	3
Medium SAND	15
Fine SAND	13
Silt & Clay	67

Grading Analysis	
D100	2
D60	0.03
D10	0.00
Uniformity Coefficient	>10*

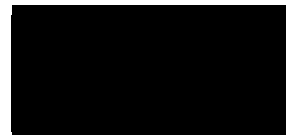
Description	
Soft to very soft, grey very sandy CLAY/SILT	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171129012-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 29  
**Your Project or Order No.** PZ1522  
**Date Tested** 07/12/2017  
**Date Report Issued** 4-Jan-18

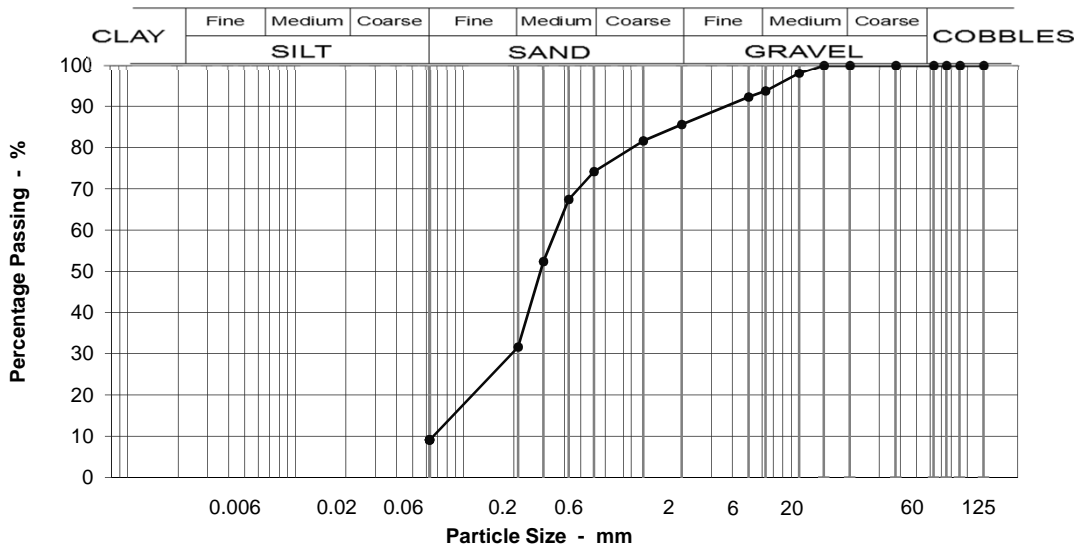
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH4 @ 6 - 6.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	94
5	92
2	86
1.18	82
0.600	74
0.425	67
0.300	52
0.212	32
0.063	9

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6K, 6M.**

**Moisture content %** 86

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	6
Fine GRAVEL	8
Coarse SAND	11
Medium SAND	43
Fine SAND	22
Silt & Clay	9

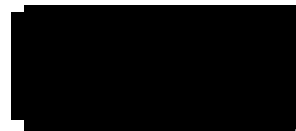
Grading Analysis	
D100	10
D60	0.36
D10	0.07
Uniformity Coefficient	5

**Description**  
Grey gravelly slightly silty fine to coarse SAND with lenses of black organic silty fine sand. Gravel is fine and medium angular to rounded flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171129014-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 31  
**Your Project or Order No.** PZ1522  
**Date Tested** 15/12/2017  
**Date Report Issued** 4-Jan-18

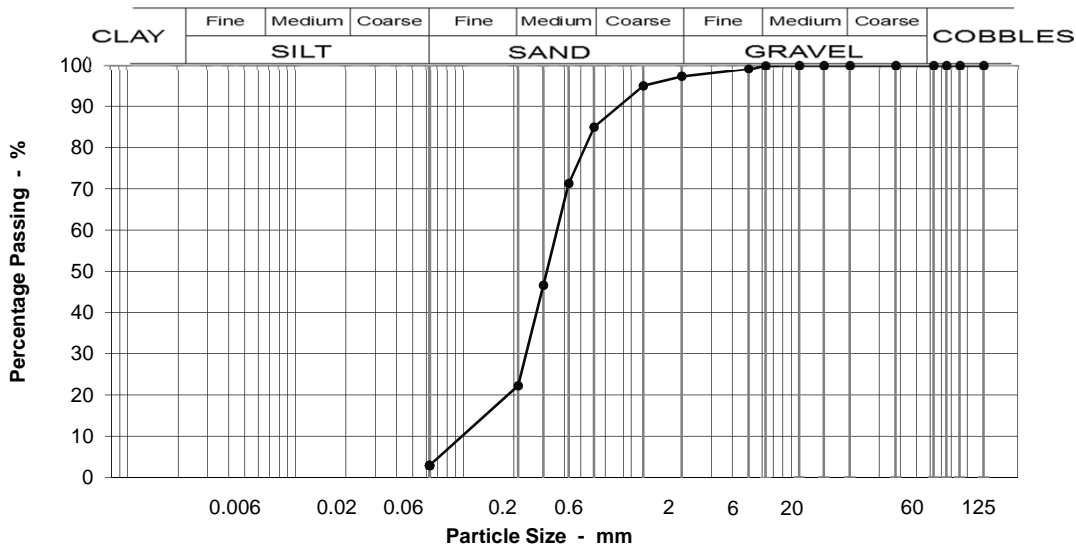
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 7 - 7.5m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	97
1.18	95
0.600	85
0.425	71
0.300	47
0.212	22
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	3
Coarse SAND	12
Medium SAND	63
Fine SAND	19
Silt & Clay	3

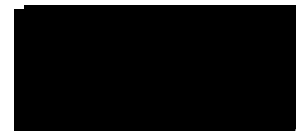
Grading Analysis	
D100	6
D60	0.37
D10	0.12
Uniformity Coefficient	3

Description	
Grey slightly organic medium SAND.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171130001-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **34**  
Your Project or Order No. **PZ1522**  
Date Tested **14/12/2017**  
Date Report Issued **4-Jan-18**

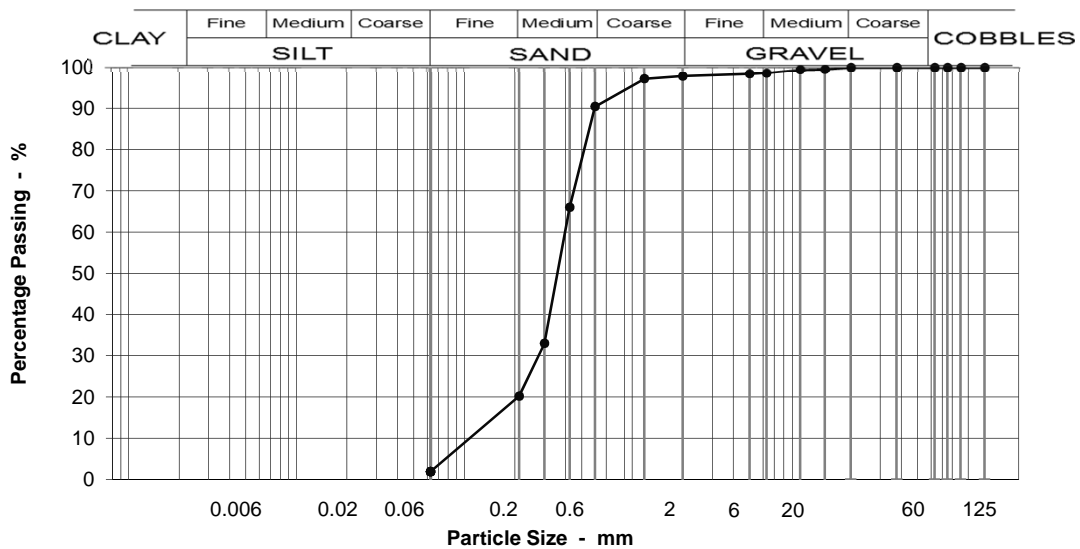
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 8 - 8.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	99
5	98
2	98
1.18	97
0.600	90
0.425	66
0.300	33
0.212	20
0.063	2

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	7
Medium SAND	70
Fine SAND	18
Silt & Clay	2

Grading Analysis	
D100	14
D60	0.40
D10	0.13
Uniformity Coefficient	3

**Description**  
Grey slightly organic medium SAND.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171201002-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 37  
**Your Project or Order No.** PZ1522  
**Date Tested** 21/12/2017  
**Date Report Issued** 4-Jan-18

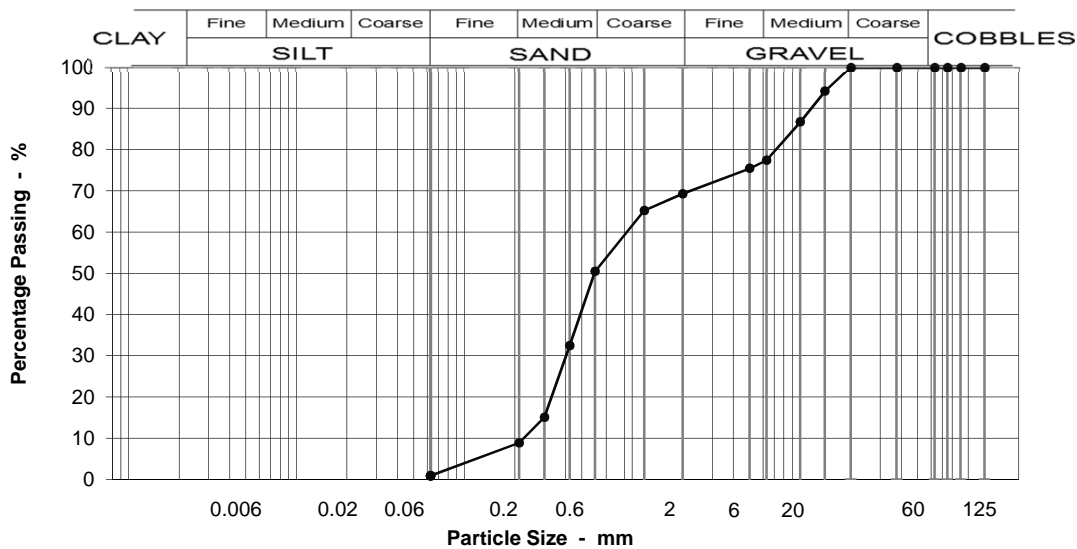
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH4 @ 9 - 9.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	94
10	87
6.3	77
5	75
2	69
1.18	65
0.600	50
0.425	33
0.300	15
0.212	9
0.063	1

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	23
Fine GRAVEL	8
Coarse SAND	19
Medium SAND	42
Fine SAND	8
Silt & Clay	1

Grading Analysis	
D100	14
D60	0.97
D10	0.23
Uniformity Coefficient	4

**Description**  
Brown very gravelly medium and coarse SAND. Gravel is fine and medium angular to rounded flint and quartz.

**Moisture content %** 13

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171201004-610**  
Our Project No. PZ1522D1  
Your Sample Ref 39  
Your Project or Order No. PZ1522  
Date Tested 22/12/2017  
Date Report Issued 13-Feb-18

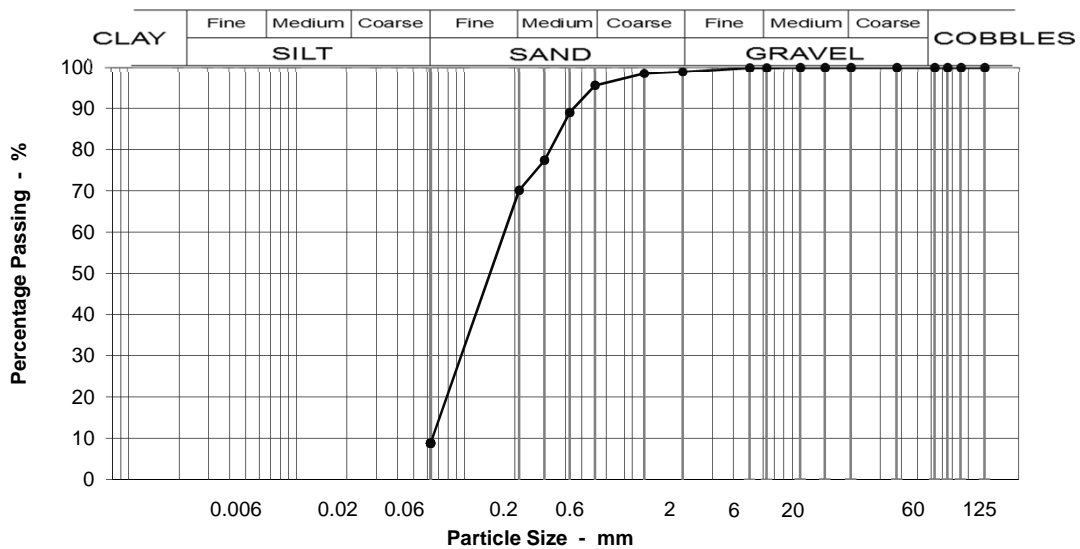
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 10 - 10.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	96
0.425	89
0.300	77
0.212	70
0.063	9

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	25
Fine SAND	61
Silt & Clay	9

Grading Analysis	
D100	6
D60	0.19
D10	0.07
Uniformity Coefficient	3

**Description**  
Brown fine SAND.

Moisture content % 23

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171201011-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 46  
**Your Project or Order No.** PZ1522  
**Date Tested** 21/12/2017  
**Date Report Issued** 4-Jan-18

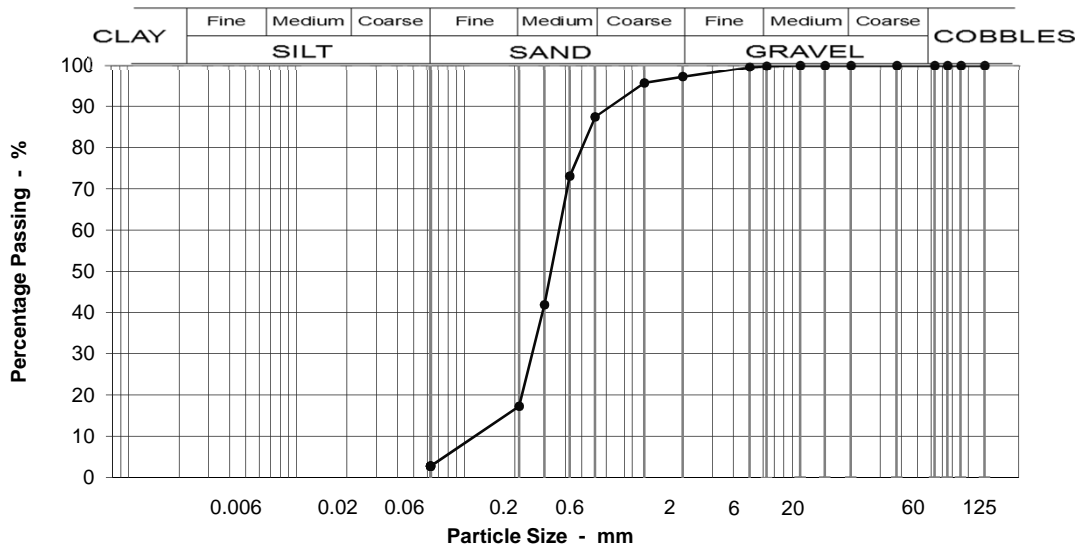
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 13 - 13.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	97
1.18	96
0.600	87
0.425	73
0.300	42
0.212	17
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	3
Coarse SAND	10
Medium SAND	70
Fine SAND	15
Silt & Clay	3

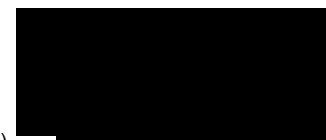
Grading Analysis	
D100	6
D60	0.37
D10	0.14
Uniformity Coefficient	3

Description	
Greyish brown medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171204002-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 53  
**Your Project or Order No.** PZ1522  
**Date Tested** 22/12/2017  
**Date Report Issued** 4-Jul-18

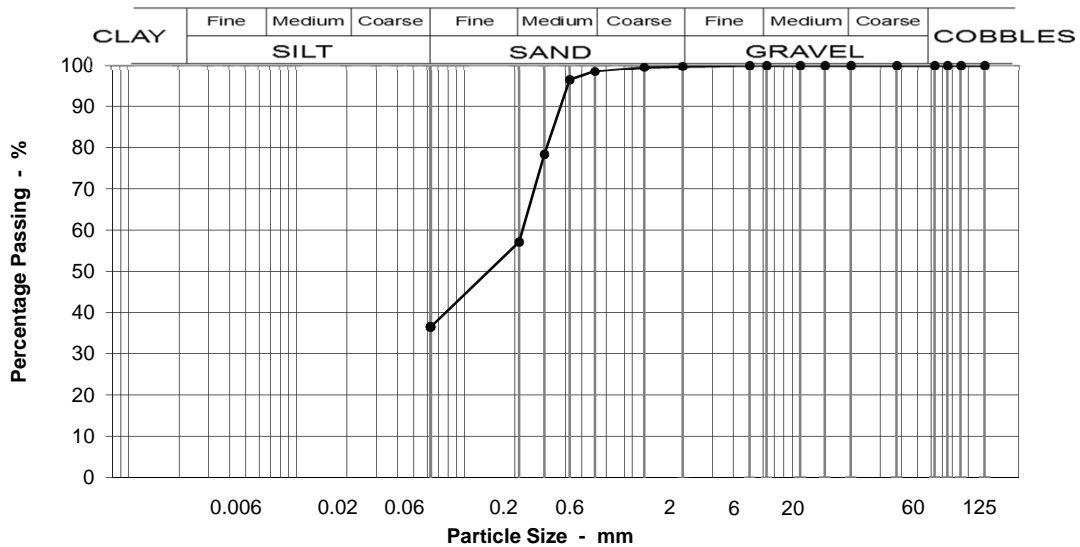
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH4 @ 16 - 16.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	96
0.300	78
0.212	57
0.063	37

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes**  
**2A/2B, 2A/2B.**

**Moisture content %** 57

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	41
Fine SAND	21
Silt & Clay	37

Grading Analysis	
D100	6
D60	0.22
D10	0.03
Uniformity Coefficient	7*

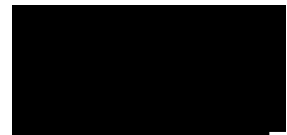
Description	
Dark brown clayey very silty fine and medium SAND.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171204009-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 60  
Your Project or Order No. PZ1522  
Date Tested 22/12/2017  
Date Report Issued 4-Jan-18

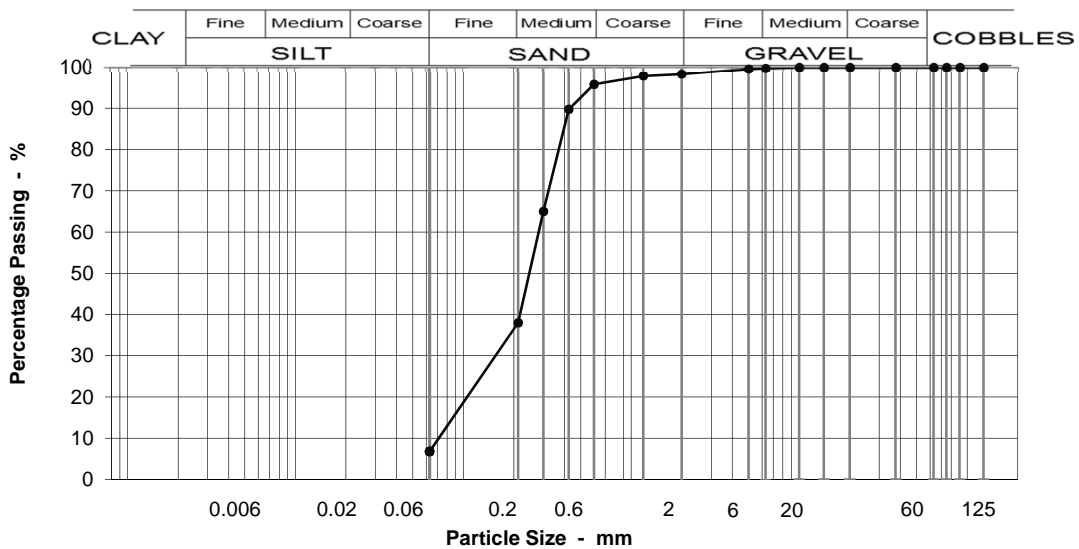
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 19 - 19.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	98
0.600	96
0.425	90
0.300	65
0.212	38
0.063	7

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 37

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	58
Fine SAND	31
Silt & Clay	7

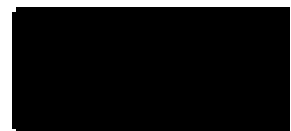
Grading Analysis	
D100	6
D60	0.28
D10	0.08
Uniformity Coefficient	4

**Description**  
Brownish grey slightly silty fine and medium SAND.

Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

Our reference No. **GTS1171204015-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 66  
Your Project or Order No. PZ1522  
Date Tested 21/12/2017  
Date Report Issued 4-Jan-18

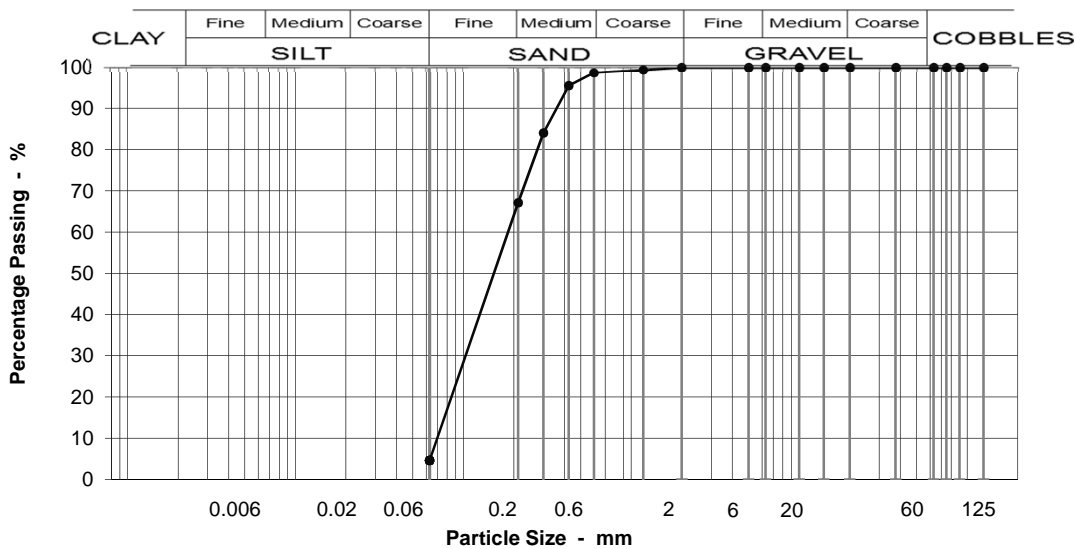
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 22 - 22.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	99
0.425	95
0.300	84
0.212	67
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	32
Fine SAND	62
Silt & Clay	5

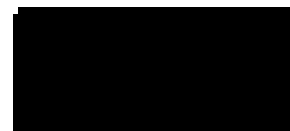
Grading Analysis	
D100	1
D60	0.20
D10	0.08
Uniformity Coefficient	3

Description	
Brownish grey slightly silty fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

Our reference No. **GTS1171204016-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 67  
Your Project or Order No. PZ1522  
Date Tested 21/12/2017  
Date Report Issued 4-Jan-18

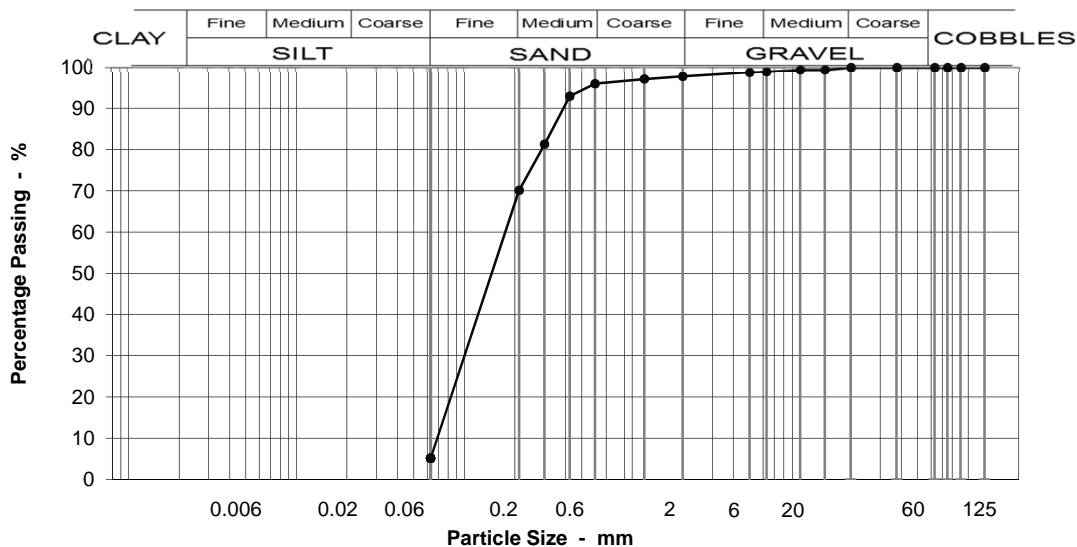
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 23 - 23.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	99
6.3	99
5	99
2	98
1.18	97
0.600	96
0.425	93
0.300	81
0.212	70
0.063	5

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	26
Fine SAND	65
Silt & Clay	5

Grading Analysis	
D100	14
D60	0.19
D10	0.07
Uniformity Coefficient	3

**Description**  
Brownish grey slightly silty fine and medium SAND.

Moisture content % 25

Test Code = 610



Simon Holden (Project Technician)



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Our reference No. **GTS5171205001-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 69  
Your Project or Order No. PZ1522  
Date Tested 20/12/2017  
Date Report Issued 4-Jan-18

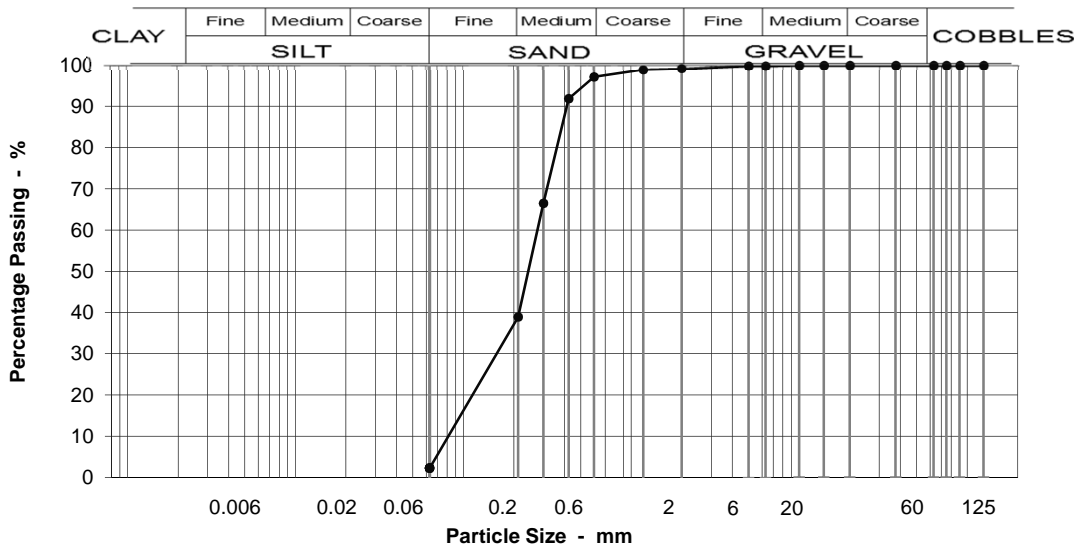
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 24.45 - 25m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	92
0.300	66
0.212	39
0.063	2

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	58
Fine SAND	37
Silt & Clay	2

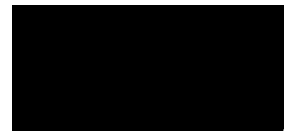
Grading Analysis	
D100	6
D60	0.28
D10	0.09
Uniformity Coefficient	3

Description	
Grey fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

Our reference No. **GTS5171205005-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 73  
Your Project or Order No. PZ1522  
Date Tested 21/12/2017  
Date Report Issued 4-Jan-18

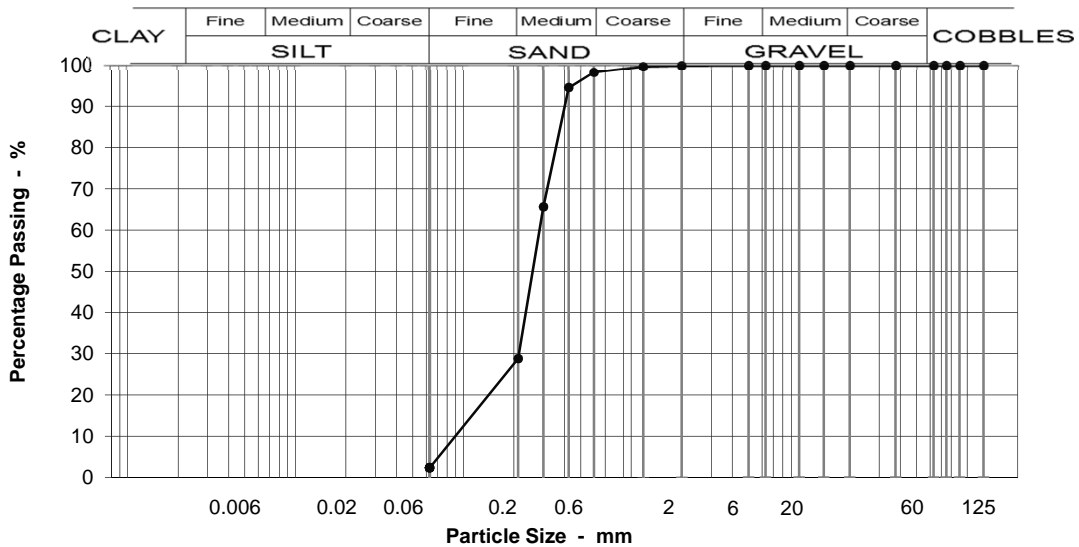
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 27 - 27.6m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	98
0.425	95
0.300	66
0.212	29
0.063	2

Specification for Highway Works Classification  
Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	69
Fine SAND	26
Silt & Clay	2

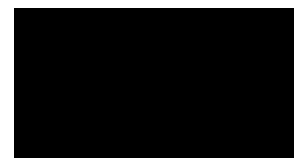
Grading Analysis	
D100	2
D60	0.29
D10	0.11
Uniformity Coefficient	3

Description	
Grey fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)





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Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS5171205009-610**  
Our Project No. PZ1522D1  
Your Sample Ref 76  
Your Project or Order No. PZ1522  
Date Tested 21/12/2017  
Date Report Issued 4-Jan-18

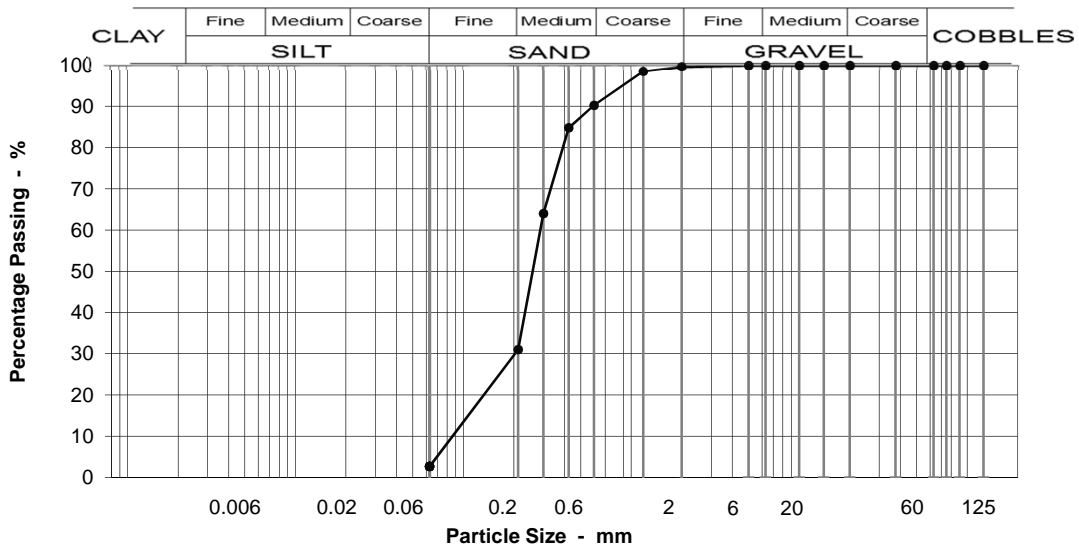
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4 @ 28 - 28.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	90
0.425	85
0.300	64
0.212	31
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	9
Medium SAND	59
Fine SAND	28
Silt & Clay	3

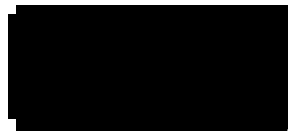
Grading Analysis	
D100	2
D60	0.29
D10	0.10
Uniformity Coefficient	3

Description	
Grey fine and medium SAND with some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171204002-610**  
Our Project No. PZ1522D1  
Your Sample Ref 1  
Your Project or Order No. PZ1522  
Date Tested 24/12/2018  
Date Report Issued 4-Jan-18

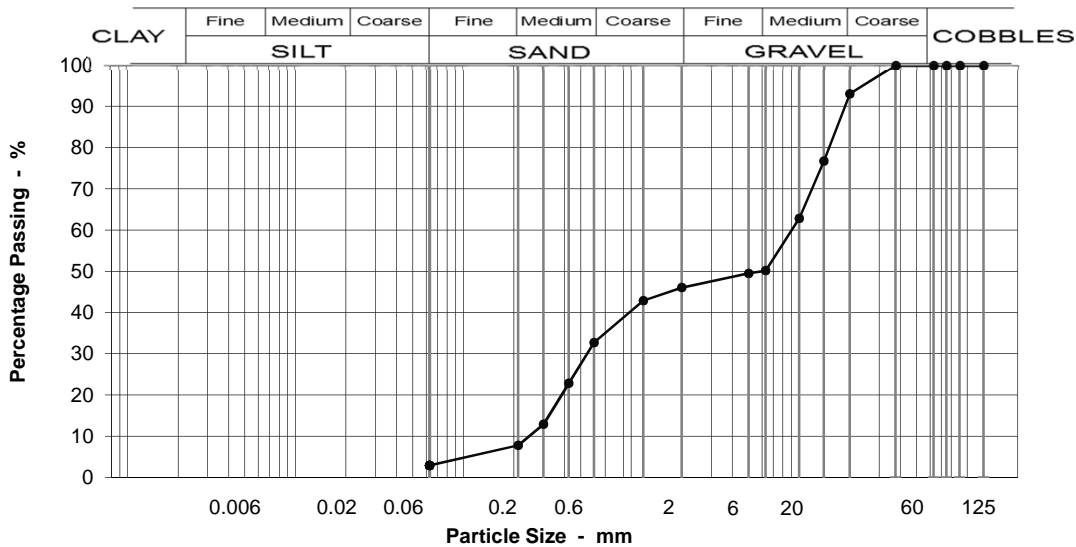
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4A @ 0.2 - 0.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	93
14	77
10	63
6.3	50
5	49
2	46
1.18	43
0.600	33
0.425	23
0.300	13
0.212	8
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 6.9

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	7
Medium GRAVEL	43
Fine GRAVEL	4
Coarse SAND	13
Medium SAND	25
Fine SAND	5
Silt & Clay	3

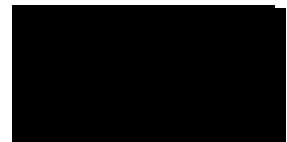
Grading Analysis	
D100	20
D60	9.18
D10	0.25
Uniformity Coefficient	37

**Description**  
MADE GROUND: comprising medium gravel sized angular to rounded concrete, flint, asphalt and quartz in a matrix of greyish-brown medium and coarse sand.

Test Code = 610



Simon Holden (Project Technician)



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Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171204004-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **3**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

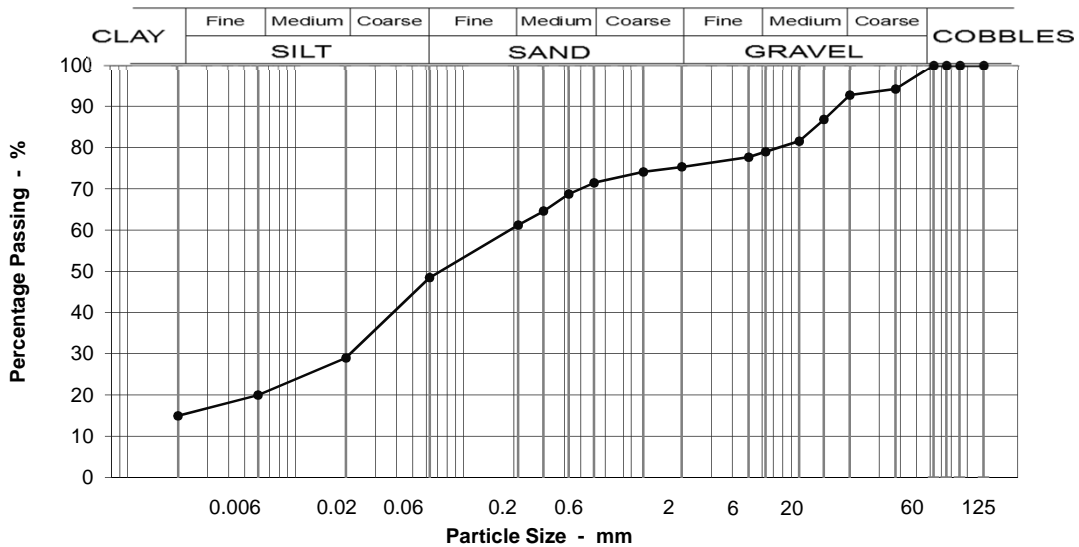
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4A @ 0.5 - 1m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	94
20	93
14	87
10	82
6.3	79
5	78
2	75
1.18	74
0.600	71
0.425	69
0.300	65
0.212	61
0.063	48
0.020	29
0.006	20
0.002	15

Specification for Highway Works Classification  
Table 6/2

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	7
Medium GRAVEL	14
Fine GRAVEL	4
Coarse SAND	4
Medium SAND	10
Fine SAND	13
Silt & Clay	48

Grading Analysis	
D100	38
D60	0.20
D10	0.00
Uniformity Coefficient	>10

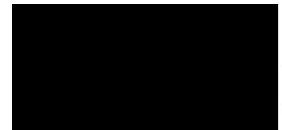
Description	
Firm dark grey very gravelly, very sandy clayey SILT with some roots. Gravel is medium angular to sub-angular concrete, brick, flint, quartz and asphalt (MADE GROUND)	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171205006-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 15  
Your Project or Order No. PZ1522  
Date Tested 02/01/2018  
Date Report Issued 12-Jan-18

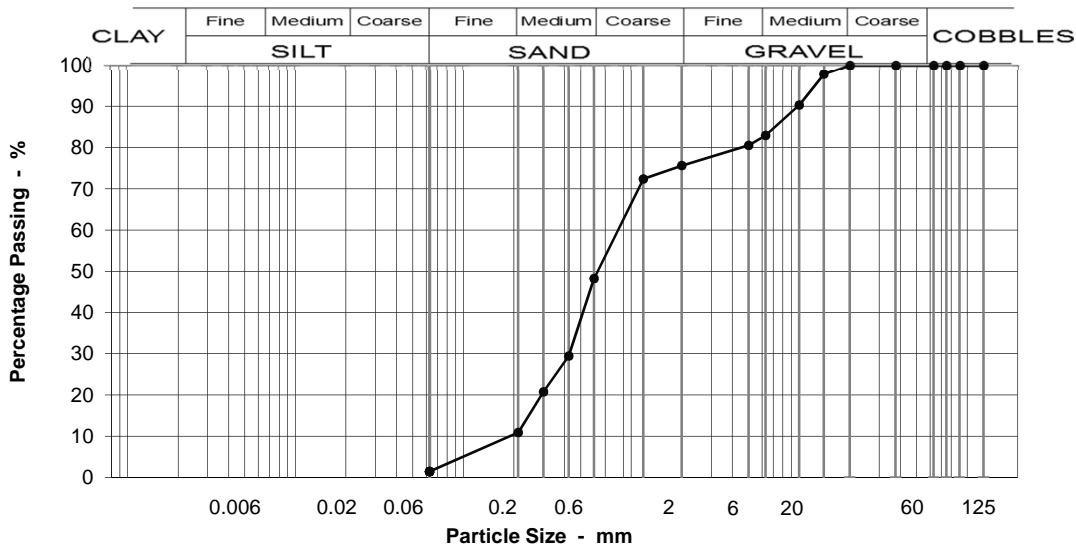
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4A @ 4 - 4.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	90
6.3	83
5	81
2	76
1.18	72
0.600	48
0.425	29
0.300	21
0.212	11
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6F1, 6M.**

Moisture content % 9

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	17
Fine GRAVEL	7
Coarse SAND	27
Medium SAND	37
Fine SAND	9
Silt & Clay	1

Grading Analysis	
D100	14
D60	0.88
D10	0.20
Uniformity Coefficient	4

**Description**  
Dark brown very gravelly medium and coarse SAND. Gravel is fine and medium subangular to rounded flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201803025-610**  
Our Project No. PZ1522D1  
Your Sample Ref 3  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

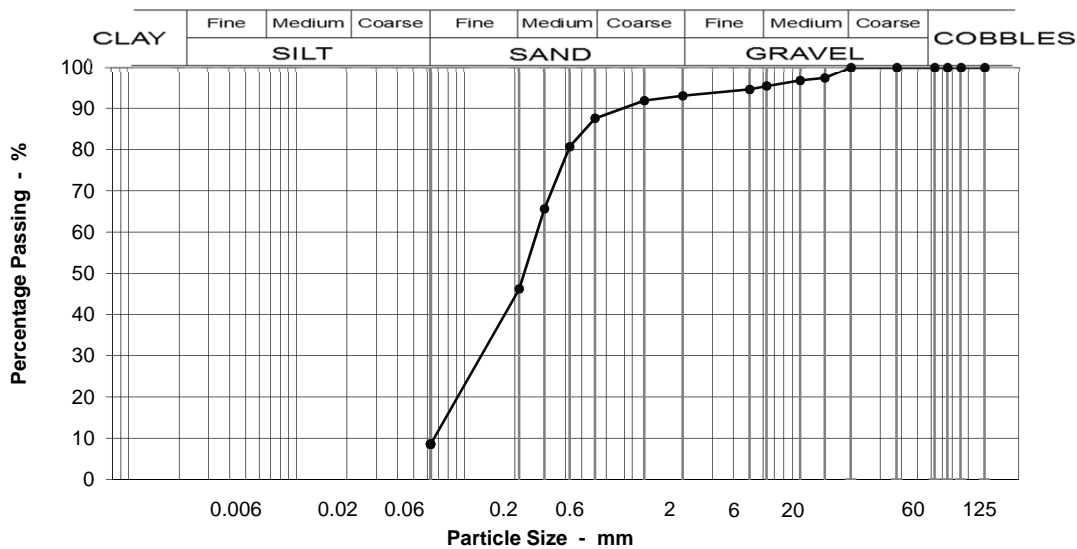
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4ASU @ 0.5 - 0.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	97
10	97
6.3	95
5	95
2	93
1.18	92
0.600	88
0.425	81
0.300	66
0.212	46
0.063	9

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	5
Fine GRAVEL	2
Coarse SAND	5
Medium SAND	41
Fine SAND	38
Silt & Clay	9

Grading Analysis	
D100	14
D60	0.27
D10	0.07
Uniformity Coefficient	4

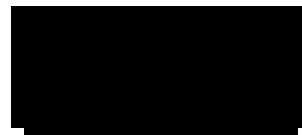
**Description**  
MADE GROUND: comprising of brown slightly silty, slightly gravelly fine and medium SAND, Gravel is fine and medium sub angular to rounded flint and quartz.

Moisture content % 11

Test Code = 610



Simon Holden (Project Technician)





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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201803029-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

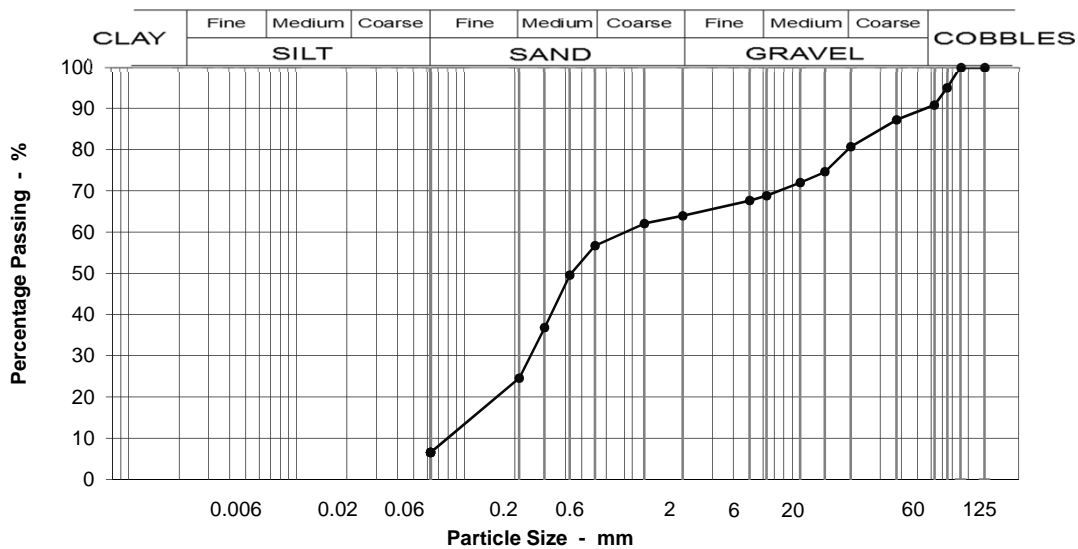
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4ASU @ 0.2 - 0.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	95
63	91
37.5	87
20	81
14	75
10	72
6.3	69
5	68
2	64
1.18	62
0.600	57
0.425	50
0.300	37
0.212	25
0.063	7

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1A, 6E/6R, 6I.**

Sample Proportions	
BOULDERS	0
COBBLES	9
Coarse GRAVEL	10
Medium GRAVEL	12
Fine GRAVEL	5
Coarse SAND	7
Medium SAND	32
Fine SAND	18
Silt & Clay	7

Grading Analysis	
D100	75
D60	0.96
D10	0.09
Uniformity Coefficient	10

**Description**  
MADE GROUND: comprising brown slightly silty very gravelly fine and medium SAND, Gravel is medium and coarse angular flint, concrete and asphalt with occasional concrete cobbles.

Moisture content % 9.6

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018030214-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **7**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **4-Jul-18**

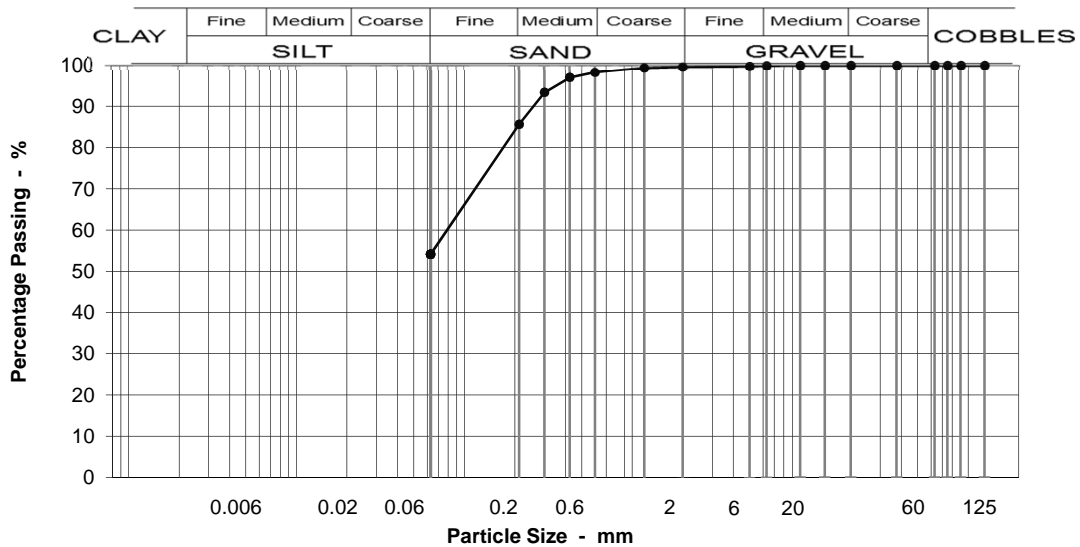
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4ASU @ 2 - 3m Specimen: 2 @ 2.35m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	98
0.425	97
0.300	93
0.212	86
0.063	54

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 2A/2B, 2A/2B.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	13
Fine SAND	31
Silt & Clay	54

Grading Analysis	
D100	6
D60	0.09
D10	0.02
Uniformity Coefficient	4*

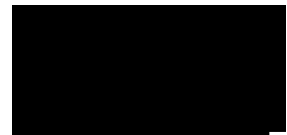
Description	
Dark grey very asndy very clayey organic SILT with some roots.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2018030212-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 10  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 17-Apr-18

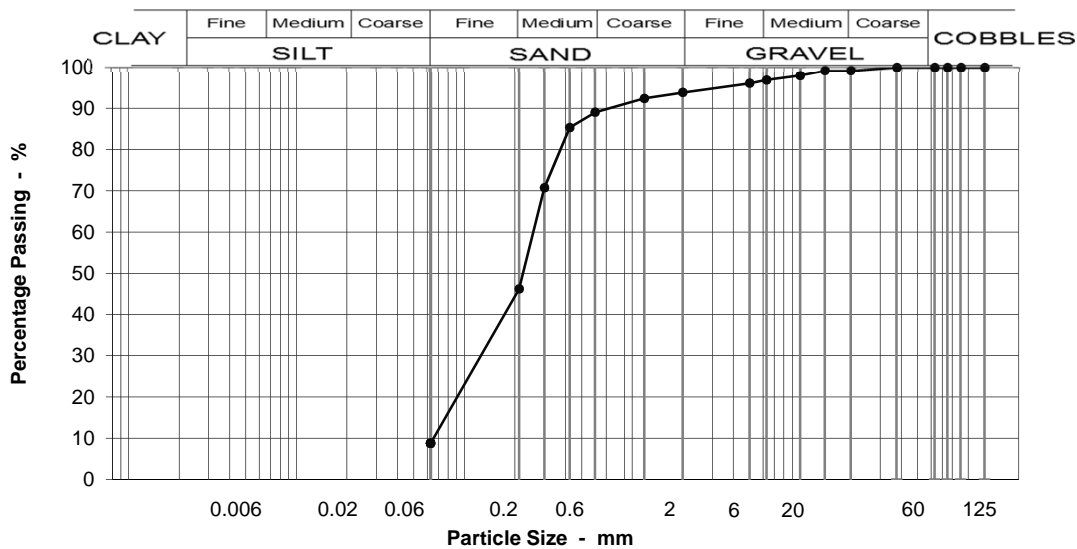
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH4ASU @ 5 - 6m **Specimen:** 1 @ 5.2m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	99
10	98
6.3	97
5	96
2	94
1.18	92
0.600	89
0.425	85
0.300	71
0.212	46
0.063	9

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	2
Fine GRAVEL	3
Coarse SAND	5
Medium SAND	43
Fine SAND	37
Silt & Clay	9

Grading Analysis	
D100	20
D60	0.26
D10	0.07
Uniformity Coefficient	4

**Description**  
Laminated greyish brown fine and medium SAND with laminae of soft grey clay.

Test Code = 610



Simon Holden (Project Technician)

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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018030215-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

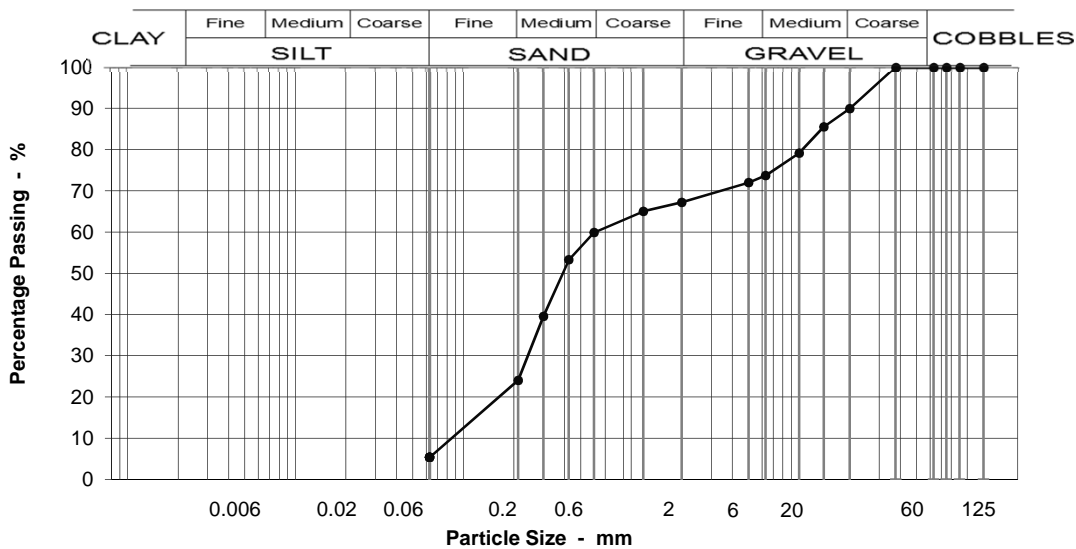
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4BU @ 0.1 - 0.4m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	90
14	86
10	79
6.3	74
5	72
2	67
1.18	65
0.600	60
0.425	53
0.300	40
0.212	24
0.063	5

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6J, 6M.**

Moisture content % 9.5

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	10
Medium GRAVEL	16
Fine GRAVEL	7
Coarse SAND	7
Medium SAND	36
Fine SAND	19
Silt & Clay	5

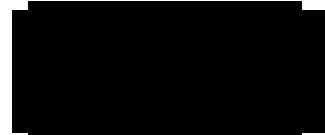
Grading Analysis	
D100	20
D60	0.61
D10	0.10
Uniformity Coefficient	6

**Description**  
Dark greyish brown very sandy, gravelly TOPSOIL with some roots

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018030217-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **3**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

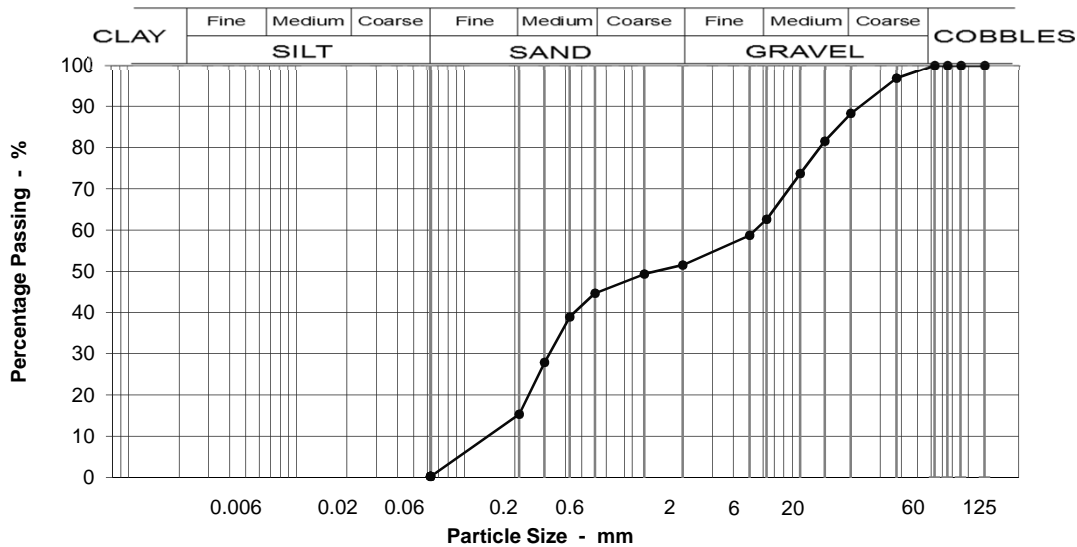
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4BU @ 0.5 - 0.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	97
20	88
14	82
10	74
6.3	63
5	59
2	52
1.18	49
0.600	45
0.425	39
0.300	28
0.212	15
0.063	0

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 7.4

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	12
Medium GRAVEL	26
Fine GRAVEL	11
Coarse SAND	7
Medium SAND	29
Fine SAND	15
Silt & Clay	0

Grading Analysis	
D100	38
D60	5.43
D10	0.16
Uniformity Coefficient	34

Description	
Brown fine to coarse SAND and fine to coarse rounded to subangular flint and quartz GRAVEL.	

Test Code = 610



Simon Holden (Project Technician)





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Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2018030218-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 4  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 4-Jul-18

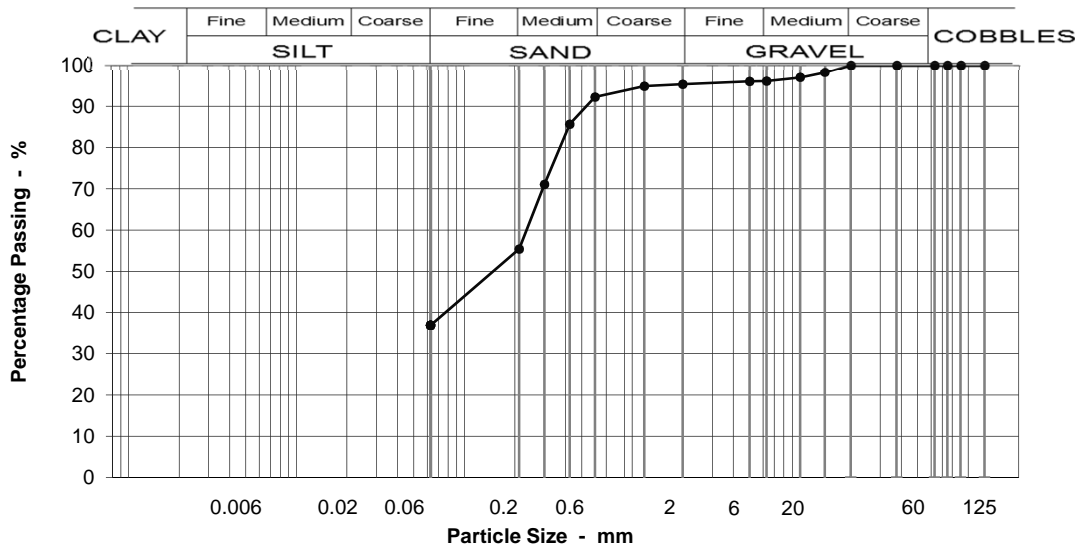
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH4BU @ 0.9 - 1.2m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	97
6.3	96
5	96
2	95
1.18	95
0.600	92
0.425	86
0.300	71
0.212	55
0.063	37

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes**  
**2A/2B, 2A/2B.**

**Moisture content %** 7

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	4
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	37
Fine SAND	18
Silt & Clay	37

Grading Analysis	
D100	14
D60	0.24
D10	0.03
Uniformity Coefficient	7*

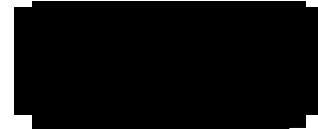
**Description**  
Orangey-brown slightly gravelly very silty fine and medium SAND. Gravel is medium rounded to subrounded flint and quartz.

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018030220-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **6**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

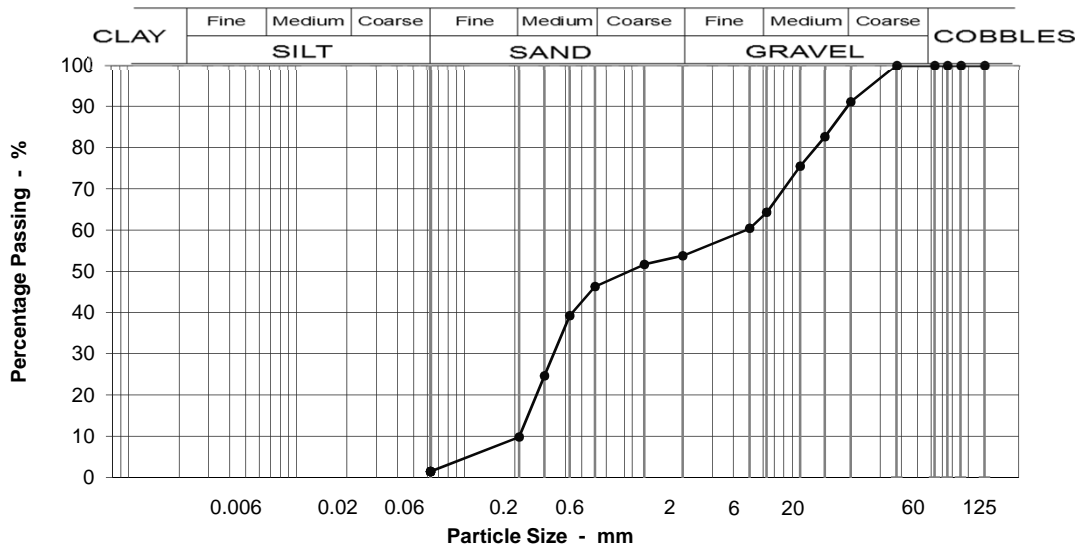
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4BU @ 1.2 - 2m Specimen: 1 @ 1.35m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	91
14	83
10	76
6.3	64
5	60
2	54
1.18	52
0.600	46
0.425	39
0.300	25
0.212	10
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 7.5

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	9
Medium GRAVEL	27
Fine GRAVEL	11
Coarse SAND	7
Medium SAND	36
Fine SAND	8
Silt & Clay	2

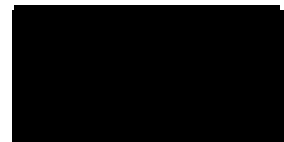
Grading Analysis	
D100	20
D60	4.82
D10	0.21
Uniformity Coefficient	23

Description	
Brown medium SAND and fine and medium rounded to sub-angular flint and quartz GRAVEL.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018030221-**  
Our Project No **PZ1522D1**  
Your Sample Ref **7**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

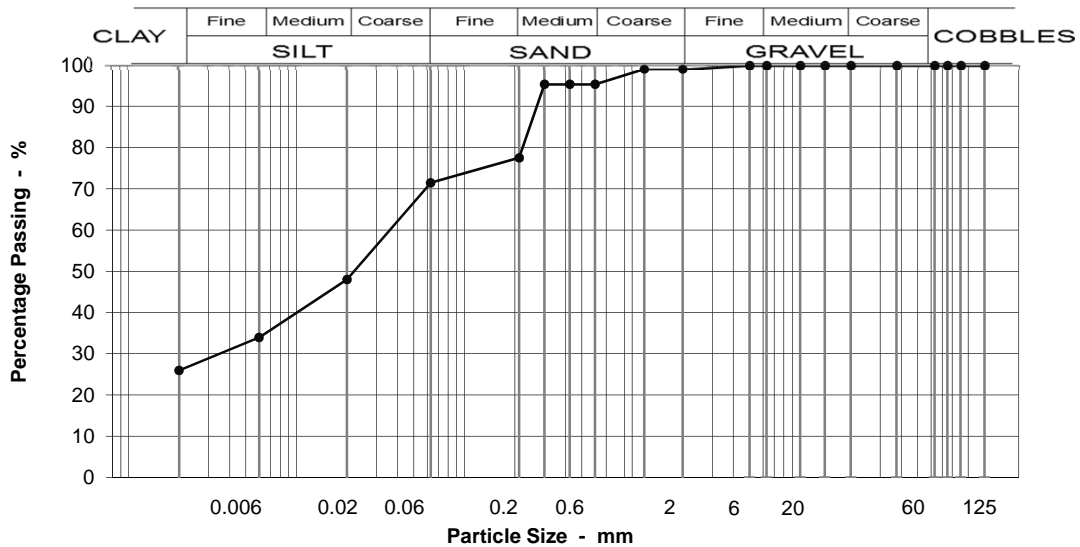
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4BU @ 2 - 3m Specimen: 2 @ 2.6m

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	4
14	100		Medium SAND	18
10	100		Fine SAND	6
6.3	100		Silt & Clay	71
5	100			
2	99			
1.18	99			
0.600	95			
0.425	95			
0.300	95			
0.212	78			
0.063	71			
0.020	48			
0.006	34			
0.002	26			
		Moisture content %		0

Grading Analysis	
D100	2
D60	0.04
D10	0.00
Uniformity Coefficient	>10*

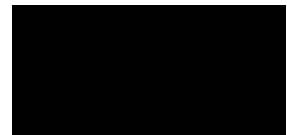
Description	
Laminated light grey very sandy clayey SILT, black organic silty CLAY and light grey, silty CLAY.	

\* Uniformity coefficient extrapolated

Test Code =



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018030224-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **10**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

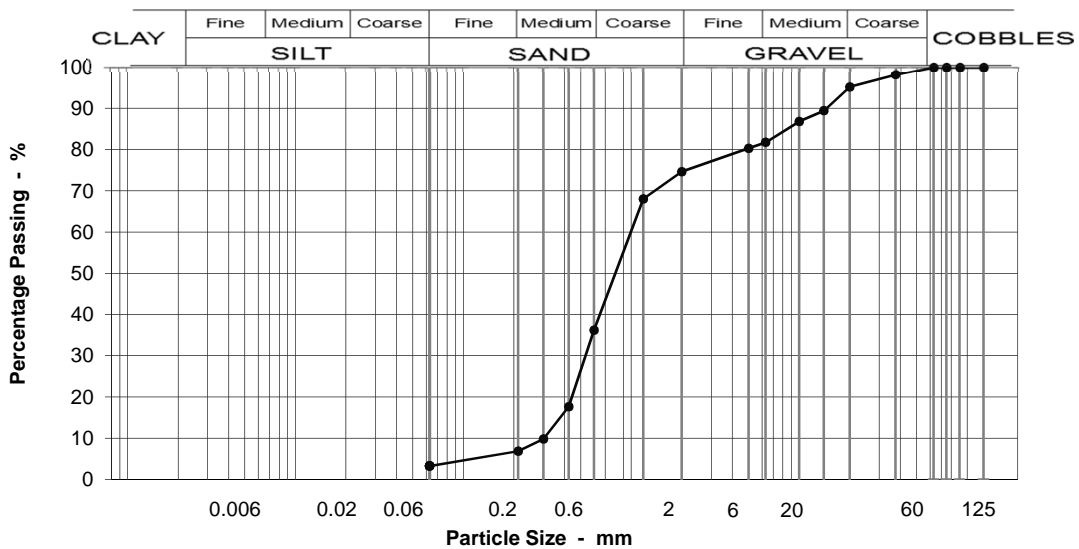
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4BU @ 4 - 5m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	98
20	95
14	89
10	87
6.3	82
5	80
2	75
1.18	68
0.600	36
0.425	18
0.300	10
0.212	7
0.063	3

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6F1, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	5
Medium GRAVEL	13
Fine GRAVEL	7
Coarse SAND	38
Medium SAND	29
Fine SAND	4
Silt & Clay	3

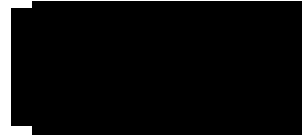
Grading Analysis	
D100	38
D60	1.03
D10	0.30
Uniformity Coefficient	3

**Description**  
Greyish brown very gravelly medium and coarse SAND. Gravel is medium angular to rounded flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171212001-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

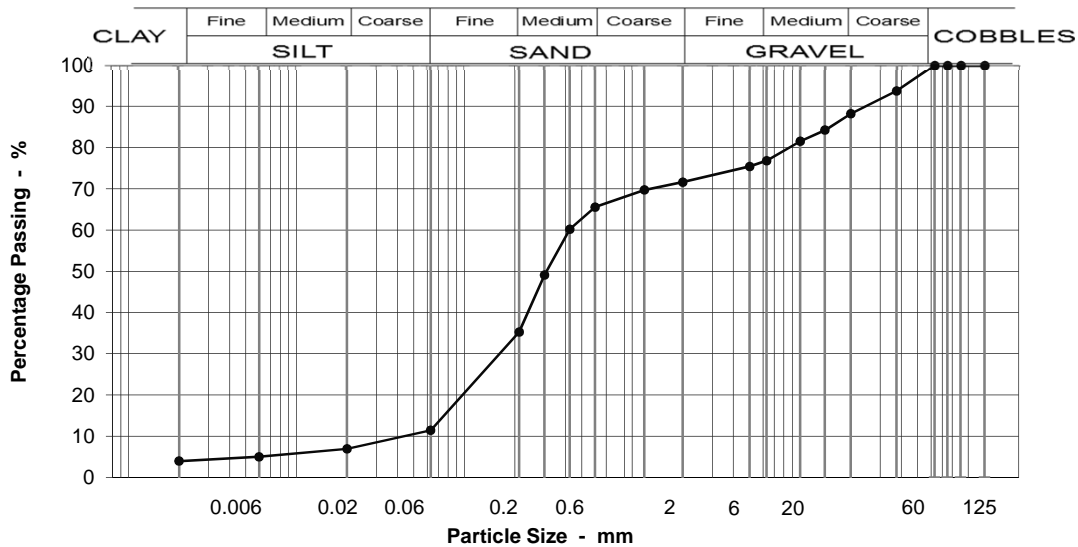
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: **Gt Yarmouth 3rd River Crossing**

Location: **BH4D @ 0.25 - 0.6m Specimen: 1**

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	94
20	88
14	84
10	82
6.3	77
5	75
2	72
1.18	70
0.600	66
0.425	60
0.300	49
0.212	35
0.063	11
0.020	7
0.006	5
0.002	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	12
Medium GRAVEL	11
Fine GRAVEL	5
Coarse SAND	6
Medium SAND	30
Fine SAND	24
Silt & Clay	11

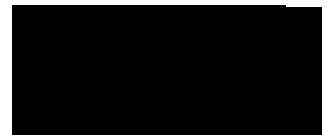
Grading Analysis	
D100	38
D60	0.42
D10	0.11
Uniformity Coefficient	4

**Description**  
MADE GROUND comprising fine, medium and coarse gravel size, angular flint, brick, asphalt, concrete and wood in a matrix of dark grey sandy topsoil.

Source : Inspection pit: Hand dug. Gen  
Test Code = 613



Simon Holden (Project Technician)





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Norfolk  
NR1 2DH

Our reference No. **GTS3171212005-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **5**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

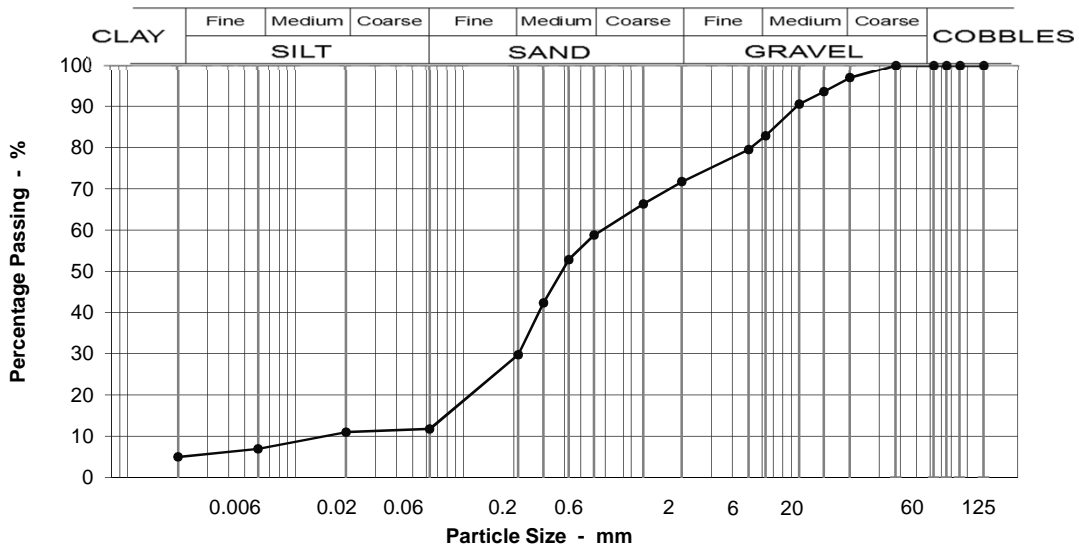
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 1 - 1.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	97
14	94
10	91
6.3	83
5	79
2	72
1.18	66
0.600	59
0.425	53
0.300	42
0.212	30
0.063	12
0.020	11
0.006	7
0.002	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J.**

Moisture content % 33

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	3
Medium GRAVEL	14
Fine GRAVEL	11
Coarse SAND	13
Medium SAND	29
Fine SAND	18
Silt & Clay	12

Grading Analysis	
D100	20
D60	0.70
D10	0.09
Uniformity Coefficient	8

**Description**  
MADE GROUND comprising very gravelly fine, medium and coarse SAND, gravel is fine and medium angular brick, flint, asphalt, slate and ash.

Source : Inspection pit: Hand dug. Gen  
Test Code = 613



Simon Holden (Project Technician)

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171212015-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 15  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 5-Feb-18

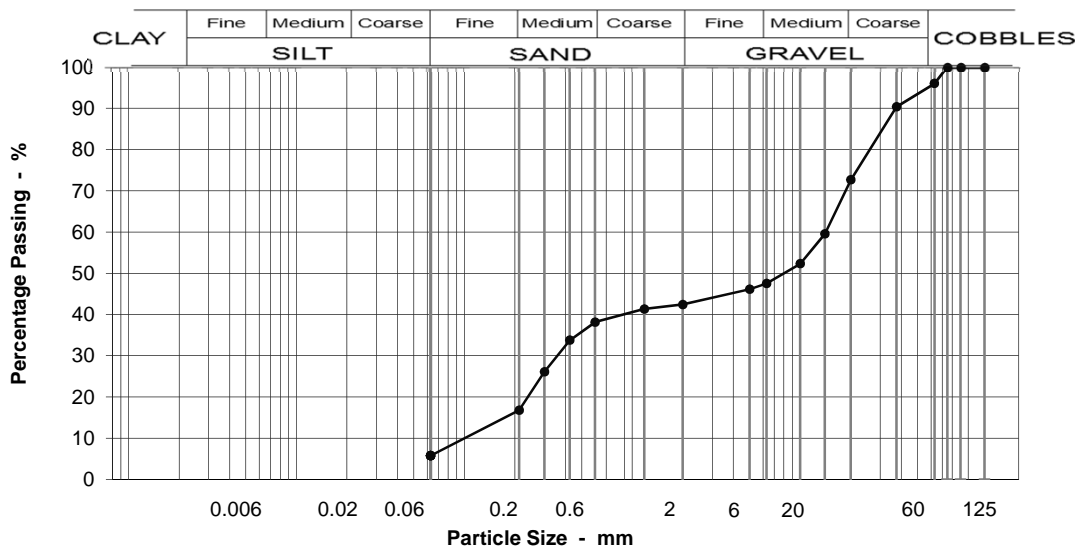
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 4 - 5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	4
75	100		Coarse GRAVEL	23
63	96		Medium GRAVEL	25
37.5	90		Fine GRAVEL	5
20	73		Coarse SAND	4
14	60		Medium SAND	21
10	52		Fine SAND	11
6.3	48		Silt & Clay	6
5	46			
2	42			
1.18	41			
0.600	38			
0.425	34			
0.300	26			
0.212	17			
0.063	6			
Moisture content %		9.6		

Grading Analysis	
D100	63
D60	14.18
D10	0.12
Uniformity Coefficient	118

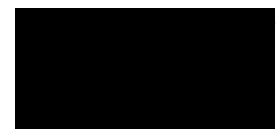
  

Description	
Greyish brown very sandy medium to coarse rounded to sub-rounded flint and quartz GRAVEL.	

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3171212017-613  
**Our Project No** PZ1522D1  
**Your Sample Ref** 17  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 17-Apr-18

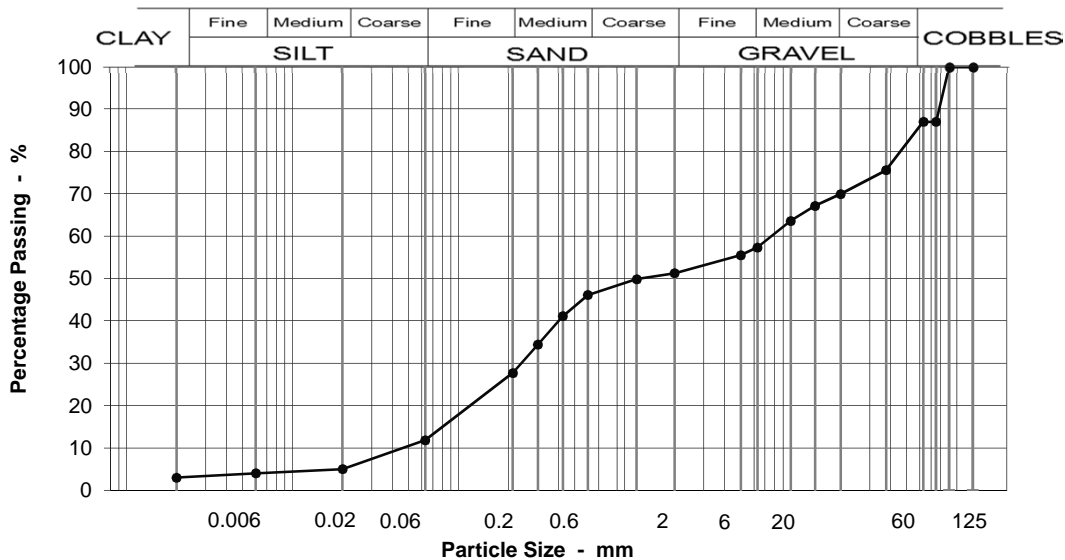
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH4D @ 5 - 6m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving Particle Size mm	% Passin
125	100
90	100
75	87
63	87
37.5	76
20	70
14	67
10	64
6.3	57
5	55
2	51
1.18	50
0.600	46
0.425	41
0.300	34
0.212	28
0.063	12
0.020	5
0.006	4
0.002	3

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1A, 6E/6R, 6I.**

**Moisture content %** 11

Sample Proportions	
BOULDERS	0
COBBLES	13
Coarse GRAVEL	17
Medium GRAVEL	13
Fine GRAVEL	6
Coarse SAND	5
Medium SAND	18
Fine SAND	16
Silt & Clay	12

Grading Analysis	
D100	75
D60	7.89
D10	0.12
Uniformity Coefficient	63

**Description**  
Greyish brown slightly silty, cobbly fine and medium SAND and medium and coarse rounded to sub-rounded flint and quartz gravel.

Source : Inspection pit: Hand dug.

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171212020-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 20  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 5-Feb-18

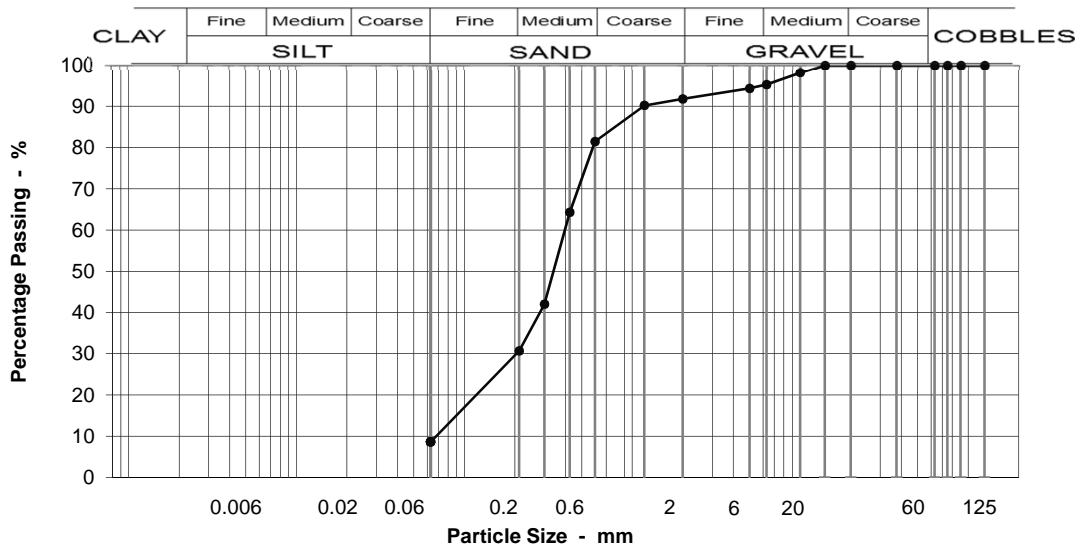
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 6 - 7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	95
5	94
2	92
1.18	90
0.600	81
0.425	64
0.300	42
0.212	31
0.063	9

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6J, 6K, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	5
Fine GRAVEL	3
Coarse SAND	10
Medium SAND	51
Fine SAND	22
Silt & Clay	9

Grading Analysis	
D100	10
D60	0.40
D10	0.07
Uniformity Coefficient	6

**Description**  
Orange slightly silty slightly gravelly medium SAND with lenses of soft grey clay. Gravel is fine to medium sub-rounded flint and quartz.

Moisture content % 15

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
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Our reference No. **GTS3171212024-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **24**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

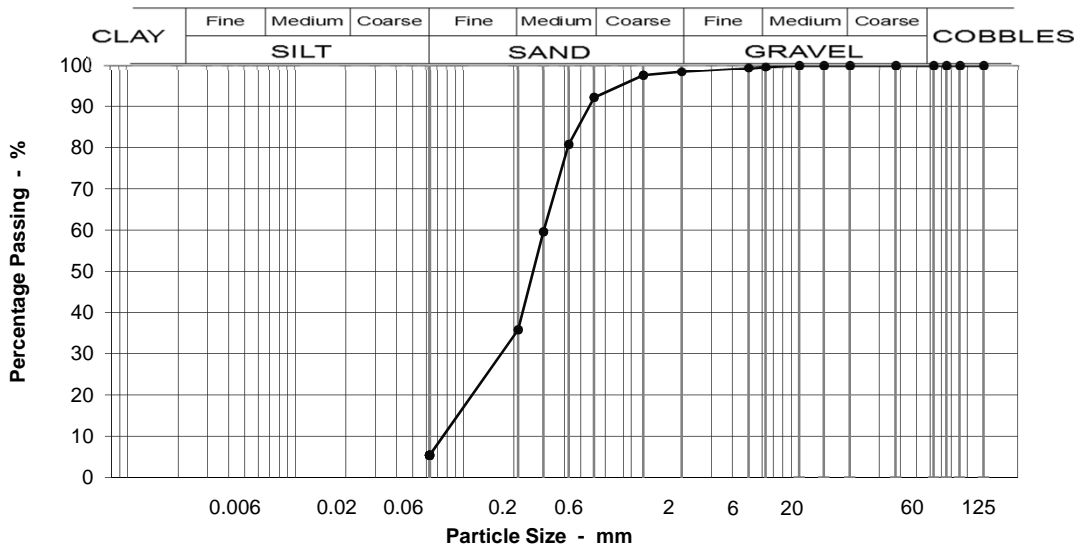
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 8 - 9m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	98
1.18	98
0.600	92
0.425	81
0.300	60
0.212	36
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	6
Medium SAND	56
Fine SAND	30
Silt & Clay	5

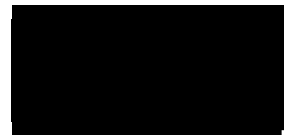
Grading Analysis	
D100	6
D60	0.30
D10	0.09
Uniformity Coefficient	4

Description	
Orange fine to medium SAND.	

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



Simon Holden (Project Technician)





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Our reference No. **GTS3171213002-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 29  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 5-Feb-18

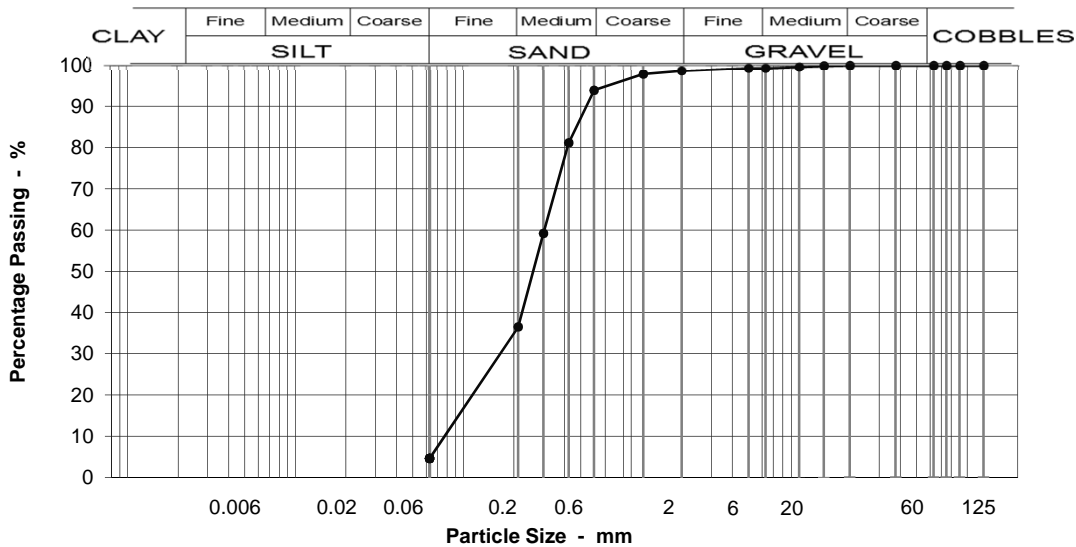
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 10 - 10.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	99
1.18	98
0.600	94
0.425	81
0.300	59
0.212	36
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	5
Medium SAND	57
Fine SAND	32
Silt & Clay	5

Grading Analysis	
D100	14
D60	0.30
D10	0.09
Uniformity Coefficient	3

Description	
Brown fine and medium SAND.	

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



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Our reference No. **GTS3171213003-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 30  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 5-Feb-18

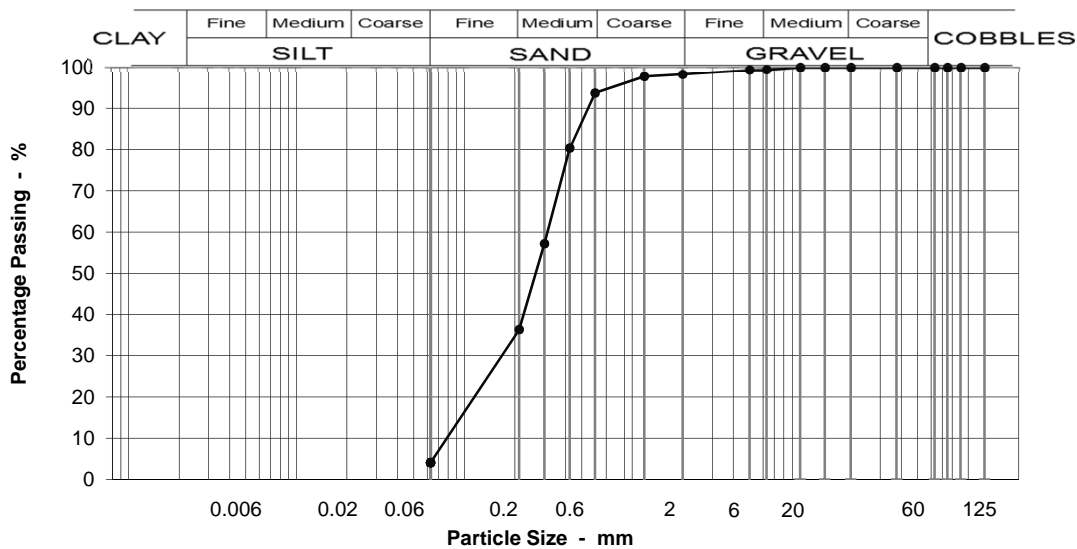
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 11 - 11.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	98
1.18	98
0.600	94
0.425	80
0.300	57
0.212	36
0.063	4

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	5
Medium SAND	57
Fine SAND	32
Silt & Clay	4

Grading Analysis	
D100	6
D60	0.32
D10	0.09
Uniformity Coefficient	3

**Description**  
Brown fine and medium SAND.

Moisture content % 17

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



Simon Holden (Project Technician)



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Our reference No. **GTS3171213005-610**  
Our Project No. PZ1522D1  
Your Sample Ref 32  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 5-Feb-18

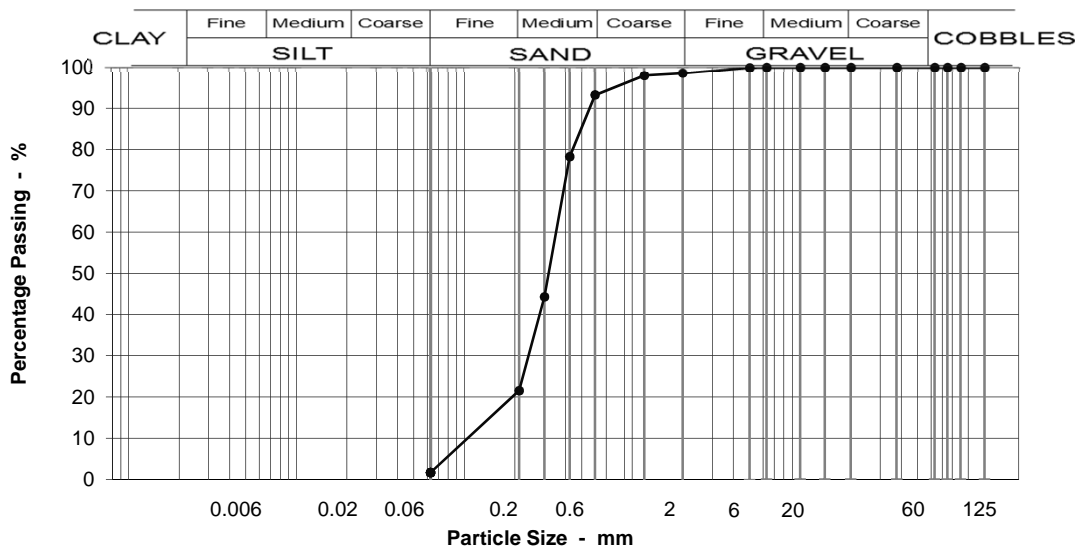
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 12 - 12.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions											
Particle Size mm	% Passing													
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0										
90	100		COBBLES	0										
75	100		Coarse GRAVEL	0										
63	100		Medium GRAVEL	0										
37.5	100		Fine GRAVEL	1										
20	100		Coarse SAND	5										
14	100		Medium SAND	72										
10	100		Fine SAND	20										
6.3	100		Silt & Clay	2										
5	100													
2	99													
1.18	98													
0.600	93													
0.425	78													
0.300	44													
0.212	22													
0.063	2													
Moisture content %		20	<table border="1"> <thead> <tr> <th colspan="2">Grading Analysis</th> </tr> </thead> <tbody> <tr><td>D100</td><td>5</td></tr> <tr><td>D60</td><td>0.36</td></tr> <tr><td>D10</td><td>0.13</td></tr> <tr><td>Uniformity Coefficient</td><td>3</td></tr> </tbody> </table>		Grading Analysis		D100	5	D60	0.36	D10	0.13	Uniformity Coefficient	3
Grading Analysis														
D100	5													
D60	0.36													
D10	0.13													
Uniformity Coefficient	3													
			<table border="1"> <thead> <tr> <th colspan="2">Description</th> </tr> </thead> <tbody> <tr> <td colspan="2">Brown medium SAND.</td> </tr> </tbody> </table>		Description		Brown medium SAND.							
Description														
Brown medium SAND.														

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



Simon Holden (Project Technician)



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**Our reference No.** GTS3171213007-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 34  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 5-Feb-18

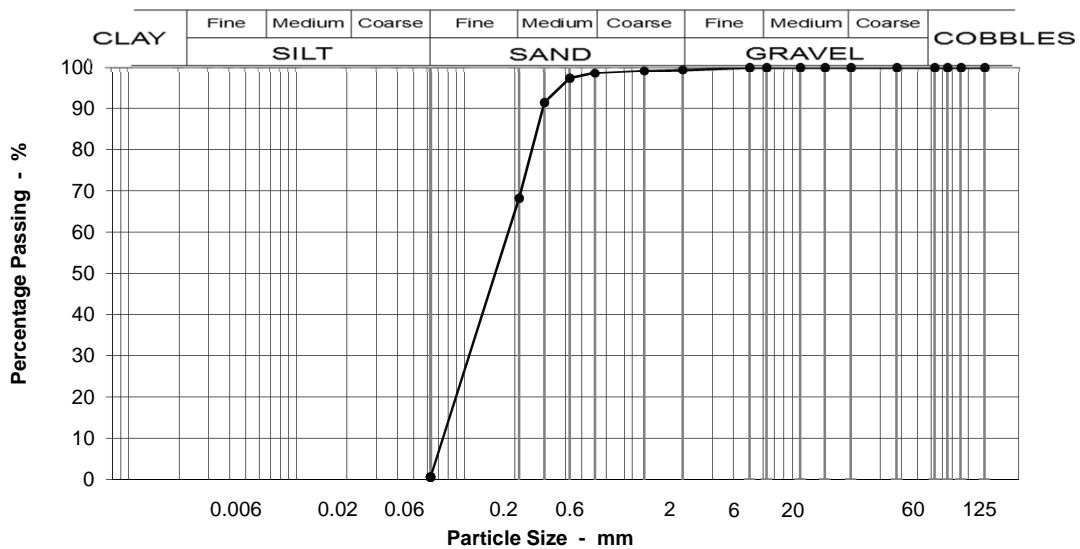
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 13 - 13.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



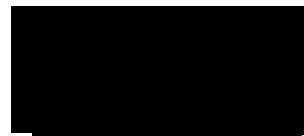
Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	1
14	100		Medium SAND	30
10	100		Fine SAND	68
6.3	100		Silt & Clay	1
5	100		<b>Grading Analysis</b>	
2	99		D100	2
1.18	99		D60	0.19
0.600	99		D10	0.08
0.425	97		Uniformity Coefficient	2
0.300	91		<b>Description</b>	
0.212	68	Brown fine SAND.		
0.063	1			

Moisture content % 24

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



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Our reference No. **GTS3171213013-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **40**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

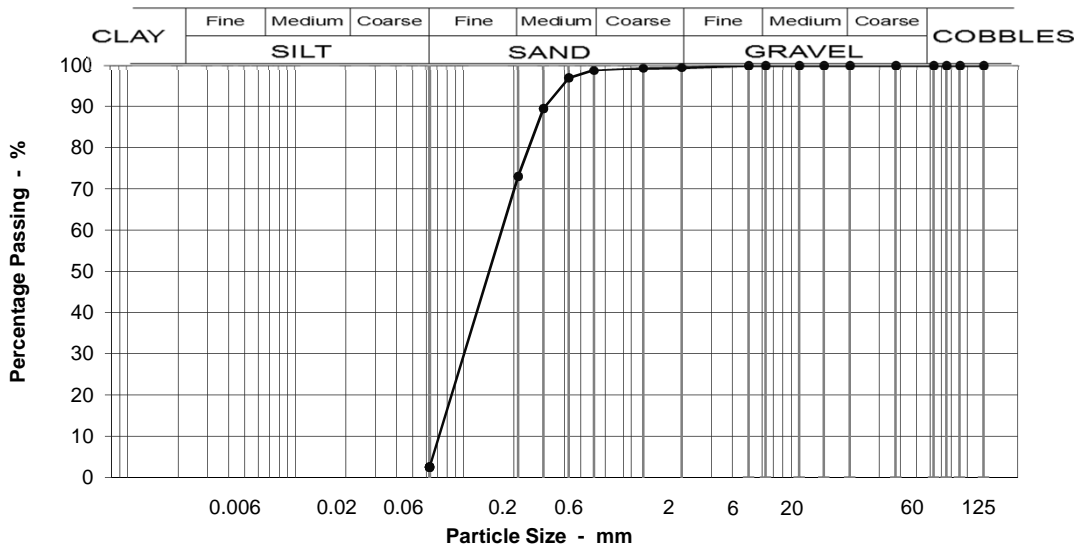
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 16 - 16.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	99
0.425	97
0.300	89
0.212	73
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	26
Fine SAND	70
Silt & Clay	3

Grading Analysis	
D100	2
D60	0.18
D10	0.08
Uniformity Coefficient	2

Description	
Brown fine SAND.	

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



Simon Holden (Project Technician)





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**Our reference No.** GTS3171213015-613  
**Our Project No** PZ1522D1  
**Your Sample Ref** 42  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 17-Apr-18

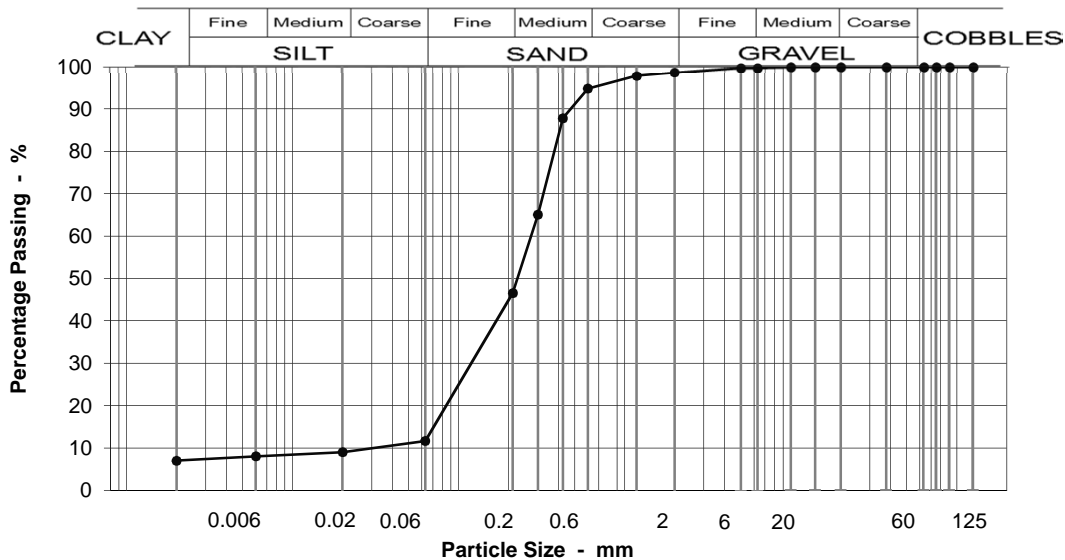
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH4D @ 17 - 17.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving Particle Size mm	% Passin
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	95
0.425	88
0.300	65
0.212	47
0.063	12
0.020	9
0.006	8
0.002	7

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R.**

**Moisture content %** 27

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	48
Fine SAND	35
Silt & Clay	12

Grading Analysis	
D100	6
D60	0.28
D10	0.08
Uniformity Coefficient	3

**Description**  
Brown fine and medium SAND with laminae of soft brown clay.

Source : Inspection pit: Hand dug.

Test Code = 613



Simon Holden (Project Technician)



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Norfolk  
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**Our reference No.** GTS3171213017-613  
**Our Project No** PZ1522D1  
**Your Sample Ref** 44  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 17-Apr-18

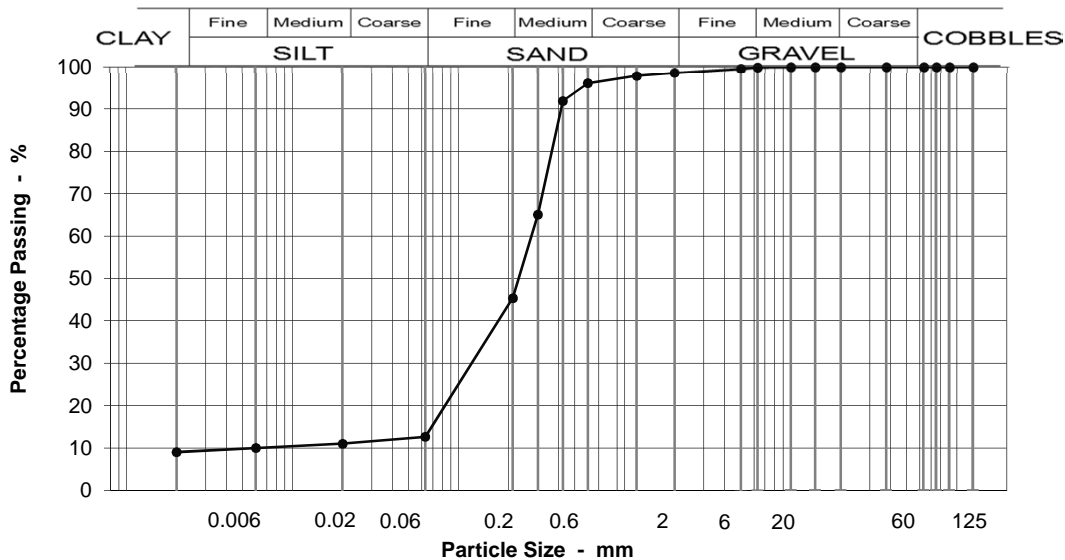
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH4D @ 18 - 18.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving Particle Size mm	% Passin
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	96
0.425	92
0.300	65
0.212	45
0.063	13
0.020	11
0.006	10
0.002	9

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6J.**

**Moisture content %** 31

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	51
Fine SAND	33
Silt & Clay	13

Grading Analysis	
D100	6
D60	0.28
D10	0.05
Uniformity Coefficient	5

**Description**  
Reddish brown fine and medium SAND with laminae of soft grey clay.

\* Uniformity coefficient extrapolated

Source : Inspection pit: Hand dug.

Test Code = 613



Simon Holden (Project Technician)



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Our reference No. **GTS3171214001-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 46  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 5-Feb-18

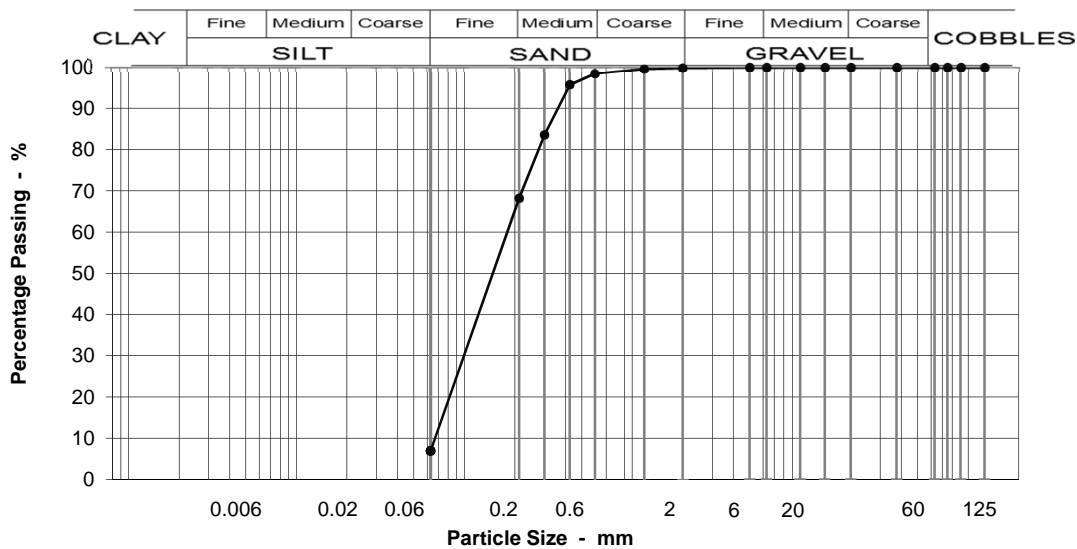
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 19 - 19.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	1
14	100		Medium SAND	30
10	100		Fine SAND	61
6.3	100		Silt & Clay	7
5	100			
2	100			
1.18	100			
0.600	98			
0.425	96			
0.300	84			
0.212	68			
0.063	7			
Moisture content %		26		

Grading Analysis	
D100	2
D60	0.19
D10	0.07
Uniformity Coefficient	3

Description	
Reddish brown fine to medium SAND.	

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



Simon Holden (Project Technician)



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Our reference No. **GTS3171214004-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **49**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

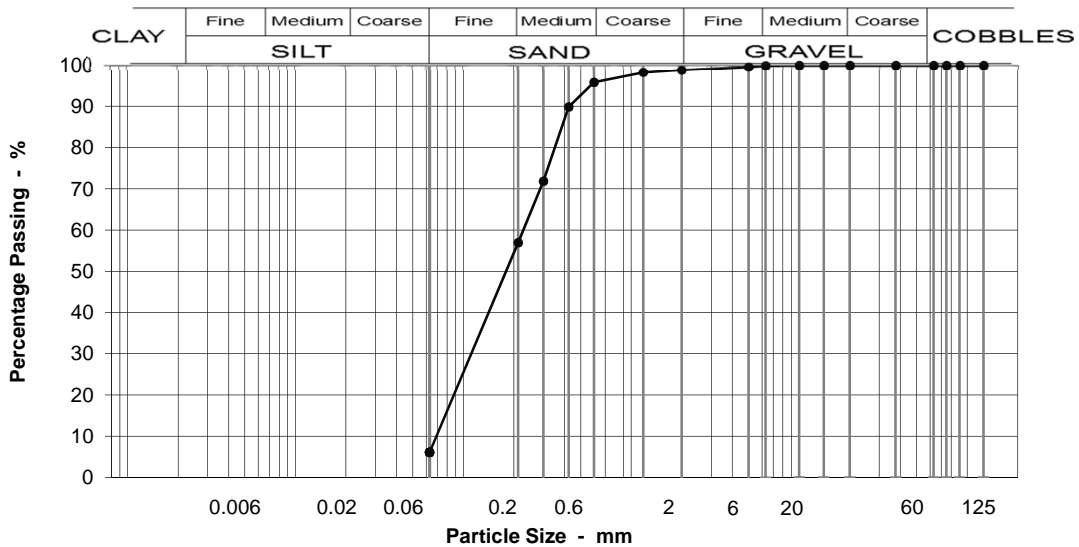
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 21 - 21.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	96
0.425	90
0.300	72
0.212	57
0.063	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	39
Fine SAND	51
Silt & Clay	6

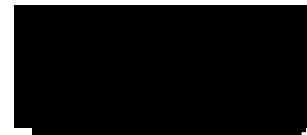
Grading Analysis	
D100	6
D60	0.23
D10	0.07
Uniformity Coefficient	3

Description	
Laminated and thinly bedded greyish brown fine and medium SAND, orange silty fine and medium SAND and reddish brown silty fine to coarse SAND.	

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



Simon Holden (Project Technician)



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NR1 2DH

Our reference No. **GTS3171214007-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **52**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

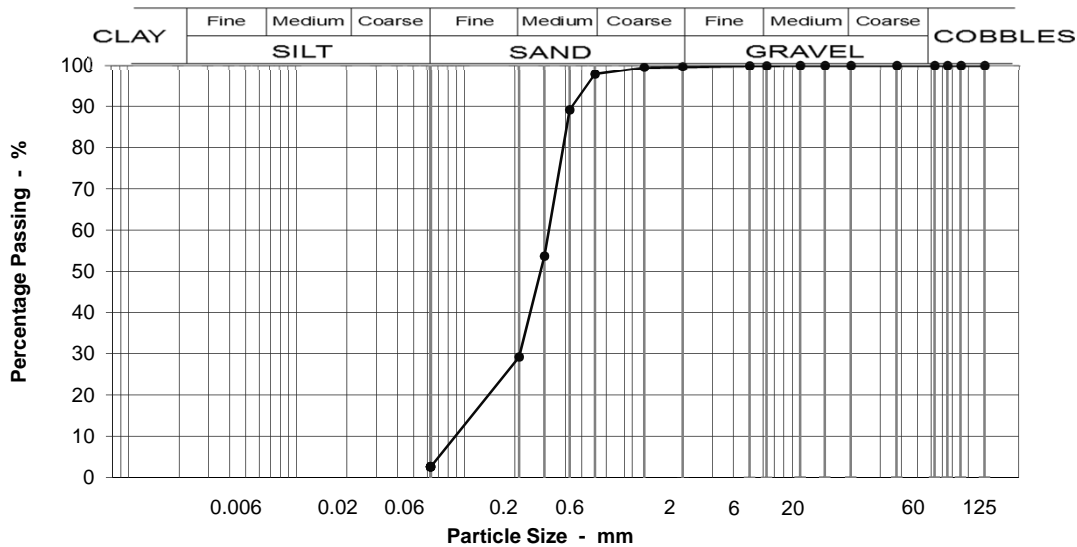
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 23 - 23.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	98
0.425	89
0.300	54
0.212	29
0.063	3

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	69
Fine SAND	27
Silt & Clay	3

Grading Analysis	
D100	6
D60	0.32
D10	0.10
Uniformity Coefficient	3

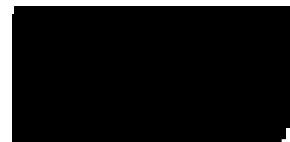
**Description**  
Dark greyish brown medium SAND with laminae of soft grey clay.

Moisture content % 22

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



Simon Holden (Project Technician)





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Norfolk  
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Our reference No. **GTS3171214009-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **54**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

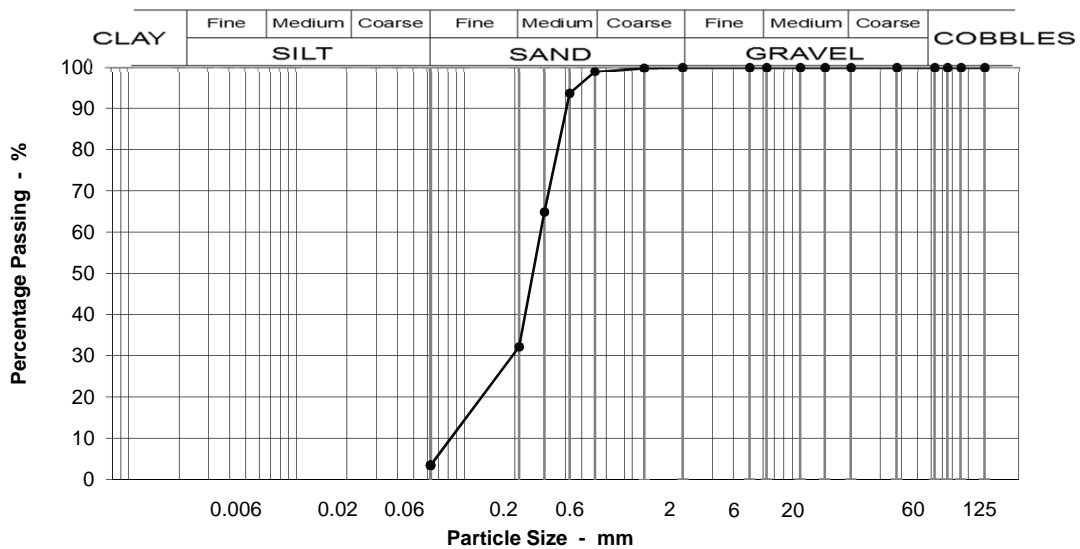
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 24 - 24.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	94
0.300	65
0.212	32
0.063	4

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	67
Fine SAND	29
Silt & Clay	4

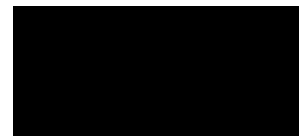
Grading Analysis	
D100	1
D60	0.29
D10	0.10
Uniformity Coefficient	3

**Description**  
Greyish brown fine to medium SAND.

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
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Norfolk  
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Our reference No. **GTS3171214010-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 55  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 5-Feb-18

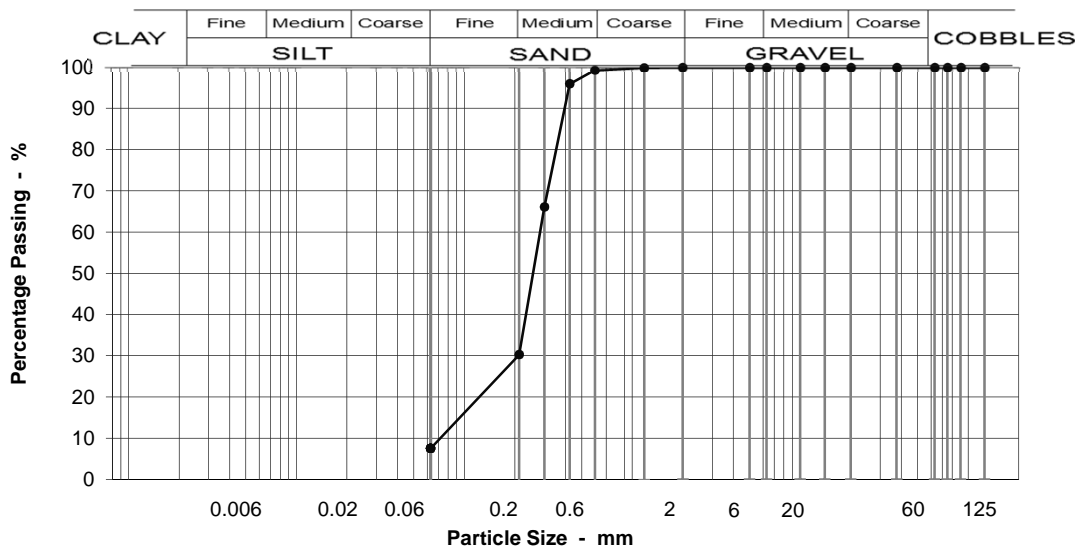
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH4D @ 25 - 25.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	96
0.300	66
0.212	30
0.063	8

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	69
Fine SAND	23
Silt & Clay	8

Grading Analysis	
D100	1
D60	0.29
D10	0.08
Uniformity Coefficient	4

**Description**  
Greyish brown medium SAND with laminae of soft grey clay.

Source : Inspection pit: Hand dug. Gen  
Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3171214017-613  
**Our Project No** PZ1522D1  
**Your Sample Ref** 62  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 17-Apr-18

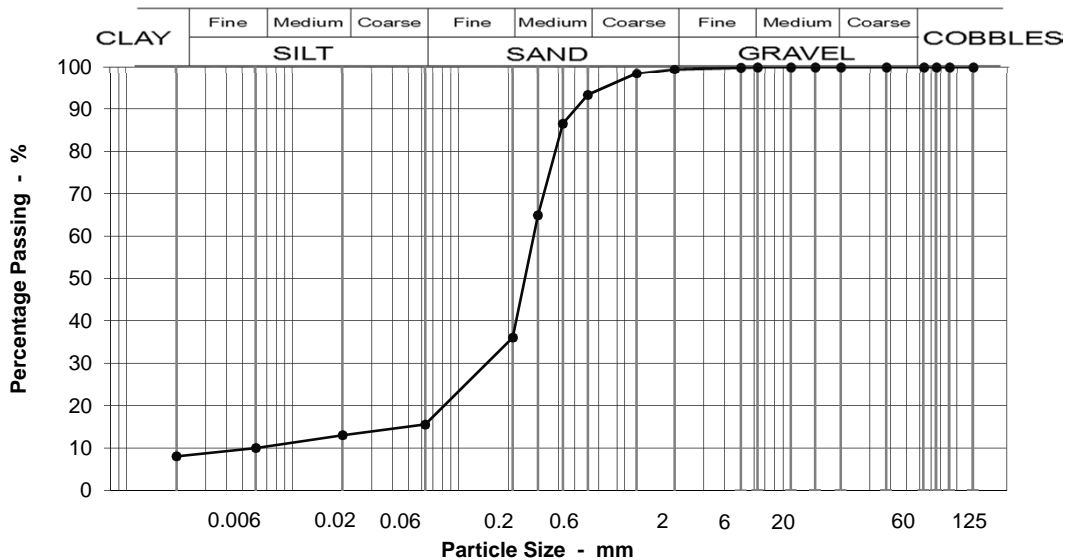
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH4D @ 27 - 27.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving Particle Size mm	% Passin
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	93
0.425	87
0.300	65
0.212	36
0.063	16
0.020	13
0.006	10
0.002	8

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes**  
2A/2B, 2A/2B.

**Moisture content %** 28

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	6
Medium SAND	57
Fine SAND	21
Silt & Clay	16

Grading Analysis	
D100	5
D60	0.29
D10	0.06
Uniformity Coefficient	5

**Description**  
Grey slightly silty medium SAND with laminae of soft grey clay.

\* Uniformity coefficient extrapolated

Source : Inspection pit: Hand dug.

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3171214021-613  
**Our Project No** PZ1522D1  
**Your Sample Ref** 66  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 17-Apr-18

Page 1 of 1

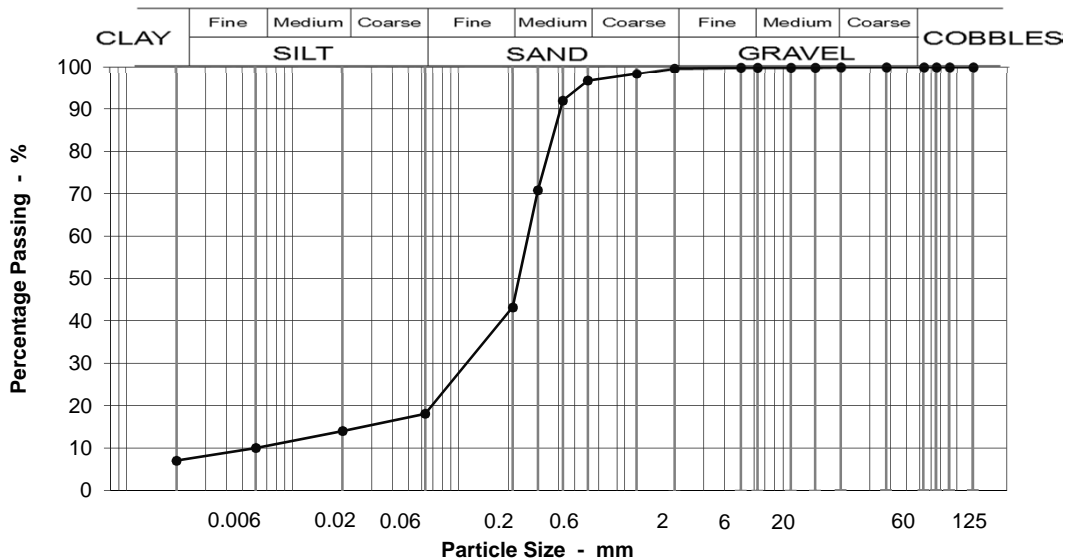
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH4D @ 29 - 29.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving Particle Size mm	% Passin
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	98
0.600	97
0.425	92
0.300	71
0.212	43
0.063	18
0.020	14
0.006	10
0.002	7

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes**  
**2A/2B, 2A/2B.**

**Moisture content %** -2

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	3
Medium SAND	54
Fine SAND	25
Silt & Clay	18

Grading Analysis	
D100	14
D60	0.27
D10	0.05
Uniformity Coefficient	5

**Description**  
Grey silty medium SAND with thin beds of soft grey clay.

\* Uniformity coefficient extrapolated

Source : Inspection pit: Hand dug.

Test Code = 613



Simon Holden (Project Technician)



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County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS3171201002-610**  
Our Project No. PZ1522D1  
Your Sample Ref 2  
Your Project or Order No. PZ1522  
Date Tested 02/01/2018  
Date Report Issued 12-Jan-18

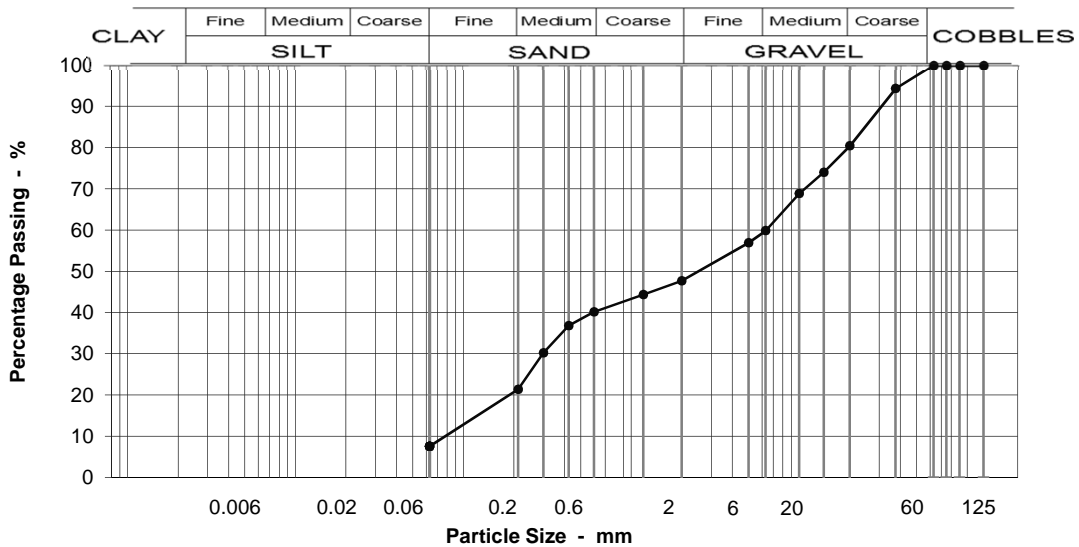
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5 @ 0.3 - 0.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	94
20	80
14	74
10	69
6.3	60
5	57
2	48
1.18	44
0.600	40
0.425	37
0.300	30
0.212	21
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 15

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	20
Medium GRAVEL	21
Fine GRAVEL	12
Coarse SAND	7
Medium SAND	19
Fine SAND	14
Silt & Clay	8

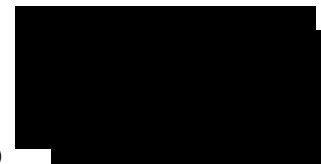
Grading Analysis	
D100	38
D60	6.36
D10	0.09
Uniformity Coefficient	72

**Description**  
MADE GROUND: comprising fine to coarse brick, asphalt and slate in a matrix of dark reddish brown slightly silty fine and medium SAND.

Test Code = 610



Simon Holden (Project Technician)





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Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171201005-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 5  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 5-Feb-18

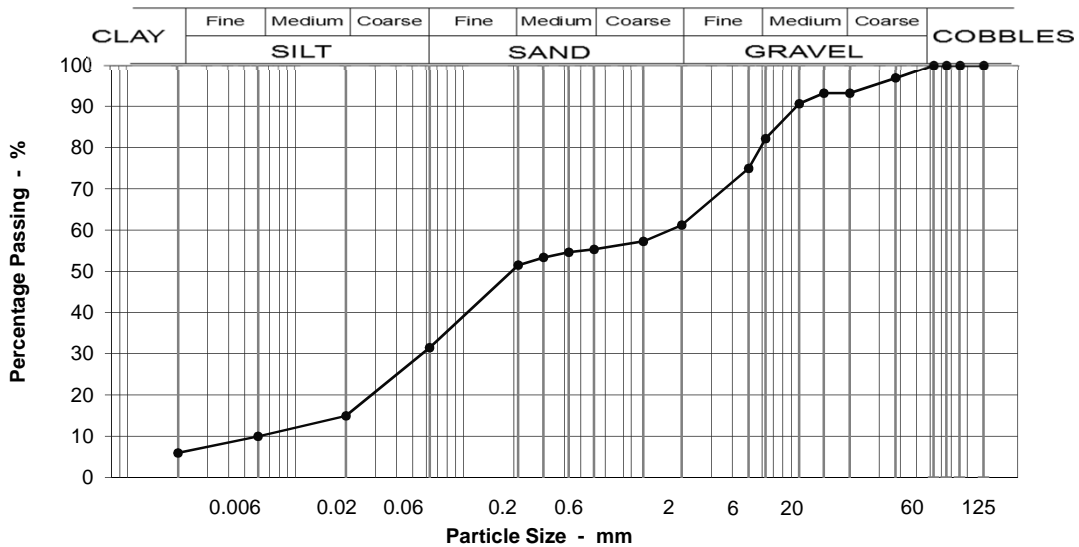
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5 @ 1.2 - 1.7m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	97
20	93
14	93
10	91
6.3	82
5	75
2	61
1.18	57
0.600	55
0.425	55
0.300	53
0.212	51
0.063	32
0.020	15
0.006	10
0.002	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 2C.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	7
Medium GRAVEL	11
Fine GRAVEL	21
Coarse SAND	6
Medium SAND	4
Fine SAND	20
Silt & Clay	32

Grading Analysis	
D100	38
D60	1.75
D10	0.04
Uniformity Coefficient	42*

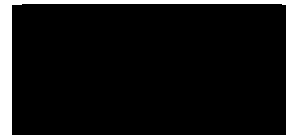
Description	
MADE GROUND - comprising soft to very soft dark grey slightly gravelly, slightly sandy, silty clay. Gravel is fine to medium angular brick, concrete, asphalt, flint & wood.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3171201015-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 15  
**Your Project or Order No.** PZ1522  
**Date Tested** 02/01/2018  
**Date Report Issued** 12-Jan-18

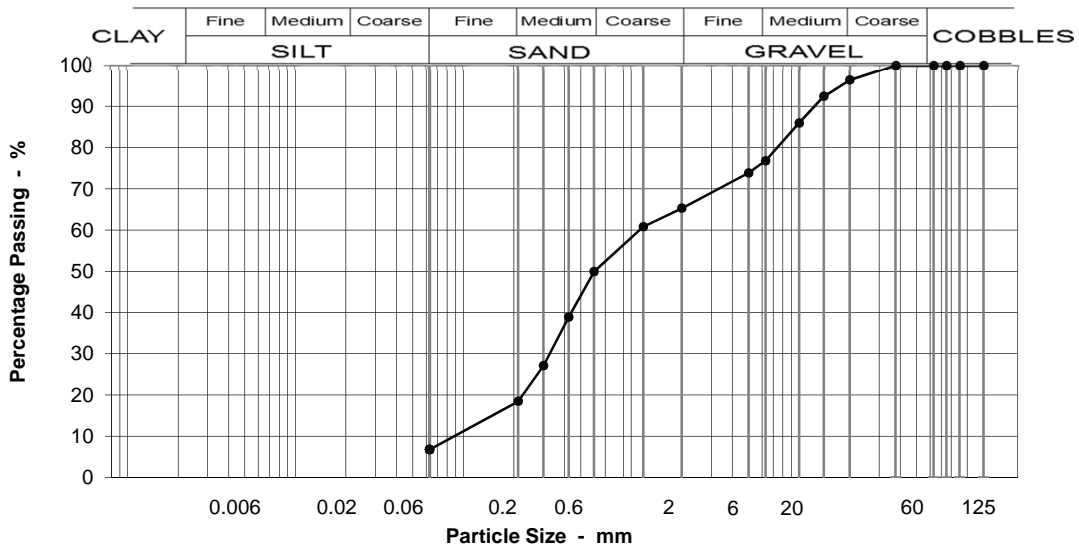
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5 @ 3.4 - 3.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	96
14	92
10	86
6.3	77
5	74
2	65
1.18	61
0.600	50
0.425	39
0.300	27
0.212	18
0.063	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 44

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	4
Medium GRAVEL	20
Fine GRAVEL	12
Coarse SAND	15
Medium SAND	31
Fine SAND	12
Silt & Clay	7

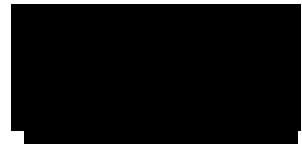
Grading Analysis	
D100	20
D60	1.14
D10	0.10
Uniformity Coefficient	11

**Description**  
Dark brown organic slightly clayey very gravelly fine to coarse SAND. Gravel is fine and medium angular to rounded flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171212002-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **2**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

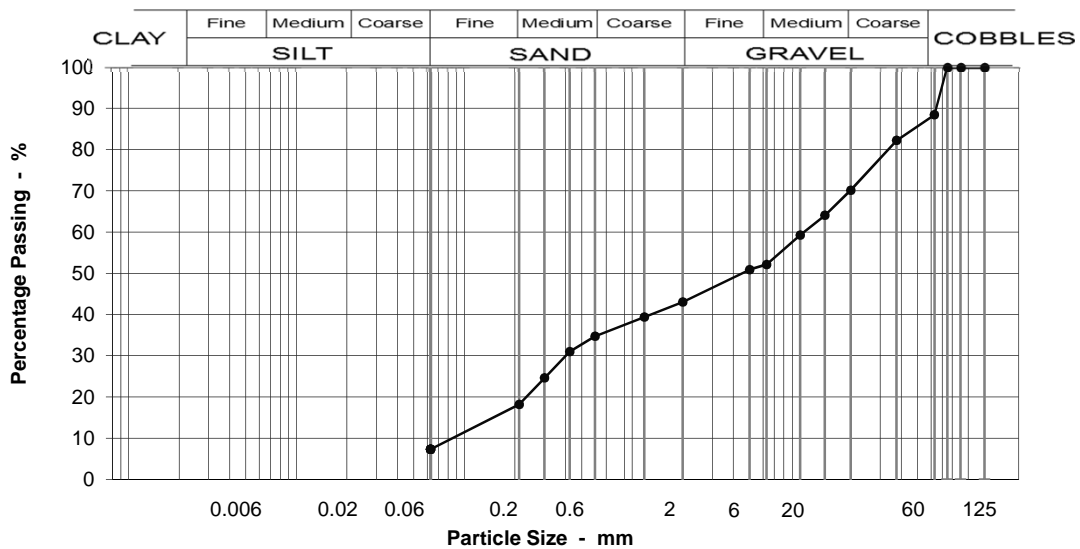
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 0.15 - 0.3m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	88
37.5	82
20	70
14	64
10	59
6.3	52
5	51
2	43
1.18	39
0.600	35
0.425	31
0.300	25
0.212	18
0.063	7

Specification for Highway Works Classification  
Table 6/2

Sample Proportions	
BOULDERS	0
COBBLES	12
Coarse GRAVEL	18
Medium GRAVEL	18
Fine GRAVEL	9
Coarse SAND	8
Medium SAND	16
Fine SAND	11
Silt & Clay	7

Grading Analysis	
D100	63
D60	10.61
D10	0.10
Uniformity Coefficient	107

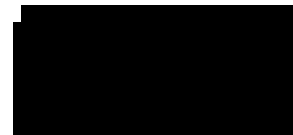
**Description**  
MADE GROUND: Comprising up to cobble size brick in a matrix of reddish brown slightly silty fine to coarse .

Moisture content % 15

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171212007-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **6**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-Feb-18**

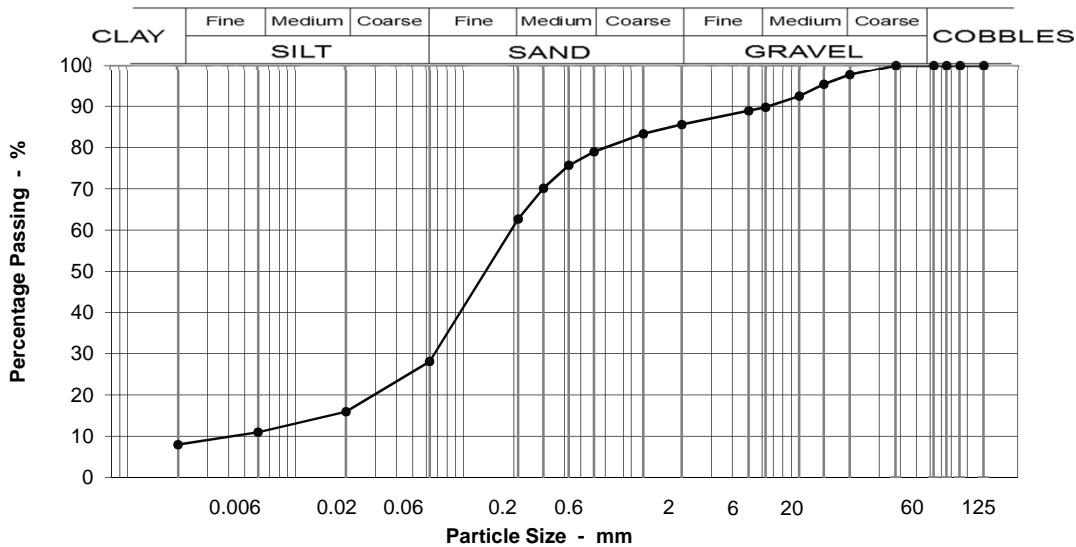
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 1.1 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	98
14	95
10	92
6.3	90
5	89
2	86
1.18	83
0.600	79
0.425	76
0.300	70
0.212	63
0.063	28
0.020	16
0.006	11
0.002	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 2A/2B, 2A/2B.**

Moisture content % 34

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	2
Medium GRAVEL	8
Fine GRAVEL	4
Coarse SAND	7
Medium SAND	16
Fine SAND	34
Silt & Clay	28

Grading Analysis	
D100	20
D60	0.20
D10	0.04
Uniformity Coefficient	5

**Description**  
Soft to firm dark brown slightly clayey, very silty, gravelly fine SAND. Gravel is fine, medium and coarse angular brick, wood, flint, concrete and asphalt.

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171212012-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **11**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-Feb-18**

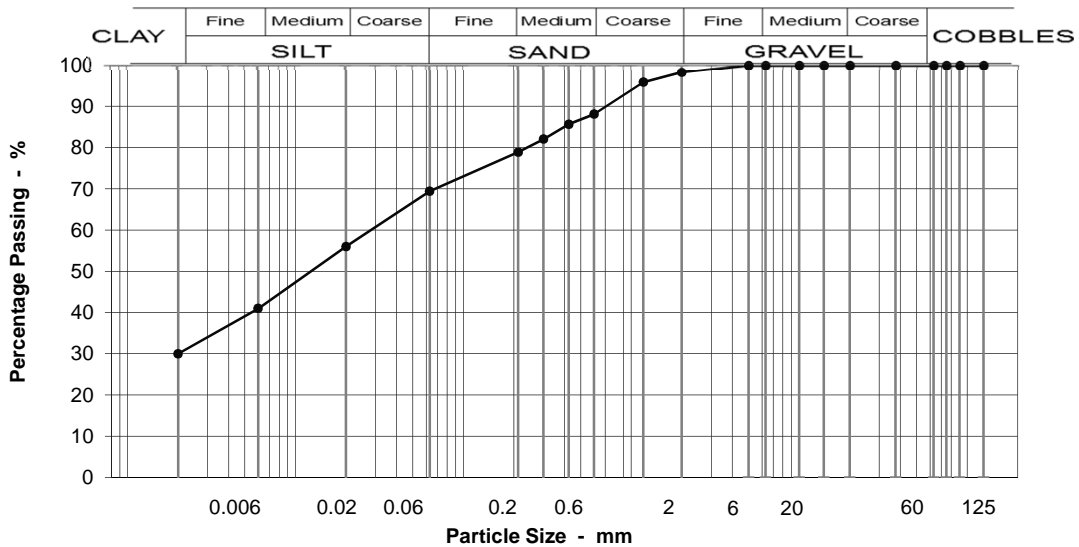
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 2.4 - 2.5m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	96
0.600	88
0.425	86
0.300	82
0.212	79
0.063	69
0.020	56
0.006	41
0.002	30

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	10
Medium SAND	9
Fine SAND	10
Silt & Clay	69

Grading Analysis	
D100	2
D60	0.03
D10	0.00
Uniformity Coefficient	>10*

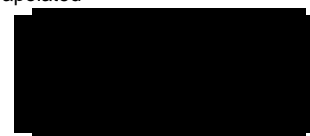
Description	
Grey very clayey, very sandy fine, medium and coarse SILT.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171213010-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **23**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

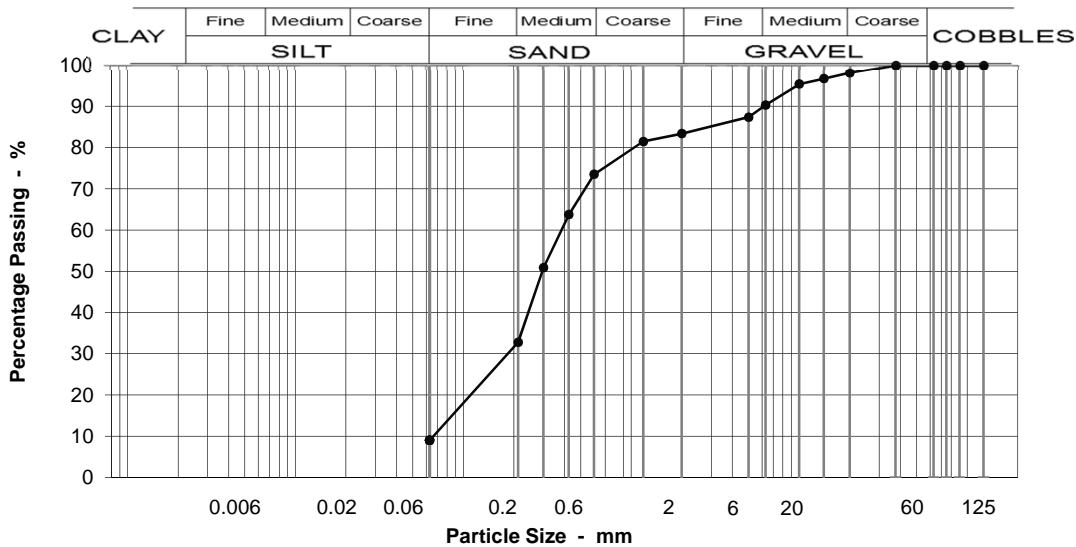
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 5 - 5.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	98
14	97
10	95
6.3	90
5	87
2	83
1.18	81
0.600	74
0.425	64
0.300	51
0.212	33
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6M.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	2
Medium GRAVEL	8
Fine GRAVEL	7
Coarse SAND	10
Medium SAND	41
Fine SAND	24
Silt & Clay	9

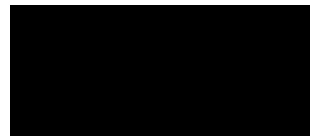
Grading Analysis	
D100	20
D60	0.39
D10	0.07
Uniformity Coefficient	6

**Description**  
Orangey-brown gravelly SAND with soft grey silty clay: Gravel is fine and medium rounded to subrounded flint, quartz and quartzite.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171213013-613  
**Our Project No** PZ1522D1  
**Your Sample Ref** 26  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 22-Feb-18

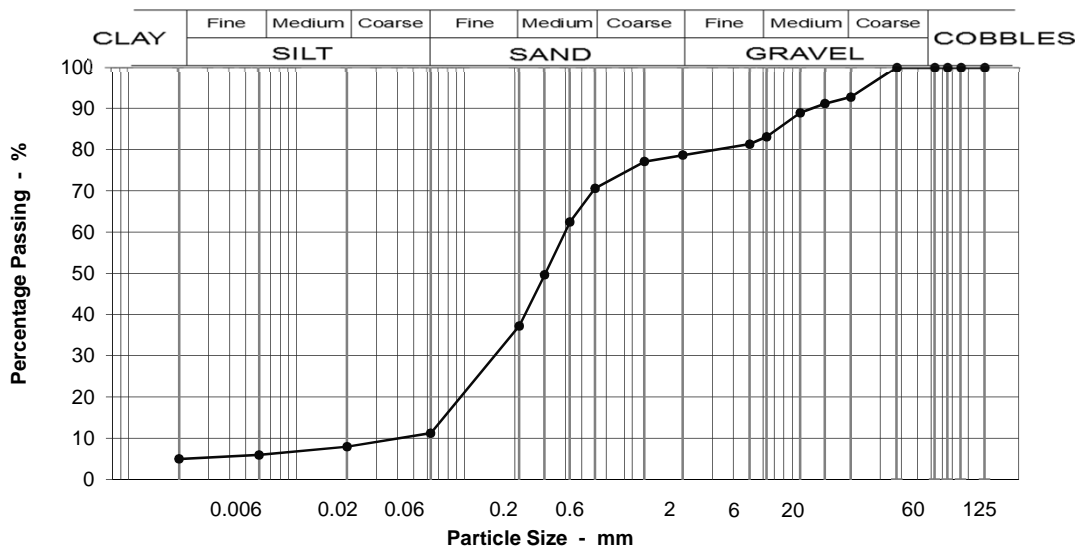
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH5A @ 6 - 6.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	93
14	91
10	89
6.3	83
5	81
2	79
1.18	77
0.600	71
0.425	62
0.300	50
0.212	37
0.063	11
0.020	8
0.006	6
0.002	5

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

**Moisture content %** 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	7
Medium GRAVEL	10
Fine GRAVEL	4
Coarse SAND	8
Medium SAND	33
Fine SAND	26
Silt & Clay	11

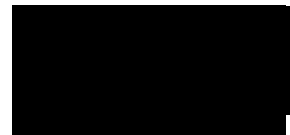
Grading Analysis	
D100	20
D60	0.40
D10	0.10
Uniformity Coefficient	4

**Description**  
Grey very gravelly fine and medium SAND. Gravel is fine, medium and coarse rounded to sub-angular flint, quartz and quartzite.

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171213016-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 29  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 5-Feb-18

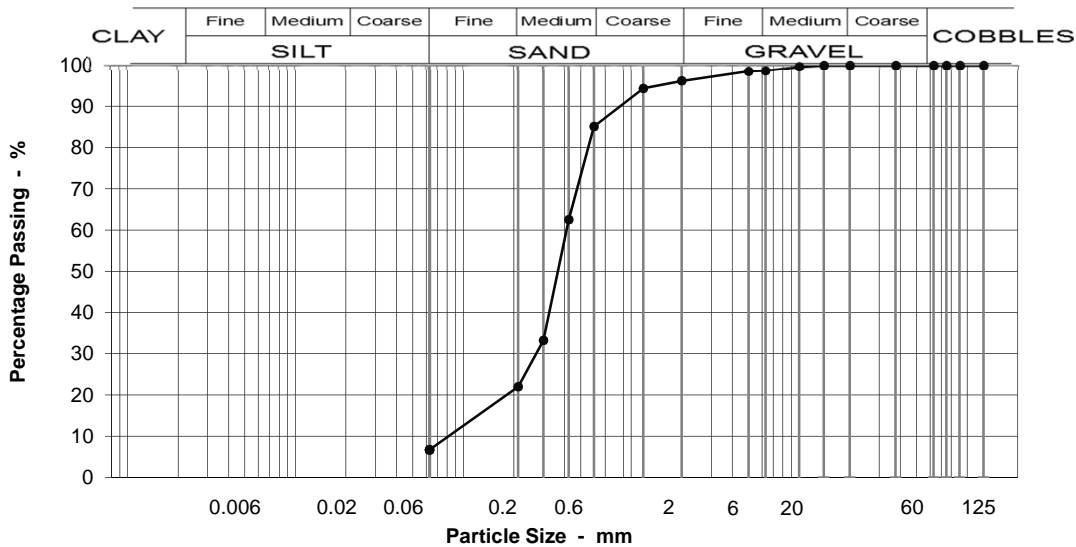
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH5A @ 7 - 7.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	96
1.18	94
0.600	85
0.425	62
0.300	33
0.212	22
0.063	7

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	3
Coarse SAND	11
Medium SAND	63
Fine SAND	15
Silt & Clay	7

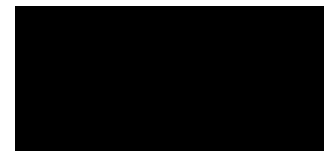
Grading Analysis	
D100	10
D60	0.41
D10	0.09
Uniformity Coefficient	4

Description	
Orangey brown medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171213019-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **32**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

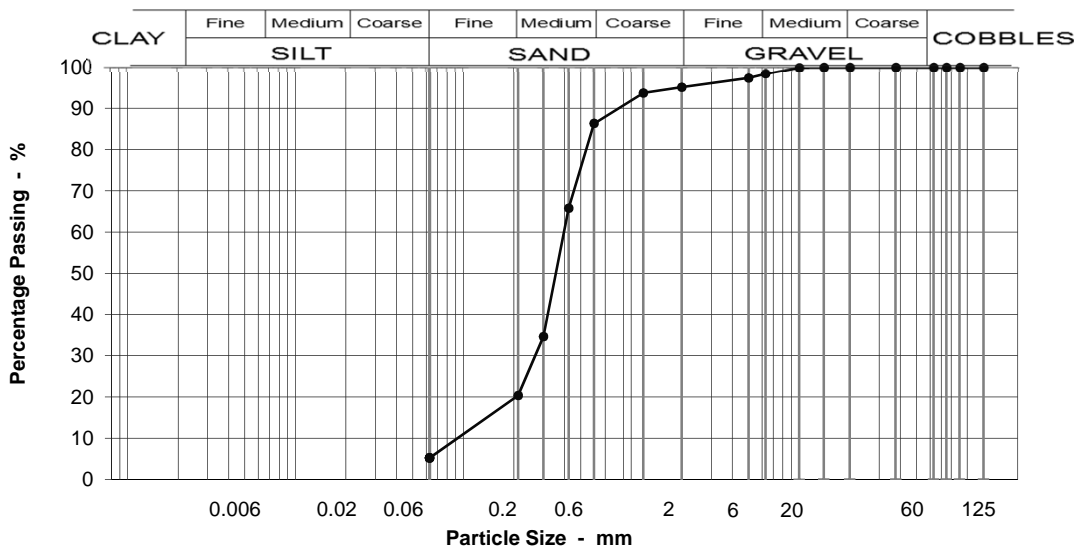
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 8 - 8.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	98
5	97
2	95
1.18	94
0.600	86
0.425	66
0.300	35
0.212	20
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	3
Coarse SAND	9
Medium SAND	66
Fine SAND	15
Silt & Clay	5

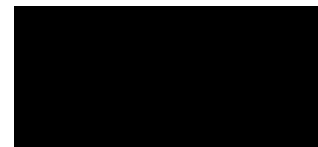
Grading Analysis	
D100	10
D60	0.40
D10	0.11
Uniformity Coefficient	4

Description	
Orangey-brown medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171213025-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 38  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 5-Feb-18

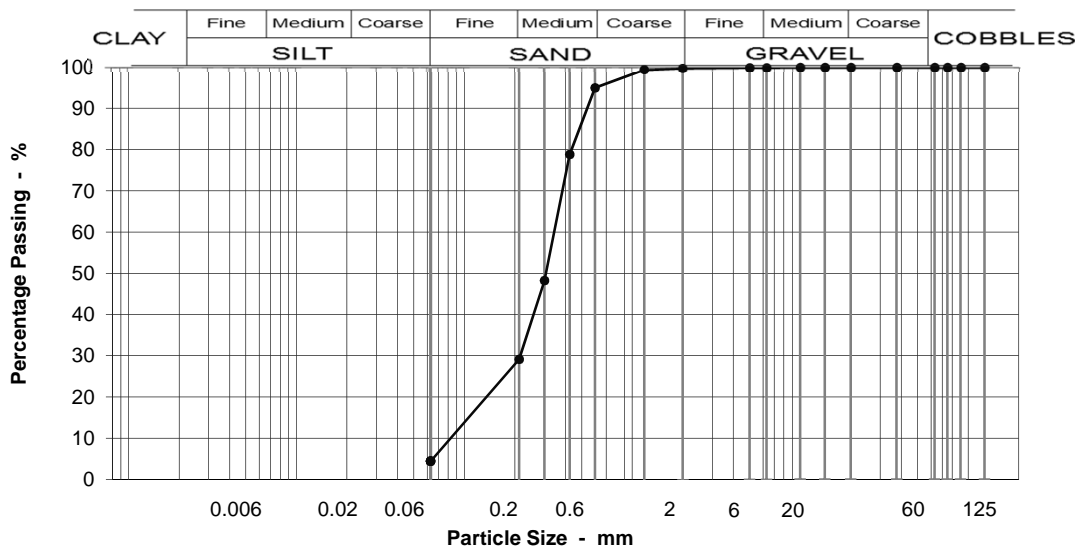
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 10 - 10.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	95
0.425	79
0.300	48
0.212	29
0.063	4

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	5
Medium SAND	66
Fine SAND	25
Silt & Clay	4

Grading Analysis	
D100	6
D60	0.35
D10	0.10
Uniformity Coefficient	4

**Description**  
Orange fine and medium SAND with occasional shell fragments.

Moisture content % 20

Test Code = 610



Simon Holden (Project Technician)





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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171213031-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **44**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

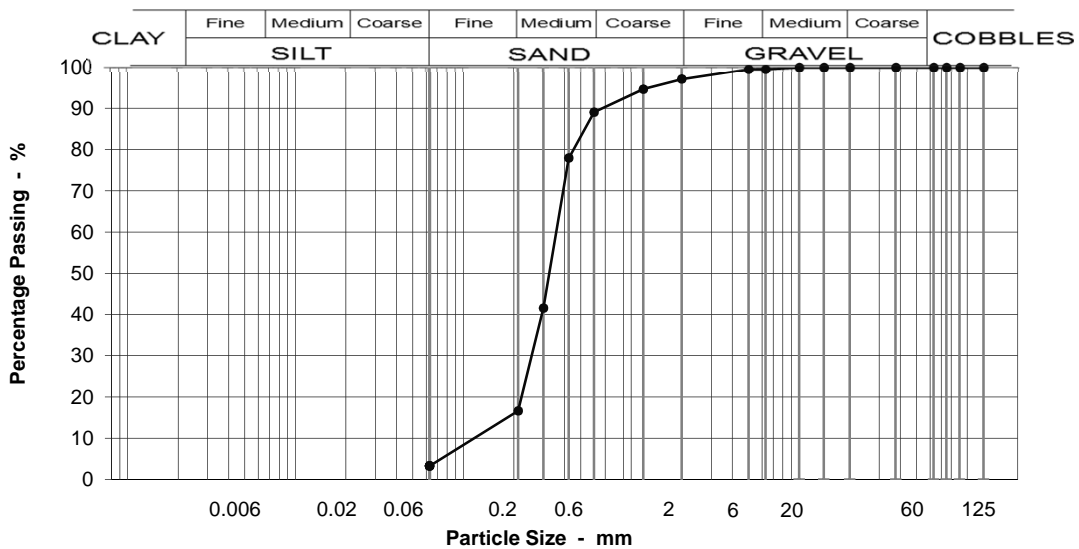
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 13 - 13.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	97
1.18	95
0.600	89
0.425	78
0.300	42
0.212	17
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	8
Medium SAND	72
Fine SAND	13
Silt & Clay	3

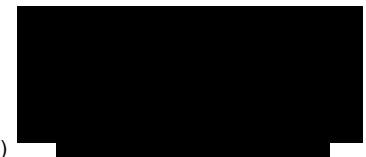
Grading Analysis	
D100	6
D60	0.36
D10	0.14
Uniformity Coefficient	3

Description	
Orangey brown medium SAND with numerous shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171213032-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 45  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 5-Feb-18

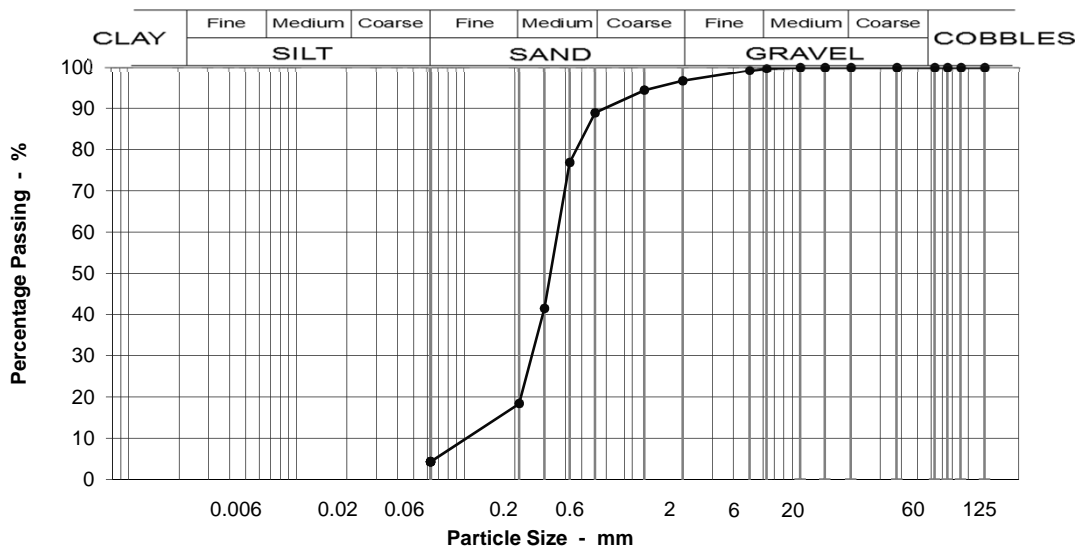
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH5A @ 14 - 14.45m **Specimen:** 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	97
1.18	94
0.600	89
0.425	77
0.300	42
0.212	18
0.063	4

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	3
Coarse SAND	8
Medium SAND	70
Fine SAND	14
Silt & Clay	4

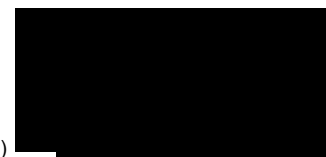
Grading Analysis	
D100	6
D60	0.37
D10	0.12
Uniformity Coefficient	3

Description	
Orangey medium SAND with numerous shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171214006-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **53**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-Feb-18**

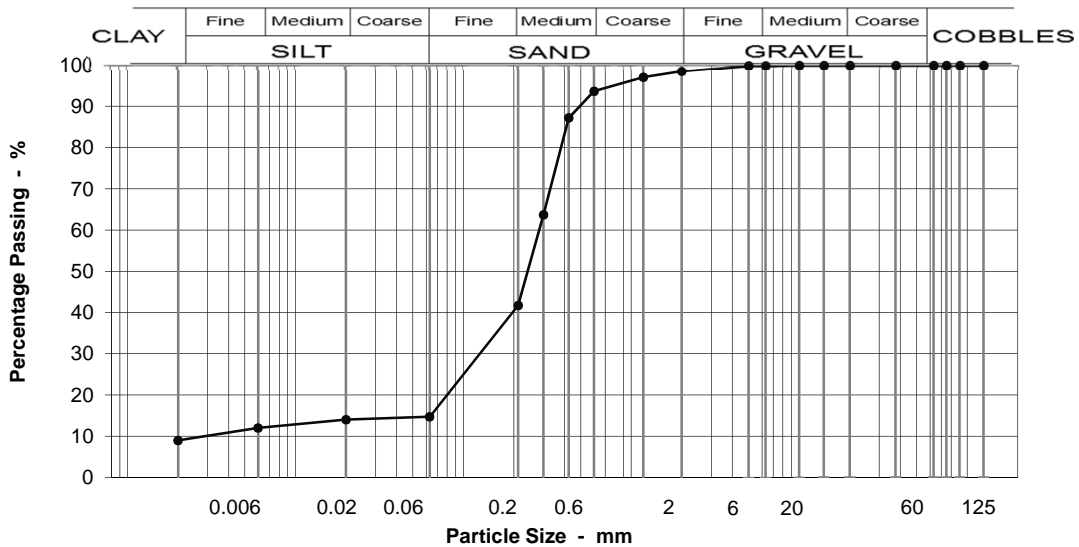
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 17 - 17.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	97
0.600	94
0.425	87
0.300	64
0.212	42
0.063	15
0.020	14
0.006	12
0.002	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J.**

Moisture content % 27

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	5
Medium SAND	52
Fine SAND	27
Silt & Clay	15

Grading Analysis	
D100	10
D60	0.29
D10	0.05
Uniformity Coefficient	5

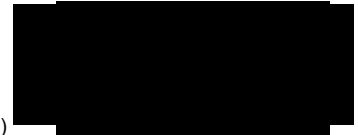
Description	
Dark brownish grey slightly clayey medium SAND with numerous shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171214010-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **57**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-Feb-18**

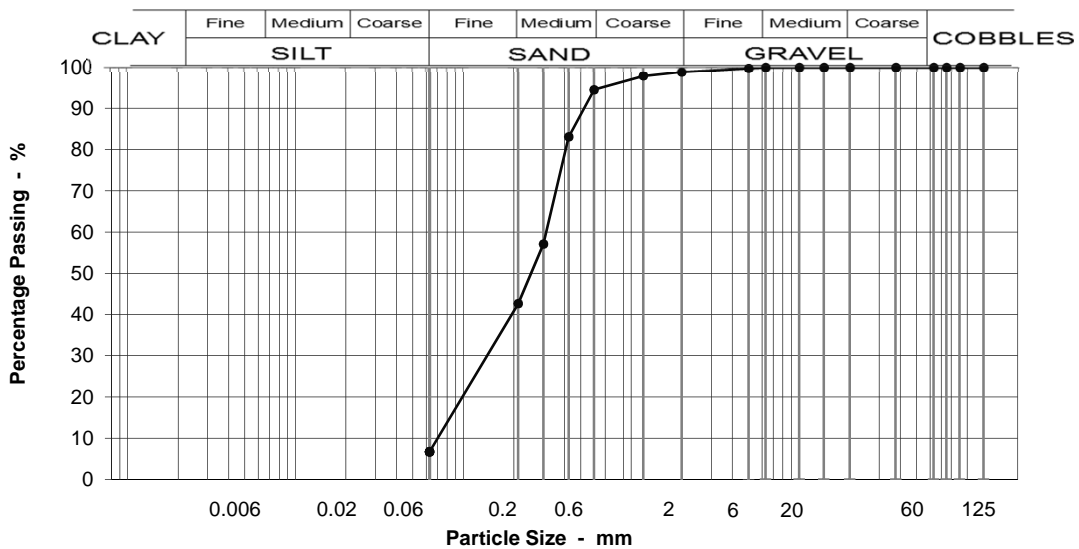
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 19 - 19.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	94
0.425	83
0.300	57
0.212	43
0.063	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	52
Fine SAND	36
Silt & Clay	7

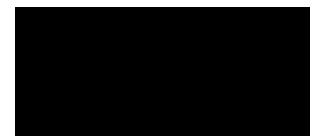
Grading Analysis	
D100	5
D60	0.31
D10	0.08
Uniformity Coefficient	4

**Description**  
Dark brownish grey slightly silty fine to medium SAND with numerous shell fragments

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171214016-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **63**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

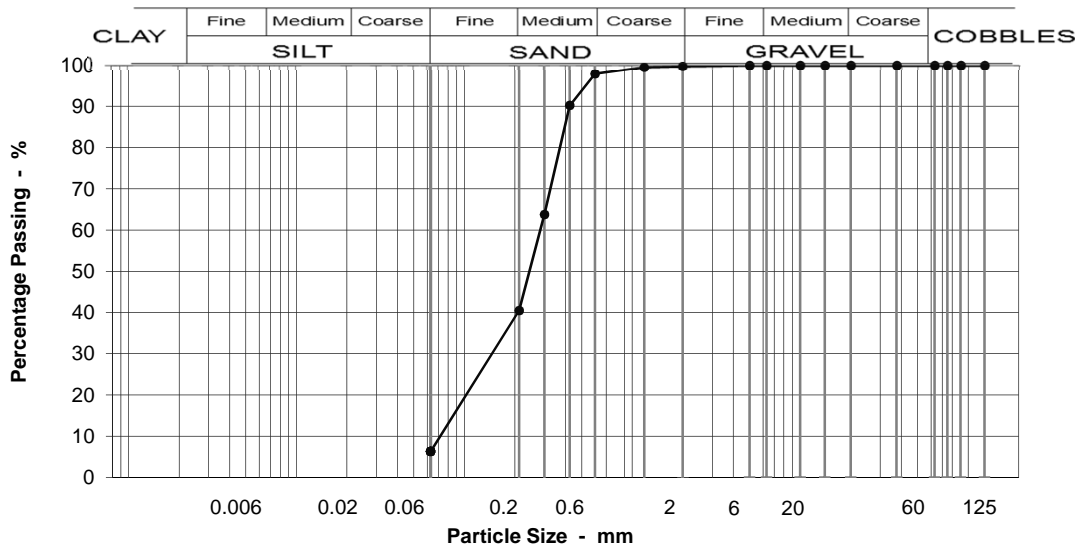
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 22 - 22.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	2
14	100		Medium SAND	57
10	100		Fine SAND	34
6.3	100		Silt & Clay	6
5	100			
2	100			
1.18	100			
0.600	98			
0.425	90			
0.300	64			
0.212	41			
0.063	6			
Moisture content %		20		

Grading Analysis	
D100	2
D60	0.29
D10	0.08
Uniformity Coefficient	4

**Description**  
Orangey brown slightly silty fine and medium SAND with some shell fragments.

Test Code = 610



Simon Holden (Project Technician)





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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171214019-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **66**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

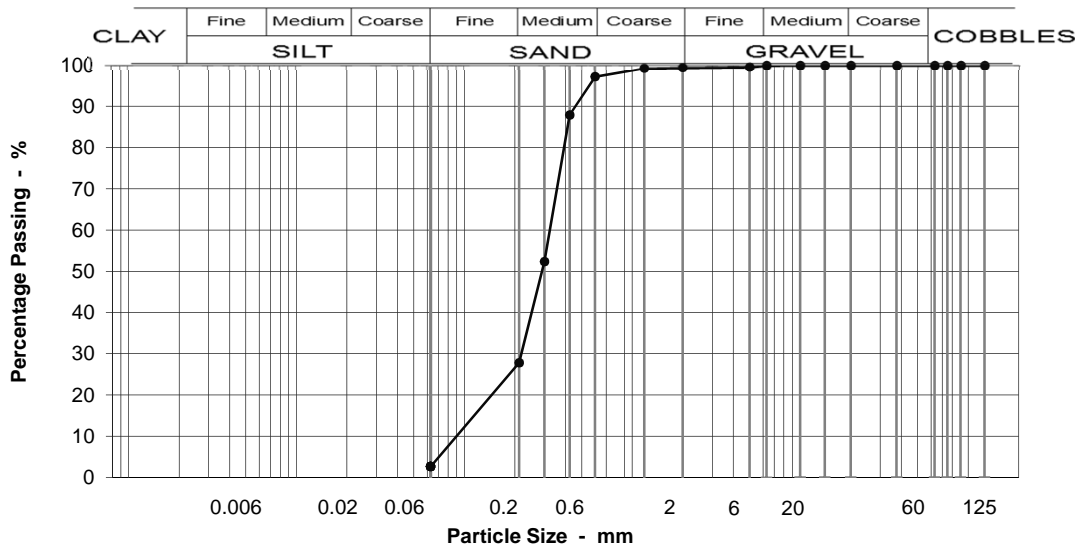
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 24 - 24.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	88
0.300	52
0.212	28
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	69
Fine SAND	25
Silt & Clay	3

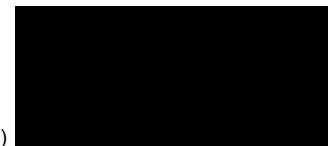
Grading Analysis	
D100	6
D60	0.33
D10	0.11
Uniformity Coefficient	3

Description	
Orangey brown fine and medium SAND with some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1171214020-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 67  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 5-Feb-18

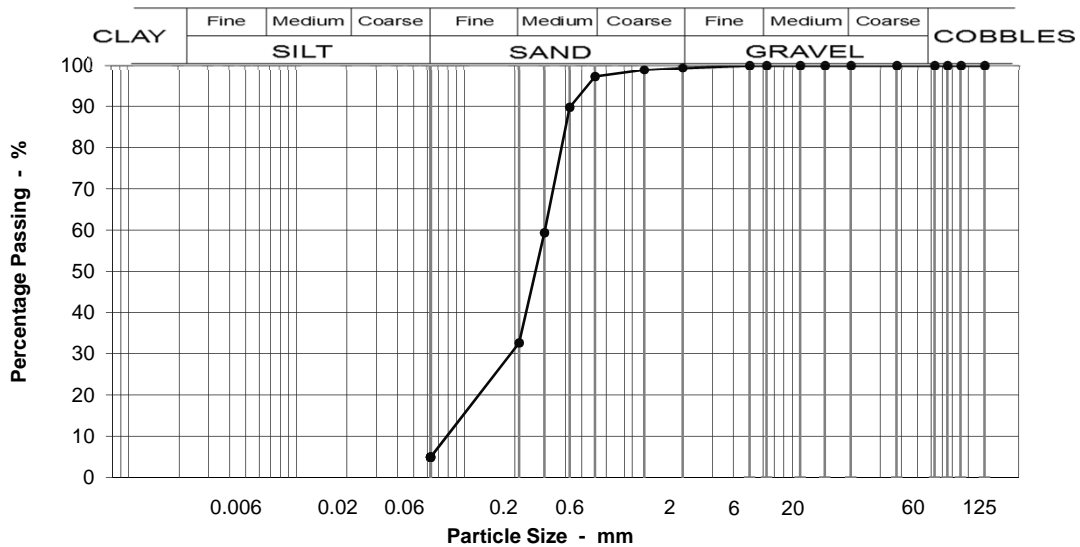
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 25 - 25.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	90
0.300	59
0.212	33
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	65
Fine SAND	28
Silt & Clay	5

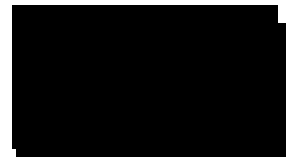
Grading Analysis	
D100	2
D60	0.30
D10	0.09
Uniformity Coefficient	3

**Description**  
Brownish grey fine and medium SAND with lenses of soft grey silty CLAY. Some shell fragments.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171214023-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **70**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-Feb-18**

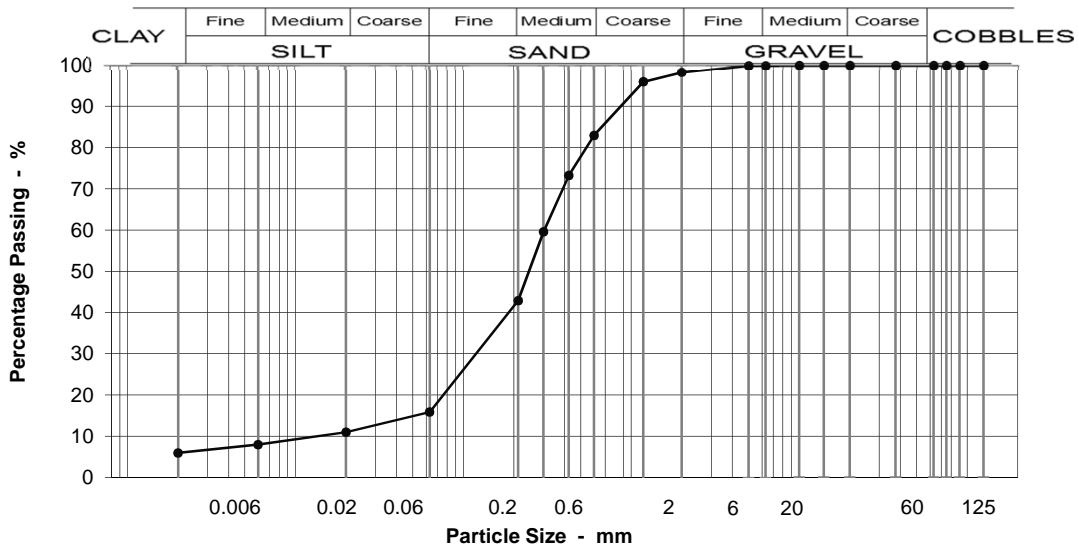
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 26 - 26.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	96
0.600	83
0.425	73
0.300	60
0.212	43
0.063	16
0.020	11
0.006	8
0.002	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 2A/2B, 2A/2B.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	15
Medium SAND	40
Fine SAND	27
Silt & Clay	16

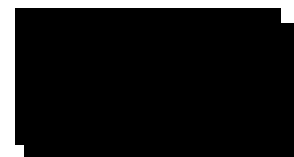
Grading Analysis	
D100	6
D60	0.30
D10	0.06
Uniformity Coefficient	5

**Description**  
Grey slightly clayey, slightly silty fine, medium and coarse SAND with some shell fragments.

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171214024-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **71**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-Feb-18**

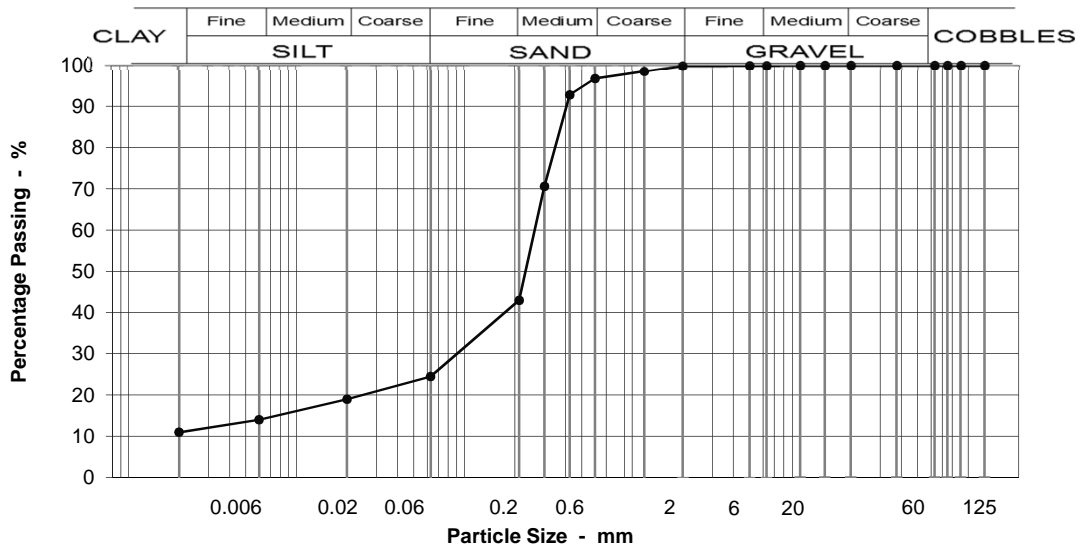
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 27 - 27.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	3
14	100		Medium SAND	54
10	100		Fine SAND	19
6.3	100		Silt & Clay	24
5	100			
2	100			
1.18	99			
0.600	97			
0.425	93			
0.300	71			
0.212	43			
0.063	24			
0.020	19			
0.006	14			
0.002	11			
		Moisture content %		23

Grading Analysis	
D100	6
D60	0.27
D10	0.00
Uniformity Coefficient	>10*

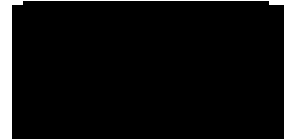
Description	
Laminated and thickly bedded brownish grey silty SAND. Firm to stiff grey silty CLAY and sandy SILT with some shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1171214026-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **73**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-Feb-18**

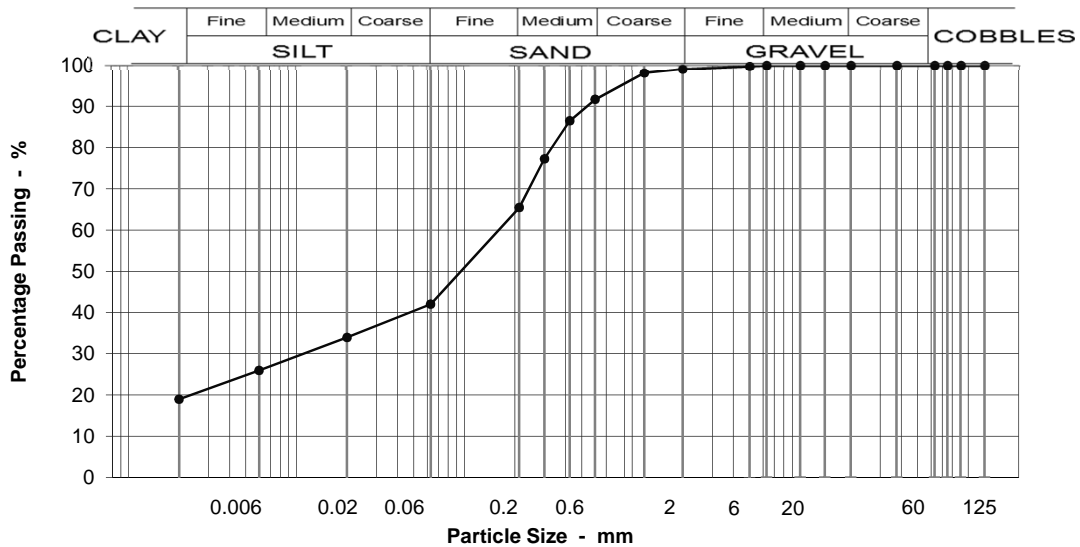
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH5A @ 28 - 28.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	92
0.425	86
0.300	77
0.212	65
0.063	42
0.020	34
0.006	26
0.002	19

Specification for Highway Works Classification  
Table 6/2

Moisture content % 47

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	7
Medium SAND	26
Fine SAND	23
Silt & Clay	42

Grading Analysis	
D100	5
D60	0.18
D10	0.00
Uniformity Coefficient	>10*

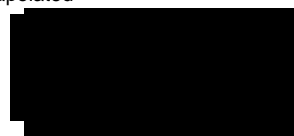
**Description**  
Laminated and thickly bedded brownish grey silty SAND. Firm to stiff grey silty CLAY and sandy SILT with some shell fragments.

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3171123001-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 1  
**Your Project or Order No.** PZ1522  
**Date Tested** 11/12/2017  
**Date Report Issued** 9-Jan-18

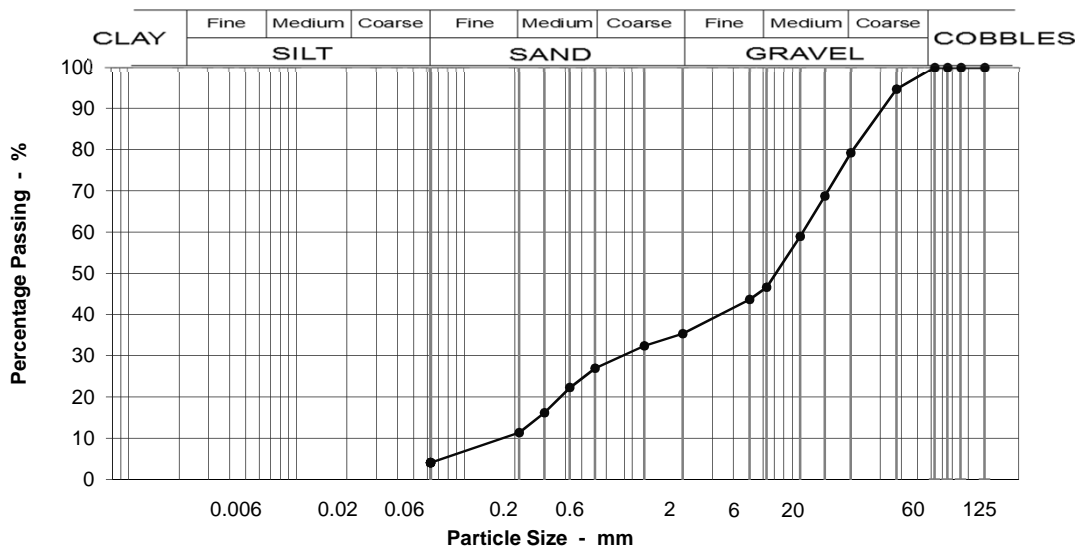
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH6 @ 0 - 0.4m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	95
20	79
14	69
10	59
6.3	47
5	44
2	35
1.18	32
0.600	27
0.425	22
0.300	16
0.212	11
0.063	4

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

**Moisture content %** 8.4

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	21
Medium GRAVEL	33
Fine GRAVEL	11
Coarse SAND	8
Medium SAND	16
Fine SAND	7
Silt & Clay	4

Grading Analysis	
D100	38
D60	10.42
D10	0.18
Uniformity Coefficient	57

**Description**  
MADE GROUND: comprising up to coarse gravel size angular concrete, brick and flint in a matrix of greyish brown medium sand.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171123004-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 4  
Your Project or Order No. PZ1522  
Date Tested 15/12/2017  
Date Report Issued 9-Jan-18

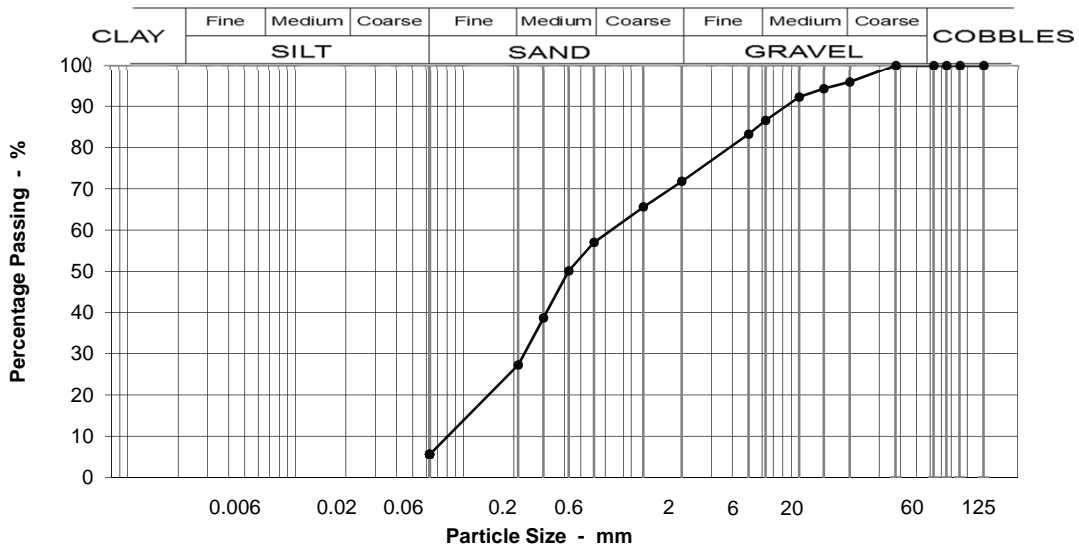
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 0.4 - 0.9m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	96
14	94
10	92
6.3	87
5	83
2	72
1.18	66
0.600	57
0.425	50
0.300	39
0.212	27
0.063	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	4
Medium GRAVEL	9
Fine GRAVEL	15
Coarse SAND	15
Medium SAND	30
Fine SAND	22
Silt & Clay	6

Grading Analysis	
D100	20
D60	0.80
D10	0.09
Uniformity Coefficient	9

**Description**  
MADE GROUND: comprising dark grey very gravelly slightly silty fine to coarse sand. Gravel is fine and medium angular flint, brick, concrete and slate,

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171123005-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **5**  
Your Project or Order No. **PZ1522**  
Date Tested **11/12/2017**  
Date Report Issued **5-Feb-18**

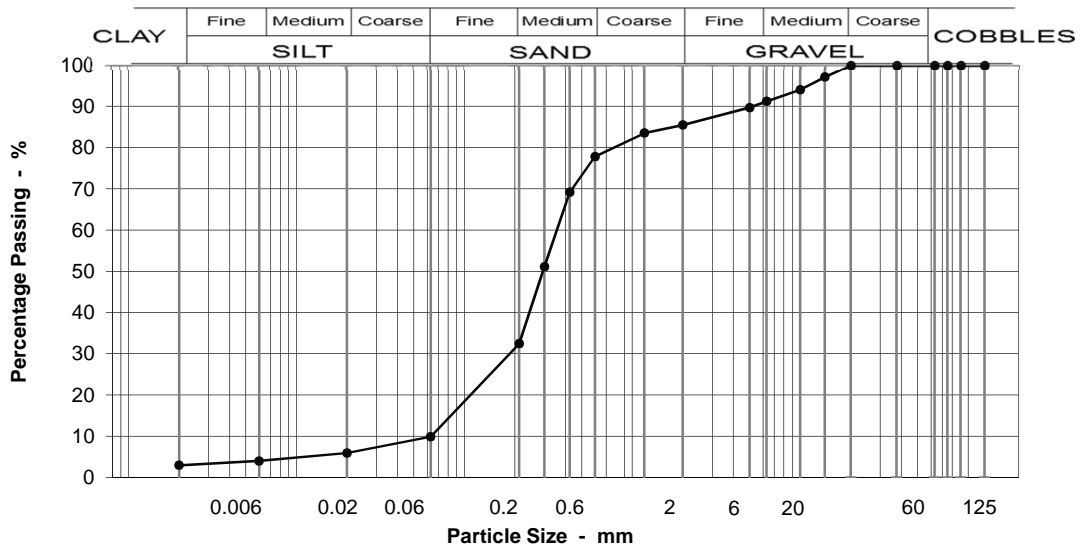
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 1 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	97
10	94
6.3	91
5	90
2	85
1.18	84
0.600	78
0.425	69
0.300	51
0.212	32
0.063	10
0.020	6
0.006	4
0.002	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6K, 6M.**

Moisture content % 16

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	9
Fine GRAVEL	6
Coarse SAND	8
Medium SAND	45
Fine SAND	23
Silt & Clay	10

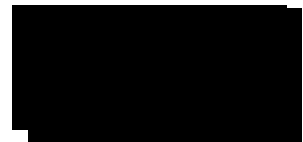
Grading Analysis	
D100	14
D60	0.36
D10	0.06
Uniformity Coefficient	6

**Description**  
MADE GROUND: Comprising of dark grey gravelly, slightly silty fine and medium SAND. Gravel is fine and medium flint, brick, concrete and slate.

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171123012-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **11**  
Your Project or Order No. **PZ1522**  
Date Tested **11/12/2017**  
Date Report Issued **9-Jan-18**

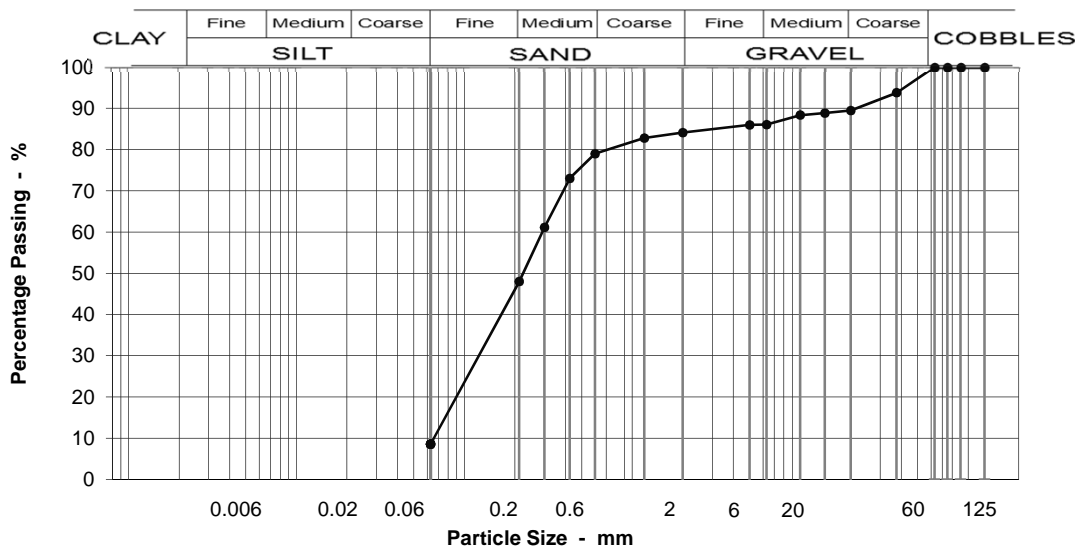
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 2 - 2.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	94
20	89
14	89
10	88
6.3	86
5	86
2	84
1.18	83
0.600	79
0.425	73
0.300	61
0.212	48
0.063	9

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	11
Medium GRAVEL	3
Fine GRAVEL	2
Coarse SAND	5
Medium SAND	31
Fine SAND	39
Silt & Clay	9

Grading Analysis	
D100	38
D60	0.29
D10	0.07
Uniformity Coefficient	4

**Description**  
Dark grey organic slightly clayey gravelly fine to medium SAND. Gravel is coarse angular flint.

Moisture content % 27

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS3171123014-610**  
Our Project No. PZ1522D1  
Your Sample Ref 13  
Your Project or Order No. PZ1522  
Date Tested 07/12/2017  
Date Report Issued 9-Jan-18

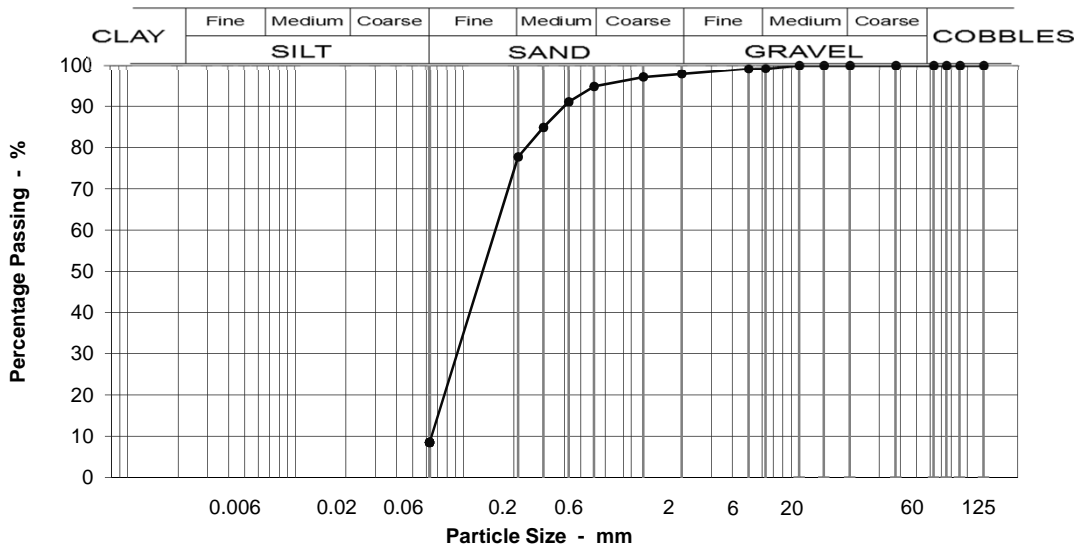
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 3 - 3.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	98
1.18	97
0.600	95
0.425	91
0.300	85
0.212	78
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 26

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	17
Fine SAND	69
Silt & Clay	9

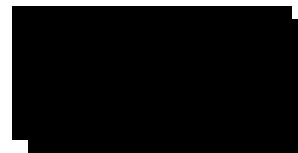
Grading Analysis	
D100	6
D60	0.17
D10	0.07
Uniformity Coefficient	3

Description	
Dark brownish grey slightly clayey fine sand.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171123022-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 20  
Your Project or Order No. PZ1522  
Date Tested 14/12/2017  
Date Report Issued 9-Jan-18

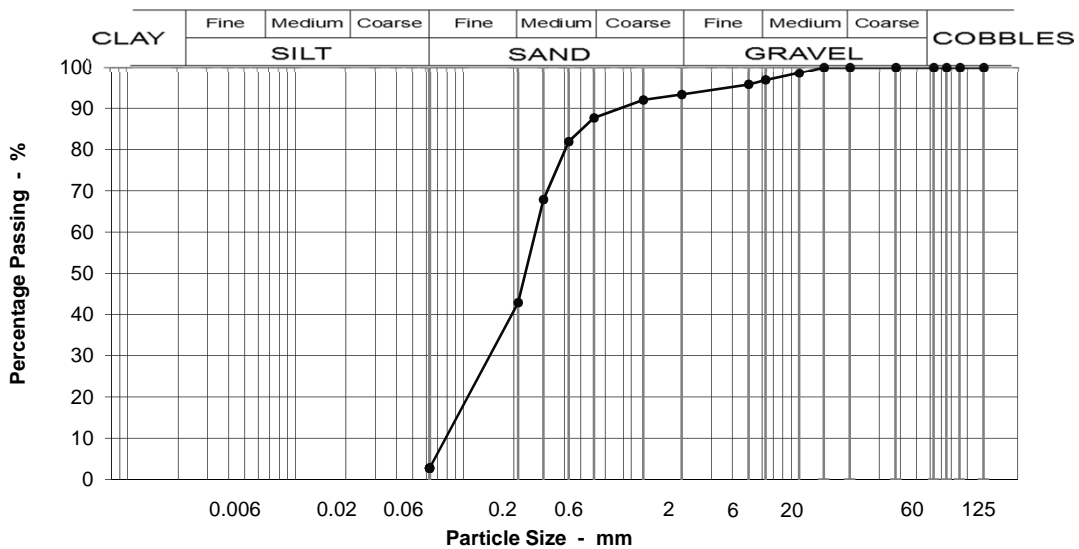
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 4 - 4.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	97
5	96
2	93
1.18	92
0.600	88
0.425	82
0.300	68
0.212	43
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	4
Coarse SAND	6
Medium SAND	45
Fine SAND	40
Silt & Clay	3

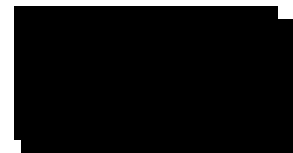
Grading Analysis	
D100	10
D60	0.27
D10	0.09
Uniformity Coefficient	3

**Description**  
Dark brownish grey slightly gravelly fine and medium SAND. Gravel is fine and medium sub-rounded to rounded flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171123024-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 22  
Your Project or Order No. PZ1522  
Date Tested 11/12/2017  
Date Report Issued 9-Jan-18

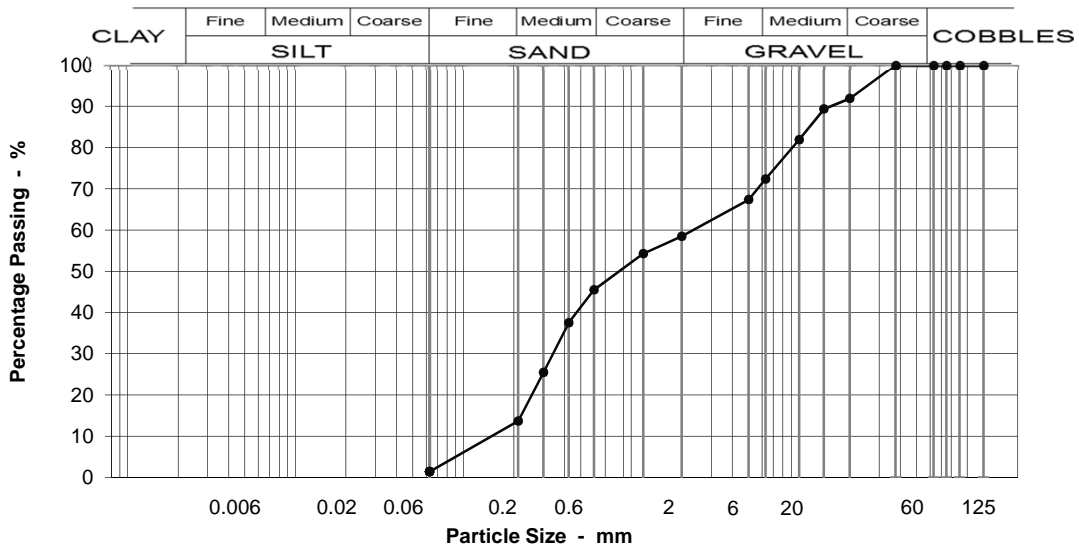
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 5 - 5.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	92
14	89
10	82
6.3	72
5	67
2	58
1.18	54
0.600	46
0.425	38
0.300	26
0.212	14
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	8
Medium GRAVEL	20
Fine GRAVEL	14
Coarse SAND	13
Medium SAND	32
Fine SAND	12
Silt & Clay	1

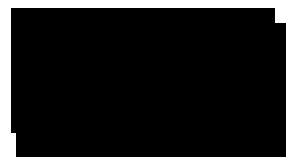
Grading Analysis	
D100	20
D60	2.51
D10	0.17
Uniformity Coefficient	15

Description	
Greyish brown fine to coarse sand and fine and medium angular to sub-angular flint GRAVEL.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171123026-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **24**  
Your Project or Order No. **PZ1522**  
Date Tested **07/12/2017**  
Date Report Issued **9-Jan-18**

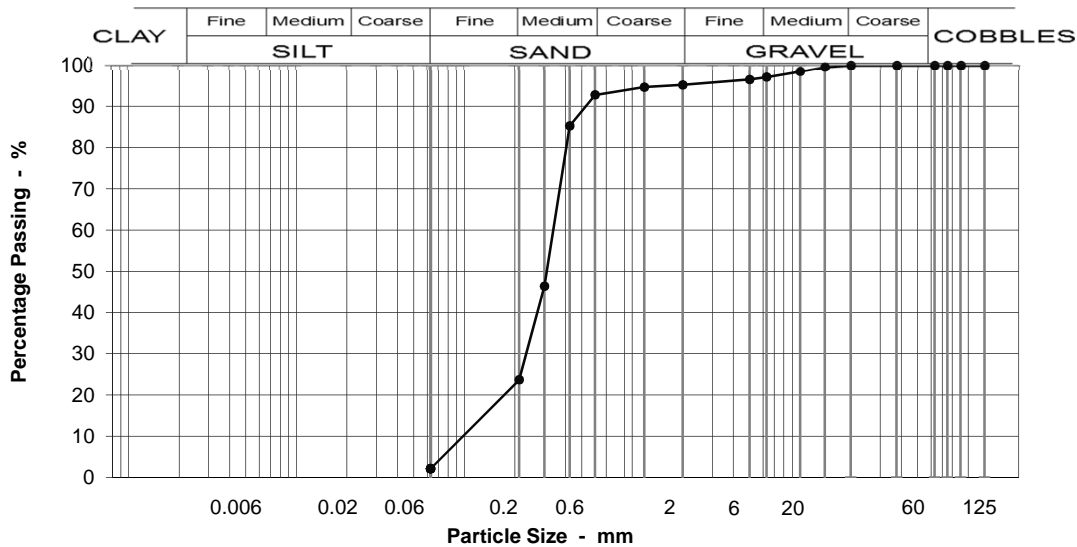
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 6 - 6.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	97
5	96
2	95
1.18	95
0.600	93
0.425	85
0.300	46
0.212	24
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	2
Coarse SAND	2
Medium SAND	69
Fine SAND	22
Silt & Clay	2

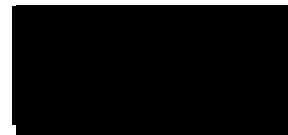
Grading Analysis	
D100	14
D60	0.34
D10	0.12
Uniformity Coefficient	3

Description	
Orange slightly gravelly fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3171123030-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 28  
**Your Project or Order No.** PZ1522  
**Date Tested** 11/12/2017  
**Date Report Issued** 9-Jan-18

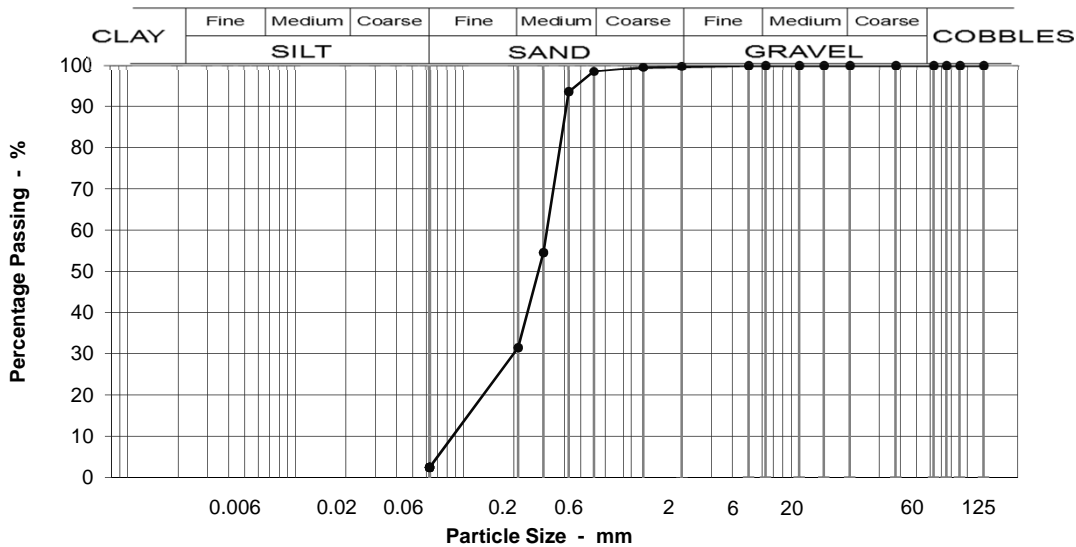
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 7 - 7.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	94
0.300	55
0.212	31
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	67
Fine SAND	29
Silt & Clay	2

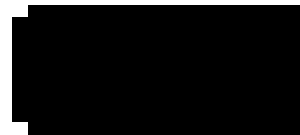
Grading Analysis	
D100	2
D60	0.32
D10	0.10
Uniformity Coefficient	3

Description	
Orange fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171124001-610**  
Our Project No. PZ1522D1  
Your Sample Ref 30  
Your Project or Order No. PZ1522  
Date Tested 11/12/2017  
Date Report Issued 9-Jan-18

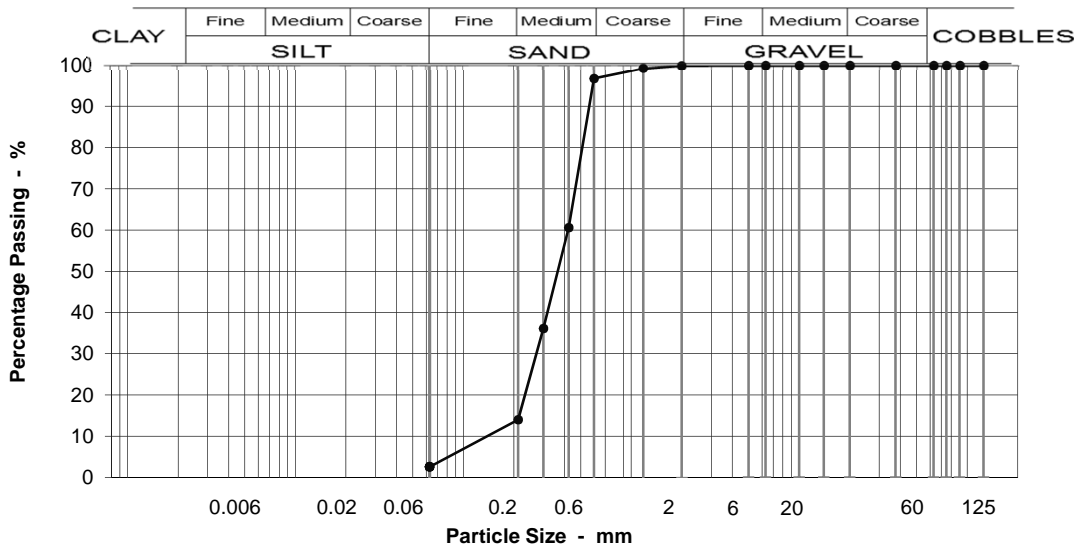
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 8 - 8.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	61
0.300	36
0.212	14
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	3
Medium SAND	83
Fine SAND	11
Silt & Clay	3

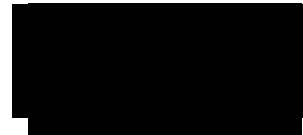
Grading Analysis	
D100	2
D60	0.42
D10	0.16
Uniformity Coefficient	3

Description	
Orange medium SAND.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171124010-610**  
Our Project No. PZ1522D1  
Your Sample Ref 37  
Your Project or Order No. PZ1522  
Date Tested 08/12/2017  
Date Report Issued 9-Jan-18

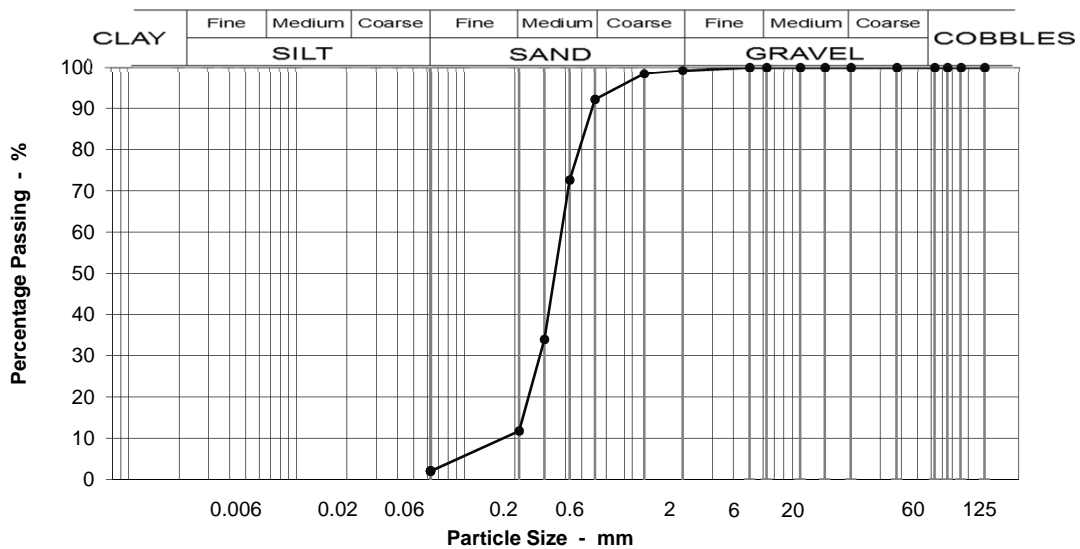
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 11 - 11.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	92
0.425	73
0.300	34
0.212	12
0.063	2

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	7
Medium SAND	80
Fine SAND	10
Silt & Clay	2

Grading Analysis	
D100	2
D60	0.38
D10	0.18
Uniformity Coefficient	2

**Description**  
Laminated orange, reddish brown and grey medium SAND.

Moisture content % 20

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171124014-610**  
Our Project No. PZ1522D1  
Your Sample Ref 41  
Your Project or Order No. PZ1522  
Date Tested 12/12/2017  
Date Report Issued 9-Jan-18

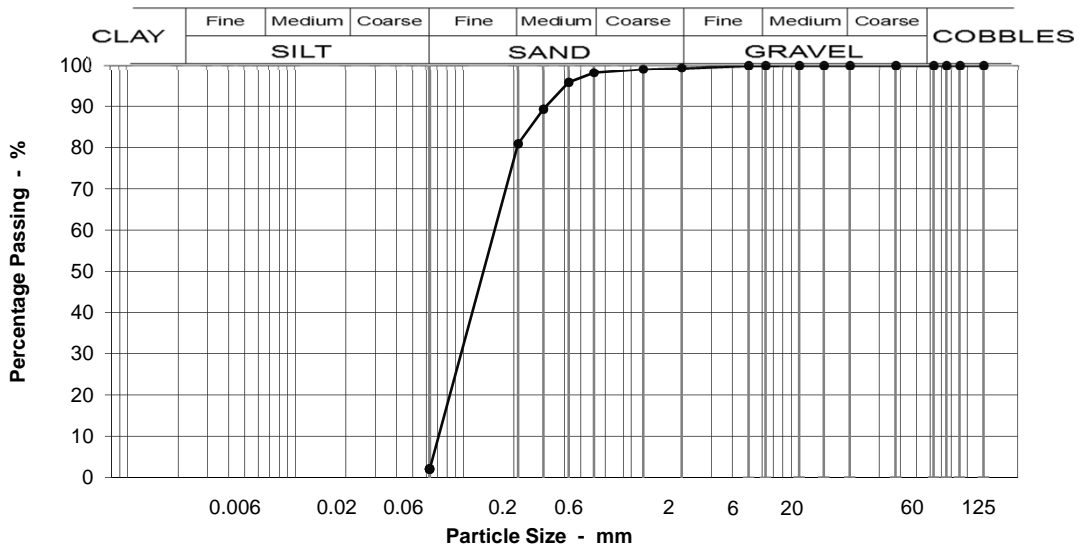
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 13 - 13.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	98
0.425	96
0.300	89
0.212	81
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 52

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	17
Fine SAND	79
Silt & Clay	2

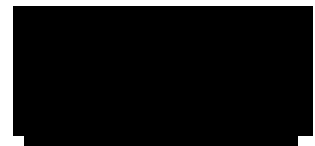
Grading Analysis	
D100	6
D60	0.17
D10	0.08
Uniformity Coefficient	2

Description	
Orangey brown fine SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171127002-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 48  
Your Project or Order No. PZ1522  
Date Tested 08/12/2017  
Date Report Issued 5-Feb-18

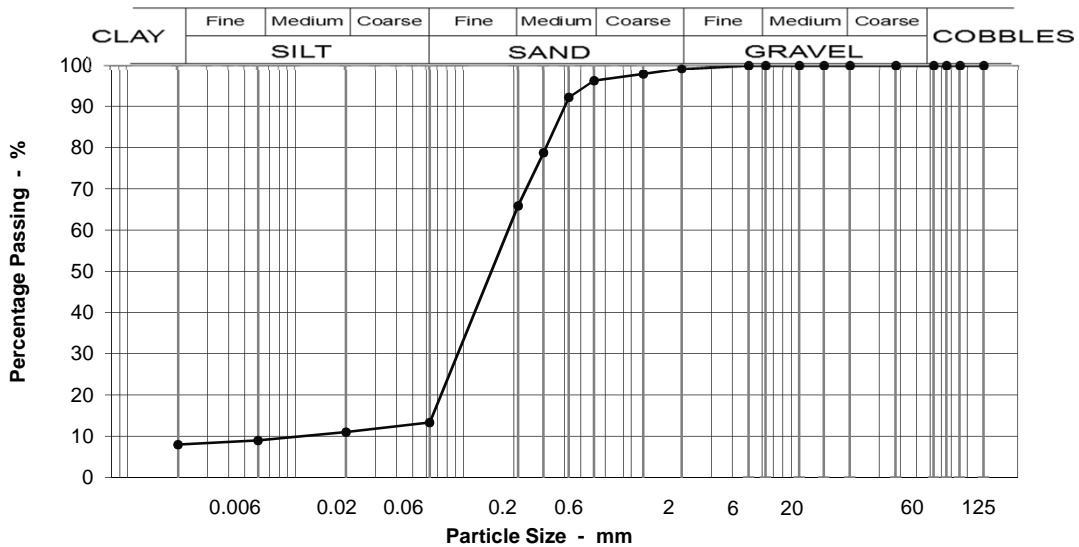
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 16 - 16.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	96
0.425	92
0.300	79
0.212	66
0.063	13
0.020	11
0.006	9
0.002	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 39

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	30
Fine SAND	53
Silt & Clay	13

Grading Analysis	
D100	2
D60	0.20
D10	0.05
Uniformity Coefficient	4

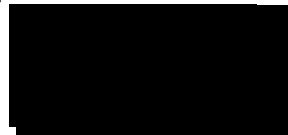
Description	
Laminated brown silty fine and medium SAND and grey very sandy silty clay.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171127004-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **50**  
Your Project or Order No. **PZ1522**  
Date Tested **07/12/2017**  
Date Report Issued **5-Feb-18**

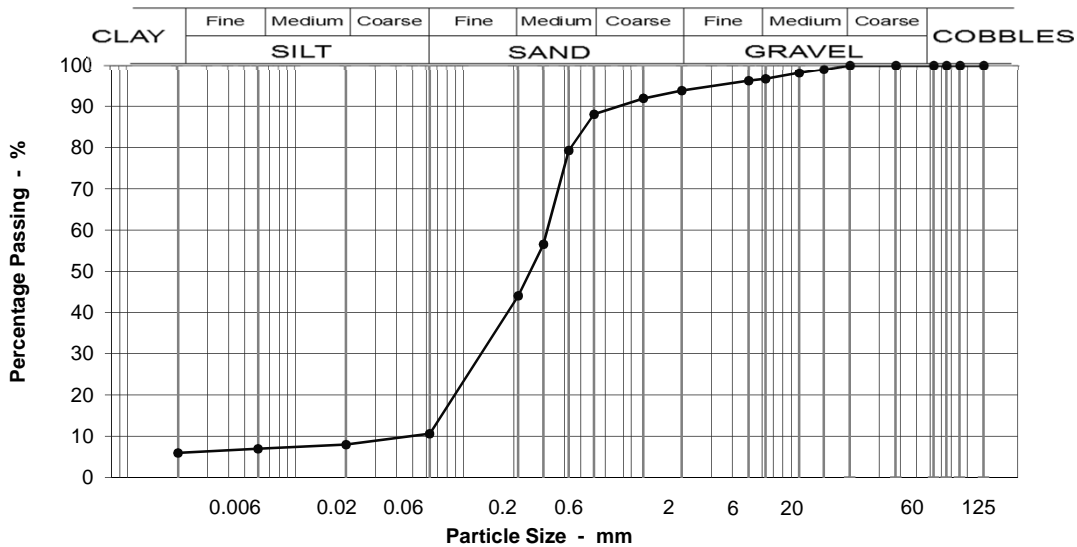
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 17.4 - 17.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	98
6.3	97
5	96
2	94
1.18	92
0.600	88
0.425	79
0.300	57
0.212	44
0.063	11
0.020	8
0.006	7
0.002	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 27

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	3
Coarse SAND	6
Medium SAND	44
Fine SAND	33
Silt & Clay	11

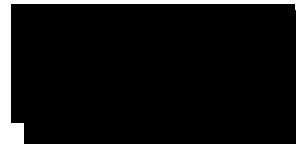
Grading Analysis	
D100	14
D60	0.32
D10	0.10
Uniformity Coefficient	3

**Description**  
Reddish brown slightly clayey, slightly gravelly fine and medium SAND with numerous shell fragments. Gravel is fine and medium angular flint.

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171127008-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 54  
Your Project or Order No. PZ1522  
Date Tested 08/12/2017  
Date Report Issued 9-Jan-18

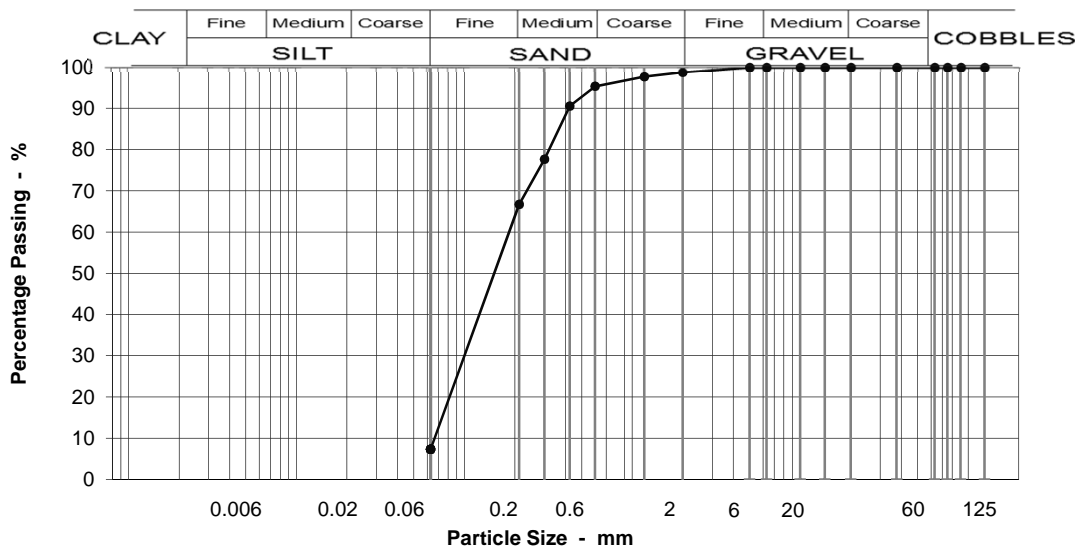
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 19 - 19.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	95
0.425	91
0.300	78
0.212	67
0.063	7

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	29
Fine SAND	59
Silt & Clay	7

Grading Analysis	
D100	2
D60	0.20
D10	0.07
Uniformity Coefficient	3

**Description**  
Reddish brown slightly silty fine and medium SAND with numerous shell fragments.

Moisture content % 25

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171127010-610**  
Our Project No. PZ1522D1  
Your Sample Ref 56  
Your Project or Order No. PZ1522  
Date Tested 07/12/2017  
Date Report Issued 9-Jan-18

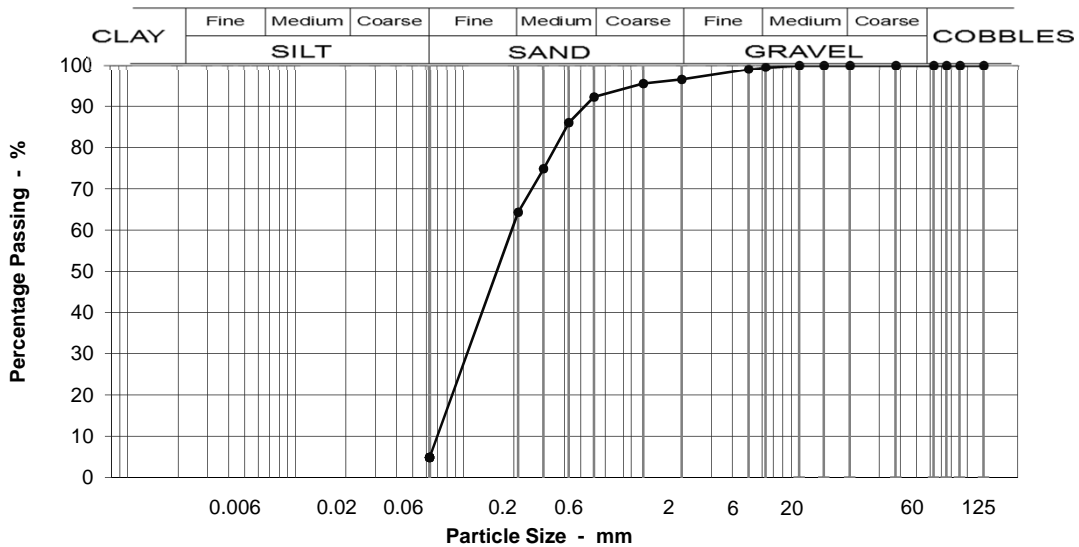
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 20 - 20.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	97
1.18	95
0.600	92
0.425	86
0.300	75
0.212	64
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	3
Coarse SAND	4
Medium SAND	28
Fine SAND	59
Silt & Clay	5

Grading Analysis	
D100	6
D60	0.20
D10	0.08
Uniformity Coefficient	3

Description	
Brownish grey fine and medium SAND with some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171127011-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **57**  
Your Project or Order No. **PZ1522**  
Date Tested **11/12/2017**  
Date Report Issued **9-Jan-18**

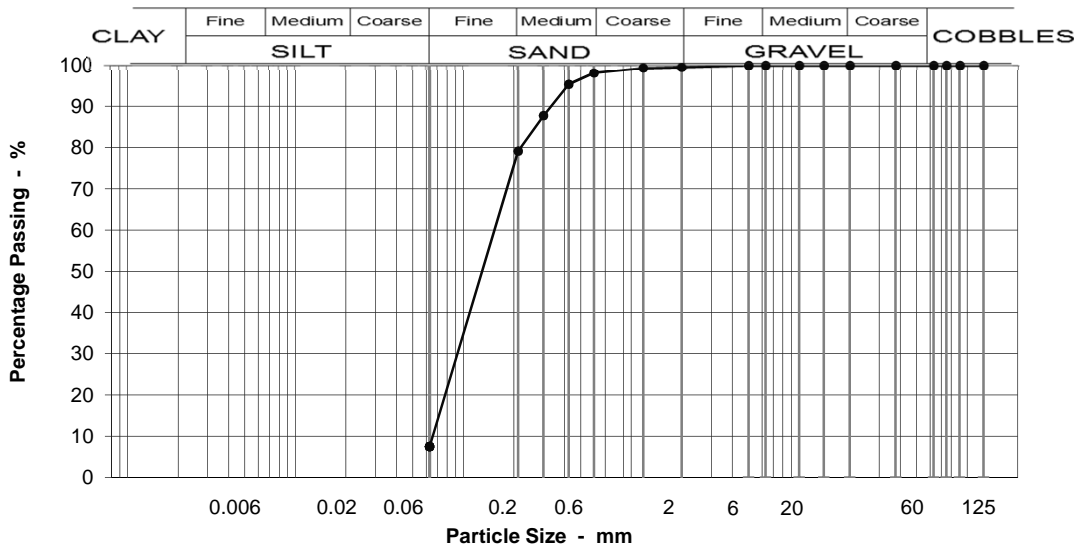
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 21 - 21.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	98
0.425	95
0.300	88
0.212	79
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 27

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	19
Fine SAND	72
Silt & Clay	8

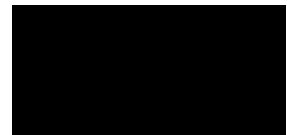
Grading Analysis	
D100	2
D60	0.17
D10	0.07
Uniformity Coefficient	3

Description	
Grey fine SAND with some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171127015-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 61  
Your Project or Order No. PZ1522  
Date Tested 11/12/2017  
Date Report Issued 5-Feb-18

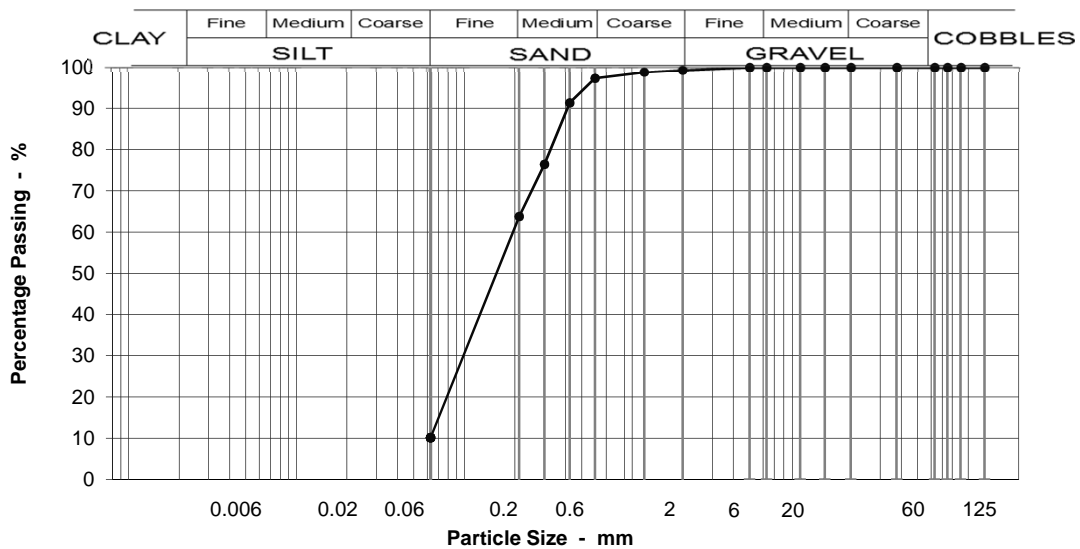
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 23.1 - 23.6m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	91
0.300	76
0.212	64
0.063	10

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6J.**

Moisture content % 24

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	34
Fine SAND	54
Silt & Clay	10

Grading Analysis	
D100	2
D60	0.20
D10	0.03
Uniformity Coefficient	6

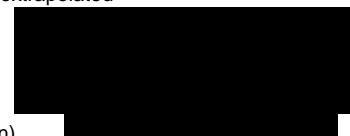
**Description**  
Grey fine and medium SAND with some shell fragments.

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171127019-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 65  
Your Project or Order No. PZ1522  
Date Tested 11/12/2017  
Date Report Issued 9-Jan-18

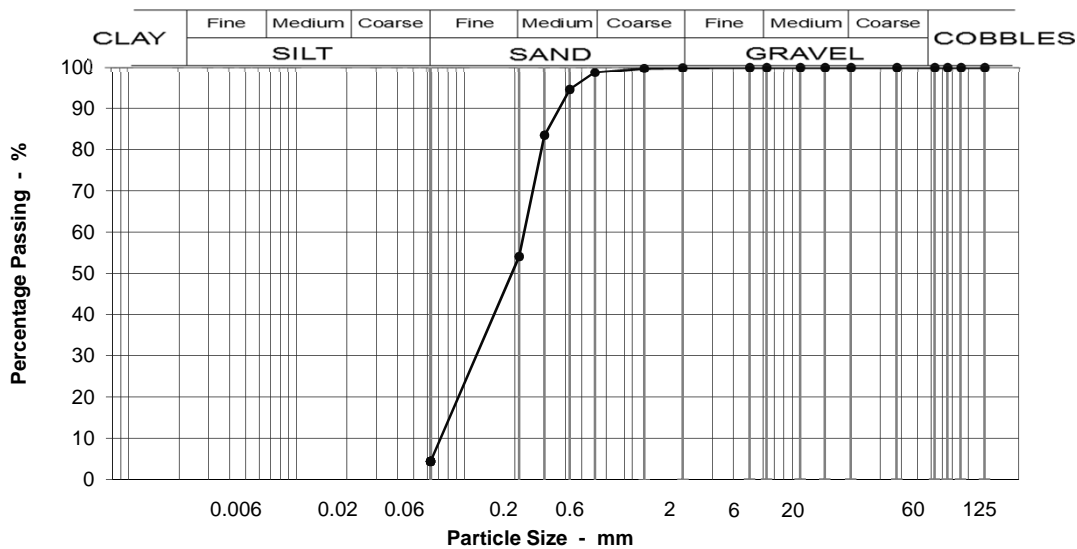
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 25 - 25.1m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	95
0.300	83
0.212	54
0.063	4

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	45
Fine SAND	50
Silt & Clay	4

Grading Analysis	
D100	2
D60	0.23
D10	0.08
Uniformity Coefficient	3

**Description**  
Grey fine and medium SAND with occasional shell fragments.

Moisture content % 20

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171127021-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 67  
Your Project or Order No. PZ1522  
Date Tested 12/12/2017  
Date Report Issued 9-Jan-18

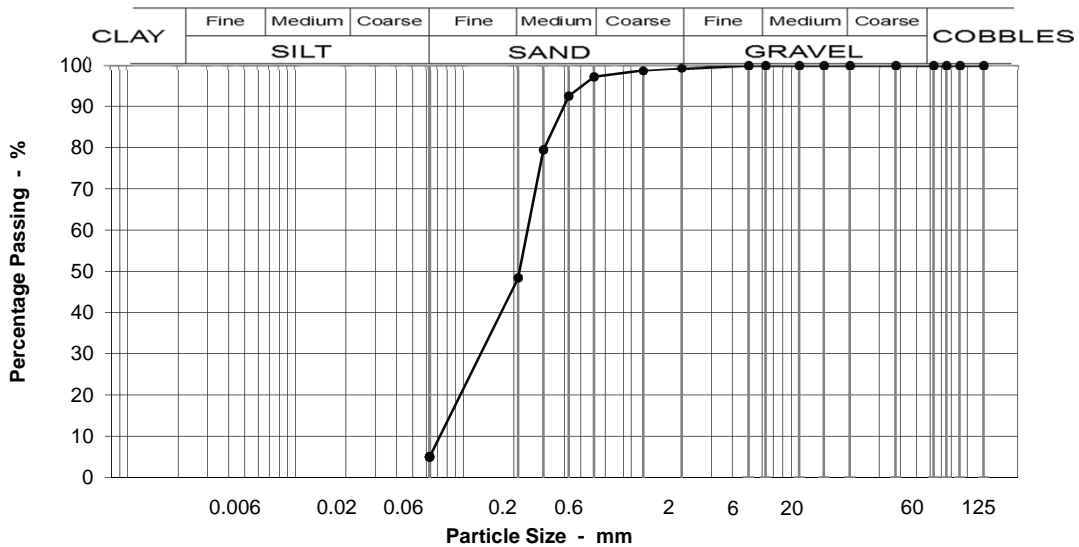
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 26 - 26.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	92
0.300	79
0.212	48
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	49
Fine SAND	43
Silt & Clay	5

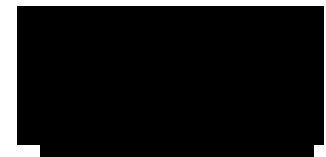
Grading Analysis	
D100	2
D60	0.24
D10	0.08
Uniformity Coefficient	3

Description	
Grey fine and medium SAND with occasional shell fragments.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171127023-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 69  
Your Project or Order No. PZ1522  
Date Tested 07/12/2017  
Date Report Issued 5-Feb-18

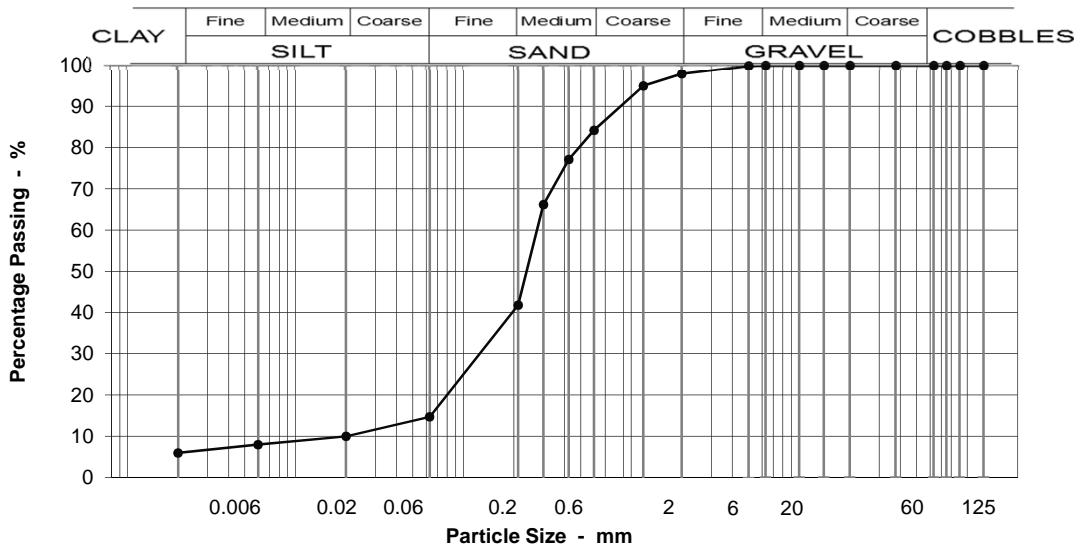
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 27 - 27.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	95
0.600	84
0.425	77
0.300	66
0.212	42
0.063	15
0.020	10
0.006	8
0.002	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	14
Medium SAND	42
Fine SAND	27
Silt & Clay	15

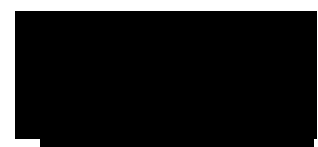
Grading Analysis	
D100	5
D60	0.28
D10	0.07
Uniformity Coefficient	4

**Description**  
Laminated and thickly bedded orangey brown fine to coarse SAND, firm grey sandy CLAY and grey very sandy clayey SILT with some shell fragments.

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171127025-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 71  
Your Project or Order No. PZ1522  
Date Tested 12/12/2017  
Date Report Issued 5-Feb-18

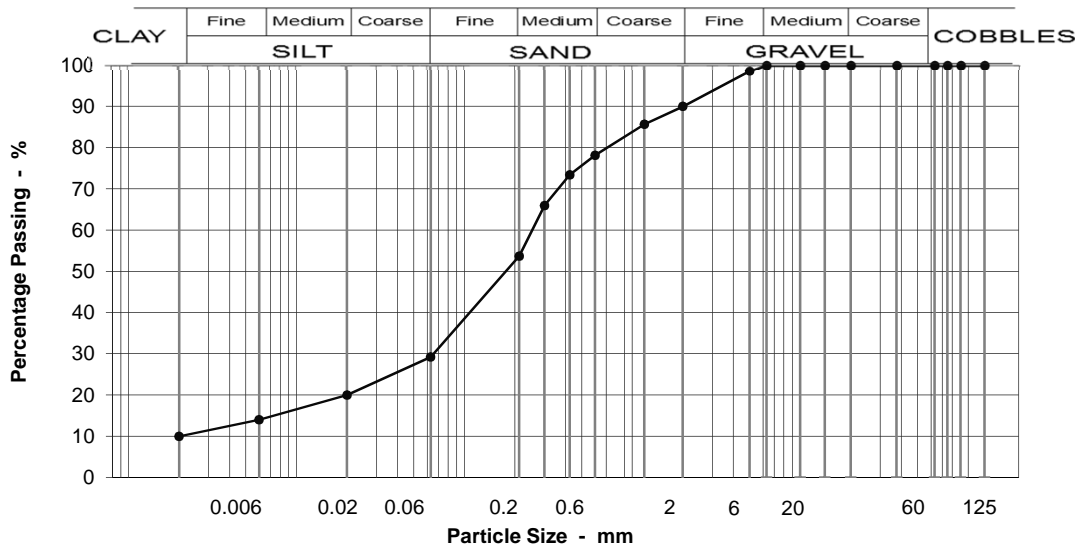
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH6 @ 28 - 28.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	90
1.18	86
0.600	78
0.425	73
0.300	66
0.212	54
0.063	29
0.020	20
0.006	14
0.002	10

Specification for Highway Works Classification  
Table 6/2

Moisture content % 34

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	10
Coarse SAND	12
Medium SAND	24
Fine SAND	24
Silt & Clay	29

Grading Analysis	
D100	5
D60	0.26
D10	0.00
Uniformity Coefficient	>10*

**Description**  
Laminated and thickly bedded orangey brown fine to coarse SAND, firm grey sandy CLAY and grey very sandy clayey SILT with some shell fragments.

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3171128001-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 1  
**Your Project or Order No.** PZ1522  
**Date Tested** 12/12/2017  
**Date Report Issued** 9-Jan-18

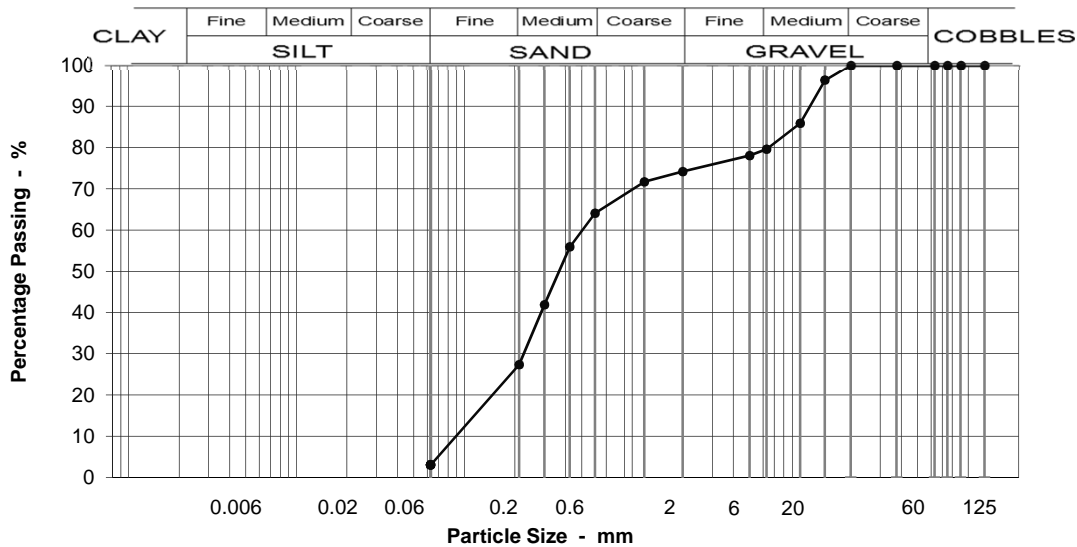
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH7 @ 0.2 - 0.45m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	96
10	86
6.3	80
5	78
2	74
1.18	72
0.600	64
0.425	56
0.300	42
0.212	27
0.063	3

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 8.9

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	20
Fine GRAVEL	5
Coarse SAND	10
Medium SAND	37
Fine SAND	24
Silt & Clay	3

Grading Analysis	
D100	14
D60	0.51
D10	0.11
Uniformity Coefficient	5

**Description**  
MADE GROUND: comprising greyish brown very gravelly fine to coarse SAND. Gravel is angular to subrounded flint, concrete and quartz.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171128003-613**  
Our Project No. PZ1522D1  
Your Sample Ref 3  
Your Project or Order No. PZ1522  
Date Tested 15/12/2017  
Date Report Issued 5-Feb-18

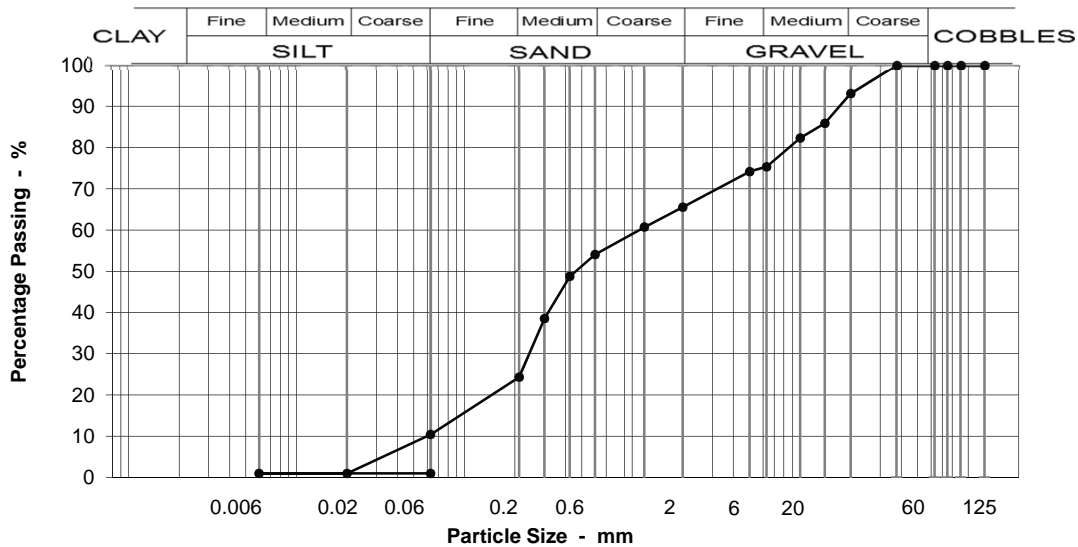
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH7 @ 0.5 - 1m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6J.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	7
63	100		Medium GRAVEL	18
37.5	100		Fine GRAVEL	10
20	93		Coarse SAND	11
14	86		Medium SAND	30
10	82		Fine SAND	14
6.3	75		Silt & Clay	10
5	74		<b>Grading Analysis</b>	
2	66		D100	20
1.18	61		D60	1.12
0.600	54		D10	0.14
0.425	49		Uniformity Coefficient	8
0.300	39		<b>Description</b>	
0.212	24	(MADE GROUND) Comprising greyish brown slightly organic very gravelly silty medium SAND. Gravel is fine and medium angular to sub-rounded red brick, flint, concrete, quartz and pottery.		
0.063	10			
0.020	1			
0.006	1			
0.002	0	Moisture content %	22	

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171129001-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **7**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

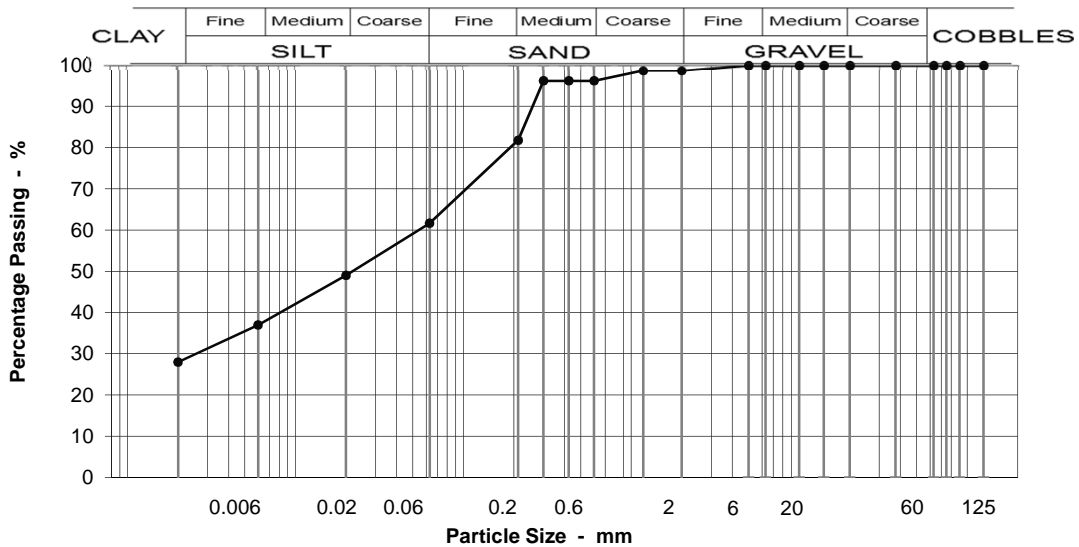
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH7 @ 1.4 - 1.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	96
0.425	96
0.300	96
0.212	82
0.063	62
0.020	49
0.006	37
0.002	28

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	14
Fine SAND	20
Silt & Clay	62

Grading Analysis	
D100	2
D60	0.06
D10	0.00
Uniformity Coefficient	>10*

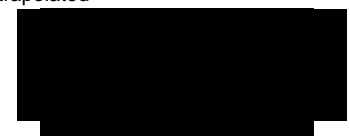
Description	
soft grey slightly organic very clayey SILT with lenses of dark brown amorphous peat.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171128005-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **5**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

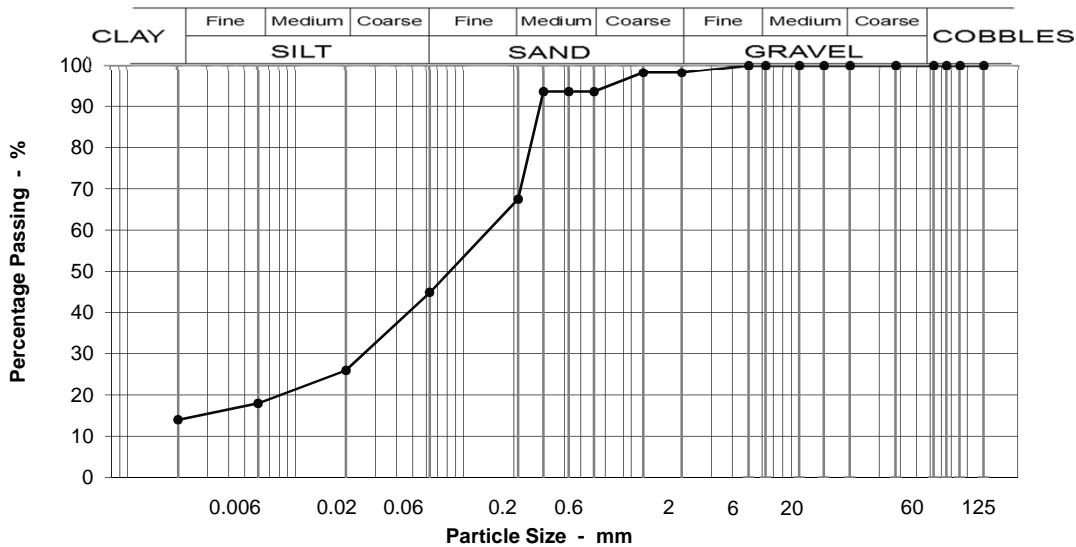
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH7 @ 1 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	98
0.600	94
0.425	94
0.300	94
0.212	67
0.063	45
0.020	26
0.006	18
0.002	14

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	5
Medium SAND	26
Fine SAND	23
Silt & Clay	45

Grading Analysis	
D100	2
D60	0.16
D10	0.00
Uniformity Coefficient	>10*

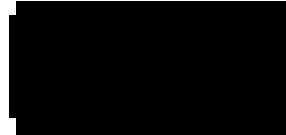
Description	
Fine to medium slightly organic clayey very sandy SILT	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171129005-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **11**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

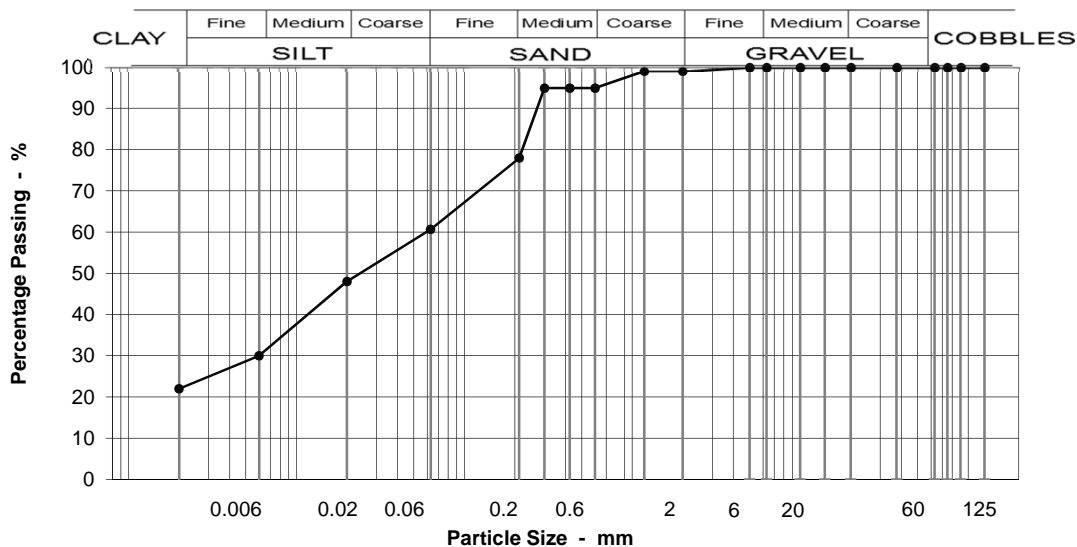
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH7 @ 2 - 2.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	95
0.425	95
0.300	95
0.212	78
0.063	61
0.020	48
0.006	30
0.002	22

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	17
Fine SAND	17
Silt & Clay	61

Grading Analysis	
D100	2
D60	0.06
D10	0.00
Uniformity Coefficient	>10*

**Description**  
very soft dark brown organic very calyey very sandy SILT with lenses of dark brown pseudo-fibrous peat.

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3171129008-613**  
Our Project No. PZ1522D1  
Your Sample Ref 13  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 5-Feb-18

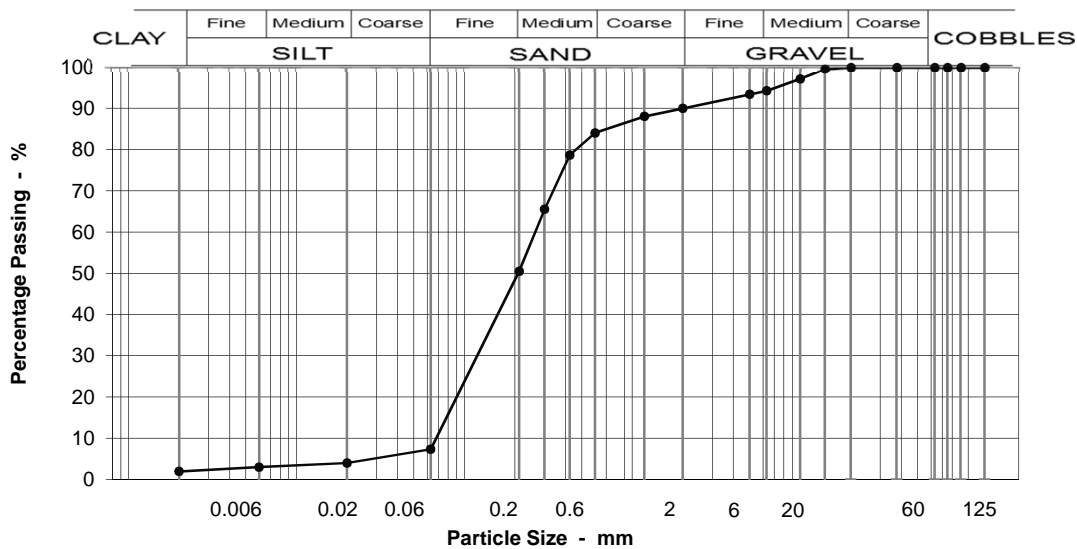
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH7 @ 3 - 3.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	97
6.3	94
5	93
2	90
1.18	88
0.600	84
0.425	79
0.300	66
0.212	50
0.063	7
0.020	4
0.006	3
0.002	2

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 51

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	6
Fine GRAVEL	4
Coarse SAND	6
Medium SAND	34
Fine SAND	43
Silt & Clay	7

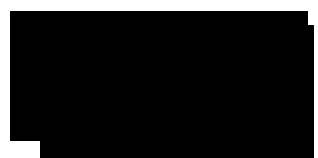
Grading Analysis	
D100	14
D60	0.27
D10	0.07
Uniformity Coefficient	4

**Description**  
Dark brown organic gravelly fine and medium SAND with lenses of dark brown PEAT. Gravel is fine and medium angular flint and quartz.

Test Code = 613



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
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Norfolk  
NR1 2DH

Our reference No. **GTS3171129011-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **16**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **5-Feb-18**

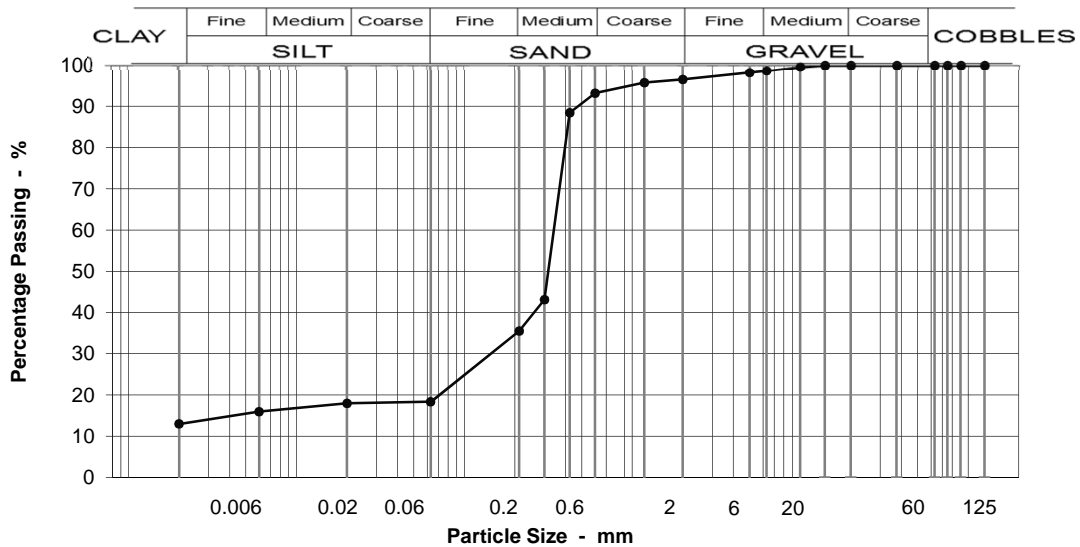
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH7 @ 4 - 4.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	98
2	96
1.18	96
0.600	93
0.425	88
0.300	43
0.212	36
0.063	18
0.020	18
0.006	16
0.002	13

Specification for Highway Works Classification  
Table 6/2

Moisture content % 24

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	2
Coarse SAND	3
Medium SAND	58
Fine SAND	17
Silt & Clay	18

Grading Analysis	
D100	10
D60	0.35
D10	0.00
Uniformity Coefficient	>10*

Description	
Yellowish grey slightly silty clayey medium SAND.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS5180123004-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **4**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

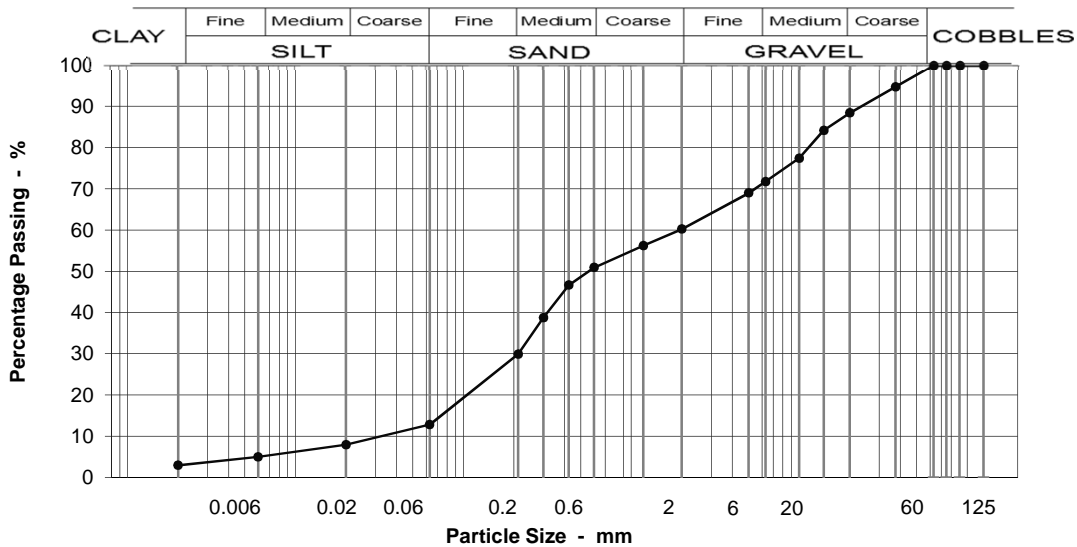
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 0.8 - 1m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	95
20	88
14	84
10	77
6.3	72
5	69
2	60
1.18	56
0.600	51
0.425	47
0.300	39
0.212	30
0.063	13
0.020	8
0.006	5
0.002	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6I, 6N.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	12
Medium GRAVEL	17
Fine GRAVEL	12
Coarse SAND	9
Medium SAND	21
Fine SAND	17
Silt & Clay	13

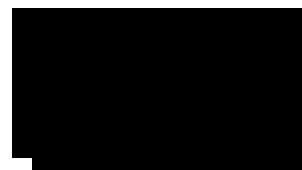
Grading Analysis	
D100	38
D60	1.95
D10	0.11
Uniformity Coefficient	19

**Description**  
MADE GROUND comprising angular, medium to coarse gravel size brick, concrete, ash, slag and flint in a matrix of dark brown silty fine and medium sand.

Test Code = 613



Simon Holden (Project Technician)





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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS5180123007-610**  
Our Project No. PZ1522D1  
Your Sample Ref 7  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 1-Mar-18

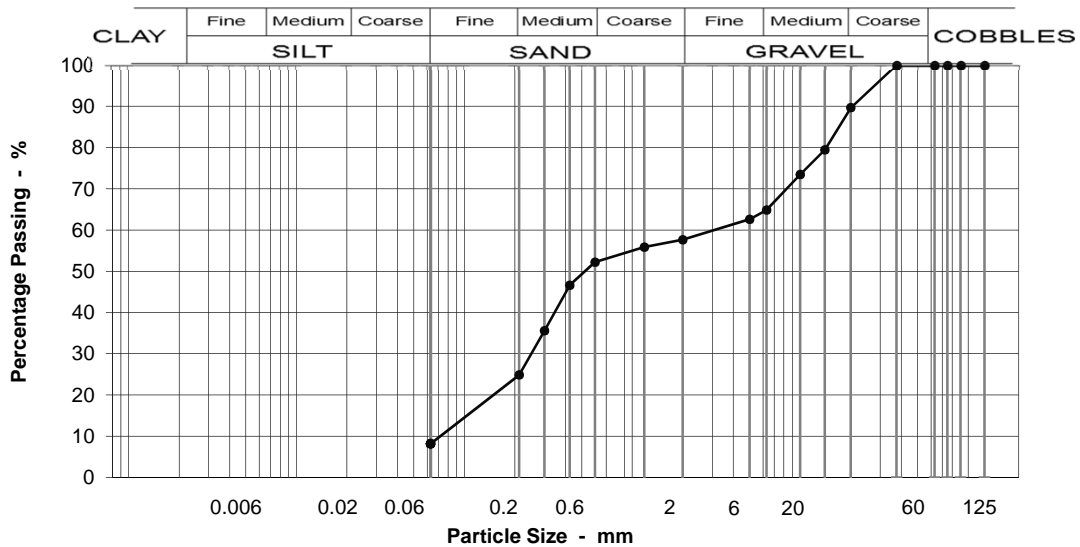
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 1.1 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	90
14	79
10	73
6.3	65
5	63
2	58
1.18	56
0.600	52
0.425	47
0.300	36
0.212	25
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6I, 6M, 6N.**

Moisture content % 11

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	10
Medium GRAVEL	25
Fine GRAVEL	7
Coarse SAND	5
Medium SAND	27
Fine SAND	17
Silt & Clay	8

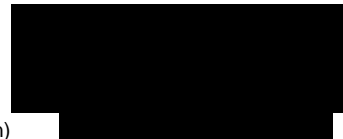
Grading Analysis	
D100	20
D60	3.43
D10	0.08
Uniformity Coefficient	43

Description	
Greyish brown silty fine to medium SAND and medium rounded to subrounded flint and quartz GRAVEL (made ground)	

Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
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Our reference No. **GTS5180123010-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **10**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **1-Mar-18**

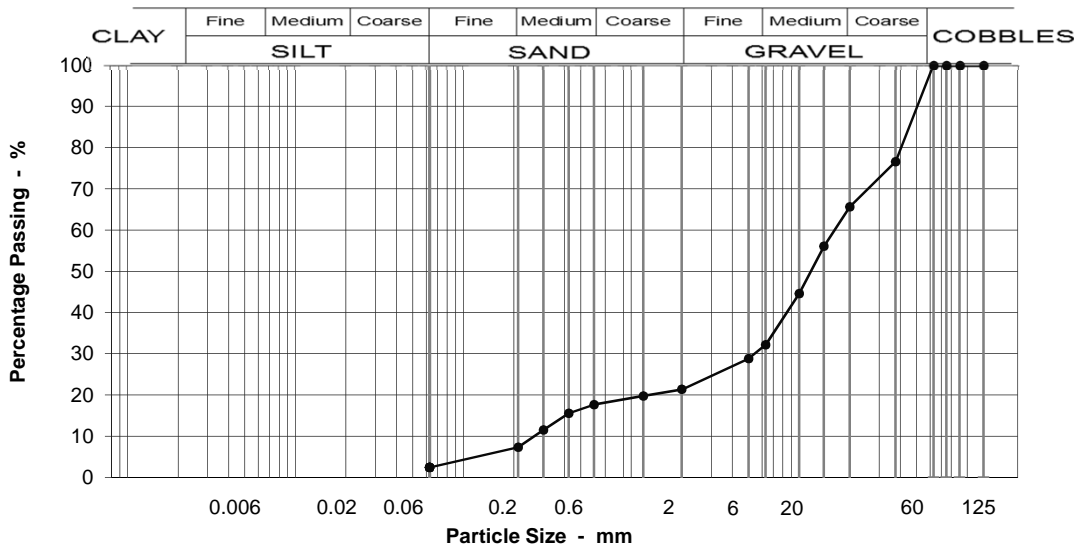
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 1.2 - 1.7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	77
20	66
14	56
10	45
6.3	32
5	29
2	21
1.18	20
0.600	18
0.425	16
0.300	12
0.212	7
0.063	2

Specification for Highway Works Classification  
Table 6/2

This material complies with the following material classes 1A, 6A, 6E/6R, 6F2/6F3, 6I, 6M, 6N.

Moisture content % 8.9

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	34
Medium GRAVEL	33
Fine GRAVEL	11
Coarse SAND	4
Medium SAND	10
Fine SAND	5
Silt & Clay	2

Grading Analysis	
D100	38
D60	16.47
D10	0.27
Uniformity Coefficient	62

Description	
Greyish brown sandy fine to coarse rounded to subrounded flint and quartz and angular brick GRAVEL	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS5180123014-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **14**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

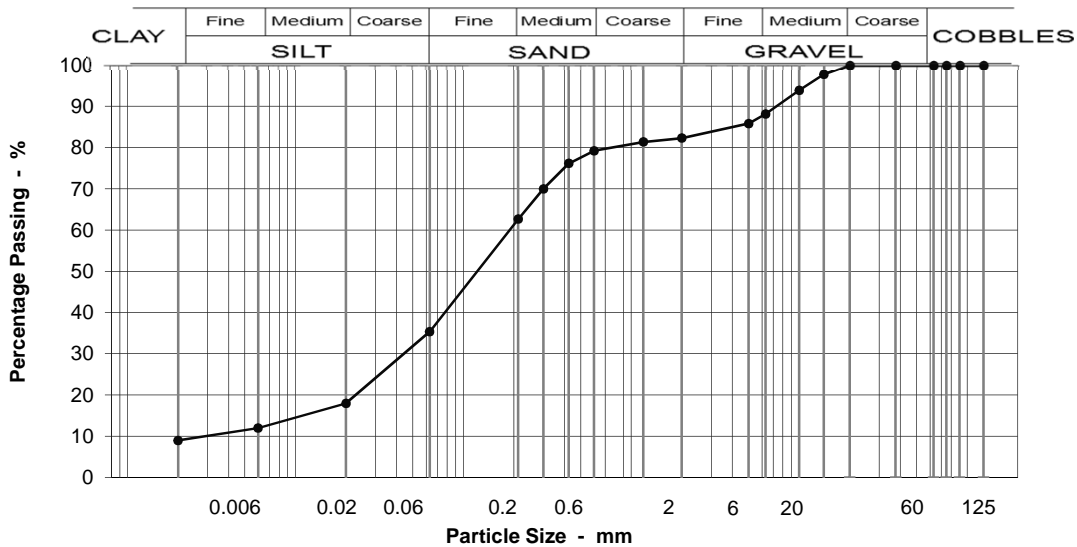
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 2 - 2.2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	94
6.3	88
5	86
2	82
1.18	81
0.600	79
0.425	76
0.300	70
0.212	63
0.063	35
0.020	18
0.006	12
0.002	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 2A/2B, 2A/2B.**

Moisture content % 35

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	12
Fine GRAVEL	6
Coarse SAND	3
Medium SAND	17
Fine SAND	27
Silt & Clay	35

Grading Analysis	
D100	14
D60	0.20
D10	0.03
Uniformity Coefficient	6

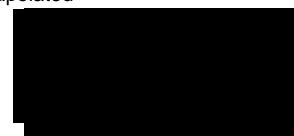
Description	
Soft to firm dark brown and black slightly orangey, very sandy clayey SILT.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS5180123019-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 19  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 1-Mar-18

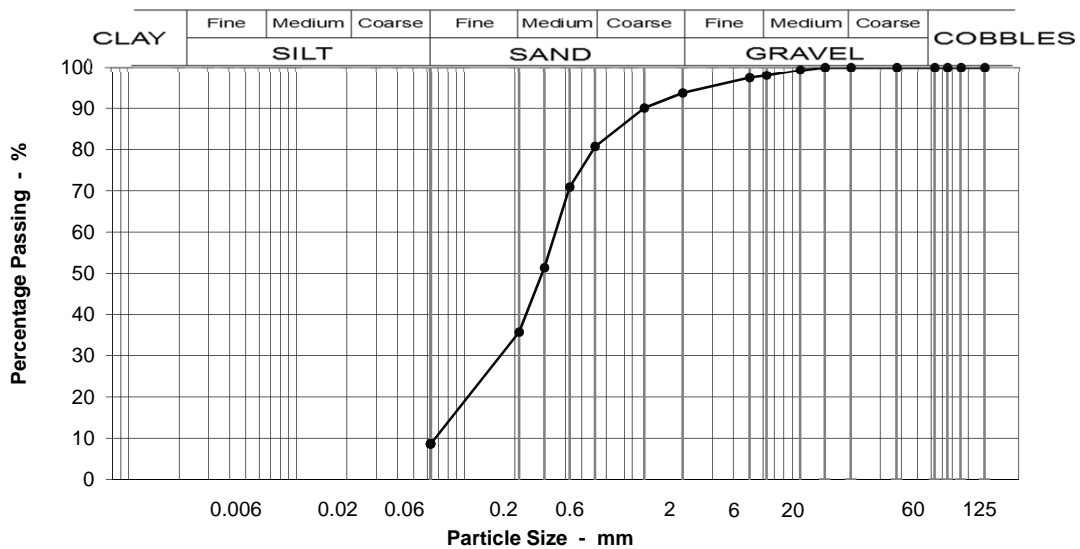
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 3 - 3.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	98
5	97
2	94
1.18	90
0.600	81
0.425	71
0.300	51
0.212	36
0.063	9

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6J, 6K, 6M.**

Moisture content % 41

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	4
Coarse SAND	13
Medium SAND	45
Fine SAND	27
Silt & Clay	9

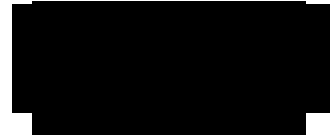
Grading Analysis	
D100	10
D60	0.36
D10	0.07
Uniformity Coefficient	5

**Description**  
Grey slightly gravely slightly silty fine to coarse SAND with lenses of brown pseudo-fibrous peat. Gravel is fine to medium rounded flint and quartz

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS5180123022-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 22  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 1-Mar-18

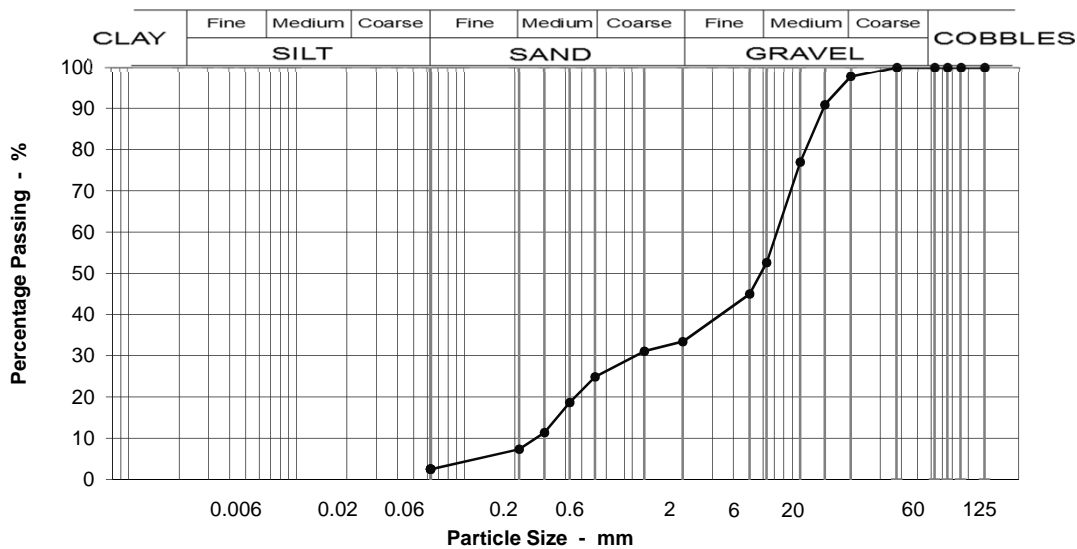
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 4 - 4.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	98
14	91
10	77
6.3	53
5	45
2	33
1.18	31
0.600	25
0.425	19
0.300	11
0.212	7
0.063	3

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 9.7

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	2
Medium GRAVEL	45
Fine GRAVEL	19
Coarse SAND	9
Medium SAND	18
Fine SAND	5
Silt & Clay	3

Grading Analysis	
D100	20
D60	7.43
D10	0.27
Uniformity Coefficient	28

**Description**  
Greyish brown very sandy fine to medium angular to rounded flint and quartz GRAVEL

Test Code = 610



Simon Holden (Project Technician)





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Norfolk  
NR1 2DH

**Our reference No.** GTS1180123025-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 25  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 1-Mar-18

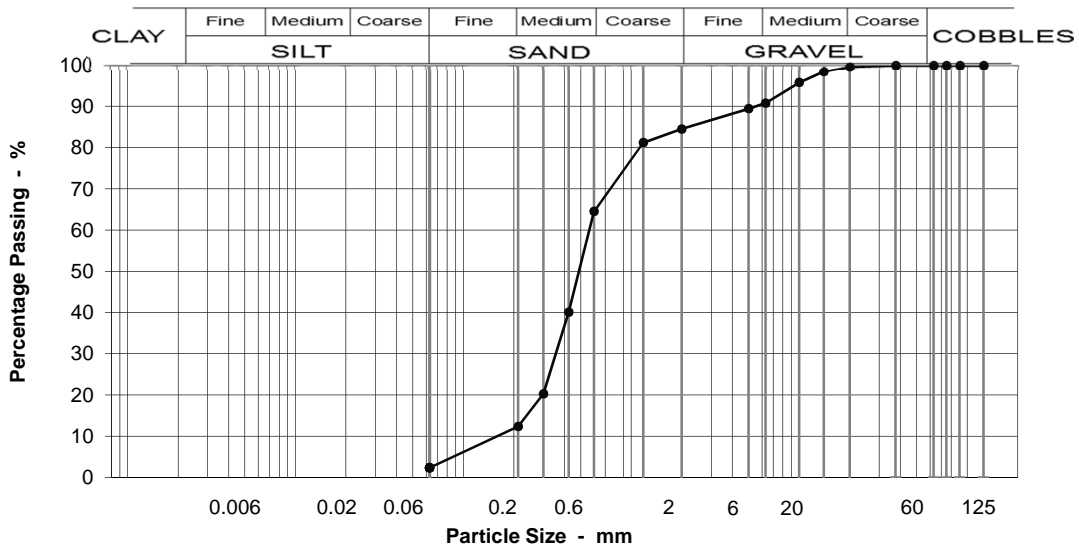
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 5 - 5.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	96
6.3	91
5	89
2	84
1.18	81
0.600	64
0.425	40
0.300	20
0.212	12
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 13

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	9
Fine GRAVEL	6
Coarse SAND	20
Medium SAND	52
Fine SAND	10
Silt & Clay	2

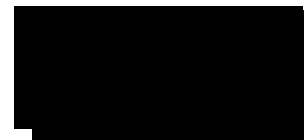
Grading Analysis	
D100	20
D60	0.57
D10	0.18
Uniformity Coefficient	3

**Description**  
Greyish brown gravelly medium SAND. Gravel is fine and medium angular to rounded flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180123028-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 28  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 1-Mar-18

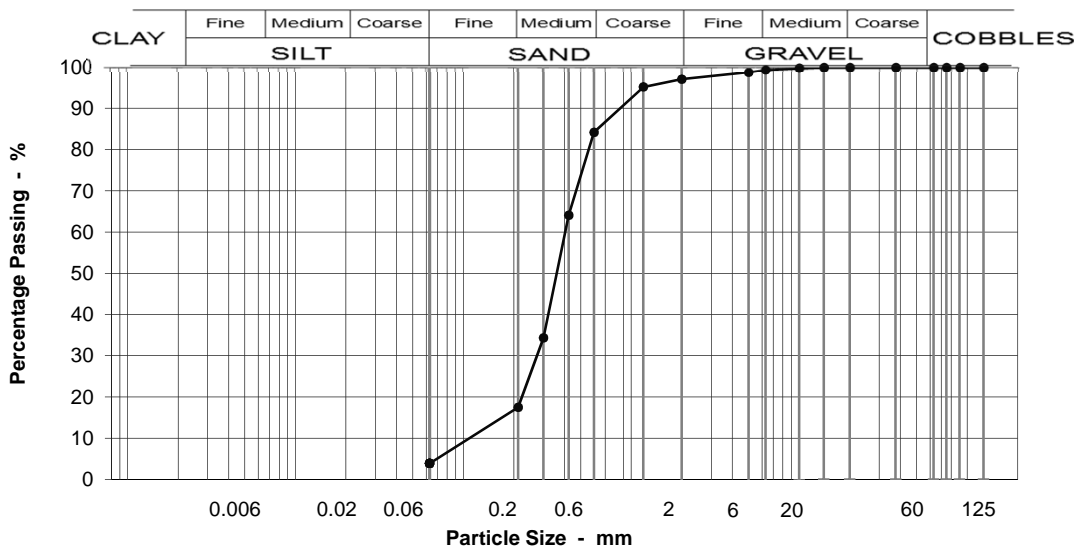
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 6 - 6.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	97
1.18	95
0.600	84
0.425	64
0.300	34
0.212	18
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	2
Coarse SAND	13
Medium SAND	67
Fine SAND	14
Silt & Clay	4

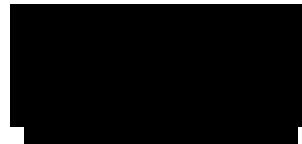
Grading Analysis	
D100	10
D60	0.41
D10	0.13
Uniformity Coefficient	3

Description	
Greyish brown medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

Our reference No. **GTS1180123034-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **34**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **1-Mar-18**

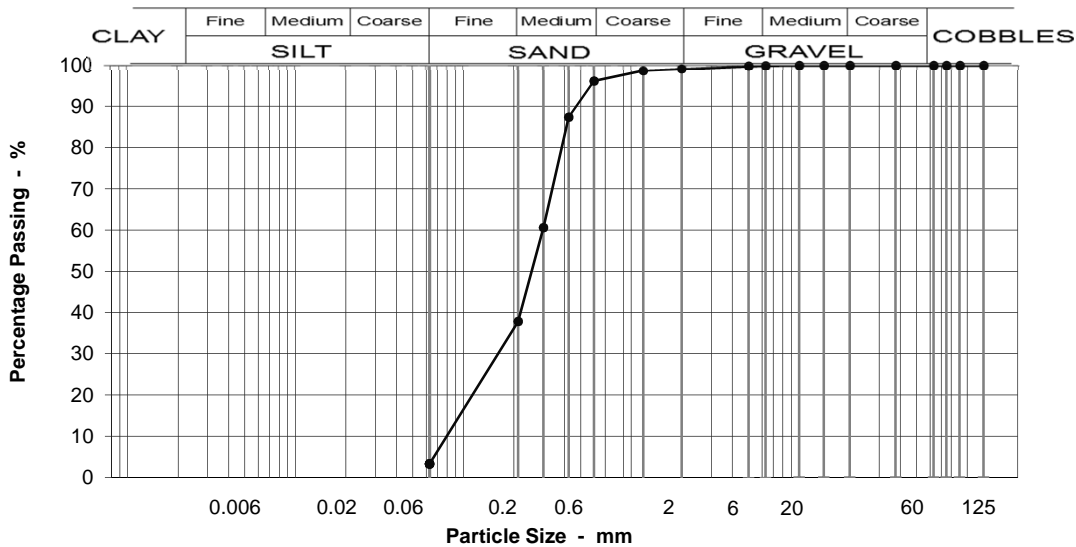
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 8 - 8.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	96
0.425	87
0.300	61
0.212	38
0.063	3

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	58
Fine SAND	34
Silt & Clay	3

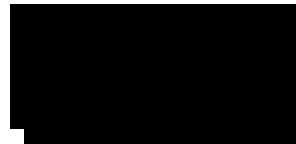
Grading Analysis	
D100	6
D60	0.30
D10	0.09
Uniformity Coefficient	3

**Description**  
Brown fine to medium SAND with occasional shell fragments.

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS1180124003-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **37**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **1-Mar-18**

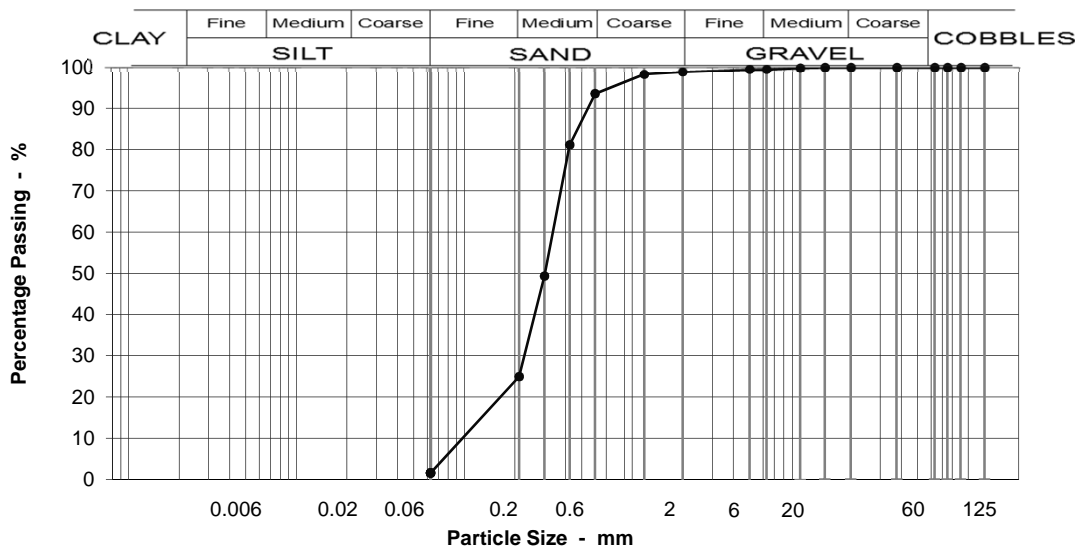
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 9 - 9.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	99
1.18	98
0.600	94
0.425	81
0.300	49
0.212	25
0.063	2

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	5
Medium SAND	69
Fine SAND	23
Silt & Clay	2

Grading Analysis	
D100	10
D60	0.34
D10	0.12
Uniformity Coefficient	3

**Description**  
Light brown medium SAND with occasional shell fragments

Moisture content % 16

Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

Our reference No. **GTS1180124006-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 40  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 1-Mar-18

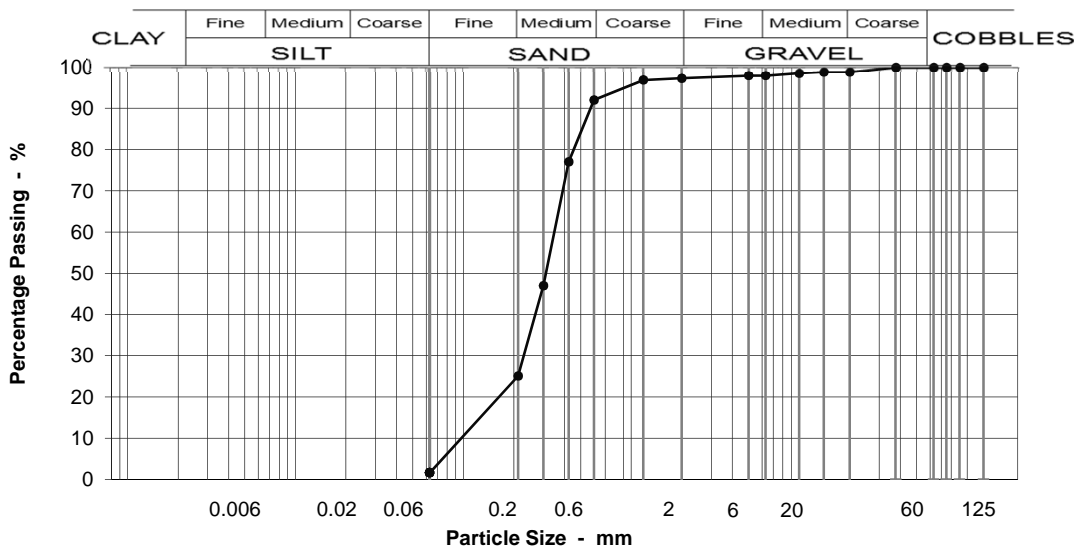
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 10 - 10.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	99
10	99
6.3	98
5	98
2	97
1.18	97
0.600	92
0.425	77
0.300	47
0.212	25
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	5
Medium SAND	67
Fine SAND	23
Silt & Clay	2

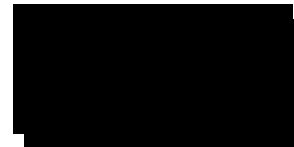
Grading Analysis	
D100	20
D60	0.35
D10	0.12
Uniformity Coefficient	3

Description	
Light brown medium SAND with occasional shell fragments	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS1180125002-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 47  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 1-Mar-18

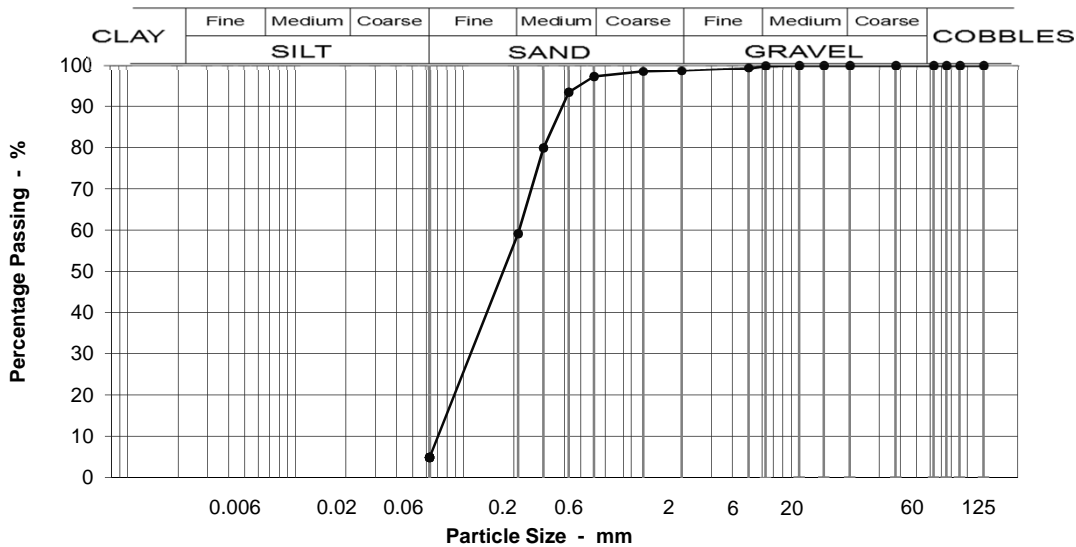
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 13 - 13.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	99
1.18	98
0.600	97
0.425	93
0.300	80
0.212	59
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	38
Fine SAND	54
Silt & Clay	5

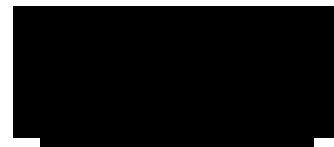
Grading Analysis	
D100	6
D60	0.22
D10	0.08
Uniformity Coefficient	3

Description	
Orange fine to medium SAND	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180126002-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **54**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **1-Mar-18**

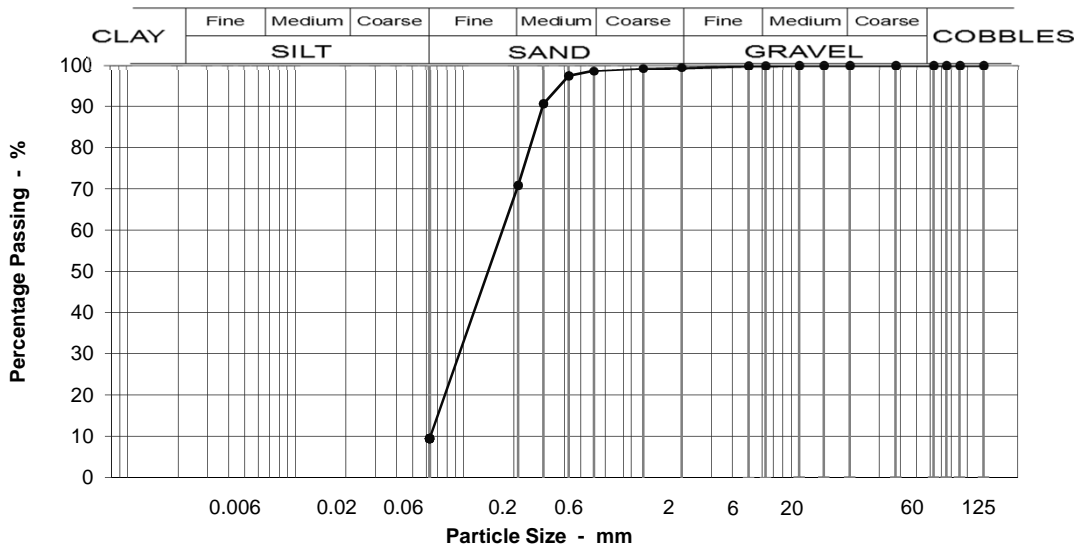
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 16 - 16.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	99
0.425	97
0.300	91
0.212	71
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 25

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	28
Fine SAND	61
Silt & Clay	9

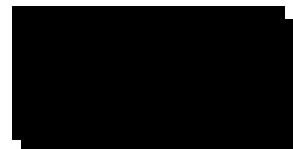
Grading Analysis	
D100	6
D60	0.19
D10	0.06
Uniformity Coefficient	3

Description	
Orangey brown fine SAND	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180126007-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **59**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **1-Mar-18**

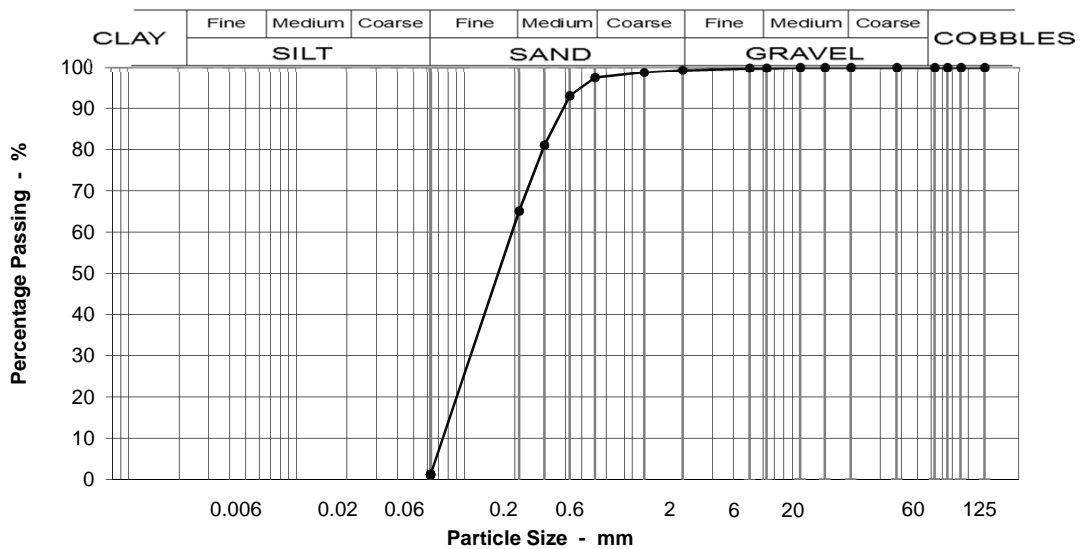
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 18 - 18.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	93
0.300	81
0.212	65
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	32
Fine SAND	64
Silt & Clay	1

Grading Analysis	
D100	6
D60	0.20
D10	0.08
Uniformity Coefficient	2

**Description**  
Orangey brown fine SAND with some shell fragments.

Test Code = 610



Simon Holden (Project Technician)

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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180126009-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **61**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

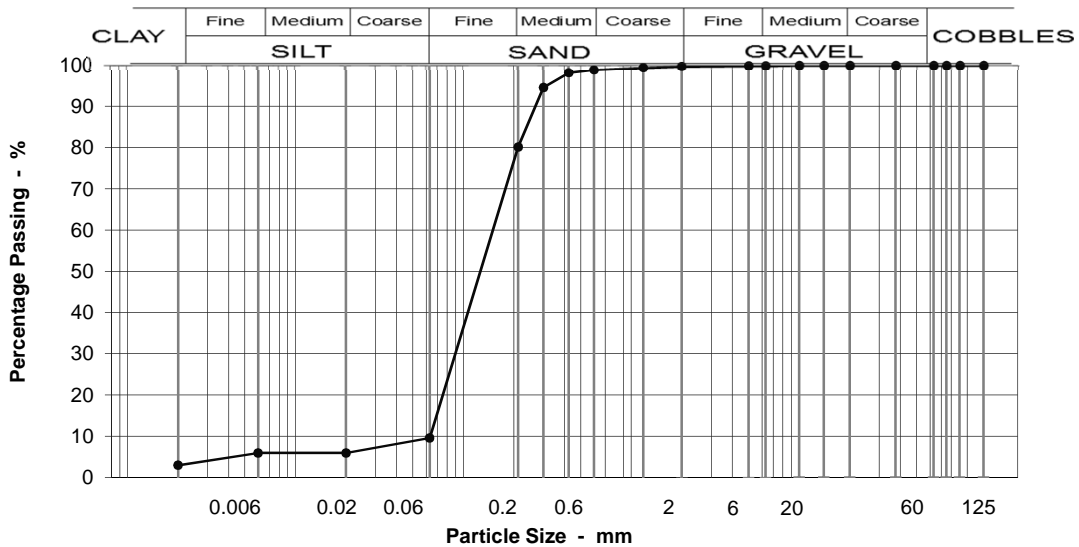
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 19 - 19.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	99
0.425	98
0.300	95
0.212	80
0.063	10
0.020	6
0.006	6
0.002	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 26

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	19
Fine SAND	71
Silt & Clay	10

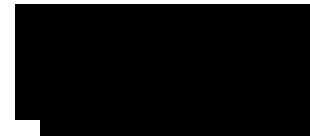
Grading Analysis	
D100	6
D60	0.17
D10	0.06
Uniformity Coefficient	3

**Description**  
Orangey brown fine SAND with thin beds of soft grey silt and clay.

Test Code = 613



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180126012-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **64**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **1-Mar-18**

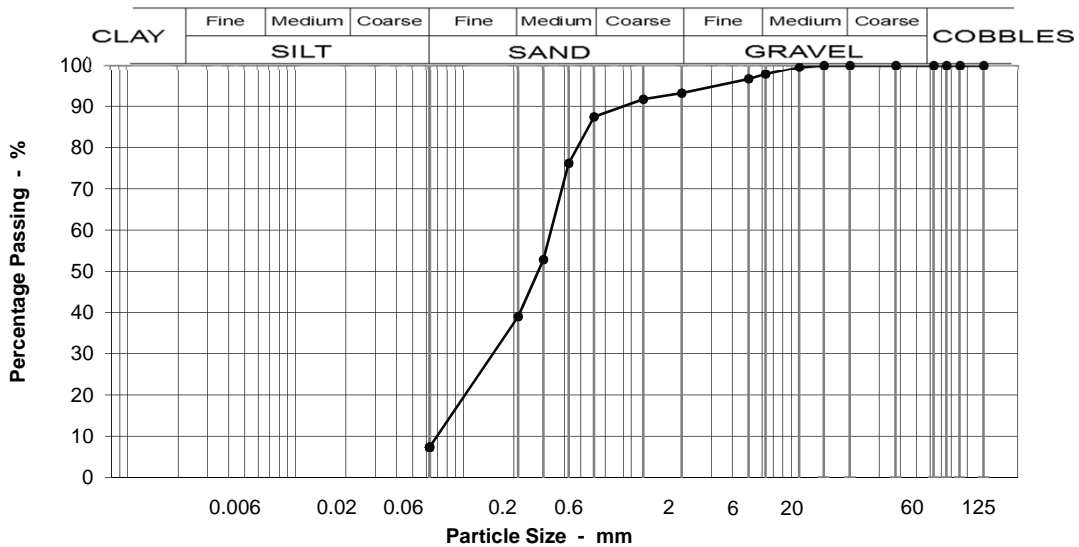
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 20 - 20.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	98
5	97
2	93
1.18	92
0.600	87
0.425	76
0.300	53
0.212	39
0.063	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	5
Coarse SAND	6
Medium SAND	48
Fine SAND	32
Silt & Clay	7

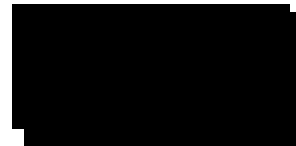
Grading Analysis	
D100	10
D60	0.34
D10	0.08
Uniformity Coefficient	4

Description	
Brownish grey slightly gravelly slightly silty fine to medium SAND with numerous shell fragments.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180126015-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **67**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

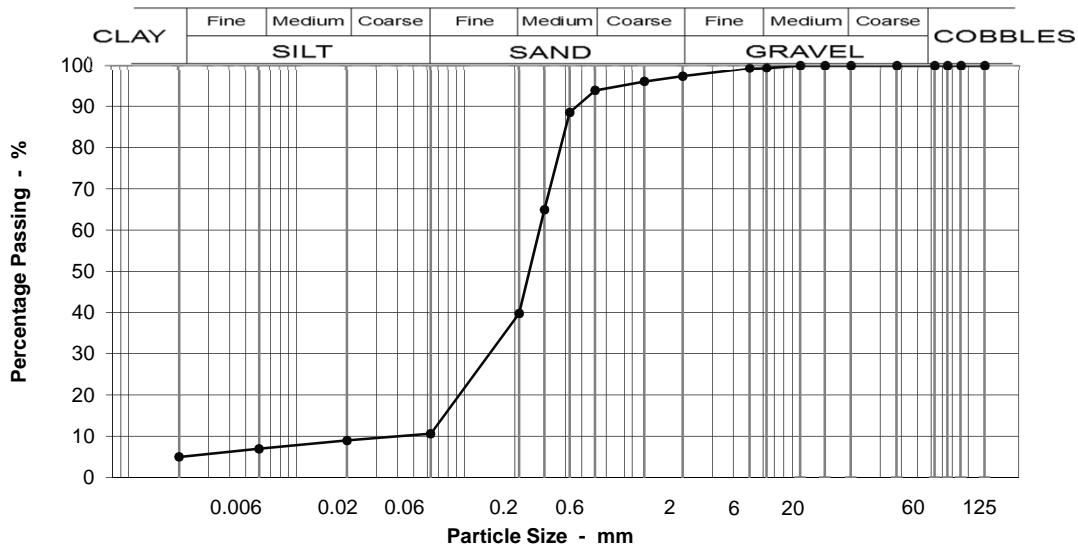
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 22 - 22.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	97
1.18	96
0.600	94
0.425	89
0.300	65
0.212	40
0.063	11
0.020	9
0.006	7
0.002	5

Specification for Highway Works Classification  
Table 6/2

This material complies with the following material classes 1B, 6E/6R.

Moisture content % 25

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	2
Coarse SAND	3
Medium SAND	54
Fine SAND	29
Silt & Clay	11

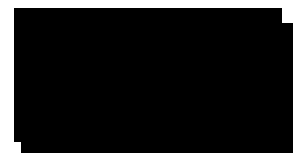
Grading Analysis	
D100	6
D60	0.28
D10	0.10
Uniformity Coefficient	3

**Description**  
Brownish grey slightly silty, fine and medium SAND with numerous shell fragments and lenses of soft grey clay.

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180126017-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **68**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **1-Mar-18**

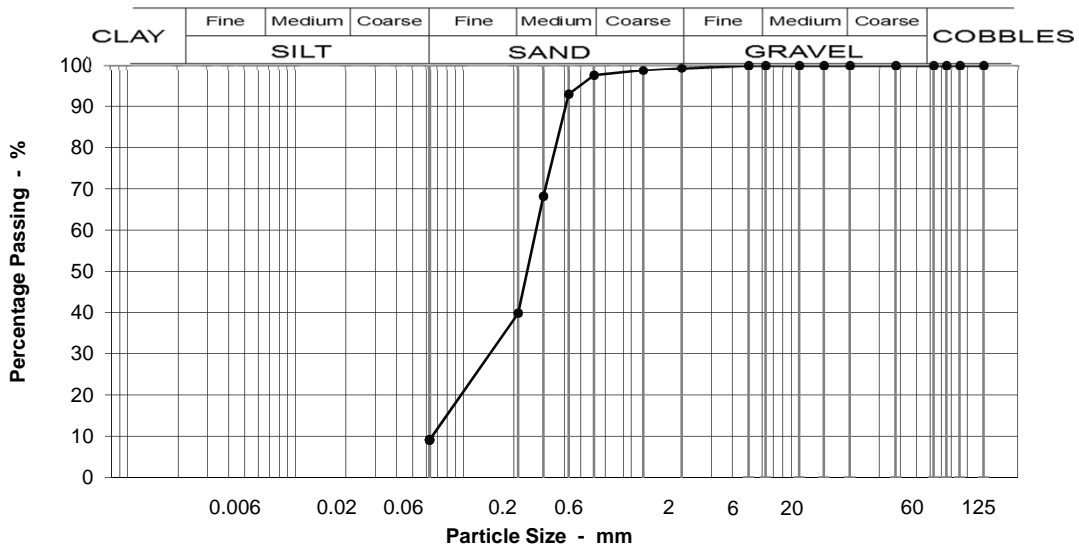
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 23 - 23.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	93
0.300	68
0.212	40
0.063	9

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 24

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	58
Fine SAND	31
Silt & Clay	9

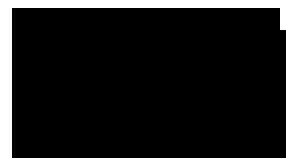
Grading Analysis	
D100	2
D60	0.27
D10	0.07
Uniformity Coefficient	4

**Description**  
Brownish grey fine to medium SAND with numerous shell fragments.

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180126019-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **70**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

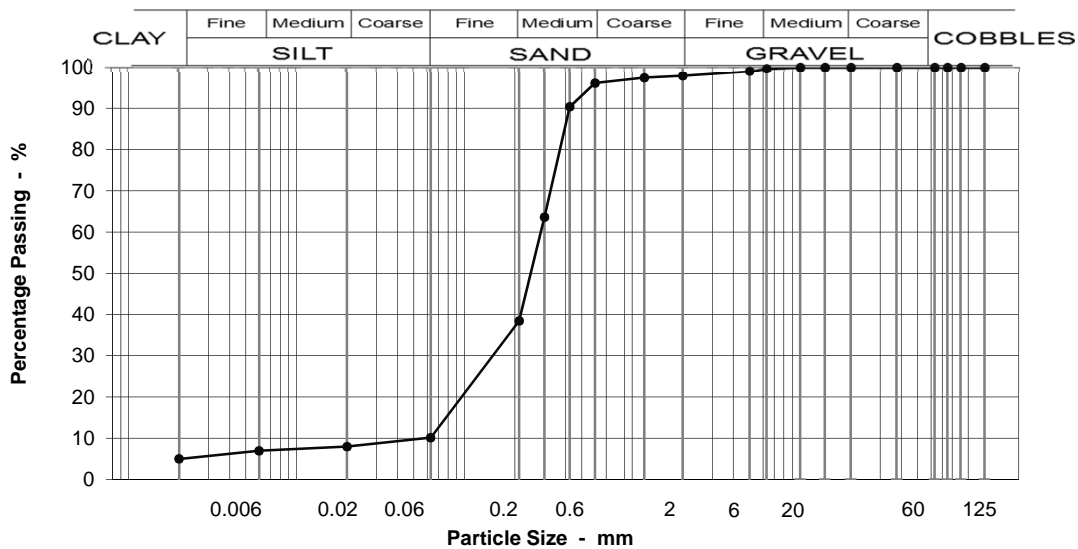
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 24 - 24.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	98
1.18	97
0.600	96
0.425	90
0.300	64
0.212	38
0.063	10
0.020	8
0.006	7
0.002	5

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content %      22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	2
Medium SAND	58
Fine SAND	28
Silt & Clay	10

Grading Analysis	
D100	6
D60	0.29
D10	0.12
Uniformity Coefficient	2

**Description**  
Grey slightly clayey, silty medium SAND with some shell fragments.

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180126021-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **72**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **1-Mar-18**

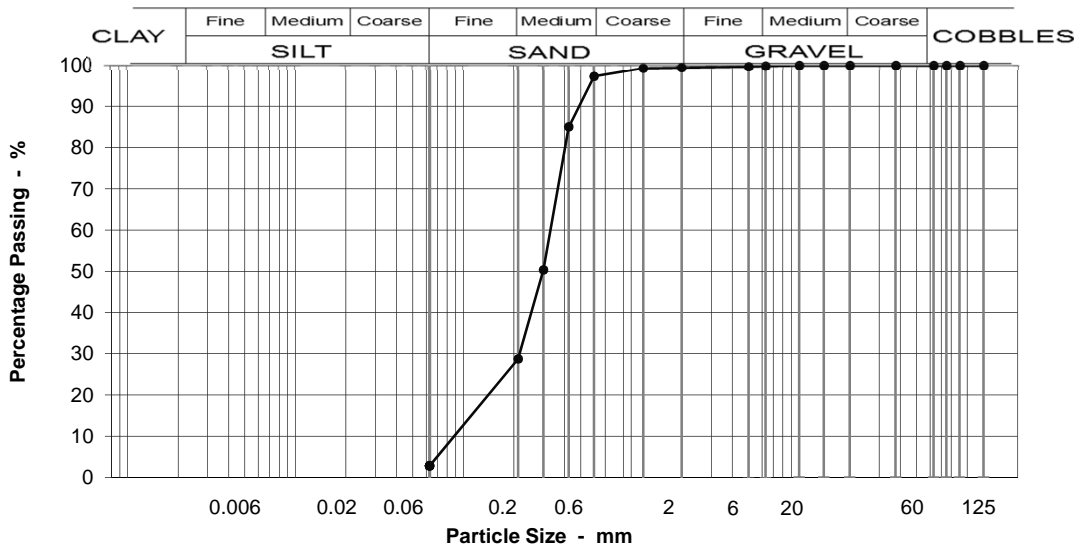
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 25 - 25.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	85
0.300	50
0.212	29
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	68
Fine SAND	26
Silt & Clay	3

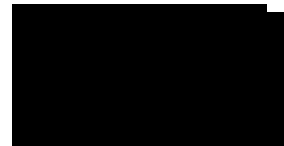
Grading Analysis	
D100	6
D60	0.33
D10	0.10
Uniformity Coefficient	3

Description	
Grey medium SAND with some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180126026-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **77**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **1-Mar-18**

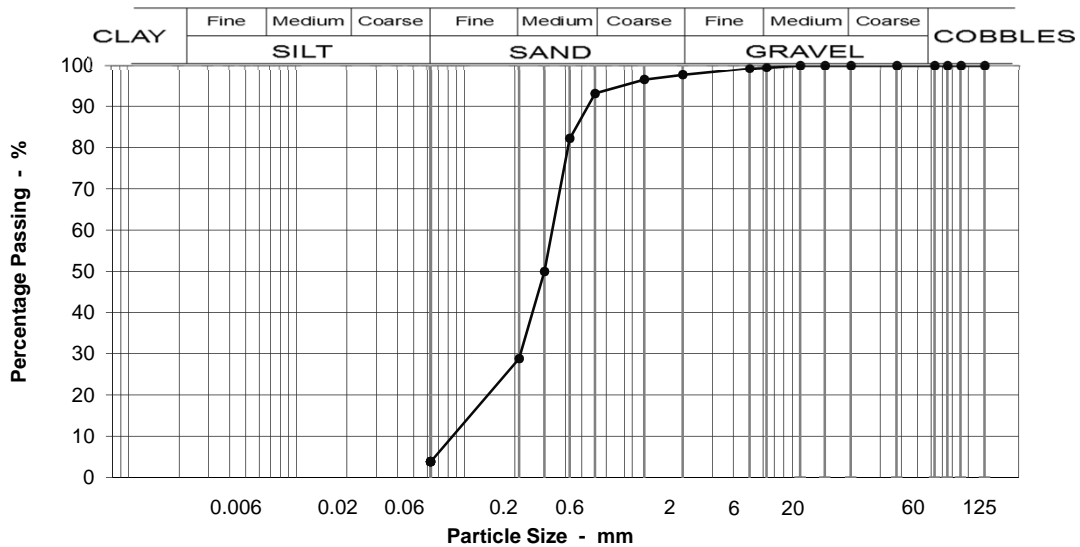
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 27.7 - 28m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	98
1.18	96
0.600	93
0.425	82
0.300	50
0.212	29
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	2
Coarse SAND	5
Medium SAND	64
Fine SAND	25
Silt & Clay	4

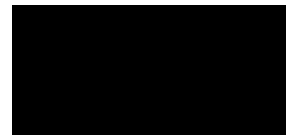
Grading Analysis	
D100	6
D60	0.34
D10	0.10
Uniformity Coefficient	3

Description	
Grey medium SAND with some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180126024-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **75**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

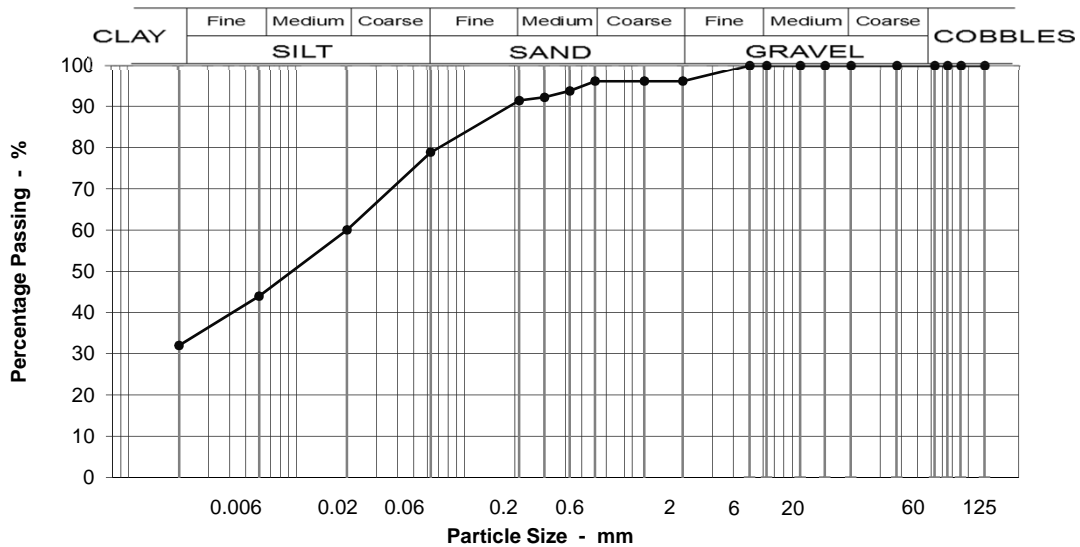
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 27 - 27.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	96
1.18	96
0.600	96
0.425	94
0.300	92
0.212	91
0.063	79
0.020	60
0.006	44
0.002	32

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	4
Coarse SAND	0
Medium SAND	5
Fine SAND	13
Silt & Clay	79

Grading Analysis	
D100	2
D60	0.02
D10	0.00
Uniformity Coefficient	>10*

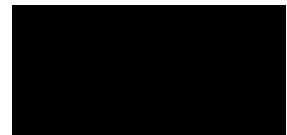
Description	
Very stiff laminated grey silty CLAY and dark grey sandy SILT with some shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180126029-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 80  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

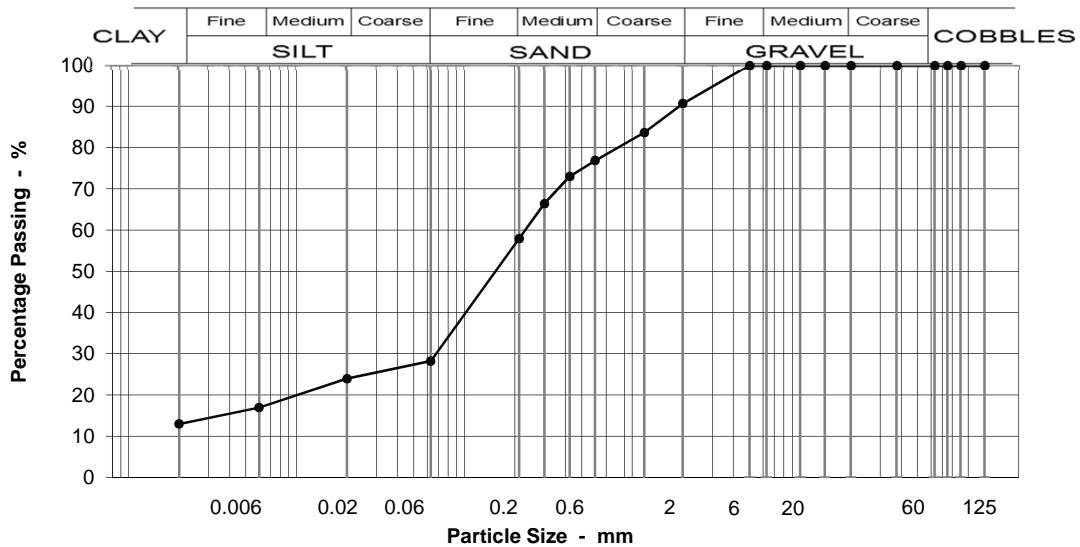
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 29 - 29.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	91
1.18	84
0.600	77
0.425	73
0.300	66
0.212	58
0.063	28
0.020	24
0.006	17
0.002	13

Specification for Highway Works Classification  
Table 6/2

Moisture content % 36

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	9
Coarse SAND	14
Medium SAND	19
Fine SAND	30
Silt & Clay	28

Grading Analysis	
D100	2
D60	0.23
D10	0.00
Uniformity Coefficient	>10*

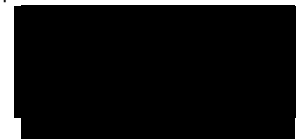
**Description**  
Laminated and thinly bedded grey silty fine SAND, slightly gravelly medium and coarse SAND and silty CLAY, Some shell fragments.

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180129003-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **86**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

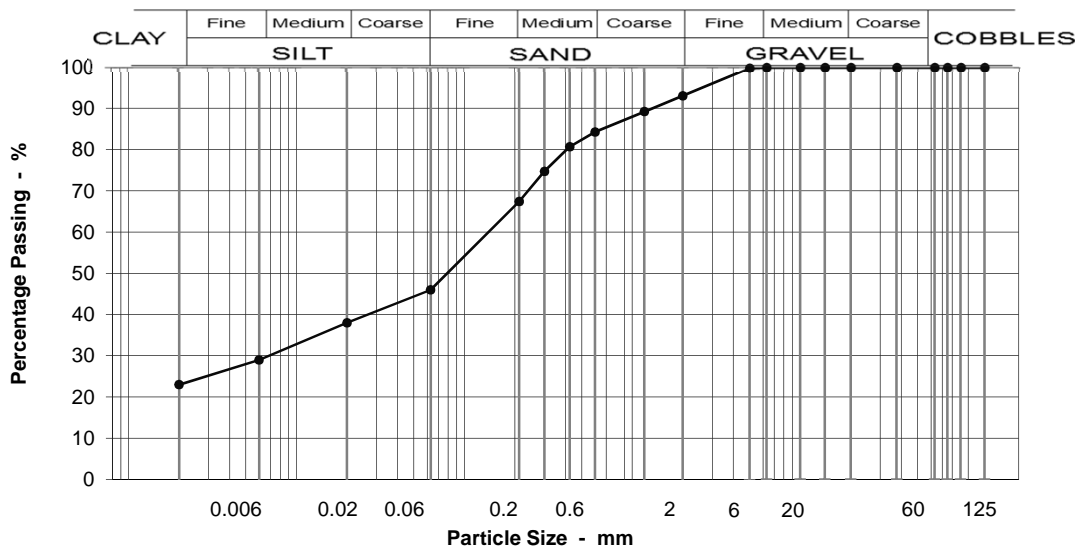
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 31.3 - 31.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	7
20	100		Coarse SAND	9
14	100		Medium SAND	17
10	100		Fine SAND	21
6.3	100		Silt & Clay	46
5	100			
2	93			
1.18	89			
0.600	84			
0.425	81			
0.300	75			
0.212	67			
0.063	46			
0.020	38			
0.006	29			
0.002	23			
		Moisture content %		95

Grading Analysis	
D100	5
D60	0.16
D10	0.00
Uniformity Coefficient	>10*

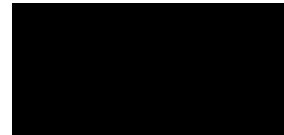
Description	
Laminated and thinly bedded dark grey silty fine to medium SAND and stiff grey CLAY with some shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180129005-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 88  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 17-Apr-18

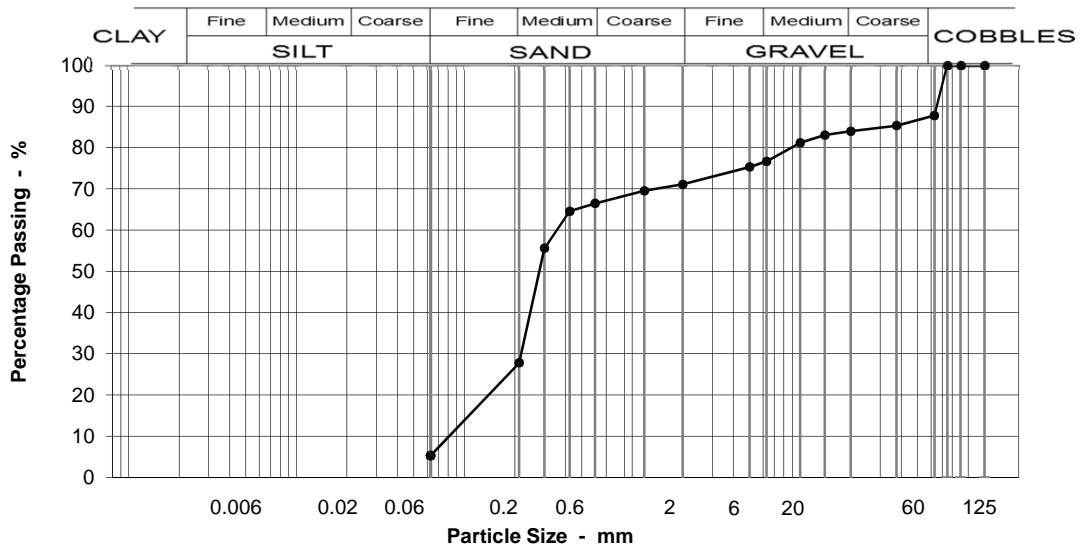
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 32 - 32.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	88
37.5	85
20	84
14	83
10	81
6.3	77
5	75
2	71
1.18	70
0.600	66
0.425	65
0.300	56
0.212	28
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 16

Sample Proportions	
BOULDERS	0
COBBLES	12
Coarse GRAVEL	4
Medium GRAVEL	7
Fine GRAVEL	6
Coarse SAND	5
Medium SAND	39
Fine SAND	22
Silt & Clay	5

Grading Analysis	
D100	63
D60	0.36
D10	0.09
Uniformity Coefficient	4

Description	
Grey gravelly slightly silty fine and medium SAND. Numerous shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180129011-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **94**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

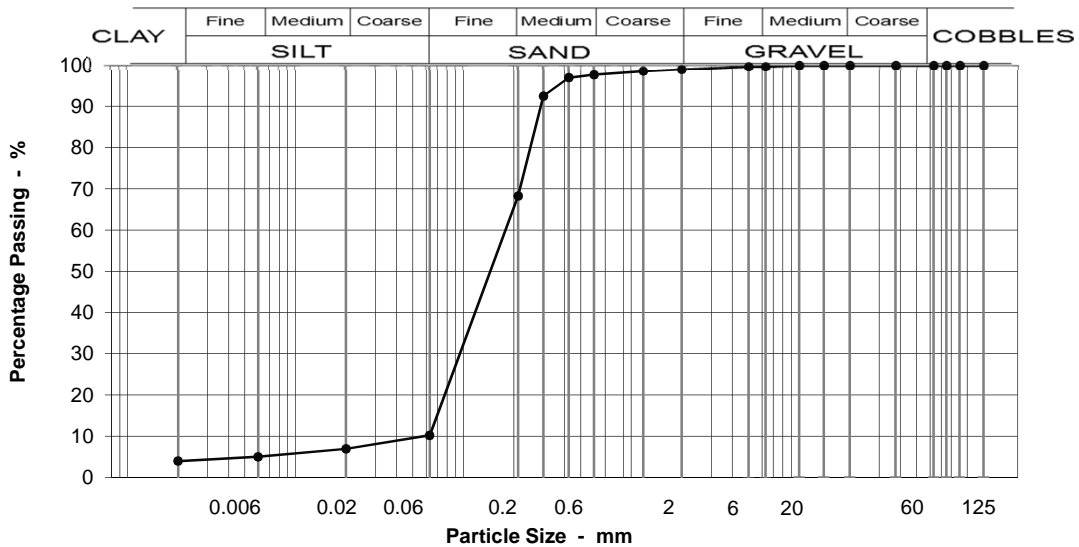
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 36 - 36.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	98
0.425	97
0.300	92
0.212	68
0.063	10
0.020	7
0.006	5
0.002	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 24

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	29
Fine SAND	58
Silt & Clay	10

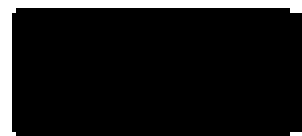
Grading Analysis	
D100	6
D60	0.19
D10	0.09
Uniformity Coefficient	2

Description	
Grey slightly silty fine SAND.	

Test Code = 613



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180129014-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **97**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **1-Mar-18**

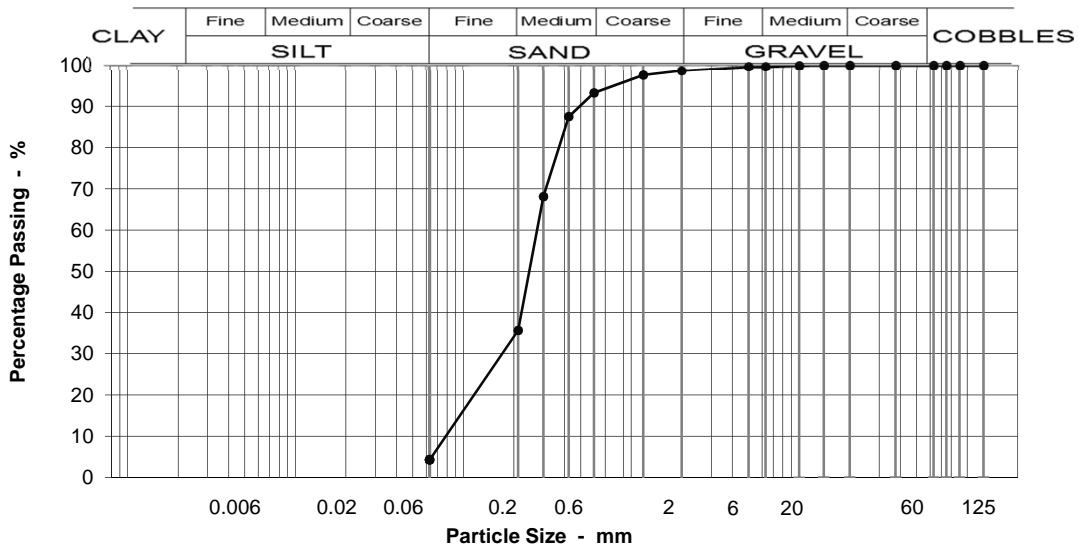
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 38 - 38.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	93
0.425	87
0.300	68
0.212	36
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	5
Medium SAND	58
Fine SAND	31
Silt & Clay	4

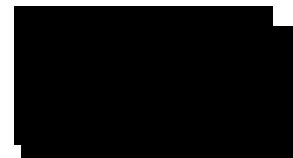
Grading Analysis	
D100	10
D60	0.28
D10	0.09
Uniformity Coefficient	3

Description	
Dark grey fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180129015-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **98**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **1-Mar-18**

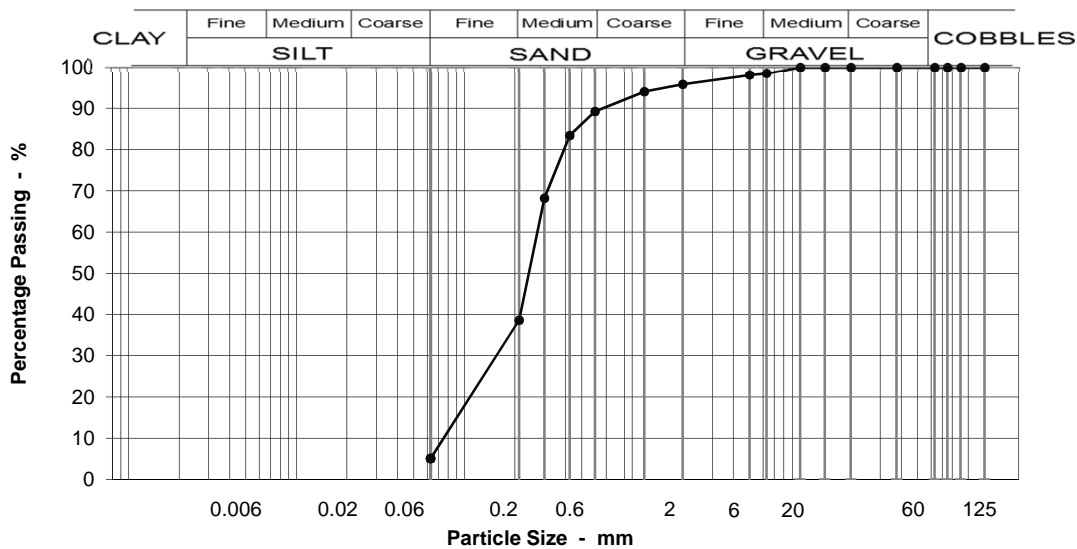
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH8 @ 39 - 39.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	98
5	98
2	96
1.18	94
0.600	89
0.425	83
0.300	68
0.212	39
0.063	5

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	3
Coarse SAND	7
Medium SAND	51
Fine SAND	34
Silt & Clay	5

Grading Analysis	
D100	6
D60	0.28
D10	0.08
Uniformity Coefficient	3

**Description**  
Grey fine to medium SAND with some shell fragments

Moisture content % 22

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180130001-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 1  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 4-Jul-18

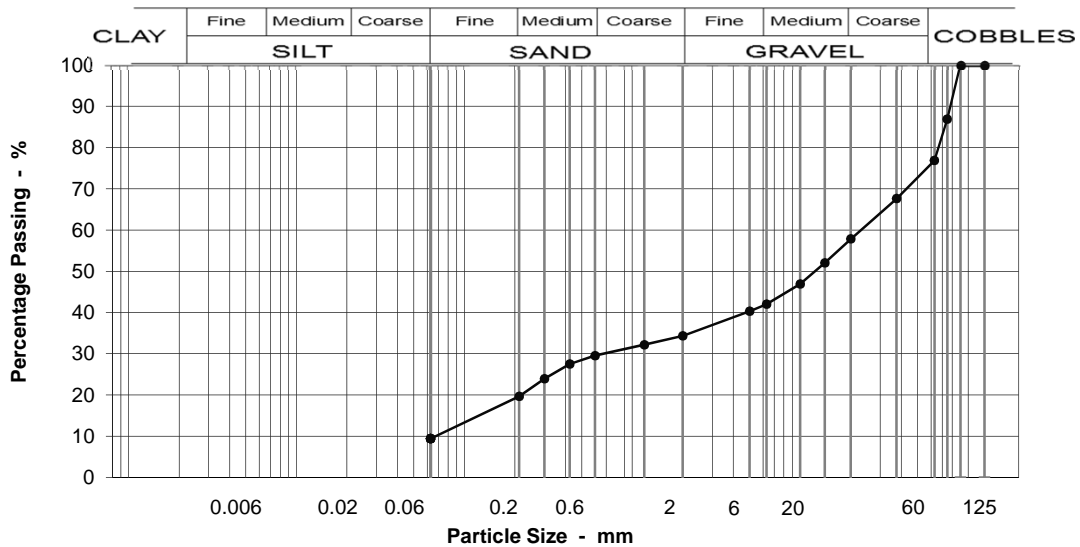
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 0.4 - 0.6m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	23
75	87		Coarse GRAVEL	19
63	77		Medium GRAVEL	16
37.5	68		Fine GRAVEL	8
20	58		Coarse SAND	5
14	52		Medium SAND	10
10	47		Fine SAND	10
6.3	42		Silt & Clay	9
5	40			
2	34			
1.18	32			
0.600	30			
0.425	28			
0.300	24			
0.212	20			
0.063	9			
		Moisture content %	12	

Grading Analysis	
D100	75
D60	23.89
D10	0.07
Uniformity Coefficient	336

Description	
MADE GROUND: comprising up to cobble sized angular to sub-angular asphalt, concrete, brick and flint in a matrix of grey clayey fine, medium and coarse sand.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180131002-**  
Our Project No. PZ1522D1  
Your Sample Ref. 3  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

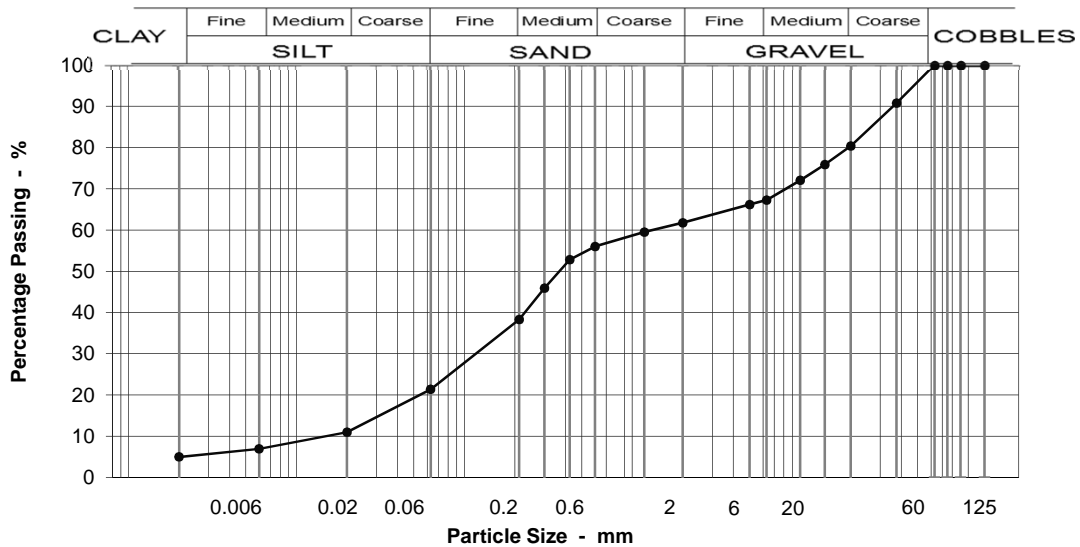
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 0.7 - 1m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2C.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	20
63	100		Medium GRAVEL	13
37.5	91		Fine GRAVEL	6
20	80		Coarse SAND	6
14	76		Medium SAND	18
10	72		Fine SAND	17
6.3	67		Silt & Clay	21
5	66			
2	62			
1.18	60			
0.600	56			
0.425	53			
0.300	46			
0.212	38			
0.063	21			
0.020	11			
0.006	7			
0.002	5	Moisture content %	22	

Grading Analysis	
D100	38
D60	1.36
D10	0.07
Uniformity Coefficient	21

**Description**  
MADE GROUND - comprising medium to coarse angular to sub-angular brick, concrete, flint and ash in matrix of brown silty fine and medium SAND.

Test Code =



Simon Holden (Project Technician)

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180131004-**  
Our Project No **PZ1522D1**  
Your Sample Ref **5**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

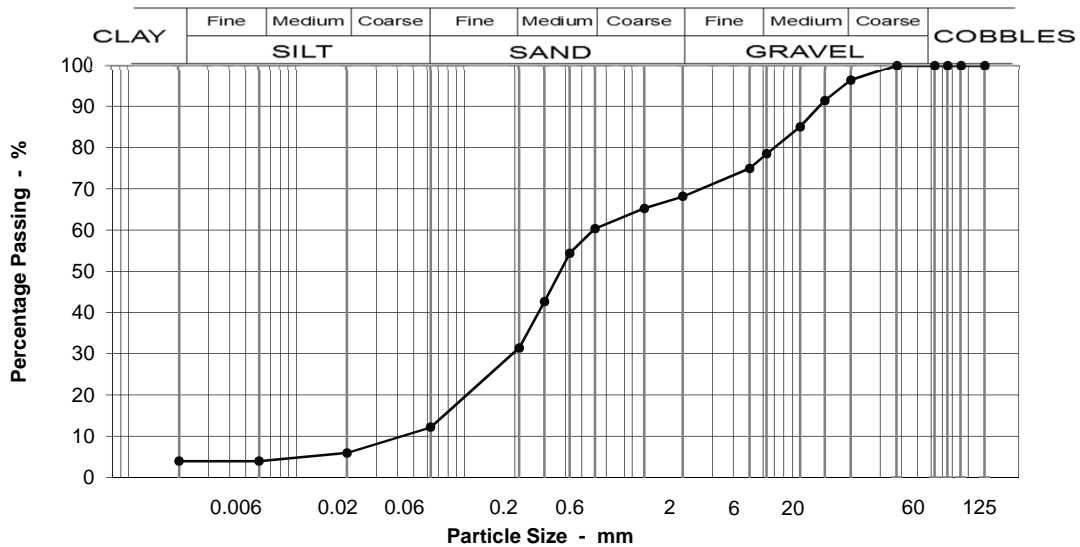
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 1.1 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	96
14	91
10	85
6.3	78
5	75
2	68
1.18	65
0.600	60
0.425	54
0.300	43
0.212	31
0.063	12
0.020	6
0.006	4
0.002	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J.**

Moisture content % 15

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	4
Medium GRAVEL	18
Fine GRAVEL	10
Coarse SAND	8
Medium SAND	29
Fine SAND	19
Silt & Clay	12

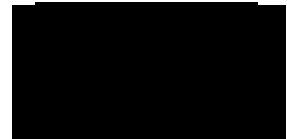
Grading Analysis	
D100	20
D60	0.59
D10	0.11
Uniformity Coefficient	5

Description	
Greyish brown slightly silty very sandy fine and medium angular to sub-rounded flint GRAVEL.	

Test Code =



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS6180131007-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 8  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 22-May-18

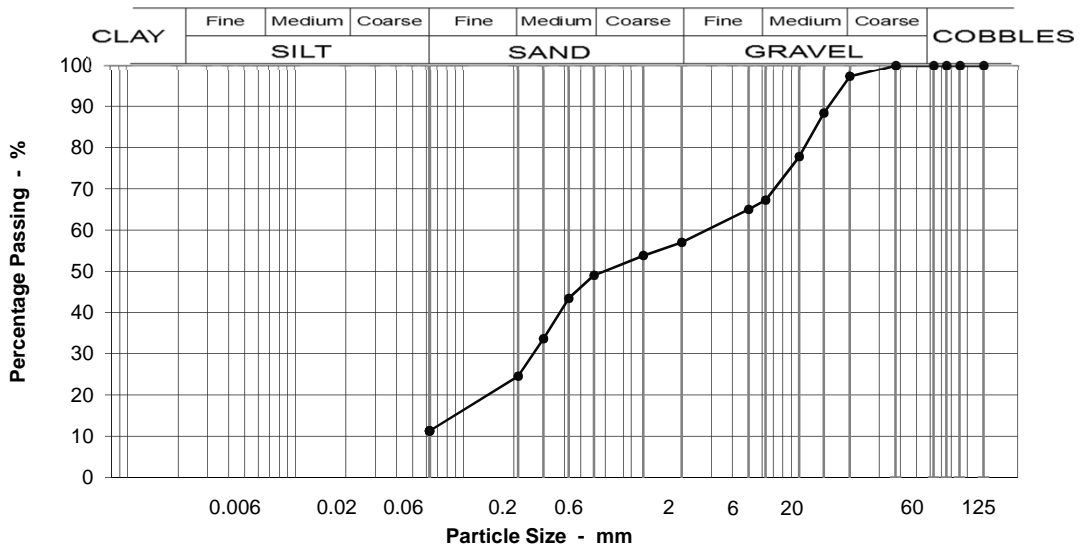
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH9 @ 1.2 - 1.7m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	97
14	88
10	78
6.3	67
5	65
2	57
1.18	54
0.600	49
0.425	43
0.300	34
0.212	25
0.063	11

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6N.**

**Moisture content %** 16

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	3
Medium GRAVEL	30
Fine GRAVEL	10
Coarse SAND	8
Medium SAND	24
Fine SAND	13
Silt & Clay	11

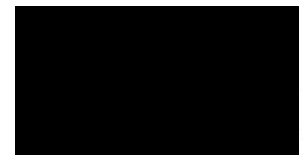
Grading Analysis	
D100	20
D60	3.13
D10	0.08
Uniformity Coefficient	39

Description	
Greyish brown silty, fine to coarse SAND, rounded to medium, angular to sub-rounded flint GRAVEL.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180131010-**  
Our Project No **PZ1522D1**  
Your Sample Ref **11**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

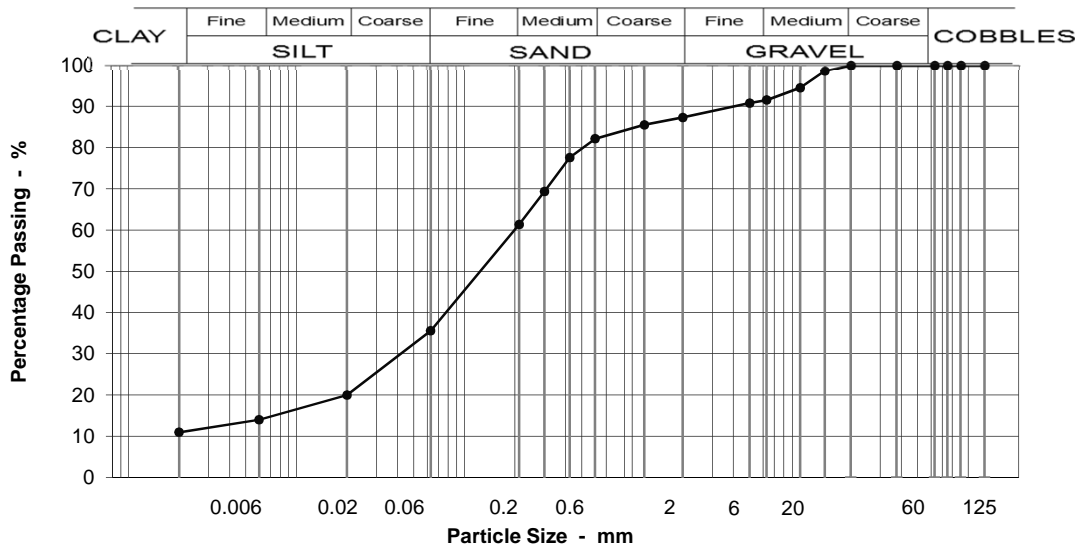
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 2.6 - 2.7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	94
6.3	91
5	91
2	87
1.18	86
0.600	82
0.425	78
0.300	69
0.212	61
0.063	36
0.020	20
0.006	14
0.002	11

Specification for Highway Works Classification  
Table 6/2

Moisture content % 28

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	9
Fine GRAVEL	4
Coarse SAND	5
Medium SAND	21
Fine SAND	26
Silt & Clay	36

Grading Analysis	
D100	14
D60	0.20
D10	0.00
Uniformity Coefficient	>10*

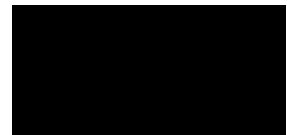
Description	
Very soft grey organic very sandy gravelly clayey SILT. Gravel is fine to medium angular flint.	

\* Uniformity coefficient extrapolated

Test Code =



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180201002-**  
Our Project No. PZ1522D1  
Your Sample Ref 36  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

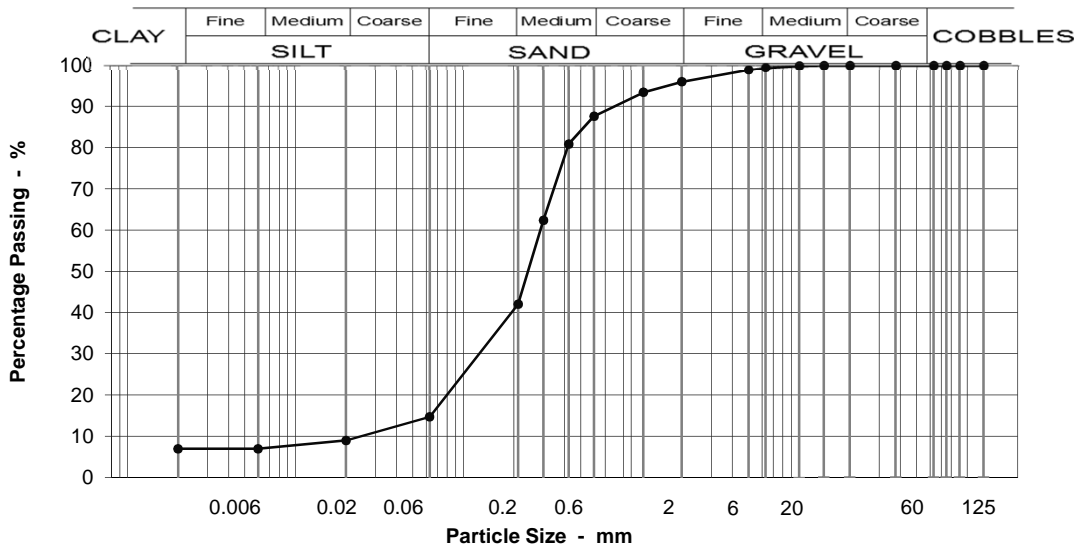
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 11 - 11.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	96
1.18	93
0.600	88
0.425	81
0.300	62
0.212	42
0.063	15
0.020	9
0.006	7
0.002	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	3
Coarse SAND	8
Medium SAND	46
Fine SAND	27
Silt & Clay	15

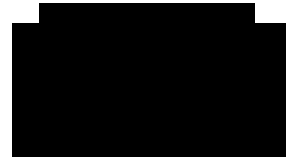
Grading Analysis	
D100	10
D60	0.29
D10	0.08
Uniformity Coefficient	4

Description	
Greyish brown fine and medium SAND.	

Test Code =



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180201012-**  
Our Project No. **PZ1522D1**  
Your Sample Ref **46**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

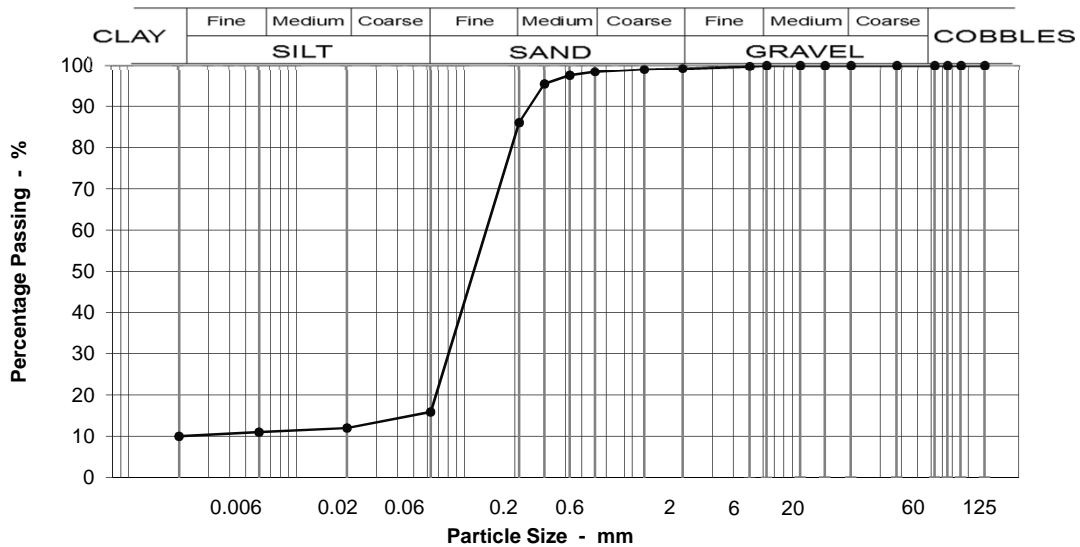
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 15 - 15.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	1
14	100		Medium SAND	12
10	100		Fine SAND	70
6.3	100		Silt & Clay	16
5	100			
2	99			
1.18	99			
0.600	98			
0.425	97			
0.300	95			
0.212	86			
0.063	16			
0.020	12			
0.006	11			
0.002	10			
		Moisture content %		37

Grading Analysis	
D100	6
D60	0.16
D10	0.00
Uniformity Coefficient	>10*

Description	
Orange fine SAND with lenses and laminae of soft grey silty clay.	

\* Uniformity coefficient extrapolated

Test Code =



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180202010-**  
Our Project No **PZ1522D1**  
Your Sample Ref **70**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

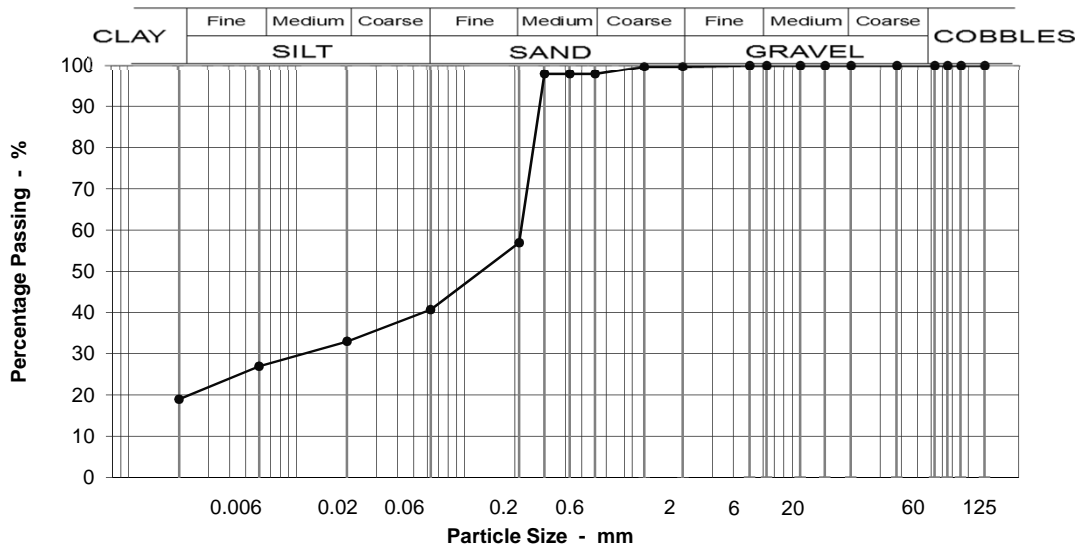
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 27.1 - 27.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	2
14	100		Medium SAND	41
10	100		Fine SAND	16
6.3	100		Silt & Clay	41
5	100			
2	100			
1.18	100			
0.600	98			
0.425	98			
0.300	98			
0.212	57			
0.063	41			
0.020	33			
0.006	27			
0.002	19			
		Moisture content %	0	

Grading Analysis	
D100	2
D60	0.22
D10	0.00
Uniformity Coefficient	>10*

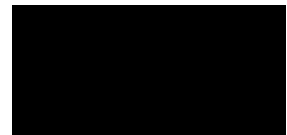
Description	
Thinly bedded greyish brown silty fine and medium SAND with shell fragments, dark grey clayey SILT and grey silty CLAY.	

\* Uniformity coefficient extrapolated

Test Code =



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180202014-**  
Our Project No **PZ1522D1**  
Your Sample Ref **74**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

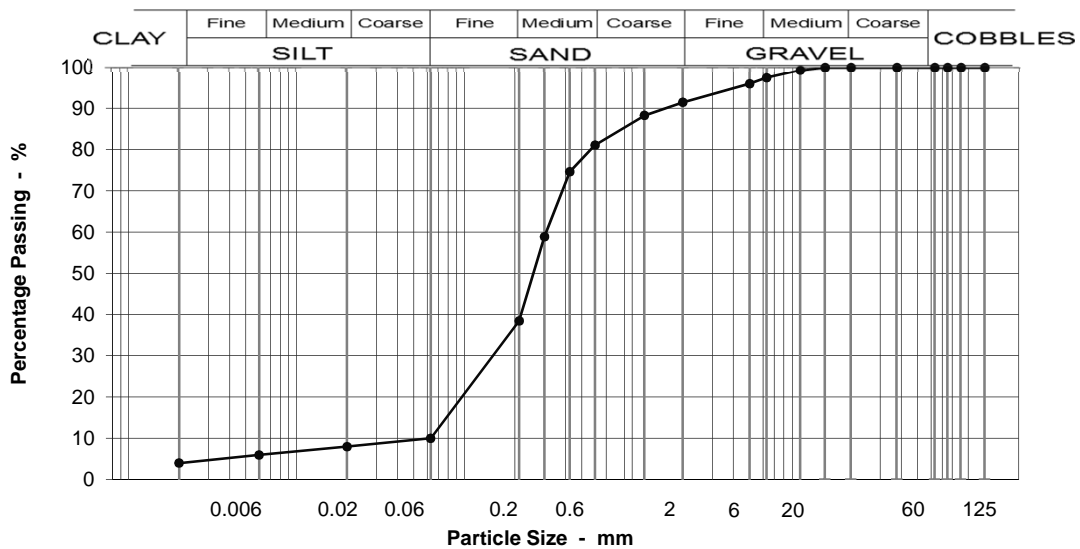
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 28 - 28.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	3
37.5	100		Fine GRAVEL	6
20	100		Coarse SAND	10
14	100		Medium SAND	43
10	99		Fine SAND	28
6.3	97		Silt & Clay	10
5	96			
2	91			
1.18	88			
0.600	81			
0.425	75			
0.300	59			
0.212	38			
0.063	10			
0.020	8			
0.006	6			
0.002	4			
		Moisture content %	19	

Grading Analysis	
D100	10
D60	0.31
D10	0.06
Uniformity Coefficient	5

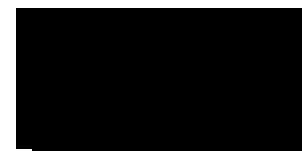
  

Description	
Thinly bedded greyish brown silty fine and medium SAND.	

Test Code =



Simon Holden (Project Technician)



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County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS6180202017-**  
Our Project No **PZ1522D1**  
Your Sample Ref **77**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

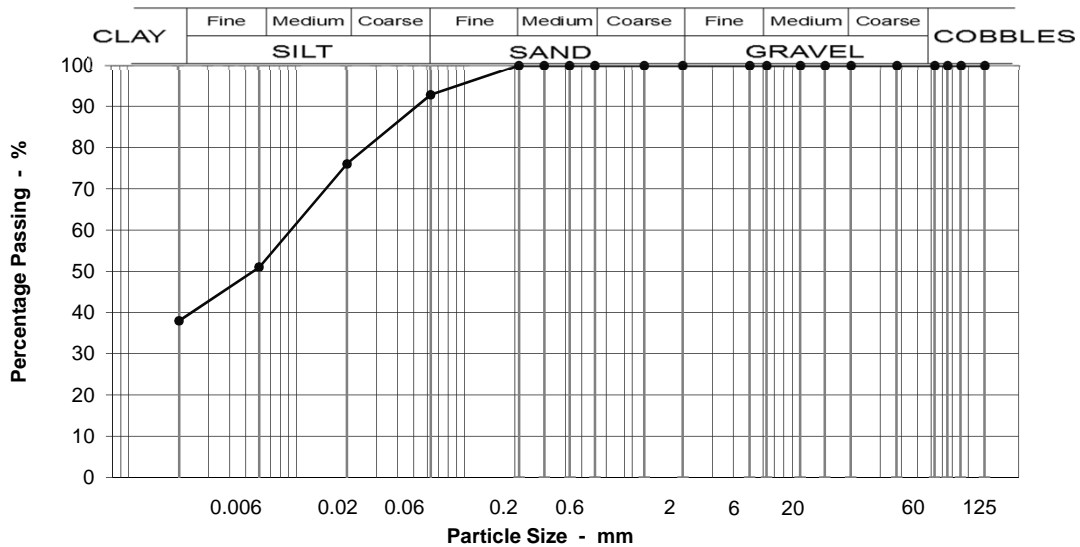
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 30 - 30.45m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	0
10	100		Fine SAND	7
6.3	100		Silt & Clay	93
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	100			
0.063	93			
0.020	76			
0.006	51			
0.002	38			
		Moisture content %		0

Grading Analysis	
D100	0
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

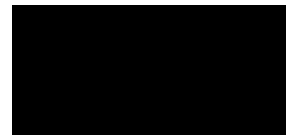
Description	
Stiff laminated grey SILT:CLAY	

\* Uniformity coefficient extrapolated

Test Code =



Simon Holden (Project Technician)



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Norfolk  
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Our reference No. **GTS6180202019-**  
Our Project No **PZ1522D1**  
Your Sample Ref **79**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

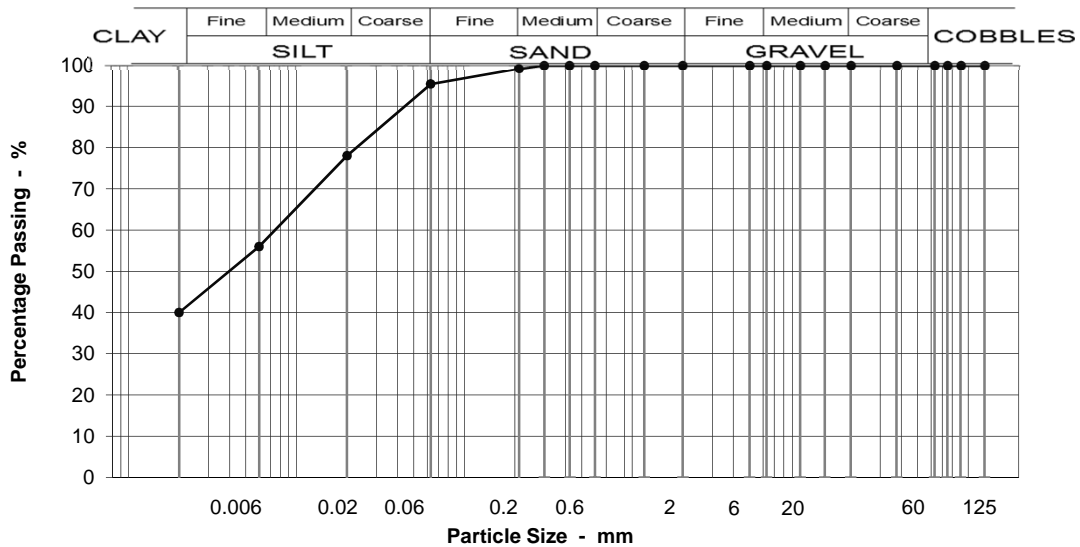
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 31 - 31.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	1
10	100		Fine SAND	4
6.3	100		Silt & Clay	95
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	99			
0.063	95			
0.020	78			
0.006	56			
0.002	40			
		Moisture content %	0	

Grading Analysis	
D100	0
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

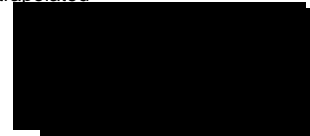
Description	
Stiff laminated grey SILT:CLAY	

\* Uniformity coefficient extrapolated

Test Code =



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Norfolk  
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**Our reference No.** GTS6180131012-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 13  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 2-Mar-18

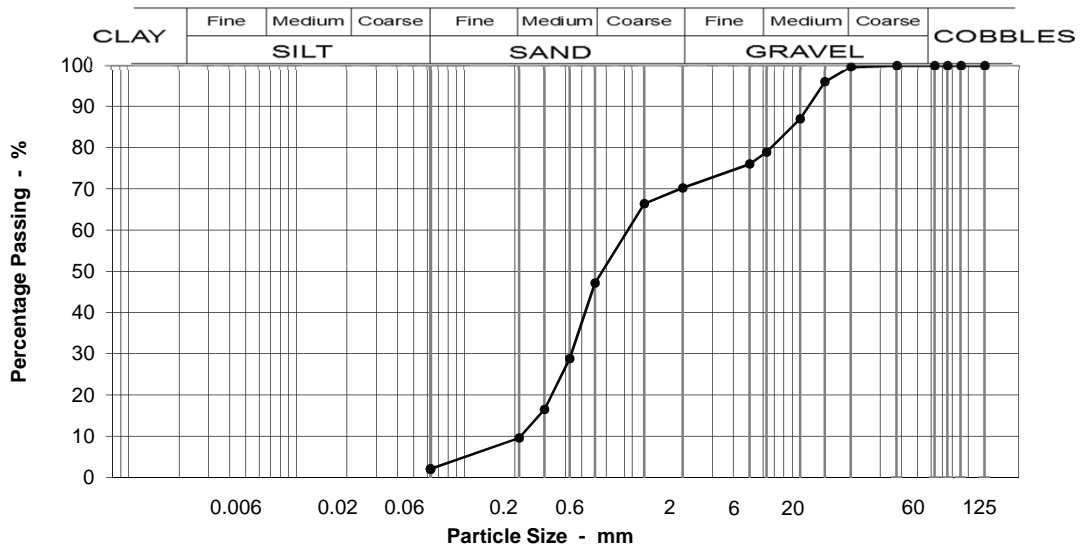
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 2.8 - 3.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	96
10	87
6.3	79
5	76
2	70
1.18	66
0.600	47
0.425	29
0.300	16
0.212	10
0.063	2

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6F1, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	21
Fine GRAVEL	9
Coarse SAND	23
Medium SAND	38
Fine SAND	8
Silt & Clay	2

Grading Analysis	
D100	20
D60	0.99
D10	0.22
Uniformity Coefficient	5

**Description**  
Greyish brown very gravelly medium and coarse SAND. Gravel is fine and medium angular to sub-angular flint and quartz.

Moisture content % 14

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS6180131015-610**  
Our Project No. PZ1522D1  
Your Sample Ref 16  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 2-Mar-18

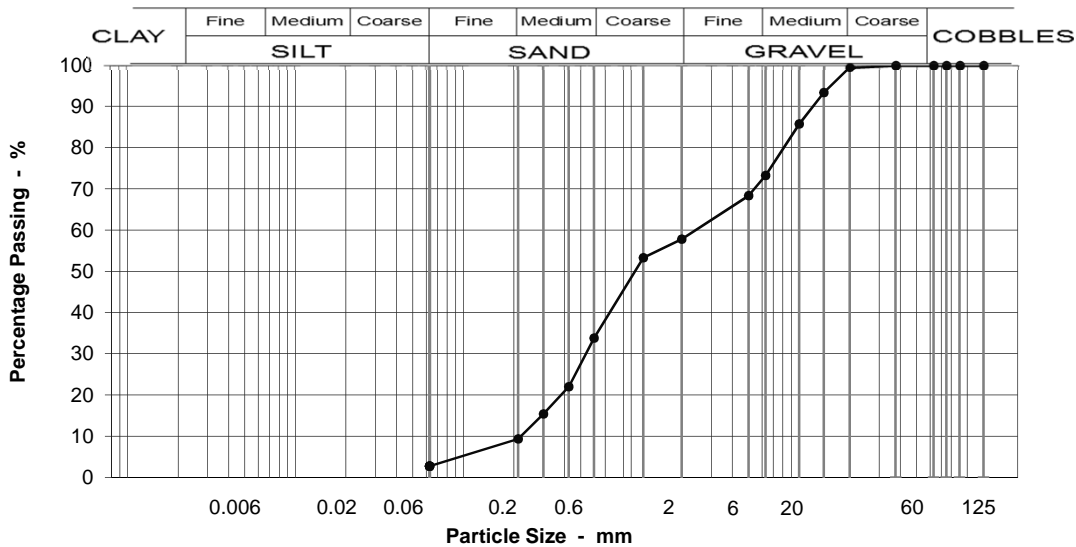
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 4 - 4.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	93
10	86
6.3	73
5	68
2	58
1.18	53
0.600	34
0.425	22
0.300	15
0.212	9
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 13

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	26
Fine GRAVEL	15
Coarse SAND	24
Medium SAND	24
Fine SAND	7
Silt & Clay	3

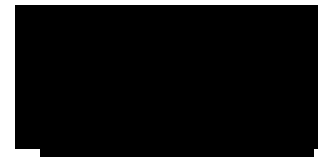
Grading Analysis	
D100	20
D60	2.62
D10	0.22
Uniformity Coefficient	12

Description	
Greyish brown very gravelly medium and coarse SAND. Gravel is fine and medium angular to sub-angular flint and quartz.	

Test Code = 610



Simon Holden (Project Technician)





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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180131022-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 22  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 2-Mar-18

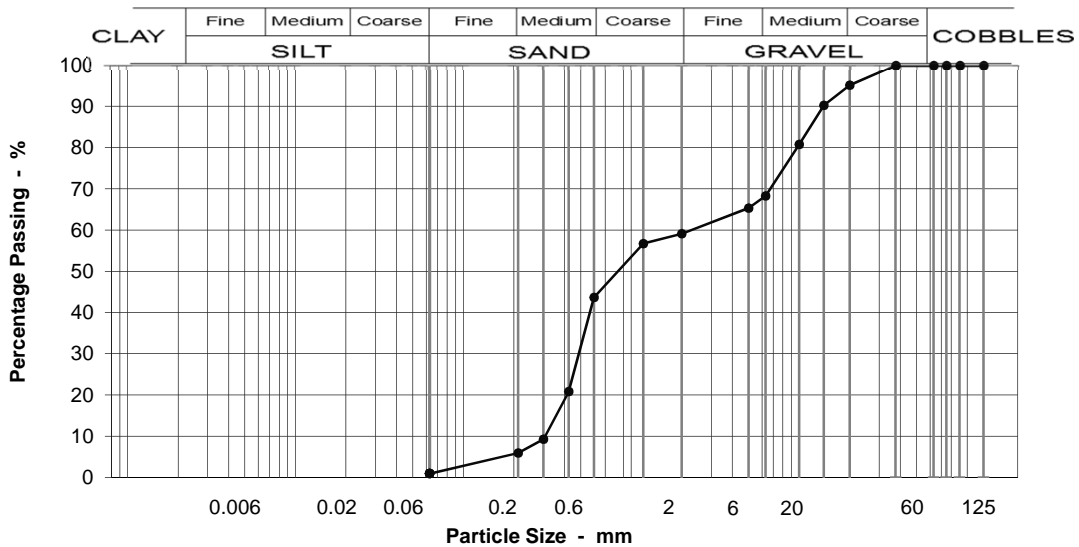
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 6 - 6.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	95
14	90
10	81
6.3	68
5	65
2	59
1.18	57
0.600	44
0.425	21
0.300	9
0.212	6
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6F1, 6J, 6M.**

Moisture content % 8

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	5
Medium GRAVEL	27
Fine GRAVEL	9
Coarse SAND	15
Medium SAND	38
Fine SAND	5
Silt & Clay	1

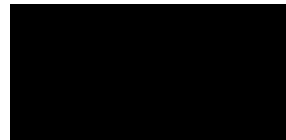
Grading Analysis	
D100	20
D60	2.44
D10	0.31
Uniformity Coefficient	8

Description	
Greyish brown medium and coarse SAND and medium angular to sub-angular flint GRAVEL.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS6180131026-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 25  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 17-Apr-18

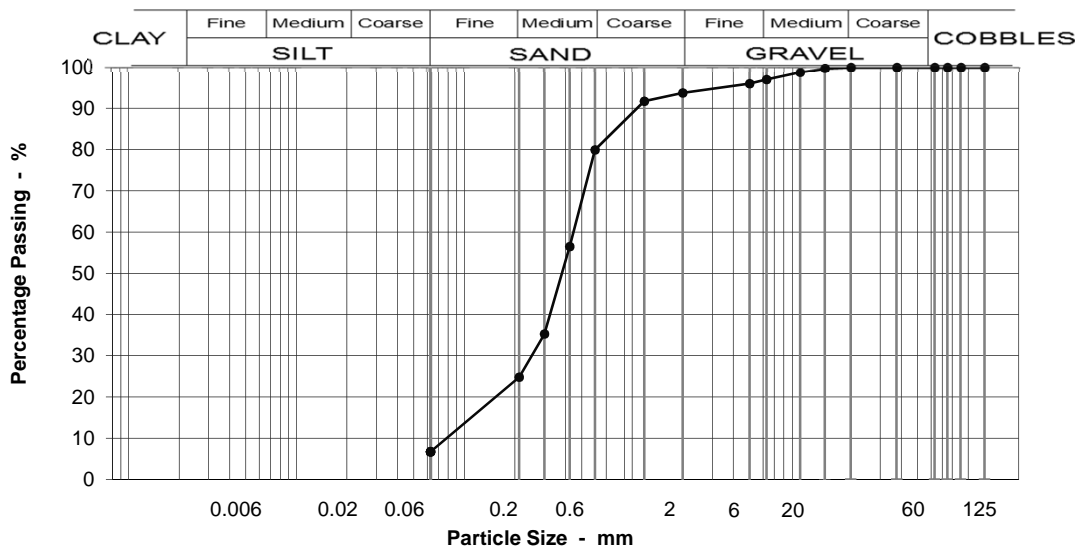
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH9 @ 7 - 7.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	97
5	96
2	94
1.18	92
0.600	80
0.425	56
0.300	35
0.212	25
0.063	7

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6J, 6K, 6M.**

**Moisture content %** 15

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	3
Coarse SAND	14
Medium SAND	55
Fine SAND	18
Silt & Clay	7

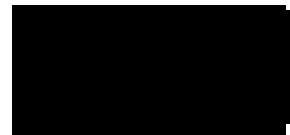
Grading Analysis	
D100	14
D60	0.45
D10	0.09
Uniformity Coefficient	5

**Description**  
Yellowish brown slightly gravelly fine and medium SAND with lenses of soft grey clay. Gravel is fine and medium sub-angular to sub-rounded flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180131032-610**  
Our Project No. PZ1522D1  
Your Sample Ref 31  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 2-Mar-18

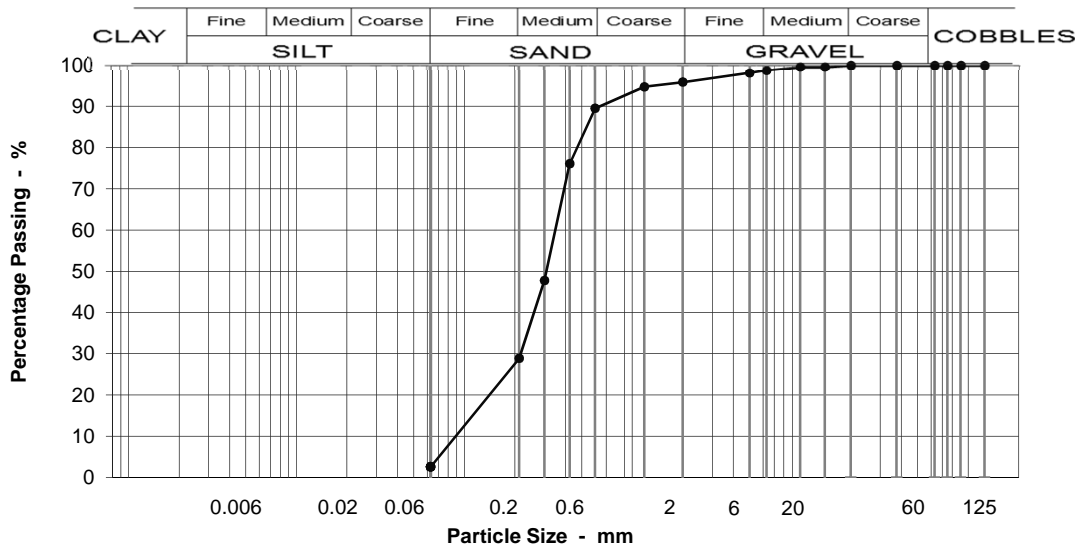
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 9 - 9.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	98
2	96
1.18	95
0.600	89
0.425	76
0.300	48
0.212	29
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	3
Coarse SAND	6
Medium SAND	61
Fine SAND	26
Silt & Clay	3

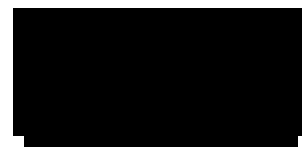
Grading Analysis	
D100	14
D60	0.35
D10	0.10
Uniformity Coefficient	3

Description	
Yellowish brown medium SAND	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180201010-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 44  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 2-Mar-18

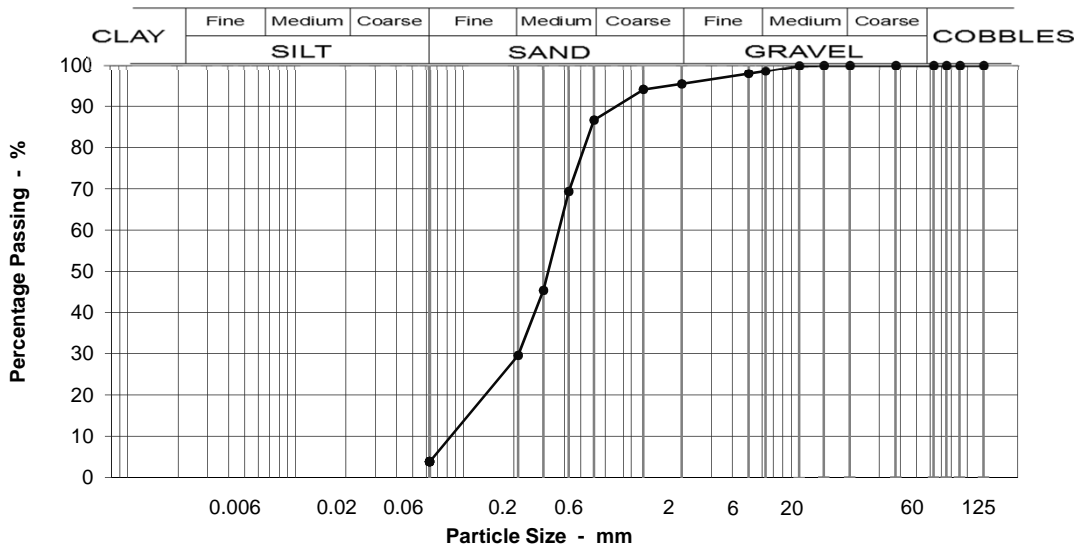
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 14 - 14.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	98
2	95
1.18	94
0.600	87
0.425	69
0.300	45
0.212	30
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	3
Coarse SAND	9
Medium SAND	57
Fine SAND	26
Silt & Clay	4

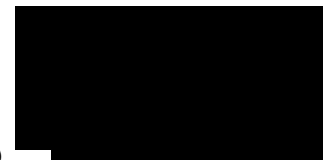
Grading Analysis	
D100	10
D60	0.38
D10	0.10
Uniformity Coefficient	4

Description	
Grey medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

Our reference No. **GTS6180201020-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **54**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **2-Mar-18**

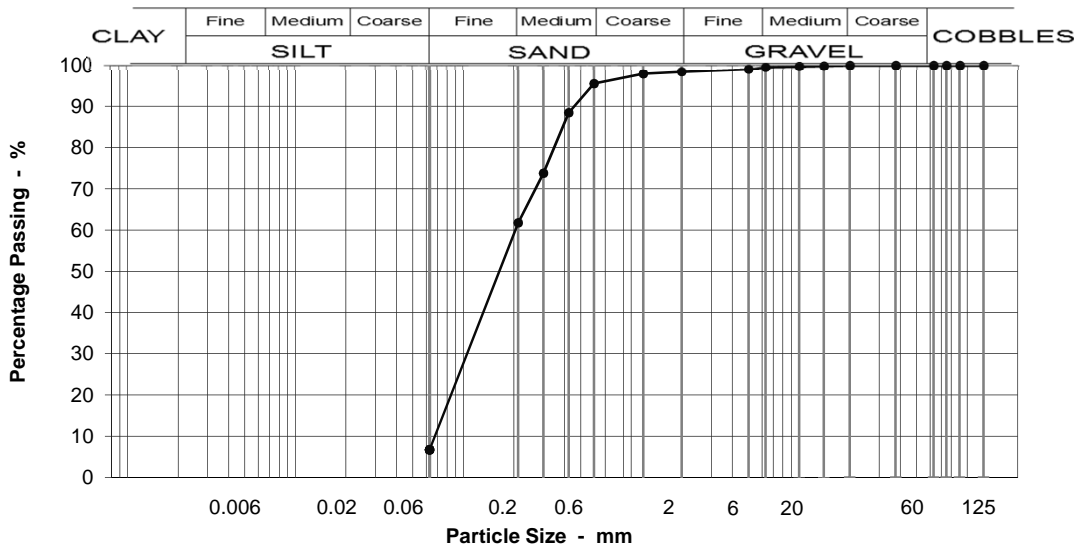
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 18 - 18.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	98
1.18	98
0.600	95
0.425	88
0.300	74
0.212	62
0.063	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 26

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	34
Fine SAND	55
Silt & Clay	7

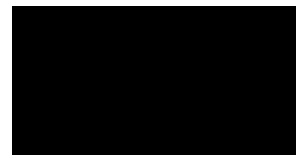
Grading Analysis	
D100	14
D60	0.21
D10	0.07
Uniformity Coefficient	3

Description	
Orangey brown fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)





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Martineau Lane  
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Norfolk  
NR1 2DH

Our reference No. **GTS6180201022-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **56**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **2-Mar-18**

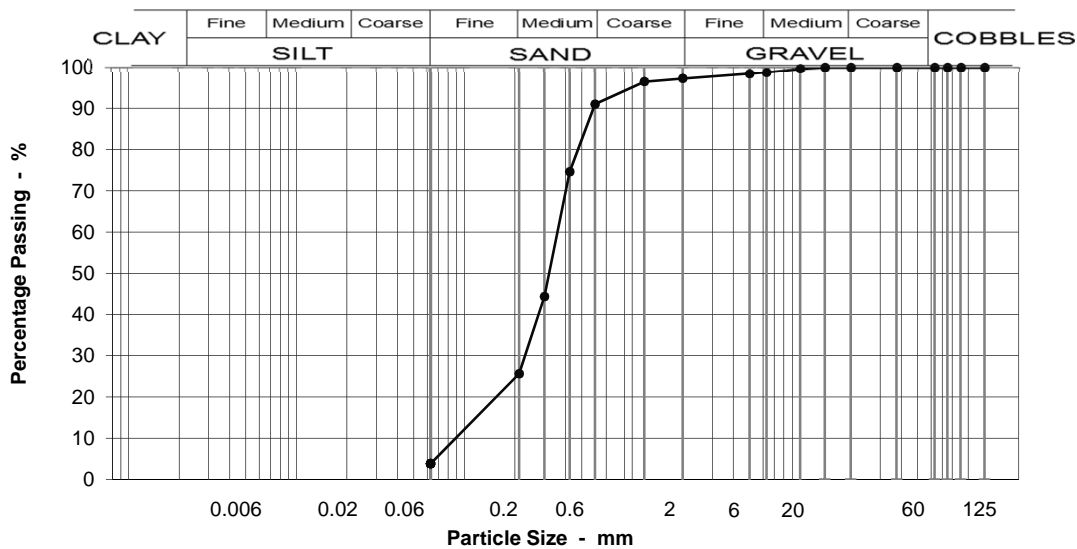
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 19 - 19.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	98
2	97
1.18	96
0.600	91
0.425	75
0.300	44
0.212	26
0.063	4

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	2
Coarse SAND	6
Medium SAND	65
Fine SAND	22
Silt & Clay	4

Grading Analysis	
D100	10
D60	0.36
D10	0.10
Uniformity Coefficient	3

**Description**  
Orangey brown medium SAND.

Moisture content % 18

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180201026-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 60  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

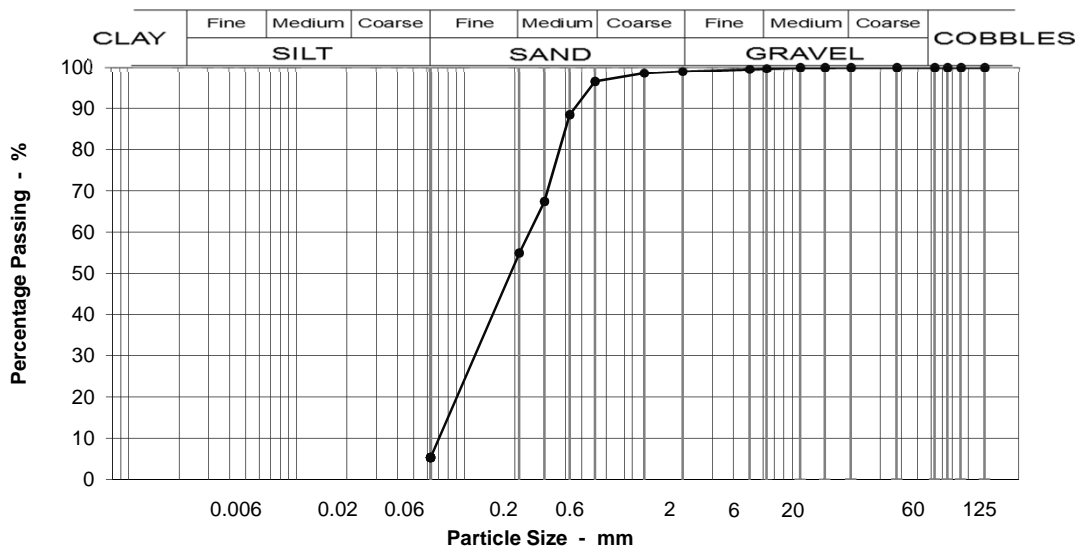
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 21 - 21.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	88
0.300	67
0.212	55
0.063	5

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	42
Fine SAND	50
Silt & Clay	5

Grading Analysis	
D100	14
D60	0.25
D10	0.08
Uniformity Coefficient	3

**Description**  
Orangey brown fine and medium SAND.

Moisture content % 20

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180202002-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 62  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

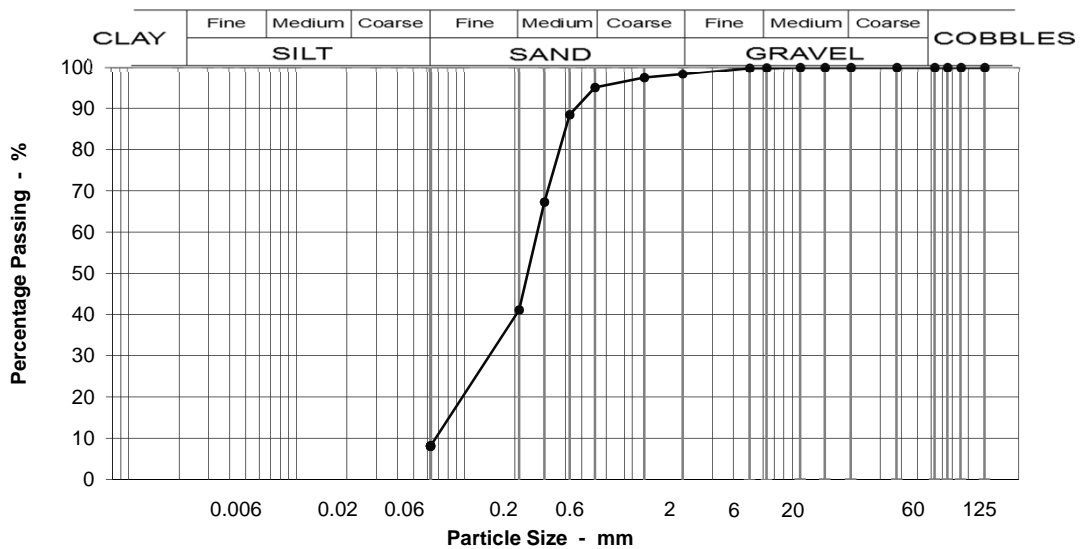
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 22 - 22.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	97
0.600	95
0.425	88
0.300	67
0.212	41
0.063	8

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	3
Medium SAND	54
Fine SAND	33
Silt & Clay	8

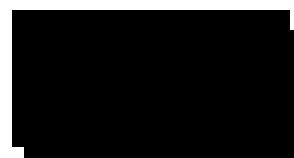
Grading Analysis	
D100	6
D60	0.28
D10	0.07
Uniformity Coefficient	4

Description	
Grey slightly silty fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180202006-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 66  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

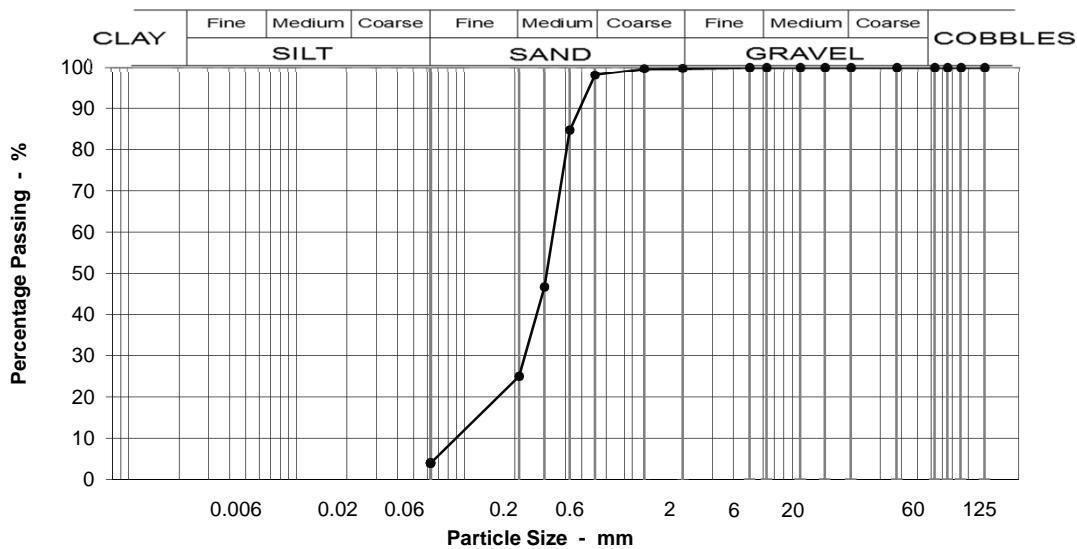
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 25 - 25.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	98
0.425	85
0.300	47
0.212	25
0.063	4

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	73
Fine SAND	21
Silt & Clay	4

Grading Analysis	
D100	2
D60	0.34
D10	0.11
Uniformity Coefficient	3

**Description**  
Grey medium SAND.

Moisture content % 17

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180202015-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 75  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

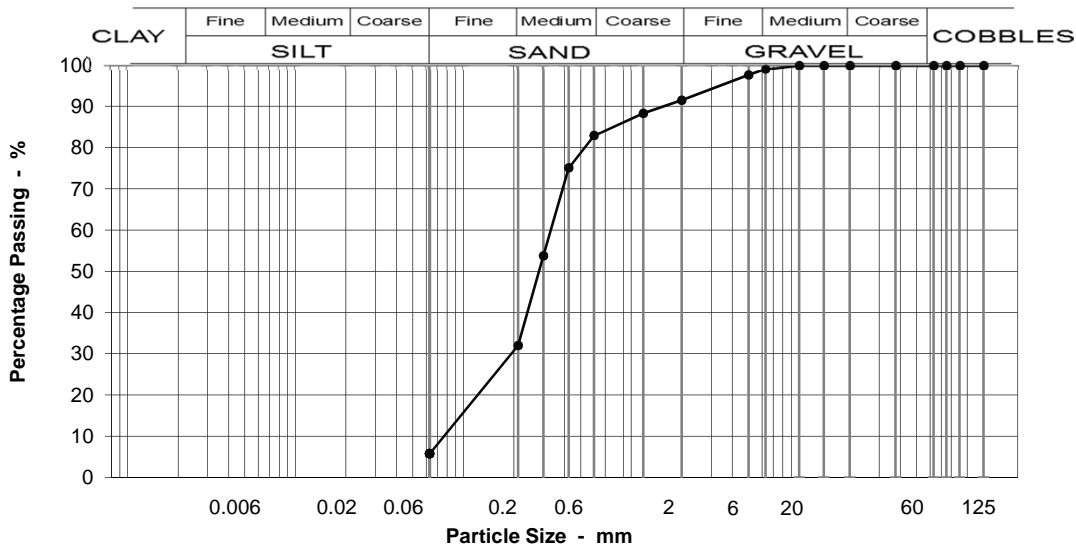
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 29 - 29.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	98
2	91
1.18	88
0.600	83
0.425	75
0.300	54
0.212	32
0.063	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	8
Coarse SAND	9
Medium SAND	51
Fine SAND	26
Silt & Clay	6

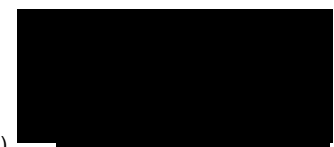
Grading Analysis	
D100	6
D60	0.34
D10	0.09
Uniformity Coefficient	4

Description	
Laminated grey medium SAND and fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180205002-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 82  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

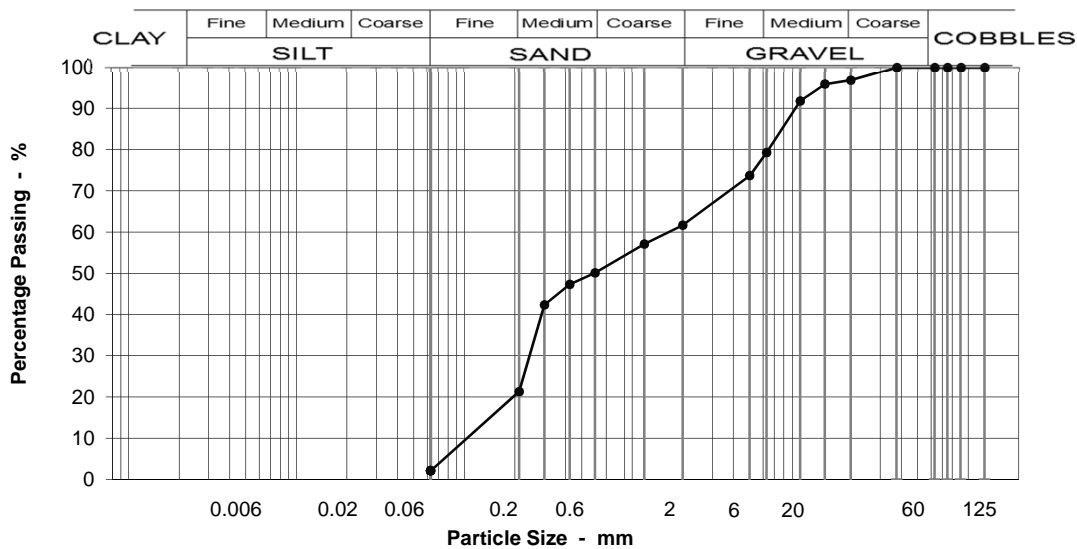
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 32.5 - 33m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	97
14	96
10	92
6.3	79
5	74
2	62
1.18	57
0.600	50
0.425	47
0.300	42
0.212	21
0.063	2

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1A, 6E/6R, 6I, 6M, 6N.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	3
Medium GRAVEL	18
Fine GRAVEL	18
Coarse SAND	12
Medium SAND	29
Fine SAND	19
Silt & Clay	2

Grading Analysis	
D100	20
D60	1.70
D10	0.12
Uniformity Coefficient	14

**Description**  
Grey very gravelly fine, medium and coarse SAND. Gravel is fine and medium angular to rounded flint and quartz.

Moisture content % 13

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180203001-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 80  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

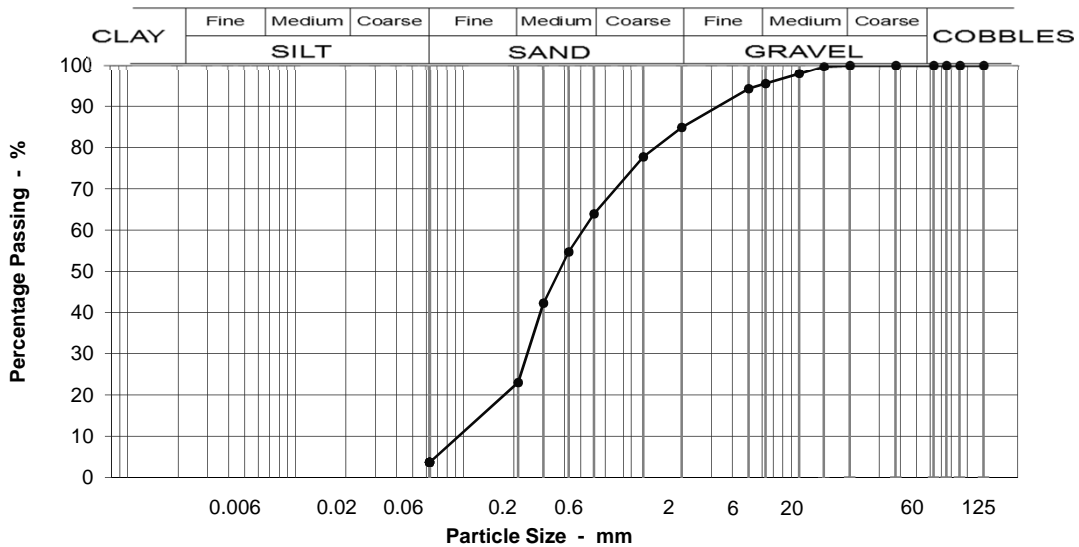
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 32 - 32.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	95
5	94
2	85
1.18	78
0.600	64
0.425	55
0.300	42
0.212	23
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	5
Fine GRAVEL	11
Coarse SAND	21
Medium SAND	41
Fine SAND	19
Silt & Clay	4

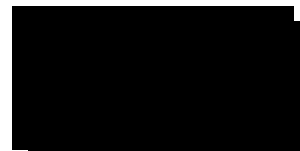
Grading Analysis	
D100	14
D60	0.53
D10	0.11
Uniformity Coefficient	5

Description	
Grey gravelly fine to coarse SAND. Gravel is rounded fine flint and quartz.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180205004-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 84  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

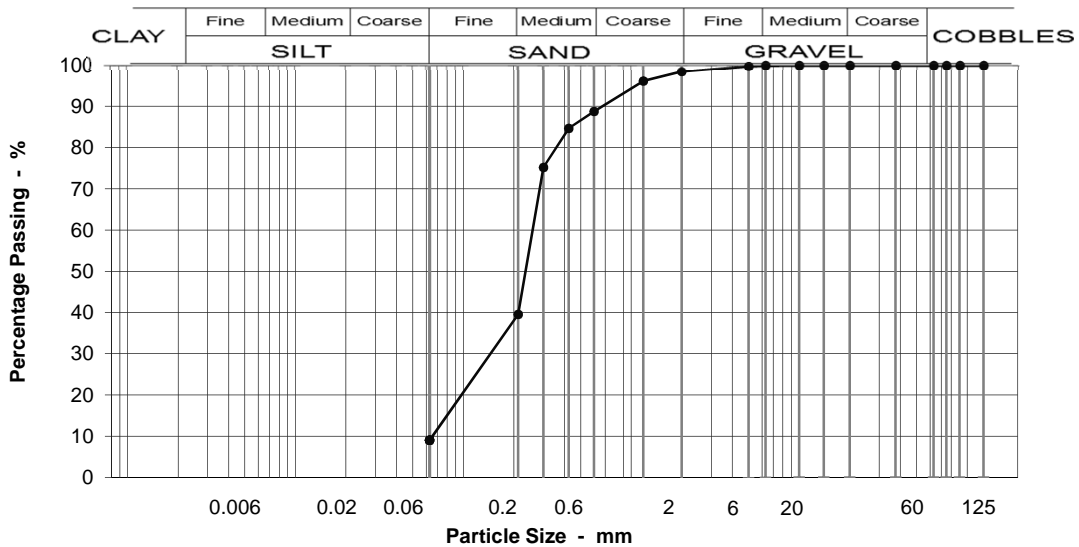
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 34 - 34.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	96
0.600	89
0.425	85
0.300	75
0.212	40
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	10
Medium SAND	49
Fine SAND	30
Silt & Clay	9

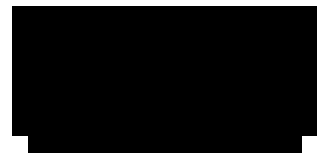
Grading Analysis	
D100	6
D60	0.26
D10	0.07
Uniformity Coefficient	4

Description	
Grey medium SAND with laminae of soft grey clay	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180205008-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 88  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

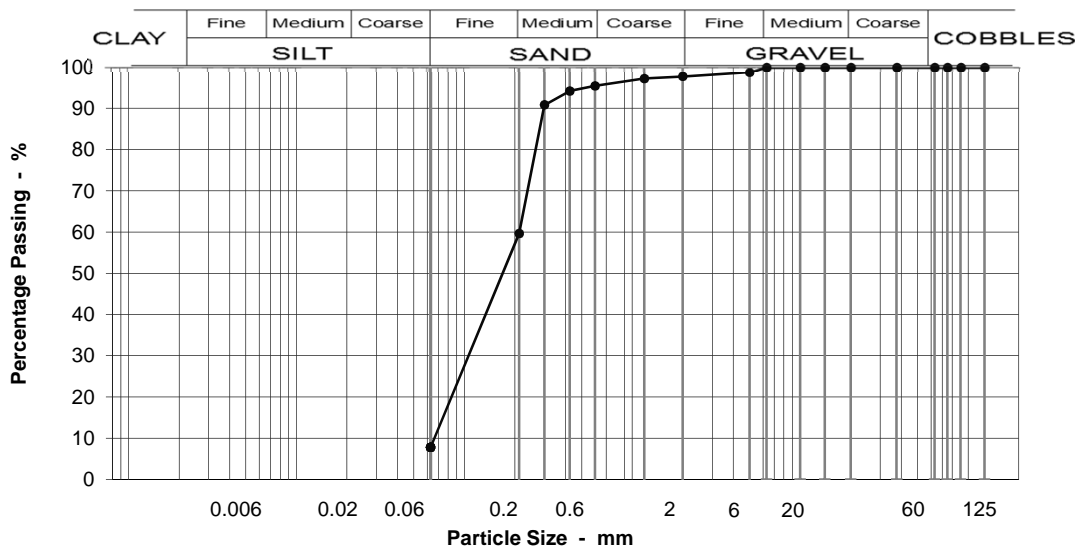
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 37 - 37.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	98
1.18	97
0.600	95
0.425	94
0.300	91
0.212	60
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 24

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	2
Medium SAND	36
Fine SAND	52
Silt & Clay	8

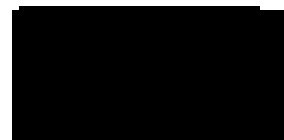
Grading Analysis	
D100	5
D60	0.21
D10	0.07
Uniformity Coefficient	3

Description	
Grey fine and medium SAND with laminae of soft grey clay.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180205011-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 91  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 17-Apr-18

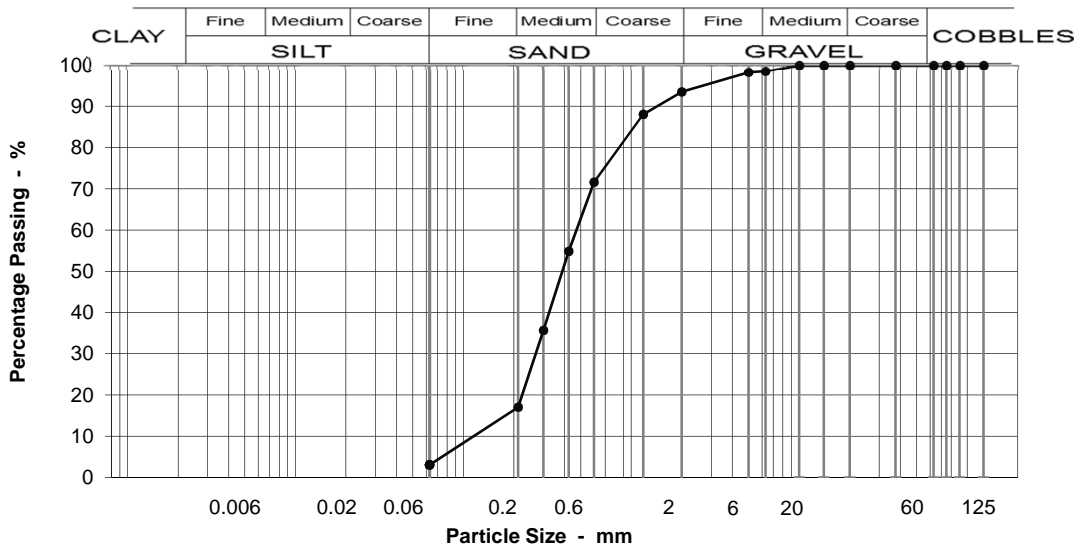
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH9 @ 39 - 39.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	98
2	93
1.18	88
0.600	72
0.425	55
0.300	36
0.212	17
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	5
Coarse SAND	22
Medium SAND	55
Fine SAND	14
Silt & Clay	3

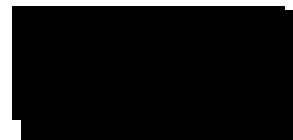
Grading Analysis	
D100	6
D60	0.48
D10	0.14
Uniformity Coefficient	4

Description	
Grey slightly gravelly medium SAND with numerous shell fragments. Gravel is rounded to sub-angular flint and quartz.	

Test Code = 610



Simon Holden (Project Technician)



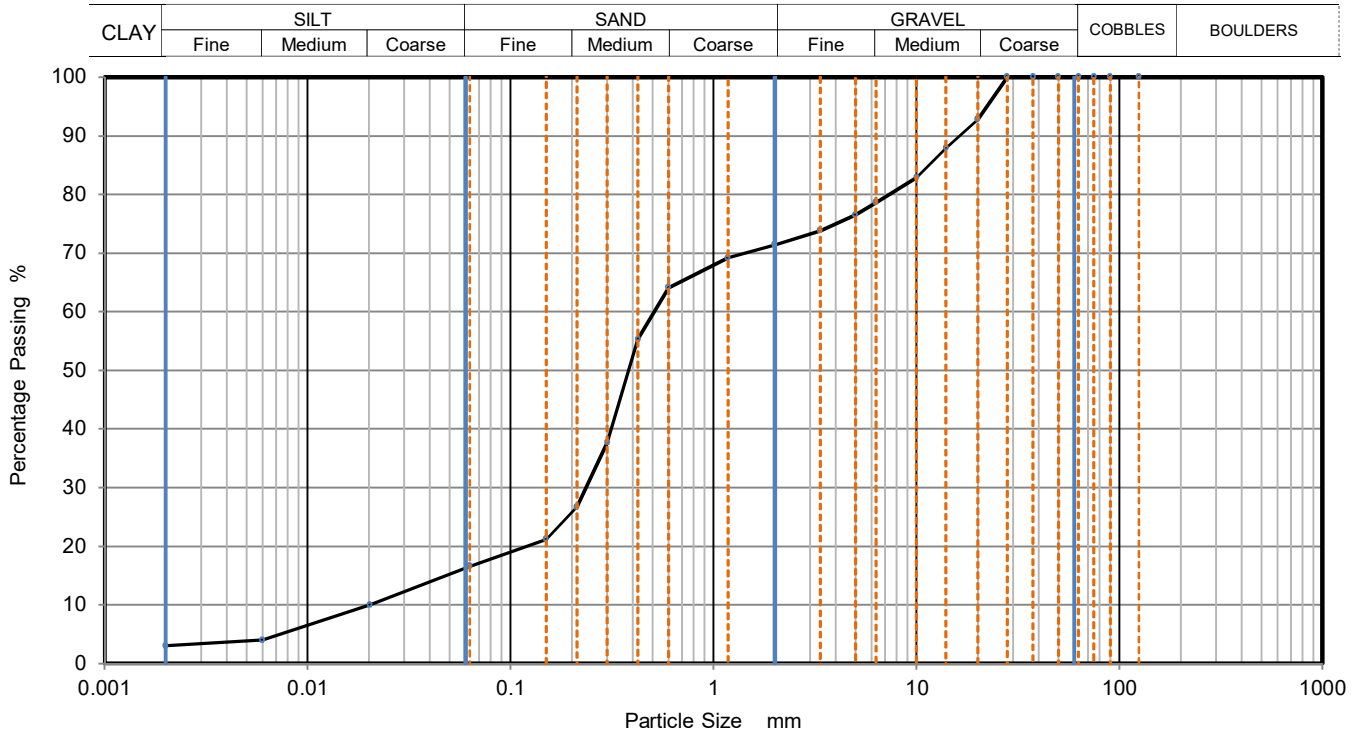




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	MADE GROUND (Dark brown slightly clayey silty very gravelly SAND. Gravel is of flint, quartzite, shell and brick fragments)	Sample Depth (m)	0.50
		Sample Reference	B2



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	10
90	100	0.0060	4
75	100	0.0020	3
63	100		
50	100		
37.5	100		
28	100		
20	93		
14	88		
10	83		
6.3	79		
5	77		
3.35	74		
2	71		
1.18	69		
0.6	64		
0.425	55	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	38		
0.212	27		
0.15	21		
0.063	17		

Sample Proportions	% dry mass
Very coarse	0
Gravel	29
Sand	55
Silt	13
Clay	3

Grading Analysis		
D100	mm	
D60	mm	0.511
D30	mm	0.235
D10	mm	0.019
Uniformity Coefficient		26
Curvature Coefficient		5.6

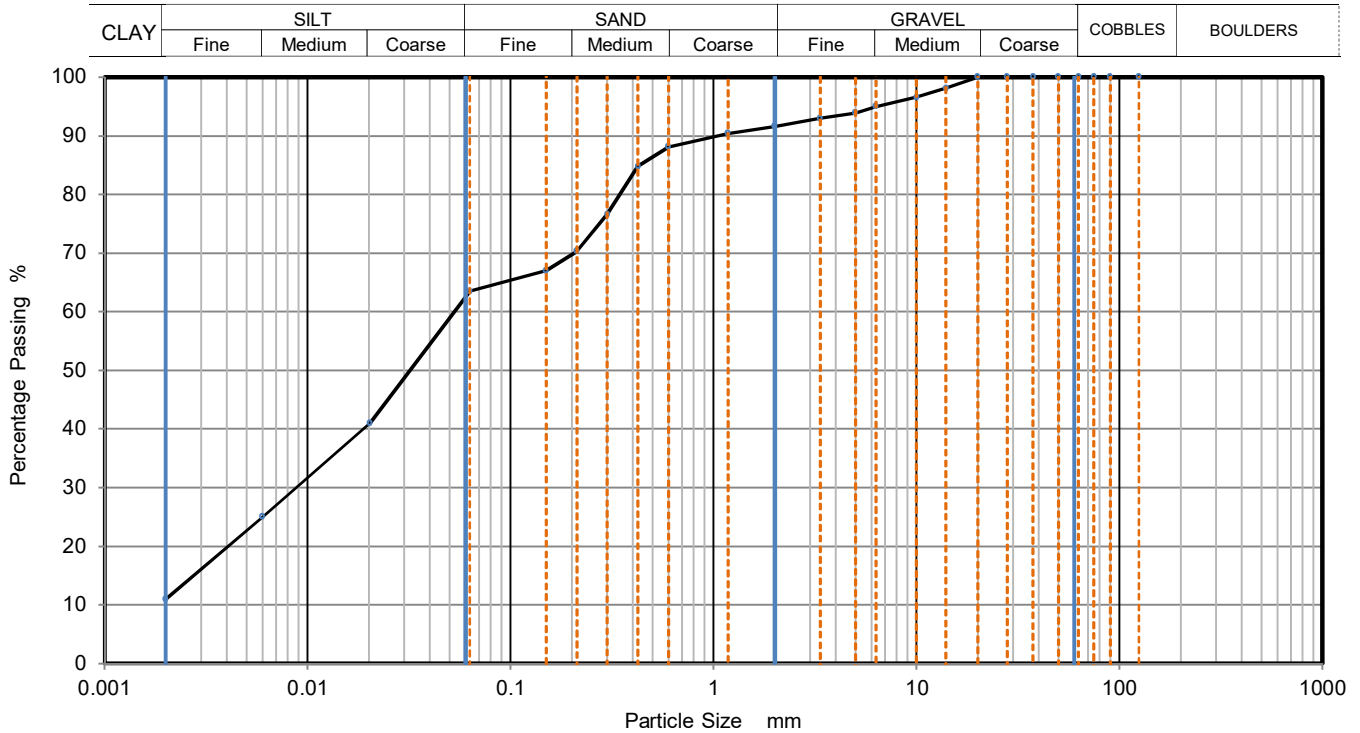
Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Dark brown slightly gravelly slightly sandy clayey SILT . Gravel is of flint, quartz and shell fragments.	Sample Depth (m)	0.90
		Sample Reference	B3



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	41
90	100	0.0060	25
75	100	0.0020	11
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	98		
10	97		
6.3	95		
5	94		
3.35	93		
2	92		
1.18	90		
0.6	88		
0.425	85	Particle density (assumed) 2.65 Mg/m3	
0.3	77		
0.212	70		
0.15	67		
0.063	64		

Sample Proportions	% dry mass
Very coarse	0
Gravel	8
Sand	28
Silt	52
Clay	11

Grading Analysis		
D100	mm	
D60	mm	0.053
D30	mm	0.009
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

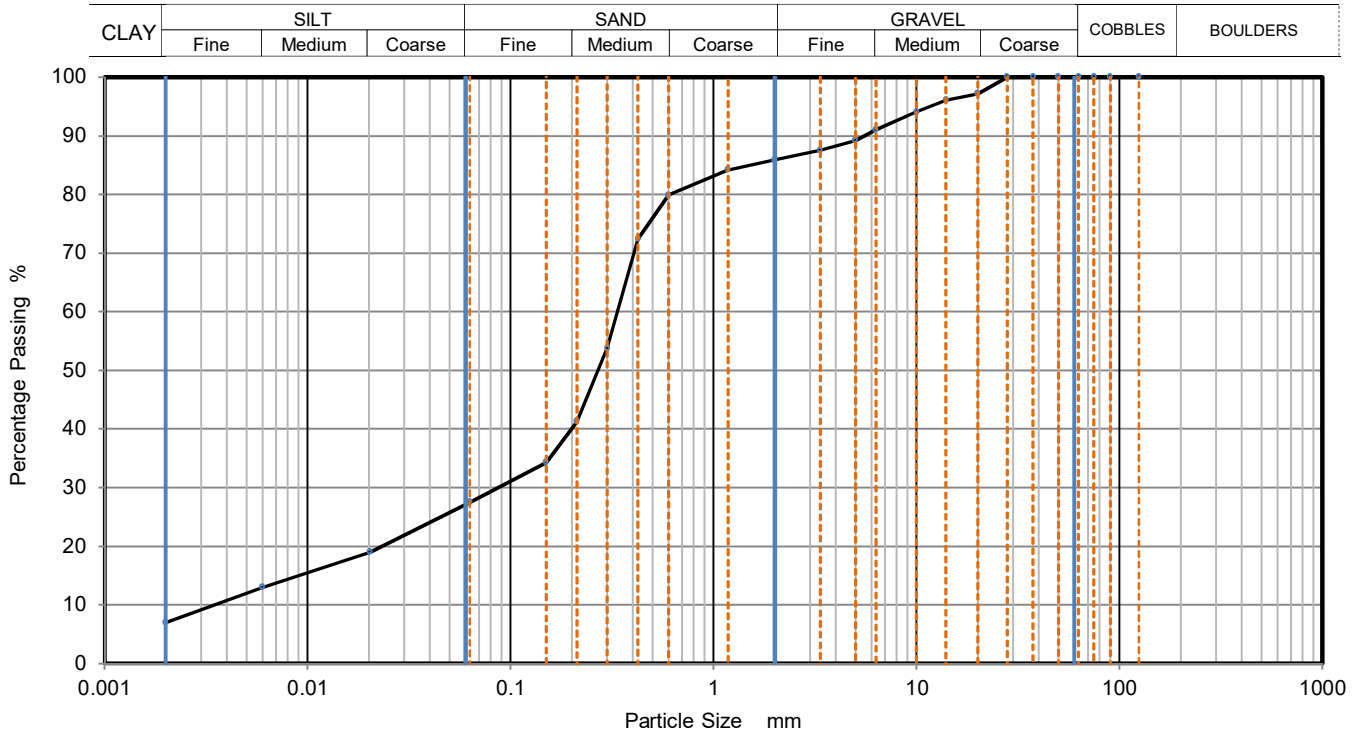
Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	MADE GROUND (Dark brown clayey silty gravelly SAND. Gravel is of flint, quartz, shell fragments and brick fragments)	Sample Depth (m)	1.20
		Sample Reference	B6



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	19
90	100	0.0060	13
75	100	0.0020	7
63	100		
50	100		
37.5	100		
28	100		
20	97		
14	96		
10	94		
6.3	91		
5	89		
3.35	88		
2	86		
1.18	84		
0.6	80		
0.425	72	Particle density (assumed) 2.65 Mg/m3	
0.3	54		
0.212	41		
0.15	34		
0.063	28		

Sample Proportions	% dry mass
Very coarse	0
Gravel	14
Sand	59
Silt	21
Clay	7

Grading Analysis		
D100	mm	
D60	mm	0.337
D30	mm	0.087
D10	mm	0.004
Uniformity Coefficient		92
Curvature Coefficient		6

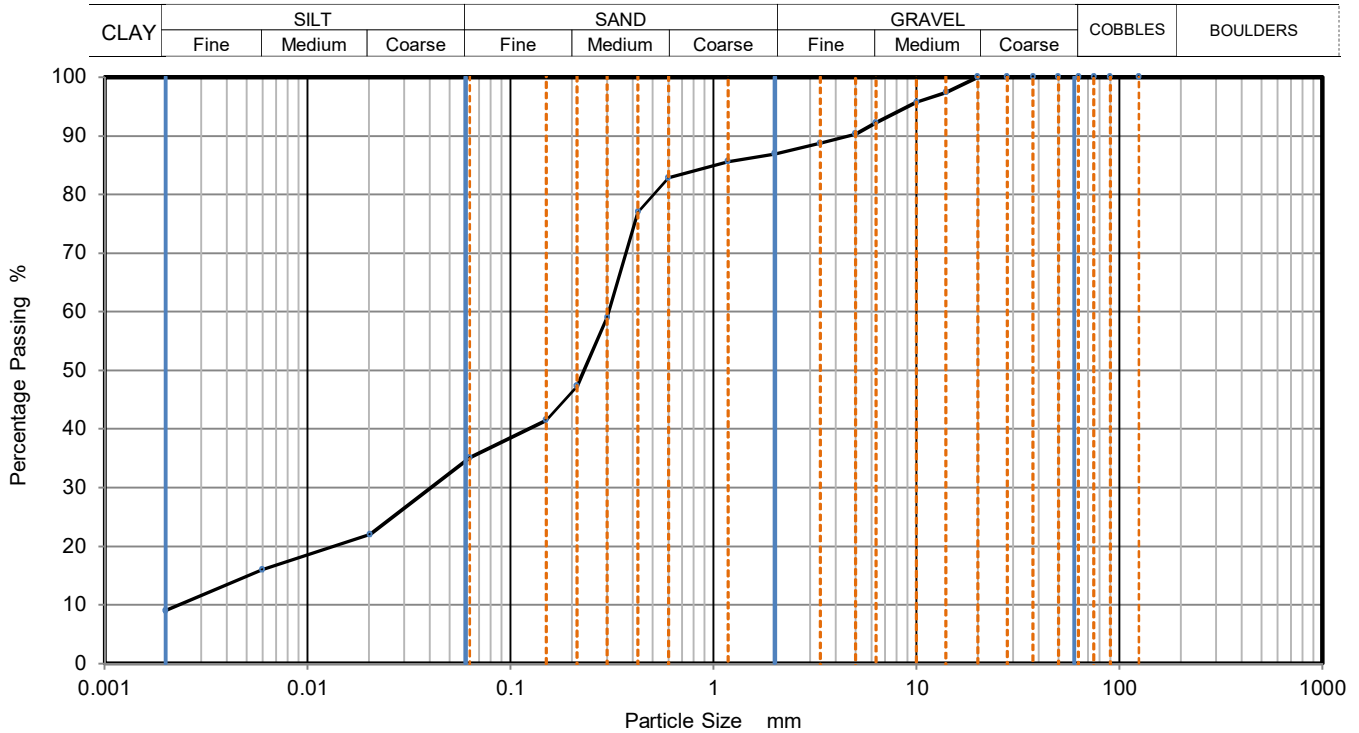
Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey brown mottled dark grey clayey silty gravelly SAND. Gravel is of flint and shell fragments.	Sample Depth (m)	2.00
		Sample Reference	B9



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	22
90	100	0.0060	16
75	100	0.0020	9
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	97		
10	96		
6.3	92		
5	90		
3.35	89		
2	87		
1.18	86		
0.6	83		
0.425	77	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	59		
0.212	47		
0.15	42		
0.063	35		

Sample Proportions	% dry mass
Very coarse	0
Gravel	13
Sand	52
Silt	26
Clay	9

Grading Analysis		
D100	mm	
D60	mm	0.306
D30	mm	0.041
D10	mm	0.002
Uniformity Coefficient		140
Curvature Coefficient		2.5

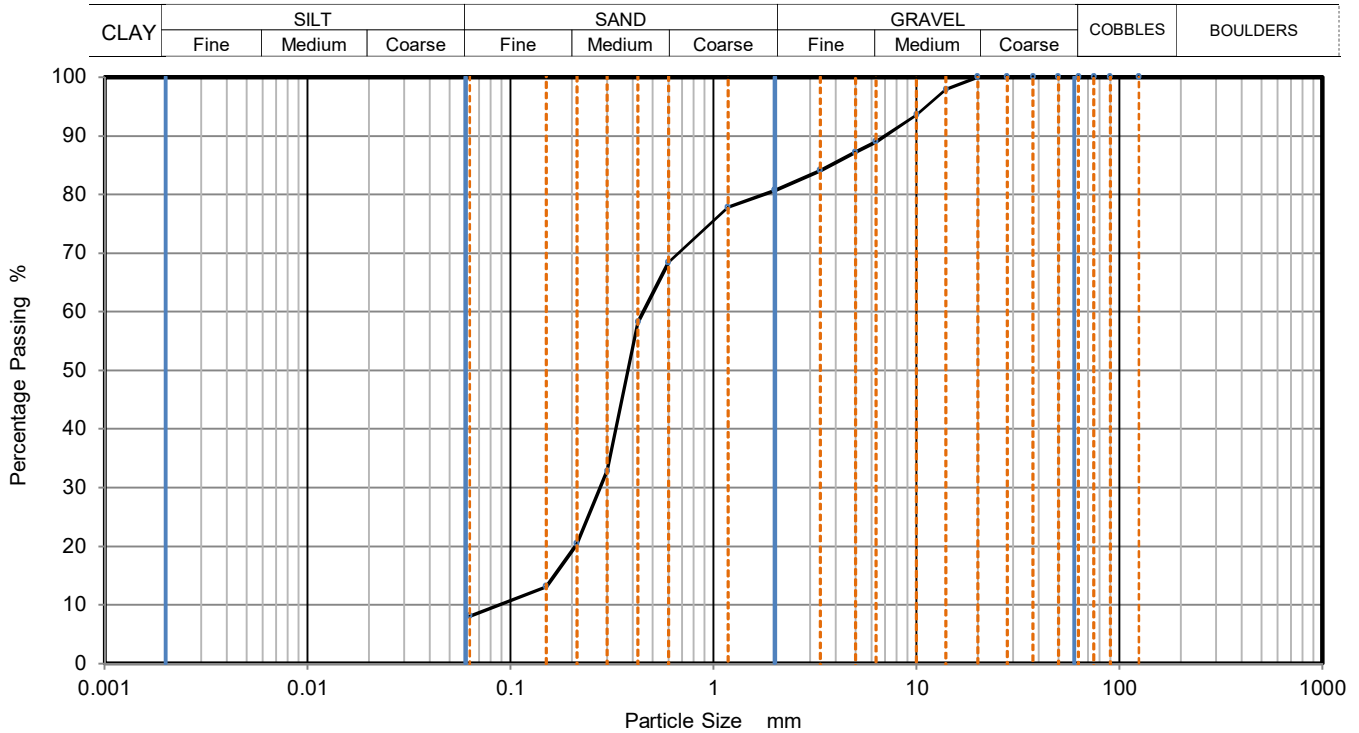
Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Dark grey brown silty gravelly SAND. Gravel is of flint and quartzite.	Sample Depth (m)	3.50
		Sample Reference	B14



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	98		
10	94		
6.3	89		
5	87		
3.35	84		
2	81		
1.18	78		
0.6	68		
0.425	58		
0.3	33		
0.212	20		
0.15	13		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	19
Sand	73
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.452
D30	mm	0.278
D10	mm	0.087
Uniformity Coefficient		5.2
Curvature Coefficient		2

Remarks	Approved	Date	Sheet No.:
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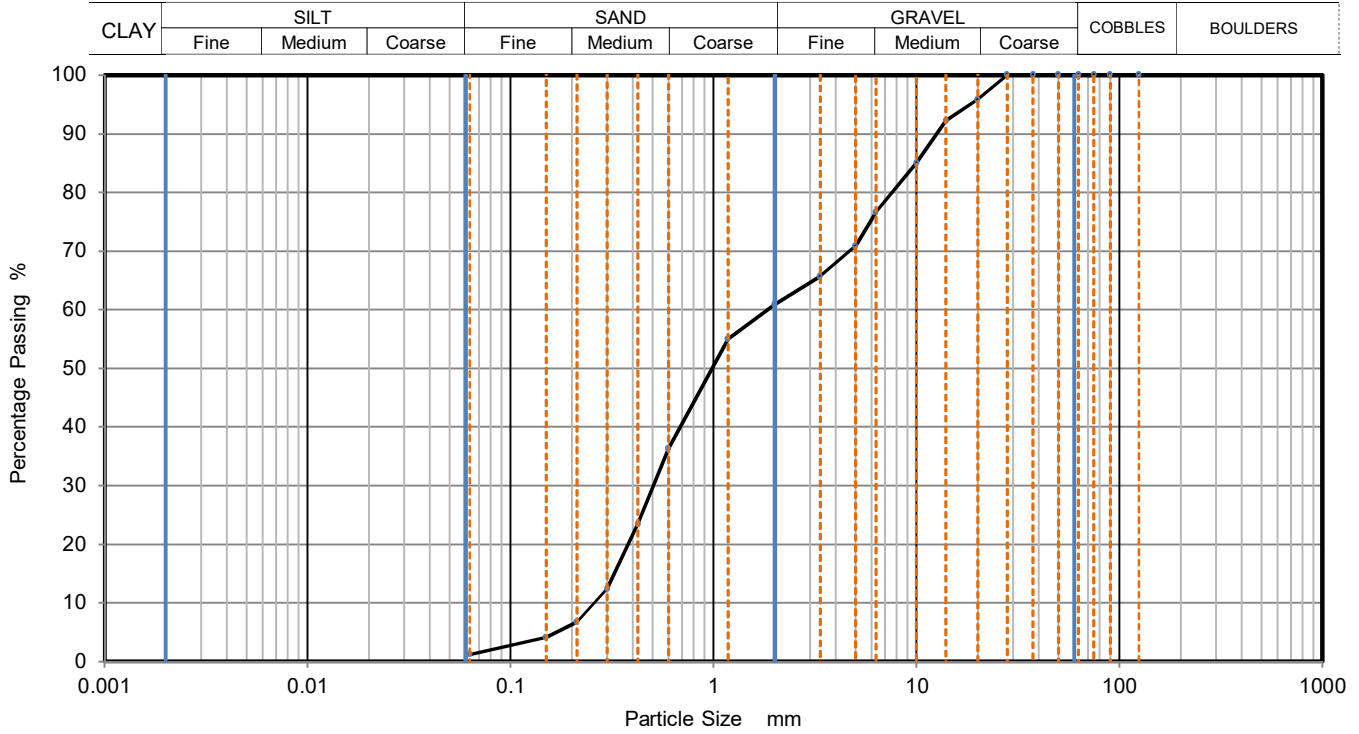




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey slightly silty very gravelly SAND. Gravel is of flint and quartzite	Sample Depth (m)	4.00
		Sample Reference	B16



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	96		
14	92		
10	85		
6.3	77		
5	71		
3.35	66		
2	61		
1.18	55		
0.6	36		
0.425	23		
0.3	12		
0.212	7		
0.15	4		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0
Gravel	39
Sand	60
Fines <0.063mm	1

Grading Analysis		
D100	mm	
D60	mm	1.850
D30	mm	0.507
D10	mm	0.259
Uniformity Coefficient		7.1
Curvature Coefficient		0.53

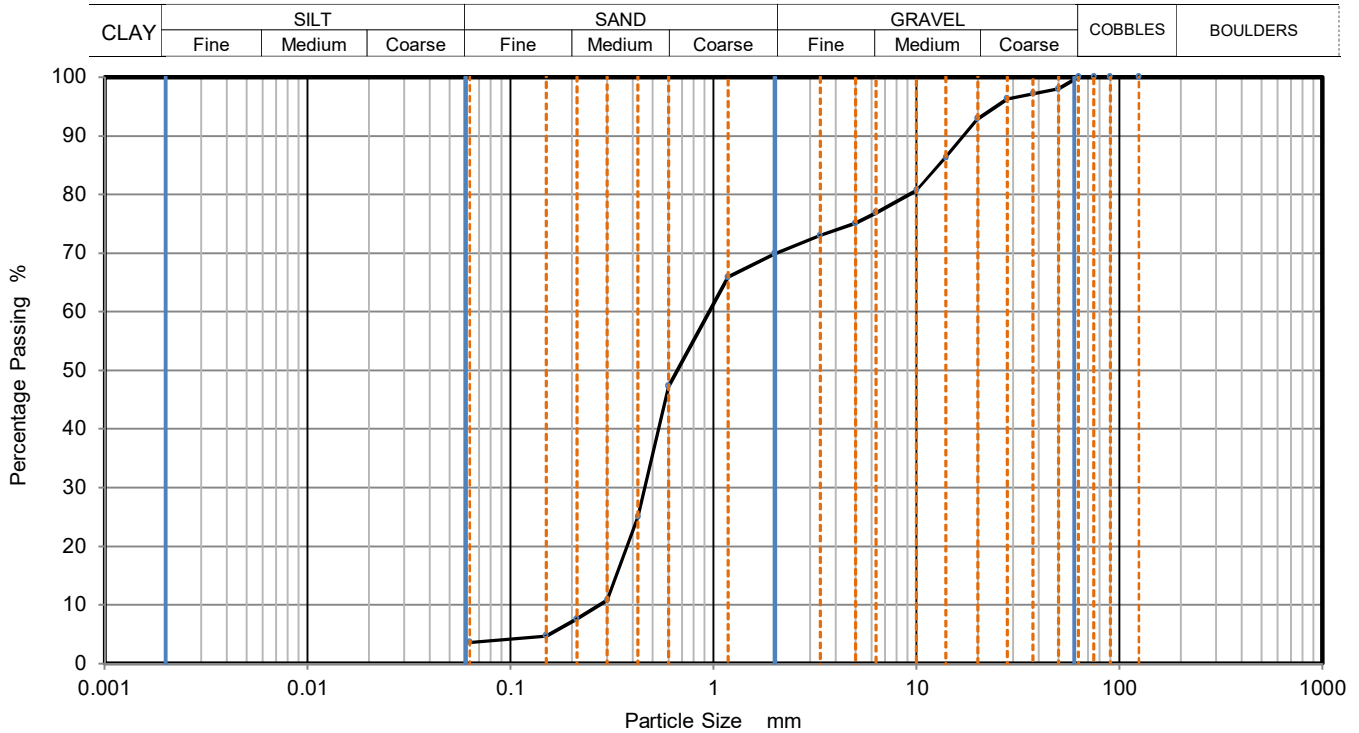
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Brown slightly silty very gravelly SAND. Gravel is of flint and quartzite.	Sample Depth (m)	5.00
		Sample Reference	B19



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	98		
37.5	97		
28	96		
20	93		
14	86		
10	81		
6.3	77		
5	75		
3.35	73		
2	70		
1.18	66		
0.6	47		
0.425	25		
0.3	11		
0.212	8		
0.15	5		
0.063	4		

Sample Proportions	% dry mass
Very coarse	0
Gravel	30
Sand	66
Fines <0.063mm	4

Grading Analysis		
D100	mm	
D60	mm	0.952
D30	mm	0.459
D10	mm	0.274
Uniformity Coefficient		3.5
Curvature Coefficient		0.81

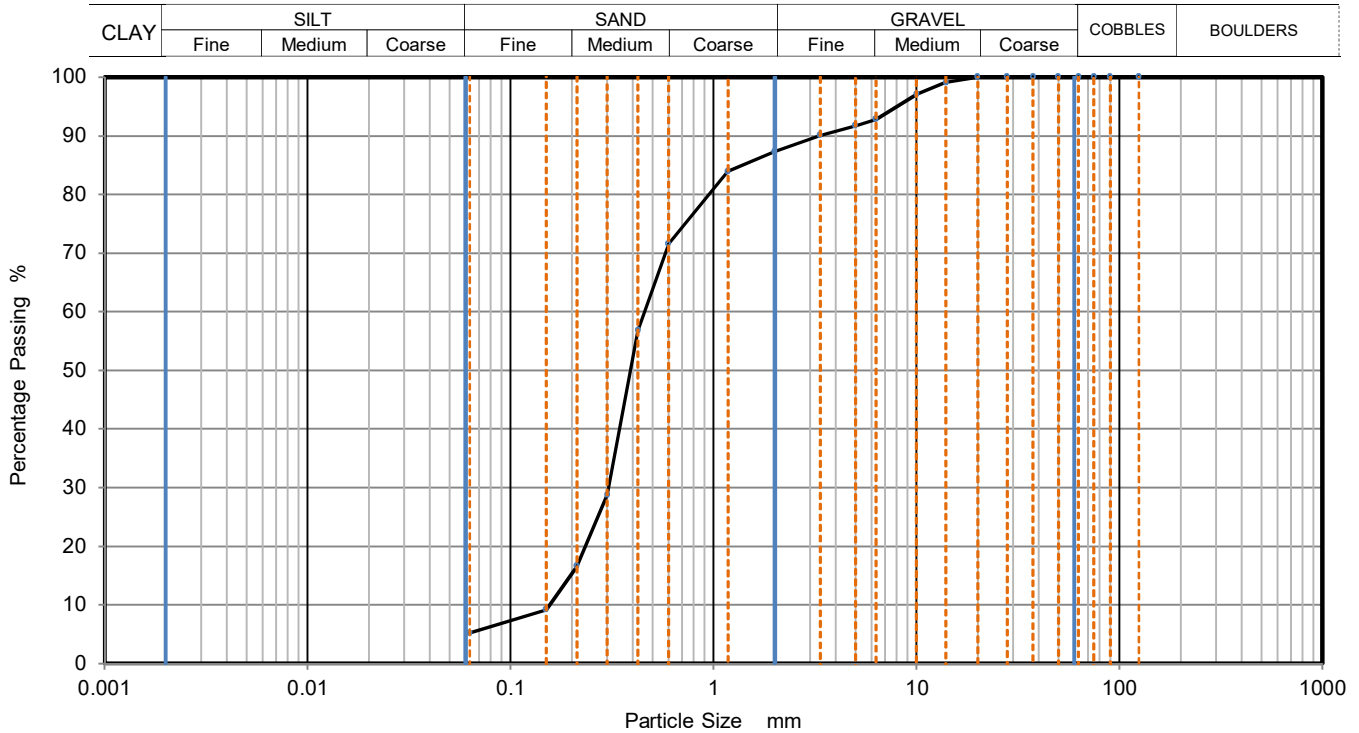
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Brown and grey brown slightly silty gravelly SAND. Gravel is of flint.	Sample Depth (m)	8.00
		Sample Reference	B28



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	97		
6.3	93		
5	92		
3.35	90		
2	87		
1.18	84		
0.6	72		
0.425	57		
0.3	29		
0.212	17		
0.15	9		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	13
Sand	82
Fines <0.063mm	5

Grading Analysis		
D100	mm	
D60	mm	0.458
D30	mm	0.305
D10	mm	0.155
Uniformity Coefficient		2.9
Curvature Coefficient		1.3

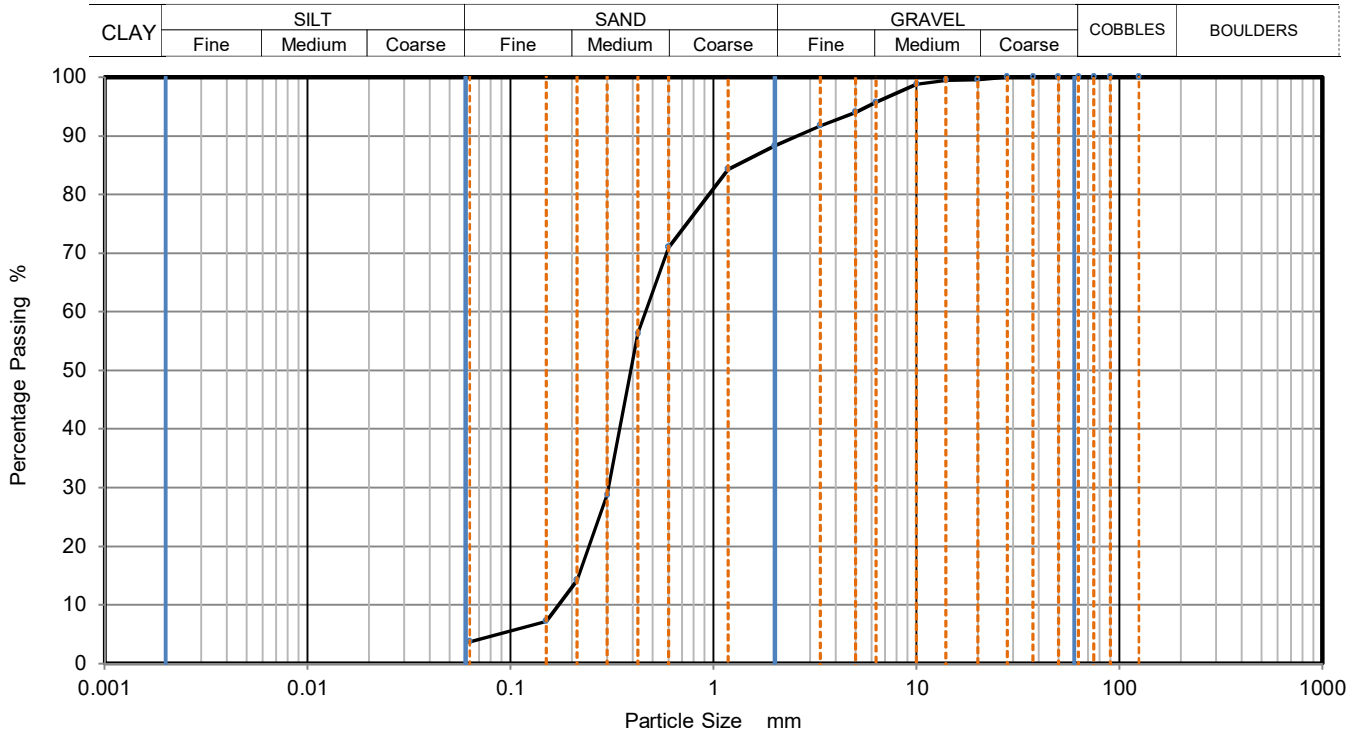
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Brown slightly silty gravelly SAND. Gravel is of flint and quartzite.	Sample Depth (m)	9.00
		Sample Reference	B31



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	96		
5	94		
3.35	92		
2	88		
1.18	84		
0.6	71		
0.425	56		
0.3	29		
0.212	14		
0.15	7		
0.063	4		

Sample Proportions	% dry mass
Very coarse	0
Gravel	12
Sand	85
Fines <0.063mm	4

Grading Analysis		
D100	mm	
D60	mm	0.464
D30	mm	0.305
D10	mm	0.172
Uniformity Coefficient		2.7
Curvature Coefficient		1.2

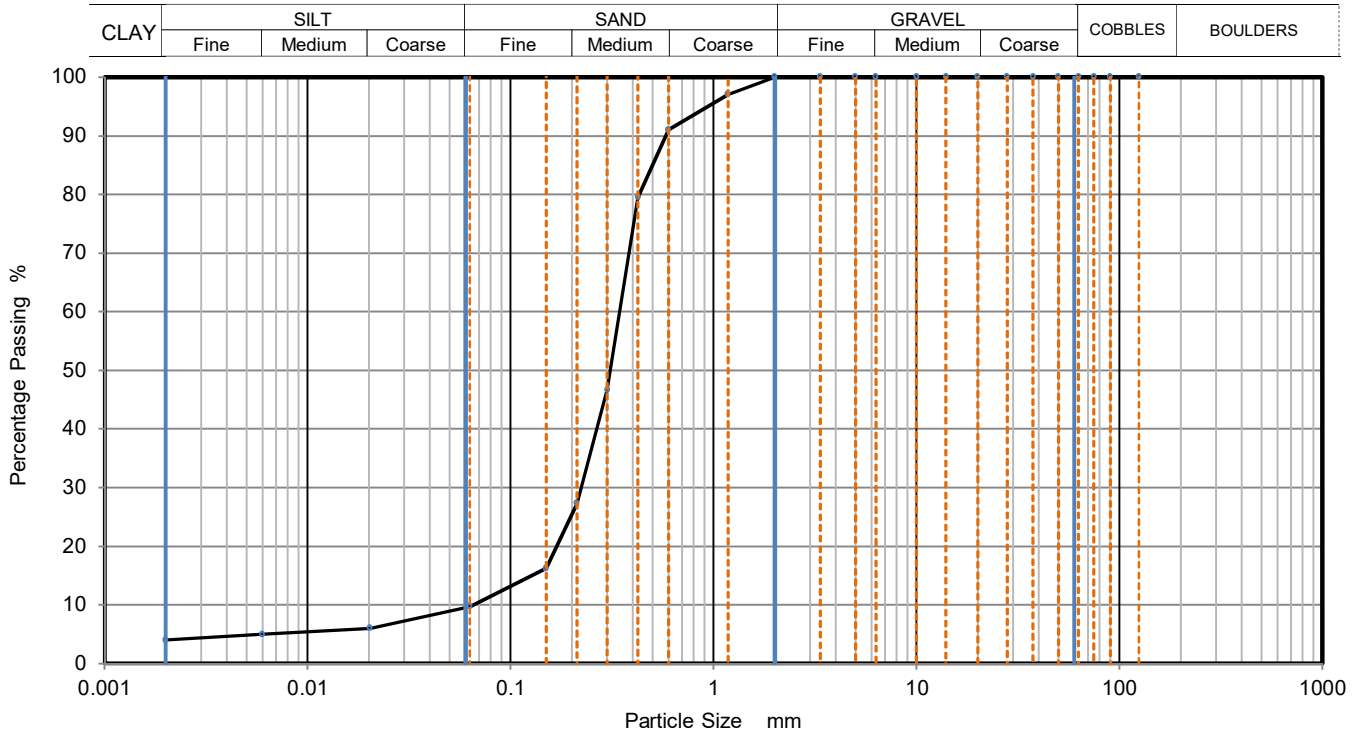
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Brown slightly clayey silty SAND.	Sample Depth (m)	10.00
		Sample Reference	B34



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	6
90	100	0.0060	5
75	100	0.0020	4
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	97		
0.6	91		
0.425	80	Particle density (assumed) 2.65 Mg/m3	
0.3	47		
0.212	27		
0.15	16		
0.063	10		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	90
Silt	6
Clay	4

Grading Analysis		
D100	mm	
D60	mm	0.345
D30	mm	0.222
D10	mm	0.066
Uniformity Coefficient		5.2
Curvature Coefficient		2.2

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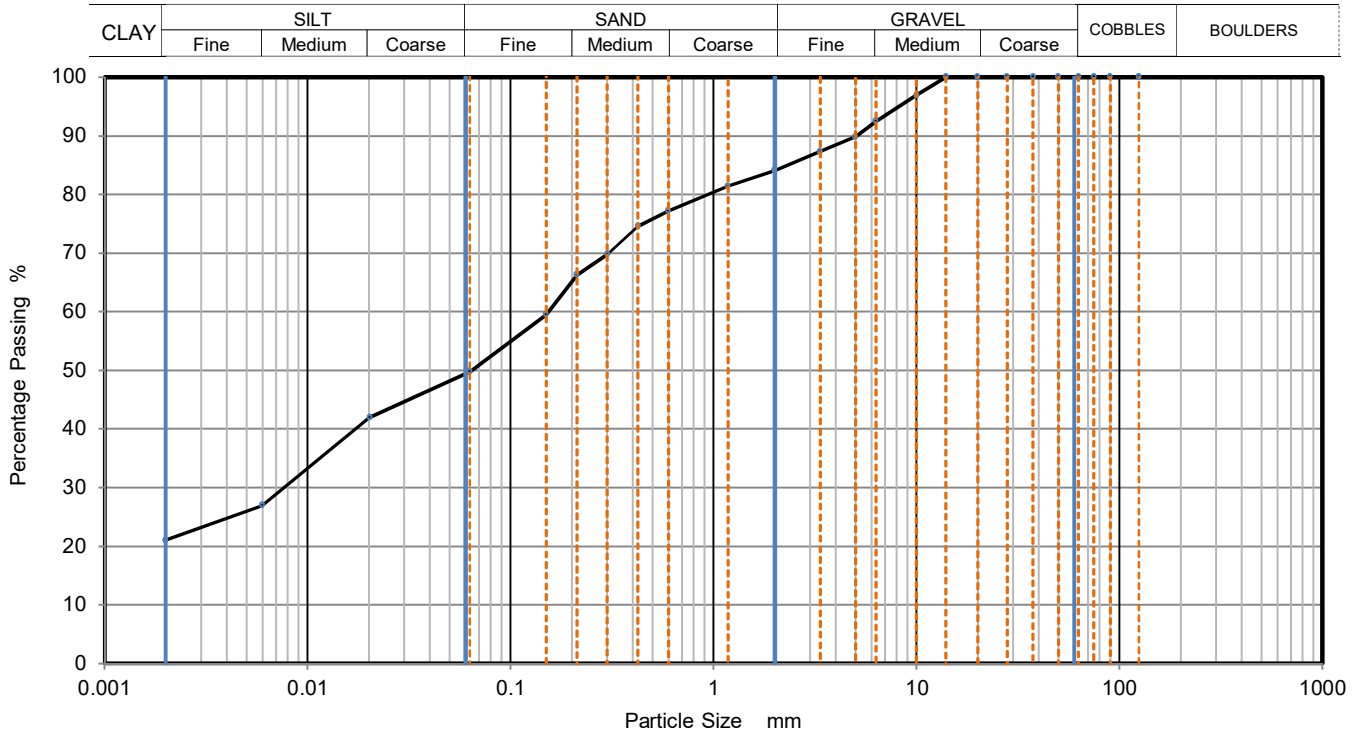




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey brown and orange brown slightly gravelly slightly sandy CLAY. Gravel is of sandstone.	Sample Depth (m)	11.20
		Sample Reference	B43



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	42
90	100	0.0060	27
75	100	0.0020	21
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	97		
6.3	93		
5	90		
3.35	87		
2	84		
1.18	81		
0.6	77		
0.425	75	Particle density (assumed) 2.65 Mg/m3	
0.3	70		
0.212	66		
0.15	60		
0.063	50		

Sample Proportions	% dry mass
Very coarse	0
Gravel	16
Sand	34
Silt	29
Clay	21

Grading Analysis		
D100	mm	
D60	mm	0.154
D30	mm	0.008
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

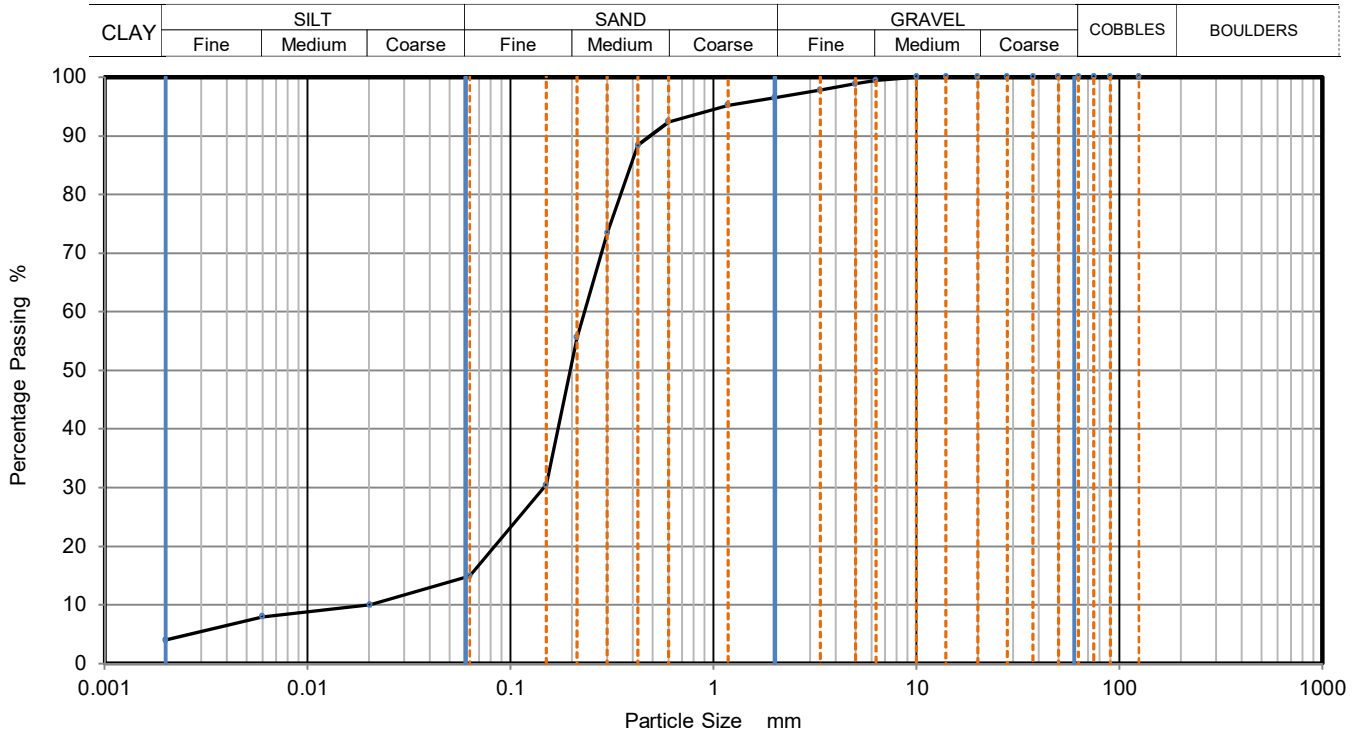
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Orange brown mottled grey slightly clayey silty slightly gravelly SAND. Gravel is of flint	Sample Depth (m)	12.00
		Sample Reference	B40



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	10
90	100	0.0060	8
75	100	0.0020	4
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	98		
2	97		
1.18	95		
0.6	92		
0.425	88	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	73		
0.212	56		
0.15	30		
0.063	15		

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	82
Silt	11
Clay	4

Grading Analysis		
D100	mm	
D60	mm	0.231
D30	mm	0.146
D10	mm	0.019
Uniformity Coefficient		12
Curvature Coefficient		5

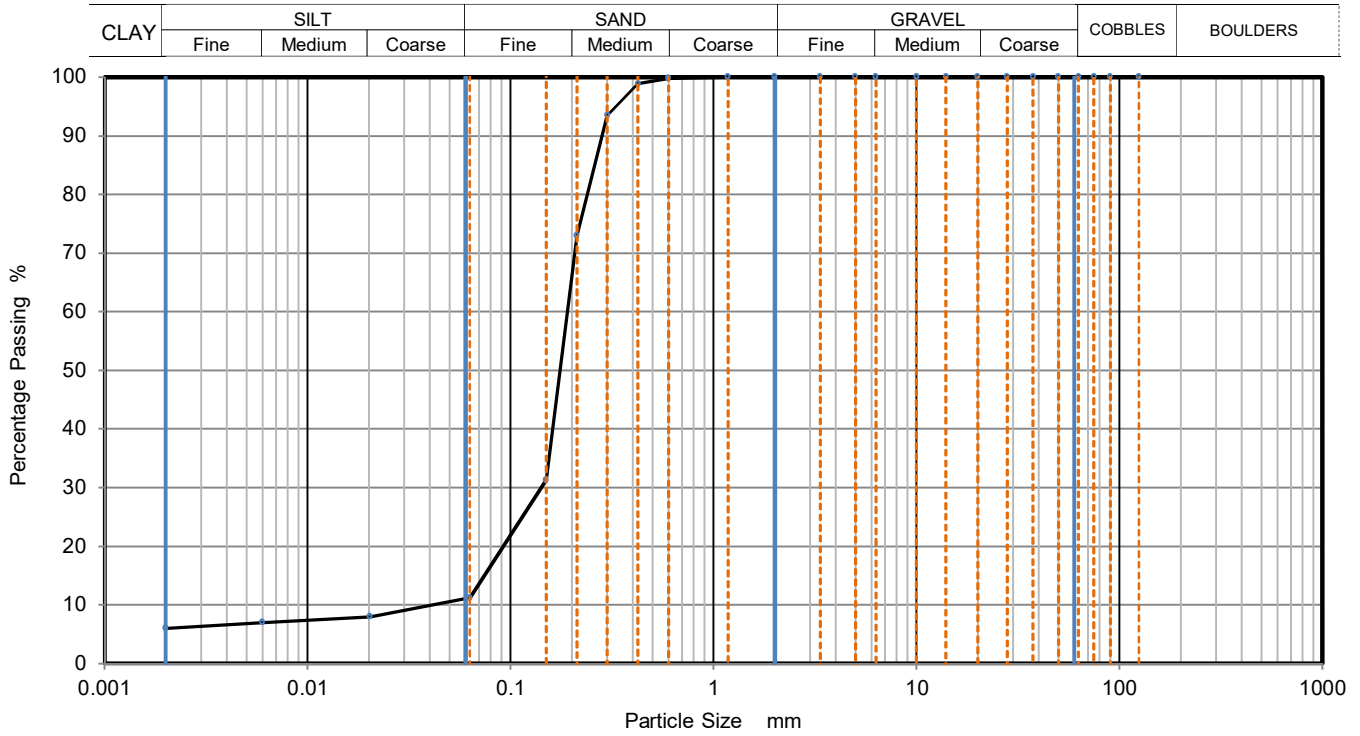
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Orange brown clayey slightly silty SAND.	Sample Depth (m)	14.00
		Sample Reference	B46



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	8
90	100	0.0060	7
75	100	0.0020	6
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99	Particle density (assumed) 2.65 Mg/m3	
0.3	94		
0.212	73		
0.15	31		
0.063	11		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	89
Silt	5
Clay	6

Grading Analysis		
D100	mm	
D60	mm	0.190
D30	mm	0.142
D10	mm	0.039
Uniformity Coefficient		4.8
Curvature Coefficient		2.7

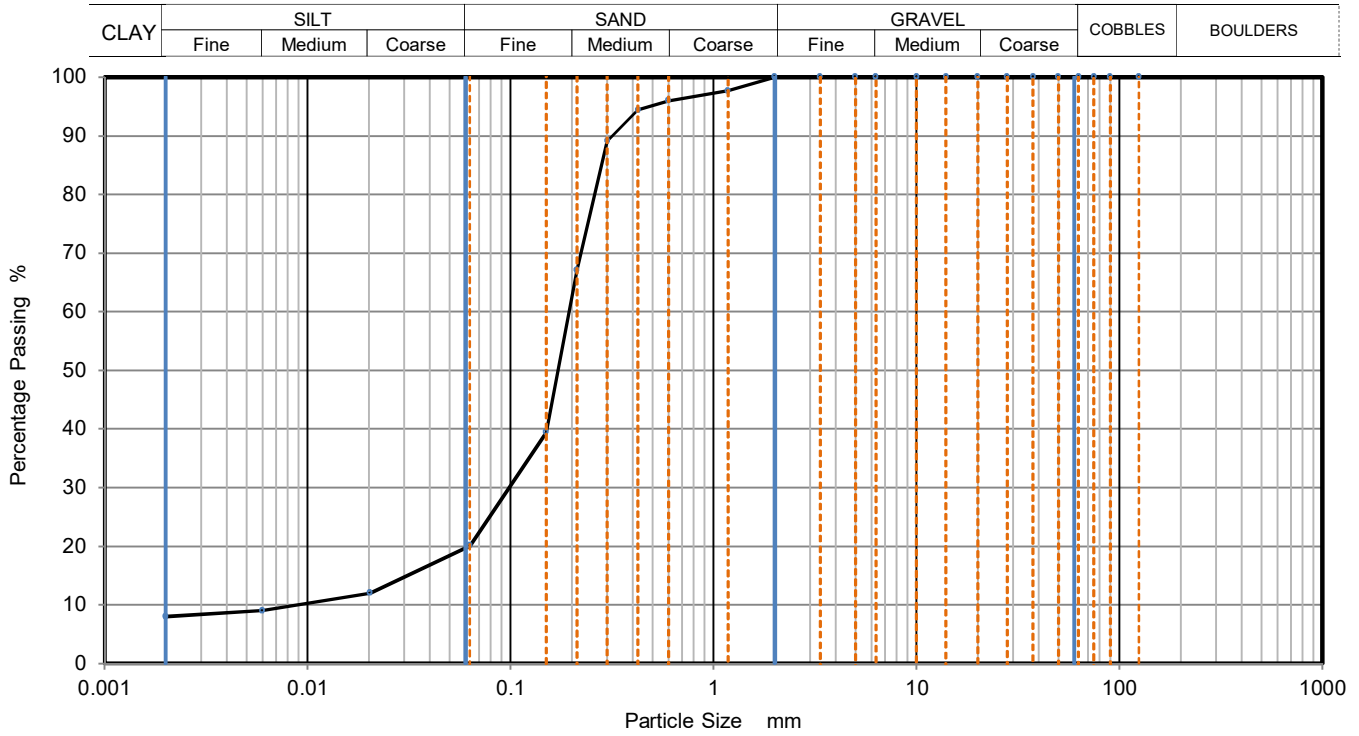
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Brown clayey silty SAND.	Sample Depth (m)	15.00
		Sample Reference	B49



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	12
90	100	0.0060	9
75	100	0.0020	8
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	98		
0.6	96		
0.425	94	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	89		
0.212	67		
0.15	39		
0.063	20		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	80
Silt	12
Clay	8

Grading Analysis		
D100	mm	
D60	mm	0.194
D30	mm	0.098
D10	mm	0.009
Uniformity Coefficient		22
Curvature Coefficient		5.5

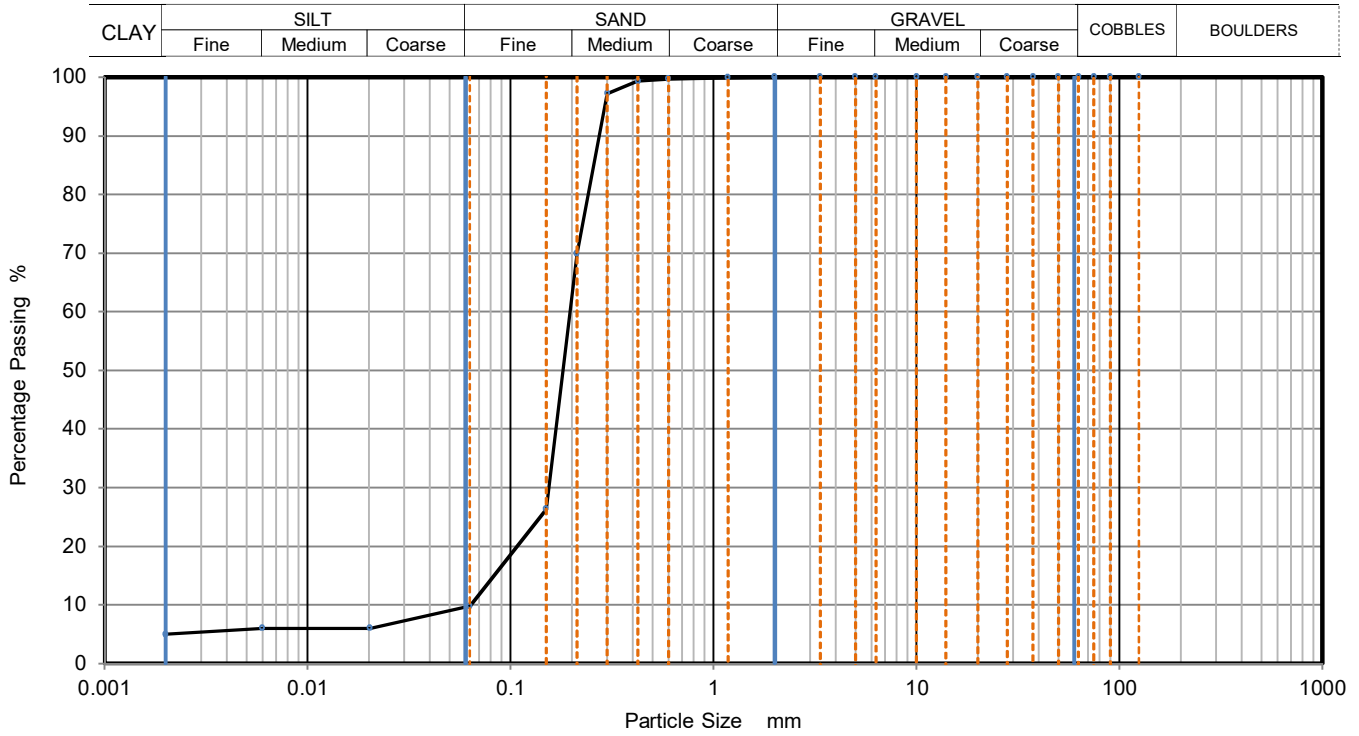
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Brown slightly clayey slightly silty SAND.	Sample Depth (m)	16.00
		Sample Reference	B51



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	6
90	100	0.0060	6
75	100	0.0020	5
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	97		
0.212	70		
0.15	26		
0.063	10		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	90
Silt	5
Clay	5

Grading Analysis		
D100	mm	
D60	mm	0.196
D30	mm	0.154
D10	mm	0.064
Uniformity Coefficient		3.1
Curvature Coefficient		1.9

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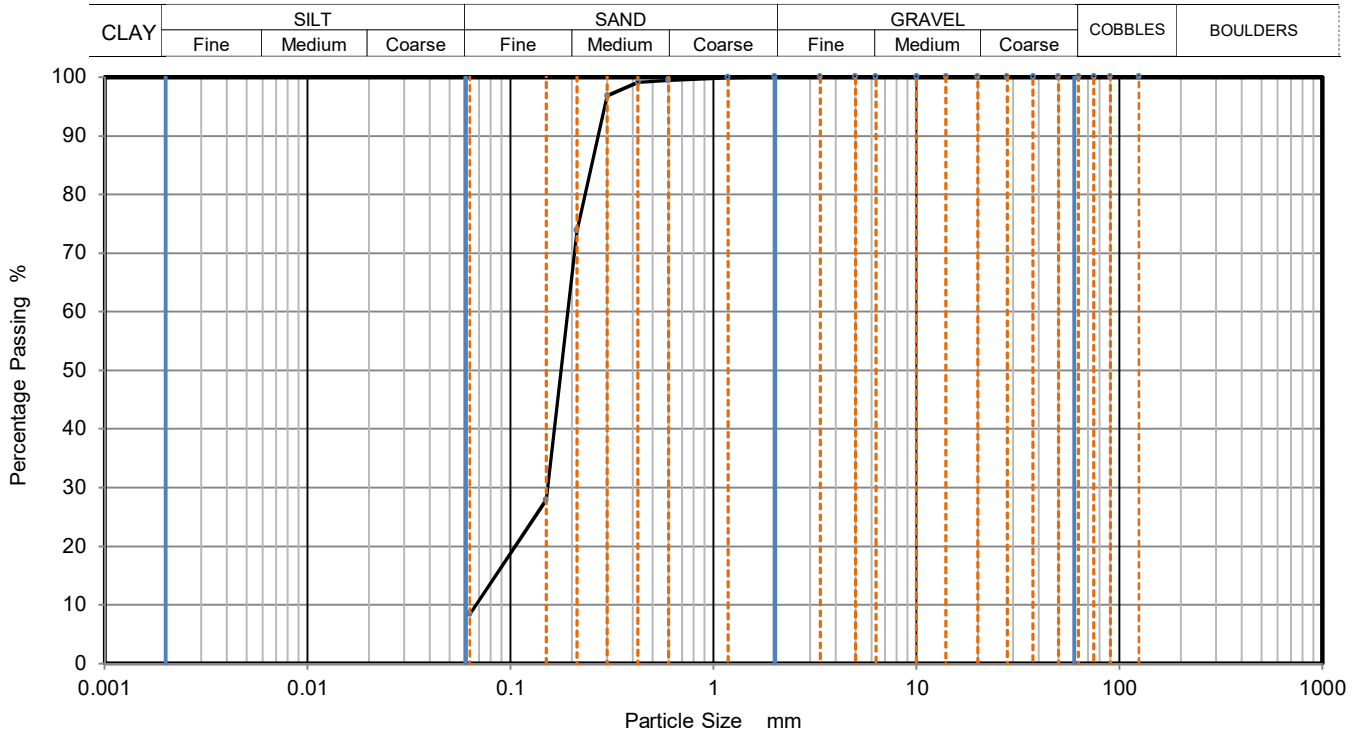




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Brown silty SAND.	Sample Depth (m)	17.00
		Sample Reference	B53



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99		
0.3	97		
0.212	74		
0.15	28		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	92
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.191
D30	mm	0.152
D10	mm	0.068
Uniformity Coefficient		2.8
Curvature Coefficient		1.8

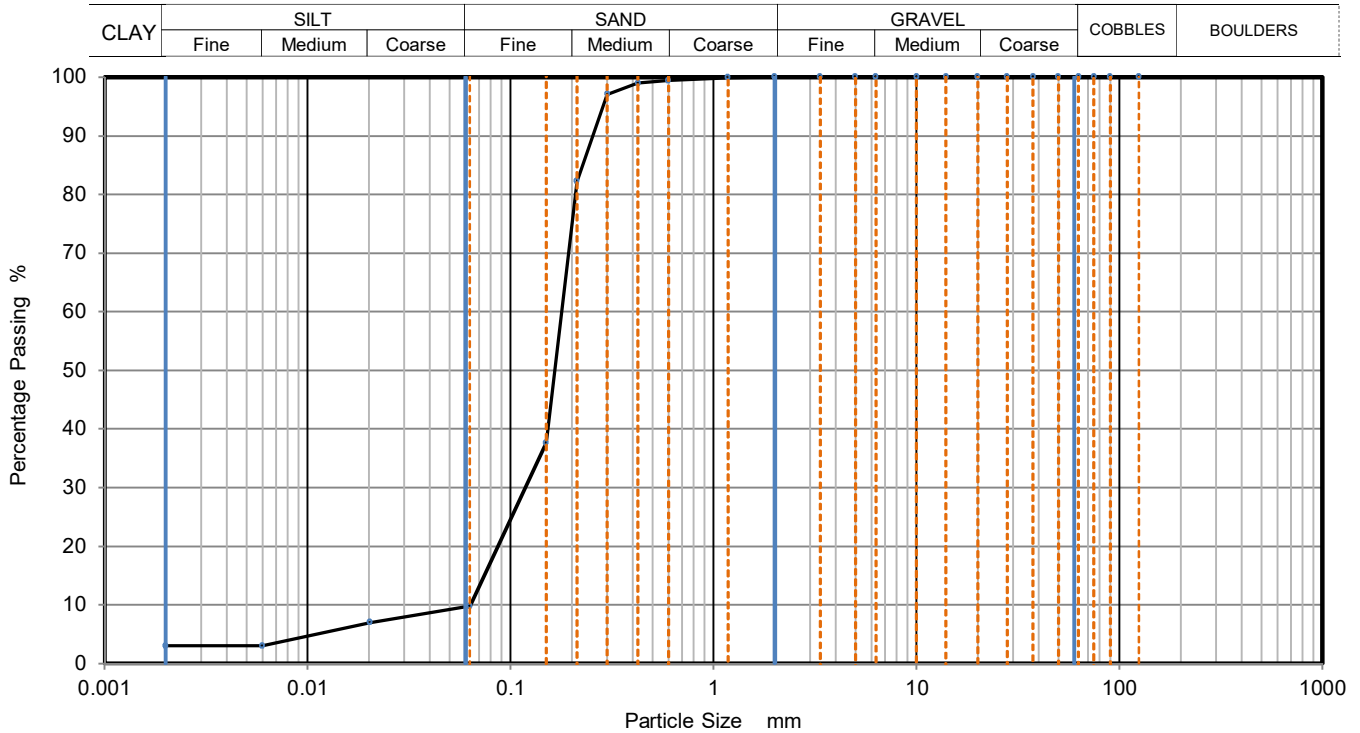
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Brown slightly clayey silty SAND.	Sample Depth (m)	19.00
		Sample Reference	B58



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	7
90	100	0.0060	3
75	100	0.0020	3
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	99		
0.3	97		
0.212	82		
0.15	38		
0.063	10		
		Particle density (assumed) 2.65 Mg/m <sup>3</sup>	

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	90
Silt	7
Clay	3

Grading Analysis		
D100	mm	
D60	mm	0.178
D30	mm	0.118
D10	mm	0.064
Uniformity Coefficient		2.8
Curvature Coefficient		1.2

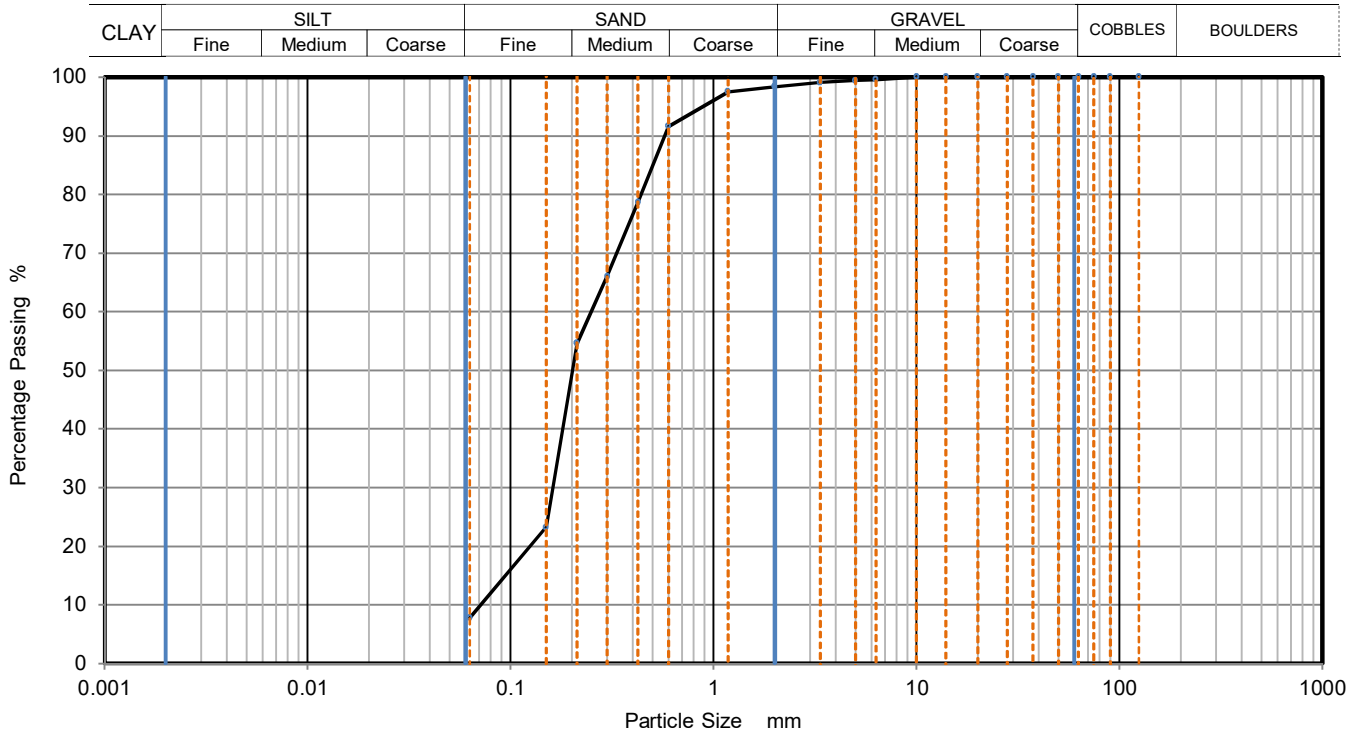
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Brown silty slightly gravelly SAND. Gravel is of chalk and shell fragments.	Sample Depth (m)	20.00
		Sample Reference	B60



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	99		
2	98		
1.18	98		
0.6	92		
0.425	79		
0.3	66		
0.212	55		
0.15	23		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	91
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.250
D30	mm	0.162
D10	mm	0.072
Uniformity Coefficient		3.5
Curvature Coefficient		1.5

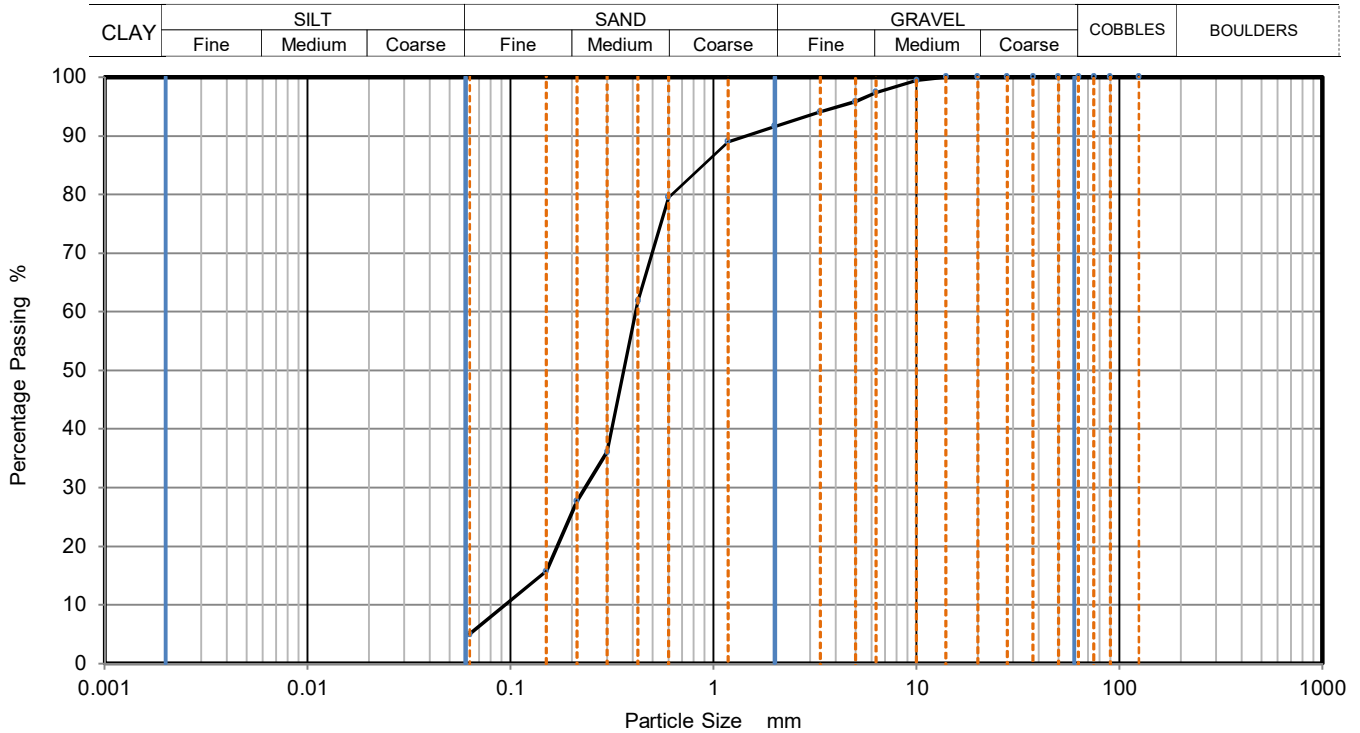
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey brown slightly silty gravelly SAND. Gravel is of chalk and shell fragments.	Sample Depth (m)	21.00
		Sample Reference	B61



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	97		
5	96		
3.35	94		
2	92		
1.18	89		
0.6	80		
0.425	62		
0.3	36		
0.212	28		
0.15	16		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	8
Sand	87
Fines <0.063mm	5

Grading Analysis		
D100	mm	
D60	mm	0.415
D30	mm	0.233
D10	mm	0.094
Uniformity Coefficient		4.4
Curvature Coefficient		1.4

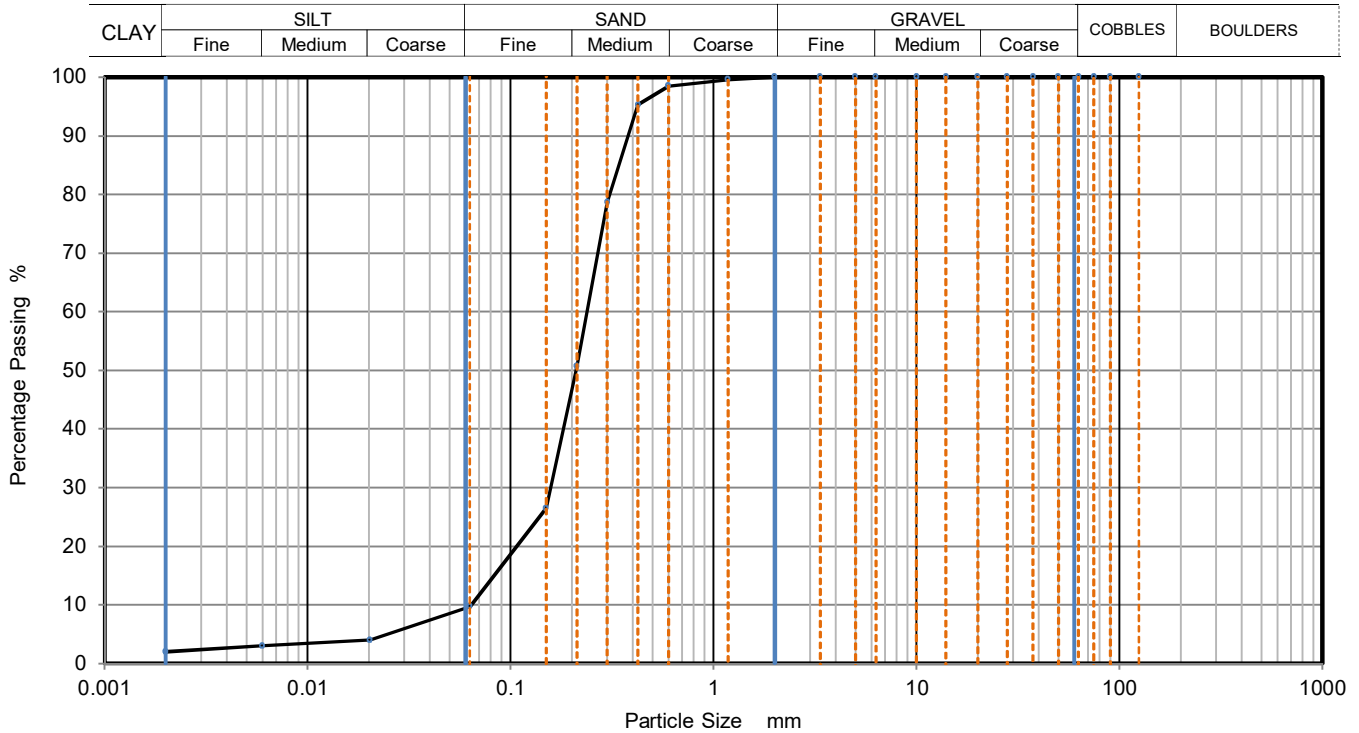
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey slightly clayey silty SAND.	Sample Depth (m)	23.00
		Sample Reference	B64



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	4
90	100	0.0060	3
75	100	0.0020	2
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	95	2.65	Mg/m3
0.3	79		
0.212	51		
0.15	27		
0.063	10		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	90
Silt	7
Clay	2

Grading Analysis		
D100	mm	
D60	mm	0.238
D30	mm	0.158
D10	mm	0.064
Uniformity Coefficient		3.7
Curvature Coefficient		1.6

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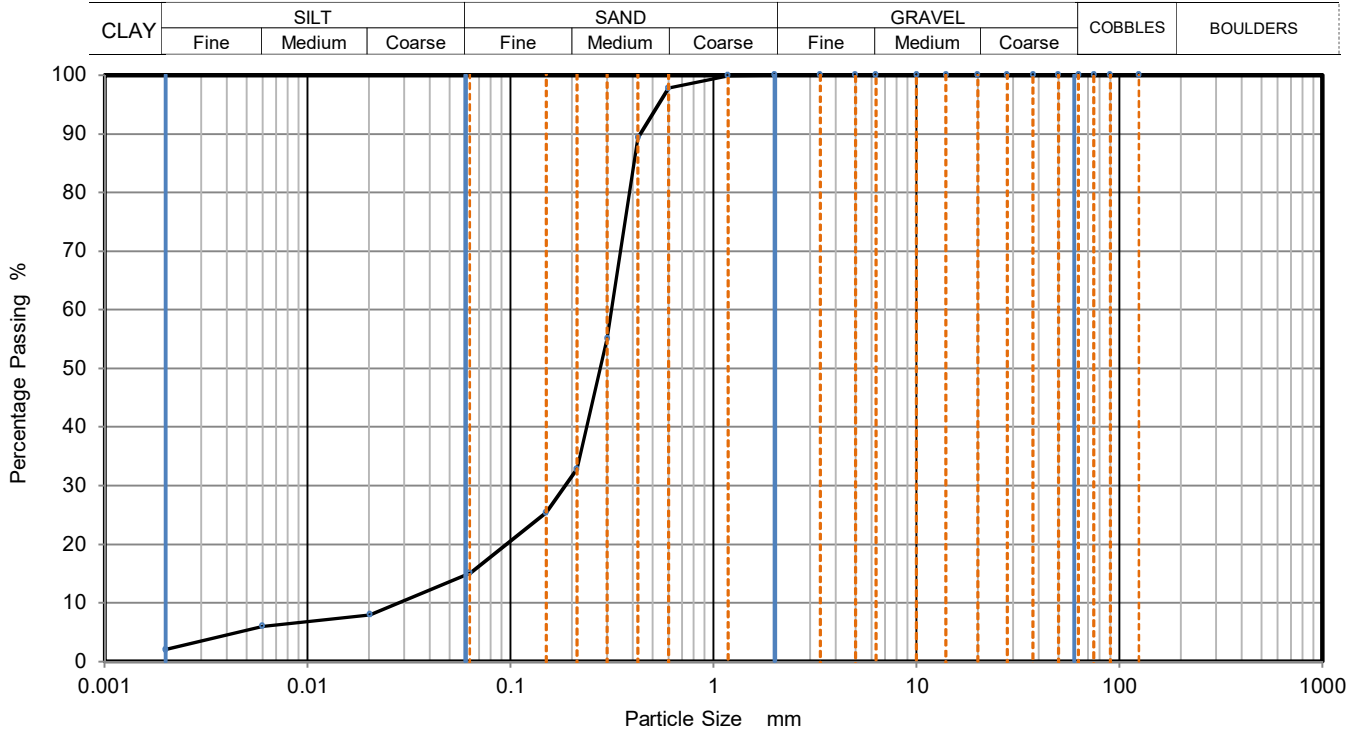




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey slightly clayey silty SAND.	Sample Depth (m)	27.00
		Sample Reference	B71



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	8
90	100	0.0060	6
75	100	0.0020	2
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98	Particle density (assumed)	
0.425	89	2.65	Mg/m3
0.3	55		
0.212	33		
0.15	25		
0.063	15		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	85
Silt	13
Clay	2

Grading Analysis		
D100	mm	
D60	mm	0.315
D30	mm	0.186
D10	mm	0.029
Uniformity Coefficient		11
Curvature Coefficient		3.8

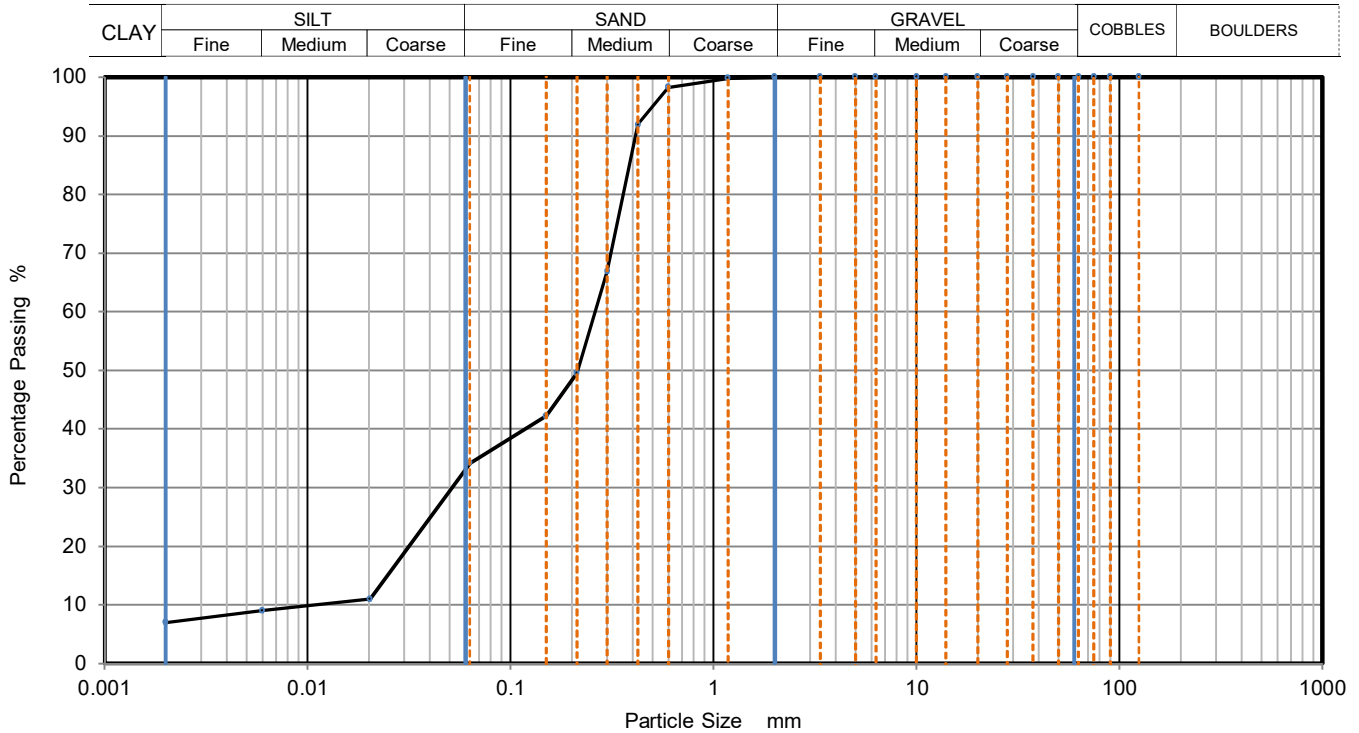
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey and blue grey clayey very silty SAND	Sample Depth (m)	28.00
		Sample Reference	B73



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	11
90	100	0.0060	9
75	100	0.0020	7
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98	Particle density (assumed)	
0.425	92	2.65	Mg/m3
0.3	67		
0.212	50		
0.15	42		
0.063	34		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	66
Silt	27
Clay	7

Grading Analysis		
D100	mm	
D60	mm	0.261
D30	mm	0.051
D10	mm	0.013
Uniformity Coefficient		20
Curvature Coefficient		0.77

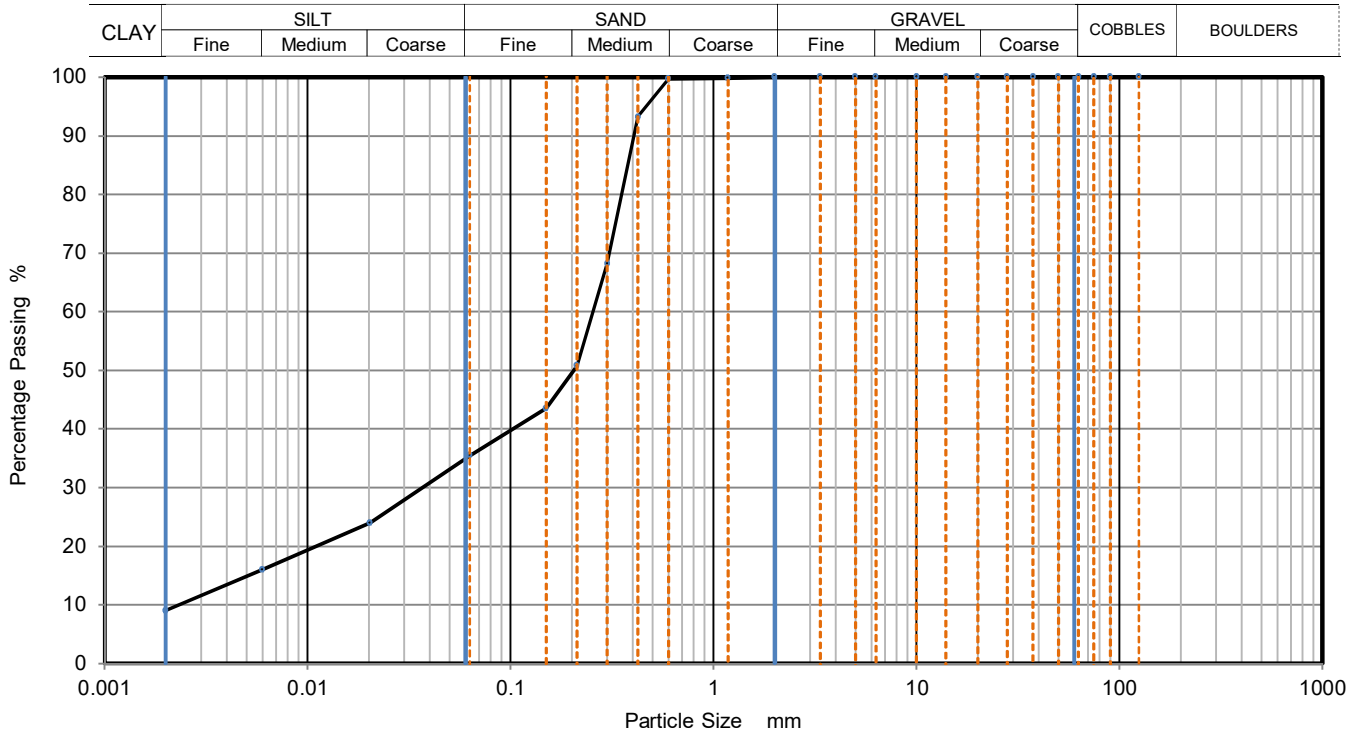
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Dark grey sandy clayey SILT	Sample Depth (m)	30.00
		Sample Reference	D75



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	24
90	100	0.0060	16
75	100	0.0020	9
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	93	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	68		
0.212	51		
0.15	44		
0.063	36		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	65
Silt	27
Clay	9

Grading Analysis		
D100	mm	
D60	mm	0.255
D30	mm	0.036
D10	mm	0.002
Uniformity Coefficient		100
Curvature Coefficient		2

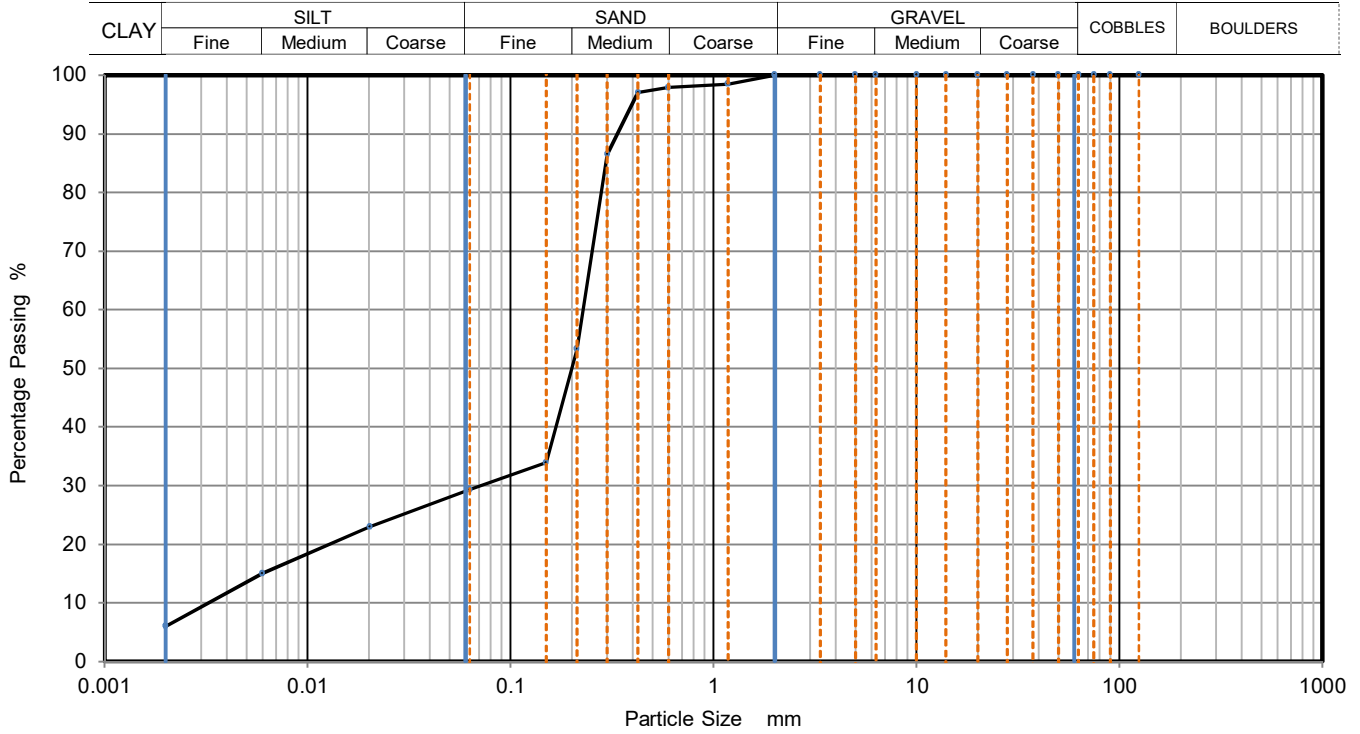
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### DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey clayey very silty SAND	Sample Depth (m)	32.00
		Sample Reference	B80



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	23
90	100	0.0060	15
75	100	0.0020	6
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	98		
0.425	97		
0.3	87		
0.212	53		
0.15	34		
0.063	29		
		Particle density (assumed) 2.65 Mg/m <sup>3</sup>	

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	71
Silt	23
Clay	6

Grading Analysis		
D100	mm	
D60	mm	0.227
D30	mm	0.072
D10	mm	0.003
Uniformity Coefficient		72
Curvature Coefficient		7.1

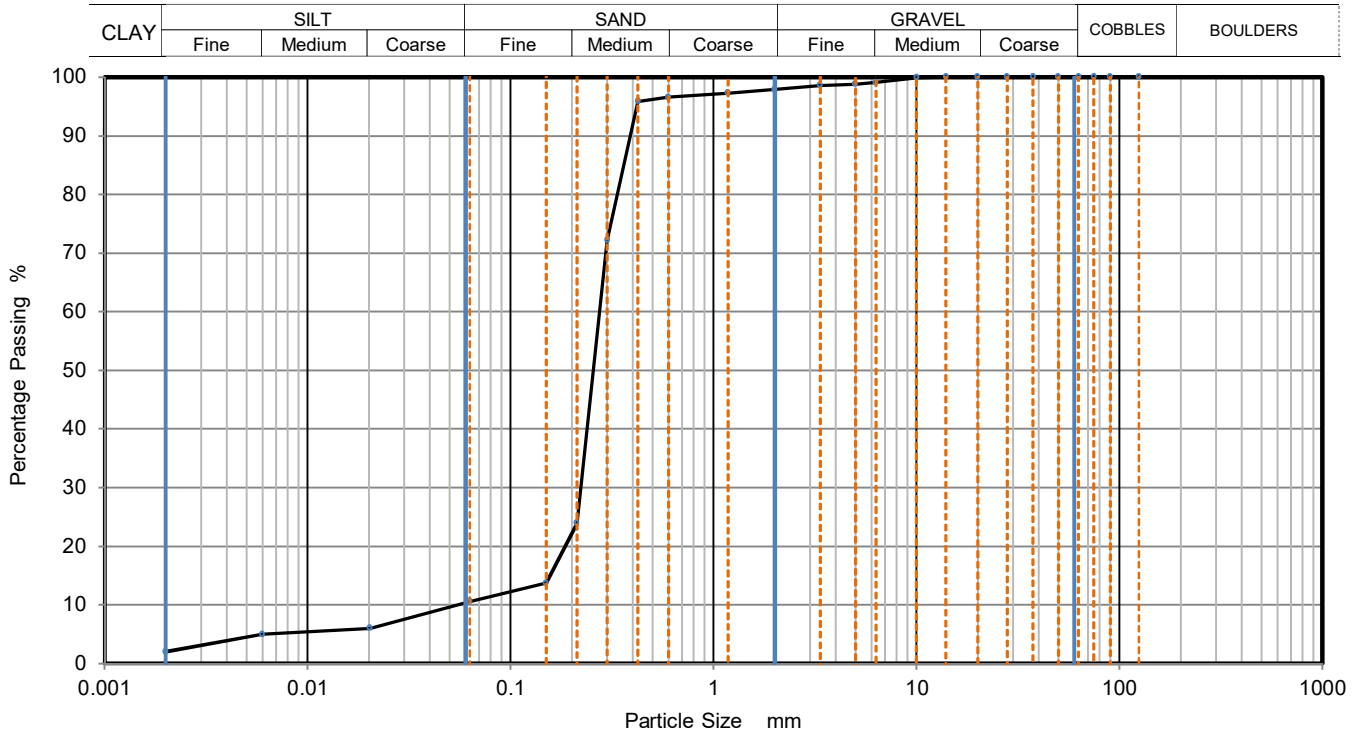
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey slightly clayey silty slightly gravelly SAND. Gravel is of shell fragments	Sample Depth (m)	33.00
		Sample Reference	B81



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	6
90	100	0.0060	5
75	100	0.0020	2
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	99		
2	98		
1.18	97		
0.6	97		
0.425	96	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	72		
0.212	24		
0.15	14		
0.063	11		

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	87
Silt	9
Clay	2

Grading Analysis		
D100	mm	
D60	mm	0.275
D30	mm	0.222
D10	mm	0.055
Uniformity Coefficient		5
Curvature Coefficient		3.3

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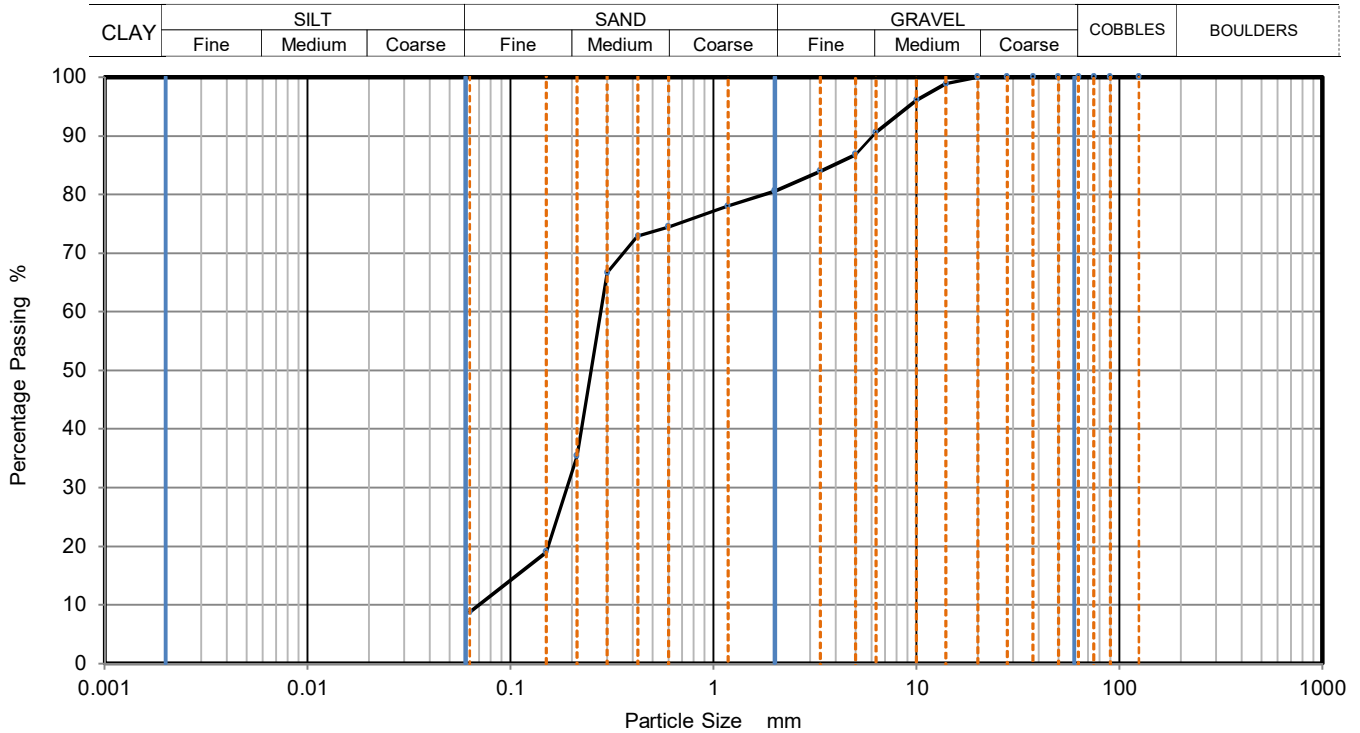




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey silty gravelly SAND. Gravel is of shell fragments.	Sample Depth (m)	35.00
		Sample Reference	B85



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	96		
6.3	91		
5	87		
3.35	84		
2	81		
1.18	78		
0.6	75		
0.425	73		
0.3	67		
0.212	35		
0.15	19		
0.063	9		

Sample Proportions	% dry mass
Very coarse	0
Gravel	19
Sand	72
Fines <0.063mm	9

Grading Analysis		
D100	mm	
D60	mm	0.279
D30	mm	0.189
D10	mm	0.070
Uniformity Coefficient		4
Curvature Coefficient		1.8

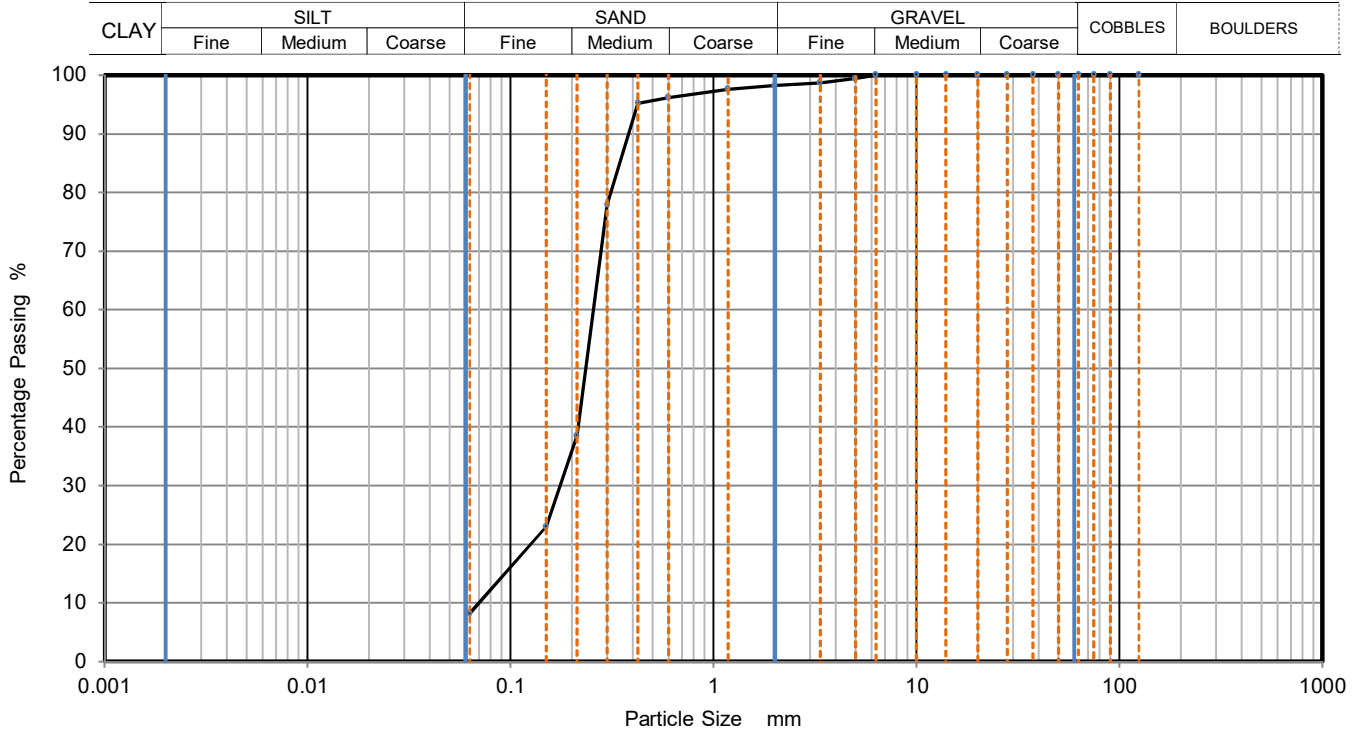
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Dark grey silty slightly gravelly SAND. Gravel is of shell fragments	Sample Depth (m)	37.00
		Sample Reference	B88



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	99		
2	98		
1.18	98		
0.6	96		
0.425	95		
0.3	78		
0.212	39		
0.15	23		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	90
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.256
D30	mm	0.175
D10	mm	0.070
Uniformity Coefficient		3.7
Curvature Coefficient		1.7

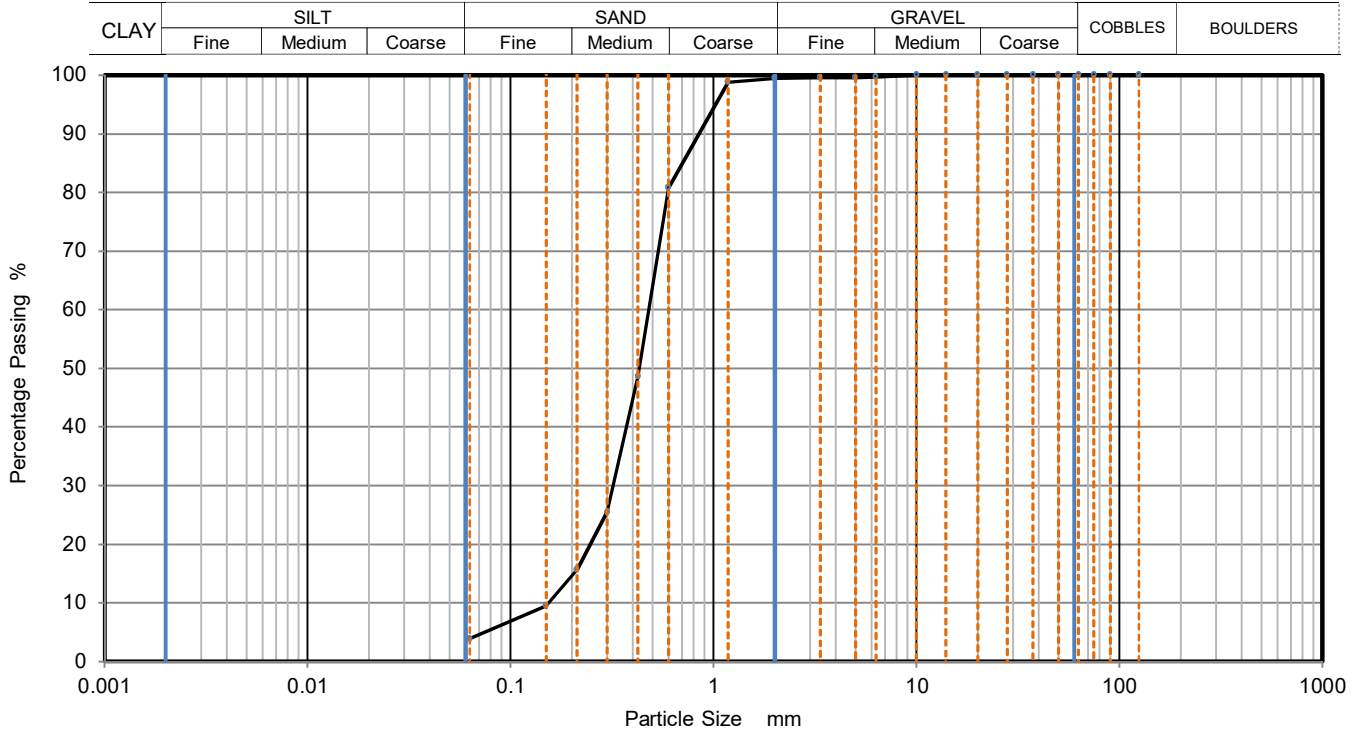
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Dark grey slightly silty slightly gravelly SAND. Gravel is of shell fragments.	Sample Depth (m)	41.00
		Sample Reference	B94



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	81		
0.425	49		
0.3	26		
0.212	16		
0.15	10		
0.063	4		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	96
Fines <0.063mm	4

Grading Analysis		
D100	mm	
D60	mm	0.480
D30	mm	0.321
D10	mm	0.154
Uniformity Coefficient		3.1
Curvature Coefficient		1.4

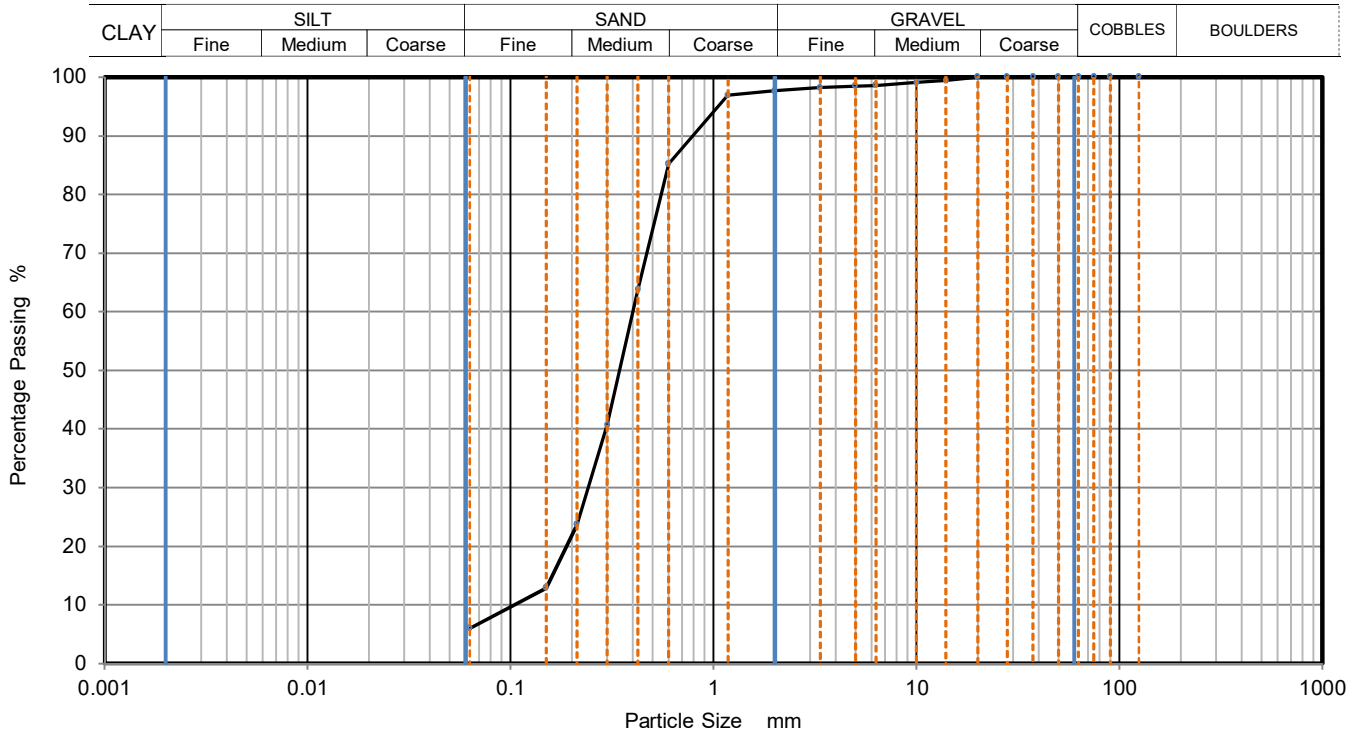
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Dark grey slightly silty slightly gravelly SAND. Gravel is of quartzite and shell fragments.	Sample Depth (m)	44.00
		Sample Reference	B99



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	99		
5	99		
3.35	98		
2	98		
1.18	97		
0.6	85		
0.425	64		
0.3	41		
0.212	24		
0.15	13		
0.063	6		

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	92
Fines <0.063mm	6

Grading Analysis		
D100	mm	
D60	mm	0.401
D30	mm	0.241
D10	mm	0.104
Uniformity Coefficient		3.9
Curvature Coefficient		1.4

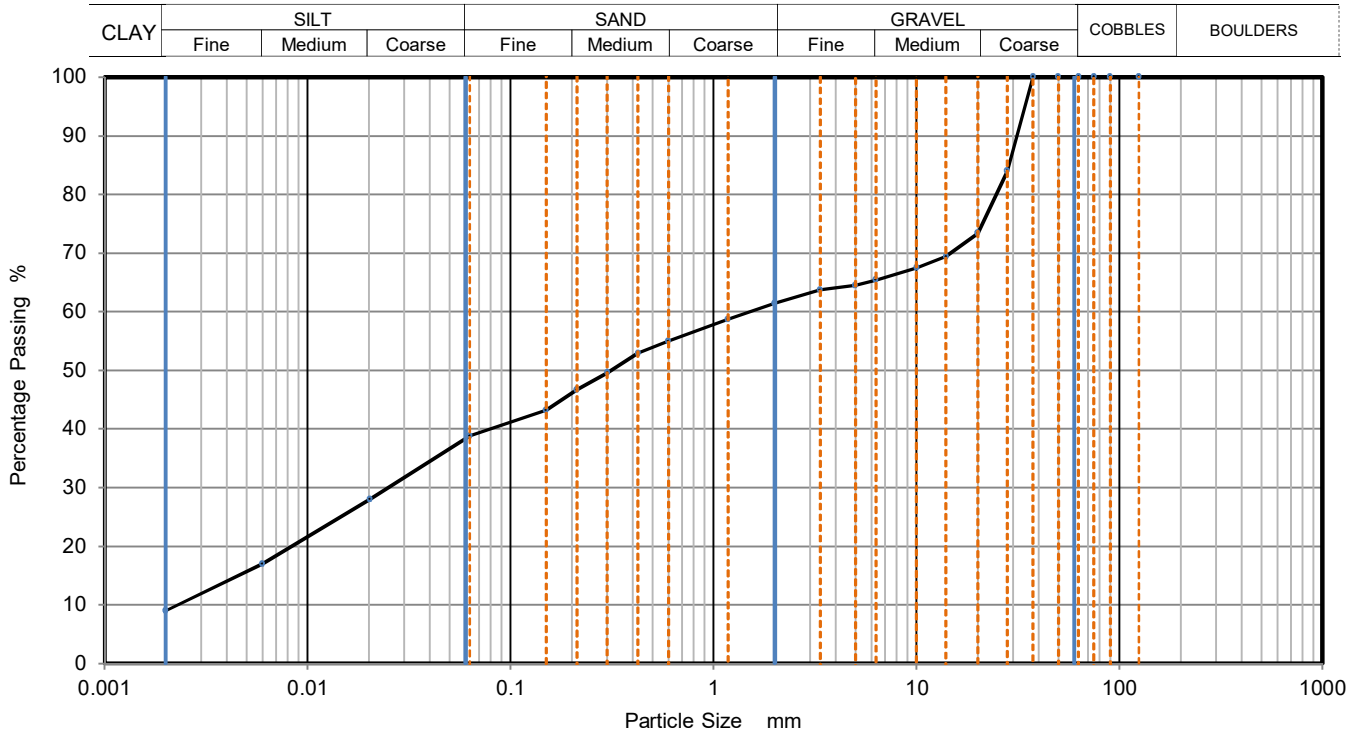
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey gravelly slightly sandy clayey SILT. Gravel is of flint	Sample Depth (m)	45.60
		Sample Reference	B100



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	28
90	100	0.0060	17
75	100	0.0020	9
63	100		
50	100		
37.5	100		
28	84		
20	73		
14	69		
10	68		
6.3	65		
5	65		
3.35	64		
2	61		
1.18	59		
0.6	55		
0.425	53	Particle density (assumed) 2.65 Mg/m3	
0.3	50		
0.212	47		
0.15	43		
0.063	39		

Sample Proportions	% dry mass
Very coarse	0
Gravel	39
Sand	23
Silt	30
Clay	9

Grading Analysis		
D100	mm	
D60	mm	1.530
D30	mm	0.025
D10	mm	0.002
Uniformity Coefficient		680
Curvature Coefficient		0.18

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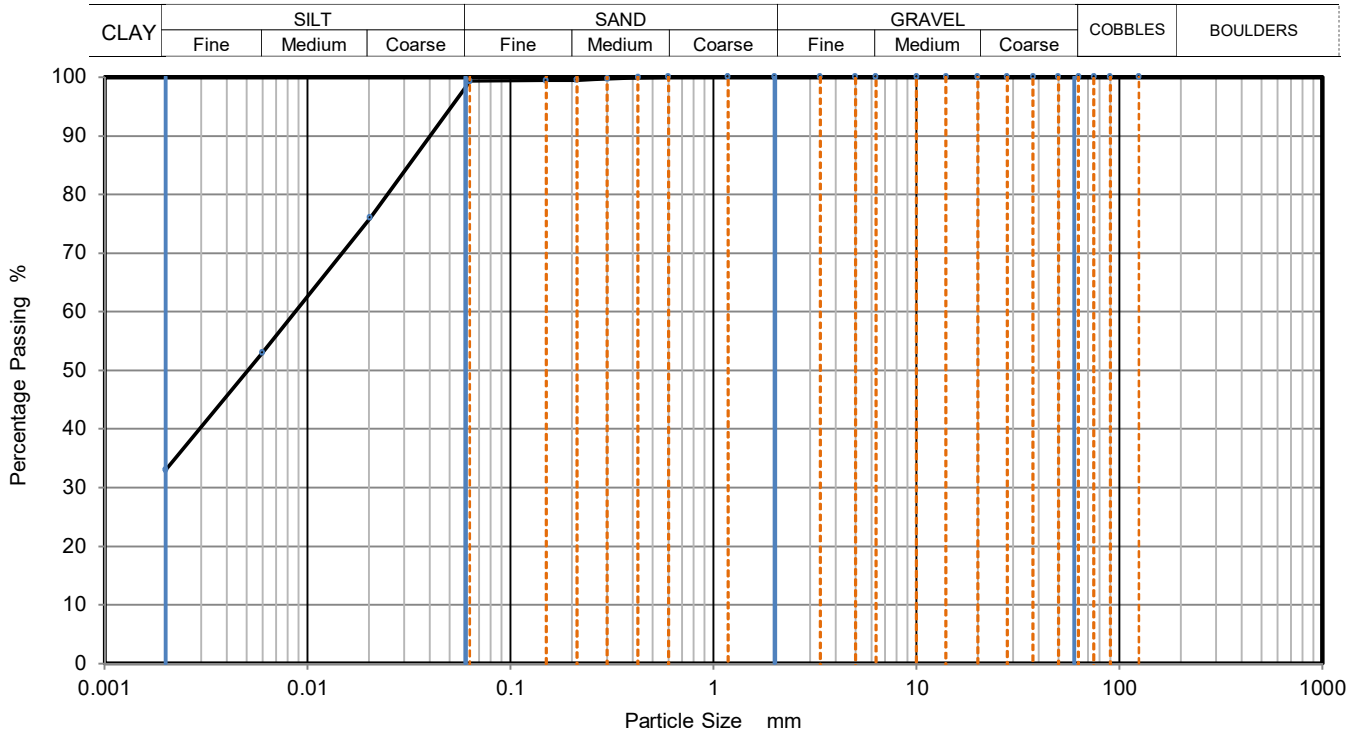




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Grey brown slightly sandy very silty CLAY	Sample Depth (m)	47.45
		Sample Reference	D104



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	76
90	100	0.0060	53
75	100	0.0020	33
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	100	Particle density (assumed) 2.65 Mg/m3	
0.3	100		
0.212	100		
0.15	99		
0.063	99		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	1
Silt	67
Clay	33

Grading Analysis		
D100	mm	
D60	mm	0.009
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

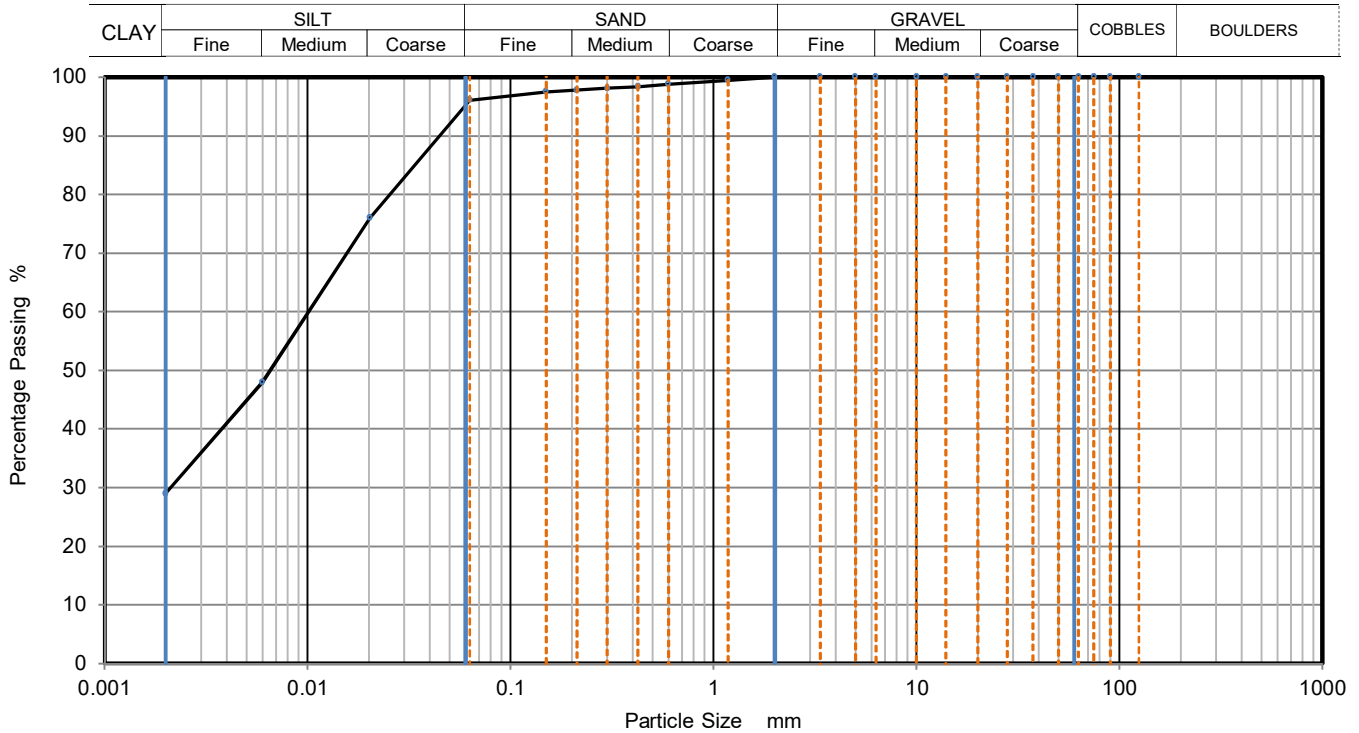
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Dark brown slightly sandy very silty CLAY.	Sample Depth (m)	50.00
		Sample Reference	D109



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	76
90	100	0.0060	48
75	100	0.0020	29
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	98		
0.3	98		
0.212	98		
0.15	98		
0.063	96		
		Particle density (assumed)	
		2.65	Mg/m3

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	4
Silt	67
Clay	29

Grading Analysis		
D100	mm	
D60	mm	0.010
D30	mm	0.002
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

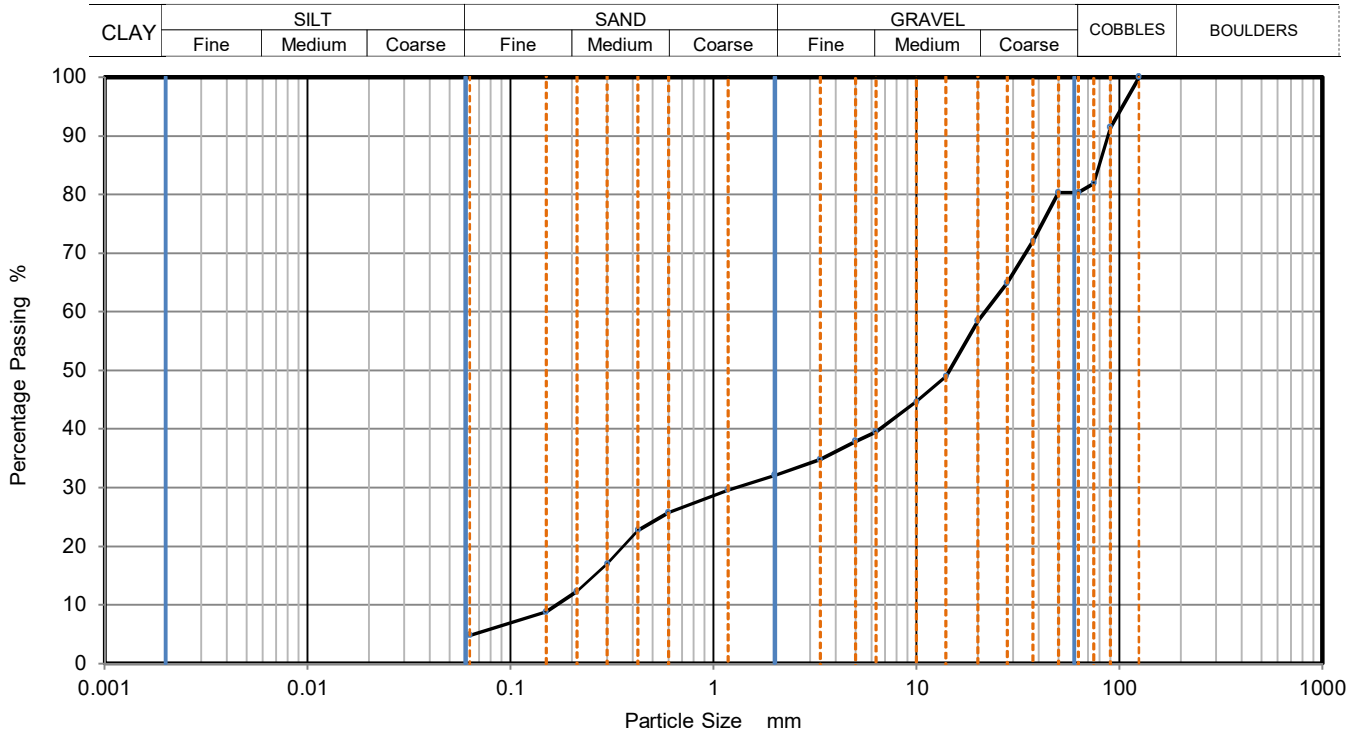
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	MADE GROUND (Dark brown slightly silty very sandy GRAVEL with high cobble content. Cobbles are of concrete fragments. Gravel is of flint, concrete and brick fragments)	Sample Depth (m)	0.50
		Sample Reference	B3



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	91		
75	82		
63	80		
50	80		
37.5	72		
28	65		
20	58		
14	49		
10	45		
6.3	40		
5	38		
3.35	35		
2	32		
1.18	30		
0.6	26		
0.425	23		
0.3	17		
0.212	12		
0.15	9		
0.063	5		

Sample Proportions	% dry mass
Very coarse	20
Gravel	48
Sand	27
Fines <0.063mm	5

Grading Analysis		
D100	mm	125.000
D60	mm	21.800
D30	mm	1.270
D10	mm	0.168
Uniformity Coefficient		130
Curvature Coefficient		0.44

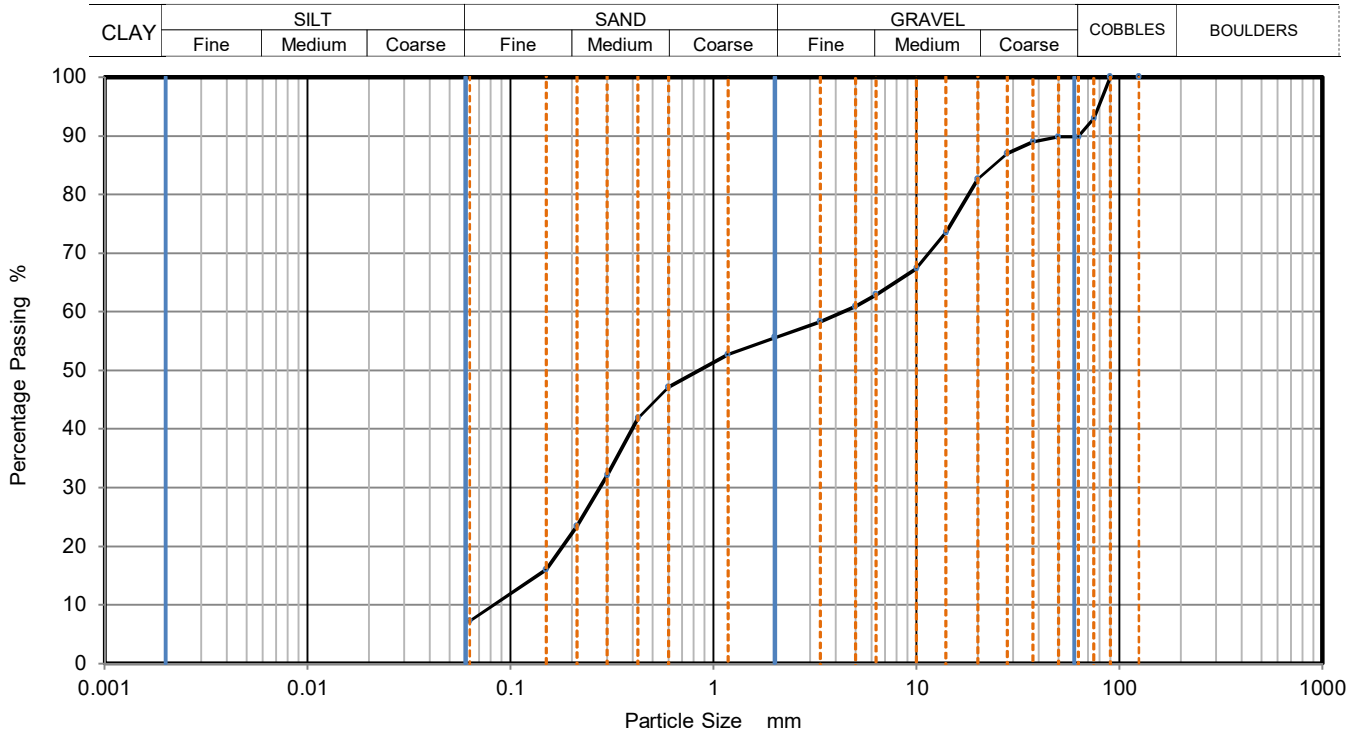
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	MADE GROUND (Brown silty very gravelly SAND with medium cobble content. Cobbles are of concrete fragments. Gravel is of flint, concrete, brick and slag fragments)	Sample Depth (m)	0.80
		Sample Reference	B6



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	93		
63	90		
50	90		
37.5	89		
28	87		
20	83		
14	74		
10	67		
6.3	63		
5	61		
3.35	58		
2	56		
1.18	53		
0.6	47		
0.425	42		
0.3	32		
0.212	23		
0.15	16		
0.063	7		

Sample Proportions	% dry mass
Very coarse	10
Gravel	34
Sand	49
Fines <0.063mm	7

Grading Analysis		
D100	mm	
D60	mm	4.380
D30	mm	0.276
D10	mm	0.083
Uniformity Coefficient		53
Curvature Coefficient		0.21

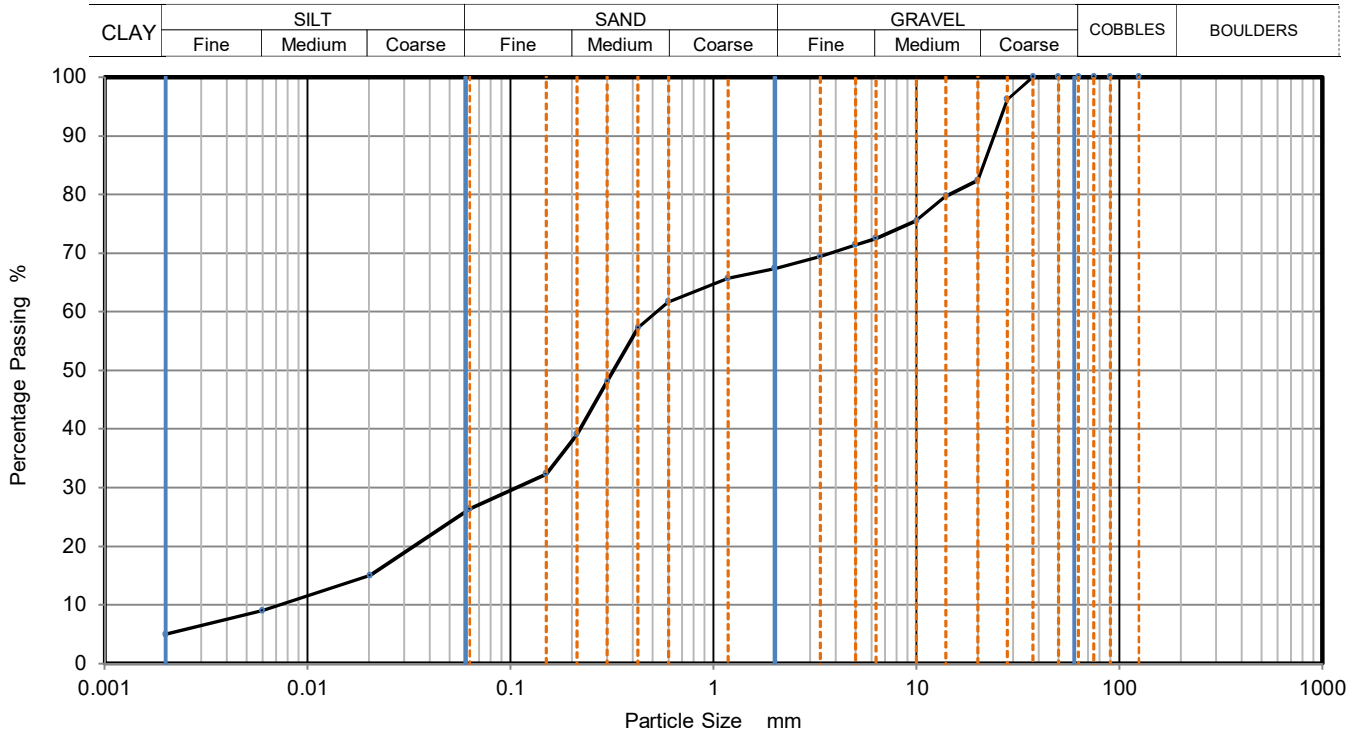
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	MADE GROUND (Brown and grey slightly clayey very silty very gravelly SAND. Gravel is of flint, chalk, shell, brick and concrete fragments)	Sample Depth (m)	1.00
		Sample Reference	B9



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	15
90	100	0.0060	9
75	100	0.0020	5
63	100		
50	100		
37.5	100		
28	96		
20	82		
14	80		
10	76		
6.3	73		
5	71		
3.35	69		
2	67		
1.18	66		
0.6	62		
0.425	57	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	48		
0.212	39		
0.15	32		
0.063	26		

Sample Proportions	% dry mass
Very coarse	0
Gravel	33
Sand	41
Silt	22
Clay	5

Grading Analysis		
D100	mm	
D60	mm	0.527
D30	mm	0.106
D10	mm	0.007
Uniformity Coefficient		73
Curvature Coefficient		3

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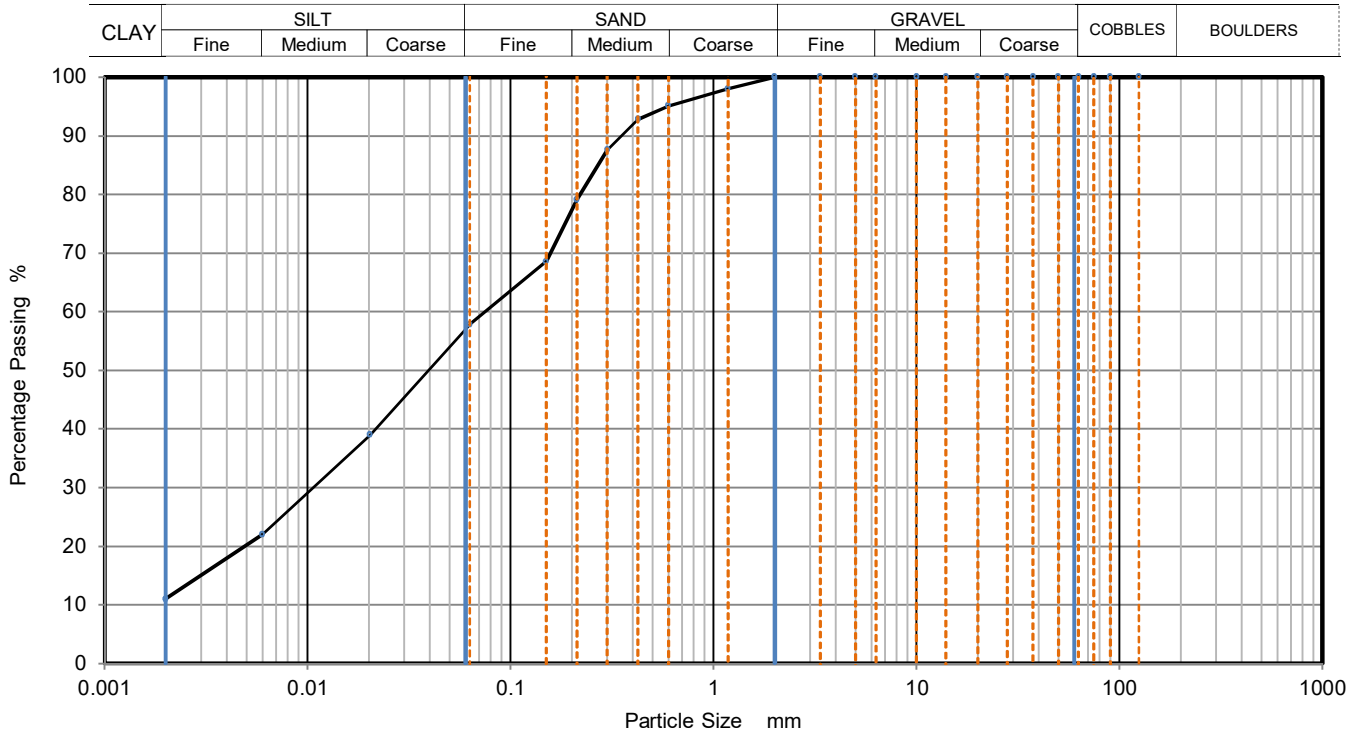




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey and brown sandy clayey SILT	Sample Depth (m)	1.00
		Sample Reference	D8



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	39
90	100	0.0060	22
75	100	0.0020	11
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	98		
0.6	95		
0.425	93	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	88		
0.212	79		
0.15	69		
0.063	58		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	42
Silt	47
Clay	11

Grading Analysis		
D100	mm	
D60	mm	0.075
D30	mm	0.011
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

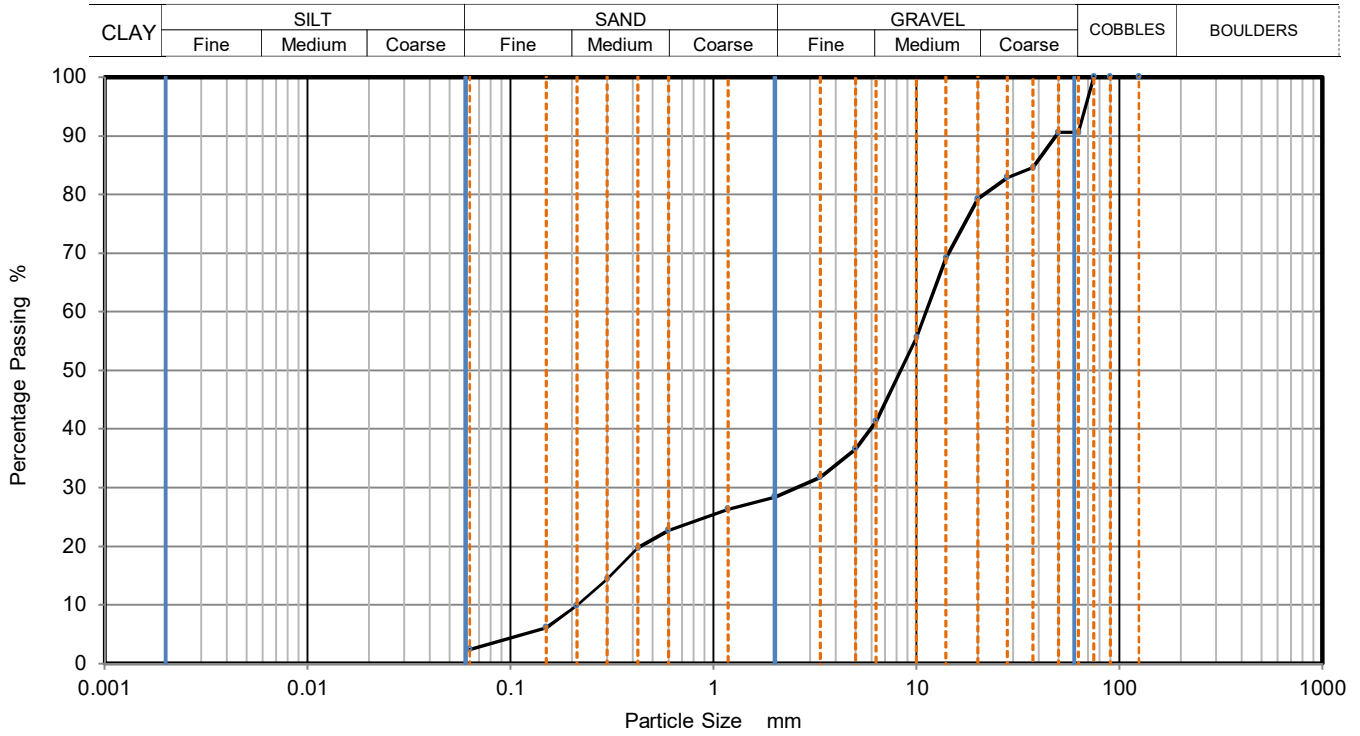
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	MADE GROUND (Dark brown slightly silty very sandy GRAVEL with medium cobble content. Cobbles are of concrete fragments. Gravel is of flint, quartz, concrete and asphalt fragments)	Sample Depth (m)	1.30
		Sample Reference	B11



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	91		
50	91		
37.5	85		
28	83		
20	79		
14	69		
10	56		
6.3	41		
5	37		
3.35	32		
2	28		
1.18	26		
0.6	23		
0.425	20		
0.3	14		
0.212	10		
0.15	6		
0.063	2		

Sample Proportions	% dry mass
Very coarse	9
Gravel	62
Sand	26
Fines <0.063mm	2

Grading Analysis		
D100	mm	
D60	mm	11.200
D30	mm	2.540
D10	mm	0.214
Uniformity Coefficient		52
Curvature Coefficient		2.7

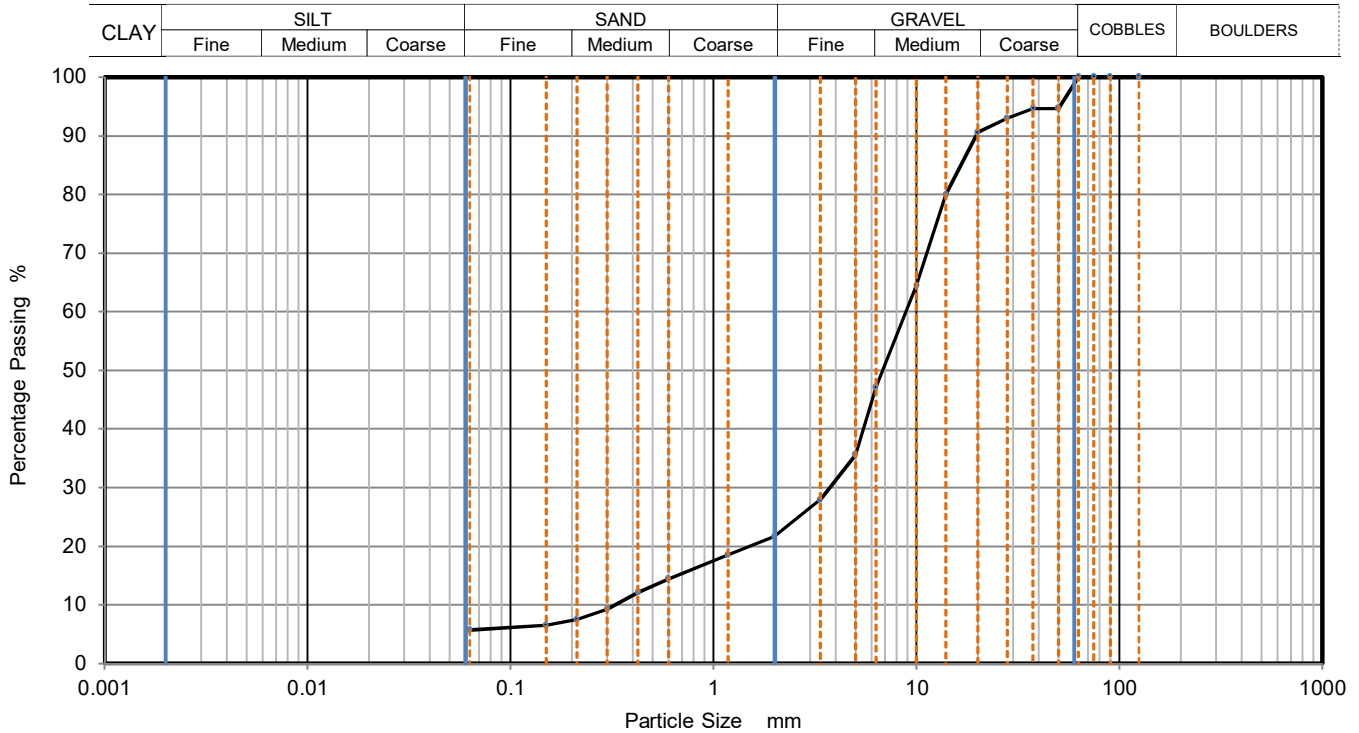
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	MADE GROUND (Dark brown slightly silty sandy GRAVEL. Gravel is of flint, quartz and brick fragments)	Sample Depth (m)	2.00
		Sample Reference	B14



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	95		
37.5	95		
28	93		
20	91		
14	80		
10	65		
6.3	47		
5	36		
3.35	28		
2	22		
1.18	19		
0.6	14		
0.425	12		
0.3	9		
0.212	8		
0.15	7		
0.063	6		

Sample Proportions	% dry mass
Very coarse	0
Gravel	78
Sand	16
Fines <0.063mm	6

Grading Analysis		
D100	mm	
D60	mm	8.880
D30	mm	3.730
D10	mm	0.328
Uniformity Coefficient		27
Curvature Coefficient		4.8

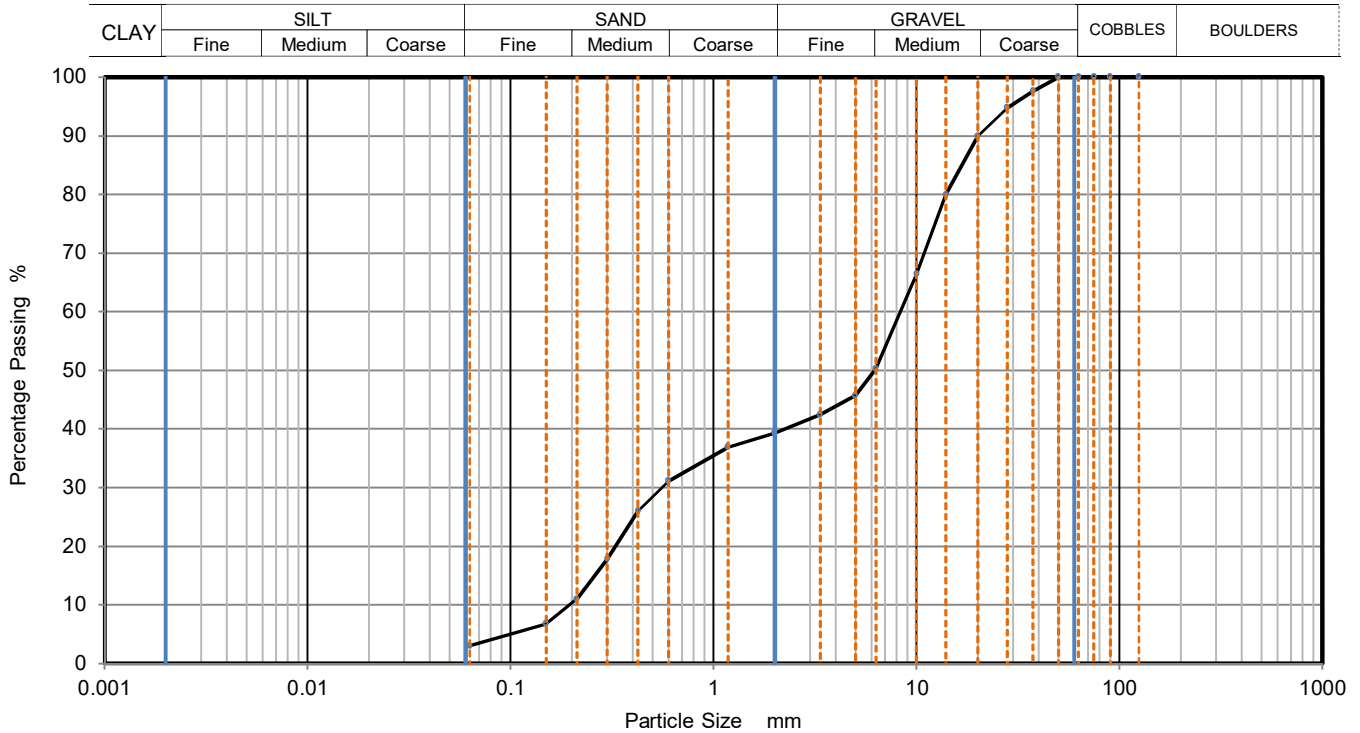
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark brown slightly silty very sandy GRAVEL. Gravel is of flint, quartz, shell and wood fragments.	Sample Depth (m)	3.00
		Sample Reference	B17



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	98		
28	95		
20	90		
14	80		
10	66		
6.3	50		
5	46		
3.35	42		
2	39		
1.18	37		
0.6	31		
0.425	26		
0.3	18		
0.212	11		
0.15	7		
0.063	3		

Sample Proportions	% dry mass
Very coarse	0
Gravel	61
Sand	36
Fines <0.063mm	3

Grading Analysis		
D100	mm	
D60	mm	8.320
D30	mm	0.557
D10	mm	0.195
Uniformity Coefficient		43
Curvature Coefficient		0.19

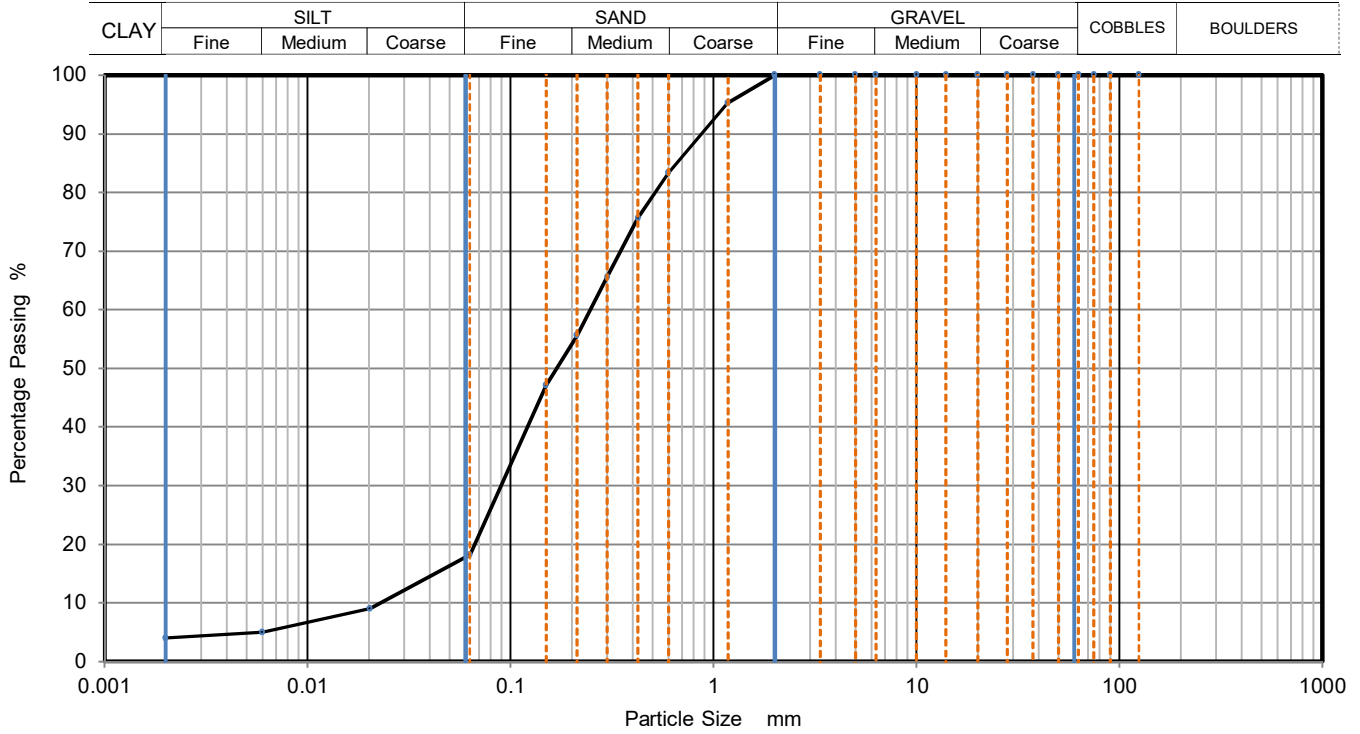
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey brown slightly clayey silty SAND	Sample Depth (m)	4.00
		Sample Reference	D19



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	9
90	100	0.0060	5
75	100	0.0020	4
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	95		
0.6	83		
0.425	76	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	66		
0.212	56		
0.15	47		
0.063	18		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	82
Silt	14
Clay	4

Grading Analysis		
D100	mm	
D60	mm	0.247
D30	mm	0.090
D10	mm	0.024
Uniformity Coefficient		10
Curvature Coefficient		1.4

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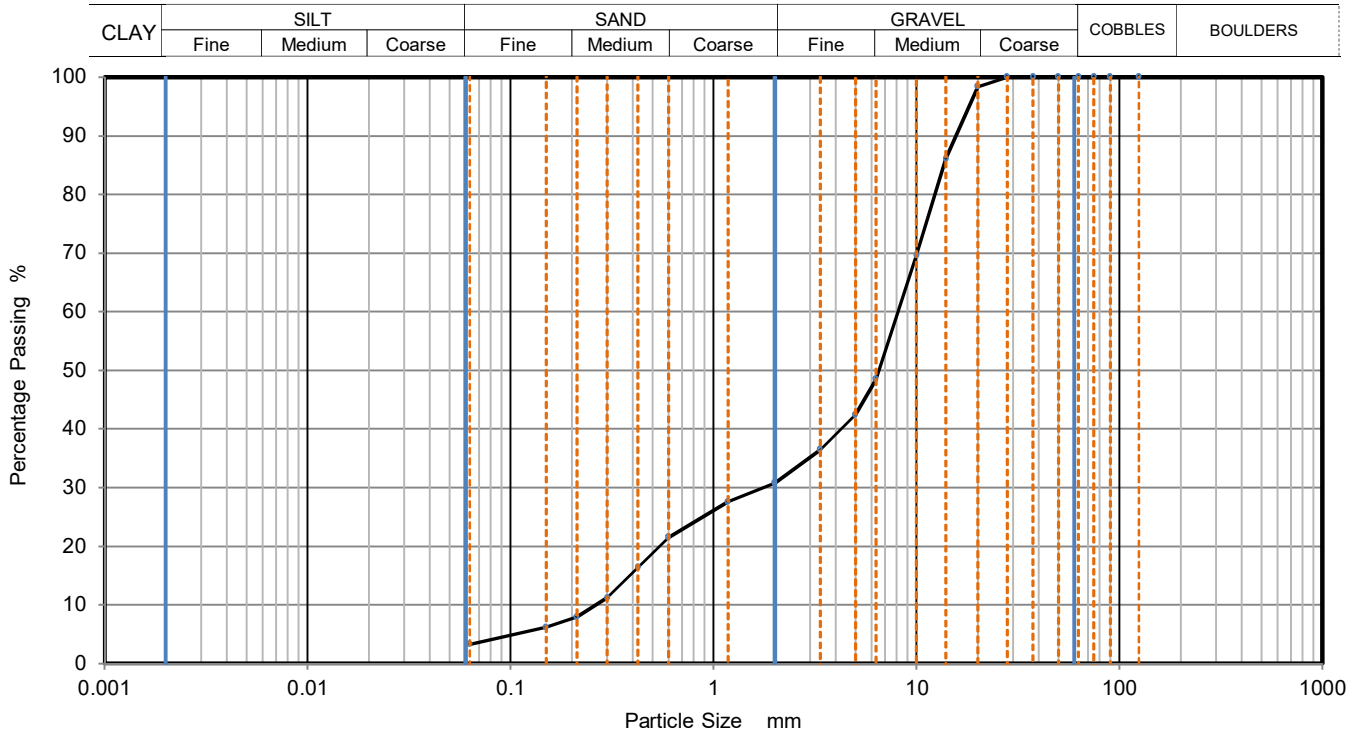




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark brown slightly silty very sandy GRAVEL. Gravel is of flint, quartz and shell fragments.	Sample Depth (m)	4.30
		Sample Reference	B21



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	98		
14	86		
10	70		
6.3	49		
5	42		
3.35	37		
2	31		
1.18	28		
0.6	22		
0.425	16		
0.3	11		
0.212	8		
0.15	6		
0.063	3		

Sample Proportions	% dry mass
Very coarse	0
Gravel	69
Sand	28
Fines <0.063mm	3

Grading Analysis		
D100	mm	
D60	mm	8.110
D30	mm	1.760
D10	mm	0.265
Uniformity Coefficient		31
Curvature Coefficient		1.4

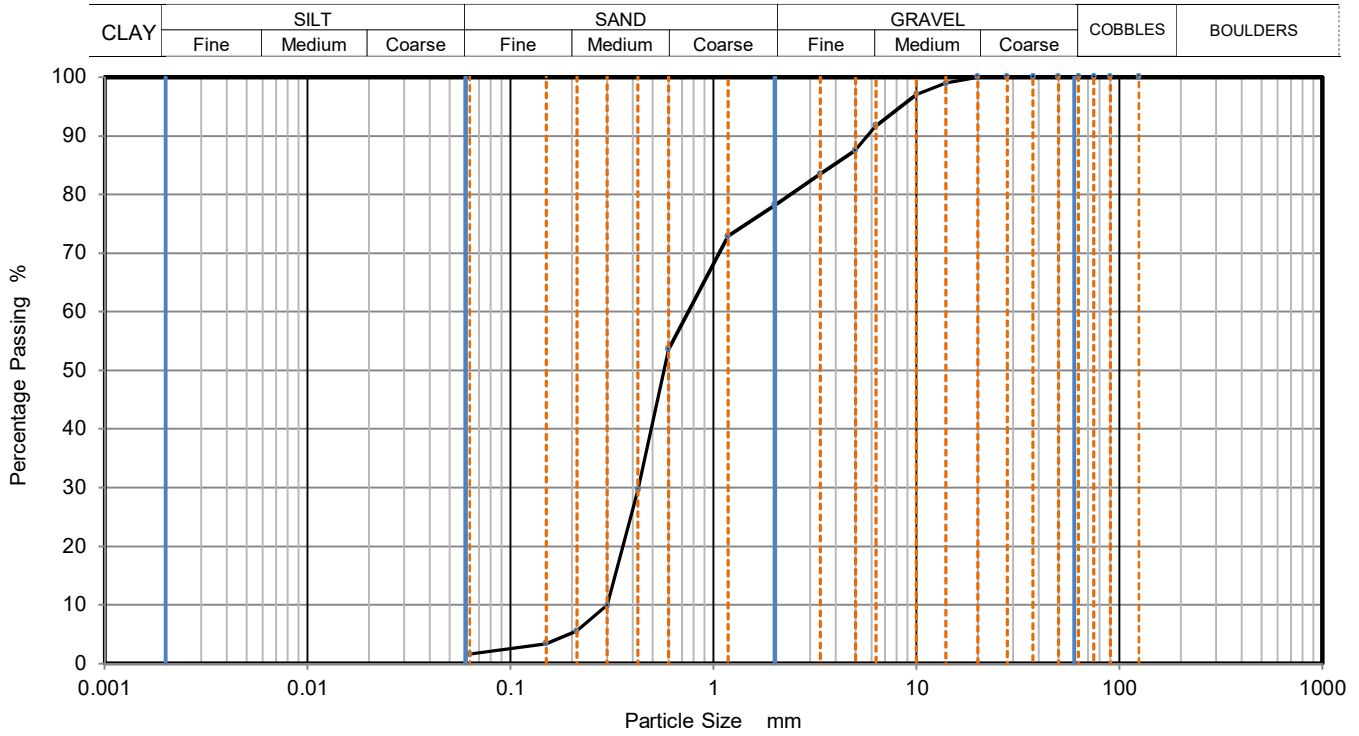
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Brown and dark grey slightly silty very gravelly SAND. Gravel is of flint and quartz.	Sample Depth (m)	6.00
		Sample Reference	B27



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	97		
6.3	92		
5	88		
3.35	84		
2	78		
1.18	73		
0.6	54		
0.425	30		
0.3	10		
0.212	6		
0.15	3		
0.063	2		

Sample Proportions	% dry mass
Very coarse	0
Gravel	22
Sand	77
Fines <0.063mm	2

Grading Analysis		
D100	mm	
D60	mm	0.750
D30	mm	0.427
D10	mm	0.300
Uniformity Coefficient		2.5
Curvature Coefficient		0.81

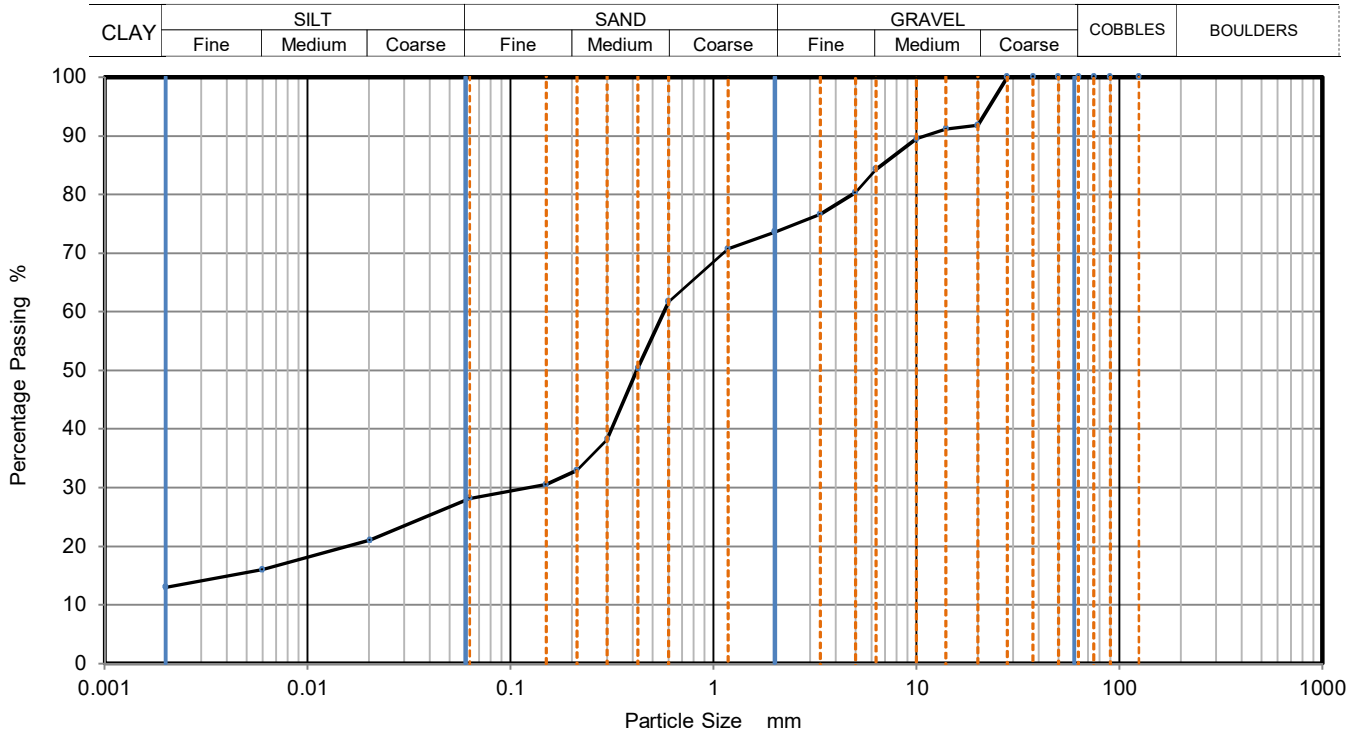
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Brown and grey clayey silty very gravelly SAND. Gravel is of flint and shell fragments.	Sample Depth (m)	7.00
		Sample Reference	B30



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	21
90	100	0.0060	16
75	100	0.0020	13
63	100		
50	100		
37.5	100		
28	100		
20	92		
14	91		
10	90		
6.3	84		
5	80		
3.35	77		
2	74		
1.18	71		
0.6	62		
0.425	50	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	38		
0.212	33		
0.15	31		
0.063	28		

Sample Proportions	% dry mass
Very coarse	0
Gravel	26
Sand	45
Silt	16
Clay	13

Grading Analysis		
D100	mm	
D60	mm	0.569
D30	mm	0.123
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

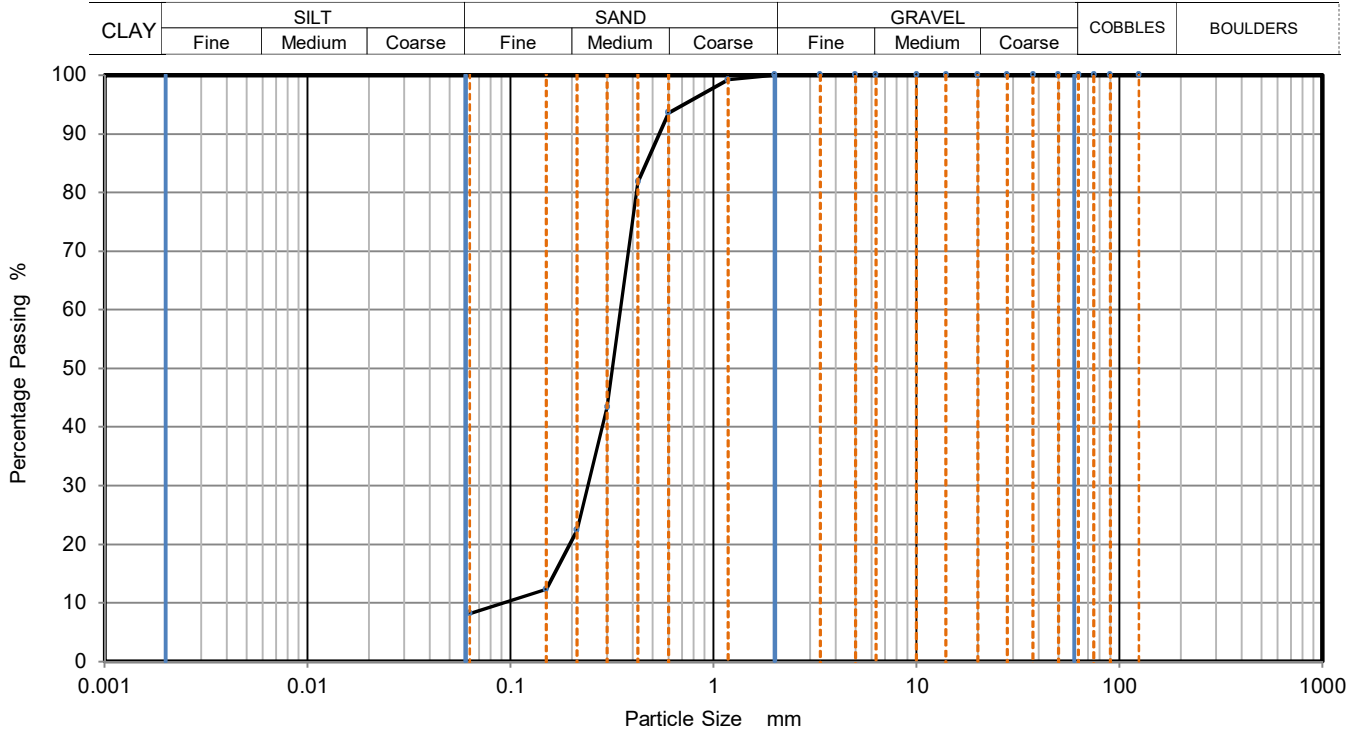
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey brown silty SAND	Sample Depth (m)	8.00
		Sample Reference	B35



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	94		
0.425	82		
0.3	43		
0.212	22		
0.15	12		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	92
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.349
D30	mm	0.240
D10	mm	0.092
Uniformity Coefficient		3.8
Curvature Coefficient		1.8

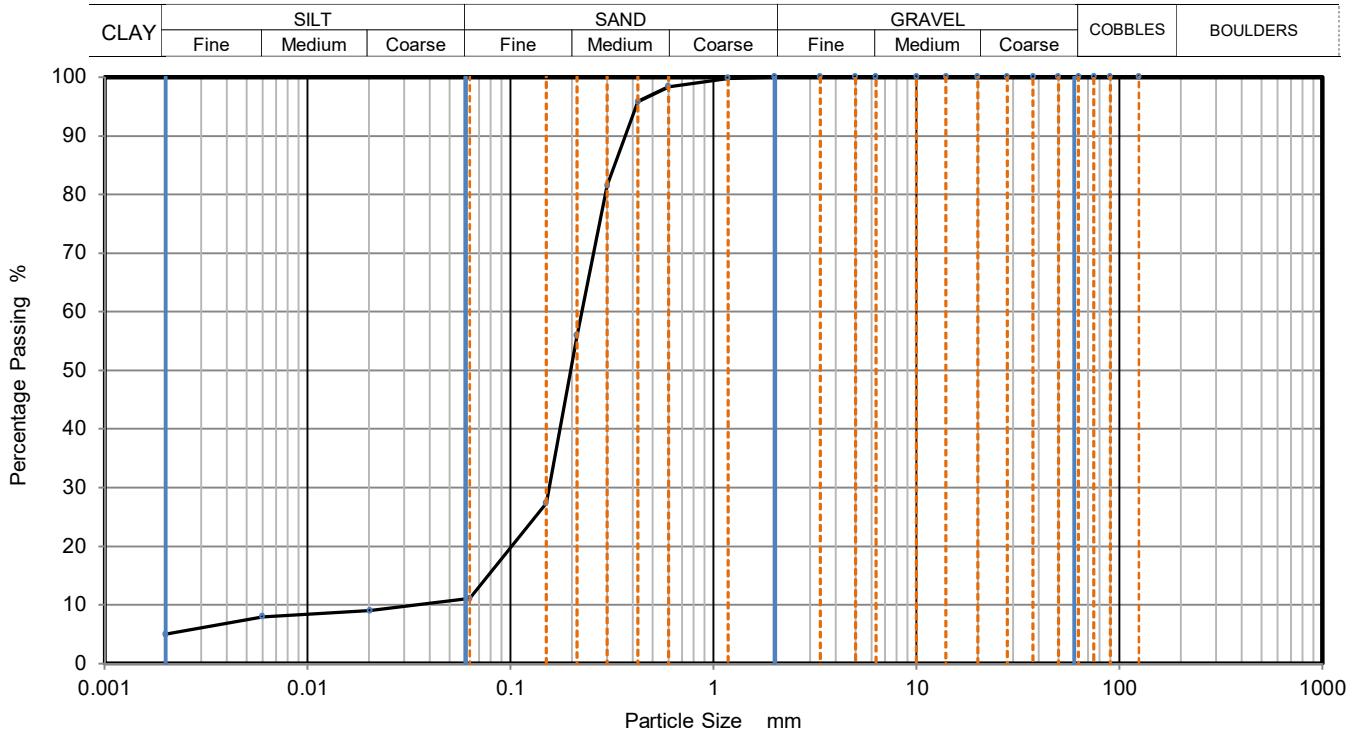
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey and brown slightly clayey silty SAND.	Sample Depth (m)	10.00
		Sample Reference	B41



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	9
90	100	0.0060	8
75	100	0.0020	5
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98	Particle density (assumed)	
0.425	96	2.65	Mg/m3
0.3	82		
0.212	56		
0.15	27		
0.063	11		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	89
Silt	6
Clay	5

Grading Analysis		
D100	mm	
D60	mm	0.224
D30	mm	0.155
D10	mm	0.037
Uniformity Coefficient		6
Curvature Coefficient		2.9

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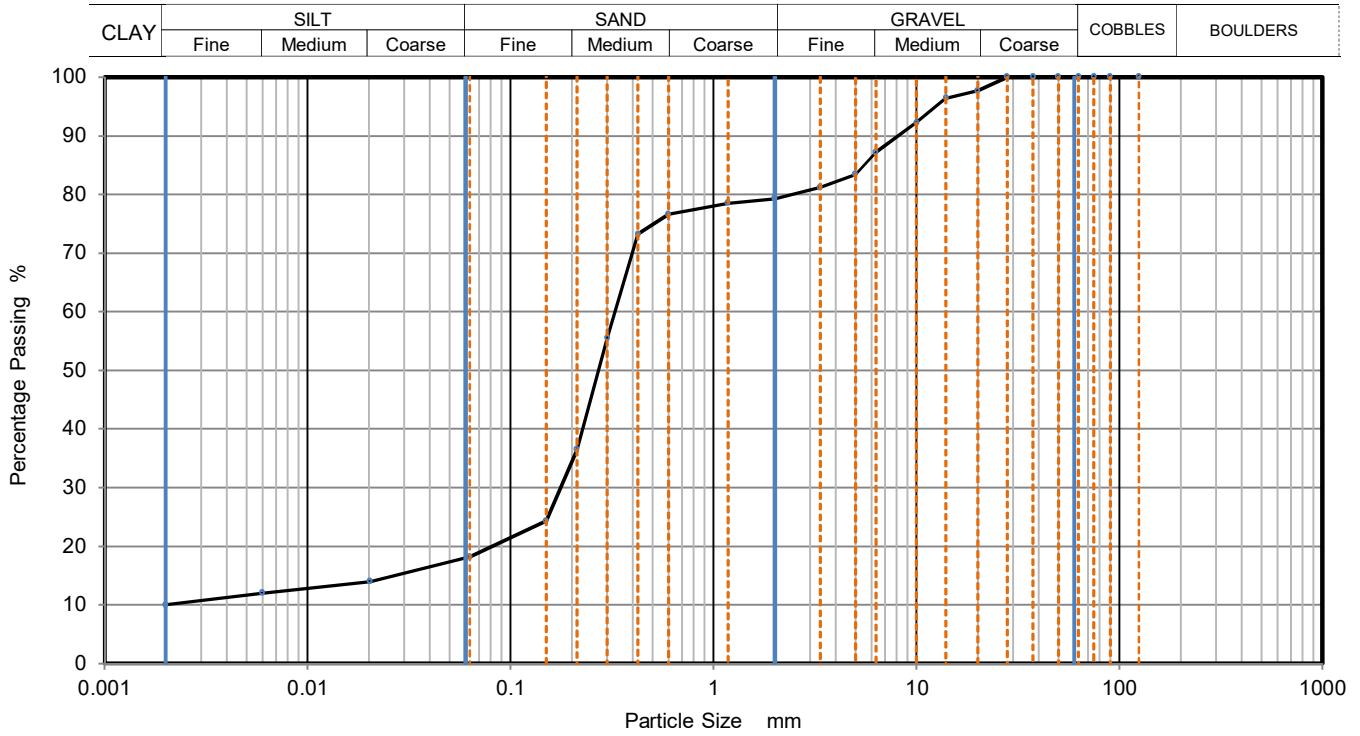




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Brown mottled dark grey clayey silty very gravelly SAND. Gravel is of flint and siltstone.	Sample Depth (m)	12.00
		Sample Reference	B46



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	14
90	100	0.0060	12
75	100	0.0020	10
63	100		
50	100		
37.5	100		
28	100		
20	98		
14	96		
10	92		
6.3	87		
5	83		
3.35	81		
2	79		
1.18	79		
0.6	77		
0.425	73	Particle density (assumed)	
0.3	56	2.65	Mg/m3
0.212	37		
0.15	24		
0.063	18		

Sample Proportions	% dry mass
Very coarse	0
Gravel	21
Sand	61
Silt	9
Clay	10

Grading Analysis		
D100	mm	
D60	mm	0.328
D30	mm	0.176
D10	mm	0.002
Uniformity Coefficient		140
Curvature Coefficient		40

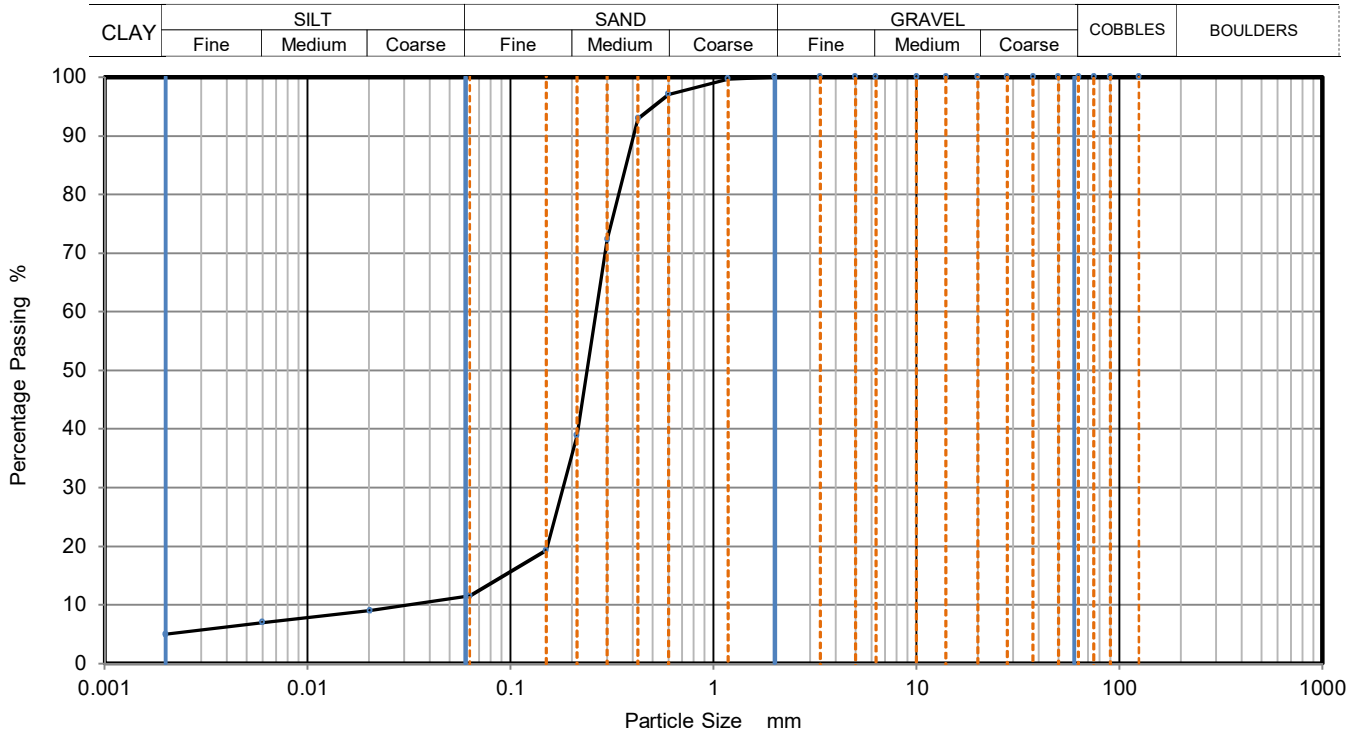
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Orange brown clayey silty SAND.	Sample Depth (m)	15.00
		Sample Reference	B53



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	9
90	100	0.0060	7
75	100	0.0020	5
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	97	Particle density (assumed)	
0.425	93	2.65	Mg/m3
0.3	72		
0.212	39		
0.15	19		
0.063	12		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	89
Silt	6
Clay	6

Grading Analysis		
D100	mm	
D60	mm	0.264
D30	mm	0.181
D10	mm	0.030
Uniformity Coefficient		8.8
Curvature Coefficient		4.1

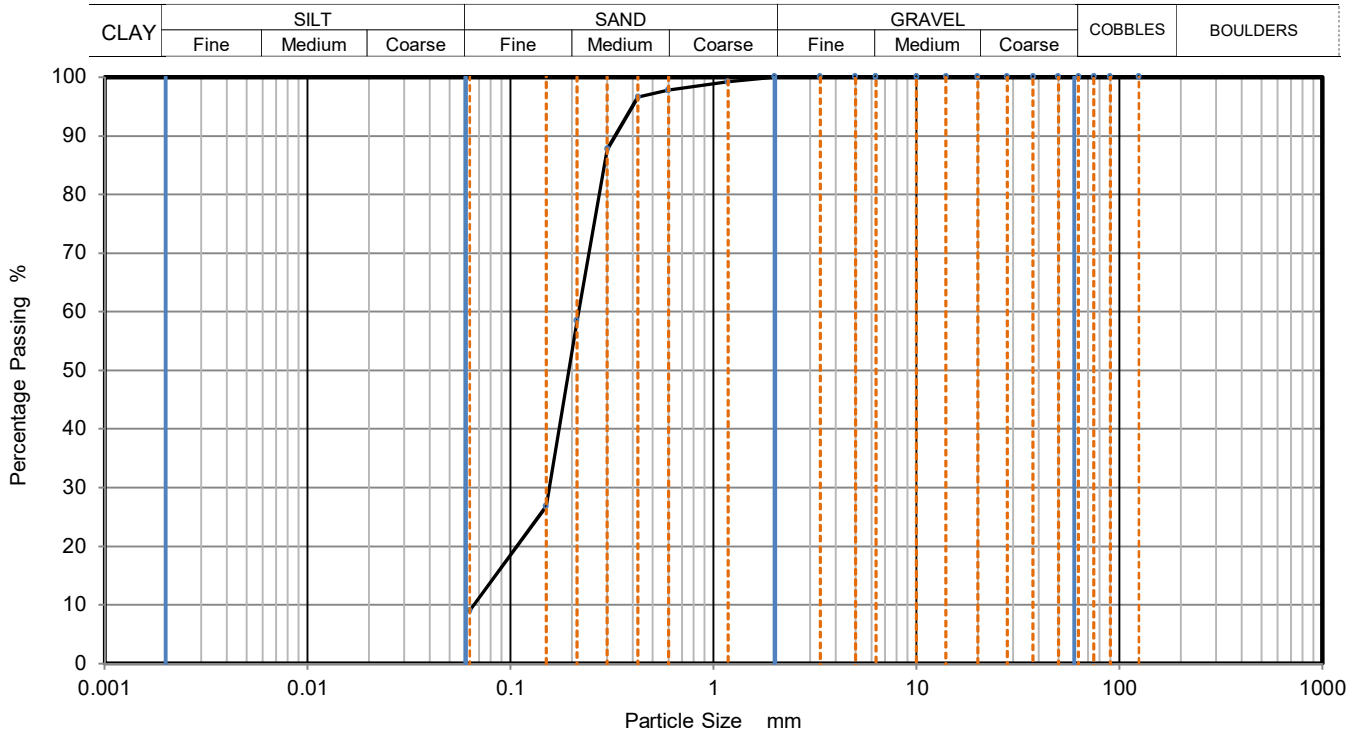
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey brown silty SAND.	Sample Depth (m)	17.00
		Sample Reference	B57



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	98		
0.425	97		
0.3	88		
0.212	58		
0.15	27		
0.063	9		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	91
Fines <0.063mm	9

Grading Analysis		
D100	mm	
D60	mm	0.216
D30	mm	0.155
D10	mm	0.066
Uniformity Coefficient		3.3
Curvature Coefficient		1.7

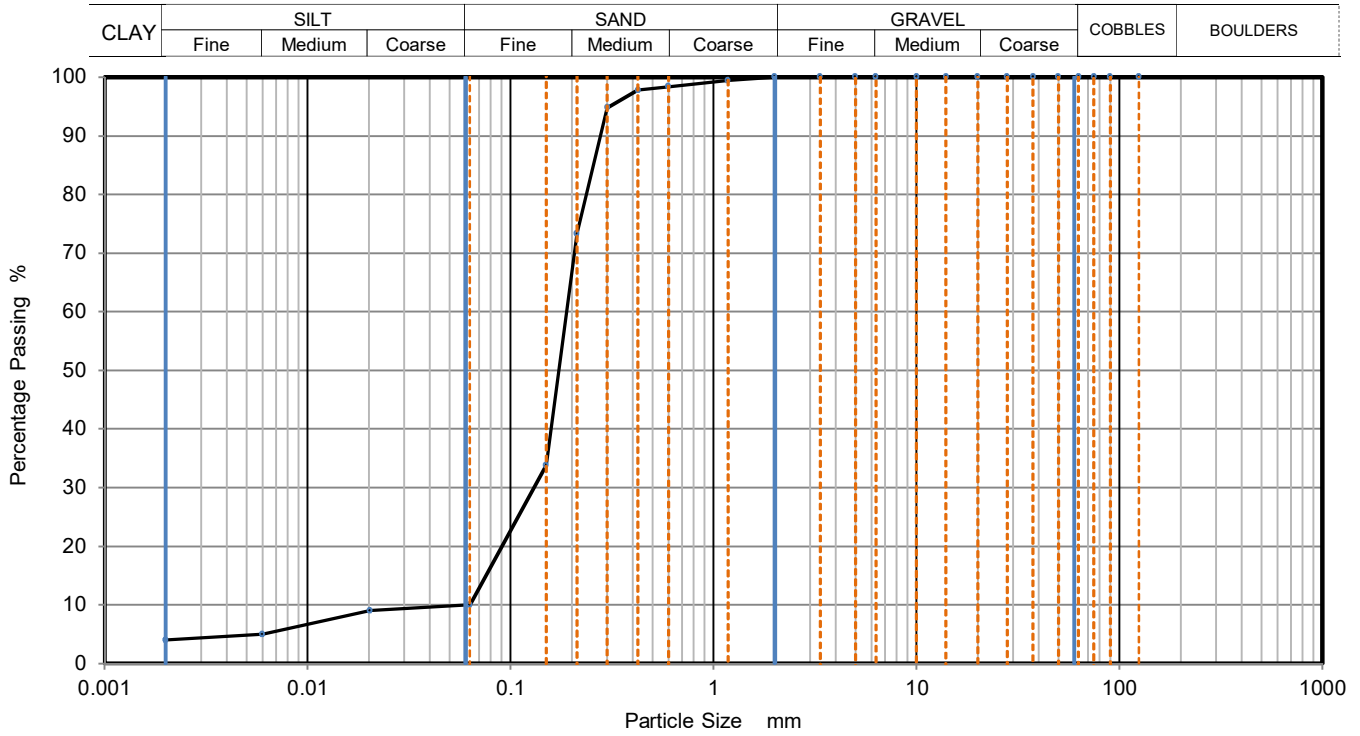
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey brown slightly clayey silty SAND.	Sample Depth (m)	20.00
		Sample Reference	B64



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	9
90	100	0.0060	5
75	100	0.0020	4
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	98		
0.425	98	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	95		
0.212	73		
0.15	34		
0.063	10		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	90
Silt	6
Clay	4

Grading Analysis		
D100	mm	
D60	mm	0.189
D30	mm	0.131
D10	mm	0.062
Uniformity Coefficient		3
Curvature Coefficient		1.5

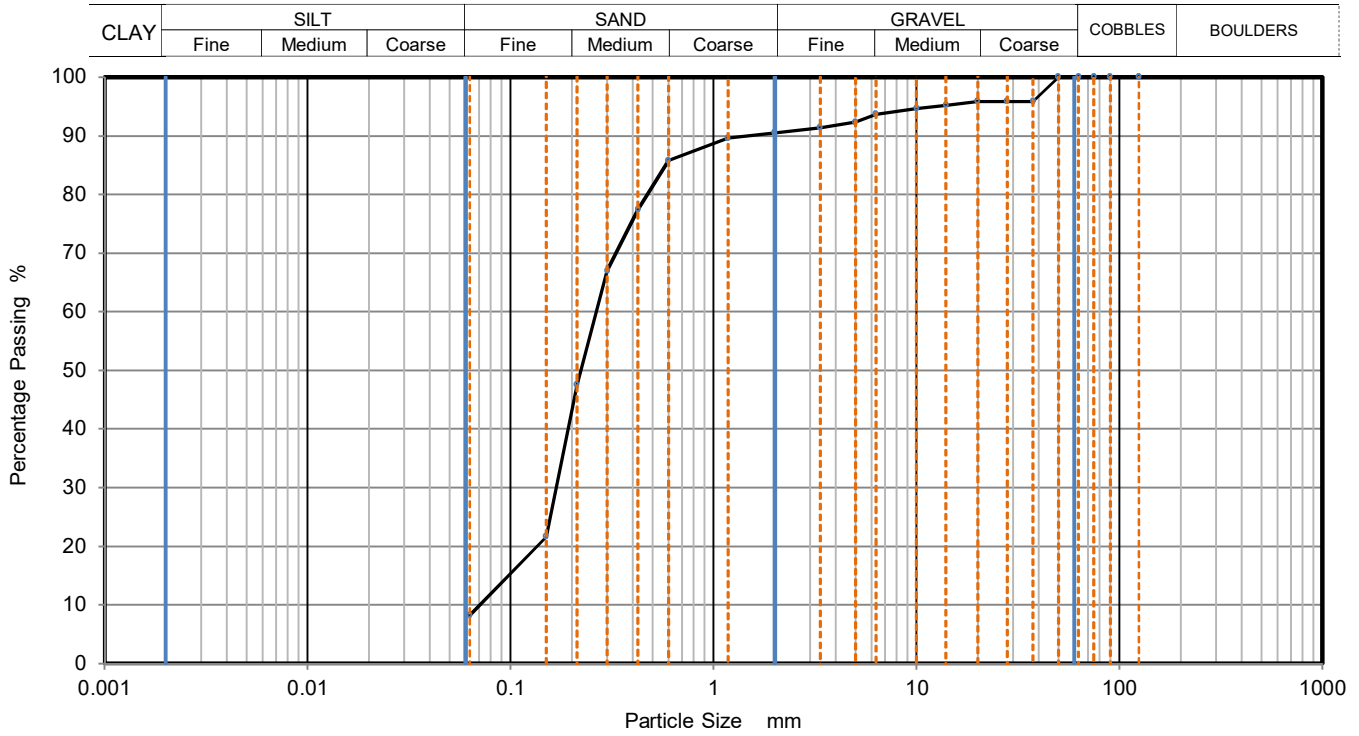
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Orange brown and grey brown silty gravelly SAND. Gravel is of flint, sandstone and shell fragments.	Sample Depth (m)	21.00
		Sample Reference	B65



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	96		
28	96		
20	96		
14	95		
10	95		
6.3	94		
5	92		
3.35	91		
2	91		
1.18	90		
0.6	86		
0.425	77		
0.3	67		
0.212	48		
0.15	22		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	10
Sand	82
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.265
D30	mm	0.168
D10	mm	0.071
Uniformity Coefficient		3.7
Curvature Coefficient		1.5

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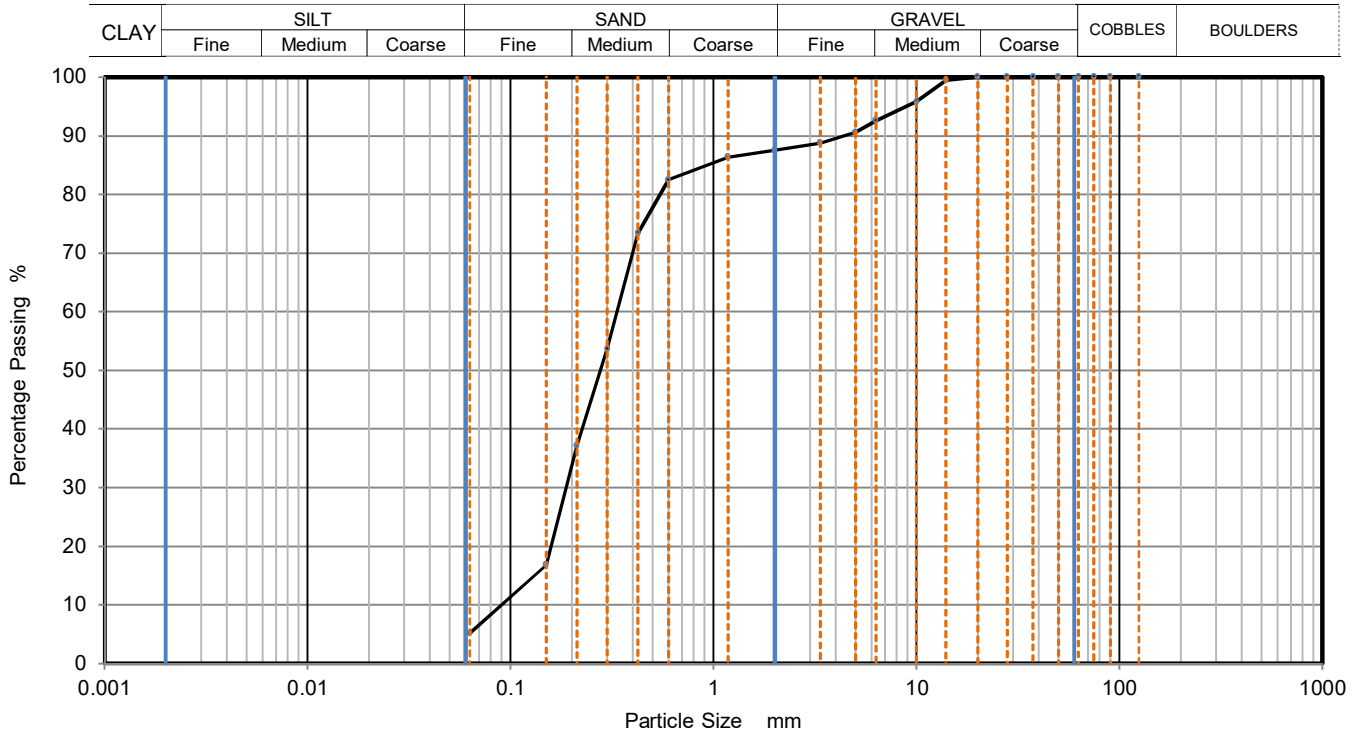




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey brown slightly silty gravelly SAND. Gravel is of flint, sandstone and shell fragments.	Sample Depth (m)	22.00
		Sample Reference	B67



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	96		
6.3	93		
5	91		
3.35	89		
2	88		
1.18	86		
0.6	83		
0.425	73		
0.3	54		
0.212	37		
0.15	17		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	13
Sand	82
Fines <0.063mm	5

Grading Analysis		
D100	mm	
D60	mm	0.336
D30	mm	0.187
D10	mm	0.090
Uniformity Coefficient		3.7
Curvature Coefficient		1.2

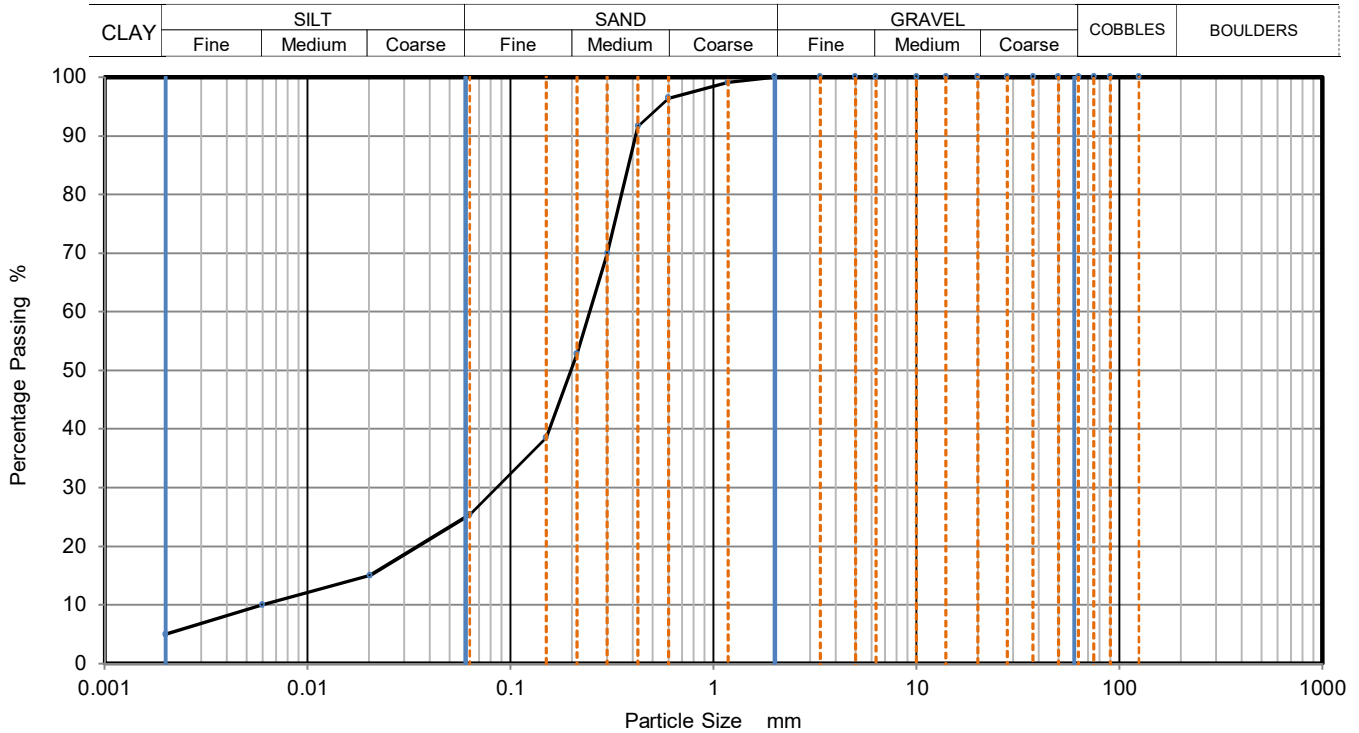
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey slightly clayey very silty SAND.	Sample Depth (m)	23.00
		Sample Reference	B69



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	15
90	100	0.0060	10
75	100	0.0020	5
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	96		
0.425	92	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	70		
0.212	53		
0.15	39		
0.063	25		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	75
Silt	21
Clay	5

Grading Analysis		
D100	mm	
D60	mm	0.246
D30	mm	0.086
D10	mm	0.006
Uniformity Coefficient		41
Curvature Coefficient		5

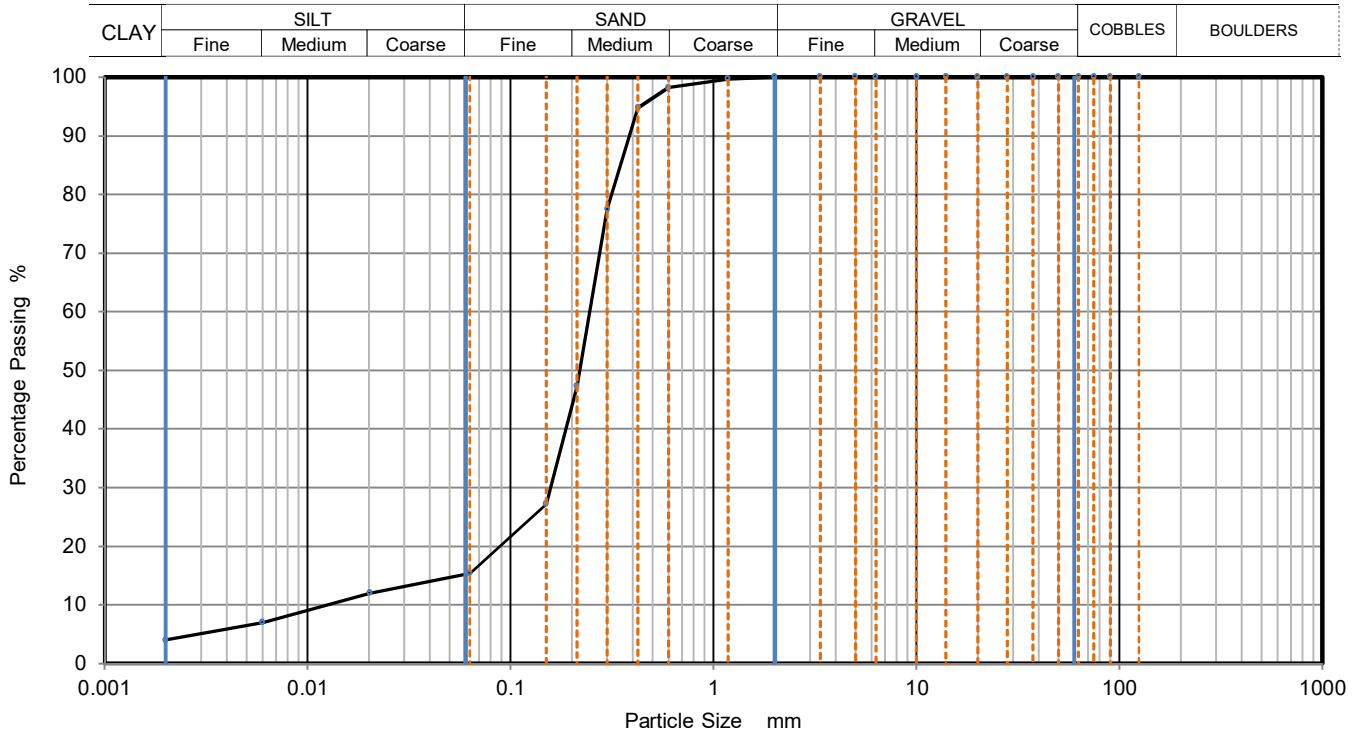
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey slightly clayey silty SAND.	Sample Depth (m)	27.00
		Sample Reference	B75



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	12
90	100	0.0060	7
75	100	0.0020	4
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98	Particle density (assumed)	
0.425	95	2.65	Mg/m3
0.3	78		
0.212	47		
0.15	27		
0.063	15		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	85
Silt	12
Clay	4

Grading Analysis		
D100	mm	
D60	mm	0.245
D30	mm	0.157
D10	mm	0.012
Uniformity Coefficient		21
Curvature Coefficient		8.6

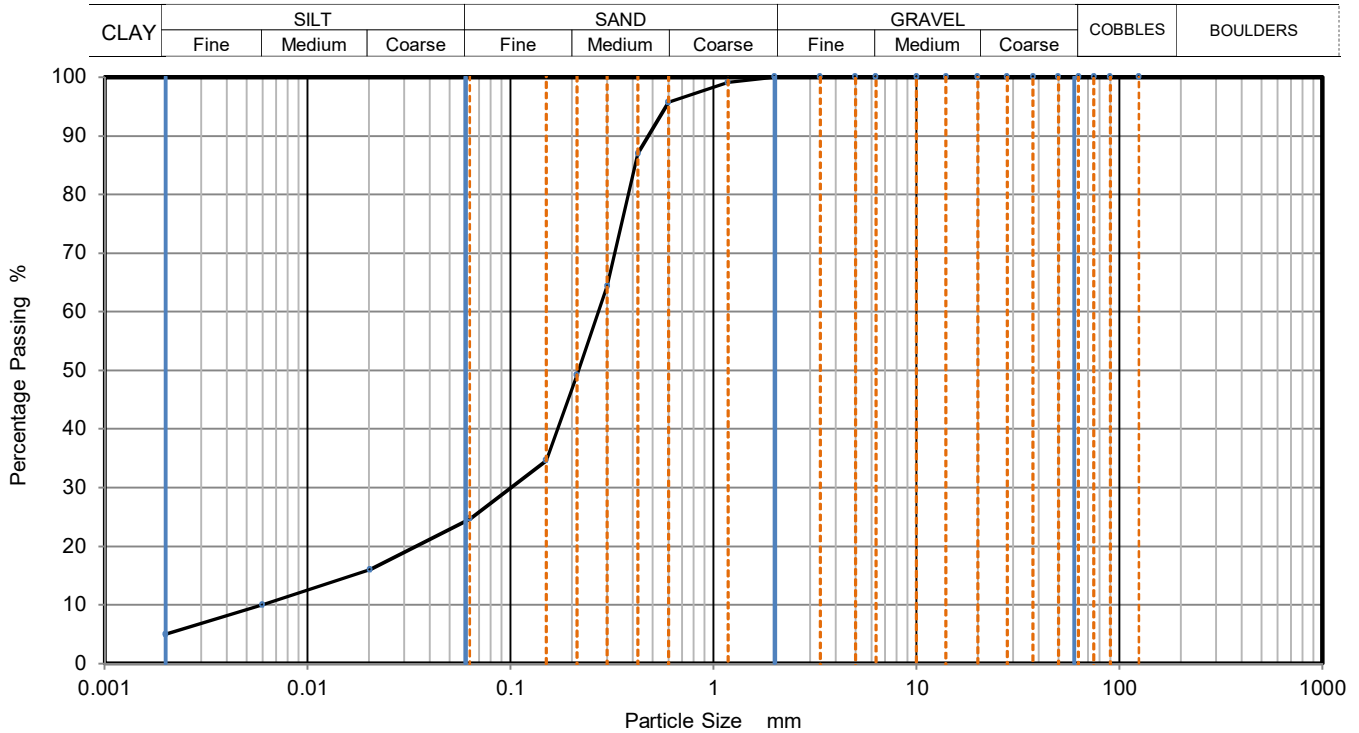
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey slightly clayey silty SAND.	Sample Depth (m)	28.00
		Sample Reference	B77



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	16
90	100	0.0060	10
75	100	0.0020	5
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	96		
0.425	87	Particle density (assumed) 2.65 Mg/m3	
0.3	64		
0.212	49		
0.15	35		
0.063	25		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	75
Silt	20
Clay	5

Grading Analysis		
D100	mm	
D60	mm	0.271
D30	mm	0.100
D10	mm	0.007
Uniformity Coefficient		41
Curvature Coefficient		5.6

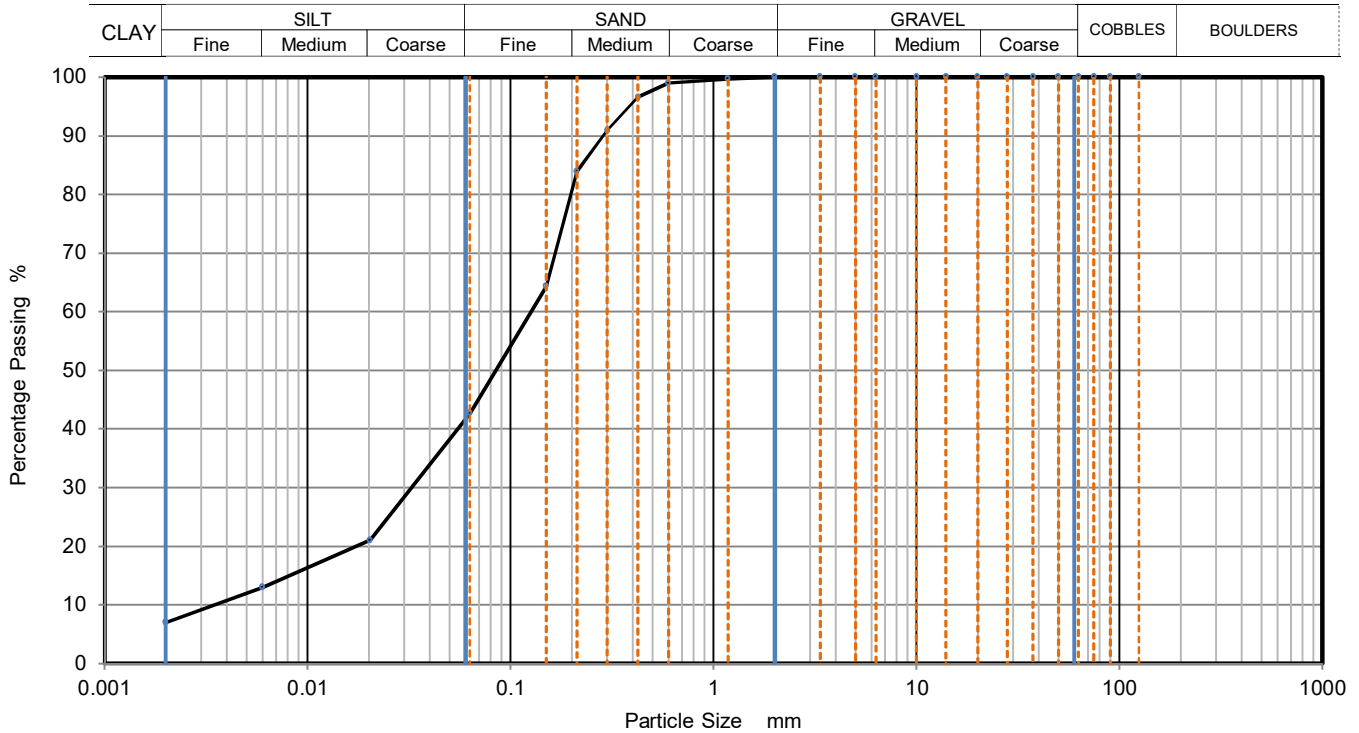
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey sandy clayey SILT	Sample Depth (m)	30.00
		Sample Reference	D79



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	21
90	100	0.0060	13
75	100	0.0020	7
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	97	2.65	Mg/m3
0.3	91		
0.212	84		
0.15	64		
0.063	43		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	57
Silt	35
Clay	7

Grading Analysis		
D100	mm	
D60	mm	0.126
D30	mm	0.032
D10	mm	0.003
Uniformity Coefficient		36
Curvature Coefficient		2.4

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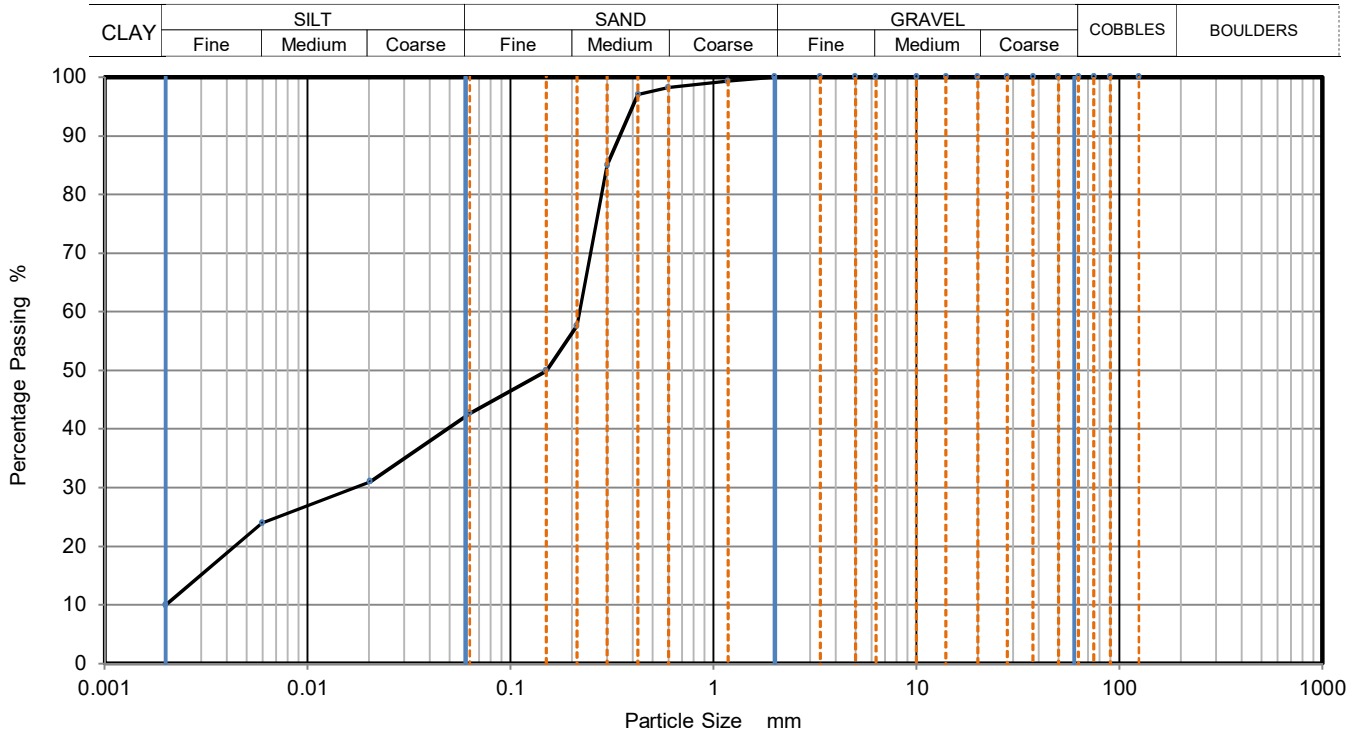




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey sandy clayey SILT	Sample Depth (m)	32.00
		Sample Reference	B84



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	31
90	100	0.0060	24
75	100	0.0020	10
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	98		
0.425	97	Particle density (assumed) 2.65 Mg/m3	
0.3	85		
0.212	58		
0.15	50		
0.063	43		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	57
Silt	32
Clay	10

Grading Analysis		
D100	mm	
D60	mm	0.219
D30	mm	0.018
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

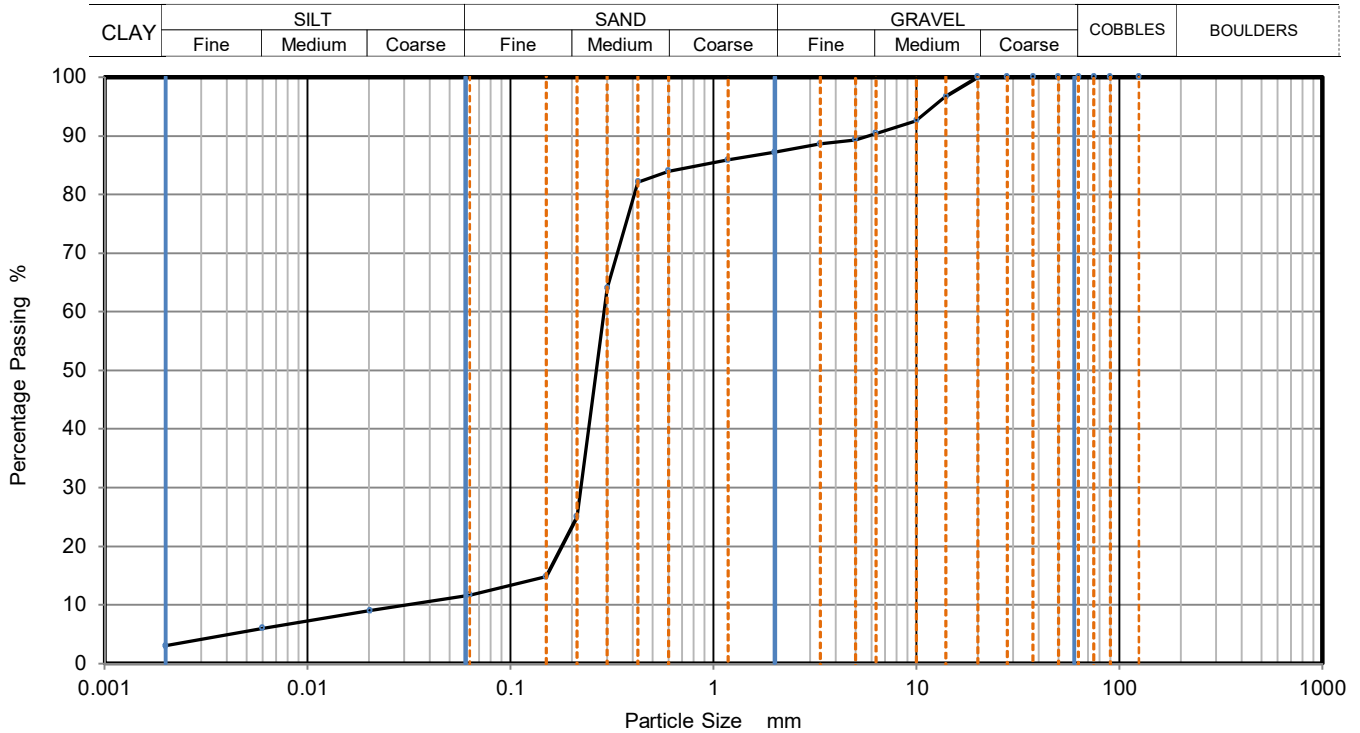
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey slightly clayey silty gravelly SAND. Gravel is of chalk and shell fragments.	Sample Depth (m)	33.00
		Sample Reference	B85



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	9
90	100	0.0060	6
75	100	0.0020	3
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	97		
10	93		
6.3	90		
5	89		
3.35	89		
2	87		
1.18	86		
0.6	84		
0.425	82	Particle density (assumed)	
0.3	64	2.65	Mg/m <sup>3</sup>
0.212	25		
0.15	15		
0.063	12		

Sample Proportions	% dry mass
Very coarse	0
Gravel	13
Sand	76
Silt	9
Clay	3

Grading Analysis		
D100	mm	
D60	mm	0.290
D30	mm	0.222
D10	mm	0.031
Uniformity Coefficient		9.4
Curvature Coefficient		5.5

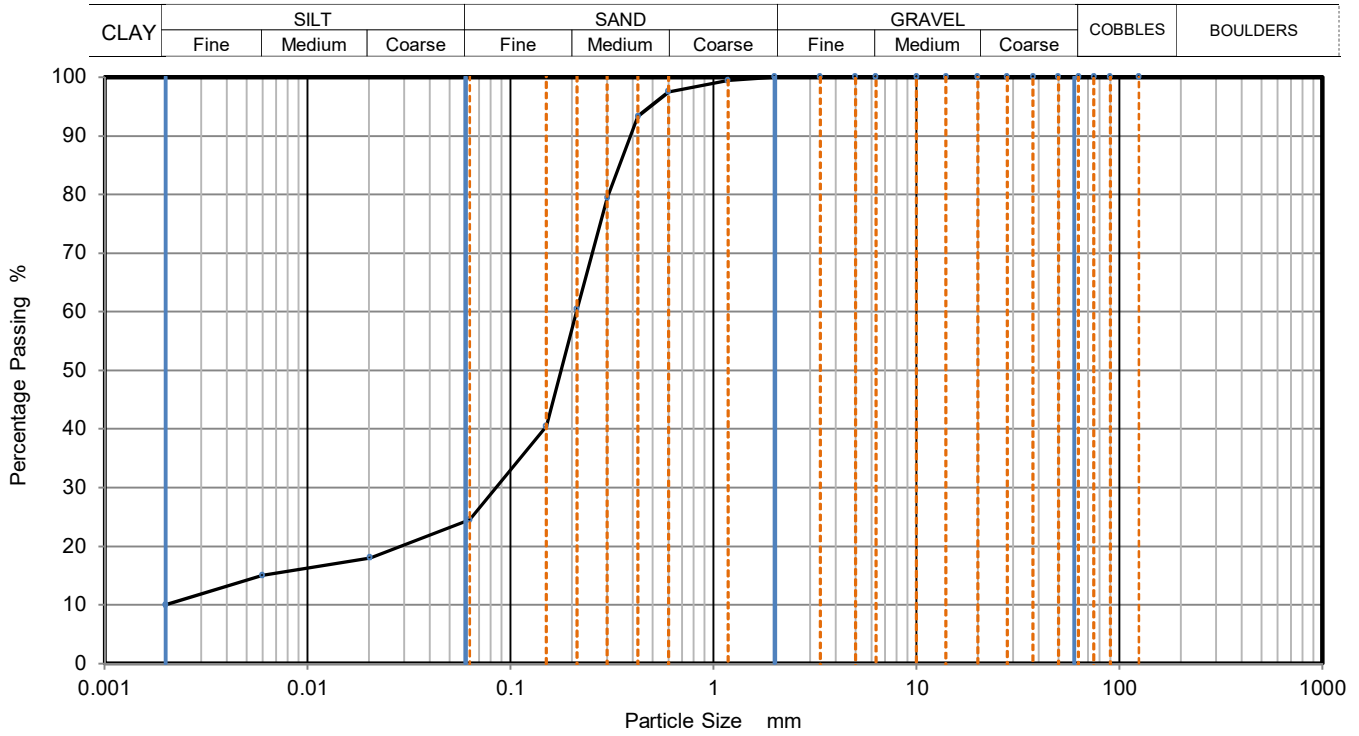
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey clayey silty SAND	Sample Depth (m)	35.00
		Sample Reference	B88



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	18
90	100	0.0060	15
75	100	0.0020	10
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	98		
0.425	93	Particle density (assumed) 2.65 Mg/m3	
0.3	79		
0.212	60		
0.15	40		
0.063	25		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	76
Silt	14
Clay	10

Grading Analysis		
D100	mm	
D60	mm	0.210
D30	mm	0.085
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

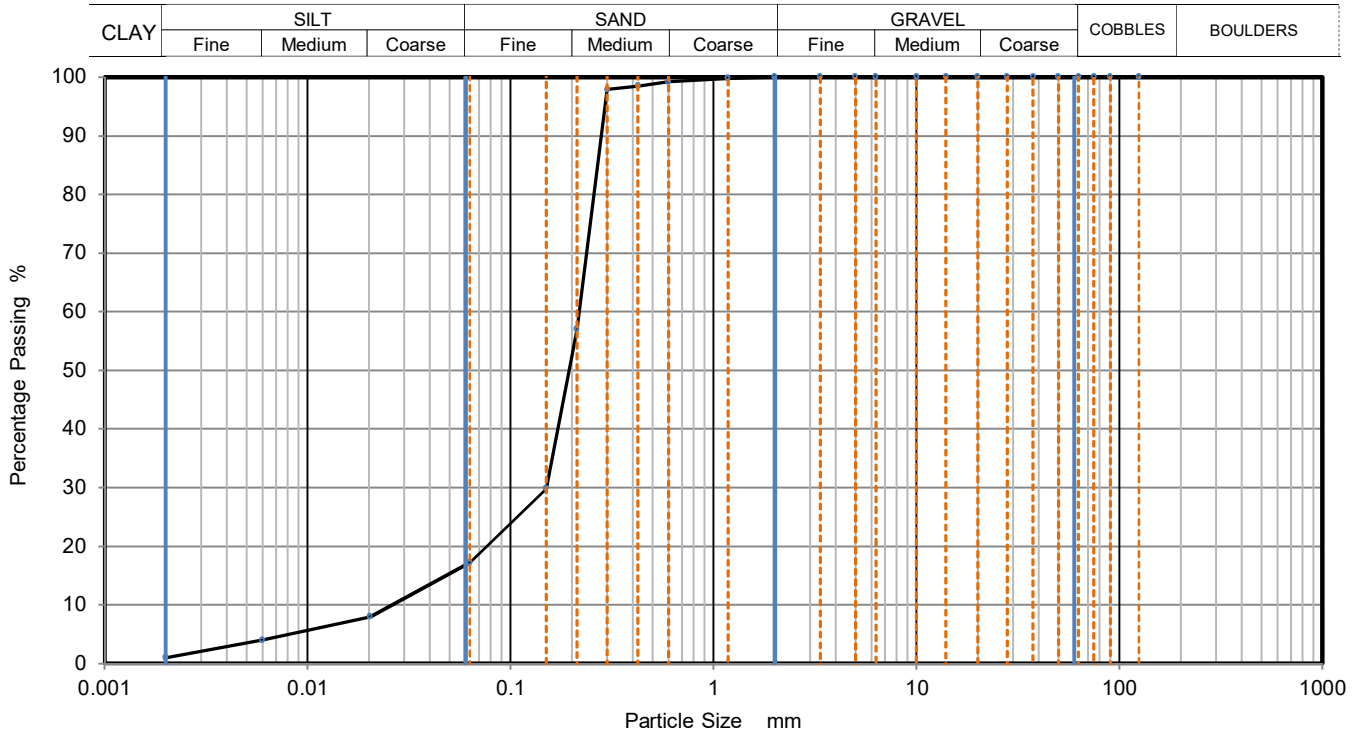
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey slightly clayey silty SAND	Sample Depth (m)	37.00
		Sample Reference	B91



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	8
90	100	0.0060	4
75	100	0.0020	1
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	99	2.65	Mg/m3
0.3	98		
0.212	57		
0.15	30		
0.063	17		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	83
Silt	16
Clay	1

Grading Analysis		
D100	mm	
D60	mm	0.217
D30	mm	0.150
D10	mm	0.027
Uniformity Coefficient		8.2
Curvature Coefficient		3.9

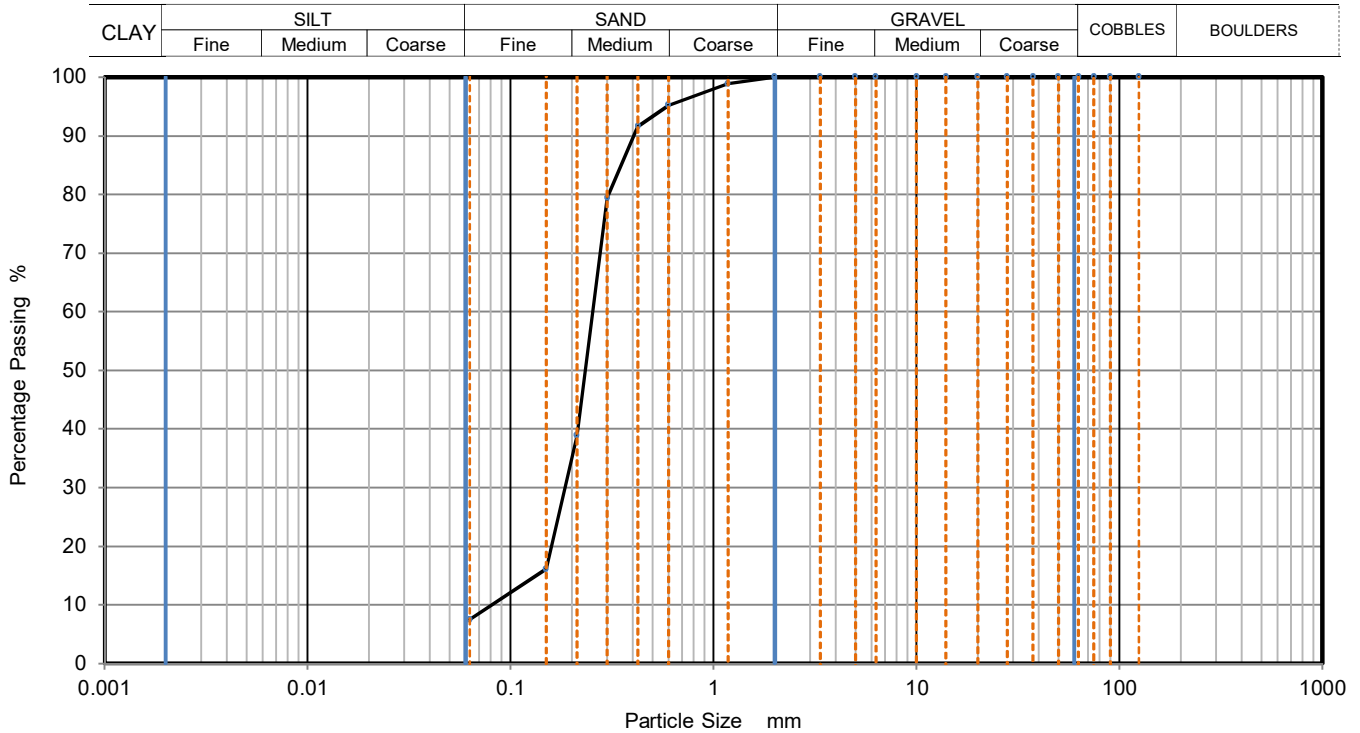
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey silty SAND	Sample Depth (m)	39.00
		Sample Reference	B94



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	95		
0.425	92		
0.3	79		
0.212	39		
0.15	16		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	93
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.254
D30	mm	0.185
D10	mm	0.081
Uniformity Coefficient		3.1
Curvature Coefficient		1.7

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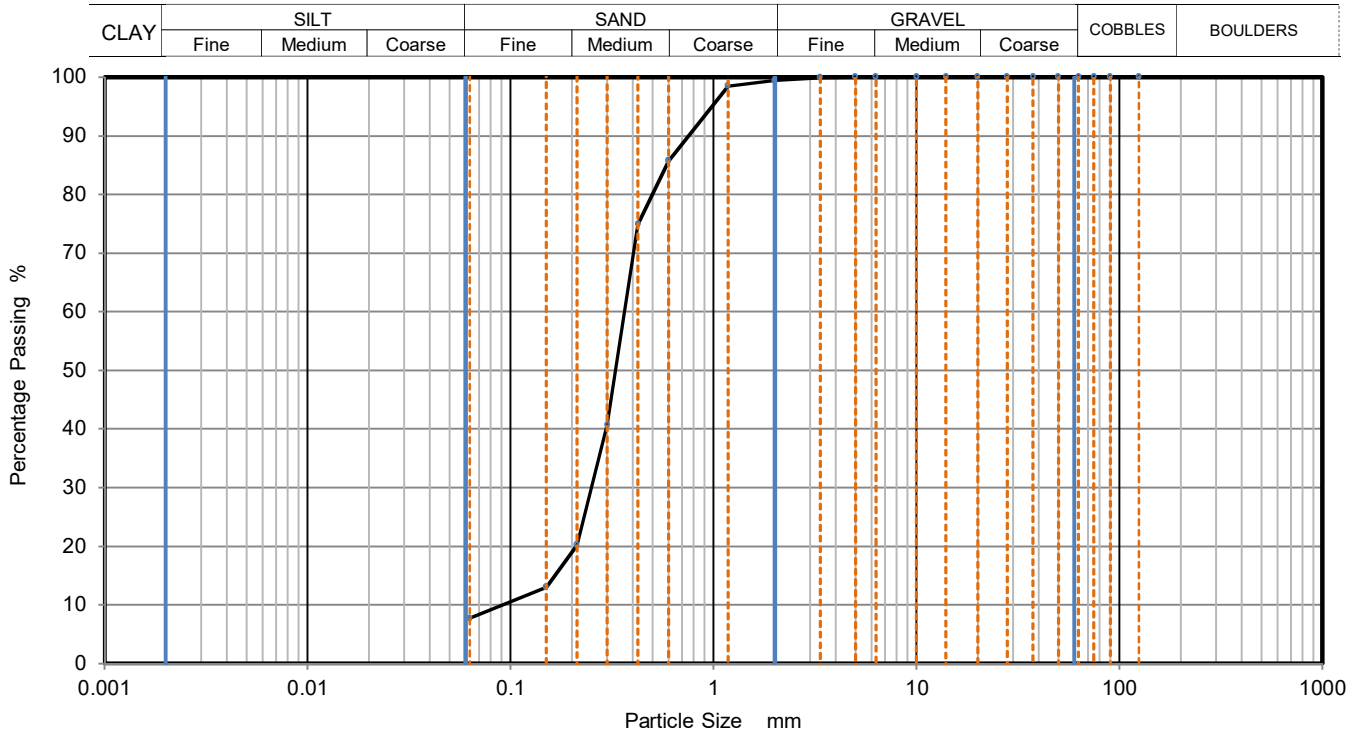




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Grey silty slightly gravelly SAND. Gravel is of shell fragments	Sample Depth (m)	44.00
		Sample Reference	B102



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	86		
0.425	75		
0.3	41		
0.212	20		
0.15	13		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	92
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.365
D30	mm	0.250
D10	mm	0.092
Uniformity Coefficient		4
Curvature Coefficient		1.9

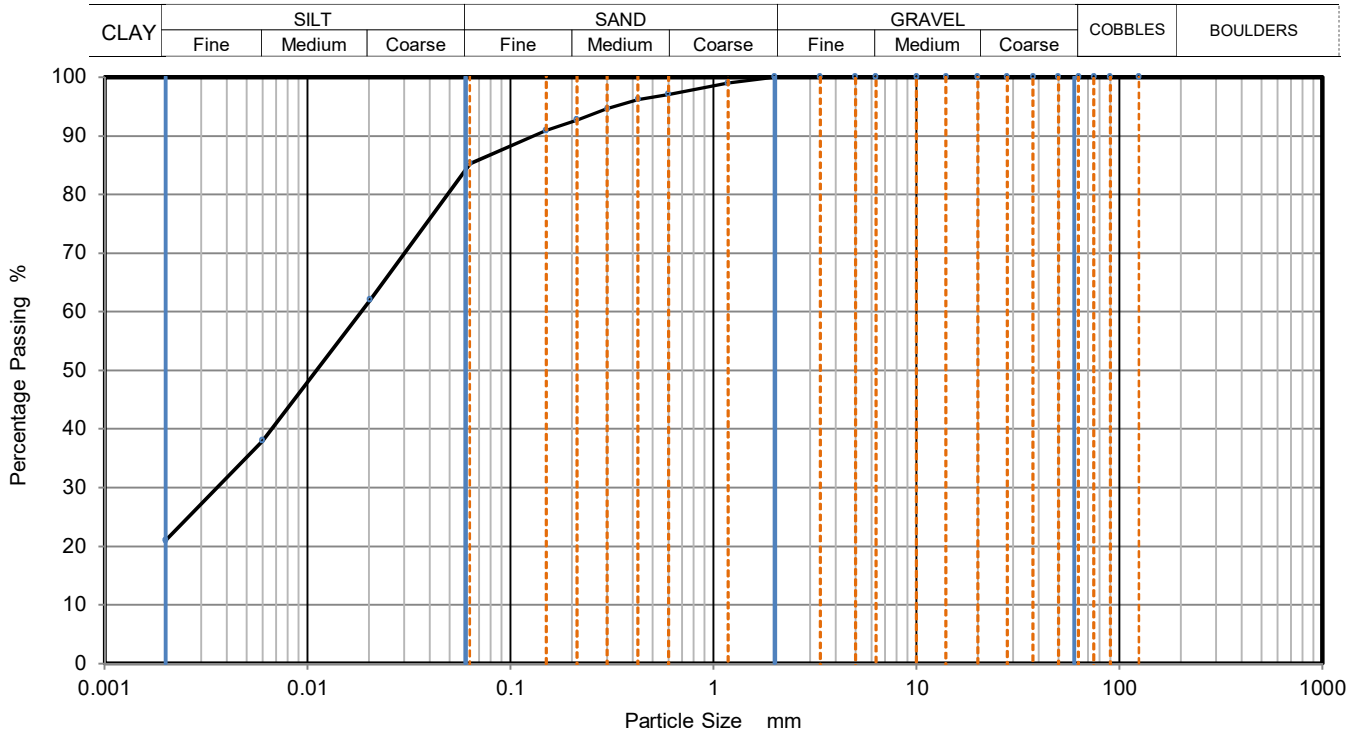
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey slightly sandy very silty CLAY	Sample Depth (m)	45.60
		Sample Reference	B104



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	62
90	100	0.0060	38
75	100	0.0020	21
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	97		
0.425	96	Particle density (assumed) 2.65 Mg/m3	
0.3	95		
0.212	93		
0.15	91		
0.063	85		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	15
Silt	64
Clay	21

Grading Analysis		
D100	mm	
D60	mm	0.019
D30	mm	0.004
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

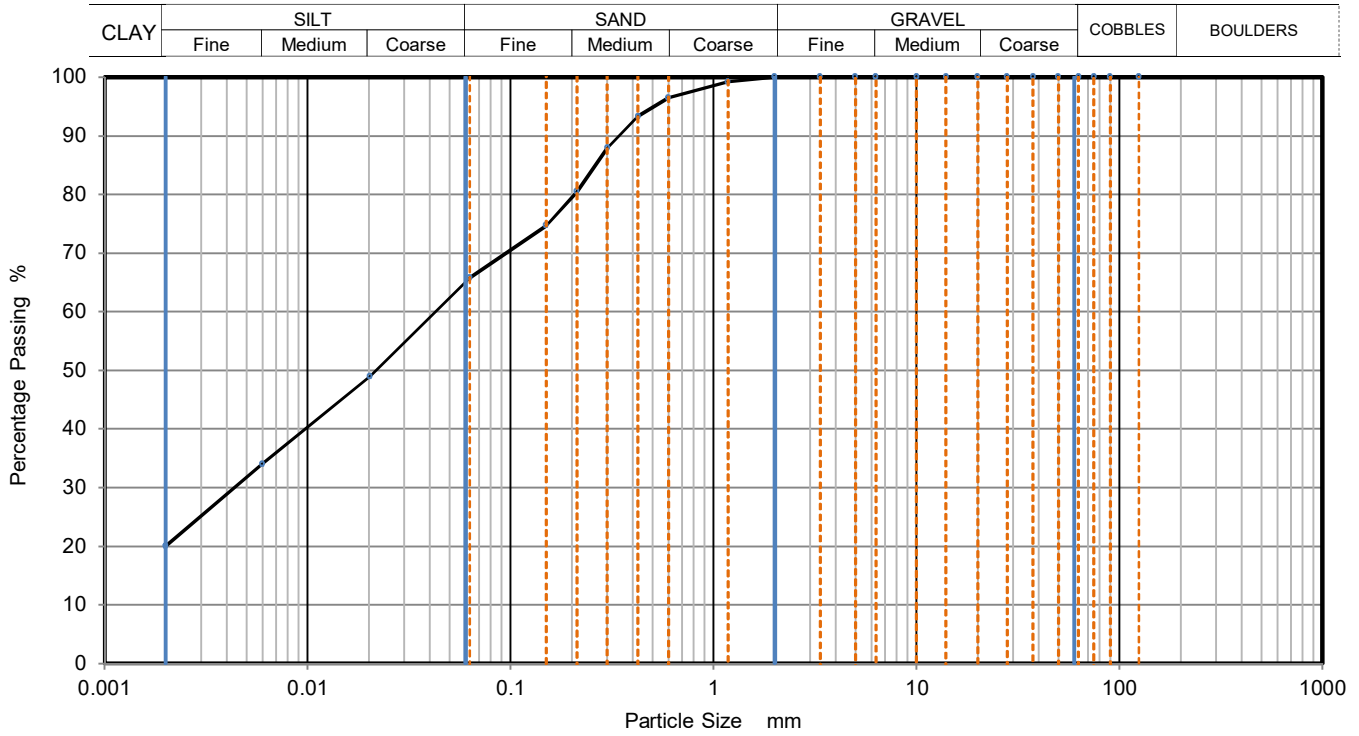
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey slightly sandy silty CLAY	Sample Depth (m)	46.00
		Sample Reference	D105



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	49
90	100	0.0060	34
75	100	0.0020	20
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	97		
0.425	93	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	88		
0.212	81		
0.15	75		
0.063	66		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	34
Silt	46
Clay	20

Grading Analysis		
D100	mm	
D60	mm	0.042
D30	mm	0.004
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

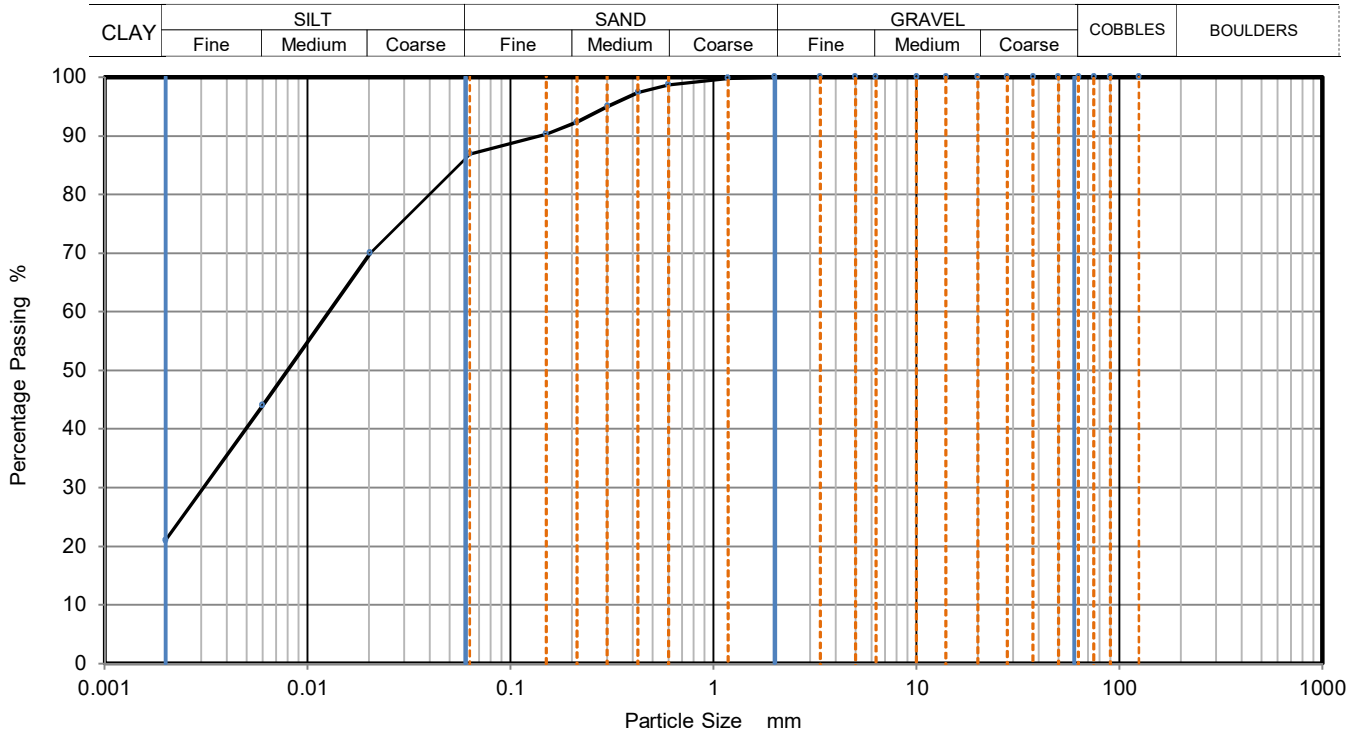
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey slightly sandy very silty CLAY	Sample Depth (m)	48.00
		Sample Reference	B110



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	70
90	100	0.0060	44
75	100	0.0020	21
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	97		
0.3	95		
0.212	92		
0.15	90		
0.063	87		
		Particle density (assumed) 2.65 Mg/m <sup>3</sup>	

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	13
Silt	66
Clay	21

Grading Analysis		
D100	mm	
D60	mm	0.013
D30	mm	0.003
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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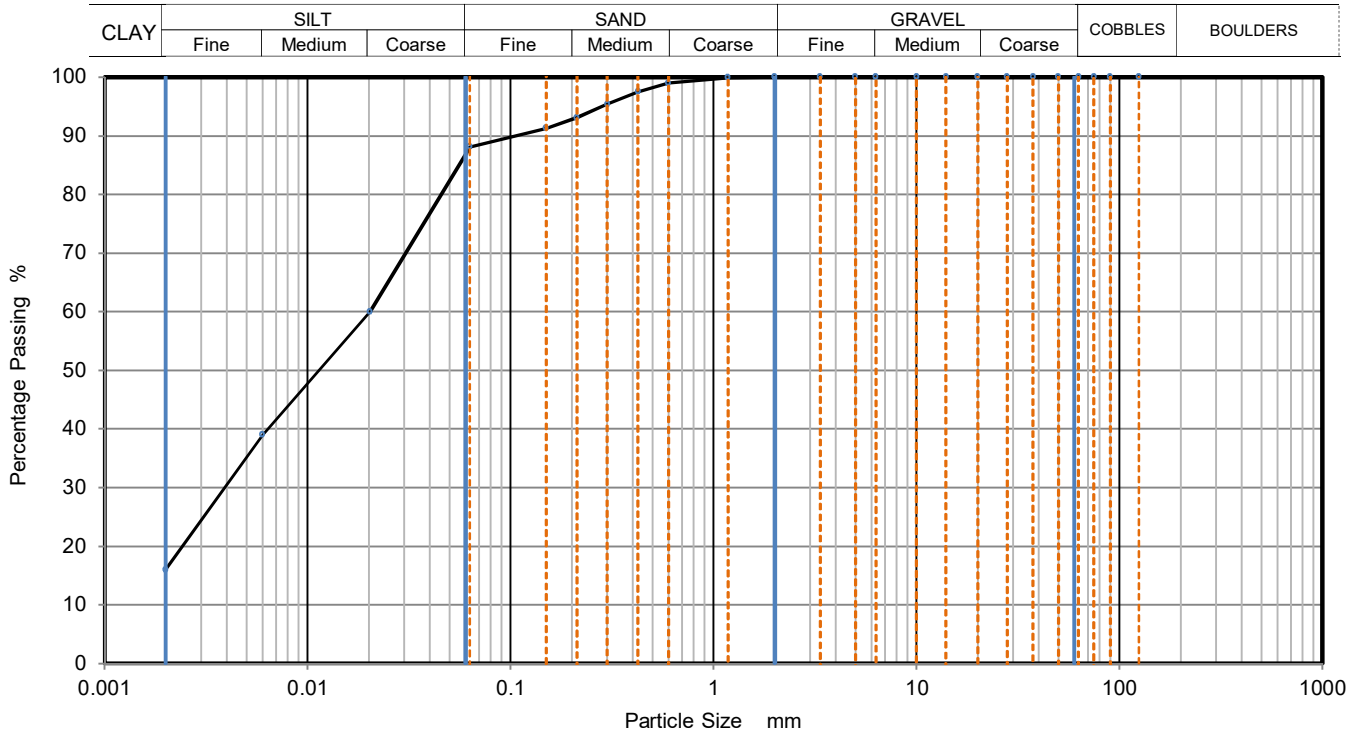




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10A
Sample Description:	Dark grey slightly sandy very silty CLAY	Sample Depth (m)	49.50
		Sample Reference	D113



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	60
90	100	0.0060	39
75	100	0.0020	16
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	98	2.65	Mg/m3
0.3	95		
0.212	93		
0.15	91		
0.063	88		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	12
Silt	72
Clay	16

Grading Analysis		
D100	mm	
D60	mm	0.020
D30	mm	0.004
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

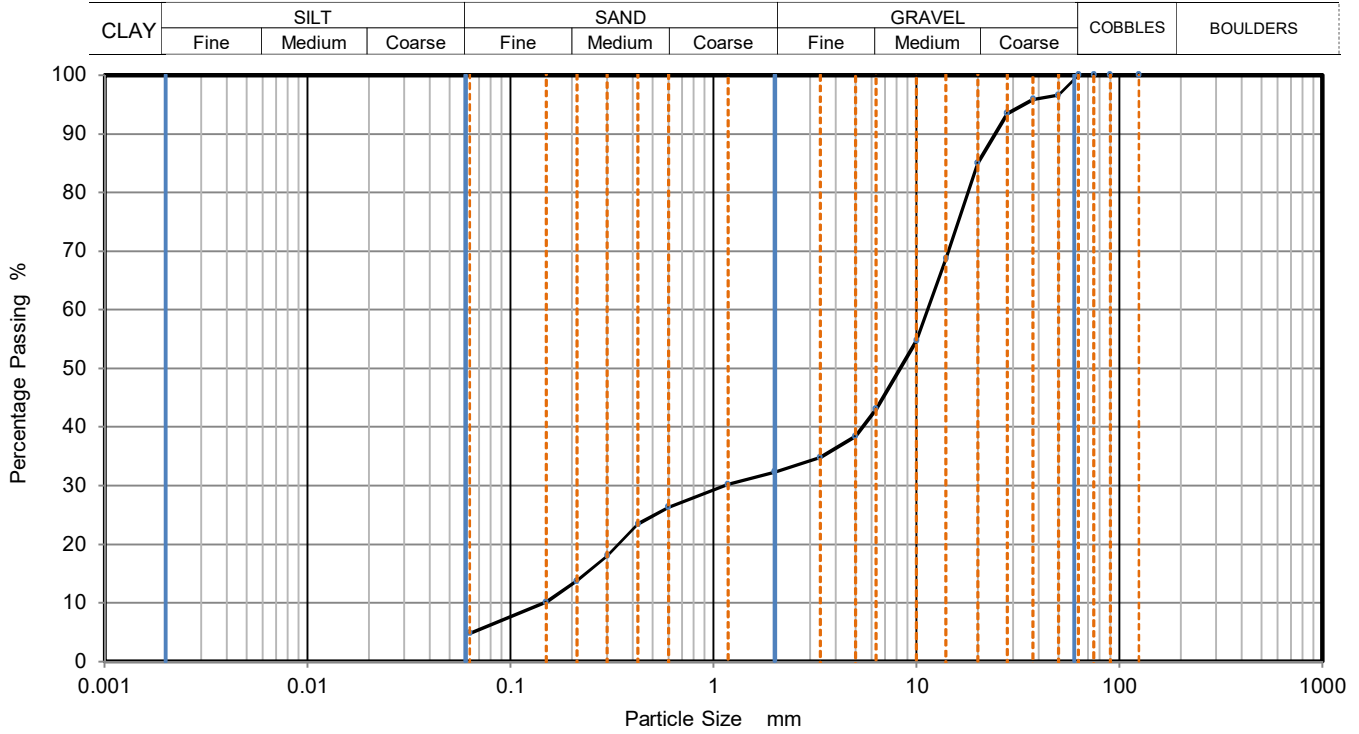
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	MADE GROUND (Dark brown slightly silty very sandy GRAVEL. Gravel is of flint, quartz, brick, concrete and asphalt fragments)	Sample Depth (m)	0.65
		Sample Reference	B1



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	97		
37.5	96		
28	94		
20	85		
14	69		
10	55		
6.3	43		
5	38		
3.35	35		
2	32		
1.18	30		
0.6	26		
0.425	23		
0.3	18		
0.212	14		
0.15	10		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	68
Sand	28
Fines <0.063mm	5

Grading Analysis		
D100	mm	
D60	mm	11.400
D30	mm	1.140
D10	mm	0.148
Uniformity Coefficient		77
Curvature Coefficient		0.78

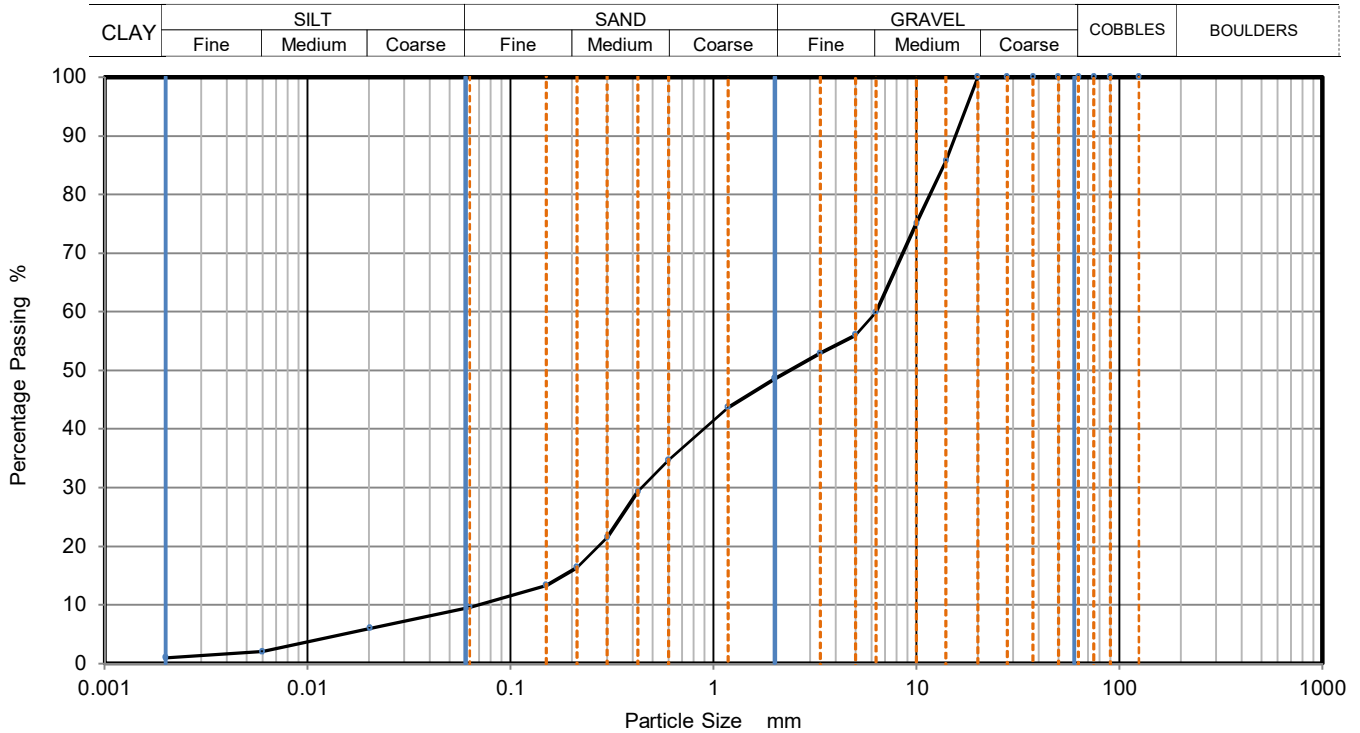
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	MADE GROUND (Dark grey slightly clayey silty very sandy GRAVEL. Gravel is of flint and asphalt fragments)	Sample Depth (m)	0.90
		Sample Reference	B3



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	6
90	100	0.0060	2
75	100	0.0020	1
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	86		
10	75		
6.3	60		
5	56		
3.35	53		
2	49		
1.18	44		
0.6	35		
0.425	29	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	22		
0.212	16		
0.15	13		
0.063	10		

Sample Proportions	% dry mass
Very coarse	0
Gravel	51
Sand	39
Silt	8
Clay	1

Grading Analysis		
D100	mm	
D60	mm	6.320
D30	mm	0.444
D10	mm	0.070
Uniformity Coefficient		90
Curvature Coefficient		0.45

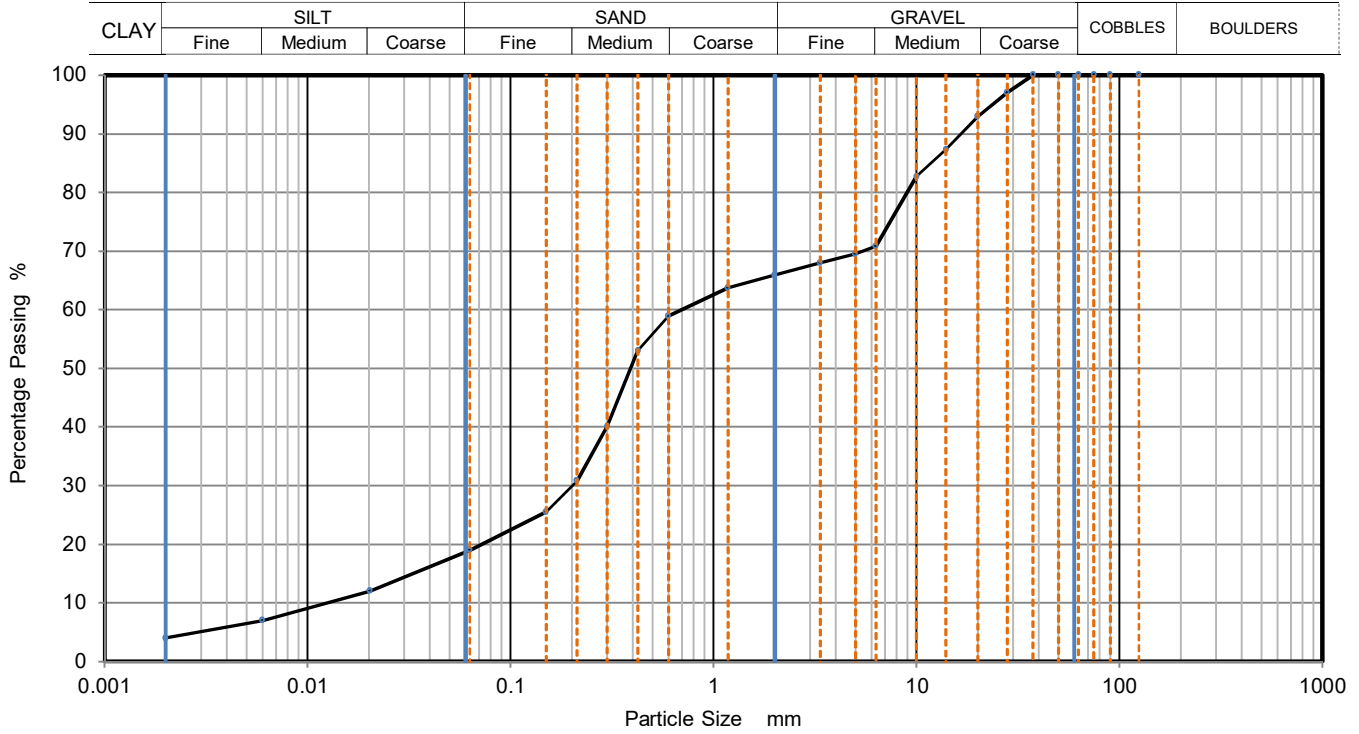
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	MADE GROUND (Dark grey brown slightly clayey silty very gravelly SAND. Gravel is of flint quartz, brick, wood and concrete fragments)	Sample Depth (m)	1.20
		Sample Reference	B5



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	12
90	100	0.0060	7
75	100	0.0020	4
63	100		
50	100		
37.5	100		
28	97		
20	93		
14	87		
10	83		
6.3	71		
5	70		
3.35	68		
2	66		
1.18	64		
0.6	59		
0.425	53	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	40		
0.212	31		
0.15	26		
0.063	19		

Sample Proportions	% dry mass
Very coarse	0
Gravel	34
Sand	47
Silt	15
Clay	4

Grading Analysis		
D100	mm	
D60	mm	0.704
D30	mm	0.201
D10	mm	0.012
Uniformity Coefficient		60
Curvature Coefficient		4.9

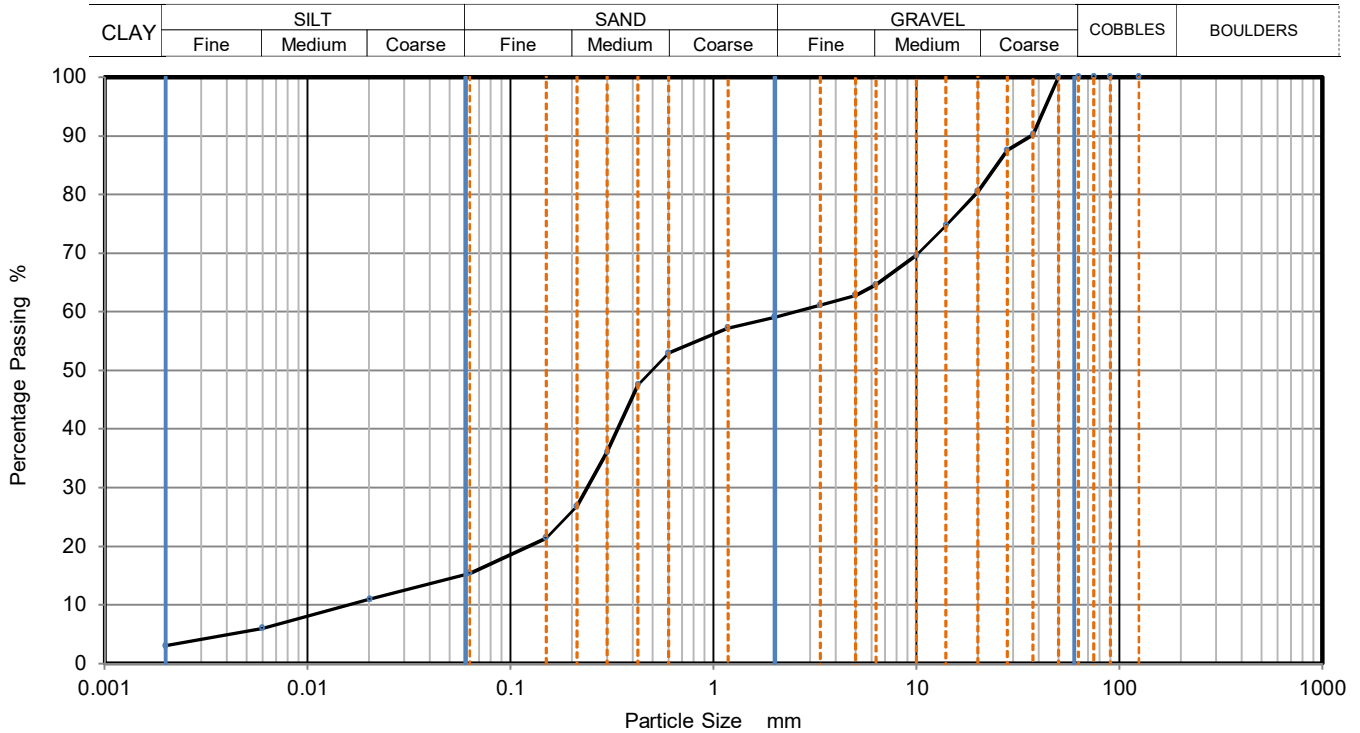
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	MADE GROUND (Dark grey brown slightly clayey silty SAND / GRAVEL. Gravel is of flint, brick wood, metal and concrete fragments.	Sample Depth (m)	1.50
		Sample Reference	B8



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	11
90	100	0.0060	6
75	100	0.0020	3
63	100		
50	100		
37.5	90		
28	88		
20	81		
14	75		
10	70		
6.3	65		
5	63		
3.35	61		
2	59		
1.18	57		
0.6	53		
0.425	48	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	36		
0.212	27		
0.15	21		
0.063	15		

Sample Proportions	% dry mass
Very coarse	0
Gravel	41
Sand	44
Silt	12
Clay	3

Grading Analysis		
D100	mm	
D60	mm	2.540
D30	mm	0.239
D10	mm	0.017
Uniformity Coefficient		150
Curvature Coefficient		1.3

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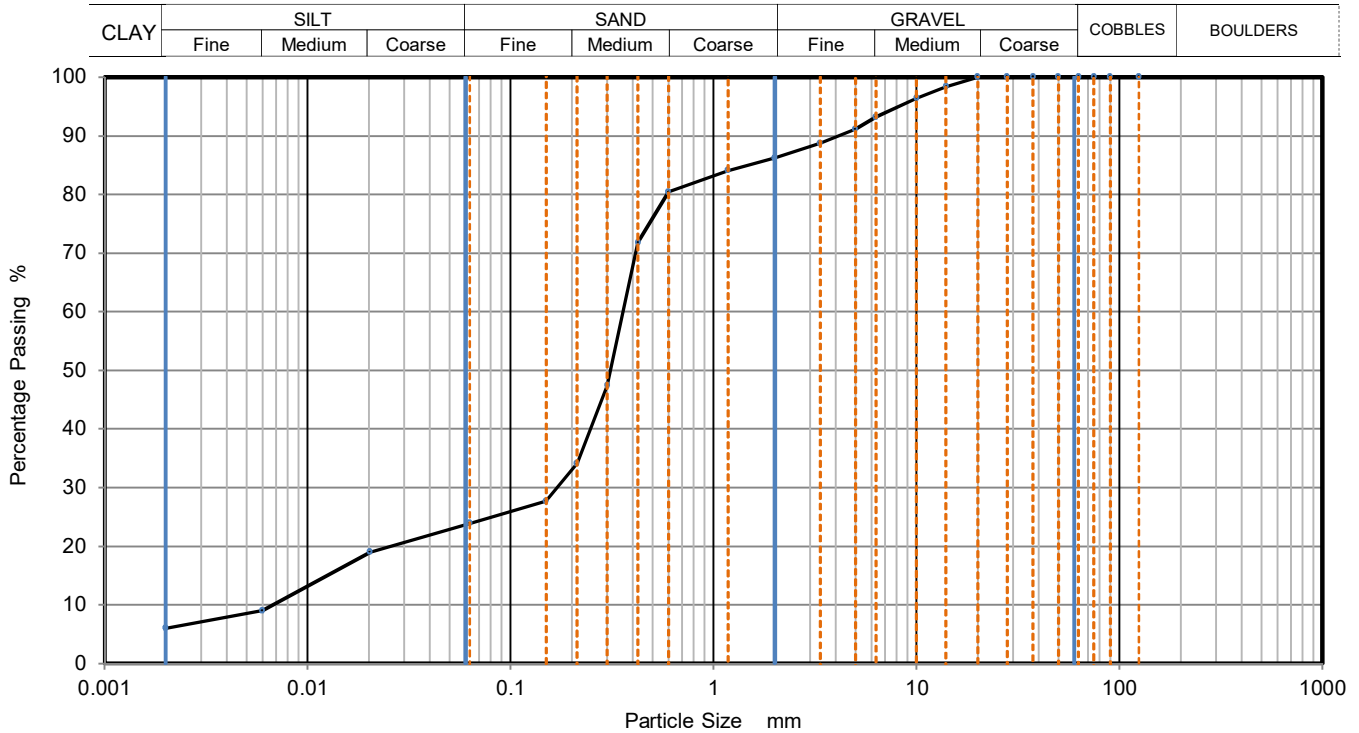




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	MADE GROUND (Dark grey clayey silty gravelly SAND. Gravel is of flint, shell and brick fragments)	Sample Depth (m)	2.80
		Sample Reference	B12



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	19
90	100	0.0060	9
75	100	0.0020	6
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	98		
10	96		
6.3	93		
5	91		
3.35	89		
2	86		
1.18	84		
0.6	80		
0.425	72	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	47		
0.212	34		
0.15	28		
0.063	24		

Sample Proportions	% dry mass
Very coarse	0
Gravel	14
Sand	62
Silt	18
Clay	6

Grading Analysis		
D100	mm	
D60	mm	0.359
D30	mm	0.170
D10	mm	0.006
Uniformity Coefficient		55
Curvature Coefficient		12

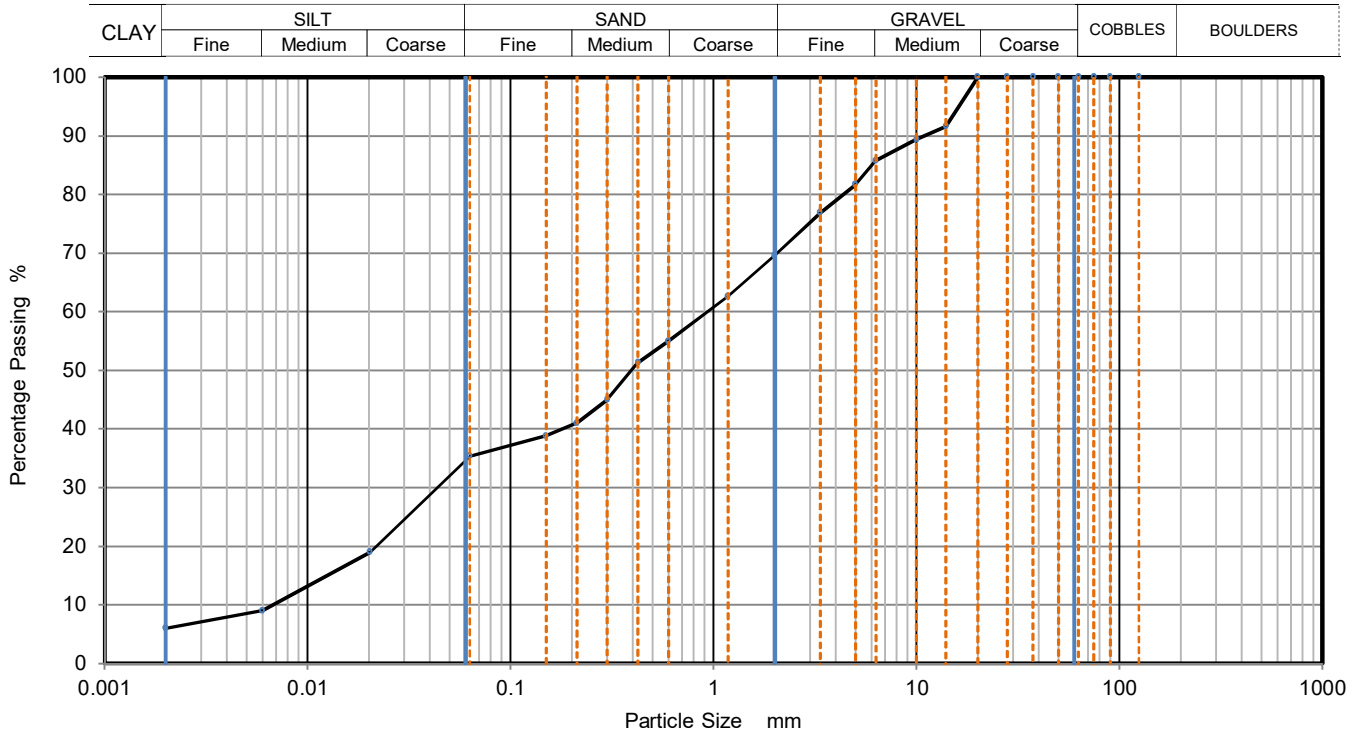
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark grey and grey clayey very silty SAND / GRAVEL. Gravel is of flint and shell fragments.	Sample Depth (m)	3.50
		Sample Reference	B15



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	19
90	100	0.0060	9
75	100	0.0020	6
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	92		
10	89		
6.3	86		
5	82		
3.35	77		
2	70		
1.18	63		
0.6	55		
0.425	51	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	45		
0.212	41		
0.15	39		
0.063	35		

Sample Proportions	% dry mass
Very coarse	0
Gravel	30
Sand	34
Silt	30
Clay	6

Grading Analysis		
D100	mm	
D60	mm	0.936
D30	mm	0.044
D10	mm	0.006
Uniformity Coefficient		150
Curvature Coefficient		0.32

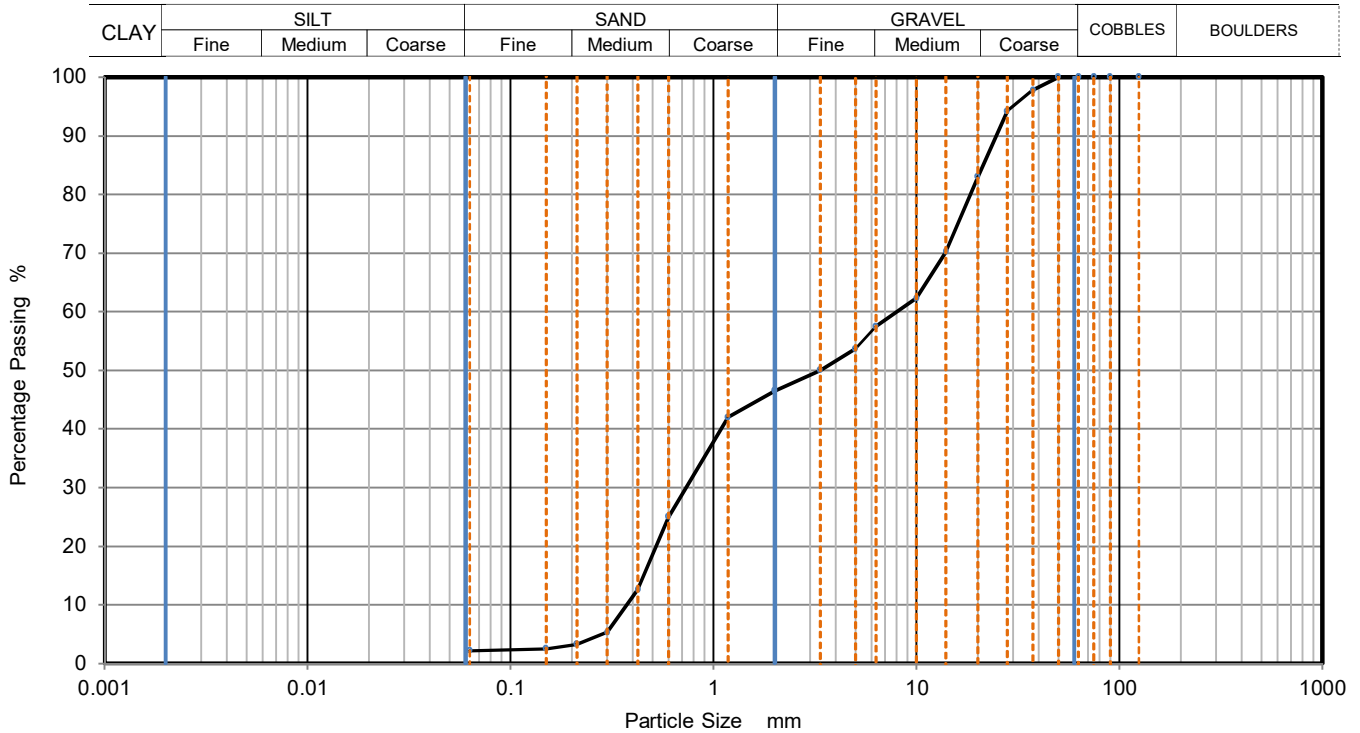
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Brown slightly silty very sandy GRAVEL. Gravel is of flint and quartz	Sample Depth (m)	4.50
		Sample Reference	B17



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	98		
28	94		
20	83		
14	70		
10	62		
6.3	58		
5	54		
3.35	50		
2	47		
1.18	42		
0.6	25		
0.425	13		
0.3	5		
0.212	3		
0.15	3		
0.063	2		

Sample Proportions	% dry mass
Very coarse	0
Gravel	54
Sand	44
Fines <0.063mm	2

Grading Analysis		
D100	mm	
D60	mm	7.990
D30	mm	0.732
D10	mm	0.375
Uniformity Coefficient		21
Curvature Coefficient		0.18

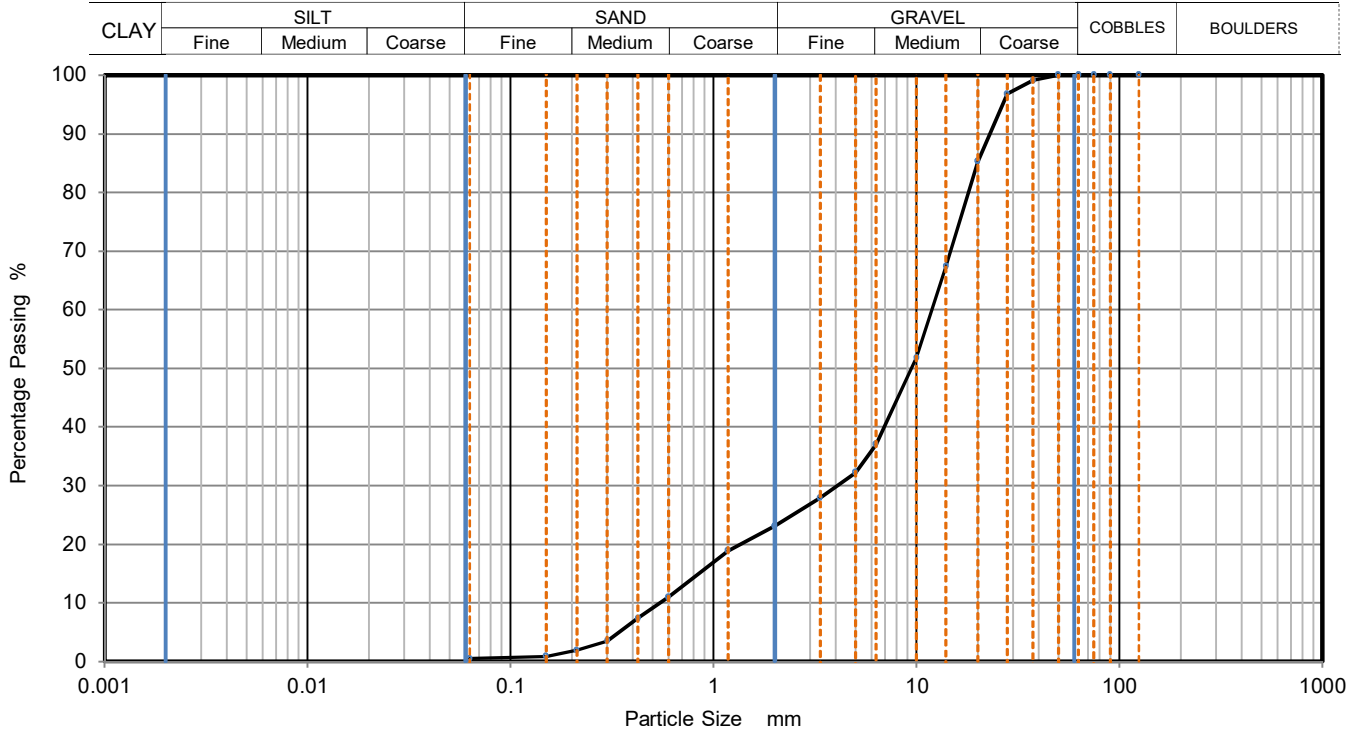
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Brown slightly silty very sandy GRAVEL. Gravel is of flint and quartz	Sample Depth (m)	6.30
		Sample Reference	B22



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	99		
28	97		
20	85		
14	67		
10	52		
6.3	37		
5	32		
3.35	28		
2	23		
1.18	19		
0.6	11		
0.425	7		
0.3	4		
0.212	2		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0
Gravel	77
Sand	23
Fines <0.063mm	1

Grading Analysis		
D100	mm	
D60	mm	11.900
D30	mm	4.080
D10	mm	0.545
Uniformity Coefficient		22
Curvature Coefficient		2.6

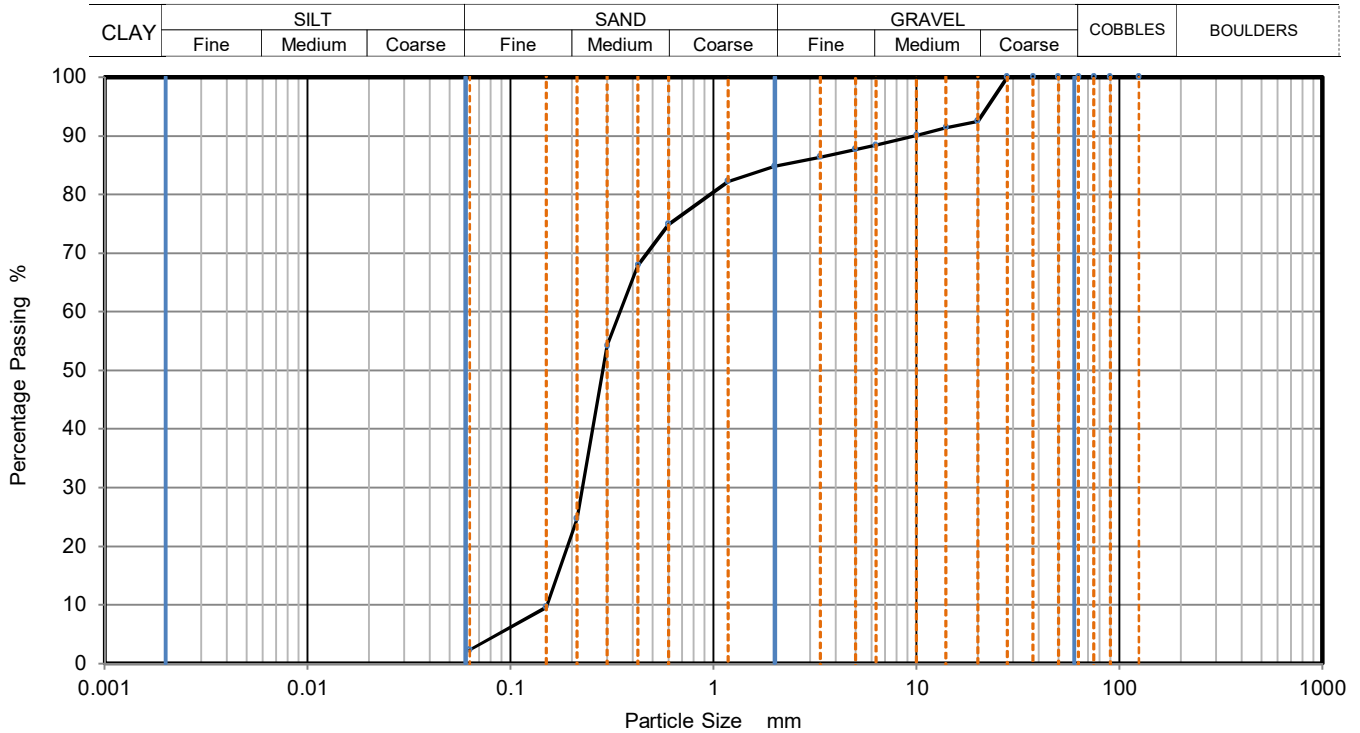
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Brown slightly silty gravelly SAND. Gravel is of flint and quartz	Sample Depth (m)	6.80
		Sample Reference	B24



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	93		
14	91		
10	90		
6.3	88		
5	88		
3.35	86		
2	85		
1.18	82		
0.6	75		
0.425	68		
0.3	54		
0.212	25		
0.15	10		
0.063	2		

Sample Proportions	% dry mass
Very coarse	0
Gravel	15
Sand	83
Fines <0.063mm	2

Grading Analysis		
D100	mm	
D60	mm	0.347
D30	mm	0.226
D10	mm	0.152
Uniformity Coefficient		2.3
Curvature Coefficient		0.97

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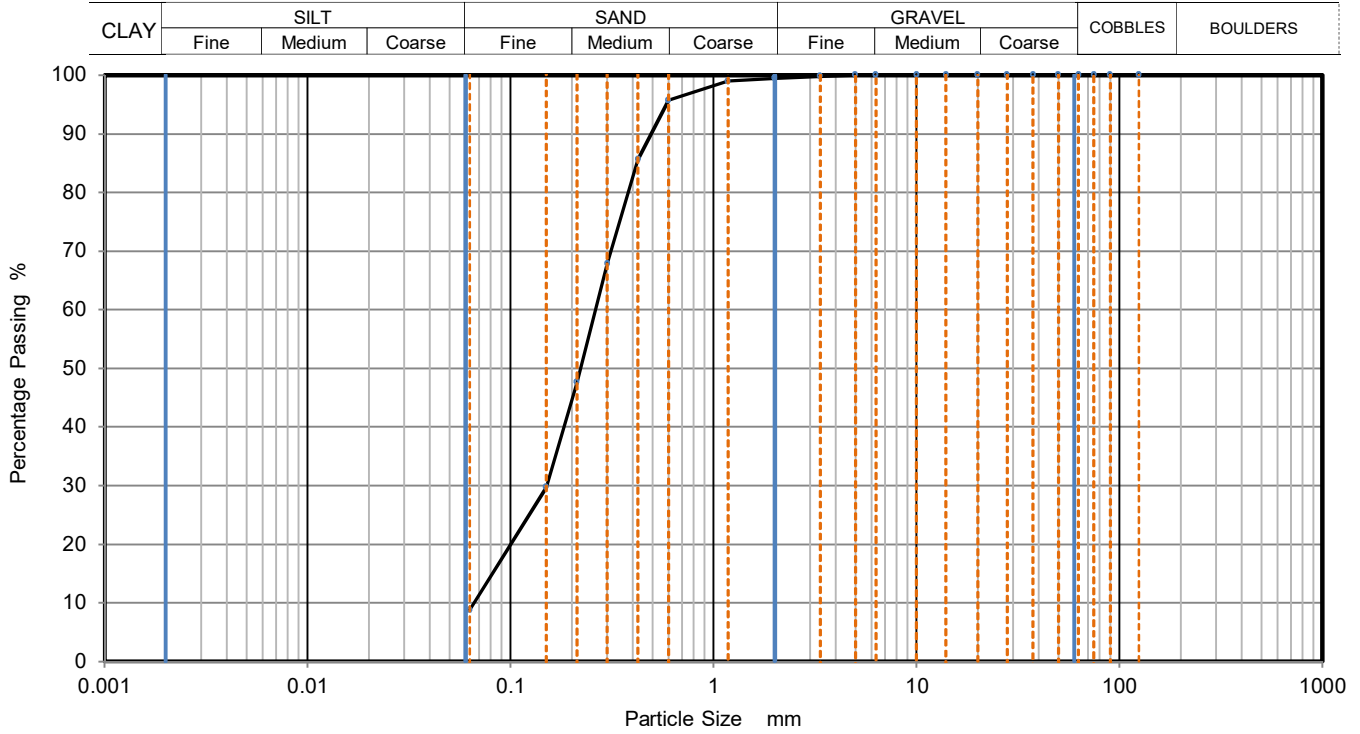




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Brown silty SAND	Sample Depth (m)	7.50
		Sample Reference	B28



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	96		
0.425	86		
0.3	68		
0.212	48		
0.15	30		
0.063	9		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	91
Fines <0.063mm	9

Grading Analysis		
D100	mm	
D60	mm	0.262
D30	mm	0.151
D10	mm	0.066
Uniformity Coefficient		4
Curvature Coefficient		1.3

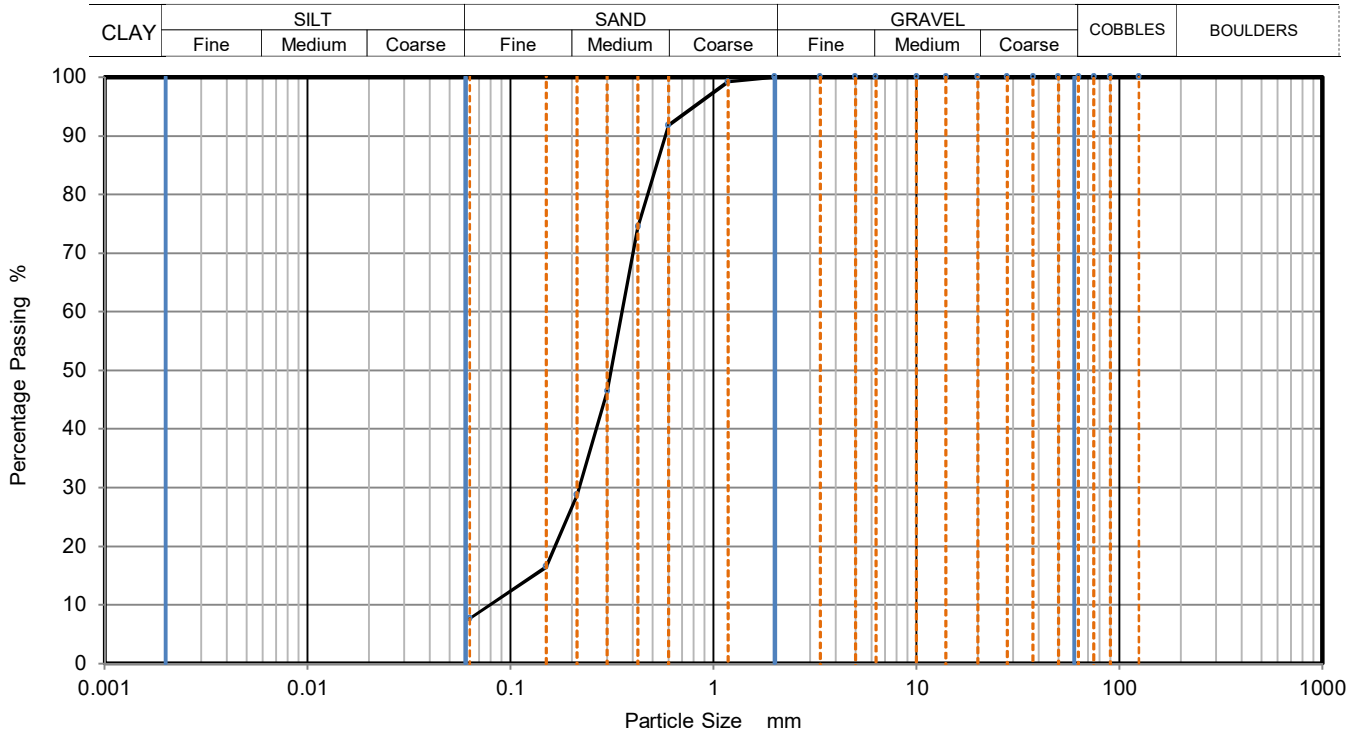
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey brown silty SAND.	Sample Depth (m)	10.50
		Sample Reference	B37



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	92		
0.425	75		
0.3	46		
0.212	29		
0.15	17		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	92
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.355
D30	mm	0.218
D10	mm	0.079
Uniformity Coefficient		4.5
Curvature Coefficient		1.7

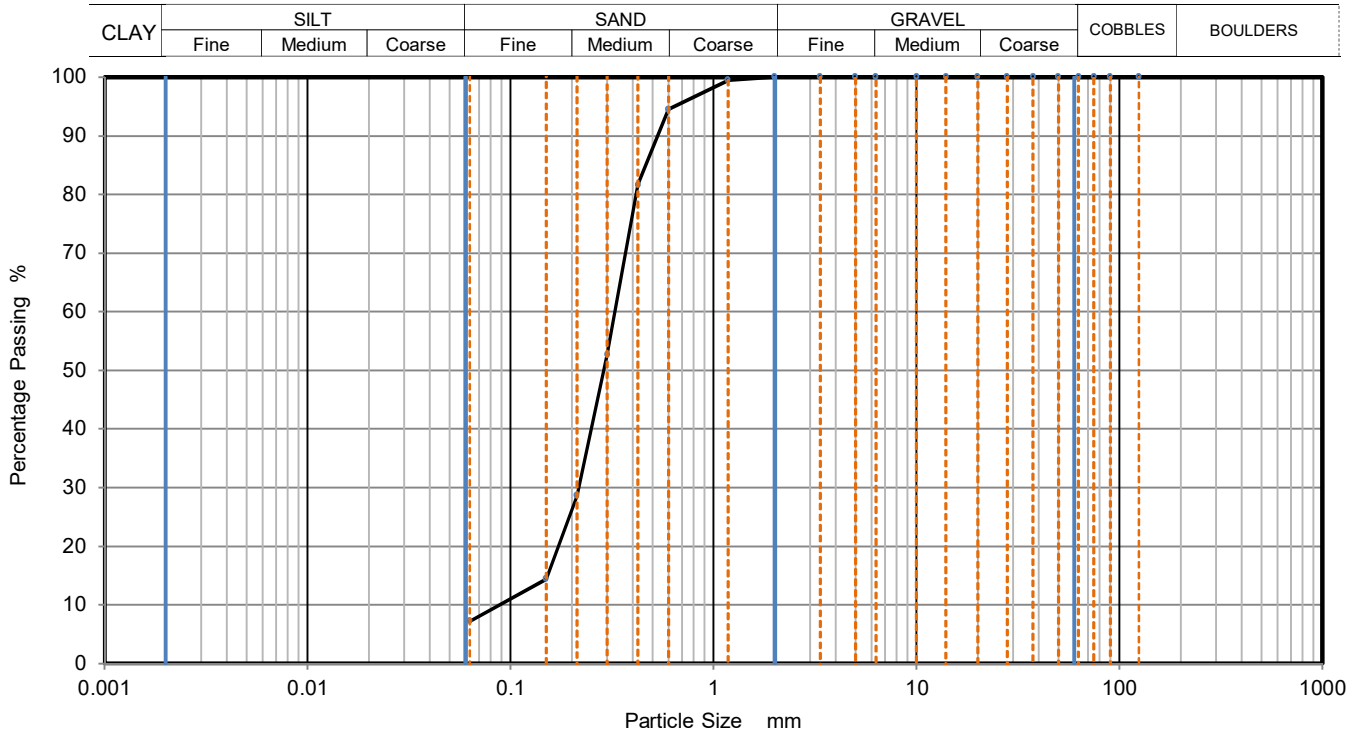
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey brown silty SAND.	Sample Depth (m)	12.50
		Sample Reference	B43



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	95		
0.425	82		
0.3	53		
0.212	29		
0.15	14		
0.063	7		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	93
Fines <0.063mm	7

Grading Analysis		
D100	mm	
D60	mm	0.328
D30	mm	0.216
D10	mm	0.088
Uniformity Coefficient		3.7
Curvature Coefficient		1.6

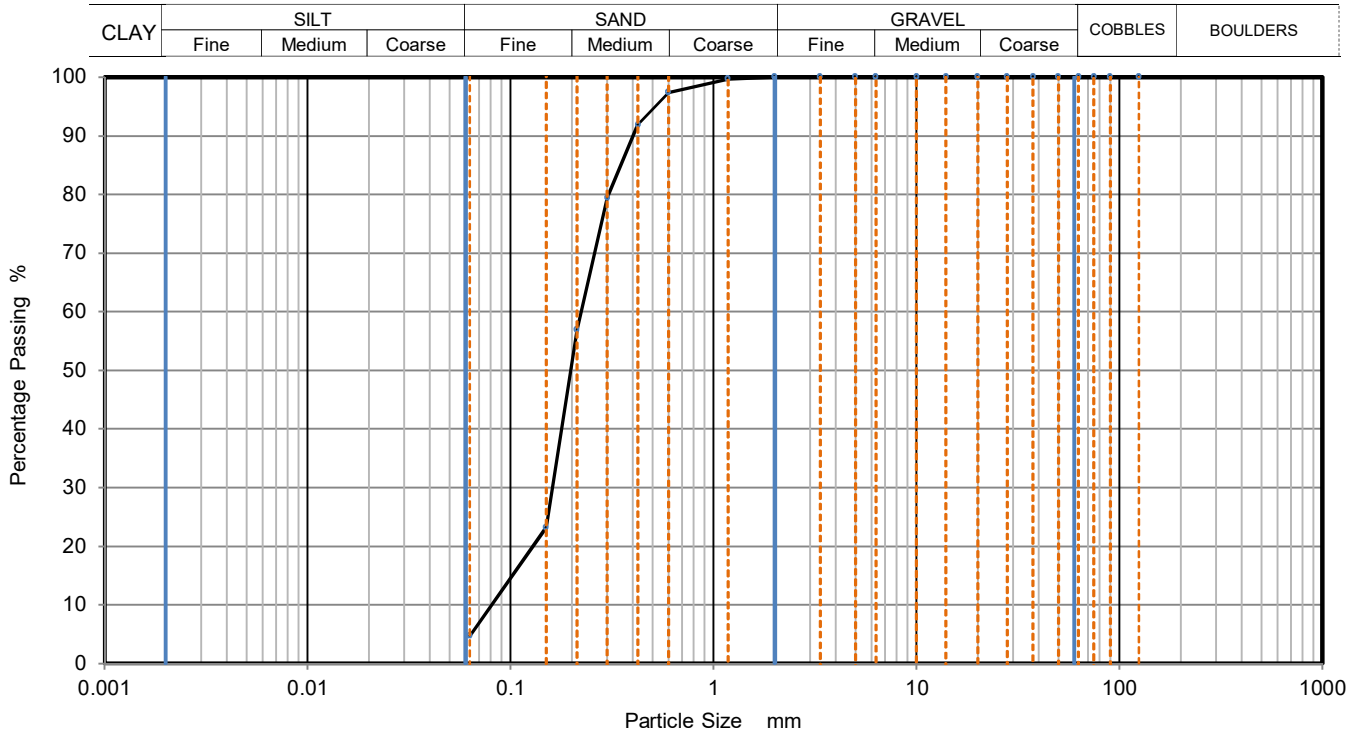
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey brown slightly silty SAND.	Sample Depth (m)	13.50
		Sample Reference	B46



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	97		
0.425	92		
0.3	79		
0.212	57		
0.15	23		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	95
Fines <0.063mm	5

Grading Analysis		
D100	mm	
D60	mm	0.222
D30	mm	0.161
D10	mm	0.081
Uniformity Coefficient		2.8
Curvature Coefficient		1.4

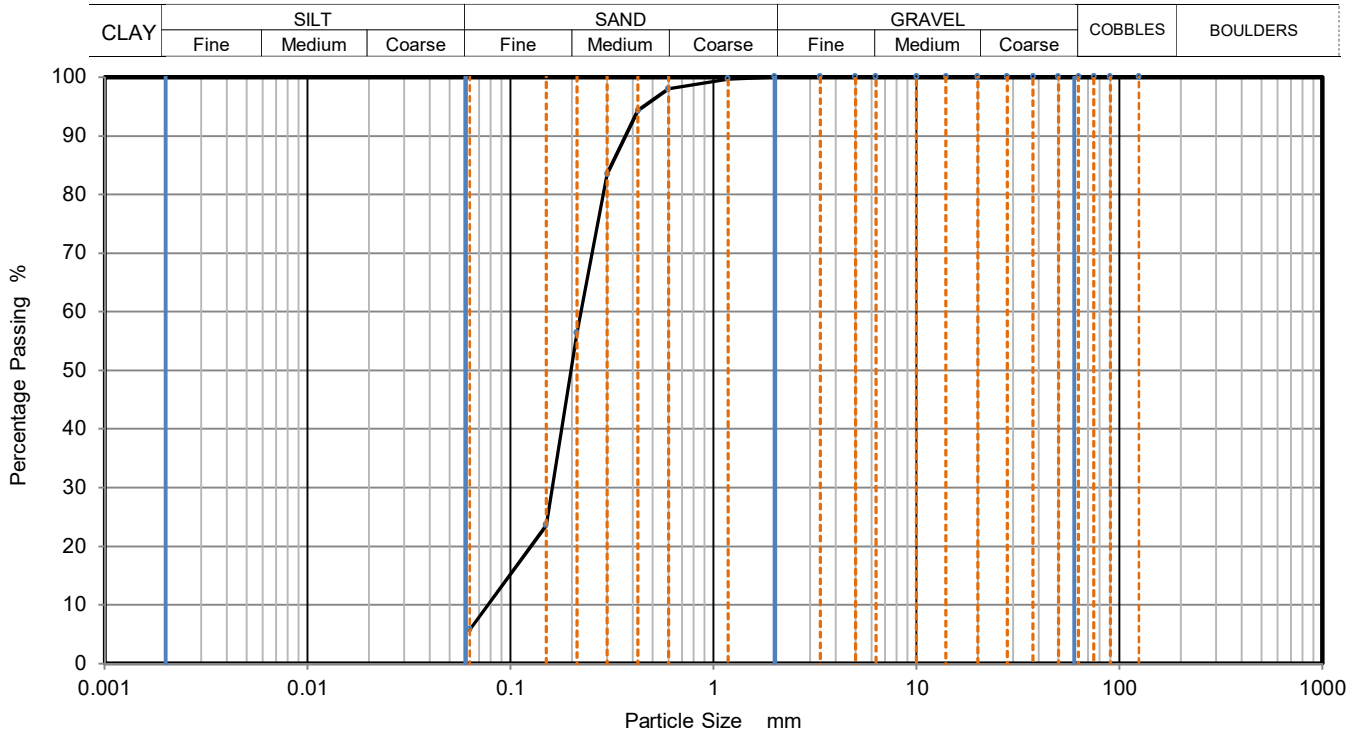
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey brown silty SAND.	Sample Depth (m)	15.50
		Sample Reference	B52



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98		
0.425	94		
0.3	84		
0.212	56		
0.15	24		
0.063	6		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	94
Fines <0.063mm	6

Grading Analysis		
D100	mm	
D60	mm	0.222
D30	mm	0.160
D10	mm	0.077
Uniformity Coefficient		2.9
Curvature Coefficient		1.5

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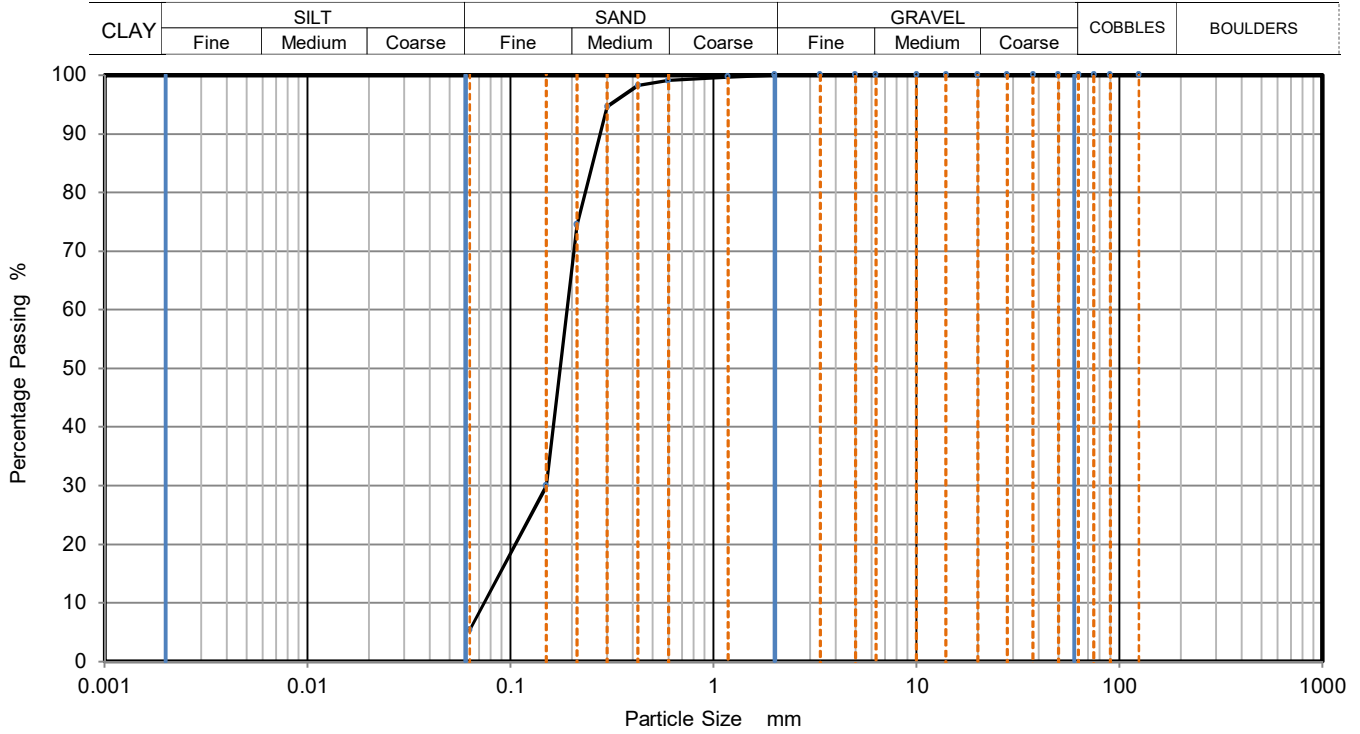




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey brown slightly silty SAND.	Sample Depth (m)	18.50
		Sample Reference	B58



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	98		
0.3	95		
0.212	75		
0.15	30		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	95
Fines <0.063mm	5

Grading Analysis		
D100	mm	
D60	mm	0.189
D30	mm	0.150
D10	mm	0.074
Uniformity Coefficient		2.6
Curvature Coefficient		1.6

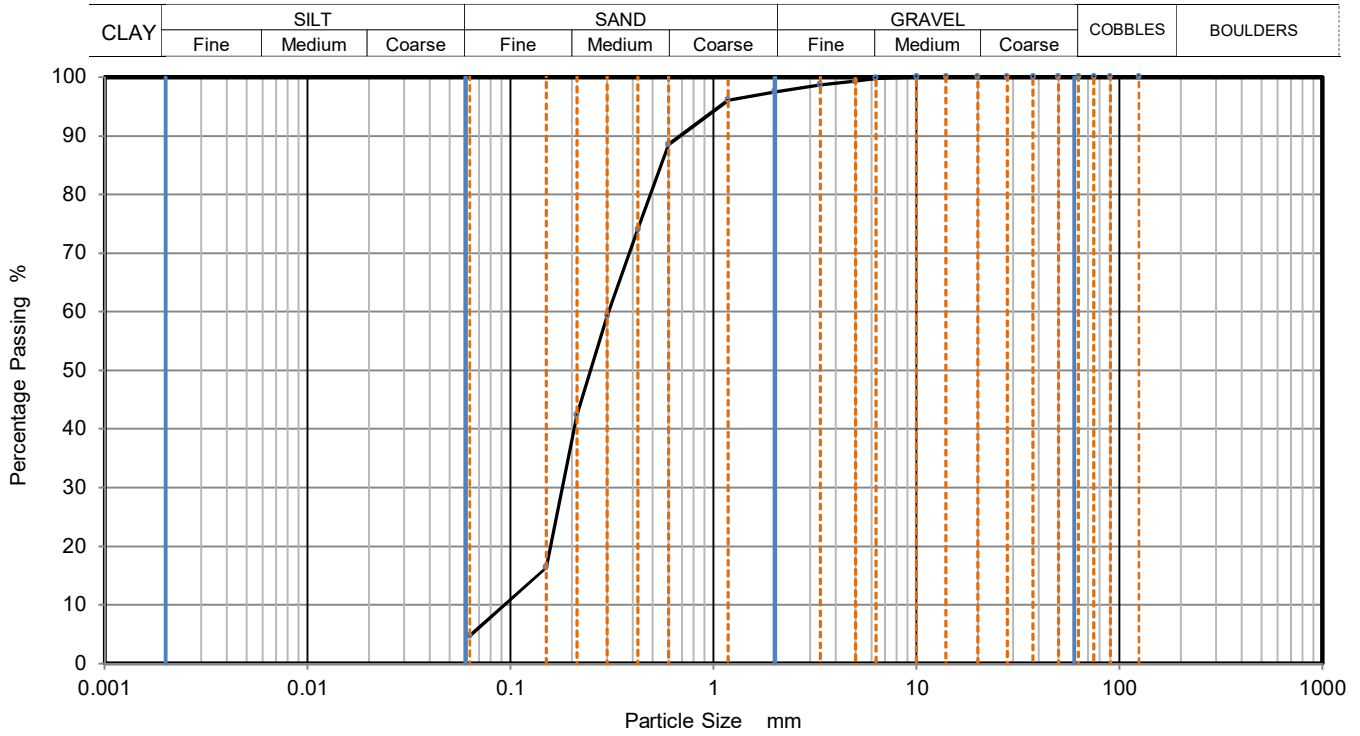
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Orange brown slightly silty slightly gravelly SAND. Gravel is of flint and quartz.	Sample Depth (m)	20.80
		Sample Reference	B63



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	99		
3.35	99		
2	98		
1.18	96		
0.6	89		
0.425	74		
0.3	59		
0.212	42		
0.15	16		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	93
Fines <0.063mm	5

Grading Analysis		
D100	mm	
D60	mm	0.305
D30	mm	0.180
D10	mm	0.093
Uniformity Coefficient		3.3
Curvature Coefficient		1.1

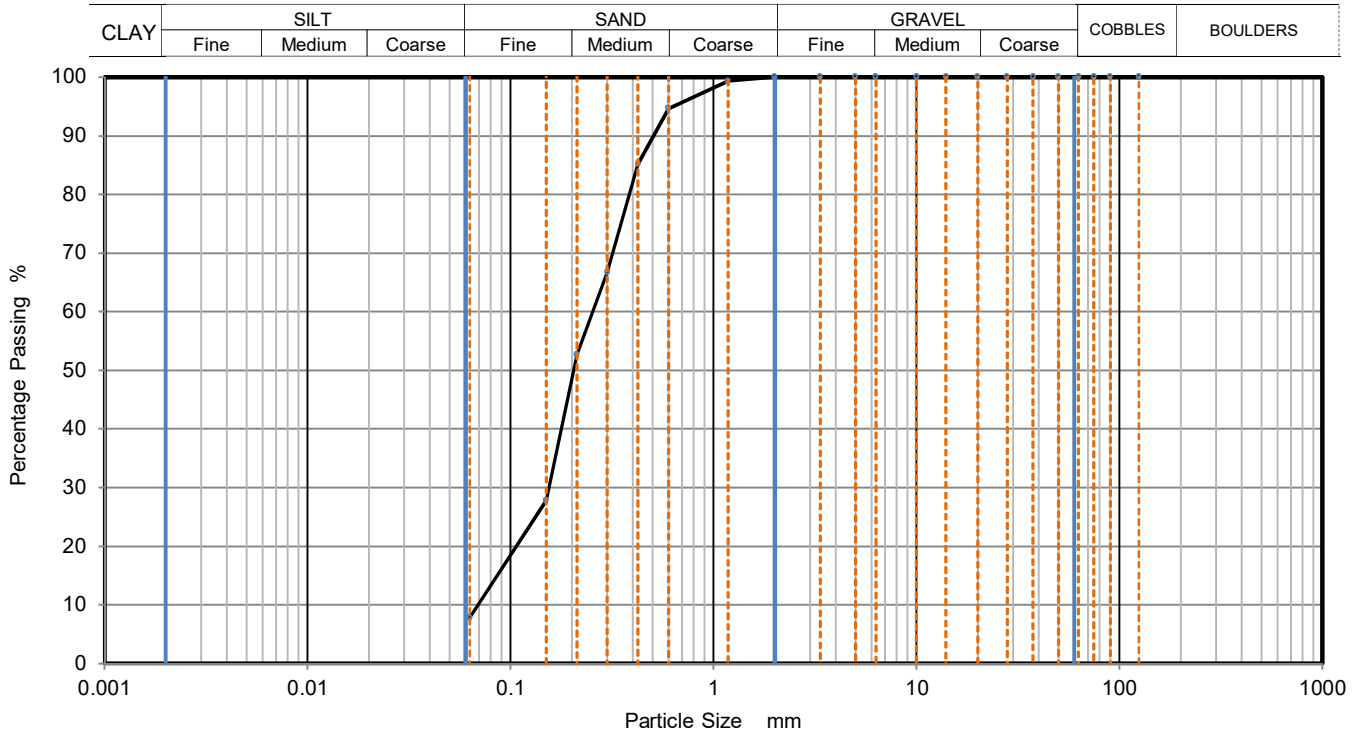
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey brown and dark grey silty SAND	Sample Depth (m)	22.00
		Sample Reference	B64



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	95		
0.425	85		
0.3	67		
0.212	53		
0.15	28		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	92
Fines <0.063mm	8

Grading Analysis		
D100	mm	
D60	mm	0.254
D30	mm	0.155
D10	mm	0.069
Uniformity Coefficient		3.7
Curvature Coefficient		1.4

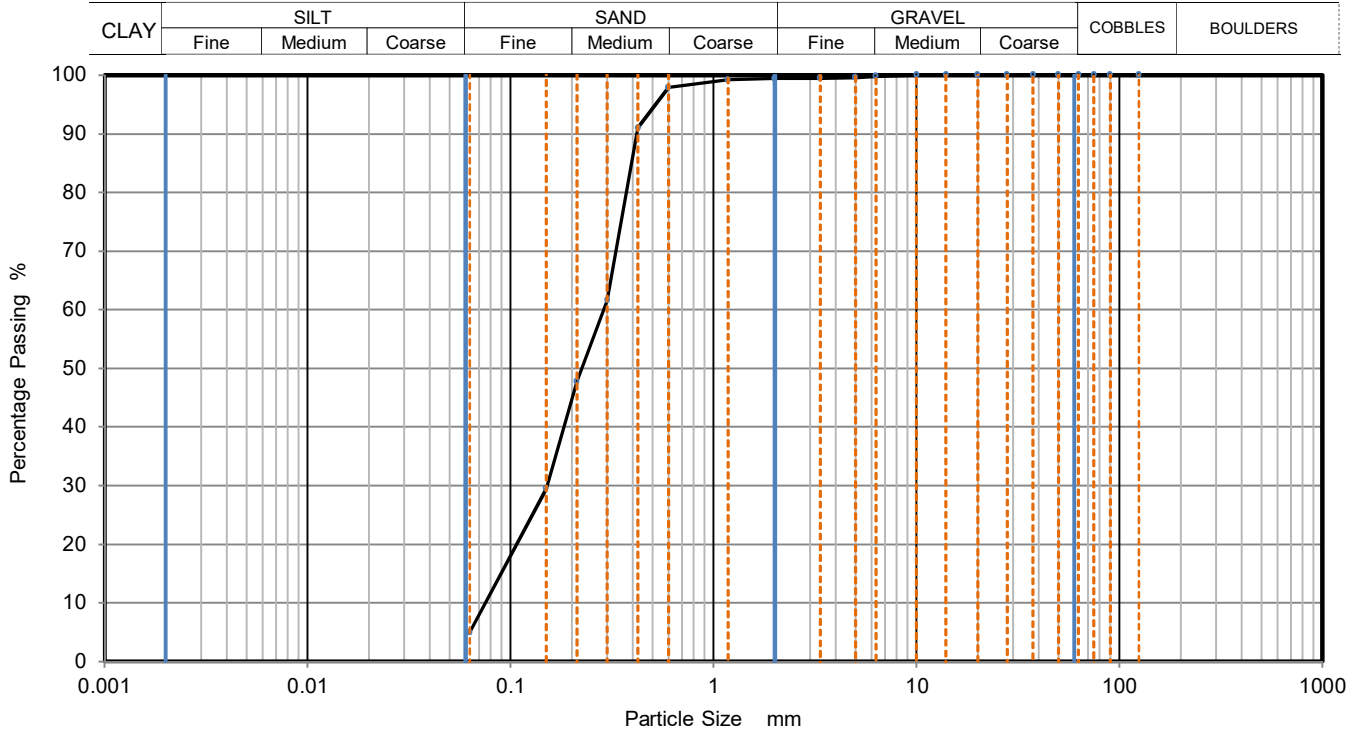
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey brown slightly silty slightly gravelly SAND. Gravel is of shell fragments	Sample Depth (m)	24.00
		Sample Reference	B68



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	98		
0.425	91		
0.3	62		
0.212	48		
0.15	30		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	94
Fines <0.063mm	5

Grading Analysis		
D100	mm	
D60	mm	0.288
D30	mm	0.151
D10	mm	0.075
Uniformity Coefficient		3.8
Curvature Coefficient		1.1

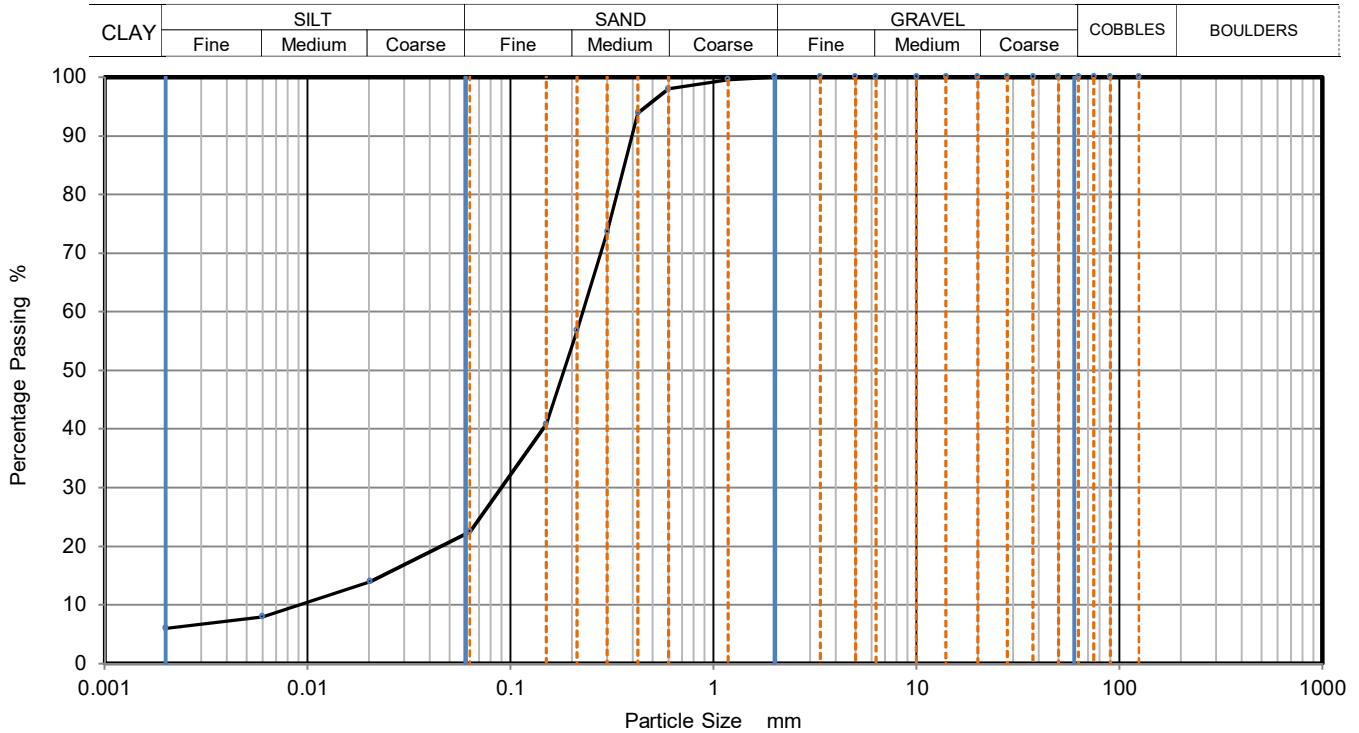
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark grey clayey silty SAND	Sample Depth (m)	27.00
		Sample Reference	B74



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	14
90	100	0.0060	8
75	100	0.0020	6
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98	Particle density (assumed)	
0.425	94	2.65	Mg/m3
0.3	74		
0.212	57		
0.15	41		
0.063	23		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	78
Silt	17
Clay	6

Grading Analysis		
D100	mm	
D60	mm	0.227
D30	mm	0.090
D10	mm	0.009
Uniformity Coefficient		26
Curvature Coefficient		4

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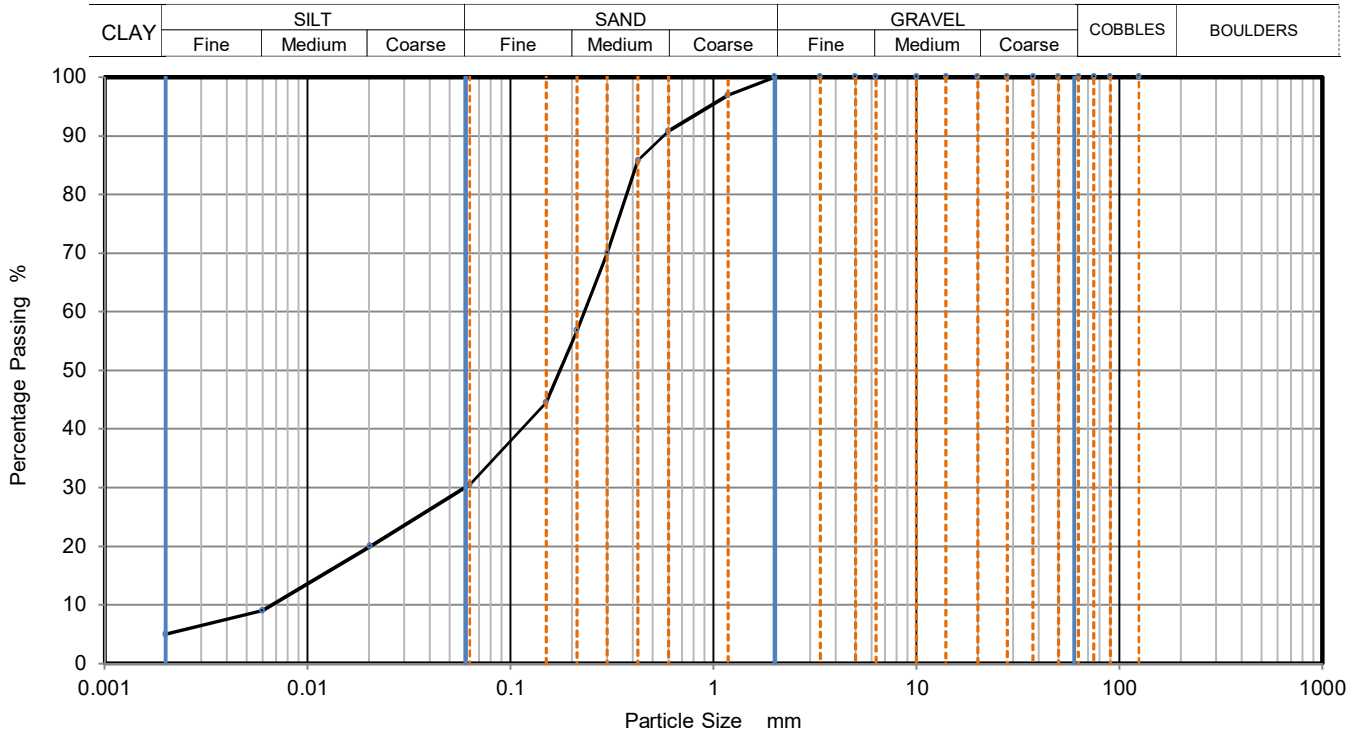




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark grey slightly clayey very silty SAND	Sample Depth (m)	29.00
		Sample Reference	B80



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	20
90	100	0.0060	9
75	100	0.0020	5
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	97		
0.6	91		
0.425	86	Particle density (assumed) 2.65 Mg/m3	
0.3	70		
0.212	57		
0.15	45		
0.063	31		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	70
Silt	25
Clay	5

Grading Analysis		
D100	mm	
D60	mm	0.231
D30	mm	0.060
D10	mm	0.006
Uniformity Coefficient		36
Curvature Coefficient		2.4

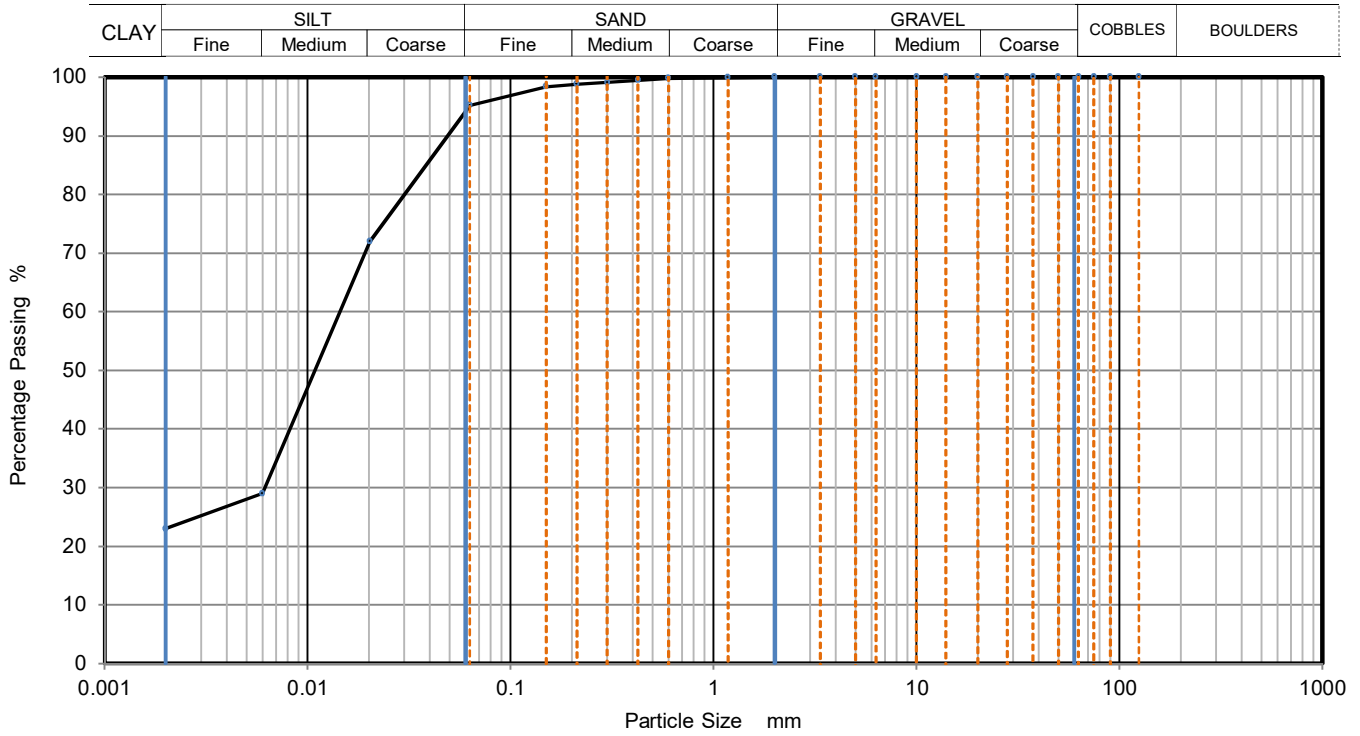
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark grey slightly sandy very silty CLAY.	Sample Depth (m)	31.00
		Sample Reference	D82



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	72
90	100	0.0060	29
75	100	0.0020	23
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	100	Particle density (assumed) 2.65 Mg/m3	
0.3	99		
0.212	99		
0.15	98		
0.063	95		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	5
Silt	72
Clay	23

Grading Analysis		
D100	mm	
D60	mm	0.014
D30	mm	0.006
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

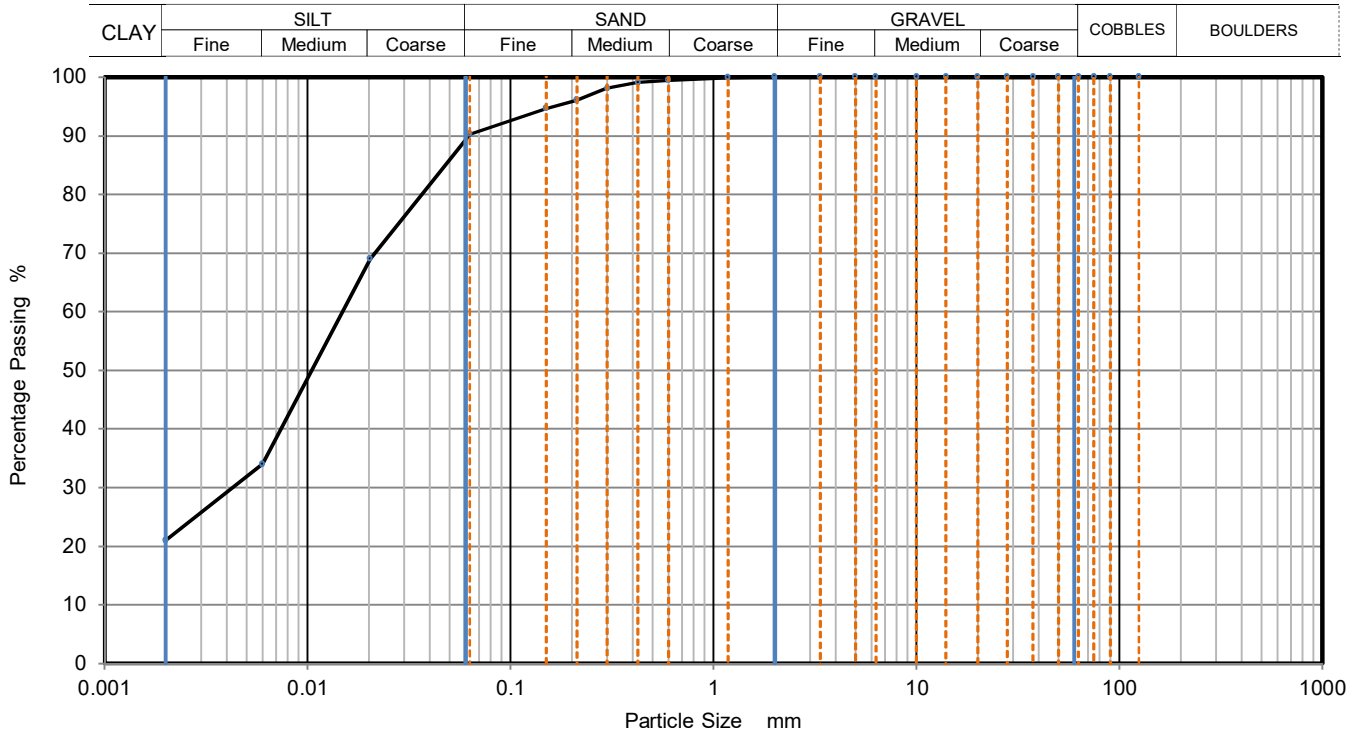
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark grey slightly sandy very silty CLAY	Sample Depth (m)	31.55
		Sample Reference	D85



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	69
90	100	0.0060	34
75	100	0.0020	21
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99	Particle density (assumed)	
0.3	98	2.65	Mg/m3
0.212	96		
0.15	95		
0.063	90		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	10
Silt	70
Clay	21

Grading Analysis		
D100	mm	
D60	mm	0.015
D30	mm	0.004
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

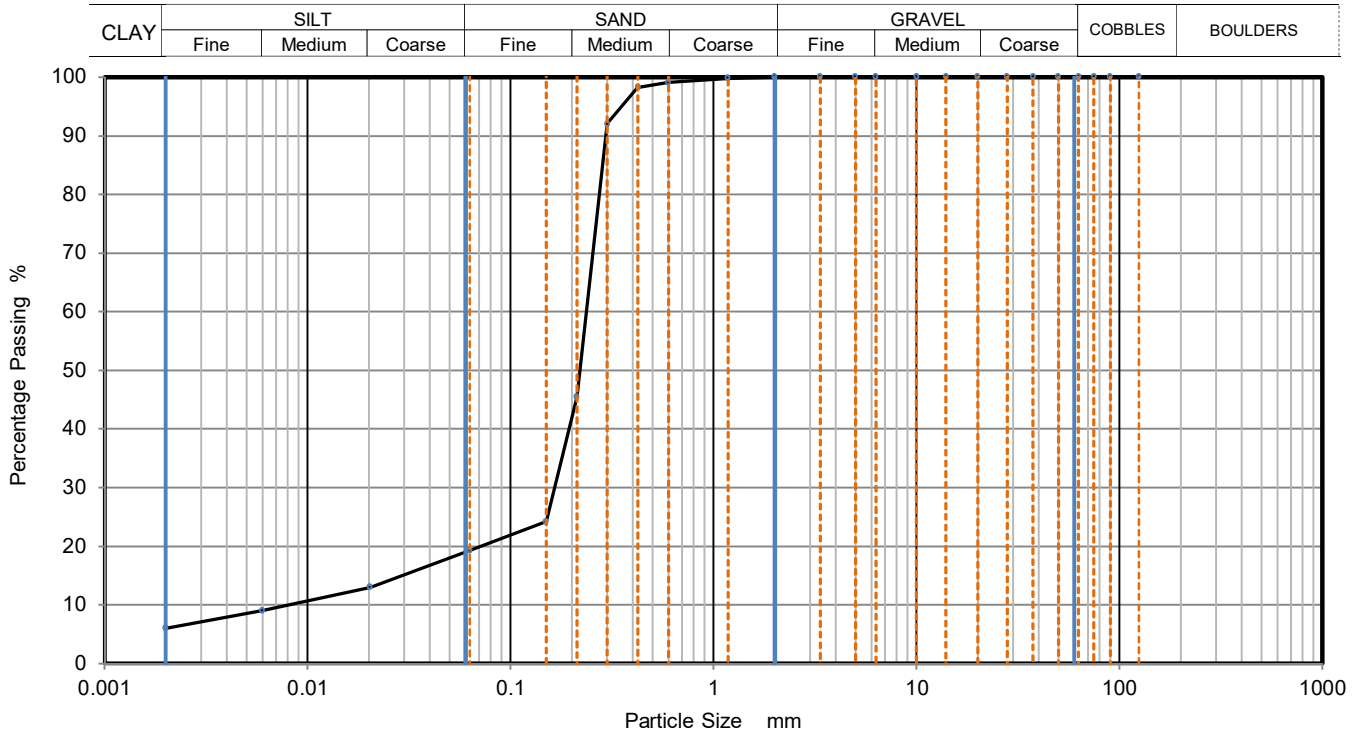
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey clayey silty SAND.	Sample Depth (m)	34.00
		Sample Reference	B90



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	13
90	100	0.0060	9
75	100	0.0020	6
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	98		
0.3	92		
0.212	46		
0.15	24		
0.063	19		
		Particle density (assumed) 2.65 Mg/m <sup>3</sup>	

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	81
Silt	14
Clay	6

Grading Analysis		
D100	mm	
D60	mm	0.236
D30	mm	0.165
D10	mm	0.008
Uniformity Coefficient		28
Curvature Coefficient		14

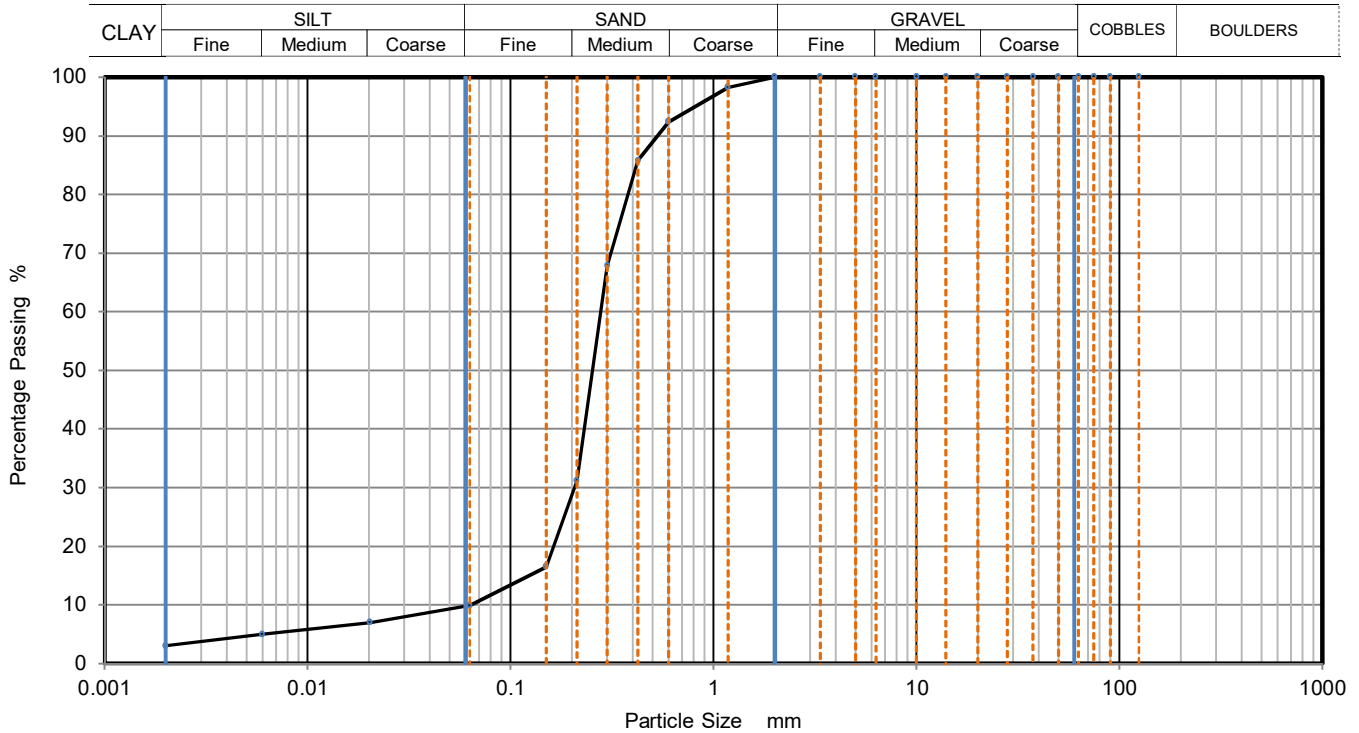
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey brown slightly clayey silty SAND.	Sample Depth (m)	37.00
		Sample Reference	B95



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	7
90	100	0.0060	5
75	100	0.0020	3
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	98		
0.6	92		
0.425	86	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	68		
0.212	31		
0.15	17		
0.063	10		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	90
Silt	7
Clay	3

Grading Analysis		
D100	mm	
D60	mm	0.279
D30	mm	0.206
D10	mm	0.064
Uniformity Coefficient		4.3
Curvature Coefficient		2.4

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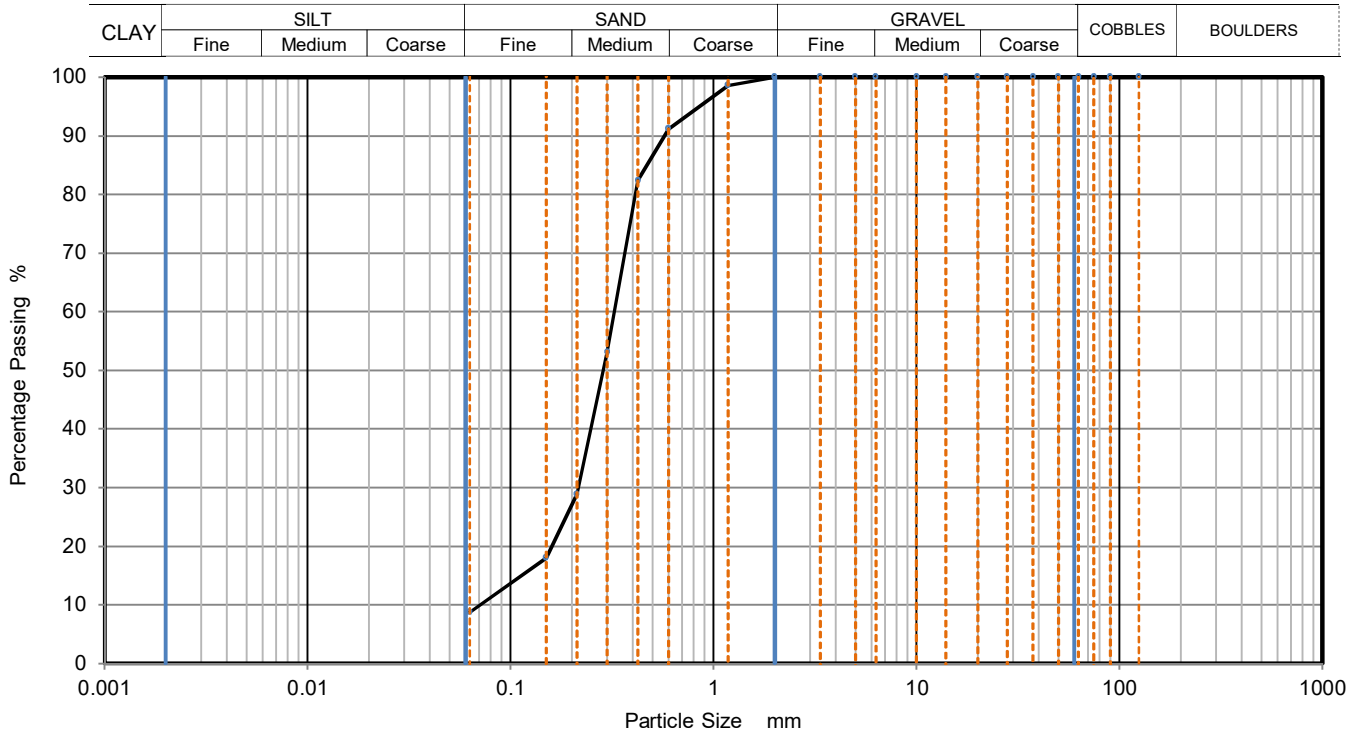




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey silty SAND	Sample Depth (m)	40.00
		Sample Reference	B98



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	91		
0.425	82		
0.3	53		
0.212	29		
0.15	18		
0.063	9		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	91
Fines <0.063mm	9

Grading Analysis		
D100	mm	
D60	mm	0.326
D30	mm	0.215
D10	mm	0.071
Uniformity Coefficient		4.6
Curvature Coefficient		2

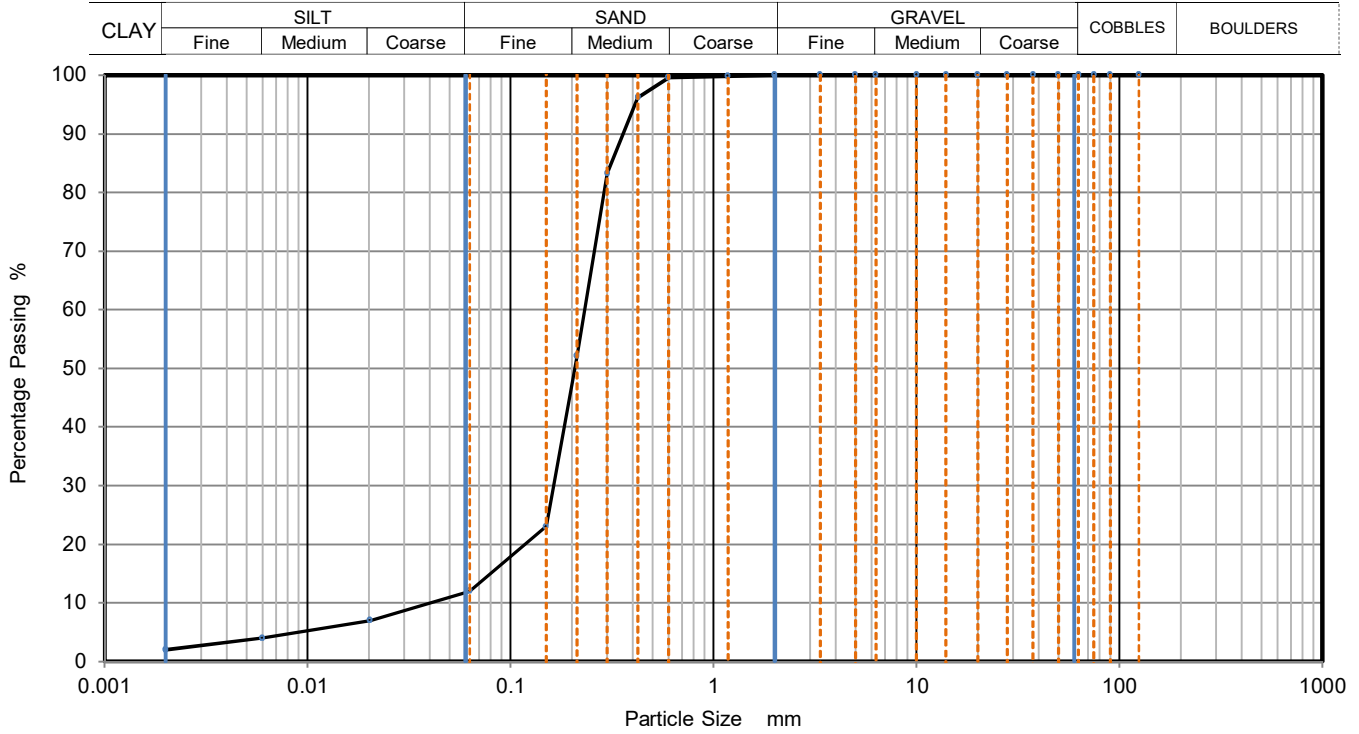
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey slightly clayey silty SAND.	Sample Depth (m)	43.00
		Sample Reference	B105



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	7
90	100	0.0060	4
75	100	0.0020	2
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	96	Particle density (assumed) 2.65 Mg/m3	
0.3	83		
0.212	52		
0.15	23		
0.063	12		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	88
Silt	10
Clay	2

Grading Analysis		
D100	mm	
D60	mm	0.232
D30	mm	0.163
D10	mm	0.040
Uniformity Coefficient		5.8
Curvature Coefficient		2.9

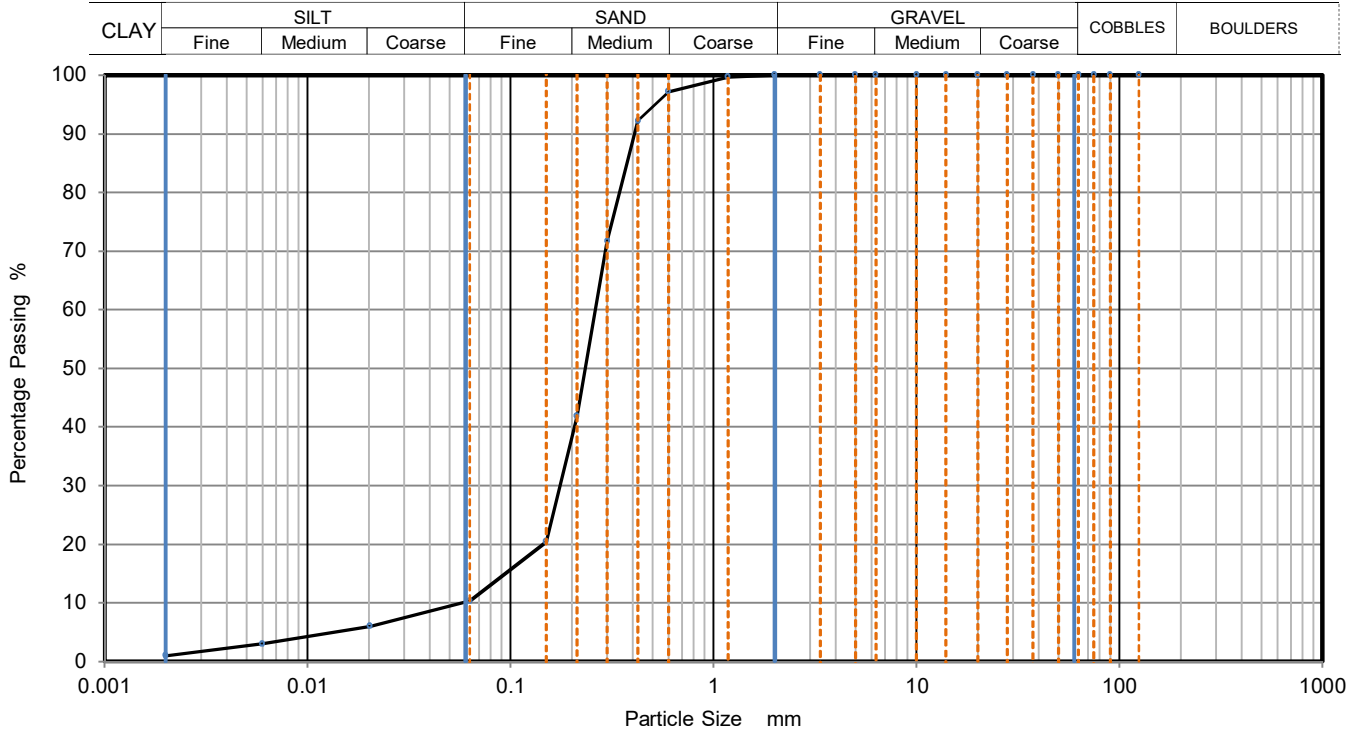
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey slightly clayey silty SAND.	Sample Depth (m)	45.00
		Sample Reference	B108



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	6
90	100	0.0060	3
75	100	0.0020	1
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	97		
0.425	92		
0.3	72		
0.212	42		
0.15	20		
0.063	10		
		Particle density (assumed) 2.65 Mg/m <sup>3</sup>	

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	90
Silt	9
Clay	2

Grading Analysis		
D100	mm	
D60	mm	0.262
D30	mm	0.175
D10	mm	0.059
Uniformity Coefficient		4.4
Curvature Coefficient		2

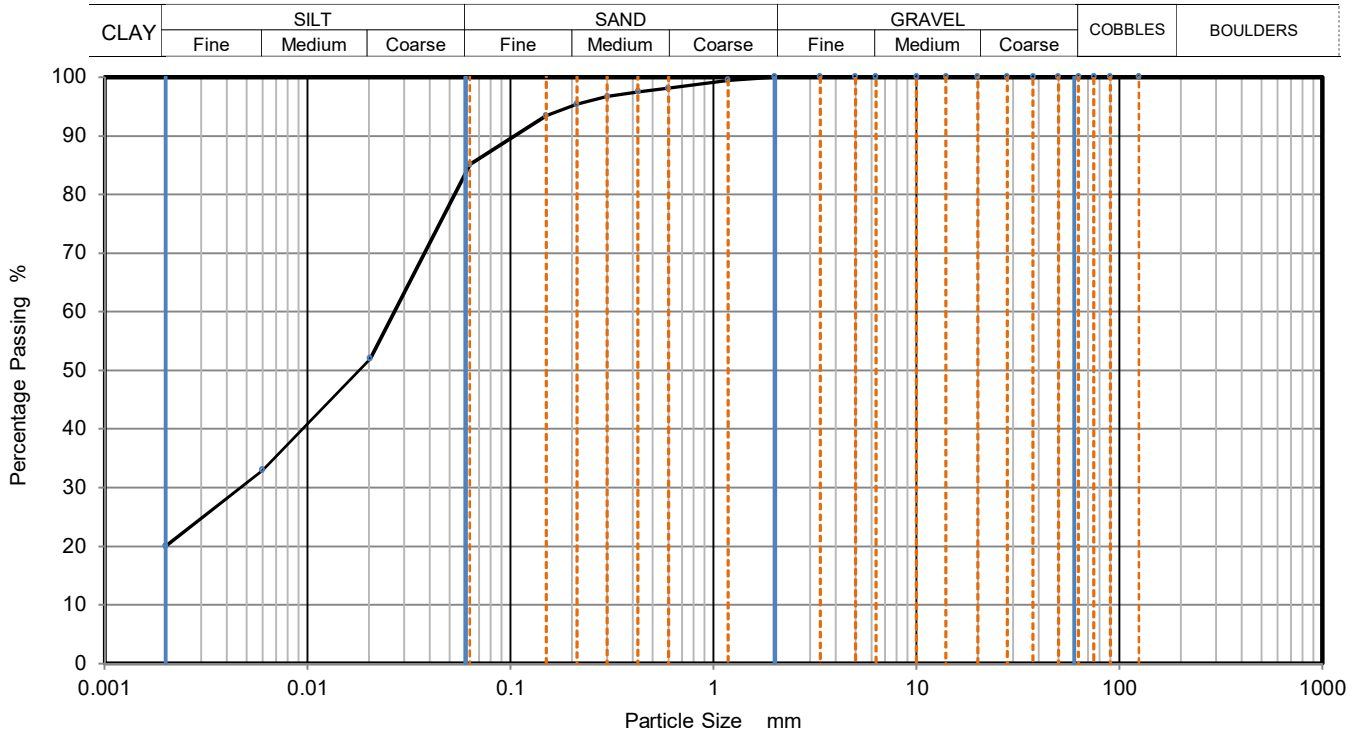
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey and dark grey slightly sandy very silty CLAY	Sample Depth (m)	45.95
		Sample Reference	D109



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	52
90	100	0.0060	33
75	100	0.0020	20
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98	Particle density (assumed)	
0.425	98	2.65	Mg/m3
0.3	97		
0.212	95		
0.15	93		
0.063	85		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	15
Silt	66
Clay	20

Grading Analysis		
D100	mm	
D60	mm	0.027
D30	mm	0.005
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

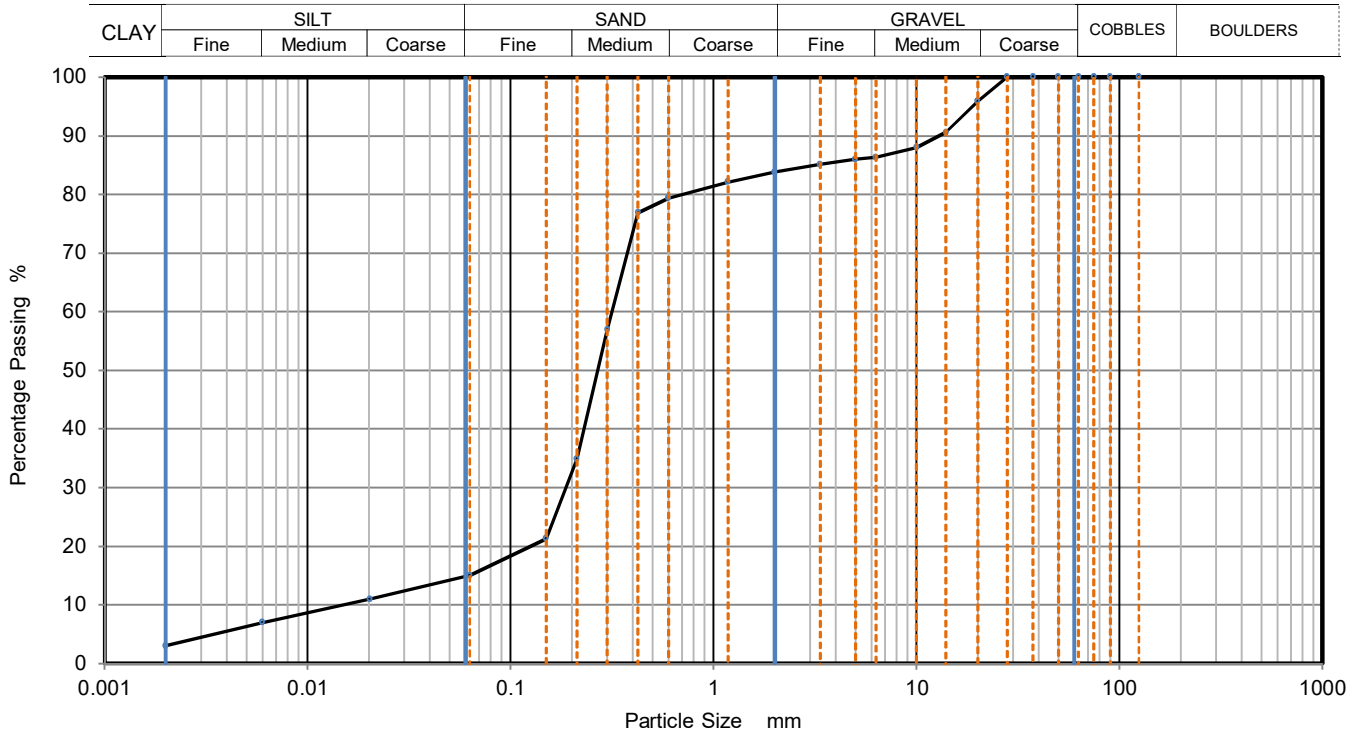
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Grey slightly clayey silty gravelly SAND. Gravel is of flint and shell fragments.	Sample Depth (m)	46.45
		Sample Reference	B111



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	11
90	100	0.0060	7
75	100	0.0020	3
63	100		
50	100		
37.5	100		
28	100		
20	96		
14	91		
10	88		
6.3	86		
5	86		
3.35	85		
2	84		
1.18	82		
0.6	79		
0.425	77		
0.3	57		
0.212	35		
0.15	21		
0.063	15		
		Particle density (assumed) 2.65 Mg/m <sup>3</sup>	

Sample Proportions	% dry mass
Very coarse	0
Gravel	16
Sand	69
Silt	12
Clay	3

Grading Analysis		
D100	mm	
D60	mm	0.316
D30	mm	0.187
D10	mm	0.014
Uniformity Coefficient		23
Curvature Coefficient		8

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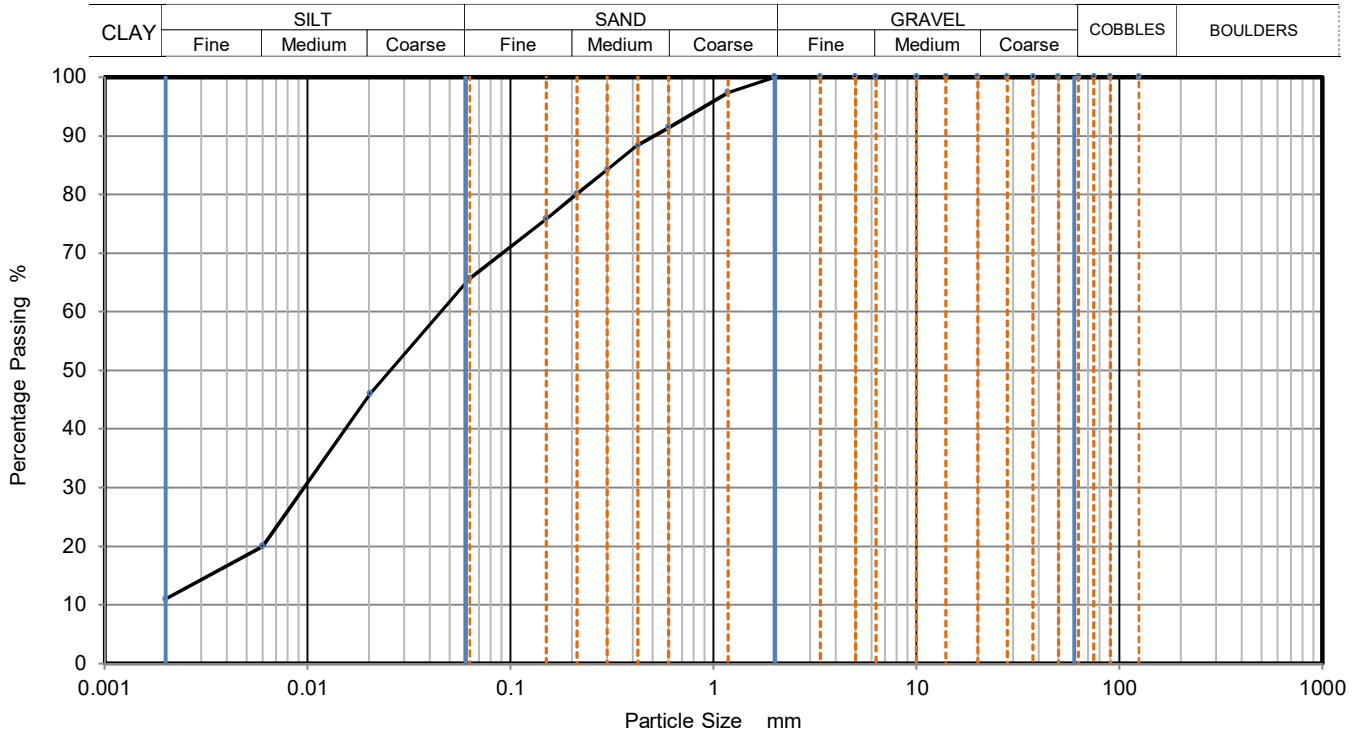




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark grey slightly sandy clayey SILT	Sample Depth (m)	46.80
		Sample Reference	D112



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	46
90	100	0.0060	20
75	100	0.0020	11
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	97		
0.6	91		
0.425	88	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	84		
0.212	80		
0.15	76		
0.063	66		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	34
Silt	54
Clay	11

Grading Analysis		
D100	mm	
D60	mm	0.045
D30	mm	0.010
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

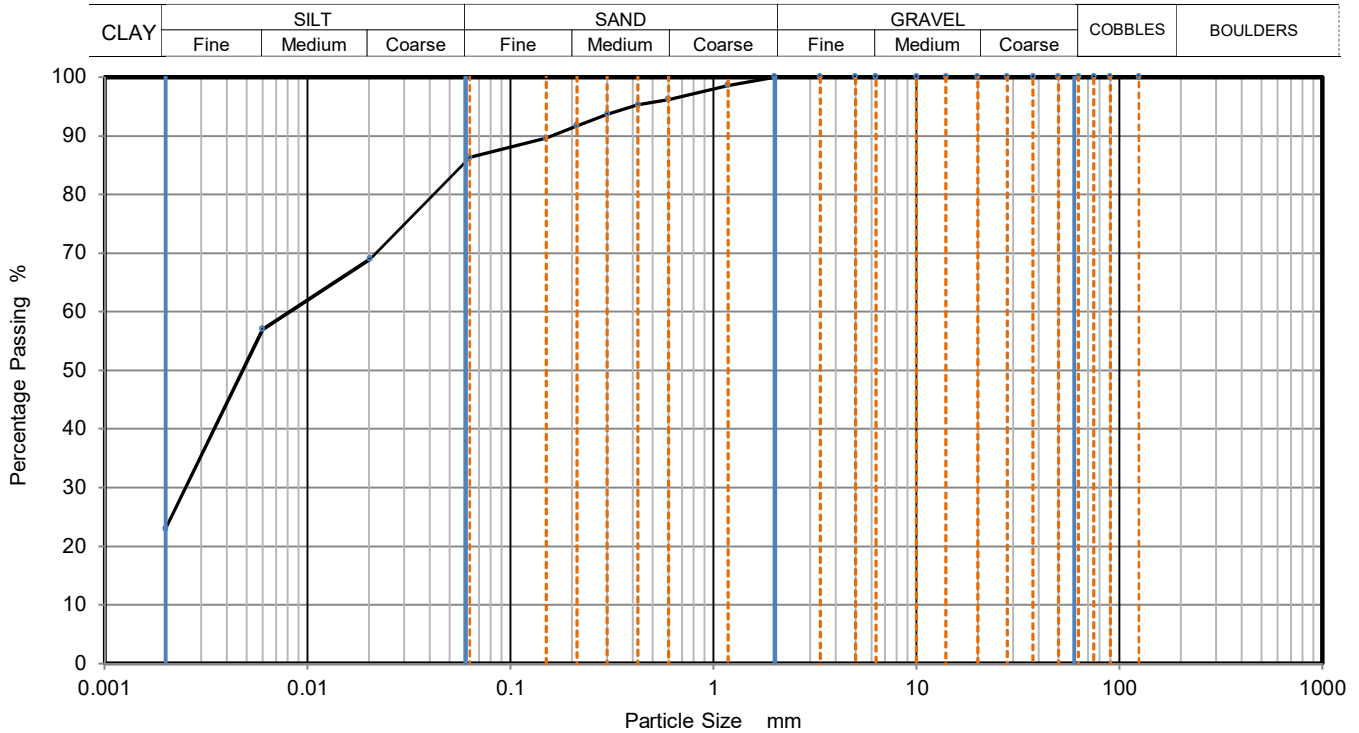
Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark brown slightly sandy silty CLAY.	Sample Depth (m)	47.55
		Sample Reference	D115



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	69
90	100	0.0060	57
75	100	0.0020	23
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	96		
0.425	95	Particle density (assumed) 2.65 Mg/m3	
0.3	94		
0.212	92		
0.15	90		
0.063	86		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	14
Silt	64
Clay	23

Grading Analysis		
D100	mm	
D60	mm	0.008
D30	mm	0.003
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

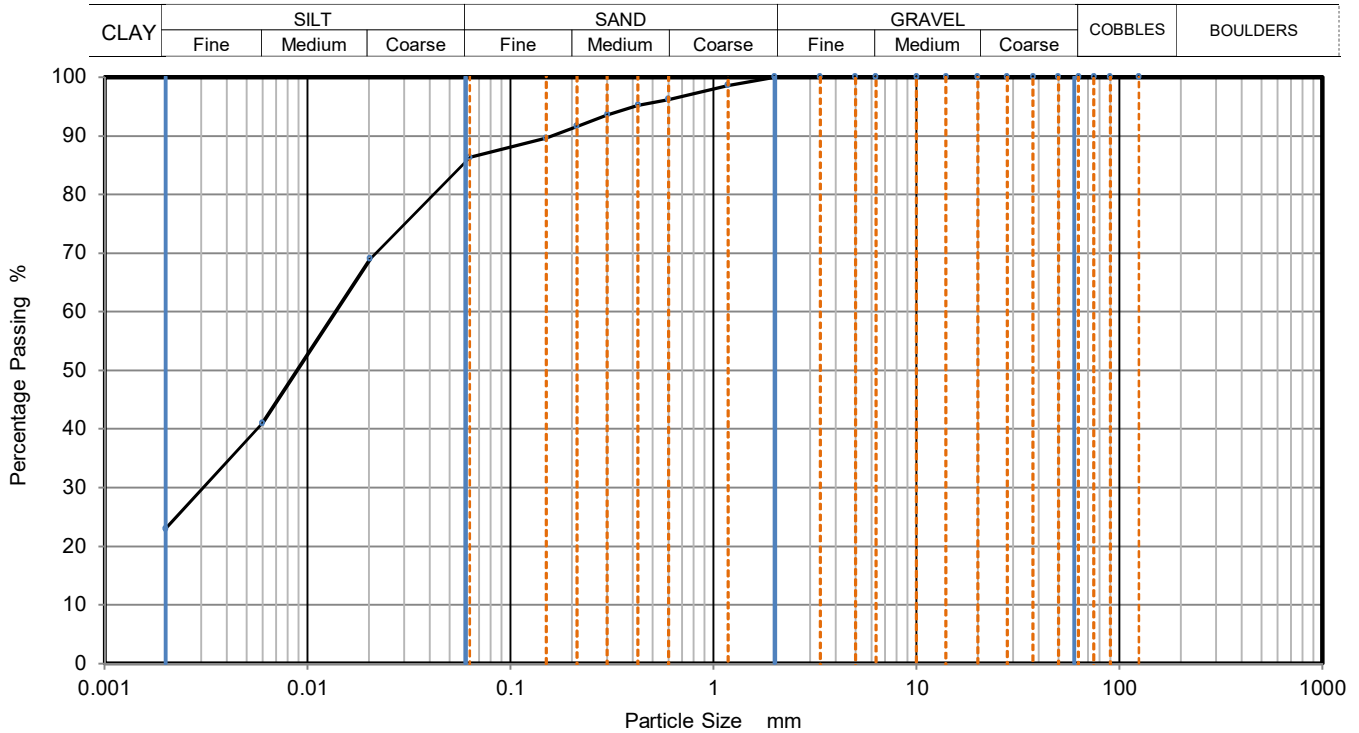
Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH11
Sample Description:	Dark brown slightly sandy silty CLAY	Sample Depth (m)	49.55
		Sample Reference	D120



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	69
90	100	0.0060	41
75	100	0.0020	23
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	96		
0.425	95		
0.3	94		
0.212	92		
0.15	90		
0.063	86		
		Particle density (assumed) 2.65 Mg/m <sup>3</sup>	

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	14
Silt	64
Clay	23

Grading Analysis		
D100	mm	
D60	mm	0.014
D30	mm	0.003
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks	Approved	Date	Sheet No.:
	MW	31/05/2018	1 of 1

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180212003-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 3  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

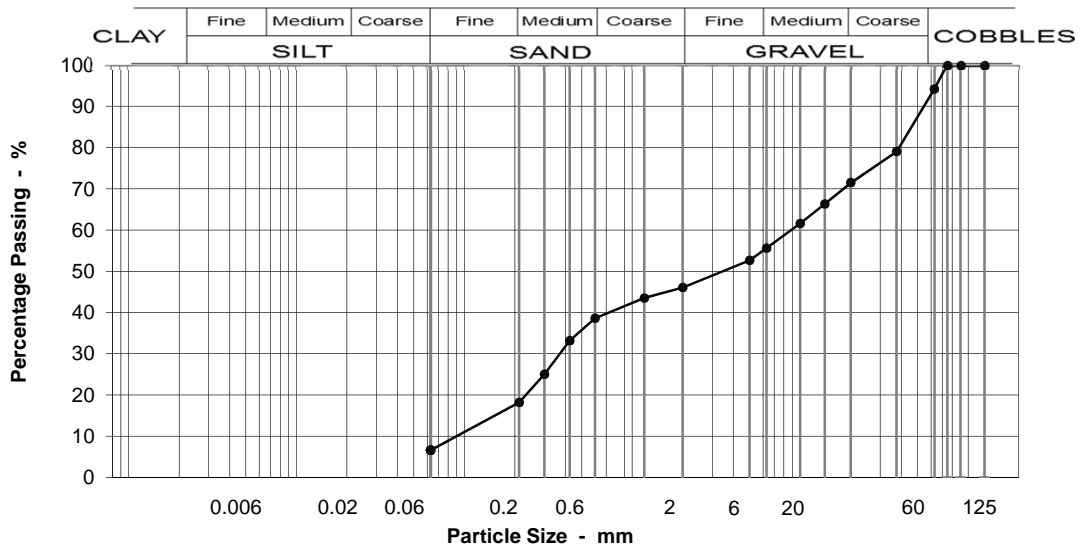
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 0.5 - 0.7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	94
37.5	79
20	71
14	66
10	62
6.3	56
5	53
2	46
1.18	44
0.600	39
0.425	33
0.300	25
0.212	18
0.063	7

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 13

Sample Proportions	
BOULDERS	0
COBBLES	6
Coarse GRAVEL	23
Medium GRAVEL	16
Fine GRAVEL	10
Coarse SAND	7
Medium SAND	20
Fine SAND	12
Silt & Clay	7

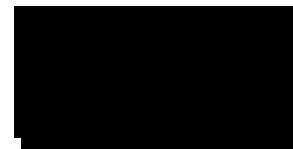
Grading Analysis	
D100	63
D60	9.00
D10	0.11
Uniformity Coefficient	85

**Description**  
MADE GROUND comprising of up to cobble size sub-rounded to angular brick, concrete and flint in a matrix of greyish brown slightly silty fine and medium SAND.

Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

**Our reference No.** GTS6180212005-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 5  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 23-Apr-18

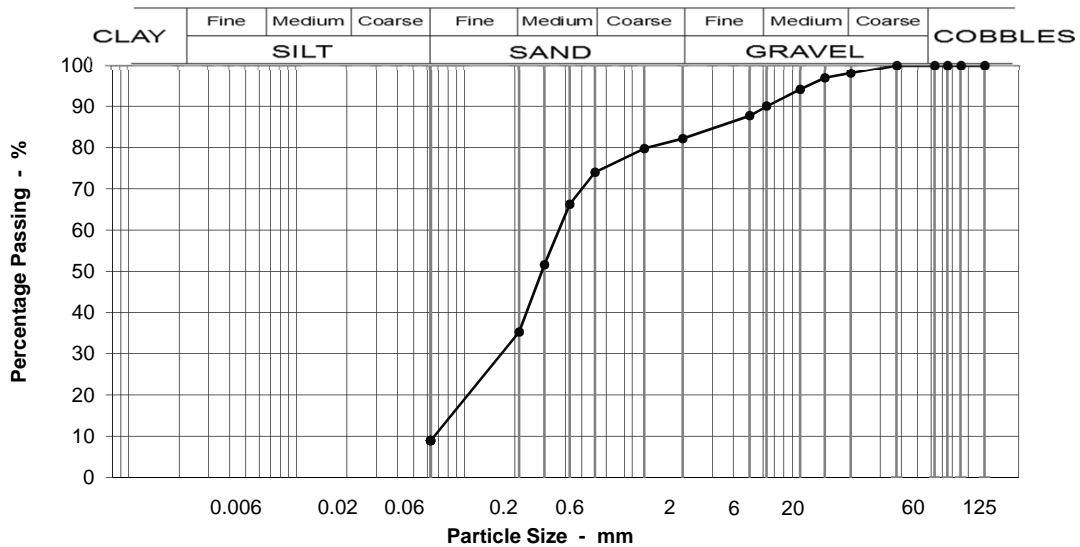
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 0.7 - 0.9m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



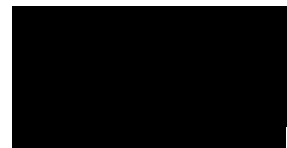
Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6J, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	2
63	100		Medium GRAVEL	8
37.5	100		Fine GRAVEL	8
20	98		Coarse SAND	8
14	97		Medium SAND	39
10	94		Fine SAND	26
6.3	90		Silt & Clay	9
5	88		<b>Grading Analysis</b>	
2	82		D100	20
1.18	80		D60	0.37
0.600	74		D10	0.07
0.425	66		Uniformity Coefficient	5
0.300	52		<b>Description</b>	
0.212	35	MADE GROUND comprising of greyish brown slightly silty gravelly fine and medium SAND. Gravel is sub-rounded to angular, fine and medium concrete, brick and flint.		
0.063	9			

Moisture content % 11

Test Code = 610



Simon Holden (Project Technician)





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County Hall  
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Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS6180212008-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 8  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 23-Apr-18

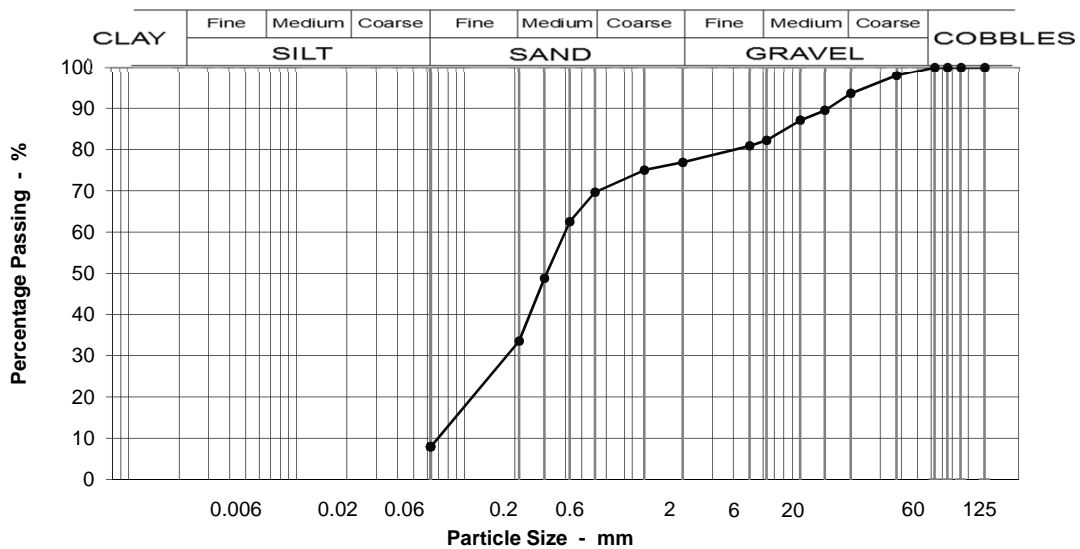
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 1.05 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	98
20	94
14	89
10	87
6.3	82
5	81
2	77
1.18	75
0.600	70
0.425	63
0.300	49
0.212	34
0.063	8

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6J, 6M.**

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	6
Medium GRAVEL	11
Fine GRAVEL	5
Coarse SAND	7
Medium SAND	36
Fine SAND	26
Silt & Clay	8

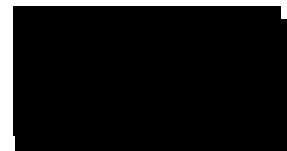
Grading Analysis	
D100	38
D60	0.40
D10	0.07
Uniformity Coefficient	5

**Description**  
MADE GROUND comprising of greyish brown, slightly silty very gravelly fine and medium SAND. Gravel is sub-rounded to angular, fine, medium and coarse brick and flint.

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
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Our reference No. **GTS6180212010-610**  
Our Project No. PZ1522D1  
Your Sample Ref 10  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

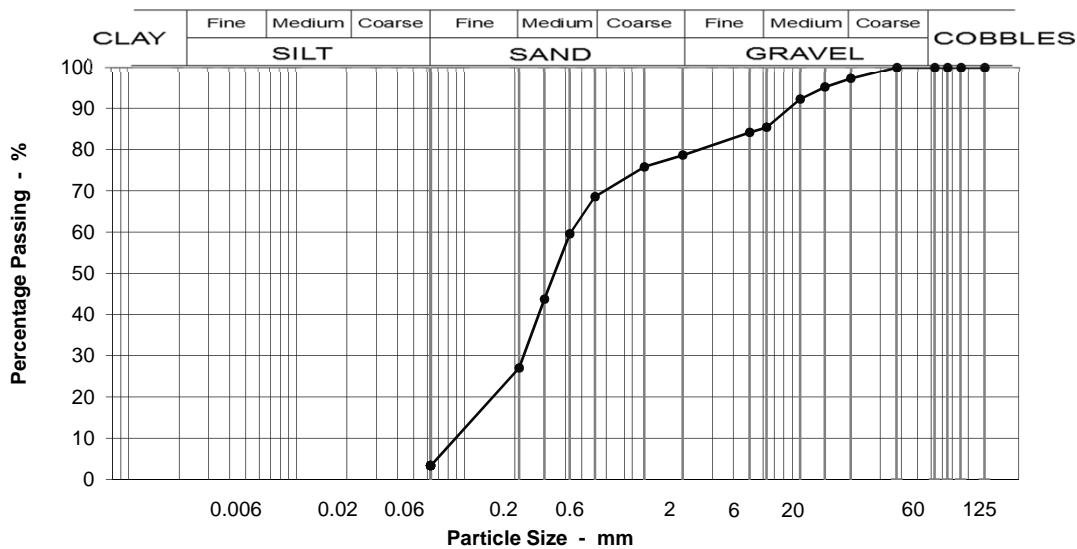
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 1.2 - 1.7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	97
14	95
10	92
6.3	85
5	84
2	79
1.18	76
0.600	69
0.425	60
0.300	44
0.212	27
0.063	3

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	3
Medium GRAVEL	12
Fine GRAVEL	7
Coarse SAND	10
Medium SAND	41
Fine SAND	24
Silt & Clay	3

Grading Analysis	
D100	20
D60	0.43
D10	0.10
Uniformity Coefficient	4

**Description**  
Brown very gravelly fine and medium SAND.  
Gravel is fine and medium angular flint.

Moisture content % 15

Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

**Our reference No.** GTS6180212014-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 14  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 23-Apr-18

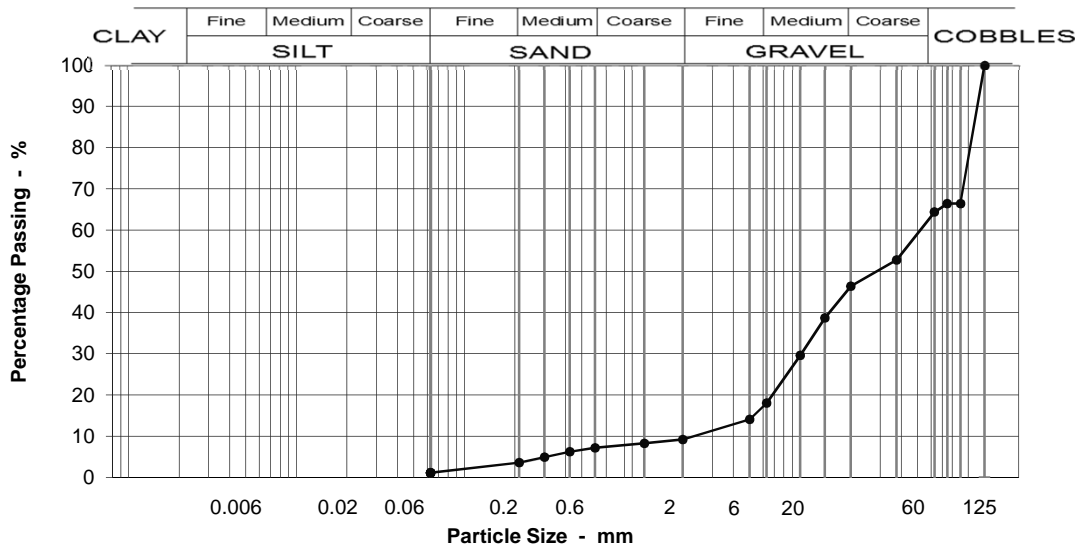
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 2 - 2.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	66
75	66
63	64
37.5	53
20	46
14	39
10	30
6.3	18
5	14
2	9
1.18	8
0.600	7
0.425	6
0.300	5
0.212	4
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A.**

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	36
Coarse GRAVEL	18
Medium GRAVEL	28
Fine GRAVEL	9
Coarse SAND	2
Medium SAND	4
Fine SAND	2
Silt & Clay	1

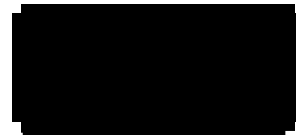
Grading Analysis	
D100	90
D60	53.45
D10	2.49
Uniformity Coefficient	21

**Description**  
MADE GROUND comprising of brownish grey very cobbly silty, slightly sandy medium and coarse angular to sub-angular brick, concrete, asphalt and quartz. Cobbles are angular broken brick.

Test Code = 610



Simon Holden (Project Technician)



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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS6180212017-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **17**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **2-Jul-18**

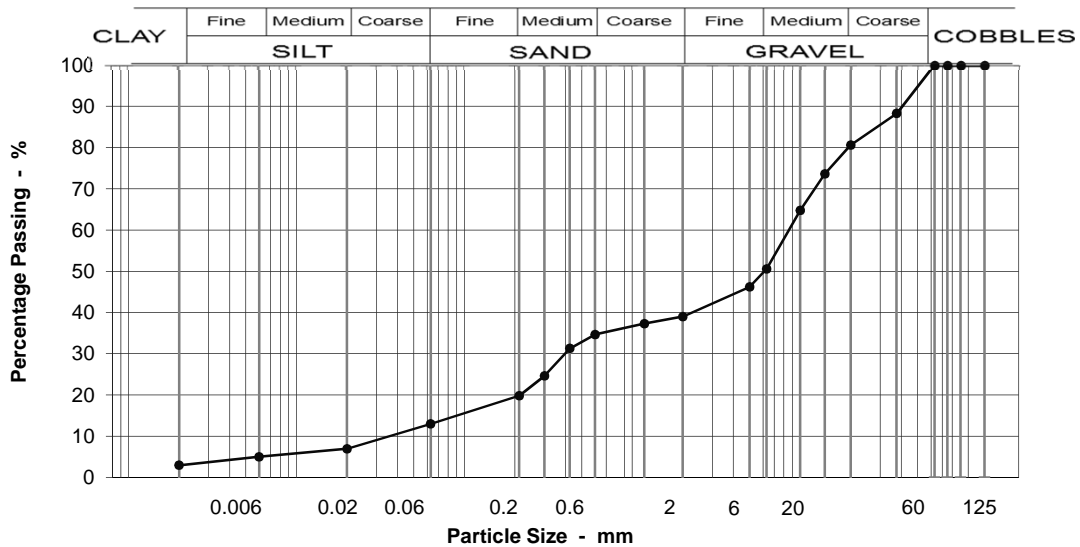
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 3 - 3.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

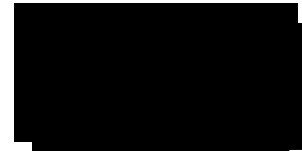


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6N.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	19
63	100		Medium GRAVEL	30
37.5	88		Fine GRAVEL	12
20	81		Coarse SAND	4
14	74		Medium SAND	15
10	65		Fine SAND	7
6.3	51		Silt & Clay	13
5	46		<b>Grading Analysis</b>	
2	39		D100	38
1.18	37		D60	8.76
0.600	35		D10	0.13
0.425	31		Uniformity Coefficient	67
0.300	25		<b>Description</b>	
0.212	20	Grey slightly silty very sandy fine to coarse angular to subangular rounded flint GRAVEL.		
0.063	13			
0.020	7			
0.006	5			
0.002	3	Moisture content %	16	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS6180212020-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 20  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 2-Jul-18

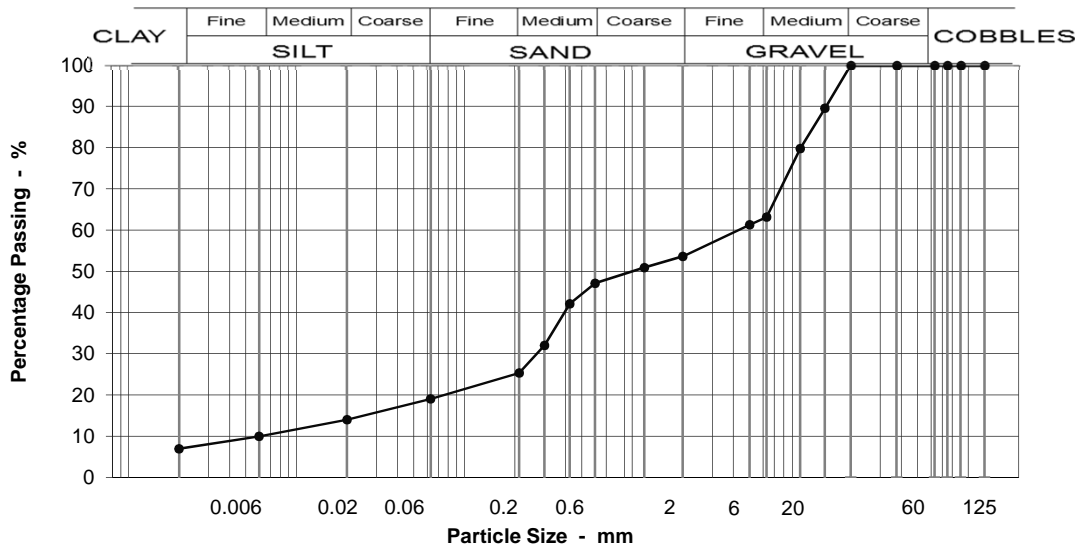
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH11A @ 4 - 4.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2C.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	37
37.5	100		Fine GRAVEL	10
20	100		Coarse SAND	7
14	89		Medium SAND	22
10	80		Fine SAND	6
6.3	63		Silt & Clay	19
5	61			
2	54			
1.18	51			
0.600	47			
0.425	42			
0.300	32			
0.212	25			
0.063	19			
0.020	14			
0.006	10			
0.002	7			
		<b>Moisture content %</b>	26	

Grading Analysis	
D100	14
D60	4.50
D10	0.07
Uniformity Coefficient	63

Description	
Dark grey slightly organic slightly clayey silty fine and medium angular to subrounded flint and siltstone GRAVEL and medium SAND, some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS6180212023-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 23  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 2-Jul-18

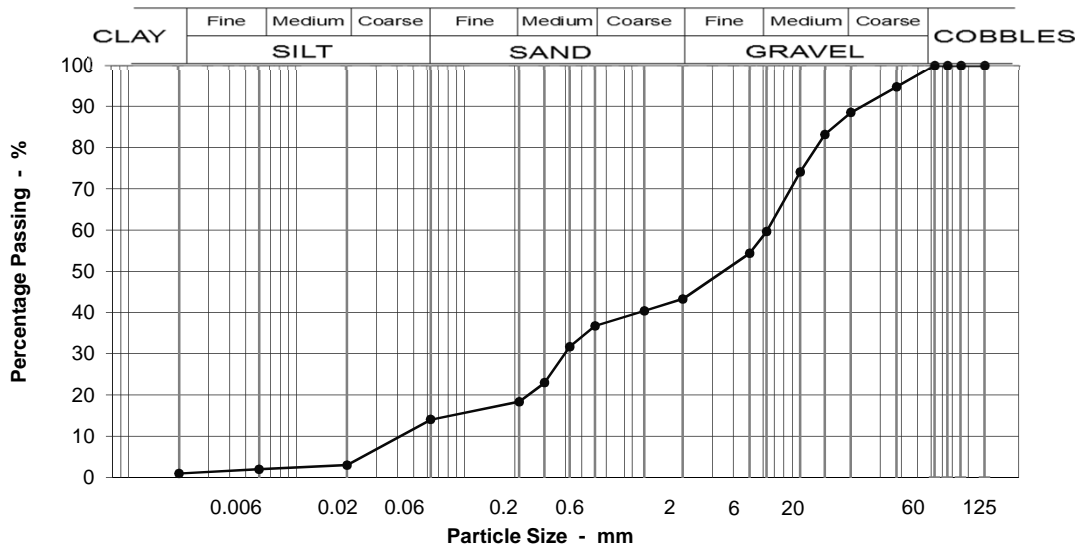
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 5 - 5.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	95
20	88
14	83
10	74
6.3	60
5	54
2	43
1.18	40
0.600	37
0.425	32
0.300	23
0.212	18
0.063	14
0.020	3
0.006	2
0.002	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6N.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	12
Medium GRAVEL	29
Fine GRAVEL	16
Coarse SAND	6
Medium SAND	18
Fine SAND	4
Silt & Clay	14

Grading Analysis	
D100	38
D60	6.39
D10	0.14
Uniformity Coefficient	47

**Description**  
Dark grey slightly organic silty very sandy fine to coarse rounded to subangular flint and quartz GRAVEL. Some shell fragments.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS6180212025-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 25  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 23-Apr-18

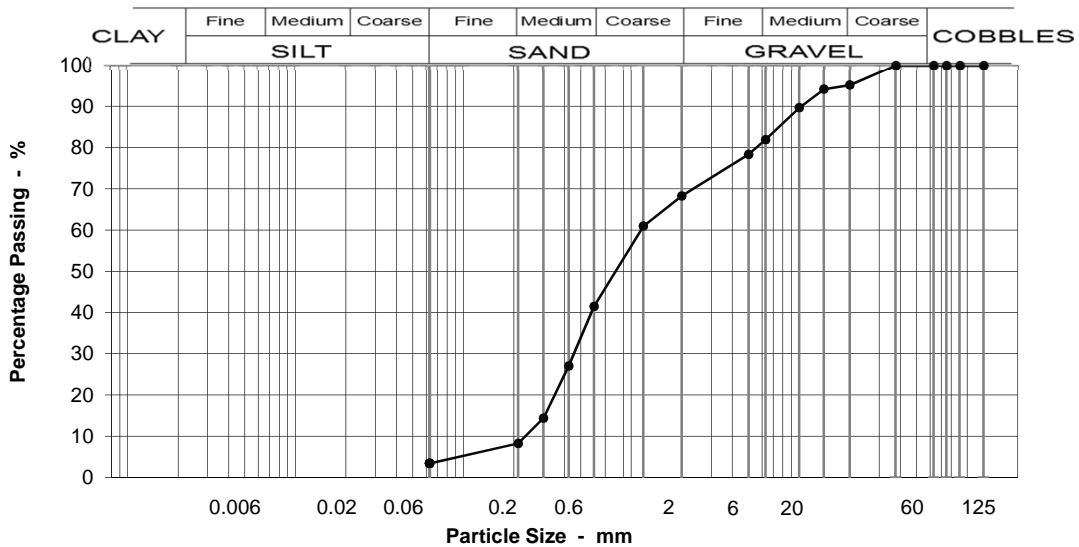
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH11A @ 6 - 6.45m **Specimen:** 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	95
14	94
10	90
6.3	82
5	78
2	68
1.18	61
0.600	41
0.425	27
0.300	14
0.212	8
0.063	3

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6F1, 6M.**

**Moisture content %** 14

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	5
Medium GRAVEL	13
Fine GRAVEL	14
Coarse SAND	27
Medium SAND	33
Fine SAND	5
Silt & Clay	3

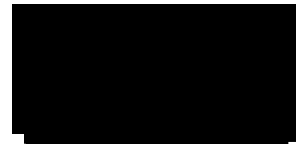
Grading Analysis	
D100	20
D60	1.15
D10	0.24
Uniformity Coefficient	5

Description	
Dark brown very gravelly medium and coarse SAND with some shell fragments. Gravel is fine and medium angular to rounded flint and quartz.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180213009-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 34  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

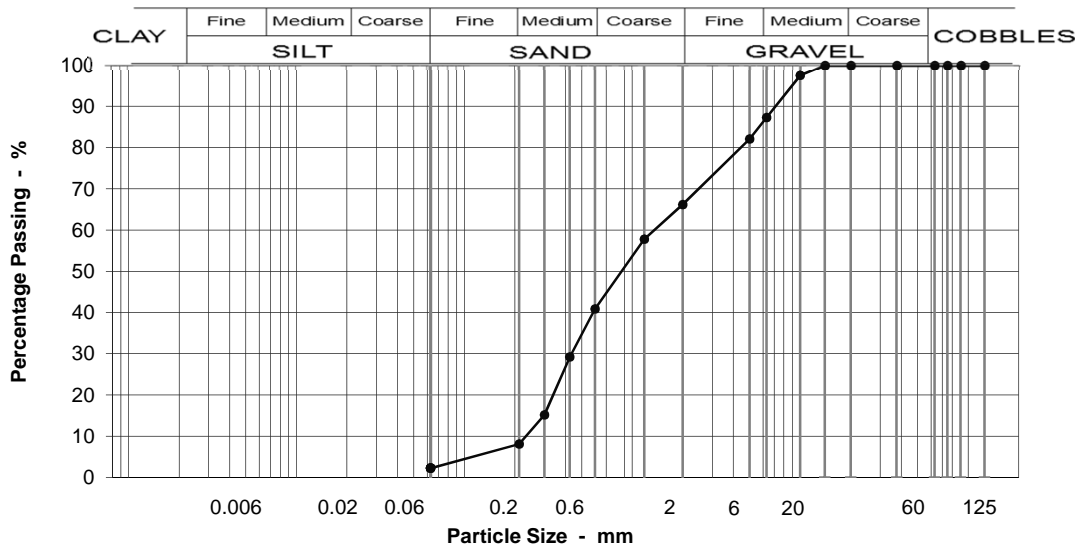
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 9 - 9.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	87
5	82
2	66
1.18	58
0.600	41
0.425	29
0.300	15
0.212	8
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6K, 6M.**

Moisture content % 10

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	13
Fine GRAVEL	21
Coarse SAND	25
Medium SAND	33
Fine SAND	6
Silt & Clay	2

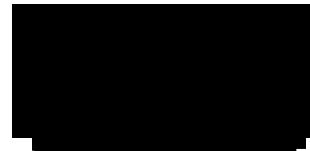
Grading Analysis	
D100	10
D60	1.40
D10	0.24
Uniformity Coefficient	6

Description	
Brown very gravelly medium and coarse SAND. Gravel is fine and medium rounded flint and quartz.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS1180213012-610**  
Our Project No. PZ1522D1  
Your Sample Ref 37  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

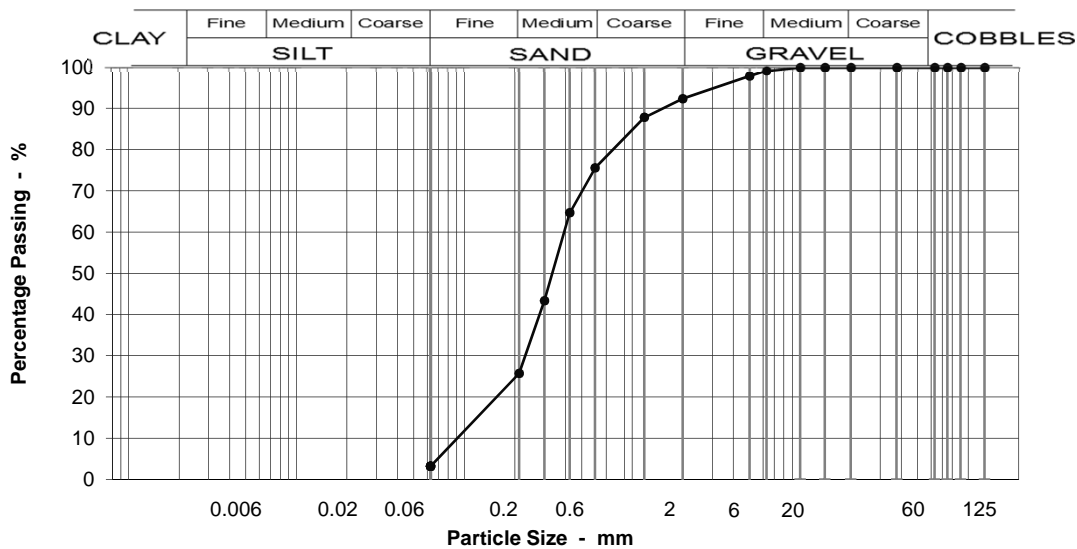
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 10 - 10.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	98
2	92
1.18	88
0.600	76
0.425	65
0.300	43
0.212	26
0.063	3

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	7
Coarse SAND	17
Medium SAND	50
Fine SAND	22
Silt & Clay	3

Grading Analysis	
D100	6
D60	0.40
D10	0.11
Uniformity Coefficient	4

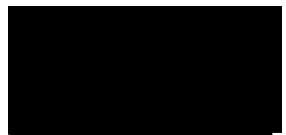
**Description**  
Light brown slightly gravelly medium SAND.  
Gravel is fine, rounded to sub-rounded flint.

Moisture content % 17

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180213018-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 43  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

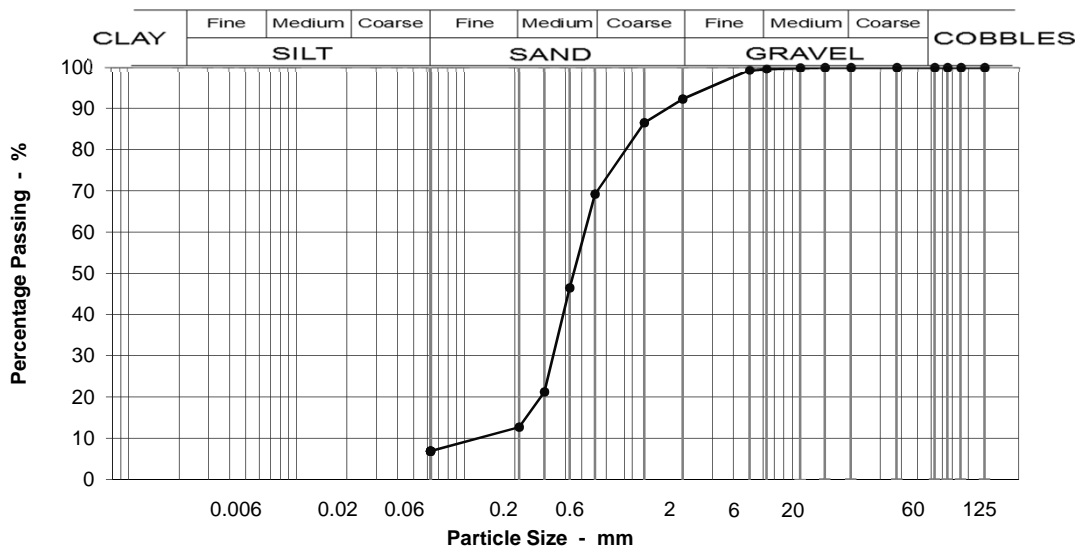
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 12 - 12.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	92
1.18	87
0.600	69
0.425	46
0.300	21
0.212	13
0.063	7

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	7
Coarse SAND	23
Medium SAND	56
Fine SAND	6
Silt & Clay	7

Grading Analysis	
D100	10
D60	0.53
D10	0.14
Uniformity Coefficient	4

**Description**  
Orangey brown slightly gravelly medium SAND.  
Gravel is fine rounded to sub-rounded flint.

Moisture content % 18

Test Code = 610



Simon Holden (Project Technician)





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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180213021-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 46  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

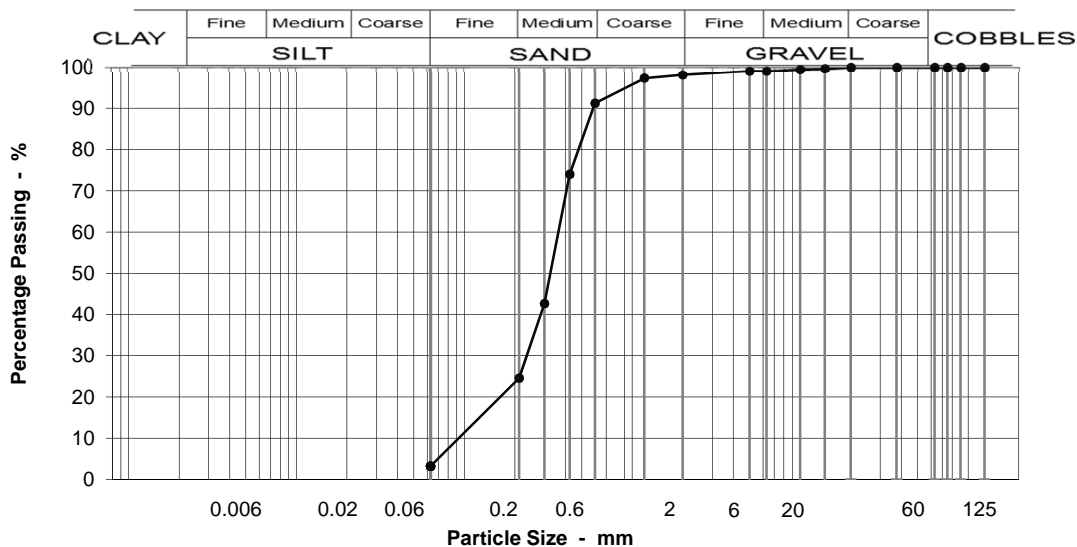
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 13 - 13.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	99
5	99
2	98
1.18	97
0.600	91
0.425	74
0.300	43
0.212	25
0.063	3

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	7
Medium SAND	67
Fine SAND	21
Silt & Clay	3

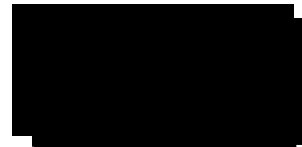
Grading Analysis	
D100	14
D60	0.37
D10	0.11
Uniformity Coefficient	3

Description	
Orangey brown medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180213024-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **49**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

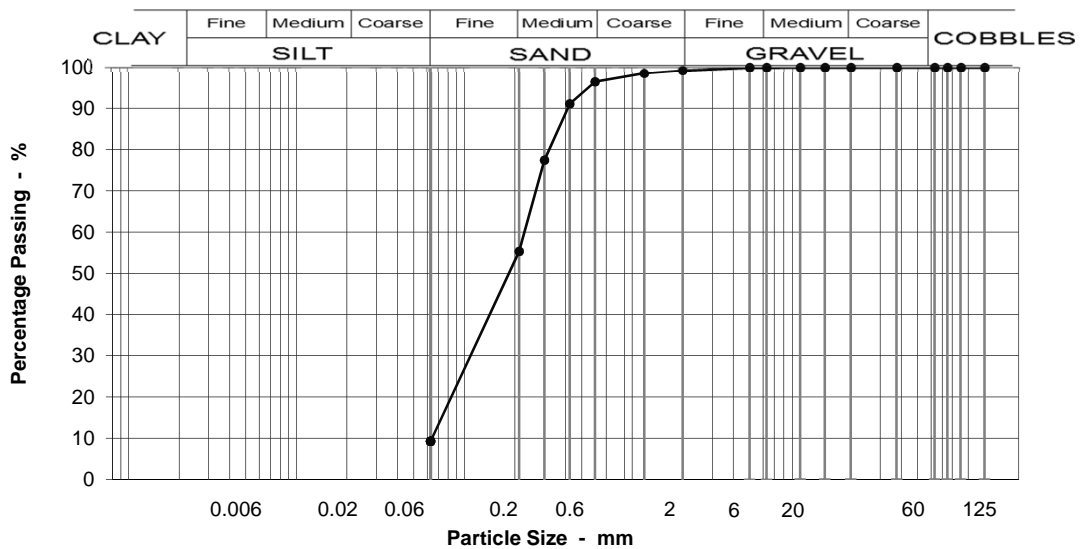
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 14 - 14.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	96
0.425	91
0.300	77
0.212	55
0.063	9

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	41
Fine SAND	46
Silt & Clay	9

Grading Analysis	
D100	6
D60	0.23
D10	0.07
Uniformity Coefficient	4

**Description**  
Orangey brown fine and medium SAND with laminae of soft grey clay.

Moisture content % 22

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180213029-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **54**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

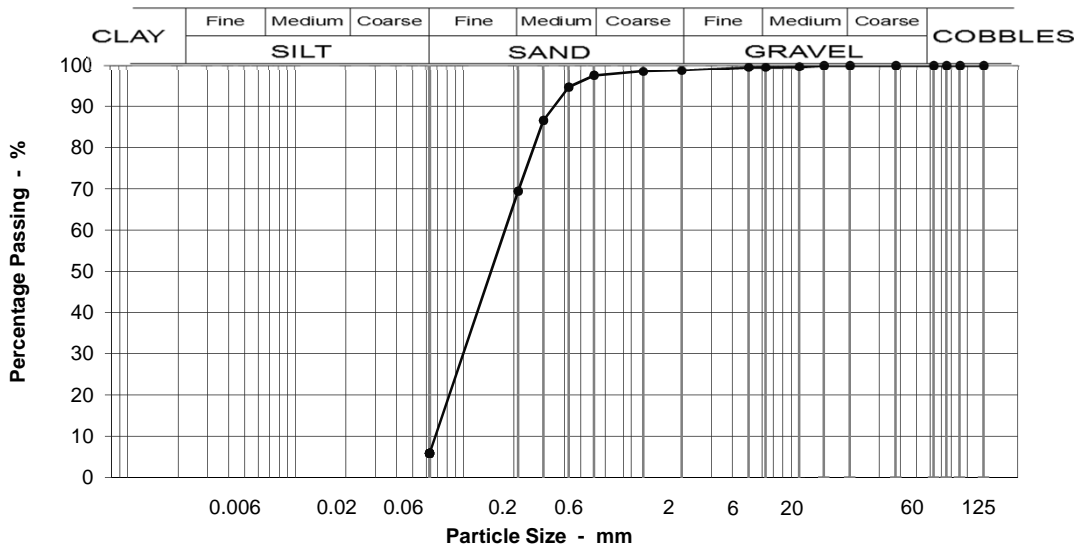
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 16 - 16.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	95
0.300	87
0.212	69
0.063	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 25

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	28
Fine SAND	64
Silt & Clay	6

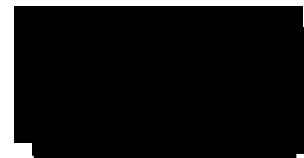
Grading Analysis	
D100	10
D60	0.19
D10	0.07
Uniformity Coefficient	3

Description	
Brown slightly silty fine SAND.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180213031-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **56**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

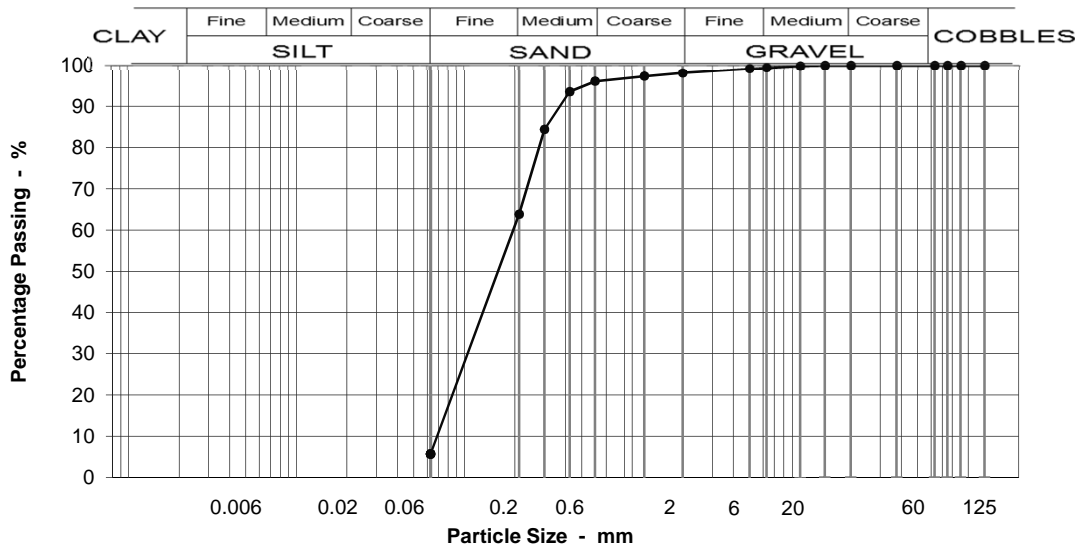
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 17 - 17.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	98
1.18	97
0.600	96
0.425	94
0.300	84
0.212	64
0.063	6

Specification for Highway Works Classification  
Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	32
Fine SAND	58
Silt & Clay	6

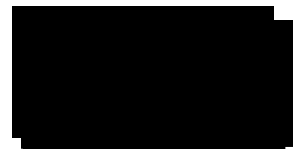
Grading Analysis	
D100	10
D60	0.20
D10	0.07
Uniformity Coefficient	3

Description	
Brown slightly silty fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180214002-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 61  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

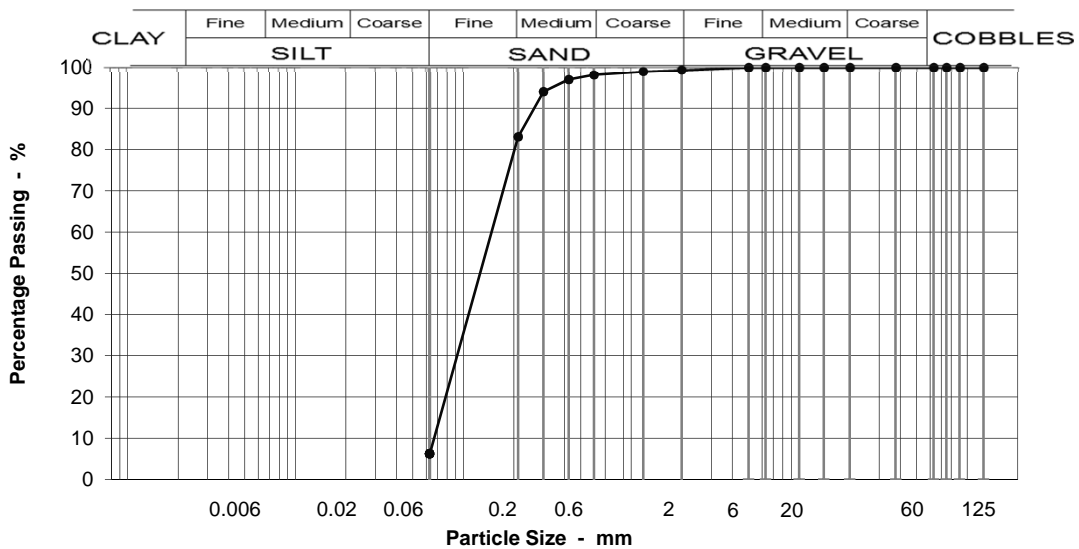
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 19 - 19.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	98
0.425	97
0.300	94
0.212	83
0.063	6

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 24

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	15
Fine SAND	77
Silt & Clay	6

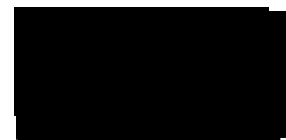
Grading Analysis	
D100	2
D60	0.17
D10	0.07
Uniformity Coefficient	2

**Description**  
Orangey brown fine SAND with laminae of soft grey clay.

Test Code = 610



Simon Holden (Project Technician)





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Our reference No. **GTS1180214007-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 65  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

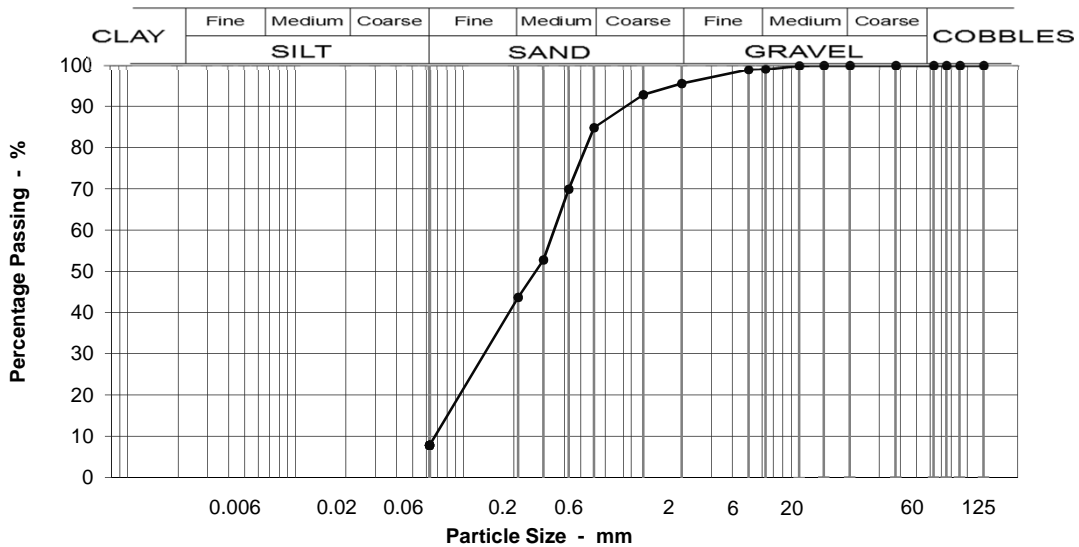
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 21 - 21.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	95
1.18	93
0.600	85
0.425	70
0.300	53
0.212	44
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 25

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	4
Coarse SAND	11
Medium SAND	41
Fine SAND	36
Silt & Clay	8

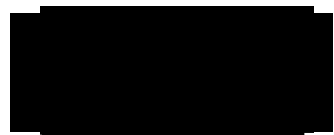
Grading Analysis	
D100	10
D60	0.35
D10	0.07
Uniformity Coefficient	5

Description	
Orangey brown fine and medium SAND with numerous shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180214009-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **67**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

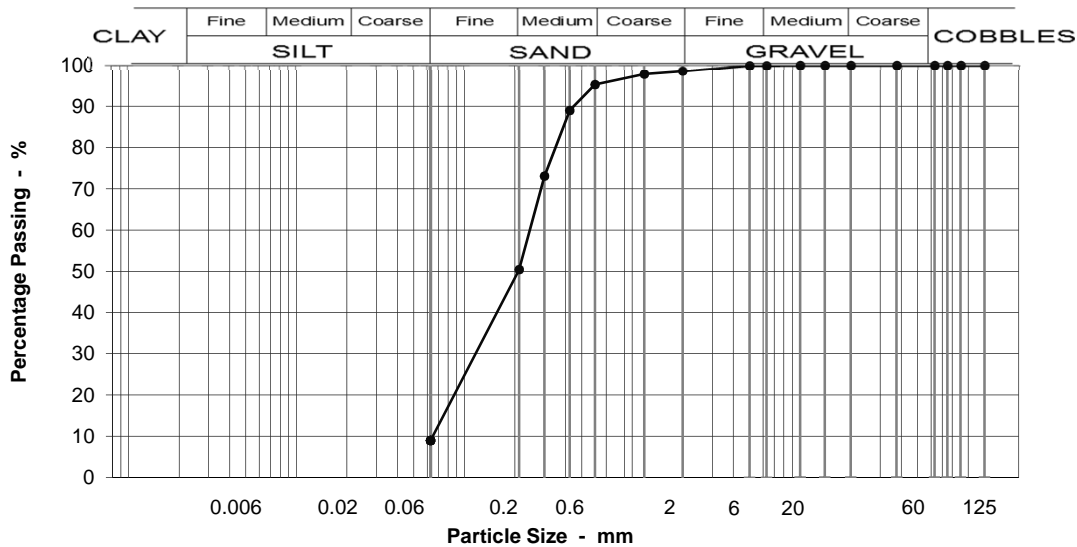
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 22 - 22.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	95
0.425	89
0.300	73
0.212	50
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	45
Fine SAND	41
Silt & Clay	9

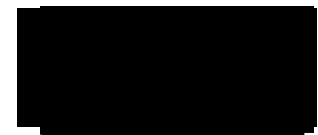
Grading Analysis	
D100	6
D60	0.25
D10	0.07
Uniformity Coefficient	4

**Description**  
Orangey brown fine and medium SAND with numerous shell fragments with laminae of soft light grey clay, firm grey silty clay and dark grey sandy silt.

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180214013-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **71**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

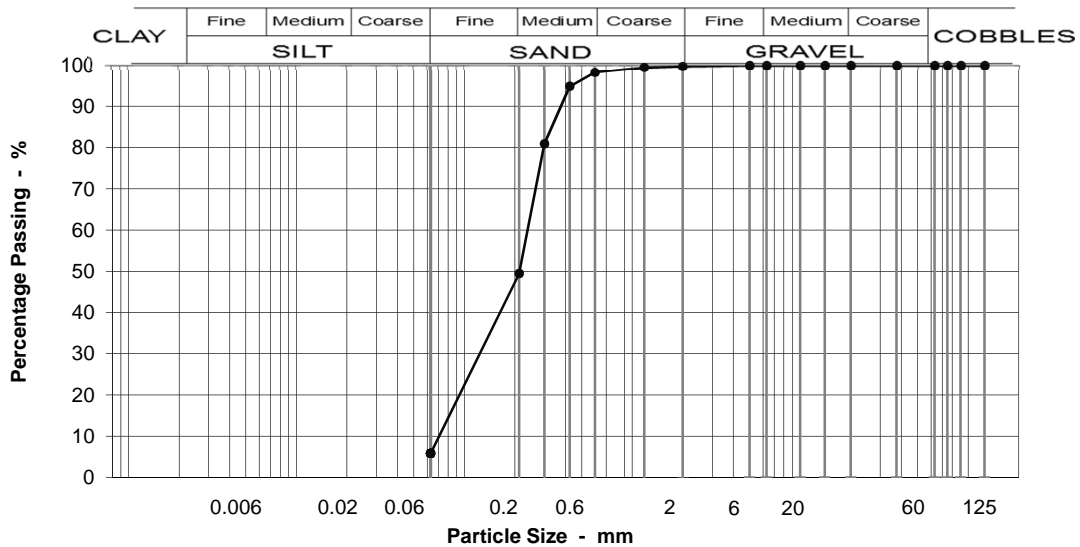
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 24 - 24.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	98
0.425	95
0.300	81
0.212	50
0.063	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	49
Fine SAND	44
Silt & Clay	6

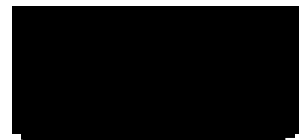
Grading Analysis	
D100	2
D60	0.24
D10	0.08
Uniformity Coefficient	3

Description	
Greyish brown slightly silty fine and medium SAND with some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180214018-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **76**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

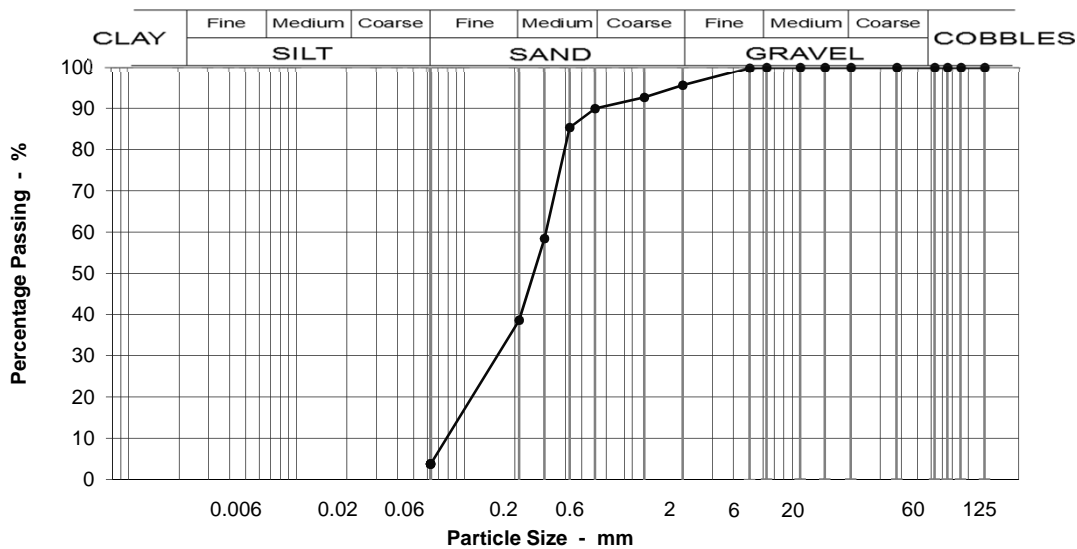
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 26 - 26.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	96
1.18	93
0.600	90
0.425	85
0.300	58
0.212	39
0.063	4

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	4
Coarse SAND	6
Medium SAND	51
Fine SAND	35
Silt & Clay	4

Grading Analysis	
D100	5
D60	0.31
D10	0.09
Uniformity Coefficient	3

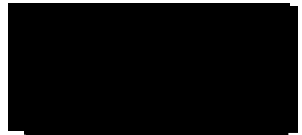
**Description**  
Brown grey fine and medium SAND with numerous laminae of soft grey clay. Occasional shell fragments.

Moisture content % 27

Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

**Our reference No.** GTS1180214020-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 78  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 12-Jun-18

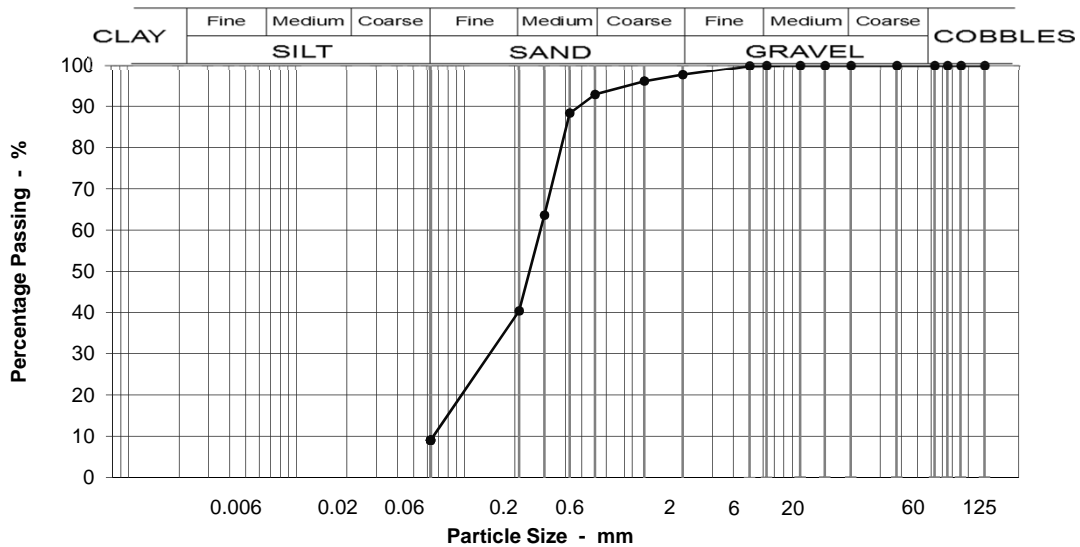
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH11A @ 27 - 27.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	96
0.600	93
0.425	88
0.300	64
0.212	40
0.063	9

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 30

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	5
Medium SAND	52
Fine SAND	31
Silt & Clay	9

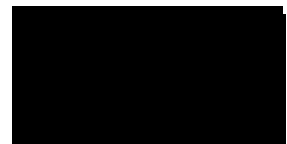
Grading Analysis	
D100	6
D60	0.29
D10	0.07
Uniformity Coefficient	4

Description	
Grey fine to medium SAND with numerous lenses of soft grey clay, some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180214024-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **82**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **2-Jul-18**

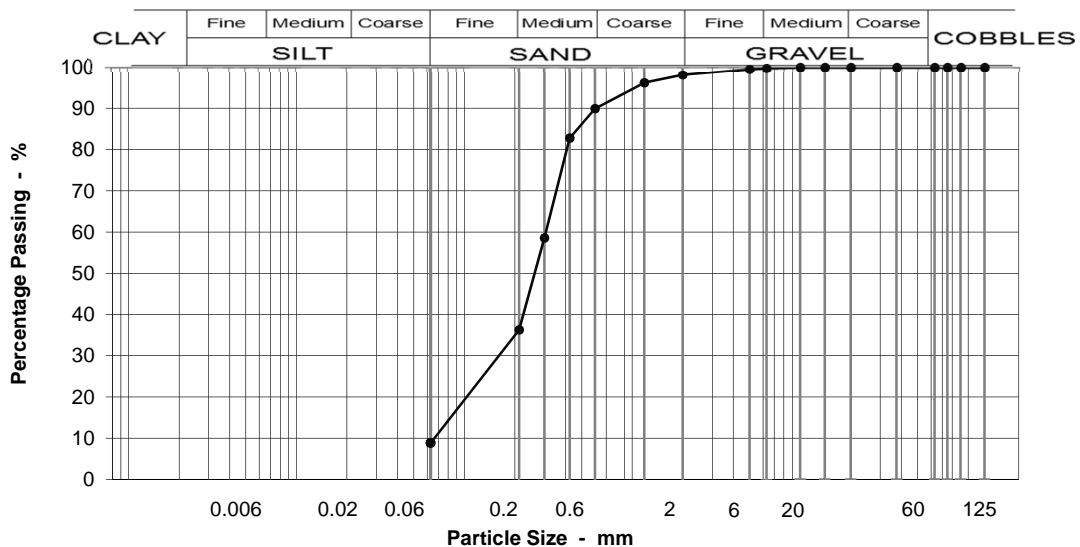
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 29 - 29.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	96
0.600	90
0.425	83
0.300	59
0.212	36
0.063	9

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	8
Medium SAND	54
Fine SAND	27
Silt & Clay	9

Grading Analysis	
D100	6
D60	0.31
D10	0.07
Uniformity Coefficient	4

**Description**  
Greyish brown fine and medium SAND with numerous laminae of firm dark grey very sandy silty clay, some shell fragments.

Moisture content % 20

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
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Norfolk  
NR1 2DH

**Our reference No.** GTS1180214027-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 85  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 2-Jul-18

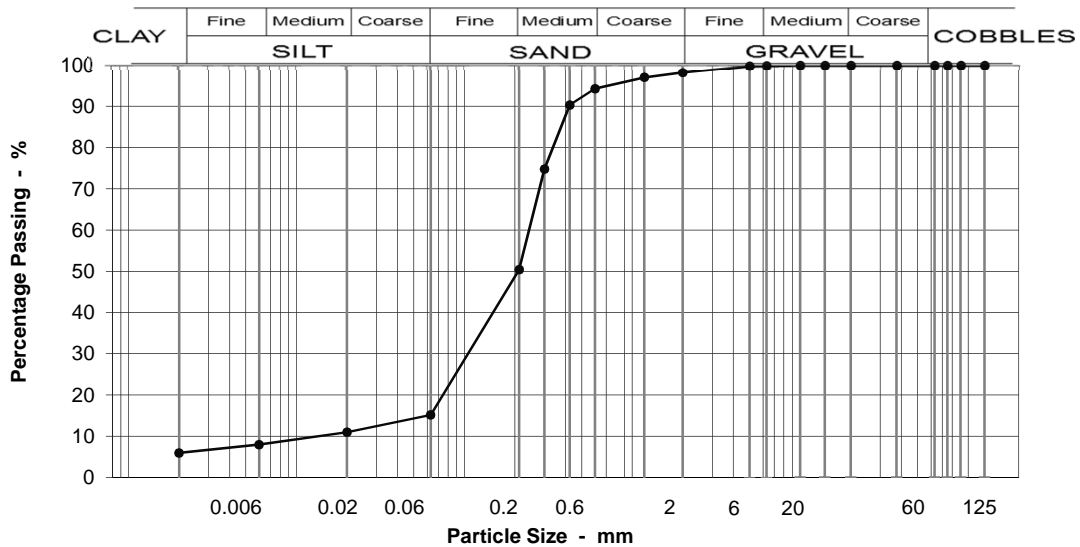
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH11A @ 30 - 30.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	2
20	100		Coarse SAND	4
14	100		Medium SAND	44
10	100		Fine SAND	35
6.3	100		Silt & Clay	15
5	100			
2	98			
1.18	97			
0.600	94			
0.425	90			
0.300	75			
0.212	50			
0.063	15			
0.020	11			
0.006	8			
0.002	6			
		<b>Moisture content %</b>	29	

Grading Analysis	
D100	6
D60	0.25
D10	0.06
Uniformity Coefficient	4

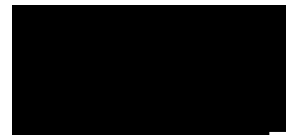
Description	
Greyish brown fine and medium SAND with numerous laminae of firm dark grey very sandy silty clay, some shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



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Our reference No. **GTS1180215001-**  
Our Project No **PZ1522D1**  
Your Sample Ref **86**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

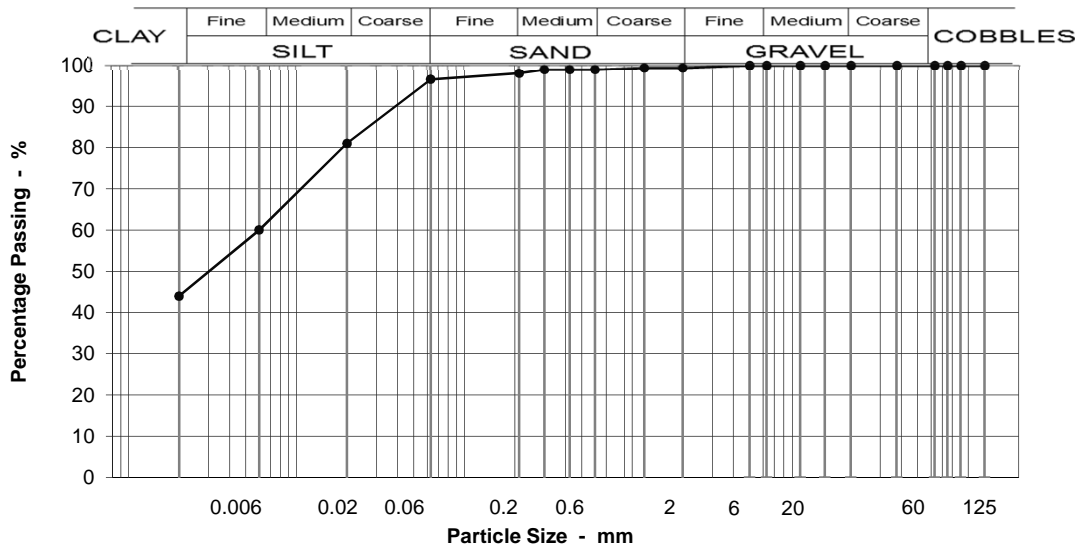
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 31.2 - 31.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	0
14	100		Medium SAND	1
10	100		Fine SAND	2
6.3	100		Silt & Clay	97
5	100			
2	99			
1.18	99			
0.600	99			
0.425	99			
0.300	99			
0.212	98			
0.063	97			
0.020	81			
0.006	60			
0.002	44			
		Moisture content %		0

Grading Analysis	
D100	2
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

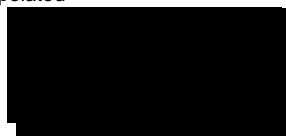
Description	
Laminated firm to stiff grey SILT, CLAY.	

\* Uniformity coefficient extrapolated

Test Code =



Simon Holden (Project Technician)



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**Our reference No.** GTS1180215005-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 90  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 23-Apr-18

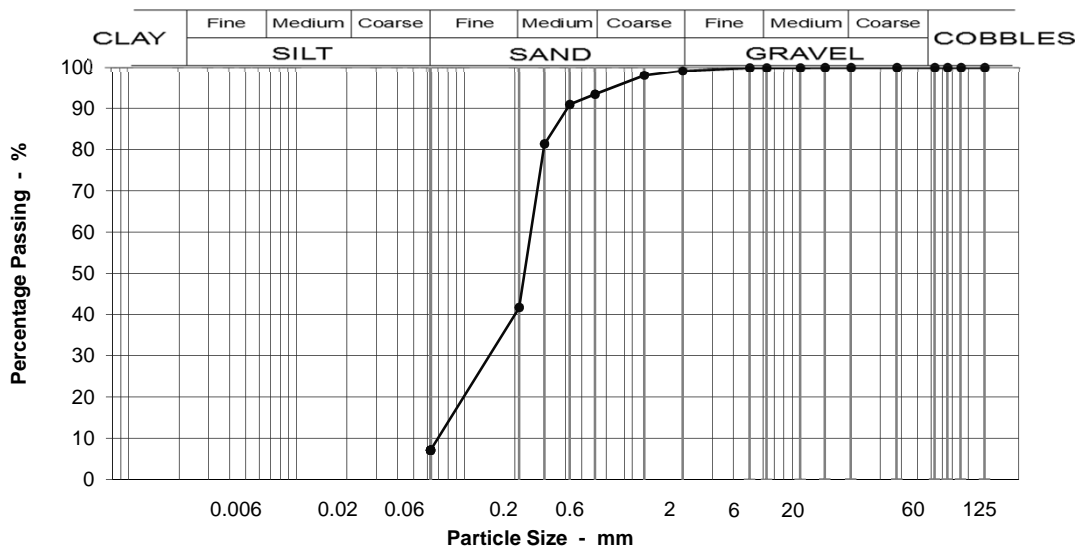
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH11A @ 32.2 - 32.7m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	93
0.425	91
0.300	81
0.212	42
0.063	7

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	6
Medium SAND	52
Fine SAND	35
Silt & Clay	7

Grading Analysis	
D100	10
D60	0.25
D10	0.08
Uniformity Coefficient	3

**Description**  
Grey fine and medium SAND with numerous shell fragments.

Moisture content % 25

Test Code = 610



Simon Holden (Project Technician)



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**Our reference No.** GTS1180215011-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 96  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 25-Jun-18

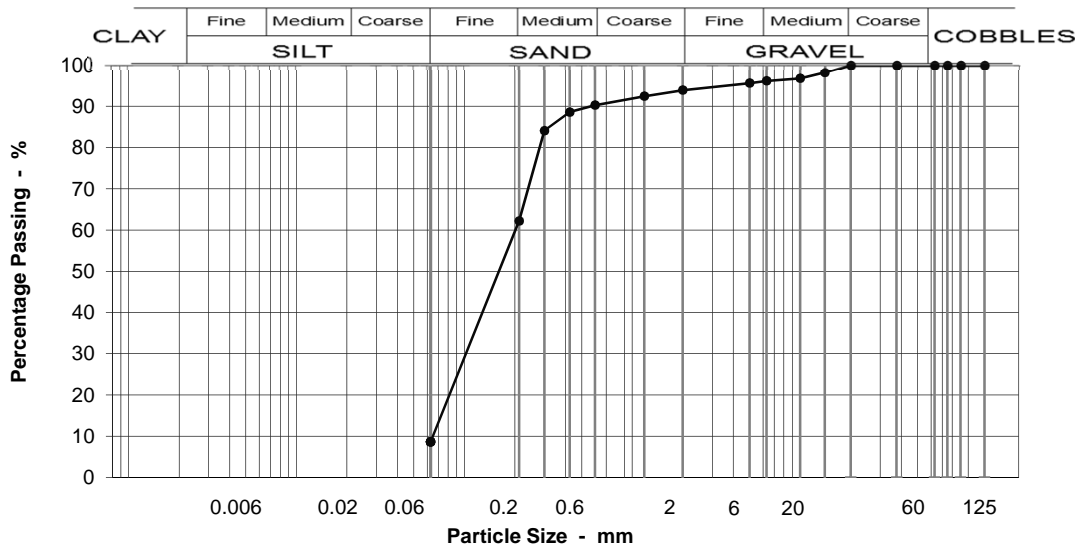
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH11A @ 36 - 36.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	4
37.5	100		Fine GRAVEL	2
20	100		Coarse SAND	4
14	98		Medium SAND	28
10	97		Fine SAND	53
6.3	96		Silt & Clay	9
5	96		<b>Grading Analysis</b>	
2	94		D100	14
1.18	92		D60	0.21
0.600	90		D10	0.07
0.425	89		Uniformity Coefficient	3
0.300	84		<b>Description</b>	
0.212	62	Grey fine to medium SAND with numerous shell fragments.		
0.063	9			

Moisture content % 28

Test Code = 610



Simon Holden (Project Technician)





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**Our reference No.** GTS1180215015-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 100  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 23-Apr-18

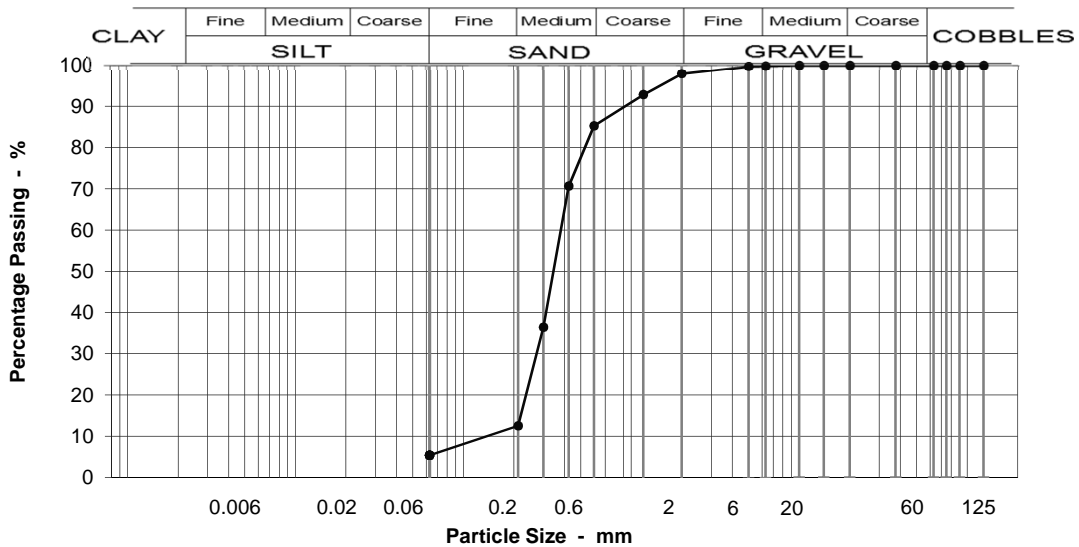
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 39 - 39.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	93
0.600	85
0.425	71
0.300	36
0.212	13
0.063	5

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	13
Medium SAND	73
Fine SAND	7
Silt & Clay	5

Grading Analysis	
D100	6
D60	0.39
D10	0.16
Uniformity Coefficient	2

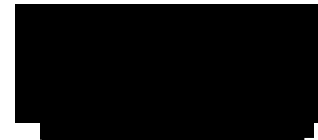
**Description**  
Grey medium SAND with some shell fragments.

Moisture content % 23

Test Code = 610



Simon Holden (Project Technician)



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Norfolk  
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**Our reference No.** GTS1180215018-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 103  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 23-Apr-18

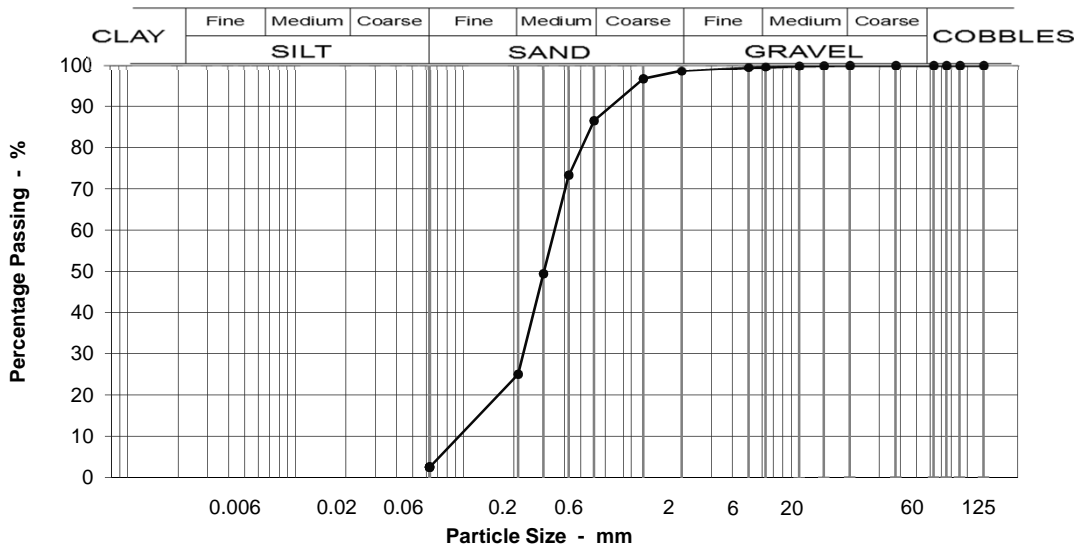
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 41 - 41.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	99
1.18	97
0.600	87
0.425	73
0.300	49
0.212	25
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	12
Medium SAND	61
Fine SAND	22
Silt & Clay	3

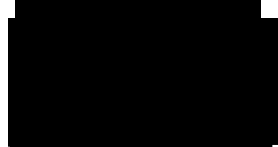
Grading Analysis	
D100	14
D60	0.36
D10	0.11
Uniformity Coefficient	3

Description	
Grey medium SAND with numerous shell fragments.	

Test Code = 610



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Our reference No. **GTS1180215023-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **108**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

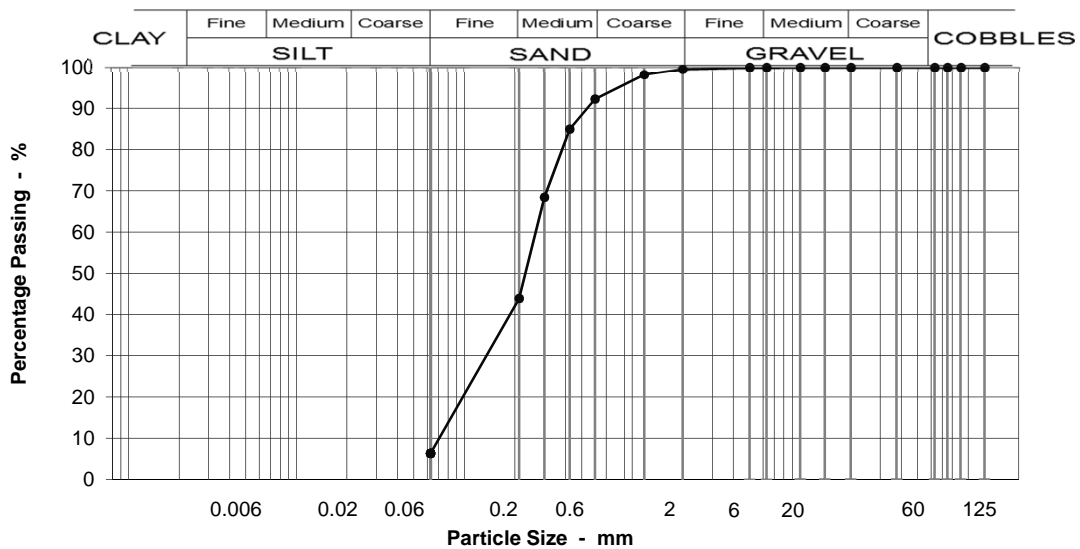
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 44 - 44.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	98
0.600	92
0.425	85
0.300	68
0.212	44
0.063	6

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	7
Medium SAND	48
Fine SAND	38
Silt & Clay	6

Grading Analysis	
D100	6
D60	0.27
D10	0.08
Uniformity Coefficient	3

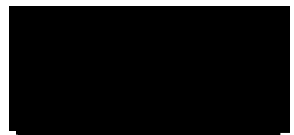
**Description**  
Dark grey fine and medium sand with numerous shell fragments.

Moisture content % 24

Test Code = 610



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Our reference No. **GTS1180216002-**  
Our Project No. PZ1522D1  
Your Sample Ref. 110  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

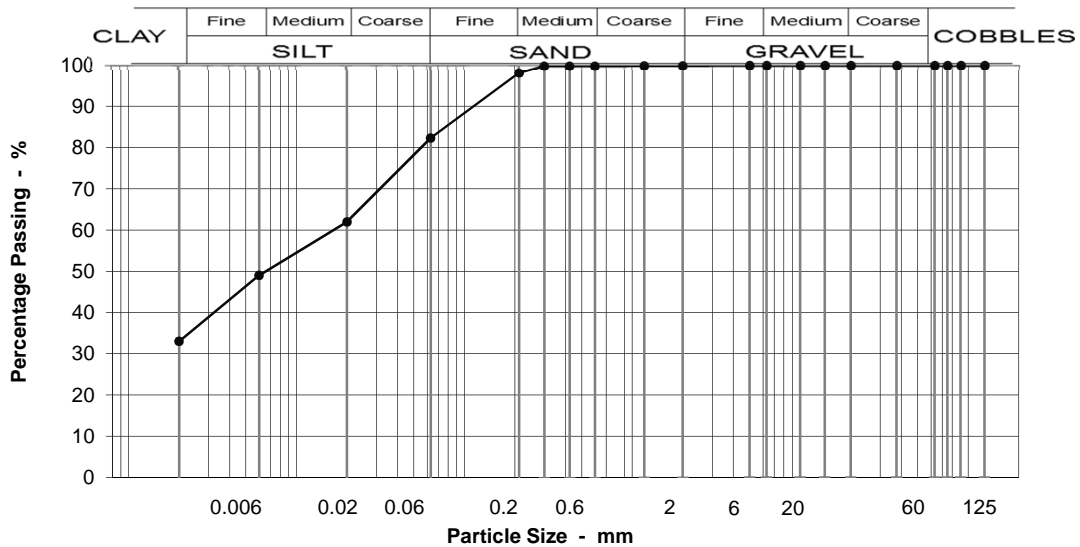
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 45.8 - 46m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	2
10	100		Fine SAND	16
6.3	100		Silt & Clay	82
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	98			
0.063	82			
0.020	62			
0.006	49			
0.002	33			
		Moisture content %	0	

Grading Analysis	
D100	2
D60	0.02
D10	0.00
Uniformity Coefficient	>10*

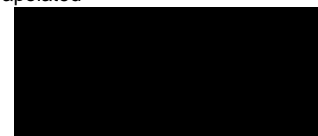
Description	
Stiff laminated grey silty CLAY, grey SILT, dark grey sandy SILT and light grey silty fine SAND.	

\* Uniformity coefficient extrapolated

Test Code =



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Our reference No. **GTS1180216003-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 111  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

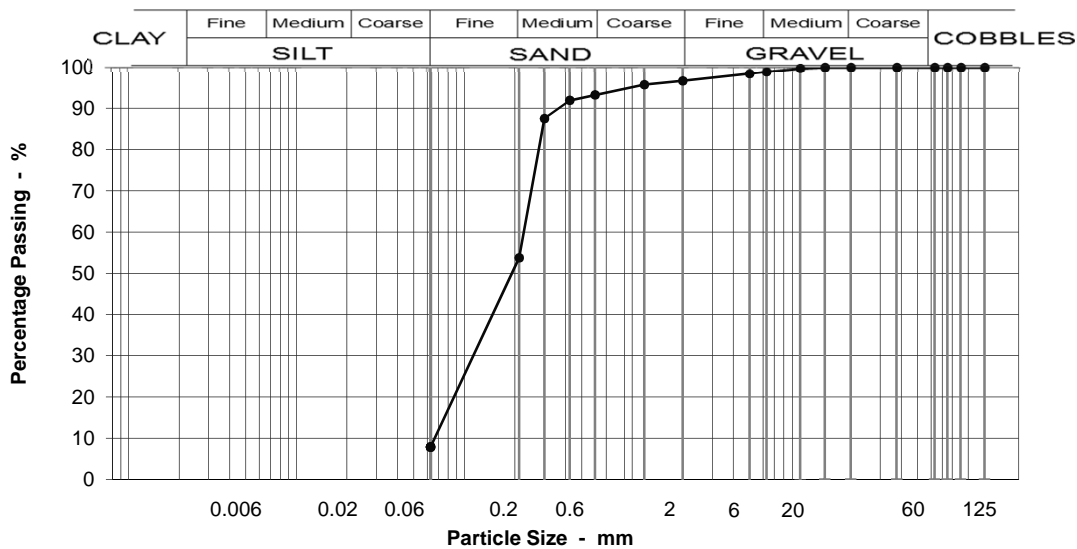
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 46 - 46.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	98
2	97
1.18	96
0.600	93
0.425	92
0.300	87
0.212	54
0.063	8

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	2
Coarse SAND	3
Medium SAND	39
Fine SAND	46
Silt & Clay	8

Grading Analysis	
D100	10
D60	0.23
D10	0.07
Uniformity Coefficient	3

**Description**  
Laminated light grey slightly silty fine and medium SAND.

Moisture content % 26

Test Code = 610



Simon Holden (Project Technician)





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Our reference No. **GTS1180216009-**  
Our Project No. PZ1522D1  
Your Sample Ref. 117  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

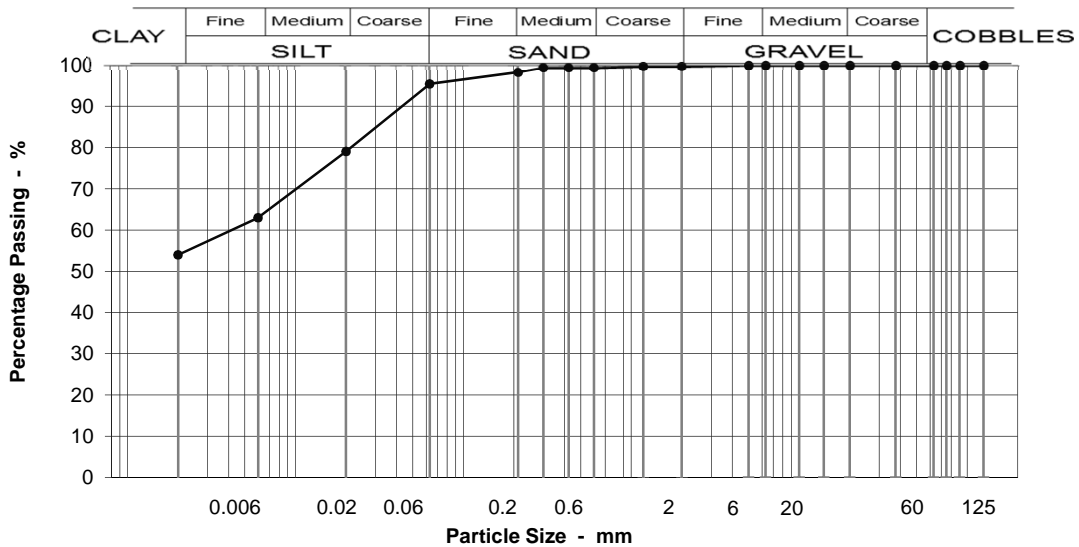
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH11A @ 47.5 - 48m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	99
0.300	99
0.212	98
0.063	95
0.020	79
0.006	63
0.002	54

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	1
Fine SAND	3
Silt & Clay	95

Grading Analysis	
D100	2
D60	0.00
D10	0.00
Uniformity Coefficient	>10*

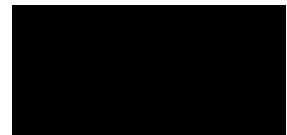
Description	
Very stiff brown CLAY.	

\* Uniformity coefficient extrapolated

Test Code =



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Norfolk  
NR1 2DH

Our reference No. **GTS3180307001-**  
Our Project No **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

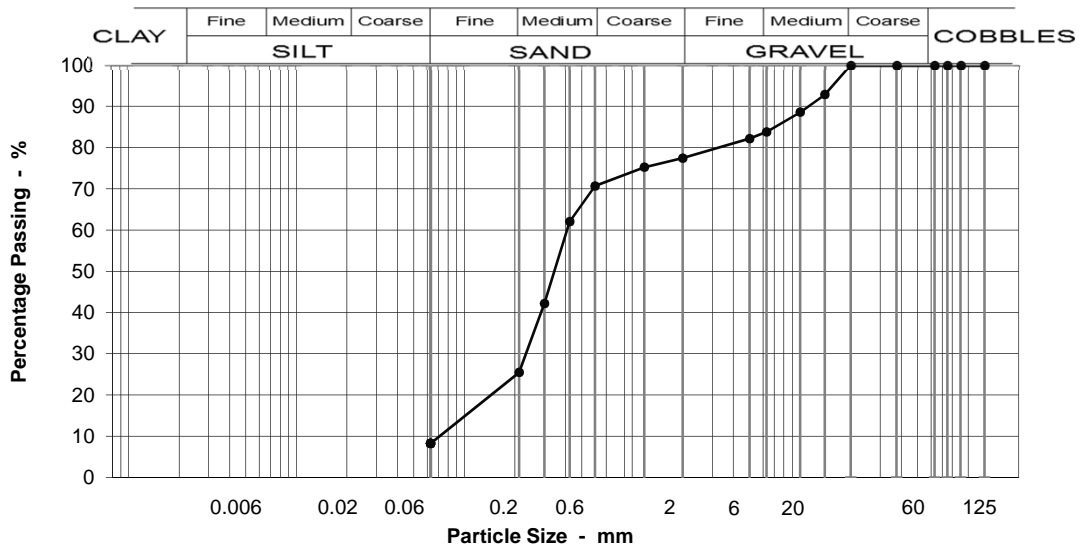
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 0.4 - 0.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	93
10	89
6.3	84
5	82
2	77
1.18	75
0.600	71
0.425	62
0.300	42
0.212	26
0.063	8

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6J, 6K, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	16
Fine GRAVEL	6
Coarse SAND	7
Medium SAND	45
Fine SAND	17
Silt & Clay	8

Grading Analysis	
D100	14
D60	0.41
D10	0.08
Uniformity Coefficient	5

**Description**  
MADE GROUND - comprising greyish brown silty very gravelly fine and medium SAND, gravel is fine and medium angular to rounded flint, brick, wood and concrete.

Moisture content % 13

Test Code =



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Our reference No. **GTS3180307004-**  
Our Project No. PZ1522D1  
Your Sample Ref 3  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

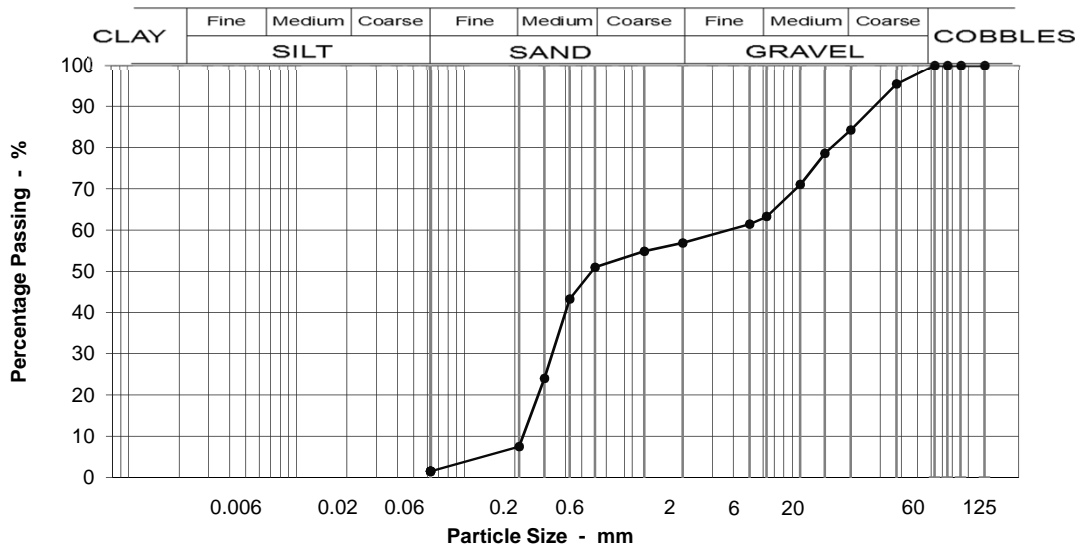
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 1.2 - 1.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	95
20	84
14	79
10	71
6.3	63
5	61
2	57
1.18	55
0.600	51
0.425	43
0.300	24
0.212	8
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6I, 6M, 6N.**

Moisture content % 9

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	16
Medium GRAVEL	21
Fine GRAVEL	6
Coarse SAND	6
Medium SAND	43
Fine SAND	6
Silt & Clay	2

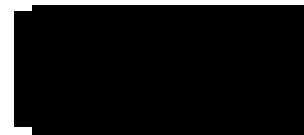
Grading Analysis	
D100	38
D60	4.06
D10	0.23
Uniformity Coefficient	18

Description	
Mottled grey and dark grey medium SAND, medium and coarse rounded to sub-angular flint,brick, quartz and sandstone.	

Source : Inspection pit: Hand dug  
Test Code =



Simon Holden (Project Technician)



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Our reference No. **GTS3180307006-**  
Our Project No **PZ1522D1**  
Your Sample Ref **5**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

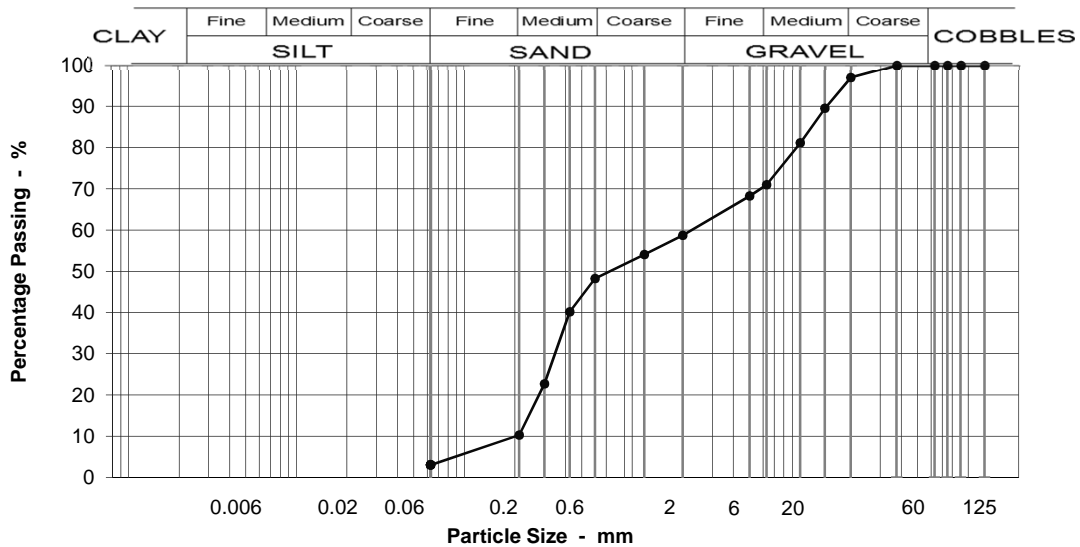
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 1.5 - 2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	97
14	89
10	81
6.3	71
5	68
2	59
1.18	54
0.600	48
0.425	40
0.300	23
0.212	10
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	3
Medium GRAVEL	26
Fine GRAVEL	12
Coarse SAND	10
Medium SAND	38
Fine SAND	7
Silt & Clay	3

Grading Analysis	
D100	20
D60	2.40
D10	0.21
Uniformity Coefficient	12

**Description**  
MADE GROUND - comprising mottled grey and dark grey medium SAND, rounded to sub-angular flint, brick, quartz and sandstone GRAVEL.

Test Code =



Simon Holden (Project Technician)

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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180307007-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **6**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

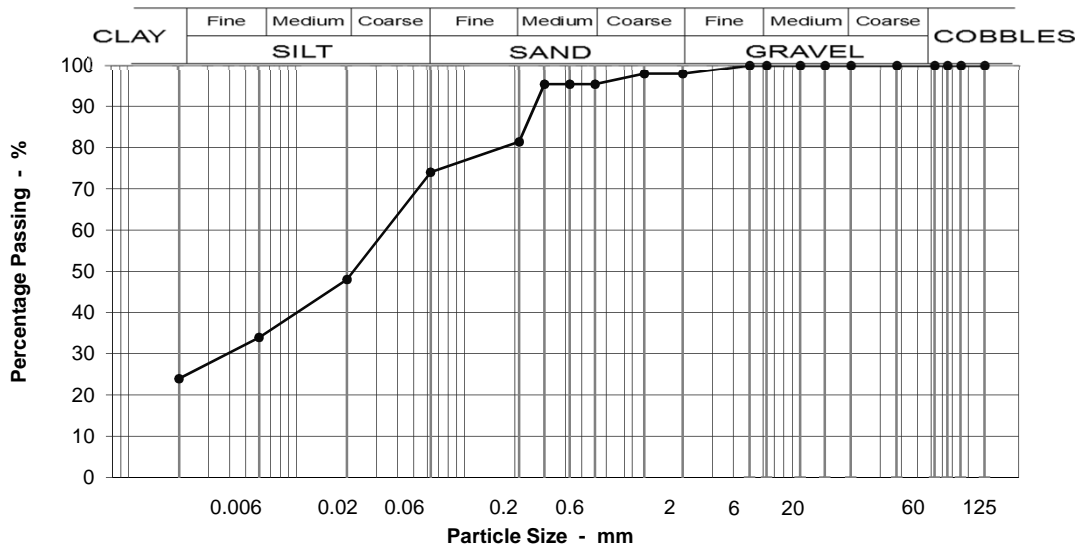
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 2 - 2.5m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	2
20	100		Coarse SAND	3
14	100		Medium SAND	14
10	100		Fine SAND	7
6.3	100		Silt & Clay	74
5	100			
2	98			
1.18	98			
0.600	95			
0.425	95			
0.300	95			
0.212	81			
0.063	74			
0.020	48			
0.006	34			
0.002	24			
		Moisture content %		0

Grading Analysis	
D100	2
D60	0.04
D10	0.00
Uniformity Coefficient	>10*

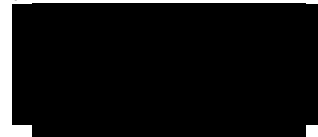
Description	
MADE GROUND - comprising very soft, dark grey, slightly sandy, silty clay. Gravel is fine and medium, rounded to sub-rounded, flint, chalk and brick.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



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Our reference No. **GTS3180307016-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 15  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 4-Jul-18

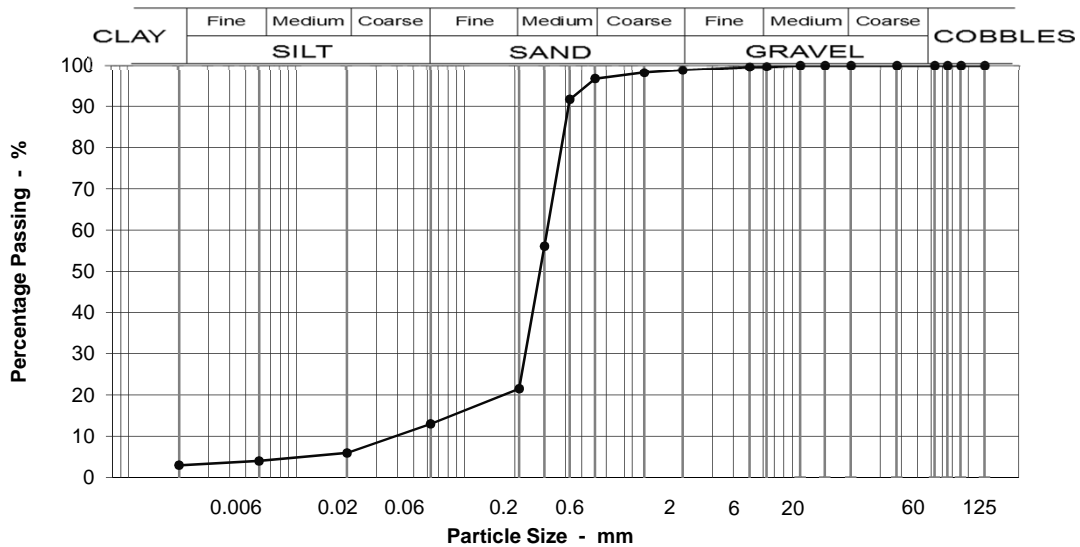
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 4.5 - 5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	2
14	100		Medium SAND	75
10	100		Fine SAND	9
6.3	100		Silt & Clay	13
5	100			
2	99			
1.18	98			
0.600	97			
0.425	92			
0.300	56			
0.212	22			
0.063	13			
0.020	6			
0.006	4			
0.002	3			
Moisture content %		22		

Grading Analysis	
D100	6
D60	0.31
D10	0.13
Uniformity Coefficient	2

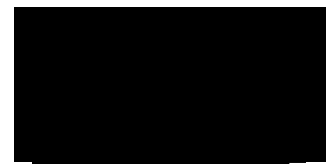
  

Description	
Dark grey organic silty medium SAND.	

Test Code = 610



Simon Holden (Project Technician)





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Norfolk  
NR1 2DH

Our reference No. **GTS3180307022-**  
Our Project No. PZ1522D1  
Your Sample Ref. 21  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

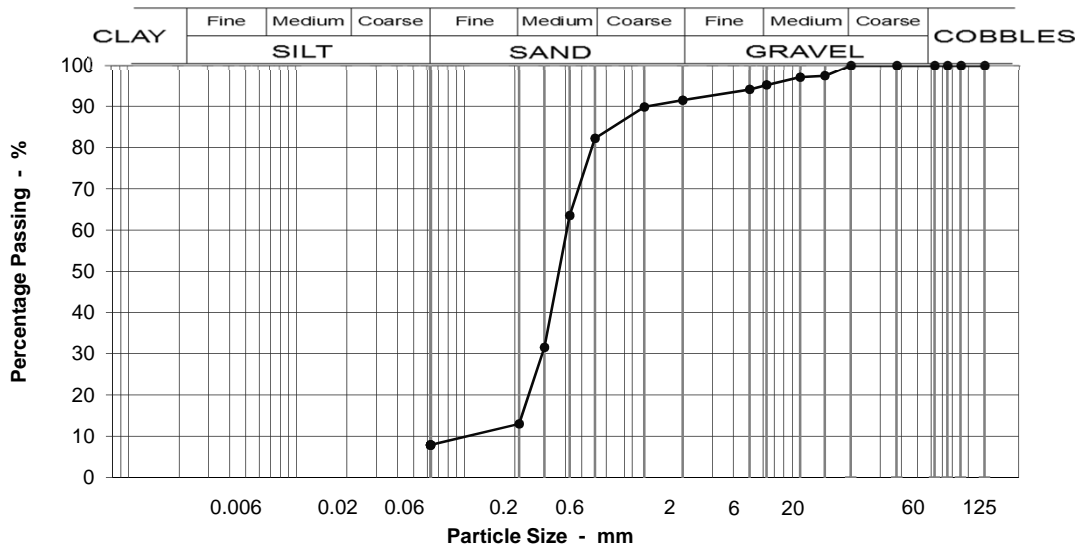
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 6.5 - 7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	97
10	97
6.3	95
5	94
2	91
1.18	90
0.600	82
0.425	64
0.300	32
0.212	13
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	5
Fine GRAVEL	4
Coarse SAND	9
Medium SAND	69
Fine SAND	5
Silt & Clay	8

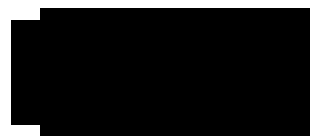
Grading Analysis	
D100	14
D60	0.41
D10	0.12
Uniformity Coefficient	3

**Description**  
Brown slightly gravelly slightly silty medium SAND with some shell fragments. Gravel is fine and medium sub-angular to sub-rounded quartz and flint.

Source : Inspection pit: Hand dug  
Test Code =



Simon Holden (Project Technician)



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NR1 2DH

Our reference No. **GTS3180307025-**  
Our Project No. **PZ1522D1**  
Your Sample Ref **24**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

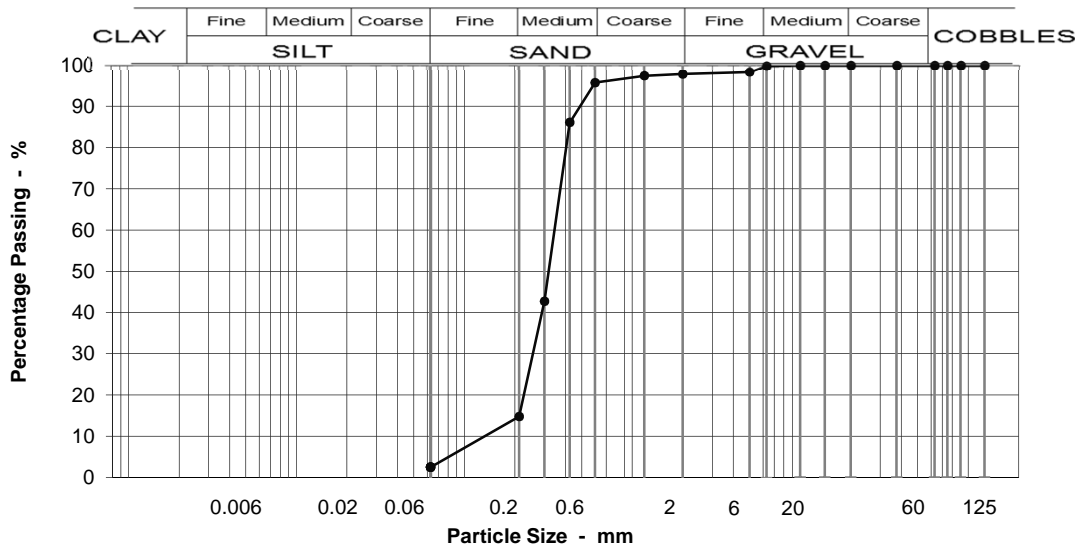
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 7.5 - 8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	98
2	98
1.18	97
0.600	96
0.425	86
0.300	43
0.212	15
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	2
Medium SAND	81
Fine SAND	12
Silt & Clay	3

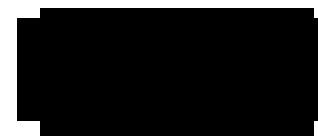
Grading Analysis	
D100	6
D60	0.35
D10	0.15
Uniformity Coefficient	2

**Description**  
Brown slightly gravelly slightly silty medium SAND with some shell fragments. Gravel is fine and medium sub-angular to sub-rounded quartz and flint.

Source : Inspection pit: Hand dug  
Test Code =



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Our reference No. **GTS3180307031-**  
Our Project No. **PZ1522D1**  
Your Sample Ref **30**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

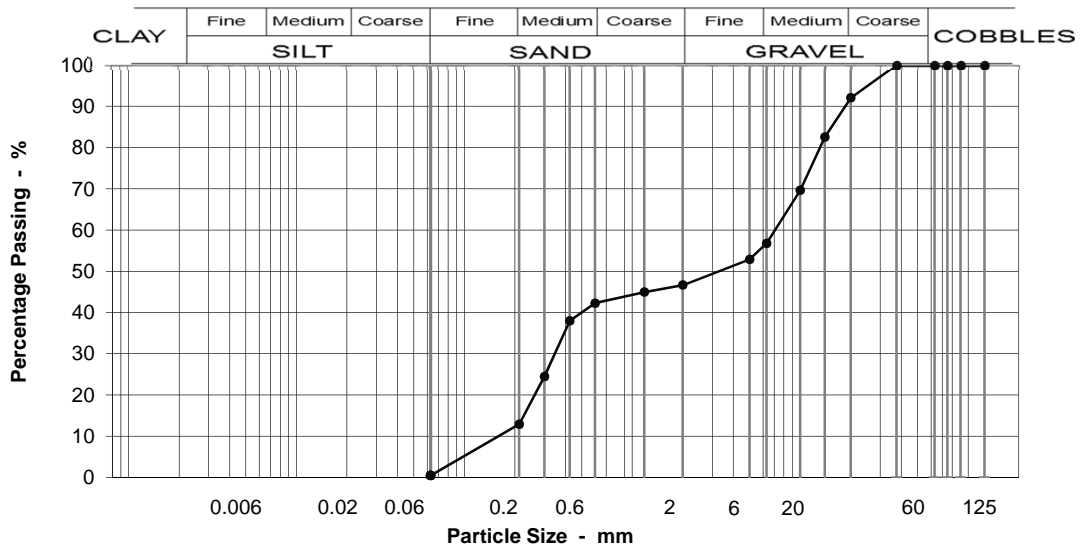
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 9.5 - 10m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	92
14	83
10	70
6.3	57
5	53
2	47
1.18	45
0.600	42
0.425	38
0.300	25
0.212	13
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 6.9

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	8
Medium GRAVEL	35
Fine GRAVEL	10
Coarse SAND	4
Medium SAND	29
Fine SAND	12
Silt & Clay	1

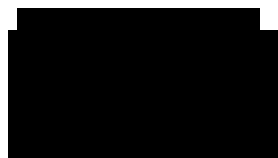
Grading Analysis	
D100	20
D60	7.23
D10	0.18
Uniformity Coefficient	41

Description	
Brown fine and medium sub-angular to rounded flint and quartz GRAVEL. Fine and medium SAND.	

Source : Inspection pit: Hand dug  
Test Code =



Simon Holden (Project Technician)



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Our reference No. **GTS3180307034-**  
Our Project No **PZ1522D1**  
Your Sample Ref **33**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

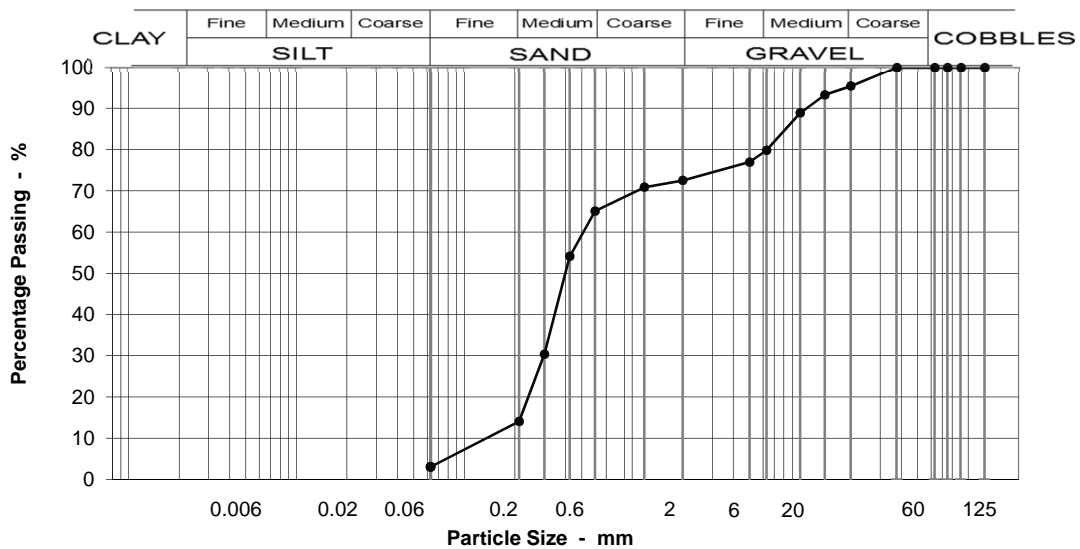
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 10.5 - 11m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	95
14	93
10	89
6.3	80
5	77
2	72
1.18	71
0.600	65
0.425	54
0.300	30
0.212	14
0.063	3

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	5
Medium GRAVEL	16
Fine GRAVEL	7
Coarse SAND	7
Medium SAND	51
Fine SAND	11
Silt & Clay	3

Grading Analysis	
D100	20
D60	0.52
D10	0.16
Uniformity Coefficient	3

**Description**  
Laminated orange medium SAND, brown fine SAND, soft grey CLAY, dark brown SILT.

Moisture content % 15

Source : Inspection pit: Hand dug  
Test Code =



Simon Holden (Project Technician)

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Our reference No. **GTS3180307036-610**  
Our Project No. PZ1522D1  
Your Sample Ref 34  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 4-Jul-18

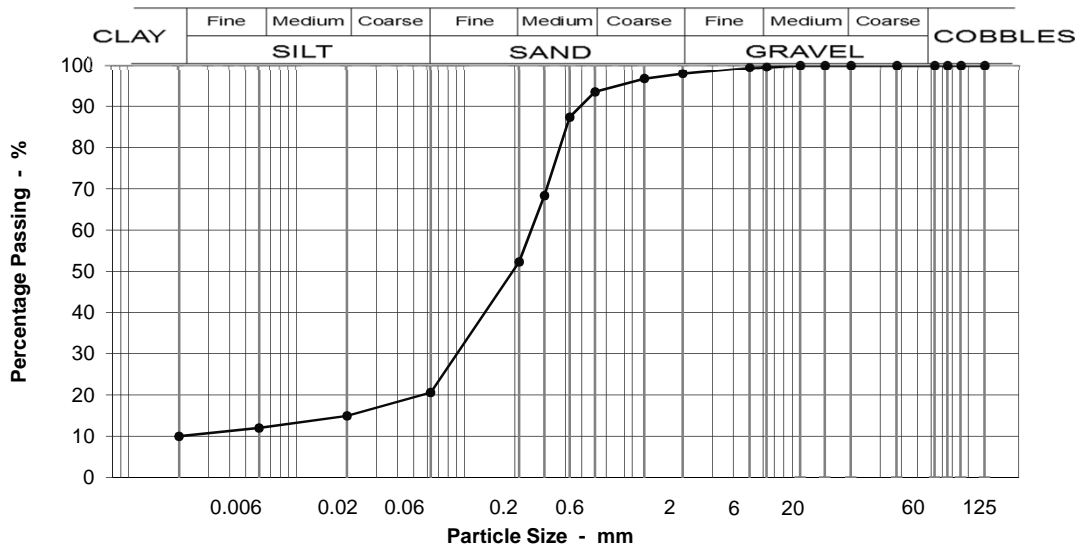
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 11.2 - 11.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	2
20	100		Coarse SAND	4
14	100		Medium SAND	41
10	100		Fine SAND	32
6.3	100		Silt & Clay	21
5	99			
2	98			
1.18	97			
0.600	93			
0.425	87			
0.300	68			
0.212	52			
0.063	21			
0.020	15			
0.006	12			
0.002	10			
		Moisture content %		23

Grading Analysis	
D100	6
D60	0.25
D10	0.00
Uniformity Coefficient	>10*

Description	
Laminated orange medium SAND, brown fine SAND, soft grey CLAY and dark brown SILT.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180307041-**  
Our Project No. **PZ1522D1**  
Your Sample Ref **39**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

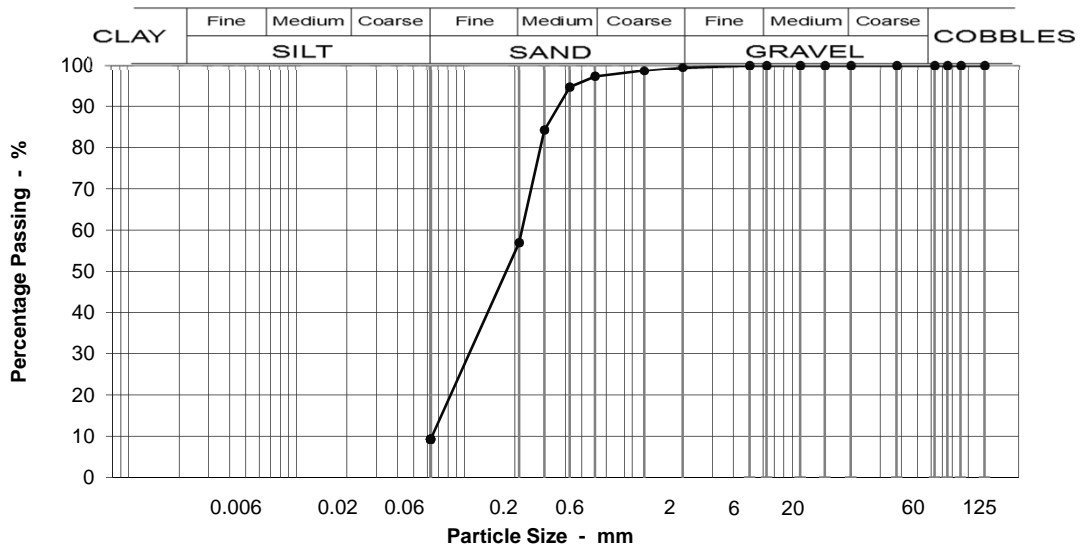
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 12.5 - 13m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	2
14	100		Medium SAND	40
10	100		Fine SAND	48
6.3	100		Silt & Clay	9
5	100			
2	99			
1.18	99			
0.600	97			
0.425	95			
0.300	84			
0.212	57			
0.063	9			
Moisture content %		23		

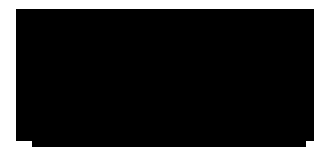
Grading Analysis	
D100	2
D60	0.22
D10	0.07
Uniformity Coefficient	3

**Description**  
Brown slightly silty fine and medium SAND some shell fragments.

Source : Inspection pit: Hand dug  
Test Code =



Simon Holden (Project Technician)





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Norfolk  
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Our reference No. **GTS3180309001-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 43  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 4-Jul-18

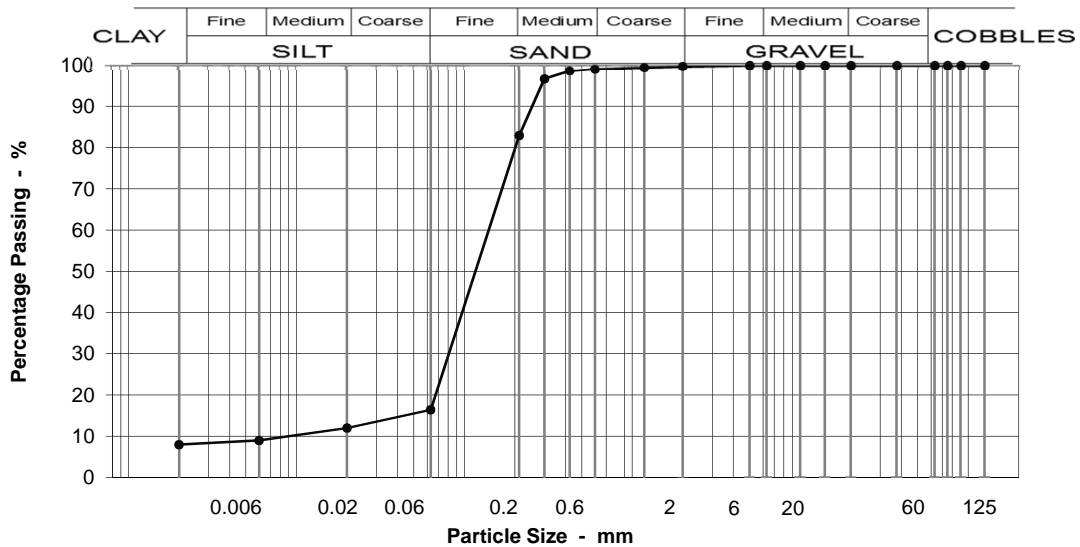
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 13.5 - 14m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	1
14	100		Medium SAND	16
10	100		Fine SAND	66
6.3	100		Silt & Clay	16
5	100			
2	100			
1.18	99			
0.600	99			
0.425	99			
0.300	97			
0.212	83			
0.063	16			
0.020	12			
0.006	9			
0.002	8	Moisture content %	45	

Grading Analysis	
D100	2
D60	0.16
D10	0.04
Uniformity Coefficient	4*

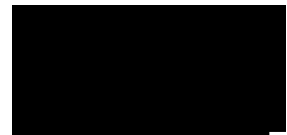
Description	
Brown slightly clayey slightly silty fine SAND, some shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



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Our reference No. **GTS3180309011-**  
Our Project No **PZ1522D1**  
Your Sample Ref **53**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

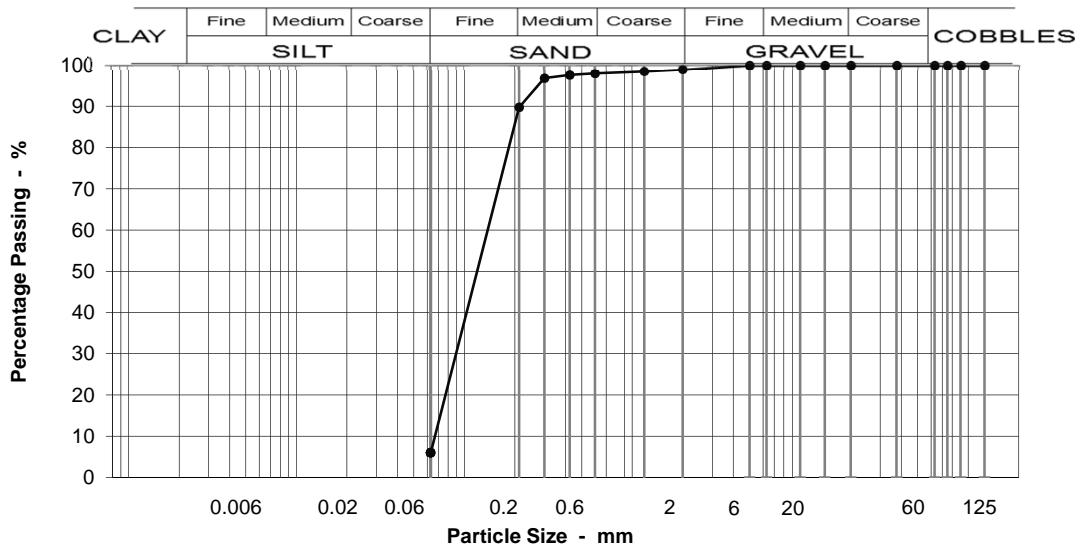
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 17.5 - 18m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	1
14	100		Medium SAND	8
10	100		Fine SAND	84
6.3	100		Silt & Clay	6
5	100			
2	99			
1.18	98			
0.600	98			
0.425	98			
0.300	97			
0.212	90			
0.063	6			
Moisture content %		24		

Grading Analysis	
D100	2
D60	0.16
D10	0.07
Uniformity Coefficient	2

**Description**  
Brown slightly silty fine SAND with thin beds of soft brown silty CLAY.

Source : Inspection pit: Hand dug  
Test Code =



Simon Holden (Project Technician)



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Our reference No. **GTS3180309018-**  
Our Project No **PZ1522D1**  
Your Sample Ref **60**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

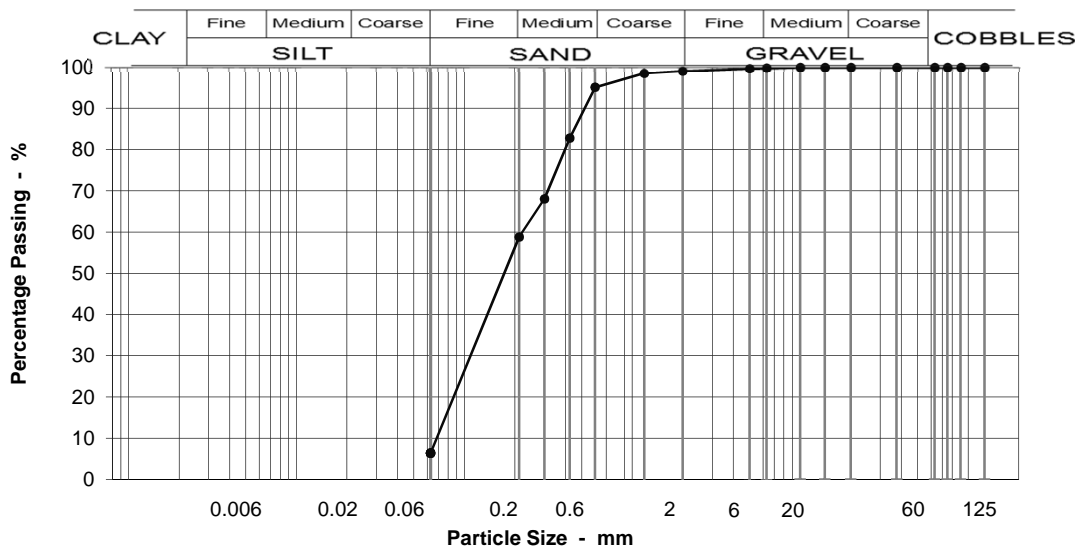
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 20.5 - 21m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	95
0.425	83
0.300	68
0.212	59
0.063	6

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 27

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	36
Fine SAND	52
Silt & Clay	6

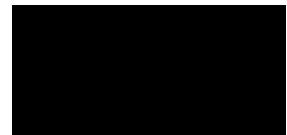
Grading Analysis	
D100	6
D60	0.22
D10	0.07
Uniformity Coefficient	3

Description	
Brown fine and medium SAND.	

Test Code =



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

Our reference No. **GTS3180309019-**  
Our Project No **PZ1522D1**  
Your Sample Ref **61**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

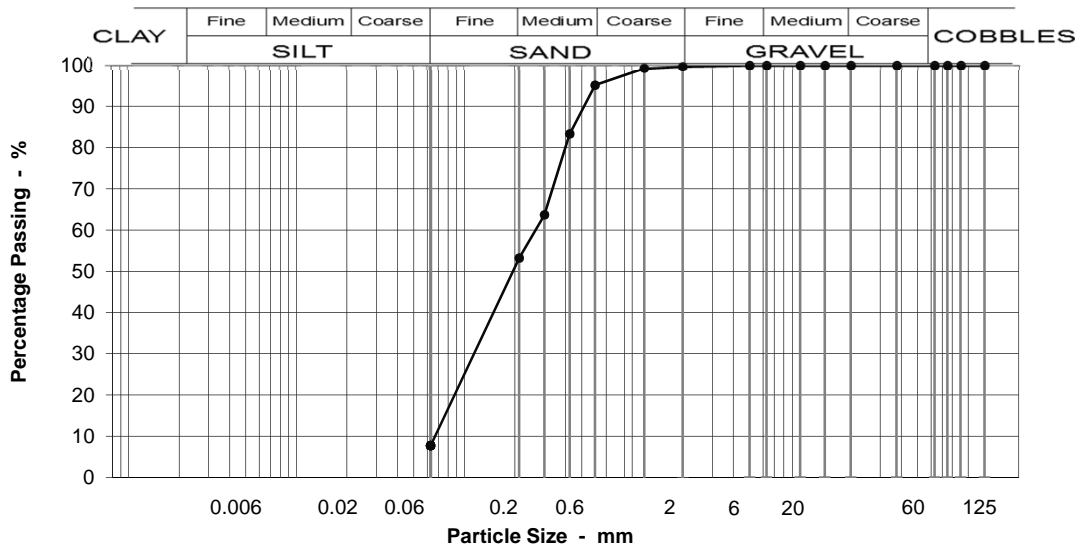
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 21.5 - 22m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	95
0.425	83
0.300	64
0.212	53
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	5
Medium SAND	42
Fine SAND	45
Silt & Clay	8

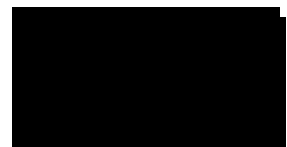
Grading Analysis	
D100	2
D60	0.27
D10	0.07
Uniformity Coefficient	4

Description	
Brown fine and medium SAND.	

Test Code =



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

Our reference No. **GTS3180309021-**  
Our Project No **PZ1522D1**  
Your Sample Ref **63**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

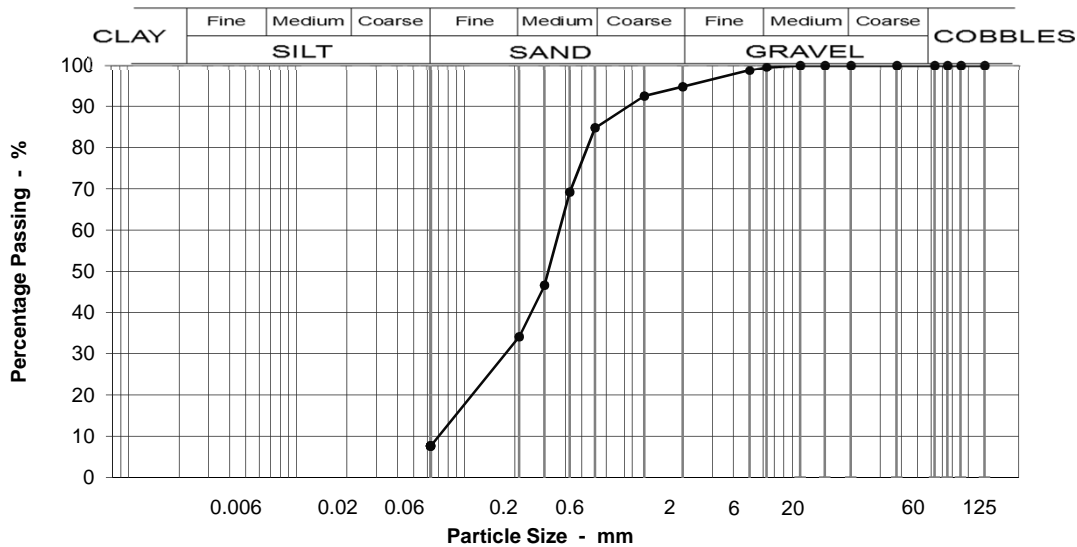
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 22.5 - 23m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	95
1.18	92
0.600	85
0.425	69
0.300	47
0.212	34
0.063	8

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	5
Coarse SAND	10
Medium SAND	51
Fine SAND	27
Silt & Clay	8

Grading Analysis	
D100	6
D60	0.37
D10	0.08
Uniformity Coefficient	5

**Description**  
Grey slightly gravelly fine and medium SAND with lenses of soft to firm grey CLAY and numerous shell fragments. Gravel is fine sub-angular to sub-rounded flint.

Moisture content % 19

Source : Inspection pit: Hand dug  
Test Code =



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180309027-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 69  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 4-Jul-18

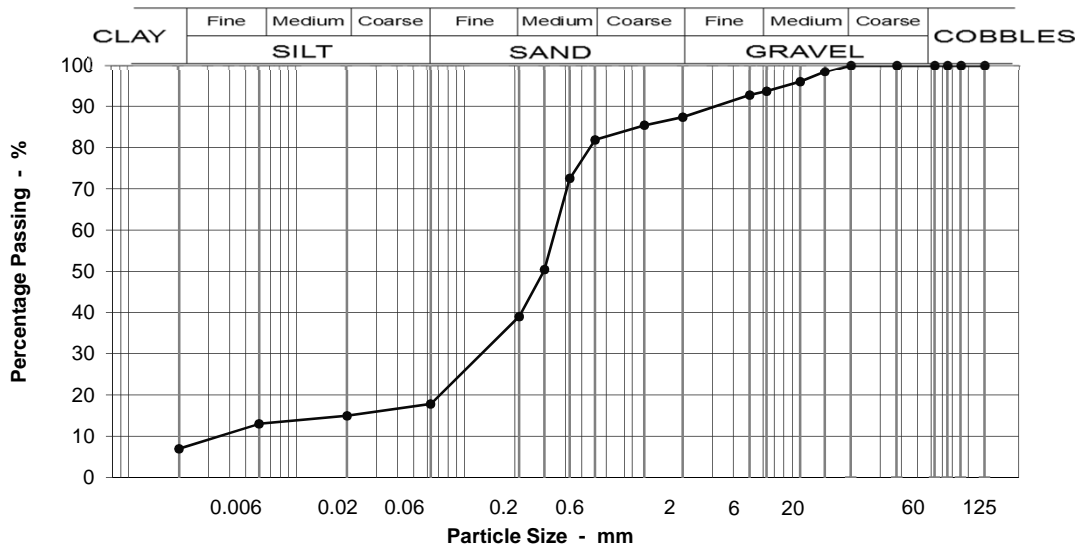
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 26.5 - 27m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	6
37.5	100		Fine GRAVEL	6
20	100		Coarse SAND	6
14	98		Medium SAND	43
10	96		Fine SAND	21
6.3	94		Silt & Clay	18
5	93			
2	87			
1.18	85			
0.600	82			
0.425	73			
0.300	50			
0.212	39			
0.063	18			
0.020	15			
0.006	13			
0.002	7			
		Moisture content %	22	

Grading Analysis	
D100	14
D60	0.35
D10	0.06
Uniformity Coefficient	6

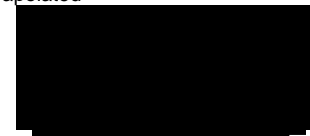
Description	
Grey gravelly fine and medium SAND with lenses of soft to firm grey clay and numerous shell fragments. Gravel is fine and medium subangular to subrounded flint.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180312004-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **73**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

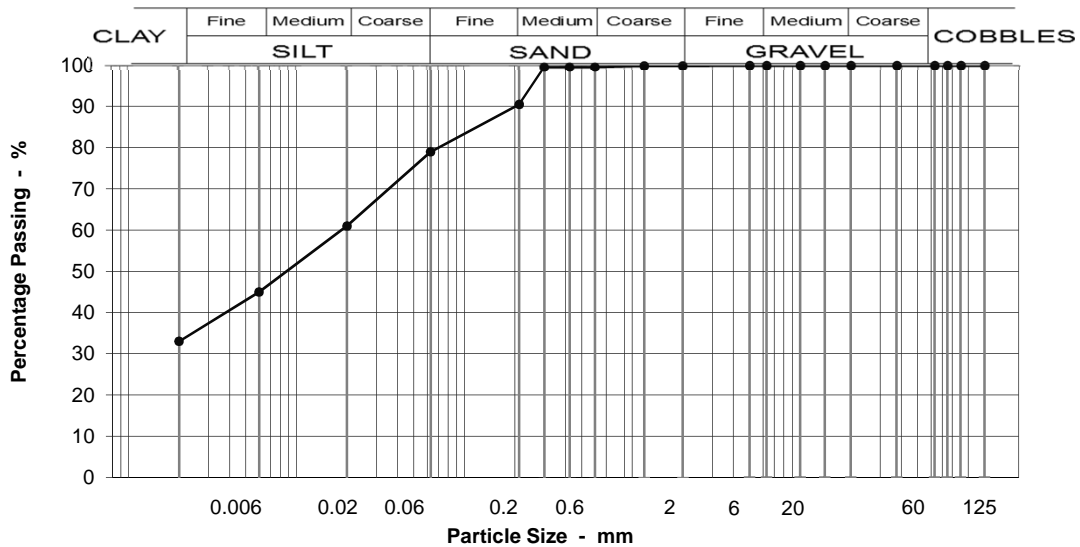
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 29.5 - 30m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	90
0.063	79
0.020	61
0.006	45
0.002	33

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	9
Fine SAND	12
Silt & Clay	79

Grading Analysis	
D100	2
D60	0.02
D10	0.00
Uniformity Coefficient	>10*

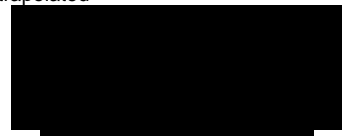
Description	
Laminated and thinly bedded, firm, grey, silty CLAY, light grey silty fine sand and black silt.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180312007-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **76**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

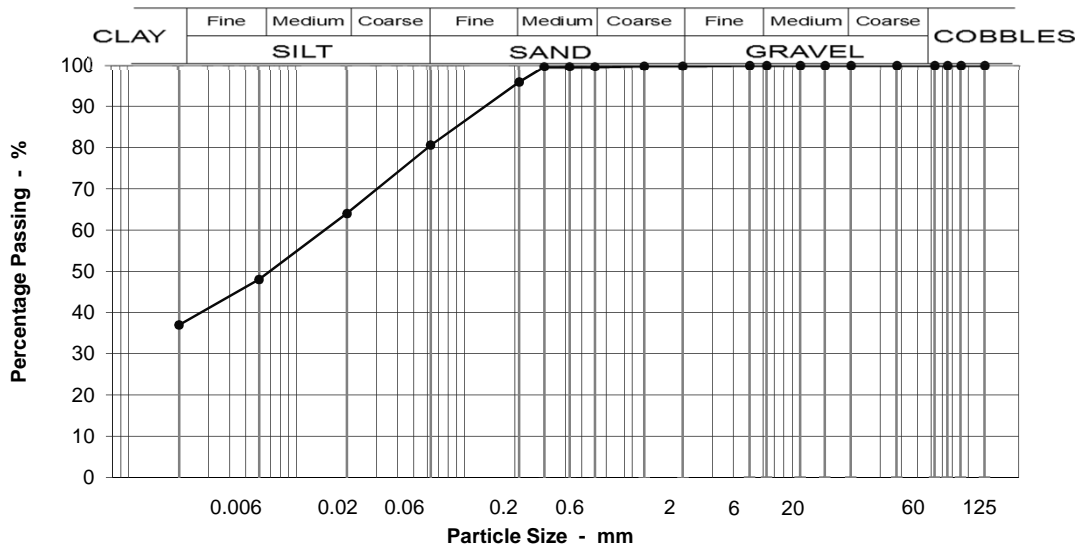
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: **Gt Yarmouth 3rd River Crossing**

Location: **BH12 @ 31.5 - 32m Specimen: 2**

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	4
10	100		Fine SAND	15
6.3	100		Silt & Clay	81
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	96			
0.063	81			
0.020	64			
0.006	48			
0.002	37			
		Moisture content %		0

Grading Analysis	
D100	2
D60	0.02
D10	0.00
Uniformity Coefficient	>10*

Description
Stiff, grey, slightly sandy, silty CLAY.

\* Uniformity coefficient extrapolated

Source : Inspection nit: Hand dug  
Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180312009-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 78  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 12-Jun-18

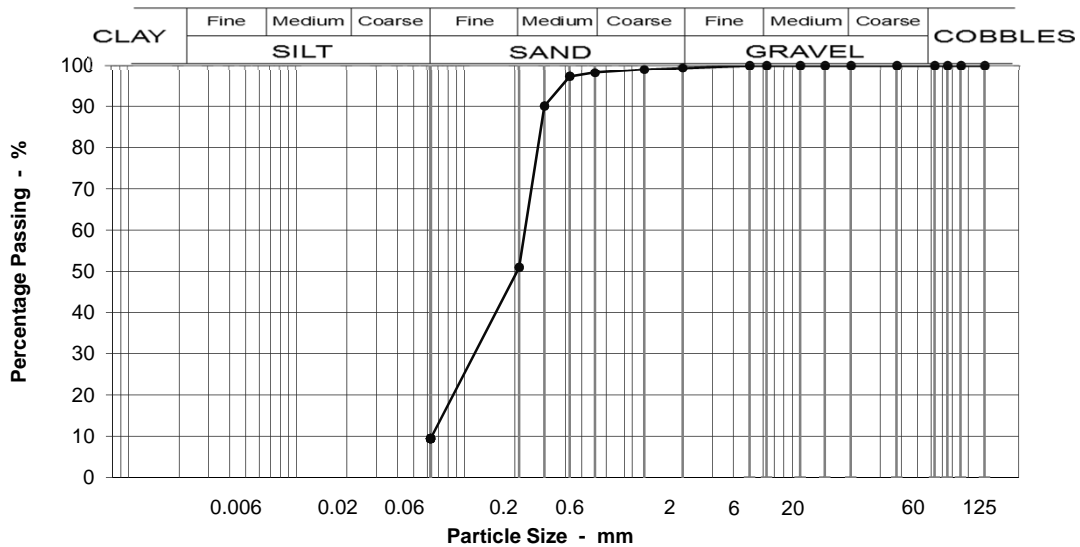
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 32.5 - 33m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	1
14	100		Medium SAND	47
10	100		Fine SAND	42
6.3	100		Silt & Clay	9
5	100		<b>Grading Analysis</b>	
2	99		D100	2
1.18	99		D60	0.23
0.600	98		D10	0.06
0.425	97		Uniformity Coefficient	4
0.300	90		<b>Description</b>	
0.212	51	Laminated and thinly bedded grey fine and medium SAND, grey very sandy clayey SILT and stiff grey silty CLAY, occasional shell fragments.		
0.063	9			

Moisture content % 23

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS3180312010-**  
Our Project No **PZ1522D1**  
Your Sample Ref **79**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

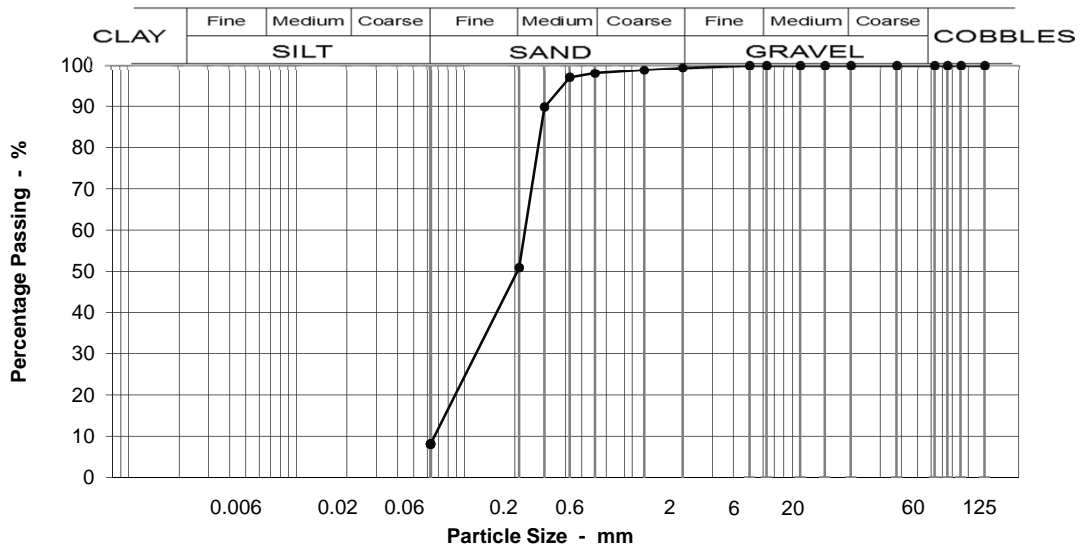
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 33.5 - 34m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

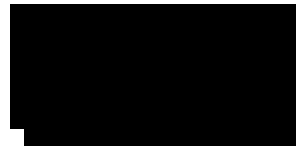


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	1
14	100		Medium SAND	47
10	100		Fine SAND	43
6.3	100		Silt & Clay	8
5	100		<b>Grading Analysis</b>	
2	99		D100	2
1.18	99		D60	0.23
0.600	98		D10	0.07
0.425	97		Uniformity Coefficient	3
0.300	90		<b>Description</b>	
0.212	51	Laminated thinly bedded grey slightly silty fine and medium SAND with laminae of grey very sandy clayey SILT and stiff light grey silty CLAY. Occasional shell fragments.		
0.063	8	Moisture content % 23		

Test Code =



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180312012-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **81**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **4-Jul-18**

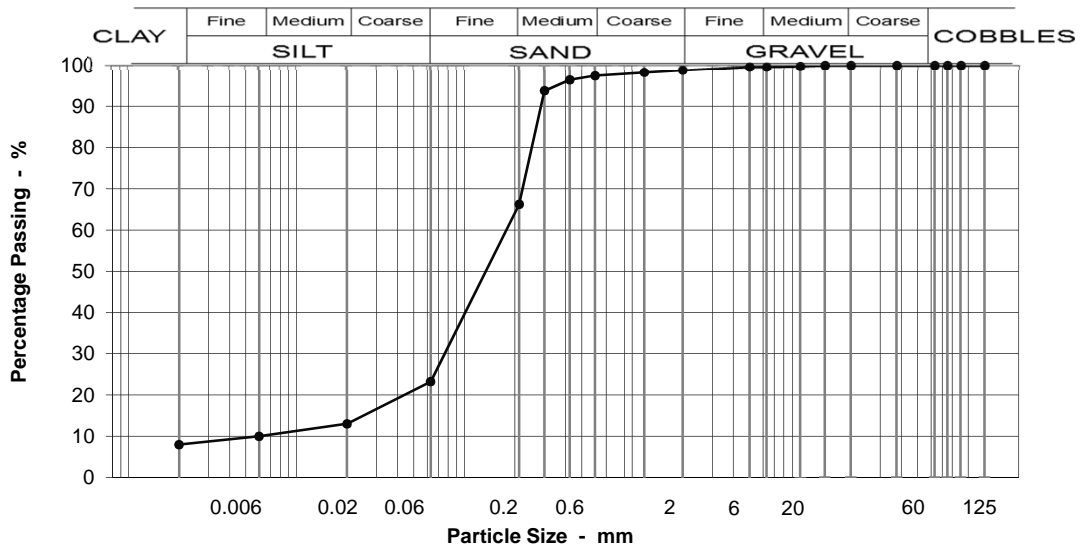
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 34.5 - 35m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	1
14	100		Medium SAND	31
10	100		Fine SAND	43
6.3	100		Silt & Clay	23
5	100			
2	99			
1.18	98			
0.600	97			
0.425	96			
0.300	94			
0.212	66			
0.063	23			
0.020	13			
0.006	10			
0.002	8			
Moisture content %		0		

Grading Analysis	
D100	10
D60	0.19
D10	0.04
Uniformity Coefficient	5*

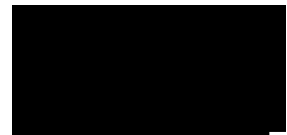
Description	
Grey slightly clayey silty fine and medium SAND with some shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180312016-**  
Our Project No **PZ1522D1**  
Your Sample Ref **85**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

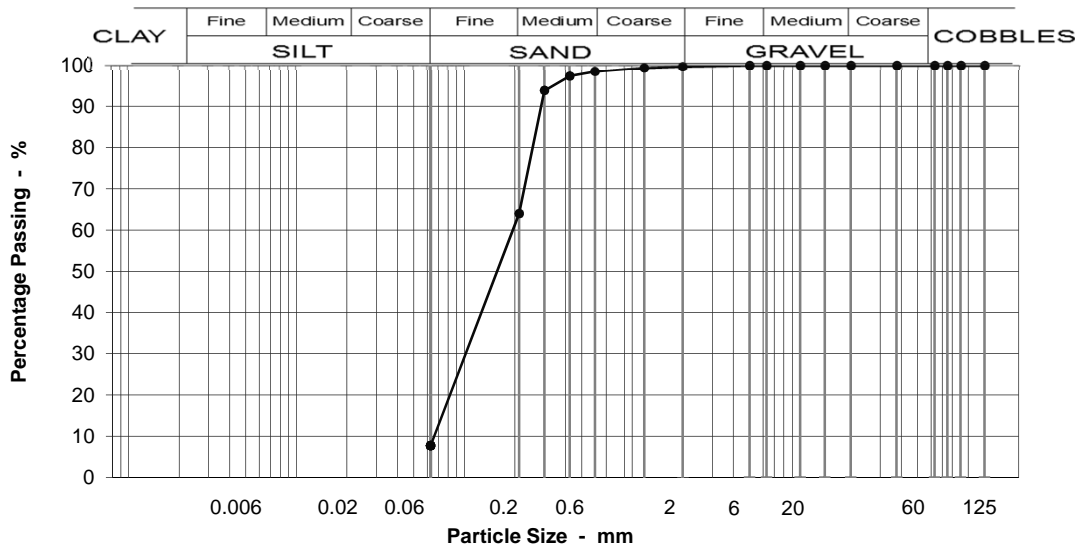
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 37.5 - 38m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	98
0.425	97
0.300	94
0.212	64
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	34
Fine SAND	56
Silt & Clay	8

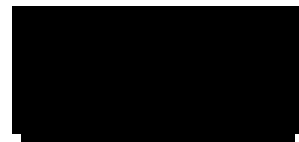
Grading Analysis	
D100	2
D60	0.20
D10	0.07
Uniformity Coefficient	3

Description	
Grey slightly silty fine and medium SAND with some shell fragments.	

Test Code =



Simon Holden (Project Technician)





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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180312019-**  
Our Project No **PZ1522D1**  
Your Sample Ref **88**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

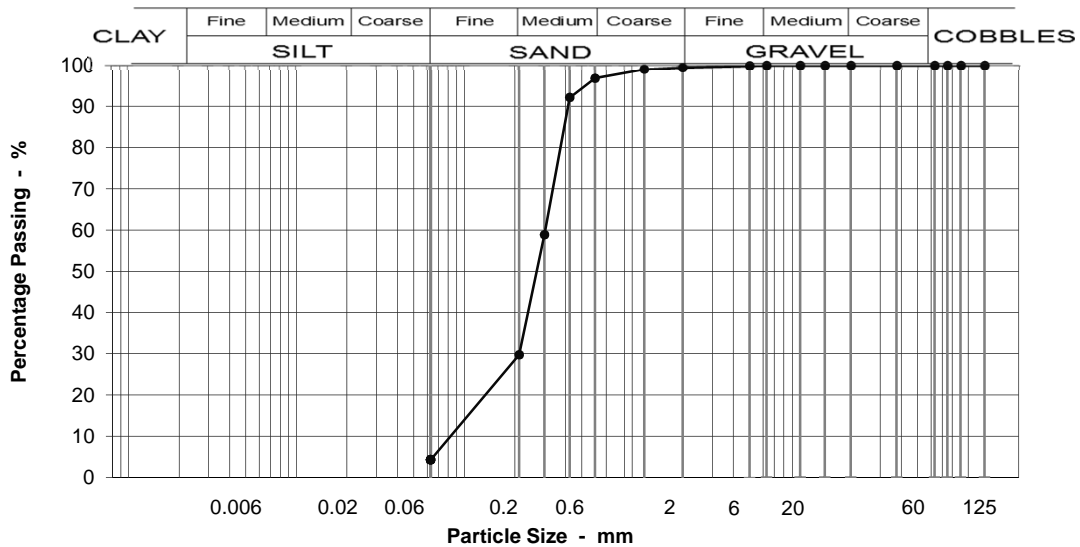
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 39.5 - 40m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



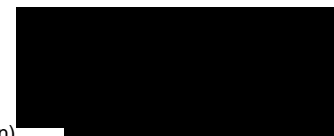
Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	3
14	100		Medium SAND	67
10	100		Fine SAND	25
6.3	100		Silt & Clay	4
5	100		<b>Grading Analysis</b>	
2	99		D100	5
1.18	99		D60	0.30
0.600	97		D10	0.10
0.425	92		Uniformity Coefficient	3
0.300	59		<b>Description</b>	
0.212	30	Dark grey slightly silty fine and medium SAND with some shell fragments.		
0.063	4			

Moisture content % 21

Test Code =



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180313001-**  
Our Project No **PZ1522D1**  
Your Sample Ref **90**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

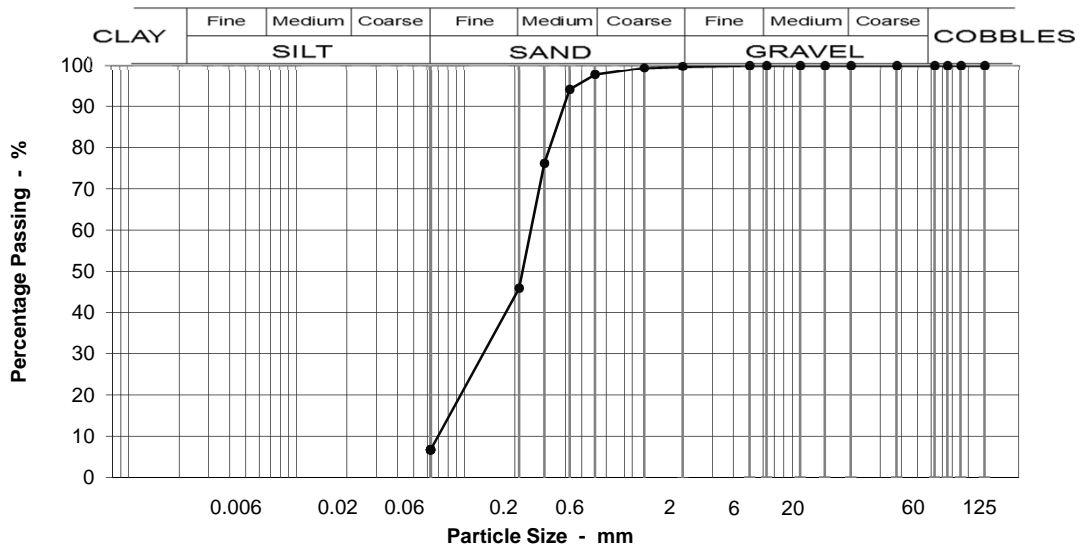
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 40.5 - 41m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

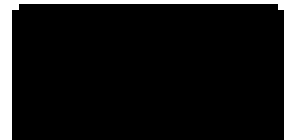


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	2
14	100		Medium SAND	52
10	100		Fine SAND	39
6.3	100		Silt & Clay	7
5	100		<b>Grading Analysis</b>	
2	100		D100	2
1.18	99		D60	0.25
0.600	98		D10	0.08
0.425	94		Uniformity Coefficient	3
0.300	76		<b>Description</b>	
0.212	46	Dark grey slightly silty fine and medium SAND with some shell fragments.		
0.063	7	Moisture content % 20		

Test Code =



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
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Norfolk  
NR1 2DH

Our reference No. **GTS3180313004-**  
Our Project No. PZ1522D1  
Your Sample Ref 93  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

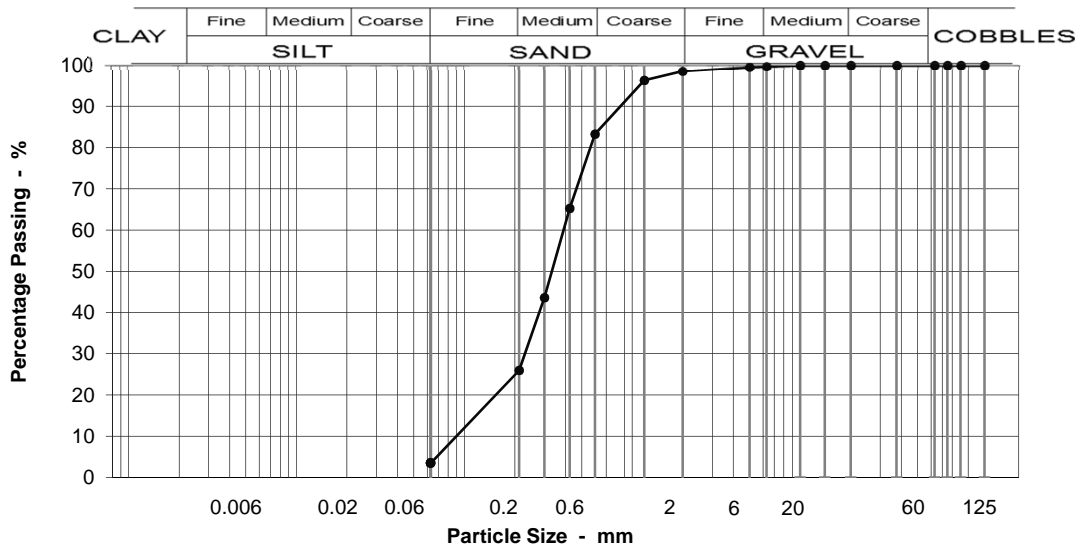
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 42.5 - 43m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	96
0.600	83
0.425	65
0.300	44
0.212	26
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	15
Medium SAND	57
Fine SAND	22
Silt & Clay	4

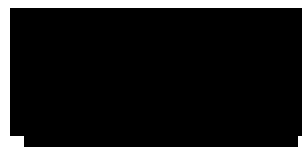
Grading Analysis	
D100	6
D60	0.39
D10	0.11
Uniformity Coefficient	4

Description	
Dark grey slightly silty fine medium and course SAND with some shell fragments.	

Test Code =



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS3180313007-**  
Our Project No. **PZ1522D1**  
Your Sample Ref **96**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

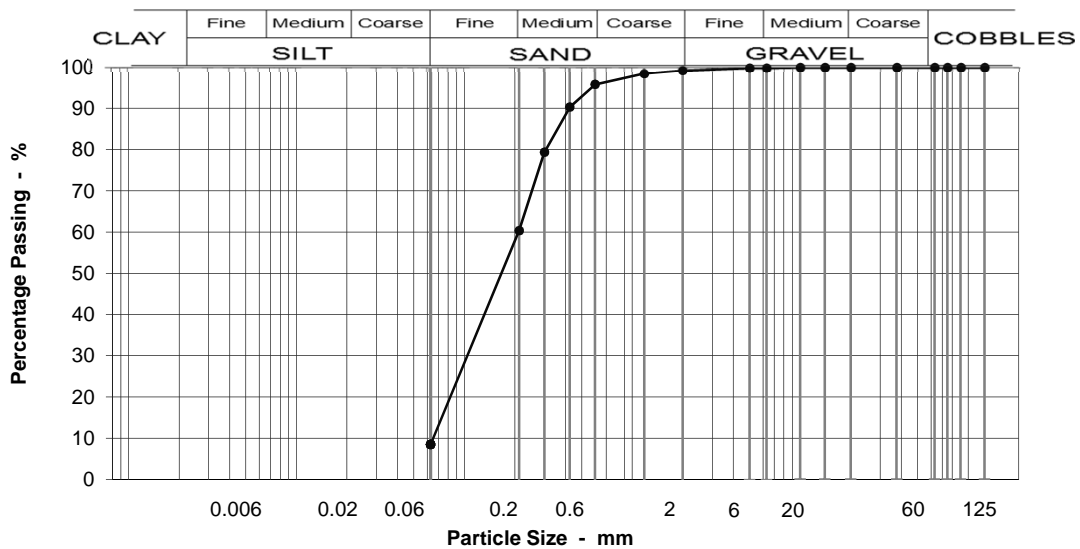
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 44.5 - 45m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	96
0.425	90
0.300	79
0.212	60
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	35
Fine SAND	52
Silt & Clay	9

Grading Analysis	
D100	6
D60	0.21
D10	0.07
Uniformity Coefficient	3

Description	
Dark grey slightly silty fine and medium SAND with some shell fragments.	

Source : Inspection pit: Hand dug  
Test Code =



Simon Holden (Project Technician)

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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180313009-**  
Our Project No. PZ1522D1  
Your Sample Ref 98  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

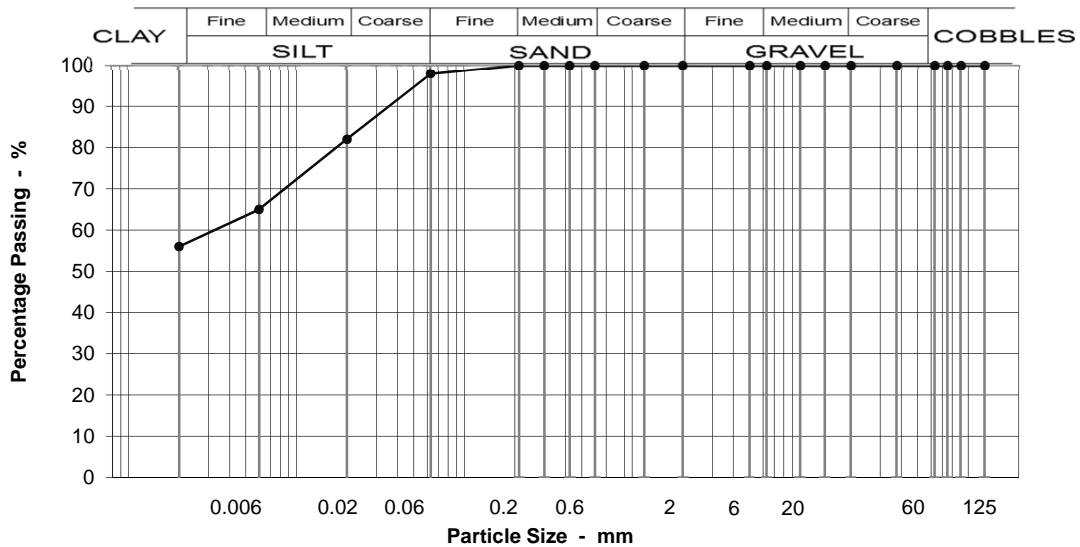
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 45.5 - 46m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	100
0.063	98
0.020	82
0.006	65
0.002	56

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	0
Fine SAND	2
Silt & Clay	98

Grading Analysis	
D100	0
D60	0.00
D10	0.00
Uniformity Coefficient	>10*

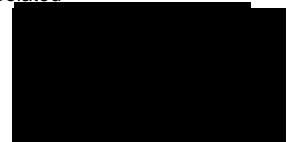
Description	
Very stiff laminated brown very silty CLAY.	

\* Uniformity coefficient extrapolated

Test Code =



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180313015-**  
Our Project No **PZ1522D1**  
Your Sample Ref **104**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

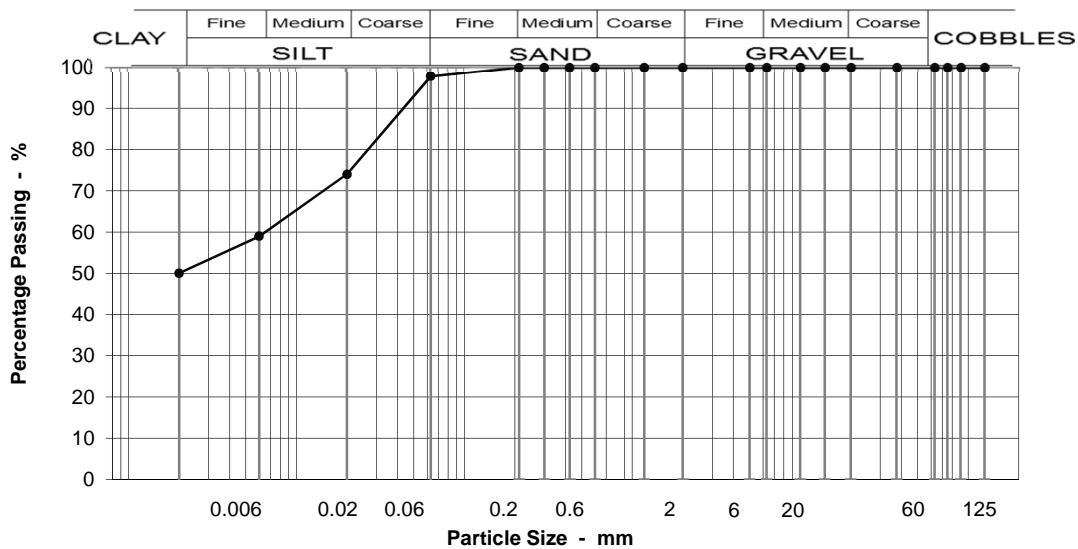
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12 @ 48.95 - 49m Specimen: 2

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	0
10	100		Fine SAND	2
6.3	100		Silt & Clay	98
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	100			
0.063	98			
0.020	74			
0.006	59			
0.002	50			
		Moisture content %		0

Grading Analysis	
D100	0
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

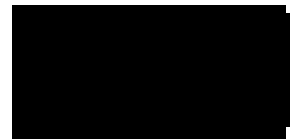
Description	
Very stiff laminated brown very silty CLAY with laminae of light brown and light grey silt.	

\* Uniformity coefficient extrapolated

Test Code =



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180315001-**  
Our Project No **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

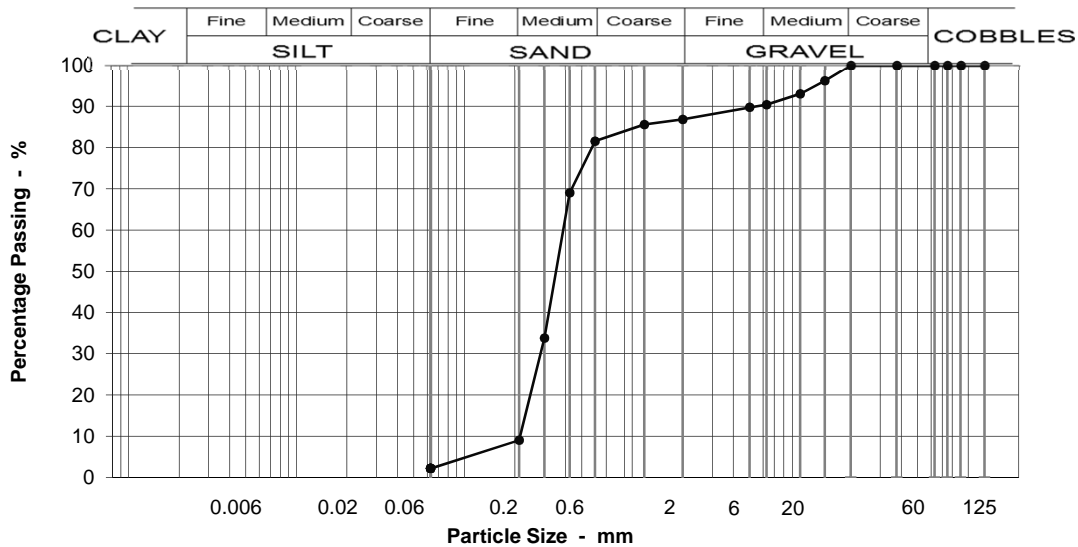
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12A @ 0.1 - 0.6m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	96
10	93
6.3	90
5	90
2	87
1.18	86
0.600	82
0.425	69
0.300	34
0.212	9
0.063	2

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 6.3

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	10
Fine GRAVEL	4
Coarse SAND	5
Medium SAND	72
Fine SAND	7
Silt & Clay	2

Grading Analysis	
D100	14
D60	0.39
D10	0.22
Uniformity Coefficient	2

**Description**  
MADE GROUND - comprising of greyish brown gravelly fine and medium SAND. Gravel is fine and medium angular to sub-rounded flint,brick,porcelain and quartz.

Test Code =



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Our reference No. **GTS3180315003-**  
Our Project No. PZ1522D1  
Your Sample Ref. 3  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

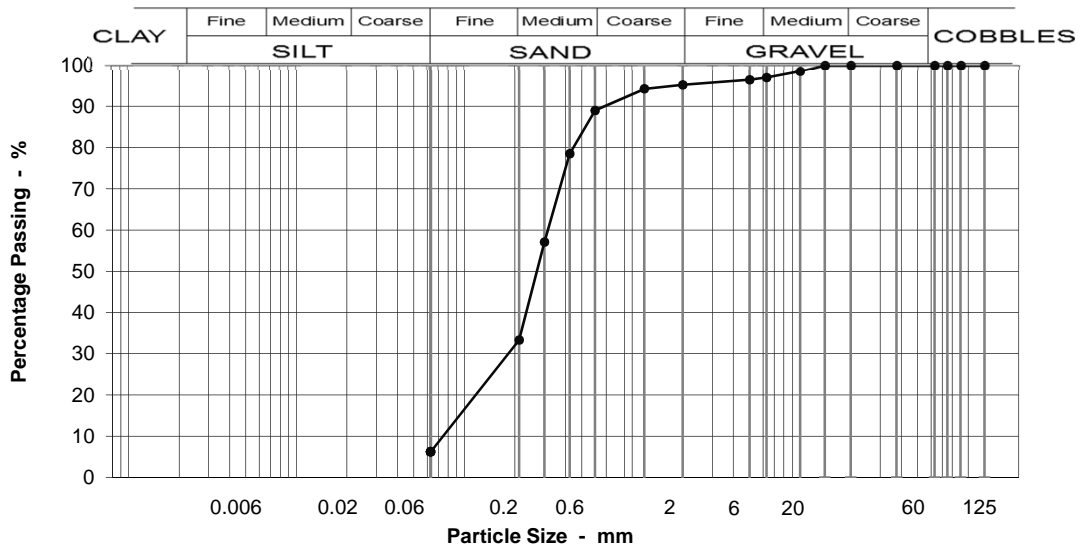
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12A @ 0.9 - 1.4m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

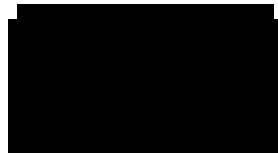


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	3
37.5	100		Fine GRAVEL	2
20	100		Coarse SAND	6
14	100		Medium SAND	56
10	99		Fine SAND	27
6.3	97		Silt & Clay	6
5	96		<b>Grading Analysis</b>	
2	95		D100	10
1.18	94		D60	0.32
0.600	89		D10	0.08
0.425	79		Uniformity Coefficient	4
0.300	57		<b>Description</b>	
0.212	33	Brown slightly gravelly fine and medium SAND. Gravel is fine and medium, rounded to sub-rounded flint.		
0.063	6	Moisture content % 9.2		

Test Code =



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

Our reference No. **GTS3180315006-**  
Our Project No **PZ1522D1**  
Your Sample Ref **6**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

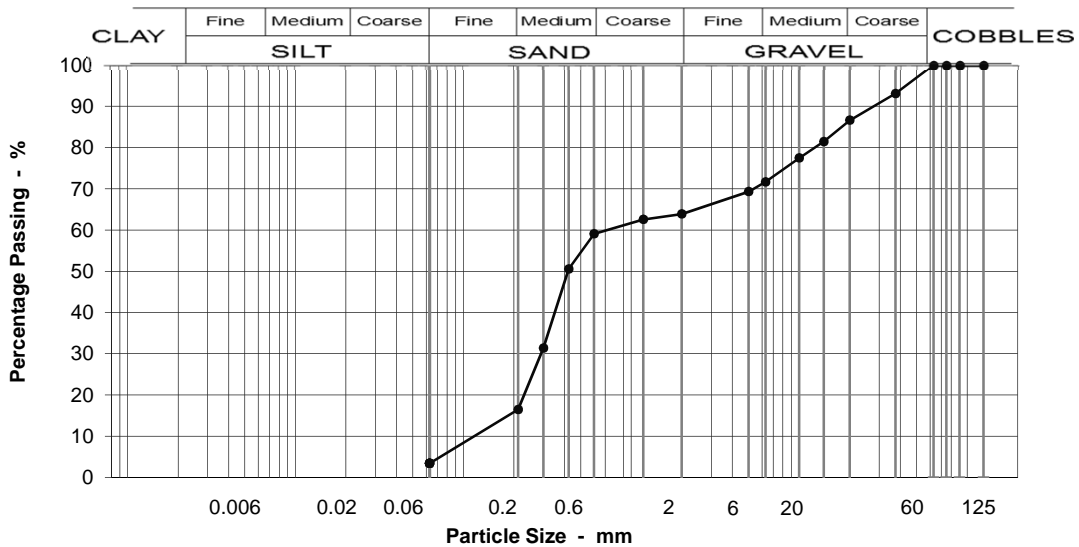
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12A @ 1.5 - 2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	93
20	87
14	81
10	77
6.3	72
5	69
2	64
1.18	63
0.600	59
0.425	51
0.300	31
0.212	17
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6M.**

Moisture content % 13

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	13
Medium GRAVEL	15
Fine GRAVEL	8
Coarse SAND	5
Medium SAND	43
Fine SAND	13
Silt & Clay	4

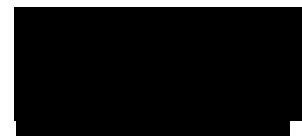
Grading Analysis	
D100	38
D60	0.75
D10	0.14
Uniformity Coefficient	5

**Description**  
Greyish brown very gravelly medium SAND. Gravel is fine, medium and coarse angular to sub-rounded flint and quartz.

Test Code =



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180316001-**  
Our Project No **PZ1522D1**  
Your Sample Ref **15**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

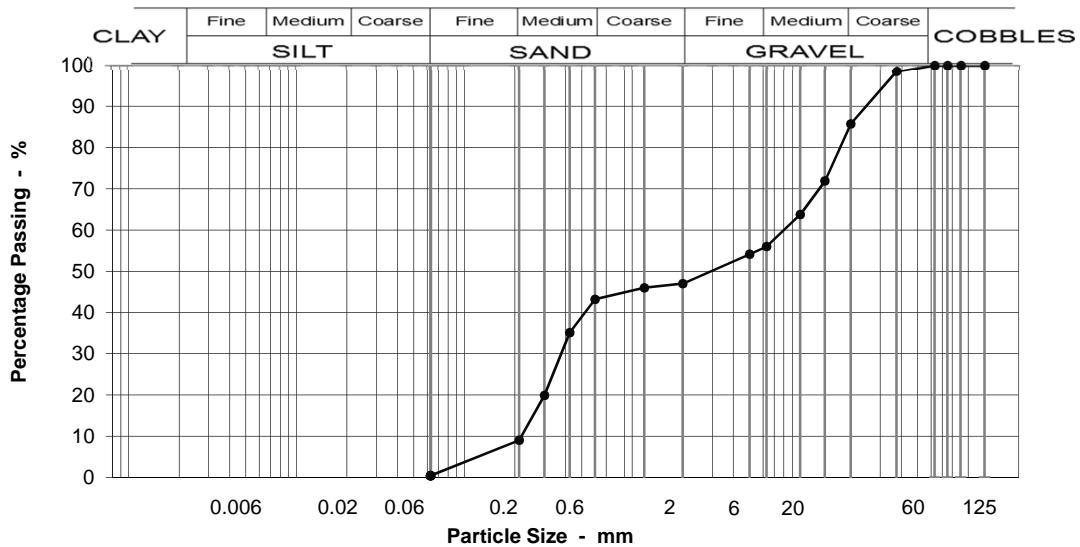
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12A @ 4.5 - 5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	98
20	86
14	72
10	64
6.3	56
5	54
2	47
1.18	46
0.600	43
0.425	35
0.300	20
0.212	9
0.063	0

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 8.3

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	14
Medium GRAVEL	30
Fine GRAVEL	9
Coarse SAND	4
Medium SAND	34
Fine SAND	9
Silt & Clay	0

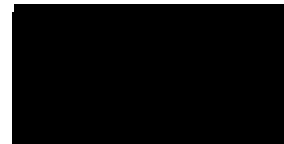
Grading Analysis	
D100	38
D60	8.20
D10	0.22
Uniformity Coefficient	37

Description	
MADE GROUND - comprising of greyish brown Fine medium and coarse rounded to sub-angular flint,brick,wood,quartzite and quartz GRAVEL and medium SAND.	

Test Code =



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County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS3180320002-**  
Our Project No. PZ1522D1  
Your Sample Ref. 2  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

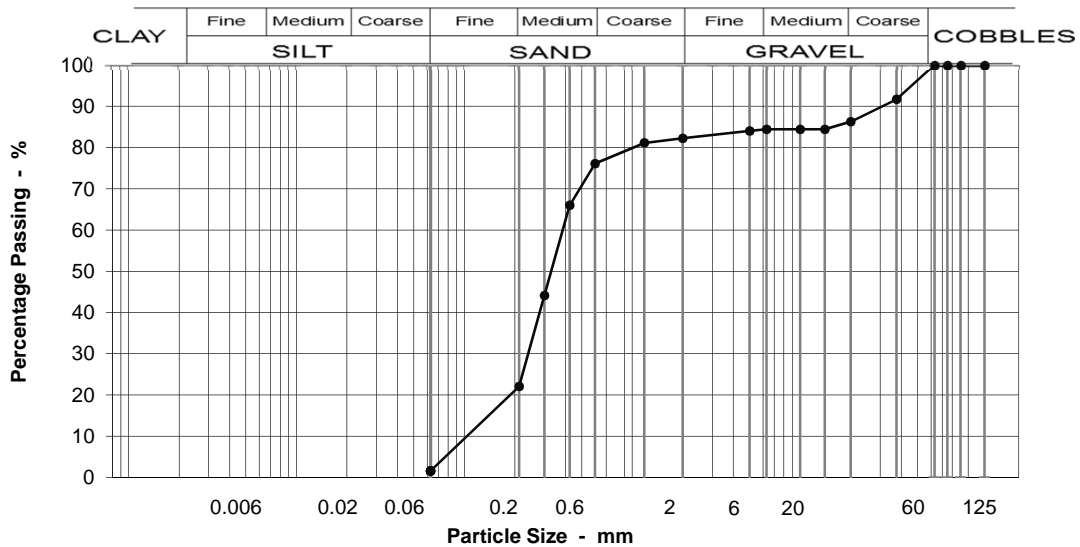
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 0.6 - 1m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	92
20	86
14	84
10	84
6.3	84
5	84
2	82
1.18	81
0.600	76
0.425	66
0.300	44
0.212	22
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 8.9

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	14
Medium GRAVEL	2
Fine GRAVEL	2
Coarse SAND	6
Medium SAND	54
Fine SAND	20
Silt & Clay	2

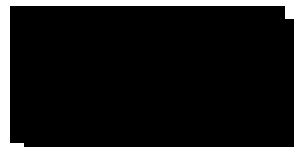
Grading Analysis	
D100	38
D60	0.39
D10	0.12
Uniformity Coefficient	3

**Description**  
MADE GROUND - comprising of brown gravelly medium SAND. Gravel is rounded to angular flint, brick, concrete, quartz.

Test Code =



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180320006-**  
Our Project No **PZ1522D1**  
Your Sample Ref **6**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

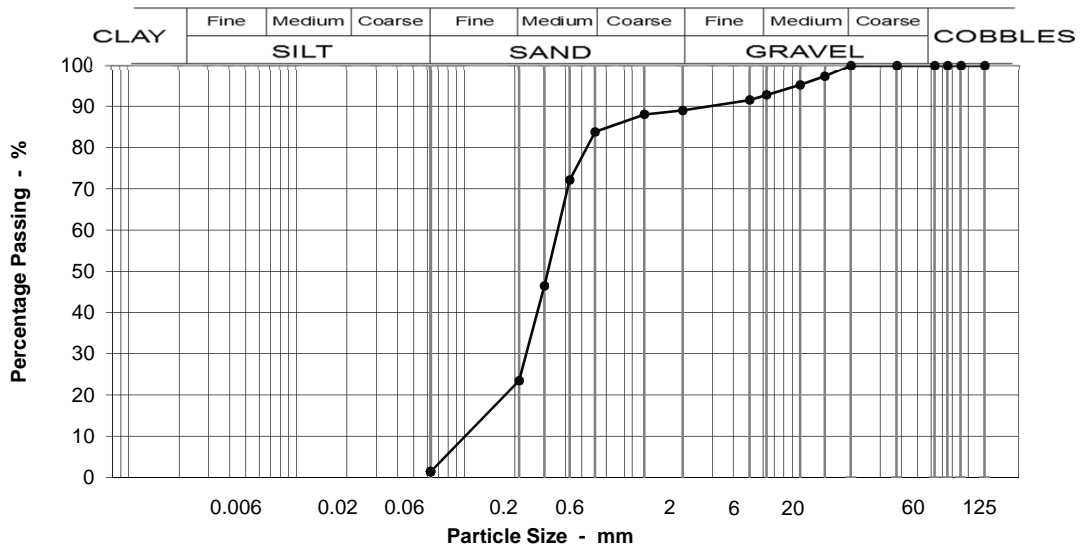
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 1.5 - 2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

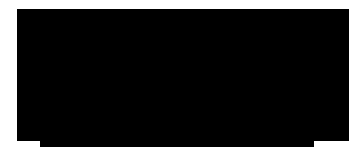


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	7
37.5	100		Fine GRAVEL	4
20	100		Coarse SAND	5
14	97		Medium SAND	60
10	95		Fine SAND	22
6.3	93		Silt & Clay	1
5	91		<b>Grading Analysis</b>	
2	89		D100	14
1.18	88		D60	0.37
0.600	84		D10	0.12
0.425	72		Uniformity Coefficient	3
0.300	46		<b>Description</b>	
0.212	23	MADE GROUND - comprising of brown gravelly medium SAND. Gravel is fine and medium, rounded to angular flint, brick, concrete and quartz.		
0.063	1	Moisture content % 20		

Test Code =



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Norfolk  
NR1 2DH

Our reference No. **GTS3180320012-**  
Our Project No. **PZ1522D1**  
Your Sample Ref **12**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

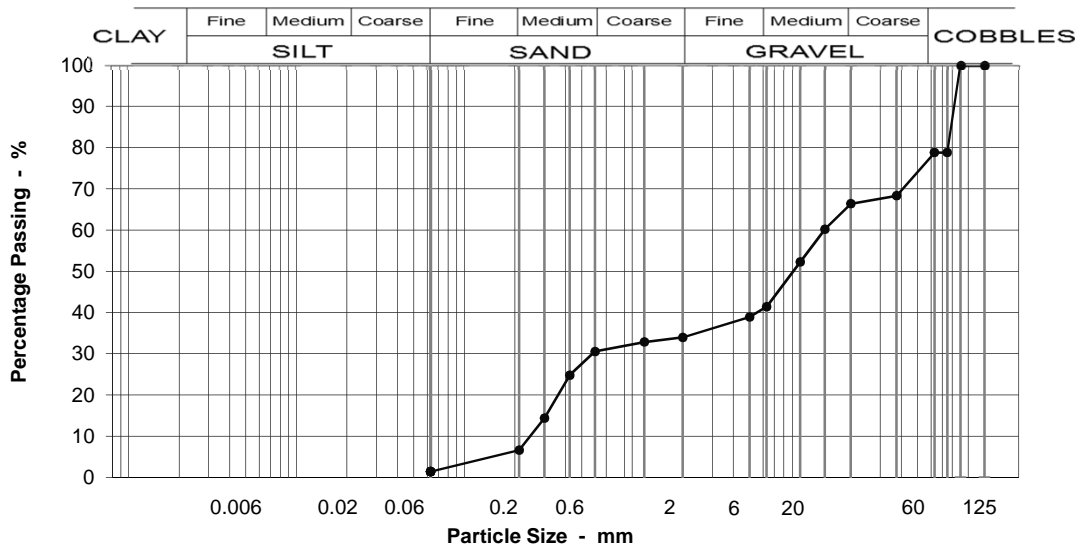
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 3.6 - 4m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

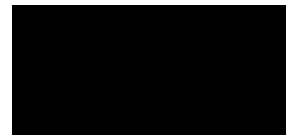


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions											
Particle Size mm	% Passing													
125	100	<b>This material complies with the following material classes 1A, 6A, 6E/6R.</b>	BOULDERS	0										
90	100		COBBLES	21										
75	79		Coarse GRAVEL	12										
63	79		Medium GRAVEL	25										
37.5	68		Fine GRAVEL	7										
20	66		Coarse SAND	3										
14	60		Medium SAND	24										
10	52		Fine SAND	5										
6.3	41		Silt & Clay	1										
5	39													
2	34													
1.18	33													
0.600	31													
0.425	25													
0.300	14													
0.212	7													
0.063	1													
Moisture content %		11	<table border="1"> <thead> <tr> <th colspan="2">Grading Analysis</th> </tr> </thead> <tbody> <tr><td>D100</td><td>75</td></tr> <tr><td>D60</td><td>13.91</td></tr> <tr><td>D10</td><td>0.25</td></tr> <tr><td>Uniformity Coefficient</td><td>56</td></tr> </tbody> </table>		Grading Analysis		D100	75	D60	13.91	D10	0.25	Uniformity Coefficient	56
Grading Analysis														
D100	75													
D60	13.91													
D10	0.25													
Uniformity Coefficient	56													
			<table border="1"> <thead> <tr> <th colspan="2">Description</th> </tr> </thead> <tbody> <tr> <td colspan="2">MADE GROUND - comprising cobbles of brick, medium and coarse rounded to angular flint, concrete, brick and quartz gravel in a matrix of dark grey medium SAND.</td> </tr> </tbody> </table>		Description		MADE GROUND - comprising cobbles of brick, medium and coarse rounded to angular flint, concrete, brick and quartz gravel in a matrix of dark grey medium SAND.							
Description														
MADE GROUND - comprising cobbles of brick, medium and coarse rounded to angular flint, concrete, brick and quartz gravel in a matrix of dark grey medium SAND.														

Source : Inspection nit: Hand dug. Gen  
Test Code =



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180320015-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 15  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 12-Jun-18

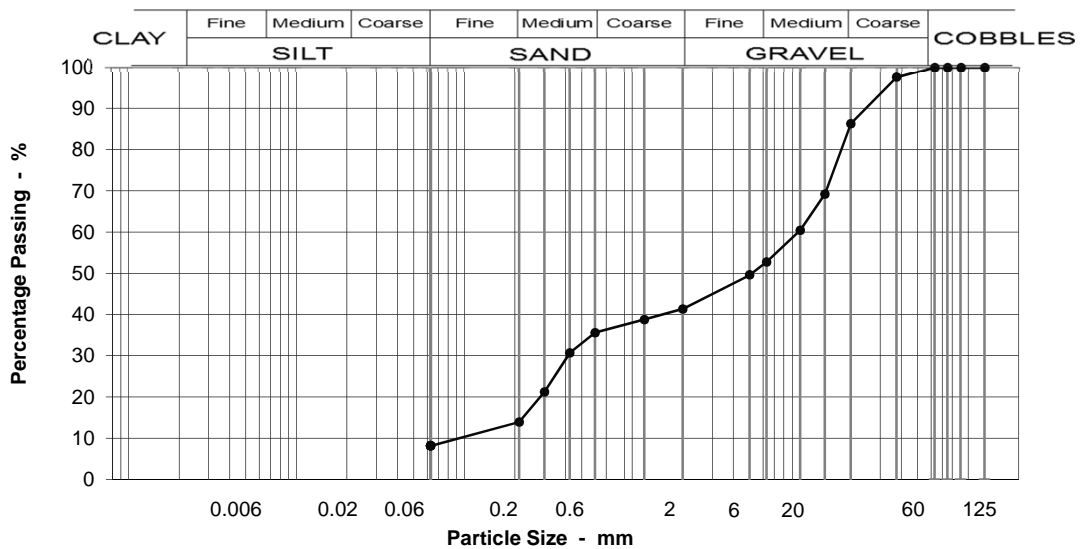
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 4.5 - 5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	98
20	86
14	69
10	60
6.3	53
5	50
2	41
1.18	39
0.600	36
0.425	31
0.300	21
0.212	14
0.063	8

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6M, 6N.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	14
Medium GRAVEL	34
Fine GRAVEL	11
Coarse SAND	6
Medium SAND	22
Fine SAND	6
Silt & Clay	8

Grading Analysis	
D100	38
D60	9.80
D10	0.11
Uniformity Coefficient	89

**Description**  
Dark grey organic clayey very sandy fine to coarse angular to sub-rounded flint, brick, wood & granite.

Moisture content % 15

Test Code = 610



Simon Holden (Project Technician)



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Our reference No. **GTS3180320018-610**  
Our Project No. PZ1522D1  
Your Sample Ref 18  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 12-Jun-18

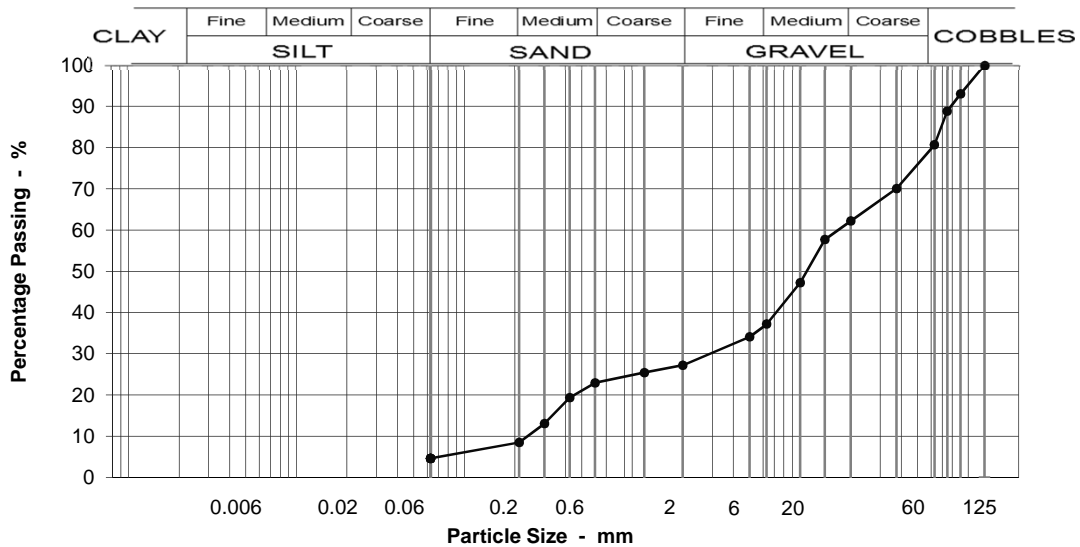
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 5.5 - 6m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	93
75	89
63	81
37.5	70
20	62
14	58
10	47
6.3	37
5	34
2	27
1.18	25
0.600	23
0.425	19
0.300	13
0.212	9
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F2/6F3, 6I.**

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	19
Coarse GRAVEL	18
Medium GRAVEL	25
Fine GRAVEL	10
Coarse SAND	4
Medium SAND	14
Fine SAND	4
Silt & Clay	5

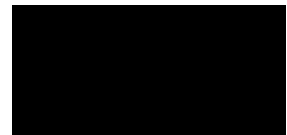
Grading Analysis	
D100	90
D60	17.06
D10	0.24
Uniformity Coefficient	71

Description	
Dark grey organic cobblely clayey very sandy fine to coarse angular to sub-rounded flint, brick, wood, granite and plastic. Cobbles are of brick.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norfolk  
NR1 2DH

**Our reference No.** GTS3180320021-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 21  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 18-Jun-18

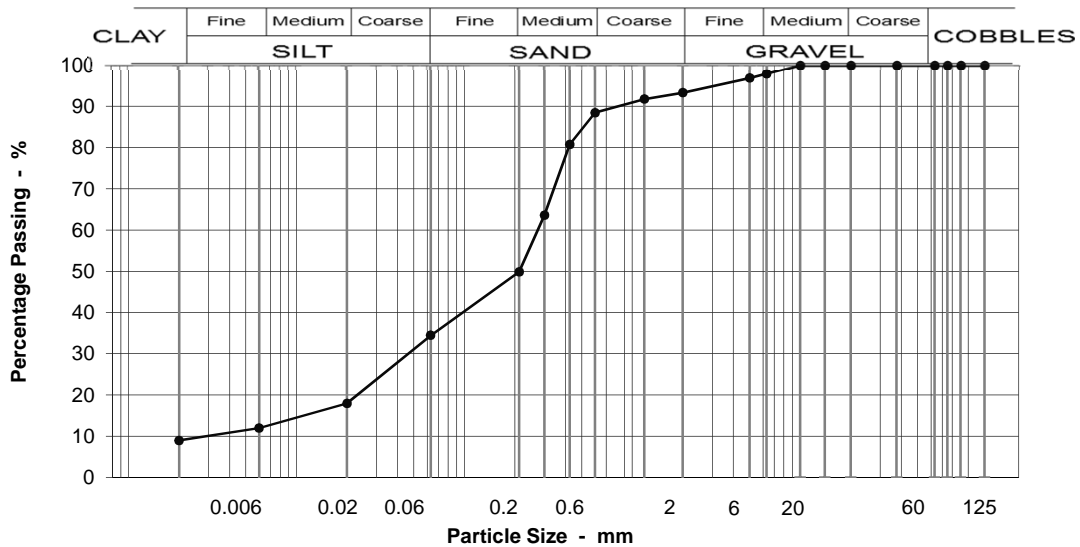
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH12B @ 6.5 - 7m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	2
37.5	100		Fine GRAVEL	5
20	100		Coarse SAND	5
14	100		Medium SAND	39
10	100		Fine SAND	15
6.3	98		Silt & Clay	34
5	97			
2	93			
1.18	92			
0.600	88			
0.425	81			
0.300	64			
0.212	50			
0.063	34			
0.020	18			
0.006	12			
0.002	9	<b>Moisture content %</b>	27	

Grading Analysis	
D100	6
D60	0.28
D10	0.04
Uniformity Coefficient	7*

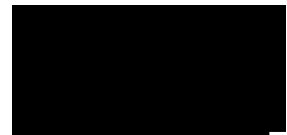
Description	
Firm to stiff greyish brown very sandy SILT with thin beds of black silty CLAY and greyish brown silty fine SAND. Some shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180320024-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 24  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 12-Jun-18

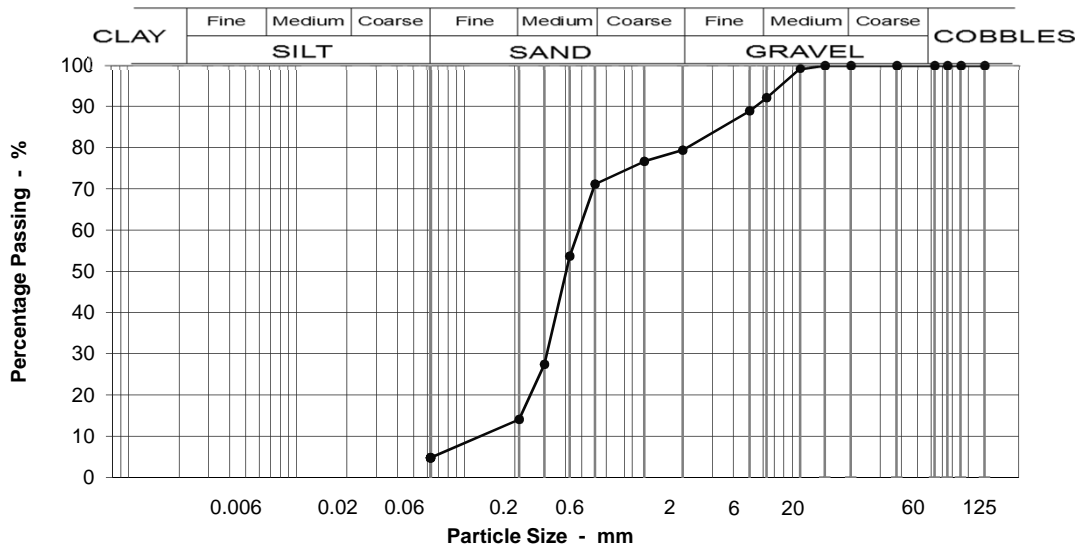
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 7.5 - 8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	92
5	89
2	79
1.18	77
0.600	71
0.425	54
0.300	27
0.212	14
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	8
Fine GRAVEL	13
Coarse SAND	8
Medium SAND	57
Fine SAND	9
Silt & Clay	5

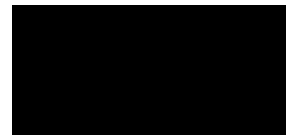
Grading Analysis	
D100	10
D60	0.49
D10	0.15
Uniformity Coefficient	3

**Description**  
Grey slightly organic very gravelly medium SAND. Gravel is fine and medium rounded to angular flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180320028-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 27  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 25-Jun-18

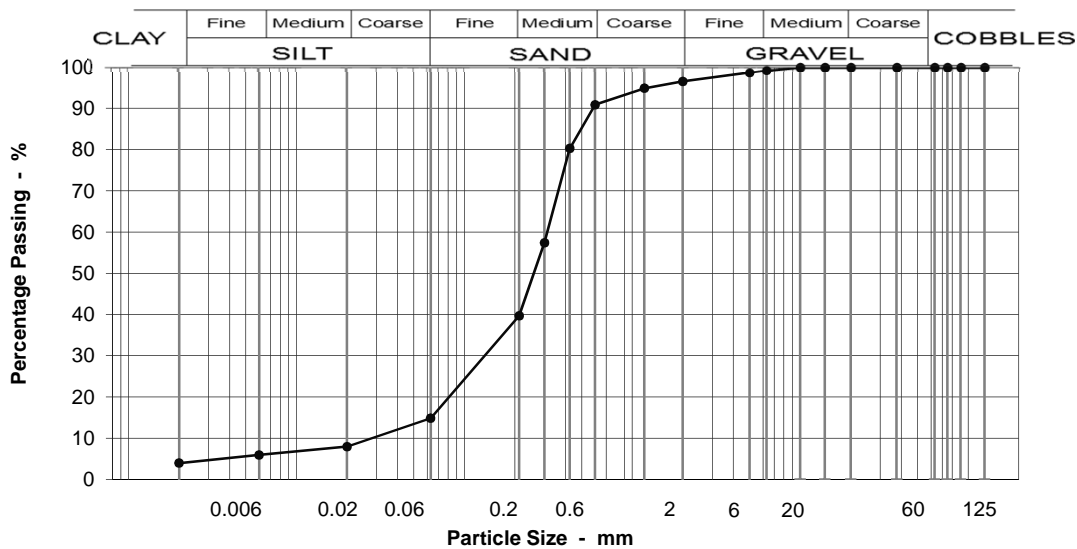
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 8.5 - 9m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	96
1.18	95
0.600	91
0.425	80
0.300	57
0.212	40
0.063	15
0.020	8
0.006	6
0.002	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	3
Coarse SAND	6
Medium SAND	51
Fine SAND	25
Silt & Clay	15

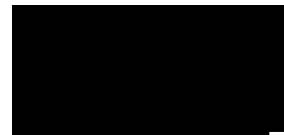
Grading Analysis	
D100	6
D60	0.31
D10	0.08
Uniformity Coefficient	4

Description	
Laminated and thinly bedded brown medium SAND with laminae of brownish grey very sandy SILT and black silty CLAY.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180320032-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **31**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **12-Jun-18**

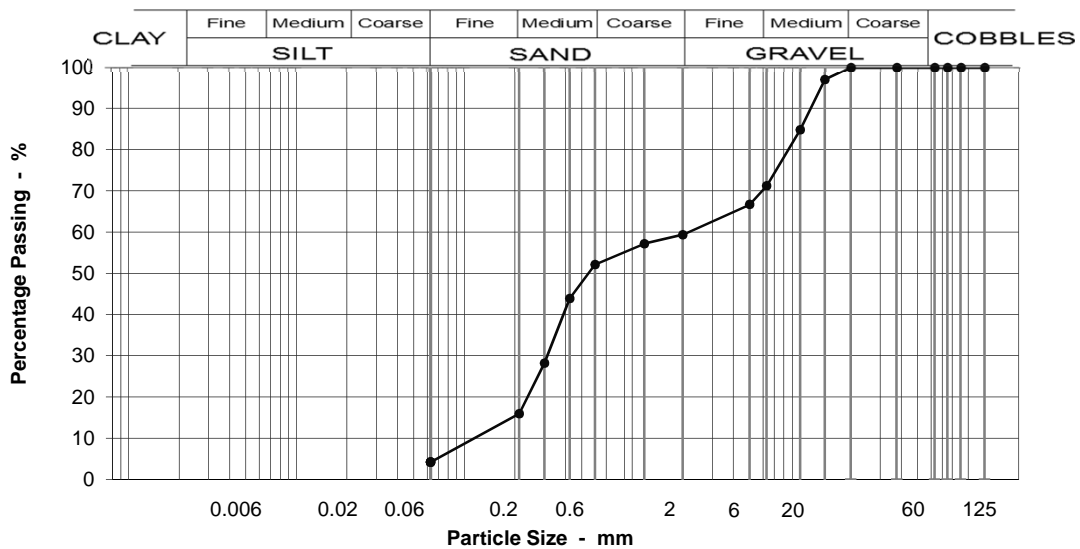
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 9.5 - 10m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	97
10	85
6.3	71
5	67
2	59
1.18	57
0.600	52
0.425	44
0.300	28
0.212	16
0.063	4

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6I, 6K, 6M, 6N.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	29
Fine GRAVEL	12
Coarse SAND	7
Medium SAND	36
Fine SAND	12
Silt & Clay	4

Grading Analysis	
D100	14
D60	2.26
D10	0.14
Uniformity Coefficient	17

**Description**  
Grey slightly organic medium SAND and medium angular flint and quartz GRAVEL.

Moisture content % 11

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3180320035-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 34  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 25-Jun-18

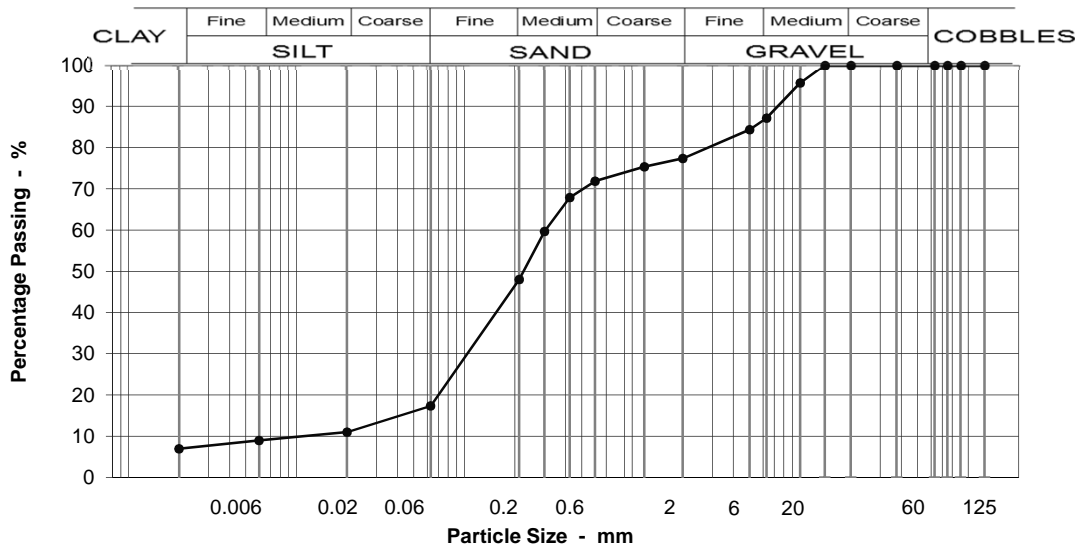
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH12B @ 10.5 - 11m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2C.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	13
37.5	100		Fine GRAVEL	10
20	100		Coarse SAND	5
14	100		Medium SAND	24
10	96		Fine SAND	31
6.3	87		Silt & Clay	17
5	84			
2	77			
1.18	75			
0.600	72			
0.425	68			
0.300	60			
0.212	48			
0.063	17			
0.020	11			
0.006	9			
0.002	7	<b>Moisture content %</b>	21	

Grading Analysis	
D100	10
D60	0.30
D10	0.06
Uniformity Coefficient	5

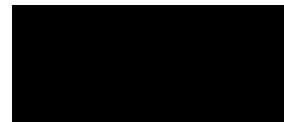
Description	
Thinly bedded greyish brown very gravelly fine and medium SAND, grey silty CLAY and orangey-brown weakly cemented fine and medium SAND. Gravel is fine and medium subangular to subrounded flint and quartz.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180320040-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 39  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 18-Jun-18

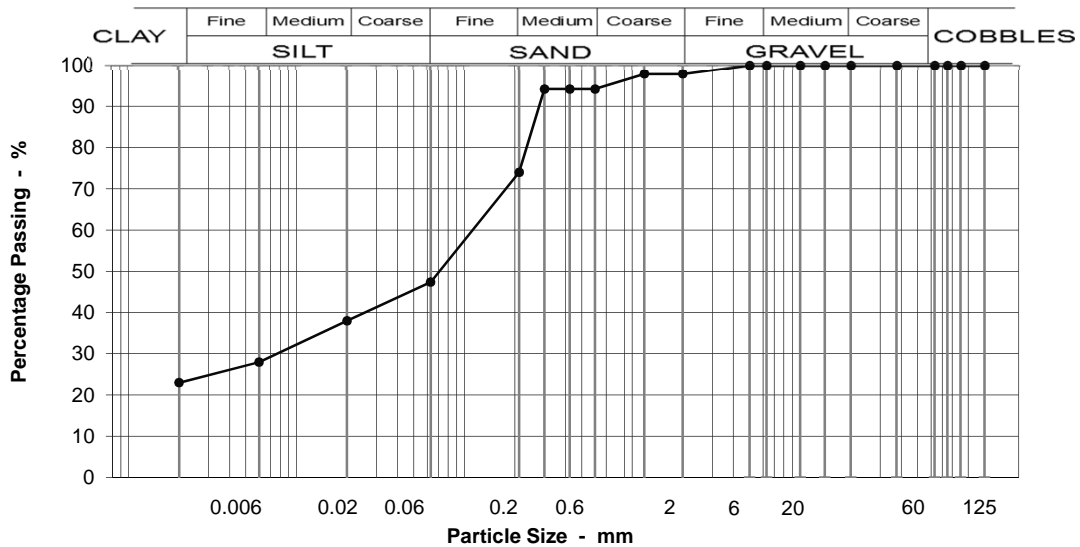
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 12.4 - 12.7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	2
20	100		Coarse SAND	4
14	100		Medium SAND	20
10	100		Fine SAND	27
6.3	100		Silt & Clay	47
5	100			
2	98			
1.18	98			
0.600	94			
0.425	94			
0.300	94			
0.212	74			
0.063	47			
0.020	38			
0.006	28			
0.002	23			
		Moisture content %		0

Grading Analysis	
D100	2
D60	0.13
D10	0.00
Uniformity Coefficient	>10*

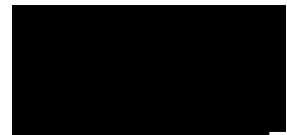
Description	
Orangey-brown SAND with numerous laminae and thin beds of light grey silty CLAY, black clayey SILT and orange sandy SILT.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180321001-**  
Our Project No **PZ1522D1**  
Your Sample Ref **41**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

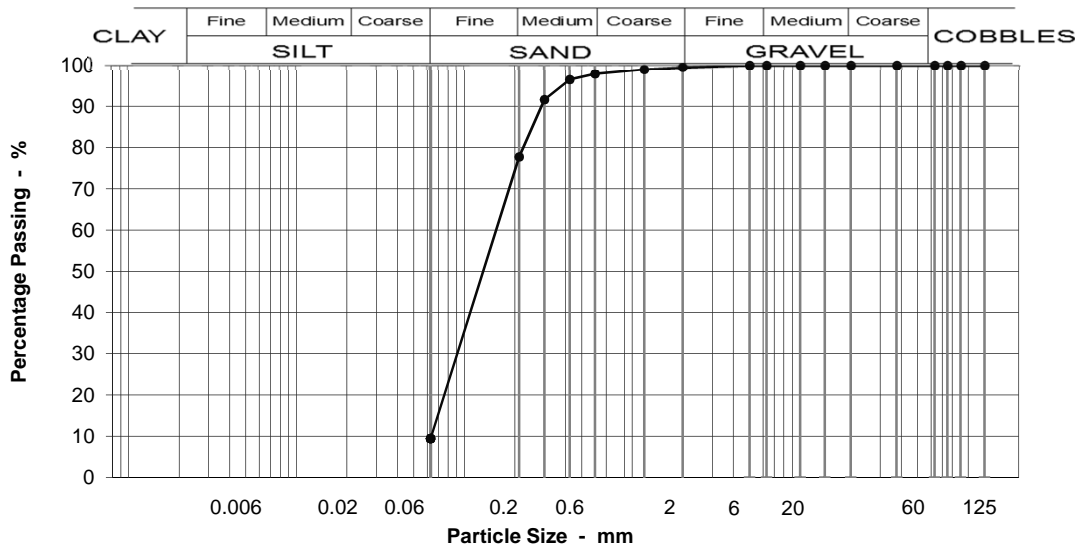
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 12.7 - 13m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	98
0.425	97
0.300	92
0.212	78
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 35

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	20
Fine SAND	68
Silt & Clay	9

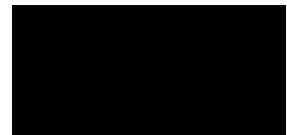
Grading Analysis	
D100	2
D60	0.17
D10	0.06
Uniformity Coefficient	3

**Description**  
Orange brown fine and medium SAND with laminae of light grey silty CLAY, black clayey SILT and orange sandy SILT.

Test Code =



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180321009-**  
Our Project No. PZ1522D1  
Your Sample Ref. 49  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

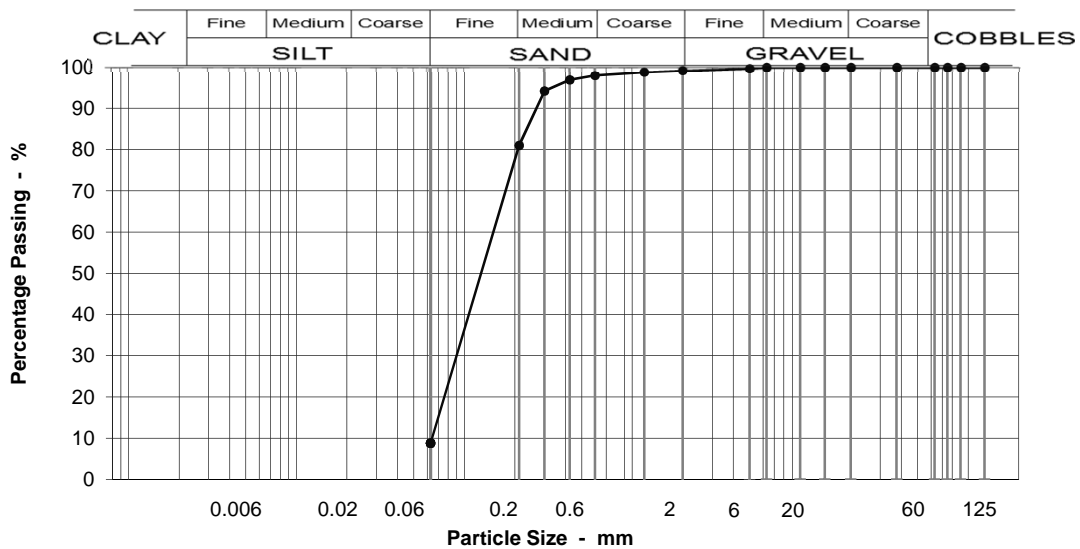
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 15.5 - 16m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

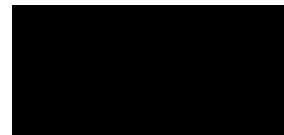


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions											
Particle Size mm	% Passing													
125	100	<p><b>This material complies with the following material classes 1B, 6E/6R, 6M.</b></p>	BOULDERS	0										
90	100		COBBLES	0										
75	100		Coarse GRAVEL	0										
63	100		Medium GRAVEL	0										
37.5	100		Fine GRAVEL	1										
20	100		Coarse SAND	1										
14	100		Medium SAND	17										
10	100		Fine SAND	72										
6.3	100		Silt & Clay	9										
5	100													
2	99													
1.18	99													
0.600	98													
0.425	97													
0.300	94													
0.212	81													
0.063	9													
Moisture content %		30	<table border="1"> <thead> <tr> <th colspan="2">Grading Analysis</th> </tr> </thead> <tbody> <tr><td>D100</td><td>5</td></tr> <tr><td>D60</td><td>0.17</td></tr> <tr><td>D10</td><td>0.07</td></tr> <tr><td>Uniformity Coefficient</td><td>3</td></tr> </tbody> </table>		Grading Analysis		D100	5	D60	0.17	D10	0.07	Uniformity Coefficient	3
Grading Analysis														
D100	5													
D60	0.17													
D10	0.07													
Uniformity Coefficient	3													
			<table border="1"> <thead> <tr> <th colspan="2">Description</th> </tr> </thead> <tbody> <tr> <td colspan="2">Thinly bedded light brown fine SAND, orange brown sandy SILT and soft grey silty CLAY.</td> </tr> </tbody> </table>		Description		Thinly bedded light brown fine SAND, orange brown sandy SILT and soft grey silty CLAY.							
Description														
Thinly bedded light brown fine SAND, orange brown sandy SILT and soft grey silty CLAY.														

Source : Inspection nit: Hand dug. Gen  
Test Code =



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180321014-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **54**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **12-Jun-18**

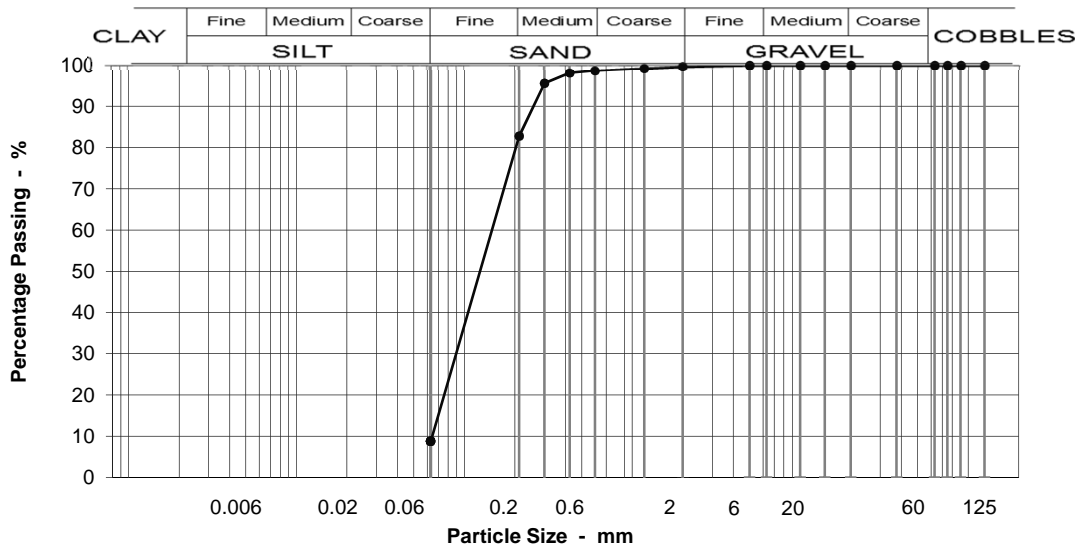
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 17.5 - 18m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



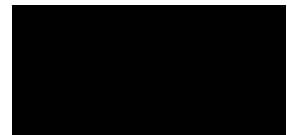
Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	1
14	100		Medium SAND	16
10	100		Fine SAND	74
6.3	100		Silt & Clay	9
5	100		<b>Grading Analysis</b>	
2	100		D100	2
1.18	99		D60	0.17
0.600	99		D10	0.07
0.425	98		Uniformity Coefficient	3
0.300	96		<b>Description</b>	
0.212	83	Laminated olive fine SAND with laminae of orangey-brown clayey fine and medium sand.		
0.063	9			

Moisture content % 25

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3180321020-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 60  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 12-Jun-18

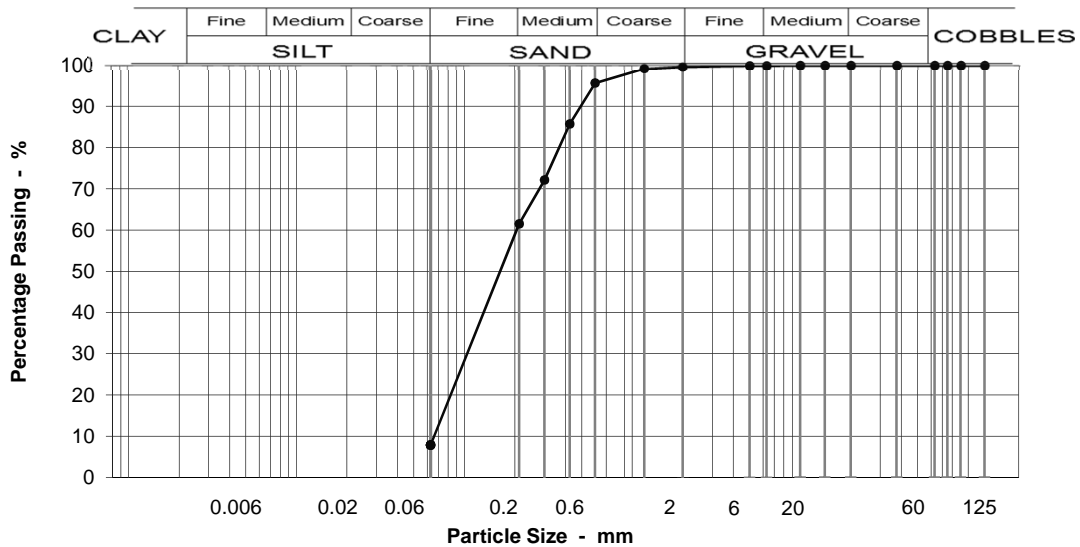
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH12B @ 20.5 - 21m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	96
0.425	86
0.300	72
0.212	62
0.063	8

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 26

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	4
Medium SAND	34
Fine SAND	54
Silt & Clay	8

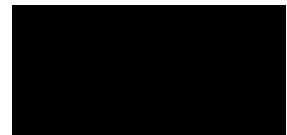
Grading Analysis	
D100	6
D60	0.21
D10	0.07
Uniformity Coefficient	3

Description	
Laminated olive fine and medium SAND with laminae of orangey-brown clayey fine and medium SAND and soft grey CLAY.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3180321022-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 62  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 25-Jun-18

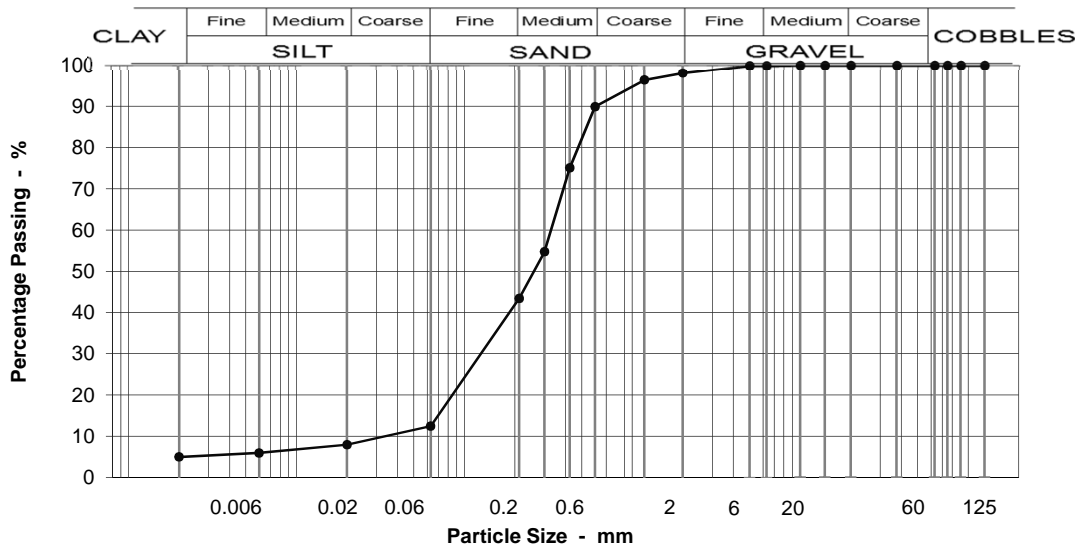
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH12B @ 21.7 - 22m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	96
0.600	90
0.425	75
0.300	55
0.212	43
0.063	13
0.020	8
0.006	6
0.002	5

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

**Moisture content %** 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	8
Medium SAND	47
Fine SAND	31
Silt & Clay	13

Grading Analysis	
D100	6
D60	0.33
D10	0.09
Uniformity Coefficient	4

Description	
Orangey-brown fine and medium SAND with numerous laminae of light grey silty CLAY, black clayey SILT and orange sandy SILT.	

Test Code = 610



Simon Holden (Project Technician)

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3180321026-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 66  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 12-Jun-18

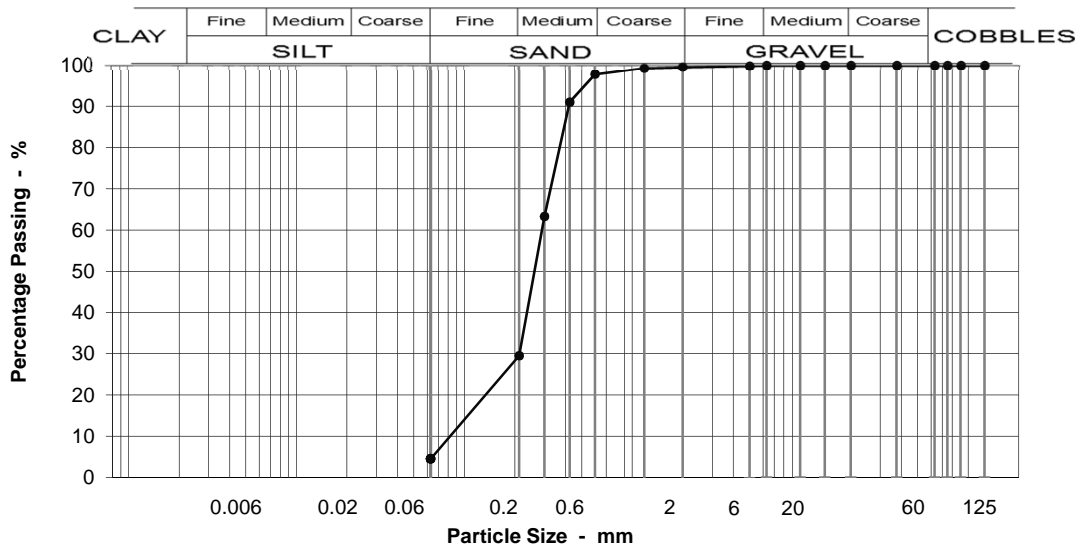
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH12B @ 24.5 - 25m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	98
0.425	91
0.300	63
0.212	30
0.063	5

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	68
Fine SAND	25
Silt & Clay	5

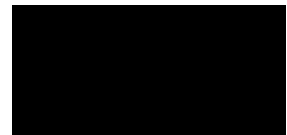
Grading Analysis	
D100	5
D60	0.29
D10	0.10
Uniformity Coefficient	3

Description	
Grey medium SAND with laminae of firm grey CLAY, numerous shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3180322003-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 71  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 4-Jul-18

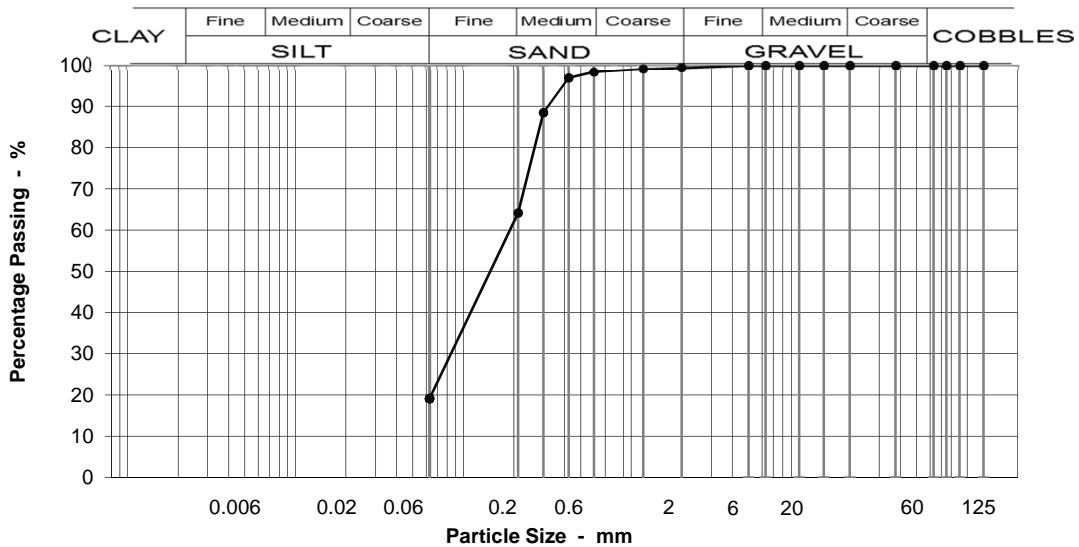
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH12B @ 27.5 - 28m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	98
0.425	97
0.300	88
0.212	64
0.063	19

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes**  
**2A/2B, 2A/2B.**

**Moisture content %** 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	34
Fine SAND	45
Silt & Clay	19

Grading Analysis	
D100	2
D60	0.20
D10	0.03
Uniformity Coefficient	6

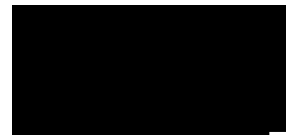
Description	
Laminated and thinly bedded grey clayey silty fine and medium SAND and firm grey silty CLAY with occasional shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180322004-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 72  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 18-Jun-18

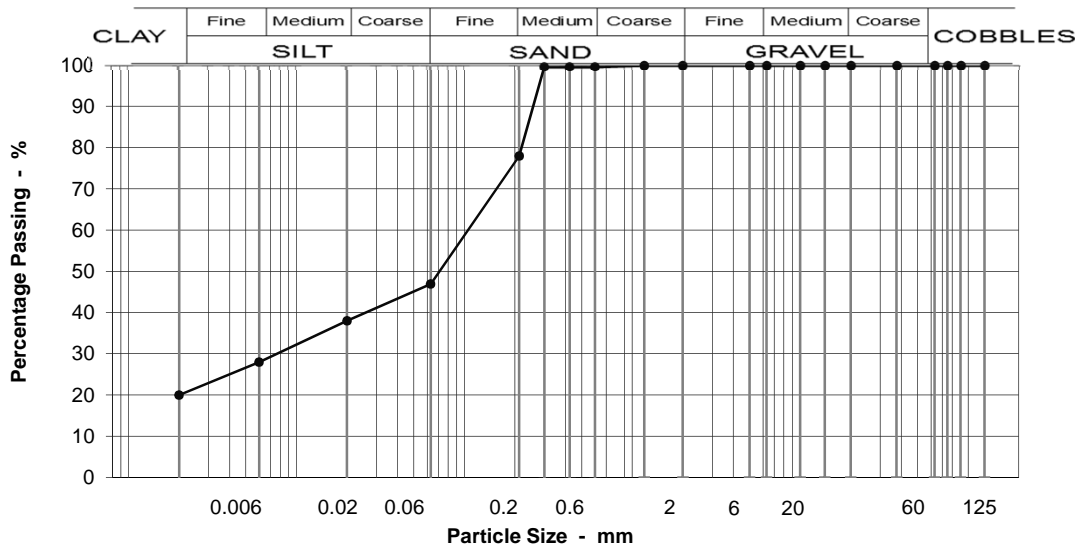
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 28.5 - 29m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	22
10	100		Fine SAND	31
6.3	100		Silt & Clay	47
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	78			
0.063	47			
0.020	38			
0.006	28			
0.002	20			
		Moisture content %		0

Grading Analysis	
D100	1
D60	0.13
D10	0.00
Uniformity Coefficient	>10*

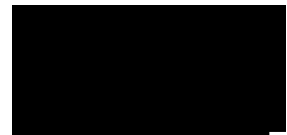
Description	
Laminated and thinly bedded clayey silty fine SAND, firm grey silty CLAY and occasional shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



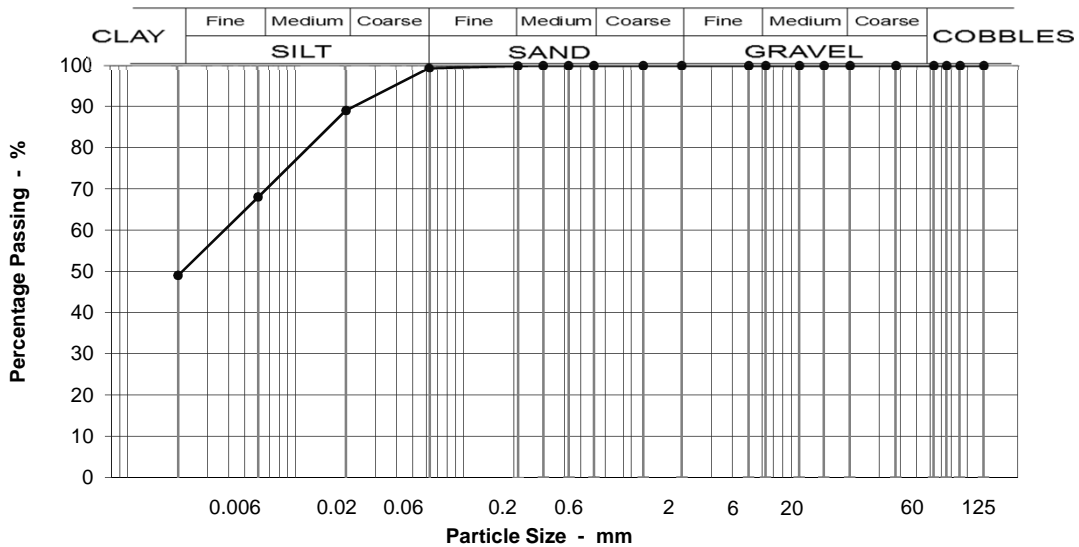
Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180322006-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 74  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 18-Jun-18

**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing  
Location and orientation within sample not applicable

Location: BH12B @ 29.95 - 30.1m Specimen: 1  
Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	100
0.063	99
0.020	89
0.006	68
0.002	49

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	0
Fine SAND	1
Silt & Clay	99

Grading Analysis	
D100	0
D60	0.00
D10	0.00
Uniformity Coefficient	>10*

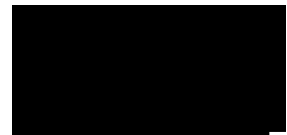
Description	
Laminated grey silty CLAY and light grey SILT.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180322013-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **80**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **12-Jun-18**

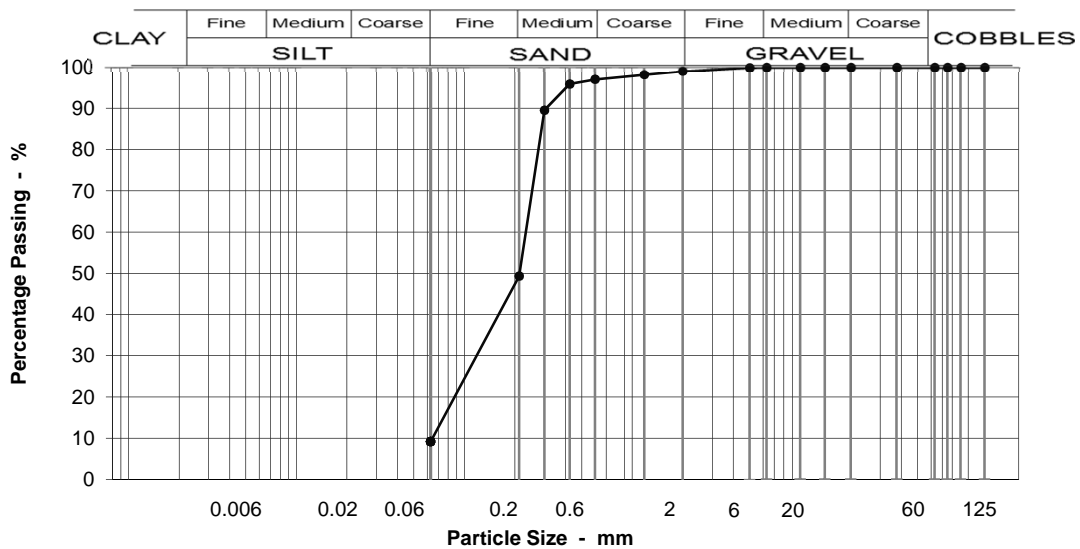
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 33.5 - 34m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	97
0.425	96
0.300	90
0.212	49
0.063	9

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	48
Fine SAND	40
Silt & Clay	9

Grading Analysis	
D100	5
D60	0.24
D10	0.07
Uniformity Coefficient	4

**Description**  
Grey slightly silty fine and medium SAND with some shell fragments.

Moisture content % 25

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180322016-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **83**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **12-Jun-18**

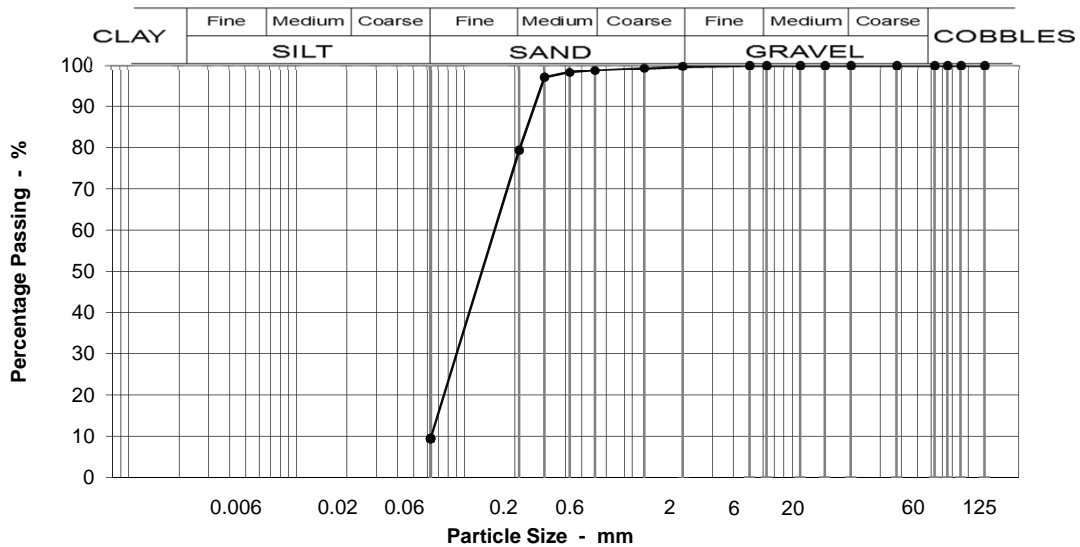
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 35.5 - 36m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	99
0.425	98
0.300	97
0.212	79
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 2

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	19
Fine SAND	70
Silt & Clay	9

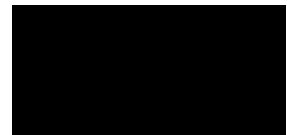
Grading Analysis	
D100	2
D60	0.17
D10	0.06
Uniformity Coefficient	3

Description	
Grey slightly silty fine SAND with some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS3180322020-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 87  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 12-Jun-18

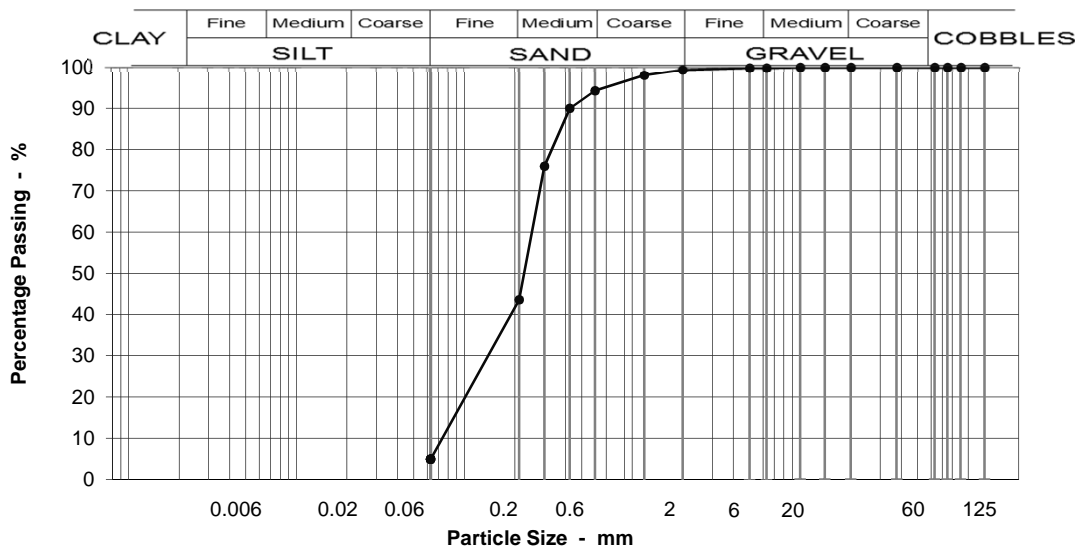
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH12B @ 38.5 - 39m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	94
0.425	90
0.300	76
0.212	44
0.063	5

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	5
Medium SAND	51
Fine SAND	39
Silt & Clay	5

Grading Analysis	
D100	6
D60	0.26
D10	0.08
Uniformity Coefficient	3

**Description**  
Grey slightly silty fine and medium SAND with some shell fragments.

**Moisture content %** 19

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180323004-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 92  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 12-Jun-18

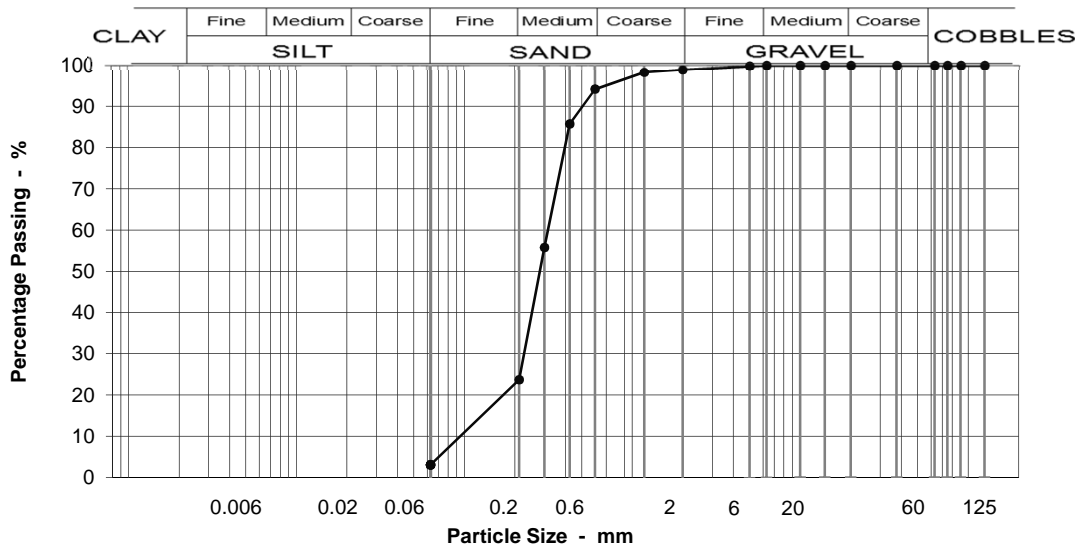
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 41.5 - 42m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	94
0.425	86
0.300	56
0.212	24
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	5
Medium SAND	70
Fine SAND	21
Silt & Clay	3

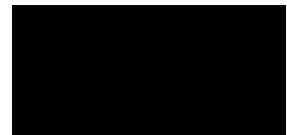
Grading Analysis	
D100	6
D60	0.32
D10	0.11
Uniformity Coefficient	3

Description	
Grey medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180323008-**  
Our Project No. PZ1522D1  
Your Sample Ref. 96  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 11-Jun-18

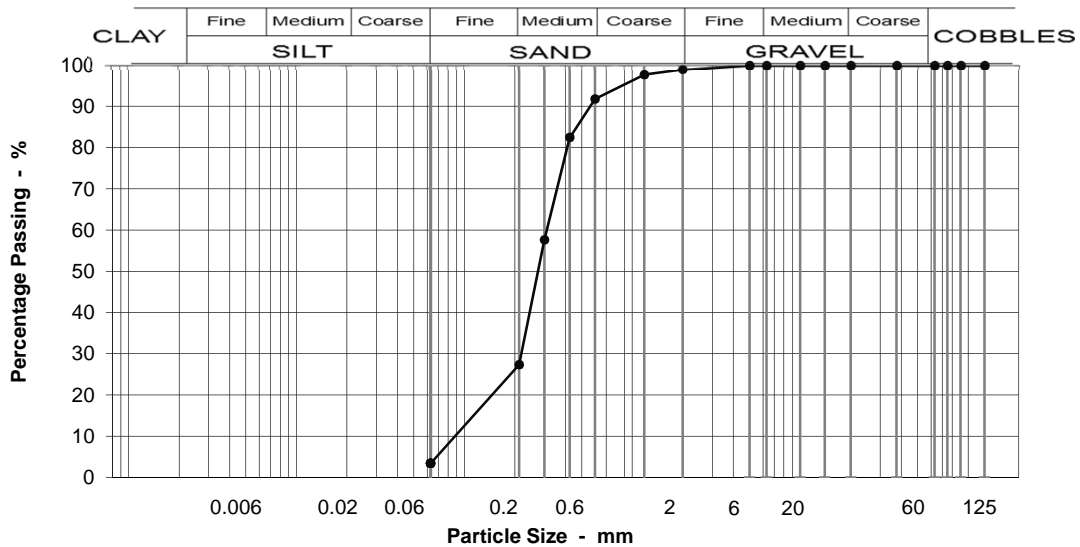
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 44.5 - 45m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	92
0.425	82
0.300	58
0.212	27
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	7
Medium SAND	64
Fine SAND	24
Silt & Clay	3

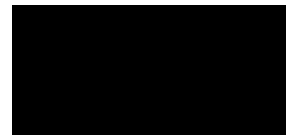
Grading Analysis	
D100	2
D60	0.31
D10	0.10
Uniformity Coefficient	3

Description	
Grey medium SAND.	

Test Code =



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180323010-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 98  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 18-Jun-18

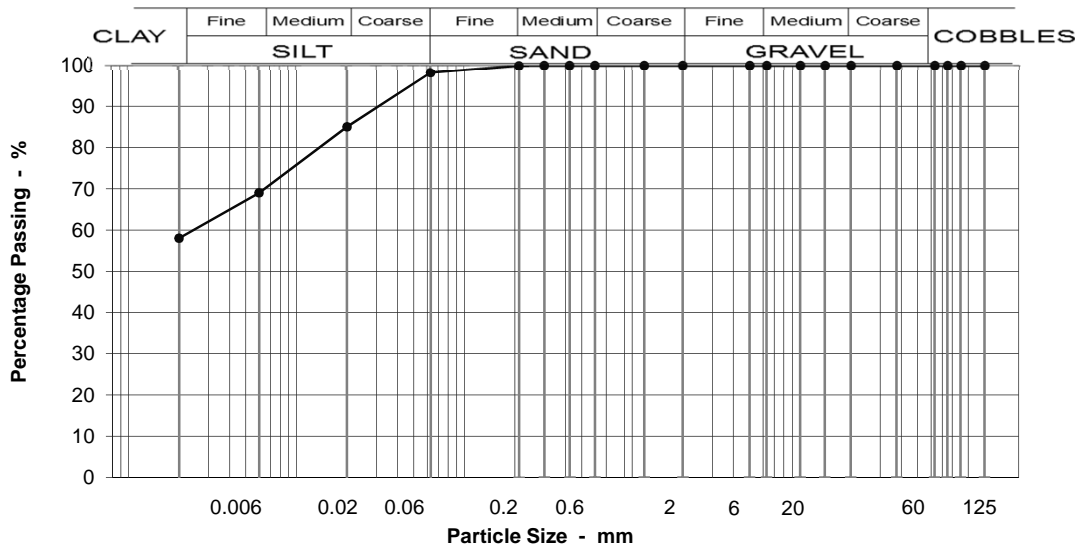
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH12B @ 45.7 - 46.2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	0
10	100		Fine SAND	2
6.3	100		Silt & Clay	98
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	100			
0.063	98			
0.020	85			
0.006	69			
0.002	58			
		Moisture content %	0	

Grading Analysis	
D100	0
D60	0.00
D10	0.00
Uniformity Coefficient	>10*

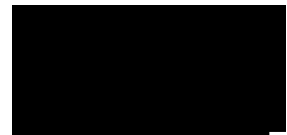
Description	
Very stiff grey and brown SILT:CLAY with some shell fragments. Occasional gypsum crystals.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)





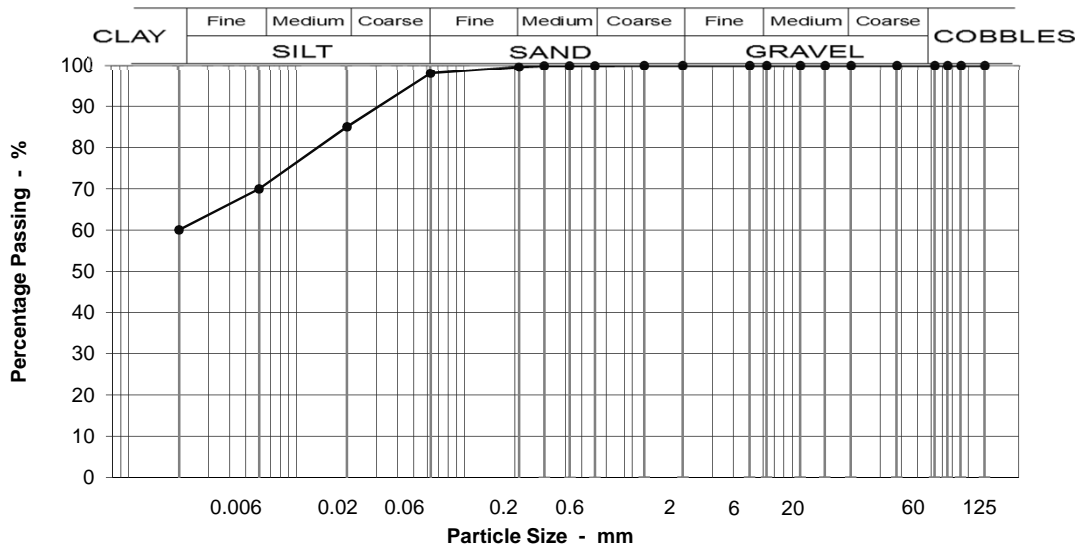
Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS3180323017-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 105  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 18-Jun-18

**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing  
Location and orientation within sample not applicable

Location: BH12B @ 49.5 - 49.95m Specimen: 1  
Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	0
10	100		Fine SAND	2
6.3	100		Silt & Clay	98
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	100			
0.063	98			
0.020	85			
0.006	70			
0.002	60			
		Moisture content %		0

Grading Analysis	
D100	1
D60	0.00
D10	0.00
Uniformity Coefficient	>10*

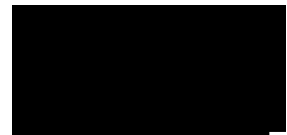
Description	
Very stiff grey and brown SILT:CLAY with some shell fragments. Occasional gypsum crystals.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180305001-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-May-18**

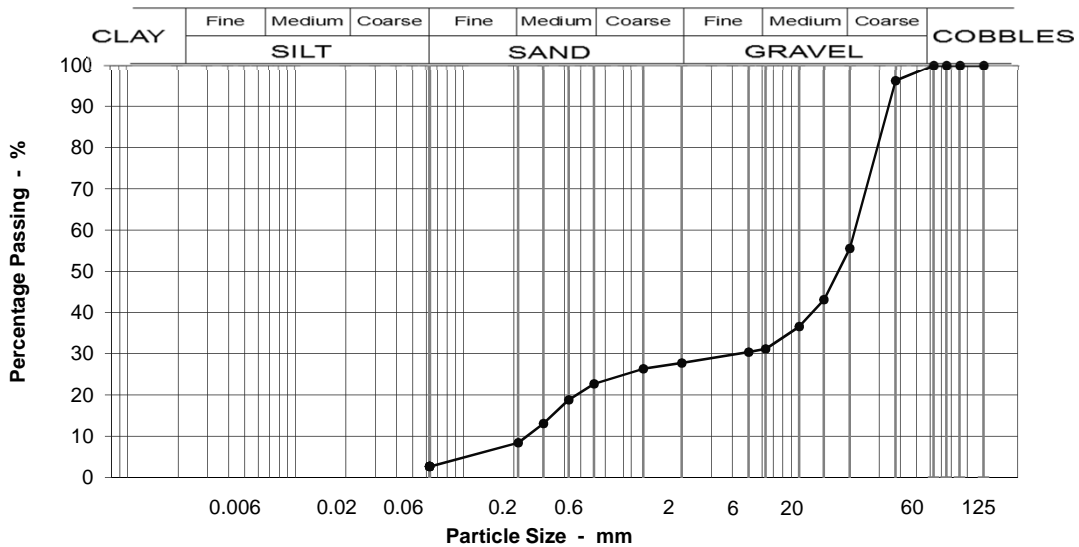
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 0.2 - 0.4m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	96
20	56
14	43
10	37
6.3	31
5	30
2	28
1.18	26
0.600	23
0.425	19
0.300	13
0.212	8
0.063	3

Specification for Highway Works Classification  
Table 6/2

This material complies with the following material classes 1A, 6A, 6E/6R, 6F2/6F3, 6I, 6M, 6N.

Moisture content % 5.6

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	44
Medium GRAVEL	24
Fine GRAVEL	3
Coarse SAND	5
Medium SAND	14
Fine SAND	6
Silt & Clay	3

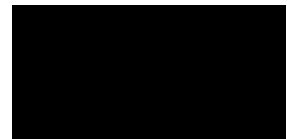
Grading Analysis	
D100	38
D60	21.92
D10	0.24
Uniformity Coefficient	91

**Description**  
MADE GROUND: Comprising greyish brown, very sandy medium and coarse, angular to sub-rounded flint, concrete, brick and asphalt GRAVEL.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180305004-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **4**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-May-18**

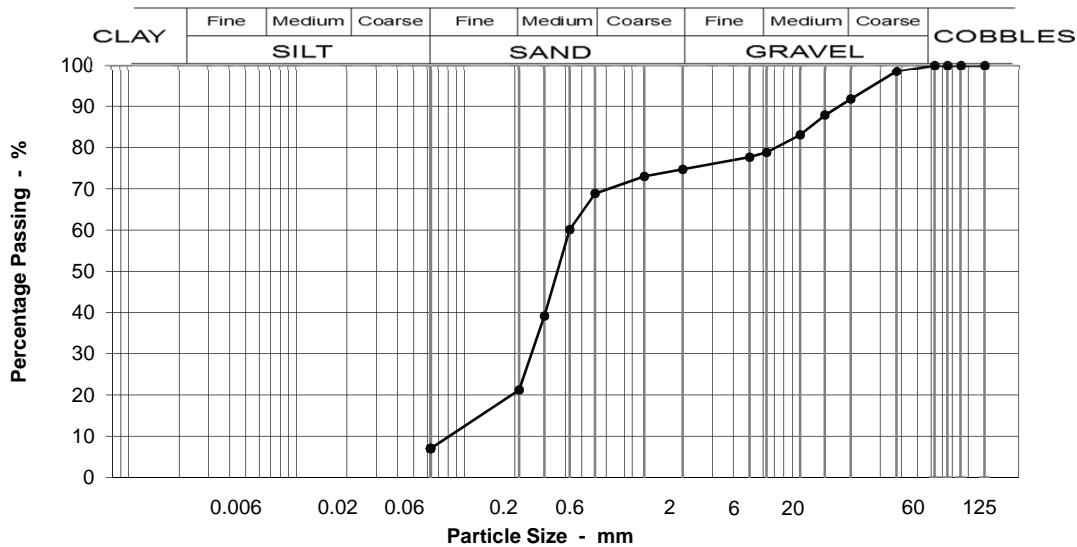
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 0.5 - 0.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	99
20	92
14	88
10	83
6.3	79
5	78
2	75
1.18	73
0.600	69
0.425	60
0.300	39
0.212	21
0.063	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 8.9

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	8
Medium GRAVEL	13
Fine GRAVEL	4
Coarse SAND	6
Medium SAND	48
Fine SAND	14
Silt & Clay	7

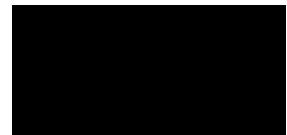
Grading Analysis	
D100	38
D60	0.42
D10	0.09
Uniformity Coefficient	5

**Description**  
Brownish grey very gravelly medium SAND.  
Gravel is medium and coarse angular to rounded flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180305008-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 8  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 4-Jul-18

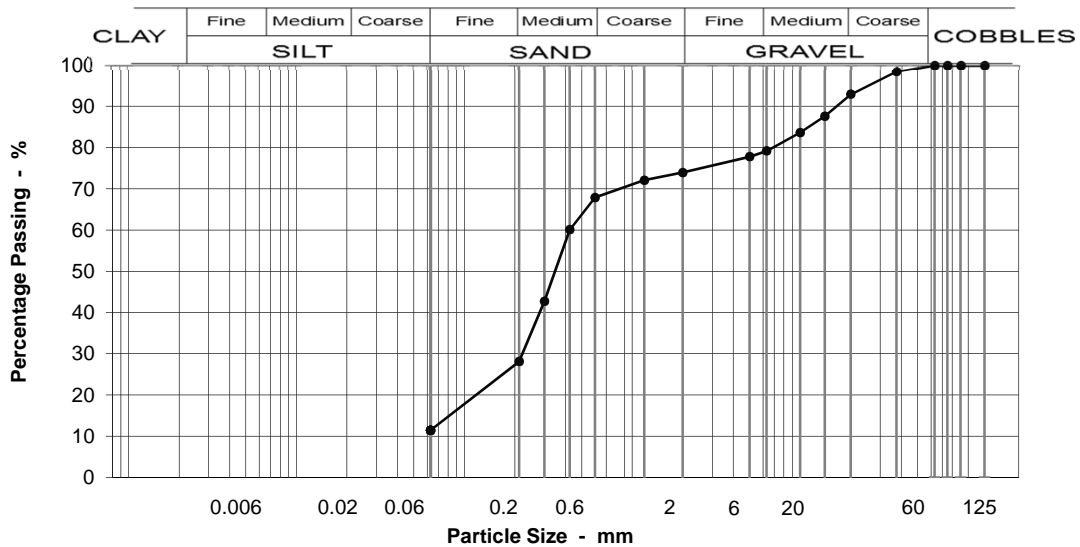
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 1.1 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	98
20	93
14	88
10	84
6.3	79
5	78
2	74
1.18	72
0.600	68
0.425	60
0.300	43
0.212	28
0.063	11

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6J.**

Moisture content % 14

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	7
Medium GRAVEL	14
Fine GRAVEL	5
Coarse SAND	6
Medium SAND	40
Fine SAND	17
Silt & Clay	11

Grading Analysis	
D100	38
D60	0.42
D10	0.07
Uniformity Coefficient	6

**Description**  
Brownish grey very gravelly fine and medium SAND. Gravel is medium angular to rounded flint, quartz, ceramics and chalk.

Test Code = 610



Simon Holden (Project Technician)

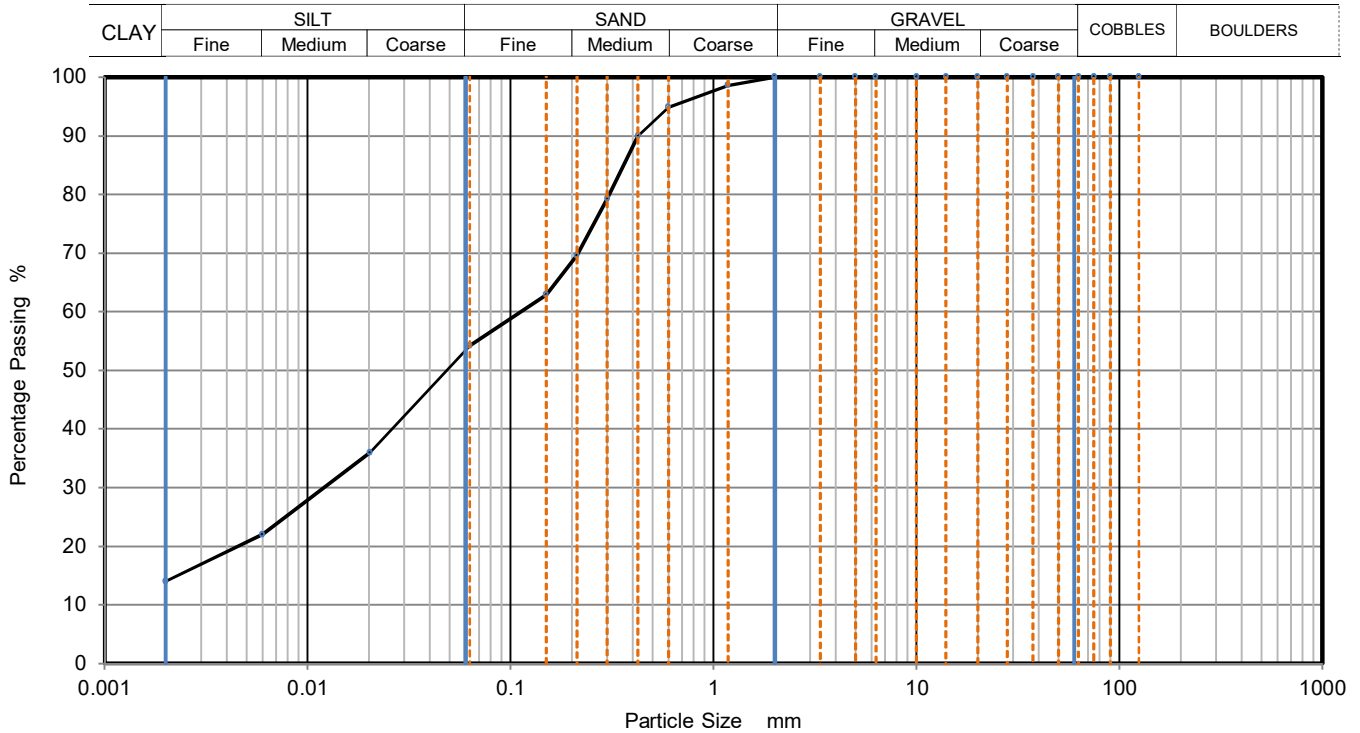




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH13
Sample Description:	Brown sandy clayey SILT	Sample Depth (m)	1.20
		Sample Reference	D9



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	36
90	100	0.0060	22
75	100	0.0020	14
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	95		
0.425	90	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	79		
0.212	70		
0.15	63		
0.063	54		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	46
Silt	41
Clay	14

Grading Analysis		
D100	mm	
D60	mm	0.112
D30	mm	0.012
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks	Approved	Date	Sheet No.:
	MW	03/07/2018	1 of 1

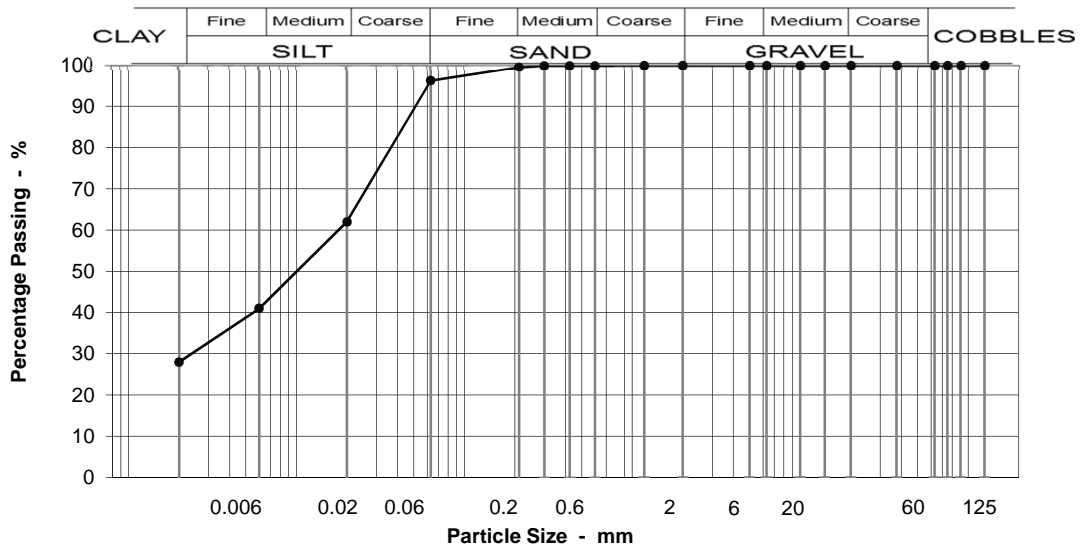
Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180305015-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 15  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 25-Jun-18

**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing  
Location and orientation within sample not applicable

Location: BH13 @ 2.6 - 2.7m Specimen: 1  
Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	100
0.063	96
0.020	62
0.006	41
0.002	28

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	0
Fine SAND	3
Silt & Clay	96

Grading Analysis	
D100	1
D60	0.02
D10	0.00
Uniformity Coefficient	>10*

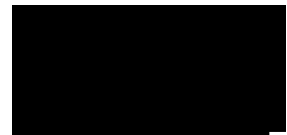
Description	
Black organic very clayey SILT.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180306002-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 22  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 2-Jul-18

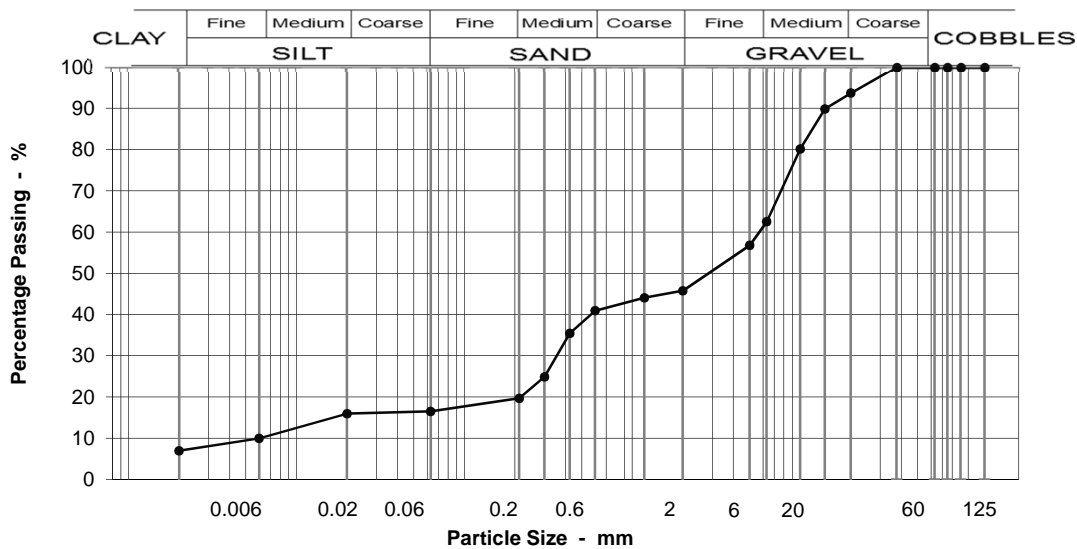
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 4 - 4.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2C.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	6
63	100		Medium GRAVEL	31
37.5	100		Fine GRAVEL	17
20	94		Coarse SAND	5
14	90		Medium SAND	21
10	80		Fine SAND	3
6.3	62		Silt & Clay	17
5	57			
2	46			
1.18	44			
0.600	41			
0.425	35			
0.300	25			
0.212	20			
0.063	17			
0.020	16			
0.006	10			
0.002	7			
		Moisture content %	18	

Grading Analysis	
D100	20
D60	5.73
D10	0.08
Uniformity Coefficient	68

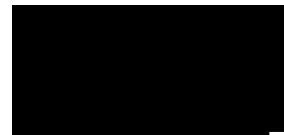
  

Description	
Brown very sandy slightly clayey slightly silty fine and medium angular to rounded flint GRAVEL. Occasional shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180306005-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 25  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

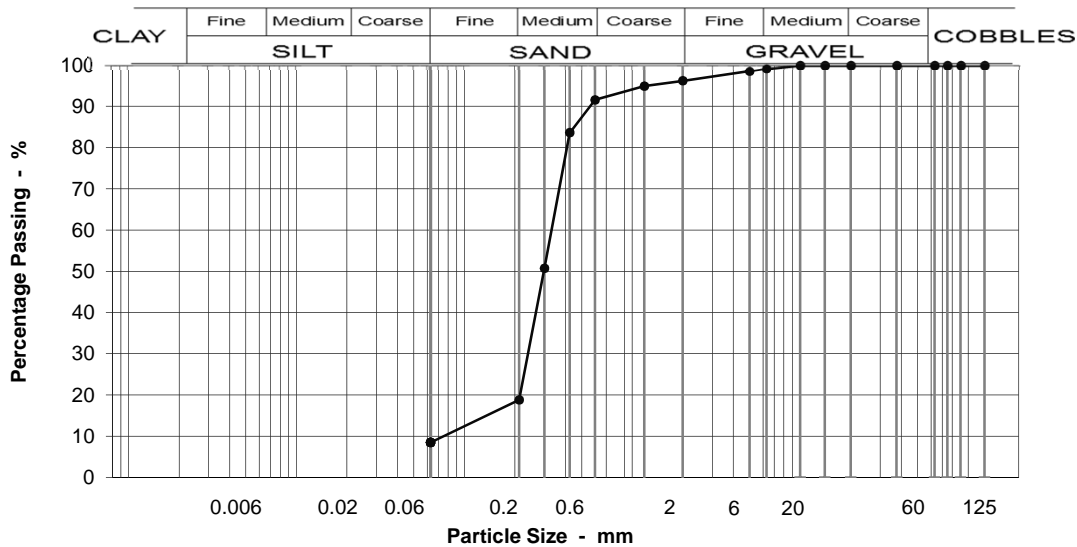
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 5 - 5.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	96
1.18	95
0.600	92
0.425	84
0.300	51
0.212	19
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	3
Coarse SAND	5
Medium SAND	73
Fine SAND	10
Silt & Clay	9

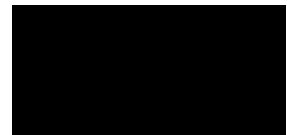
Grading Analysis	
D100	6
D60	0.34
D10	0.08
Uniformity Coefficient	4

Description	
Dark grey organic medium SAND. Weathering to brown, occasional shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180306017-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **37**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-May-18**

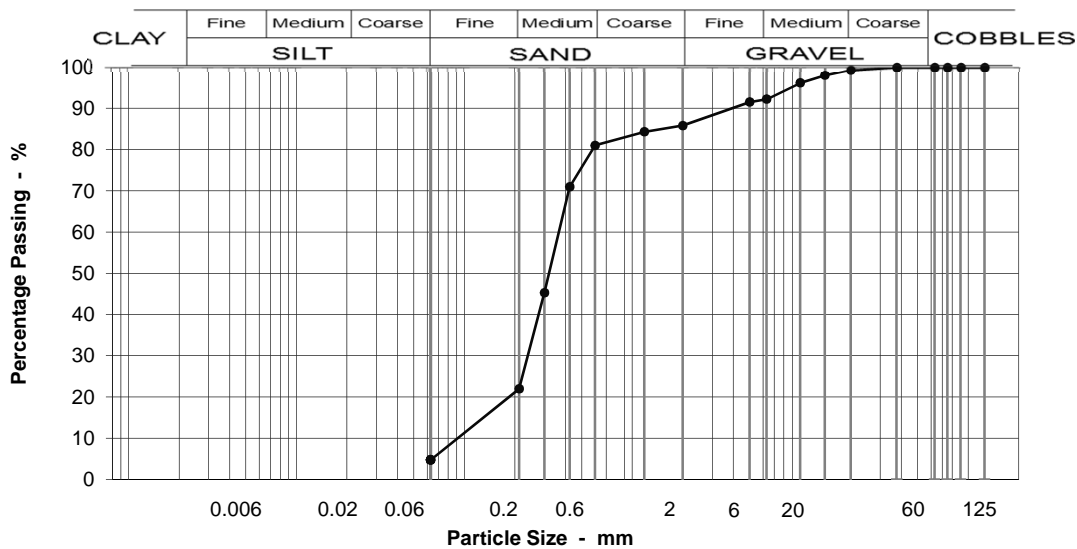
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 9 - 9.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	98
10	96
6.3	92
5	92
2	86
1.18	84
0.600	81
0.425	71
0.300	45
0.212	22
0.063	5

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	7
Fine GRAVEL	6
Coarse SAND	5
Medium SAND	59
Fine SAND	17
Silt & Clay	5

Grading Analysis	
D100	20
D60	0.37
D10	0.11
Uniformity Coefficient	3

**Description**  
Grey slightly organic gravelly medium SAND weathering to brown. Gravel is fine and medium angular to rounded flint and quartz.

Moisture content % 17

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
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**Our reference No.** GTS1180306018-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 38  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 22-May-18

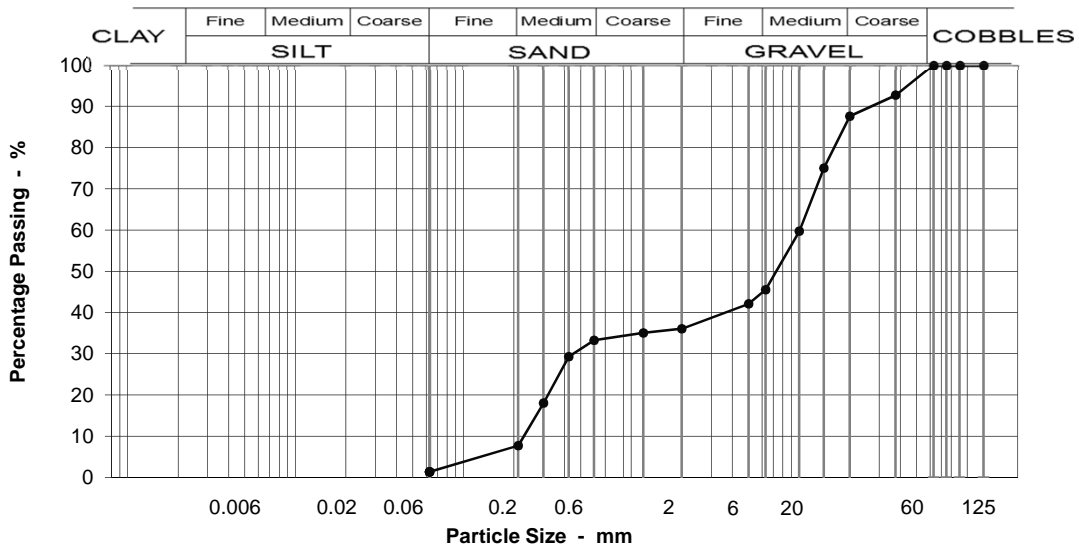
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 9.5 - 10m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	93
20	88
14	75
10	60
6.3	46
5	42
2	36
1.18	35
0.600	33
0.425	29
0.300	18
0.212	8
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 8.4

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	12
Medium GRAVEL	42
Fine GRAVEL	9
Coarse SAND	3
Medium SAND	26
Fine SAND	6
Silt & Clay	1

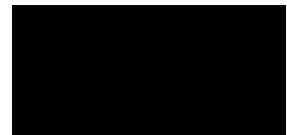
Grading Analysis	
D100	38
D60	10.08
D10	0.23
Uniformity Coefficient	44

**Description**  
Dark grey organic very sandy medium, rounded to angular flint and quartz GRAVEL. Occasional shell fragments.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
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Our reference No. **GTS1180306021-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 41  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

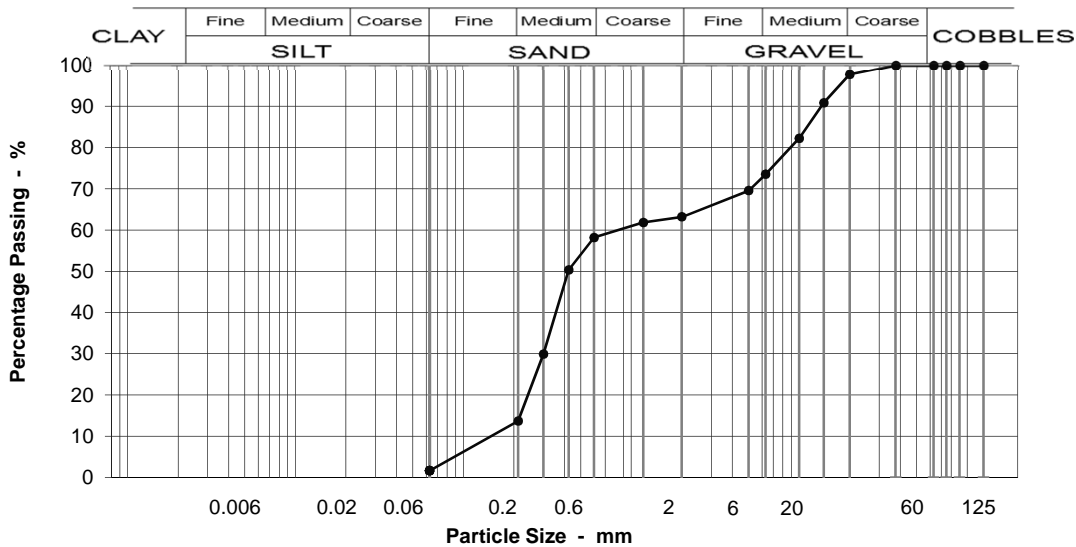
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 10 - 10.5m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	98
14	91
10	82
6.3	73
5	70
2	63
1.18	62
0.600	58
0.425	50
0.300	30
0.212	14
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6M.**

Moisture content % 13

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	2
Medium GRAVEL	24
Fine GRAVEL	10
Coarse SAND	5
Medium SAND	44
Fine SAND	12
Silt & Clay	2

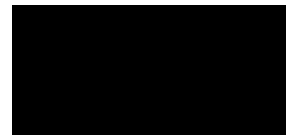
Grading Analysis	
D100	20
D60	0.89
D10	0.17
Uniformity Coefficient	5

**Description**  
Dark grey very gravelly organic medium SAND. Gravel is fine and medium rounded to angular flint, quartz, quartzite and sandstone.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180306023-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 43  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 22-May-18

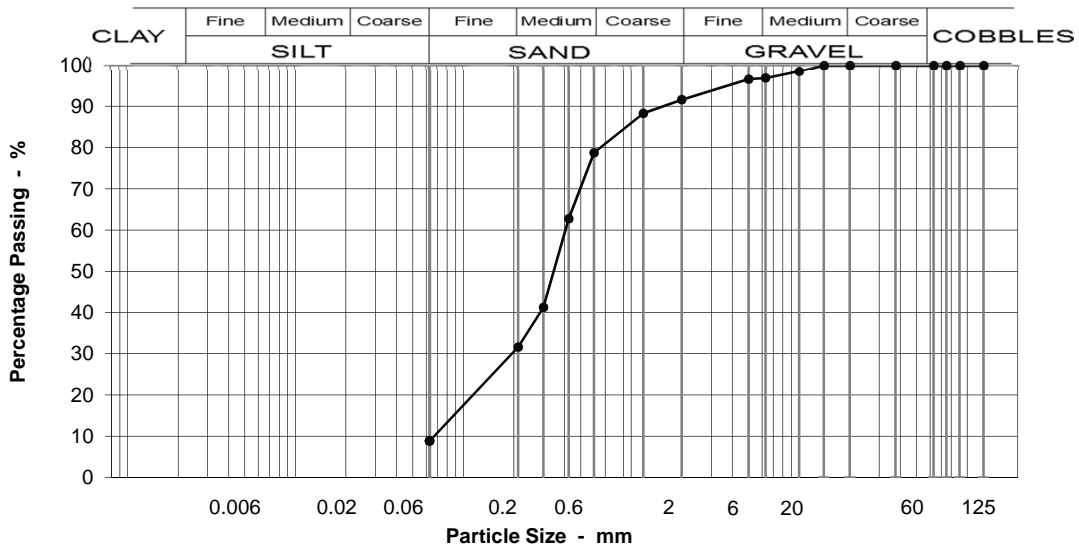
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 11 - 11.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	97
5	97
2	92
1.18	88
0.600	79
0.425	63
0.300	41
0.212	32
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6K, 6M.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	5
Coarse SAND	13
Medium SAND	47
Fine SAND	23
Silt & Clay	9

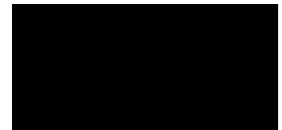
Grading Analysis	
D100	10
D60	0.41
D10	0.07
Uniformity Coefficient	6

Description	
Laminated and thinly bedded light grey slightly organic fine medium and coarse SAND, light brown fine and medium SAND. Black organic sandy SILT and light brown silty CLAY.	

Test Code = 610



Simon Holden (Project Technician)





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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180306024-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 44  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

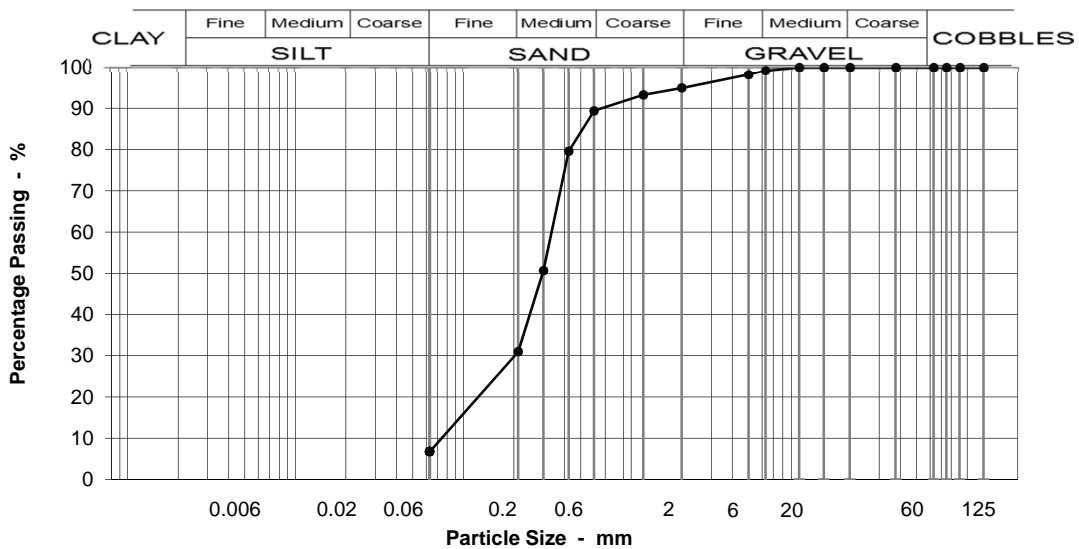
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 11.7 - 12m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	98
2	95
1.18	93
0.600	89
0.425	80
0.300	51
0.212	31
0.063	7

Specification for Highway Works Classification  
Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	4
Coarse SAND	6
Medium SAND	58
Fine SAND	24
Silt & Clay	7

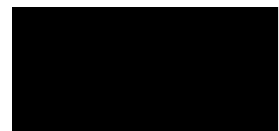
Grading Analysis	
D100	6
D60	0.34
D10	0.08
Uniformity Coefficient	4

Description	
Dark brownish grey slightly organic medium SAND with lenses of brown silty clay.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180306027-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 47  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 2-Jul-18

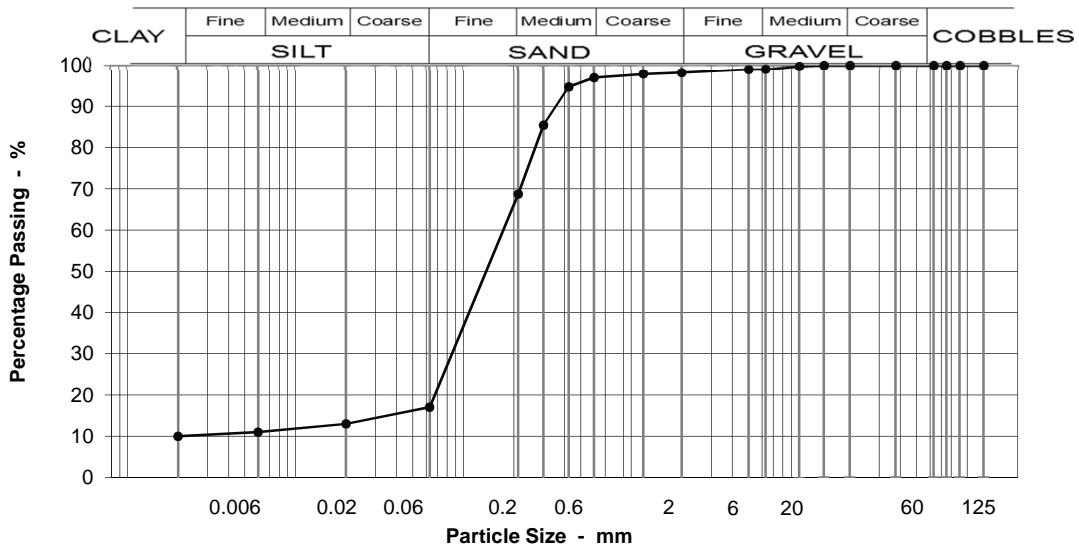
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 12 - 12.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	98
1.18	98
0.600	97
0.425	95
0.300	85
0.212	69
0.063	17
0.020	13
0.006	11
0.002	10

Specification for Highway Works Classification  
Table 6/2

Moisture content % 36

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	28
Fine SAND	52
Silt & Clay	17

Grading Analysis	
D100	10
D60	0.19
D10	0.00
Uniformity Coefficient	>10*

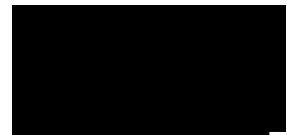
**Description**  
Laminated brown, fine to medium SAND, firm grey and brown silty CLAY, and black sandy SILT.

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180307005-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 52  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

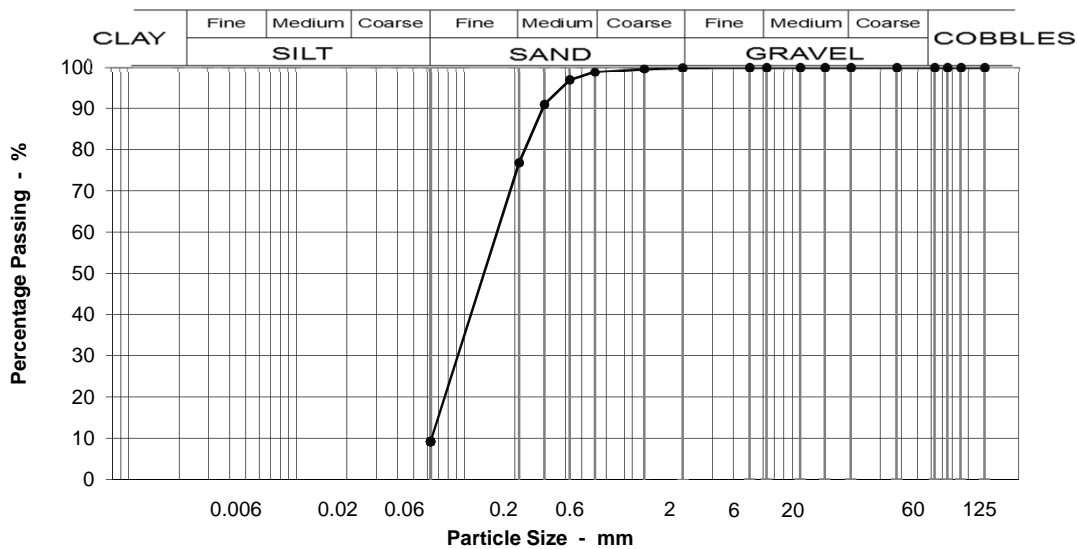
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 14 - 14.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	97
0.300	91
0.212	77
0.063	9

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 27

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	22
Fine SAND	68
Silt & Clay	9

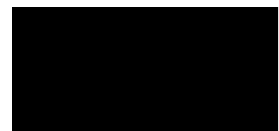
Grading Analysis	
D100	2
D60	0.17
D10	0.06
Uniformity Coefficient	3

**Description**  
Thinly bedded brown and orange brown fine SAND. Laminae of soft brown clay.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180307010-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **57**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-May-18**

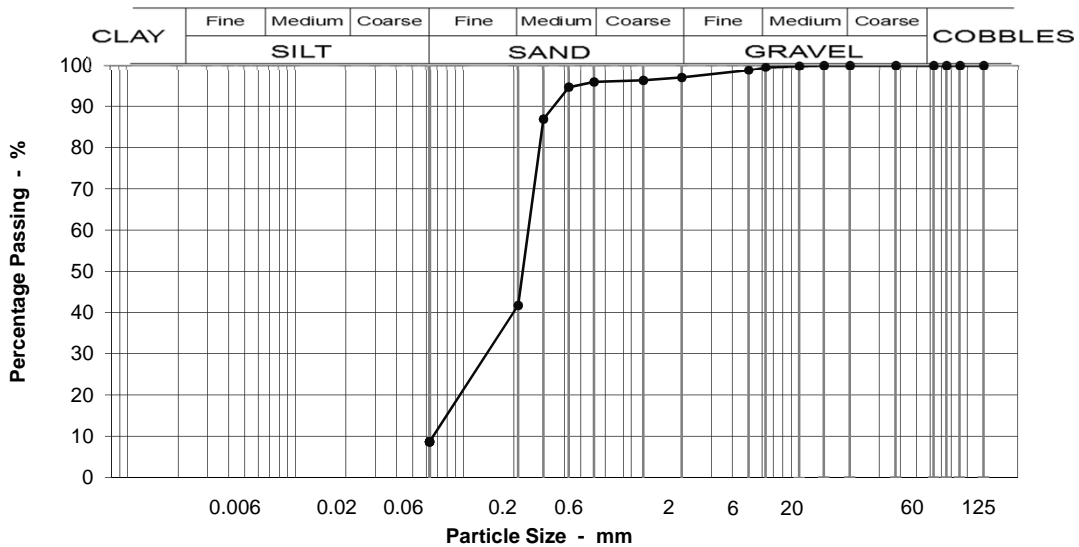
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 16 - 16.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	97
1.18	96
0.600	96
0.425	95
0.300	87
0.212	42
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 26

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	3
Coarse SAND	1
Medium SAND	54
Fine SAND	33
Silt & Clay	9

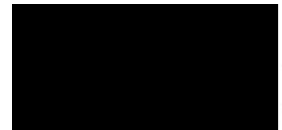
Grading Analysis	
D100	10
D60	0.25
D10	0.07
Uniformity Coefficient	4

Description	
Laminated and thinly bedded light brown, orangey brown and grey fine and medium SAND, orangey brown medium SAND and soft grey CLAY.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
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Norfolk  
NR1 2DH

Our reference No. **GTS1180307015-**  
Our Project No **PZ1522D1**  
Your Sample Ref **62**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

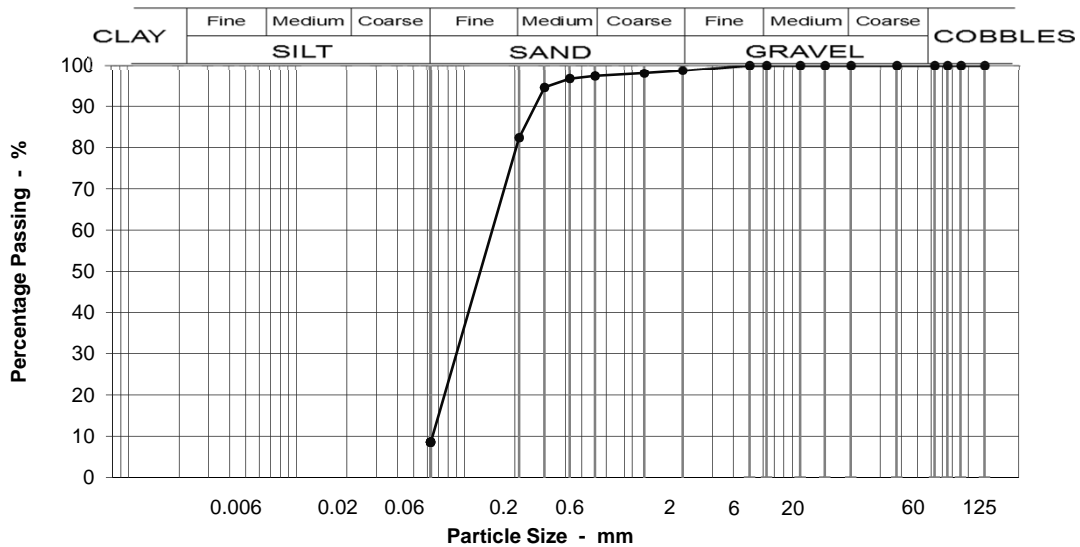
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 18 - 18.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	97
0.425	97
0.300	95
0.212	82
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	15
Fine SAND	74
Silt & Clay	9

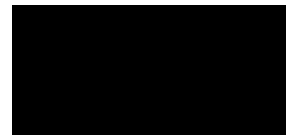
Grading Analysis	
D100	2
D60	0.17
D10	0.07
Uniformity Coefficient	3

Description	
Brown fine and medium SAND.	

Test Code =



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
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Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180307017-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 64  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 22-May-18

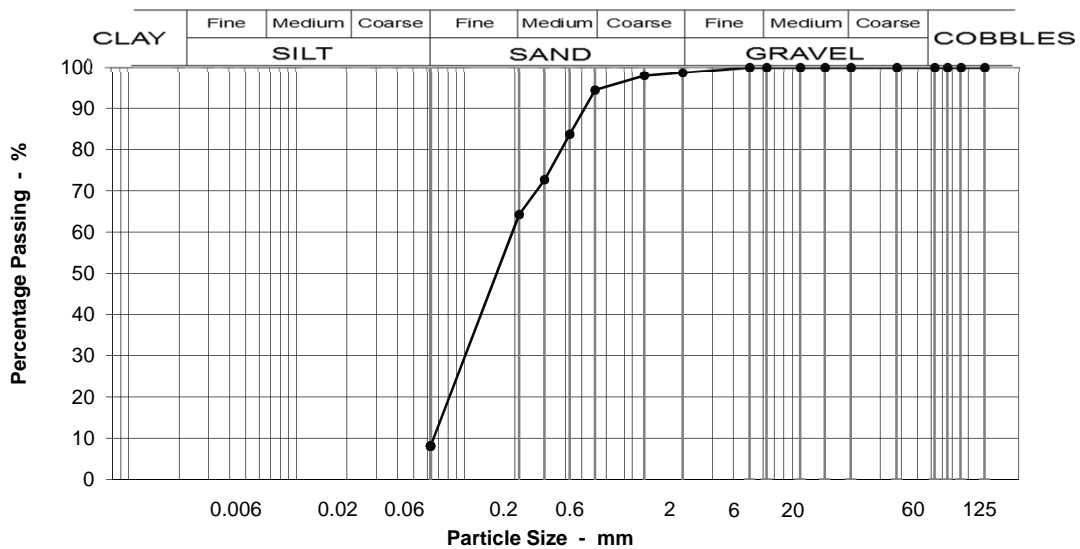
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 19 - 19.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	94
0.425	84
0.300	73
0.212	64
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	30
Fine SAND	56
Silt & Clay	8

Grading Analysis	
D100	2
D60	0.20
D10	0.07
Uniformity Coefficient	3

**Description**  
Thinly bedded light brown fine and medium SAND and orangey brown silty fine SAND.

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180307023-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 70  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 22-May-18

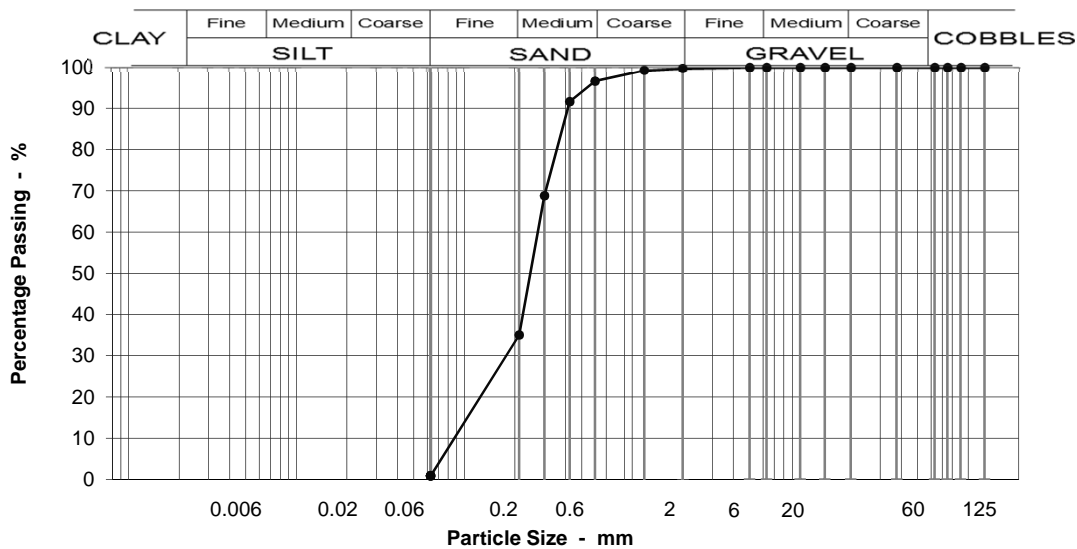
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 22 - 22.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	92
0.300	69
0.212	35
0.063	1

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	3
Medium SAND	62
Fine SAND	34
Silt & Clay	1

Grading Analysis	
D100	2
D60	0.28
D10	0.10
Uniformity Coefficient	3

**Description**  
Grey fine and medium SAND, occasional shell fragments.

Moisture content % 17

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180307024-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 71  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

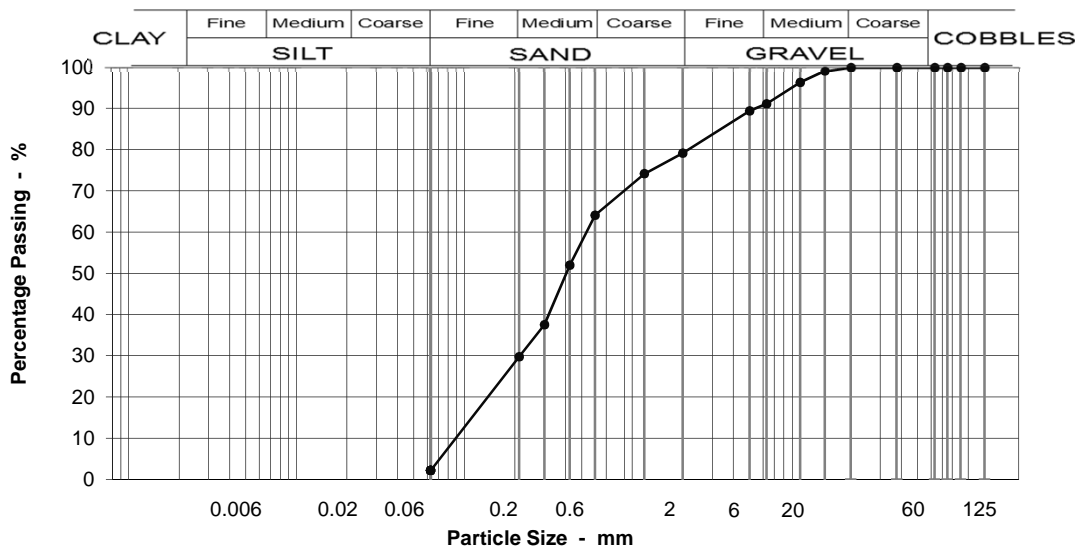
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 23 - 23.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	96
6.3	91
5	89
2	79
1.18	74
0.600	64
0.425	52
0.300	38
0.212	30
0.063	2

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6K, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	9
Fine GRAVEL	12
Coarse SAND	15
Medium SAND	34
Fine SAND	28
Silt & Clay	2

Grading Analysis	
D100	14
D60	0.54
D10	0.10
Uniformity Coefficient	5

**Description**  
Grey very gravelly fine and medium SAND, some shell fragments. Gravel is fine and medium rounded flint.

Moisture content % 17

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
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Norfolk  
NR1 2DH

Our reference No. **GTS1180307029-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 76  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

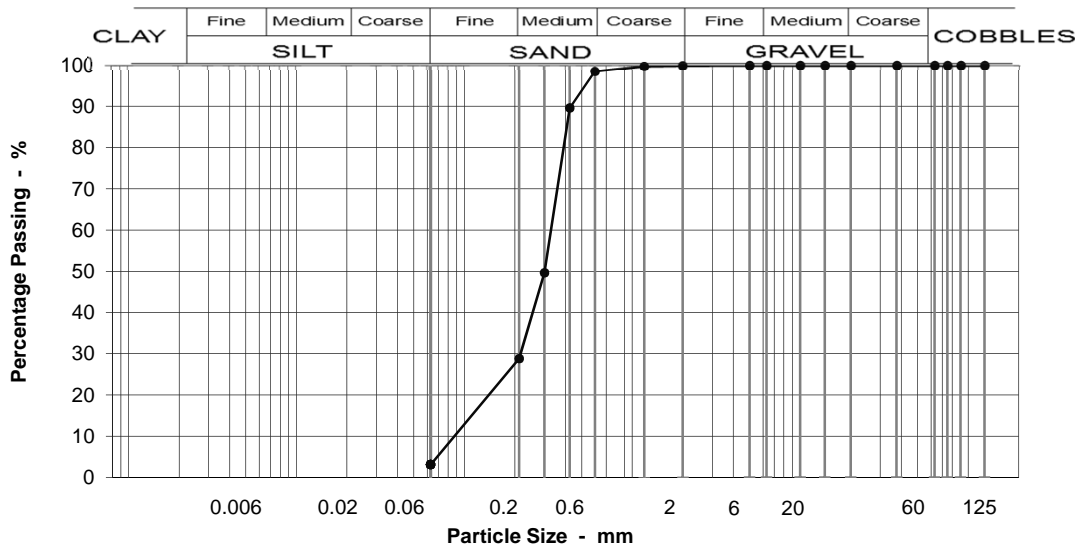
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 26 - 26.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	90
0.300	50
0.212	29
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	70
Fine SAND	26
Silt & Clay	3

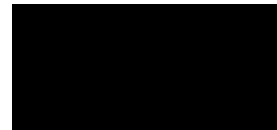
Grading Analysis	
D100	2
D60	0.33
D10	0.10
Uniformity Coefficient	3

Description	
Grey medium SAND.	

Test Code = 610



Simon Holden (Project Technician)

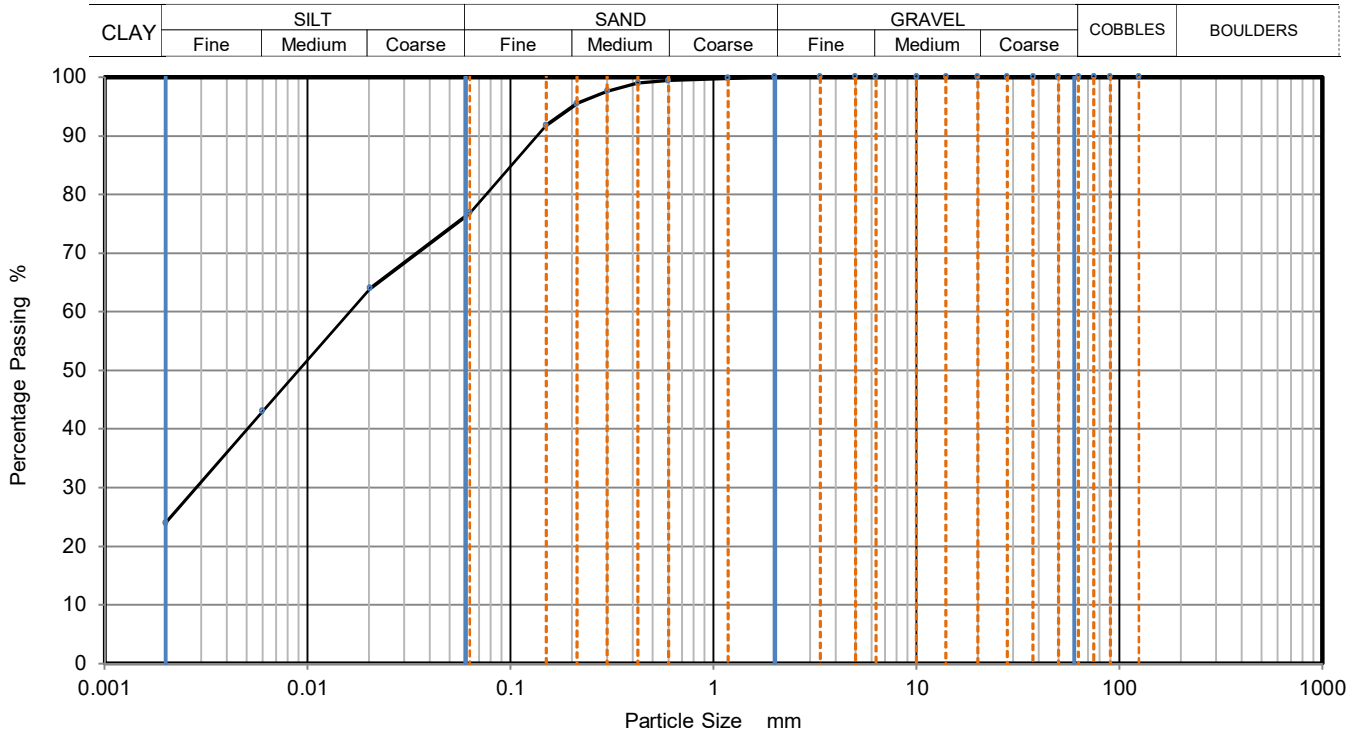




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH13
Sample Description:	Grey slightly sandy silty CLAY	Sample Depth (m)	28.25
		Sample Reference	D79



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	64
90	100	0.0060	43
75	100	0.0020	24
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	99		
0.3	98		
0.212	96		
0.15	92		
0.063	77		
		Particle density (assumed)	
		2.65	Mg/m3

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	23
Silt	53
Clay	24

Grading Analysis		
D100	mm	
D60	mm	0.016
D30	mm	0.003
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks	Approved	Date	Sheet No.:
	MW	03/07/2018	1 of 1

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County Hall  
Martineau Lane  
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Norfolk  
NR1 2DH

Our reference No. **GTS1180307036-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 83  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 25-Jun-18

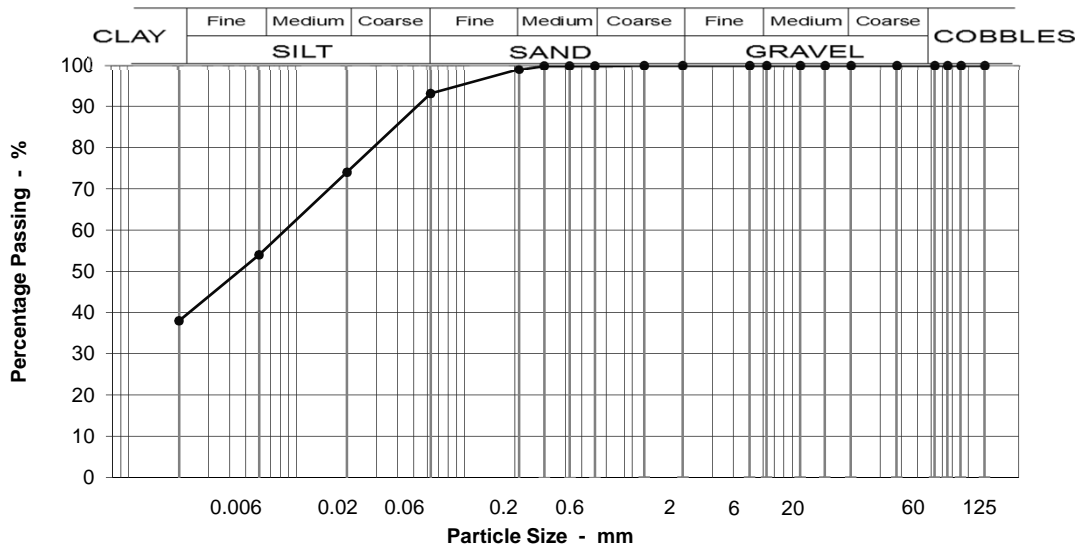
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 30 - 30.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	99
0.063	93
0.020	74
0.006	54
0.002	38

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	1
Fine SAND	6
Silt & Clay	93

Grading Analysis	
D100	1
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

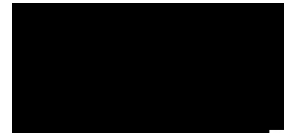
**Description**  
Thinly bedded stiff grey silty CLAY with laminae of silty fine SAND.

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180308001-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **84**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **2-Jul-18**

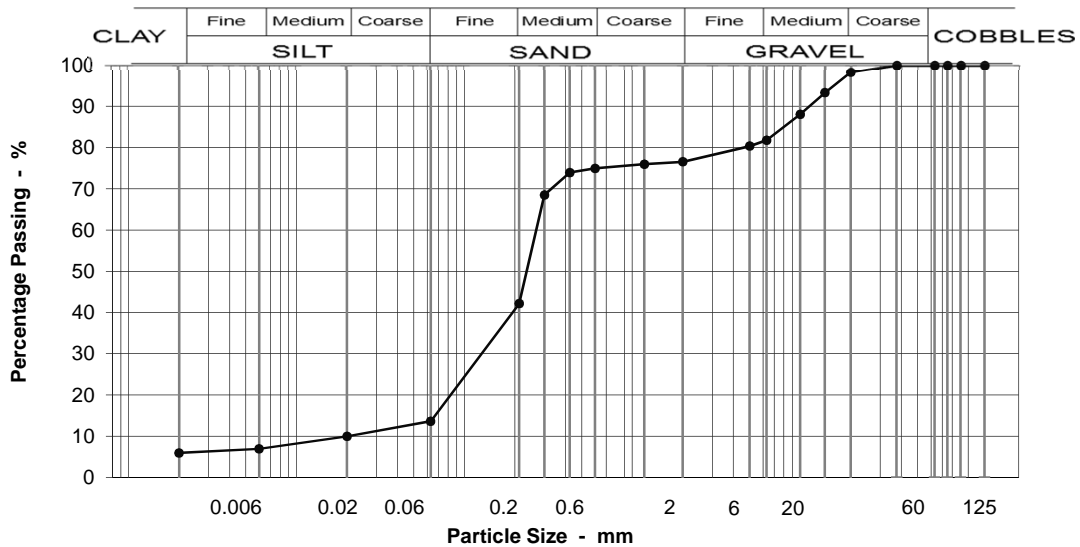
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 30.8 - 31.3m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	98
14	93
10	88
6.3	82
5	80
2	77
1.18	76
0.600	75
0.425	74
0.300	69
0.212	42
0.063	14
0.020	10
0.006	7
0.002	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	2
Medium GRAVEL	17
Fine GRAVEL	5
Coarse SAND	2
Medium SAND	33
Fine SAND	28
Silt & Clay	14

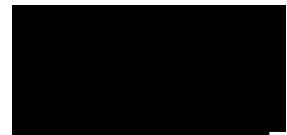
Grading Analysis	
D100	20
D60	0.27
D10	0.07
Uniformity Coefficient	4

**Description**  
Thinly bedded very gravelly silty fine and medium SAND. Gravel is medium rounded flint with laminae of stiff grey silty clay. Some shell fragments.

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180308003-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 86  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 25-Jun-18

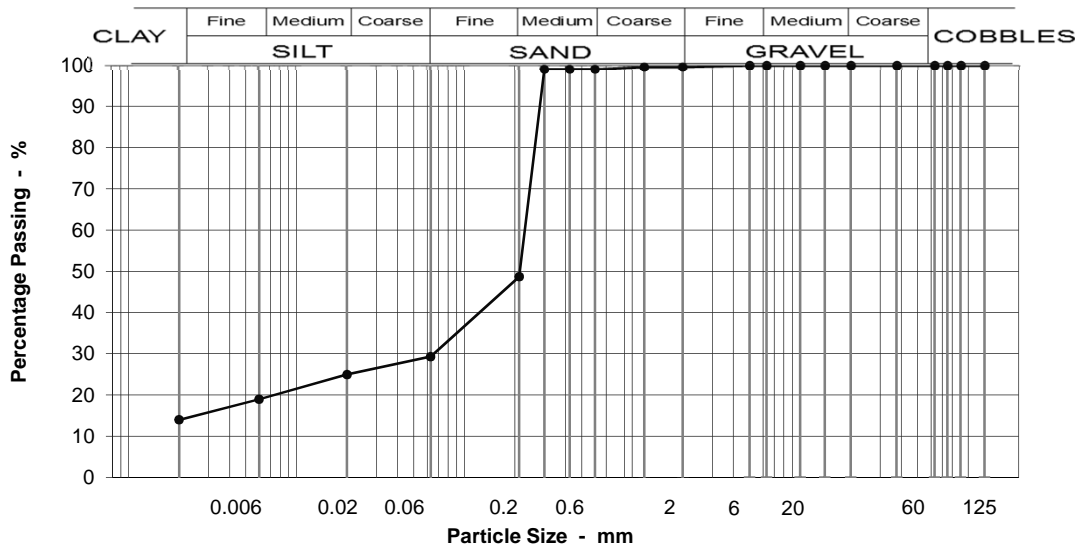
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 32 - 32.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	1
14	100		Medium SAND	50
10	100		Fine SAND	19
6.3	100		Silt & Clay	29
5	100			
2	100			
1.18	100			
0.600	99			
0.425	99			
0.300	99			
0.212	49			
0.063	29			
0.020	25			
0.006	19			
0.002	14			
		Moisture content %	0	

Grading Analysis	
D100	2
D60	0.23
D10	0.00
Uniformity Coefficient	>10*

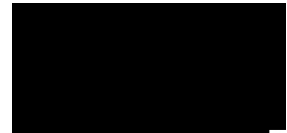
Description	
Laminated and thinly bedded light grey medium SAND and firm grey silty CLAY.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180308004-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **87**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **2-Jul-18**

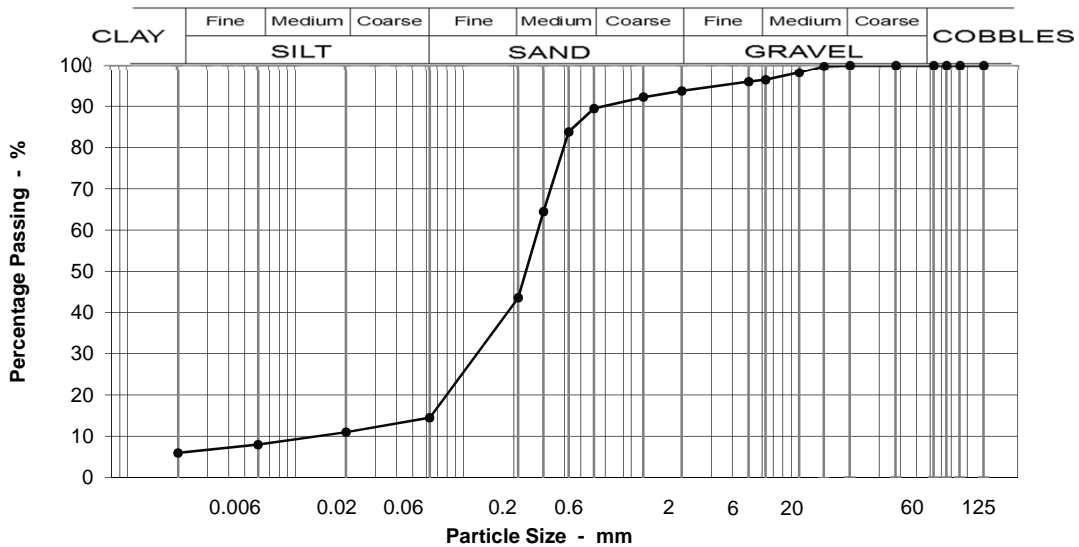
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 33 - 33.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	96
5	96
2	94
1.18	92
0.600	89
0.425	84
0.300	64
0.212	44
0.063	15
0.020	11
0.006	8
0.002	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	4
Fine GRAVEL	3
Coarse SAND	4
Medium SAND	46
Fine SAND	29
Silt & Clay	15

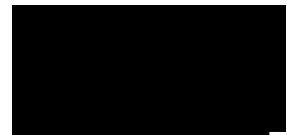
Grading Analysis	
D100	14
D60	0.28
D10	0.06
Uniformity Coefficient	4

**Description**  
Greyish brown slightly clayey slightly silty fine and medium SAND with occasional shell fragments.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180308006-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 89  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 22-May-18

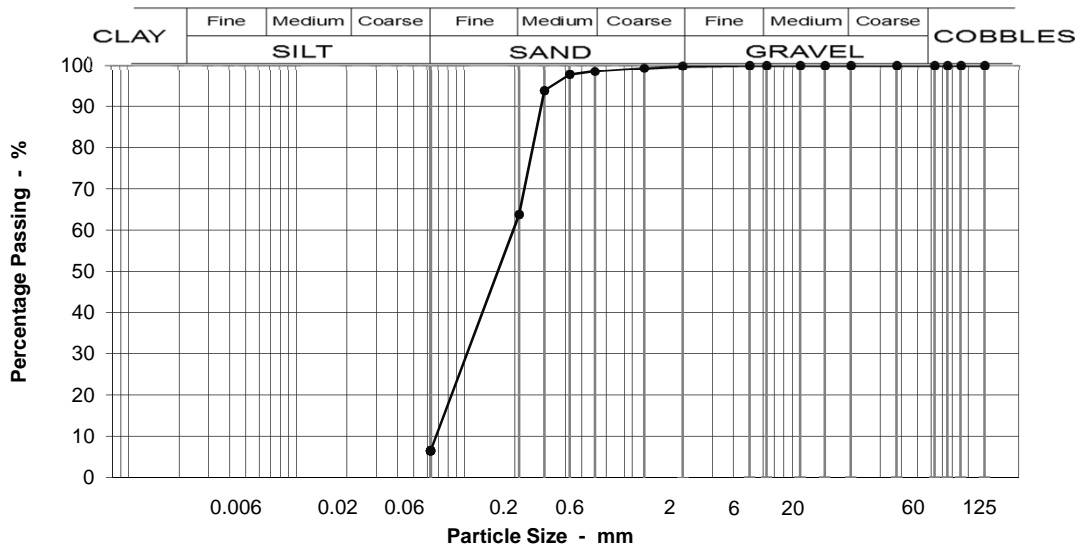
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 34 - 34.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	1
14	100		Medium SAND	35
10	100		Fine SAND	57
6.3	100		Silt & Clay	7
5	100		<b>Grading Analysis</b>	
2	100		D100	2
1.18	99		D60	0.20
0.600	99		D10	0.07
0.425	98		Uniformity Coefficient	3
0.300	94		<b>Description</b>	
0.212	64	Grey slightly silty fine and medium SAND with laminae of soft grey silty clay.		
0.063	7			

Moisture content % 25

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Norfolk  
NR1 2DH

Our reference No. **GTS1180308011-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 93  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

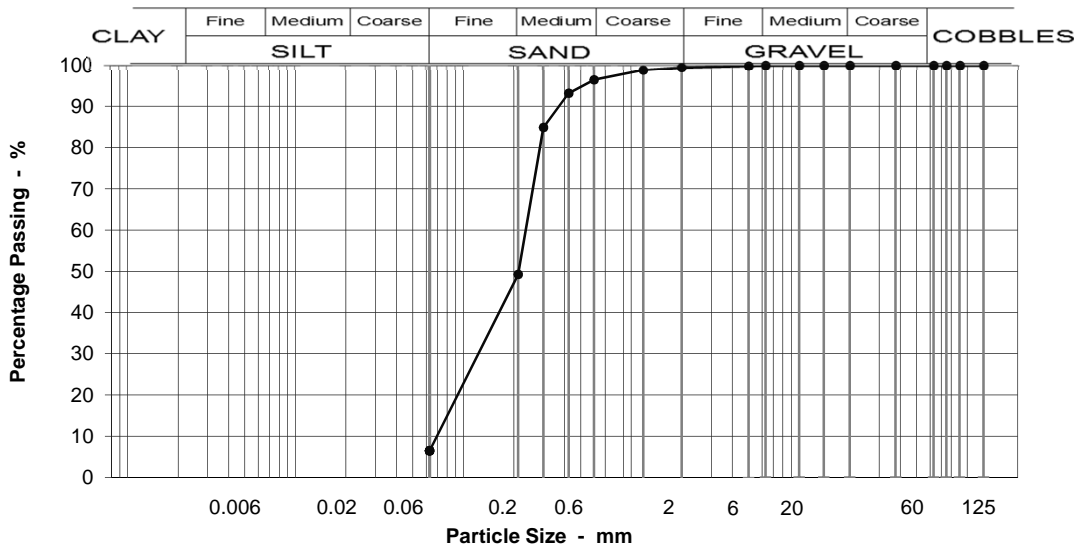
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 37 - 37.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	96
0.425	93
0.300	85
0.212	49
0.063	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	47
Fine SAND	43
Silt & Clay	7

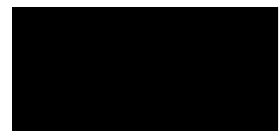
Grading Analysis	
D100	5
D60	0.24
D10	0.08
Uniformity Coefficient	3

Description	
Grey slightly silty fine and medium SAND. Occasional shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180308013-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 95  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 22-May-18

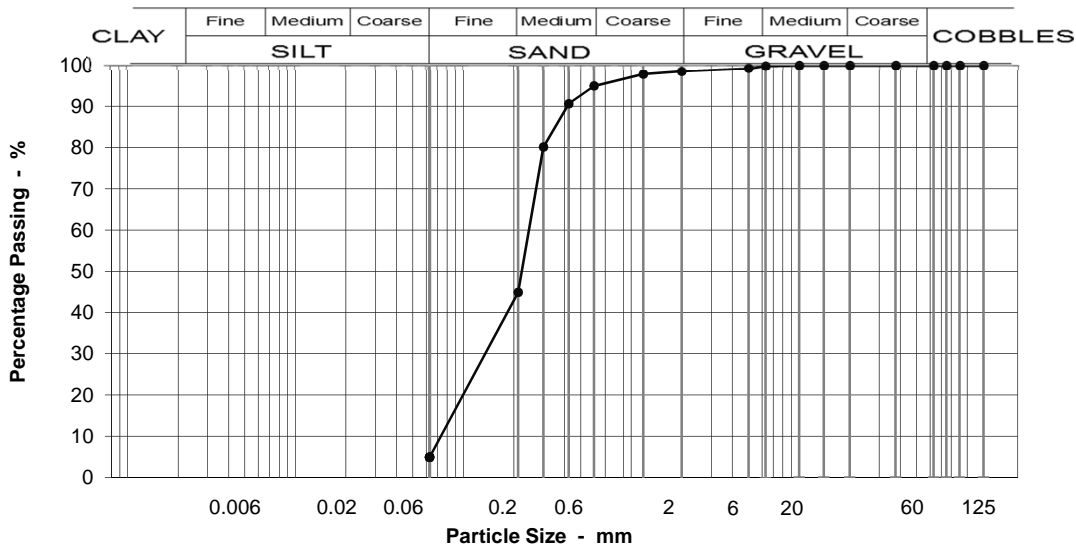
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 38 - 38.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	99
1.18	98
0.600	95
0.425	91
0.300	80
0.212	45
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	50
Fine SAND	40
Silt & Clay	5

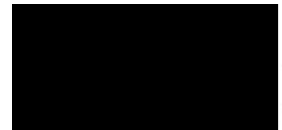
Grading Analysis	
D100	6
D60	0.25
D10	0.08
Uniformity Coefficient	3

Description	
Grey slightly silty fine and medium SAND. Occasional shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norfolk  
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Our reference No. **GTS1180308014-**  
Our Project No **PZ1522D1**  
Your Sample Ref **96**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

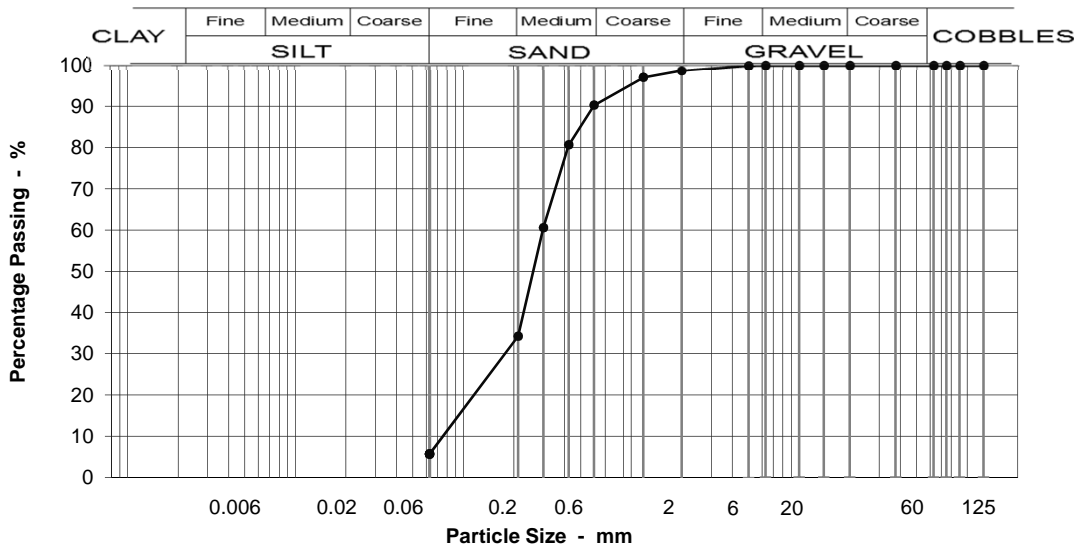
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 39 - 39.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	97
0.600	90
0.425	81
0.300	61
0.212	34
0.063	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	8
Medium SAND	56
Fine SAND	29
Silt & Clay	6

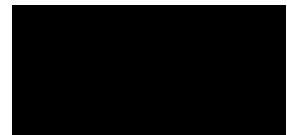
Grading Analysis	
D100	5
D60	0.30
D10	0.09
Uniformity Coefficient	3

Description	
Grey medium SAND with some shell fragments.	

Test Code =



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180309005-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 102  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 22-May-18

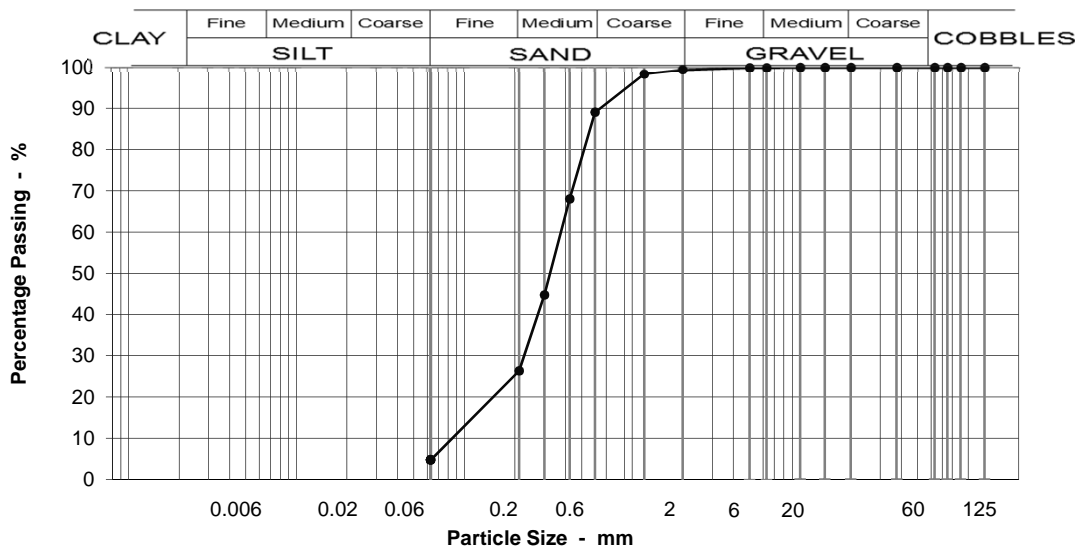
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 43 - 43.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	89
0.425	68
0.300	45
0.212	26
0.063	5

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	10
Medium SAND	63
Fine SAND	22
Silt & Clay	5

Grading Analysis	
D100	6
D60	0.38
D10	0.10
Uniformity Coefficient	4

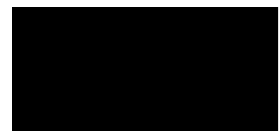
**Description**  
Grey medium SAND with some shell fragments.

Moisture content % 21

Test Code = 610



Simon Holden (Project Technician)

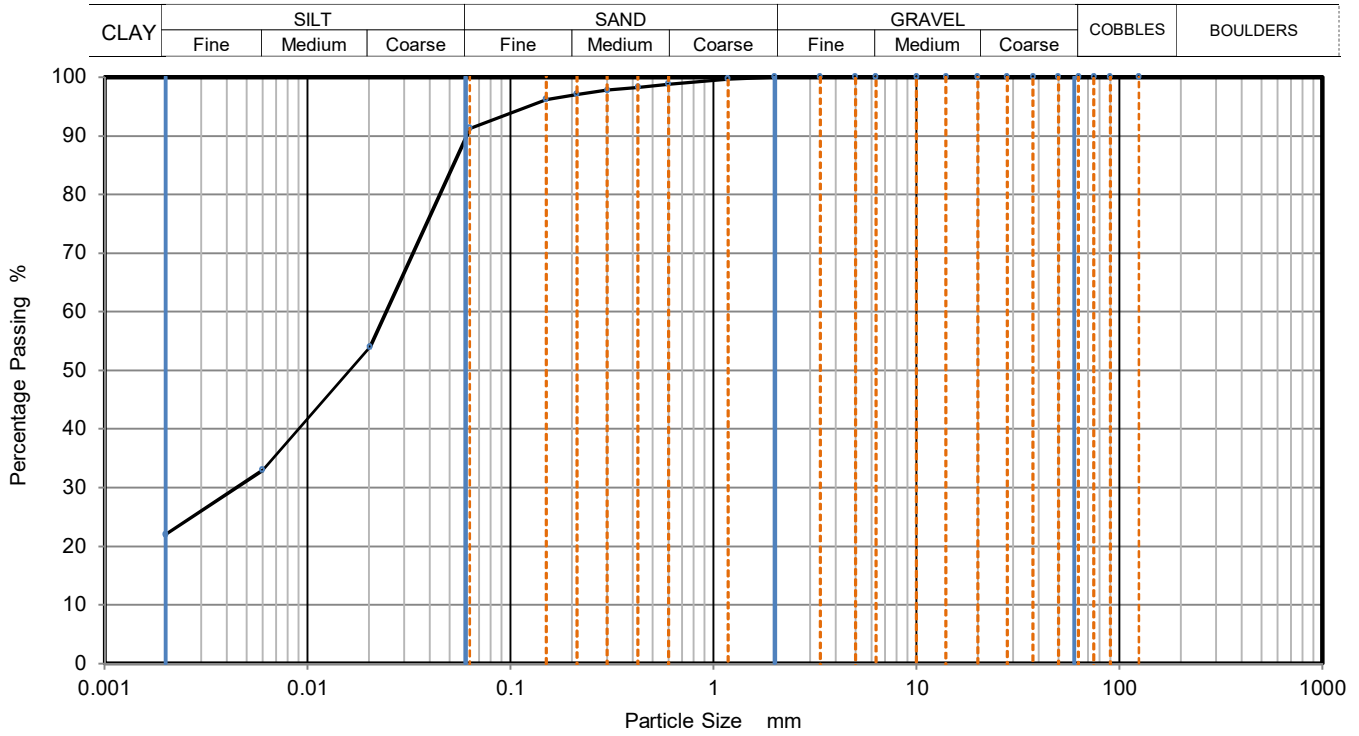




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH13
Sample Description:	Grey brown and blue grey slightly sandy very silty CLAY	Sample Depth (m)	44.80
		Sample Reference	B105



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	54
90	100	0.0060	33
75	100	0.0020	22
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	98		
0.3	98		
0.212	97		
0.15	96		
0.063	91		
		Particle density (assumed) 2.65 Mg/m <sup>3</sup>	

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	9
Silt	69
Clay	22

Grading Analysis		
D100	mm	
D60	mm	0.024
D30	mm	0.004
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks	Approved	Date	Sheet No.:
	MW	03/07/2018	1 of 1

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180309012-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 109  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 25-Jun-18

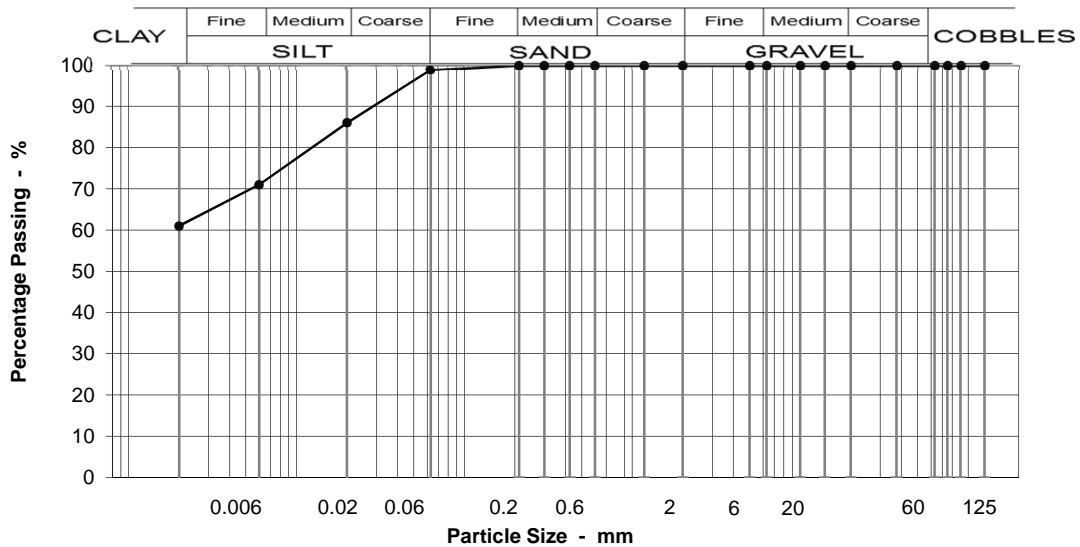
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13 @ 45.5 - 46m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	0
10	100		Fine SAND	1
6.3	100		Silt & Clay	99
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	100			
0.063	99			
0.020	86			
0.006	71			
0.002	61			
		Moisture content %		0

Grading Analysis	
D100	0
D60	0.00
D10	0.00
Uniformity Coefficient	>10*

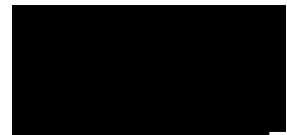
Description	
Very stiff laminated brown very silty CLAY.	

\* Uniformity coefficient extrapolated

Test Code = 610



Not approved



Community & Environmental Services  
County Hall  
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Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180309021-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 118  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 25-Jun-18

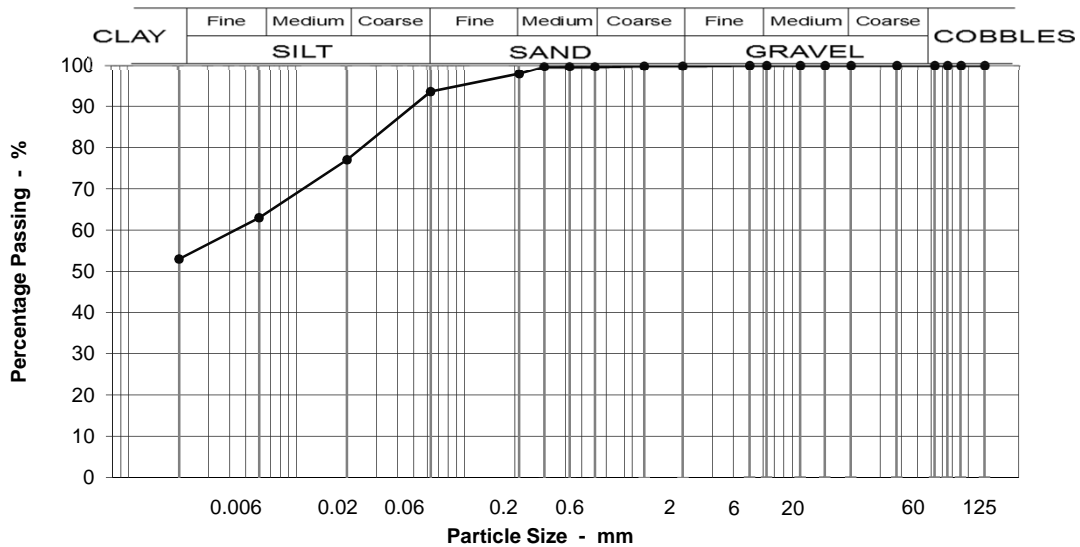
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13 @ 49.5 - 50m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	98
0.063	94
0.020	77
0.006	63
0.002	53

**Specification for Highway Works Classification**  
Table 6/2

**Moisture content %** 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	2
Fine SAND	4
Silt & Clay	94

Grading Analysis	
D100	2
D60	0.00
D10	0.00
Uniformity Coefficient	>10*

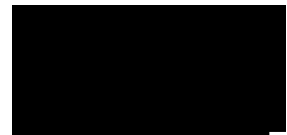
Description	
Very stiff laminated brownish grey very silty CLAY.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180315003-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 3  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 14-Jun-18

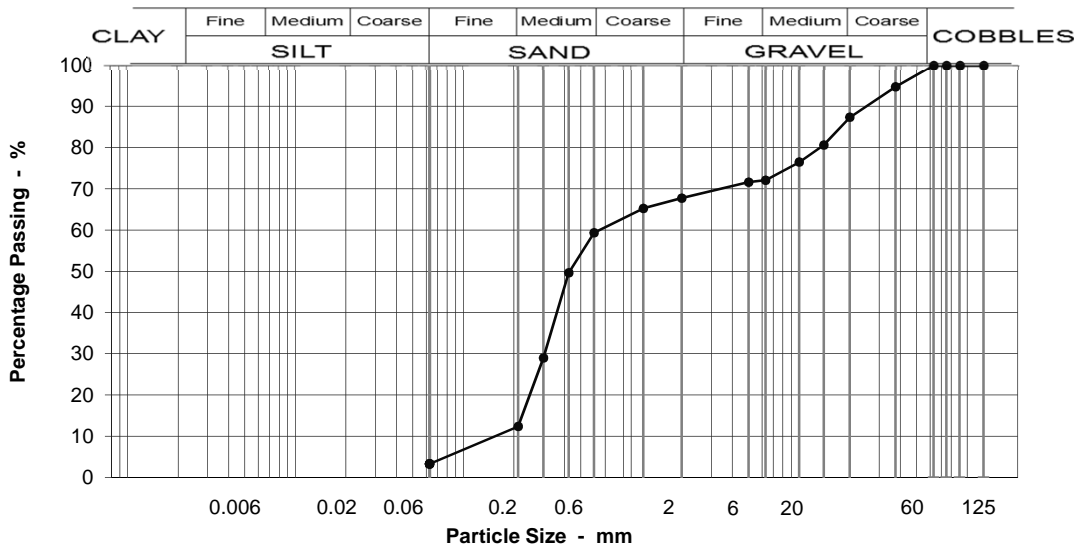
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 0.6 - 0.9m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	95
20	87
14	81
10	76
6.3	72
5	72
2	68
1.18	65
0.600	59
0.425	50
0.300	29
0.212	12
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 7.4

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	13
Medium GRAVEL	15
Fine GRAVEL	4
Coarse SAND	8
Medium SAND	47
Fine SAND	9
Silt & Clay	3

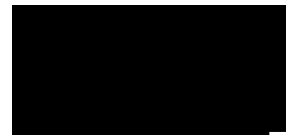
Grading Analysis	
D100	38
D60	0.66
D10	0.17
Uniformity Coefficient	4

**Description**  
Brown very gravelly medium SAND. Gravel is medium and coarse angular to rounded concrete, flint, quartz and quartzite.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180315007-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 7  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 14-Jun-18

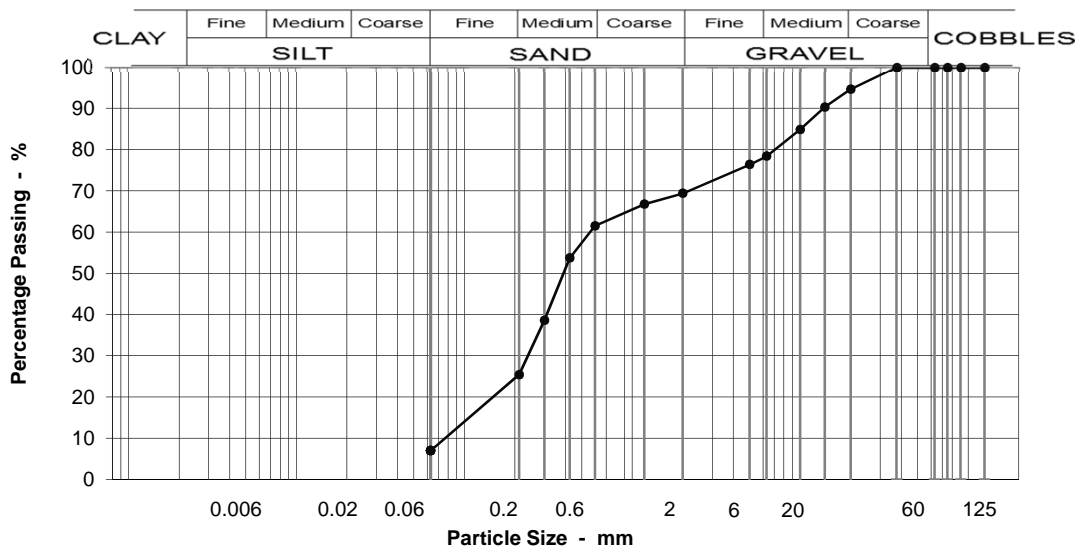
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13A @ 1.2 - 1.7m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6J, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	5
63	100		Medium GRAVEL	16
37.5	100		Fine GRAVEL	9
20	95		Coarse SAND	8
14	90		Medium SAND	36
10	85		Fine SAND	18
6.3	78		Silt & Clay	7
5	76			
2	69			
1.18	67			
0.600	62			
0.425	54			
0.300	39			
0.212	25			
0.063	7			
<b>Moisture content %</b>		14		

Grading Analysis	
D100	20
D60	0.57
D10	0.09
Uniformity Coefficient	6

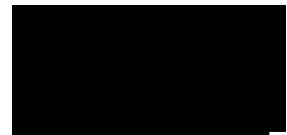
  

Description	
Brown very gravelly slightly silty fine and medium SAND. Gravel is fine and medium angular to rounded flint and quartz.	

Test Code = 610



Simon Holden (Project Technician)





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County Hall  
Martineau Lane  
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NR1 2DH

Our reference No. **GTS1180315010-610**  
Our Project No. PZ1522D1  
Your Sample Ref 10  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 4-Jul-18

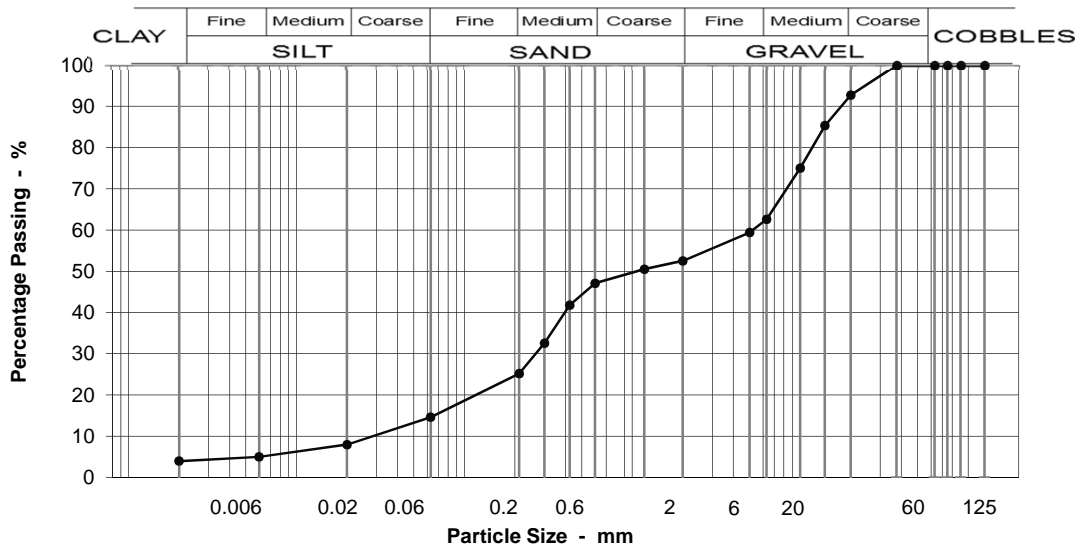
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 2 - 2.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	93
14	85
10	75
6.3	63
5	59
2	52
1.18	51
0.600	47
0.425	42
0.300	33
0.212	25
0.063	15
0.020	8
0.006	5
0.002	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6N.**

Moisture content % 16

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	7
Medium GRAVEL	30
Fine GRAVEL	10
Coarse SAND	5
Medium SAND	22
Fine SAND	11
Silt & Clay	15

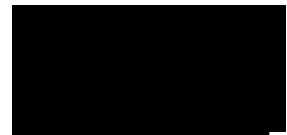
Grading Analysis	
D100	20
D60	5.23
D10	0.11
Uniformity Coefficient	49

Description	
Brown silty medium angular to rounded flint and quartz GRAVEL and fine to medium SAND.	

Test Code = 610



Simon Holden (Project Technician)

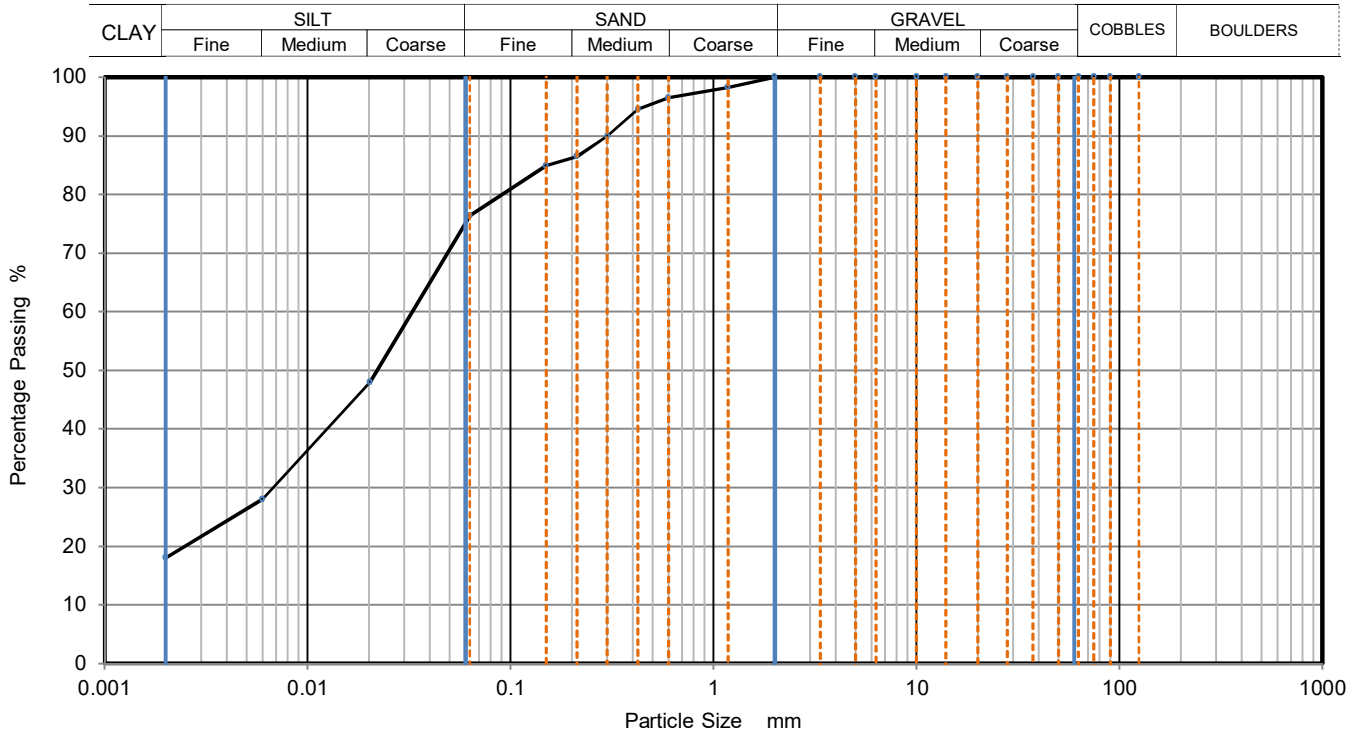




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH13A
Sample Description:	Brown and dark grey slightly sandy silty CLAY	Sample Depth (m)	2.70
		Sample Reference	D11



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	48
90	100	0.0060	28
75	100	0.0020	18
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	98		
0.6	97		
0.425	95	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	90		
0.212	87		
0.15	85		
0.063	76		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	24
Silt	59
Clay	18

Grading Analysis		
D100	mm	
D60	mm	0.033
D30	mm	0.007
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

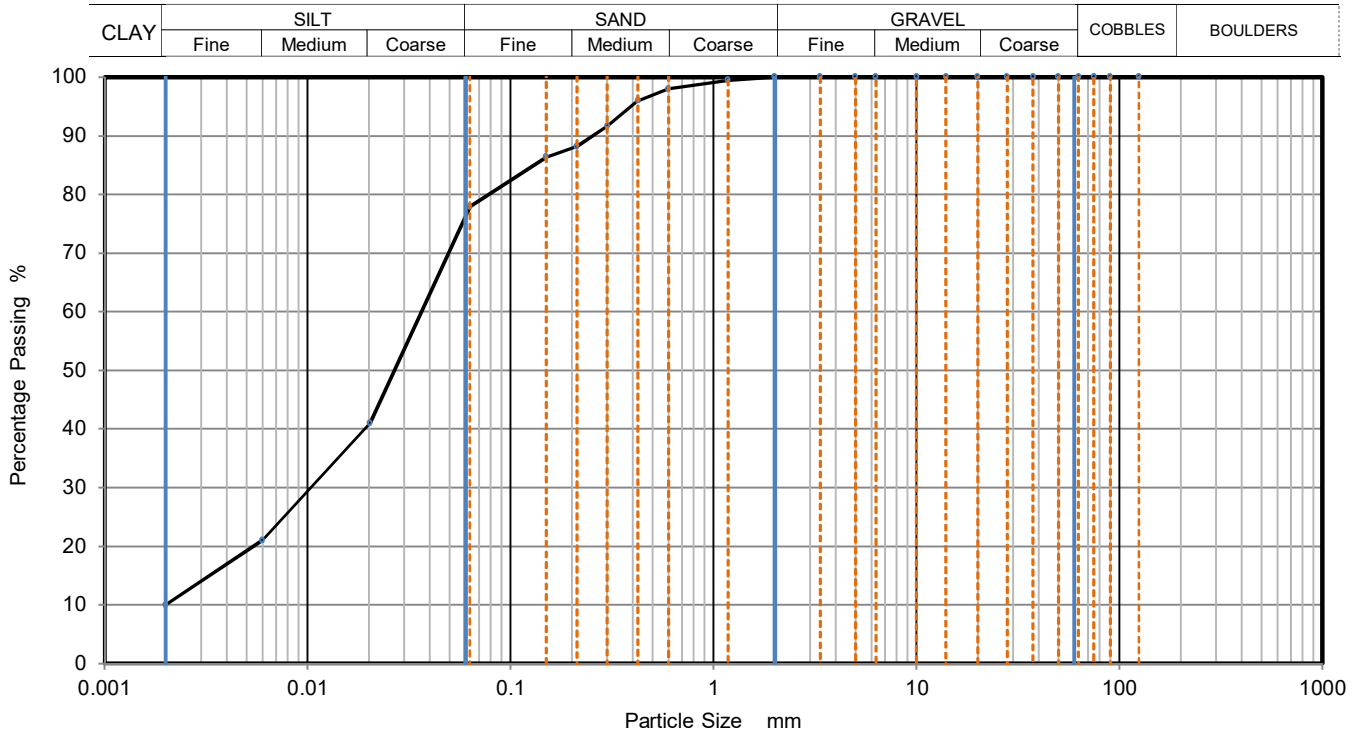
Remarks	Approved	Date	Sheet No.:
	MW	03/07/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH13A
Sample Description:	Brown and dark grey slightly sandy clayey SILT	Sample Depth (m)	4.60
		Sample Reference	B19



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	41
90	100	0.0060	21
75	100	0.0020	10
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98	Particle density (assumed)	
0.425	96	2.65	Mg/m3
0.3	92		
0.212	88		
0.15	86		
0.063	78		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	22
Silt	68
Clay	10

Grading Analysis		
D100	mm	
D60	mm	0.037
D30	mm	0.011
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks	Approved	Date	Sheet No.:
	MW	03/07/2018	1 of 1

Community & Environmental Services  
County Hall  
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Norfolk  
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Our reference No. **NCCL2018040521-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 22  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 14-Jun-18

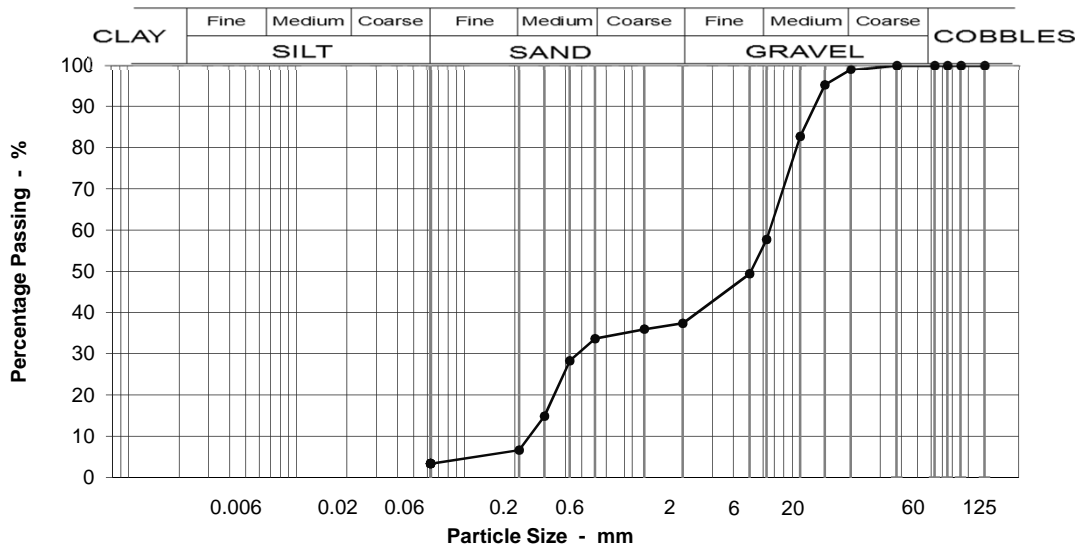
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 5 - 5.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	95
10	83
6.3	58
5	49
2	37
1.18	36
0.600	34
0.425	28
0.300	15
0.212	7
0.063	3

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 6.8

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	41
Fine GRAVEL	20
Coarse SAND	4
Medium SAND	27
Fine SAND	3
Silt & Clay	3

Grading Analysis	
D100	20
D60	6.64
D10	0.25
Uniformity Coefficient	27

**Description**  
Greyish brown very sandy fine and medium subangular to subrounded flint and quartz GRAVEL.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
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NR1 2DH

Our reference No. **GTS1180316003-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 25  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 14-Jun-18

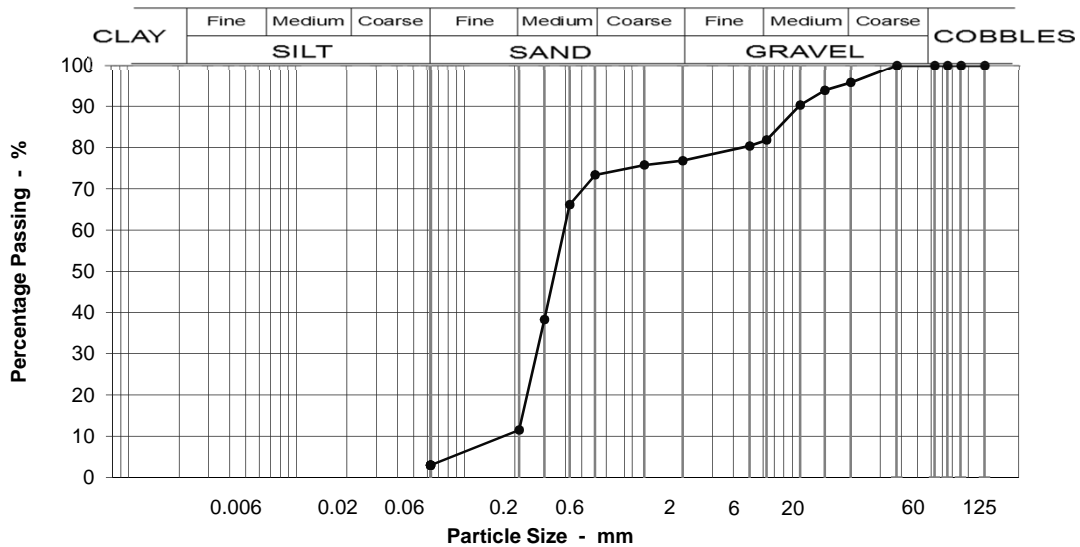
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 6 - 6.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	96
14	94
10	90
6.3	82
5	80
2	77
1.18	76
0.600	73
0.425	66
0.300	38
0.212	12
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	4
Medium GRAVEL	14
Fine GRAVEL	5
Coarse SAND	3
Medium SAND	62
Fine SAND	9
Silt & Clay	3

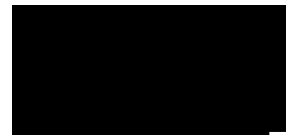
Grading Analysis	
D100	20
D60	0.40
D10	0.19
Uniformity Coefficient	2

**Description**  
Brown slightly organic very gravelly medium SAND. Gravel is medium angular to rounded flint and quartz. Some shell fragments.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180316007-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 29  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 14-Jun-18

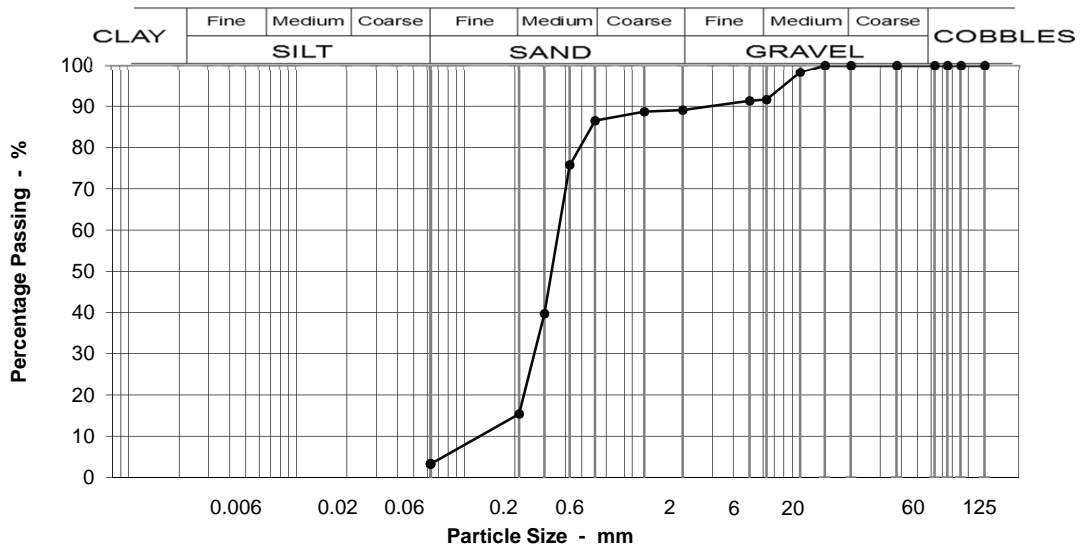
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13A @ 7 - 7.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	92
5	91
2	89
1.18	89
0.600	87
0.425	76
0.300	40
0.212	15
0.063	3

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	8
Fine GRAVEL	3
Coarse SAND	3
Medium SAND	71
Fine SAND	12
Silt & Clay	3

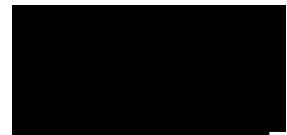
Grading Analysis	
D100	10
D60	0.37
D10	0.15
Uniformity Coefficient	3

**Description**  
Brown slightly organic gravelly medium SAND. Gravel is fine and medium subangular to angular flint.

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180316013-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **35**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **14-Jun-18**

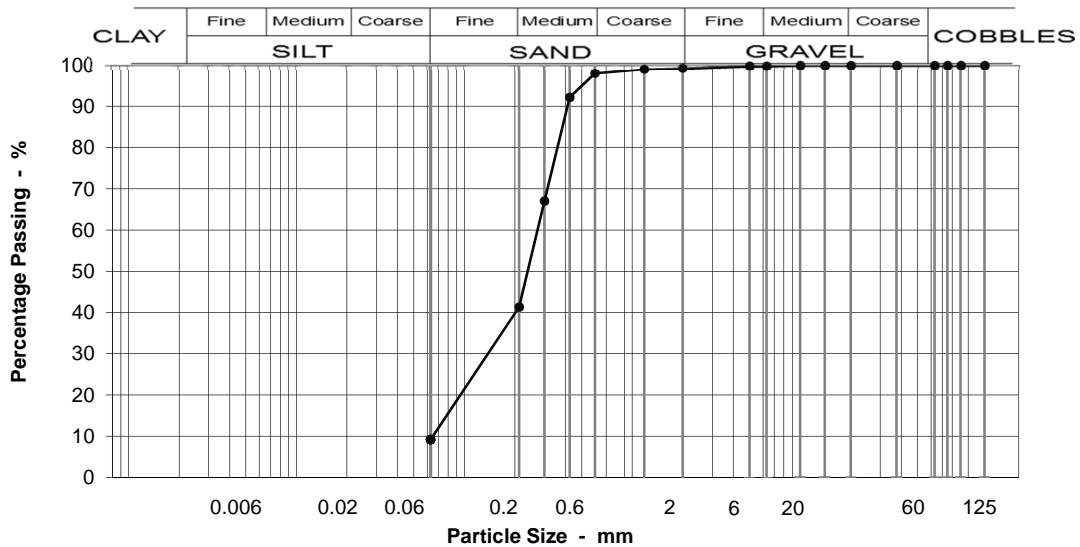
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 9 - 9.5m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	98
0.425	92
0.300	67
0.212	41
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	57
Fine SAND	32
Silt & Clay	9

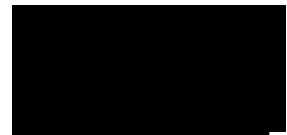
Grading Analysis	
D100	6
D60	0.28
D10	0.07
Uniformity Coefficient	4

Description	
Brown slightly organic fine and medium SAND with laminae of dark grey silty clay and black clayey silt.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180316016-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 38  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 14-Jun-18

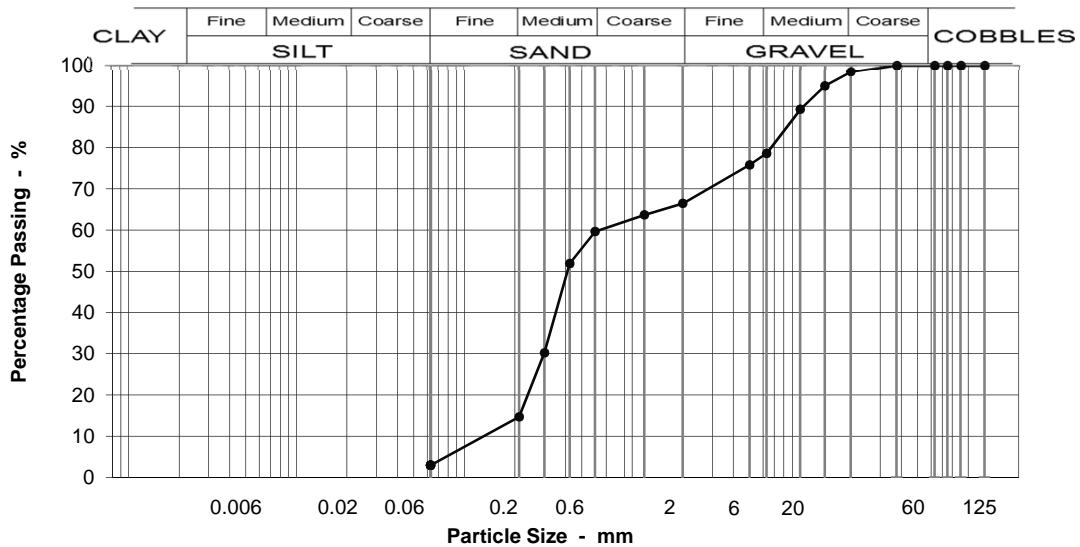
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 10 - 10.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	98
14	95
10	89
6.3	79
5	76
2	66
1.18	64
0.600	60
0.425	52
0.300	30
0.212	15
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 14

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	2
Medium GRAVEL	20
Fine GRAVEL	12
Coarse SAND	7
Medium SAND	45
Fine SAND	12
Silt & Clay	3

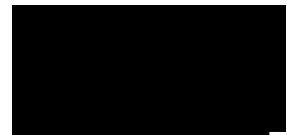
Grading Analysis	
D100	20
D60	0.65
D10	0.15
Uniformity Coefficient	4

**Description**  
Brown very gravelly medium SAND. Gravel is fine and medium angular to rounded flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180316018-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 40  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 14-Jun-18

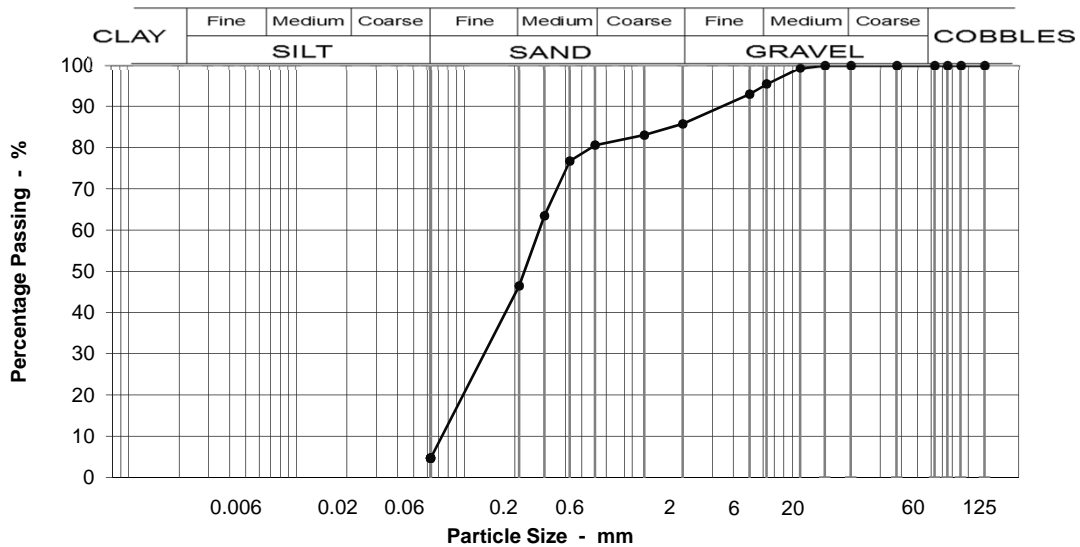
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 11 - 11.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

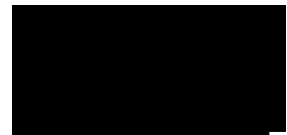


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	5
37.5	100		Fine GRAVEL	10
20	100		Coarse SAND	5
14	100		Medium SAND	34
10	99		Fine SAND	42
6.3	95		Silt & Clay	5
5	93		<b>Grading Analysis</b>	
2	86		D100	10
1.18	83		D60	0.28
0.600	81		D10	0.08
0.425	77		Uniformity Coefficient	3
0.300	63		<b>Description</b>	
0.212	46	Dark grey slightly organic slightly silty gravelly fine and medium SAND and orangey-brown fine SAND.		
0.063	5	Moisture content % 19		

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180316021-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 43  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 14-Jun-18

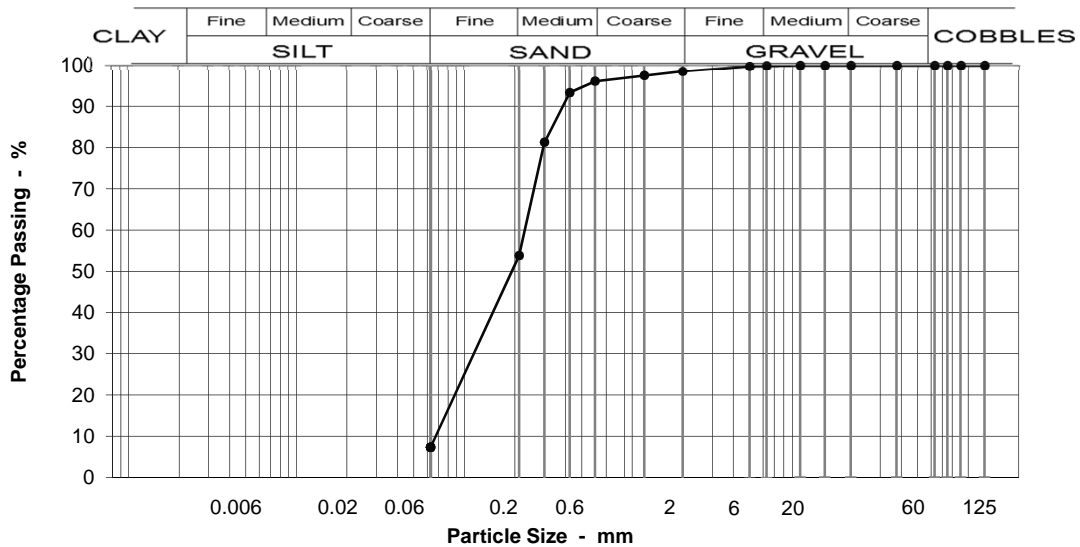
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 12 - 12.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	97
0.600	96
0.425	93
0.300	81
0.212	54
0.063	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	42
Fine SAND	46
Silt & Clay	7

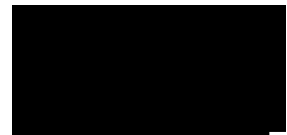
Grading Analysis	
D100	6
D60	0.23
D10	0.07
Uniformity Coefficient	3

Description	
Olive fine and medium SAND with laminae of soft grey clay.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180316028-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 50  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 12-Jun-18

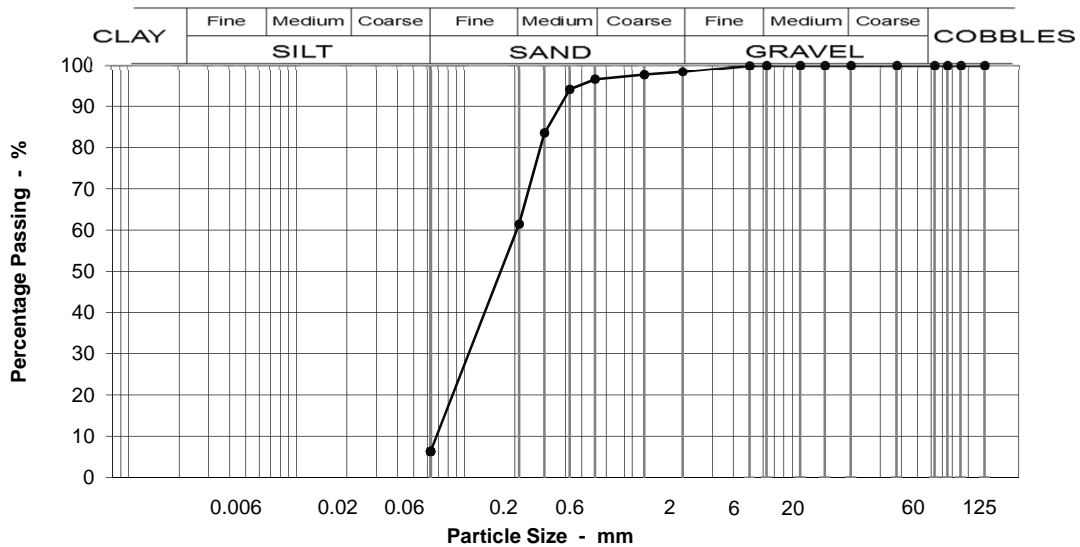
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13A @ 15 - 15.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



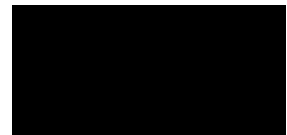
Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	2
20	100		Coarse SAND	2
14	100		Medium SAND	35
10	100		Fine SAND	55
6.3	100		Silt & Clay	6
5	100		<b>Grading Analysis</b>	
2	98		D100	5
1.18	98		D60	0.21
0.600	97		D10	0.07
0.425	94		Uniformity Coefficient	3
0.300	84		<b>Description</b>	
0.212	61	Brown fine and medium SAND with laminae of soft grey clay.		
0.063	6			

**Moisture content %** 23

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180319003-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 53  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 4-Jul-18

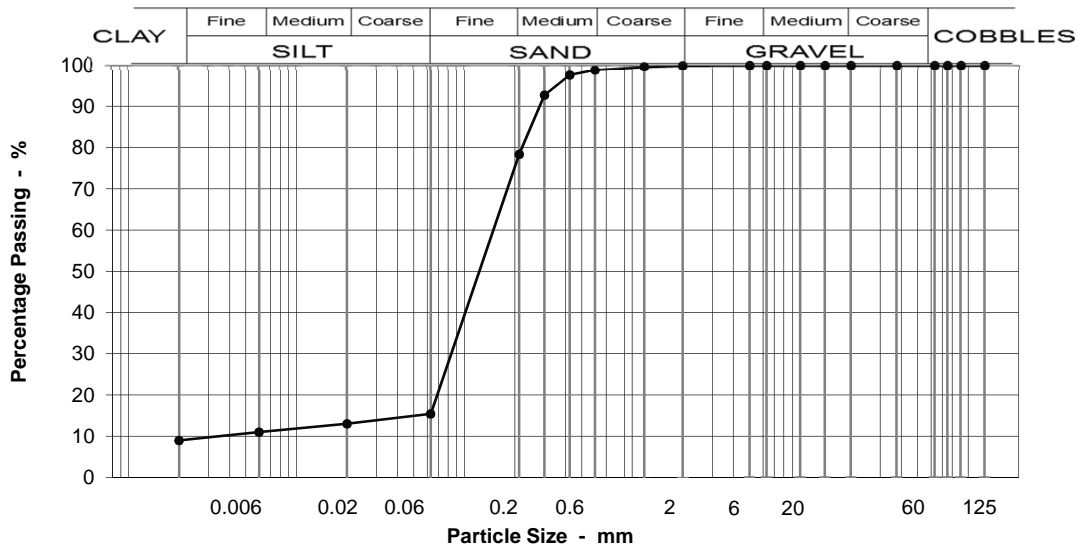
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 16 - 16.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	1
14	100		Medium SAND	21
10	100		Fine SAND	63
6.3	100		Silt & Clay	15
5	100			
2	100			
1.18	100			
0.600	99			
0.425	98			
0.300	93			
0.212	78			
0.063	15			
0.020	13			
0.006	11			
0.002	9	Moisture content %	33	

Grading Analysis	
D100	2
D60	0.17
D10	0.03
Uniformity Coefficient	5*

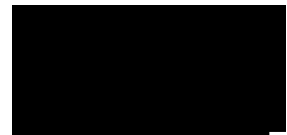
Description	
Olive fine SAND with numerous lenses of soft grey silty CLAY.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180319010-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **60**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **14-Jun-18**

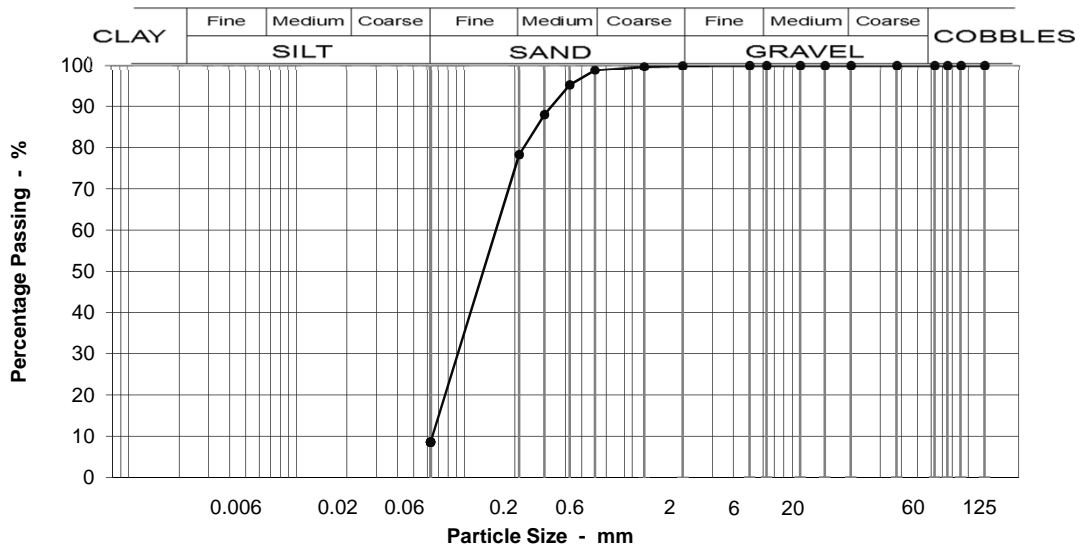
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 19 - 19.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	95
0.300	88
0.212	78
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	21
Fine SAND	70
Silt & Clay	9

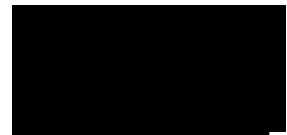
Grading Analysis	
D100	2
D60	0.17
D10	0.07
Uniformity Coefficient	3

Description	
Brown fine SAND with laminae of soft grey clay. Occasional dark brown ironstone nodules.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180319013-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **63**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **14-Jun-18**

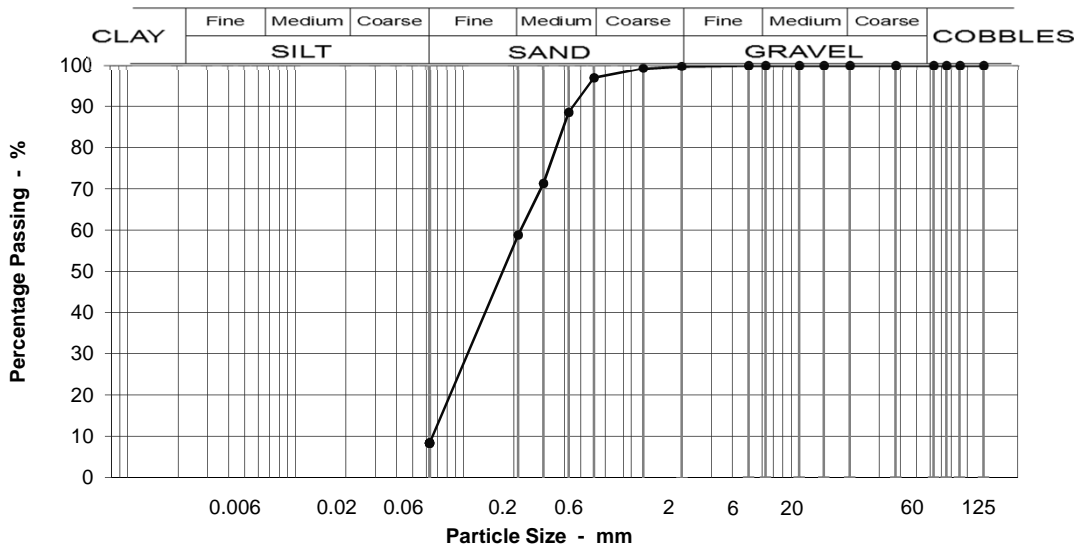
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 20 - 20.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	89
0.300	71
0.212	59
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	3
Medium SAND	38
Fine SAND	50
Silt & Clay	8

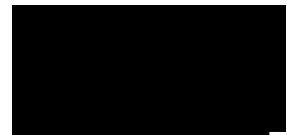
Grading Analysis	
D100	2
D60	0.22
D10	0.07
Uniformity Coefficient	3

Description	
Laminated and thinly bedded brown and orange slightly silty fine and medium SAND and sandy SILT.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180319014-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 64  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 18-Jun-18

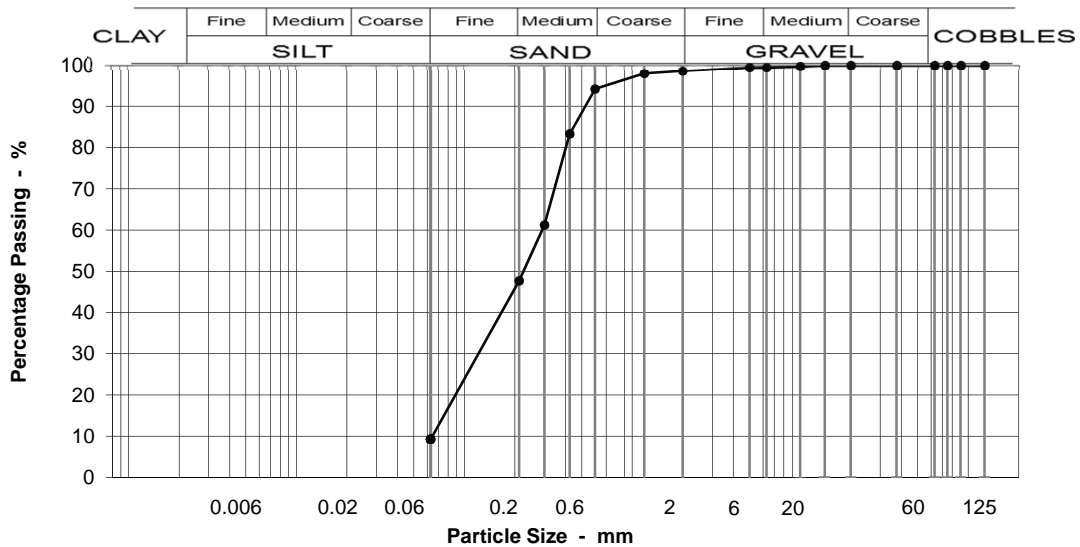
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13A @ 21 - 21.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	99
1.18	98
0.600	94
0.425	83
0.300	61
0.212	48
0.063	9

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	46
Fine SAND	38
Silt & Clay	9

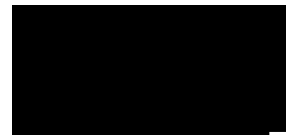
Grading Analysis	
D100	10
D60	0.29
D10	0.07
Uniformity Coefficient	4

Description	
Laminated and thinly bedded brown and orange slightly silty fine and medium SAND and occasional laminae of brown sandy silt.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180319016-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 66  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 14-Jun-18

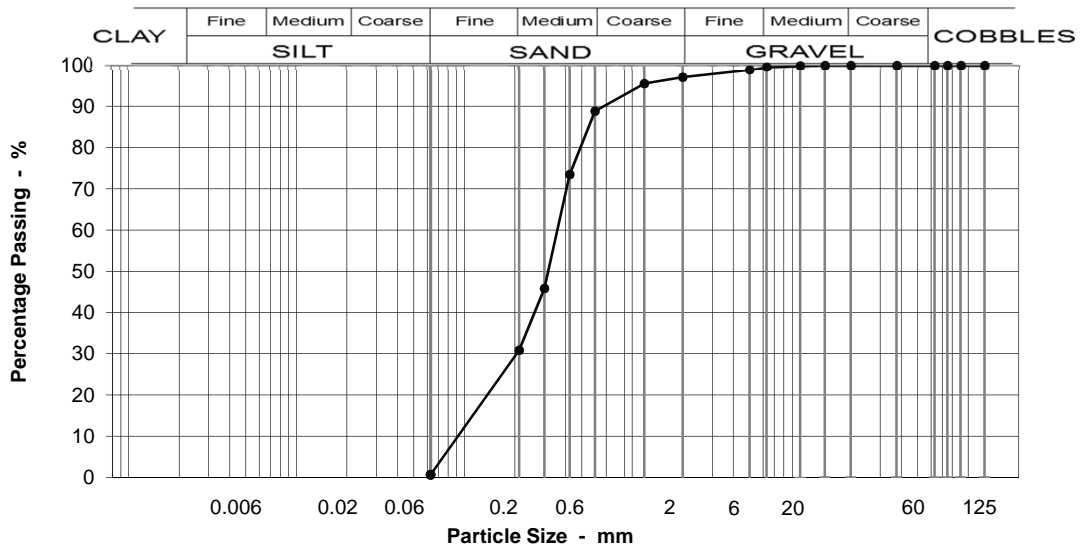
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13A @ 22 - 22.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	97
1.18	96
0.600	89
0.425	73
0.300	46
0.212	31
0.063	1

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	3
Coarse SAND	8
Medium SAND	58
Fine SAND	30
Silt & Clay	1

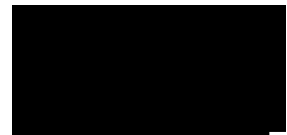
Grading Analysis	
D100	10
D60	0.36
D10	0.11
Uniformity Coefficient	3

Description	
Laminated and thinly bedded brown and orange fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180319017-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 67  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 12-Jun-18

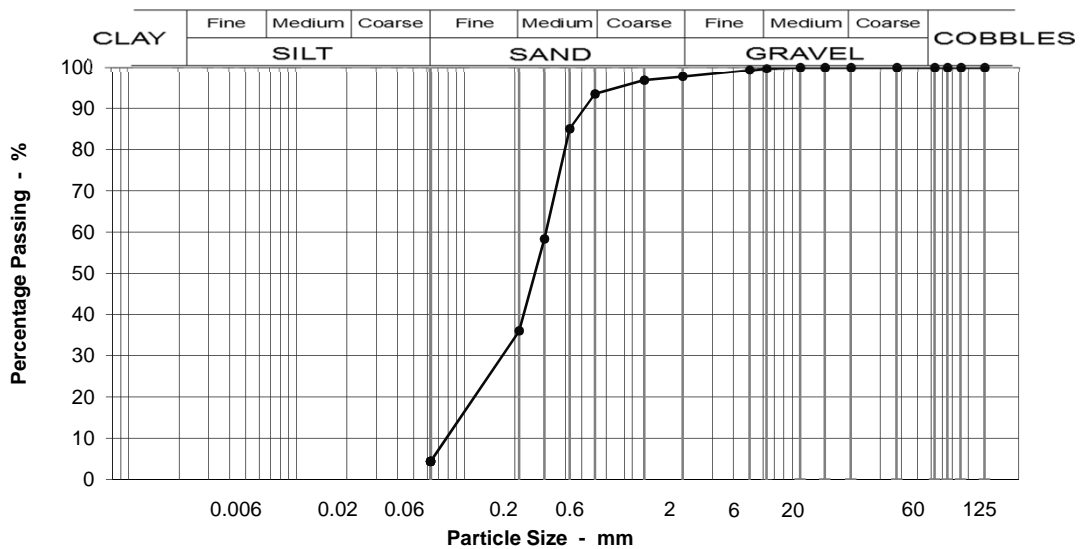
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13A @ 23 - 23.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	98
1.18	97
0.600	93
0.425	85
0.300	58
0.212	36
0.063	4

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	4
Medium SAND	57
Fine SAND	32
Silt & Clay	4

Grading Analysis	
D100	6
D60	0.31
D10	0.09
Uniformity Coefficient	3

**Description**  
Dark brown fine and medium SAND with laminae of soft grey CLAY, some shell fragments.

**Moisture content %** 20

Test Code = 610



Simon Holden (Project Technician)

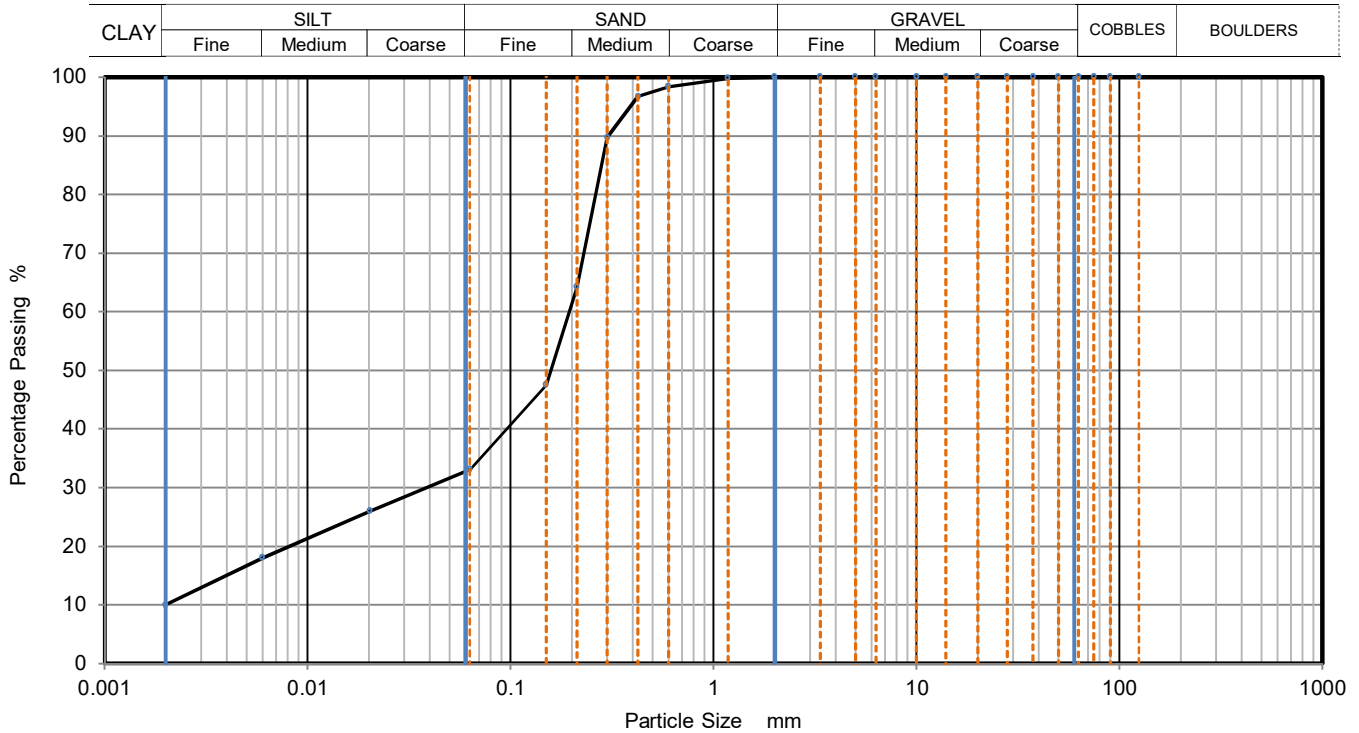




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH13A
Sample Description:	Dark grey clayey very silty SAND	Sample Depth (m)	26.00
		Sample Reference	B72



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	26
90	100	0.0060	18
75	100	0.0020	10
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98		
0.425	97		
0.3	90		
0.212	64		
0.15	48		
0.063	33		
		Particle density (assumed) 2.65 Mg/m <sup>3</sup>	

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	67
Silt	23
Clay	10

Grading Analysis		
D100	mm	
D60	mm	0.194
D30	mm	0.039
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks	Approved	Date	Sheet No.:
	MW	03/07/2018	1 of 1



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180319023-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **73**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **14-Jun-18**

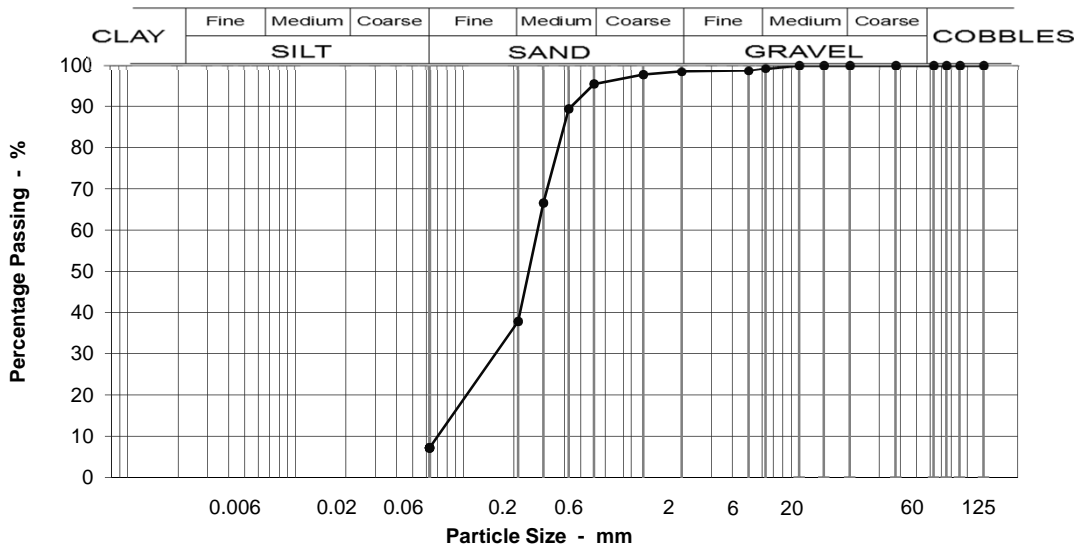
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 27 - 27.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	98
1.18	98
0.600	95
0.425	89
0.300	67
0.212	38
0.063	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	58
Fine SAND	31
Silt & Clay	7

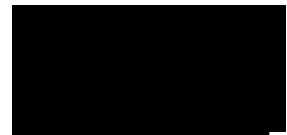
Grading Analysis	
D100	6
D60	0.28
D10	0.08
Uniformity Coefficient	4

Description	
Dark brown fine and medium SAND with laminae of soft grey clay.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180319026-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 76  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 4-Jul-18

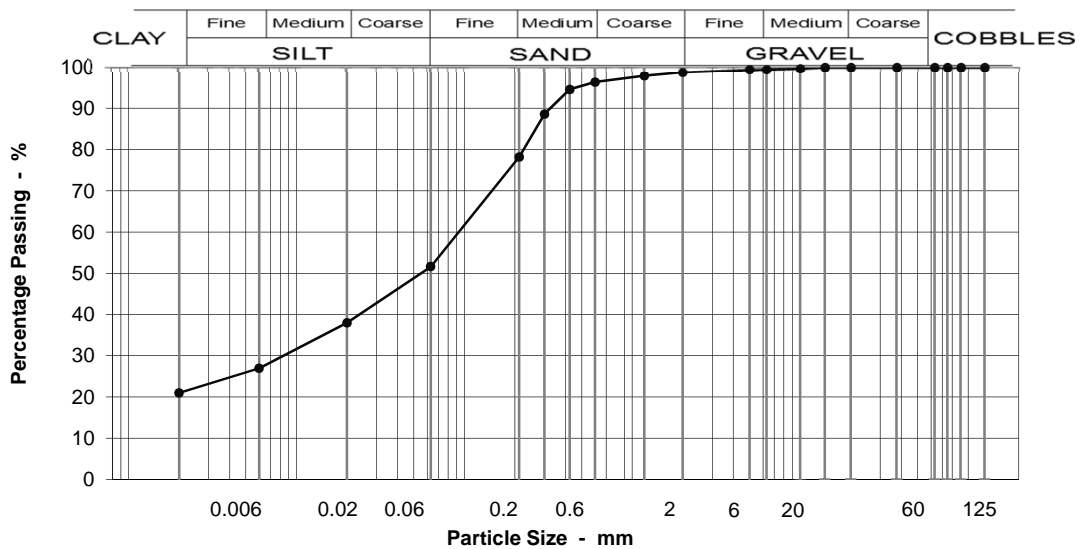
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13A @ 27.7 - 28m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	99
1.18	98
0.600	96
0.425	95
0.300	89
0.212	78
0.063	52
0.020	38
0.006	27
0.002	21

**Specification for Highway Works Classification**  
Table 6/2

**Moisture content %** 28

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	18
Fine SAND	27
Silt & Clay	52

Grading Analysis	
D100	10
D60	0.11
D10	0.00
Uniformity Coefficient	>10*

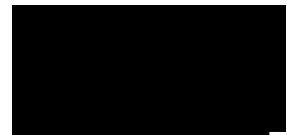
Description	
Laminated and thinly bedded soft to firm grey CLAY:SILT and light grey silty fine and medium SAND.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)

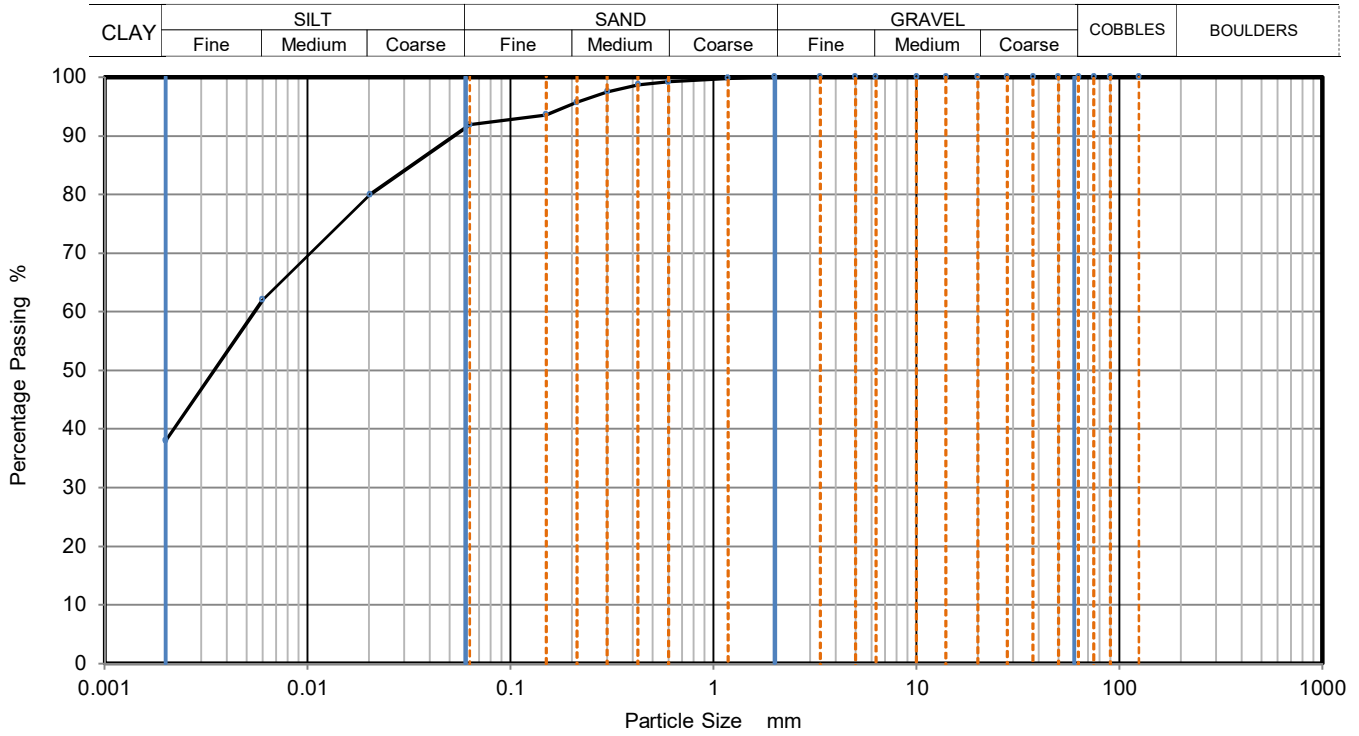




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH13A
Sample Description:	Grey slightly sandy silty CLAY	Sample Depth (m)	30.00
		Sample Reference	B80



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	80
90	100	0.0060	62
75	100	0.0020	38
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	99	Particle density (assumed) 2.65 Mg/m3	
0.3	98		
0.212	96		
0.15	94		
0.063	92		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	8
Silt	54
Clay	38

Grading Analysis		
D100	mm	
D60	mm	0.006
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks	Approved	Date	Sheet No.:
	MW	03/07/2018	1 of 1

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180320004-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 84  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 4-Jul-18

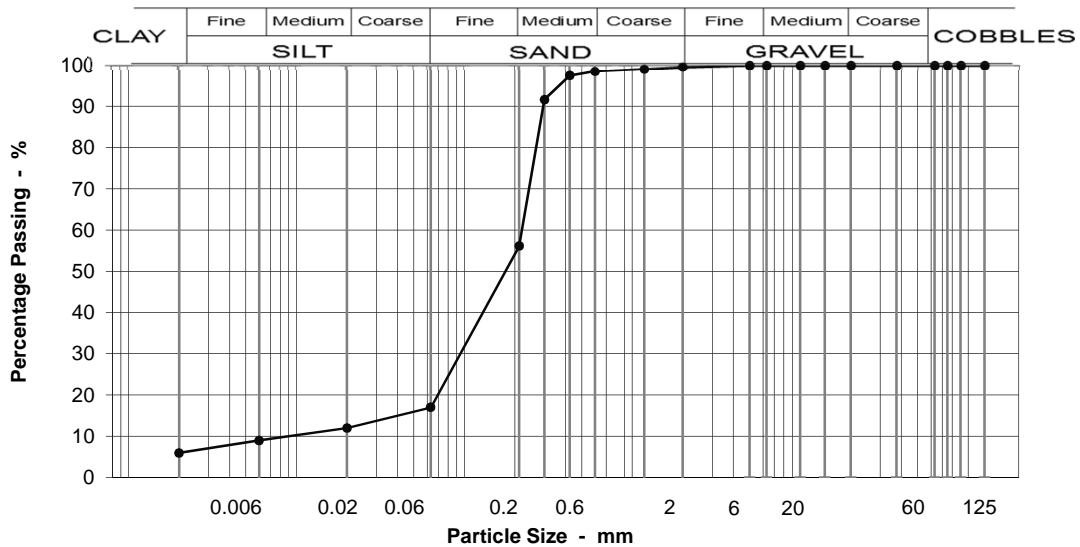
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13A @ 32 - 32.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	1
14	100		Medium SAND	42
10	100		Fine SAND	39
6.3	100		Silt & Clay	17
5	100			
2	100			
1.18	99			
0.600	99			
0.425	97			
0.300	92			
0.212	56			
0.063	17			
0.020	12			
0.006	9			
0.002	6			
		<b>Moisture content %</b>	23	

Grading Analysis	
D100	2
D60	0.22
D10	0.05
Uniformity Coefficient	5*

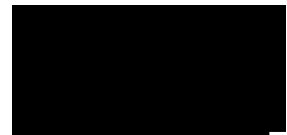
Description	
Grey slightly clayey silty fine and medium SAND, some shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180320008-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 88  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 14-Jun-18

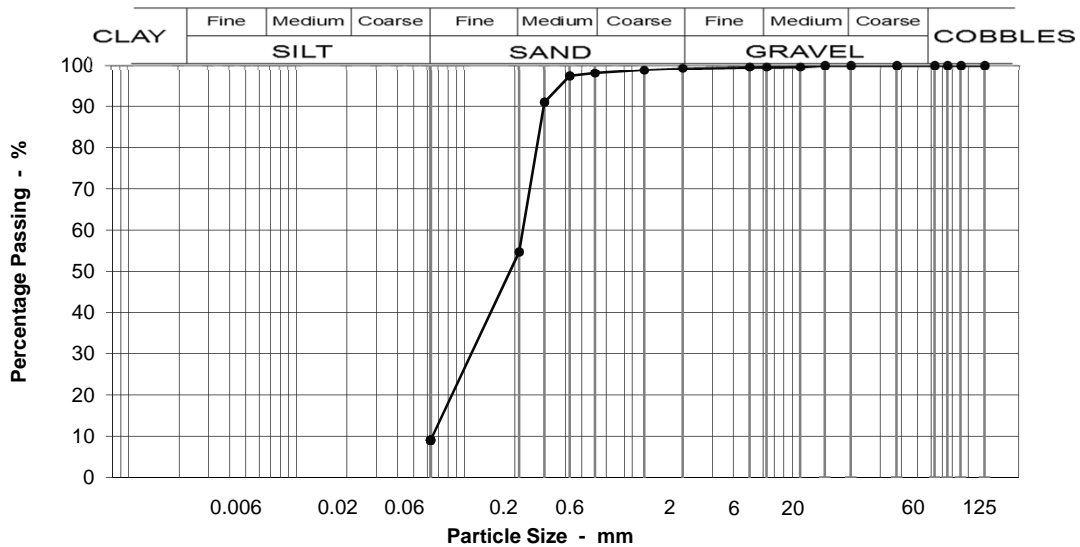
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 35 - 35.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

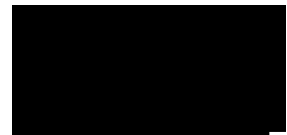


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions											
Particle Size mm	% Passing													
125	100	<p><b>This material complies with the following material classes 1B, 6E/6R, 6M.</b></p>	BOULDERS	0										
90	100		COBBLES	0										
75	100		Coarse GRAVEL	0										
63	100		Medium GRAVEL	0										
37.5	100		Fine GRAVEL	0										
20	100		Coarse SAND	1										
14	100		Medium SAND	43										
10	100		Fine SAND	46										
6.3	100		Silt & Clay	9										
5	100													
2	99													
1.18	99													
0.600	98													
0.425	97													
0.300	91													
0.212	55													
0.063	9													
Moisture content %		26	<table border="1"> <thead> <tr> <th colspan="2">Grading Analysis</th> </tr> </thead> <tbody> <tr><td>D100</td><td>10</td></tr> <tr><td>D60</td><td>0.22</td></tr> <tr><td>D10</td><td>0.07</td></tr> <tr><td>Uniformity Coefficient</td><td>3</td></tr> </tbody> </table>		Grading Analysis		D100	10	D60	0.22	D10	0.07	Uniformity Coefficient	3
Grading Analysis														
D100	10													
D60	0.22													
D10	0.07													
Uniformity Coefficient	3													
			<table border="1"> <thead> <tr> <th colspan="2">Description</th> </tr> </thead> <tbody> <tr> <td colspan="2">Grey fine and medium SAND with laminae of soft grey clay.</td> </tr> </tbody> </table>		Description		Grey fine and medium SAND with laminae of soft grey clay.							
Description														
Grey fine and medium SAND with laminae of soft grey clay.														

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180320015-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 94  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 14-Jun-18

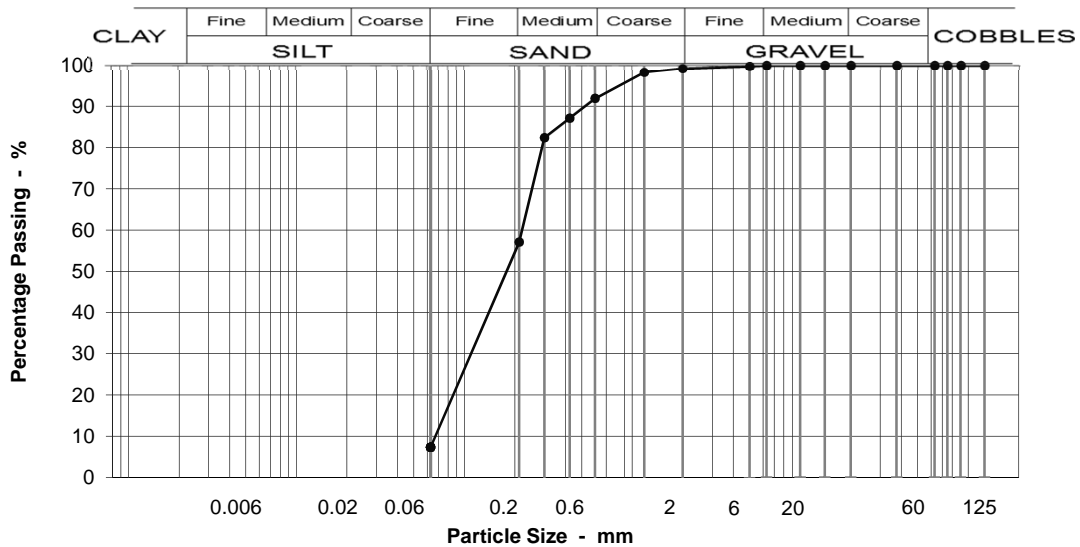
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 39 - 39.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	7
14	100		Medium SAND	35
10	100		Fine SAND	50
6.3	100		Silt & Clay	7
5	100			
2	99			
1.18	98			
0.600	92			
0.425	87			
0.300	82			
0.212	57			
0.063	7			
Moisture content %		22		

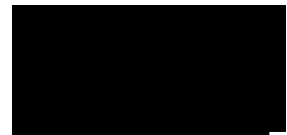
Grading Analysis	
D100	5
D60	0.22
D10	0.07
Uniformity Coefficient	3

Description	
Grey fine and medium SAND with laminae of soft grey clay.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS1180320018-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 96  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 14-Jun-18

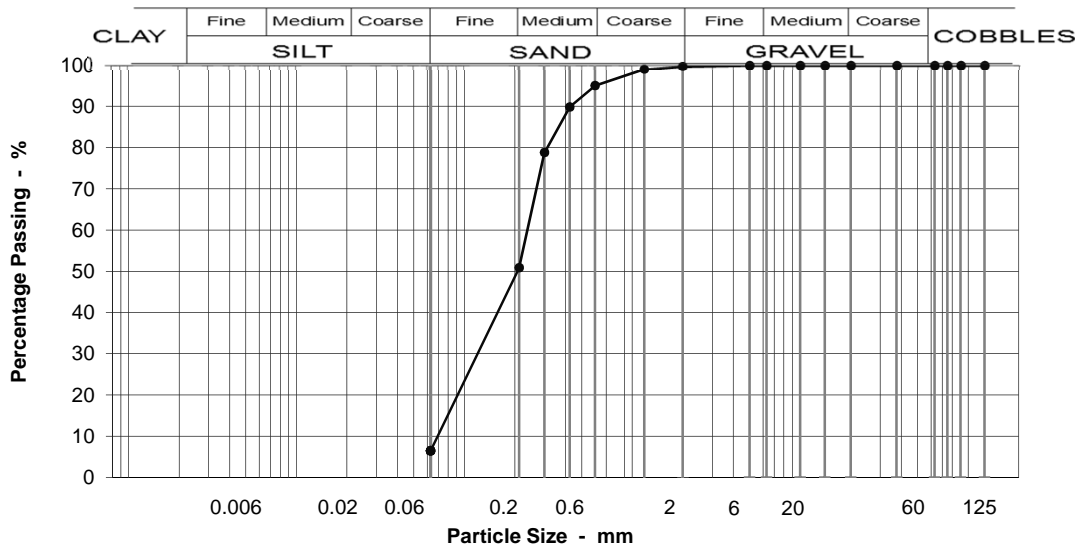
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH13A @ 40 - 40.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

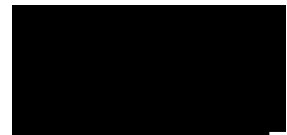


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	5
14	100		Medium SAND	44
10	100		Fine SAND	44
6.3	100		Silt & Clay	7
5	100		<b>Grading Analysis</b>	
2	100		D100	2
1.18	99		D60	0.24
0.600	95		D10	0.07
0.425	90		Uniformity Coefficient	3
0.300	79		<b>Description</b>	
0.212	51	Grey fine and medium SAND with laminae of soft grey clay.		
0.063	7	Moisture content % 23		

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180320021-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 99  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 14-Jun-18

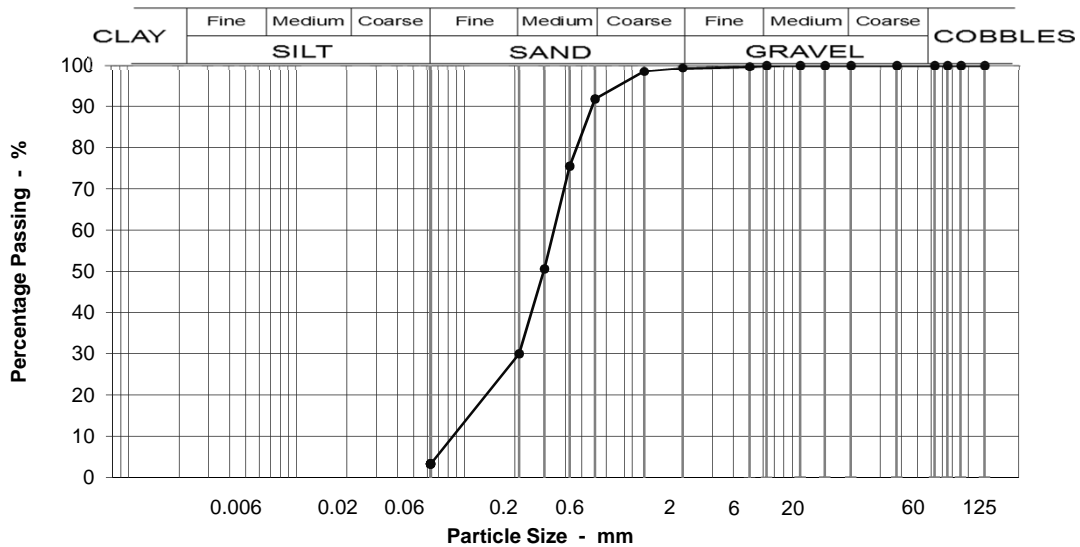
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13A @ 42 - 42.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	92
0.425	75
0.300	51
0.212	30
0.063	3

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	8
Medium SAND	62
Fine SAND	27
Silt & Clay	3

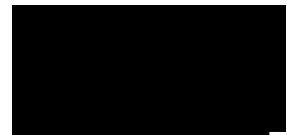
Grading Analysis	
D100	6
D60	0.35
D10	0.10
Uniformity Coefficient	3

Description	
Grey fine and medium SAND with laminae of soft grey clay.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180321003-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 102  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 12-Jun-18

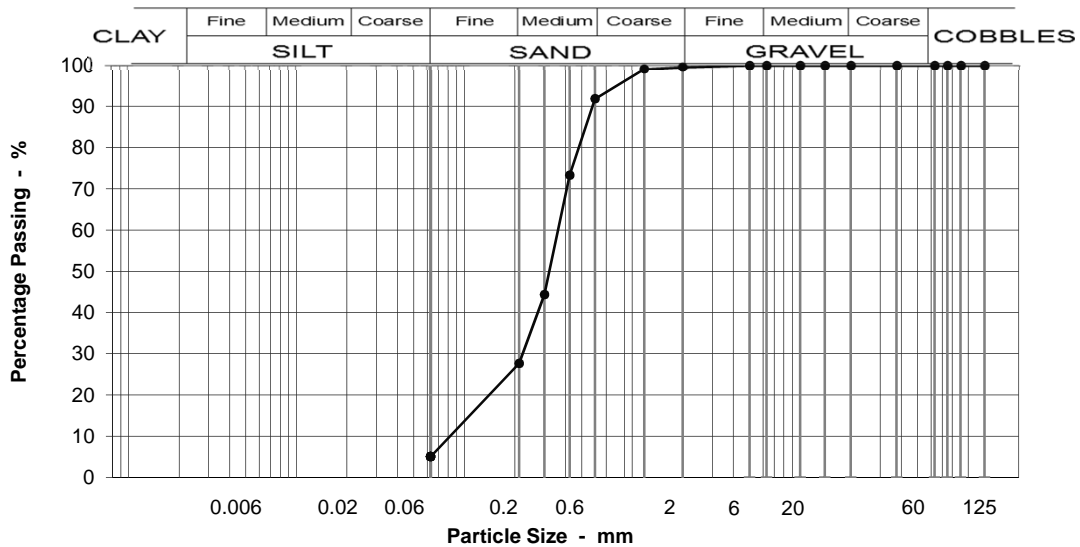
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13A @ 44 - 44.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	92
0.425	73
0.300	44
0.212	28
0.063	5

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	8
Medium SAND	64
Fine SAND	23
Silt & Clay	5

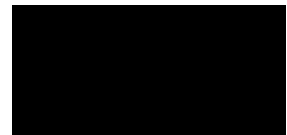
Grading Analysis	
D100	2
D60	0.37
D10	0.10
Uniformity Coefficient	4

Description	
Grey medium SAND with laminae of soft light grey and dark grey CLAY, some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS1180321004-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 103  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 14-Jun-18

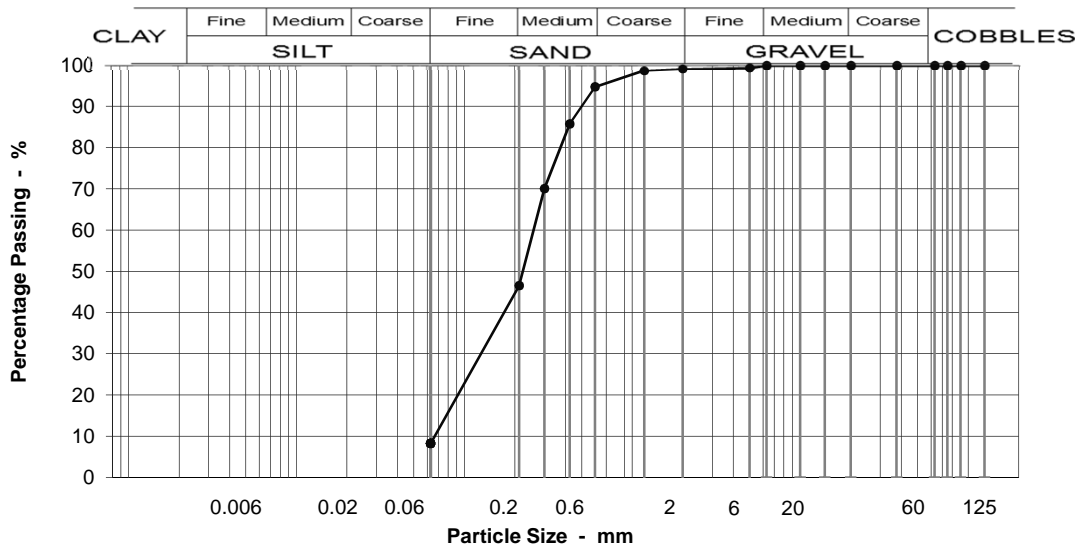
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH13A @ 45 - 45.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



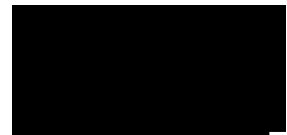
Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	4
14	100		Medium SAND	48
10	100		Fine SAND	38
6.3	100		Silt & Clay	8
5	99		<b>Grading Analysis</b>	
2	99		D100	5
1.18	99		D60	0.26
0.600	95		D10	0.07
0.425	86		Uniformity Coefficient	4
0.300	70		<b>Description</b>	
0.212	47	Grey clayey fine and medium SAND with laminae of black silt. Some shell fragments.		
0.063	8			

**Moisture content %** 23

Test Code = 610



Simon Holden (Project Technician)

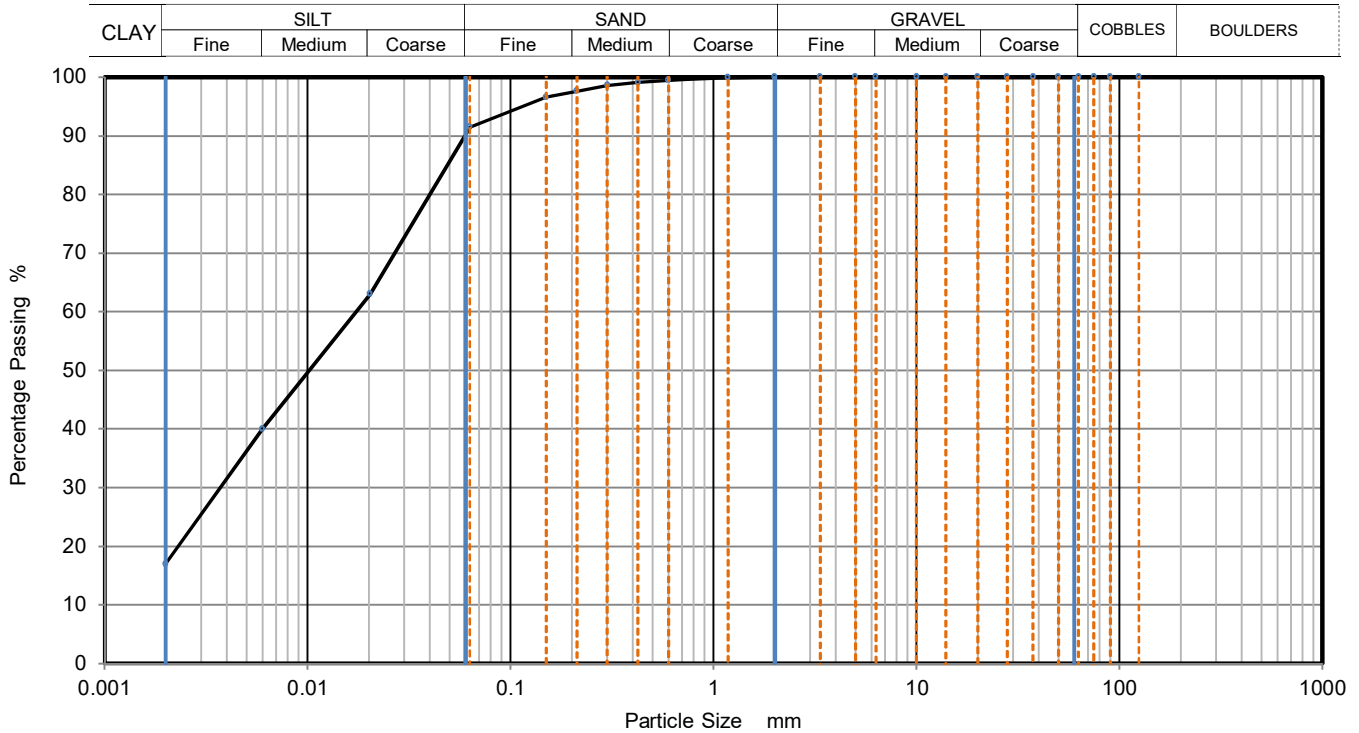




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH13A
Sample Description:	Brown and dark grey slightly sandy very silty CLAY	Sample Depth (m)	45.70
		Sample Reference	B104



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	63
90	100	0.0060	40
75	100	0.0020	17
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	99		
0.212	98		
0.15	97		
0.063	92		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	9
Silt	75
Clay	17

Grading Analysis		
D100	mm	
D60	mm	0.017
D30	mm	0.004
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

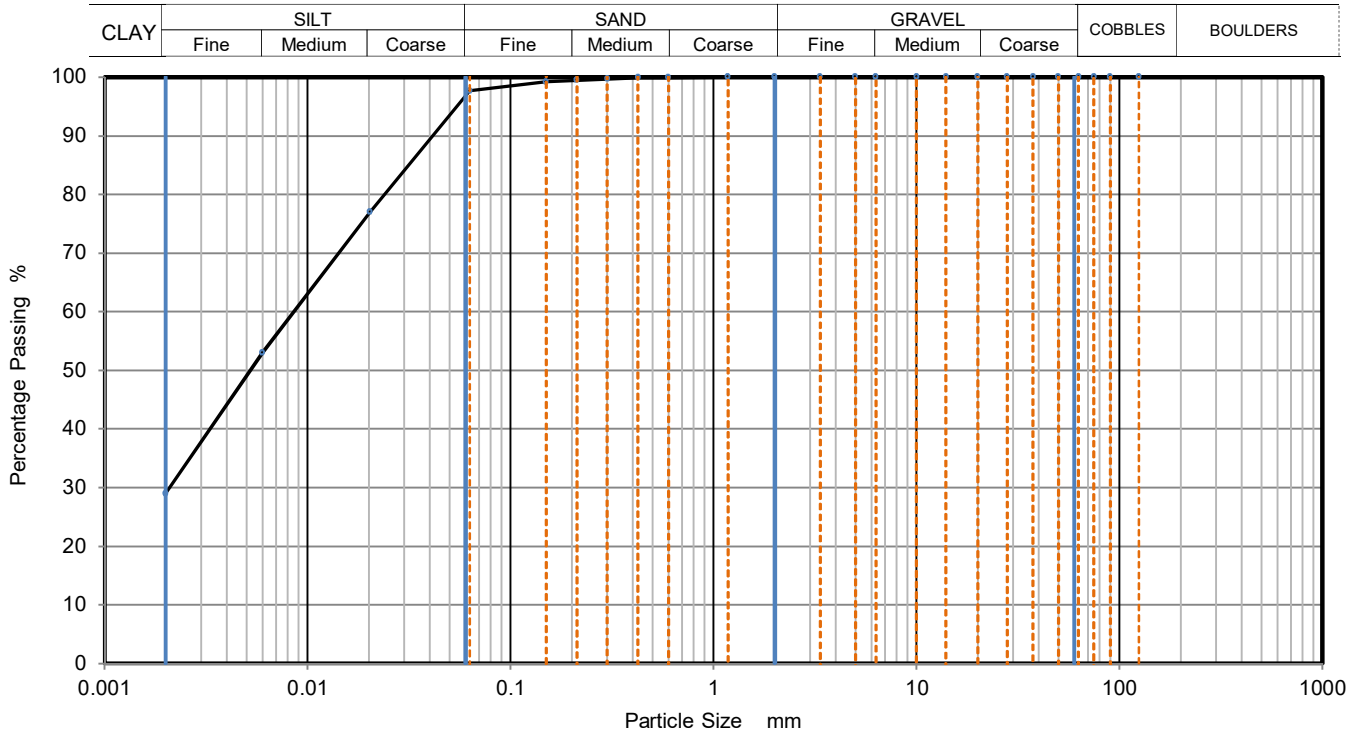
Remarks	Approved	Date	Sheet No.:
	MW	03/07/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH13A
Sample Description:	Dark grey brown slightly sandy very silty CLAY	Sample Depth (m)	46.50
		Sample Reference	B107



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	77
90	100	0.0060	53
75	100	0.0020	29
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	100	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	100		
0.212	100		
0.15	99		
0.063	98		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	2
Silt	69
Clay	29

Grading Analysis		
D100	mm	
D60	mm	0.009
D30	mm	0.002
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks	Approved	Date	Sheet No.:
	MW	03/07/2018	1 of 1

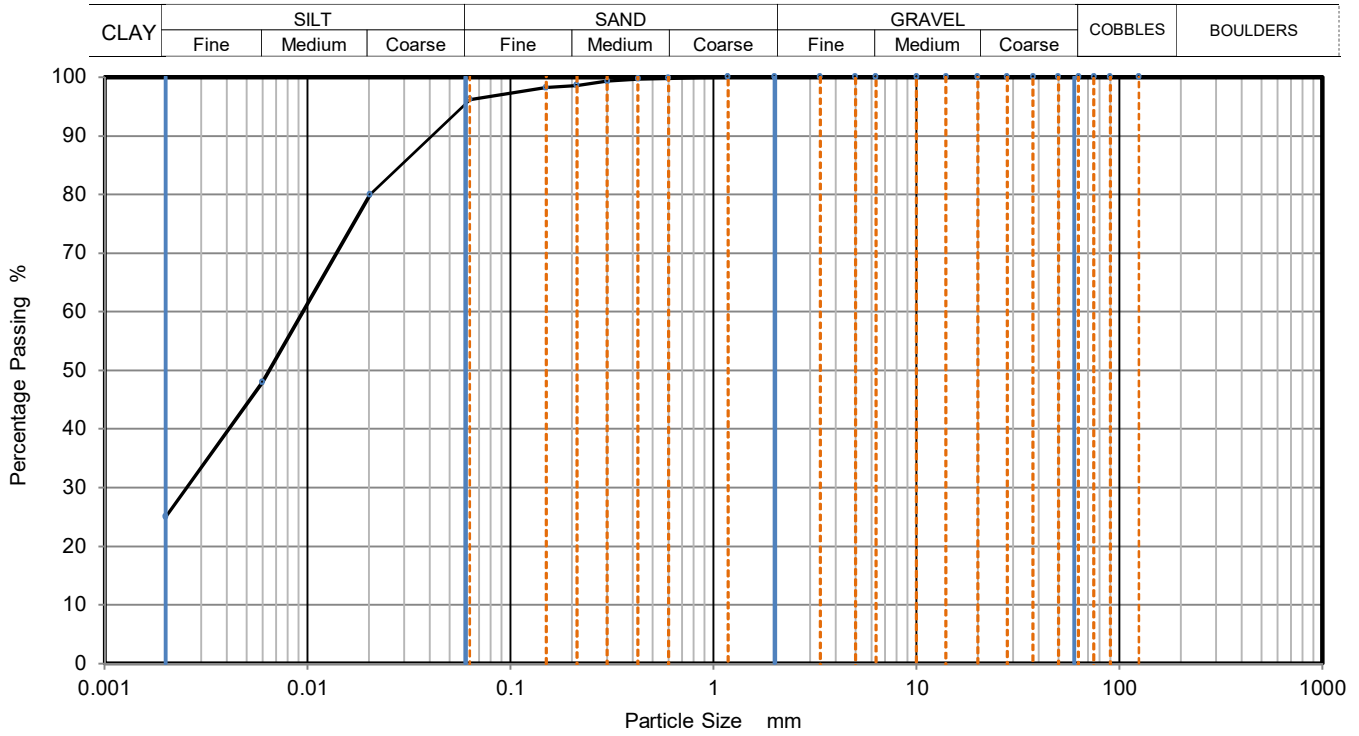




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH13A
Sample Description:	Brown slightly sandy very silty CLAY	Sample Depth (m)	49.00
		Sample Reference	B114



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	80
90	100	0.0060	48
75	100	0.0020	25
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	100	Particle density (assumed) 2.65 Mg/m3	
0.3	99		
0.212	99		
0.15	98		
0.063	96		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	4
Silt	71
Clay	26

Grading Analysis		
D100	mm	
D60	mm	0.010
D30	mm	0.003
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks	Approved	Date	Sheet No.:
	MW	03/07/2018	1 of 1

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201711293-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested **05/12/2017**  
Date Report Issued **12-Jan-18**

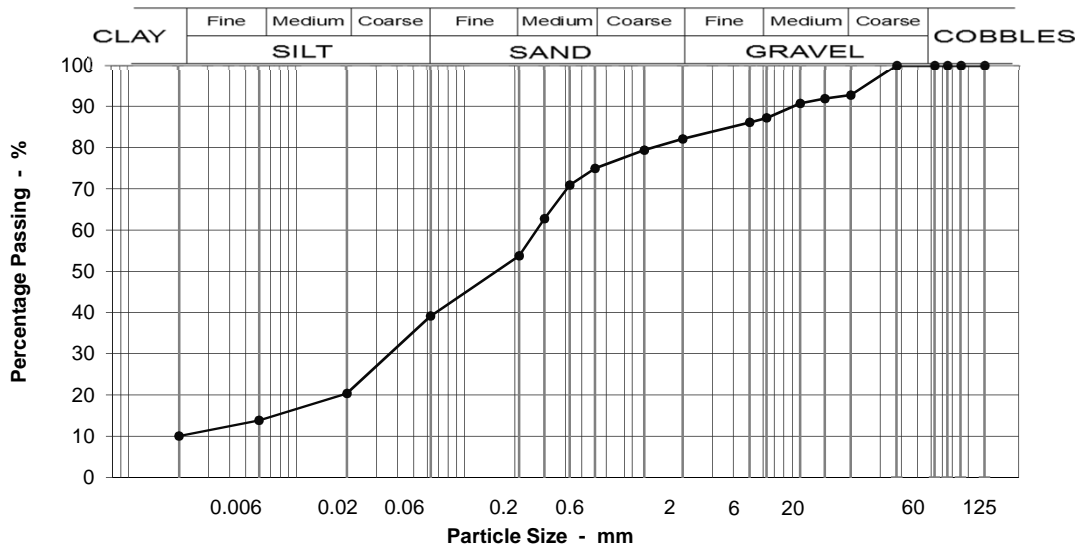
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 @ 0.6 - 1m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	93
14	92
10	91
6.3	87
5	86
2	82
1.18	79
0.600	75
0.425	71
0.300	63
0.212	54
0.063	39
0.020	20
0.006	14
0.002	10

Specification for Highway Works Classification  
Table 6/2

Moisture content % 29

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	7
Medium GRAVEL	6
Fine GRAVEL	5
Coarse SAND	7
Medium SAND	21
Fine SAND	15
Silt & Clay	39

Grading Analysis	
D100	20
D60	0.27
D10	0.00
Uniformity Coefficient	>10*

**Description**  
MADE GROUND comprising fine to coarse concrete, wood, flint and brick in a matrix of orangey brown and dark grey, clayey, silty sand.

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)

## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

**Gt Yarmouth 3rd River Crossing**  
 Community & Environmental Services  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL201711294-612

**Your Sample Ref** D9

**Your Project or Order No** PZ1522

**Date Report Issued** 03-Jan-18

**Date Tested** 15-Dec-17

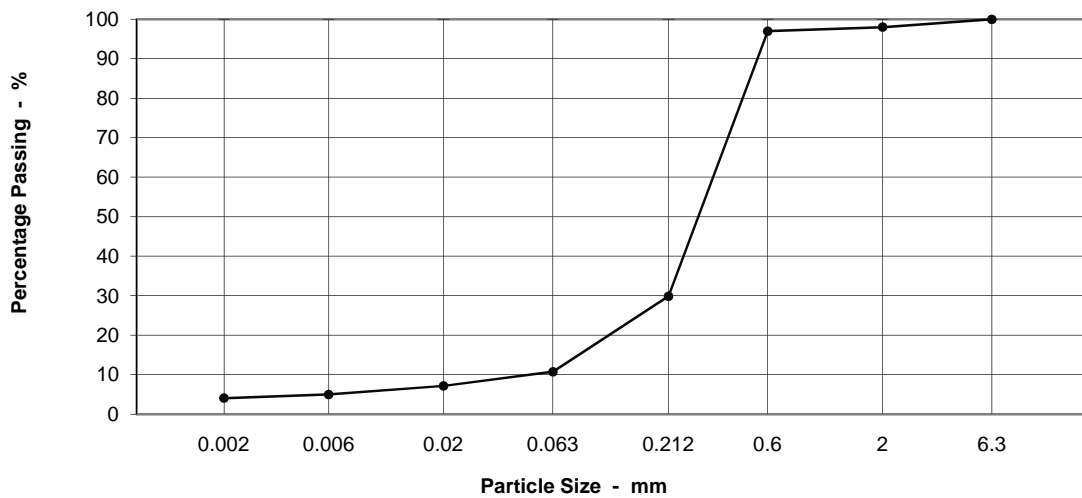
Page 1 of 1

### Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH14 D9 3.8m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	1	Dark greyish brown, clayey, silty, fine and medium SAND, weathering to brown.
2.0	98	Medium SAND	67	
0.6	97	Fine SAND	19	
0.212	30	Coarse SILT	4	
0.063	11	Medium SILT	2	
0.02	7	Fine SILT	1	
0.006	5	CLAY	4	
0.002	4	Moisture content	22	

Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201710115-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **12**  
Your Project or Order No. **PZ1522**  
Date Tested **19/10/2017**  
Date Report Issued **21-Nov-17**

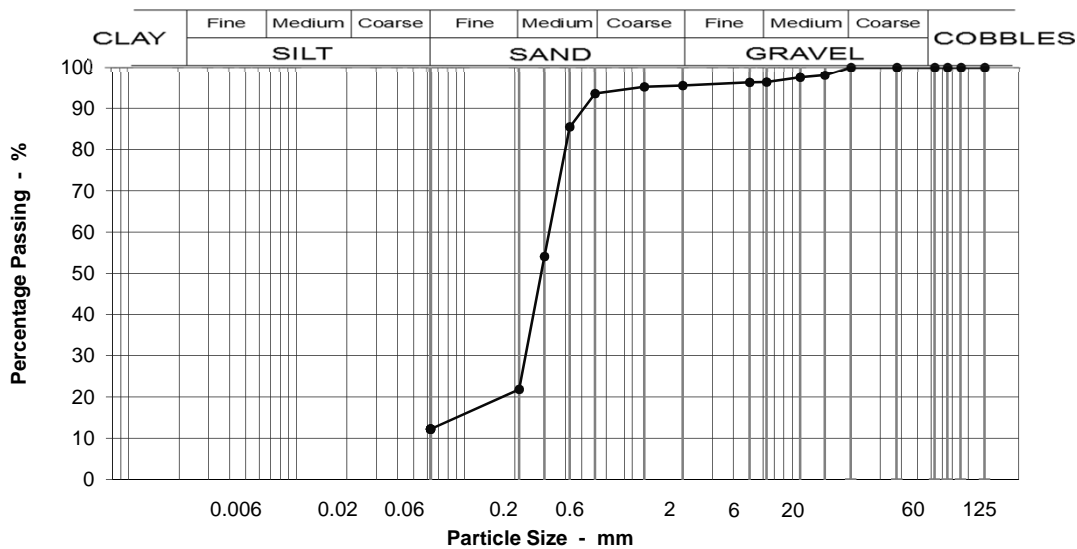
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 @ 5.6 - 6.1m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	98
6.3	96
5	96
2	96
1.18	95
0.600	94
0.425	85
0.300	54
0.212	22
0.063	12

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	4
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	72
Fine SAND	10
Silt & Clay	12

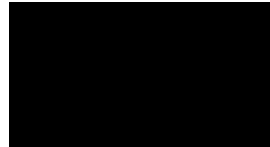
Grading Analysis	
D100	14
D60	0.32
D10	0.09
Uniformity Coefficient	4

**Description**  
Brown, silty, slightly gravelly, fine, medium and coarse SAND. Gravel is sub-angular, medium flint.

Test Code = 610



Peter Hardiment (Operations Manager)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201711295-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **14**  
Your Project or Order No. **PZ1522**  
Date Tested **05/12/2017**  
Date Report Issued **9-Jan-18**

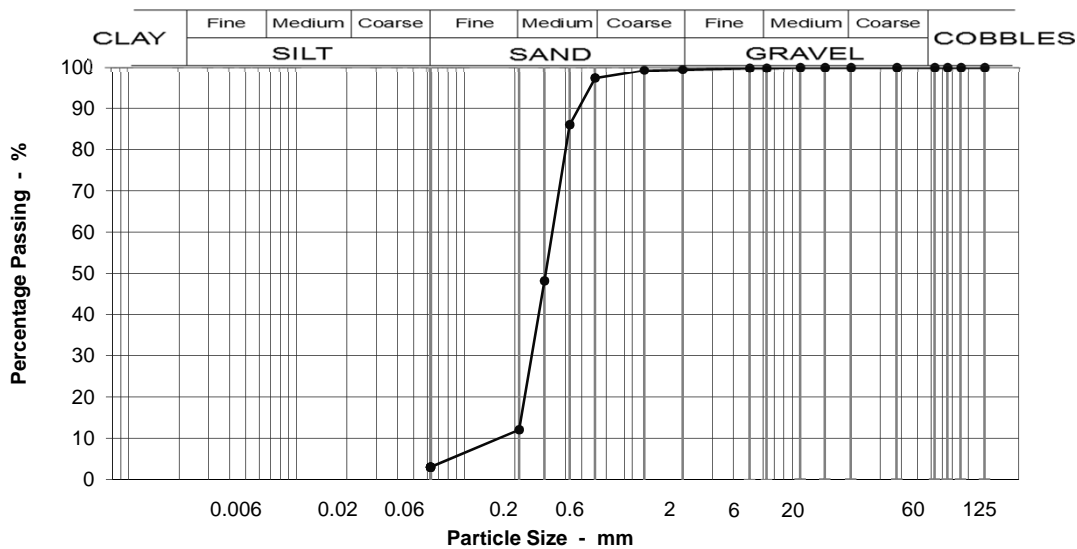
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 @ 6.6 - 7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	86
0.300	48
0.212	12
0.063	3

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	85
Fine SAND	9
Silt & Clay	3

Grading Analysis	
D100	6
D60	0.34
D10	0.18
Uniformity Coefficient	2

**Description**  
Yellowish brown medium SAND.

Moisture content % 22

Test Code = 610



Simon Holden (Project Technician)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201710116-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **20**  
Your Project or Order No. **PZ1522**  
Date Tested **19/10/2017**  
Date Report Issued **21-Nov-17**

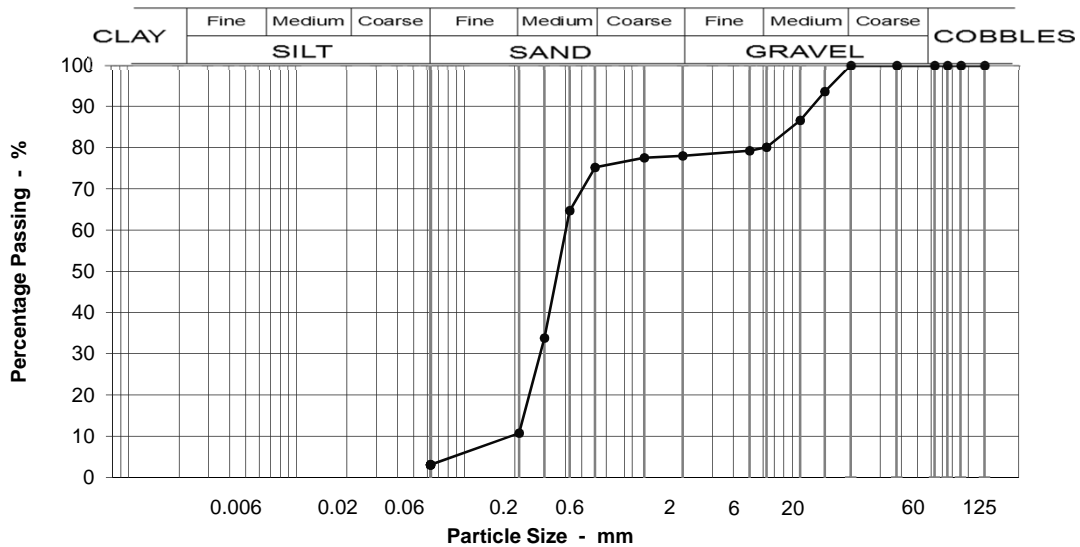
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 @ 9.7 - 10m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	94
10	87
6.3	80
5	79
2	78
1.18	77
0.600	75
0.425	65
0.300	34
0.212	11
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	20
Fine GRAVEL	2
Coarse SAND	3
Medium SAND	64
Fine SAND	8
Silt & Clay	3

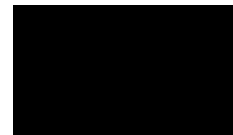
Grading Analysis	
D100	14
D60	0.41
D10	0.20
Uniformity Coefficient	2

Description	
Dark grey and brown, silty, fine, medium and coarse, gravelly SAND. Gravel is fine and medium, sub-angular to sub-rounded, flint.	

Test Code = 610



Peter Hardiment (Operations Manager)





CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201710117-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **23**  
Your Project or Order No. **PZ1522**  
Date Tested **19/10/2017**  
Date Report Issued **21-Nov-17**

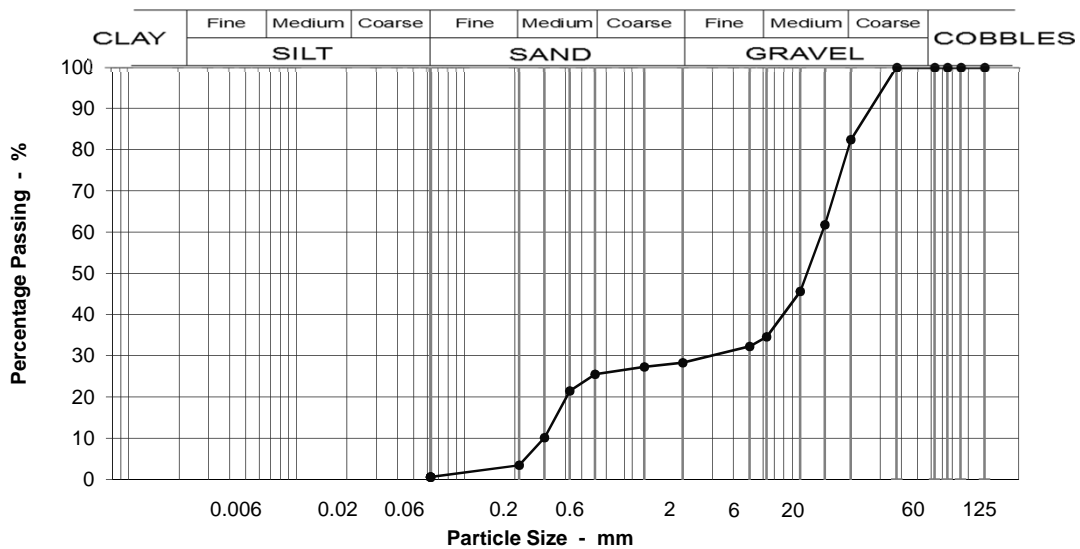
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 @ 10.9m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	82
14	62
10	46
6.3	35
5	32
2	28
1.18	27
0.600	26
0.425	21
0.300	10
0.212	3
0.063	1

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 4.2

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	18
Medium GRAVEL	48
Fine GRAVEL	6
Coarse SAND	3
Medium SAND	22
Fine SAND	3
Silt & Clay	1

Grading Analysis	
D100	20
D60	13.57
D10	0.30
Uniformity Coefficient	46

**Description**  
Dark grey and brown, very sandy, fine, medium and coarse GRAVEL. Gravel is sub-rounded to sub-angular flint.

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201710118-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **27**  
Your Project or Order No. **PZ1522**  
Date Tested **19/10/2017**  
Date Report Issued **21-Nov-17**

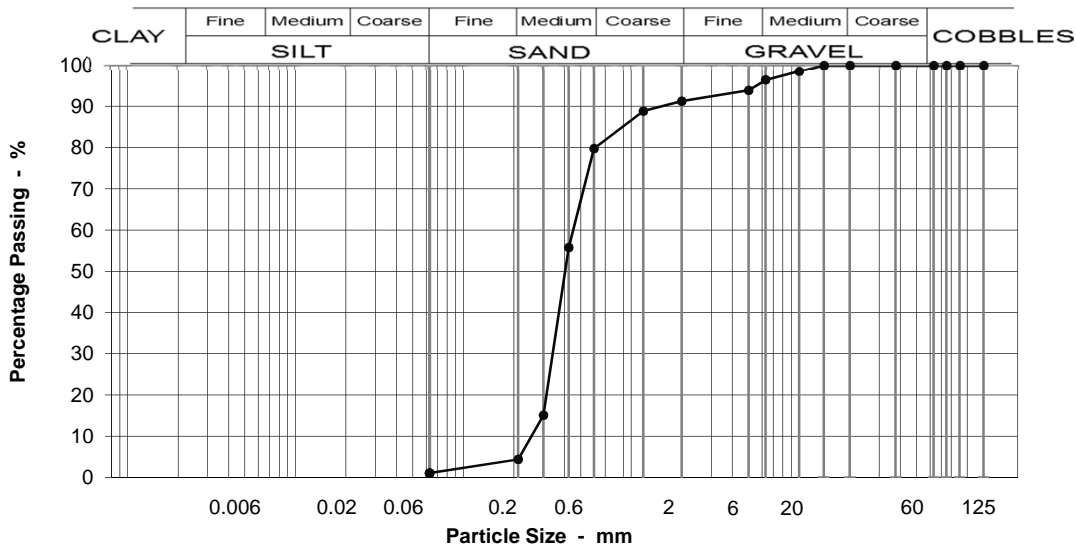
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 @ 12.6 - 13.1m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	96
5	94
2	91
1.18	89
0.600	80
0.425	56
0.300	15
0.212	4
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 11

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	4
Fine GRAVEL	5
Coarse SAND	11
Medium SAND	75
Fine SAND	3
Silt & Clay	1

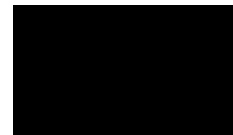
Grading Analysis	
D100	10
D60	0.46
D10	0.26
Uniformity Coefficient	2

Description	
Dark yellowish brown, gravelly, fine, medium and coarse SAND. Gravel is fine and medium, sub-rounded to sub-angular, flint, quartz and limestone.	

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201710119-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **31**  
Your Project or Order No. **PZ1522**  
Date Tested **20/10/2017**  
Date Report Issued **21-Nov-17**

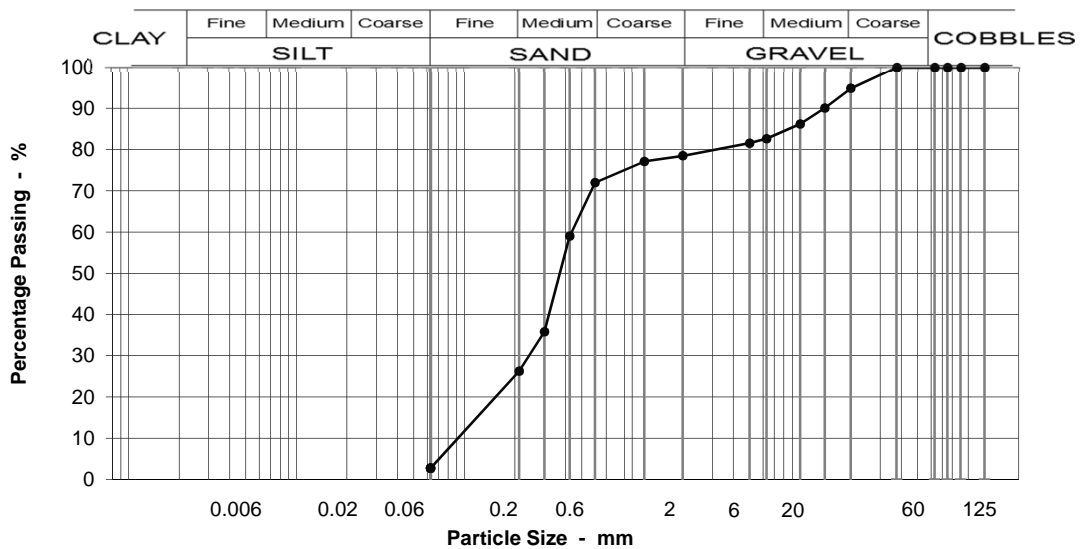
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 @ 14.7 - 15m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	95
14	90
10	86
6.3	83
5	82
2	78
1.18	77
0.600	72
0.425	59
0.300	36
0.212	26
0.063	3

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	5
Medium GRAVEL	12
Fine GRAVEL	4
Coarse SAND	7
Medium SAND	46
Fine SAND	23
Silt & Clay	3

Grading Analysis	
D100	20
D60	0.44
D10	0.11
Uniformity Coefficient	4

**Description**  
Dark yellowish brown, very gravelly, slightly clayey, fine, medium and coarse SAND. Gravel is fine, medium and coarse, sub-rounded to sub-angular, flint, quartz and limestone.

Moisture content % 17

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017101110-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **35**  
Your Project or Order No. **PZ1522**  
Date Tested **19/10/2017**  
Date Report Issued **21-Nov-17**

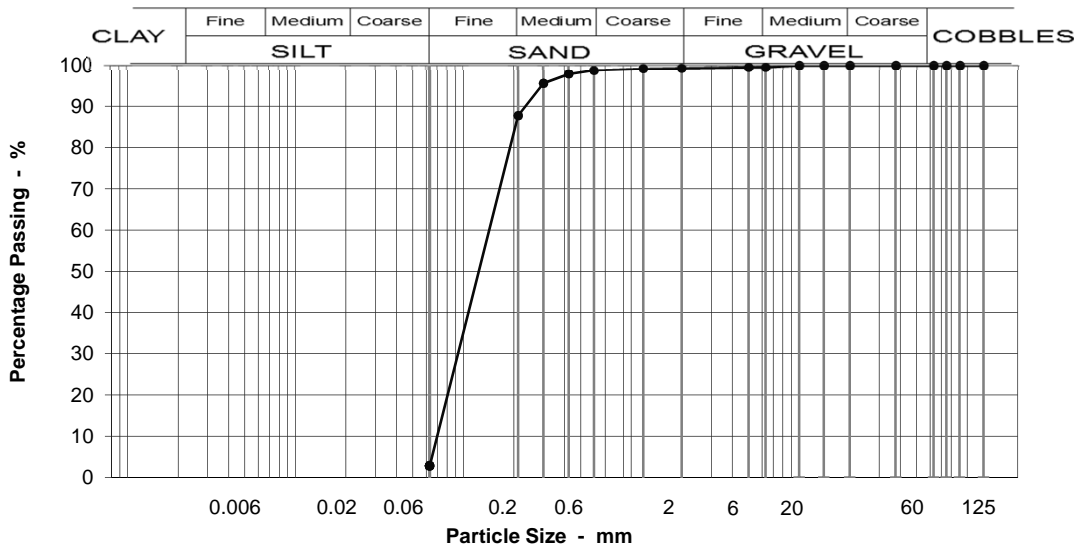
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 @ 16.6 - 17m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	99
0.425	98
0.300	96
0.212	88
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	11
Fine SAND	85
Silt & Clay	3

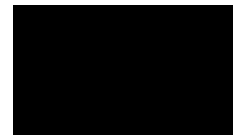
Grading Analysis	
D100	6
D60	0.16
D10	0.08
Uniformity Coefficient	2

Description	
Light yellowish brown, slightly silty, fine and medium SAND.	

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017101111-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 41  
**Your Project or Order No.** PZ1522  
**Date Tested** 19/10/2017  
**Date Report Issued** 21-Nov-17

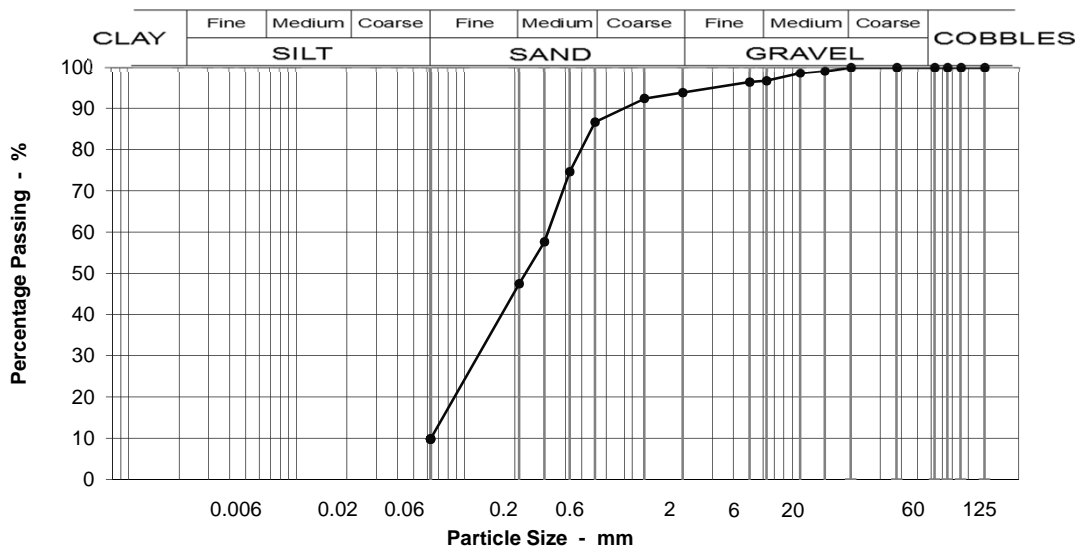
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH14 @ 19.6 - 20m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	99
6.3	97
5	96
2	94
1.18	92
0.600	87
0.425	75
0.300	58
0.212	47
0.063	10

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	3
Coarse SAND	7
Medium SAND	39
Fine SAND	38
Silt & Clay	10

Grading Analysis	
D100	14
D60	0.32
D10	0.06
Uniformity Coefficient	5

**Description**  
Greyish brown, slightly gravelly, fine, medium and coarse SAND with lenses of soft, light grey CLAY.

**Moisture content %** 24

Test Code = 610



Peter Hardiment (Operations Manager)



## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

### Great Yarmouth Third River Crossing

Norfolk County Council  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

Our Project No PZ1522D1

Our Report and sample No NCCL201710113-612

Your Sample Ref B43

Your Project or Order No PZ1522

Date Report Issued 28-Nov-17

Date Tested 25-Oct-17

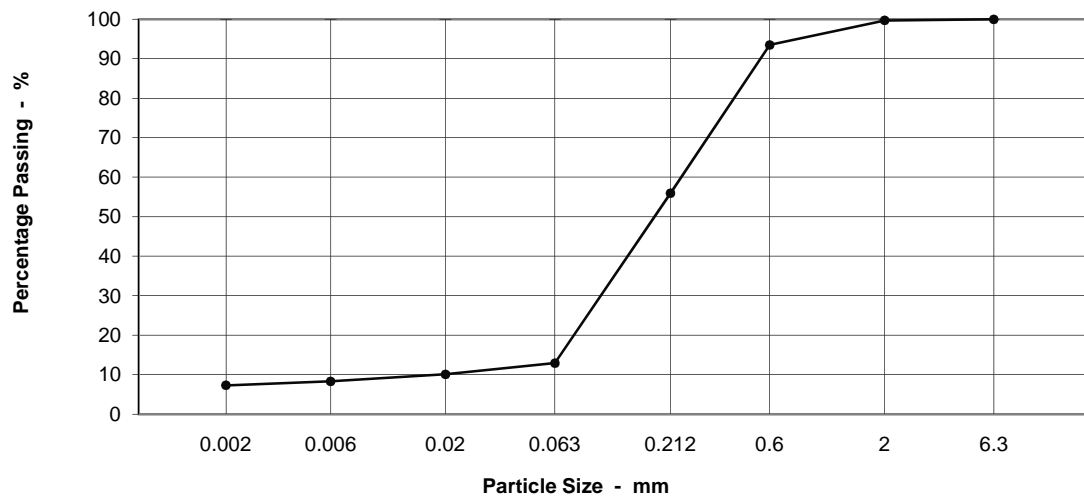
Page 1 of 1

## Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 B43 21m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	6	Greyish brown, clayey, silty, fine, medium and coarse SAND, with occasional fine, sub-rounded flint gravel.
2.0	100	Medium SAND	38	
0.6	93	Fine SAND	43	
0.212	56	Coarse SILT	3	
0.063	13	Medium SILT	2	
0.02	10	Fine SILT	1	
0.006	8	CLAY	7	
0.002	7	Moisture content	27	

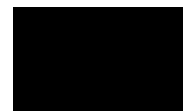
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)





CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017101112-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 45  
**Your Project or Order No.** PZ1522  
**Date Tested** 19/10/2017  
**Date Report Issued** 21-Nov-17

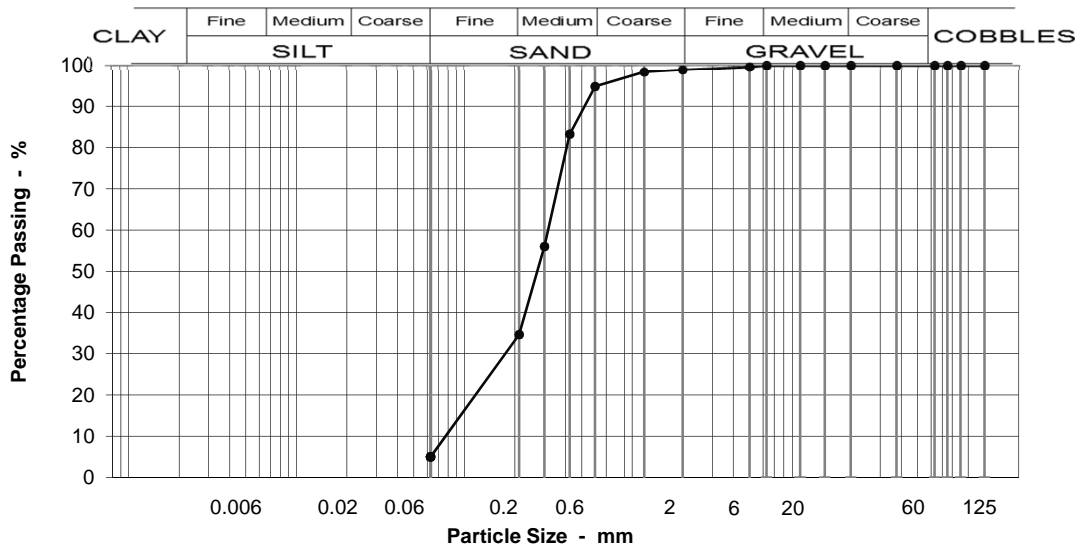
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 @ 23 - 23.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	95
0.425	83
0.300	56
0.212	35
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	60
Fine SAND	30
Silt & Clay	5

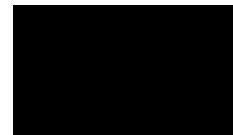
Grading Analysis	
D100	5
D60	0.32
D10	0.09
Uniformity Coefficient	4

Description	
Light yellowish grey, silty, fine, medium and coarse SAND.	

Test Code = 610



Peter Hardiment (Operations Manager)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201711296-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 49  
Your Project or Order No. PZ1522  
Date Tested 06/12/2017  
Date Report Issued 12-Jan-18

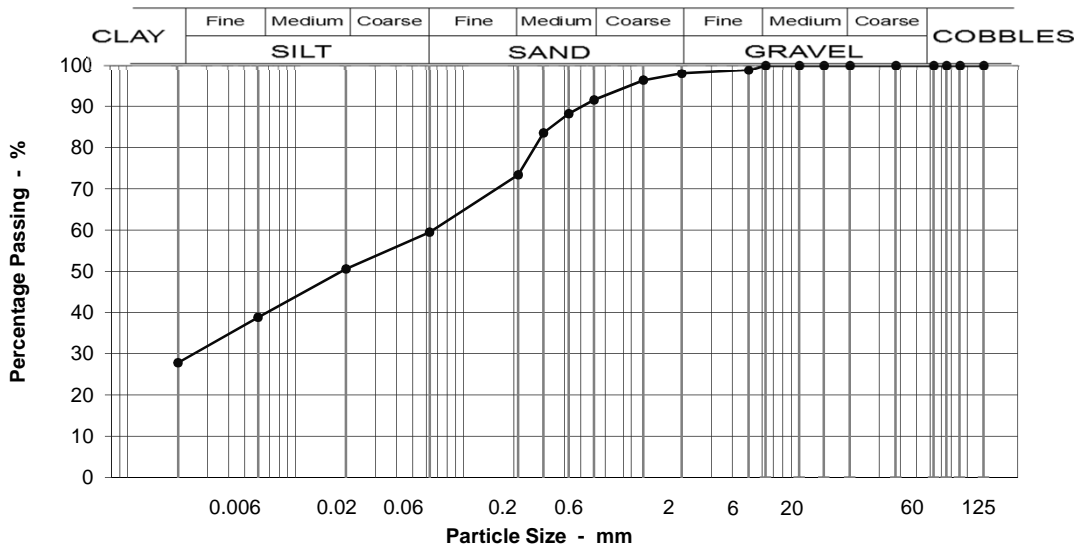
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 @ 27.5 - 28m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	98
1.18	96
0.600	92
0.425	88
0.300	84
0.212	73
0.063	59
0.020	51
0.006	39
0.002	28

Specification for Highway Works Classification  
Table 6/2

Moisture content % 34

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	6
Medium SAND	18
Fine SAND	14
Silt & Clay	59

Grading Analysis	
D100	5
D60	0.07
D10	0.00
Uniformity Coefficient	>10*

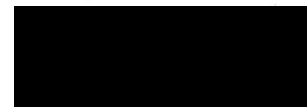
Description	
Firm, laminated, light greyish brown, very clayey, very sandy SILT.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



**Norfolk Partnership Laboratory**

 Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)
**Gt Yarmouth 3rd River Crossing**  
 CES Highways Projects  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL201710114-612

**Your Sample Ref** D51

**Your Project or Order No** PZ1522

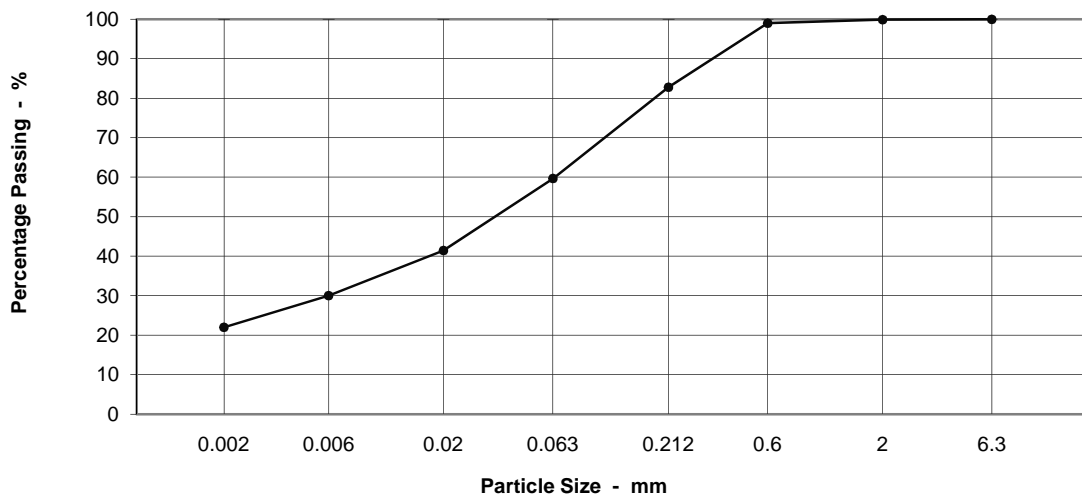
**Date Report Issued** 21-Nov-17

**Date Tested** 31-Oct-17

Page 1 of 1

**Particle Size Distribution to BS 1377 : Part 2 : 1990**  
**Sedimentation Method Section 9.4**
**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH14 D51 31m

**Particle Size Distribution**


Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	1	Firm light grey, very clayey, very silty, fine, medium and coarse SAND with a trace of shell fragments.
2.0	100	Medium SAND	16	
0.6	99	Fine SAND	23	
0.212	83	Coarse SILT	18	
0.063	60	Medium SILT	11	
0.02	41	Fine SILT	8	
0.006	30	CLAY	22	
0.002	22	Moisture content	21	

Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



**Norfolk Partnership Laboratory**

 Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)
**Gt Yarmouth 3rd River Crossing**  
 Community & Environmental Services  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL201710114-612

**Your Sample Ref** D51

**Your Project or Order No** PZ1522

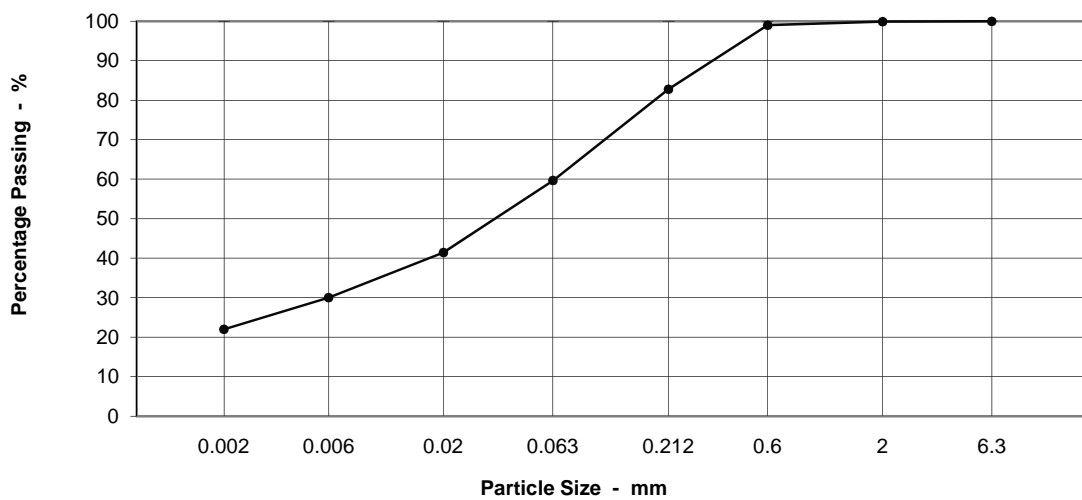
**Date Report Issued** 12-Jan-18

**Date Tested** 31-Oct-17

Page 1 of 1

**Particle Size Distribution to BS 1377 : Part 2 : 1990**  
**Sedimentation Method Section 9.4**
**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH14 D51 31.45m

**Particle Size Distribution**


Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	1	Firm light grey, very clayey, very silty, fine, medium and coarse SAND with a trace of shell fragments.
2.0	100	Medium SAND	16	
0.6	99	Fine SAND	23	
0.212	83	Coarse SILT	18	
0.063	60	Medium SILT	11	
0.02	41	Fine SILT	8	
0.006	30	CLAY	22	
0.002	22	Moisture content	21	

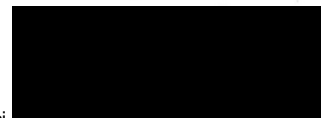
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state". Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out. Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Simon Holden (Project Technici



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017101113-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **57**  
Your Project or Order No. **PZ1522**  
Date Tested **19/10/2017**  
Date Report Issued **21-Nov-17**

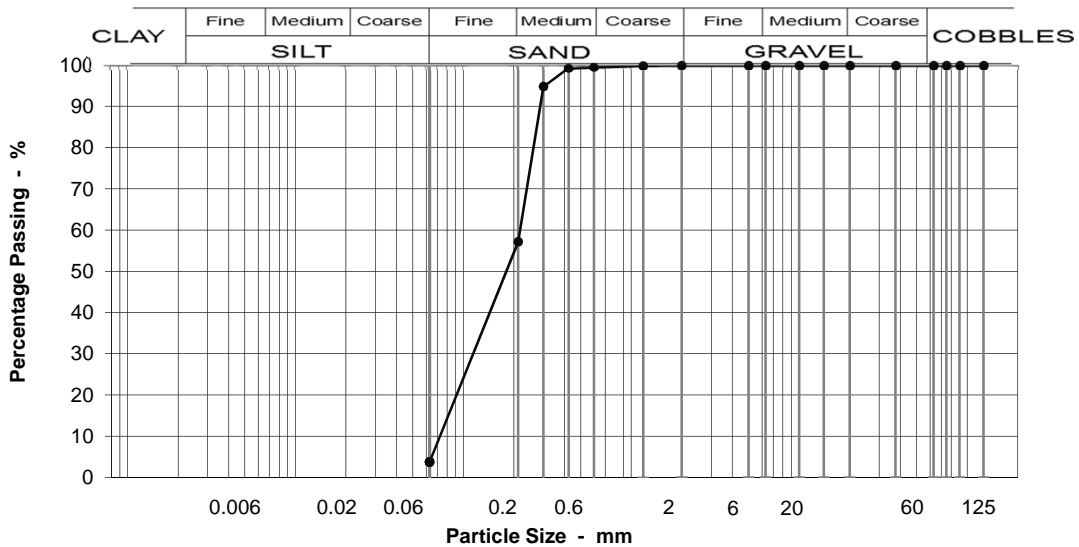
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH14 @ 36 - 36.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	99
0.300	95
0.212	57
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	42
Fine SAND	53
Silt & Clay	4

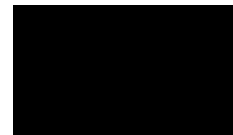
Grading Analysis	
D100	1
D60	0.22
D10	0.08
Uniformity Coefficient	3

**Description**  
Brownish grey, slightly silty, fine and medium SAND.

Test Code = 610



Peter Hardiment (Operations Manager)

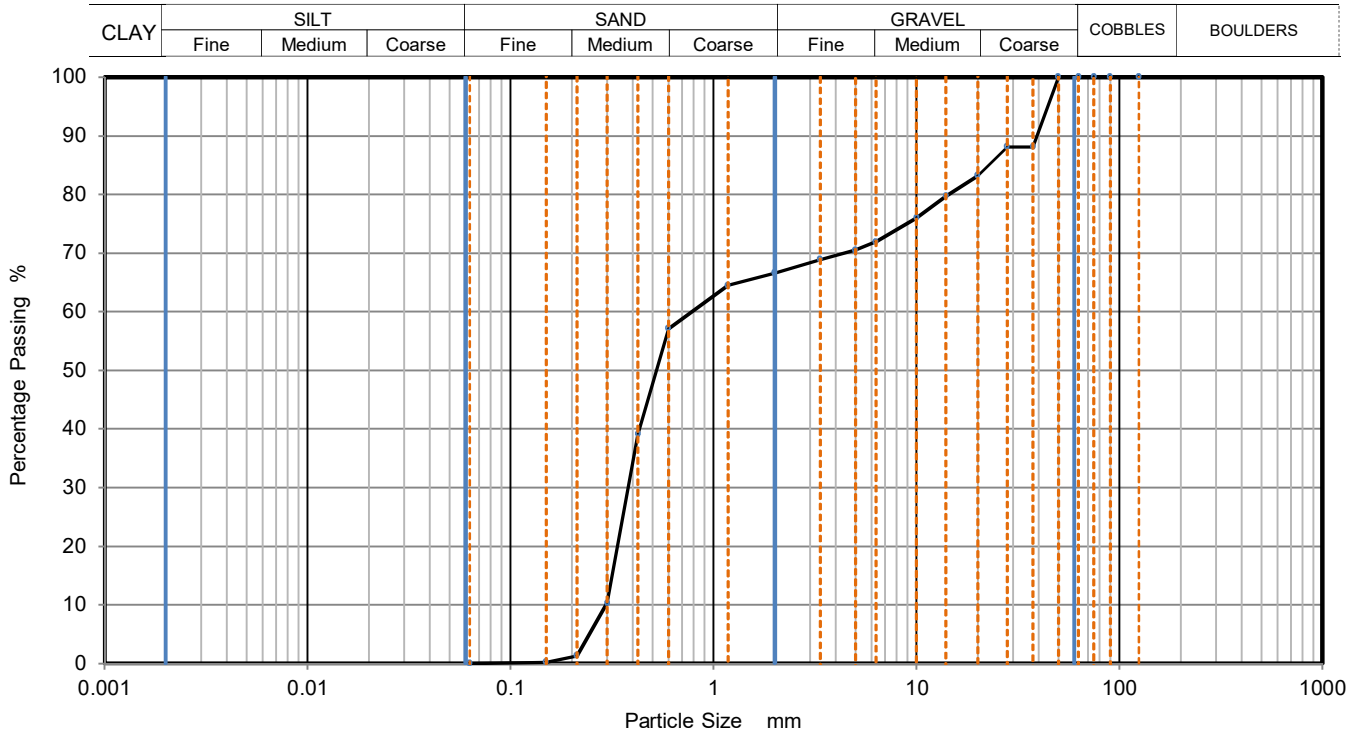




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Light brown very gravelly SAND. Gravel is of flint	Sample Depth (m)	0.40
		Sample Reference	B1



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	88		
28	88		
20	83		
14	80		
10	76		
6.3	72		
5	71		
3.35	69		
2	67		
1.18	65		
0.6	57		
0.425	39		
0.3	10		
0.212	1		
0.15	0		
0.063	0		

Sample Proportions	% dry mass
Very coarse	0
Gravel	33
Sand	67
Fines <0.063mm	0

Grading Analysis		
D100	mm	
D60	mm	0.781
D30	mm	0.381
D10	mm	0.296
Uniformity Coefficient		2.6
Curvature Coefficient		0.63

Remarks	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1

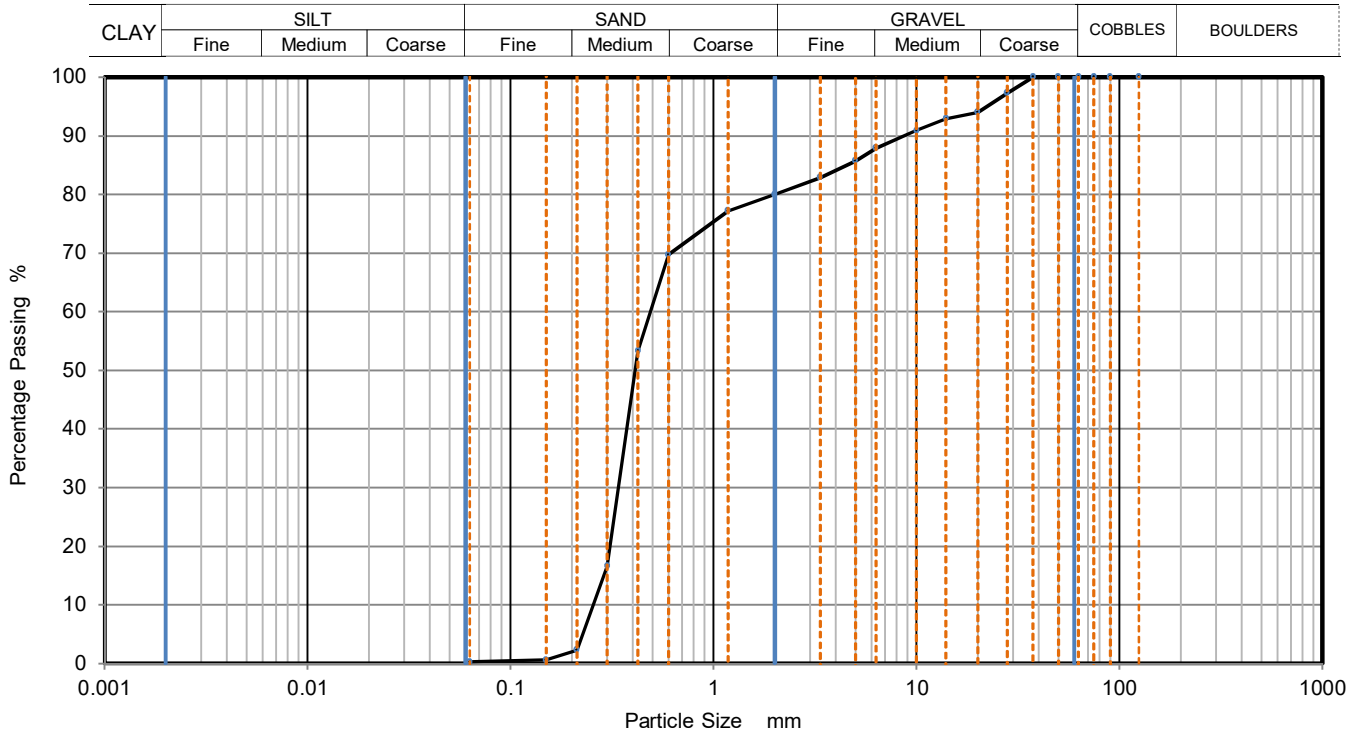




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Light grey very gravelly SAND. Gravel is of flint and quartzite	Sample Depth (m)	1.00
		Sample Reference	B3



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	97		
20	94		
14	93		
10	91		
6.3	88		
5	86		
3.35	83		
2	80		
1.18	77		
0.6	70		
0.425	53		
0.3	17		
0.212	2		
0.15	1		
0.063	0		

Sample Proportions	% dry mass
Very coarse	0
Gravel	20
Sand	80
Fines <0.063mm	0

Grading Analysis		
D100	mm	
D60	mm	0.489
D30	mm	0.341
D10	mm	0.255
Uniformity Coefficient		1.9
Curvature Coefficient		0.93

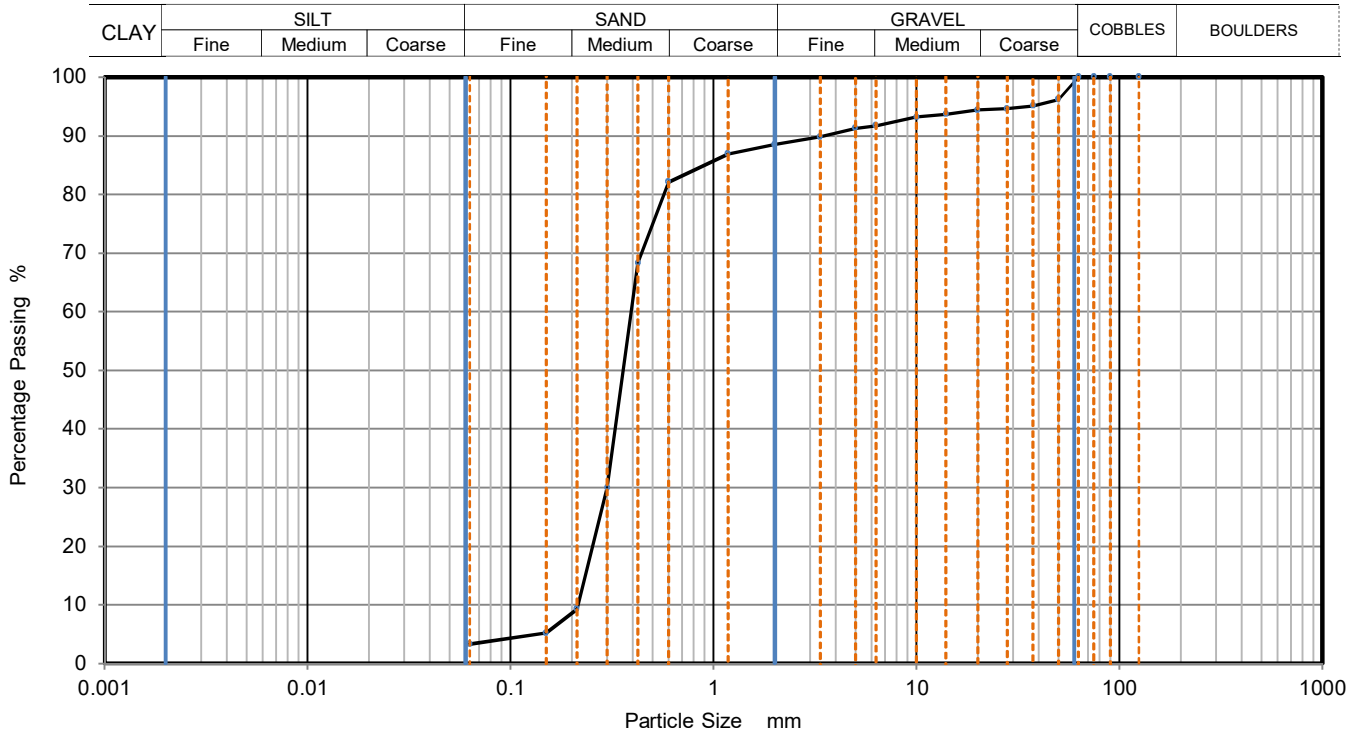
Remarks	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Brown slightly silty gravelly SAND. Gravel is of flint	Sample Depth (m)	1.20
		Sample Reference	B6



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	96		
37.5	95		
28	95		
20	94		
14	94		
10	93		
6.3	92		
5	91		
3.35	90		
2	89		
1.18	87		
0.6	82		
0.425	68		
0.3	30		
0.212	9		
0.15	5		
0.063	3		

Sample Proportions	% dry mass
Very coarse	0
Gravel	12
Sand	85
Fines <0.063mm	3

Grading Analysis		
D100	mm	
D60	mm	0.394
D30	mm	0.300
D10	mm	0.214
Uniformity Coefficient		1.8
Curvature Coefficient		1.1

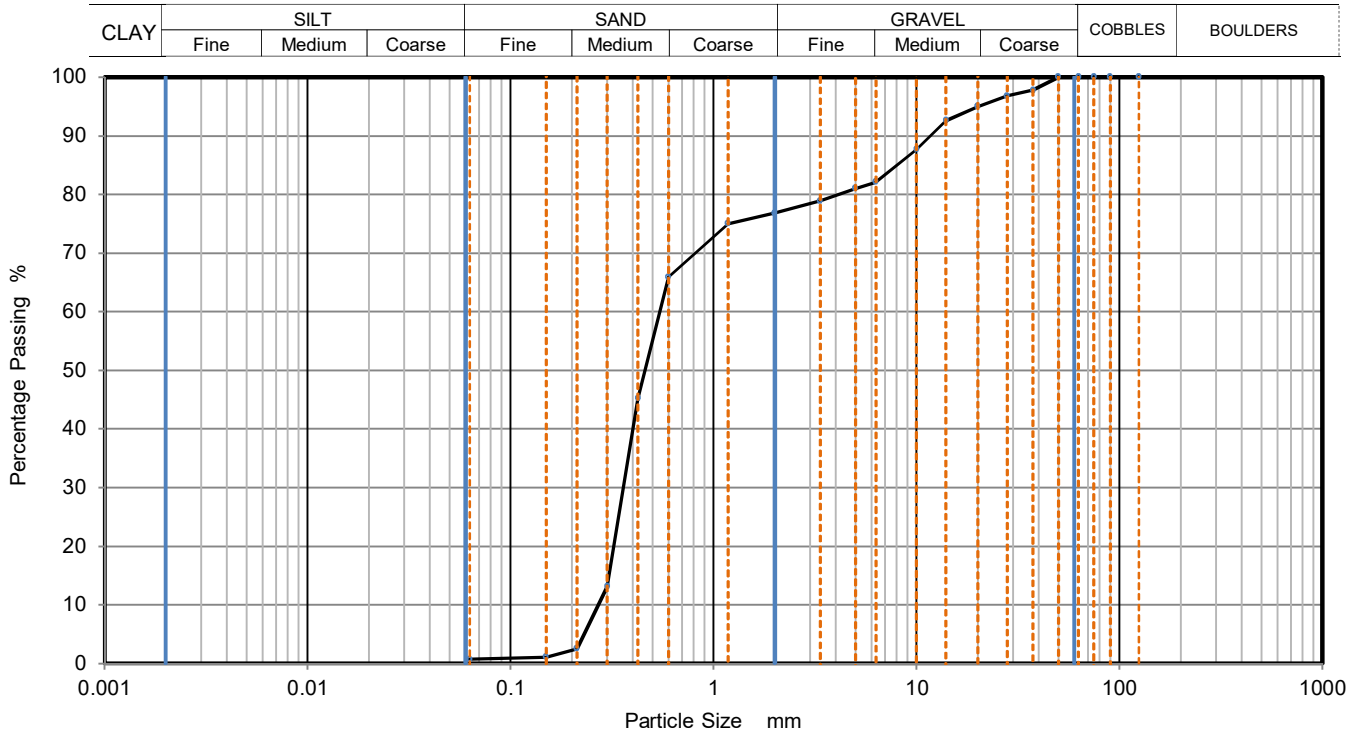
Remarks	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Brown slightly silty very gravelly SAND. Gravel is of flint and quartzite	Sample Depth (m)	2.00
		Sample Reference	B9



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	98		
28	97		
20	95		
14	93		
10	88		
6.3	82		
5	81		
3.35	79		
2	77		
1.18	75		
0.6	66		
0.425	45		
0.3	13		
0.212	3		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0
Gravel	23
Sand	76
Fines <0.063mm	1

Grading Analysis		
D100	mm	
D60	mm	0.544
D30	mm	0.360
D10	mm	0.271
Uniformity Coefficient		2
Curvature Coefficient		0.88

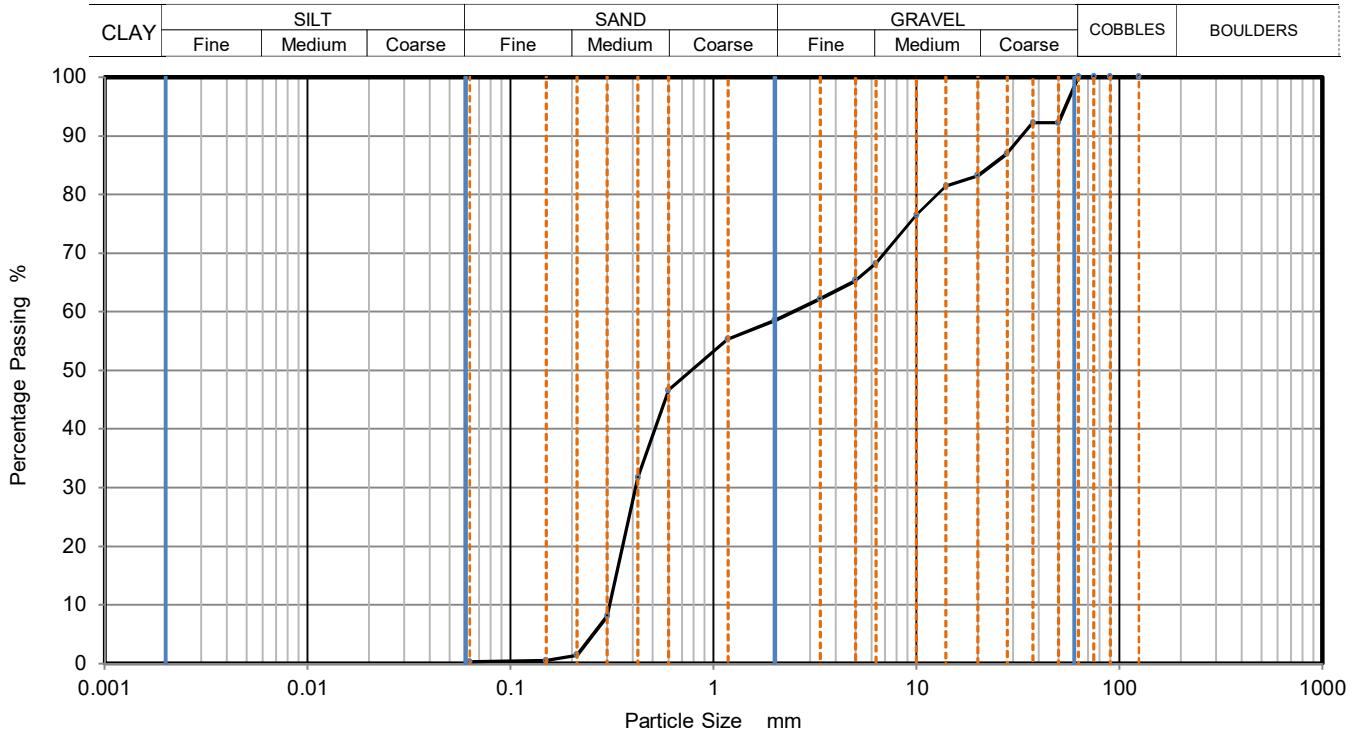
Remarks	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Light brown very gravelly SAND. Gravel is of flint and quartzite	Sample Depth (m)	4.00
		Sample Reference	B15



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	92		
37.5	92		
28	87		
20	83		
14	81		
10	77		
6.3	68		
5	65		
3.35	62		
2	59		
1.18	55		
0.6	47		
0.425	32		
0.3	8		
0.212	1		
0.15	1		
0.063	0		

Sample Proportions	% dry mass
Very coarse	0
Gravel	42
Sand	58
Fines <0.063mm	0

Grading Analysis		
D100	mm	
D60	mm	2.470
D30	mm	0.414
D10	mm	0.308
Uniformity Coefficient		8
Curvature Coefficient		0.23

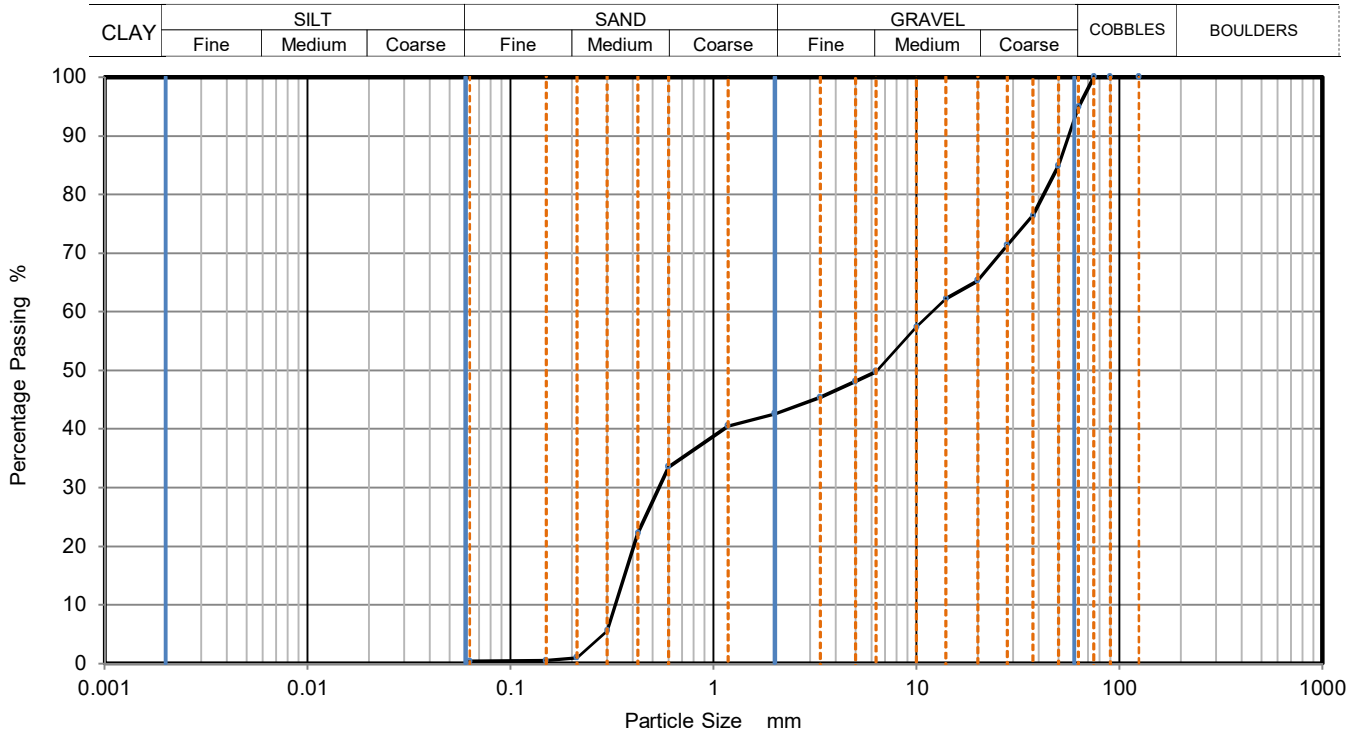
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Brown very sandy GRAVEL with low cobble content. Cobbles are of flint. Gravel is of flint and quartzite	Sample Depth (m)	5.00
		Sample Reference	B18



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	95		
50	85		
37.5	76		
28	71		
20	65		
14	62		
10	57		
6.3	50		
5	48		
3.35	45		
2	43		
1.18	41		
0.6	34		
0.425	22		
0.3	6		
0.212	1		
0.15	1		
0.063	0		

Sample Proportions	% dry mass
Very coarse	5
Gravel	52
Sand	42
Fines <0.063mm	0

Grading Analysis		
D100	mm	
D60	mm	12.000
D30	mm	0.540
D10	mm	0.329
Uniformity Coefficient		36
Curvature Coefficient		0.074

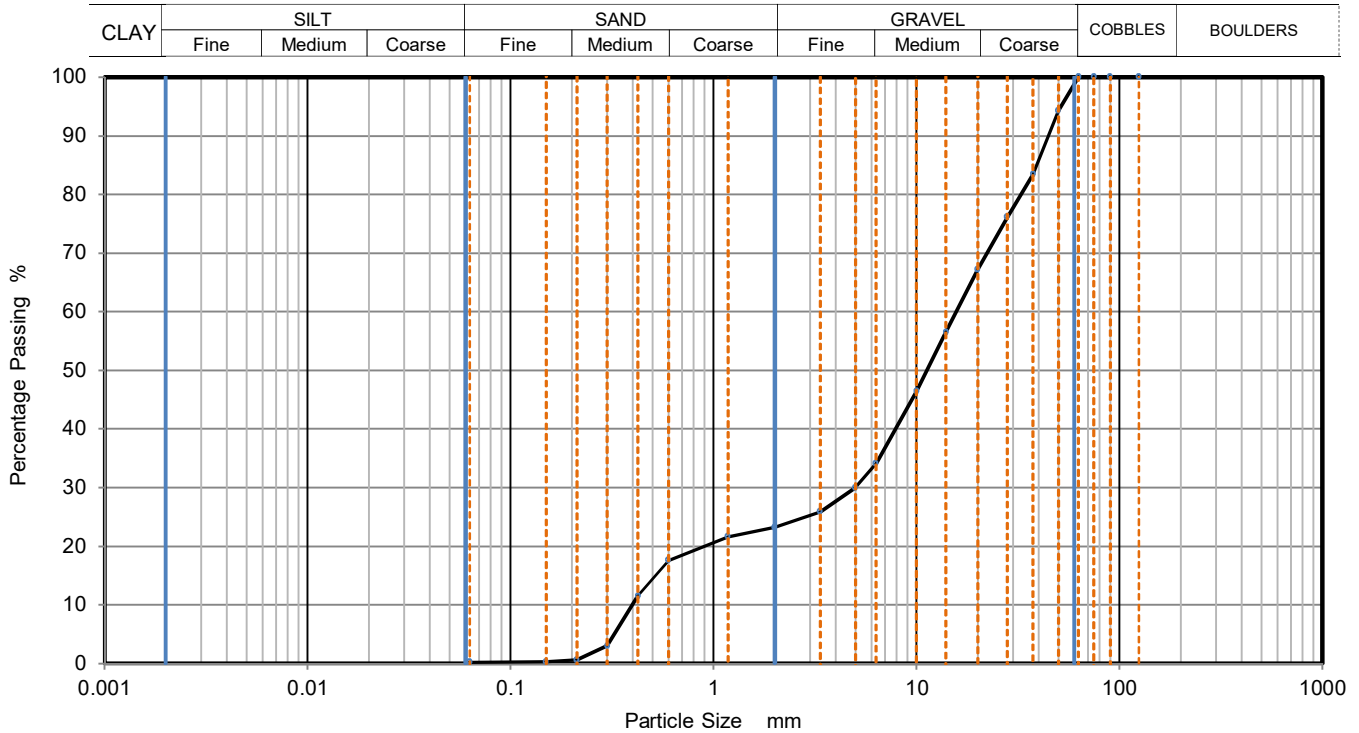
Remarks Insufficient sample to test in full accordance with BS 1377	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Brown very sandy GRAVEL. Gravel is of flint and quartzite	Sample Depth (m)	6.00
		Sample Reference	B21



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	94		
37.5	83		
28	76		
20	67		
14	57		
10	46		
6.3	34		
5	30		
3.35	26		
2	23		
1.18	22		
0.6	18		
0.425	12		
0.3	3		
0.212	1		
0.15	0		
0.063	0		

Sample Proportions	% dry mass
Very coarse	0
Gravel	77
Sand	23
Fines <0.063mm	0

Grading Analysis		
D100	mm	
D60	mm	15.700
D30	mm	4.990
D10	mm	0.399
Uniformity Coefficient		39
Curvature Coefficient		4

Remarks	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1

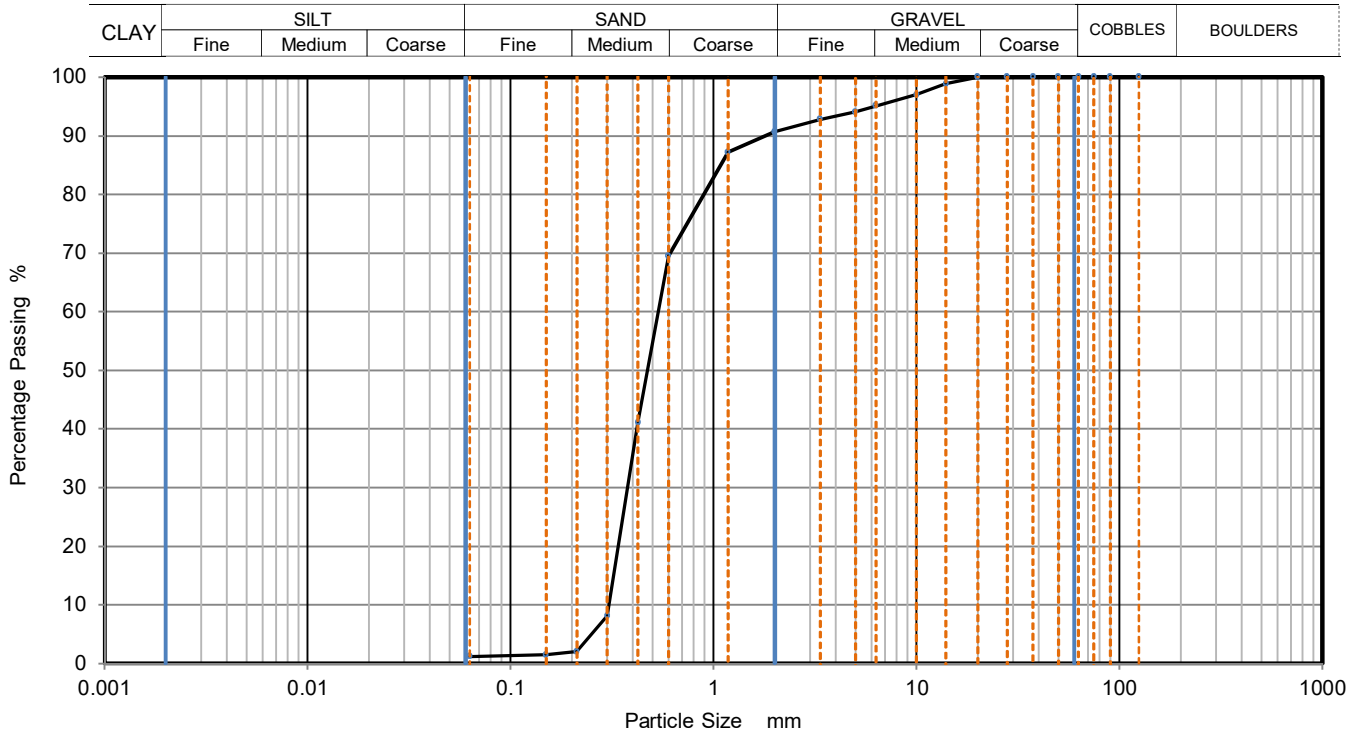




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Brown slightly silty gravelly SAND. Gravel is of flint and quartzite	Sample Depth (m)	7.00
		Sample Reference	B24



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	97		
6.3	95		
5	94		
3.35	93		
2	91		
1.18	87		
0.6	70		
0.425	41		
0.3	8		
0.212	2		
0.15	2		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0
Gravel	9
Sand	90
Fines <0.063mm	1

Grading Analysis		
D100	mm	100
D60	mm	0.534
D30	mm	0.378
D10	mm	0.306
Uniformity Coefficient		1.7
Curvature Coefficient		0.87

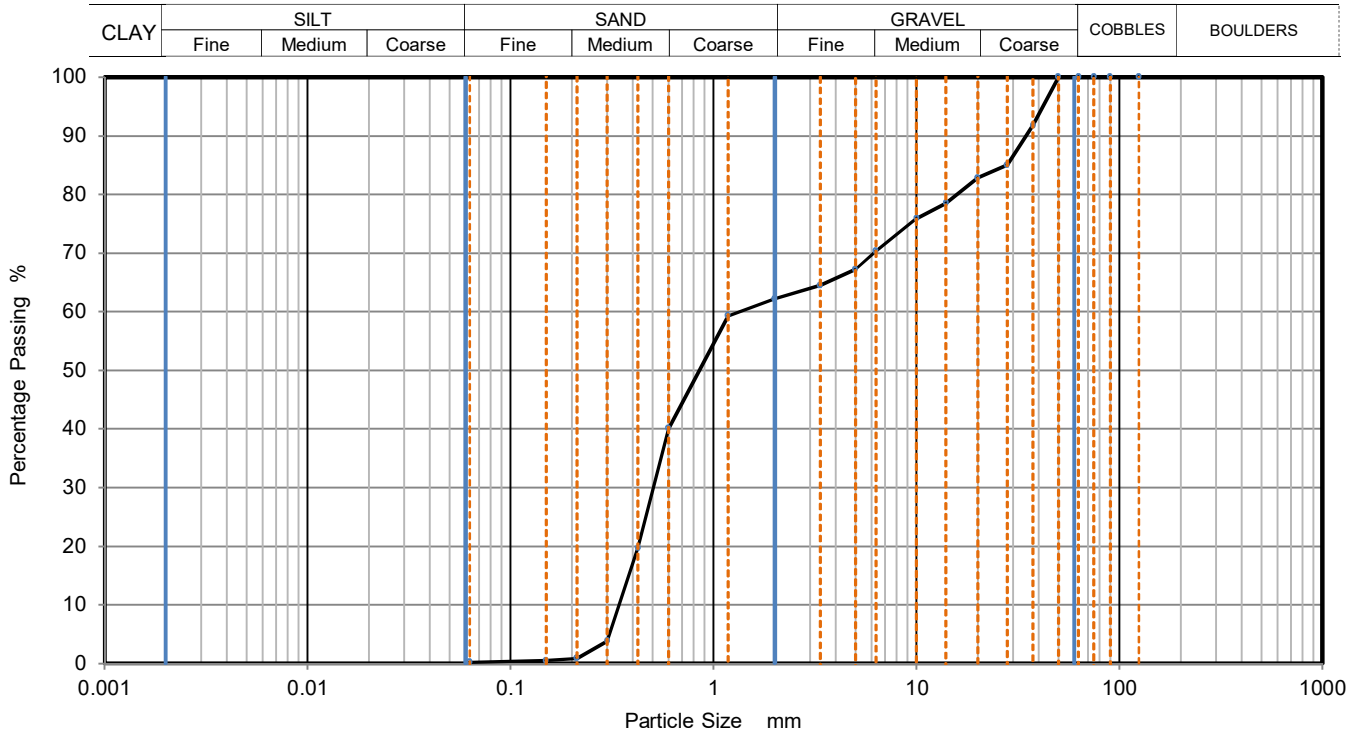
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Brown and dark grey very gravelly SAND. Gravel is of flint, quartzite and occasional shell fragments	Sample Depth (m)	9.00
		Sample Reference	B30



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	92		
28	85		
20	83		
14	79		
10	76		
6.3	70		
5	67		
3.35	65		
2	62		
1.18	59		
0.6	40		
0.425	20		
0.3	4		
0.212	1		
0.15	1		
0.063	0		

Sample Proportions	% dry mass
Very coarse	0
Gravel	38
Sand	62
Fines <0.063mm	0

Grading Analysis		
D100	mm	
D60	mm	1.330
D30	mm	0.506
D10	mm	0.344
Uniformity Coefficient		3.9
Curvature Coefficient		0.56

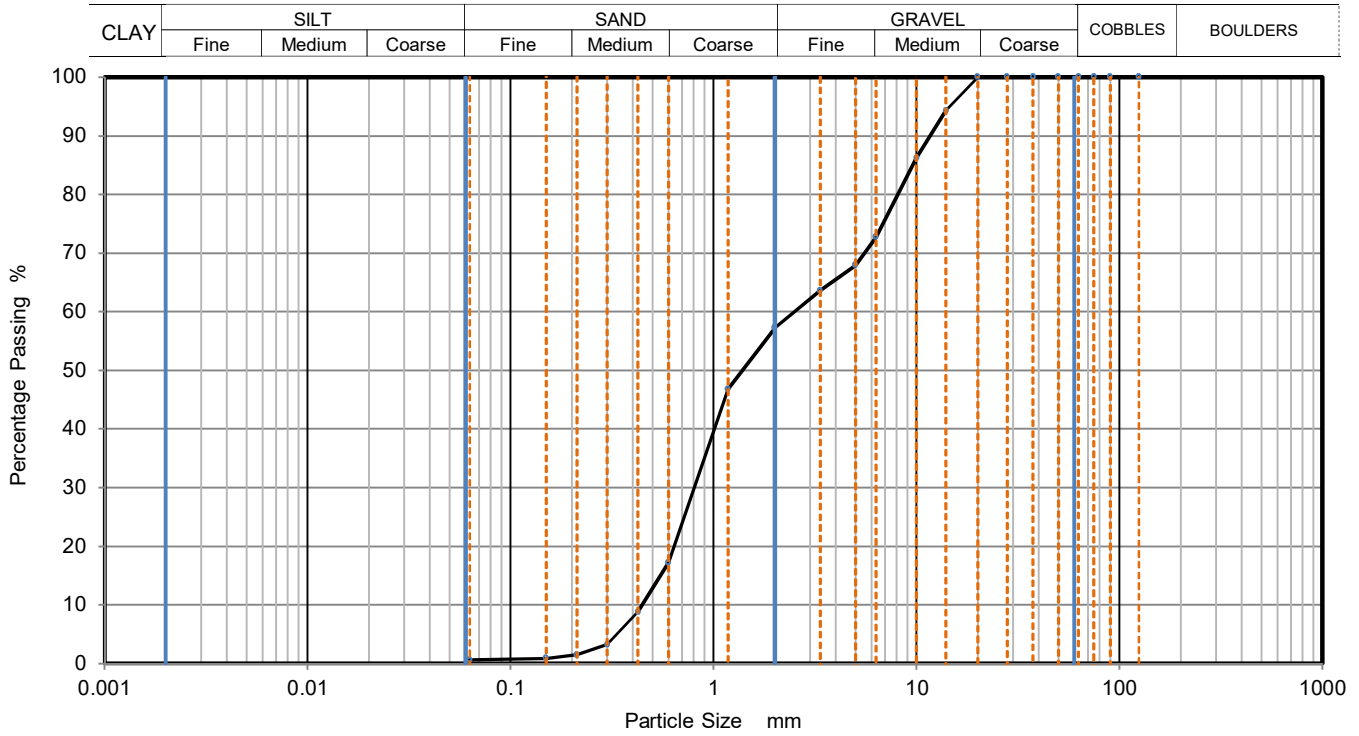
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Brown slightly silty very gravelly SAND. Gravel is of flint, quartzite and occasional shell fragments	Sample Depth (m)	10.00
		Sample Reference	B33



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	94		
10	86		
6.3	73		
5	68		
3.35	64		
2	57		
1.18	47		
0.6	17		
0.425	9		
0.3	3		
0.212	2		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0
Gravel	43
Sand	57
Fines <0.063mm	1

Grading Analysis		
D100	mm	
D60	mm	2.510
D30	mm	0.804
D10	mm	0.446
Uniformity Coefficient		5.6
Curvature Coefficient		0.58

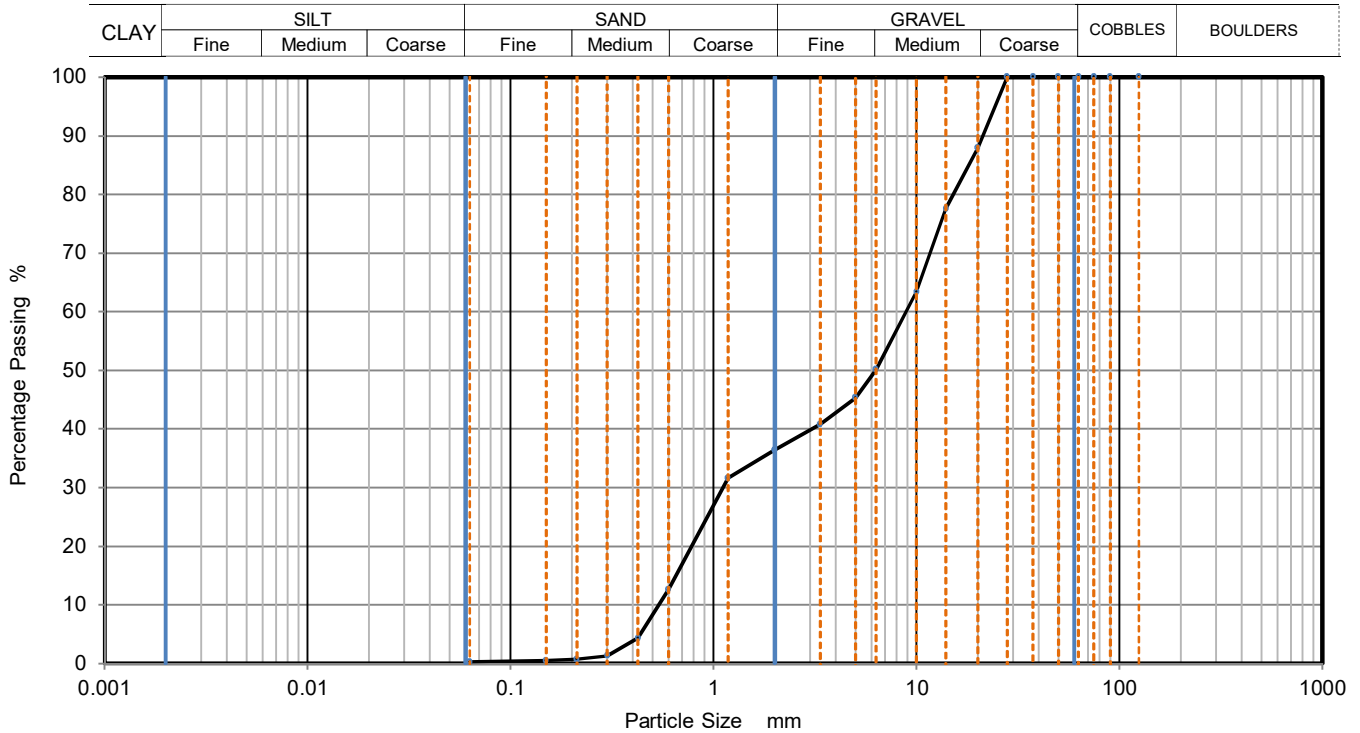
Remarks	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1



# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Brown very sandy GRAVEL. Gravel is of flint and quartzite	Sample Depth (m)	13.00
		Sample Reference	B41



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	88		
14	78		
10	63		
6.3	50		
5	45		
3.35	41		
2	36		
1.18	32		
0.6	13		
0.425	4		
0.3	1		
0.212	1		
0.15	1		
0.063	0		

Sample Proportions	% dry mass
Very coarse	0
Gravel	64
Sand	36
Fines <0.063mm	0

Grading Analysis		
D100	mm	
D60	mm	8.880
D30	mm	1.120
D10	mm	0.539
Uniformity Coefficient		16
Curvature Coefficient		0.26

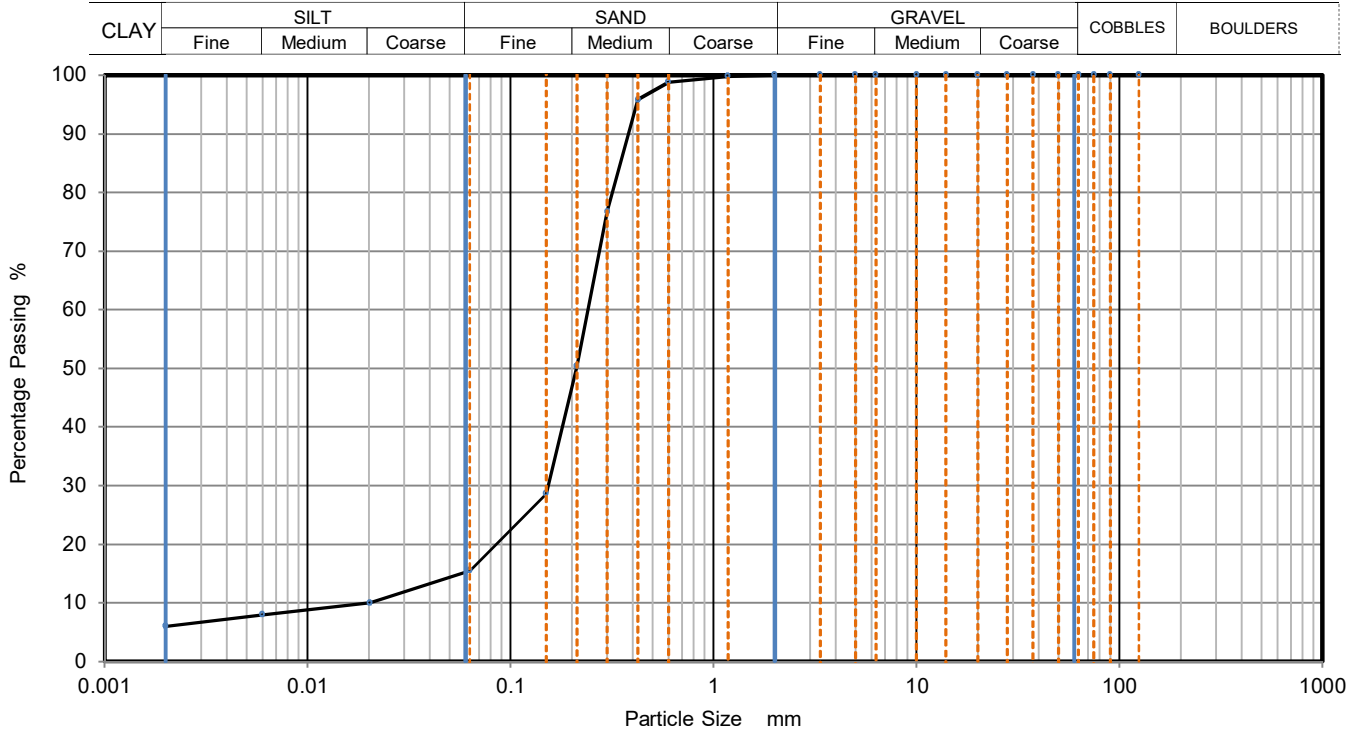
Remarks	Approved	Date	Sheet No.:
	MW	30/01/2018	1 of 1



## DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Light brown clayey silty SAND	Sample Depth (m)	14.30
		Sample Reference	B43



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	10
90	100	0.0060	8
75	100	0.0020	6
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	96	2.65	Mg/m3
0.3	77		
0.212	50		
0.15	29		
0.063	16		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	85
Silt	9
Clay	6

Grading Analysis		
D100	mm	
D60	mm	0.241
D30	mm	0.153
D10	mm	0.021
Uniformity Coefficient		12
Curvature Coefficient		4.7

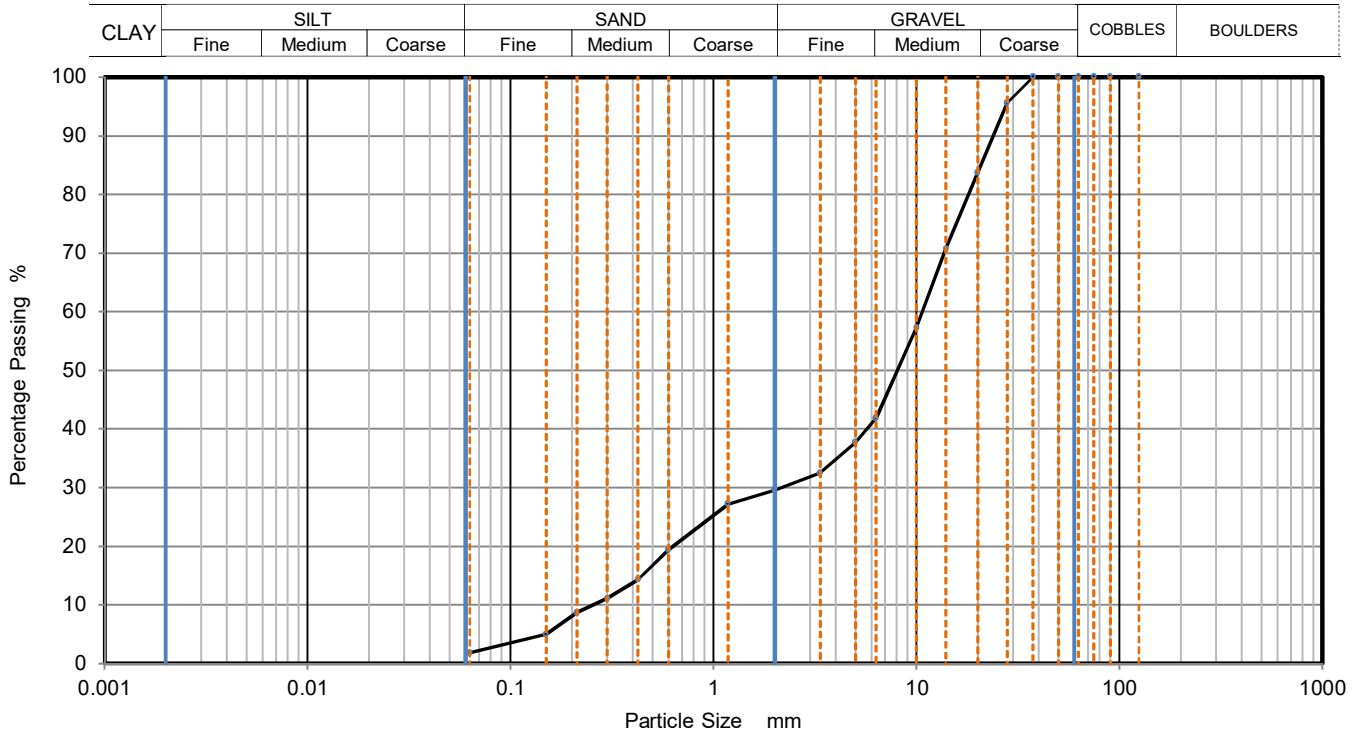
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Brown slightly silty very sandy GRAVEL. Gravel is of flint, quartzite and shell fragments	Sample Depth (m)	14.60
		Sample Reference	B44



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	96		
20	84		
14	71		
10	57		
6.3	42		
5	38		
3.35	33		
2	30		
1.18	27		
0.6	19		
0.425	14		
0.3	11		
0.212	9		
0.15	5		
0.063	2		

Sample Proportions	% dry mass
Very coarse	0
Gravel	70
Sand	28
Fines <0.063mm	2

Grading Analysis		
D100	mm	
D60	mm	10.700
D30	mm	2.130
D10	mm	0.255
Uniformity Coefficient		42
Curvature Coefficient		1.7

Remarks	Approved	Date	Sheet No.:
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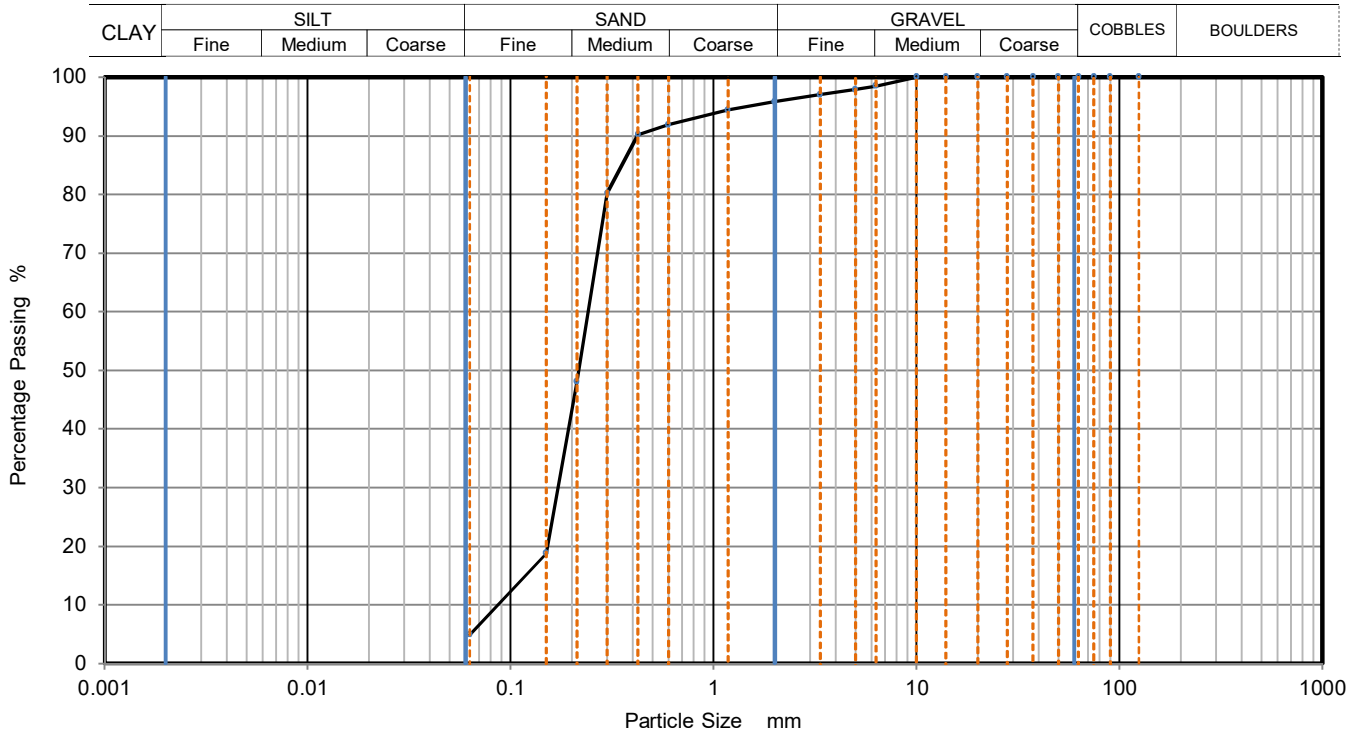




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Brown slightly silty slightly gravelly SAND. Gravel is of flint	Sample Depth (m)	15.40
		Sample Reference	B46



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	98		
3.35	97		
2	96		
1.18	94		
0.6	92		
0.425	90		
0.3	80		
0.212	48		
0.15	19		
0.063	5		

Sample Proportions	% dry mass
Very coarse	0
Gravel	4
Sand	91
Fines <0.063mm	5

Grading Analysis		
D100	mm	
D60	mm	0.241
D30	mm	0.171
D10	mm	0.087
Uniformity Coefficient		2.8
Curvature Coefficient		1.4

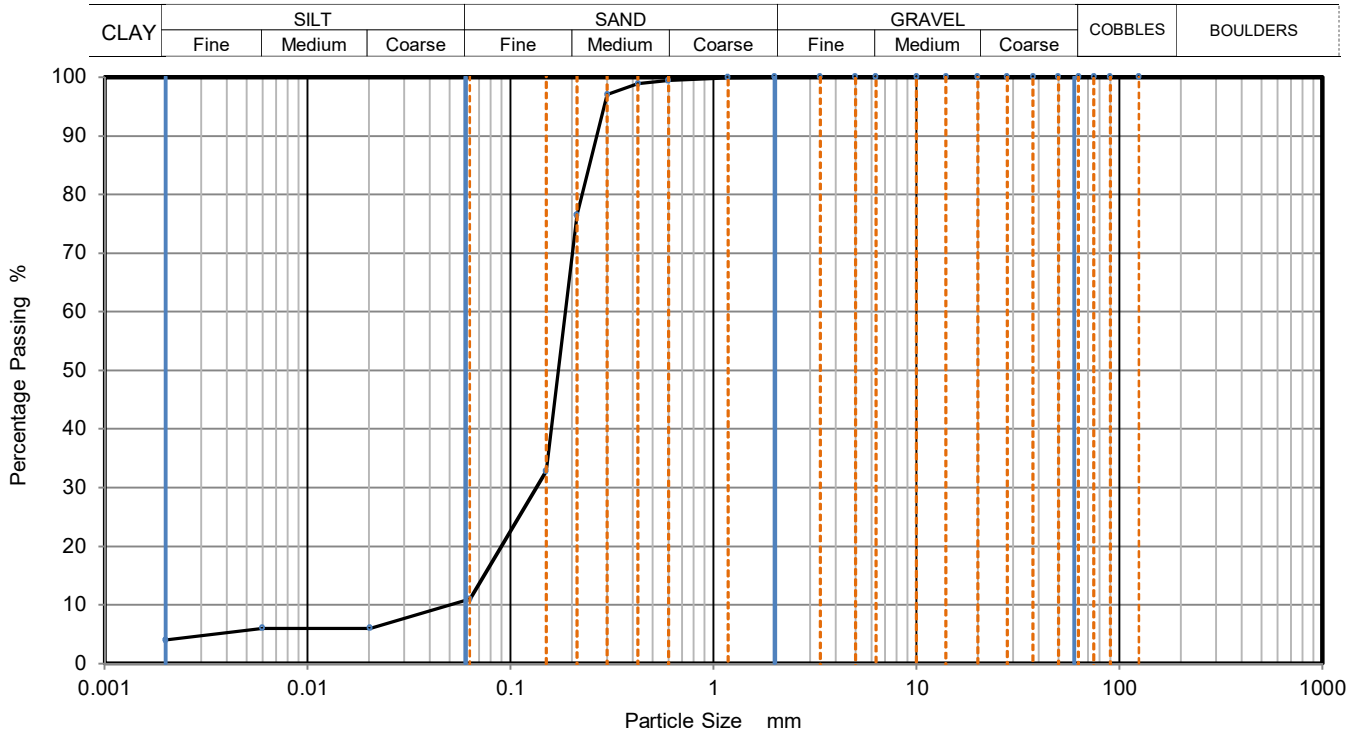
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Brown slightly clayey silty SAND	Sample Depth (m)	18.00
		Sample Reference	B53



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	6
90	100	0.0060	6
75	100	0.0020	4
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed)	
0.425	99	2.65	Mg/m3
0.3	97		
0.212	77		
0.15	33		
0.063	11		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	89
Silt	7
Clay	4

Grading Analysis		
D100	mm	
D60	mm	0.186
D30	mm	0.134
D10	mm	0.049
Uniformity Coefficient		3.8
Curvature Coefficient		2

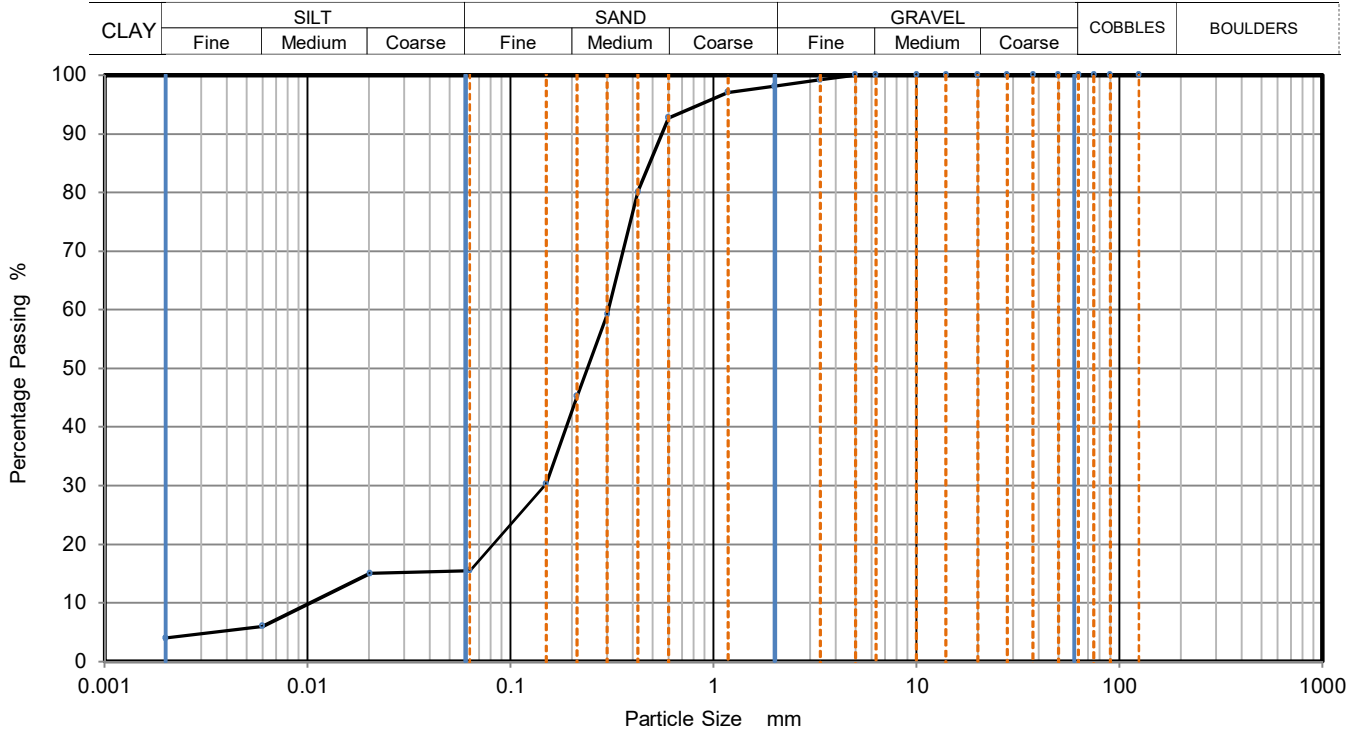
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Grey slightly clayey silty slightly gravelly SAND. Gravel is of flint	Sample Depth (m)	21.00
		Sample Reference	B59



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	15
90	100	0.0060	6
75	100	0.0020	4
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	98		
1.18	97		
0.6	93		
0.425	80	Particle density (assumed) 2.65 Mg/m <sup>3</sup>	
0.3	59		
0.212	45		
0.15	30		
0.063	16		

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	83
Silt	12
Clay	4

Grading Analysis		
D100	mm	
D60	mm	0.304
D30	mm	0.147
D10	mm	0.011
Uniformity Coefficient		29
Curvature Coefficient		6.7

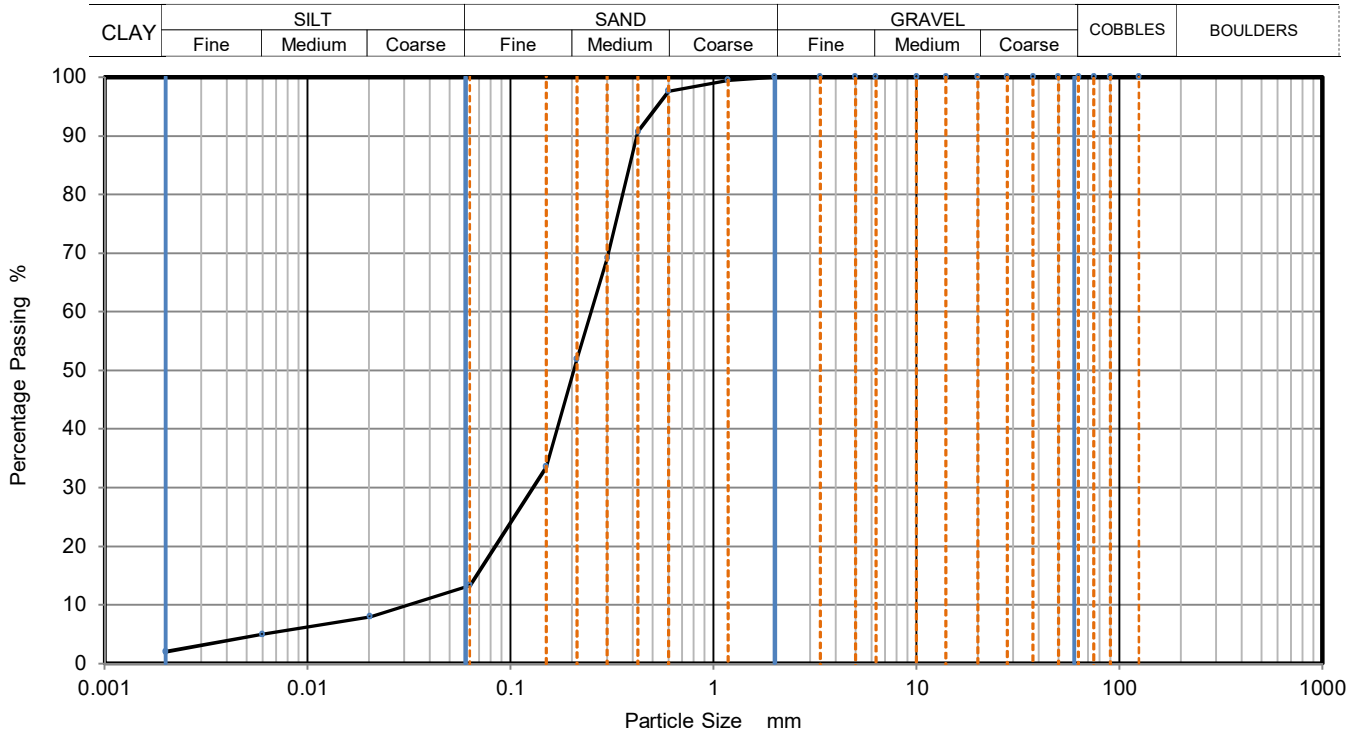
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Grey slightly clayey silty SAND	Sample Depth (m)	22.00
		Sample Reference	B61



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	8
90	100	0.0060	5
75	100	0.0020	2
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98		
0.425	91		
0.3	69		
0.212	52		
0.15	34		
0.063	13		
		Particle density (assumed) 2.65 Mg/m <sup>3</sup>	

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	87
Silt	11
Clay	2

Grading Analysis		
D100	mm	
D60	mm	0.250
D30	mm	0.129
D10	mm	0.031
Uniformity Coefficient		8.2
Curvature Coefficient		2.2

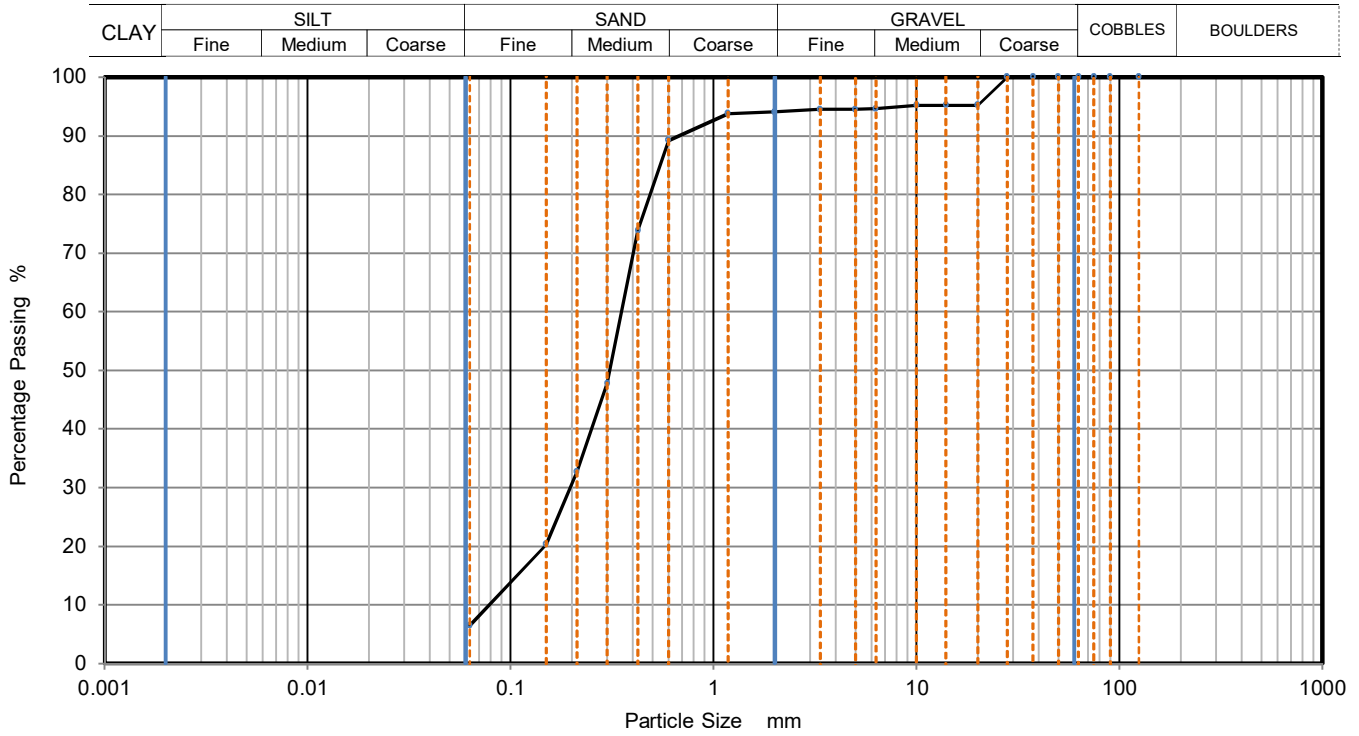
Remarks	Approved	Date	Sheet No.:
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Grey silty gravelly SAND. Gravel is of flint	Sample Depth (m)	23.00
		Sample Reference	B62



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	95		
14	95		
10	95		
6.3	95		
5	95		
3.35	95		
2	94		
1.18	94		
0.6	89		
0.425	74		
0.3	48		
0.212	33		
0.15	20		
0.063	7		

Sample Proportions	% dry mass
Very coarse	0
Gravel	6
Sand	88
Fines <0.063mm	7

Grading Analysis		
D100	mm	
D60	mm	0.353
D30	mm	0.197
D10	mm	0.078
Uniformity Coefficient		4.5
Curvature Coefficient		1.4

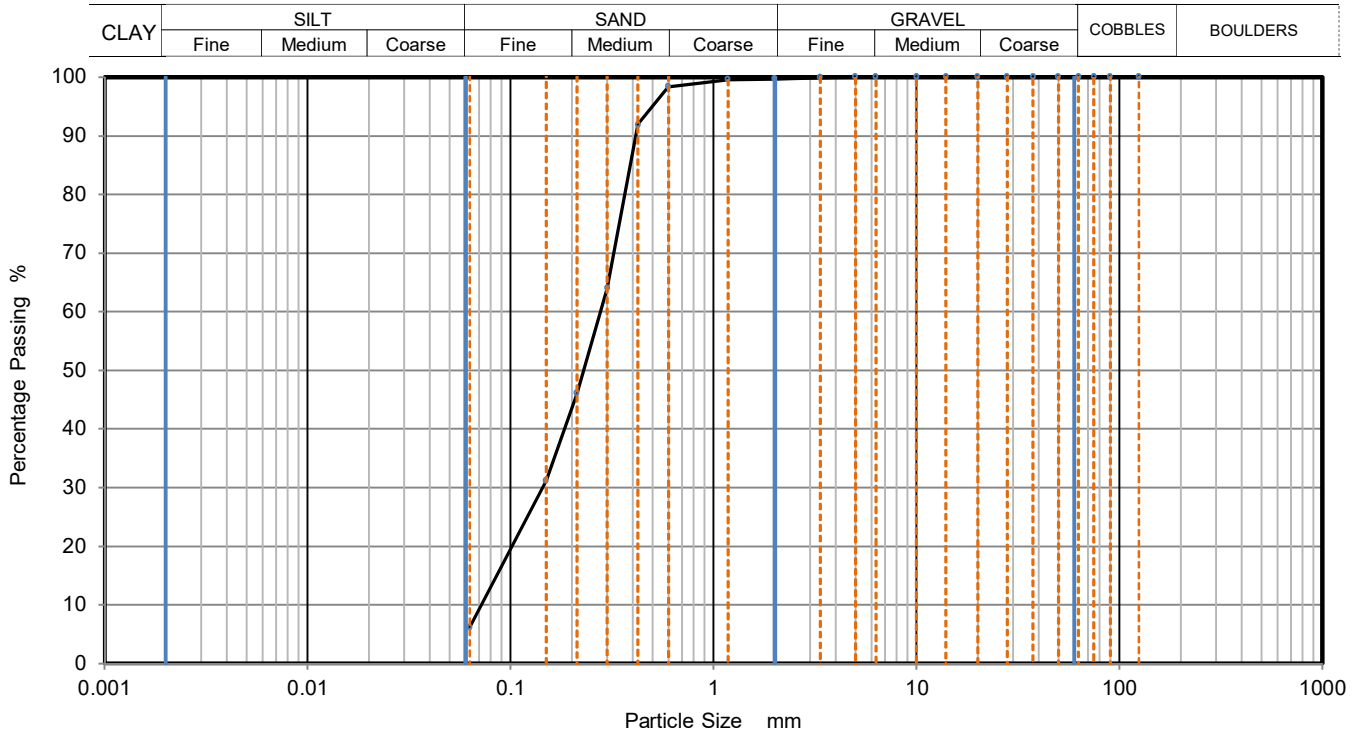
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clause 9.2

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Grey silty SAND	Sample Depth (m)	26.00
		Sample Reference	B68



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98		
0.425	92		
0.3	64		
0.212	46		
0.15	31		
0.063	6		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	94
Fines <0.063mm	6

Grading Analysis		
D100	mm	
D60	mm	0.278
D30	mm	0.144
D10	mm	0.072
Uniformity Coefficient		3.9
Curvature Coefficient		1

Remarks	Approved	Date	Sheet No.:
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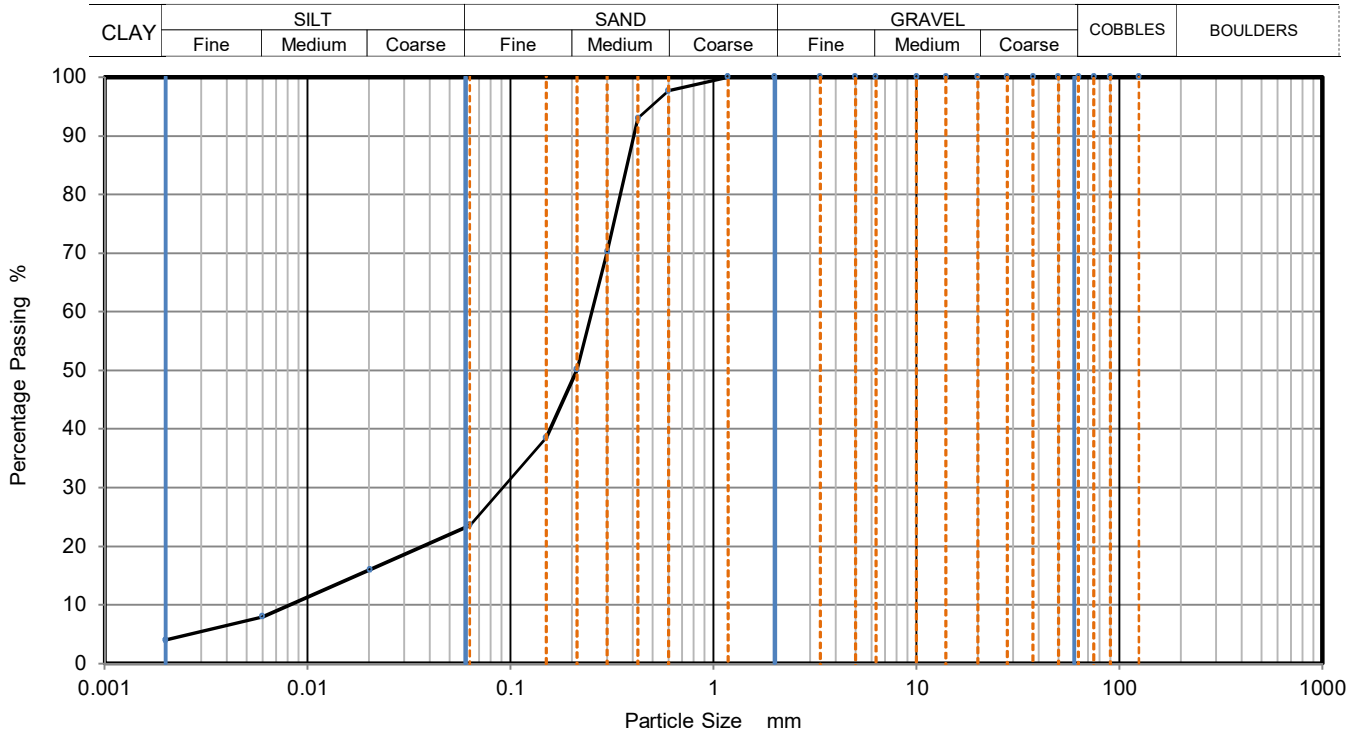




# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Dark grey slightly clayey silty SAND	Sample Depth (m)	28.00
		Sample Reference	B72



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	16
90	100	0.0060	8
75	100	0.0020	4
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	98	Particle density (assumed)	
0.425	93	2.65	Mg/m3
0.3	70		
0.212	50		
0.15	39		
0.063	24		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	76
Silt	20
Clay	4

Grading Analysis		
D100	mm	
D60	mm	0.251
D30	mm	0.091
D10	mm	0.008
Uniformity Coefficient		31
Curvature Coefficient		4.1

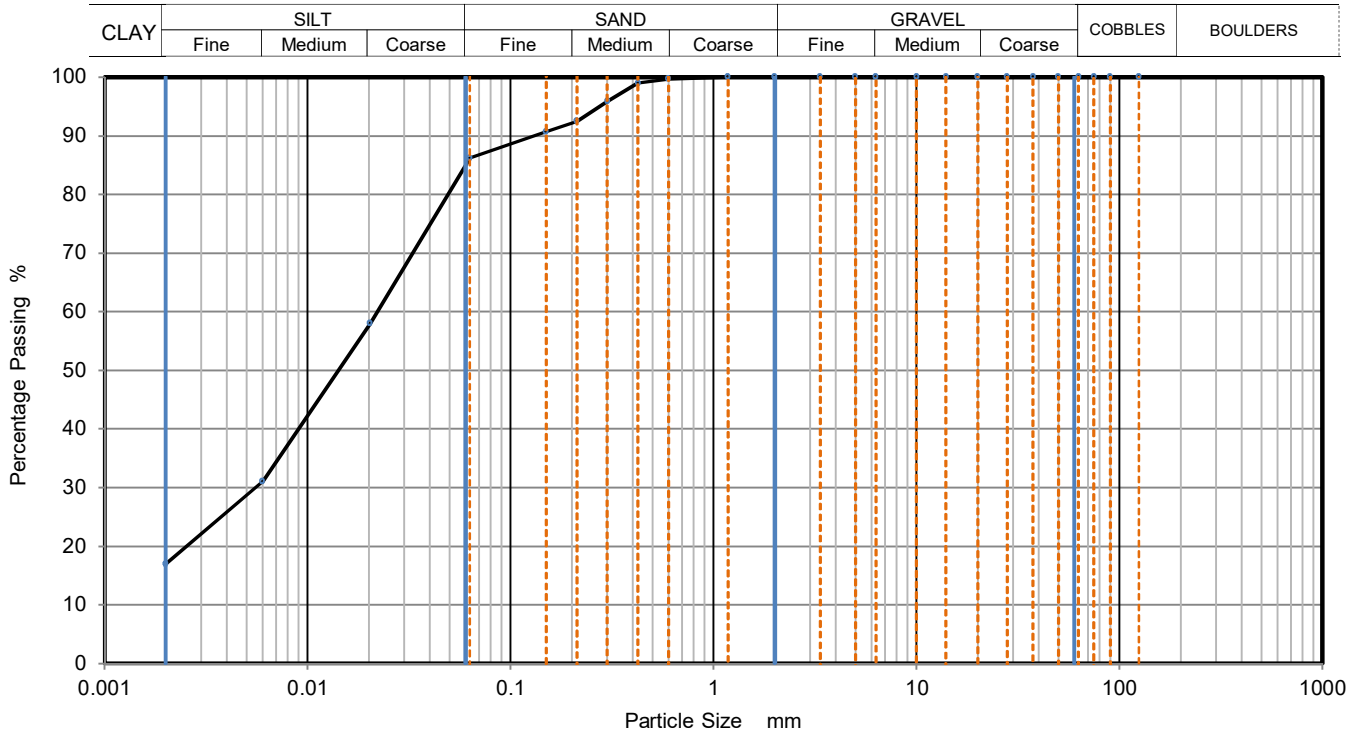
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# DETERMINATION OF PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990, clauses 9.2 and 9.4

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH15
Sample Description:	Grey mottled dark grey slightly sandy very silty CLAY	Sample Depth (m)	30.00
		Sample Reference	D74



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	58
90	100	0.0060	31
75	100	0.0020	17
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99	Particle density (assumed) 2.65 Mg/m3	
0.3	96		
0.212	93		
0.15	91		
0.063	86		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	14
Silt	70
Clay	17

Grading Analysis		
D100	mm	
D60	mm	0.022
D30	mm	0.005
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks	Approved	Date	Sheet No.:
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Our reference No. **NCCL201711297-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested **04/12/2017**  
Date Report Issued **9-Jan-18**

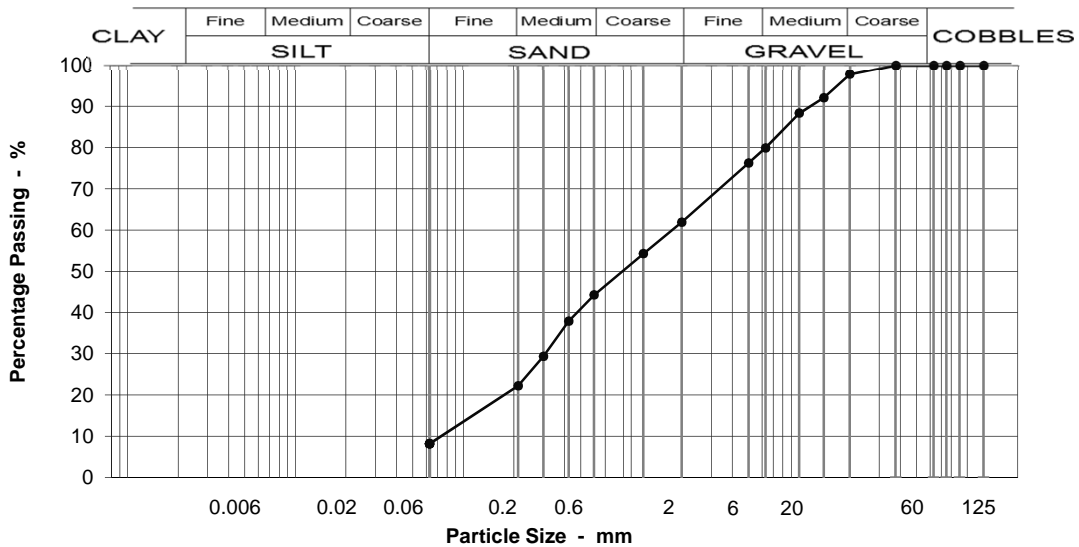
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 @ 0.5 - 1m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	98
14	92
10	88
6.3	80
5	76
2	62
1.18	54
0.600	44
0.425	38
0.300	29
0.212	22
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 9.5

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	2
Medium GRAVEL	18
Fine GRAVEL	18
Coarse SAND	18
Medium SAND	22
Fine SAND	14
Silt & Clay	8

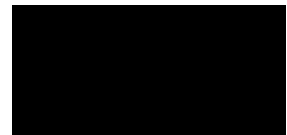
Grading Analysis	
D100	20
D60	1.79
D10	0.08
Uniformity Coefficient	22

Description	
MADE GROUND: comprising grey fine to coarse sand and light grey fine to medium concrete gravel	

Test Code = 610



Simon Holden (Project Technician)



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NR1 2DH

Our reference No. **NCCL201710270-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **10270**  
Your Project or Order No. **PZ1522**  
Date Tested **20/10/2017**  
Date Report Issued **15-Nov-17**

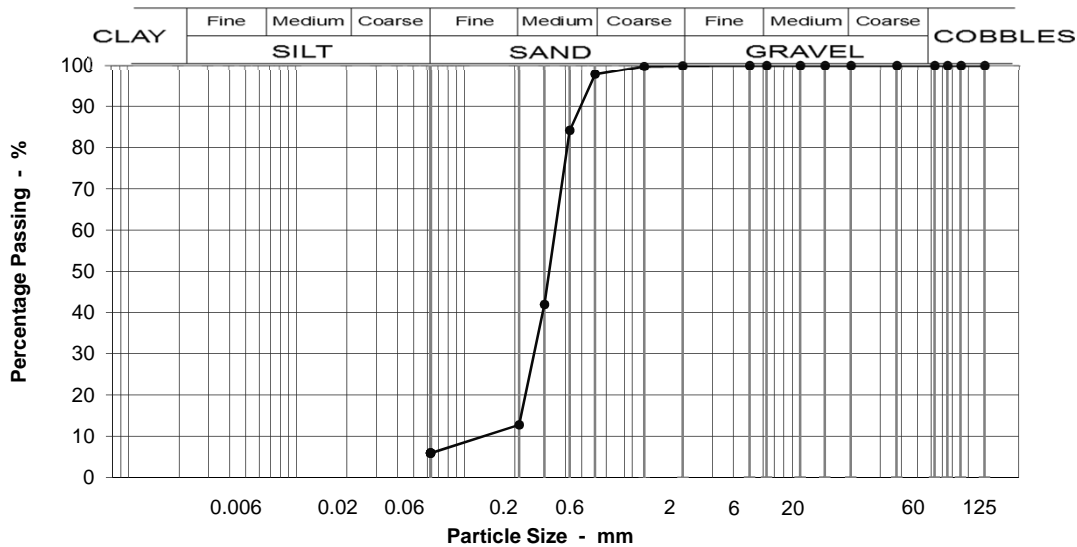
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 @ 3 - 3.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	98
0.425	84
0.300	42
0.212	13
0.063	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	85
Fine SAND	7
Silt & Clay	6

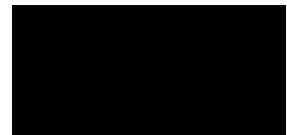
Grading Analysis	
D100	2
D60	0.35
D10	0.15
Uniformity Coefficient	2

Description	
Brownish-grey slightly silty medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



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NR1 2DH

Our reference No. **NCCL201711298-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **7**  
Your Project or Order No. **PZ1522**  
Date Tested **06/12/2017**  
Date Report Issued **9-Jan-18**

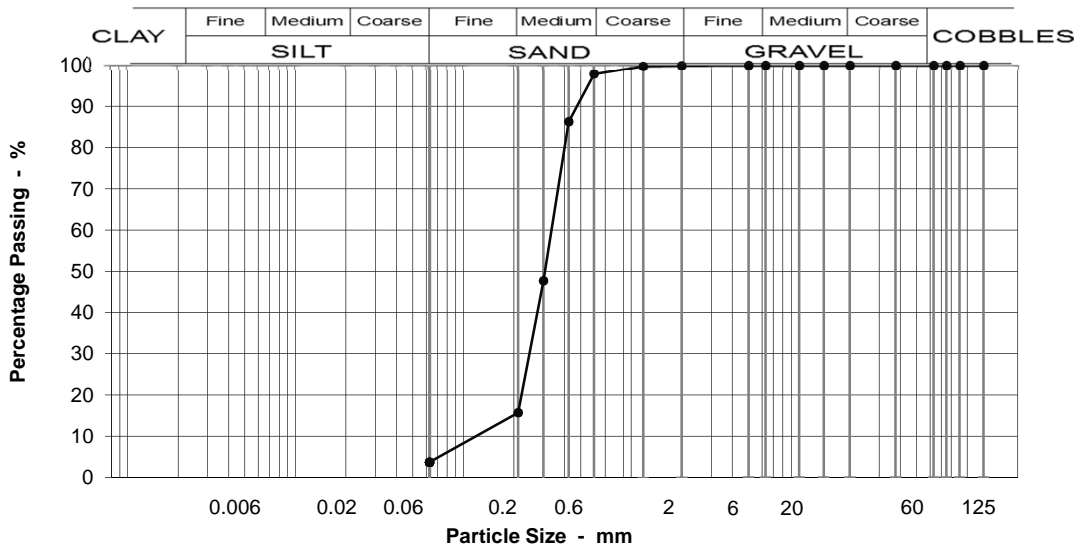
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 @ 4 - 4.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	98
0.425	86
0.300	48
0.212	16
0.063	4

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	82
Fine SAND	12
Silt & Clay	4

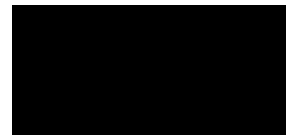
Grading Analysis	
D100	2
D60	0.34
D10	0.14
Uniformity Coefficient	2

**Description**  
Brownish grey medium SAND.

Test Code = 610



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Norfolk  
NR1 2DH

Our reference No. **NCCL201710271-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **10271**  
Your Project or Order No. **PZ1522**  
Date Tested **06/11/2017**  
Date Report Issued **15-Nov-17**

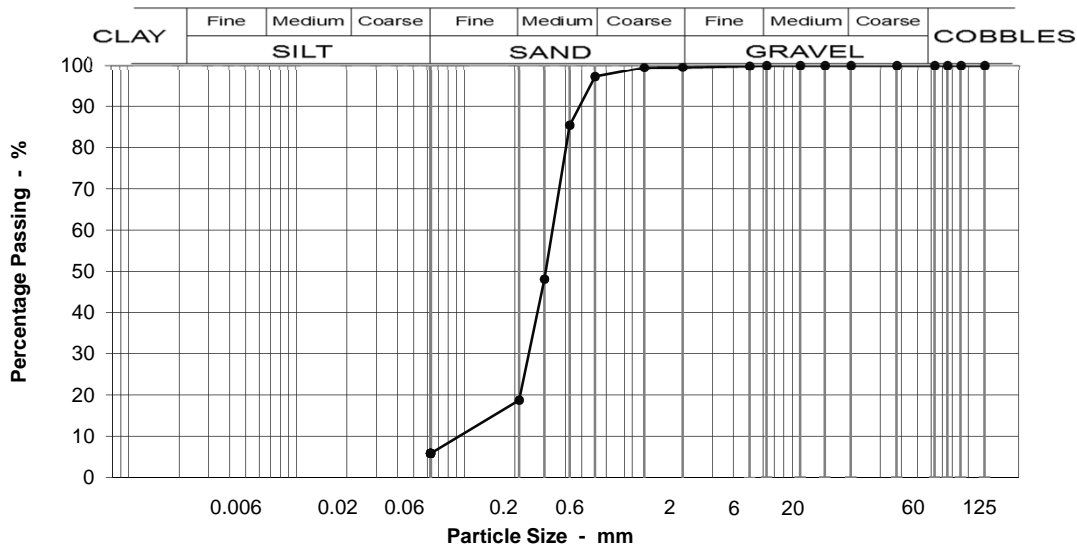
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 @ 7 - 7.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	85
0.300	48
0.212	19
0.063	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 24

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	78
Fine SAND	13
Silt & Clay	6

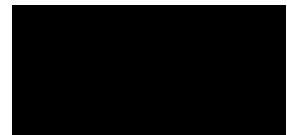
Grading Analysis	
D100	5
D60	0.34
D10	0.11
Uniformity Coefficient	3

Description	
Brownish-grey slightly silty medium SAND.	

Test Code = 610



Simon Holden (Project Technician)





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Norfolk  
NR1 2DH

Our reference No. **NCCL201710272-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **10272**  
Your Project or Order No. **PZ1522**  
Date Tested **02/11/2017**  
Date Report Issued **15-Nov-17**

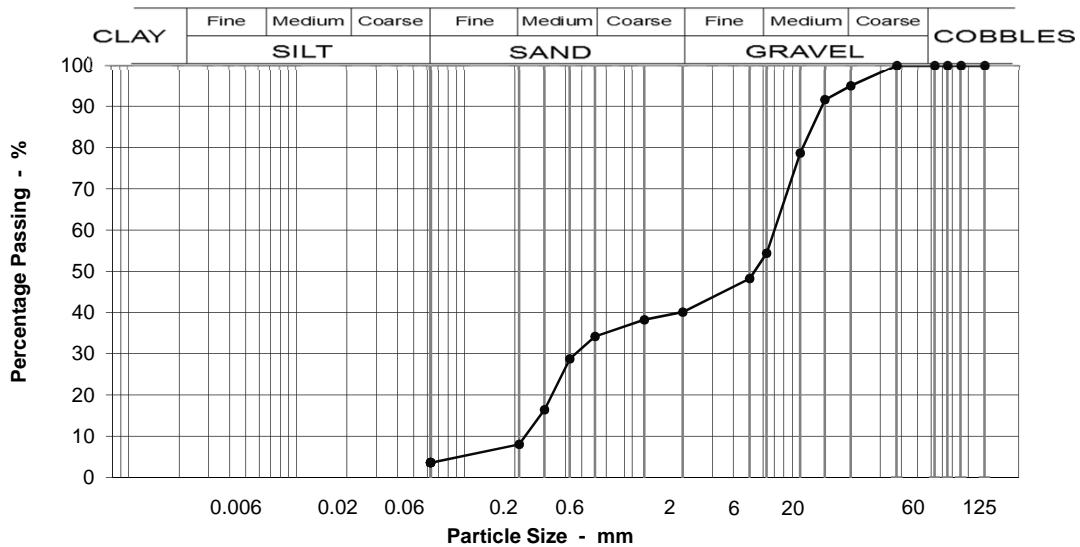
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 @ 10 - 10.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	95
14	92
10	79
6.3	54
5	48
2	40
1.18	38
0.600	34
0.425	29
0.300	16
0.212	8
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 13

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	5
Medium GRAVEL	41
Fine GRAVEL	14
Coarse SAND	6
Medium SAND	26
Fine SAND	4
Silt & Clay	4

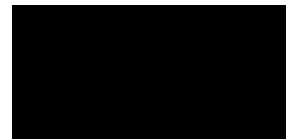
Grading Analysis	
D100	20
D60	7.16
D10	0.23
Uniformity Coefficient	31

Description	
Dark grey very sandy fine to medium subangular to subrounded flint and quartz GRAVEL.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201711299-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **18**  
Your Project or Order No. **PZ1522**  
Date Tested **05/12/2017**  
Date Report Issued **9-Jan-18**

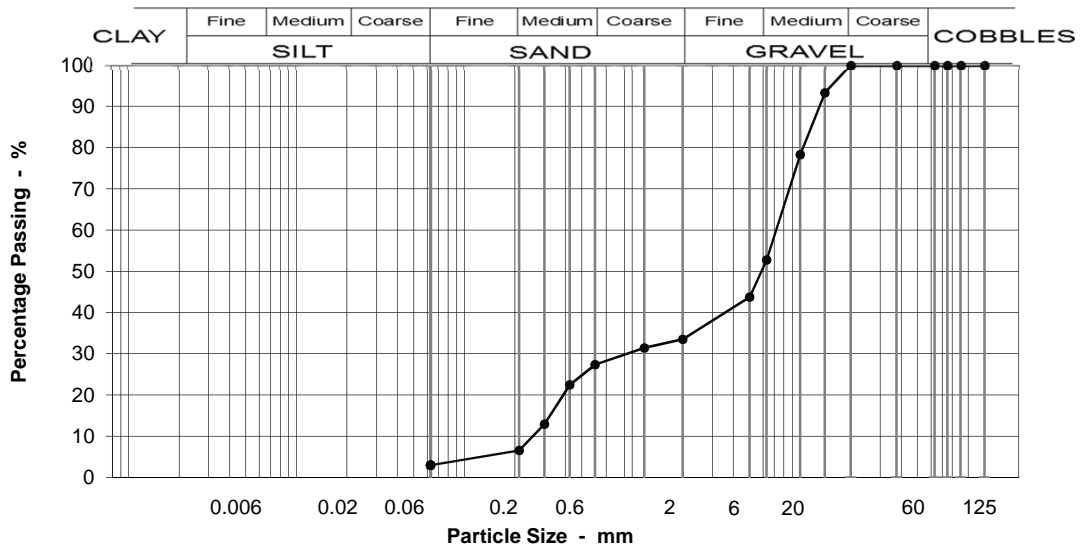
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 @ 12 - 12.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	93
10	78
6.3	53
5	44
2	33
1.18	31
0.600	27
0.425	23
0.300	13
0.212	7
0.063	3

Specification for Highway Works Classification  
Table 6/2

This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6K, 6M, 6N.

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	47
Fine GRAVEL	19
Coarse SAND	6
Medium SAND	21
Fine SAND	4
Silt & Clay	3

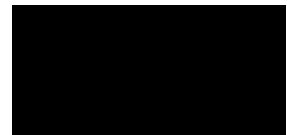
Grading Analysis	
D100	14
D60	7.35
D10	0.26
Uniformity Coefficient	28

Description	
Grey and orangey brown very sandy fine to medium sub-rounded to angular flint GRAVEL.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201710273-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **10273**  
Your Project or Order No. **PZ1522**  
Date Tested **06/11/2017**  
Date Report Issued **6-Aug-18**

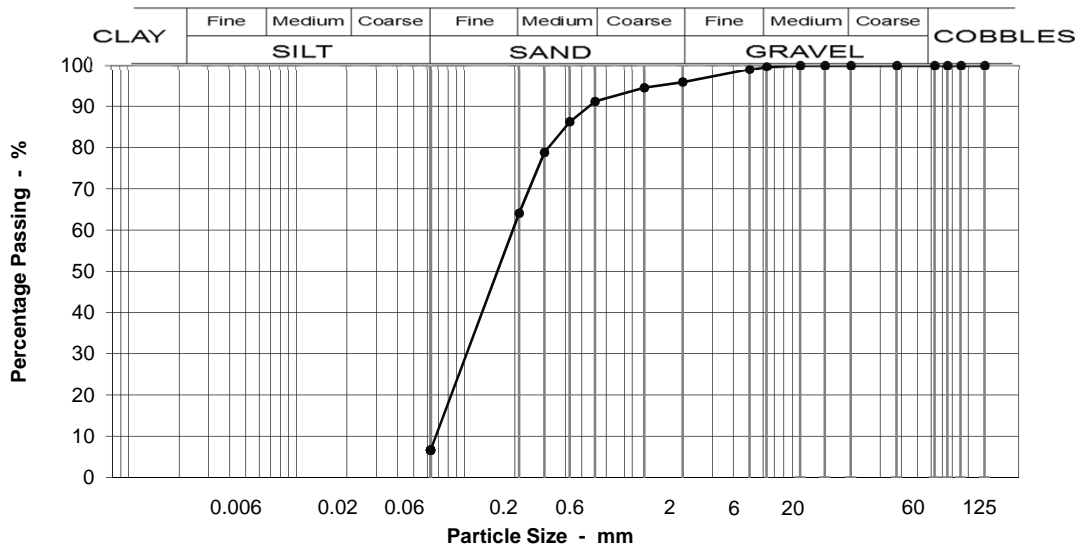
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 @ 15 - 15.45m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	96
1.18	94
0.600	91
0.425	86
0.300	79
0.212	64
0.063	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 25

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	4
Coarse SAND	5
Medium SAND	27
Fine SAND	57
Silt & Clay	7

Grading Analysis	
D100	6
D60	0.20
D10	0.07
Uniformity Coefficient	3

Description	
Greyish-brown slightly silty fine to medium SAND.	

Test Code = 610



Simon Holden (Project Technician)

CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201710274-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **10274**  
Your Project or Order No. **PZ1522**  
Date Tested **02/11/2017**  
Date Report Issued **15-Nov-17**

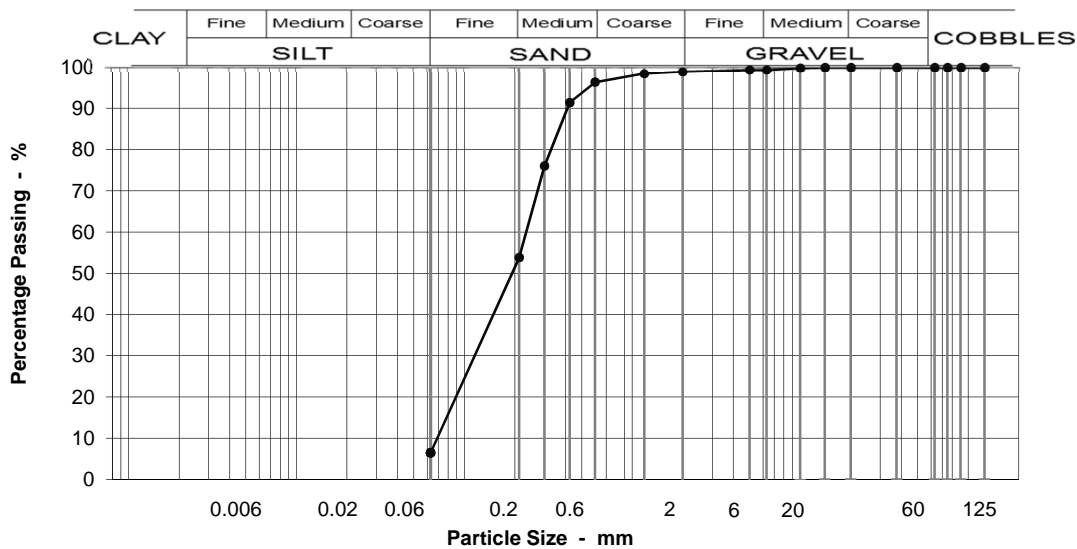
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 @ 21 - 21.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	1
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	3
14	100		Medium SAND	43
10	100		Fine SAND	47
6.3	99		Silt & Clay	6
5	99			
2	99			
1.18	98			
0.600	96			
0.425	91			
0.300	76			
0.212	54			
0.063	6			
Moisture content %		20		

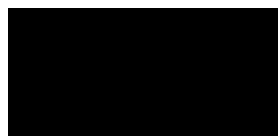
Grading Analysis	
D100	10
D60	0.24
D10	0.07
Uniformity Coefficient	3

**Description**  
Dark brownish-grey slightly silty fine to medium SAND.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017112910-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 32  
**Your Project or Order No.** PZ1522  
**Date Tested** 05/12/2017  
**Date Report Issued** 9-Jan-18

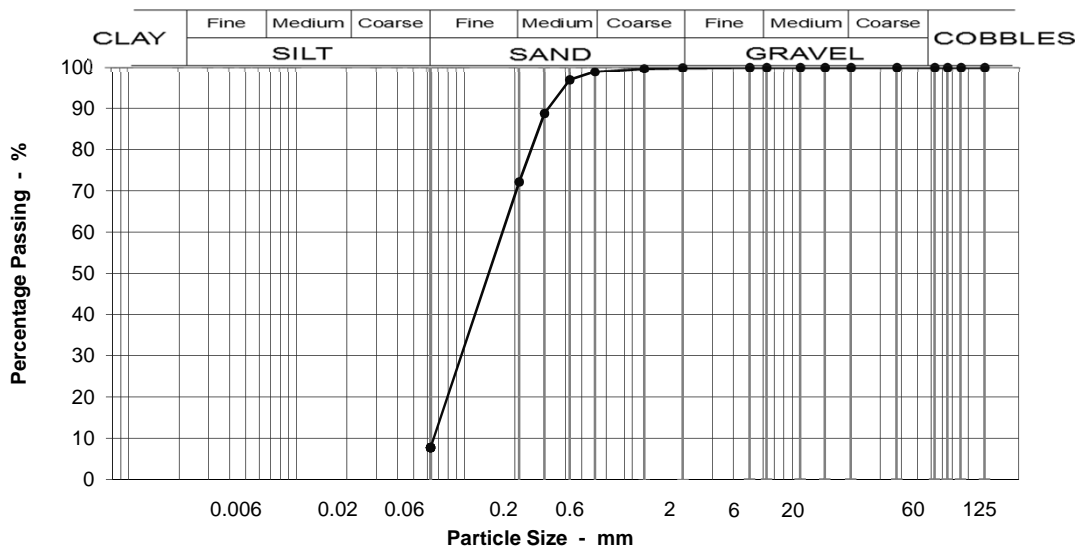
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 @ 25 - 25.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	97
0.300	89
0.212	72
0.063	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	27
Fine SAND	64
Silt & Clay	8

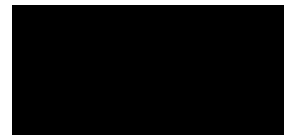
Grading Analysis	
D100	2
D60	0.18
D10	0.07
Uniformity Coefficient	3

Description	
Dark brownish grey slightly silty fine to medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201710276-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **10276**  
Your Project or Order No. **PZ1522**  
Date Tested **06/11/2017**  
Date Report Issued **15-Nov-17**

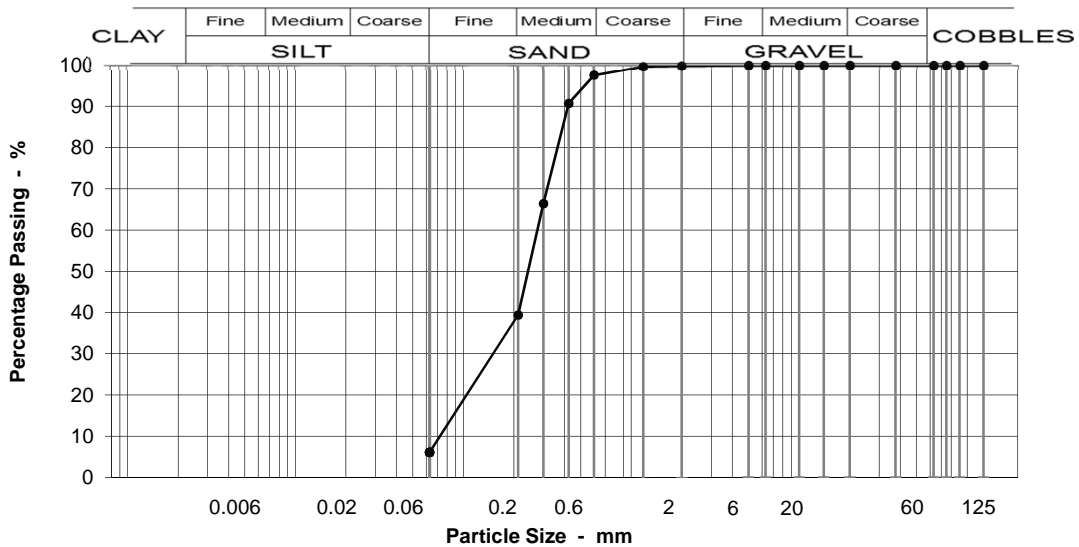
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 @ 31 - 31.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	98
0.425	91
0.300	66
0.212	39
0.063	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	58
Fine SAND	33
Silt & Clay	6

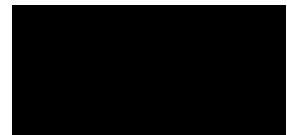
Grading Analysis	
D100	2
D60	0.28
D10	0.08
Uniformity Coefficient	3

Description	
Dark grey slightly silty fine to medium SAND.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017112911-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 40  
**Your Project or Order No.** PZ1522  
**Date Tested** 04/12/2017  
**Date Report Issued** 9-Jan-18

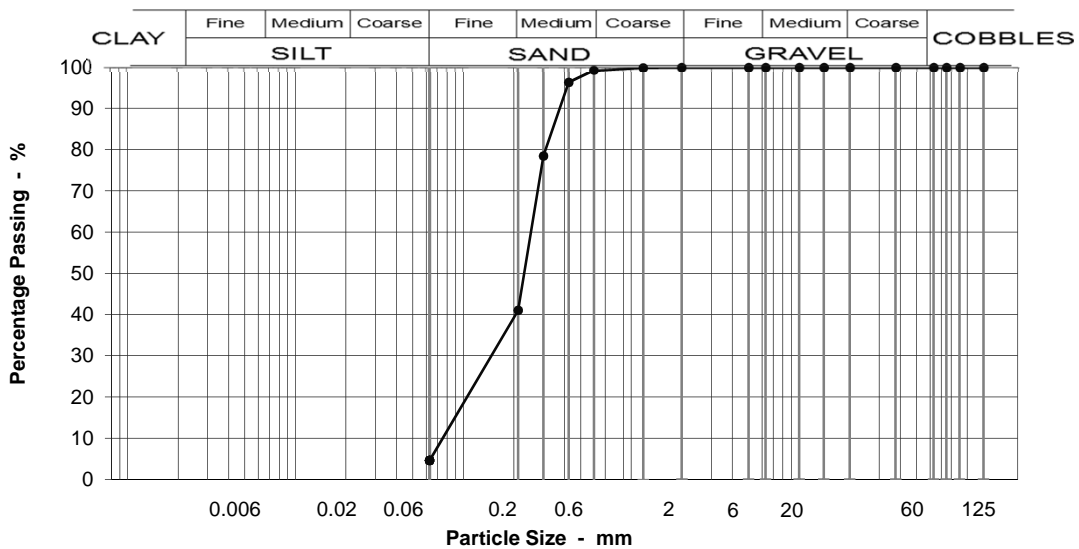
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH16 @ 35 - 35.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	96
0.300	78
0.212	41
0.063	5

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	58
Fine SAND	36
Silt & Clay	5

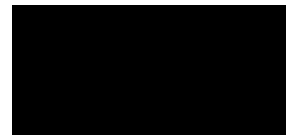
Grading Analysis	
D100	1
D60	0.26
D10	0.08
Uniformity Coefficient	3

Description	
Greyish brown fine to medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

### Great Yarmouth Third River Crossing

Norfolk County Council  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

Our Project No PZ1522D1

Our Report and sample No NCCL201710275-612

Your Sample Ref B10275

Your Project or Order No PZ1522

Date Report Issued 28-Nov-17

Date Tested 20-Nov-17

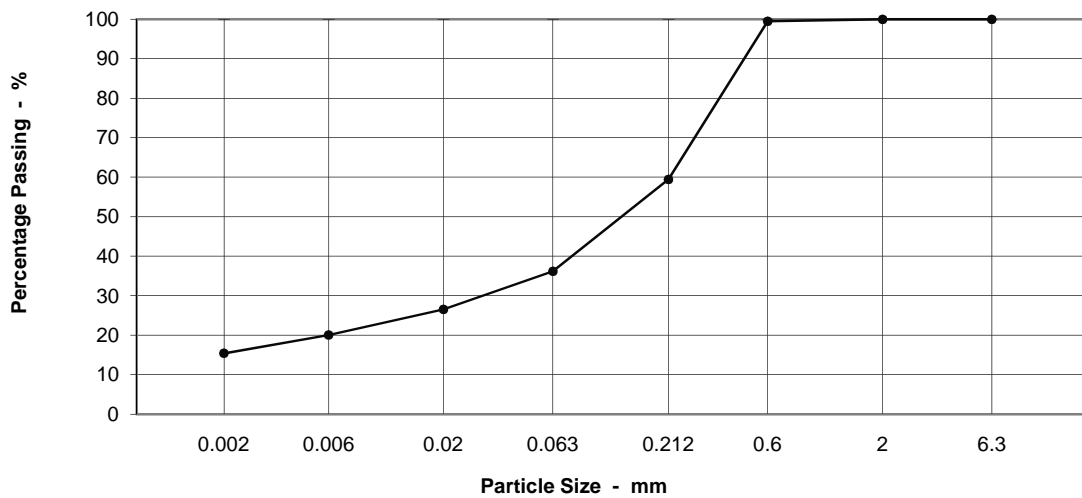
Page 1 of 1

## Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 B10275 37-37.5m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	0	Soft, dark grey, clayey, silty, fine and medium SAND with some shell fragments.
2.0	100	Medium SAND	40	
0.6	100	Fine SAND	23	
0.212	59	Coarse SILT	10	
0.063	36	Medium SILT	7	
0.02	27	Fine SILT	5	
0.006	20	CLAY	15	
0.002	15	Moisture content	29	

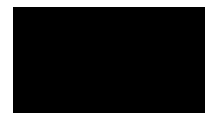
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017102626-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 102626  
**Your Project or Order No.** PZ1522  
**Date Tested** 03/11/2017  
**Date Report Issued** 15-Nov-17

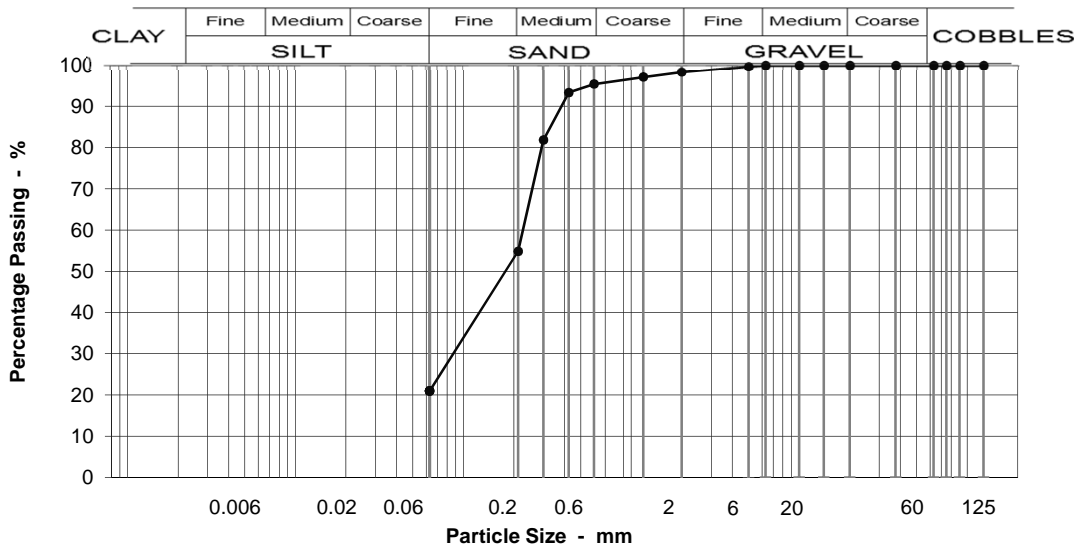
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH16 @ 39 - 39.5m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	97
0.600	95
0.425	93
0.300	82
0.212	55
0.063	21

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 2A/2B, 2A/2B.**

Moisture content % 28

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	3
Medium SAND	41
Fine SAND	34
Silt & Clay	21

Grading Analysis	
D100	5
D60	0.23
D10	0.04
Uniformity Coefficient	6

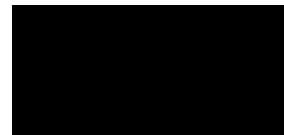
Description	
Grey silty fine to medium SAND with lenses of soft grey clay and some shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017112912-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested **05/12/2017**  
Date Report Issued **12-Jan-18**

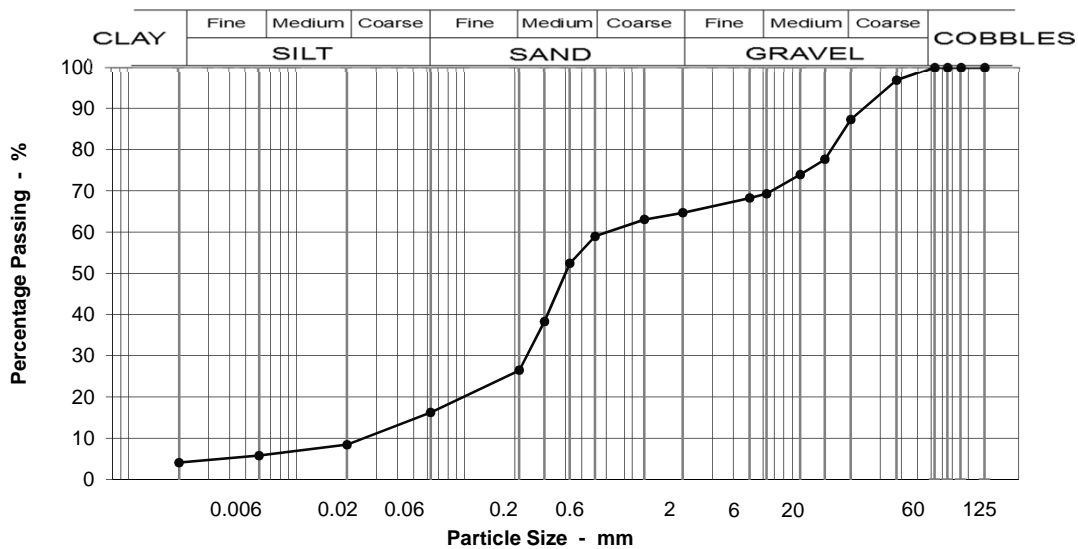
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 0.5 - 1m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample

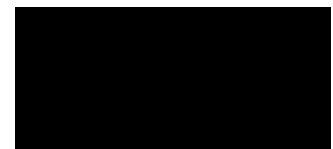


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2C.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	13
63	100		Medium GRAVEL	18
37.5	97		Fine GRAVEL	5
20	87		Coarse SAND	6
14	78		Medium SAND	32
10	74		Fine SAND	10
6.3	69		Silt & Clay	16
5	68		<b>Grading Analysis</b>	
2	65		D100	38
1.18	63		D60	0.75
0.600	59		D10	0.10
0.425	52		Uniformity Coefficient	8
0.300	38		<b>Description</b>	
0.212	26	MADE GROUND: comprising medium and coarse gravel sized concrete, brick, flint and metal in a matrix of greyish brown silty fine and medium SAND		
0.063	16			
0.020	8			
0.006	6			
0.002	4	Moisture content %	17	

Test Code = 613



David Houseago (Lead Technician)



## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

**Gt Yarmouth 3rd River Crossing**  
 CES Highways Projects  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL2017100329-612

**Your Sample Ref** B6

**Your Project or Order No** PZ1522

**Date Report Issued** 07-Nov-17

**Date Tested** 20-Oct-17

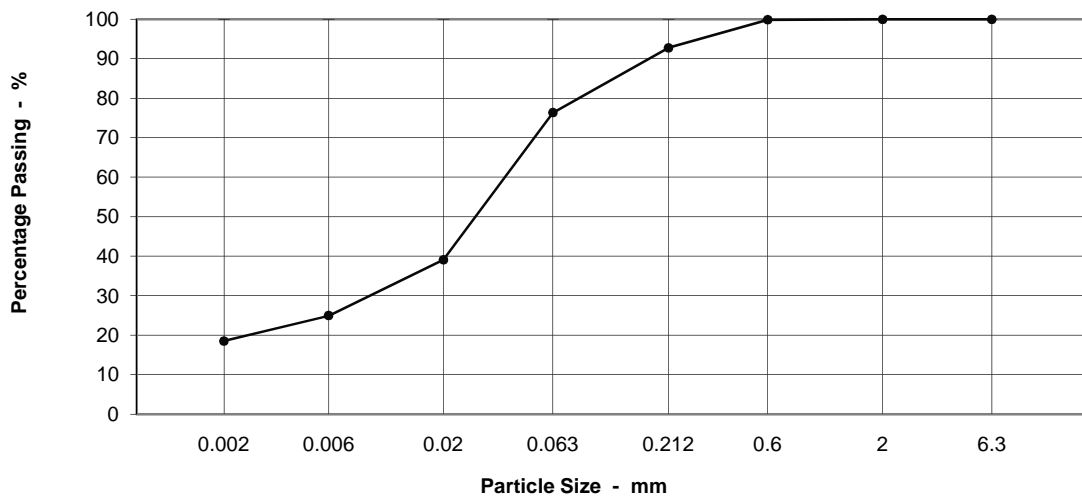
Page 1 of 1

### Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 B6 2.0-2.5m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	0	Soft, greenish grey, clayey, very sandy, medium and coarse SILT.
2.0	100	Medium SAND	7	
0.6	100	Fine SAND	16	
0.212	93	Coarse SILT	37	
0.063	76	Medium SILT	14	
0.02	39	Fine SILT	6	
0.006	25	CLAY	19	
0.002	19	Moisture content	34	

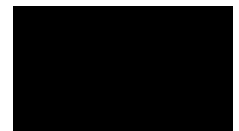
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017100521-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 10  
Your Project or Order No. PZ1522  
Date Tested 28/10/2017  
Date Report Issued 7-Nov-17

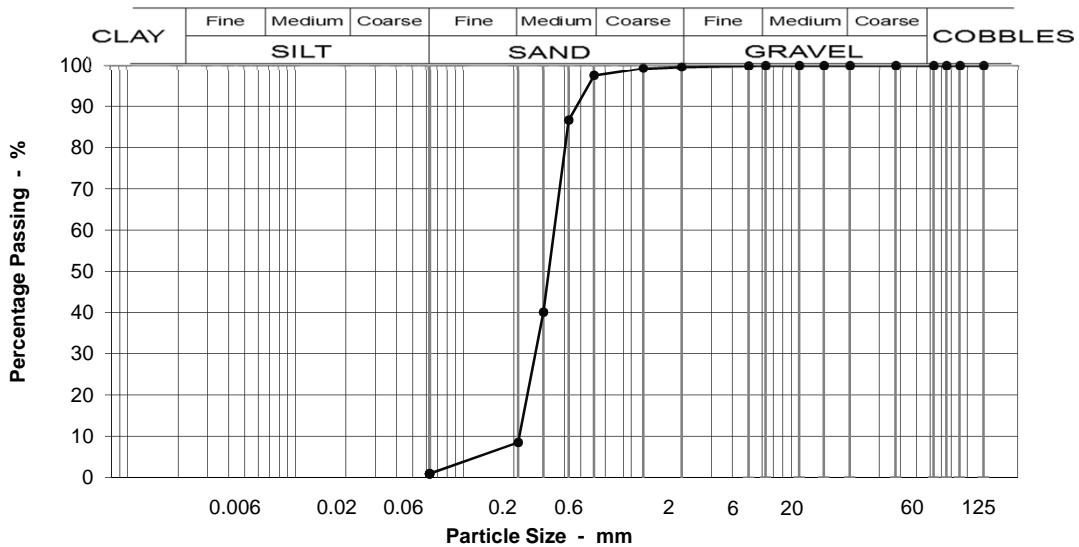
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 4.0-4.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	87
0.300	40
0.212	9
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	89
Fine SAND	8
Silt & Clay	1

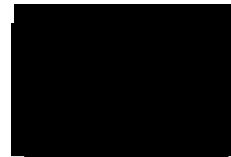
Grading Analysis	
D100	5
D60	0.35
D10	0.22
Uniformity Coefficient	2

Description	
Grey, medium SAND, rapidly weathering to brown.	

Test Code = 610



Peter Hardiment (Operations Manager)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017112913-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **14**  
Your Project or Order No. **PZ1522**  
Date Tested **05/12/2017**  
Date Report Issued **9-Jan-18**

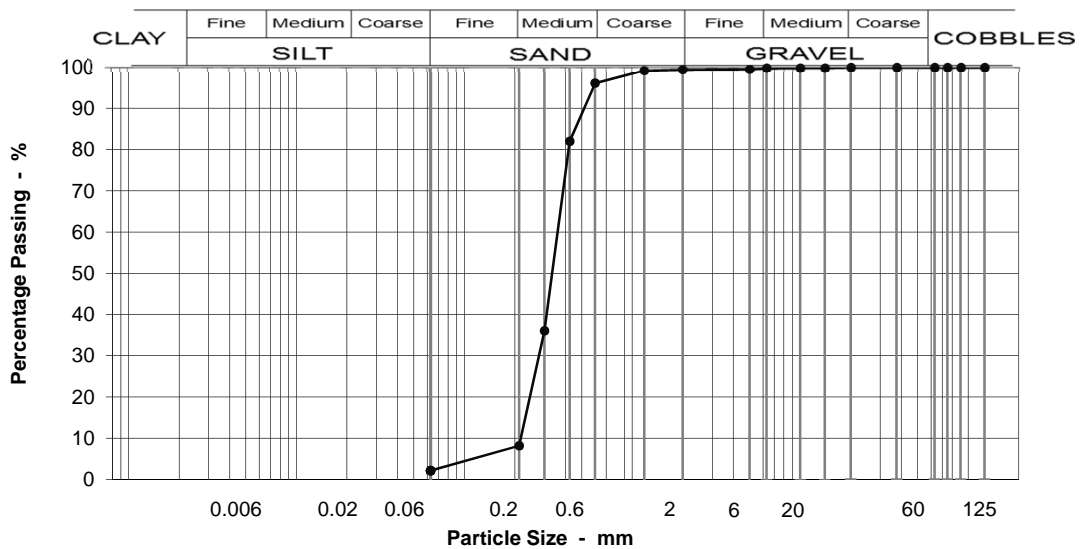
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 6 - 6.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	3
14	100		Medium SAND	88
10	100		Fine SAND	6
6.3	100		Silt & Clay	2
5	100			
2	99			
1.18	99			
0.600	96			
0.425	82			
0.300	36			
0.212	8			
0.063	2			
Moisture content %		20		

Grading Analysis	
D100	14
D60	0.37
D10	0.22
Uniformity Coefficient	2

Description	
Grey medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201710032-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **16**  
Your Project or Order No. **PZ1522**  
Date Tested **28/10/2017**  
Date Report Issued **7-Nov-17**

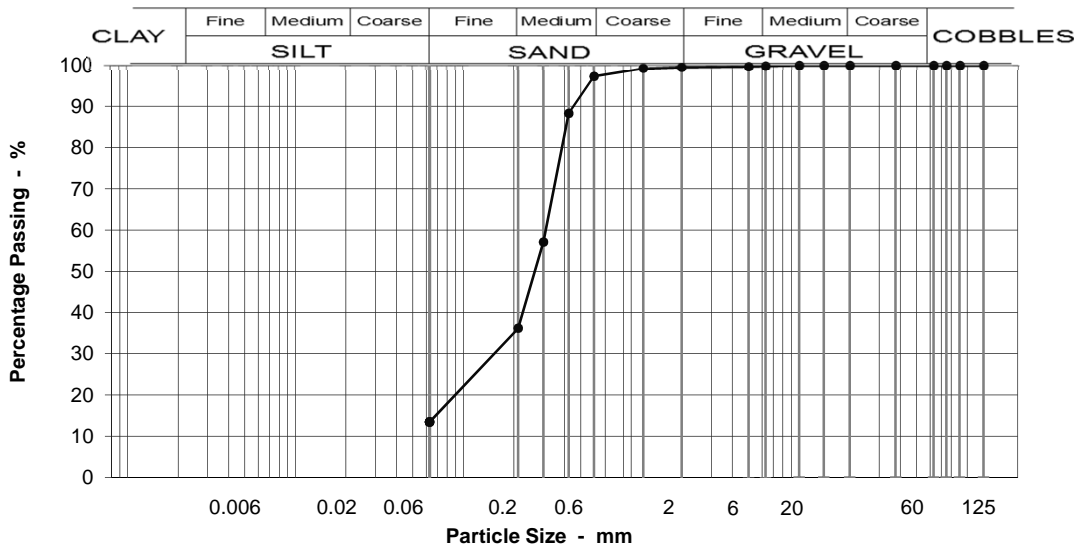
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 8.0-8.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	88
0.300	57
0.212	36
0.063	14

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	61
Fine SAND	23
Silt & Clay	14

Grading Analysis	
D100	6
D60	0.31
D10	0.06
Uniformity Coefficient	5*

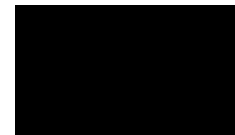
Description	
Dark grey and grey, clayey, silty, fine and medium SAND.	

\* Uniformity coefficient extrapolated

Test Code = 610



Peter Hardiment (Operations Manager)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201710032-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **16**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **18-Jan-18**

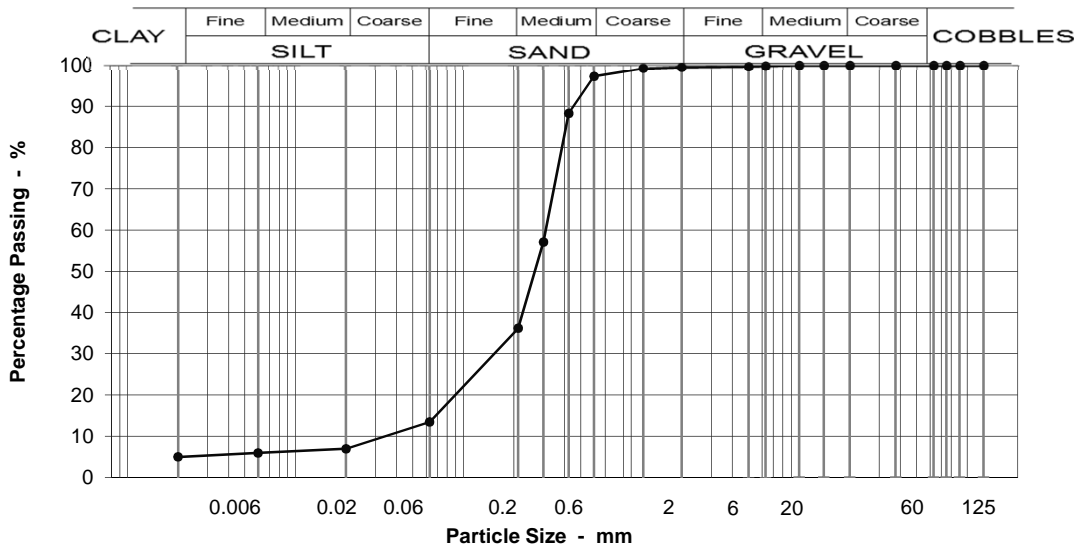
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 8 - 8.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	88
0.300	57
0.212	36
0.063	14
0.020	7
0.006	6
0.002	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	61
Fine SAND	23
Silt & Clay	14

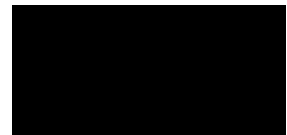
Grading Analysis	
D100	6
D60	0.31
D10	0.10
Uniformity Coefficient	3

Description	
Dark grey and light grey slightly clayey, slightly silty, fine and medium SAND.	

Test Code = 613



Simon Holden (Project Technician)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017100522-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 20  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 7-Nov-17

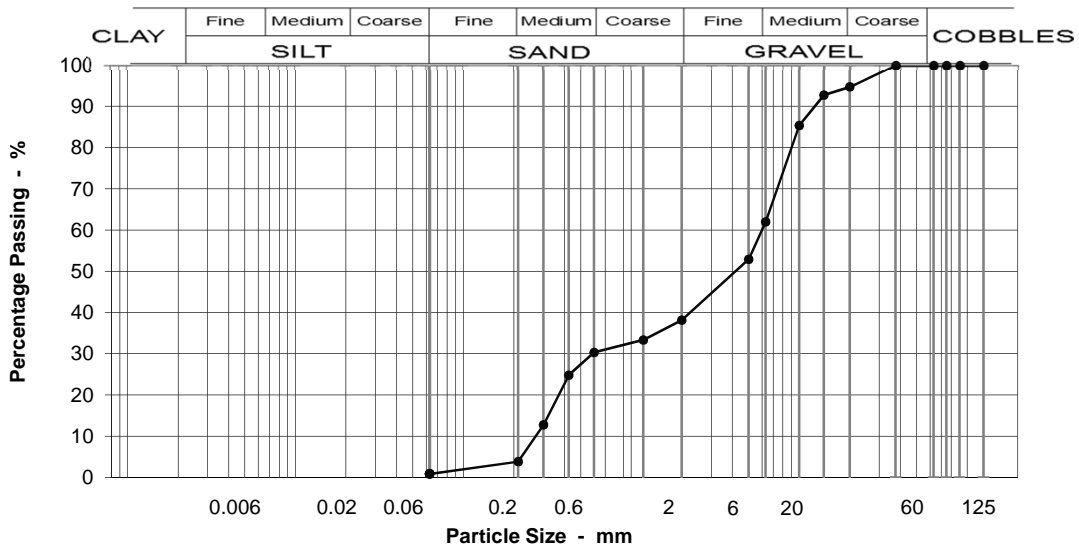
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 @ 11.0-11.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	95
14	93
10	85
6.3	62
5	53
2	38
1.18	33
0.600	30
0.425	25
0.300	13
0.212	4
0.063	1

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

**Moisture content %** 6.4

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	5
Medium GRAVEL	33
Fine GRAVEL	24
Coarse SAND	8
Medium SAND	26
Fine SAND	3
Silt & Clay	1

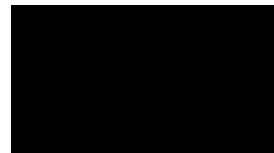
Grading Analysis	
D100	20
D60	6.01
D10	0.27
Uniformity Coefficient	22

Description	
Light grey and brown, very sandy, GRAVEL. Gravel is sub-rounded to angular, fine and medium, flint and quartz.	

Test Code = 610



Peter Hardiment (Operations Manager)



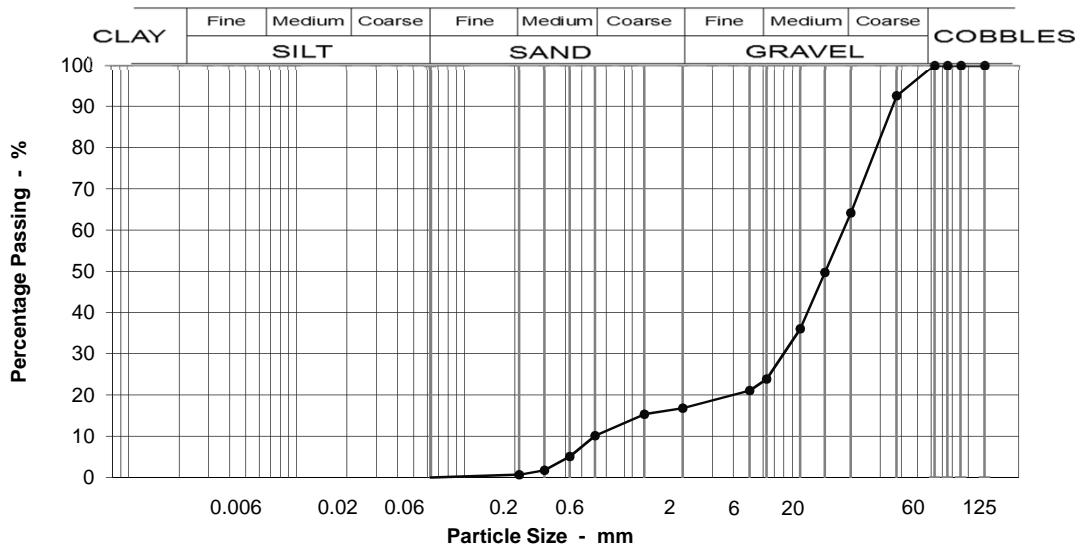
CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017100523-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 22  
**Your Project or Order No.** PZ1522  
**Date Tested** 20/10/2017  
**Date Report Issued** 7-Nov-17

**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing  
Location and orientation within sample not applicable

**Location:** BH17 @ 13.0-13.5m  
Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	93
20	64
14	50
10	36
6.3	24
5	21
2	17
1.18	15
0.600	10
0.425	5
0.300	2
0.212	1
0.063	0

**Specification for Highway Works Classification**  
Table 6/2

**Moisture content %** 2.1

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	36
Medium GRAVEL	40
Fine GRAVEL	7
Coarse SAND	7
Medium SAND	9
Fine SAND	1
Silt & Clay	0

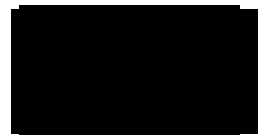
Grading Analysis	
D100	38
D60	18.28
D10	0.59
Uniformity Coefficient	31

**Description**  
Brown and light grey, sandy, medium and coarse GRAVEL. Gravel is rounded to sub-rounded, flint and quartz.

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017100524-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 24  
**Your Project or Order No.** PZ1522  
**Date Tested** 19/10/2017  
**Date Report Issued** 7-Nov-17

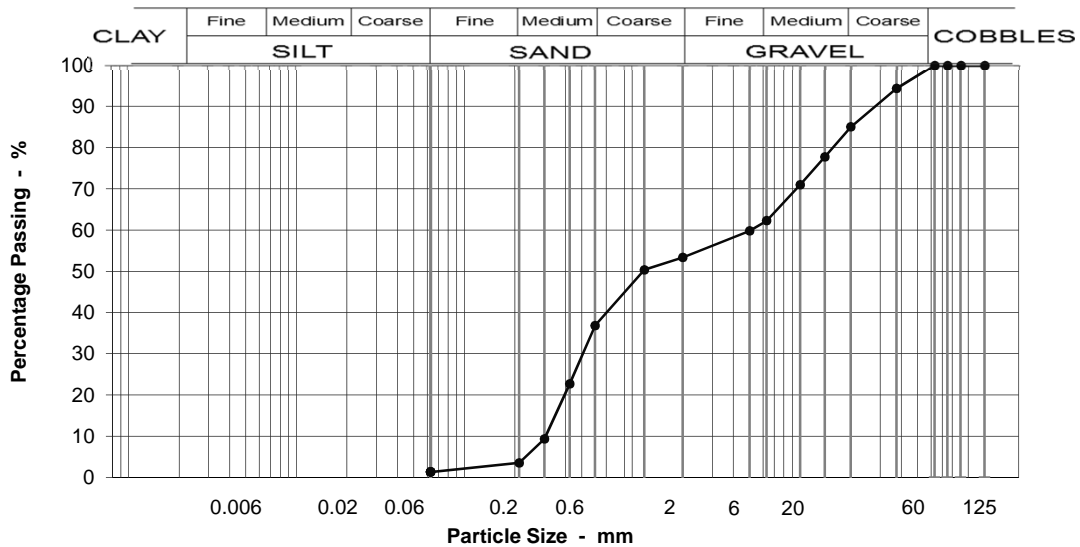
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 15.0-15.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	94
20	85
14	78
10	71
6.3	62
5	60
2	53
1.18	50
0.600	37
0.425	23
0.300	9
0.212	4
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 5.5

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	15
Medium GRAVEL	23
Fine GRAVEL	9
Coarse SAND	17
Medium SAND	33
Fine SAND	2
Silt & Clay	1

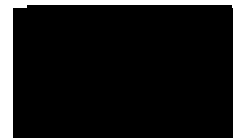
Grading Analysis	
D100	38
D60	5.11
D10	0.31
Uniformity Coefficient	17

Description	
Brown and light grey, medium to coarse SAND and rounded to sub-rounded, medium to coarse flint and quartz GRAVEL.	

Test Code = 610



Peter Hardiment (Operations Manager)





CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201711068-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **S26**  
Your Project or Order No. **PZ1522**  
Date Tested **06/11/2017**  
Date Report Issued **10-Nov-17**

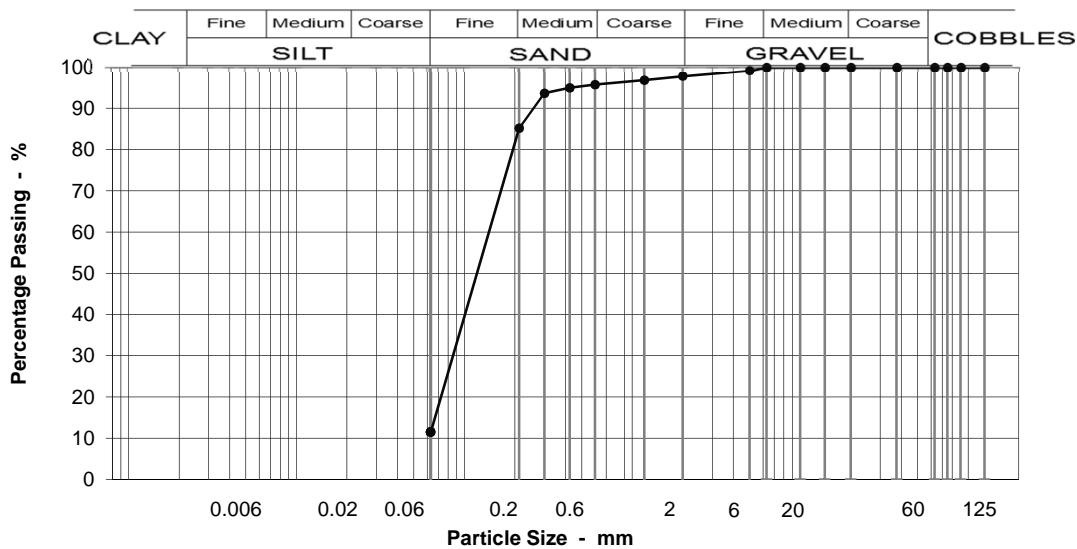
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 16 - 16.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	98
1.18	97
0.600	96
0.425	95
0.300	94
0.212	85
0.063	12

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	2
Medium SAND	11
Fine SAND	74
Silt & Clay	12

Grading Analysis	
D100	5
D60	0.16
D10	0.03
Uniformity Coefficient	6

**Description**  
Light brown and orangey-brown silty fine SAND.

Moisture content % 24

\* Uniformity coefficient extrapolated

Test Code = 610



Peter Hardiment (Operations Manager)



## Norfolk Partnership Laboratory

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**Gt Yarmouth 3rd River Crossing**  
 CES Highways Projects  
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 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL2017100330-612

**Your Sample Ref** D31

**Your Project or Order No** PZ1522

**Date Report Issued** 07-Nov-17

**Date Tested** 20-Oct-17

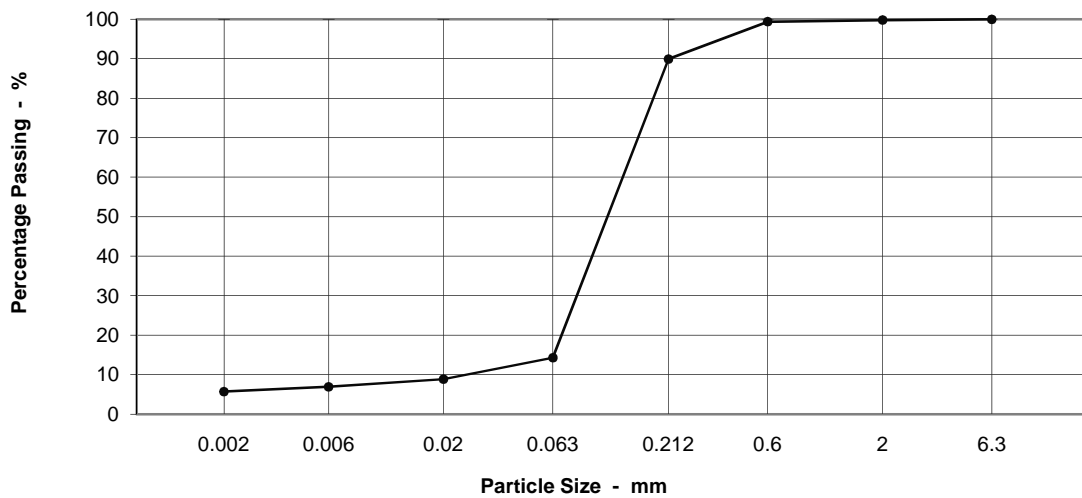
Page 1 of 1

### Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 D31 19m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	0	Light brown and grey, slightly clayey, slightly silty, fine SAND.
2.0	100	Medium SAND	9	
0.6	99	Fine SAND	76	
0.212	90	Coarse SILT	5	
0.063	14	Medium SILT	2	
0.02	9	Fine SILT	1	
0.006	7	CLAY	6	
0.002	6	Moisture content	27	

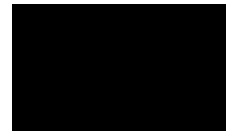
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



## Norfolk Partnership Laboratory

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**Gt Yarmouth 3rd River Crossing**  
 Community & Environmental Services  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL2017112918-612

**Your Sample Ref** B32

**Your Project or Order No** PZ1522

**Date Report Issued** 12-Jan-18

**Date Tested** 30-Nov-17

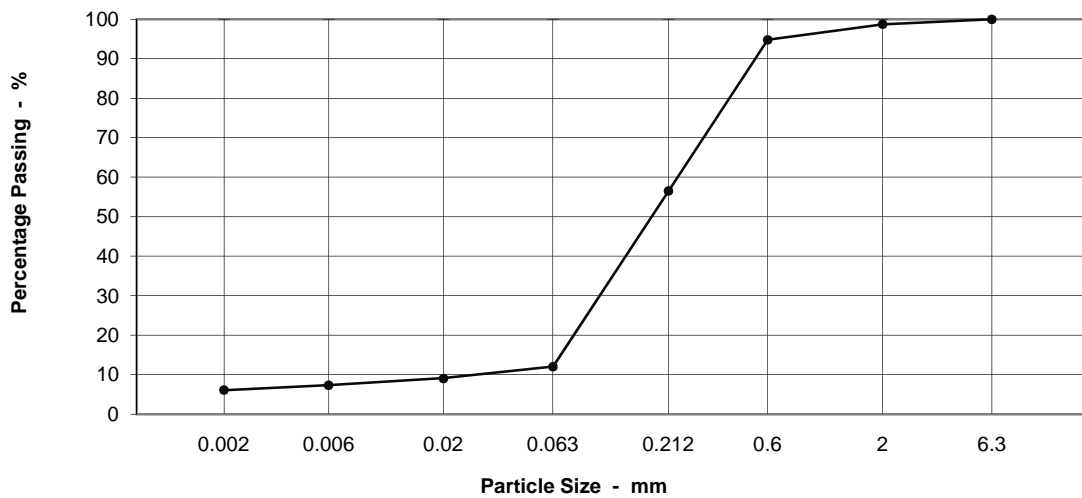
Page 1 of 1

### Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 B32 20m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	4	Grey and orangey-brown slightly clayey slightly silty fine to medium SAND.
2.0	99	Medium SAND	38	
0.6	95	Fine SAND	44	
0.212	56	Coarse SILT	3	
0.063	12	Medium SILT	2	
0.02	9	Fine SILT	1	
0.006	7	CLAY	6	
0.002	6	Moisture content	20	

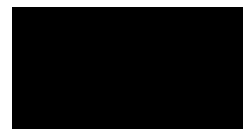
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Simon Holden (Project Technician)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017100525-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 33  
Your Project or Order No. PZ1522  
Date Tested 28/10/2017  
Date Report Issued 7-Nov-17

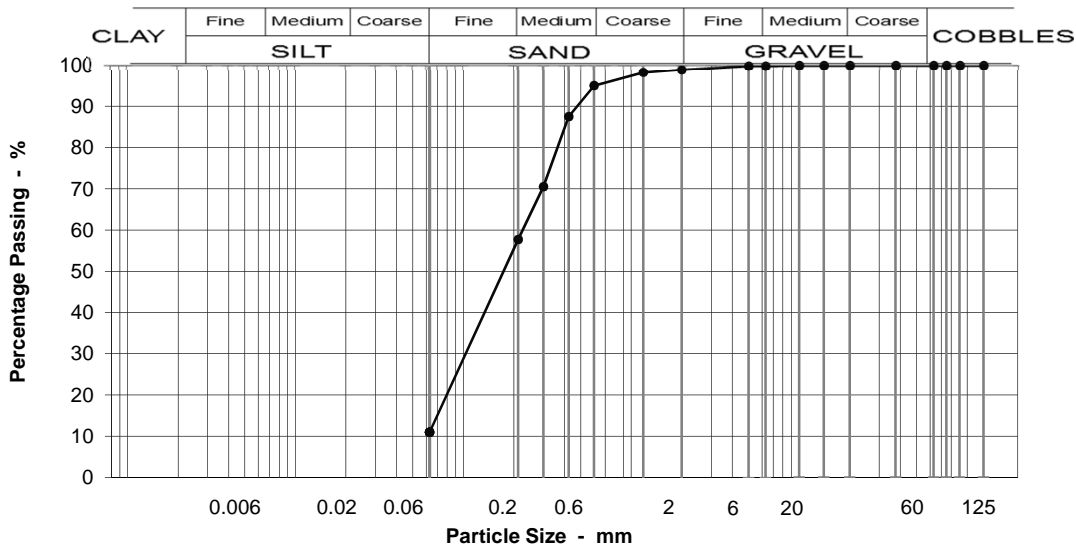
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 21.0-21.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	95
0.425	88
0.300	71
0.212	58
0.063	11

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J.**

Moisture content % 25

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	37
Fine SAND	47
Silt & Clay	11

Grading Analysis	
D100	6
D60	0.23
D10	0.04
Uniformity Coefficient	6

Description	
Grey and orangey brown, silty, clayey, fine to medium SAND.	

\* Uniformity coefficient extrapolated

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201711069-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **S38**  
Your Project or Order No. **PZ1522**  
Date Tested **06/11/2017**  
Date Report Issued **10-Nov-17**

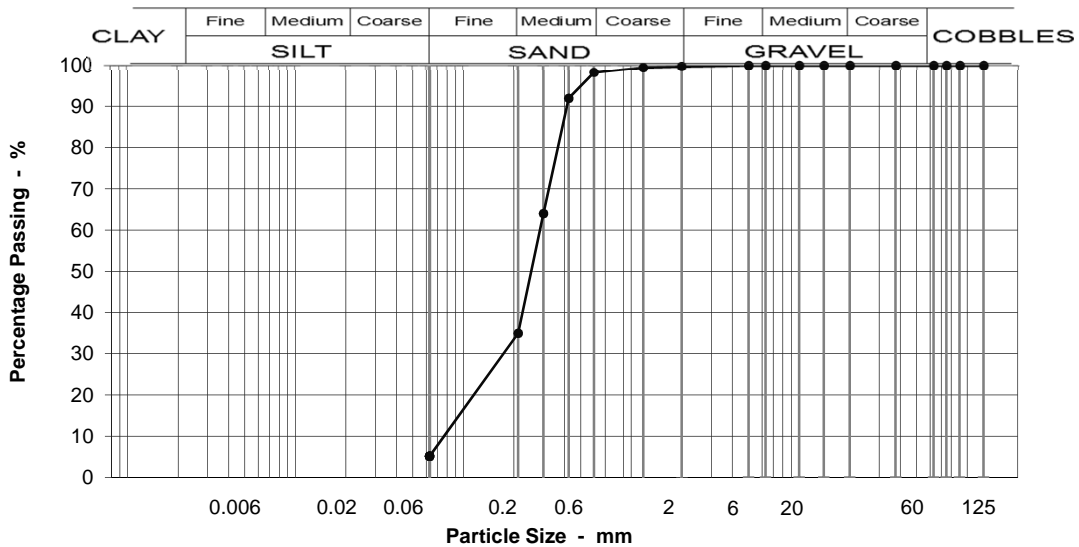
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 24 - 24.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	98
0.425	92
0.300	64
0.212	35
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	63
Fine SAND	30
Silt & Clay	5

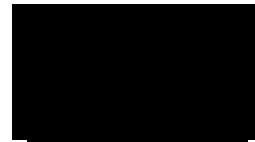
Grading Analysis	
D100	2
D60	0.29
D10	0.09
Uniformity Coefficient	3

Description	
Greyish brown slightly silty fine to medium SAND.	

Test Code = 610



Peter Hardiment (Operations Manager)



## Norfolk Partnership Laboratory

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**Gt Yarmouth 3rd River Crossing**  
 CES Highways Projects  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL2017100529-612

**Your Sample Ref** B40

**Your Project or Order No** PZ1522

**Date Report Issued** 07-Nov-17

**Date Tested** 17-Oct-17

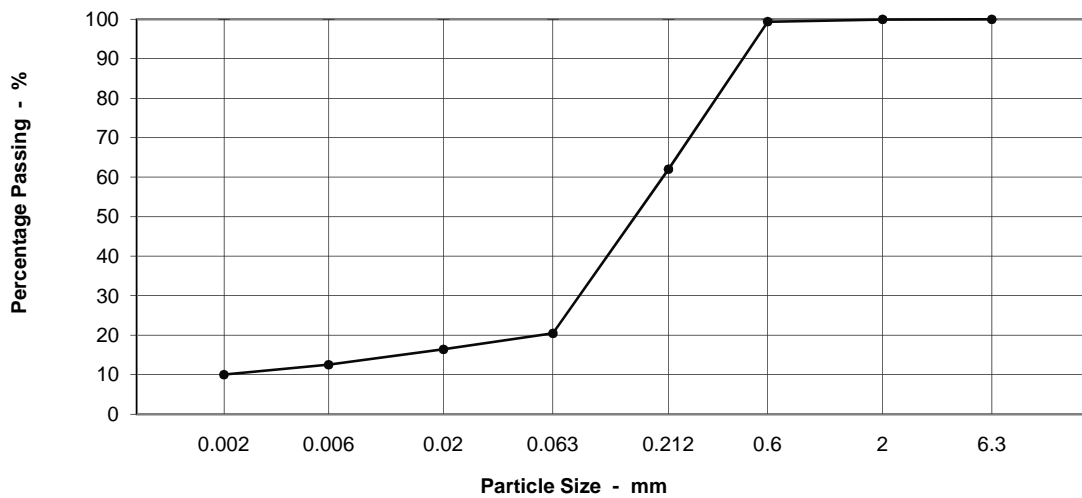
Page 1 of 1

### Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 B40 26.0-26.5m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	1	Greyish brown, clayey, silty, fine and medium SAND.
2.0	100	Medium SAND	37	
0.6	99	Fine SAND	42	
0.212	62	Coarse SILT	4	
0.063	20	Medium SILT	4	
0.02	16	Fine SILT	3	
0.006	13	CLAY	10	
0.002	10	Moisture content	26	

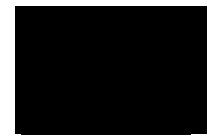
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)





## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

**Gt Yarmouth 3rd River Crossing**  
 CES Highways Projects  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL2017100530-612

**Your Sample Ref** B43

**Your Project or Order No** PZ1522

**Date Report Issued** 07-Nov-17

**Date Tested** 17-Oct-17

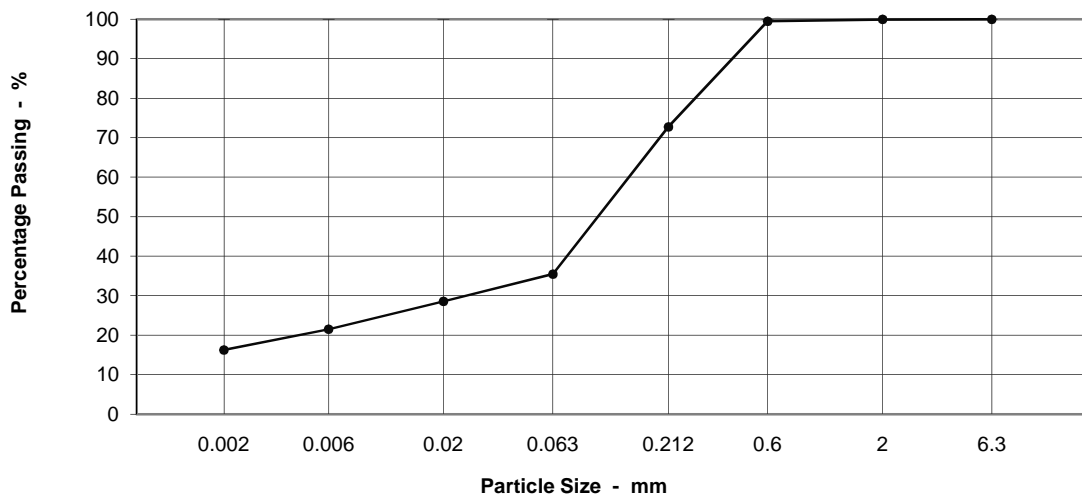
Page 1 of 1

### Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 B43 28.0-28.5m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	0	Light grey, clayey, silty, fine and medium SAND.
2.0	100	Medium SAND	27	
0.6	100	Fine SAND	37	
0.212	73	Coarse SILT	7	
0.063	35	Medium SILT	7	
0.02	29	Fine SILT	5	
0.006	22	CLAY	16	
0.002	16	Moisture content	27	

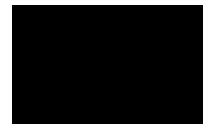
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

**Gt Yarmouth 3rd River Crossing**  
 CES Highways Projects  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL2017100530-612

**Your Sample Ref** B43

**Your Project or Order No** PZ1522

**Date Report Issued** 03-Nov-17

**Date Tested** 17-Oct-17

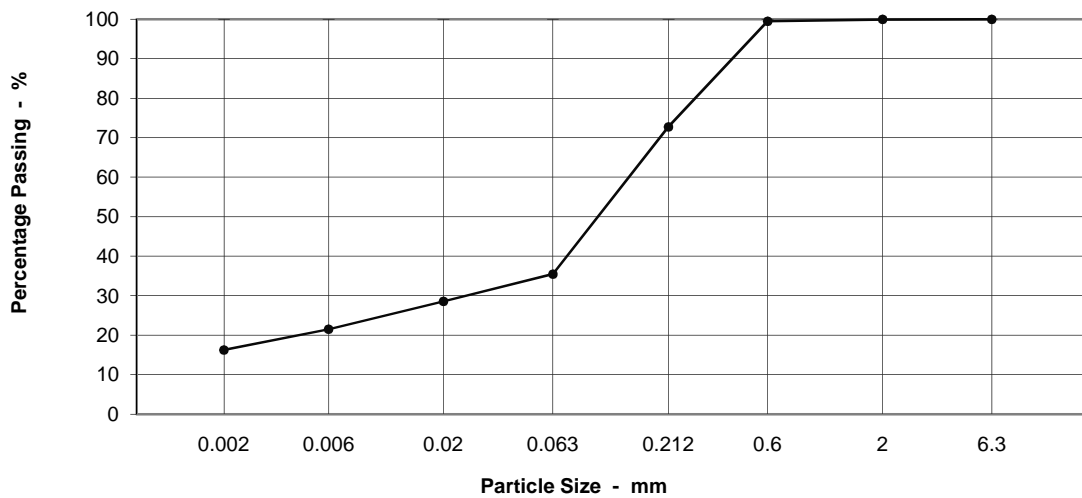
Page 1 of 1

### Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 B43 28.5m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	0	Light grey, very clayey, silty, fine and medium SAND.
2.0	100	Medium SAND	27	
0.6	100	Fine SAND	37	
0.212	73	Coarse SILT	7	
0.063	35	Medium SILT	7	
0.02	29	Fine SILT	5	
0.006	22	CLAY	16	
0.002	16	Moisture content	27	

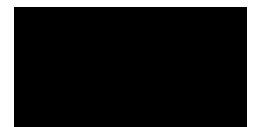
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



Norfolk County Council  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017110610-613  
**Our Project No** PZ1522D1  
**Your Sample Ref** S47  
**Your Project or Order No.** PZ1522  
**Date Tested** 20/11/2017  
**Date Report Issued** 28-Nov-17

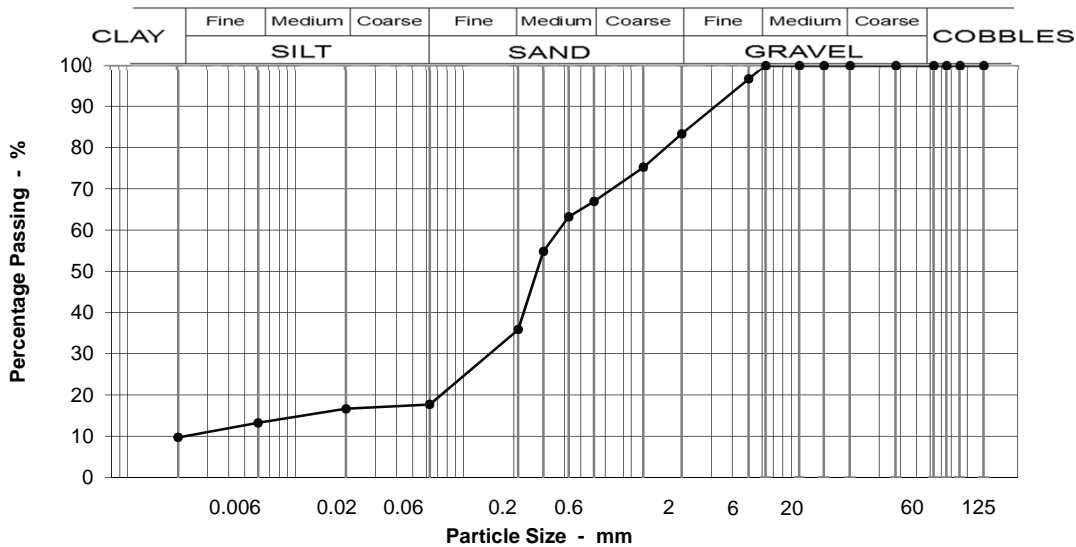
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 @ 31 - 31.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	97
2	83
1.18	75
0.600	67
0.425	63
0.300	55
0.212	36
0.063	18
0.020	17
0.006	13
0.002	10

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes**  
**2A/2B, 2A/2B.**

**Moisture content %** 32

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	17
Coarse SAND	16
Medium SAND	31
Fine SAND	18
Silt & Clay	18

Grading Analysis	
D100	5
D60	0.38
D10	0.06
Uniformity Coefficient	7

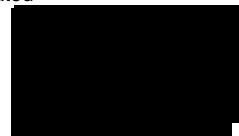
Description	
Grey clayey gravelly fine to coarse SAND. Gravel is fine rounded to subrounded flint.	

\* Uniformity coefficient extrapolated

Test Code = 613



Peter Hardiment (Operations Manager)



## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

### Great Yarmouth Third River Crossing

Norfolk County Council  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

Our Project No PZ1522D1

Our Report and sample No NCCL2017110610-612

Your Sample Ref BS47

Your Project or Order No PZ1522

Date Report Issued 28-Nov-17

Date Tested 13-Nov-17

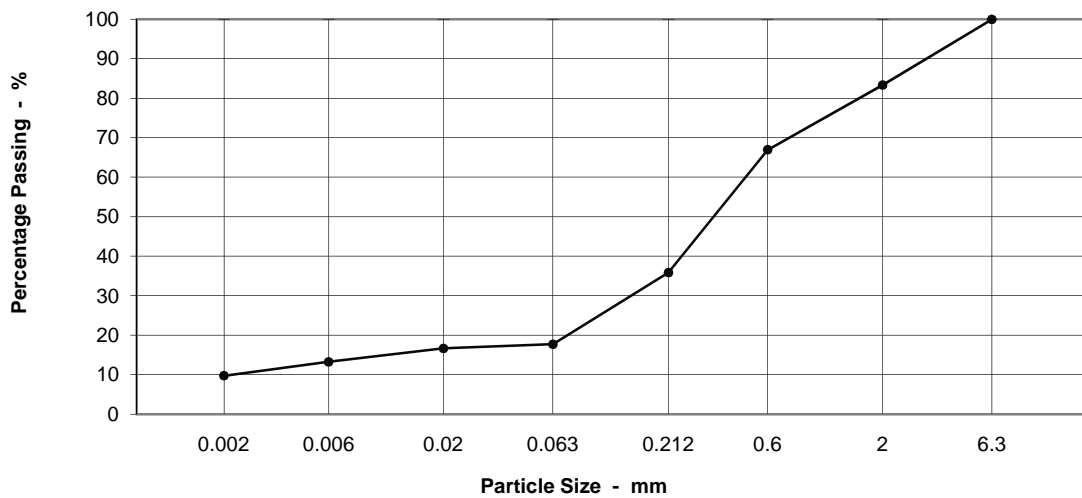
Page 1 of 1

## Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 BS47 31-31.5m

### Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	16	Laminated, grey fine, medium and coarse SAND, stiff dark grey CLAY & thin laminae of light grey SILT.
2.0	83	Medium SAND	31	
0.6	67	Fine SAND	18	
0.212	36	Coarse SILT	1	
0.063	18	Medium SILT	3	
0.02	17	Fine SILT	3	
0.006	13	CLAY	10	
0.002	10	Moisture content	33	

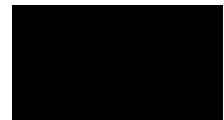
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017100526-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **52**  
Your Project or Order No. **PZ1522**  
Date Tested **20/10/2017**  
Date Report Issued **7-Nov-17**

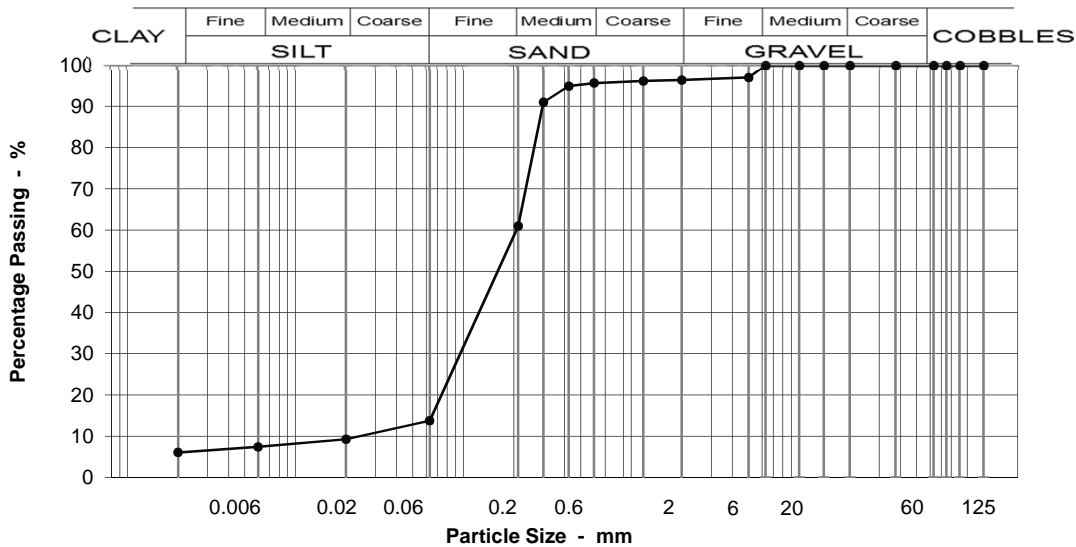
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 34.5-35.0m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	97
2	96
1.18	96
0.600	96
0.425	95
0.300	91
0.212	61
0.063	14
0.020	9
0.006	7
0.002	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 27

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	4
Coarse SAND	1
Medium SAND	35
Fine SAND	47
Silt & Clay	14

Grading Analysis	
D100	5
D60	0.21
D10	0.06
Uniformity Coefficient	3

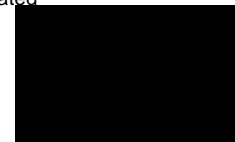
**Description**  
Laminated, dark grey and grey, clayey, silty, fine and medium SAND with occasional fine flint gravel.

\* Uniformity coefficient extrapolated

Test Code = 613



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017110611-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** S55  
**Your Project or Order No.** PZ1522  
**Date Tested** 06/11/2017  
**Date Report Issued** 10-Nov-17

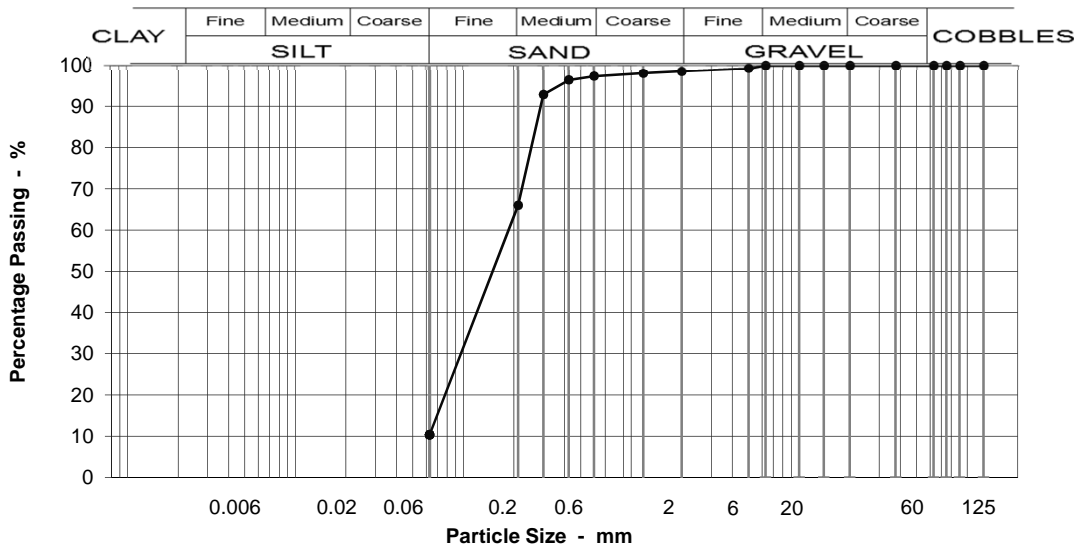
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 @ 36 - 36.5m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	99
1.18	98
0.600	97
0.425	96
0.300	93
0.212	66
0.063	10

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J.**

**Moisture content %** 20

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	31
Fine SAND	56
Silt & Clay	10

Grading Analysis	
D100	5
D60	0.20
D10	0.03
Uniformity Coefficient	6

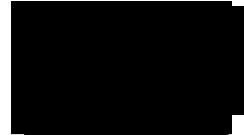
Description	
Grey slightly clayey slightly silty fine to medium SAND.	

\* Uniformity coefficient extrapolated

Test Code = 610



Peter Hardiment (Operations Manager)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017112919-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **58**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **12-Jan-18**

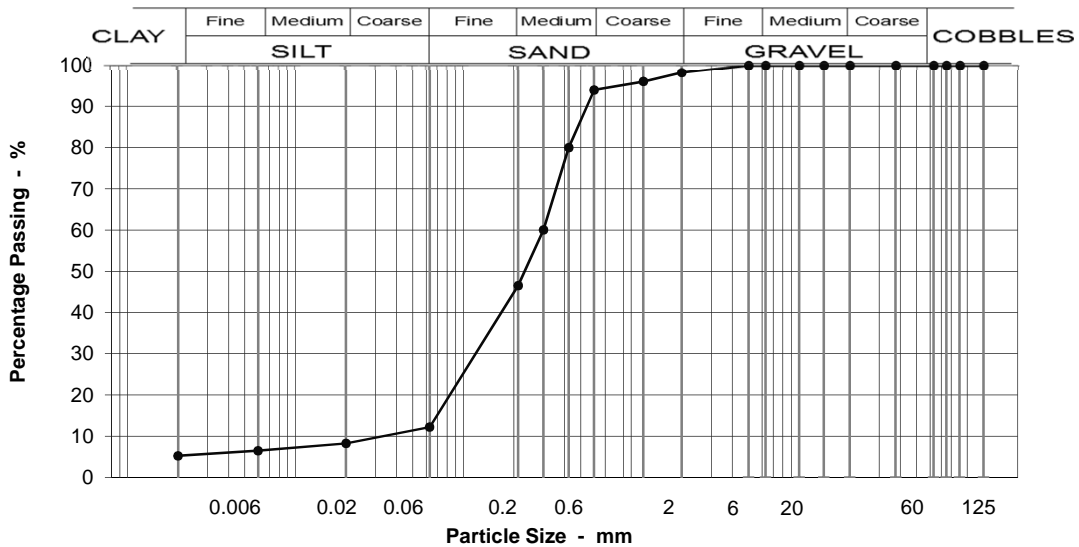
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 38 - 38.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	96
0.600	94
0.425	80
0.300	60
0.212	47
0.063	12
0.020	8
0.006	7
0.002	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	4
Medium SAND	47
Fine SAND	34
Silt & Clay	12

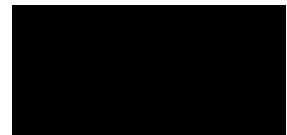
Grading Analysis	
D100	2
D60	0.30
D10	0.08
Uniformity Coefficient	4

**Description**  
Grey silty fine to medium SAND with lenses of soft grey clay.

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017112920-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **60**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **12-Jan-18**

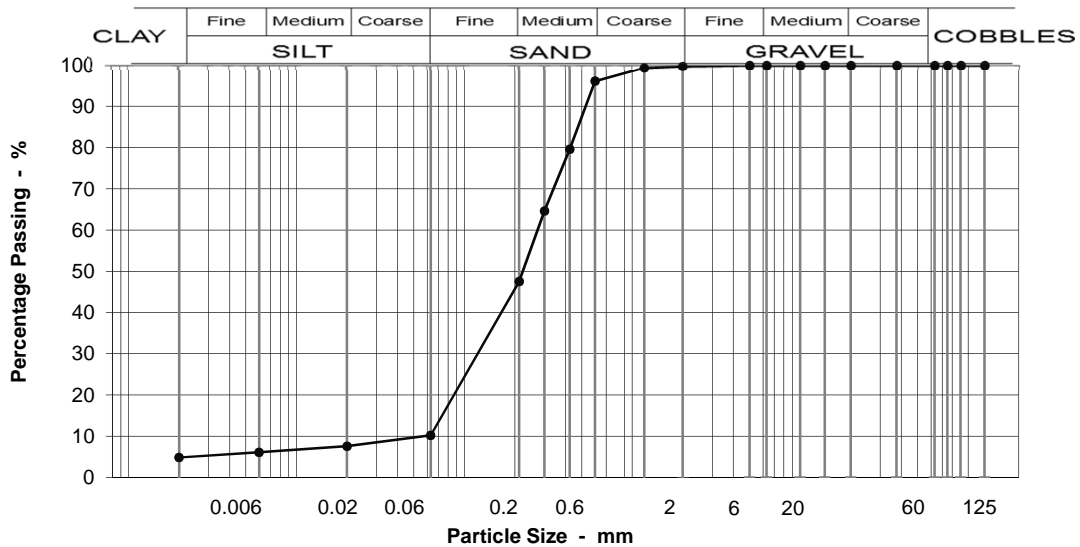
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 40 - 40.45m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	96
0.425	80
0.300	65
0.212	48
0.063	10
0.020	8
0.006	6
0.002	5

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	4
Medium SAND	48
Fine SAND	37
Silt & Clay	10

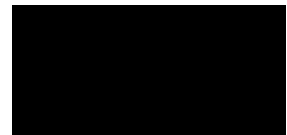
Grading Analysis	
D100	2
D60	0.28
D10	0.10
Uniformity Coefficient	3

**Description**  
Grey slightly silty fine to medium SAND with occasional lenses of soft grey clay.

Test Code = 613



Simon Holden (Project Technician)



**Norfolk Partnership Laboratory**

 Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)
**Gt Yarmouth 3rd River Crossing**  
 CES Highways Projects  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL2017100329-612

**Your Sample Ref** B6

**Your Project or Order No** PZ1522

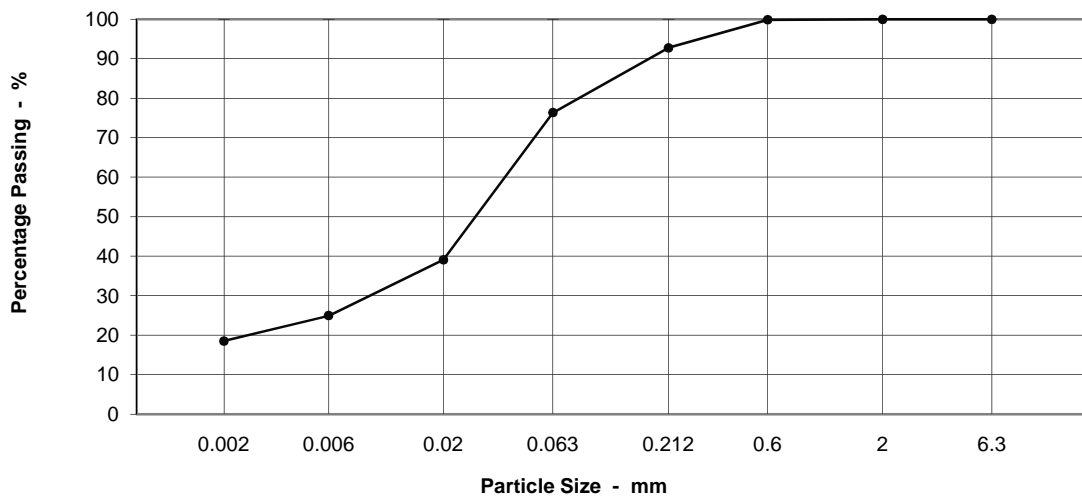
**Date Report Issued** 03-Nov-17

**Date Tested** 20-Oct-17

Page 1 of 1

**Particle Size Distribution to BS 1377 : Part 2 : 1990**  
**Sedimentation Method Section 9.4**
**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 B6 2.5m

**Particle Size Distribution**


Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	0	Soft, greeny grey, very clayey, sandy, fine, medium and coarse SILT.
2.0	100	Medium SAND	7	
0.6	100	Fine SAND	16	
0.212	93	Coarse SILT	37	
0.063	76	Medium SILT	14	
0.02	39	Fine SILT	6	
0.006	25	CLAY	19	
0.002	19	Moisture content	34	

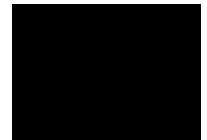
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017100521-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 10  
**Your Project or Order No.** PZ1522  
**Date Tested** 28/10/2017  
**Date Report Issued** 3-Nov-17

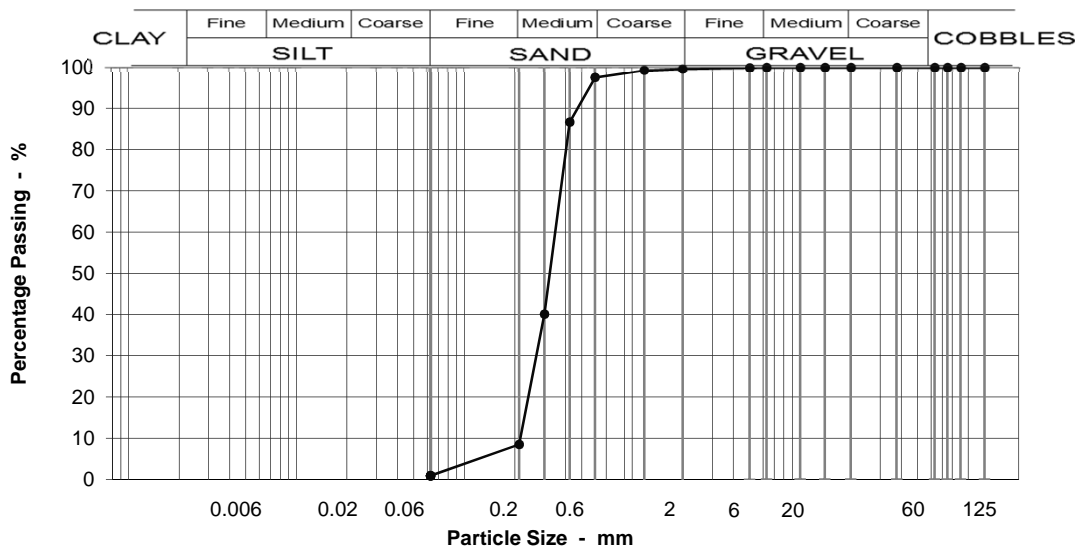
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 @ 4.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	87
0.300	40
0.212	9
0.063	1

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	89
Fine SAND	8
Silt & Clay	1

Grading Analysis	
D100	5
D60	0.35
D10	0.22
Uniformity Coefficient	2

**Description**  
Grey, fine, medium and coarse SAND, rapidly weathering to grey.

**Moisture content %** 22

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201710032-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **16**  
Your Project or Order No. **PZ1522**  
Date Tested **28/10/2017**  
Date Report Issued **3-Nov-17**

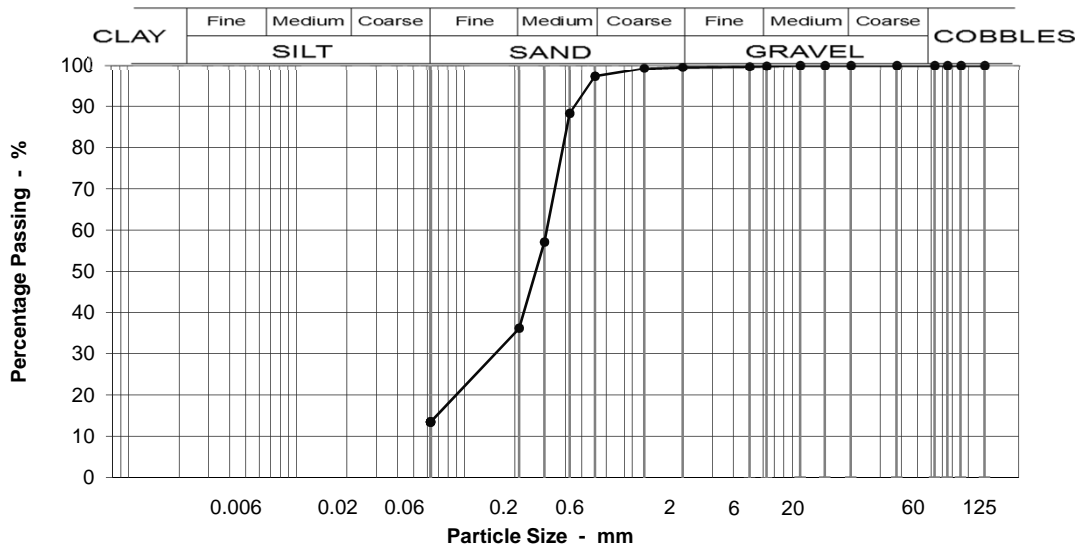
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 8.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	88
0.300	57
0.212	36
0.063	14

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	61
Fine SAND	23
Silt & Clay	14

Grading Analysis	
D100	6
D60	0.31
D10	0.06
Uniformity Coefficient	5*

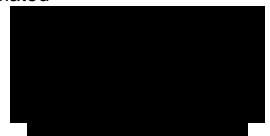
Description	
Dark grey and grey, clayey, silty, fine and medium SAND.	

\* Uniformity coefficient extrapolated

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017100522-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 20  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 3-Nov-17

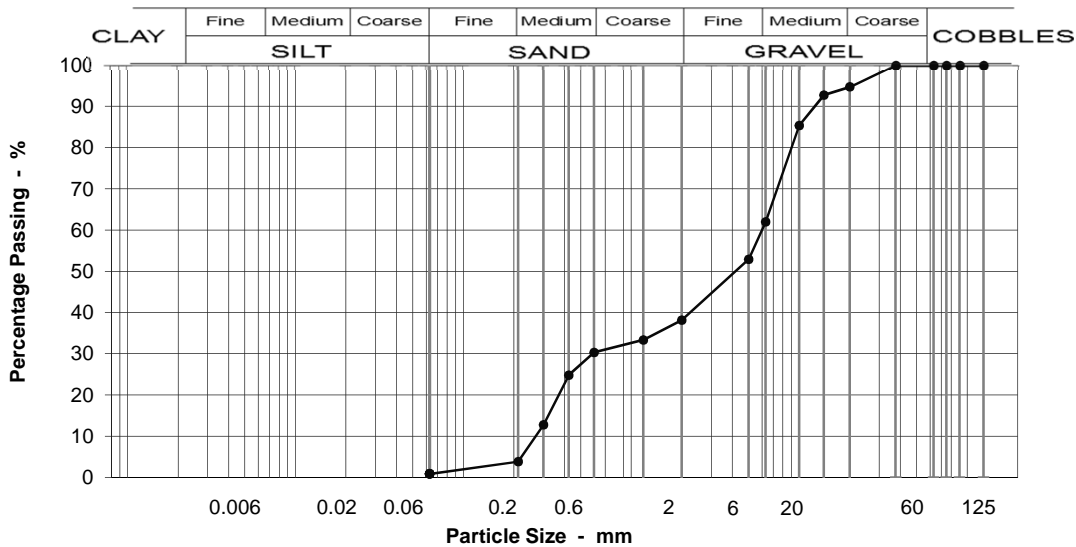
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 @ 11.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	95
14	93
10	85
6.3	62
5	53
2	38
1.18	33
0.600	30
0.425	25
0.300	13
0.212	4
0.063	1

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

**Moisture content %** 6.4

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	5
Medium GRAVEL	33
Fine GRAVEL	24
Coarse SAND	8
Medium SAND	26
Fine SAND	3
Silt & Clay	1

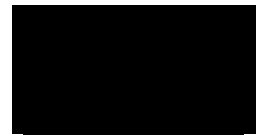
Grading Analysis	
D100	20
D60	6.01
D10	0.27
Uniformity Coefficient	22

Description	
Light grey and brown, very sandy, GRAVEL. Gravel is sub-rounded to angular, fine, medium and coarse flint and quartz.	

Test Code = 610



Peter Hardiment (Operations Manager)





CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017100523-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 22  
**Your Project or Order No.** PZ1522  
**Date Tested** 20/10/2017  
**Date Report Issued** 3-Nov-17

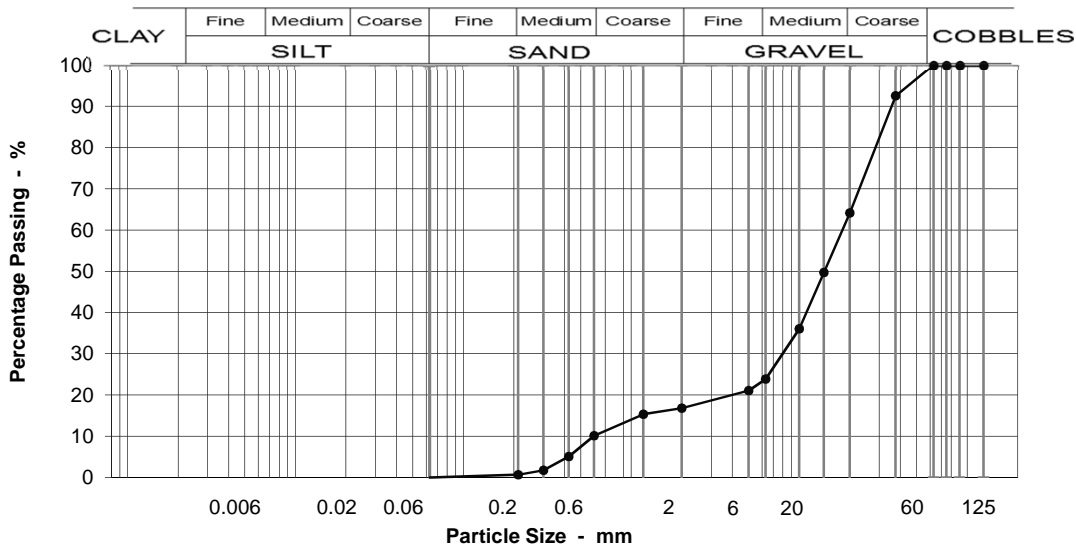
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 @ 13.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	93
20	64
14	50
10	36
6.3	24
5	21
2	17
1.18	15
0.600	10
0.425	5
0.300	2
0.212	1
0.063	0

**Specification for Highway Works Classification**  
Table 6/2

**Moisture content %** 2.1

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	36
Medium GRAVEL	40
Fine GRAVEL	7
Coarse SAND	7
Medium SAND	9
Fine SAND	1
Silt & Clay	0

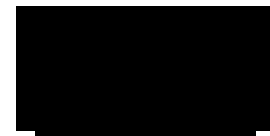
Grading Analysis	
D100	38
D60	18.28
D10	0.59
Uniformity Coefficient	31

**Description**  
Brown and light grey, sandy, fine, medium and coarse GRAVEL. Gravel is rounded to sub-rounded, flint and quartz.

Test Code = 610



Peter Hardiment (Operations Manager)





## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

**Gt Yarmouth 3rd River Crossing**  
 CES Highways Projects  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL2017100330-612

**Your Sample Ref** D31

**Your Project or Order No** PZ1522

**Date Report Issued** 03-Nov-17

**Date Tested** 20-Oct-17

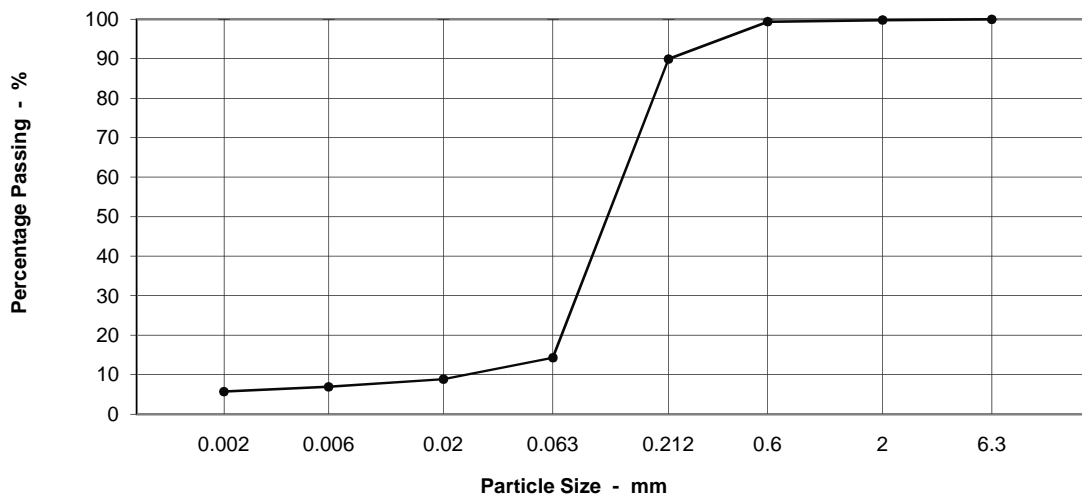
Page 1 of 1

### Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 D31 19.45m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	0	Light brown and grey, clayey, silty, fine and medium SAND.
2.0	100	Medium SAND	9	
0.6	99	Fine SAND	76	
0.212	90	Coarse SILT	5	
0.063	14	Medium SILT	2	
0.02	9	Fine SILT	1	
0.006	7	CLAY	6	
0.002	6	Moisture content	27	

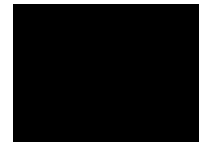
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017100525-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 33  
Your Project or Order No. PZ1522  
Date Tested 28/10/2017  
Date Report Issued 3-Nov-17

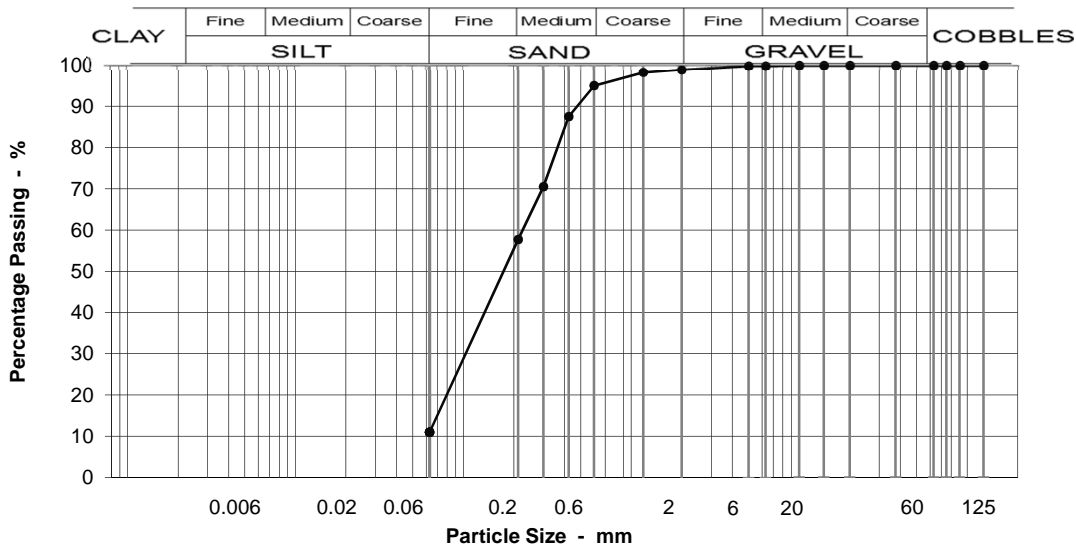
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 21.5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	95
0.425	88
0.300	71
0.212	58
0.063	11

Specification for Highway Works Classification  
Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6J.

Moisture content % 25

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	37
Fine SAND	47
Silt & Clay	11

Grading Analysis	
D100	6
D60	0.23
D10	0.04
Uniformity Coefficient	6

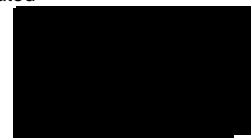
Description	
Grey and orangey brown, silty, layey, fine, medium and coarse SAND.	

\* Uniformity coefficient extrapolated

Test Code = 610



Peter Hardiment (Operations Manager)



## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

**Gt Yarmouth 3rd River Crossing**  
 CES Highways Projects  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL2017100529-612

**Your Sample Ref** B40

**Your Project or Order No** PZ1522

**Date Report Issued** 03-Nov-17

**Date Tested** 17-Oct-17

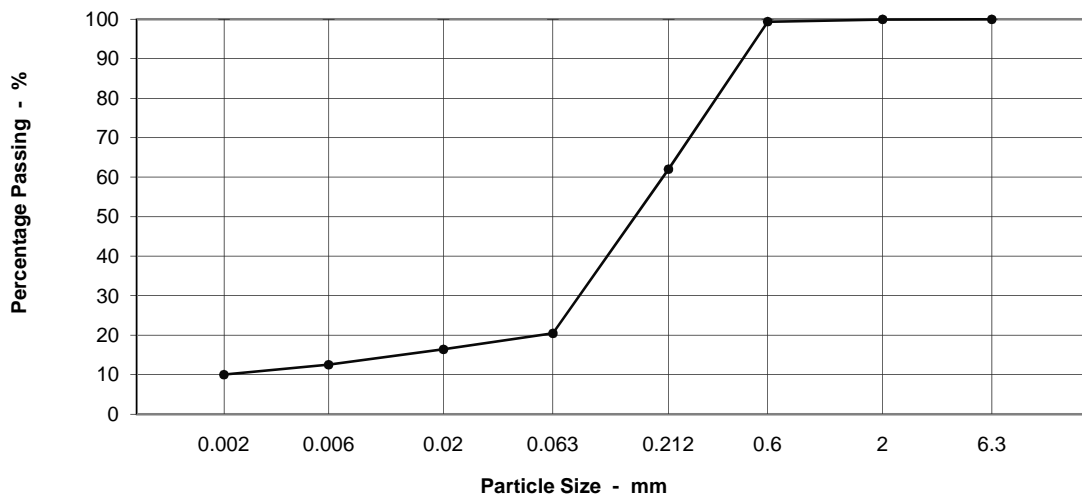
Page 1 of 1

### Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 B40 26.5m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	1	Greyish brown, slightly clayey, silty, fine and medium SAND.
2.0	100	Medium SAND	37	
0.6	99	Fine SAND	42	
0.212	62	Coarse SILT	4	
0.063	20	Medium SILT	4	
0.02	16	Fine SILT	3	
0.006	13	CLAY	10	
0.002	10	Moisture content	26	

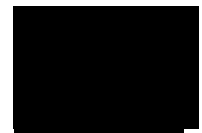
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

**Gt Yarmouth 3rd River Crossing**  
 CES Highways Projects  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL2017100530-612

**Your Sample Ref** B43

**Your Project or Order No** PZ1522

**Date Report Issued** 03-Nov-17

**Date Tested** 17-Oct-17

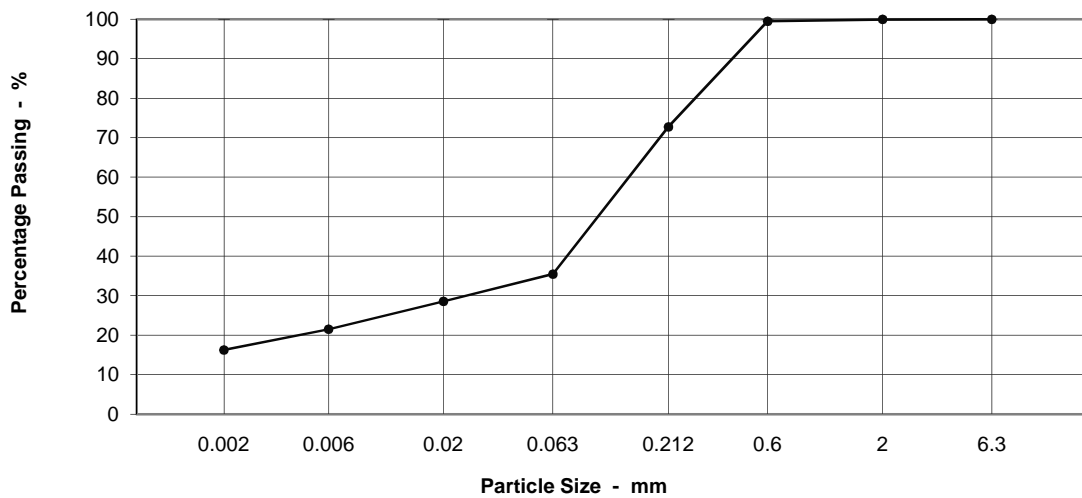
Page 1 of 1

### Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 B43 28.5m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	0	Light grey, very clayey, silty, fine and medium SAND.
2.0	100	Medium SAND	27	
0.6	100	Fine SAND	37	
0.212	73	Coarse SILT	7	
0.063	35	Medium SILT	7	
0.02	29	Fine SILT	5	
0.006	22	CLAY	16	
0.002	16	Moisture content	27	

Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)





CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017100526-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **52**  
Your Project or Order No. **PZ1522**  
Date Tested **20/10/2017**  
Date Report Issued **3-Nov-17**

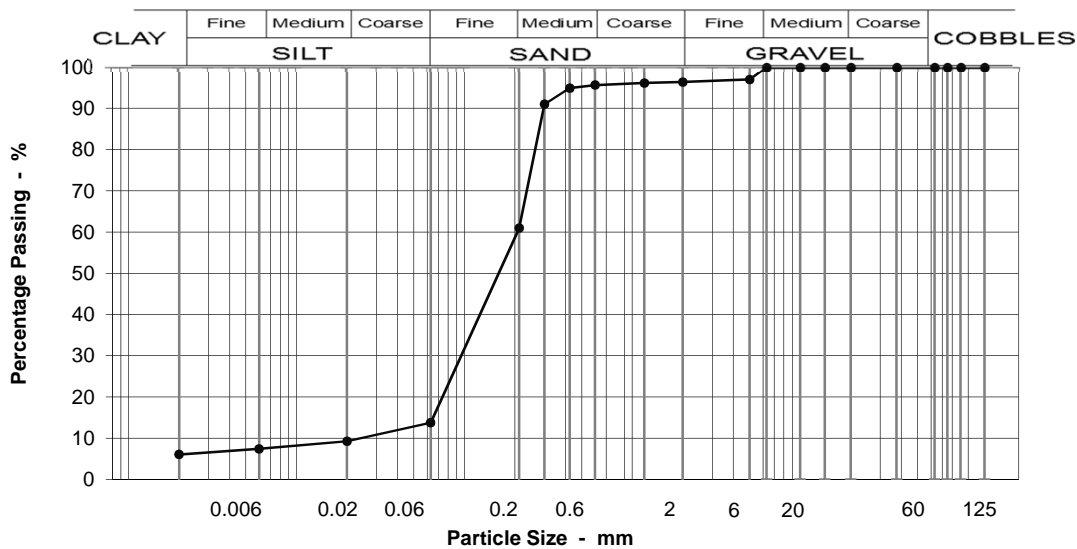
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: **Gt Yarmouth 3rd River Crossing**

Location: **BH17 @ 35m**

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	4
20	100		Coarse SAND	1
14	100		Medium SAND	35
10	100		Fine SAND	47
6.3	100		Silt & Clay	14
5	97			
2	96			
1.18	96			
0.600	96			
0.425	95			
0.300	91			
0.212	61			
0.063	14			
0.020	9			
0.006	7			
0.002	6			
<b>Moisture content %</b>		<b>27</b>		

Grading Analysis	
D100	5
D60	0.21
D10	0.06
Uniformity Coefficient	3

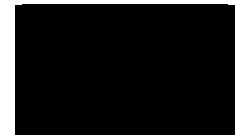
Description	
Firm to stiff, laminated, dark grey and grey, clayey, silty, fine and medium SAND with occasional flint gravel.	

\* Uniformity coefficient extrapolated

Test Code = 613



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017100527-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 57  
**Your Project or Order No.** PZ1522  
**Date Tested** 20/10/2017  
**Date Report Issued** 3-Nov-17

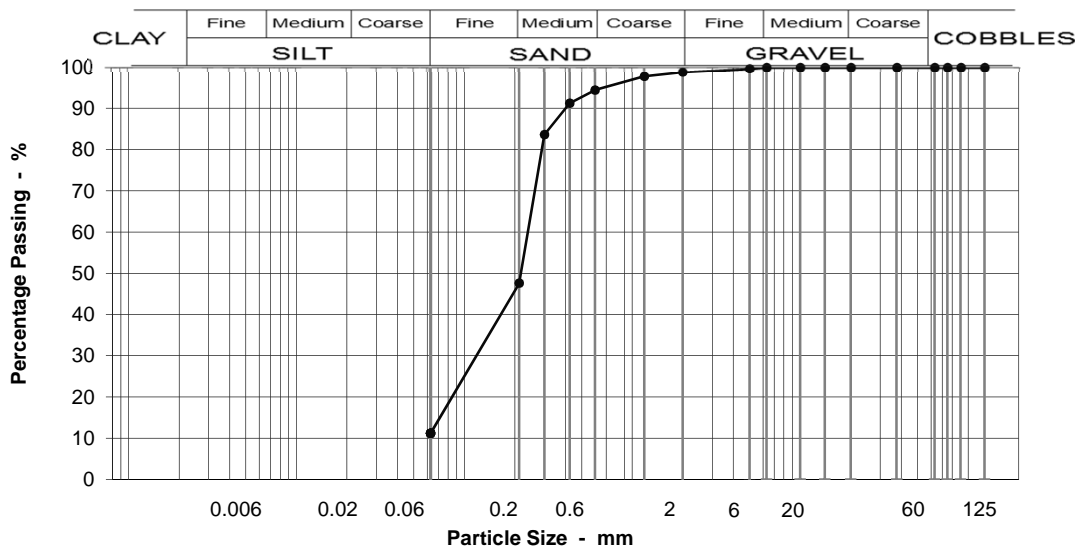
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH17 @ 38m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	94
0.425	91
0.300	84
0.212	48
0.063	11

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6J.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	47
Fine SAND	36
Silt & Clay	11

Grading Analysis	
D100	5
D60	0.24
D10	0.05
Uniformity Coefficient	5

**Description**  
Grey, fine, medium and coarse SAND with lenses of soft grey clay.

**Moisture content %** 24

\* Uniformity coefficient extrapolated

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017100528-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 60  
Your Project or Order No. PZ1522  
Date Tested 20/10/2017  
Date Report Issued 3-Nov-17

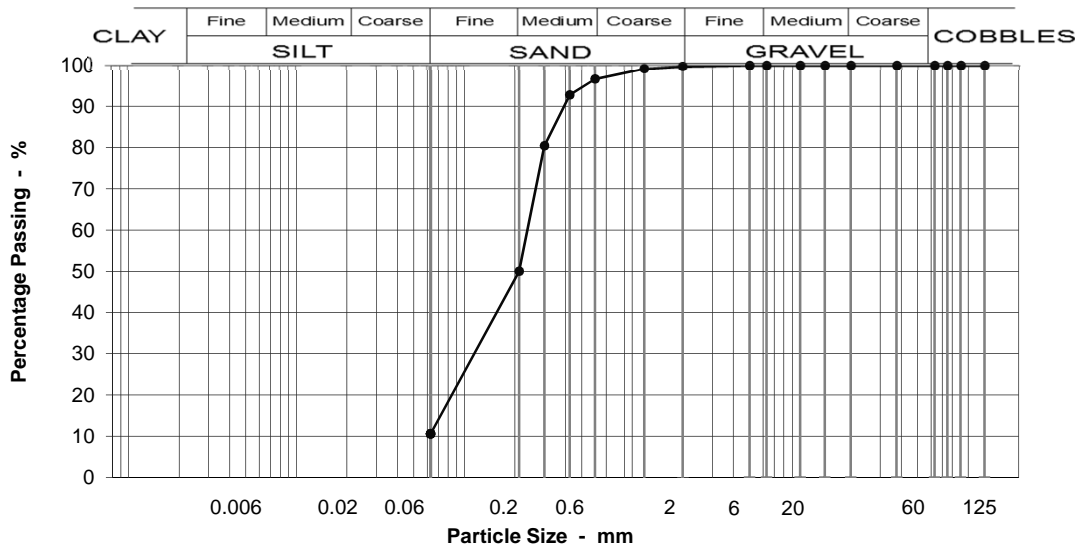
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH17 @ 40m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	93
0.300	80
0.212	50
0.063	11

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J.**

Moisture content % 24

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	3
Medium SAND	47
Fine SAND	39
Silt & Clay	11

Grading Analysis	
D100	2
D60	0.24
D10	0.04
Uniformity Coefficient	6

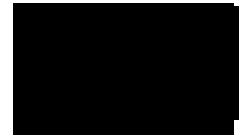
Description	
Grey, fine, medium and coarse SAND with lenses of soft grey clay.	

\* Uniformity coefficient extrapolated

Test Code = 610



Peter Hardiment (Operations Manager)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017112921-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested **12/12/2017**  
Date Report Issued **22-Jan-18**

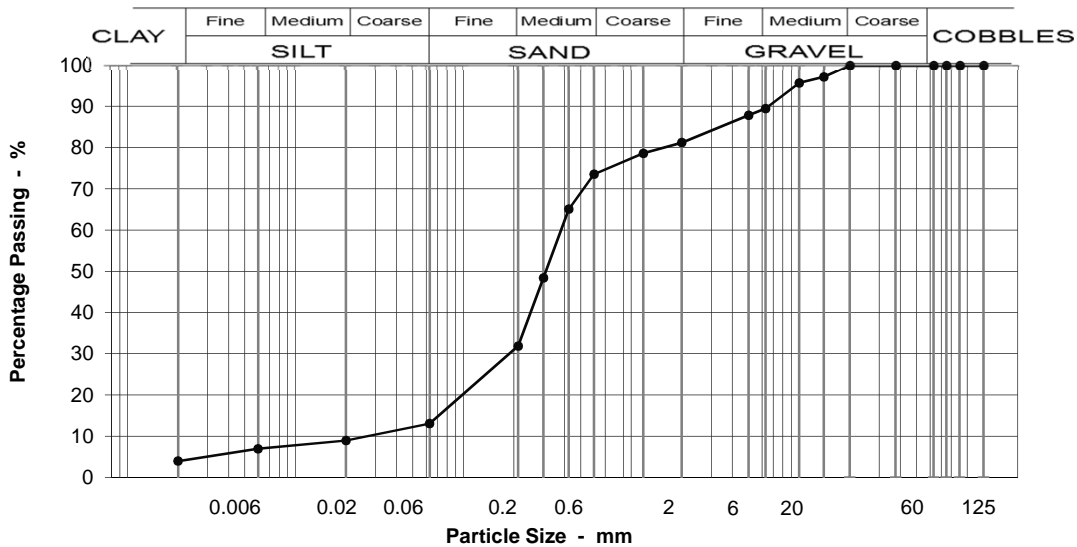
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH18 @ 0.8m Specimen: 2

Location and orientation within sample not applicable

Disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	97
10	96
6.3	89
5	88
2	81
1.18	79
0.600	74
0.425	65
0.300	48
0.212	32
0.063	13
0.020	9
0.006	7
0.002	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 16

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	11
Fine GRAVEL	8
Coarse SAND	8
Medium SAND	42
Fine SAND	19
Silt & Clay	13

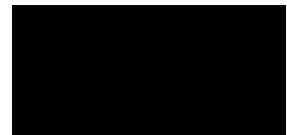
Grading Analysis	
D100	14
D60	0.39
D10	0.09
Uniformity Coefficient	4

**Description**  
MADE GROUND: comprising dark brown very gravelly slightly silty fine to medium SAND. Gravel is fine to medium angular concrete, flint, chalk and some shell fragments.

Test Code = 613



Simon Holden (Project Technician)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017101729-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **5**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-Nov-17**

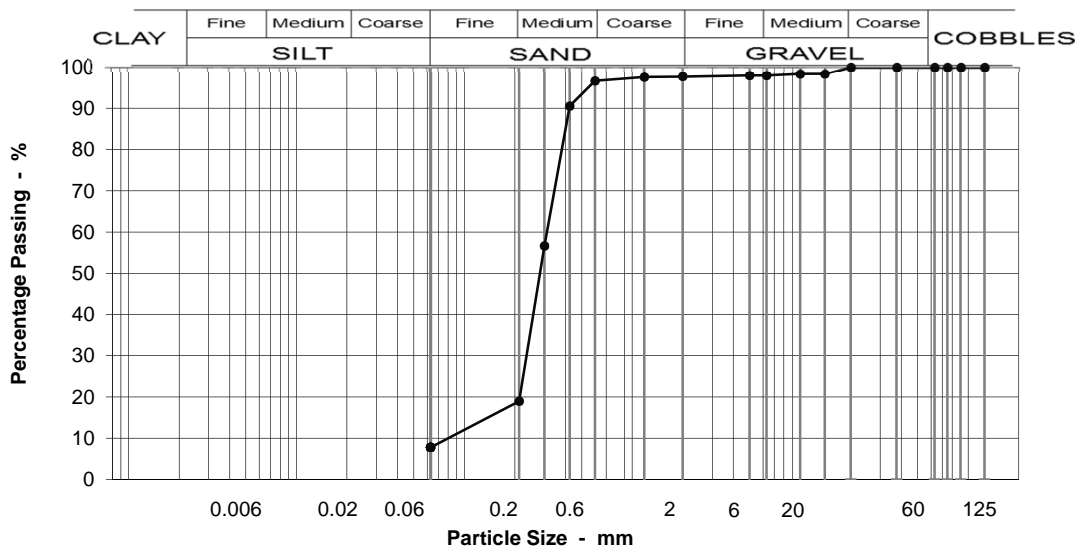
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH18 @ 2.6 - 3m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	98
6.3	98
5	98
2	98
1.18	98
0.600	97
0.425	91
0.300	57
0.212	19
0.063	8

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	78
Fine SAND	11
Silt & Clay	8

Grading Analysis	
D100	14
D60	0.31
D10	0.09
Uniformity Coefficient	3

**Description**  
Dark grey, slightly clayey, fine, medium and coarse SAND with numerous shell fragments.

Moisture content % 17

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017101730-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **9**  
Your Project or Order No. **PZ1522**  
Date Tested **20/10/2017**  
Date Report Issued **22-Nov-17**

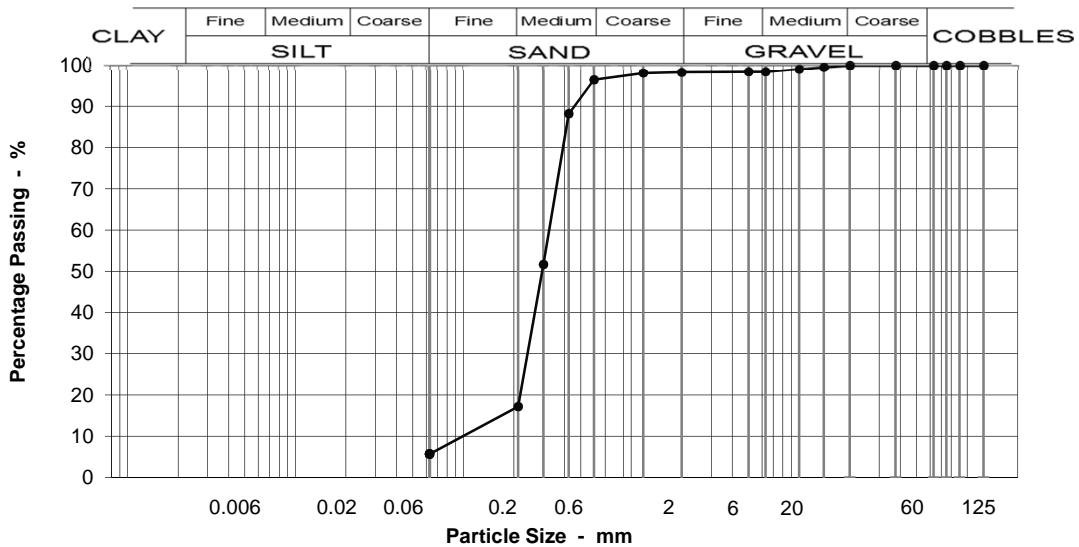
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH18 @ 4.7 - 5m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	98
5	98
2	98
1.18	98
0.600	96
0.425	88
0.300	52
0.212	17
0.063	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	79
Fine SAND	11
Silt & Clay	6

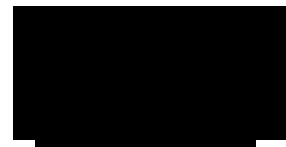
Grading Analysis	
D100	14
D60	0.33
D10	0.12
Uniformity Coefficient	3

**Description**  
Dark grey, fine, medium and coarse SAND with some lenses of dark grey, SILT.

Test Code = 610



Peter Hardiment (Operations Manager)





CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017101731-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 14  
**Your Project or Order No.** PZ1522  
**Date Tested** 20/10/2017  
**Date Report Issued** 22-Nov-17

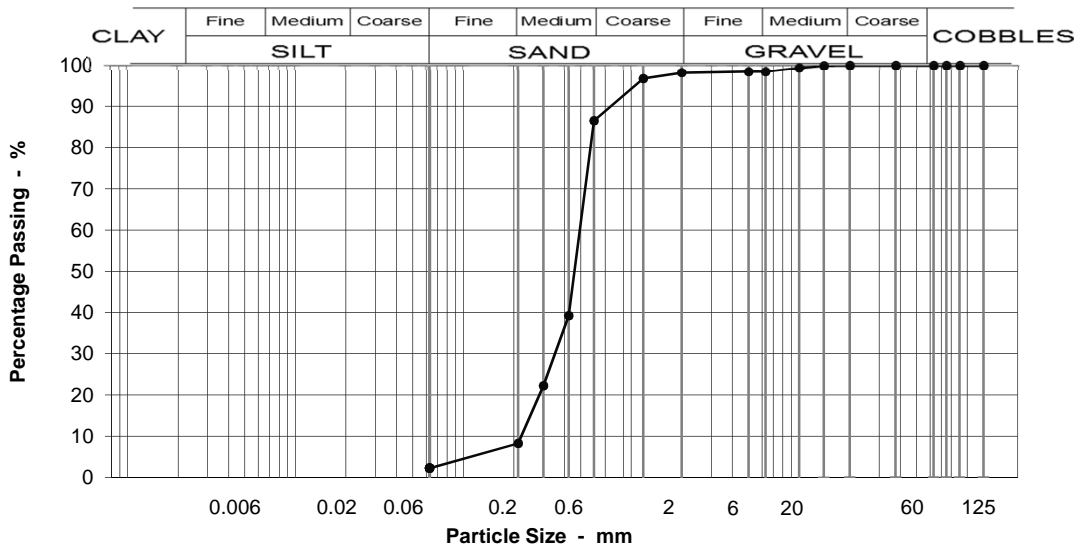
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH18 @ 7.6 - 7.9m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	98
5	98
2	98
1.18	97
0.600	87
0.425	39
0.300	22
0.212	8
0.063	2

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	0
Coarse SAND	12
Medium SAND	78
Fine SAND	6
Silt & Clay	2

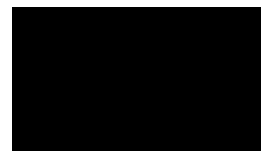
Grading Analysis	
D100	14
D60	0.50
D10	0.22
Uniformity Coefficient	2

Description	
Dark grey, fine, medium and coarse SAND.	

Test Code = 610



Peter Hardiment (Operations Manager)



## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

### Great Yarmouth Third River Crossing

Norfolk County Council  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

Our Project No PZ1522D1

Our Report and sample No NCCL2017101725-612

Your Sample Ref B17

Your Project or Order No PZ1522

Date Report Issued 28-Nov-17

Date Tested 31-Oct-17

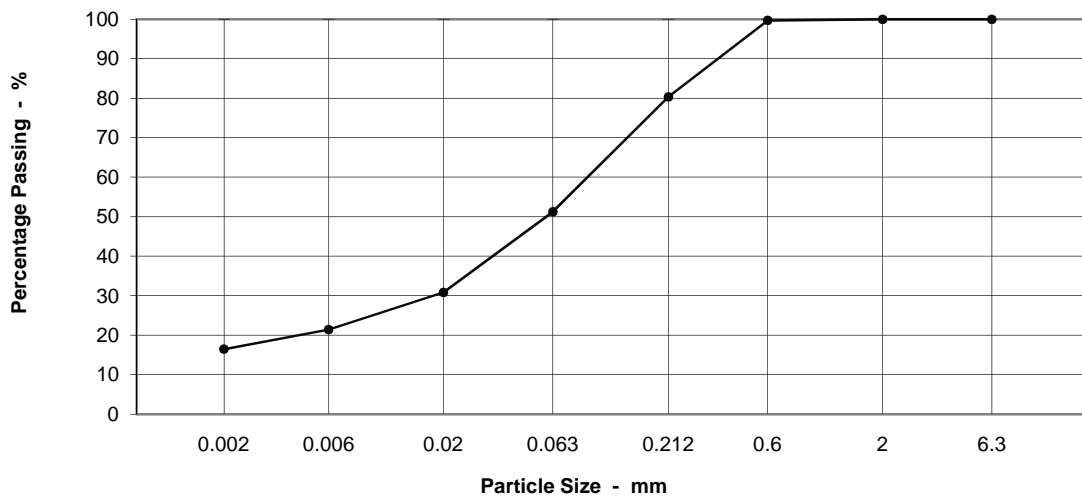
Page 1 of 1

## Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH18 B17 9.6-10.0m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	0	Dark grey, clayey, very silty fine and medium SAND, weathering to brown.
2.0	100	Medium SAND	19	
0.6	100	Fine SAND	29	
0.212	80	Coarse SILT	20	
0.063	51	Medium SILT	9	
0.02	31	Fine SILT	5	
0.006	21	CLAY	16	
0.002	16	Moisture content	38	

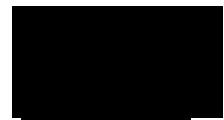
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state".  
 Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out.  
 Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017101732-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 22  
Your Project or Order No. PZ1522  
Date Tested 20/10/2017  
Date Report Issued 22-Nov-17

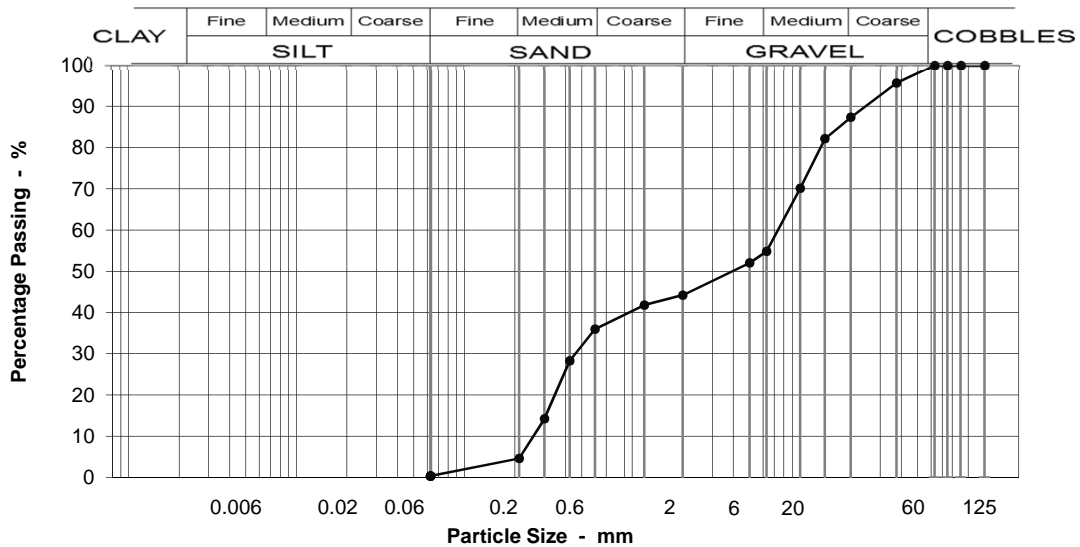
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH18 @ 12.6 - 13m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	96
20	87
14	82
10	70
6.3	55
5	52
2	44
1.18	42
0.600	36
0.425	28
0.300	14
0.212	5
0.063	0

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 8.1

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	13
Medium GRAVEL	32
Fine GRAVEL	11
Coarse SAND	8
Medium SAND	31
Fine SAND	4
Silt & Clay	0

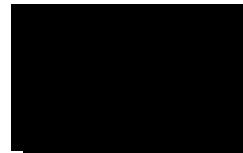
Grading Analysis	
D100	38
D60	7.55
D10	0.26
Uniformity Coefficient	29

Description	
Orangey grey, fine, medium and coarse SAND and greyish brown, fine, medium and coarse, angular to sub-angular, flint and quartz GRAVEL.	

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017101733-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 28  
**Your Project or Order No.** PZ1522  
**Date Tested** 20/10/2017  
**Date Report Issued** 22-Nov-17

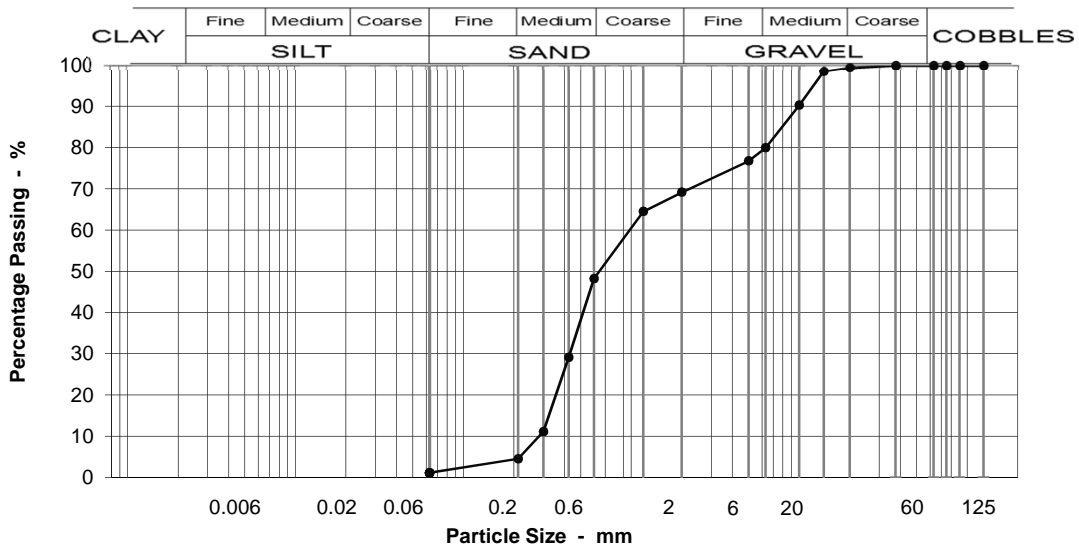
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH18 @ 16.8 - 17m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	99
10	90
6.3	80
5	77
2	69
1.18	64
0.600	48
0.425	29
0.300	11
0.212	5
0.063	1

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6F1, 6M.**

**Moisture content %** 5

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	19
Fine GRAVEL	11
Coarse SAND	21
Medium SAND	44
Fine SAND	3
Silt & Clay	1

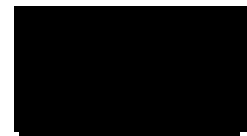
Grading Analysis	
D100	20
D60	1.02
D10	0.28
Uniformity Coefficient	4

**Description**  
Yellowy grey, very gravelly, fine, medium and coarse SAND. Gravel is rounded to sub-rounded, fine and medium, flint and quartz.

Test Code = 610



Peter Hardiment (Operations Manager)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017101734-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **33**  
Your Project or Order No. **PZ1522**  
Date Tested **28/10/2017**  
Date Report Issued **22-Nov-17**

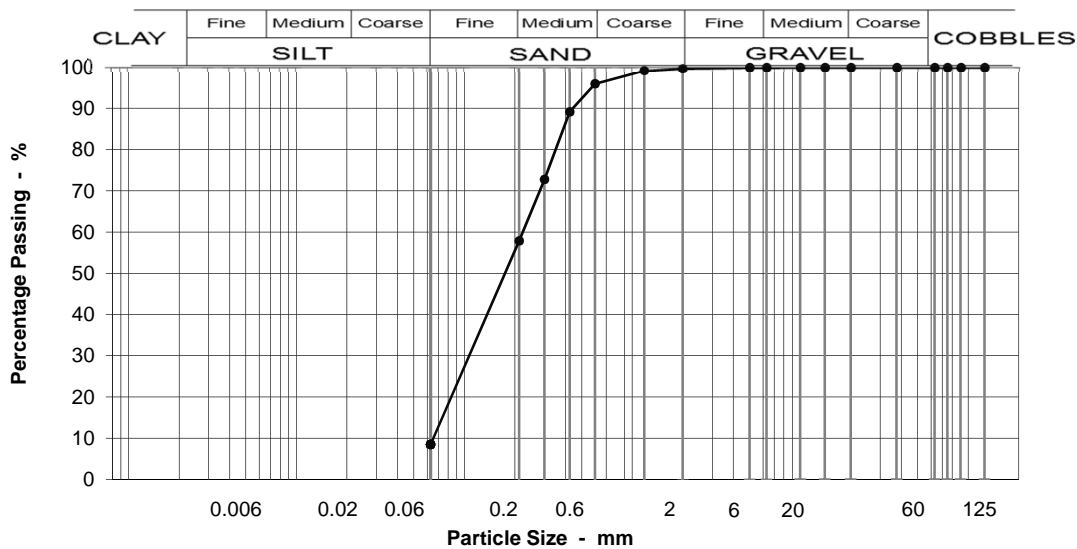
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH18 @ 19.6 - 19.9m

Location and orientation within sample not applicable

Bulk disturbed sample



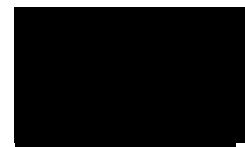
Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	4
14	100		Medium SAND	38
10	100		Fine SAND	49
6.3	100		Silt & Clay	9
5	100		<b>Grading Analysis</b>	
2	100		D100	6
1.18	99		D60	0.22
0.600	96		D10	0.07
0.425	89		Uniformity Coefficient	3
0.300	73		<b>Description</b>	
0.212	58	Yellowish brown, silty, fine and medium SAND.		
0.063	9			

Moisture content % 29

Test Code = 610



Peter Hardiment (Operations Manager)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2017112922-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **35**  
Your Project or Order No. **PZ1522**  
Date Tested **05/12/2017**  
Date Report Issued **22-Jan-18**

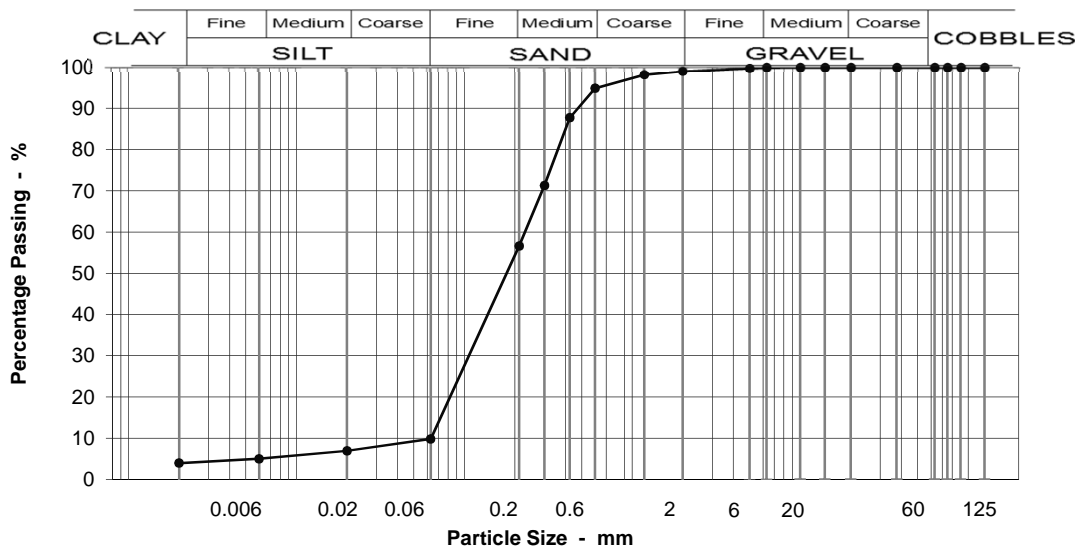
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH18 @ 21 - 21.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	4
14	100		Medium SAND	38
10	100		Fine SAND	47
6.3	100		Silt & Clay	10
5	100			
2	99			
1.18	98			
0.600	95			
0.425	88			
0.300	71			
0.212	57			
0.063	10			
0.020	7			
0.006	5			
0.002	4	Moisture content %	22	

Grading Analysis	
D100	6
D60	0.23
D10	0.06
Uniformity Coefficient	4

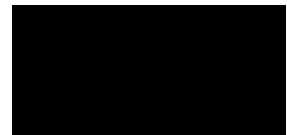
  

Description	
Yellowish brown slightly silty fine to medium SAND.	

Test Code = 613



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017112923-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 38  
**Your Project or Order No.** PZ1522  
**Date Tested** 05/12/2017  
**Date Report Issued** 9-Jan-18

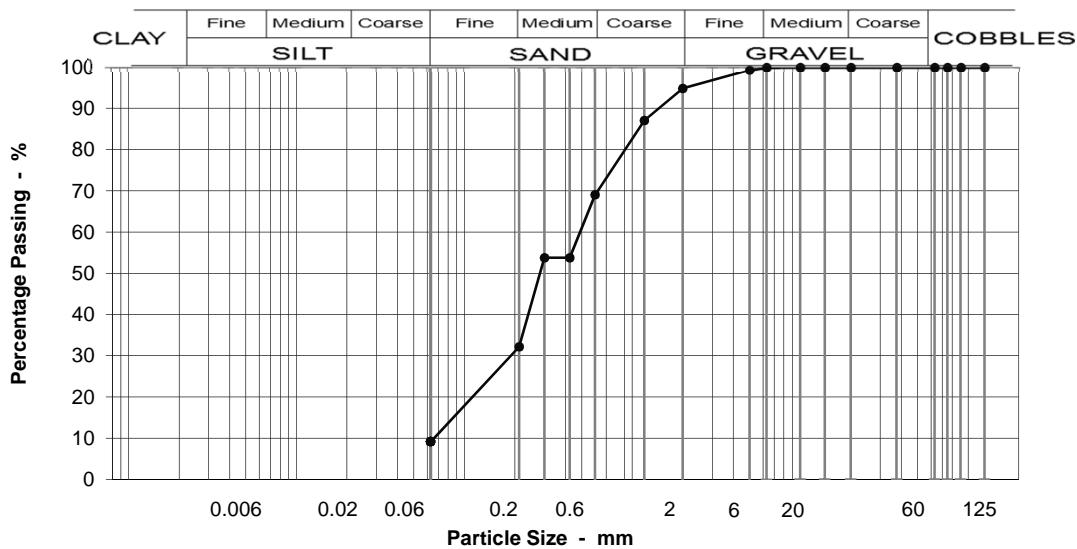
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH18 @ 25 - 25.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	95
1.18	87
0.600	69
0.425	54
0.300	54
0.212	32
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6K, 6M.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	5
Coarse SAND	26
Medium SAND	37
Fine SAND	23
Silt & Clay	9

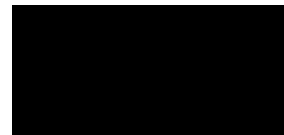
Grading Analysis	
D100	6
D60	0.50
D10	0.07
Uniformity Coefficient	7

Description	
Greyish brown slightly silty fine to coarse SAND.	

Test Code = 610



Simon Holden (Project Technician)



CES Highways Projects  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2017101735-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 43  
**Your Project or Order No.** PZ1522  
**Date Tested** 20/10/2017  
**Date Report Issued** 22-Nov-17

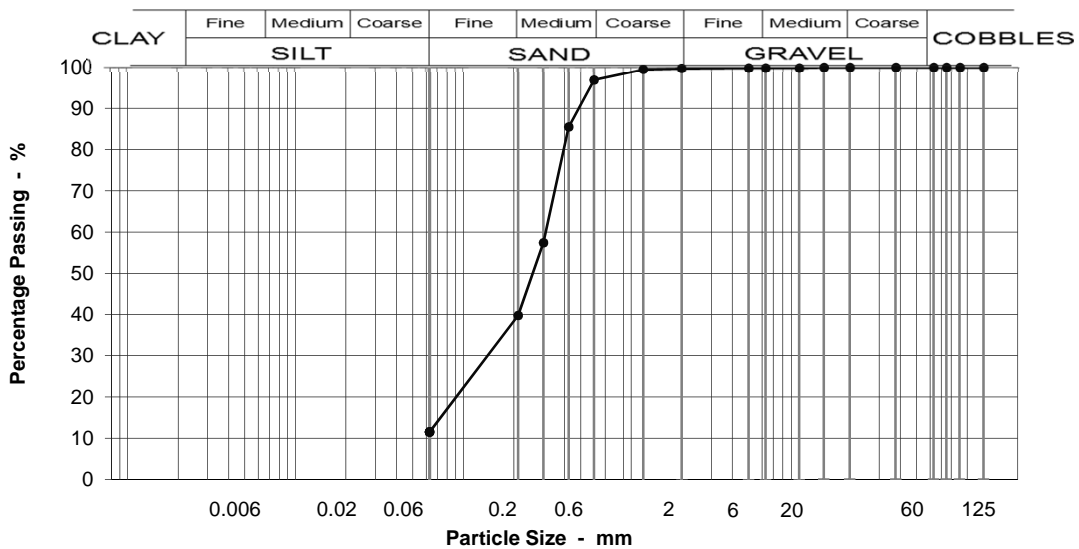
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH18 @ 32m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	86
0.300	57
0.212	40
0.063	12

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J.**

**Moisture content %** 24

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	3
Medium SAND	57
Fine SAND	28
Silt & Clay	12

Grading Analysis	
D100	10
D60	0.31
D10	0.05
Uniformity Coefficient	6

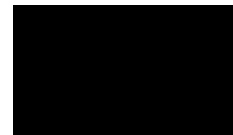
Description	
Greyish brown, silty, fine, and medium SAND.	

\* Uniformity coefficient extrapolated

Test Code = 610



Peter Hardiment (Operations Manager)



**Norfolk Partnership Laboratory**

 Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)
**Great Yarmouth Third River Crossing**

 Norfolk County Council  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

**Our Project No** PZ1522D1

**Our Report and sample No** NCCL2017101726-612

**Your Sample Ref** B45

**Your Project or Order No** PZ1522

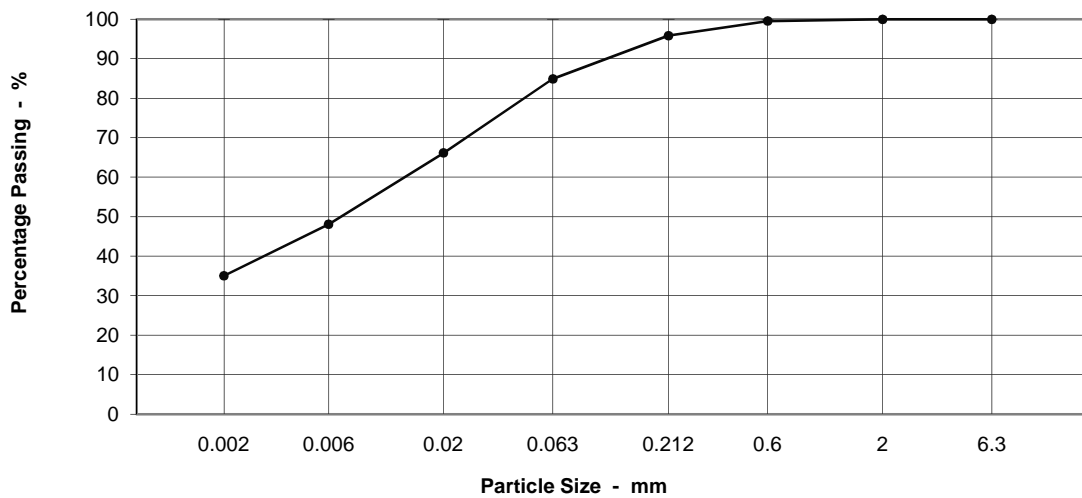
**Date Report Issued** 28-Nov-17

**Date Tested** 20-Nov-17

Page 1 of 1

**Particle Size Distribution to BS 1377 : Part 2 : 1990  
 Sedimentation Method Section 9.4**
**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** BH18 B45 34.8-35.0m

**Particle Size Distribution**


Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	0	Firm dark grey, sandy, very silty CLAY weathering to brown.
2.0	100	Medium SAND	4	
0.6	100	Fine SAND	11	
0.212	96	Coarse SILT	19	
0.063	85	Medium SILT	18	
0.02	66	Fine SILT	13	
0.006	48	CLAY	35	
0.002	35	Moisture content	26	

Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state". Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out. Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



## Norfolk Partnership Laboratory

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

### Great Yarmouth Third River Crossing

Norfolk County Council  
 County Hall  
 Martineau Lane  
 Norwich  
 Norfolk  
 NR1 2DH

Our Project No PZ1522D1

Our Report and sample No NCCL2017101727-612

Your Sample Ref D48

Your Project or Order No PZ1522

Date Report Issued 28-Nov-17

Date Tested 13-Nov-17

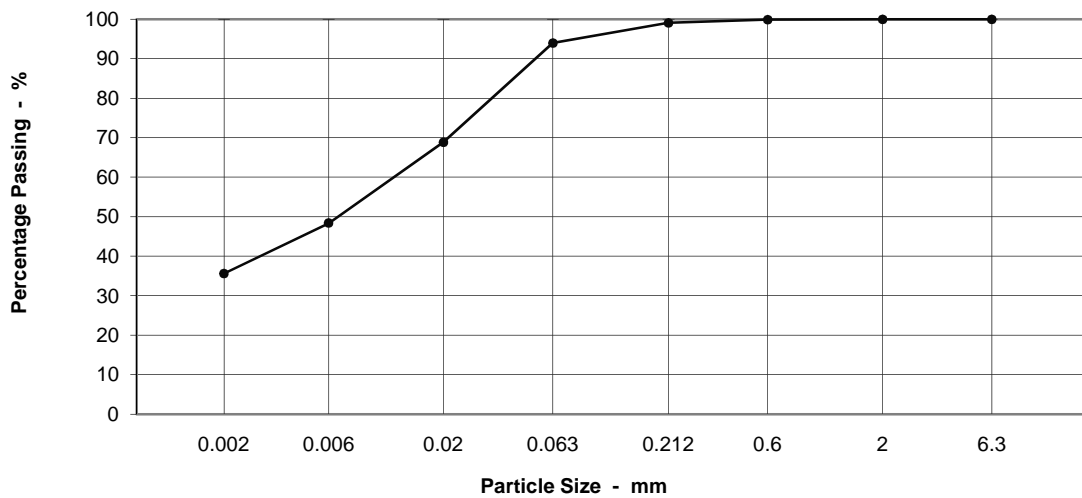
Page 1 of 1

## Particle Size Distribution to BS 1377 : Part 2 : 1990 Sedimentation Method Section 9.4

Scheme: Gt Yarmouth 3rd River Crossing

Location: BH18 D48 38m

Particle Size Distribution



Sieving & Sed.		Sample Proportions		Description
Particle Size mm	% Passing		%	
6.3	*See note	Coarse SAND	0	Firm to stiff, dark grey, very clayey, fine, medium and coarse SILT.
2.0	100	Medium SAND	1	
0.6	100	Fine SAND	5	
0.212	99	Coarse SILT	25	
0.063	94	Medium SILT	20	
0.02	69	Fine SILT	13	
0.006	48	CLAY	36	
0.002	36	Moisture content	26	

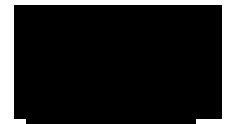
Test carried out on a disturbed sample prepared in accordance with BS1377 Part 1 clause 7.4.5, "in its natural state". Moisture content in accordance with BS1377 Part 2 clause 3.2, Oven-drying method. No pre-treatment was carried out. Location and orientation are not applicable.

\* This test determines the particle size distribution from the coarse sand size to the clay size.

Test Code = 612



Peter Hardiment (Operations Manager)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201803235-610**  
Our Project No. PZ1522D1  
Your Sample Ref 3  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 15-May-18

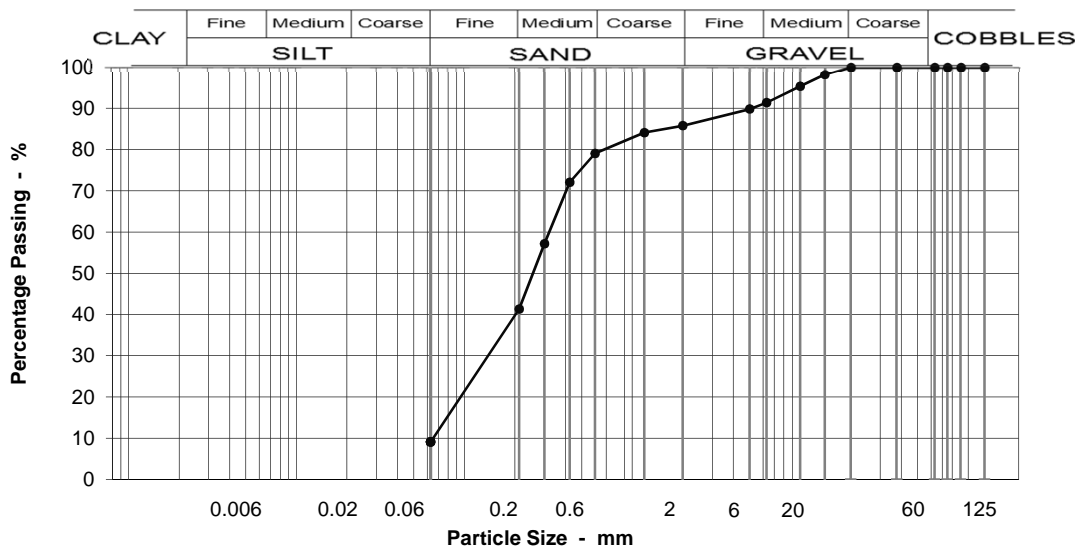
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: CPT1 @ 0.42 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	95
6.3	91
5	90
2	86
1.18	84
0.600	79
0.425	72
0.300	57
0.212	41
0.063	9

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	9
Fine GRAVEL	6
Coarse SAND	7
Medium SAND	38
Fine SAND	32
Silt & Clay	9

Grading Analysis	
D100	14
D60	0.32
D10	0.07
Uniformity Coefficient	5

**Description**  
Brown gravelly slightly silty fine and medium SAND. Gravel is fine and medium, angular to sub-rounded flint and quartz.

Moisture content % 13

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201803236-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **2**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **15-May-18**

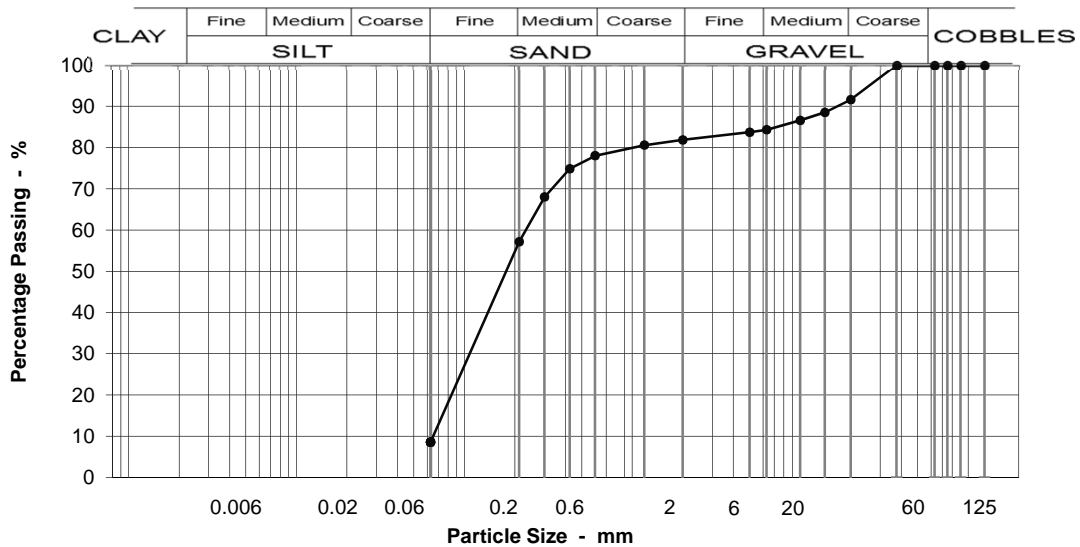
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: CPT2 @ 0.47 - 0.96m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	92
14	88
10	87
6.3	84
5	84
2	82
1.18	81
0.600	78
0.425	75
0.300	68
0.212	57
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	8
Medium GRAVEL	7
Fine GRAVEL	2
Coarse SAND	4
Medium SAND	21
Fine SAND	49
Silt & Clay	9

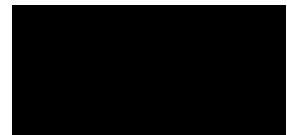
Grading Analysis	
D100	20
D60	0.23
D10	0.07
Uniformity Coefficient	3

Description	
Brown gravelly slightly silty fine SAND. Gravel is medium and coarse angular to rounded flint, quartz, brick and slate (MADE GROUND)	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201803237-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **3**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **12-Jun-18**

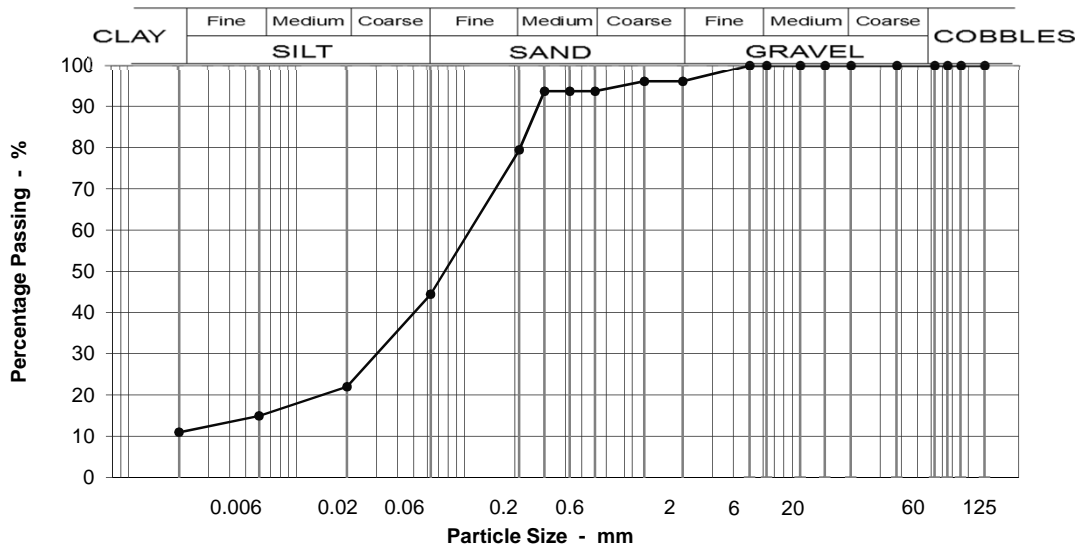
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: CPT2 @ 0.96 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	4
20	100		Coarse SAND	2
14	100		Medium SAND	14
10	100		Fine SAND	35
6.3	100		Silt & Clay	44
5	100			
2	96			
1.18	96			
0.600	94			
0.425	94			
0.300	94			
0.212	79			
0.063	44			
0.020	22			
0.006	15			
0.002	11			
		Moisture content %	14	

Grading Analysis	
D100	2
D60	0.13
D10	0.00
Uniformity Coefficient	>10*

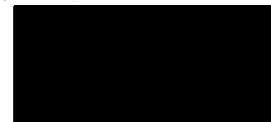
Description
Dark grey very sandy clayey SILT.

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201803238-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 2  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 12-Jun-18

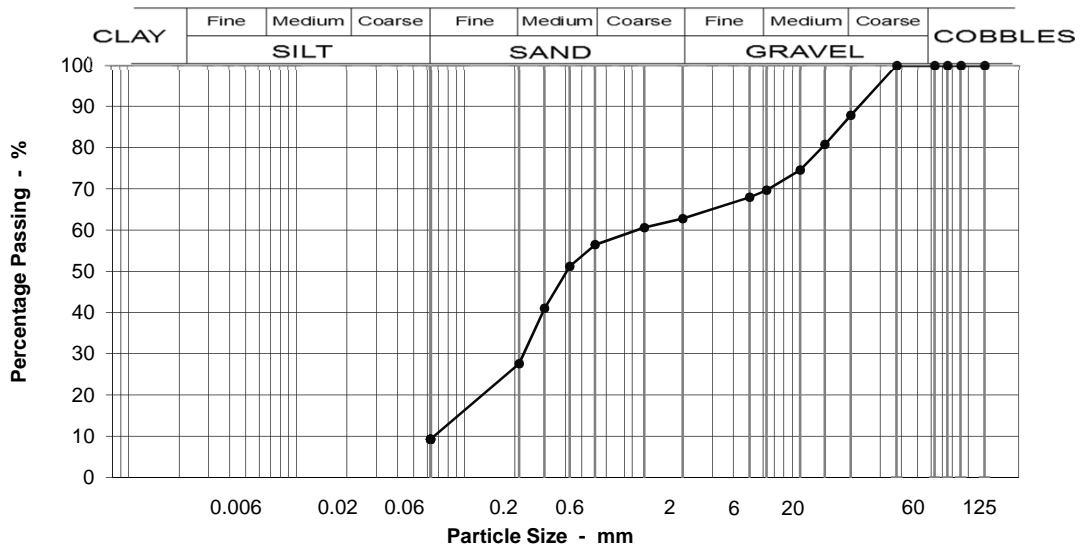
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: CPT3 @ 0.67 - 0.9m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1A, 6E/6R, 6I, 6M, 6N.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	12
63	100		Medium GRAVEL	18
37.5	100		Fine GRAVEL	7
20	88		Coarse SAND	6
14	81		Medium SAND	29
10	75		Fine SAND	18
6.3	70		Silt & Clay	9
5	68		<b>Grading Analysis</b>	
2	63		D100	20
1.18	61		D60	1.10
0.600	56		D10	0.07
0.425	51		Uniformity Coefficient	16
0.300	41		<b>Description</b>	
0.212	28	Dark grey organic very gravelly slightly silty fine and medium SAND. Gravel is fine to coarse angular flint.		
0.063	9	Moisture content % 14		

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201803239-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **2**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **15-May-18**

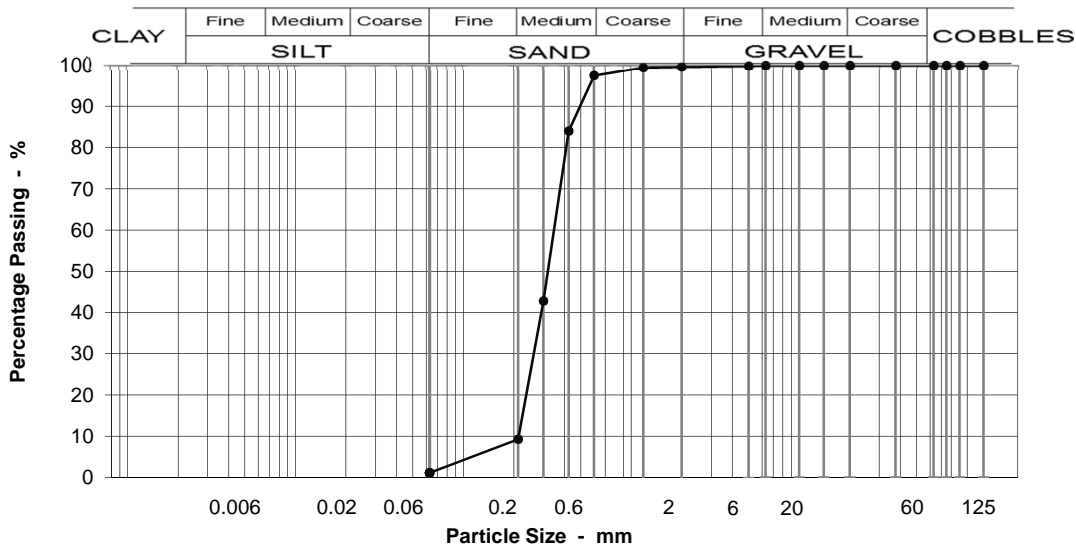
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: CPT4 @ 0.25 - 0.6m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	84
0.300	43
0.212	9
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 8.2

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	88
Fine SAND	8
Silt & Clay	1

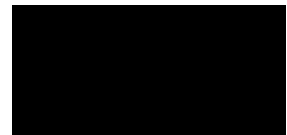
Grading Analysis	
D100	5
D60	0.35
D10	0.21
Uniformity Coefficient	2

Description	
Brown medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018032310-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **4**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **12-Jun-18**

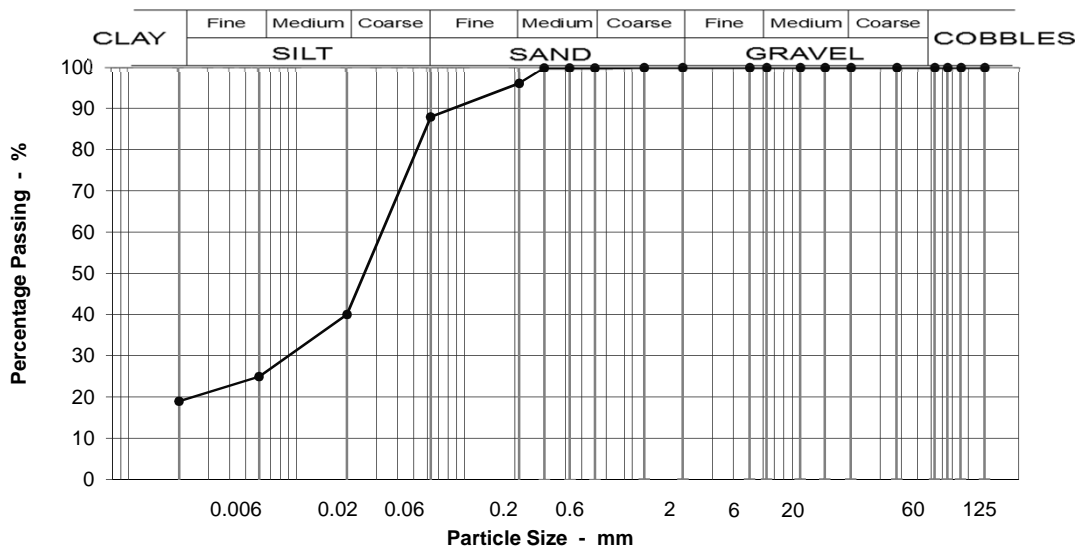
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: CPT4 @ 0.82 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	4
10	100		Fine SAND	8
6.3	100		Silt & Clay	88
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	96			
0.063	88			
0.020	40			
0.006	25			
0.002	19			
		Moisture content %	14	

Grading Analysis	
D100	1
D60	0.04
D10	0.00
Uniformity Coefficient	>10*

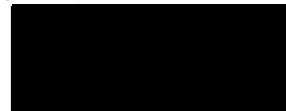
Description
Firm grey sandy clayey SILT.

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018032311-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **15-May-18**

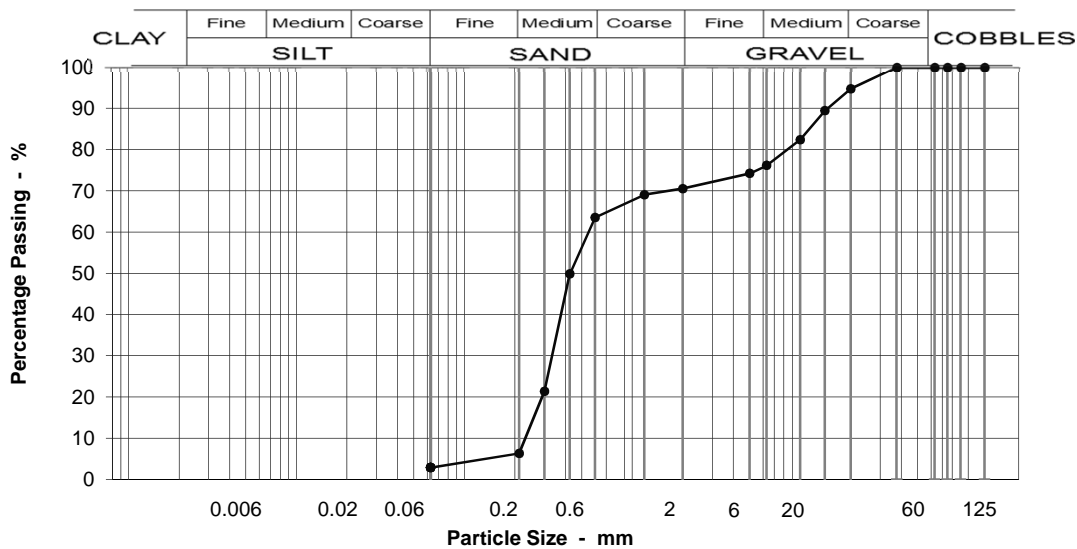
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: CPT5 @ 0.18 - 0.85m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	95
14	89
10	82
6.3	76
5	74
2	71
1.18	69
0.600	64
0.425	50
0.300	21
0.212	6
0.063	3

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	5
Medium GRAVEL	19
Fine GRAVEL	6
Coarse SAND	7
Medium SAND	57
Fine SAND	3
Silt & Clay	3

Grading Analysis	
D100	20
D60	0.56
D10	0.23
Uniformity Coefficient	2

**Description**  
Brown very gravely medium SAND. Gravel is medium rounded to sub-angular flint and quartz.

Moisture content % 9

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018032312-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **2**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **15-May-18**

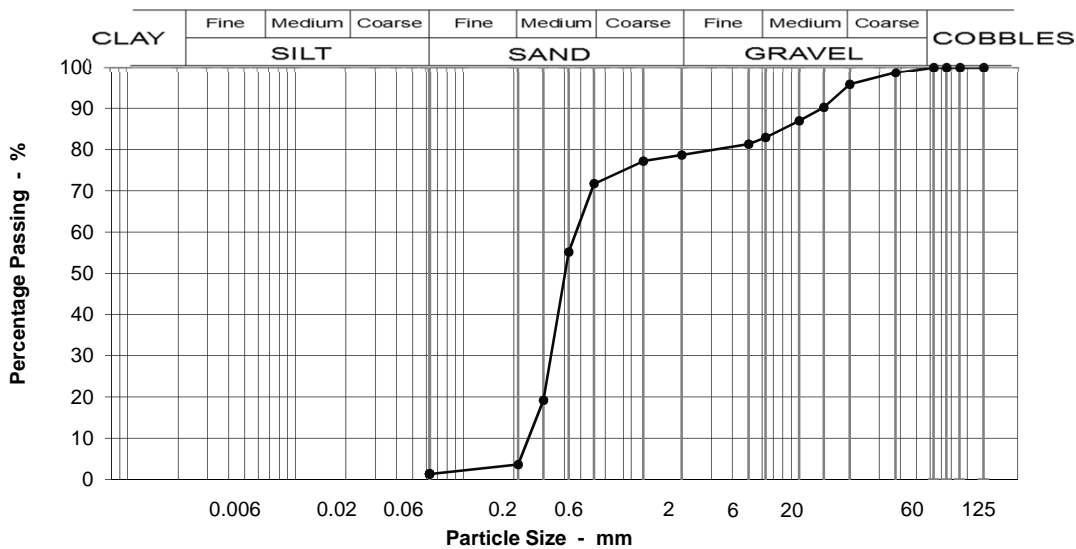
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: CPT5 @ 0.85 - 1.3m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	99
20	96
14	90
10	87
6.3	83
5	81
2	79
1.18	77
0.600	72
0.425	55
0.300	19
0.212	4
0.063	1

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 11

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	4
Medium GRAVEL	13
Fine GRAVEL	4
Coarse SAND	7
Medium SAND	68
Fine SAND	2
Silt & Clay	1

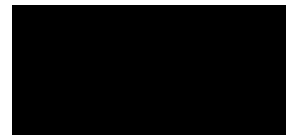
Grading Analysis	
D100	38
D60	0.48
D10	0.25
Uniformity Coefficient	2

**Description**  
Brown very gravelly medium SAND. Gravel is medium rounded to angular flint and quartz.

Test Code = 610



Simon Holden (Project Technician)





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Norfolk  
NR1 2DH

Our reference No. **GTS2171207003-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **2**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **25-Jun-18**

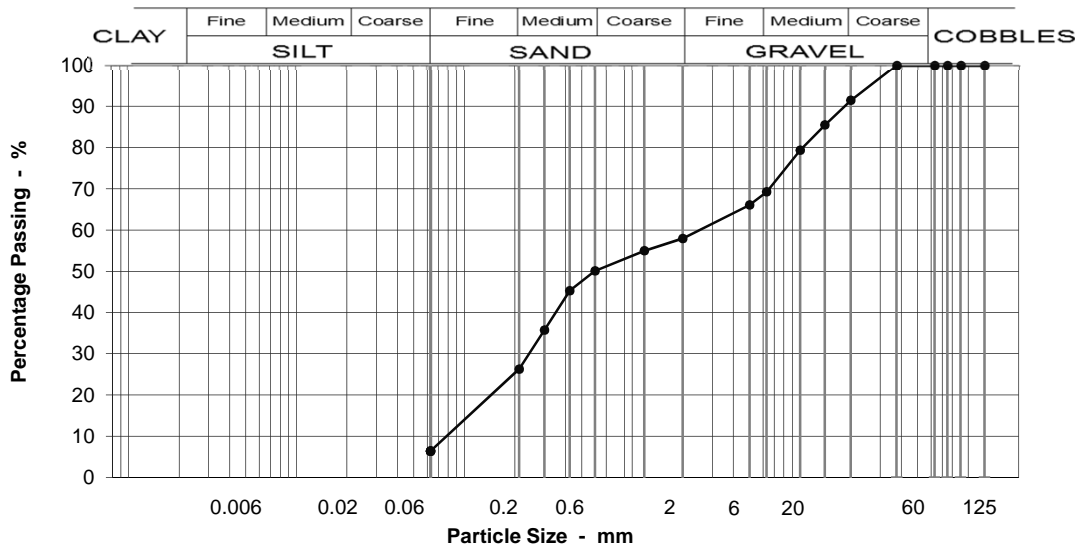
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1 @ 0.5 - 0.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

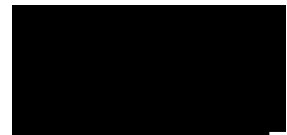


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1A, 6E/6R, 6I, 6M, 6N.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	9
63	100		Medium GRAVEL	22
37.5	100		Fine GRAVEL	11
20	91		Coarse SAND	8
14	85		Medium SAND	24
10	79		Fine SAND	20
6.3	69		Silt & Clay	6
5	66		<b>Grading Analysis</b>	
2	58		D100	20
1.18	55		D60	2.75
0.600	50		D10	0.09
0.425	45		Uniformity Coefficient	31
0.300	36		<b>Description</b>	
0.212	26	MADE GROUND: comprising up to cobble size angular to rounded brick, concrete, asphalt and wood in a matrix of reddish brown fine and medium sand.		
0.063	6	Moisture content % 22		

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS2171207004-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 3  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 25-Jun-18

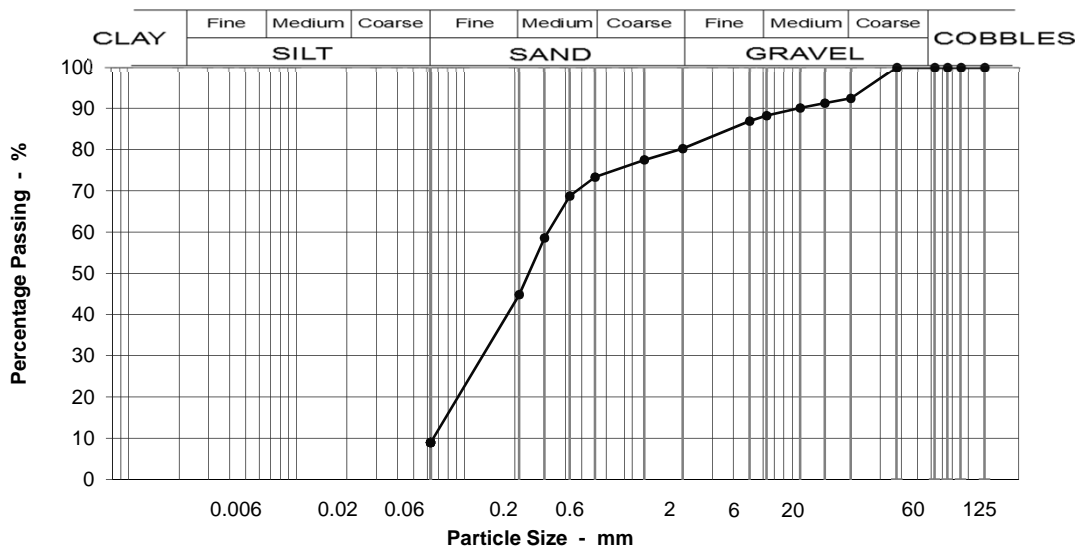
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** TP1 @ 0.9 - 1.2m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	92
14	91
10	90
6.3	88
5	87
2	80
1.18	77
0.600	73
0.425	69
0.300	59
0.212	45
0.063	9

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	8
Medium GRAVEL	4
Fine GRAVEL	8
Coarse SAND	7
Medium SAND	29
Fine SAND	36
Silt & Clay	9

Grading Analysis	
D100	20
D60	0.32
D10	0.07
Uniformity Coefficient	5

**Description**  
Dark brown gravelly slightly silty fine and medium SAND. Gravel is fine and medium subangular to subrounded flint.

Test Code = 610



Simon Holden (Project Technician)



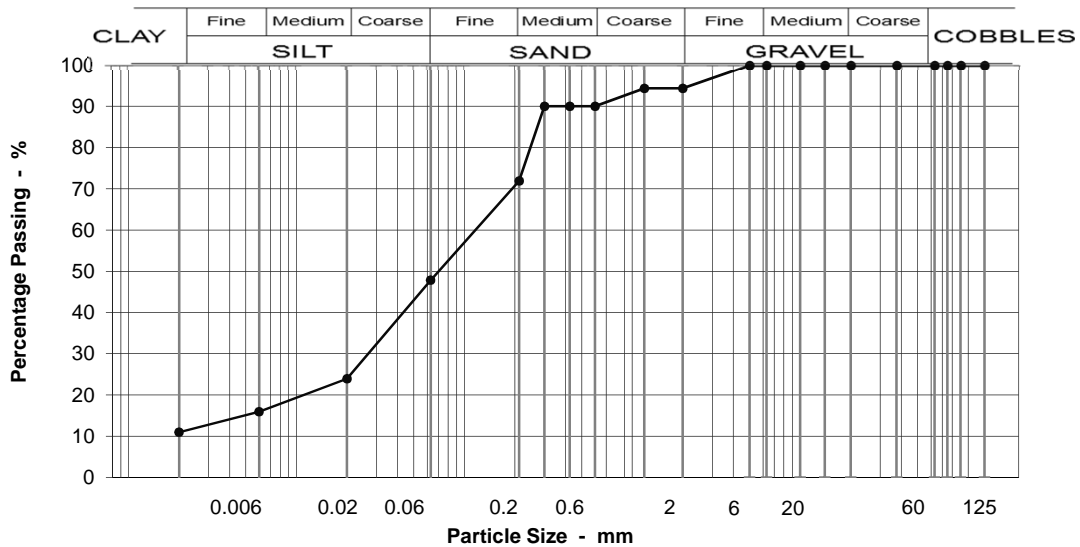
Community & Environmental Services  
County Hall  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171207007-**  
Our Project No **PZ1522D1**  
Your Sample Ref **6**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing  
Location and orientation within sample not applicable

Location: TP1 @ 1.2 - 2m Specimen: 2 @ 1.3m  
Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	6
20	100		Coarse SAND	4
14	100		Medium SAND	18
10	100		Fine SAND	24
6.3	100		Silt & Clay	48
5	100			
2	94			
1.18	94			
0.600	90			
0.425	90			
0.300	90			
0.212	72			
0.063	48			
0.020	24			
0.006	16			
0.002	11			
		Moisture content %		0

Grading Analysis	
D100	2
D60	0.14
D10	0.00
Uniformity Coefficient	>10*

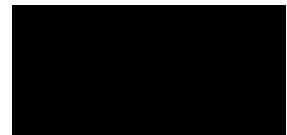
Description	
Firm to stiff dark grey very sandy clayey SILT.	

\* Uniformity coefficient extrapolated

Test Code =



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171207007-**  
Our Project No **PZ1522D1**  
Your Sample Ref **6**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

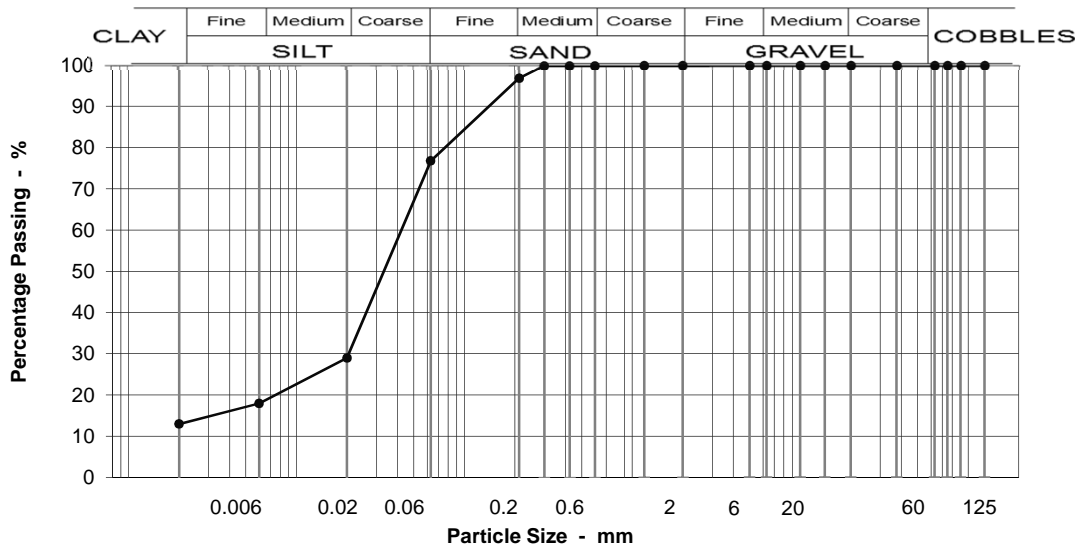
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1 @ 1.2 - 2m Specimen: 3 @ 1.5m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	97
0.063	77
0.020	29
0.006	18
0.002	13

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	3
Fine SAND	20
Silt & Clay	77

Grading Analysis	
D100	2
D60	0.05
D10	0.00
Uniformity Coefficient	>10*

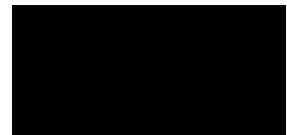
Description	
Firm to stiff dark grey very sandy clayey SILT.	

\* Uniformity coefficient extrapolated

Test Code =



Simon Holden (Project Technician)



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Norfolk  
NR1 2DH

Our reference No. **GTS2171207008-**  
Our Project No **PZ1522D1**  
Your Sample Ref **7**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

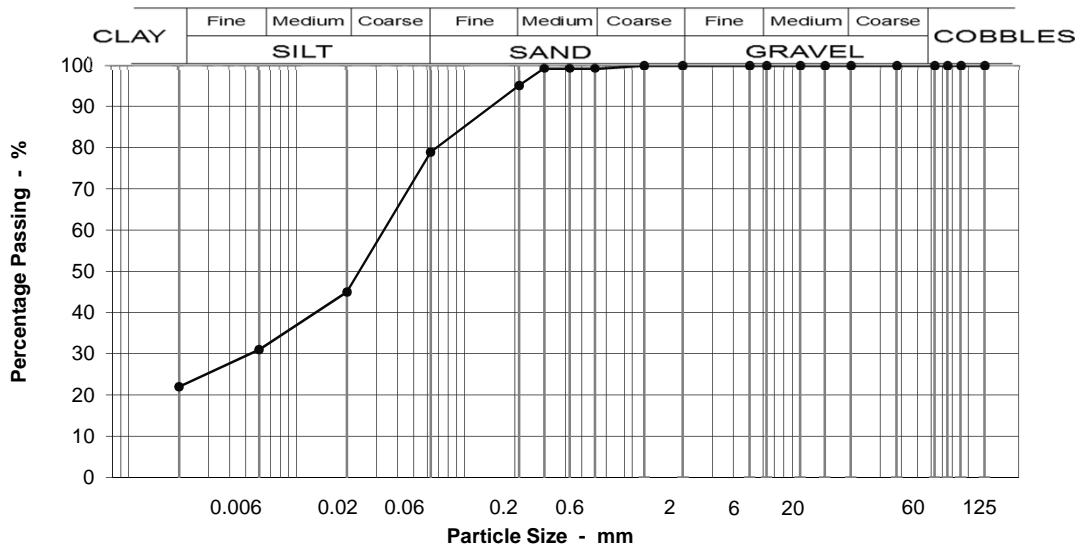
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1 @ 2.3 - 3m Specimen: 3 @ 2.3m

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	1
14	100		Medium SAND	4
10	100		Fine SAND	16
6.3	100		Silt & Clay	79
5	100			
2	100			
1.18	100			
0.600	99			
0.425	99			
0.300	99			
0.212	95			
0.063	79			
0.020	45			
0.006	31			
0.002	22			
		Moisture content %		0

Grading Analysis	
D100	1
D60	0.04
D10	0.00
Uniformity Coefficient	>10*

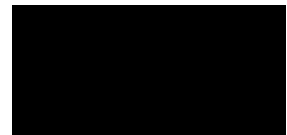
Description	
Soft to firm grey very sandy very clayey SILT with numerous lenses of brown, fibrous peat. Trace of fine flint gravel.	

\* Uniformity coefficient extrapolated

Test Code =



Simon Holden (Project Technician)



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County Hall  
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Norfolk  
NR1 2DH

Our reference No. **GTS2171207010-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 9  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 4-Jul-18

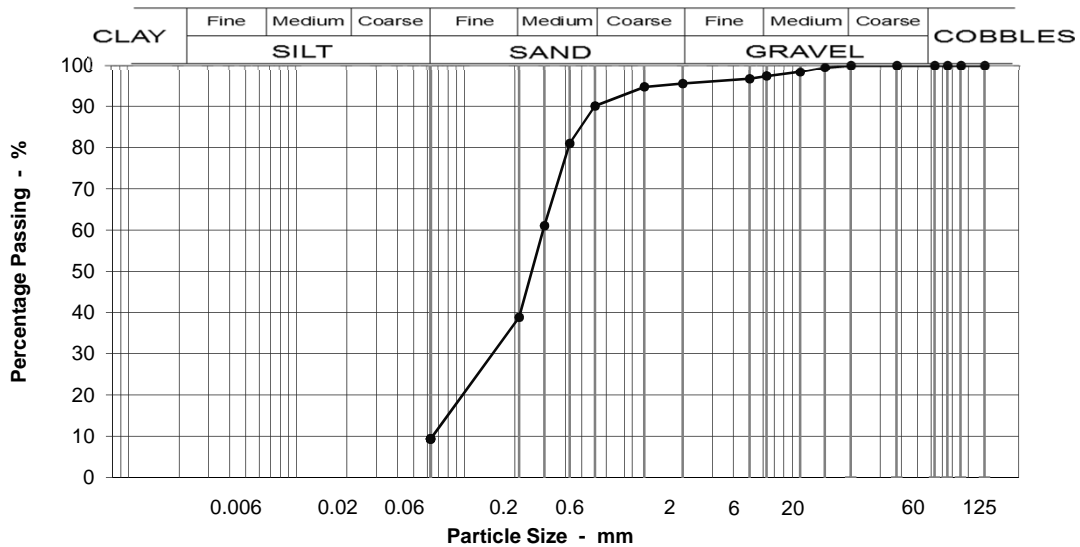
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1 @ 4 - 5m Specimen: 1 @ 4.6m

Location and orientation within sample not applicable

Disturbed sample

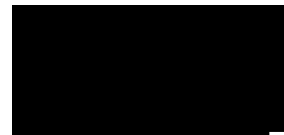


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	3
37.5	100		Fine GRAVEL	2
20	100		Coarse SAND	5
14	99		Medium SAND	51
10	98		Fine SAND	29
6.3	97		Silt & Clay	9
5	97		<b>Grading Analysis</b>	
2	95		D100	14
1.18	95		D60	0.30
0.600	90		D10	0.07
0.425	81		Uniformity Coefficient	4
0.300	61		<b>Description</b>	
0.212	39	Grey slightly silty slightly gravelly fine and medium SAND. Gravel is fine and medium subangular to rounded flint and quartz.		
0.063	9	Moisture content % 16		

Test Code = 610



Not approved





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NR1 2DH

Our reference No. **GTS2171207011-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **10**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

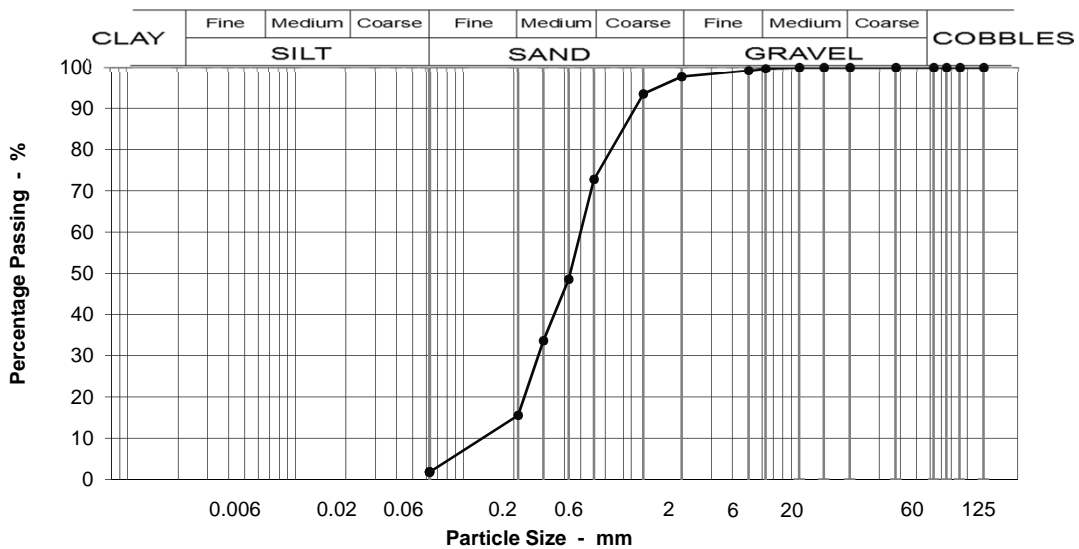
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1 @ 5 - 6m Specimen: 1 @ 5.1m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	99
2	98
1.18	93
0.600	73
0.425	49
0.300	34
0.212	16
0.063	2

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 15

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	25
Medium SAND	57
Fine SAND	14
Silt & Clay	2

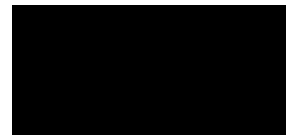
Grading Analysis	
D100	6
D60	0.51
D10	0.15
Uniformity Coefficient	3

Description	
Brown medium and coarse SAND.	

Source : General: @ 6m Sand blown up  
Test Code = 610



Simon Holden (Project Technician)



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NR1 2DH

Our reference No. **GTS2171213011-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **25-Jun-18**

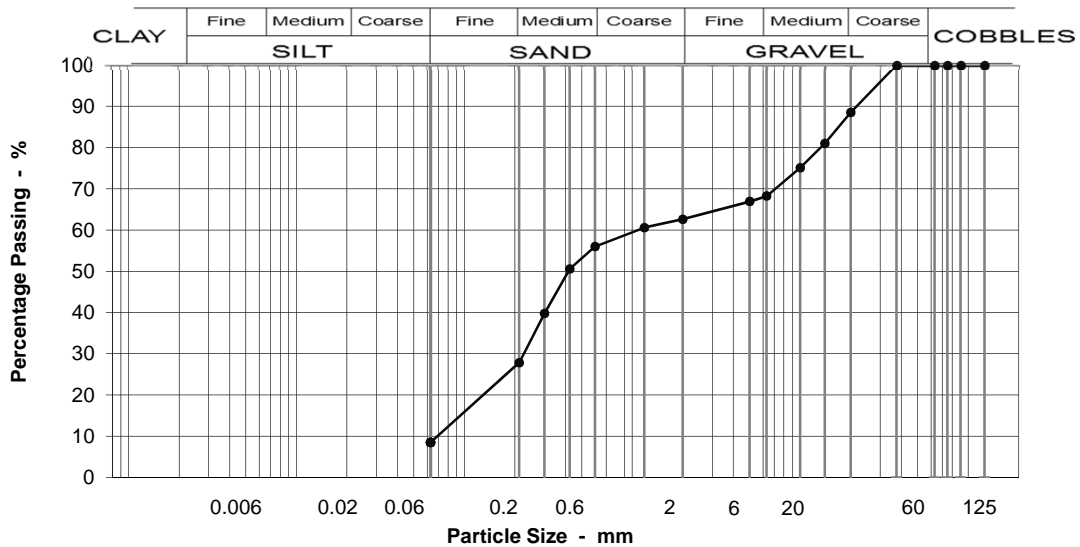
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1B @ 0.1 - 0.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	89
14	81
10	75
6.3	68
5	67
2	63
1.18	61
0.600	56
0.425	51
0.300	40
0.212	28
0.063	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6E/6R, 6I, 6M, 6N.**

Moisture content % 8.6

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	11
Medium GRAVEL	20
Fine GRAVEL	6
Coarse SAND	7
Medium SAND	28
Fine SAND	19
Silt & Clay	9

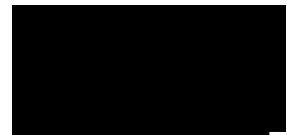
Grading Analysis	
D100	20
D60	1.11
D10	0.07
Uniformity Coefficient	15

**Description**  
MADE GROUND: comprising fine to coarse gravel size angular to rounded flint, concrete, and brick in a matrix of slightly silty fine to medium SAND.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
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Norfolk  
NR1 2DH

**Our reference No.** GTS2171213013-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 3  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 25-Jun-18

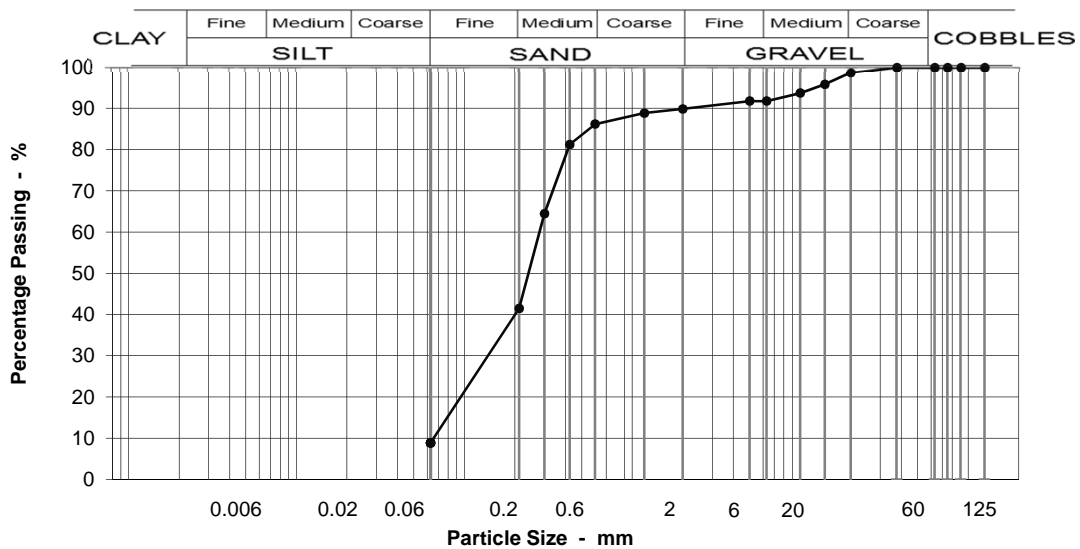
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** TP1B @ 0.5 - 1m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	96
10	94
6.3	92
5	92
2	90
1.18	89
0.600	86
0.425	81
0.300	64
0.212	42
0.063	9

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 4.9

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	7
Fine GRAVEL	2
Coarse SAND	4
Medium SAND	45
Fine SAND	33
Silt & Clay	9

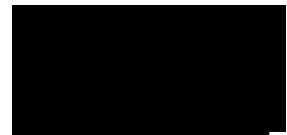
Grading Analysis	
D100	20
D60	0.28
D10	0.07
Uniformity Coefficient	4

**Description**  
MADE GROUND: comprising loose gravelly fine and medium SAND. Gravel is medium, angular brick and concrete.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
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Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171214012-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **6**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

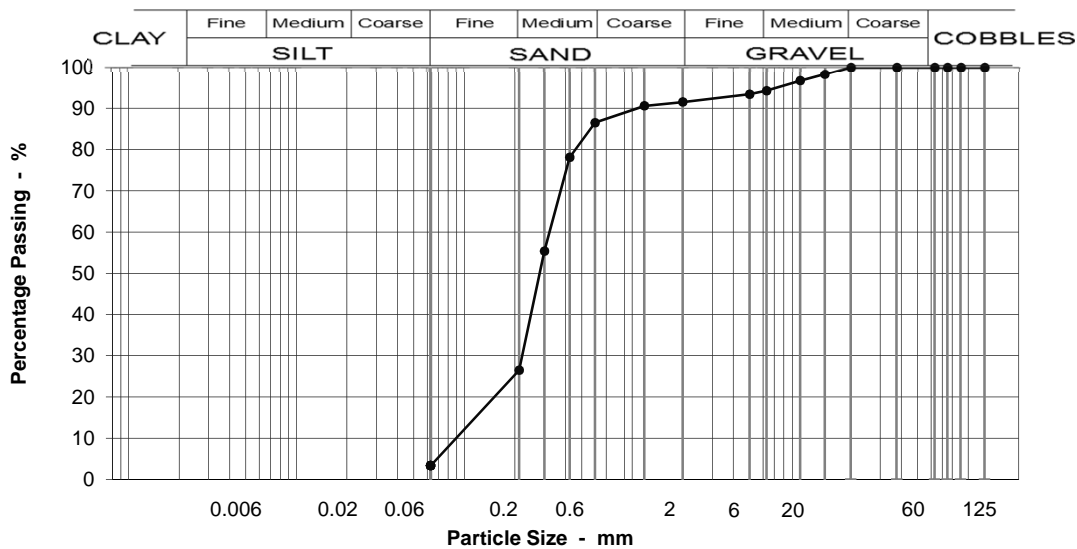
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1B @ 1.2 - 2m Specimen: 3 @ 1.5m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	97
6.3	94
5	93
2	92
1.18	91
0.600	87
0.425	78
0.300	55
0.212	27
0.063	3

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 16

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	6
Fine GRAVEL	3
Coarse SAND	5
Medium SAND	60
Fine SAND	23
Silt & Clay	3

Grading Analysis	
D100	14
D60	0.33
D10	0.11
Uniformity Coefficient	3

**Description**  
Orangey brown medium SAND.

Source : General: 1 liners 4 and 5 in bulk  
Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171214012-**  
Our Project No **PZ1522D1**  
Your Sample Ref **6**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

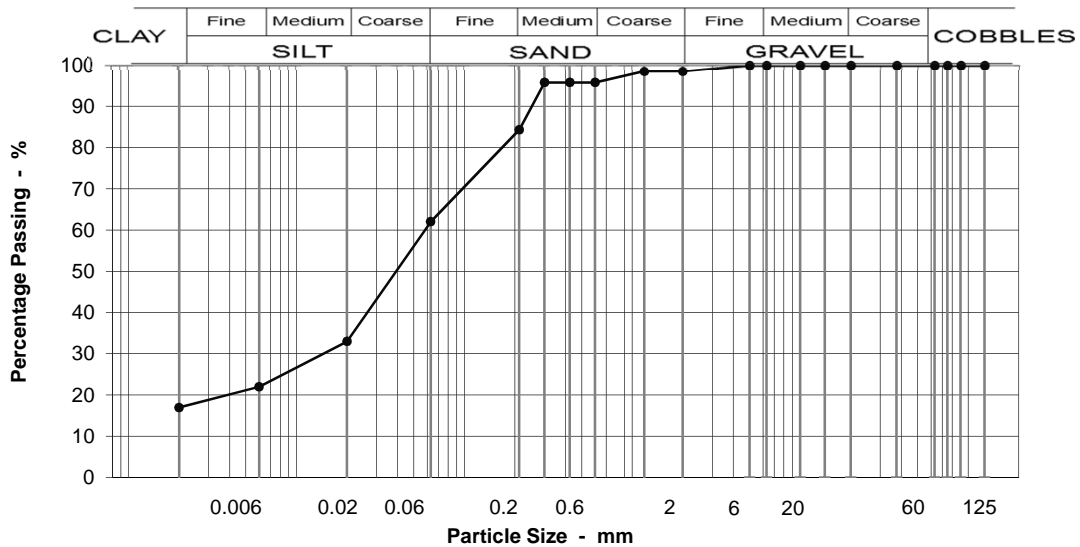
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1B @ 1.8 - 2m Specimen: 5 @ 1.8m

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	3
14	100		Medium SAND	11
10	100		Fine SAND	22
6.3	100		Silt & Clay	62
5	100			
2	99			
1.18	99			
0.600	96			
0.425	96			
0.300	96			
0.212	84			
0.063	62			
0.020	33			
0.006	22			
0.002	17			
		Moisture content %	0	

Grading Analysis	
D100	2
D60	0.06
D10	0.00
Uniformity Coefficient	>10*

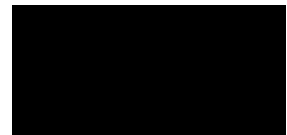
Description	
Stiff dark grey slightly organic very sandy clayey SILT.	

\* Uniformity coefficient extrapolated

Test Code =



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171214013-**  
Our Project No **PZ1522D1**  
Your Sample Ref **7**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **11-Jun-18**

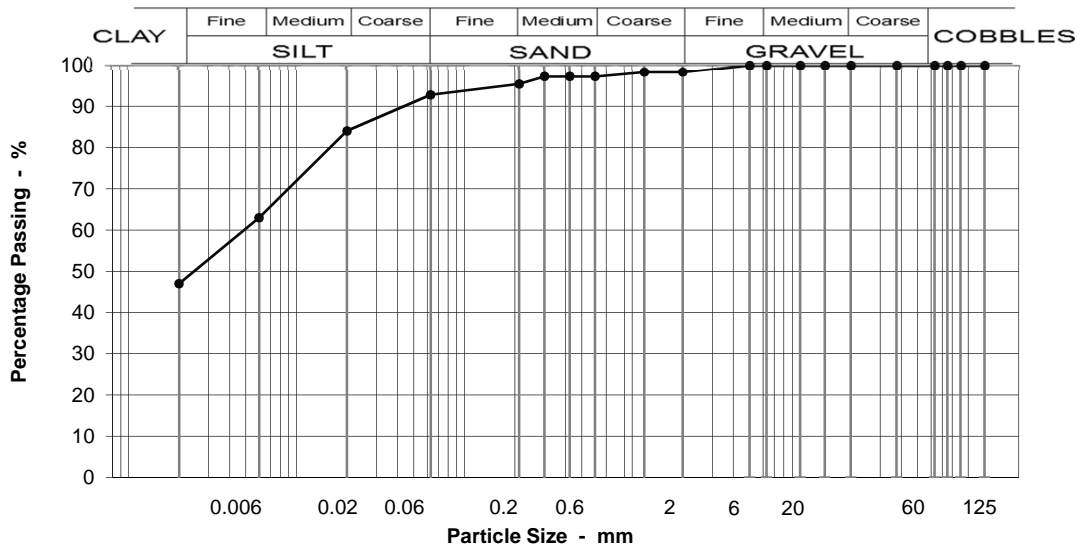
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1B @ 2 - 3m Specimen: 2 @ 2.8m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	98
0.600	97
0.425	97
0.300	97
0.212	95
0.063	93
0.020	84
0.006	63
0.002	47

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	1
Medium SAND	2
Fine SAND	3
Silt & Clay	93

Grading Analysis	
D100	2
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

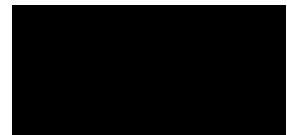
Description	
Soft grey SILT:CLAY	

\* Uniformity coefficient extrapolated

Test Code =



Simon Holden (Project Technician)





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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** GTS2171214014-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 8  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 4-Jul-18

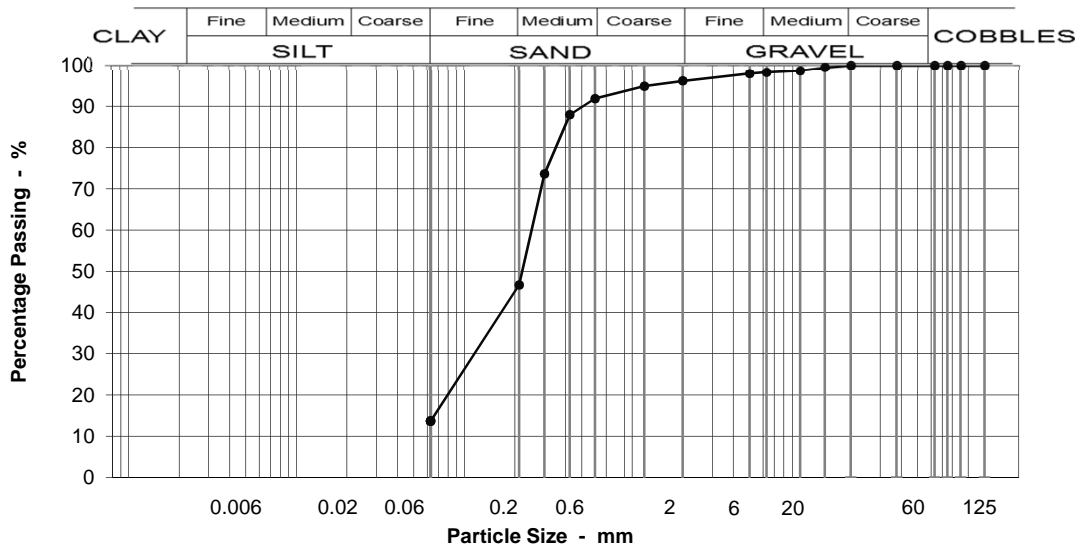
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** TP1B @ 3 - 4m **Specimen:** 1

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6J.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	2
37.5	100		Fine GRAVEL	2
20	100		Coarse SAND	4
14	99		Medium SAND	45
10	99		Fine SAND	33
6.3	98		Silt & Clay	14
5	98			
2	96			
1.18	95			
0.600	92			
0.425	88			
0.300	74			
0.212	47			
0.063	14			
<b>Moisture content %</b>		18		

Grading Analysis	
D100	14
D60	0.26
D10	0.05
Uniformity Coefficient	6*

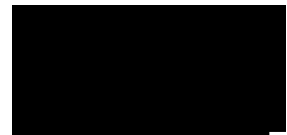
Description	
Grery laminated silty fine and medium SAND with occasional lenses of dark grey organic material, some roots.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171214014-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **8**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **17-Apr-18**

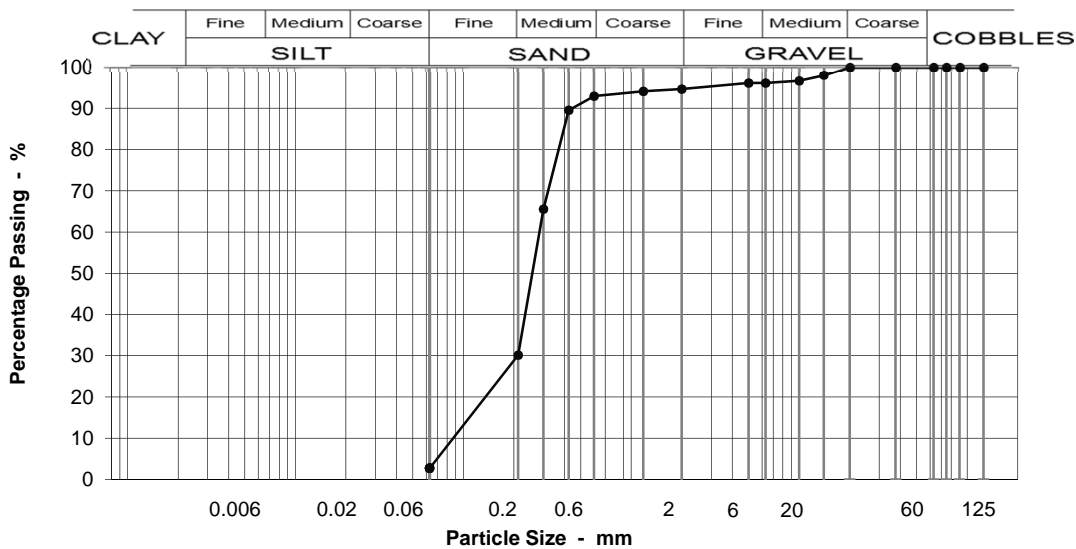
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1B @ 3 - 4m Specimen: 2 @ 3.6m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	97
6.3	96
5	96
2	95
1.18	94
0.600	93
0.425	90
0.300	66
0.212	30
0.063	3

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	4
Fine GRAVEL	1
Coarse SAND	2
Medium SAND	63
Fine SAND	27
Silt & Clay	3

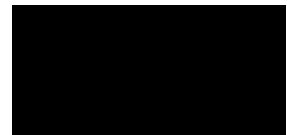
Grading Analysis	
D100	14
D60	0.29
D10	0.10
Uniformity Coefficient	3

Description	
Grey medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171214015-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **9**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **25-Jun-18**

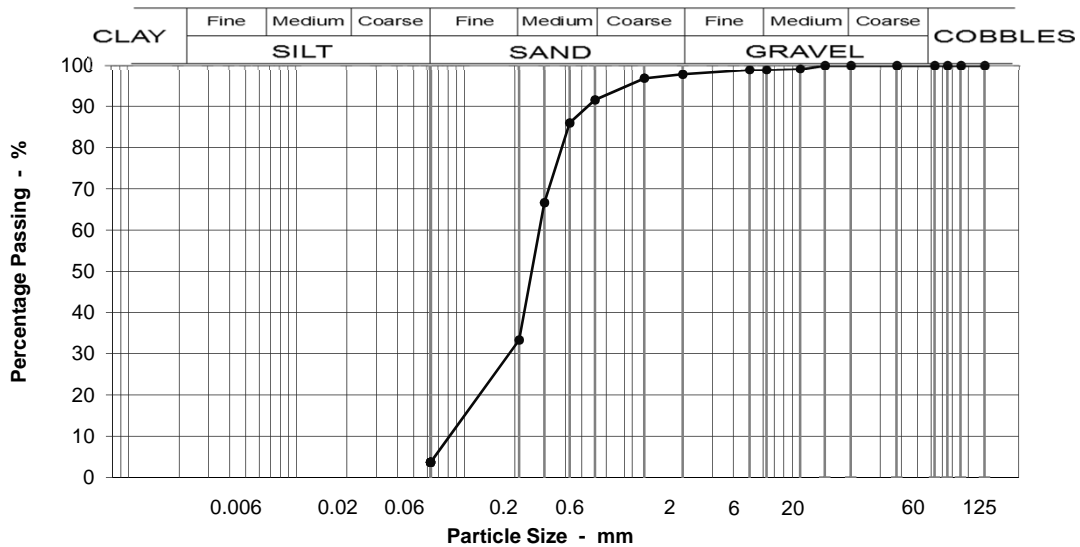
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1B @ 4 - 5m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



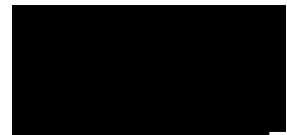
Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	1
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	6
14	100		Medium SAND	58
10	99		Fine SAND	30
6.3	99		Silt & Clay	4
5	99		<b>Grading Analysis</b>	
2	98		D100	10
1.18	97		D60	0.28
0.600	92		D10	0.09
0.425	86		Uniformity Coefficient	3
0.300	67		<b>Description</b>	
0.212	33	Grey fine and medium SAND.		
0.063	4			

Moisture content % 21

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171214016-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **10**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **25-Jun-18**

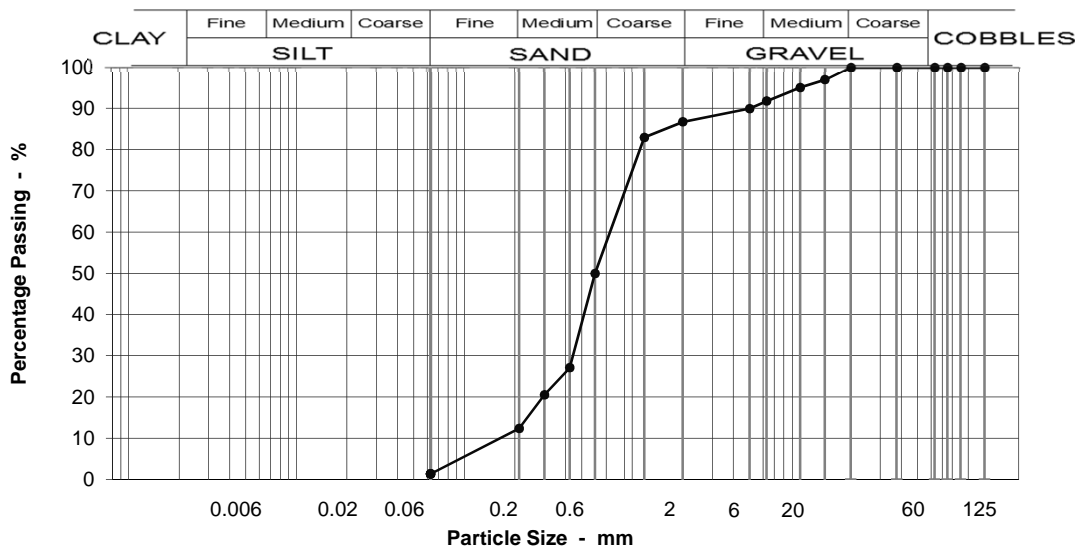
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: TP1B @ 5 - 6m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	97
10	95
6.3	92
5	90
2	87
1.18	83
0.600	50
0.425	27
0.300	21
0.212	12
0.063	1

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	8
Fine GRAVEL	5
Coarse SAND	37
Medium SAND	38
Fine SAND	11
Silt & Clay	1

Grading Analysis	
D100	14
D60	0.78
D10	0.18
Uniformity Coefficient	4

**Description**  
Grey gravelly medium and coarse SAND. Gravel is fine and medium subrounded to subangular flint and quartz.

Moisture content % 15

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205024-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **3**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **25-Jun-18**

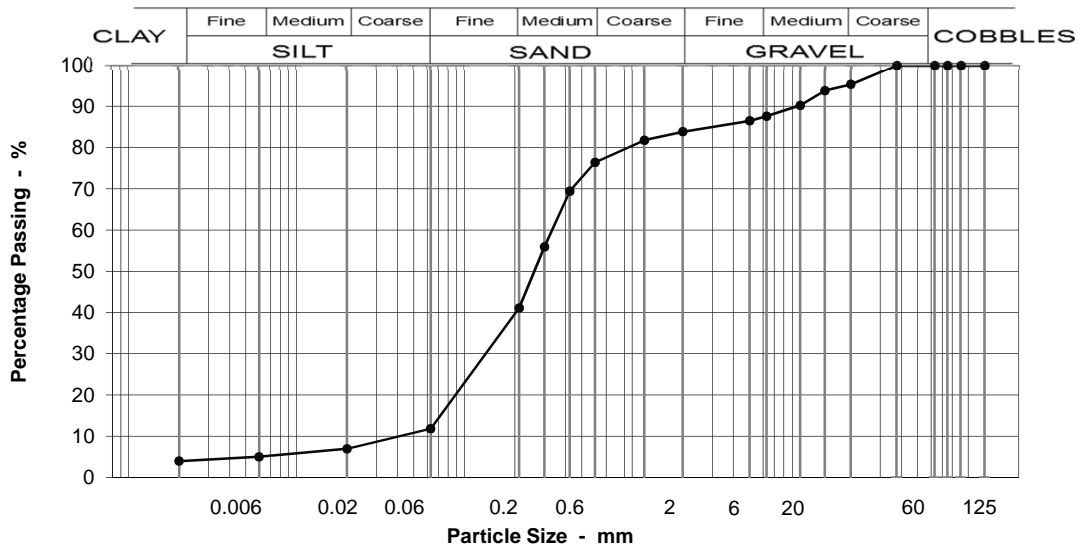
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS1 @ 0.8 - 1.1m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

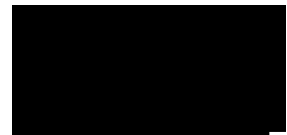


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	5
63	100		Medium GRAVEL	8
37.5	100		Fine GRAVEL	4
20	95		Coarse SAND	7
14	94		Medium SAND	35
10	90		Fine SAND	29
6.3	88		Silt & Clay	12
5	86		<b>Grading Analysis</b>	
2	84		D100	20
1.18	82		D60	0.34
0.600	76		D10	0.10
0.425	69		Uniformity Coefficient	3
0.300	56		<b>Description</b>	
0.212	41	Brown slightly silty gravelly fine and medium SAND. Gravel is fine and medium subangular to subrounded flint and quartz.		
0.063	12			
0.020	7			
0.006	5			
0.002	4	Moisture content %	12	

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205028-610**  
Our Project No. PZ1522D1  
Your Sample Ref 7  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

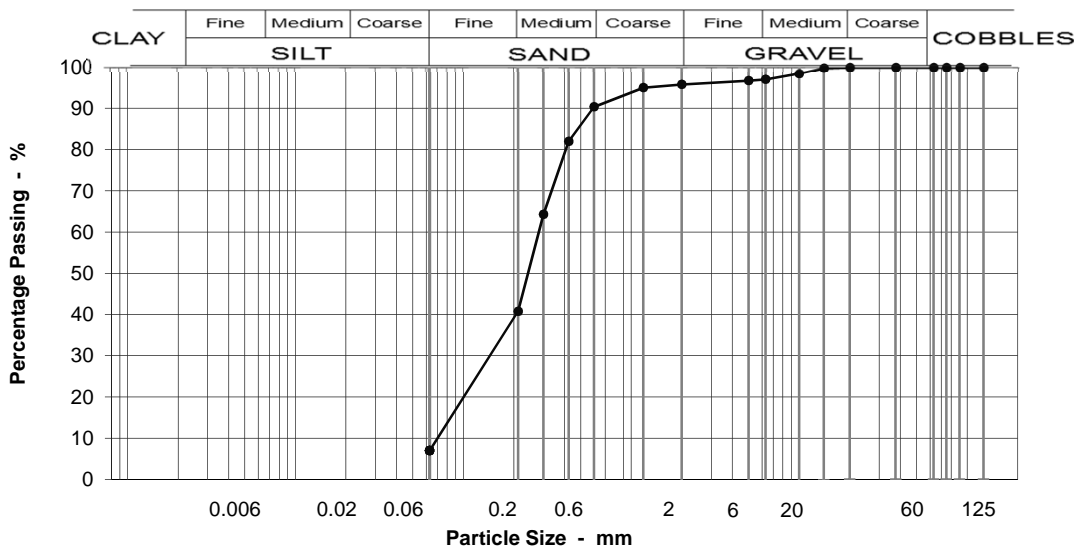
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS1 @ 2 - 3m Specimen: 1 @ 1.6m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	97
5	97
2	96
1.18	95
0.600	90
0.425	82
0.300	64
0.212	41
0.063	7

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 16

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	1
Coarse SAND	5
Medium SAND	50
Fine SAND	34
Silt & Clay	7

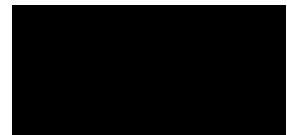
Grading Analysis	
D100	14
D60	0.28
D10	0.08
Uniformity Coefficient	4

Description	
Grey slightly silty fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205029-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **8**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

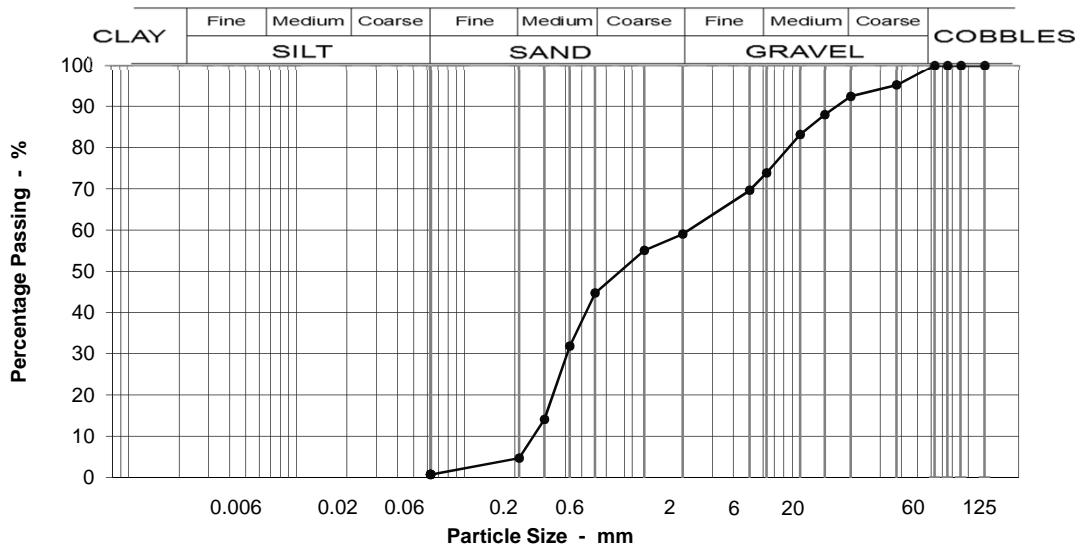
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS1 @ 3 - 4m Specimen: 1 @ 3m

Location and orientation within sample not applicable

Disturbed sample

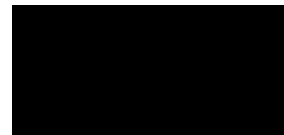


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6F1, 6J, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	8
63	100		Medium GRAVEL	19
37.5	95		Fine GRAVEL	15
20	92		Coarse SAND	14
14	88		Medium SAND	40
10	83		Fine SAND	4
6.3	74		Silt & Clay	1
5	70		<b>Grading Analysis</b>	
2	59		D100	38
1.18	55		D60	2.27
0.600	45		D10	0.26
0.425	32		Uniformity Coefficient	9
0.300	14		<b>Description</b>	
0.212	5	Grey medium and coarse SAND and fine and medium sub-rounded flint gravel.		
0.063	1	Moisture content % 7.5		

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205030-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 9  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

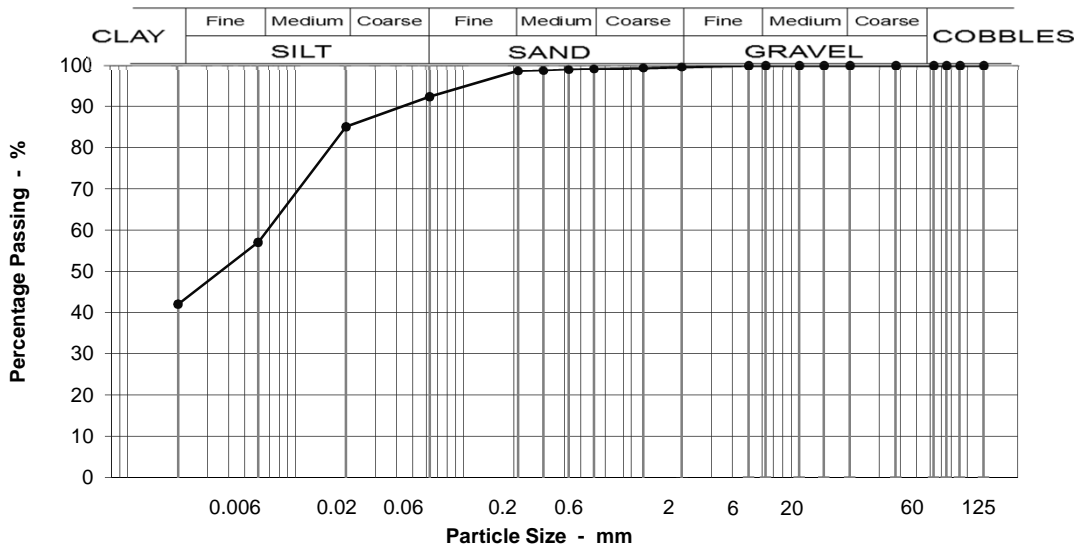
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS1 @ 4 - 5m Specimen: 2 @ 4.2m

Location and orientation within sample not applicable

Disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	99
0.425	99
0.300	99
0.212	99
0.063	92
0.020	85
0.006	57
0.002	42

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	0
Fine SAND	6
Silt & Clay	92

Grading Analysis	
D100	2
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

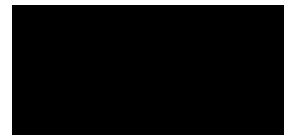
Description	
Soft laminated grey silty CLAY, with numerous lenses & laminae of black organic material.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206010-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

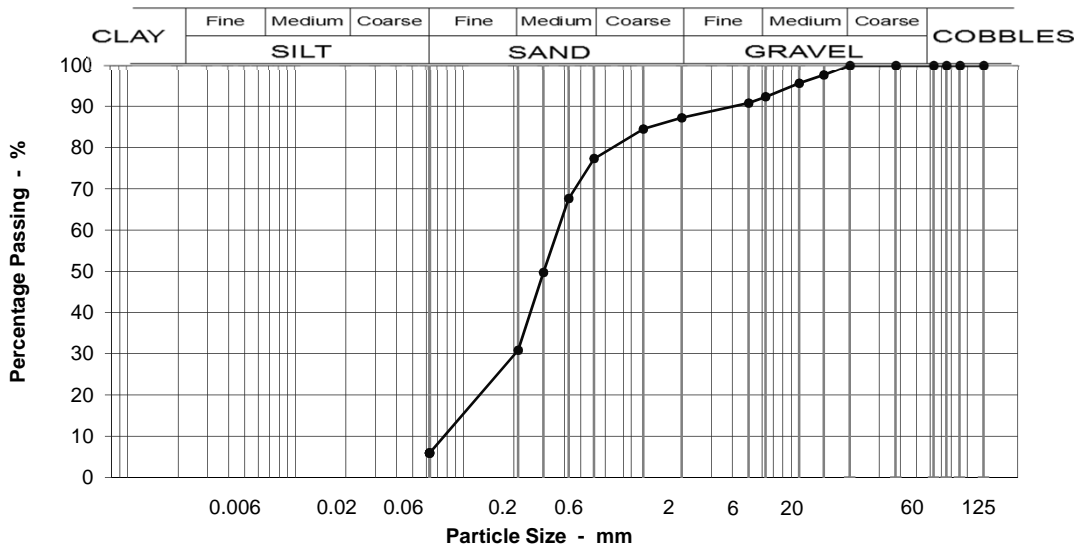
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS2 @ 0.1 - 0.3m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	96
6.3	92
5	91
2	87
1.18	84
0.600	77
0.425	68
0.300	50
0.212	31
0.063	6

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 8.9

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	8
Fine GRAVEL	5
Coarse SAND	10
Medium SAND	46
Fine SAND	25
Silt & Clay	6

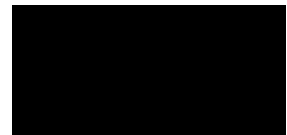
Grading Analysis	
D100	14
D60	0.37
D10	0.09
Uniformity Coefficient	4

**Description**  
Orangey brown gravelly fine and medium SAND. Gravel is fine and medium, rounded to sub-angular flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206011-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **2**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

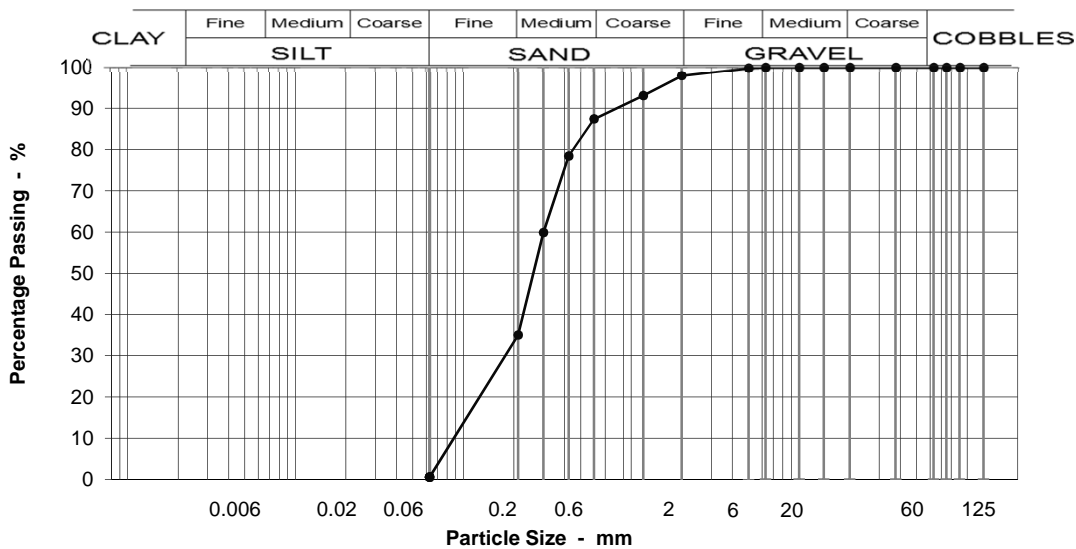
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS2 @ 0.5 - 0.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	93
0.600	87
0.425	78
0.300	60
0.212	35
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 4.2

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	11
Medium SAND	52
Fine SAND	34
Silt & Clay	1

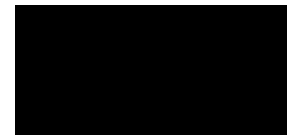
Grading Analysis	
D100	5
D60	0.30
D10	0.10
Uniformity Coefficient	3

Description	
Yellowish brown fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206012-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **3**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-May-18**

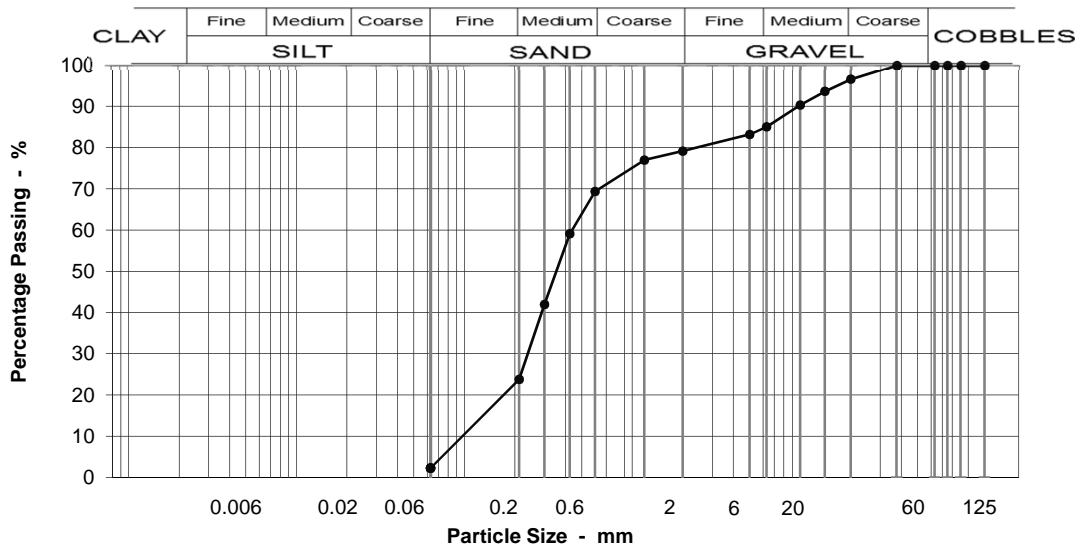
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS2 @ 0.9 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	97
14	94
10	90
6.3	85
5	83
2	79
1.18	77
0.600	69
0.425	59
0.300	42
0.212	24
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 3

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	3
Medium GRAVEL	12
Fine GRAVEL	6
Coarse SAND	10
Medium SAND	46
Fine SAND	21
Silt & Clay	2

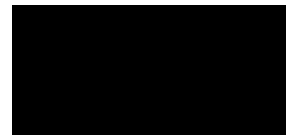
Grading Analysis	
D100	20
D60	0.44
D10	0.12
Uniformity Coefficient	4

**Description**  
Brown very gravelly medium SAND. Gravel is fine and medium, rounded to sub-angular flint and quartz. Occasional shell fragments.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206015-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **6**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

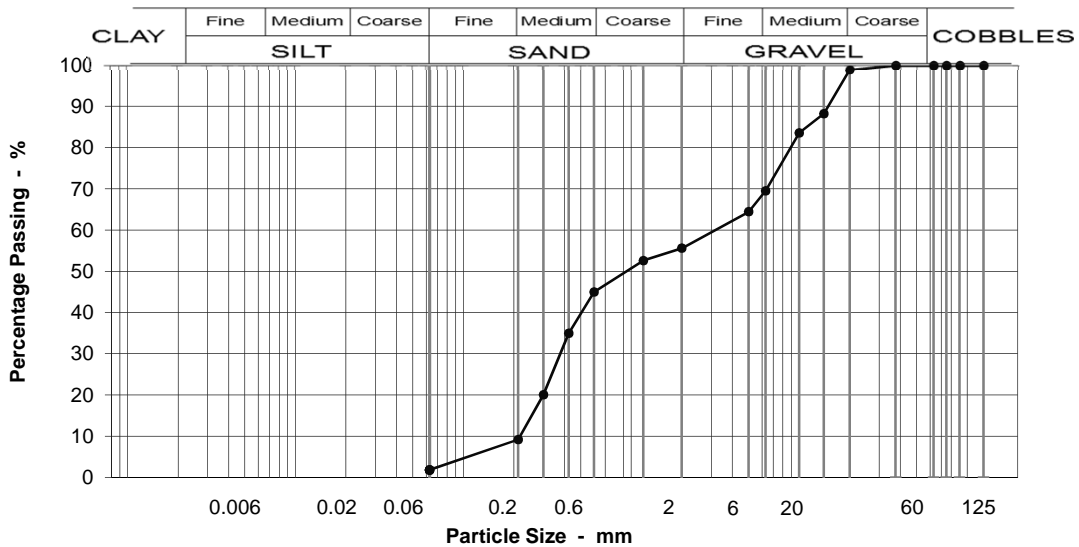
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS2 @ 1.2 - 2m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	88
10	84
6.3	70
5	64
2	56
1.18	53
0.600	45
0.425	35
0.300	20
0.212	9
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 11

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	29
Fine GRAVEL	14
Coarse SAND	11
Medium SAND	36
Fine SAND	7
Silt & Clay	2

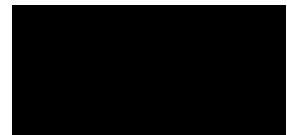
Grading Analysis	
D100	20
D60	3.50
D10	0.22
Uniformity Coefficient	16

**Description**  
Grey slightly organic medium SAND and fine to medium angular to sub-rounded flint and quartz GRAVEL.

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206001-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **25-Jun-18**

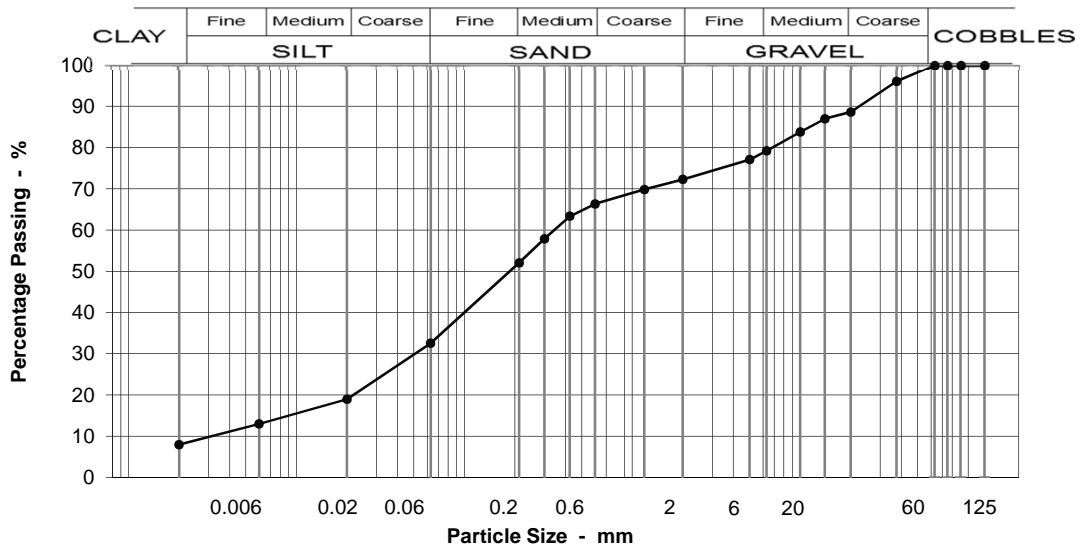
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS3 @ 0.1 - 0.4m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	96
20	89
14	87
10	84
6.3	79
5	77
2	72
1.18	70
0.600	66
0.425	63
0.300	58
0.212	52
0.063	33
0.020	19
0.006	13
0.002	8

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 2C.**

Moisture content % 30

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	11
Medium GRAVEL	9
Fine GRAVEL	7
Coarse SAND	6
Medium SAND	14
Fine SAND	19
Silt & Clay	33

Grading Analysis	
D100	38
D60	0.35
D10	0.04
Uniformity Coefficient	9

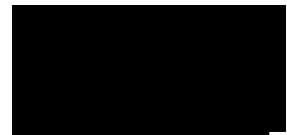
**Description**  
MADE GROUND: comprising fine to coarse gravel size angular to subangular brick, concrete, flint and wood in a matrix of dark grey clayey, very silty fine and medium sand.

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206003-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 3  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 25-Jun-18

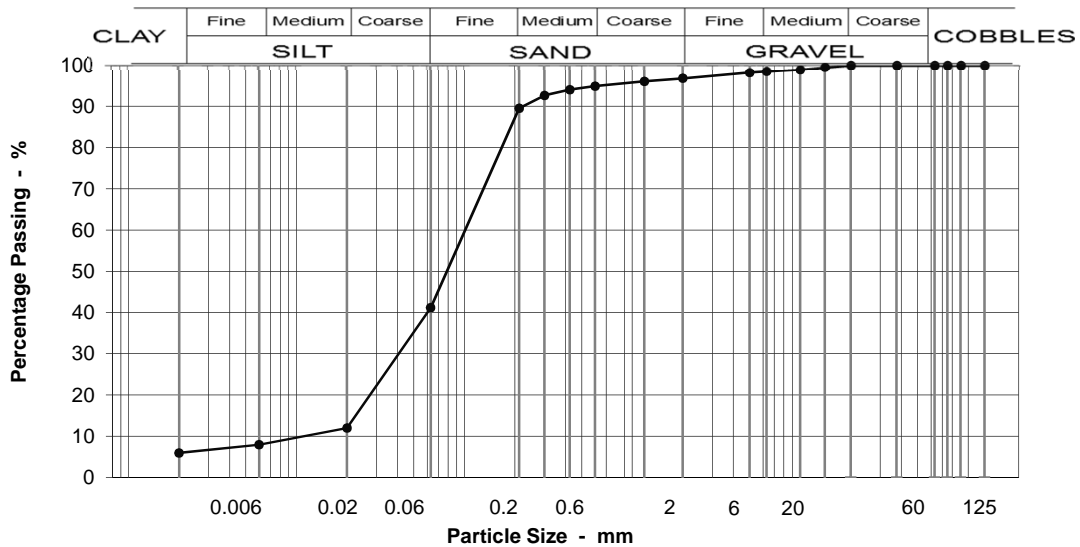
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS3 @ 0.5 - 0.7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	2
37.5	100		Fine GRAVEL	2
20	100		Coarse SAND	2
14	99		Medium SAND	5
10	99		Fine SAND	48
6.3	98		Silt & Clay	41
5	98			
2	97			
1.18	96			
0.600	95			
0.425	94			
0.300	93			
0.212	90			
0.063	41			
0.020	12			
0.006	8			
0.002	6	Moisture content %	21	

Grading Analysis	
D100	14
D60	0.12
D10	0.04
Uniformity Coefficient	3

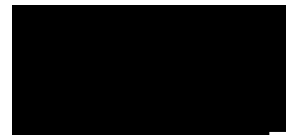
Description	
Light brown very sandy slightly clayey SILT.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206004-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 4  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 25-Jun-18

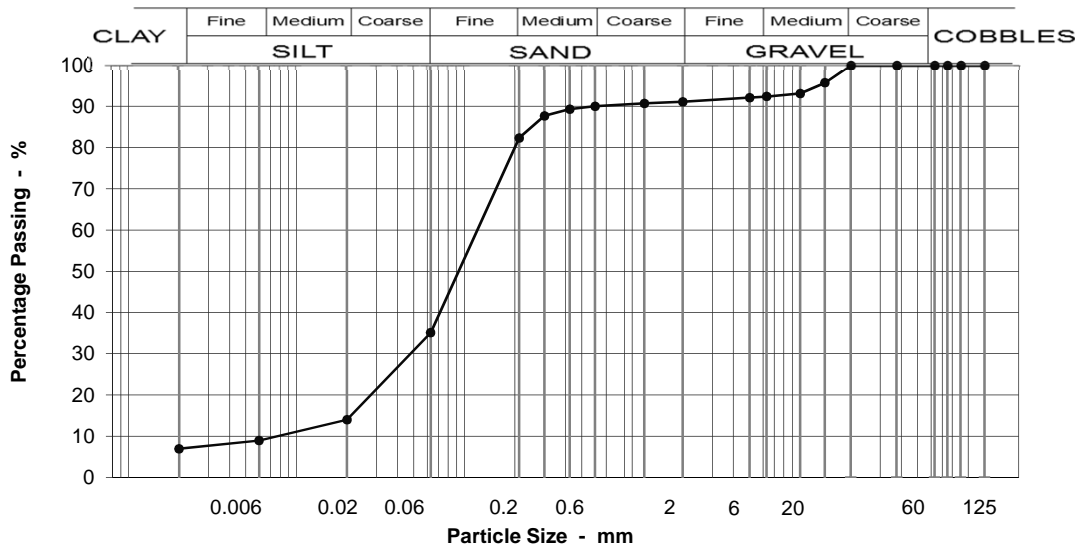
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS3 @ 0.9 - 1.2m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	8
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	1
14	96		Medium SAND	8
10	93		Fine SAND	47
6.3	92		Silt & Clay	35
5	92			
2	91			
1.18	91			
0.600	90			
0.425	89			
0.300	88			
0.212	82			
0.063	35			
0.020	14			
0.006	9			
0.002	7	Moisture content %	21	

Grading Analysis	
D100	14
D60	0.14
D10	0.03
Uniformity Coefficient	4

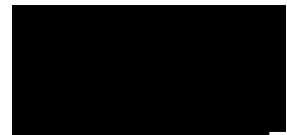
Description	
Soft grey slightly gravelly slightly clayey very sandy SILT. Gravel is medium angular to subangular flint.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206006-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 6  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

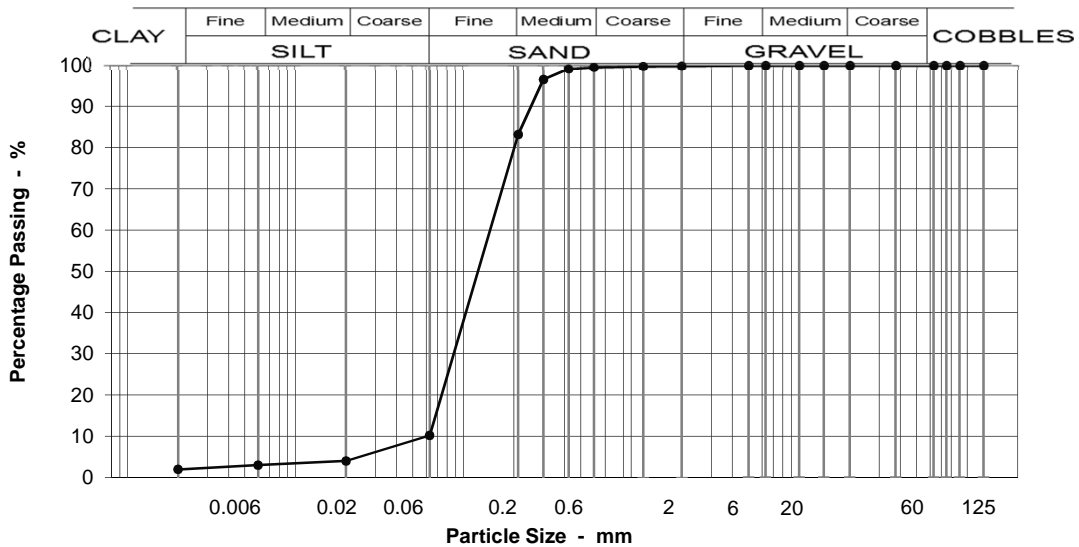
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS3 @ 1.2 - 2m Specimen: 1 @ 1.7m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	99
0.300	96
0.212	83
0.063	10
0.020	4
0.006	3
0.002	2

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	16
Fine SAND	73
Silt & Clay	10

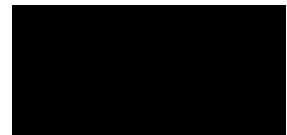
Grading Analysis	
D100	2
D60	0.16
D10	0.09
Uniformity Coefficient	2

**Description**  
Bedded olive and grey fine and medium SAND;  
Soft dark grey organic sandy SILT and grey silty fine SAND.

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206007-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **7**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

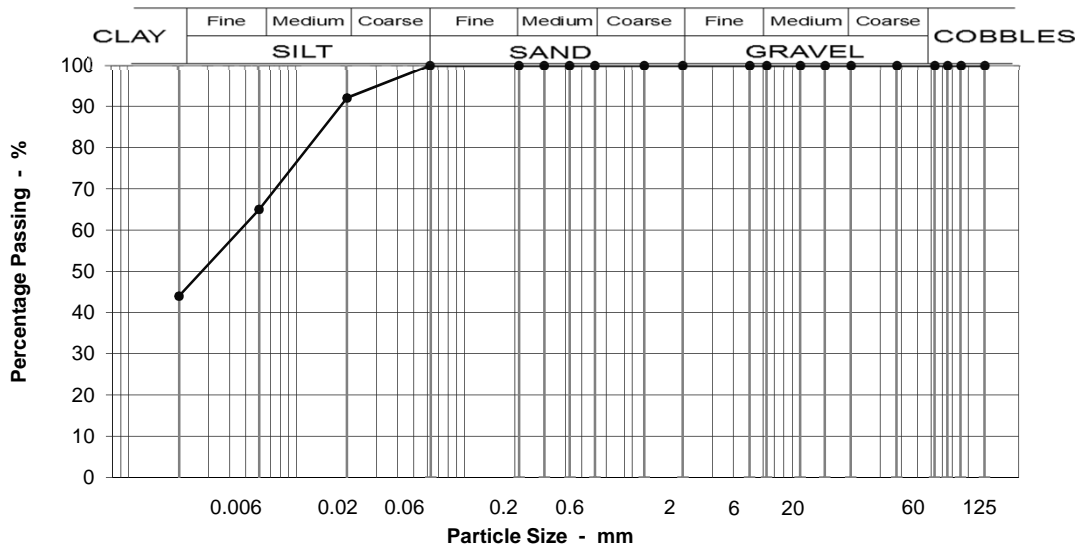
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS3 @ 2 - 3m Specimen: 1 @ 2.5m

Location and orientation within sample not applicable

Disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	100
0.063	100
0.020	92
0.006	65
0.002	44

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	0
Fine SAND	0
Silt & Clay	100

Grading Analysis	
D100	0
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

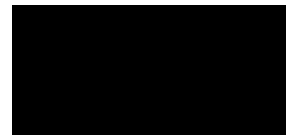
Description	
Soft laminated grey CLAY; SILT with numerous lenses of black organic material.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206009-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 9  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

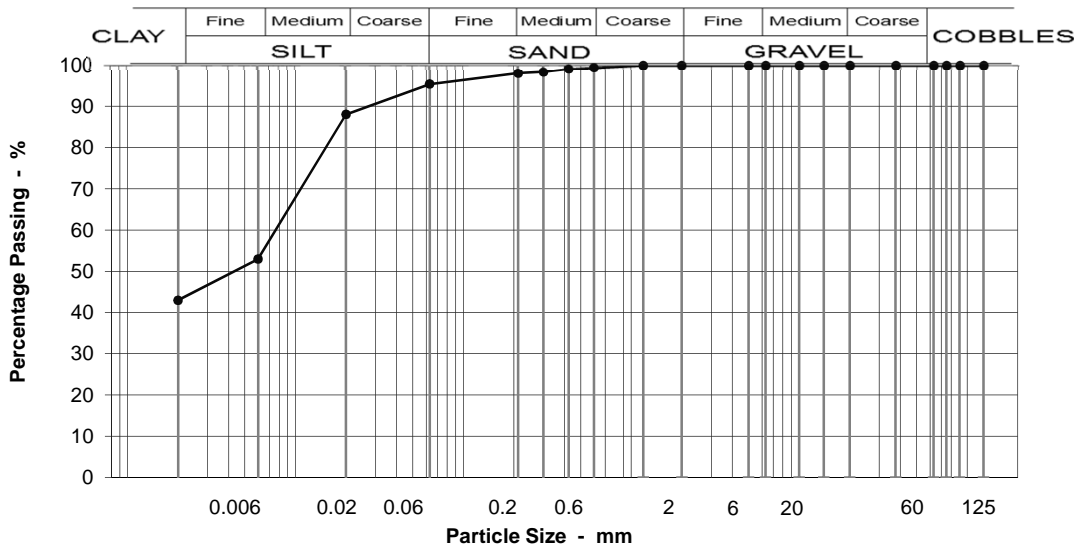
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS3 @ 4 - 5m Specimen: 3 @ 4.5m

Location and orientation within sample not applicable

Disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	99
0.300	98
0.212	98
0.063	95
0.020	88
0.006	53
0.002	43

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	1
Fine SAND	3
Silt & Clay	95

Grading Analysis	
D100	1
D60	0.01
D10	0.00
Uniformity Coefficient	>10

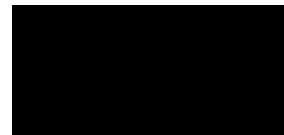
**Description**  
Laminated and thinly bedded, black and dark grey organic silty CLAY and clayey SILT.

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205015-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref. **3**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-May-18**

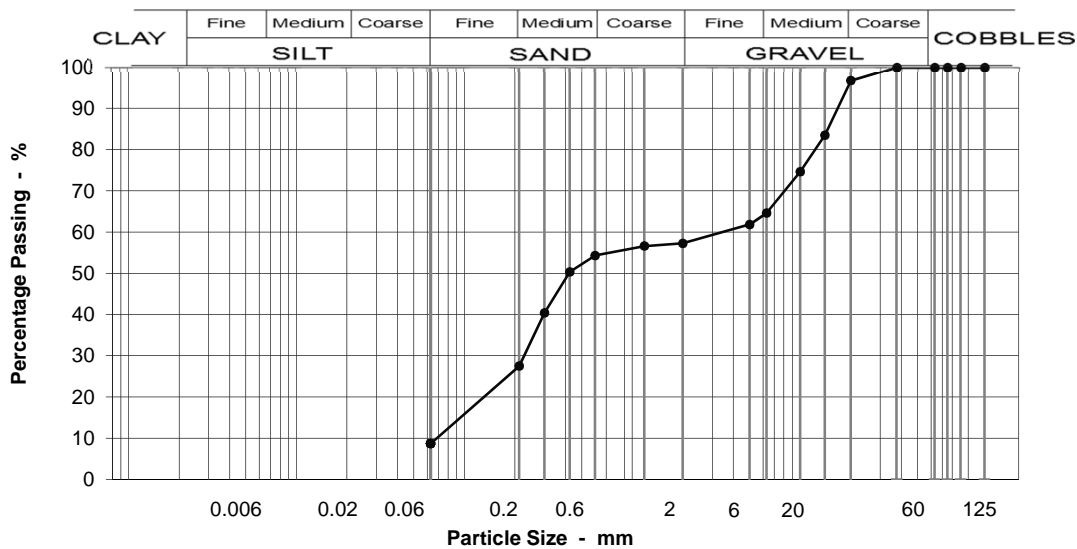
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS4 @ 0.7 - 1.1m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	97
14	83
10	75
6.3	65
5	62
2	57
1.18	57
0.600	54
0.425	50
0.300	40
0.212	27
0.063	9

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1A, 6E/6R, 6I, 6M, 6N.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	3
Medium GRAVEL	32
Fine GRAVEL	7
Coarse SAND	3
Medium SAND	27
Fine SAND	19
Silt & Clay	9

Grading Analysis	
D100	20
D60	3.81
D10	0.07
Uniformity Coefficient	52

**Description**  
Brown fine and medium SAND and angular to rounded flint and quartz GRAVEL.

Moisture content % 6.1

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205019-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **7**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

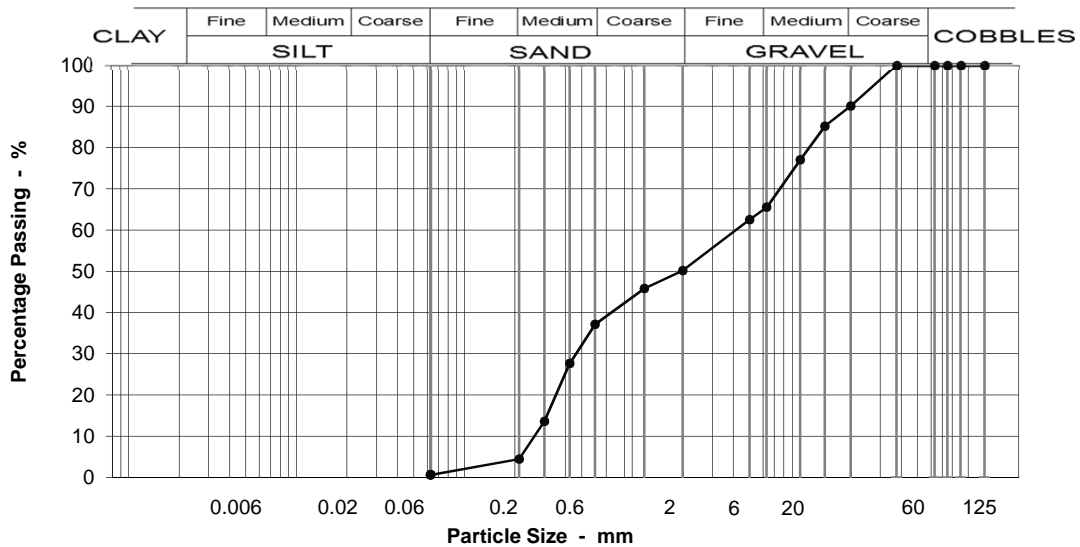
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS4 @ 2 - 3m Specimen: 1

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	90
14	85
10	77
6.3	66
5	63
2	50
1.18	46
0.600	37
0.425	28
0.300	14
0.212	5
0.063	1

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1A, 6A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 9.5

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	10
Medium GRAVEL	25
Fine GRAVEL	15
Coarse SAND	13
Medium SAND	33
Fine SAND	4
Silt & Clay	1

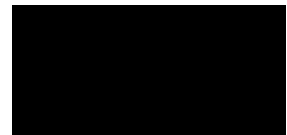
Grading Analysis	
D100	20
D60	4.38
D10	0.27
Uniformity Coefficient	17

**Description**  
Light grey fine and medium SAND and fine to coarse subangular to subrounded flint GRAVEL.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205020-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **8**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

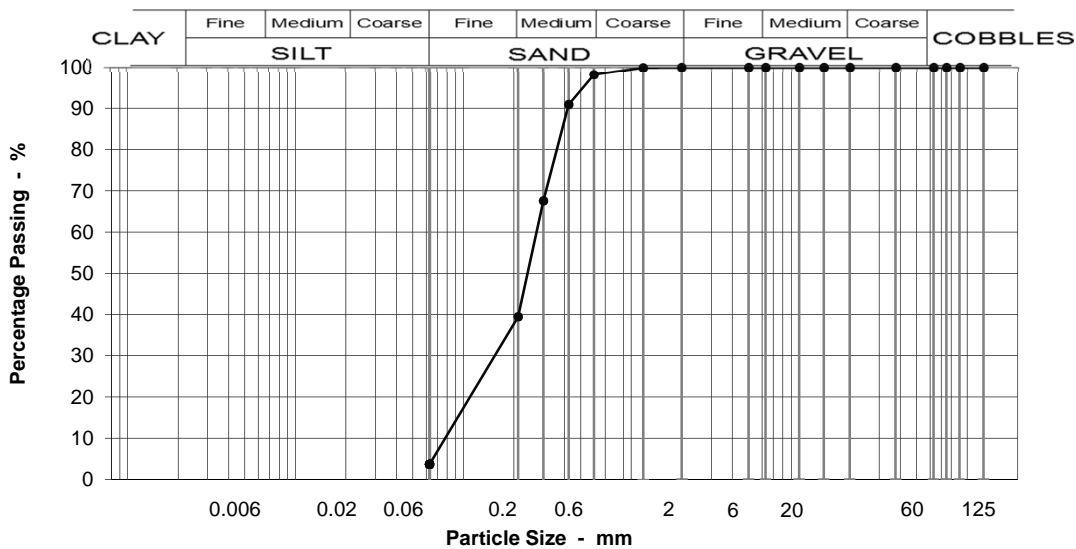
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS4 @ 3 - 4m Specimen: 1 @ 3.65m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	98
0.425	91
0.300	68
0.212	39
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	2
Medium SAND	59
Fine SAND	36
Silt & Clay	4

Grading Analysis	
D100	1
D60	0.28
D10	0.09
Uniformity Coefficient	3

Description	
Laminated light grey fine and medium SAND with some shell fragments.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205021-613**  
Our Project No. **PZ1522D1**  
Your Sample Ref **9**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-May-18**

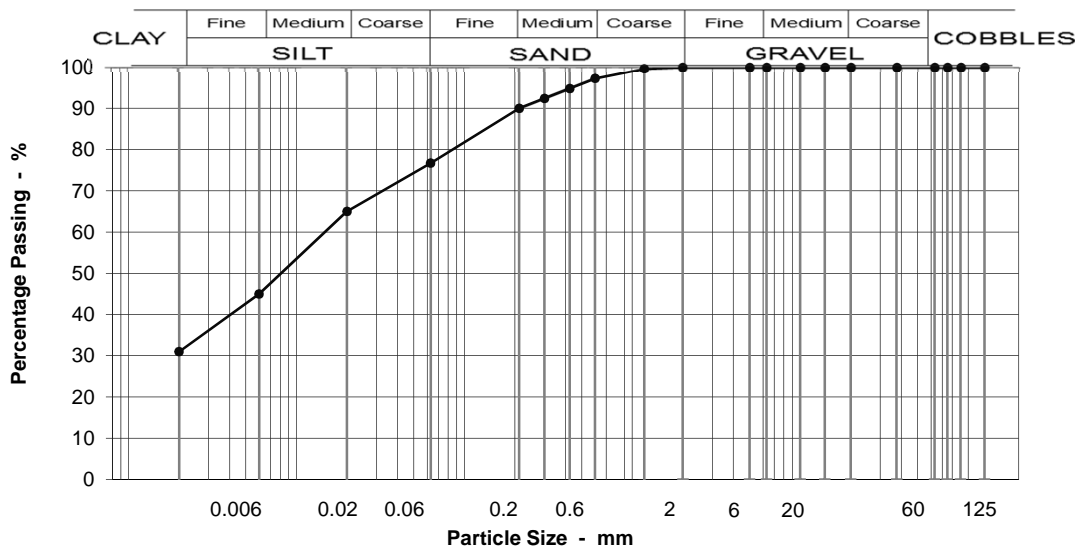
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS4 @ 4 - 5m Specimen: 1 @ 4.7m

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	3
14	100		Medium SAND	7
10	100		Fine SAND	13
6.3	100		Silt & Clay	77
5	100			
2	100			
1.18	100			
0.600	97			
0.425	95			
0.300	92			
0.212	90			
0.063	77			
0.020	65			
0.006	45			
0.002	31			
		Moisture content %		0

Grading Analysis	
D100	1
D60	0.02
D10	0.00
Uniformity Coefficient	>10*

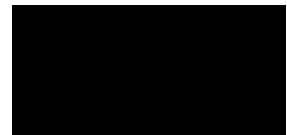
Description	
Laminated grey silty CLAY, brown organic SILT, grey silty fine SAND and light grey fine and medium SAND.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171204015-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **2-Jul-18**

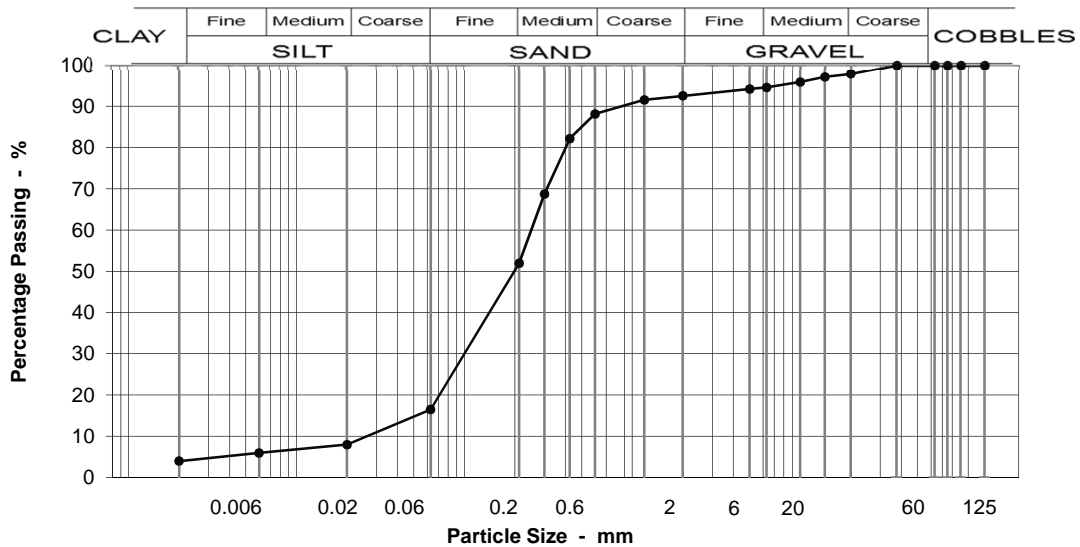
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS5 @ 0.1 - 0.4m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

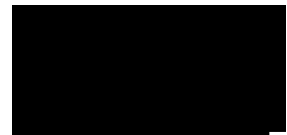


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	2
63	100		Medium GRAVEL	3
37.5	100		Fine GRAVEL	2
20	98		Coarse SAND	4
14	97		Medium SAND	36
10	96		Fine SAND	35
6.3	95		Silt & Clay	17
5	94		<b>Grading Analysis</b>	
2	93		D100	20
1.18	92		D60	0.25
0.600	88		D10	0.07
0.425	82		Uniformity Coefficient	4
0.300	69		<b>Description</b>	
0.212	52	Brownish grey fine and medium silty SAND.		
0.063	17			
0.020	8			
0.006	6			
0.002	4			
<b>Moisture content %</b>		12		

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171204016-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **2**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

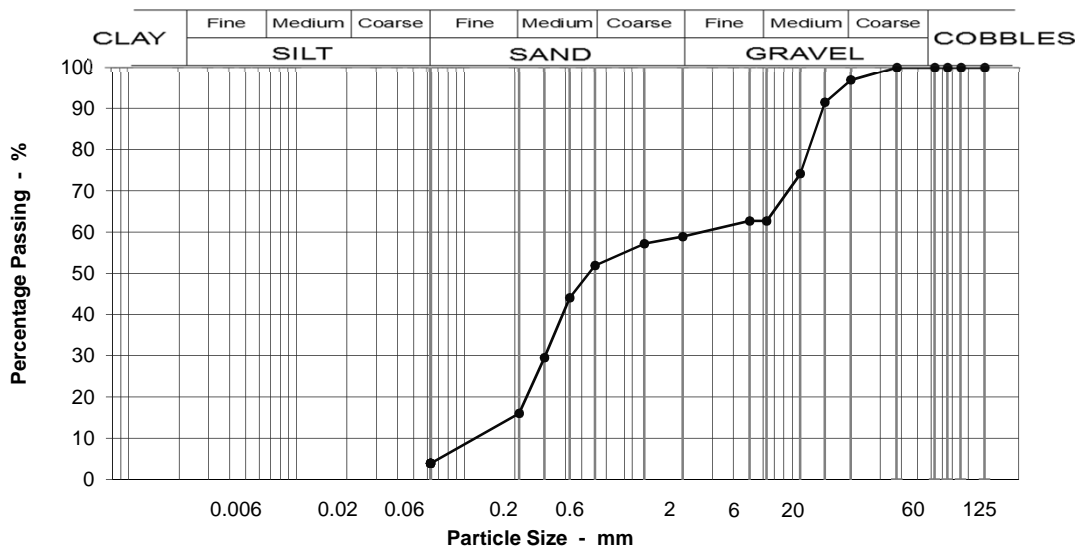
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS5 @ 0.4 - 0.7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	97
14	91
10	74
6.3	63
5	63
2	59
1.18	57
0.600	52
0.425	44
0.300	30
0.212	16
0.063	4

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1A, 6E/6R, 6I, 6M, 6N.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	3
Medium GRAVEL	34
Fine GRAVEL	4
Coarse SAND	7
Medium SAND	36
Fine SAND	12
Silt & Clay	4

Grading Analysis	
D100	20
D60	2.87
D10	0.14
Uniformity Coefficient	21

**Description**  
Brown fine and medium SAND and medium angular to sub-rounded flint GRAVEL.

Moisture content % 5.6

Test Code = 610



Simon Holden (Project Technician)





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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171204017-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **3**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **22-May-18**

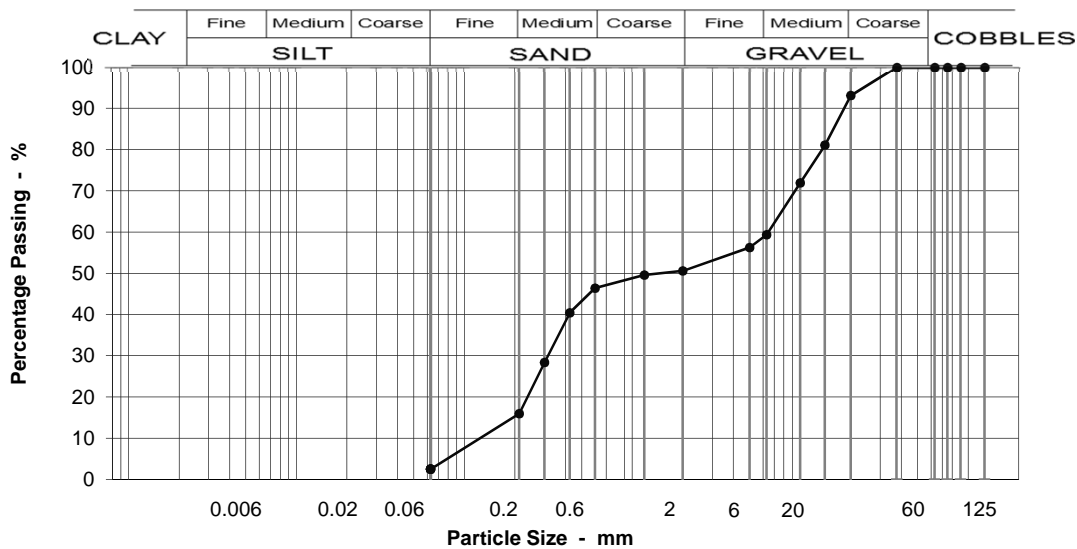
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS5 @ 0.9 - 1.2m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	93
14	81
10	72
6.3	59
5	56
2	51
1.18	50
0.600	46
0.425	40
0.300	28
0.212	16
0.063	3

**Specification for Highway Works Classification**  
Table 6/2  
  
**This material complies with the following material classes 1A, 6E/6R, 6F1, 6I, 6M, 6N.**

Moisture content % 3.1

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	7
Medium GRAVEL	34
Fine GRAVEL	9
Coarse SAND	4
Medium SAND	30
Fine SAND	13
Silt & Clay	3

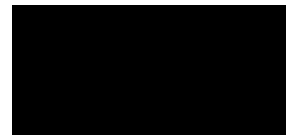
Grading Analysis	
D100	20
D60	6.49
D10	0.15
Uniformity Coefficient	45

**Description**  
Brown medium, rounded to sub-angular flint and quartz GRAVEL and medium SAND.

Test Code = 610



Simon Holden (Project Technician)



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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205003-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **2**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **2-Jul-18**

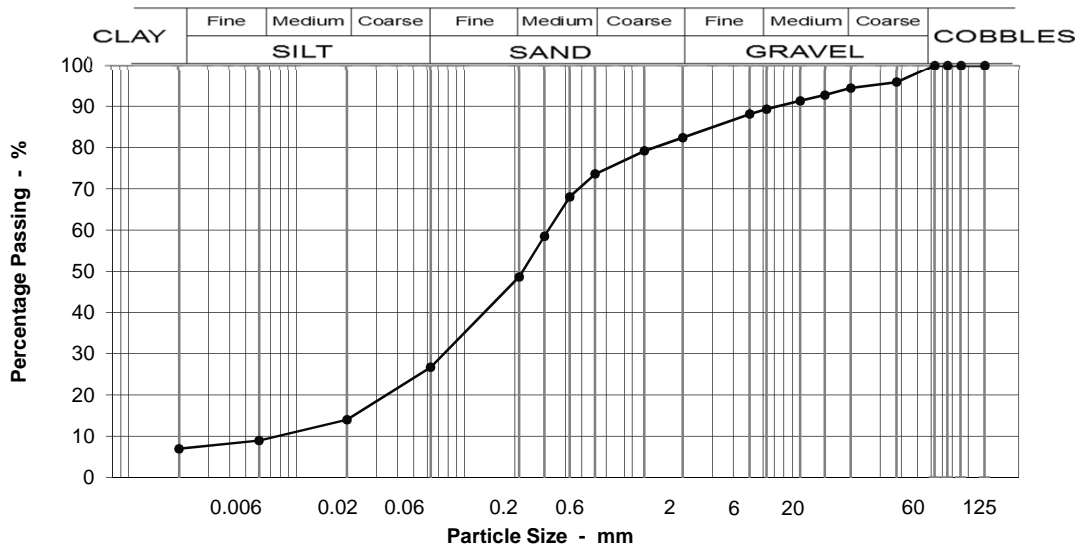
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS6 @ 0.3 - 0.6m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



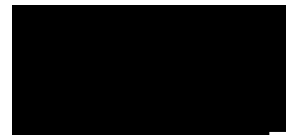
Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	6
63	100		Medium GRAVEL	5
37.5	96		Fine GRAVEL	7
20	94		Coarse SAND	9
14	93		Medium SAND	25
10	91		Fine SAND	22
6.3	89		Silt & Clay	27
5	88		<b>Grading Analysis</b>	
2	82		D100	38
1.18	79		D60	0.32
0.600	74		D10	0.05
0.425	68		Uniformity Coefficient	7
0.300	58		<b>Description</b>	
0.212	49	Greyish brown slightly clayey, very silty fine and medium SAND with some roots. Gravel is fine to coarse angular to subangular flint, ceramics, wood and concrete.		
0.063	27			
0.020	14			
0.006	9			
0.002	7	Moisture content %	24	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205004-613**  
Our Project No. PZ1522D1  
Your Sample Ref 3  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

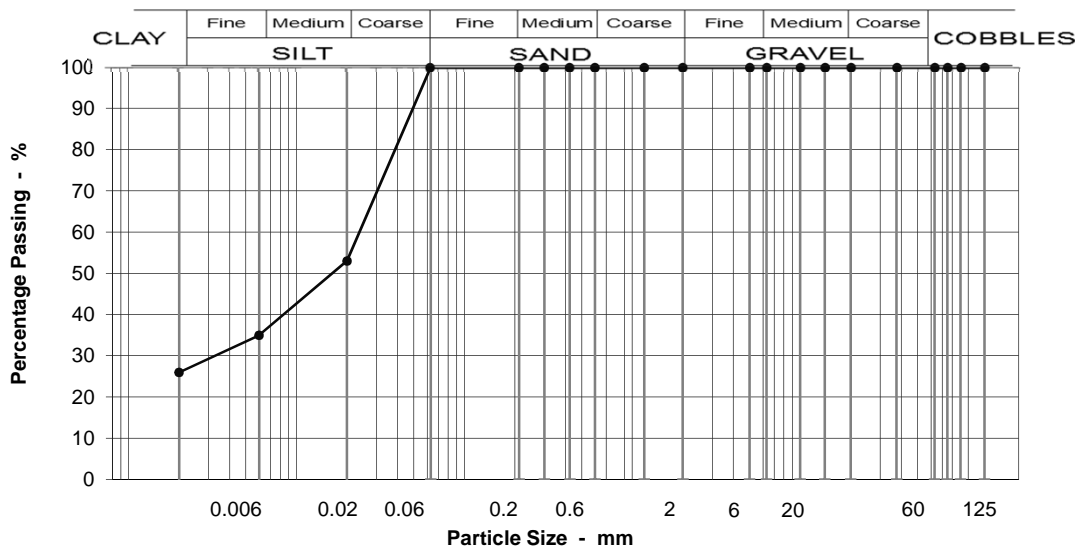
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS6 @ 0.9 - 1.1m Specimen: 1 @ 0.9m

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	0
10	100		Fine SAND	0
6.3	100		Silt & Clay	100
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	100			
0.063	100			
0.020	53			
0.006	35			
0.002	26			
		Moisture content %		0

Grading Analysis	
D100	0
D60	0.03
D10	0.00
Uniformity Coefficient	>10*

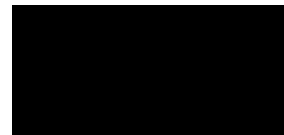
Description	
Mottled light grey and orangey brown very clayey coarse SILT with some roots.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205007-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 6  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

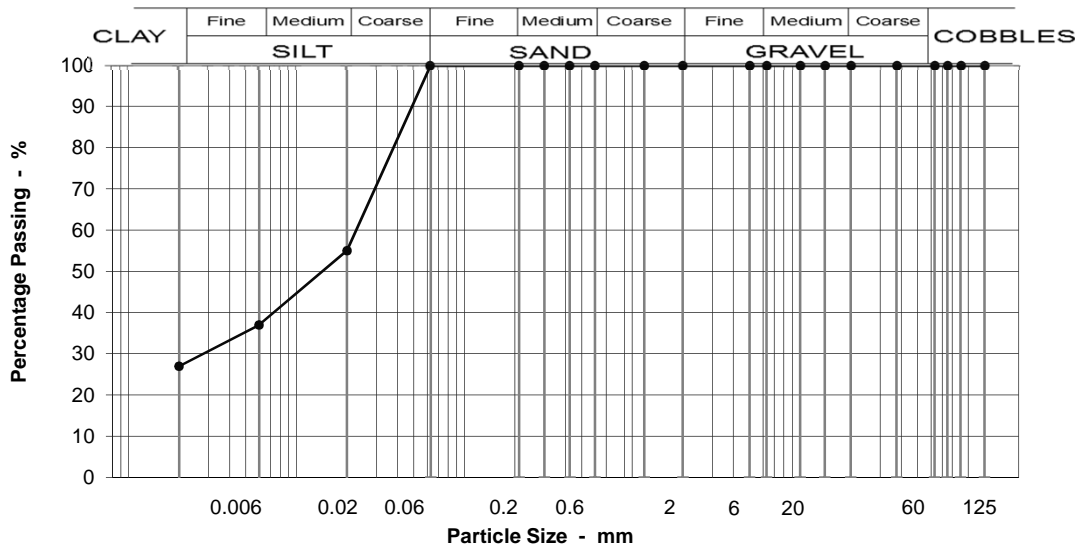
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS6 @ 1.2 - 2m Specimen: 2 @ 1.3m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	100
0.063	100
0.020	55
0.006	37
0.002	27

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	0
Fine SAND	0
Silt & Clay	100

Grading Analysis	
D100	0
D60	0.02
D10	0.00
Uniformity Coefficient	>10*

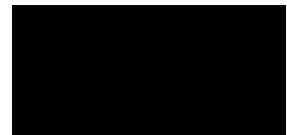
Description	
Mottled light grey and orangey brown very clayey coarse SILT.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205009-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 8  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

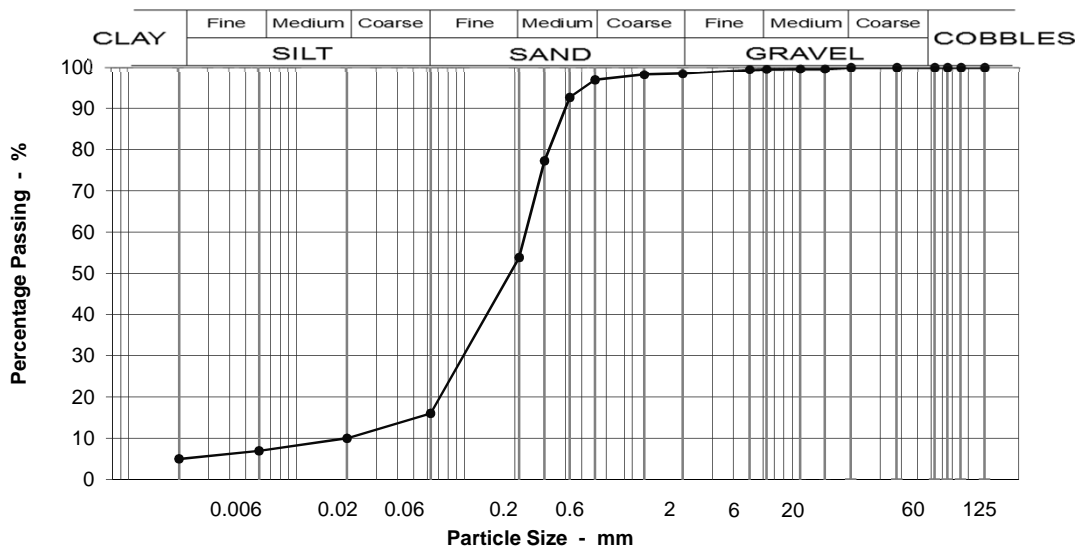
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS6 @ 2 - 2.5m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	2
14	100		Medium SAND	43
10	100		Fine SAND	38
6.3	100		Silt & Clay	16
5	99			
2	98			
1.18	98			
0.600	97			
0.425	93			
0.300	77			
0.212	54			
0.063	16			
0.020	10			
0.006	7			
0.002	5			
<b>Moisture content %</b>		21		

Grading Analysis	
D100	14
D60	0.24
D10	0.06
Uniformity Coefficient	4

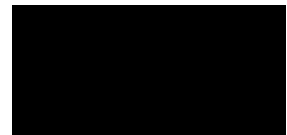
Description	
Grey fine and medium SAND with thin beds of dark grey sandy SILT and soft brown silty CLAY.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171205010-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 9  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

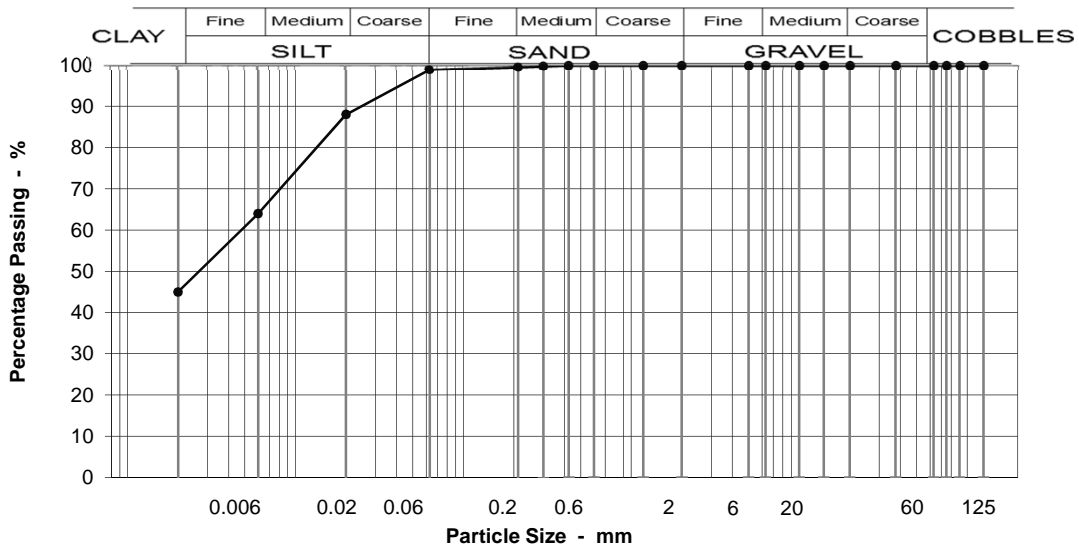
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS6 @ 2.5 - 3m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	100
0.063	99
0.020	88
0.006	64
0.002	45

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	0
Fine SAND	1
Silt & Clay	99

Grading Analysis	
D100	0
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

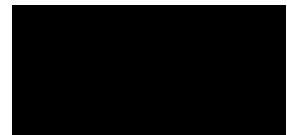
Description	
Laminated soft grey CLAY and black organic clayey SILT.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206017-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 2  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

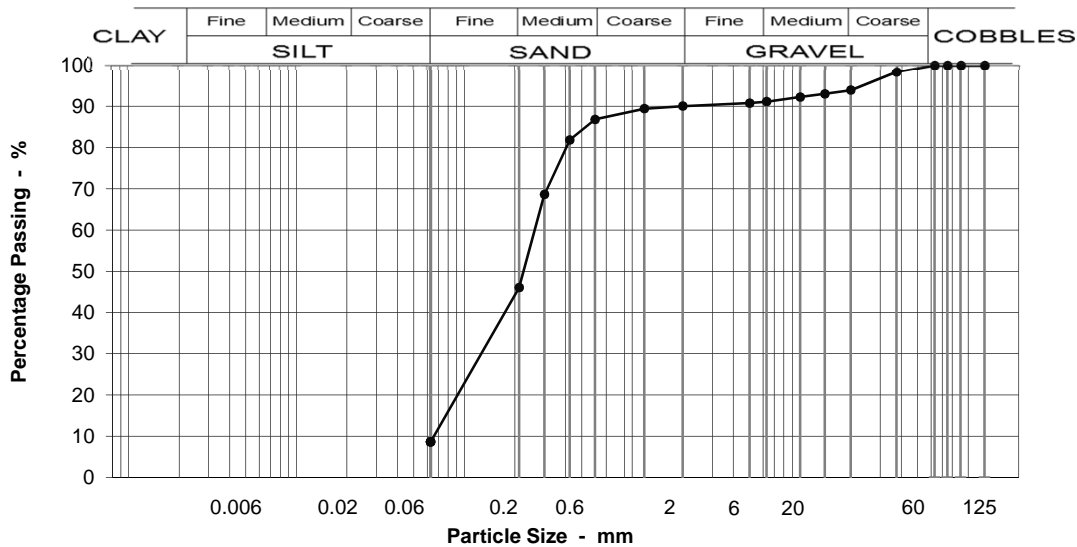
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS7 @ 0.5 - 0.8m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample

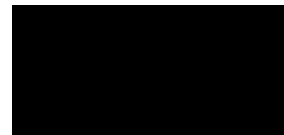


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	6
63	100		Medium GRAVEL	3
37.5	98		Fine GRAVEL	1
20	94		Coarse SAND	3
14	93		Medium SAND	41
10	92		Fine SAND	37
6.3	91		Silt & Clay	9
5	91		<b>Grading Analysis</b>	
2	90		D100	38
1.18	89		D60	0.27
0.600	87		D10	0.07
0.425	82		Uniformity Coefficient	4
0.300	69		<b>Description</b>	
0.212	46	Brown gravelly fine and medium SAND with occasional roots. Gravel is medium and coarse rounded to sub-angular flint.		
0.063	9	Moisture content % 7.3		

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206019-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **4**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **4-Jul-18**

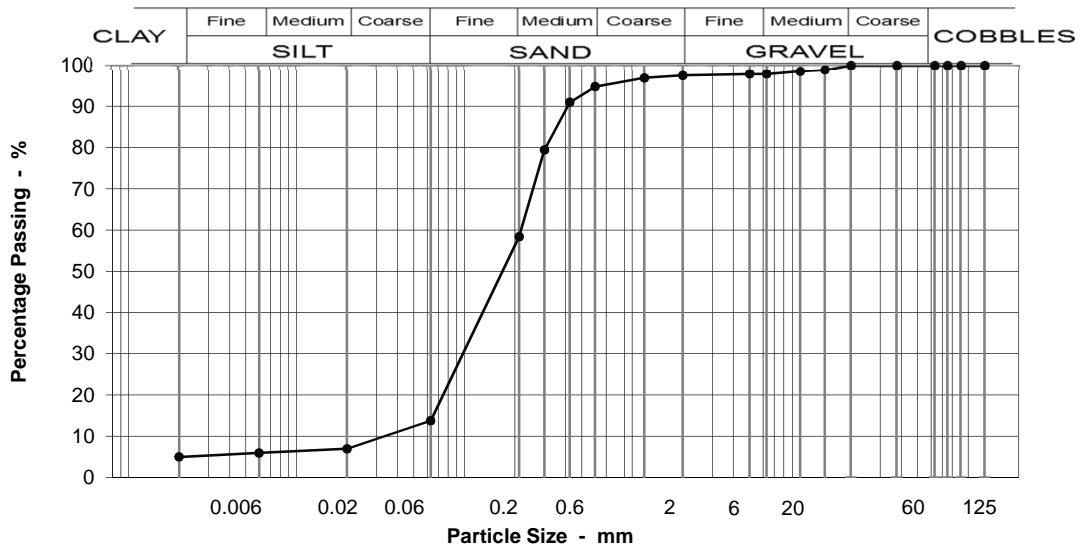
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS7 @ 1.2 - 2m Specimen: 2 @ 1.5m

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	2
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	3
14	99		Medium SAND	36
10	99		Fine SAND	45
6.3	98		Silt & Clay	14
5	98			
2	97			
1.18	97			
0.600	95			
0.425	91			
0.300	79			
0.212	58			
0.063	14			
0.020	7			
0.006	6			
0.002	5			
<b>Moisture content %</b>		11		

Grading Analysis	
D100	14
D60	0.22
D10	0.08
Uniformity Coefficient	3

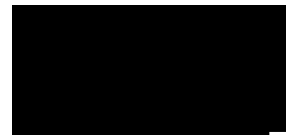
  

Description	
Light brown slightly clayey silty fine and medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206020-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 5  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 23-Apr-18

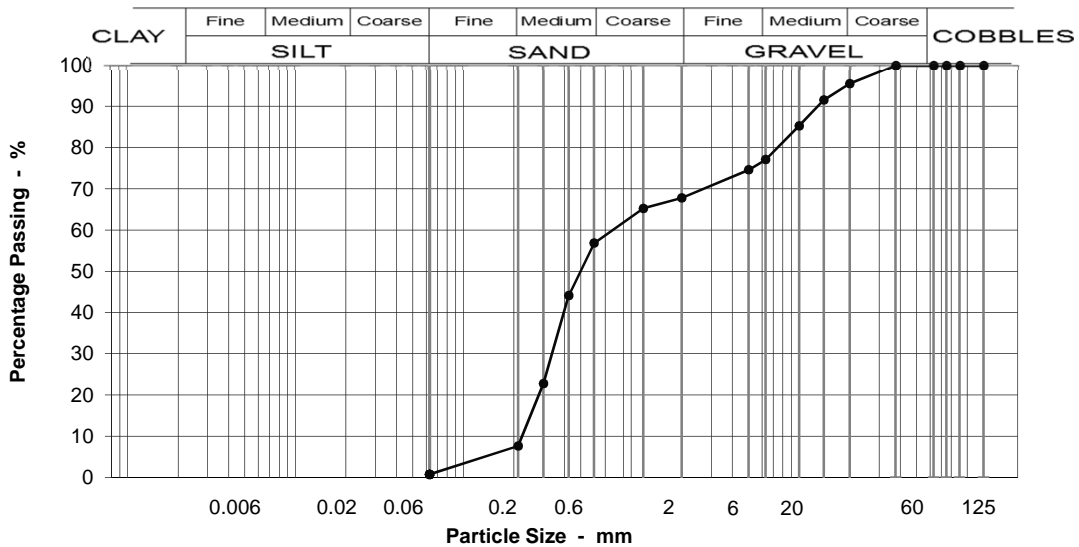
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS7 @ 2 - 3m Specimen: 3 @ 2.6m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	96
14	92
10	85
6.3	77
5	75
2	68
1.18	65
0.600	57
0.425	44
0.300	23
0.212	8
0.063	1

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	4
Medium GRAVEL	18
Fine GRAVEL	9
Coarse SAND	11
Medium SAND	49
Fine SAND	7
Silt & Clay	1

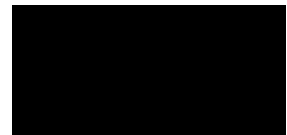
Grading Analysis	
D100	20
D60	0.82
D10	0.23
Uniformity Coefficient	4

**Description**  
Grey very gravelly medium and coarse SAND. Gravel is fine to medium subrounded to subangular flint GRAVEL.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206023-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 8  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

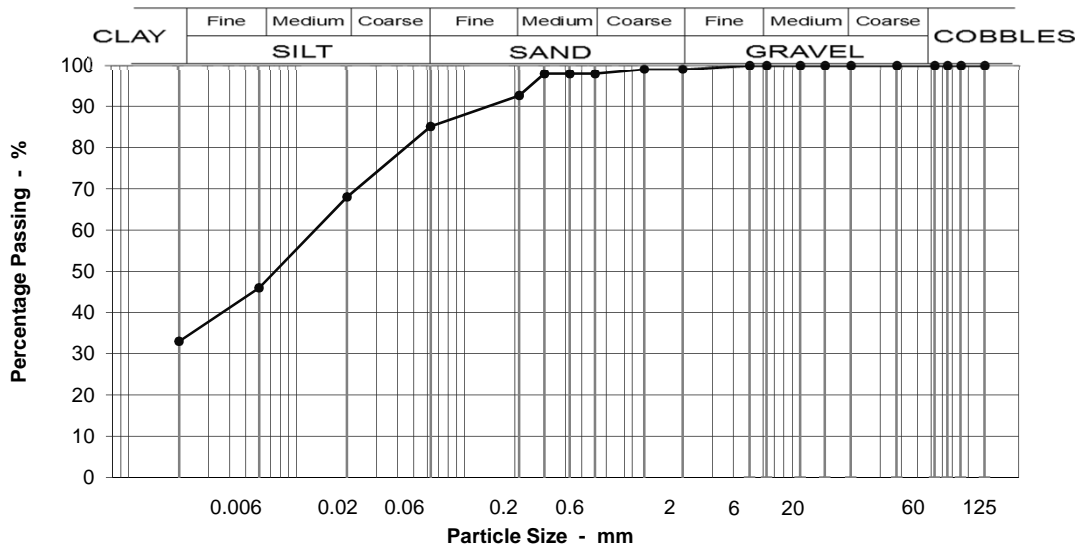
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS7 @ 3.6 - 4m Specimen: 2 @ 3.6m

Location and orientation within sample not applicable

Disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	98
0.425	98
0.300	98
0.212	93
0.063	85
0.020	68
0.006	46
0.002	33

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	5
Fine SAND	8
Silt & Clay	85

Grading Analysis	
D100	2
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

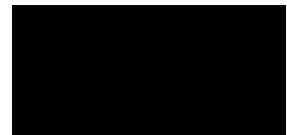
Description	
Firm light grey very clayey, fine and coarse SILT with numerous lenses of black organic material.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206024-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 9  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

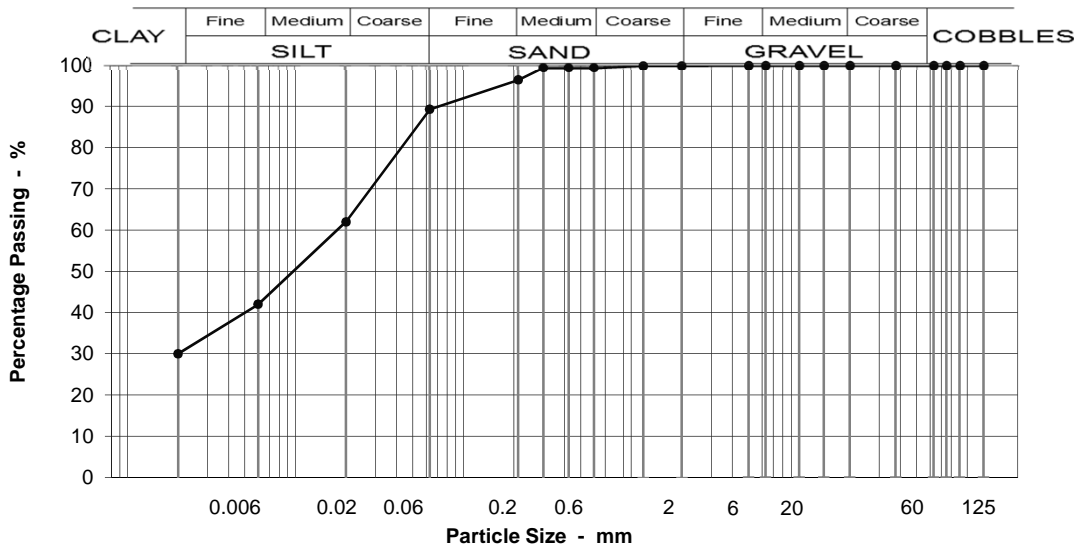
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS7 @ 4.8 - 5m Specimen: 2 @ 4.8m

Location and orientation within sample not applicable

Disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	99
0.300	99
0.212	96
0.063	89
0.020	62
0.006	42
0.002	30

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	3
Fine SAND	7
Silt & Clay	89

Grading Analysis	
D100	2
D60	0.02
D10	0.00
Uniformity Coefficient	>10*

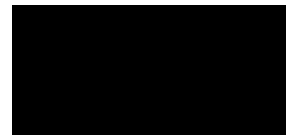
**Description**  
Soft to firm grey very clayey sandy SILT with occasional lenses of brown organic material and some shell fragments.

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171206026-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 11  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

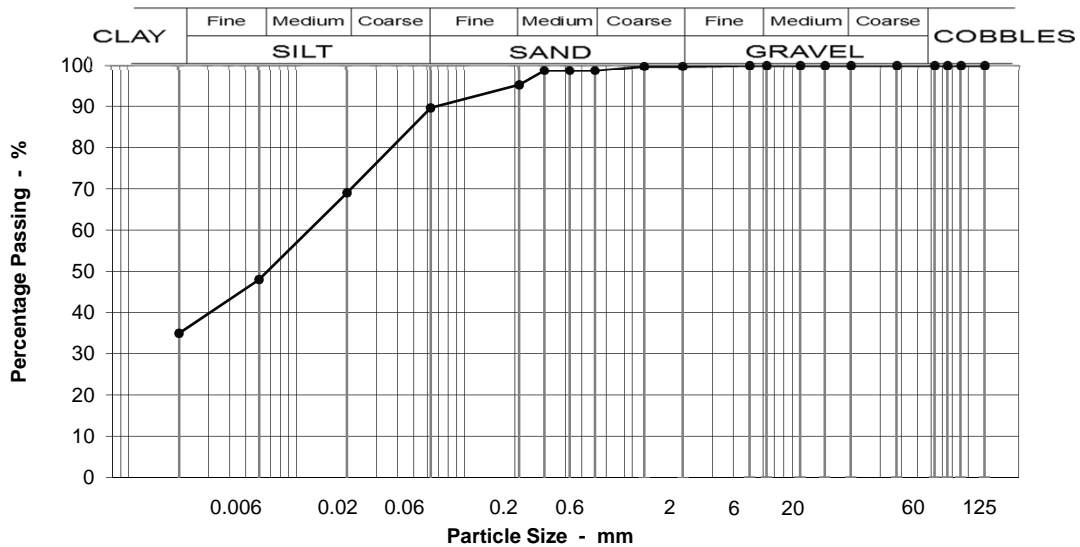
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS7 @ 6.2 - 7m Specimen: 2 @ 6.2m

Location and orientation within sample not applicable

Disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	99
0.300	99
0.212	95
0.063	90
0.020	69
0.006	48
0.002	35

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	4
Fine SAND	6
Silt & Clay	90

Grading Analysis	
D100	2
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

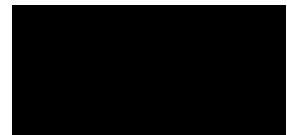
**Description**  
Soft grey sandy very clayey SILT with some shell fragments.

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171204001-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

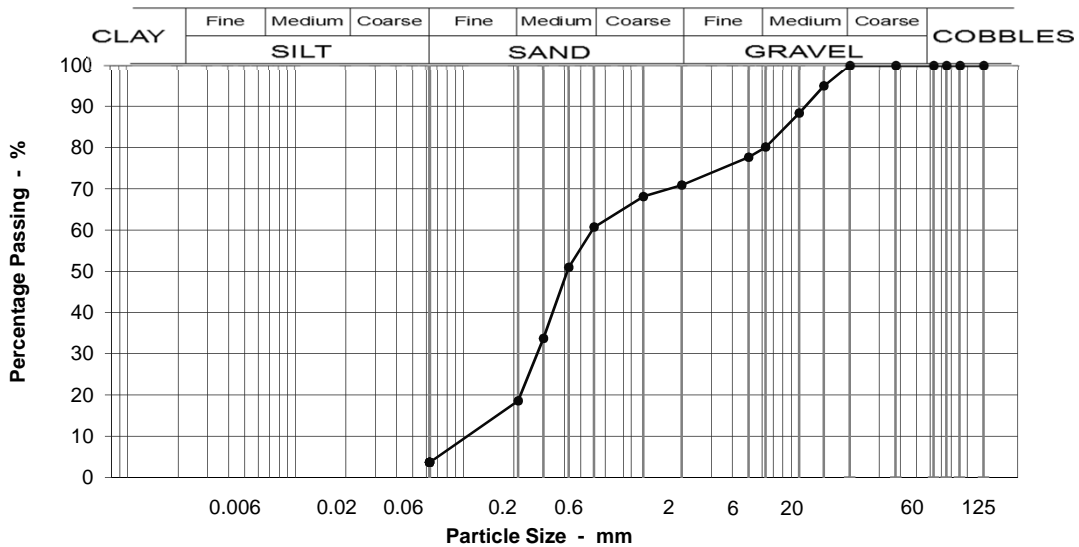
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS9 @ 0.1 - 0.3m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	95
10	88
6.3	80
5	78
2	71
1.18	68
0.600	61
0.425	51
0.300	34
0.212	19
0.063	4

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 14

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	20
Fine GRAVEL	9
Coarse SAND	10
Medium SAND	42
Fine SAND	15
Silt & Clay	4

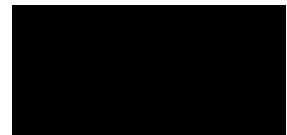
Grading Analysis	
D100	14
D60	0.59
D10	0.13
Uniformity Coefficient	5

**Description**  
Greyish brown very gravelly medium SAND with some roots. Gravel is fine and medium rounded to sub-angular flint and quartz.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171204003-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **3**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **23-Apr-18**

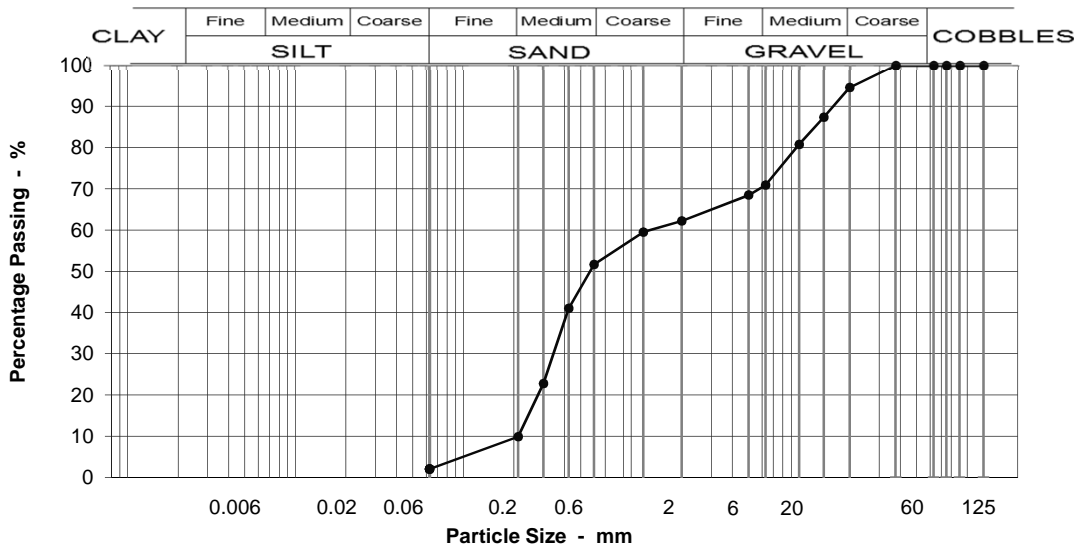
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 Wet Sieving Method**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS9 @ 0.5 - 0.7m Specimen: 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	95
14	87
10	81
6.3	71
5	68
2	62
1.18	59
0.600	52
0.425	41
0.300	23
0.212	10
0.063	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6J, 6M.**

Moisture content % 14

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	5
Medium GRAVEL	24
Fine GRAVEL	9
Coarse SAND	11
Medium SAND	42
Fine SAND	8
Silt & Clay	2

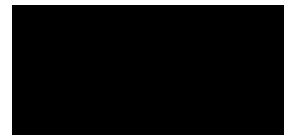
Grading Analysis	
D100	20
D60	1.33
D10	0.21
Uniformity Coefficient	6

**Description**  
Greyish brown very gravelly medium SAND with some roots. Gravel is fine, medium and course rounded to sub-angular flint.

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171204004-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **4**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **2-Jul-18**

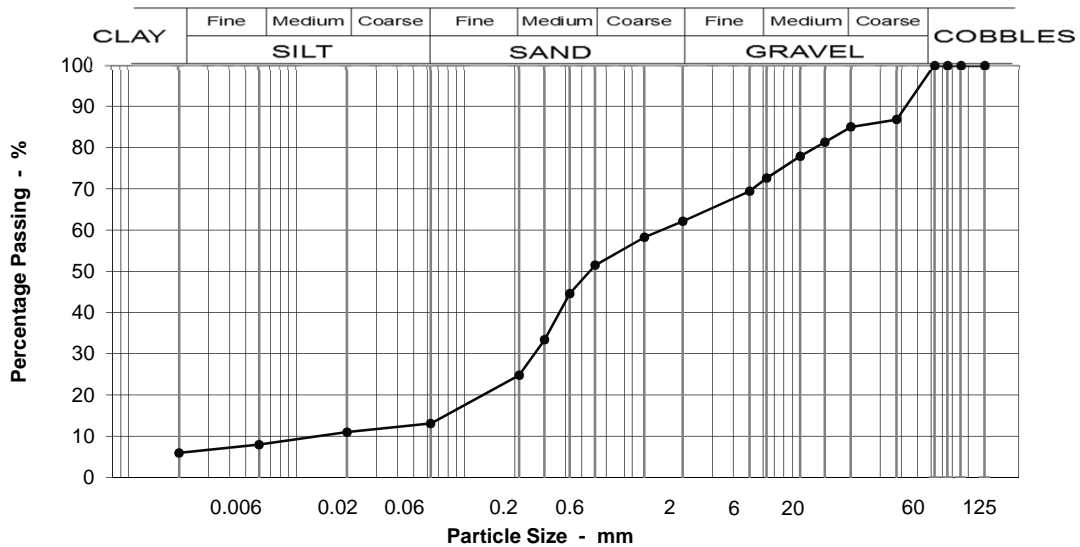
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS9 @ 0.8 - 1.2m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample

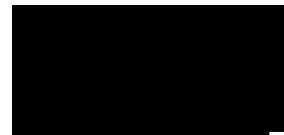


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1A, 6E/6R, 6I, 6N.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	15
63	100		Medium GRAVEL	12
37.5	87		Fine GRAVEL	11
20	85		Coarse SAND	11
14	81		Medium SAND	27
10	78		Fine SAND	12
6.3	73		Silt & Clay	13
5	69		<b>Grading Analysis</b>	
2	62		D100	38
1.18	58		D60	1.55
0.600	51		D10	0.09
0.425	45		Uniformity Coefficient	17
0.300	33		<b>Description</b>	
0.212	25	MADE GROUND comprising dark grey organic very gravelly, very sandy silty clay. Gravel is fine to medium angular to rounded flint, brick & quartz. Some roots.		
0.063	13			
0.020	11			
0.006	8			
0.002	6	Moisture content %	26	

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171204006-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 6  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

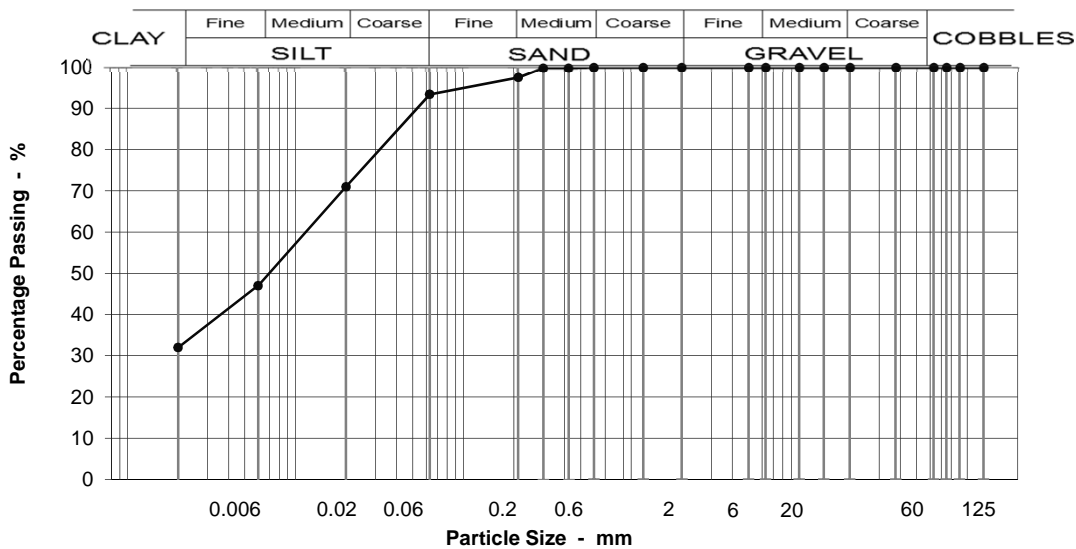
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS9 @ 1.7 - 2m Specimen: 2 @ 1.7m

Location and orientation within sample not applicable

Disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	97
0.063	93
0.020	71
0.006	47
0.002	32

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	3
Fine SAND	4
Silt & Clay	93

Grading Analysis	
D100	0
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

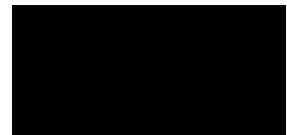
Description	
Stiff, grey, very clayey SILT with occasional shell fragments and some roots.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **GTS2171204008-613**  
Our Project No. PZ1522D1  
Your Sample Ref. 8  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 22-May-18

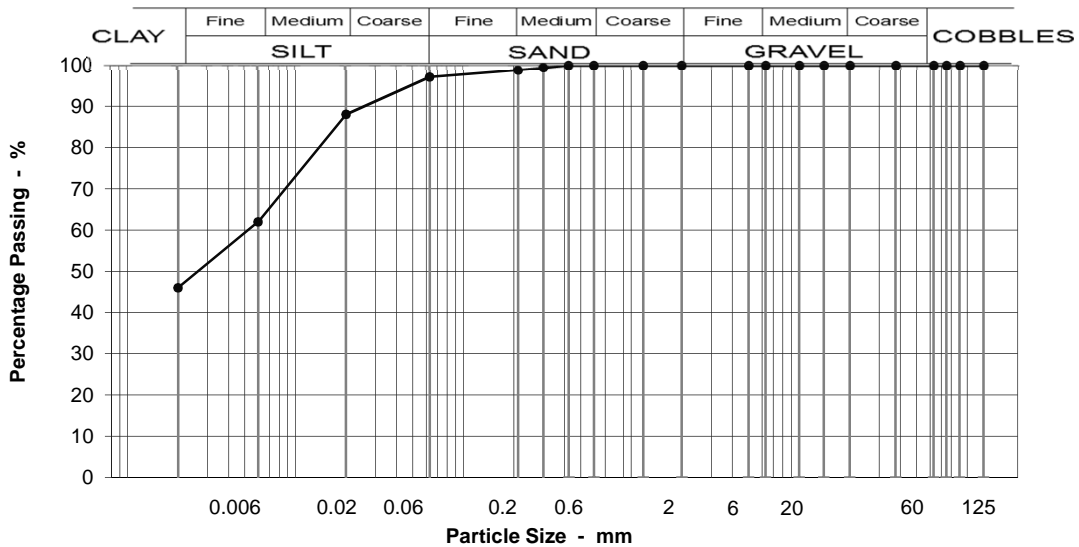
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9.1 & 9.4**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS9 @ 3.5 - 4m Specimen: 2 @ 3.5m

Location and orientation within sample not applicable

Disturbed sample



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	99
0.212	99
0.063	97
0.020	88
0.006	62
0.002	46

Specification for Highway Works Classification  
Table 6/2

Moisture content % 0

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	1
Fine SAND	2
Silt & Clay	97

Grading Analysis	
D100	0
D60	0.01
D10	0.00
Uniformity Coefficient	>10*

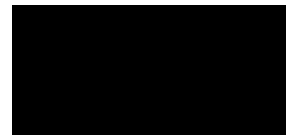
Description	
Soft to firm, laminated, grey CLAY: SILT with lenses of brown fibrous peat.	

\* Uniformity coefficient extrapolated

Test Code = 613



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201809266-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **2**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **19-Oct-18**

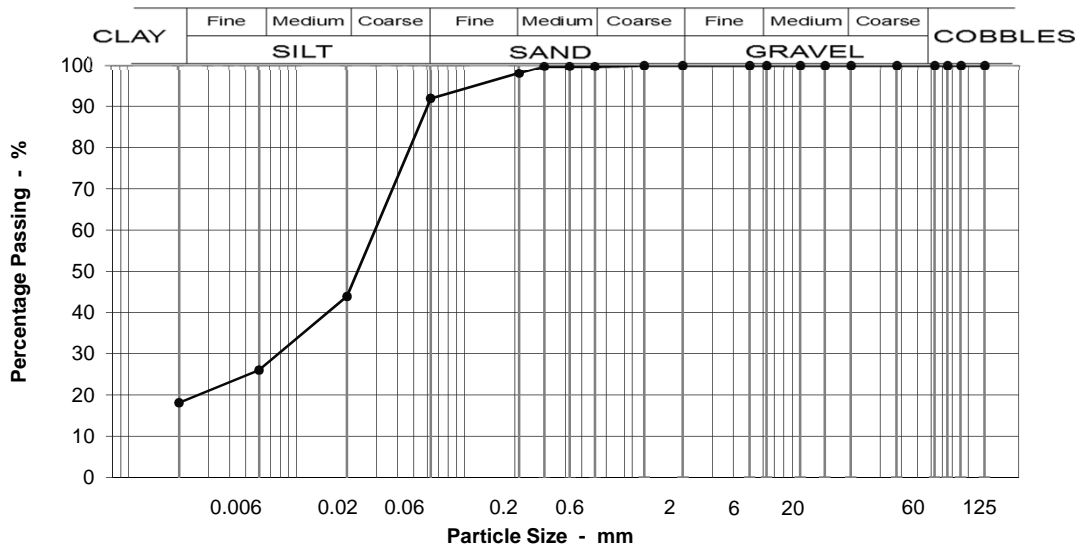
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: **WS20 @ 1 - 2m Specimen: 1 @ 1.4m**

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	98
0.063	92
0.020	44
0.006	26
0.002	18

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 2A/2B, 2A/2B, 2D.**

Moisture content % 31

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	0
Medium SAND	2
Fine SAND	6
Silt & Clay	92

Grading Analysis	
D100	1
D60	0.03
D10	0.00
Uniformity Coefficient	>10*

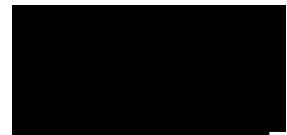
Description	
Grey slightly sandy clayey SILT.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL201809267-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **3**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **19-Oct-18**

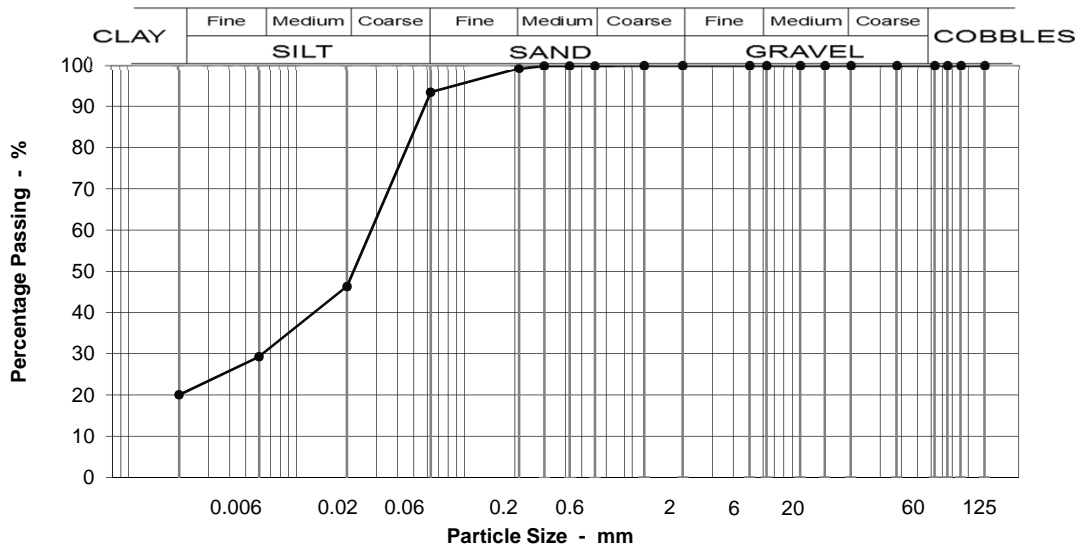
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: **WS20 @ 2 - 3m Specimen: 4 @ 2.6m**

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B, 2D.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	1
10	100		Fine SAND	6
6.3	100		Silt & Clay	93
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	99			
0.063	93			
0.020	46			
0.006	29			
0.002	20	Moisture content %	53	

Grading Analysis	
D100	1
D60	0.03
D10	0.00
Uniformity Coefficient	>10*

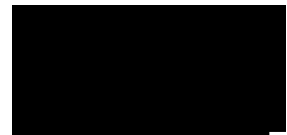
Description	
Laminated, dark grey SILT, organic very silty CLAY and light grey sandy SILT.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2018092613-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 2  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 19-Oct-18

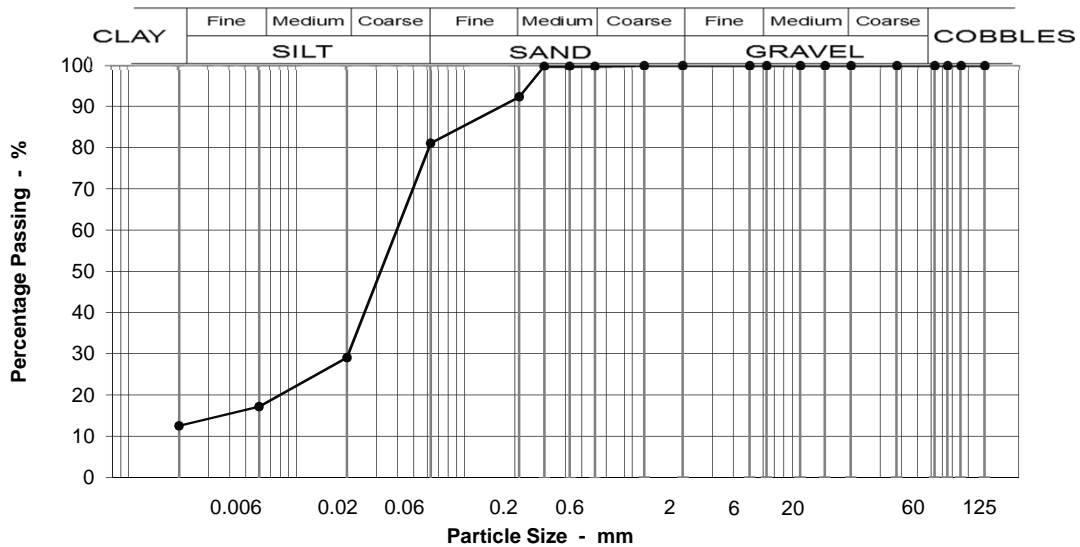
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** WS21 @ 1 - 2m **Specimen:** 3 @ 1.4m

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 2A/2B, 2A/2B, 2D.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	0
20	100		Coarse SAND	0
14	100		Medium SAND	8
10	100		Fine SAND	11
6.3	100		Silt & Clay	81
5	100			
2	100			
1.18	100			
0.600	100			
0.425	100			
0.300	100			
0.212	92			
0.063	81			
0.020	29			
0.006	17			
0.002	13			
<b>Moisture content %</b>		26		

Grading Analysis	
D100	1
D60	0.05
D10	0.00
Uniformity Coefficient	>10*

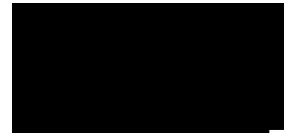
Description	
Laminated and thinly bedded light grey sandy SILT soft to firm grey and greyish brown silty CLAY, dark grey slightly organic sandy SILT and greyish brown silty fine to medium SAND.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018092614-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **3**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **19-Oct-18**

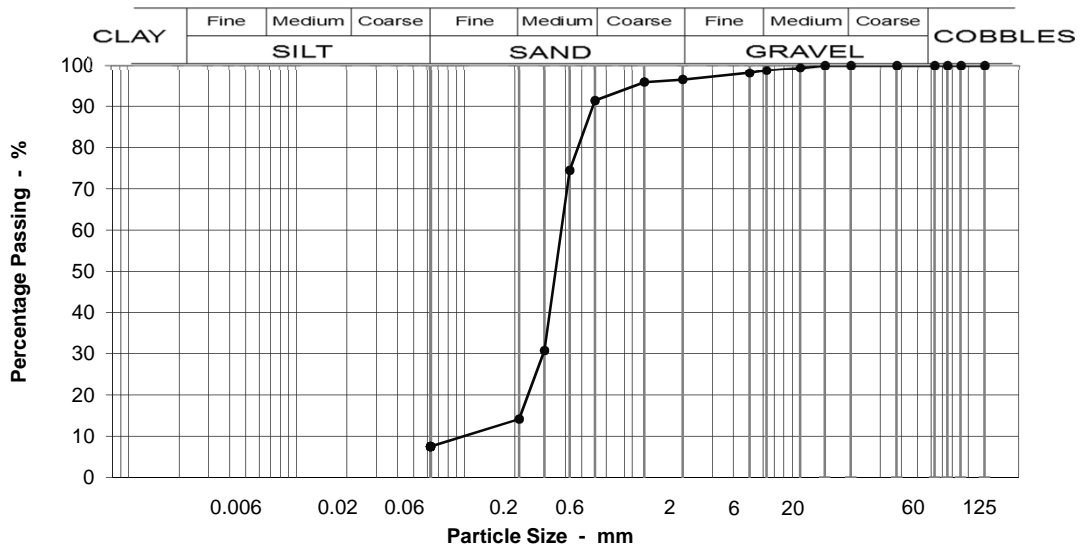
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS21 @ 2 - 3m Specimen: 1 @ 2m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	99
5	98
2	96
1.18	96
0.600	91
0.425	74
0.300	31
0.212	14
0.063	8

Specification for Highway Works Classification  
Table 6/2  
  
**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	2
Coarse SAND	5
Medium SAND	77
Fine SAND	7
Silt & Clay	8

Grading Analysis	
D100	10
D60	0.38
D10	0.12
Uniformity Coefficient	3

**Description**  
Greyish brown medium SAND.

Moisture content % 19

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018092616-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **5**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **19-Oct-18**

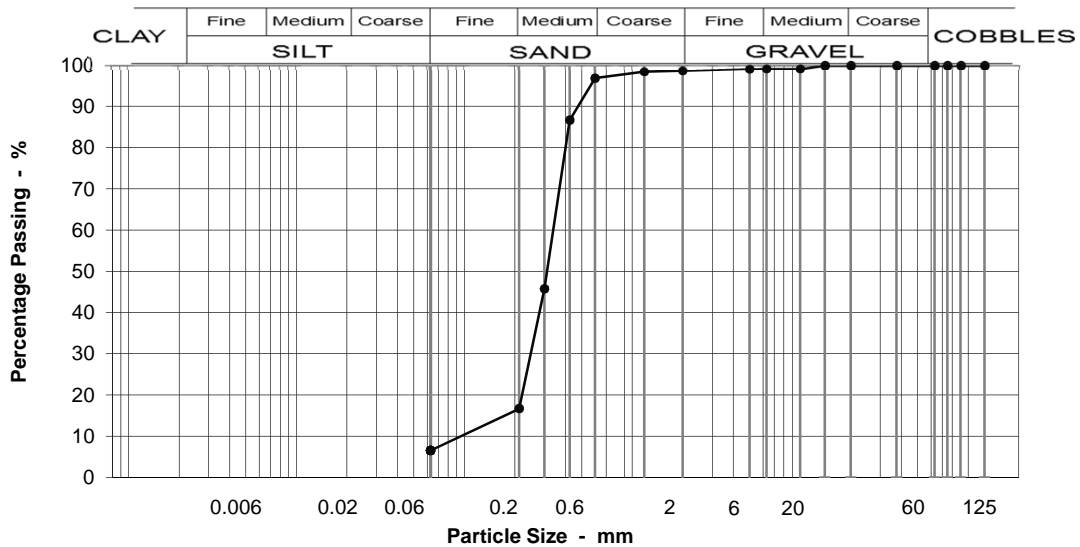
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS21 @ 4 - 5m Specimen: 2 @ 4m

Location and orientation within sample not applicable

Disturbed sample



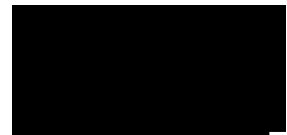
Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R, 6M.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	1
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	2
14	100		Medium SAND	80
10	99		Fine SAND	10
6.3	99		Silt & Clay	7
5	99		<b>Grading Analysis</b>	
2	99		D100	10
1.18	98		D60	0.34
0.600	97		D10	0.11
0.425	87		Uniformity Coefficient	3
0.300	46		<b>Description</b>	
0.212	17	Dark grey medium SAND.		
0.063	7			

Moisture content % 14

Test Code = 610



Simon Holden (Project Technician)



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018092620-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **19-Oct-18**

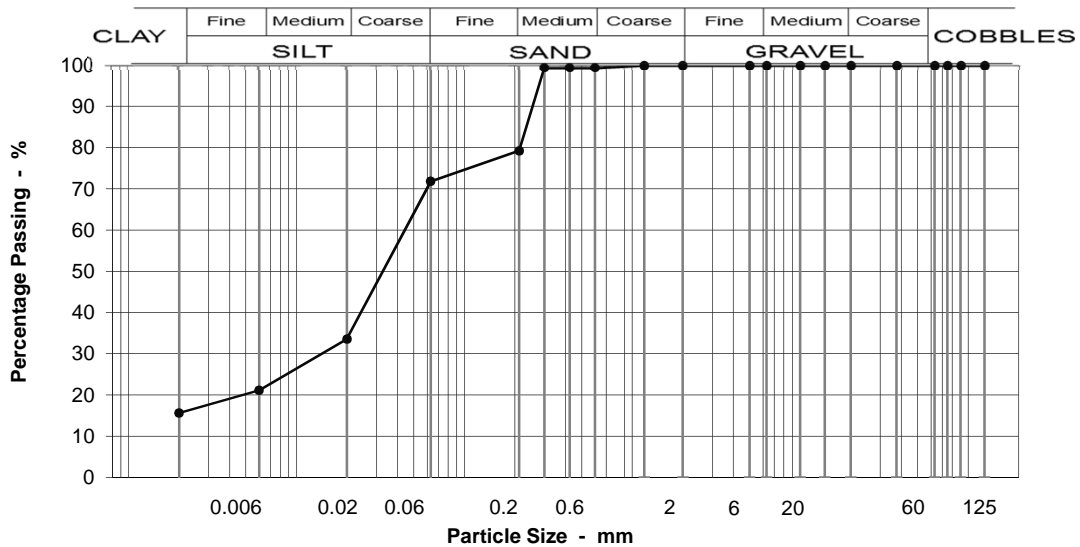
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS22 @ 0 - 1m Specimen: 3 @ 0.55m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	99
0.300	99
0.212	79
0.063	72
0.020	34
0.006	21
0.002	16

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 2A/2B, 2A/2B.**

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	1
Medium SAND	20
Fine SAND	7
Silt & Clay	72

Grading Analysis	
D100	1
D60	0.05
D10	0.00
Uniformity Coefficient	>10*

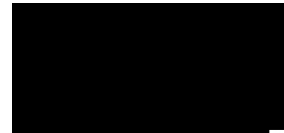
Description	
Laminated soft to firm light grey clayey SILT and dark grey slightly organic silty CLAY.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



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NR1 2DH

Our reference No. **NCCL2018092622-610**  
Our Project No. PZ1522D1  
Your Sample Ref. 3  
Your Project or Order No. PZ1522  
Date Tested  
Date Report Issued 19-Oct-18

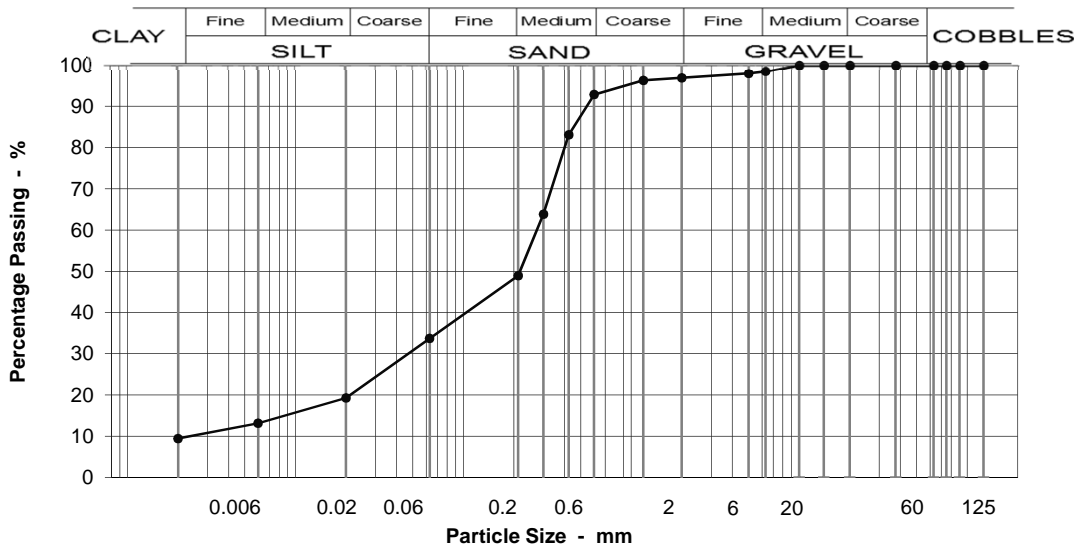
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS22 @ 2 - 3m Specimen: 2 @ 2m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	98
5	98
2	97
1.18	96
0.600	93
0.425	83
0.300	64
0.212	49
0.063	34
0.020	19
0.006	13
0.002	9

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 2A/2B, 2A/2B.**

Moisture content % 28

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	2
Coarse SAND	4
Medium SAND	44
Fine SAND	15
Silt & Clay	34

Grading Analysis	
D100	6
D60	0.28
D10	0.04
Uniformity Coefficient	7

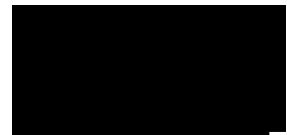
Description	
dark grey organic slightly clayey very silty fine to medium SAND.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)





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Norfolk  
NR1 2DH

Our reference No. **NCCL2018092624-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **5**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **19-Oct-18**

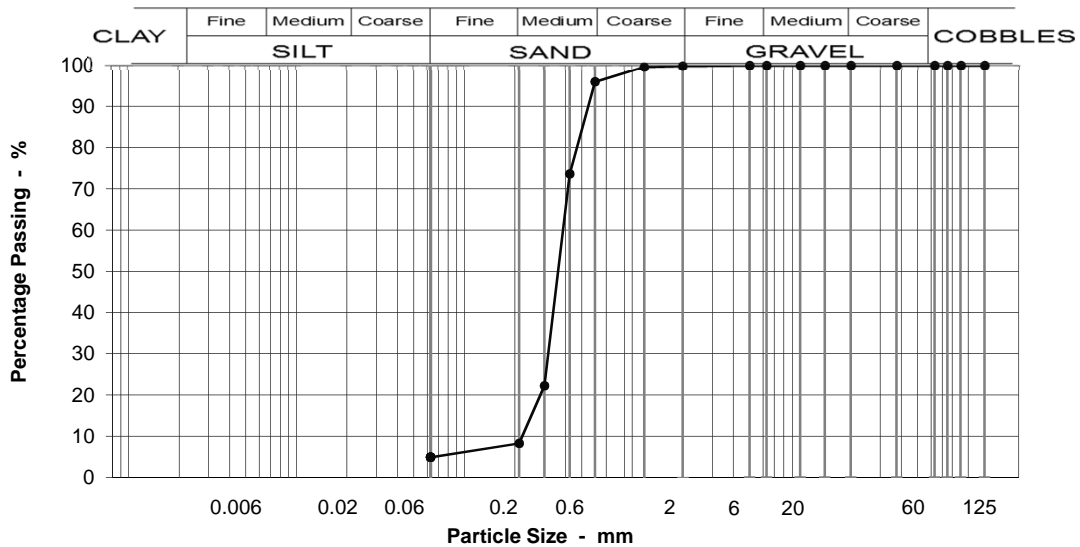
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: WS22 @ 4 - 5m Specimen: 2 @ 4.5m

Location and orientation within sample not applicable

Disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	96
0.425	74
0.300	22
0.212	8
0.063	5

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Moisture content % 18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	4
Medium SAND	88
Fine SAND	3
Silt & Clay	5

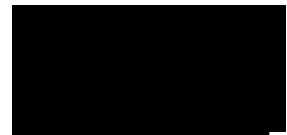
Grading Analysis	
D100	2
D60	0.39
D10	0.22
Uniformity Coefficient	2

Description	
Brownish grey medium SAND.	

Test Code = 610



Simon Holden (Project Technician)





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**Our Project No** PZ1522D1  
**Our Report and sample No** GTS1171128003-642  
**Your Sample Ref** B3  
**Your Project or Order No** PZ1522  
**Date Report Issued** 02-Mar-18  
**Date Tested** 27-Feb-18

Page 1 of 1

### Determination of the California Bearing Ratio to BS 1377 : PART 4 : 1990

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH4 @ 0.7m	Specimen: 1	
<b>Date sampled</b>	28-Nov-17	<b>Date received</b>	
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass</b>	8.5kg
If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Soil		
<b>Description</b>	Brown slightly gravelly fine to medium SAND. Gravel is fine to coarse sub-angular to rounded flint, quartz & concrete. MADE GROUND.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site

<b>Location</b>	<b>Test Specimen</b>		
<b>Orientation</b>	Not applicable		
	Not applicable		
<b>Method of Division</b>	<b>Preparation Details</b>		
<b>Preparation Method</b>	Quartering		
<b>Condition</b>	Sieving, Natural Moisture Content		
	Unsoaked		
<b>Retained 37.5mm</b>	%	0	
<b>Retained 20mm</b>	%	12.9	
<b>Number of layers</b>		3	<b>CBR Value Top</b> % <b>29</b>
<b>Blows per layer</b>		62 Blows	<b>CBR Value Bottom</b> % <b>19</b>
<b>BS Method</b>	3.4, 2.5kg Rammer		
<b>Bulk Density</b>	Mg/m <sup>3</sup>	1.83	<b>Moisture Content Top</b> % <b>4.0</b>
<b>Dry Density</b>	Mg/m <sup>3</sup>	1.76	<b>Moisture Cont. Bottom</b> % <b>2.4</b>
<b>Initial Moisture Content</b>	%	2.1	<b>Moisture Content Method</b> Oven dried @ 105-110°C

Remarks

Test Code = 642



0920

Scott Viner (Project Technician)





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**Our Project No** PZ1522D1  
**Our Report and sample No** GTS2171205023-642  
**Your Sample Ref** B2  
**Your Project or Order No** PZ1522  
**Date Report Issued**  
**Date Tested** 21-Mar-18

Page 1 of 1

### Determination of the California Bearing Ratio to BS 1377 : PART 4 : 1990

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS1 @ 0.3m		
<b>Date sampled</b>	05-Dec-17	<b>Date received</b>	06-Dec-17
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass</b>	12.543kg
If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Soil		
<b>Description</b>	Dark brown, gravelly fine and medium SAND. Gravel is fine, medium and coarse, sub-angular to sub-rounded flint. Numerous roots.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site

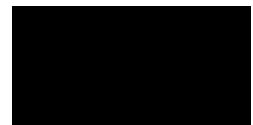
<b>Location</b>	<b>Test Specimen</b>		
<b>Orientation</b>	Not applicable		
<b>Method of Division</b>	<b>Preparation Details</b>		
<b>Preparation Method</b>	Quartering		
<b>Condition</b>	Sieving, Natural Moisture Content		
	Unsoaked		
<b>Retained 37.5mm</b>	%	5	
<b>Retained 20mm</b>	%	8.2	
<b>Number of layers</b>		3	<b>CBR Value Top</b> % <b>19</b>
<b>Blows per layer</b>		N/A	<b>CBR Value Bottom</b> % <b>29</b>
<b>BS Method</b>	3.7, Vib.Hammer		
<b>Bulk Density</b>	Mg/m <sup>3</sup>	2.06	<b>Moisture Content Top</b> % <b>10</b>
<b>Dry Density</b>	Mg/m <sup>3</sup>	1.87	<b>Moisture Cont. Bottom</b> % <b>11</b>
<b>Initial Moisture Content</b>	%	12	<b>Moisture Content Method</b> Oven dried @ 105-110°C

Remarks

Test Code = 642



Peter Hardiment (Operations Manager)



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<b>Our Project No</b>	PZ1522D1
<b>Our Report and sample No</b>	GTS2171205014-642
<b>Your Sample Ref</b>	B2
<b>Your Project or Order No</b>	PZ1522
<b>Date Report Issued</b>	
<b>Date Tested</b>	21-Mar-18

Page 1 of 1

**Determination of the California Bearing Ratio to BS 1377 : PART 4 : 1990**

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS4 @ 0.4m		
<b>Date sampled</b>	05-Dec-17	<b>Date received</b>	06-Dec-17
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass</b>	13.4467kg

If a sample certificate was provided it is available for inspection.

The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising brown, very gravelly, fine and medium sand. Gravel is fine, medium and coarse, sub-rounded to rounded, flint, concrete and quartz.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site

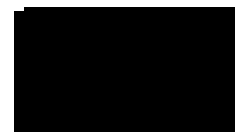
<b>Location</b>	Not applicable		
<b>Orientation</b>	Not applicable		
<b>Method of Division</b>	<b>Test Specimen</b>		
<b>Preparation Method</b>	Quartering		
<b>Condition</b>	Sieving, Natural Moisture Content		
	Unsoaked		
<b>Retained 37.5mm</b>	%	7	
<b>Retained 20mm</b>	%	13.7	
<b>Number of layers</b>		3	<b>CBR Value Top</b> % <b>18</b>
<b>Blows per layer</b>		N/A	<b>CBR Value Bottom</b> % <b>18</b>
<b>BS Method</b>		3.7, Vib.Hammer	<b>Average CBR Value</b> % <b>18</b>
<b>Bulk Density</b>	Mg/m <sup>3</sup>	1.99	<b>Moisture Content Top</b> % <b>8.4</b>
<b>Dry Density</b>	Mg/m <sup>3</sup>	1.83	<b>Moisture Cont. Bottom</b> % <b>8.4</b>
<b>Initial Moisture Content</b>	%	8.9	<b>Moisture Content Method</b> Oven dried @ 105-110°C

Remarks

Test Code = 642



Peter Hardiment (Operations Manager)





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**Our Project No** PZ1522D1  
**Our Report and sample No** GTS2171206016-642  
**Your Sample Ref** B1  
**Your Project or Order No** PZ1522  
**Date Report Issued**  
**Date Tested** 21-Mar-18

Page 1 of 1

### Determination of the California Bearing Ratio to BS 1377 : PART 4 : 1990

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	WS7 @ 0.1m		
<b>Date sampled</b>	06-Dec-17	<b>Date received</b>	07-Dec-17
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass</b>	16.84kg

If a sample certificate was provided it is available for inspection.

The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Soil		
<b>Description</b>	MADE GROUND - comprising brown, slightly silty, very gravelly, fine and medium sand. Gravel is angular to sub-rounded, flint and quartz. Some roots.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site

<b>Location</b>	Not applicable		
<b>Orientation</b>	Not applicable		
<b>Method of Division</b>	<b>Test Specimen</b>		
<b>Preparation Method</b>	Quartering		
<b>Condition</b>	Sieving, Natural Moisture Content		
	Unsoaked		
<b>Retained 37.5mm</b>	%	6	
<b>Retained 20mm</b>	%	12.8	
<b>Number of layers</b>		3	<b>CBR Value Top</b> % <1
<b>Blows per layer</b>		N/A	<b>CBR Value Bottom</b> % <1
<b>BS Method</b>	3.7, Vib.Hammer		
<b>Bulk Density</b>	Mg/m <sup>3</sup>	2.07	<b>Moisture Content Top</b> % 16
<b>Dry Density</b>	Mg/m <sup>3</sup>	1.79	<b>Moisture Cont. Bottom</b> % 16
<b>Initial Moisture Content</b>	%	16	<b>Moisture Content Method</b> Oven dried @ 105-110°C

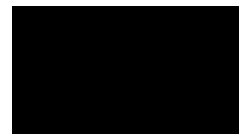
Remarks

Test Code = 642



0920

Peter Hardiment (Operations Manager)



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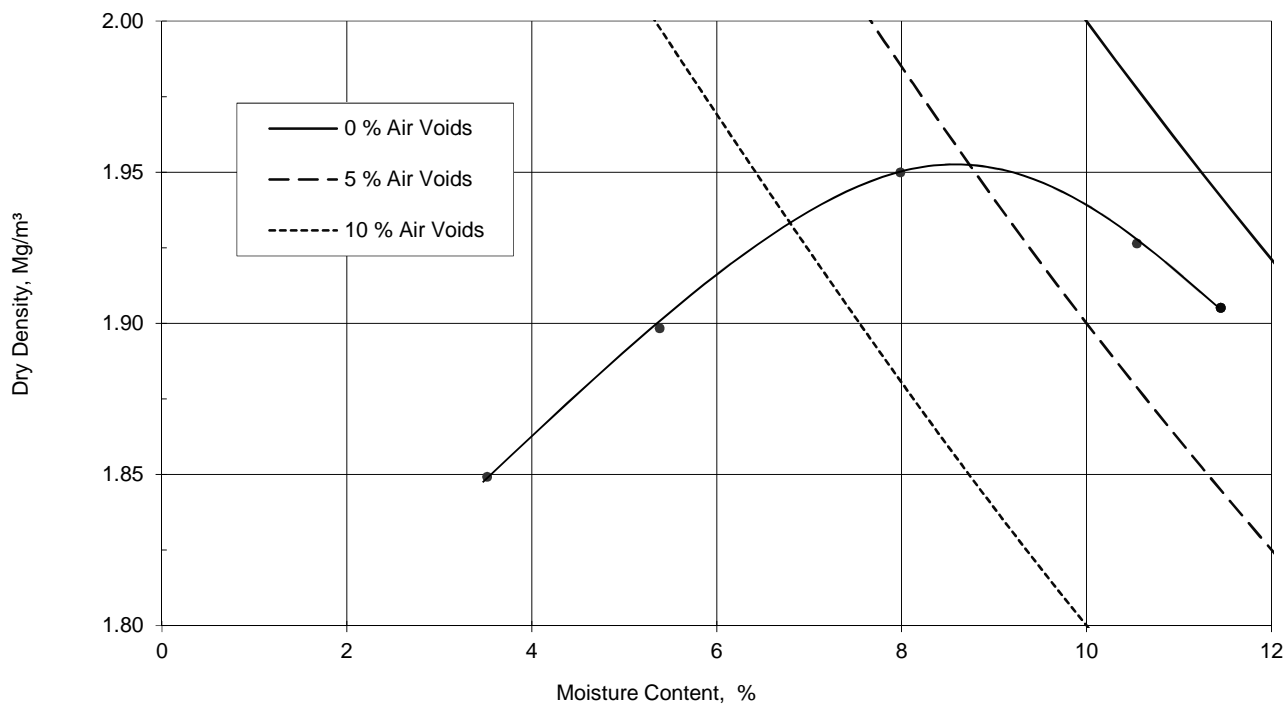
**Our Project No** PZ1522D1  
**Our Report and sample No.** GTS1171128003-640  
**Your Sample Ref** B3  
**Your Project or Order No** PZ1522  
**Date Report Issued** 14-Mar-18

Page 1 of 1

### Determination of Dry Density/Moisture Content Relationship to BS 1377 : Part 4 : 1990 : Section 3

<b>Scheme</b>	Gt Yarmouth 3rd River Crossing		
<b>Location</b>	BH4	<b>Depth</b>	0.7 - 1m
<b>Date received</b>	28-Nov-17	<b>Date tested</b>	15-Feb-18
<b>Sample type</b>	Bulk Disturbed	<b>Sample Mass</b>	18kg
<b>Description</b>	MADE GROUND - comprising greyish brown slightly gravelly fine to medium sand. Gravel is fine to coarse sub-angular to rounded flint, quartz & concrete.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site

If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.



<b>Method of division</b>	Quartering	<b>Retained on 37.5 mm Sieve</b>	%	3.5
<b>Preparation</b>	Natural	<b>Retained on 20.0 mm Sieve</b>	%	14.5
<b>Test Method</b>	3.4 2.5kg	<b>Particle Density</b>	Assumed	Mg/m³ 2.50
<b>Mould Type</b>	CBR	<b>Maximum Dry Density</b>	Mg/m³	1.95
<b>Samples Used</b>	Seperate	<b>Optimum Moisture Content</b>	%	8.5

Remarks

Test Code = 640



Peter Hardiment (Operations Manager)





## DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES

BS1377:Part 5:1990, clause 3

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey brown and grey CLAY	Sample Depth (m):	4.00
		Sample Reference:	P17

Sample condition: Undisturbed  
 Depth of specimen: 4.10 m

Swelling Pressure: 0.4 kPa  
 Note: Initial seating load of 0.4 kPa sufficient to prevent swelling

**Initial Conditions:**

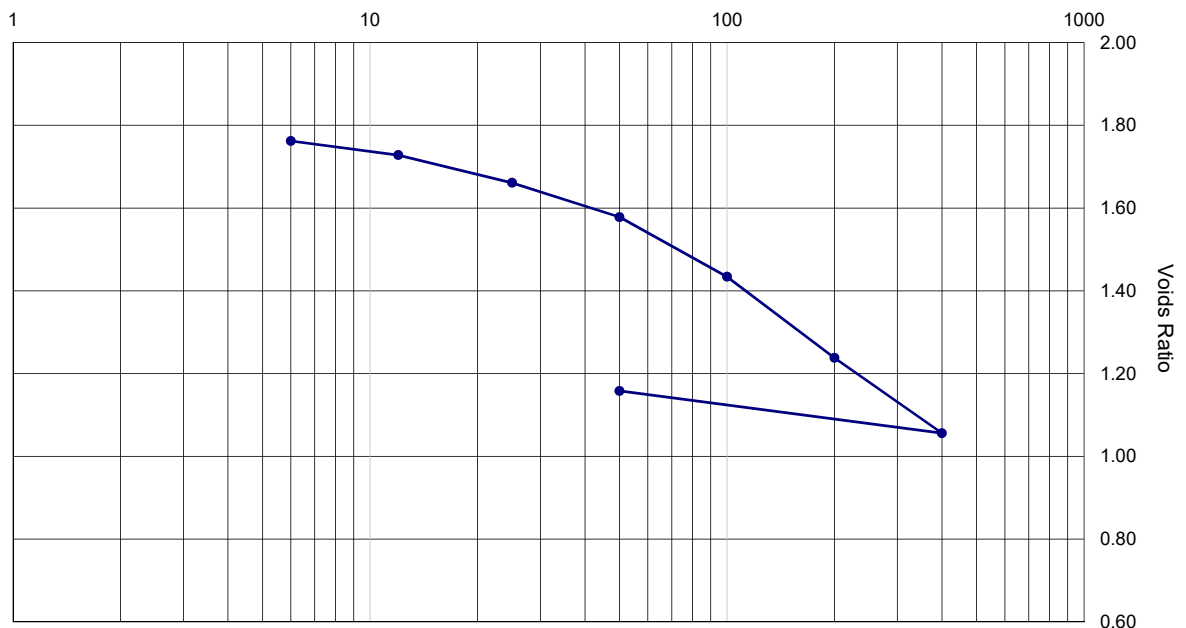
Moisture Content: 68 %  
 Voids Ratio: 1.813  
 Diameter: 74.69 mm  
 Height: 20.04 mm  
 Bulk Density: 1.62 Mg/m<sup>3</sup>  
 Dry Density: 0.96 Mg/m<sup>3</sup>

**Final Conditions**

Moisture Content: 47 %  
 Voids Ratio: 1.158  
 Initial Degree of Saturation: 100 %  
 Particle Density (Assumed): 2.70 Mg/m<sup>3</sup>  
 Laboratory Temperature: 16.9 °C

Pressure Range kPa	Time Fitting Method	Mv (m <sup>2</sup> /MN)	Voids Ratio	Cv M <sup>2</sup> /year
0 - 6	t90	3.0	1.762	0.91
6 - 12	t90	2.1	1.728	0.41
12 - 25	t90	1.9	1.661	0.40
25 - 50	t90	1.2	1.578	0.38
50 - 100	t90	1.1	1.434	0.28
100 - 200	t90	0.81	1.238	0.32
200 - 400	t90	0.4	1.056	0.32
400 - 50	t90	0.14	1.158	

Log of Pressure (kPa)



**Remarks**

Swelling pressure determined in accordance with BS 1377 Part 5 Clause 4.1a  
 Determination of swelling pressure not covered by UKAS accreditation.

Approved	Date	Sheet No.:
MW	31/03/2018	1 of 1

## DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES

BS1377:Part 5:1990, clause 3

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Dark grey CLAY	Sample Depth (m):	6.50
		Sample Reference:	UT22

Sample condition: Undisturbed  
 Depth of specimen: 6.60 m

Swelling Pressure: 0.4 kPa  
 Note: Initial seating load of 0.4 kPa sufficient to prevent swelling

**Initial Conditions:**

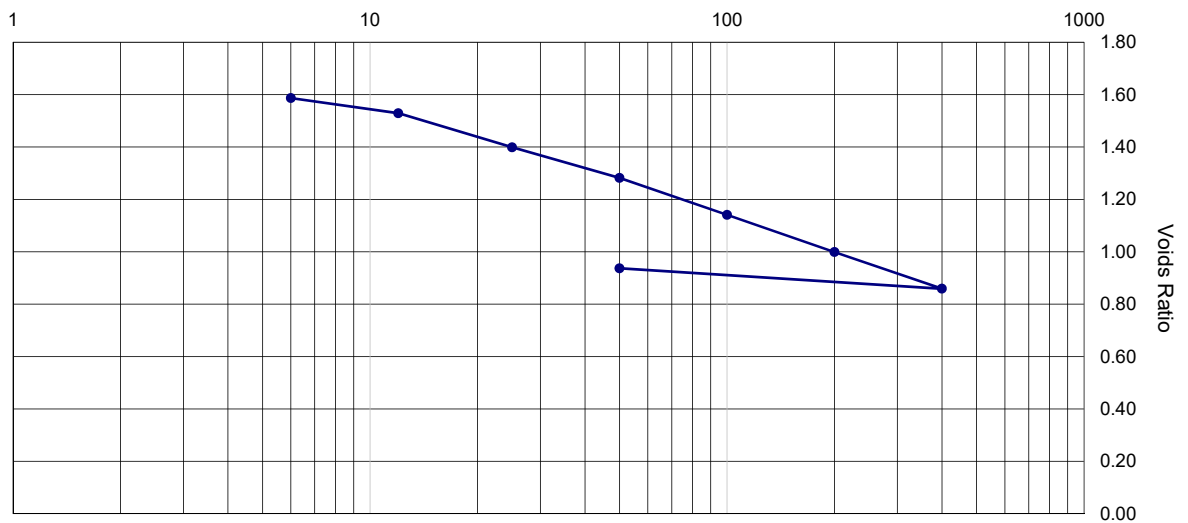
Moisture Content: 69 %  
 Voids Ratio: 1.842  
 Diameter: 74.85 mm  
 Height: 20.11 mm  
 Bulk Density: 1.60 Mg/m<sup>3</sup>  
 Dry Density: 0.95 Mg/m<sup>3</sup>

**Final Conditions**

Moisture Content: 37 %  
 Voids Ratio: 0.937  
 Initial Degree of Saturation: 100 %  
 Particle Density (Assumed): 2.70 Mg/m<sup>3</sup>  
 Laboratory Temperature: 16.4 °C

Pressure Range kPa	Time Fitting Method	Mv (m <sup>2</sup> /MN)	Voids Ratio	Cv M <sup>2</sup> /year
0 - 6	t90	15	1.587	0.12
6 - 12	t90	3.7	1.529	0.13
12 - 25	t90	4.0	1.399	0.23
25 - 50	t90	2.0	1.282	0.23
50 - 100	t90	1.2	1.141	0.28
100 - 200	t90	0.66	0.999	0.28
200 - 400	t90	0.35	0.859	0.33
400 - 50	t90	0.12	0.937	

Log of Pressure (kPa)



**Remarks**

Swelling pressure determined in accordance with BS 1377 Part 5 Clause 4.1a  
 Determination of swelling pressure not covered by UKAS accreditation.

Approved	Date	Sheet No.:
MW	31/03/2018	1 of 1

### DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES

BS1377:Part 5:1990, clause 3

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Dark brown pseudo fibrous PEAT	Sample Depth (m):	8.50
		Sample Reference:	UT29

Sample condition: Undisturbed      Swelling Pressure: 11.9 kPa  
 Depth of specimen: 8.60 m

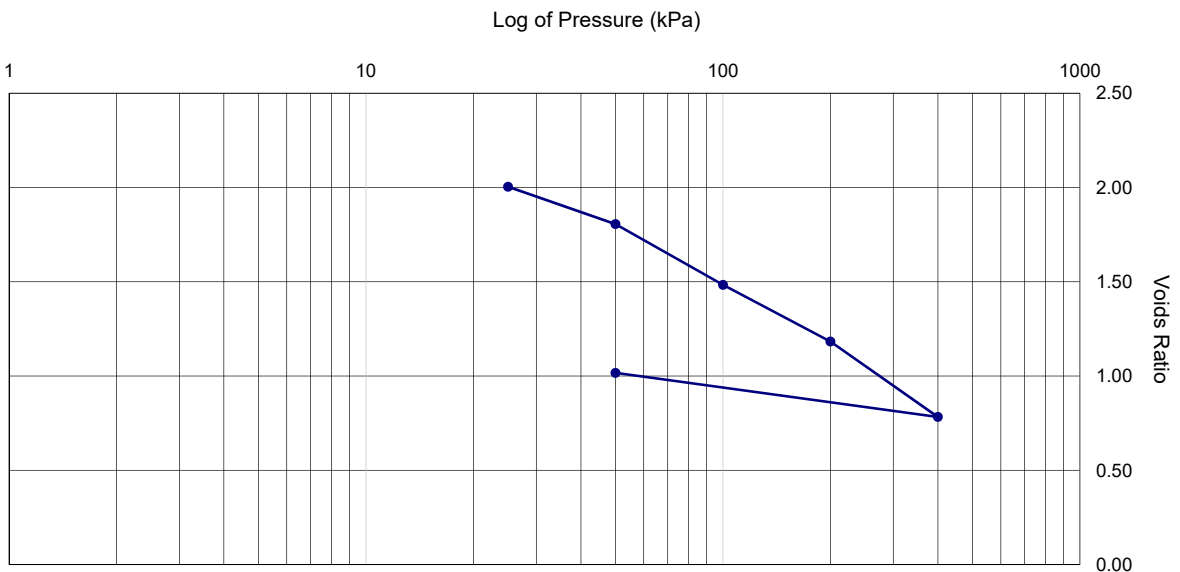
**Initial Conditions:**

Moisture Content: 330 %  
 Voids Ratio: 2.286  
 Diameter: 74.36 mm  
 Height: 20.03 mm  
 Bulk Density: 0.91 Mg/m<sup>3</sup>  
 Dry Density: 0.21 Mg/m<sup>3</sup>

**Final Conditions**

Moisture Content: 240 %  
 Voids Ratio: 1.017  
 Initial Degree of Saturation: 100 %  
 Particle Density (Assumed): 0.69 Mg/m<sup>3</sup>  
 Laboratory Temperature: 16.3 °C

Pressure Range kPa	Time Fitting Method	Mv (m <sup>2</sup> /MN)	Voids Ratio	Cv M <sup>2</sup> /year
0 - 25	t90	3.4	2.004	7.2
25 - 50	t90	2.6	1.806	20
50 - 100	t90	2.3	1.484	6.6
100 - 200	t90	1.2	1.183	5.5
200 - 400	t90	0.92	0.783	1.7
400 - 50	t90	0.37	1.017	



**Remarks**

Swelling pressure determined in accordance with BS 1377 Part 5 Clause 4.1a  
 Determination of swelling pressure not covered by UKAS accreditation.

Approved

Date

Sheet No.:

MW

31/03/2018

1 of 1



## DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES

BS1377:Part 5:1990, clause 3

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Grey CLAY	Sample Depth (m):	27.00
		Sample Reference:	UT70

Sample condition: Undisturbed    Swelling Pressure: 6.4 kPa  
 Depth of specimen: 27.25 m

**Initial Conditions:**

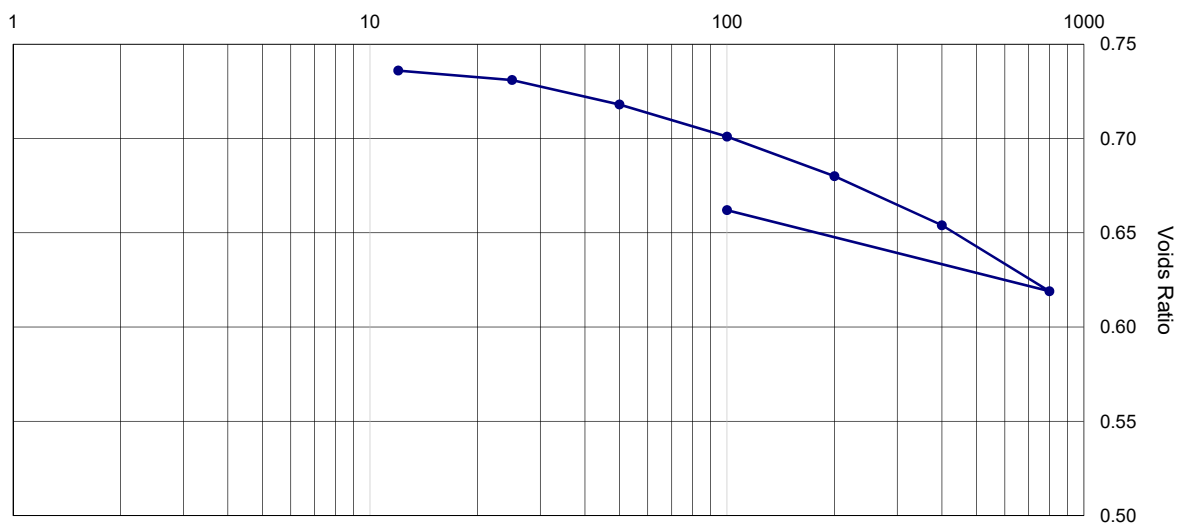
Moisture Content: 28 %  
 Voids Ratio: 0.742  
 Diameter: 74.55 mm  
 Height: 20.07 mm  
 Bulk Density: 1.99 Mg/m<sup>3</sup>  
 Dry Density: 1.55 Mg/m<sup>3</sup>

**Final Conditions**

Moisture Content: 29 %  
 Voids Ratio: 0.662  
 Initial Degree of Saturation: 100 %  
 Particle Density (Assumed): 2.70 Mg/m<sup>3</sup>  
 Laboratory Temperature: 17.0 °C

Pressure Range kPa	Time Fitting Method	Mv (m <sup>2</sup> /MN)	Voids Ratio	Cv M <sup>2</sup> /year
0 - 12	t90	0.29	0.736	66
12 - 25	t90	0.23	0.731	8.4
25 - 50	t90	0.30	0.718	10
50 - 100	t90	0.19	0.701	5.9
100 - 200	t90	0.13	0.680	6.4
200 - 400	t90	0.078	0.654	14
400 - 800	t90	0.053	0.619	20
800 - 1000	t90	0.038	0.662	

Log of Pressure (kPa)



**Remarks**

Swelling pressure determined in accordance with BS 1377 Part 5 Clause 4.1a  
 Determination of swelling pressure not covered by UKAS accreditation.

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Date

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# DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES

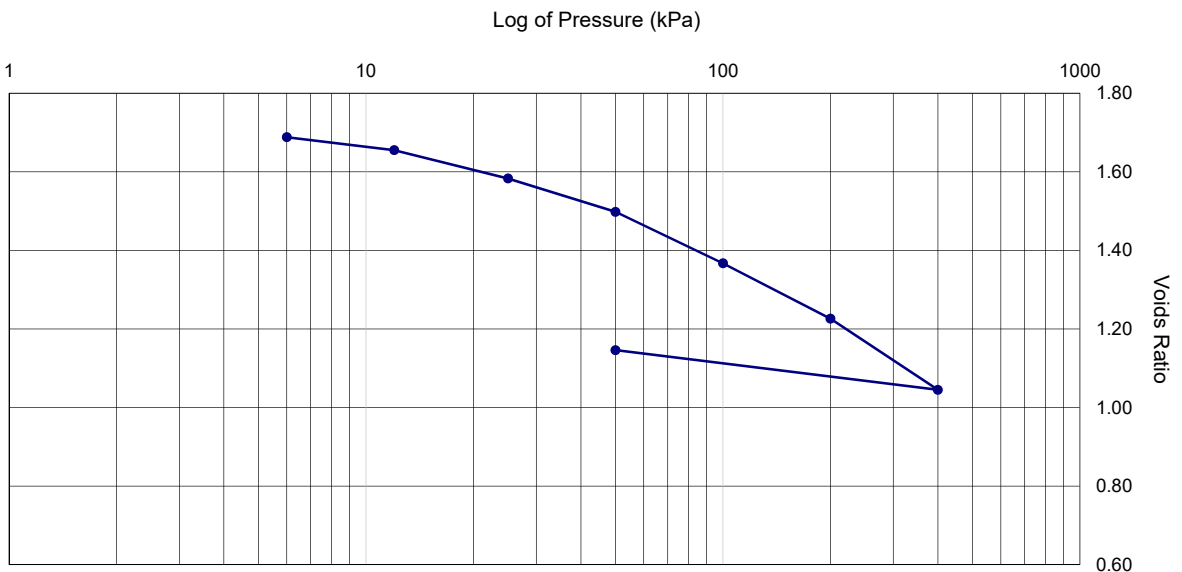
BS1377:Part 5:1990, clause 3

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Dark grey and grey CLAY	Sample Depth (m):	5.50
		Sample Reference:	P18

Sample condition:                          Undisturbed    Swelling Pressure:    5.6 kPa  
 Depth of specimen:    5.60 m

<b>Initial Conditions:</b>	<b>Final Conditions</b>
Moisture Content:    68 %	Moisture Content:    47 %
Voids Ratio:    1.755	Voids Ratio:    1.146
Diameter:    74.48 mm	
Height:    20.05 mm	Initial Degree of Saturation:    100 %
Bulk Density:    1.64 Mg/m3	Particle Density (Assumed):    2.70 Mg/m3
Dry Density:    0.98 Mg/m3	Laboratory Temperature:    16.4 °C

Pressure Range kPa	Time Fitting Method	Mv (m2/MN)	Voids Ratio	Cv M2/year
0 - 6	t90	4.0	1.688	0.20
6 - 12	t90	2.1	1.655	0.18
12 - 25	t90	2.1	1.583	0.22
25 - 50	t90	1.3	1.498	0.27
50 - 100	t90	1.1	1.367	0.27
100 - 200	t90	0.59	1.226	0.28
200 - 400	t90	0.41	1.045	0.26
400 - 50	t90	0.14	1.146	



<b>Remarks</b> Swelling pressure determined in accordance with BS 1377 Part 5 Clause 4.1a Determination of swelling pressure not covered by UKAS accreditation.	Approved	Date	Sheet No.:
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### DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES

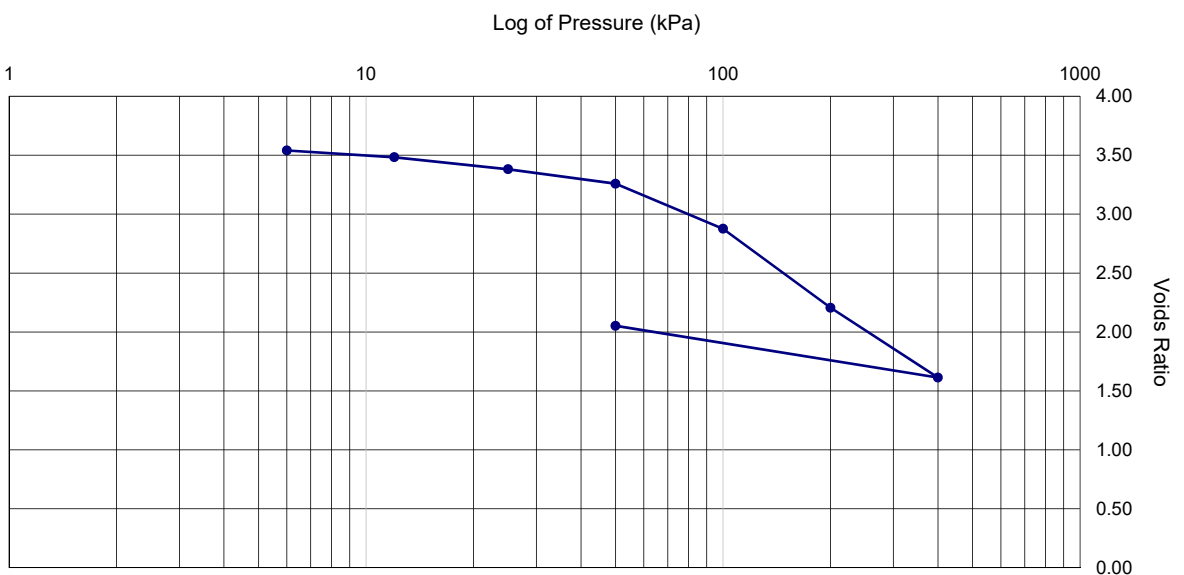
BS1377:Part 5:1990, clause 3

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Dark brown amorphous PEAT with pockets of grey clay and occasional roots and plant remains	Sample Depth (m):	8.00
		Sample Reference:	UT23

Sample condition: Undisturbed	Swelling Pressure: 0.88 kPa
Depth of specimen: 8.20 m	

Initial Conditions:	Final Conditions
Moisture Content: 390 %	Moisture Content: 300 %
Voids Ratio: 3.600	Voids Ratio: 2.052
Diameter: 74.46 mm	
Height: 20.04 mm	Initial Degree of Saturation: 100 %
Bulk Density: 0.98 Mg/m <sup>3</sup>	Particle Density (Assumed): 0.92 Mg/m <sup>3</sup>
Dry Density: 0.20 Mg/m <sup>3</sup>	Laboratory Temperature: 16.7 °C

Pressure Range kPa	Time Fitting Method	Mv (m2/MN)	Voids Ratio	Cv M2/year
0 - 6	t90	2.2	3.540	5.7
6 - 12	t90	2.1	3.483	17
12 - 25	t90	1.7	3.381	18
25 - 50	t90	1.1	3.258	17
50 - 100	t90	1.8	2.876	6.3
100 - 200	t90	1.7	2.206	3.1
200 - 400	t90	0.92	1.613	0.83
400 - 50	t90	0.48	2.052	



#### Remarks

Swelling pressure determined in accordance with BS 1377 Part 5 Clause 4.1a  
Determination of swelling pressure not covered by UKAS accreditation.

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## DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES

BS1377:Part 5:1990, clause 3

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH4
Sample Description:	Grey CLAY with pockets of peat	Sample Depth (m):	4.00
		Sample Reference:	P21

Sample condition: Undisturbed  
 Depth of specimen: 4.07 m

Swelling Pressure: 0.4 kPa  
 Note: Initial seating load of 0.4 kPa sufficient to prevent swelling

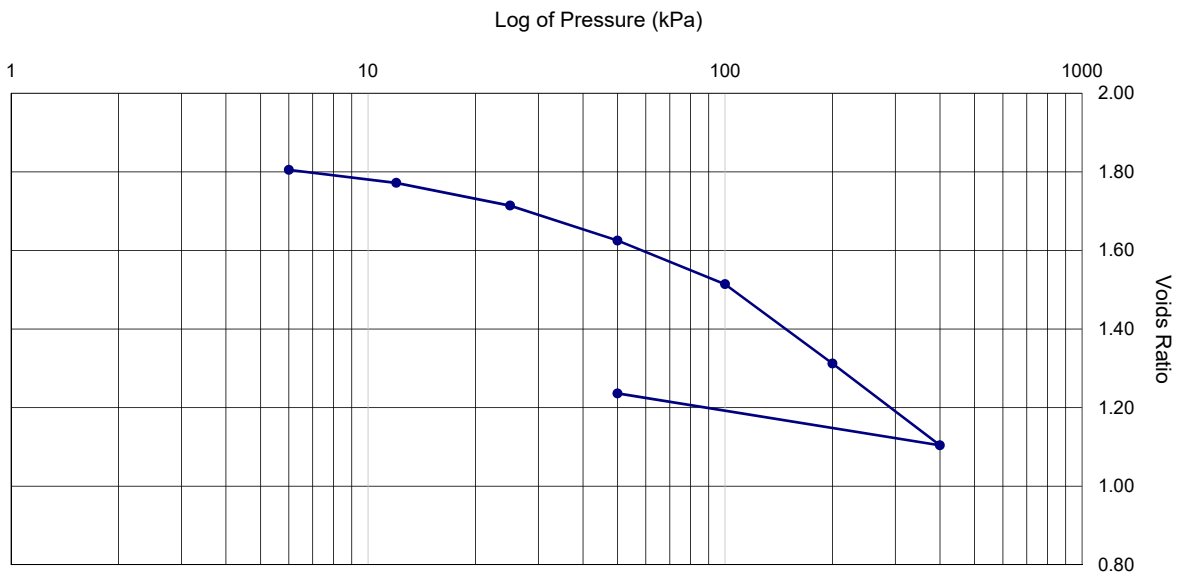
**Initial Conditions:**

Moisture Content: 69 %  
 Voids Ratio: 1.842  
 Diameter: 74.70 mm  
 Height: 19.97 mm  
 Bulk Density: 1.61 Mg/m<sup>3</sup>  
 Dry Density: 0.95 Mg/m<sup>3</sup>

**Final Conditions**

Moisture Content: 50 %  
 Voids Ratio: 1.236  
 Initial Degree of Saturation: 100 %  
 Particle Density (Assumed): 2.70 Mg/m<sup>3</sup>  
 Laboratory Temperature: 16.8 °C

Pressure Range kPa	Time Fitting Method	Mv (m <sup>2</sup> /MN)	Voids Ratio	Cv M <sup>2</sup> /year
0 - 6	t90	2.2	1.805	0.81
6 - 12	t90	1.9	1.772	0.48
12 - 25	t90	1.6	1.714	0.37
25 - 50	t90	1.3	1.625	0.42
50 - 100	t90	0.85	1.514	0.33
100 - 200	t90	0.8	1.312	0.20
200 - 400	t90	0.45	1.104	0.16
400 - 50	t90	0.18	1.236	



**Remarks**

Swelling pressure determined in accordance with BS 1377 Part 5 Clause 4.1a  
 Determination of swelling pressure not covered by UKAS accreditation.

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**DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES**

BS1377:Part 5:1990, clause 3

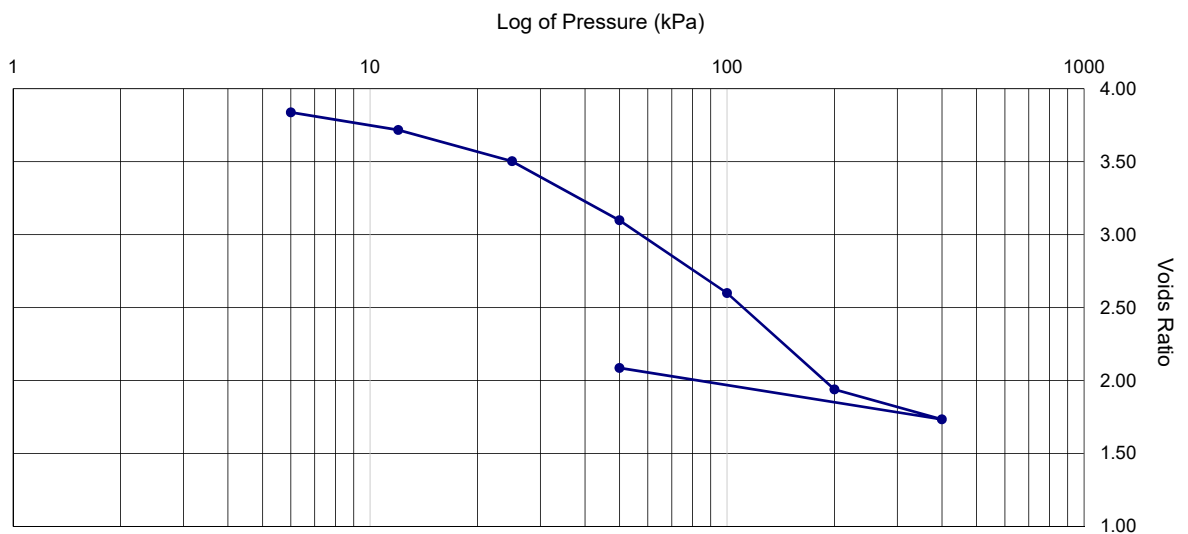
Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH5
Sample Description:	Dark brown and black pseudo fibrous PEAT	Sample Depth (m):	3.00
		Sample Reference:	U10

Sample condition:	Undisturbed	Swelling Pressure:	0.4 kPa
Depth of specimen:	3.10 m	Note: Initial seating load of 0.4 kPa sufficient to prevent swelling	

<b>Initial Conditions:</b>		<b>Final Conditions</b>	
Moisture Content:	420 %	Moisture Content:	290 %
Voids Ratio:	4.000	Voids Ratio:	2.086
Diameter:	74.73 mm		
Height:	20.02 mm	Initial Degree of Saturation:	100 %
Bulk Density:	0.98 Mg/m <sup>3</sup>	Particle Density (Assumed):	0.95 Mg/m <sup>3</sup>
Dry Density:	0.19 Mg/m <sup>3</sup>	Laboratory Temperature:	16.8 °C

Pressure Range kPa	Time Fitting Method	Mv (m <sup>2</sup> /MN)	Voids Ratio	Cv M <sup>2</sup> /year
0 - 6	t90	5.4	3.838	0.028
6 - 12	t90	4.1	3.717	0.011
12 - 25	t90	3.5	3.503	0.023
25 - 50	t90	3.6	3.098	0.0084
50 - 100	t90	2.4	2.599	0.012
100 - 200	t90	1.8	1.938	0.0039
*200 - 400	t90	No Determination	1.733	0.0064
400 - 50	t90	0.37	2.086	

\*Oedometer reached end of travel during the final loading of 400 kPa before settlement was completed. The voids ratio reported do not represent the final voids ratio for this stage. Mv for this stage has not been reported.



<b>Remarks</b> Swelling pressure determined in accordance with BS 1377 Part 5 Clause 4.1a Determination of swelling pressure not covered by UKAS accreditation.	Approved	Date	Sheet No.:
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## DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES

BS1377:Part 5:1990, clause 3

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH7
Sample Description:	Dark brown pseudo fibrous PEAT with pockets of grey clay	Sample Depth (m):	2.00
		Sample Reference:	U9

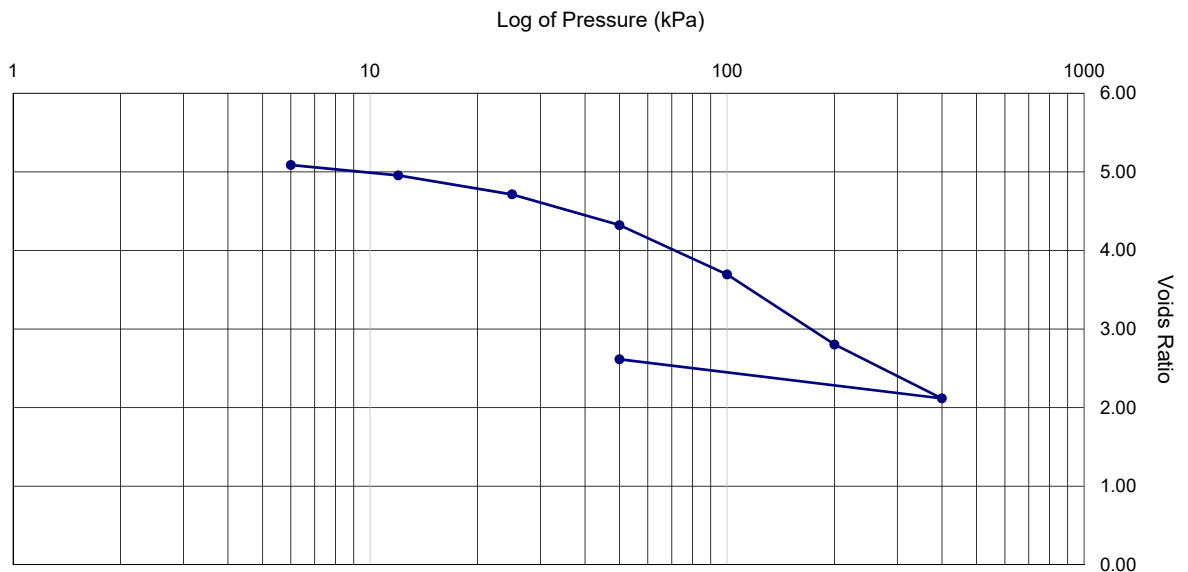
Sample condition:                              Undisturbed  
 Depth of specimen:                              2.10 m

Swelling Pressure:                              0.4 kPa  
 Note: Initial seating load of 0.4 kPa sufficient to prevent swelling

**Initial Conditions:**  
 Moisture Content:                              300 %  
 Voids Ratio:                                      5.25  
 Diameter:                                        74.57 mm  
 Height:    20.17 mm  
 Bulk Density:                                  1.11 Mg/m3  
 Dry Density:                                    0.28 Mg/m3

**Final Conditions**  
 Moisture Content:                              170 %  
 Voids Ratio:                                      2.614  
  
 Initial Degree of Saturation:                  100 %  
 Particle Density (Assumed):                  1.75 Mg/m3  
 Laboratory Temperature:                      16.5 °C

Pressure Range	Time Fitting Method	Mv (m2/MN)	Voids Ratio	Cv M2/year
kPa				
0 - 6	t90	4.3	5.087	23
6 - 12	t90	3.6	4.954	6.6
12 - 25	t90	3.1	4.713	3.8
25 - 50	t90	2.7	4.321	2.3
50 - 100	t90	2.4	3.694	0.78
100 - 200	t90	1.9	2.801	0.29
200 - 400	t90	0.9	2.116	0.12
400 - 50	t90	0.46	2.614	



<b>Remarks</b> Swelling pressure determined in accordance with BS 1377 Part 5 Clause 4.1a Determination of swelling pressure not covered by UKAS accreditation.	Approved	Date	Sheet No.:
	MW	31/03/2018	1 of 1

## DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES

BS1377:Part 5:1990, clause 3 and 4.1a

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH9
Sample Description:	Grey and brown slightly sandy CLAY	Sample Depth (m):	1.80
		Sample Reference:	P10

Sample condition: Undisturbed  
 Depth of specimen: 1.89 m

Swelling Pressure: 0.4 kPa  
 Note: Initial seating load of 0.4 kPa sufficient to prevent swelling

**Initial Conditions:**

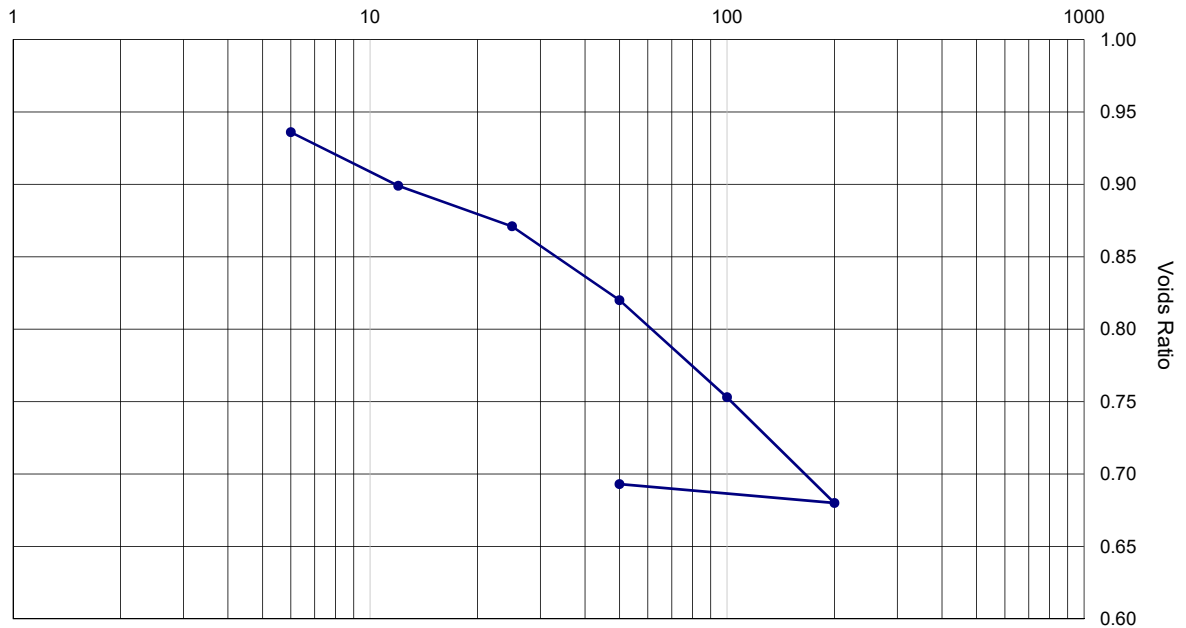
Moisture Content: 39 %  
 Voids Ratio: 1.008  
 Diameter: 74.98 mm  
 Height: 20.07 mm  
 Bulk Density: 1.83 Mg/m<sup>3</sup>  
 Dry Density: 1.32 Mg/m<sup>3</sup>

**Final Conditions**

Moisture Content: 29 %  
 Voids Ratio: 0.693  
 Initial Degree of Saturation: 100 %  
 Particle Density (Assumed): 2.65 Mg/m<sup>3</sup>  
 Laboratory Temperature: 18.8 °C

Pressure Range kPa	Time Fitting Method	Mv (m <sup>2</sup> /MN)	Voids Ratio	Cv M <sup>2</sup> /year
0 - 6	t90	6.0	0.936	0.30
6 - 12	t90	3.1	0.899	0.26
12 - 25	t90	1.2	0.871	0.36
25 - 50	t90	1.1	0.820	0.50
50 - 100	t90	0.73	0.753	0.58
100 - 200	t90	0.41	0.680	1.0
200 - 50	t90	0.05	0.693	

Log of Pressure (kPa)



**Remarks**

Swelling pressure determined in accordance with BS 1377 Part 5 Clause 4.1a  
 Determination of swelling pressure not covered by UKAS accreditation.

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## DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES

BS1377:Part 5:1990, clause 3 and 4.1a

Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Dark grey and grey brown silty CLAY	Sample Depth (m):	3.00
		Sample Reference:	UT11

Sample condition: Undisturbed  
 Depth of specimen: 3.08 m

Swelling Pressure: 0.4 kPa  
 Note: Initial seating load of 0.4 kPa sufficient to prevent swelling

**Initial Conditions:**

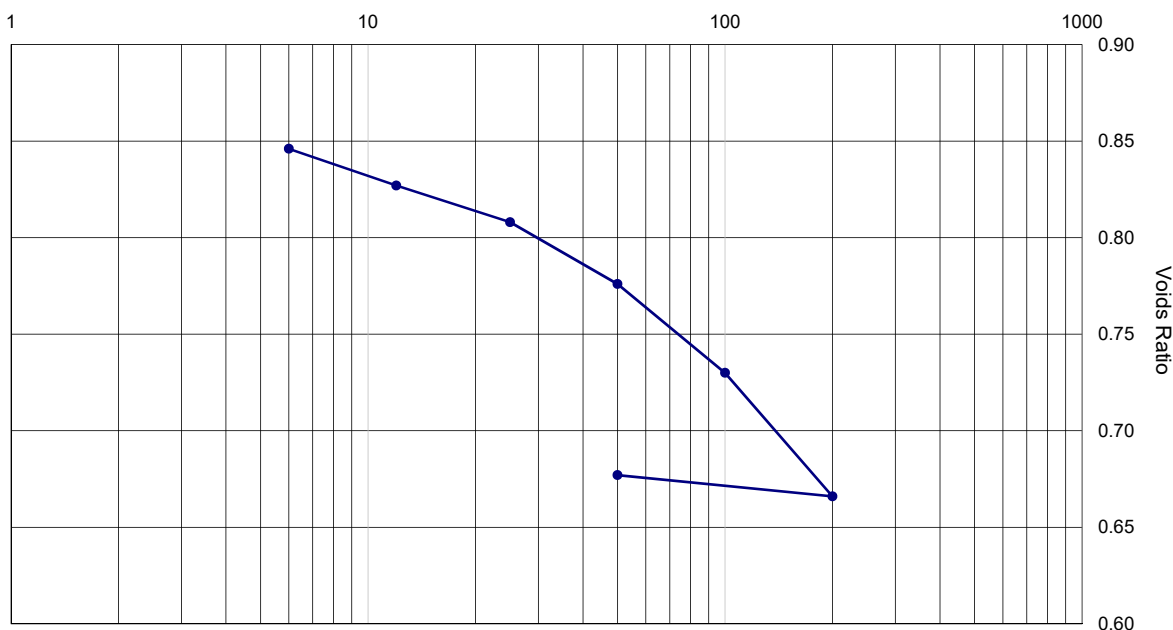
Moisture Content: 35 %  
 Voids Ratio: 0.879  
 Diameter: 74.49 mm  
 Height: 20.04 mm  
 Bulk Density: 1.90 Mg/m<sup>3</sup>  
 Dry Density: 1.41 Mg/m<sup>3</sup>

**Final Conditions**

Moisture Content: 29 %  
 Voids Ratio: 0.677  
 Initial Degree of Saturation: 100 %  
 Particle Density (Assumed): 2.65 Mg/m<sup>3</sup>  
 Laboratory Temperature: 18.8 °C

Pressure Range kPa	Time Fitting Method	Mv (m <sup>2</sup> /MN)	Voids Ratio	Cv M <sup>2</sup> /year
0 - 6	t90	2.9	0.846	3.6
6 - 12	t90	1.7	0.827	2.3
12 - 25	t90	0.8	0.808	5.2
25 - 50	t90	0.72	0.776	5.9
50 - 100	t90	0.52	0.730	9.4
100 - 200	t90	0.37	0.666	10
200 - 50	t90	0.044	0.677	

Log of Pressure (kPa)



**Remarks**

Swelling pressure determined in accordance with BS 1377 Part 5 Clause 4.1a  
 Determination of swelling pressure not covered by UKAS accreditation.

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MW	25/04/2018	1 of 1

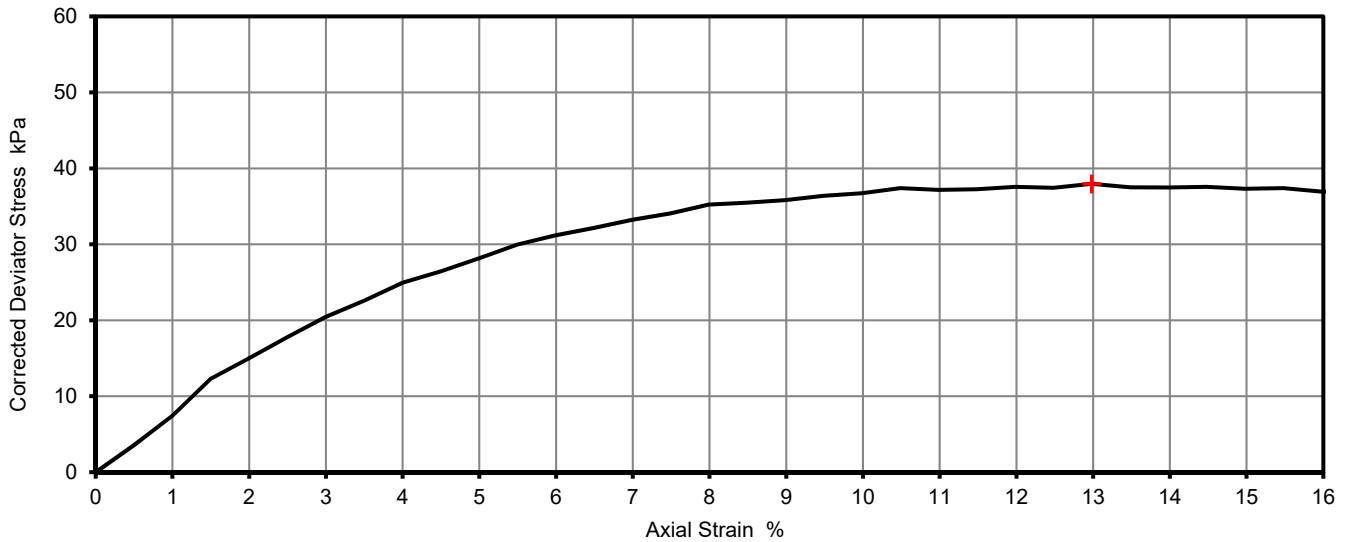
## DETERMINATION OF UNDRAINED SHEAR STRENGTH - DEFINITIVE

BS1377 : Part 7 : 1990, Clause 8, Single Specimen

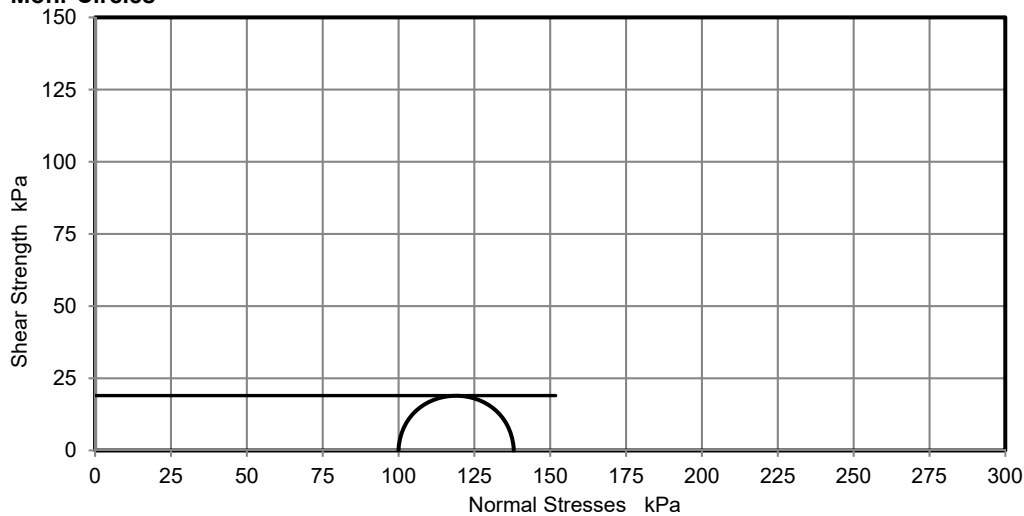
Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH1
Sample Description:	Very low strength dark grey CLAY with pockets of peat and plant remains	Sample Depth (m)	4.00
		Sample Reference	P17

Test Number	1		
Length	200.3	mm	
Diameter	101.2	mm	
Bulk Density	1.63	Mg/m <sup>3</sup>	
Moisture Content	71.7	%	
Dry Density	0.95	Mg/m <sup>3</sup>	
Rate of Strain	1.2	%/min	
Cell Pressure	100	kPa	
At failure	13.0	%	
Axial Strain	38	kPa	
Deviator Stress, ( $\sigma_1 - \sigma_3$ ) <sub>f</sub>	19	kPa	$\frac{1}{2}(\sigma_1 - \sigma_3)$ <sub>f</sub>
Undrained Shear Strength, <i>c<sub>u</sub></i>	Plastic		
Mode of Failure			

**Deviator Stress v Axial Strain**



**Mohr Circles**



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks	Approved	Date	Sheet No.:
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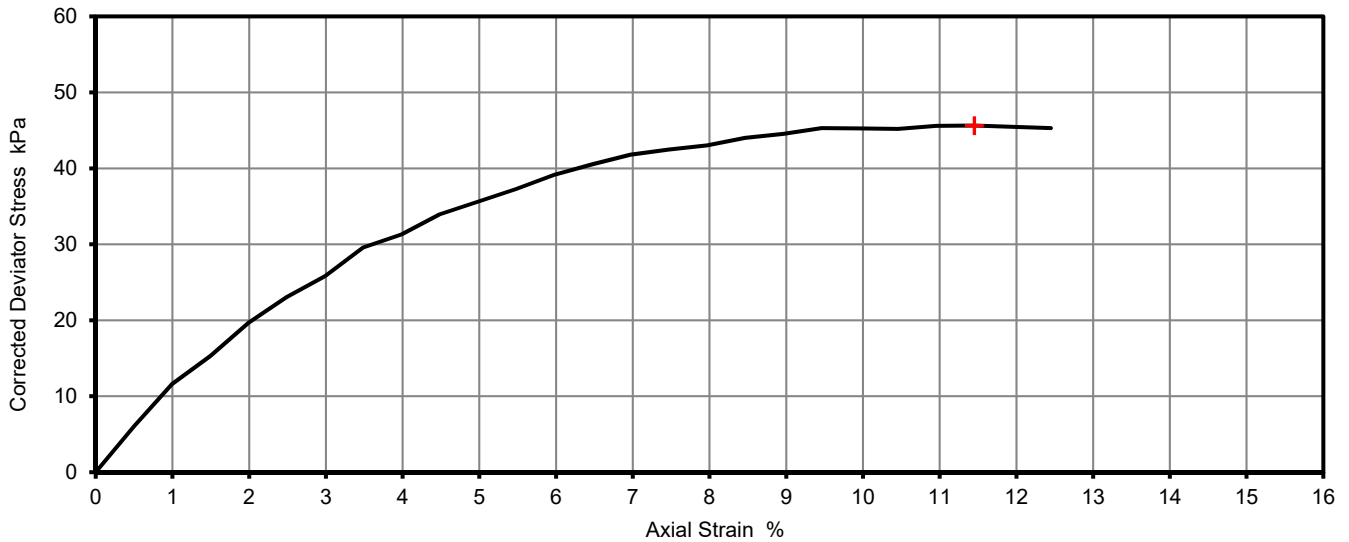
## DETERMINATION OF UNDRAINED SHEAR STRENGTH - DEFINITIVE

BS1377 : Part 7 : 1990, Clause 8, Single Specimen

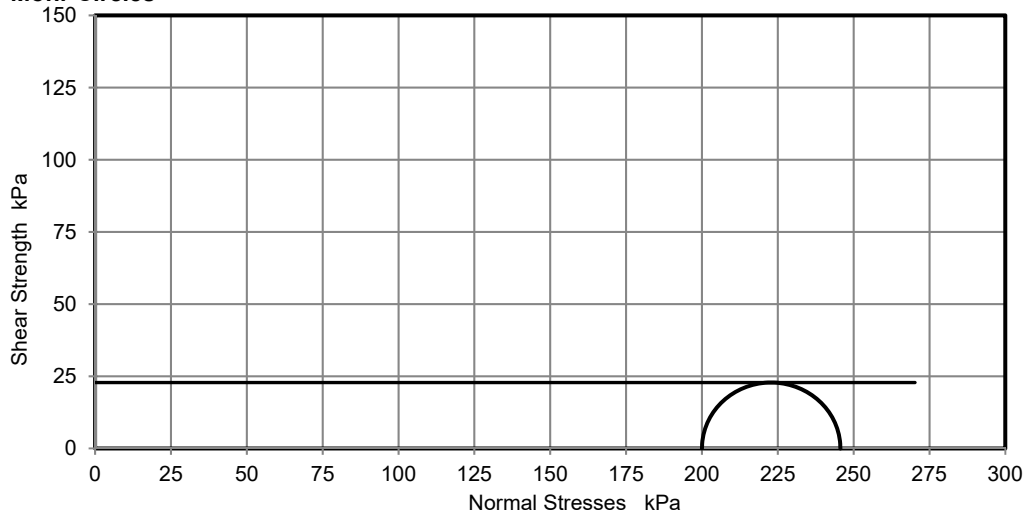
Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH2
Sample Description:	Low strength grey and dark grey CLAY with pockets of peat and plant remains	Sample Depth (m)	5.50
		Sample Reference	P18

Test Number	1				
Length	200.8	mm			
Diameter	101.3	mm			
Bulk Density	1.55	Mg/m <sup>3</sup>			
Moisture Content	72.3	%			
Dry Density	0.90	Mg/m <sup>3</sup>			
Rate of Strain	1.2	%/min			
Cell Pressure	200	kPa			
At failure	11.5	%			
Axial Strain	46	kPa			
Deviator Stress, (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>	23	kPa	½(σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>		
Undrained Shear Strength, c <sub>u</sub>	Plastic				
Mode of Failure					

**Deviator Stress v Axial Strain**



**Mohr Circles**



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks	Approved	Date	Sheet No.:
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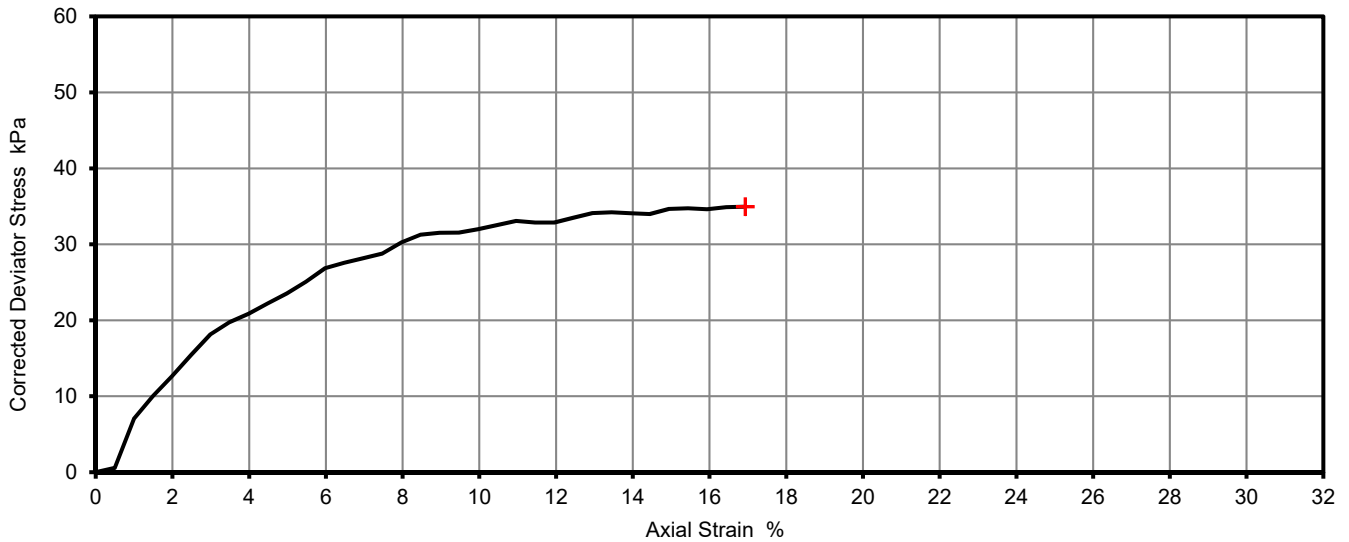
### DETERMINATION OF UNDRAINED SHEAR STRENGTH - DEFINITIVE

BS1377 : Part 7 : 1990, Clause 8, Single Specimen

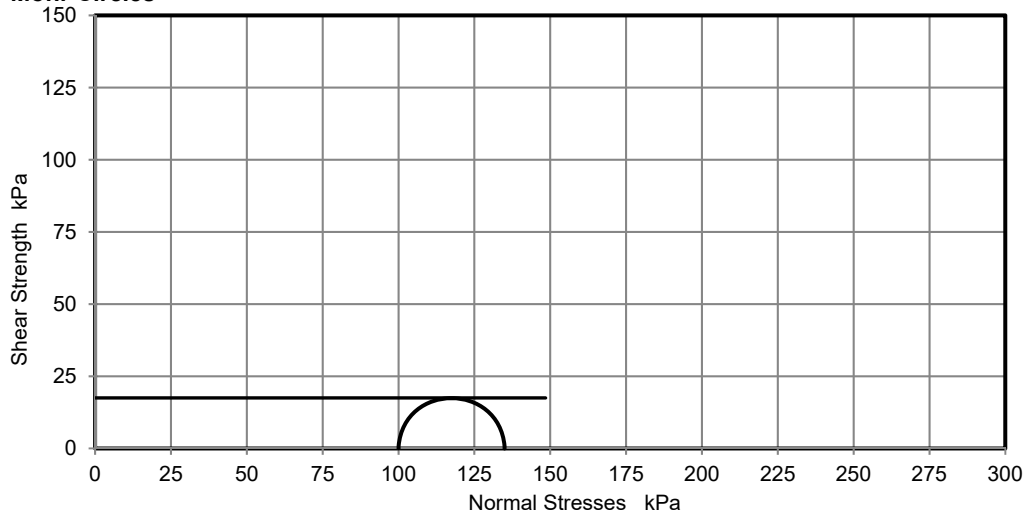
Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH5
Sample Description:	Very low strength dark brown and grey brown pseudo fibrous PEAT with occasional layers of plant remains and fine to medium sand	Sample Depth (m)	3.00
		Sample Reference	U10

Test Number	1		
Length	200.8	mm	
Diameter	103.2	mm	
Bulk Density	1.14	Mg/m <sup>3</sup>	
Moisture Content	103.0	%	
Dry Density	0.56	Mg/m <sup>3</sup>	
Rate of Strain	1.2	%/min	
Cell Pressure	100	kPa	
At failure	16.9	%	
Axial Strain	35	kPa	
Deviator Stress, (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>	17	kPa	½(σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>
Undrained Shear Strength, c <sub>u</sub>	Plastic		
Mode of Failure			

**Deviator Stress v Axial Strain**



**Mohr Circles**



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks	Approved	Date	Sheet No.:
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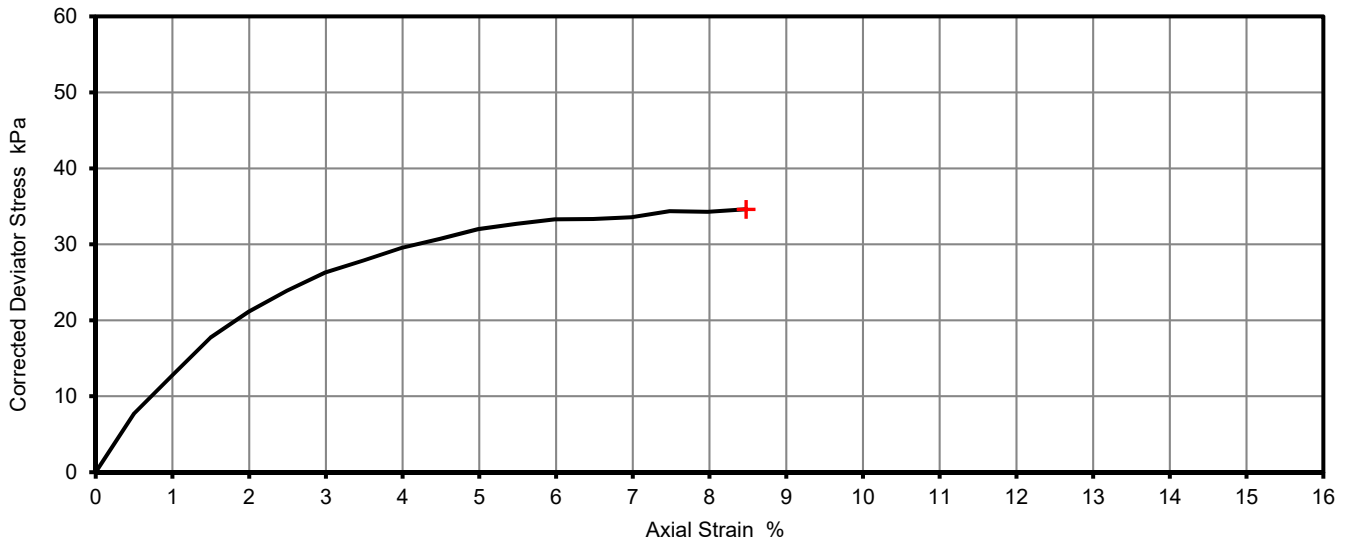
## DETERMINATION OF UNDRAINED SHEAR STRENGTH - DEFINITIVE

BS1377 : Part 7 : 1990, Clause 8, Single Specimen

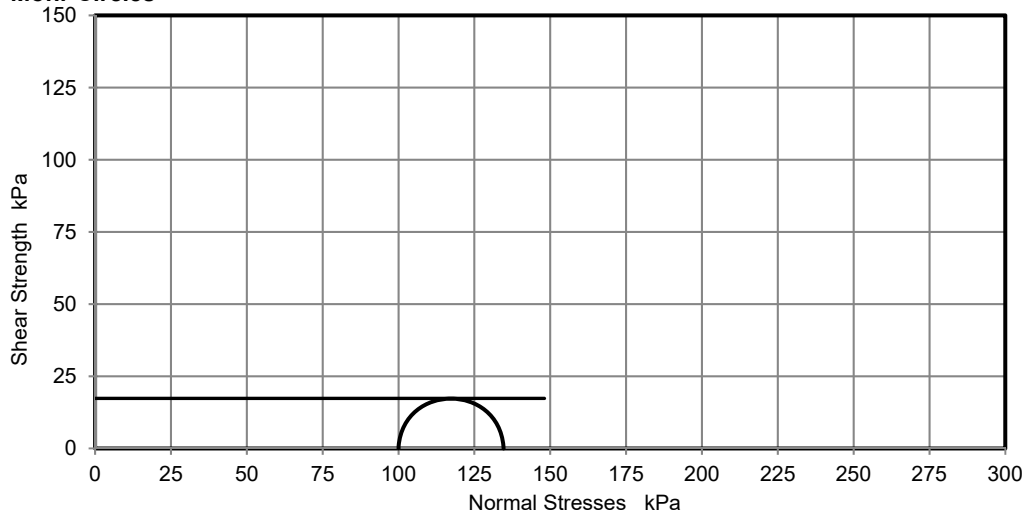
Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH7
Sample Description:	Very low strength dark brown pseudo fibrous PEAT with layers of plant remains	Sample Depth (m)	2.00
		Sample Reference	U9

Test Number	1				
Length	200.5	mm			
Diameter	103.1	mm			
Bulk Density	1.03	Mg/m <sup>3</sup>			
Moisture Content	348.3	%			
Dry Density	0.23	Mg/m <sup>3</sup>			
Rate of Strain	1.2	%/min			
Cell Pressure	100	kPa			
At failure	8.5	%			
Axial Strain	35	kPa			
Deviator Stress, (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>	17	kPa	½(σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>		
Undrained Shear Strength, c <sub>u</sub>	Compound				
Mode of Failure					

**Deviator Stress v Axial Strain**



**Mohr Circles**



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks	Approved	Date	Sheet No.:
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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH05A
Sample Ref	76
Depth (m)	30.00-30.45
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	174.0		
Diameter	mm	103.1		
Moisture Content	%	25		
Bulk Density	Mg/m <sup>3</sup>	2.00		
Dry Density	Mg/m <sup>3</sup>	1.60		

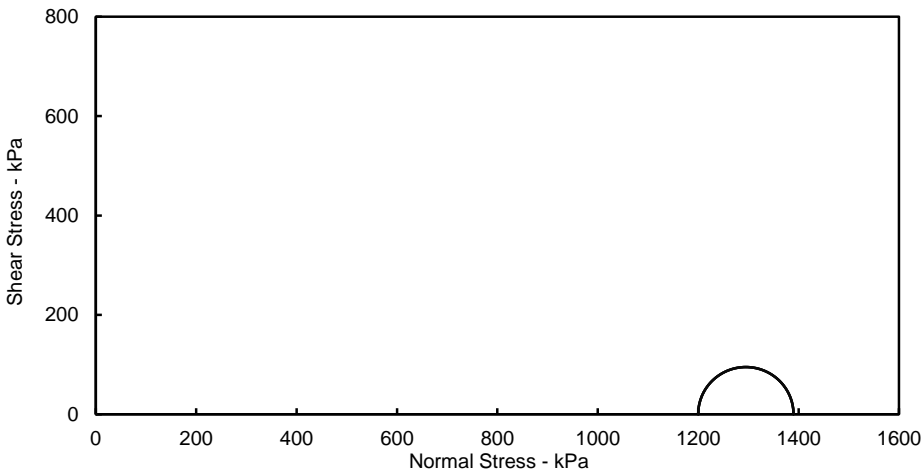
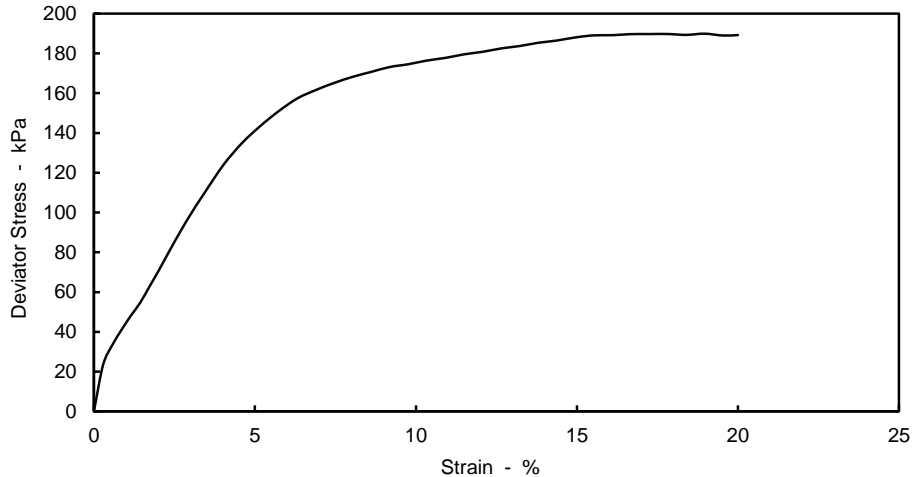
**Comments**  
Undisturbed specimen taken 20mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.07		
Rate of Axial Displacement	%/min	2.33		
Cell Pressure	kPa	1200		
Strain at Failure	%	19.0		
Maximum Deviator Stress	kPa	190		
Shear Strength	kPa	95		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>	
C	kPa
Phi	°

Non Engineering Description	Stiff intact grey slightly sandy CLAY with occasional pockets and layers of sand.
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Originator	DM	Checked & Approved	
			30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
BS 1377 : Part 7 : 1990 Clause 8



Sheet 1 of 2





Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole BH05A


Engineer Norfolk Partnership Laboratory

Sample Ref 76

Depth (m) 30.00-30.45

Sample Type UT



Originator	Checked & Approved
DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2



SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH05A
Sample Ref	76
Depth (m)	30.00-30.45
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	154.1		
Diameter	mm	102.2		
Moisture Content	%	23		
Bulk Density	Mg/m <sup>3</sup>	2.02		
Dry Density	Mg/m <sup>3</sup>	1.64		

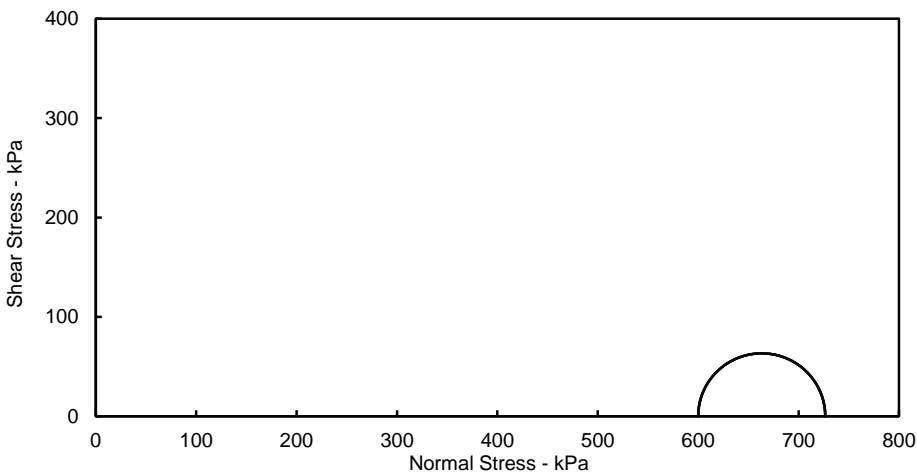
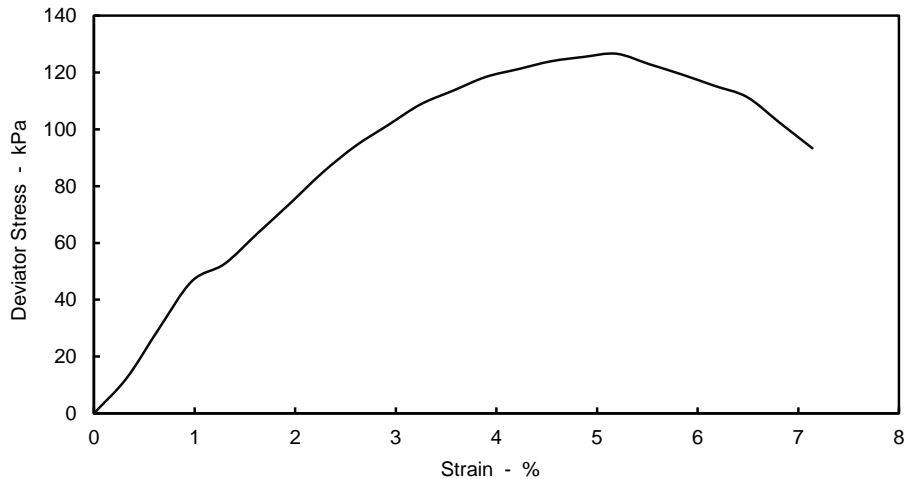
**Comments**  
Undisturbed specimen taken 200mm below top of tube

**Test Details**

Membrane Thickness	mm	0.60		
Membrane Correction	kPa	0.78		
Rate of Axial Displacement	%/min	0.99		
Cell Pressure	kPa	600		
Strain at Failure	%	5.2		
Maximum Deviator Stress	kPa	127		
Shear Strength	kPa	63		
Mode of Failure			Brittle	

Shear Strength Parameters	
C	kPa
Phi	°

Non Engineering Description	Grey clayey SAND.
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Originator	Checked & Approved
MAB	30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole BH05A

Sample Ref 76

Depth (m) 30.00-30.45

Sample Type UT



Originator

Checked & Approved

MAB

30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



**Norfolk Partnership Laboratory**

County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2SG

For the attention of Mr. S. Holden

Report No: C6401

Issue No 01

**LABORATORY TEST REPORT**

Project Name	<b>GREAT YARMOUTH THIRD RIVER CROSSING</b>		
Project Number	<b>C6401</b>	Date samples received	27/03/2018
Your Ref	PZ1522D1	Date written instructions received	26/03/2018
Purchase Order	PO 586415	Date testing commenced	21/04/2018
<b>Please find enclosed the results as summarised below</b>			
Item No	Test Quantity	Description	ISO 17025 Accredited
7.33	27	Single stage UU triaxial	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 30/04/2018	Key to symbols used in this report S/C : Testing was sub-contracted
Approved Signatories :  30/04/2018			
G Wilson (JMD/Laboratories Director), M D Brown (Quality Manager), L Anaz (Supervisor), Julie Hopkins (Administrator), A Davison (Supervisor)			
<p>Unless we are notified to the contrary, samples will be disposed after a period of one month from this date. The results reported relate to samples received in the laboratory only. All results contained in this report are provisional unless signed by an approved signatory This report should not be reproduced except in full without the written approval of the laboratory. Under multisite accreditation the testing contained in this report may have been performed at another Terra Tek laboratory. The enclosed results remain the property of Terra Tek Limited and we reserve the right to withdraw our report if we have not received cleared funds in accordance with our standard terms and conditions <b>Only those results indicated in this report are UKAS accredited and any opinions or interpretations expressed are outside the scope of UKAS accreditation.</b> Feedback on the this report may be left via our website <a href="http://www.terratek.co.uk/contact-us">www.terratek.co.uk/contact-us</a></p>			



Unit 2 Springfield Road, Chesham, Bucks, HP51PW

Tel: +44 (0)1494 810 136 Fax: +44 (0)1494 784 837

[chesham@terratek.co.uk](mailto:chesham@terratek.co.uk)

[www.terratek.co.uk](http://www.terratek.co.uk)

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Offices in Airdrie, Birmingham, Belfast and Chesham

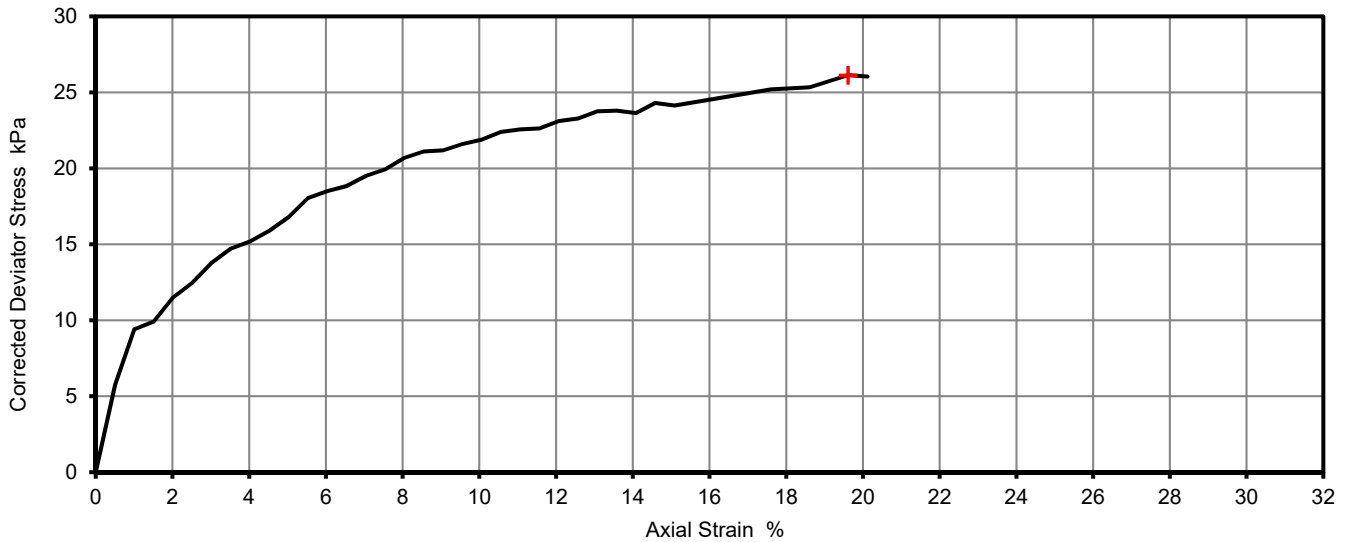
## DETERMINATION OF UNDRAINED SHEAR STRENGTH - DEFINITIVE

BS1377 : Part 7 : 1990, clause 8, single specimen

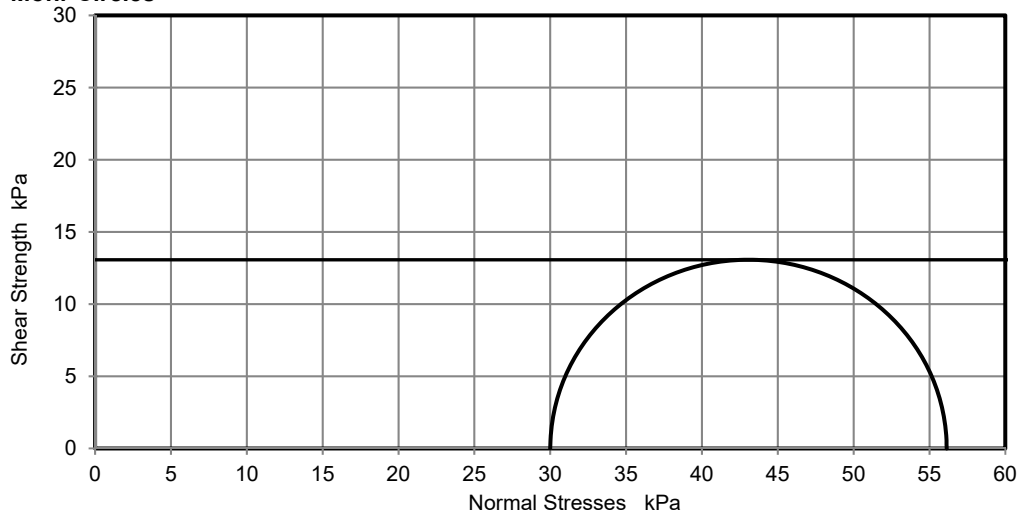
Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH9
Sample Description:	Very low strength grey and dark grey brown slightly gravelly CLAY with occasional pockets of sand. Gravel is of fine to medium flint	Sample Depth (m)	1.80
		Sample Reference	P10

Test Number	1		
Length	198.8	mm	
Diameter	102.5	mm	
Bulk Density	1.97	Mg/m <sup>3</sup>	
Moisture Content	31.0	%	
Dry Density	1.50	Mg/m <sup>3</sup>	
Rate of Strain	1.0	%/min	
Cell Pressure	30	kPa	
At failure	19.6	%	
Axial Strain	26	kPa	
Deviator Stress, ( $\sigma_1 - \sigma_3$ ) <sub>f</sub>	13	kPa	$\frac{1}{2}(\sigma_1 - \sigma_3)$ <sub>f</sub>
Undrained Shear Strength, $c_u$	Plastic		
Mode of Failure			

**Deviator Stress v Axial Strain**



**Mohr Circles**



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks	Approved	Date	Sheet No.:
	MW	25/04/2018	1 of 1



Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No. PZ1522D1

Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Hole BH09  
 Sample Ref 71  
 Depth (m) 27.50-27.95  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	199.8		
Diameter	mm	104.2		
Moisture Content	%	25		
Bulk Density	Mg/m <sup>3</sup>	2.04		
Dry Density	Mg/m <sup>3</sup>	1.63		

**Comments**

Undisturbed specimen taken 10mm below top of tube

**Test Details**

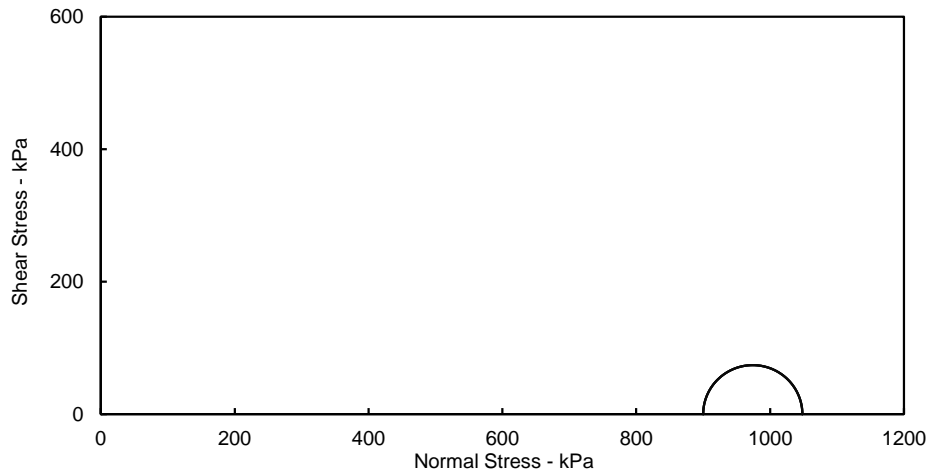
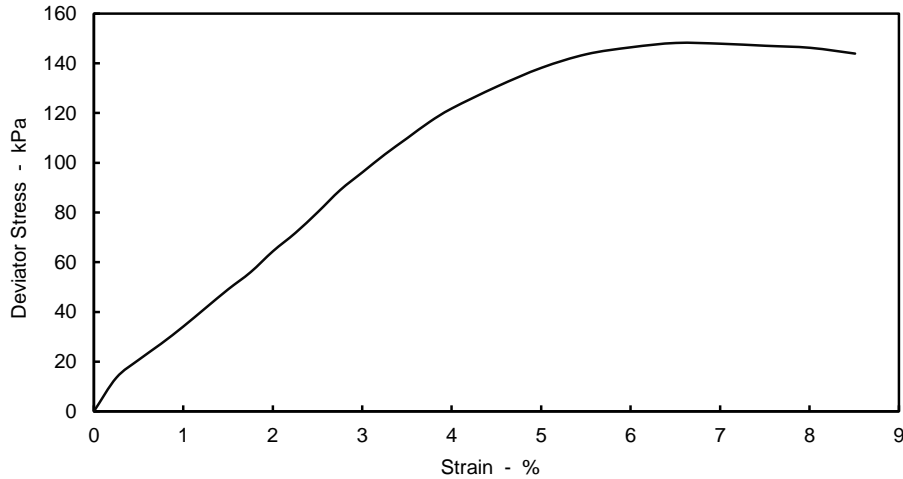
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.46		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	900		
Strain at Failure	%	6.5		
Maximum Deviator Stress	kPa	148		
Shear Strength	kPa	74		
Mode of Failure			Plastic	

**Shear Strength Parameters**

C	kPa
Phi	°

Non Engineering Description

Firm layered slightly sandy CLAY with occasional layers of sand.



Originator

Checked & Approved

MAB

30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8







Site GREAT YARMOUTH THIRD RIVER CROSSING


Contract No PZ1522D1

Client Norfolk County Council

Hole BH09  
Sample Ref 71  
Depth (m) 27.50-27.95  
Sample Type UT

Engineer Norfolk Partnership Laboratory



Originator	Checked & Approved
MAB	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2



Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No. PZ1522D1

Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Hole BH09  
 Sample Ref 71  
 Depth (m) 27.50-27.95  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	184.3		
Diameter	mm	103.4		
Moisture Content	%	25		
Bulk Density	Mg/m <sup>3</sup>	2.05		
Dry Density	Mg/m <sup>3</sup>	1.64		

**Comments**

Undisturbed specimen taken 220mm below top of tube

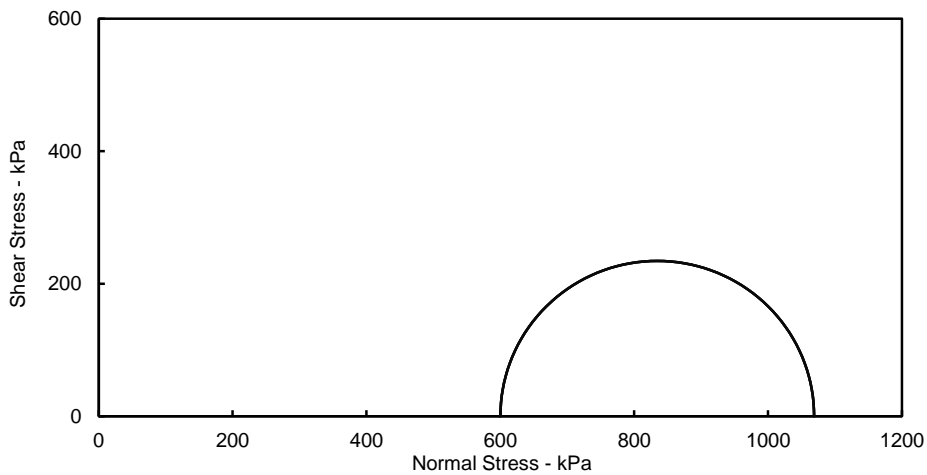
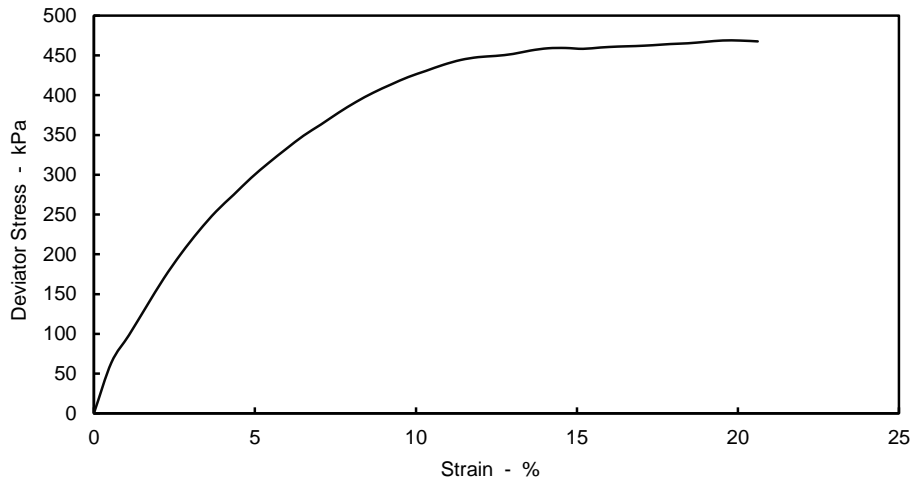
**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.08		
Rate of Axial Displacement	%/min	0.82		
Cell Pressure	kPa	600		
Strain at Failure	%	19.5		
Maximum Deviator Stress	kPa	469		
Shear Strength	kPa	234		
Mode of Failure			Brittle	

**Shear Strength Parameters**

C	kPa
Phi	°

Non Engineering Description Very stiff layered grey slightly sandy CLAY.



Originator

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MAB

30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1


Hole BH09

Sample Ref 71

Depth (m) 27.50-27.95

Sample Type UT



Originator	Checked & Approved
MAB	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2

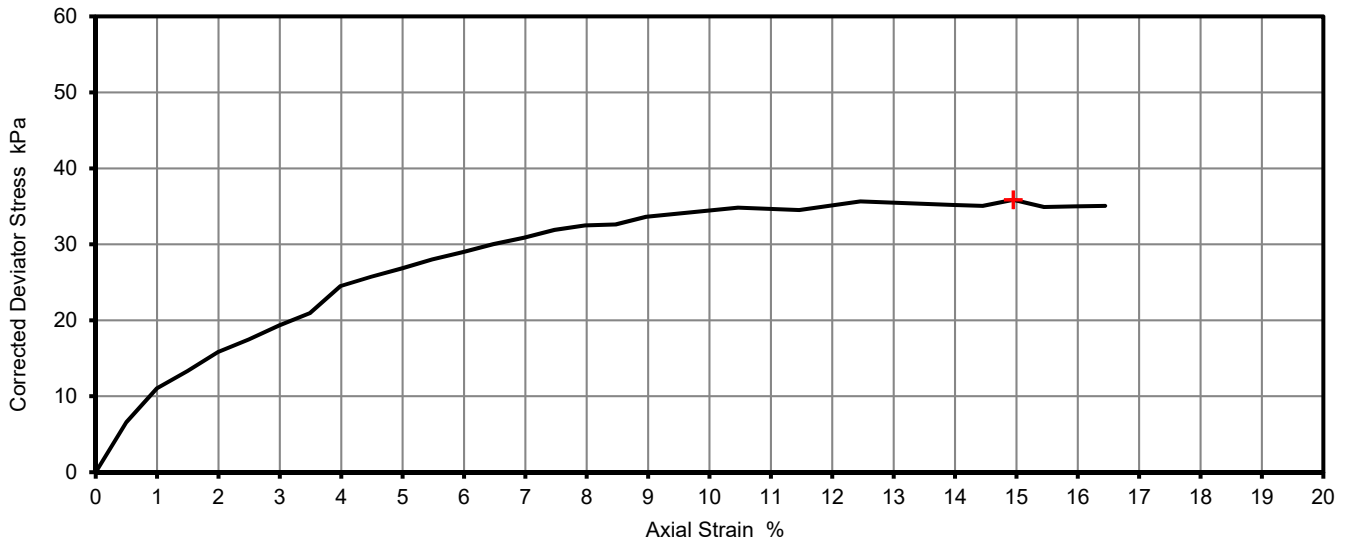
## DETERMINATION OF UNDRAINED SHEAR STRENGTH - DEFINITIVE

BS1377 : Part 7 : 1990, clause 8, single specimen

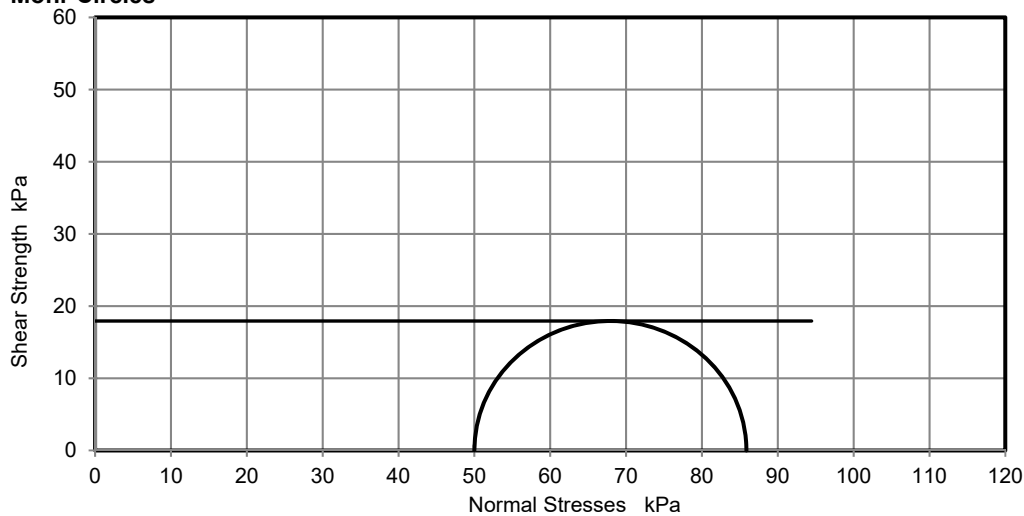
Project Name:	<b>Gt Yarmouth 3rd River Crossing</b>	Project Number:	<b>PZ1522D1</b>
Client Name:	<b>Community &amp; Environmental Services</b>	Sample Location:	BH10
Sample Description:	Very low strength dark brown and dark grey slightly sandy CLAY becoming dark brown gravelly clayey SAND with pockets of peat. Gravel is of fine to coarse flint	Sample Depth (m)	3.00
		Sample Reference	UT11

Test Number	1				
Length	200.7	mm			
Diameter	102.8	mm			
Bulk Density	1.64	Mg/m <sup>3</sup>			
Moisture Content	73.8	%			
Dry Density	0.95	Mg/m <sup>3</sup>			
Rate of Strain	1.0	%/min			
Cell Pressure	50	kPa			
At failure	15.0	%			
Axial Strain	36	kPa			
Deviator Stress, (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>	18	kPa	½(σ <sub>1</sub> - σ <sub>3</sub> ) <sub>f</sub>		
Undrained Shear Strength, c <sub>u</sub>					
Mode of Failure	Plastic				

### Deviator Stress v Axial Strain



### Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks	Approved	Date	Sheet No.:
	MW	25/04/2018	1 of 1



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No. PZ1522D1

Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Hole BH10  
 Sample Ref 77  
 Depth (m) 31.00-31.60  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	176.1		
Diameter	mm	100.3		
Moisture Content	%	26		
Bulk Density	Mg/m <sup>3</sup>	2.08		
Dry Density	Mg/m <sup>3</sup>	1.66		

**Comments**

Undisturbed specimen taken 50mm below top of tube

**Test Details**

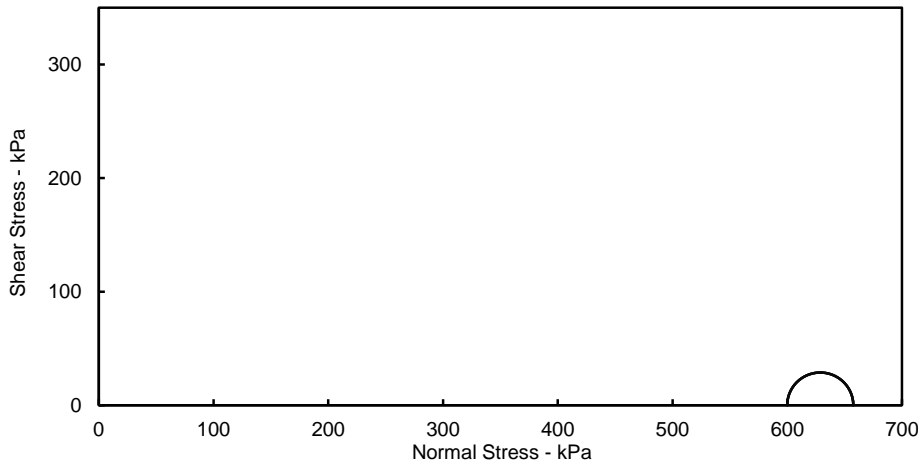
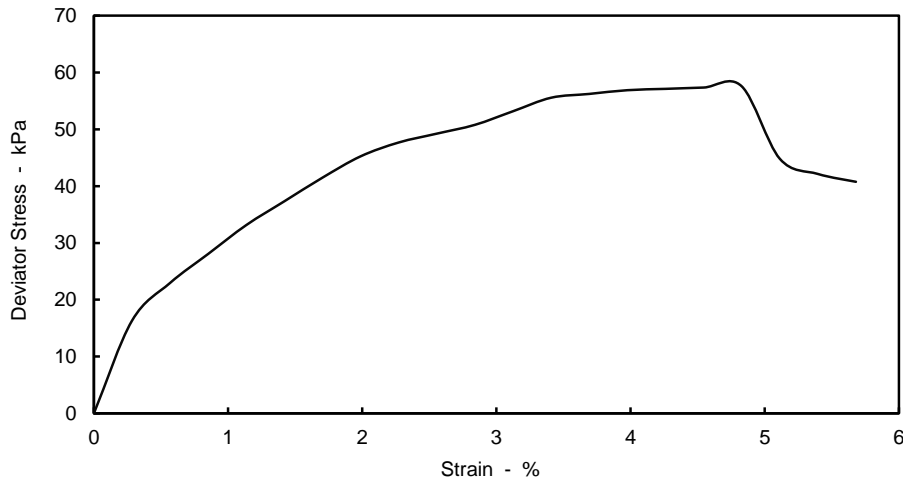
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.37		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	600		
Strain at Failure	%	4.8		
Maximum Deviator Stress	kPa	58		
Shear Strength	kPa	29		
Mode of Failure			Brittle	

**Shear Strength Parameters**

C	kPa
Phi	°

Non Engineering Description

Soft intact grey sandy CLAY.



Originator

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MAB

30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8







Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole BH10


Engineer Norfolk Partnership Laboratory

Sample Ref 77

Depth (m) 31.00-31.60

Sample Type UT



Originator	Checked & Approved
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Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2





Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No. PZ1522D1

Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Hole BH10  
 Sample Ref 77  
 Depth (m) 31.00-31.60  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	161.2		
Diameter	mm	102.3		
Moisture Content	%	24		
Bulk Density	Mg/m <sup>3</sup>	2.05		
Dry Density	Mg/m <sup>3</sup>	1.65		

**Comments**

Undisturbed specimen taken 250mm below top of tube

**Test Details**

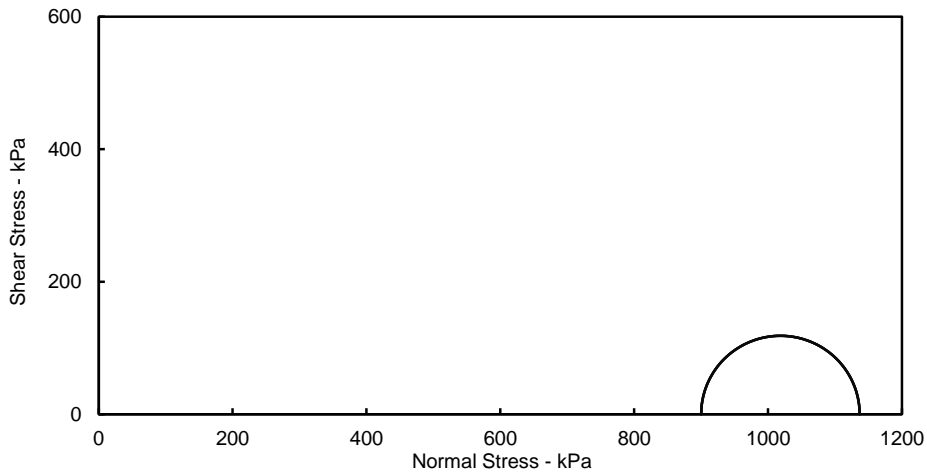
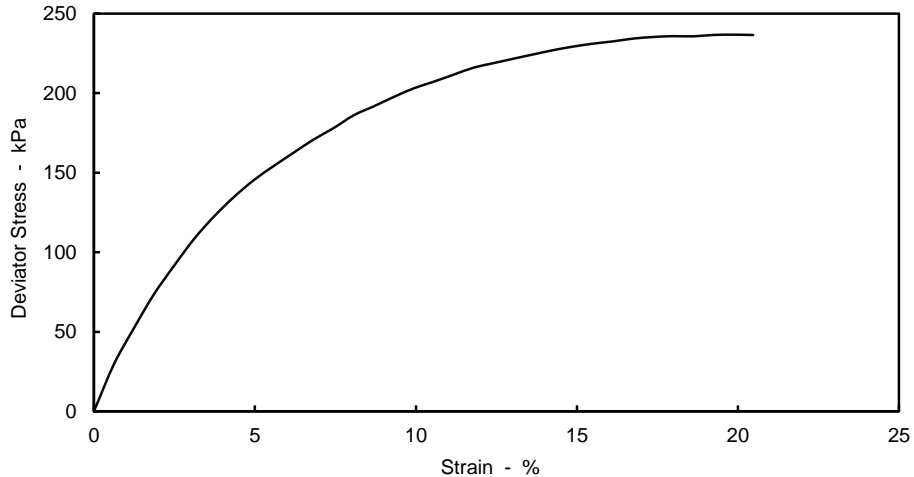
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.11		
Rate of Axial Displacement	%/min	0.94		
Cell Pressure	kPa	900		
Strain at Failure	%	19.9		
Maximum Deviator Stress	kPa	237		
Shear Strength	kPa	118		
Mode of Failure			Compound	

Non Engineering Description

Stiff intact grey sandy CLAY with layers of sand.

**Shear Strength Parameters**

C	kPa
Phi	°



Originator

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MAB

30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1


Hole BH10

Sample Ref 77

Depth (m) 31.00-31.60

Sample Type UT



Originator	Checked & Approved
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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH10
Sample Ref	103
Depth (m)	47.00-47.60
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	175.3		
Diameter	mm	103.3		
Moisture Content	%	32		
Bulk Density	Mg/m <sup>3</sup>	1.94		
Dry Density	Mg/m <sup>3</sup>	1.47		

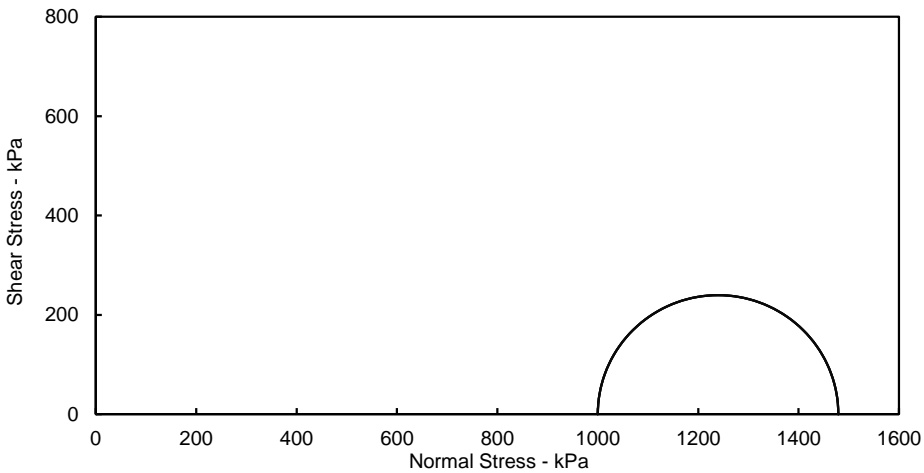
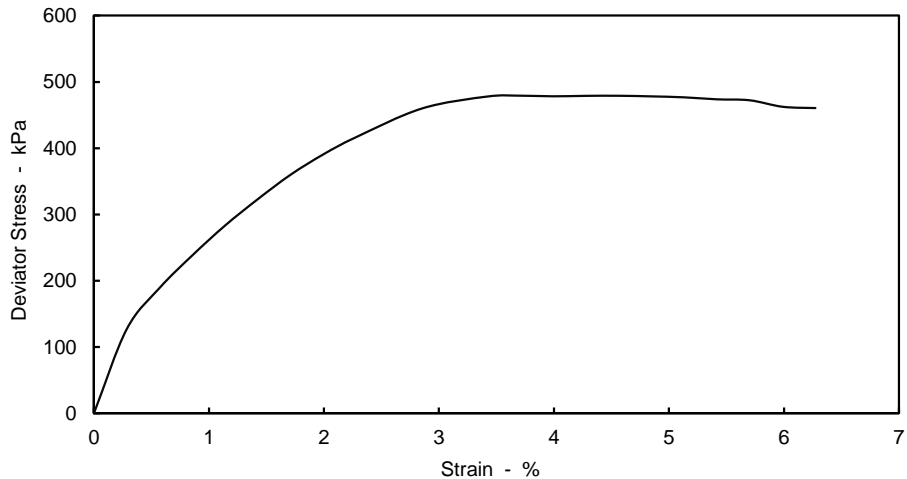
**Comments**  
Undisturbed specimen taken 30mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.29		
Rate of Axial Displacement	%/min	0.87		
Cell Pressure	kPa	1000		
Strain at Failure	%	3.7		
Maximum Deviator Stress	kPa	479		
Shear Strength	kPa	240		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>	
C	kPa
Phi	°

Non Engineering Description: Very stiff intact dark grey CLAY.



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DM	30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8





Site GREAT YARMOUTH THIRD RIVER CROSSING


Contract No PZ1522D1

Client Norfolk County Council

Hole BH10  
Sample Ref 103  
Depth (m) 47.00-47.60  
Sample Type UT

Engineer Norfolk Partnership Laboratory



Originator	Checked & Approved
DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole BH10  
 Sample Ref 103  
 Depth (m) 47.00-47.60  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	159.4		
Diameter	mm	103.3		
Moisture Content	%	29		
Bulk Density	Mg/m <sup>3</sup>	1.99		
Dry Density	Mg/m <sup>3</sup>	1.54		

**Comments**

Undisturbed specimen taken 250mm below top of tube

**Test Details**

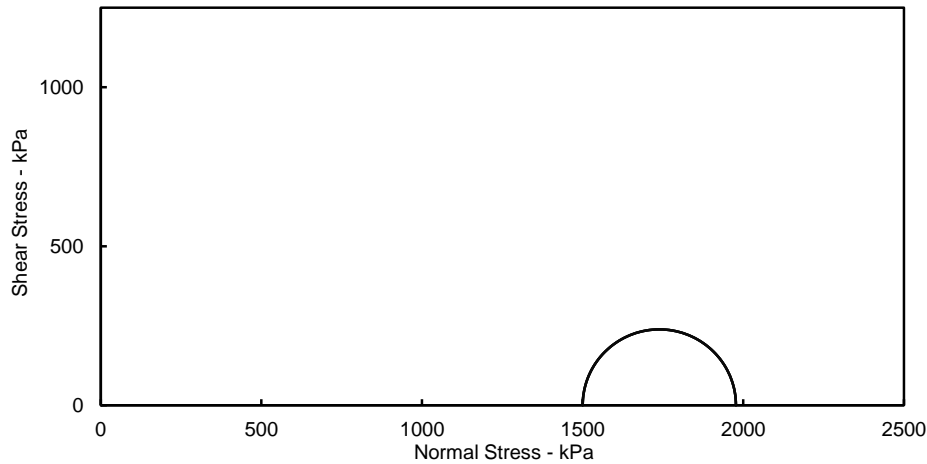
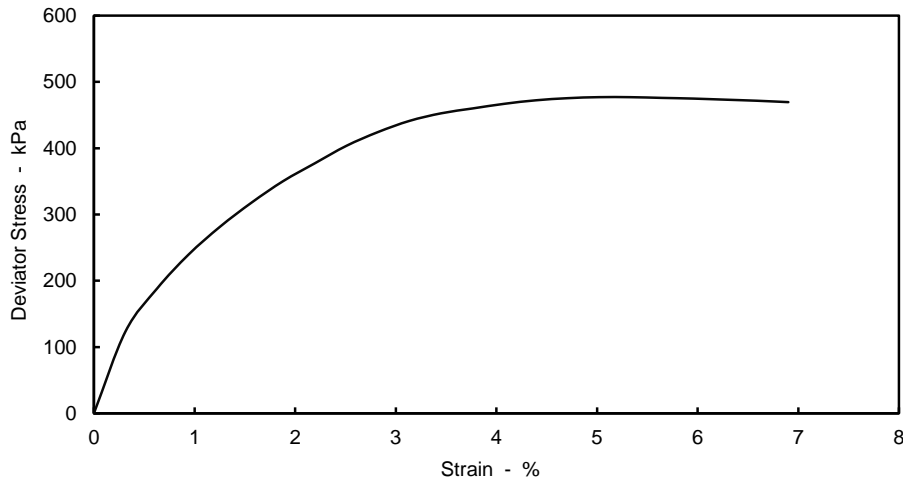
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.38		
Rate of Axial Displacement	%/min	0.95		
Cell Pressure	kPa	1500		
Strain at Failure	%	5.0		
Maximum Deviator Stress	kPa	477		
Shear Strength	kPa	239		
Mode of Failure			Brittle	

**Shear Strength Parameters**

C	kPa
Phi	°

Non Engineering Description

Very stiff intact dark grey CLAY.



Originator

Checked & Approved

DM

30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8





Site GREAT YARMOUTH THIRD RIVER CROSSING


Contract No PZ1522D1

Client Norfolk County Council

Hole BH10  
Sample Ref 103  
Depth (m) 47.00-47.60  
Sample Type UT

Engineer Norfolk Partnership Laboratory



Originator	Checked & Approved
DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2





Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No. PZ1522D1

Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Hole BH10  
 Sample Ref 107  
 Depth (m) 49.00-49.50  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	199.5		
Diameter	mm	103.2		
Moisture Content	%	38		
Bulk Density	Mg/m <sup>3</sup>	1.92		
Dry Density	Mg/m <sup>3</sup>	1.40		

**Comments**

Undisturbed specimen taken 210mm below top of tube

**Test Details**

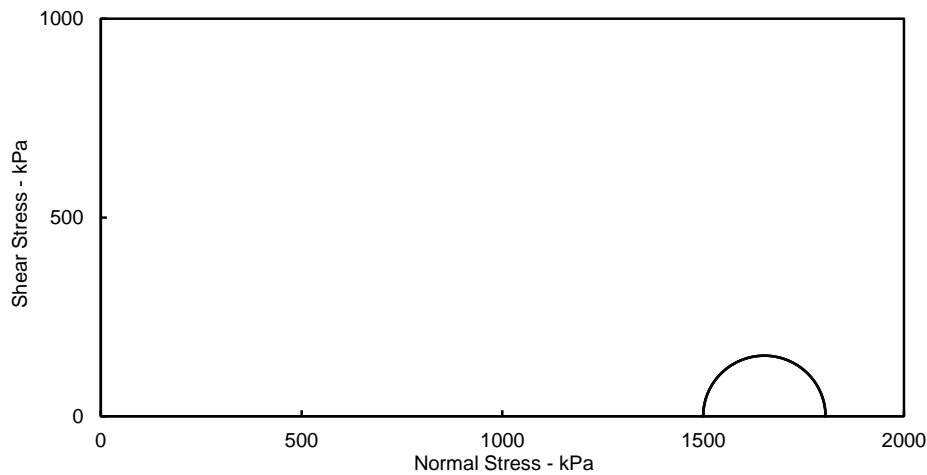
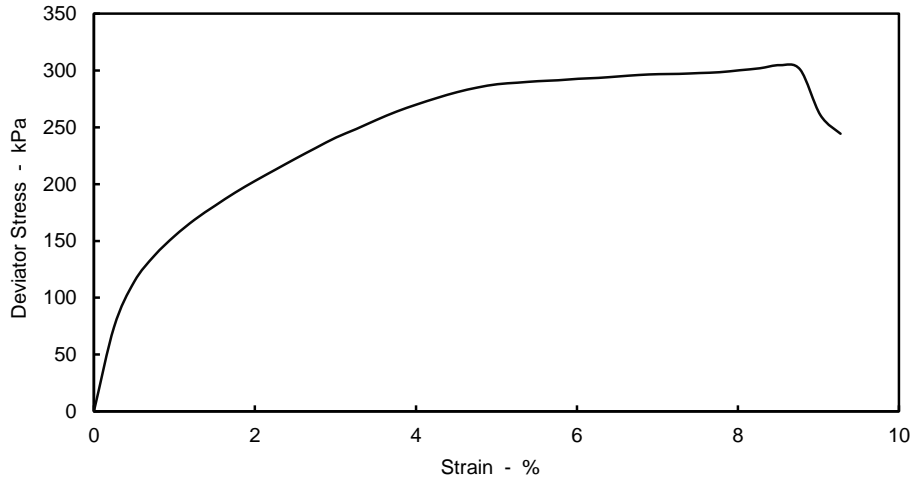
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.58		
Rate of Axial Displacement	%/min	2.04		
Cell Pressure	kPa	1500		
Strain at Failure	%	8.5		
Maximum Deviator Stress	kPa	305		
Shear Strength	kPa	152		
Mode of Failure			Compound	

Non Engineering Description

Very stiff fissured dark greyish brown slightly sandy CLAY.

**Shear Strength Parameters**

C kPa  
 Phi °



Originator

Checked & Approved

DM

30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8






Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No	<b>PZ1522D1</b>
Hole	BH10
Sample Ref	107
Depth (m)	49.00-49.50
Sample Type	UT



Originator	Checked & Approved
DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No. PZ1522D1

Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Hole BH10A  
 Sample Ref 81  
 Depth (m) 31.00-31.45  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	170.5		
Diameter	mm	104.4		
Moisture Content	%	28		
Bulk Density	Mg/m <sup>3</sup>	2.01		
Dry Density	Mg/m <sup>3</sup>	1.56		

**Comments**

Undisturbed specimen taken 20mm below top of tube

**Test Details**

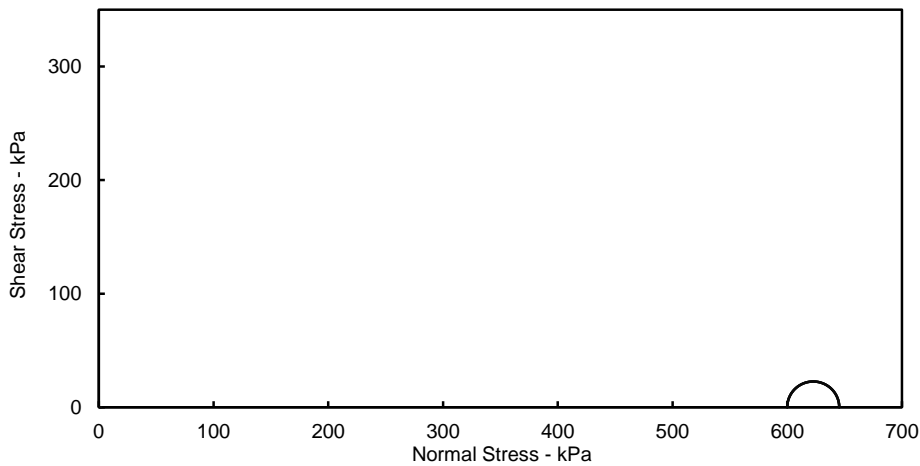
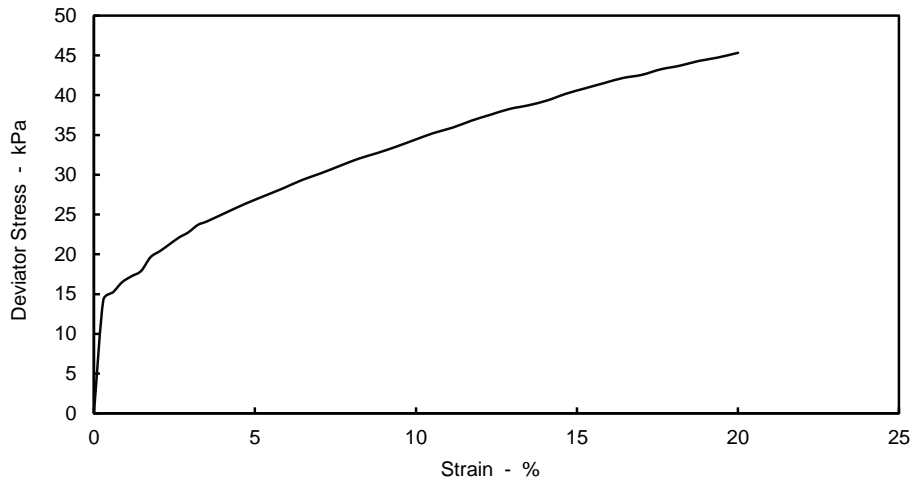
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.09		
Rate of Axial Displacement	%/min	0.89		
Cell Pressure	kPa	600		
Strain at Failure	%	20.0		
Maximum Deviator Stress	kPa	45		
Shear Strength	kPa	23		
Mode of Failure			Plastic	

Non Engineering Description

Soft intact light grey CLAY with pockets/layers of sand.

**Shear Strength Parameters**

C	kPa
Phi	°



Originator

Checked & Approved

DM

30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole BH10A


Engineer Norfolk Partnership Laboratory

Sample Ref 81

Depth (m) 31.00-31.45

Sample Type UT



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DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2



SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH10A
Sample Ref	81
Depth (m)	31.00-31.45
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	199.4		
Diameter	mm	103.8		
Moisture Content	%	28		
Bulk Density	Mg/m <sup>3</sup>	2.00		
Dry Density	Mg/m <sup>3</sup>	1.56		

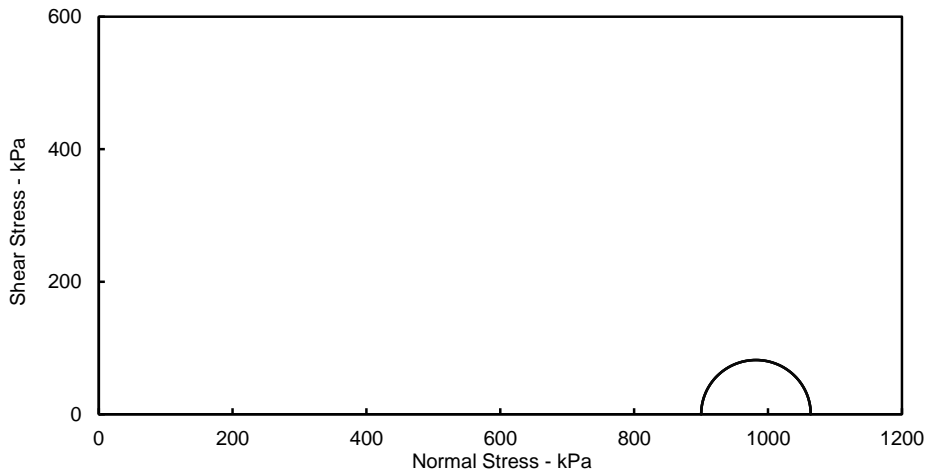
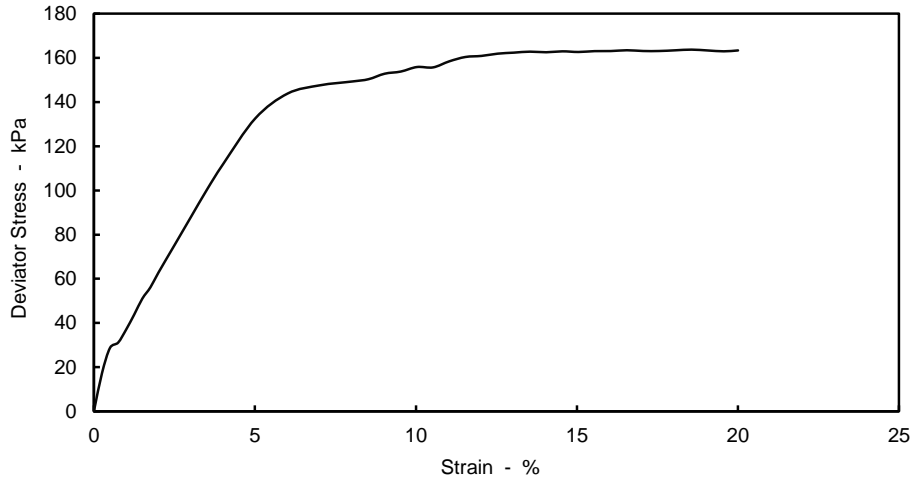
**Comments**  
Undisturbed specimen taken 200mm below top of tube


**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.04		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	900		
Strain at Failure	%	18.6		
Maximum Deviator Stress	kPa	164		
Shear Strength	kPa	82		
Mode of Failure			Compound	

Shear Strength Parameters	
C	kPa
Phi	°

Non Engineering Description	Stiff laminated light grey sandy CLAY.
-----------------------------	--



Originator	Checked & Approved
DM	 30/04/2018

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1


Hole BH10A

Sample Ref 81

Depth (m) 31.00-31.45

Sample Type UT



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No. PZ1522D1

Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Hole BH10A  
 Sample Ref 107  
 Depth (m) 47.00-47.45  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	199.7		
Diameter	mm	101.3		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	1.97		
Dry Density	Mg/m <sup>3</sup>	1.51		

**Comments**

Undisturbed specimen taken 10mm below top of tube

**Test Details**

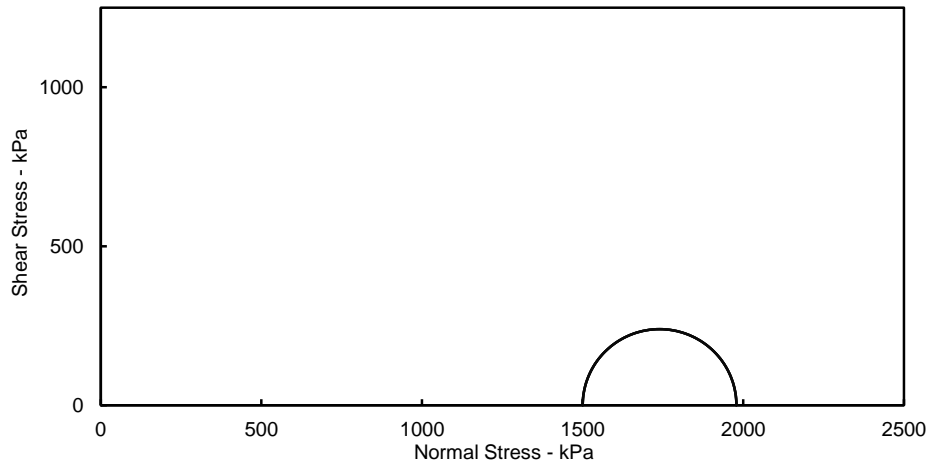
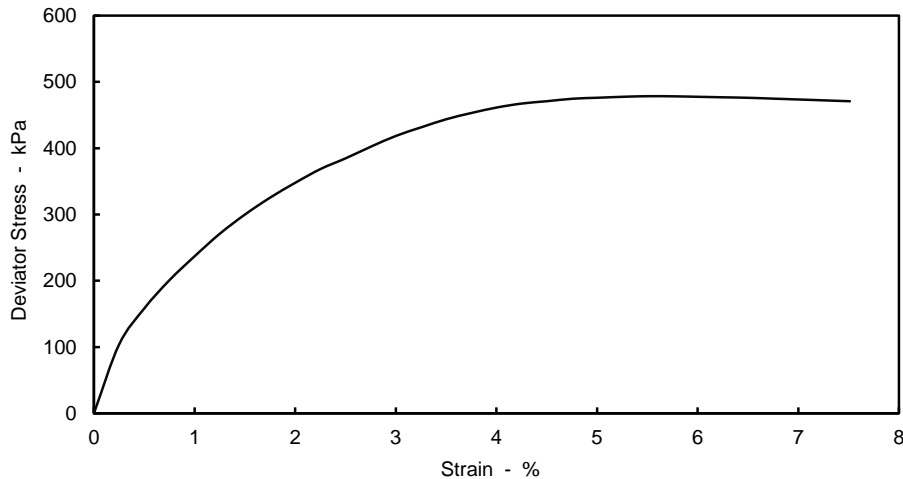
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.42		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	1500		
Strain at Failure	%	5.5		
Maximum Deviator Stress	kPa	478		
Shear Strength	kPa	239		
Mode of Failure			Brittle	

**Shear Strength Parameters**

C	kPa
Phi	°

Non Engineering Description

Very stiff fissured dark greyish brown slightly sandy CLAY.



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Site GREAT YARMOUTH THIRD RIVER CROSSING


Contract No PZ1522D1

Client Norfolk County Council

Hole BH10A  
Sample Ref 107  
Depth (m) 47.00-47.45  
Sample Type UT

Engineer Norfolk Partnership Laboratory



Originator	Checked & Approved
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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH10A
Sample Ref	107
Depth (m)	47.00-47.45
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	159.6		
Diameter	mm	101.1		
Moisture Content	%	37		
Bulk Density	Mg/m <sup>3</sup>	1.87		
Dry Density	Mg/m <sup>3</sup>	1.36		

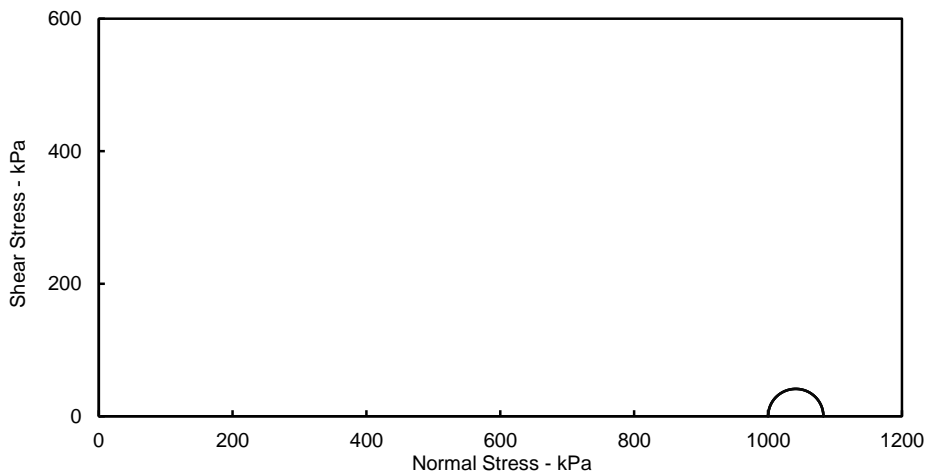
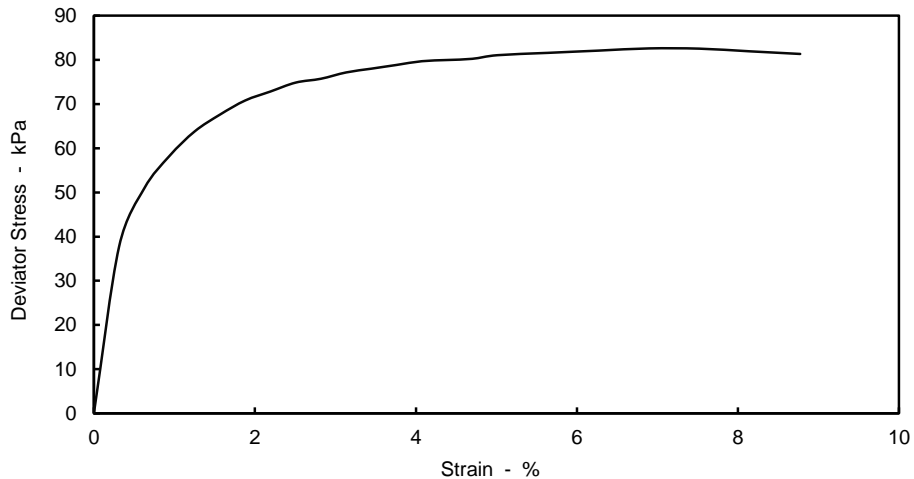
**Comments**  
Undisturbed specimen taken 230mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.50		
Rate of Axial Displacement	%/min	2.54		
Cell Pressure	kPa	1000		
Strain at Failure	%	6.9		
Maximum Deviator Stress	kPa	83		
Shear Strength	kPa	41		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>	
C	kPa
Phi	°

Non Engineering Description: Firm fissured greyish brown slightly sandy CLAY.



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**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

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Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No	PZ1522D1
Hole	BH10A
Sample Ref	107
Depth (m)	47.00-47.45
Sample Type	UT



Originator	Checked & Approved
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Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH10A
Sample Ref	111
Depth (m)	49.00-49.45
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	149.9		
Diameter	mm	103.8		
Moisture Content	%	37		
Bulk Density	Mg/m <sup>3</sup>	1.89		
Dry Density	Mg/m <sup>3</sup>	1.38		

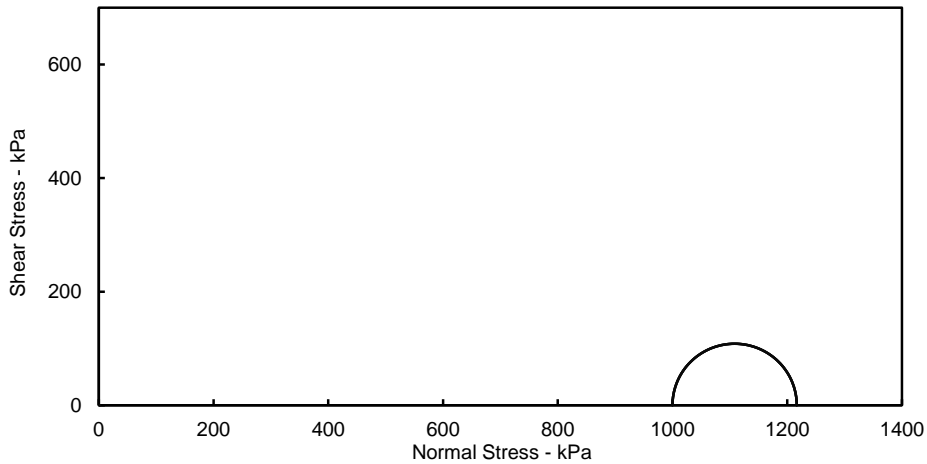
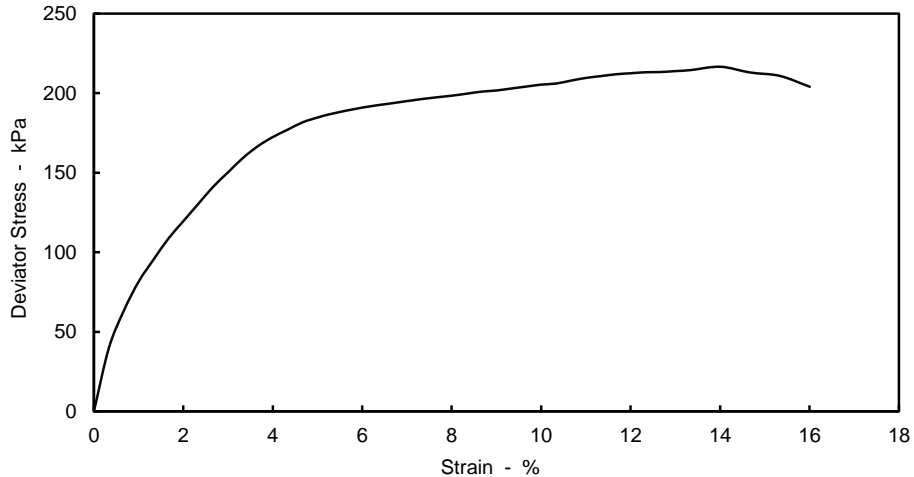
**Comments**  
Undisturbed specimen taken 105mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.84		
Rate of Axial Displacement	%/min	2.71		
Cell Pressure	kPa	1000		
Strain at Failure	%	14.0		
Maximum Deviator Stress	kPa	217		
Shear Strength	kPa	108		
Mode of Failure			Compound	

Shear Strength Parameters	
C	kPa
Phi	°

Non Engineering Description  
Top: Firm intact greyish brown slightly sandy CLAY.  
Bottom: Stiff fissured dark greyish brown slightly sandy CLAY.



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**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole BH10A


Engineer Norfolk Partnership Laboratory

Sample Ref 111

Depth (m) 49.00-49.45

Sample Type UT



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Sheet 2 of 2





Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No. PZ1522D1

Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Hole BH10A  
 Sample Ref 111  
 Depth (m) 49.00-49.45  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	157.5		
Diameter	mm	102.9		
Moisture Content	%	33		
Bulk Density	Mg/m <sup>3</sup>	1.92		
Dry Density	Mg/m <sup>3</sup>	1.44		

**Comments**

Undisturbed specimen taken 280mm below top of tube

**Test Details**

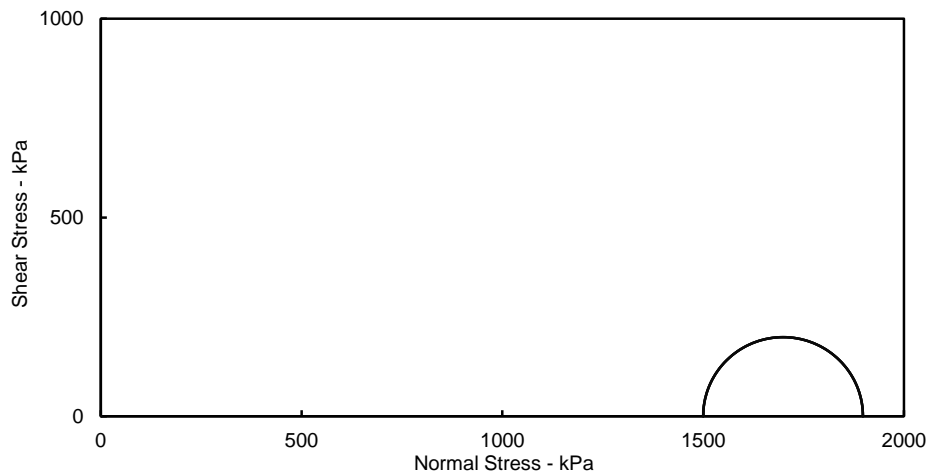
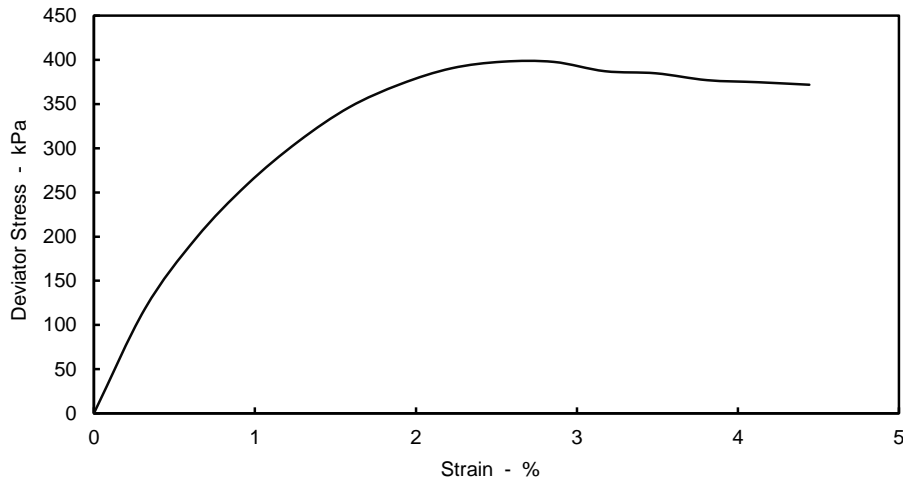
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.21		
Rate of Axial Displacement	%/min	0.96		
Cell Pressure	kPa	1500		
Strain at Failure	%	2.5		
Maximum Deviator Stress	kPa	398		
Shear Strength	kPa	199		
Mode of Failure			Brittle	

Non Engineering Description

Very stiff fissured greyish brown slightly sandy CLAY.

**Shear Strength Parameters**

C	kPa
Phi	°



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**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

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Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No	<b>PZ1522D1</b>
Hole	BH10A
Sample Ref	111
Depth (m)	49.00-49.45
Sample Type	UT



Originator	DM	Checked & Approved	[Redacted Signature]
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Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



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Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No. PZ1522D1

Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Hole BH11  
 Sample Ref 83  
 Depth (m) 31.00-31.45  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	175.6		
Diameter	mm	103.2		
Moisture Content	%	27		
Bulk Density	Mg/m <sup>3</sup>	2.02		
Dry Density	Mg/m <sup>3</sup>	1.60		

**Comments**

Undisturbed specimen taken 30mm below top of tube

**Test Details**

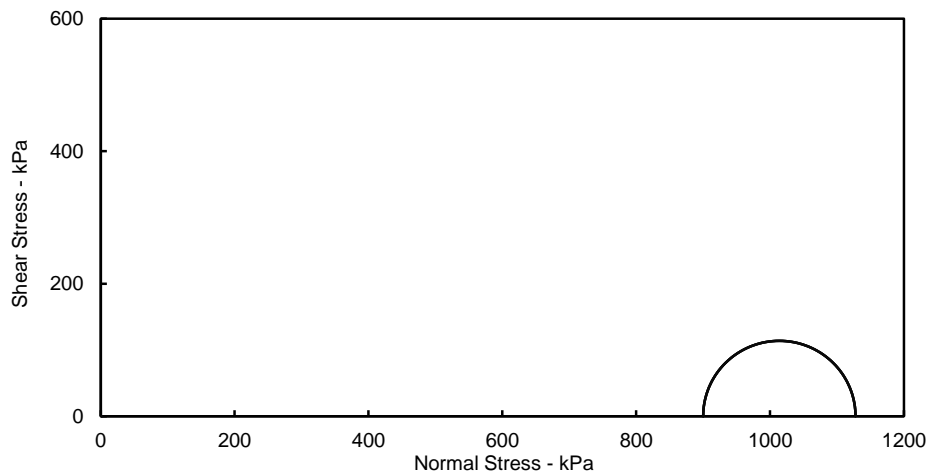
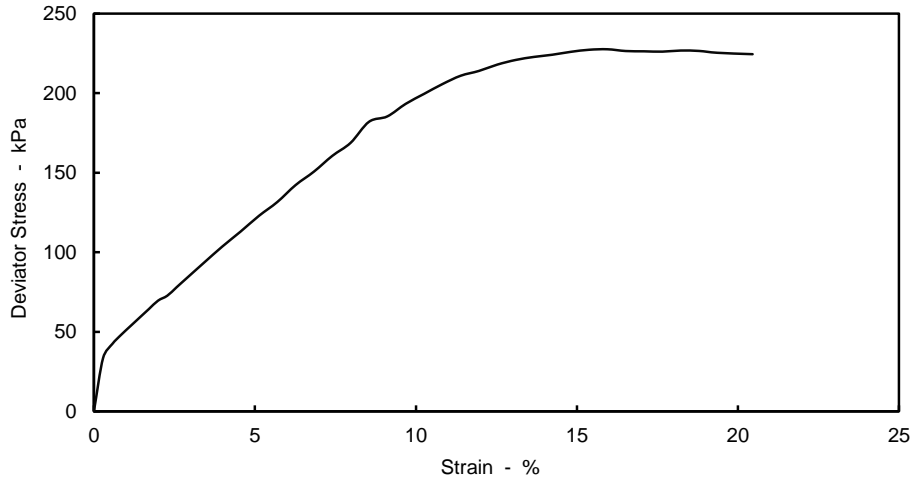
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.94		
Rate of Axial Displacement	%/min	0.87		
Cell Pressure	kPa	900		
Strain at Failure	%	15.9		
Maximum Deviator Stress	kPa	228		
Shear Strength	kPa	114		
Mode of Failure			Plastic	

**Shear Strength Parameters**

C	kPa
Phi	°

Non Engineering Description

Stiff intact light grey sandy CLAY.



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Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole BH11


Engineer Norfolk Partnership Laboratory

Sample Ref 83

Depth (m) 31.00-31.45

Sample Type UT



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Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



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SITE INVESTIGATION AND LABORATORY SERVICES

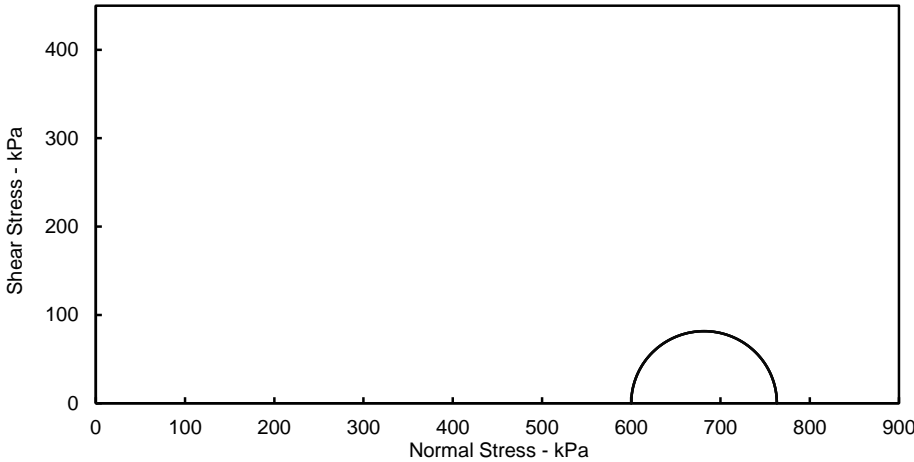
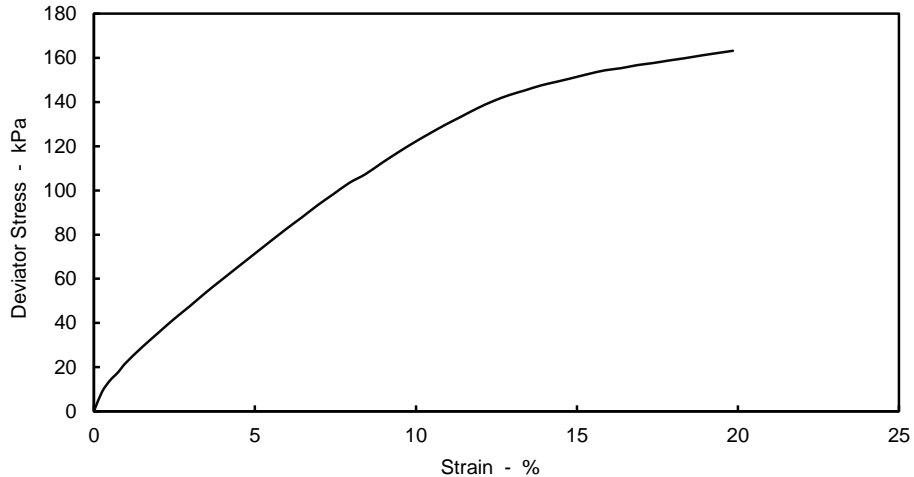
Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11
Sample Ref	83
Depth (m)	31.00-31.45
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	201.6		
Diameter	mm	103.5		
Moisture Content	%	28		
Bulk Density	Mg/m <sup>3</sup>	2.01		
Dry Density	Mg/m <sup>3</sup>	1.57		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.10		
Rate of Axial Displacement	%/min	0.75		
Cell Pressure	kPa	600		
Strain at Failure	%	19.8		
Maximum Deviator Stress	kPa	163		
Shear Strength	kPa	82		
Mode of Failure			Plastic	
Non Engineering Description	Stiff laminated light grey sandy CLAY.			

**Comments**  
Undisturbed specimen taken 210mm below top of tube

<b>Shear Strength Parameters</b>	
C	kPa
Phi	°



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**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
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Site GREAT YARMOUTH THIRD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole BH11


Engineer Norfolk Partnership Laboratory

Sample Ref 83

Depth (m) 31.00-31.45

Sample Type UT



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Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11
Sample Ref	110
Depth (m)	46.00-46.45
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	175.0		
Diameter	mm	102.9		
Moisture Content	%	33		
Bulk Density	Mg/m <sup>3</sup>	1.95		
Dry Density	Mg/m <sup>3</sup>	1.47		

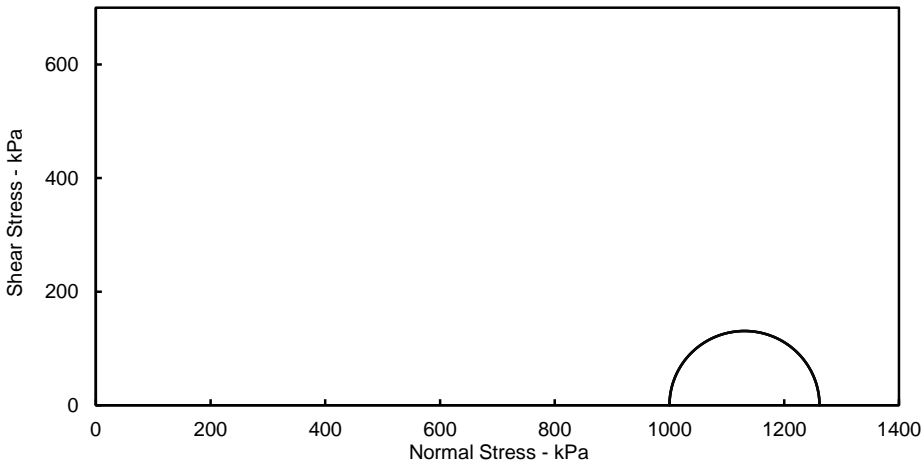
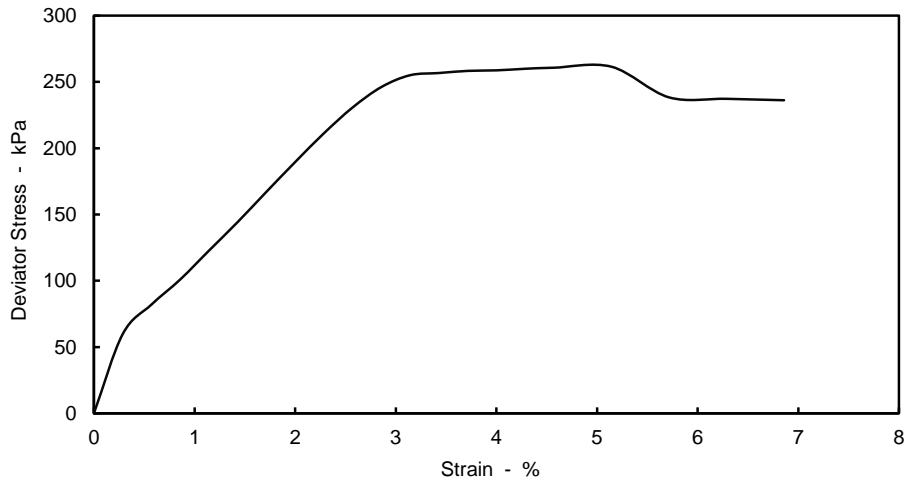
**Comments**  
Undisturbed specimen taken 60mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.39		
Rate of Axial Displacement	%/min	0.87		
Cell Pressure	kPa	1000		
Strain at Failure	%	5.1		
Maximum Deviator Stress	kPa	261		
Shear Strength	kPa	131		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>	
C	kPa
Phi	°

Non Engineering Description	Stiff laminated light grey sandy CLAY.
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**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
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Sheet 1 of 2



Site GREAT YARMOUTH THIRD RIVER CROSSING


Contract No PZ1522D1

Client Norfolk County Council

Hole BH11  
Sample Ref 110  
Depth (m) 46.00-46.45  
Sample Type UT

Engineer Norfolk Partnership Laboratory



Originator	Checked & Approved
MAB	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11
Sample Ref	110
Depth (m)	46.00-46.45
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	157.0		
Diameter	mm	100.9		
Moisture Content	%	29		
Bulk Density	Mg/m <sup>3</sup>	1.95		
Dry Density	Mg/m <sup>3</sup>	1.52		

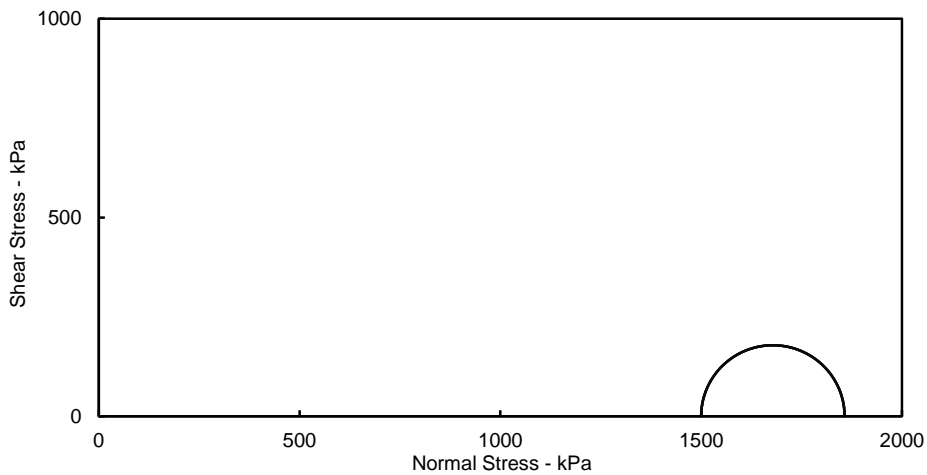
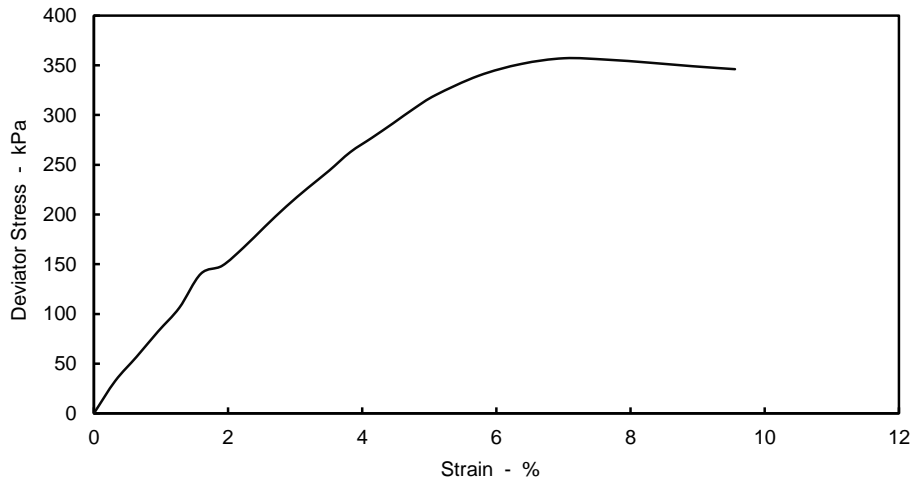
<b>Comments</b>
Undisturbed specimen taken 250mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.51		
Rate of Axial Displacement	%/min	0.97		
Cell Pressure	kPa	1500		
Strain at Failure	%	7.0		
Maximum Deviator Stress	kPa	357		
Shear Strength	kPa	179		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>	
C	kPa
Phi	°

Non Engineering Description	Very stiff laminated light grey sandy CLAY.
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DM	30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8






Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No	<b>PZ1522D1</b>
Hole	BH11
Sample Ref	110
Depth (m)	46.00-46.45
Sample Type	UT



Originator	Checked & Approved
DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11
Sample Ref	113
Depth (m)	47.00
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	199.7		
Diameter	mm	102.6		
Moisture Content	%	33		
Bulk Density	Mg/m <sup>3</sup>	1.94		
Dry Density	Mg/m <sup>3</sup>	1.46		

**Comments**

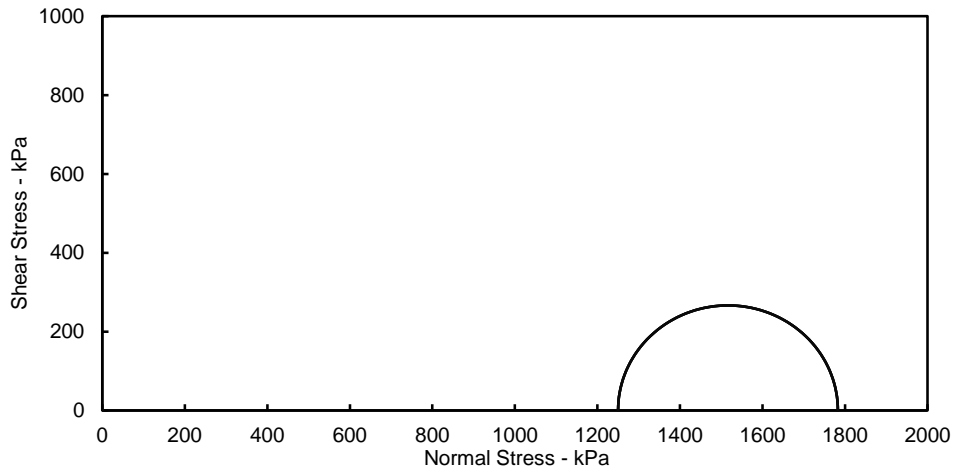
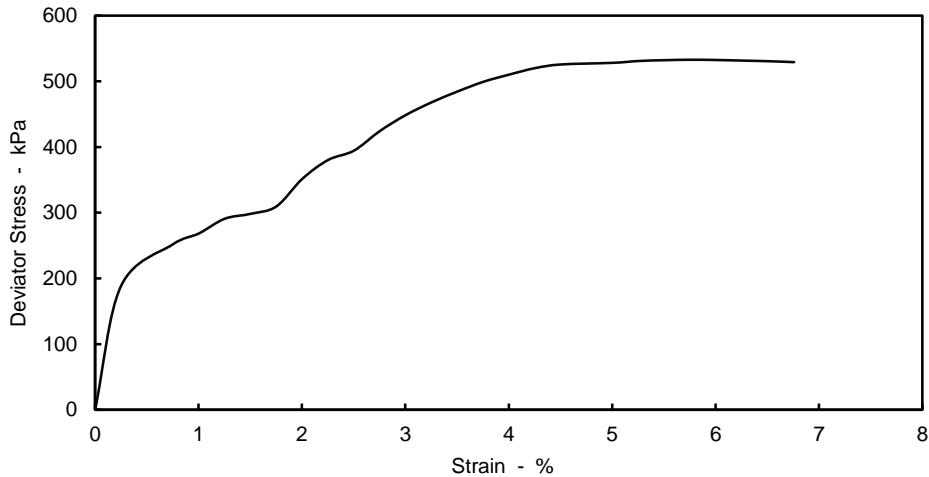
Undisturbed specimen taken 240mm below top of tube


**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.43		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	1250		
Strain at Failure	%	5.8		
Maximum Deviator Stress	kPa	533		
Shear Strength	kPa	266		
Mode of Failure			Brittle	

Non Engineering Description: Very stiff fissured brown slightly sandy CLAY.

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
EH	 15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole BH11

Sample Ref 113

Depth (m) 47.00

Sample Type UT



Originator

Checked & Approved

EH

15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.







SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11
Sample Ref	113
Depth (m)	47.00
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	798.6		
Diameter	mm	102.5		
Moisture Content	%	33		
Bulk Density	Mg/m <sup>3</sup>	0.46		
Dry Density	Mg/m <sup>3</sup>	0.34		

**Comments**

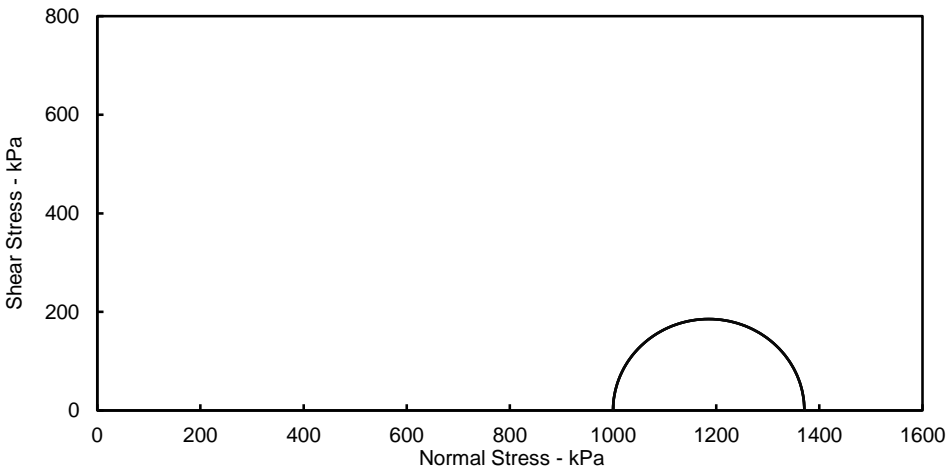
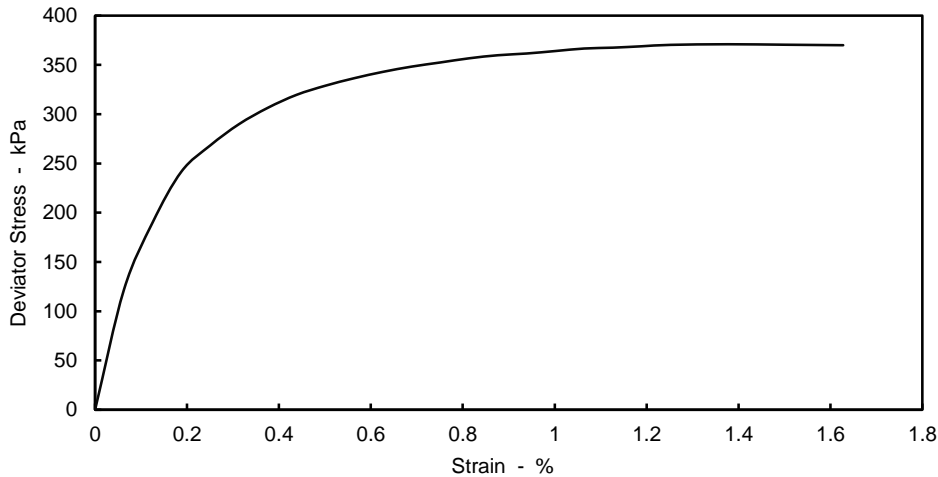
Undisturbed specimen taken 20mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.12		
Rate of Axial Displacement	%/min	0.19		
Cell Pressure	kPa	1000		
Strain at Failure	%	1.4		
Maximum Deviator Stress	kPa	371		
Shear Strength	kPa	185		
Mode of Failure			Compound	

Non Engineering Description: Very stiff fissured brown slightly sandy CLAY.

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8

Originator	Checked & Approved
EH	15/08/2018



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole BH11

Sample Ref 113

Depth (m) 47.00

Sample Type UT



Originator

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EH

15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11A
Sample Ref	118
Depth (m)	48.50
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	176.6		
Diameter	mm	102.7		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	1.94		
Dry Density	Mg/m <sup>3</sup>	1.50		

**Comments**

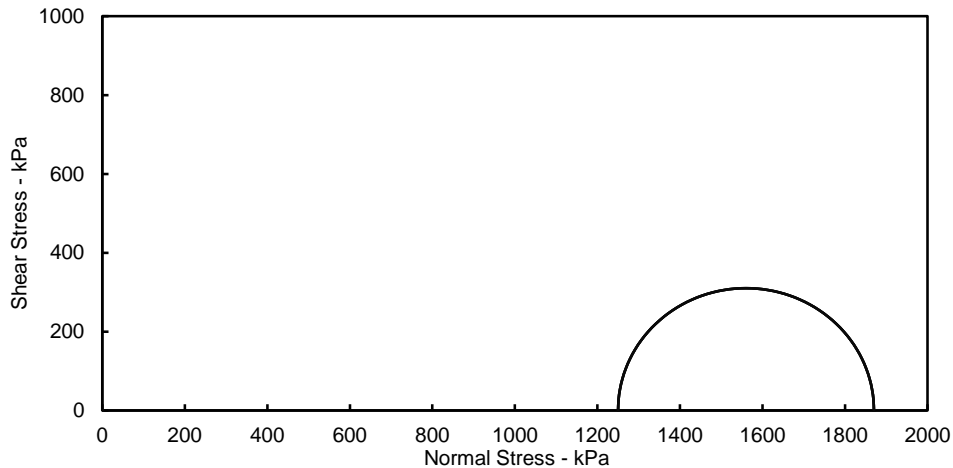
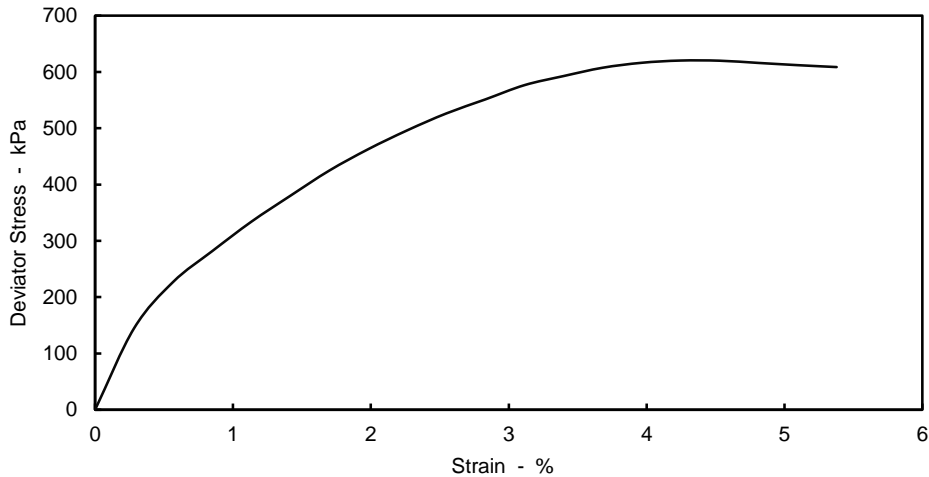
Undisturbed specimen taken 250mm below top of tube


**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.33		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	1250		
Strain at Failure	%	4.2		
Maximum Deviator Stress	kPa	620		
Shear Strength	kPa	310		
Mode of Failure			Compound	

Non Engineering Description	Hard fissured olive brown slightly sandy CLAY.
-----------------------------	--

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
EH	 15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE  
 STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**


Hole BH11A

Sample Ref 118

Depth (m) 48.50

Sample Type UT



Originator	Checked & Approved
EH	 15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

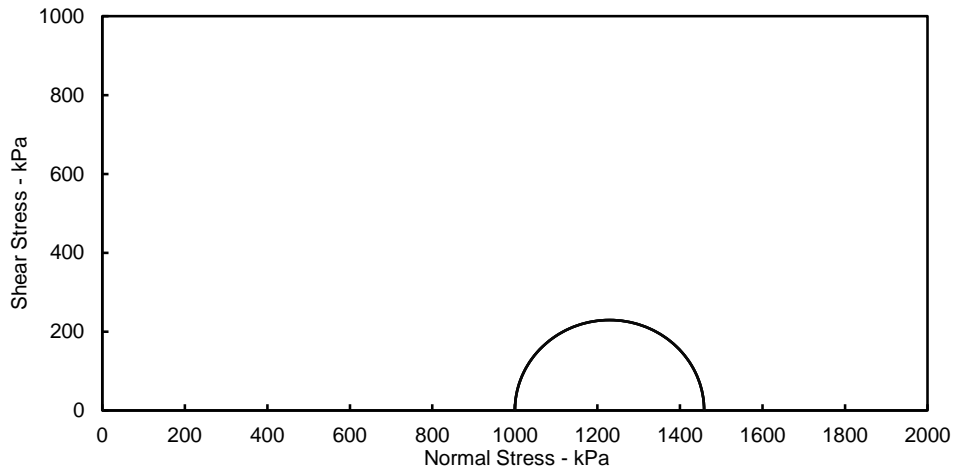
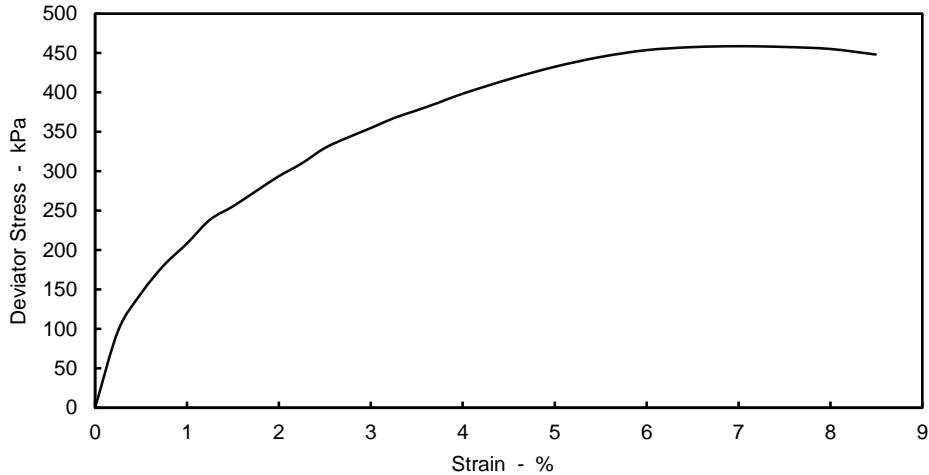
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	BH11A
Sample Ref	118
Depth (m)	48.50
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	200.2		
Diameter	mm	102.4		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	1.96		
Dry Density	Mg/m <sup>3</sup>	1.50		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.50		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	1000		
Strain at Failure	%	7.0		
Maximum Deviator Stress	kPa	459		
Shear Strength	kPa	229		
Mode of Failure			Brittle	
Non Engineering Description	Very stiff fissured olive brown slightly sandy CLAY.			

**Comments**  
 Undisturbed specimen taken 40mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
EH	 15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole BH11A

Sample Ref 118

Depth (m) 48.50

Sample Type UT



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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11
Sample Ref	117
Depth (m)	48.50-48.95
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	157.9		
Diameter	mm	103.3		
Moisture Content	%	24		
Bulk Density	Mg/m <sup>3</sup>	2.06		
Dry Density	Mg/m <sup>3</sup>	1.66		

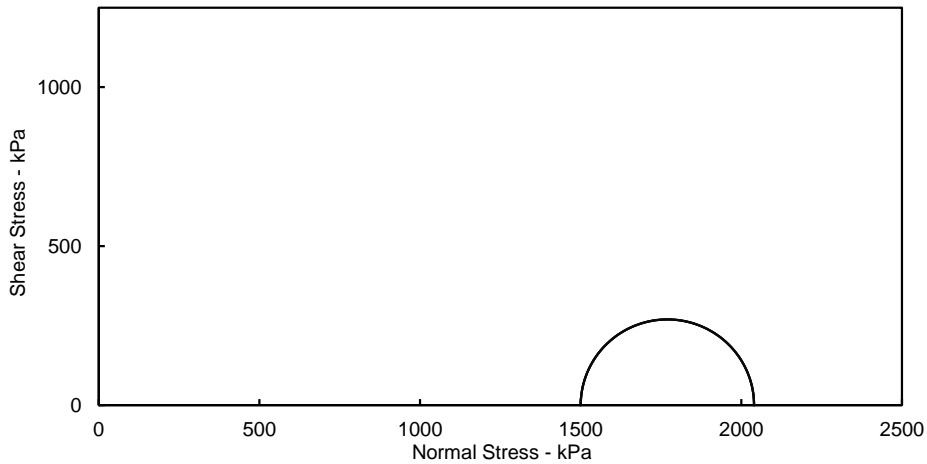
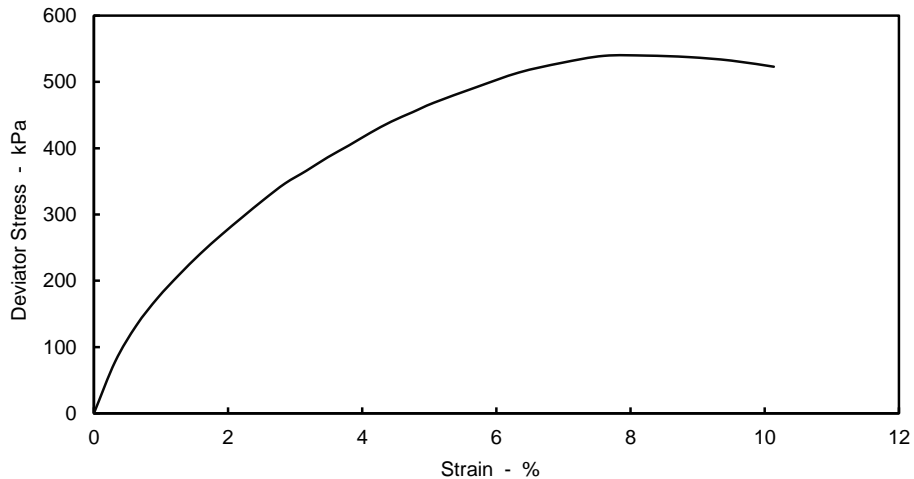
**Comments**  
Undisturbed specimen taken 80mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.57		
Rate of Axial Displacement	%/min	0.96		
Cell Pressure	kPa	1500		
Strain at Failure	%	8.2		
Maximum Deviator Stress	kPa	540		
Shear Strength	kPa	270		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>	
C	kPa
Phi	°

Non Engineering Description: Very stiff fissured dark brown slightly sandy CLAY.



Originator	Checked & Approved
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**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8





Site GREAT YARMOUTH THIRD RIVER CROSSING


Contract No PZ1522D1

Client Norfolk County Council

Hole BH11  
Sample Ref 117  
Depth (m) 48.50-48.95  
Sample Type UT

Engineer Norfolk Partnership Laboratory



Originator	Checked & Approved
DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2



SITE INVESTIGATION AND LABORATORY SERVICES

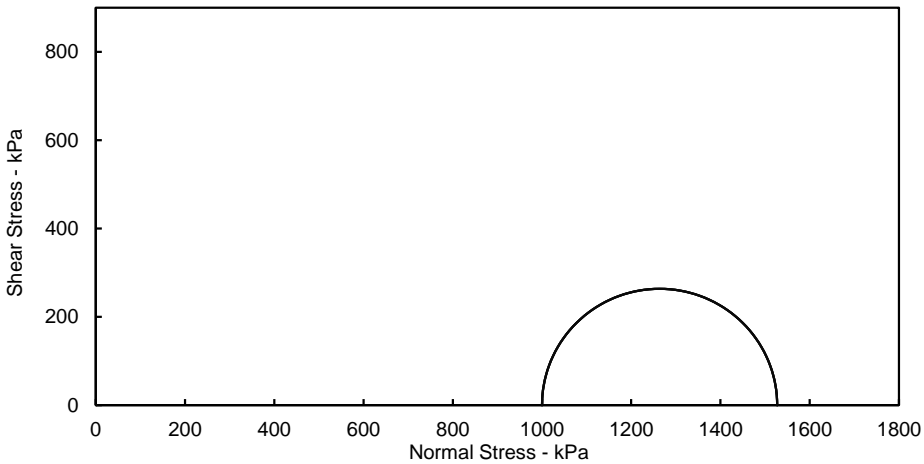
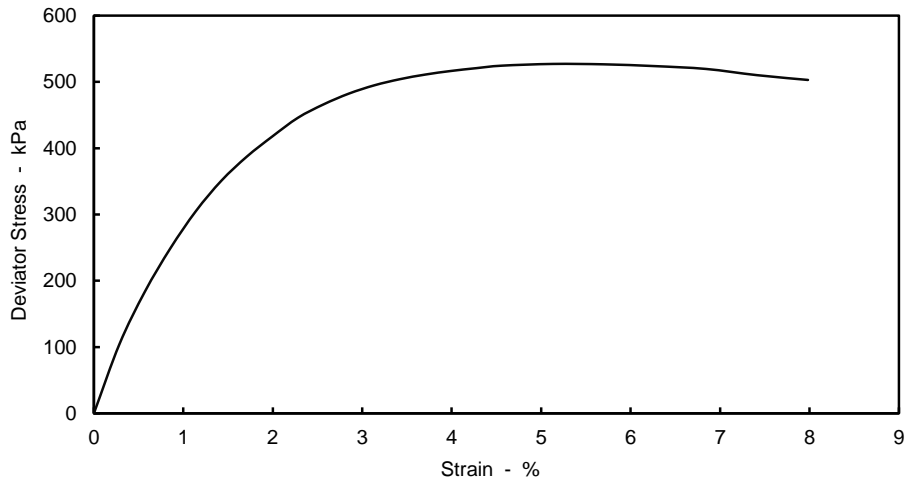
Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11
Sample Ref	117
Depth (m)	48.50-48.95
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	175.4		
Diameter	mm	103.3		
Moisture Content	%	31		
Bulk Density	Mg/m <sup>3</sup>	1.96		
Dry Density	Mg/m <sup>3</sup>	1.50		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.38		
Rate of Axial Displacement	%/min	0.87		
Cell Pressure	kPa	1000		
Strain at Failure	%	5.1		
Maximum Deviator Stress	kPa	527		
Shear Strength	kPa	264		
Mode of Failure			Brittle	
Non Engineering Description	Very stiff fissured dark brown slightly sandy CLAY.			

**Comments**  
Undisturbed specimen taken 260mm below top of tube

<b>Shear Strength Parameters</b>	
C	kPa
Phi	°



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**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
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Sheet 1 of 2



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1


Hole BH11

Sample Ref 117

Depth (m) 48.50-48.95

Sample Type UT



Originator	Checked & Approved
DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole BH11A  
 Sample Ref 79  
 Depth (m) 28.00-28.45  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	170.3		
Diameter	mm	103.5		
Moisture Content	%	21		
Bulk Density	Mg/m <sup>3</sup>	2.06		
Dry Density	Mg/m <sup>3</sup>	1.70		

**Comments**

Undisturbed specimen taken 80mm below top of tube

**Test Details**

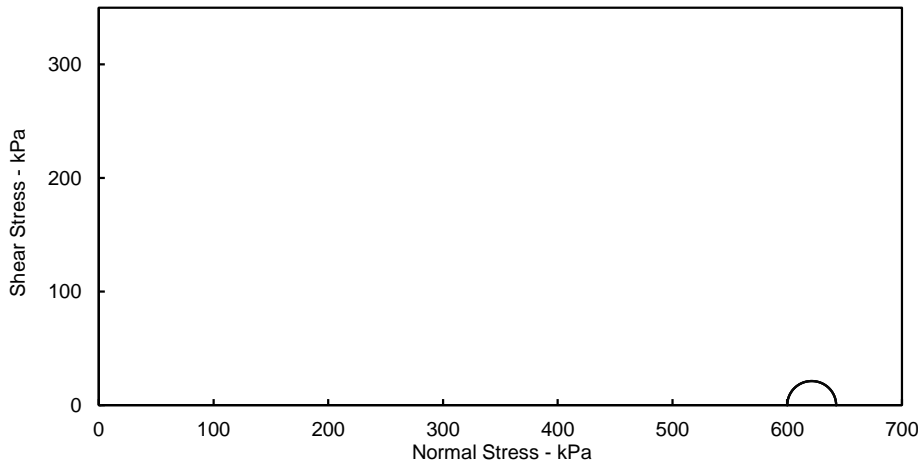
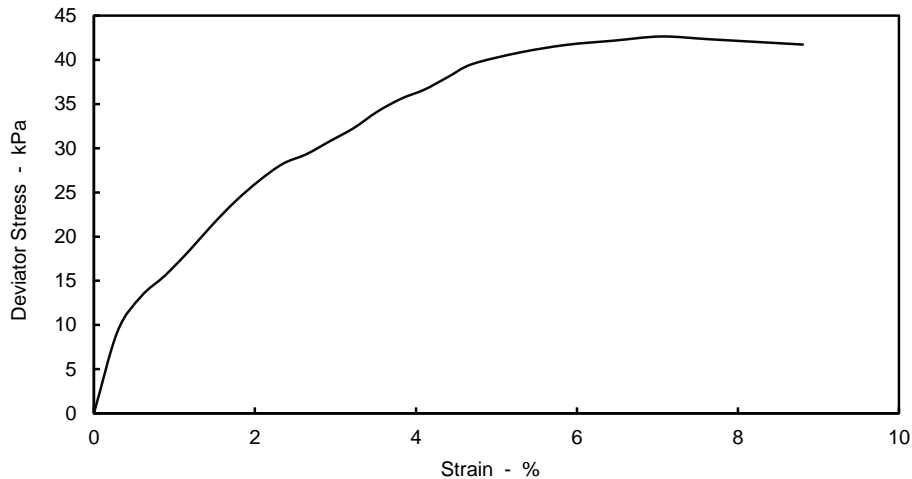
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.50		
Rate of Axial Displacement	%/min	0.89		
Cell Pressure	kPa	600		
Strain at Failure	%	7.0		
Maximum Deviator Stress	kPa	43		
Shear Strength	kPa	21		
Mode of Failure			Plastic	

**Shear Strength Parameters**

C	kPa
Phi	°

Non Engineering Description

Soft intact light grey slightly clayey SAND.



Originator

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DM

30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8







Site GREAT YARMOUTH THIRD RIVER CROSSING


Contract No PZ1522D1

Client Norfolk County Council

Hole BH11A  
Sample Ref 79  
Depth (m) 28.00-28.45  
Sample Type UT

Engineer Norfolk Partnership Laboratory



Originator	Checked & Approved
DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11A
Sample Ref	79
Depth (m)	28.00-28.45
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	194.8		
Diameter	mm	103.9		
Moisture Content	%	24		
Bulk Density	Mg/m <sup>3</sup>	2.08		
Dry Density	Mg/m <sup>3</sup>	1.67		

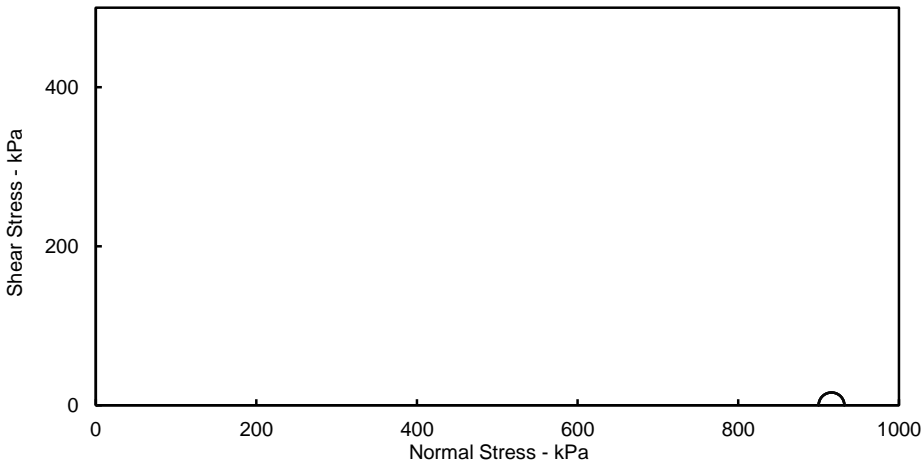
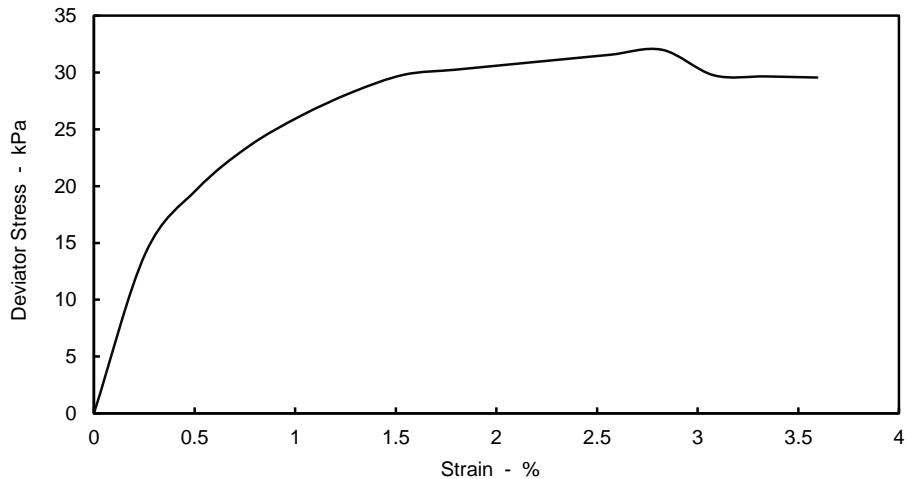
**Comments**  
Undisturbed specimen taken 250mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.22		
Rate of Axial Displacement	%/min	0.78		
Cell Pressure	kPa	900		
Strain at Failure	%	2.8		
Maximum Deviator Stress	kPa	32		
Shear Strength	kPa	16		
Mode of Failure			Plastic	

Shear Strength Parameters	
C	kPa
Phi	°

Non Engineering Description	Light grey slightly clayey SAND.
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Originator	Checked & Approved
MAB	30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
BS 1377 : Part 7 : 1990 Clause 8



Sheet 1 of 2



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole BH11A

Sample Ref 79

Depth (m) 28.00-28.45

Sample Type UT



Originator

Checked & Approved

MAB

30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11A
Sample Ref	87
Depth (m)	31.50-32.10
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	173.2		
Diameter	mm	103.5		
Moisture Content	%	26		
Bulk Density	Mg/m <sup>3</sup>	1.99		
Dry Density	Mg/m <sup>3</sup>	1.57		

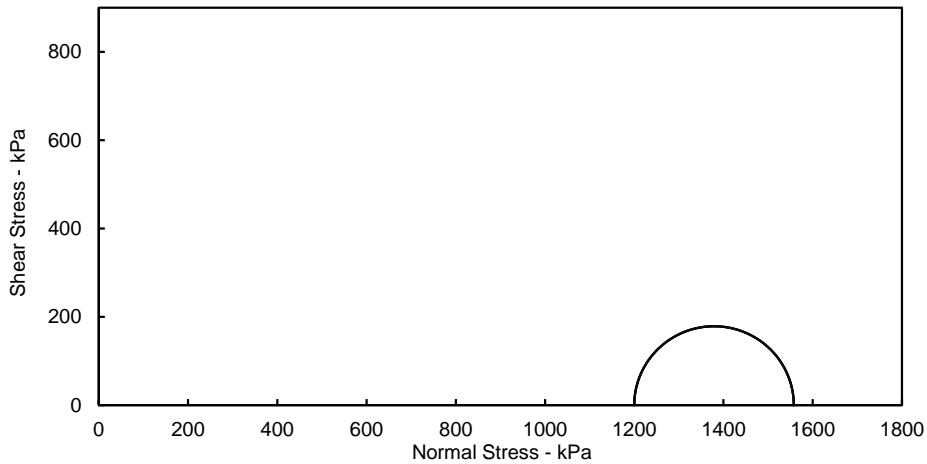
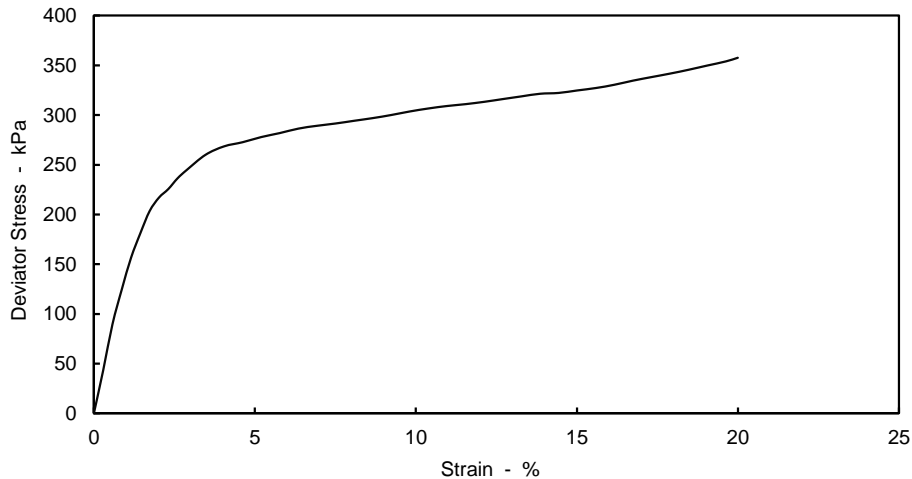
**Comments**  
Undisturbed specimen taken 40mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.10		
Rate of Axial Displacement	%/min	0.88		
Cell Pressure	kPa	1200		
Strain at Failure	%	20.0		
Maximum Deviator Stress	kPa	358		
Shear Strength	kPa	179		
Mode of Failure			Plastic	

Shear Strength Parameters	
C	kPa
Phi	°

Non Engineering Description: Very stiff intact CLAY with layers/pockets of sand.



Originator	Checked & Approved
DM	2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8





Site GREAT YARMOUTH THIRD RIVER CROSSING


Contract No PZ1522D1

Client Norfolk County Council

Hole BH11A  
Sample Ref 87  
Depth (m) 31.50-32.10  
Sample Type UT

Engineer Norfolk Partnership Laboratory



Originator	Checked & Approved
DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole BH11A  
 Sample Ref 87  
 Depth (m) 31.50-32.10  
 Sample Type UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	173.4		
Diameter	mm	103.4		
Moisture Content	%	24		
Bulk Density	Mg/m <sup>3</sup>	2.05		
Dry Density	Mg/m <sup>3</sup>	1.65		

**Comments**

Undisturbed specimen taken 240mm below top of tube

**Test Details**

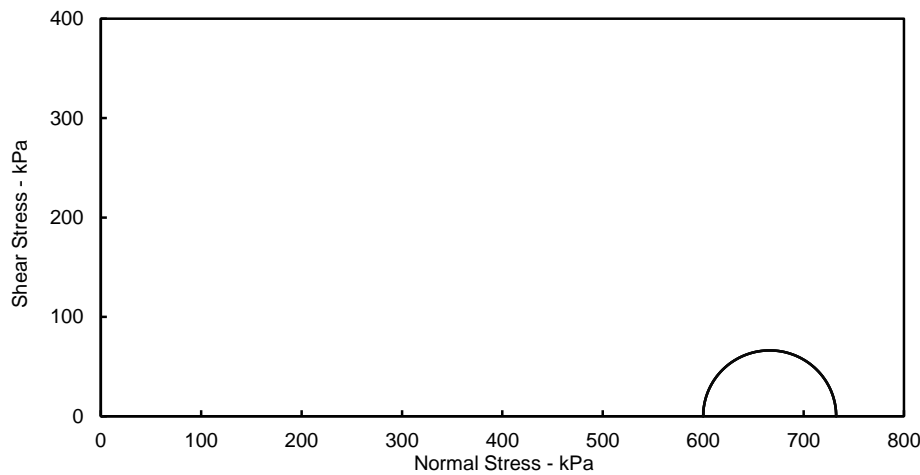
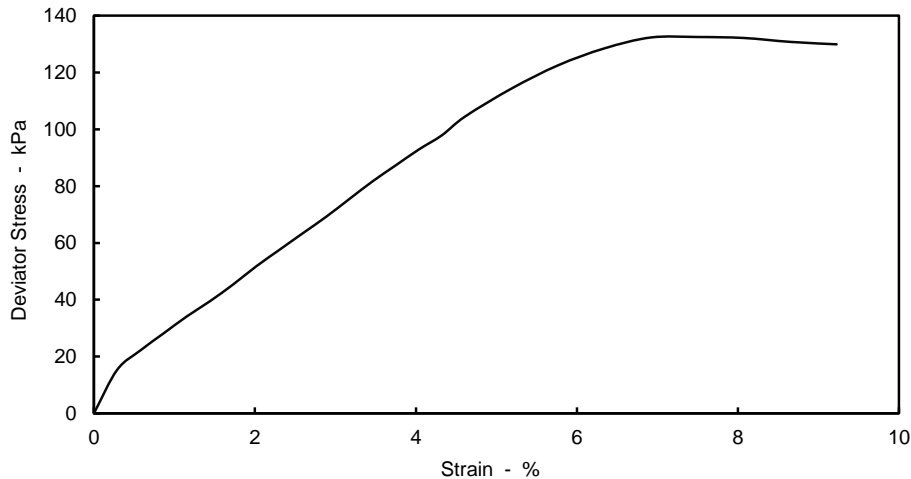
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.52		
Rate of Axial Displacement	%/min	0.88		
Cell Pressure	kPa	600		
Strain at Failure	%	7.5		
Maximum Deviator Stress	kPa	132		
Shear Strength	kPa	66		
Mode of Failure			Plastic	

**Shear Strength Parameters**

C	kPa
Phi	°

Non Engineering Description

Grey very clayey SAND.



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**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1


Hole BH11A

Sample Ref 87

Depth (m) 31.50-32.10

Sample Type UT



Originator	Checked & Approved
DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



Sheet 2 of 2





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11A
Sample Ref	114
Depth (m)	47.00-47.50
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	175.3		
Diameter	mm	102.6		
Moisture Content	%	31		
Bulk Density	Mg/m <sup>3</sup>	1.99		
Dry Density	Mg/m <sup>3</sup>	1.52		

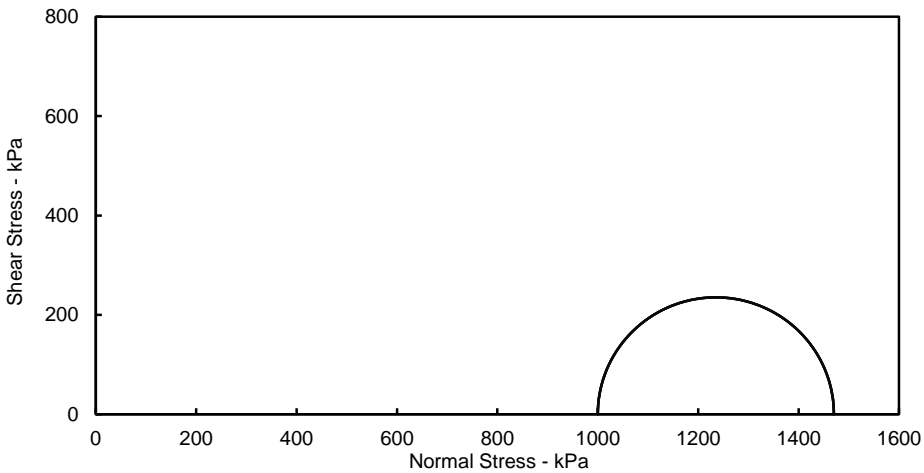
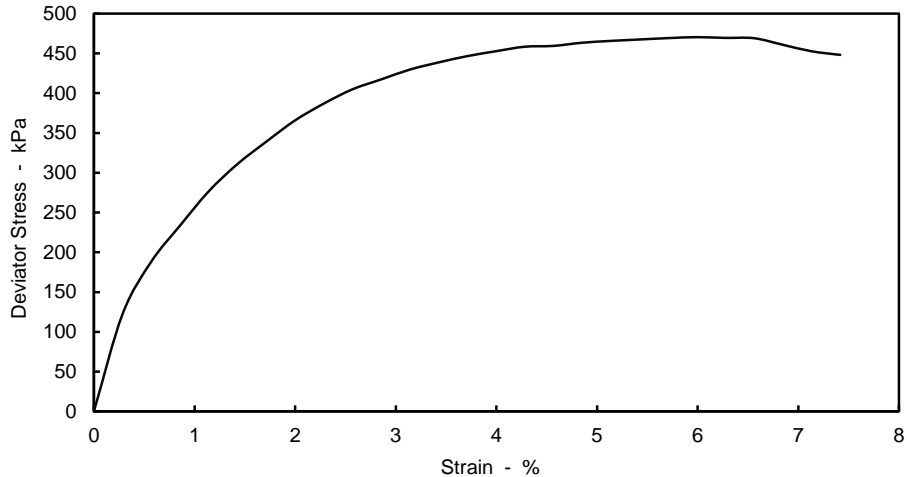
**Comments**  
Undisturbed specimen taken 30mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.44		
Rate of Axial Displacement	%/min	0.87		
Cell Pressure	kPa	1000		
Strain at Failure	%	6.0		
Maximum Deviator Stress	kPa	470		
Shear Strength	kPa	235		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>	
C	kPa
Phi	°

Non Engineering Description	Hard fissured dark brown CLAY.
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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH THIRD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole BH11A

Sample Ref 114

Depth (m) 47.00-47.50

Sample Type UT



Originator

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DM

30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH THIRD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH11A
Sample Ref	114
Depth (m)	47.00-47.50
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	174.2		
Diameter	mm	102.4		
Moisture Content	%	31		
Bulk Density	Mg/m <sup>3</sup>	1.98		
Dry Density	Mg/m <sup>3</sup>	1.51		

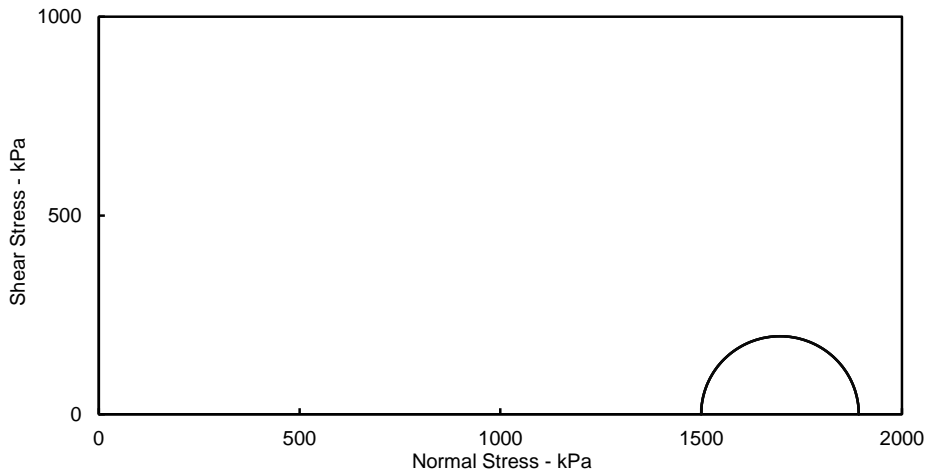
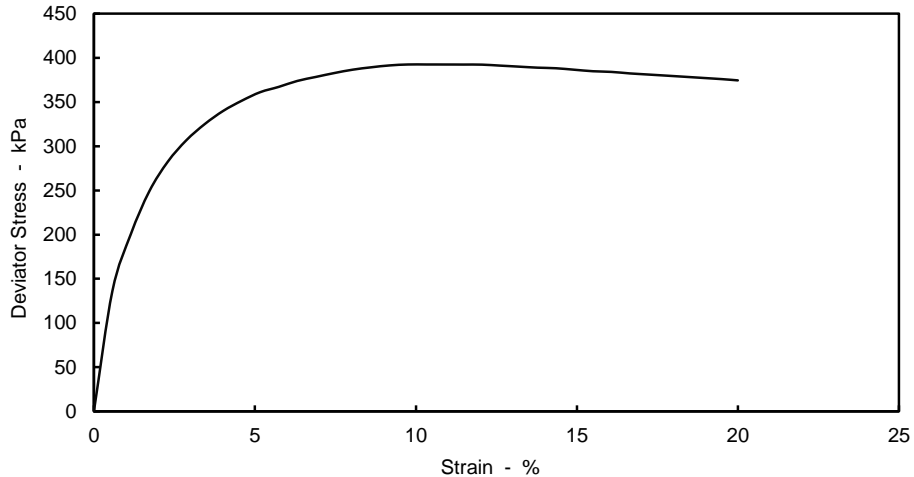
**Comments**  
Undisturbed specimen taken 250mm below top of tube


**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.68		
Rate of Axial Displacement	%/min	0.87		
Cell Pressure	kPa	1500		
Strain at Failure	%	10.3		
Maximum Deviator Stress	kPa	392		
Shear Strength	kPa	196		
Mode of Failure			Brittle	

Shear Strength Parameters	
C	kPa
Phi	°

Non Engineering Description	Very stiff fissured dark brown CLAY.
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DM	 30/04/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

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Site GREAT YARMOUTH THIRD RIVER CROSSING


Contract No PZ1522D1

Client Norfolk County Council

Hole BH11A  
Sample Ref 114  
Depth (m) 47.00-47.50  
Sample Type UT


Engineer Norfolk Partnership Laboratory



Originator	Checked & Approved
DM	 30/04/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.

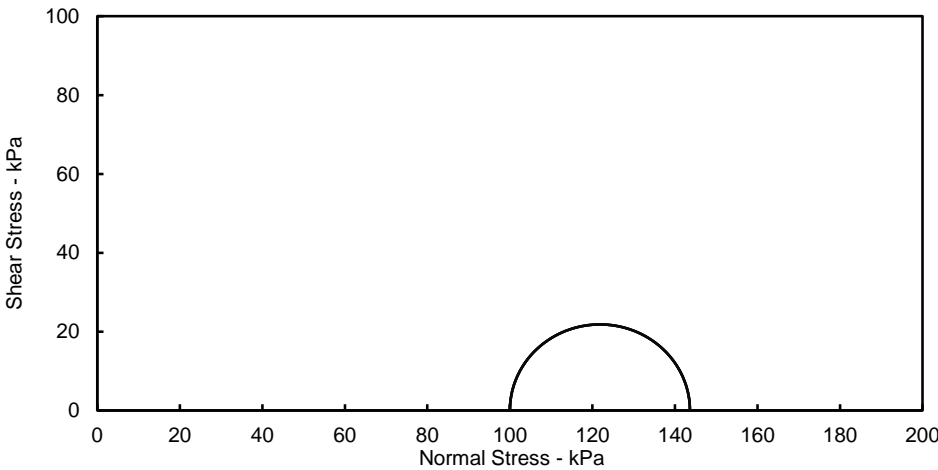
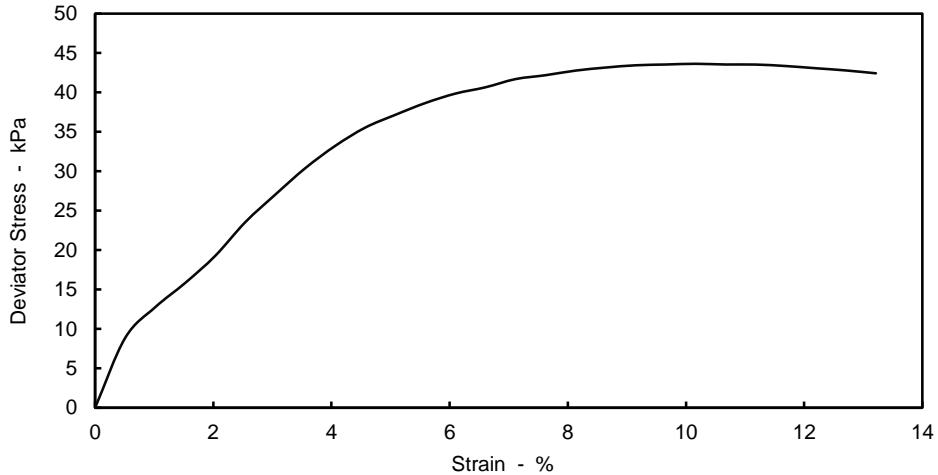



 SITE INVESTIGATION AND LABORATORY SERVICES	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No.	<b>PZ1522D1</b>
	Client	Norfolk County Council	Hole	BH12
	Engineer	Norfolk Partnership Laboratory	Sample Ref	7
			Depth (m)	2.50
			Sample Type	P

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	196.8		
Diameter	mm	101.3		
Moisture Content	%	42		
Bulk Density	Mg/m <sup>3</sup>	1.77		
Dry Density	Mg/m <sup>3</sup>	1.25		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.68		
Rate of Axial Displacement	%/min	2.06		
Cell Pressure	kPa	100		
Strain at Failure	%	10.2		
Maximum Deviator Stress	kPa	44		
Shear Strength	kPa	22		
Mode of Failure			Compound	
Non Engineering Description	Soft intact very dark grey slightly sandy CLAY			

**Comments**  
Undisturbed specimen taken 250mm below bottom of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved	<b>UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION</b> BS 1377 : Part 7 : 1990 Clause 8	
EH	15/08/2018		



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1



Hole BH12

Sample Ref 7

Depth (m) 2.50

Sample Type P



Originator	Checked & Approved	Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.	 <p style="text-align: right;">Sheet 2 of 2</p>
EH	 15/08/2018		





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH12
Sample Ref	7
Depth (m)	2.50
Sample Type	P

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	198.6		
Diameter	mm	99.8		
Moisture Content	%	47		
Bulk Density	Mg/m <sup>3</sup>	1.77		
Dry Density	Mg/m <sup>3</sup>	1.21		

**Comments**

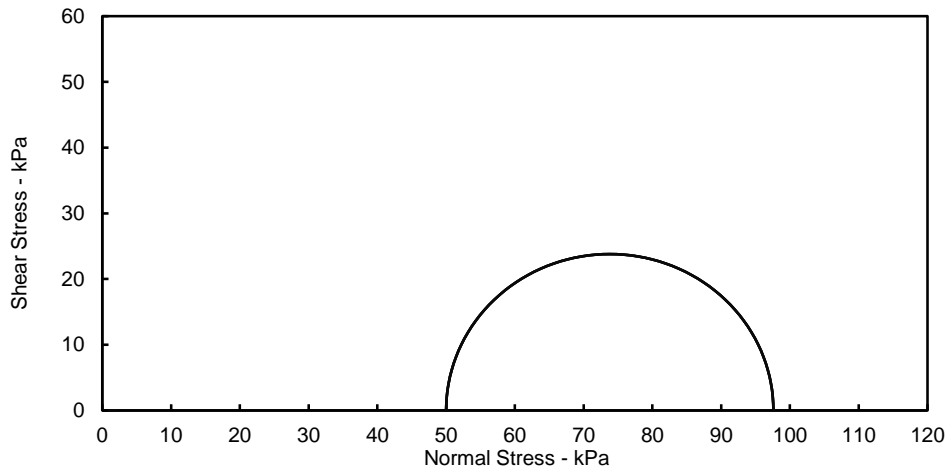
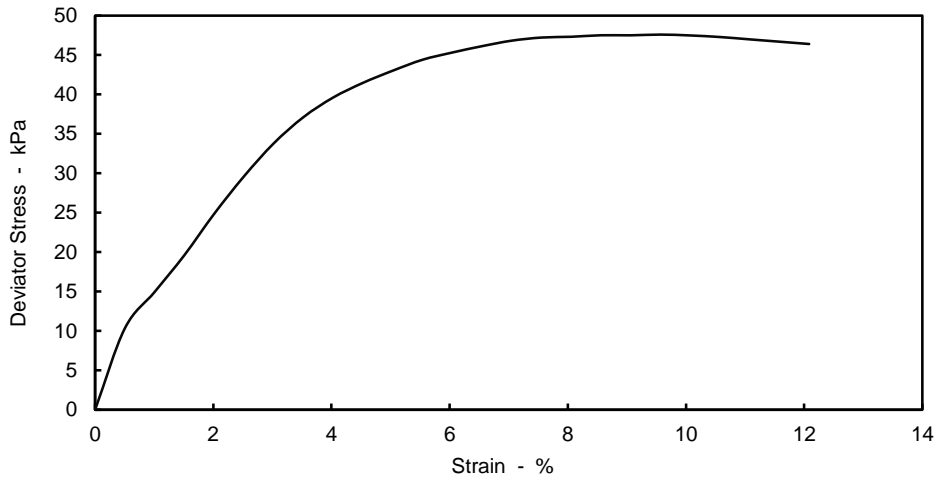
Undisturbed specimen taken 50mm below bottom of tube


**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.66		
Rate of Axial Displacement	%/min	2.04		
Cell Pressure	kPa	50		
Strain at Failure	%	9.6		
Maximum Deviator Stress	kPa	48		
Shear Strength	kPa	24		
Mode of Failure			Plastic	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description	Soft intact very dark grey slightly sandy CLAY.
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Originator	Checked & Approved
EH	 15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole BH12

Sample Ref 7

Depth (m) 2.50

Sample Type P



Originator

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EH

15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH12
Sample Ref	74
Depth (m)	30.50
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	199.6		
Diameter	mm	104.4		
Moisture Content	%	28		
Bulk Density	Mg/m <sup>3</sup>	2.04		
Dry Density	Mg/m <sup>3</sup>	1.59		

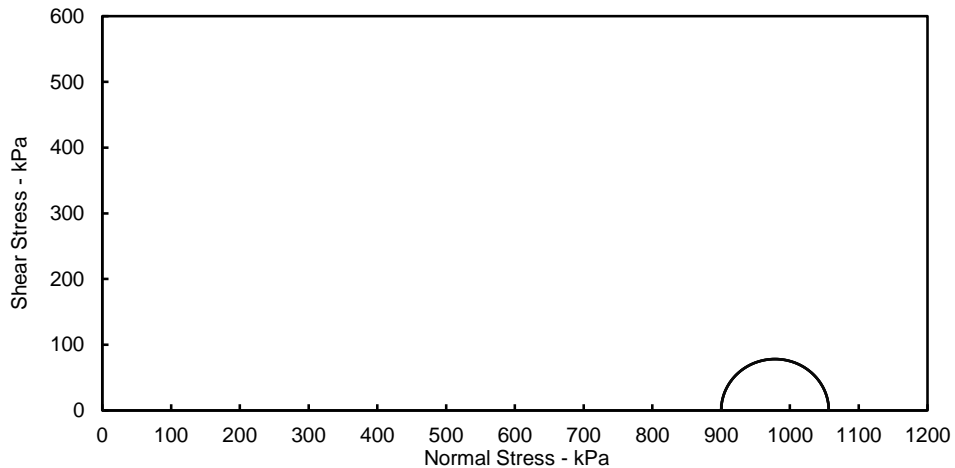
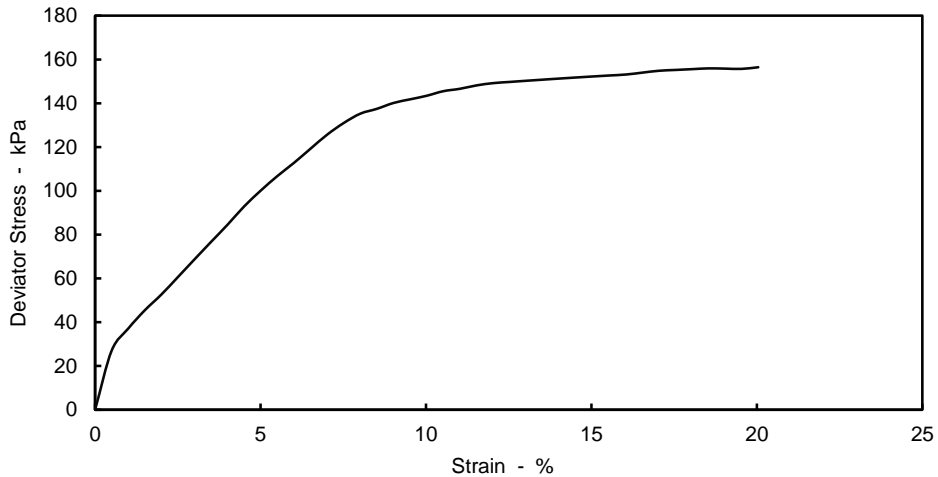
**Comments**  
 Undisturbed specimen taken  
 230mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.09		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	900		
Strain at Failure	%	20.0		
Maximum Deviator Stress	kPa	156		
Shear Strength	kPa	78		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Stiff intact light grey slightly sandy SILT/CLAY.



Originator	Checked & Approved
EH	8/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Hole BH12

Sample Ref 74

Depth (m) 30.50

Sample Type U

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory



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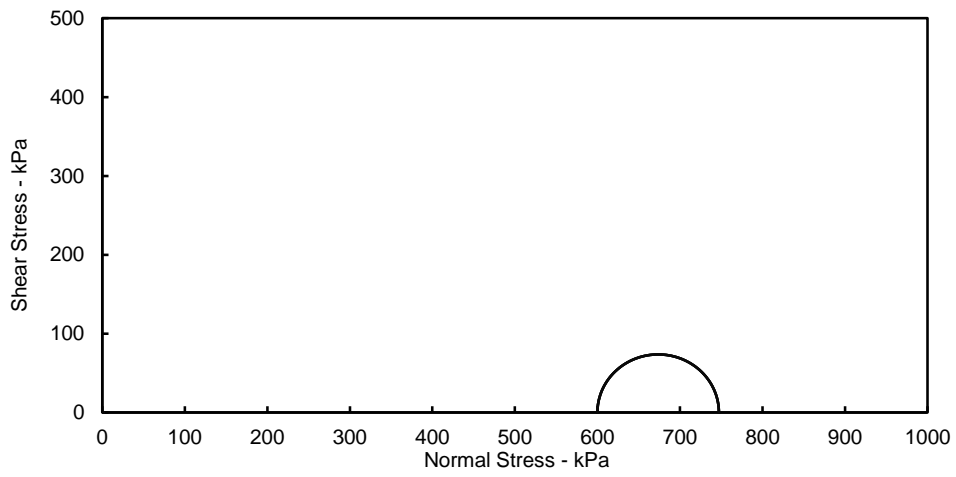
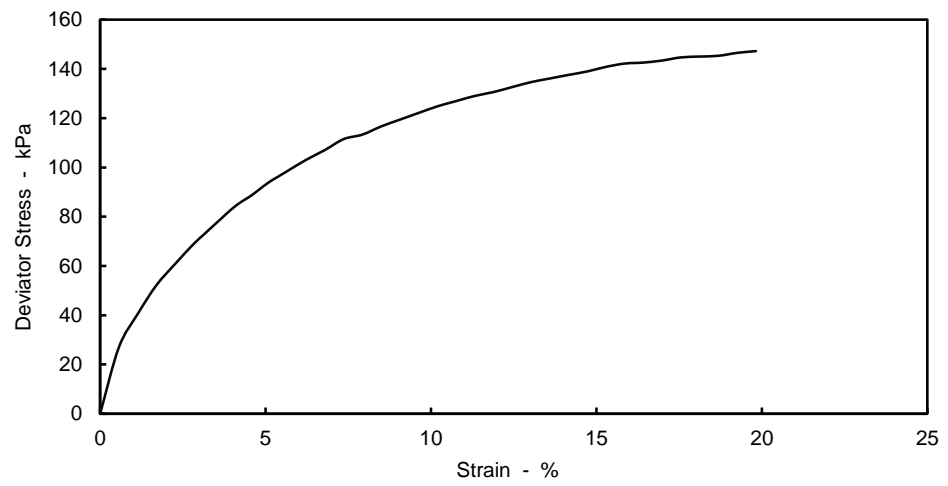
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH12
Sample Ref	74
Depth (m)	30.50
Sample Type	U

Sample Details		Undisturbed		
Sample Condition		Undisturbed		
Height	mm	176.6		
Diameter	mm	103.5		
Moisture Content	%	24		
Bulk Density	Mg/m <sup>3</sup>	2.05		
Dry Density	Mg/m <sup>3</sup>	1.65		
Test Details				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.10		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	600		
Strain at Failure	%	19.8		
Maximum Deviator Stress	kPa	147		
Shear Strength	kPa	74		
Mode of Failure			Plastic	
Non Engineering Description	Firm intact light grey slightly sandy SILT.			

**Comments**  
 Undisturbed specimen taken  
 40mm below top of tube

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



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EH	 15/08/2018	



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole BH12



Sample Ref 74

Depth (m) 30.50

Engineer Norfolk Partnership Laboratory

Sample Type U



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EH	 15/08/2018		





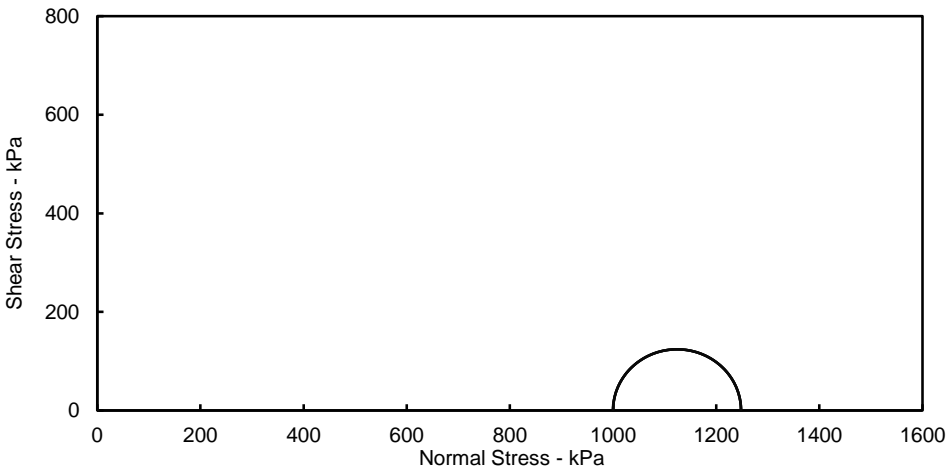
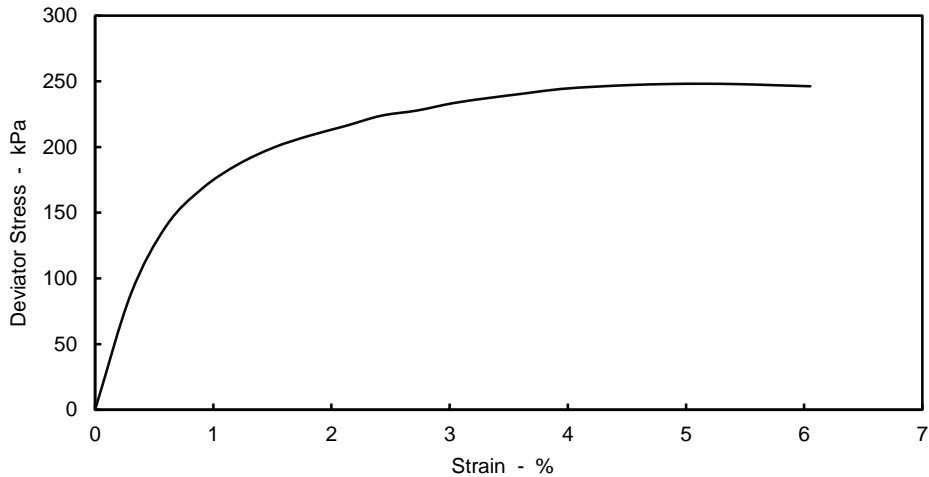
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	BH12
Sample Ref	99
Depth (m)	46.50
Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	165.2		
Diameter	mm	104.1		
Moisture Content	%	32		
Bulk Density	Mg/m <sup>3</sup>	1.94		
Dry Density	Mg/m <sup>3</sup>	1.47		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.38		
Rate of Axial Displacement	%/min	0.92		
Cell Pressure	kPa	1000		
Strain at Failure	%	5.1		
Maximum Deviator Stress	kPa	248		
Shear Strength	kPa	124		
Mode of Failure			Plastic	
Non Engineering Description		Stiff fissured olive brown slightly sandy CLAY.		

**Comments**  
 Undisturbed specimen taken 160mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



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Sheet 1 of 2

# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**


Hole BH12

Sample Ref 99

Depth (m) 46.50

Sample Type U



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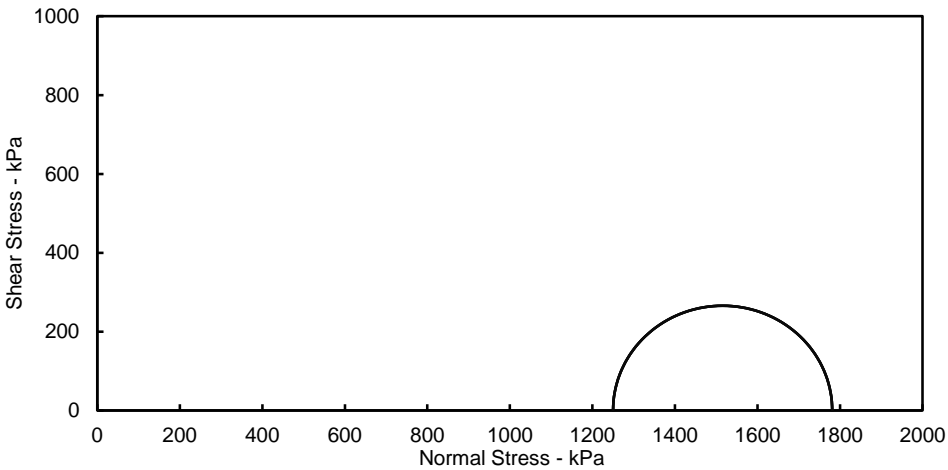
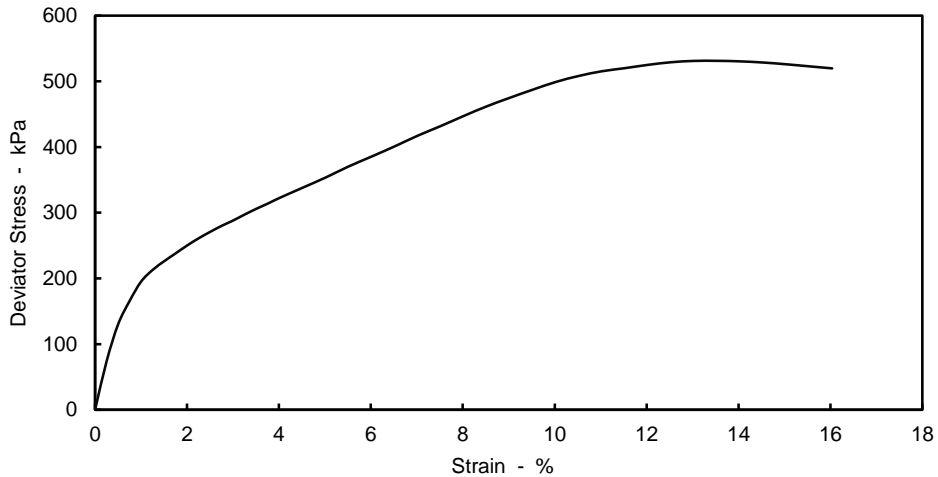


<b>TERRA TEK</b> <small>SITE INVESTIGATION AND LABORATORY SERVICES</small>	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No.	<b>PZ1522D1</b>
	Client	Norfolk County Council	Hole	BH12
	Engineer	Norfolk Partnership Laboratory	Sample Ref	103
			Depth (m)	48.50
			Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	199.5		
Diameter	mm	104.6		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	1.97		
Dry Density	Mg/m <sup>3</sup>	1.51		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.82		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	1250		
Strain at Failure	%	13.5		
Maximum Deviator Stress	kPa	531		
Shear Strength	kPa	266		
Mode of Failure			Plastic	
Non Engineering Description	Very stiff fissured olive brown slightly sandy CLAY.			

**Comments**  
 Undisturbed specimen taken 240mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole BH12

Sample Ref 103

Depth (m) 48.50

Engineer Norfolk Partnership Laboratory

Sample Type U



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SITE INVESTIGATION AND LABORATORY SERVICES

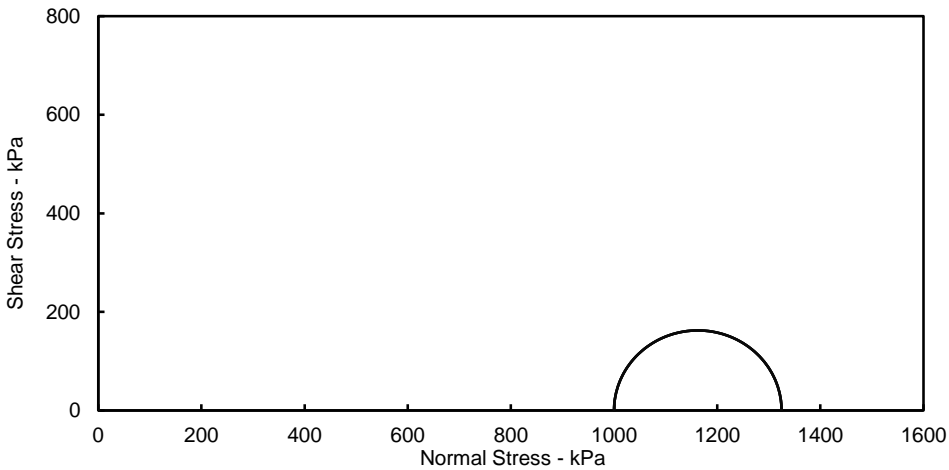
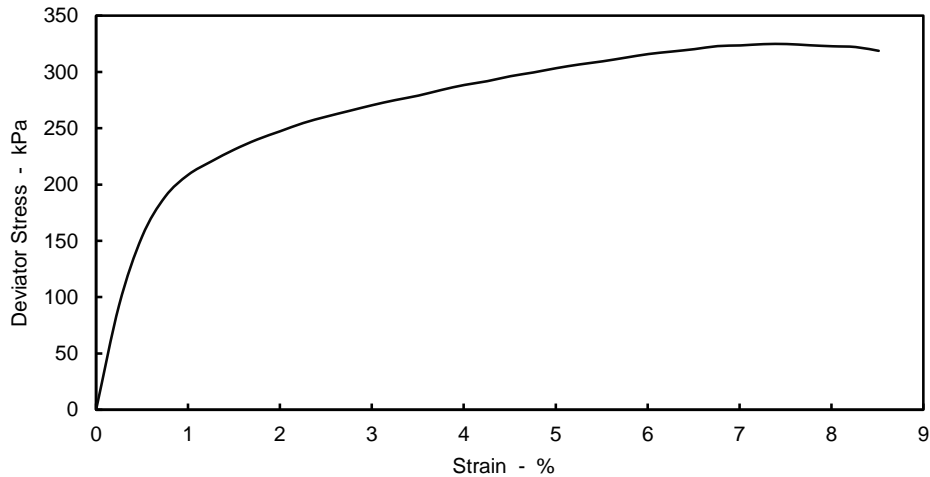
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Conucl
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	BH12
Sample Ref	103
Depth (m)	48.50
Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	199.7		
Diameter	mm	104.2		
Moisture Content	%	34		
Bulk Density	Mg/m <sup>3</sup>	1.91		
Dry Density	Mg/m <sup>3</sup>	1.43		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.52		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	1000		
Strain at Failure	%	7.5		
Maximum Deviator Stress	kPa	325		
Shear Strength	kPa	162		
Mode of Failure			Compound	
Non Engineering Description	Very stiff fissured olive brown slightly sandy CLAY.			

**Comments**  
Undisturbed specimen taken 30mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1


Hole BH12

Sample Ref 103

Depth (m) 48.50

Sample Type U



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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH12B
Sample Ref	73
Depth (m)	29.50
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	200.1		
Diameter	mm	103.3		
Moisture Content	%	24		
Bulk Density	Mg/m <sup>3</sup>	2.08		
Dry Density	Mg/m <sup>3</sup>	1.68		

**Comments**

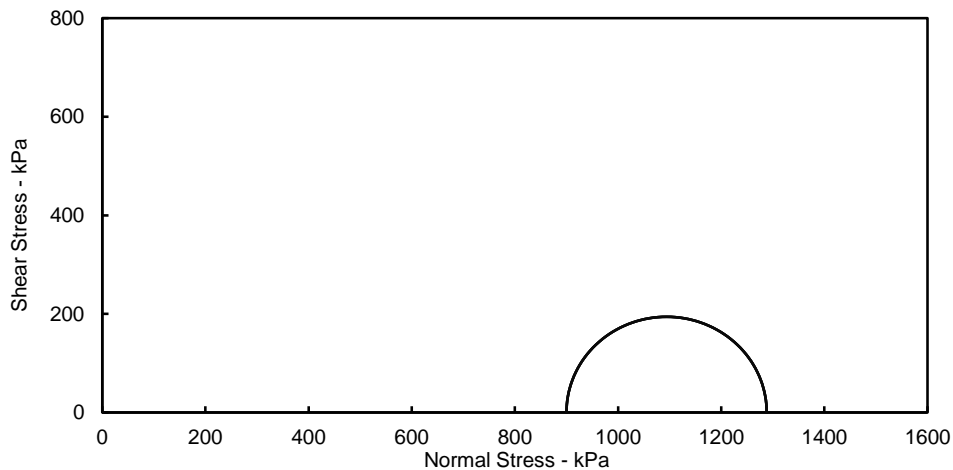
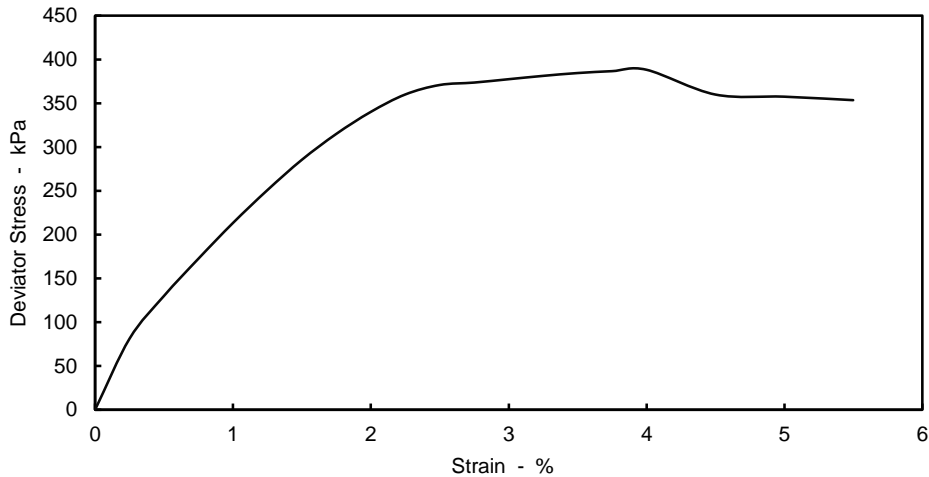
Undisturbed specimen taken 220mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.31		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	900		
Strain at Failure	%	4.0		
Maximum Deviator Stress	kPa	388		
Shear Strength	kPa	194		
Mode of Failure			Brittle	

Non Engineering Description	Very stiff fissured grey slightly sandy CLAY.
-----------------------------	---

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**


Hole BH12B

Sample Ref 73

Depth (m) 29.50

Sample Type UT



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SITE INVESTIGATION AND LABORATORY SERVICES

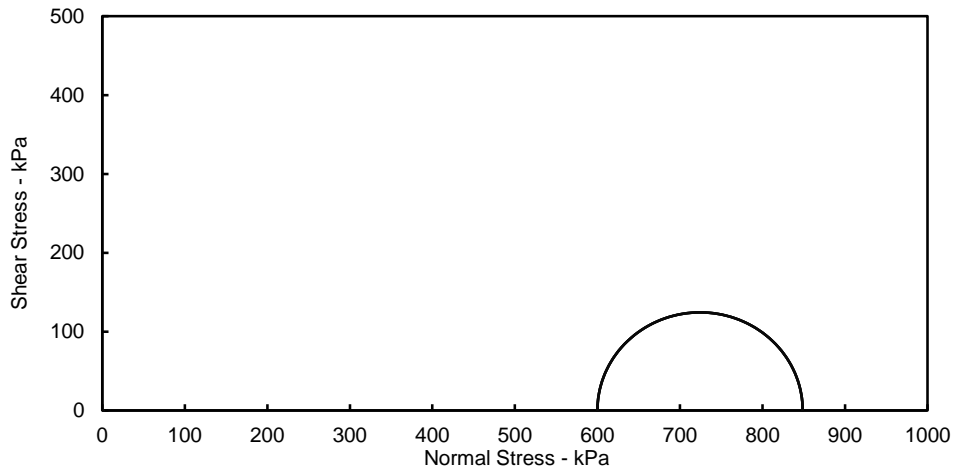
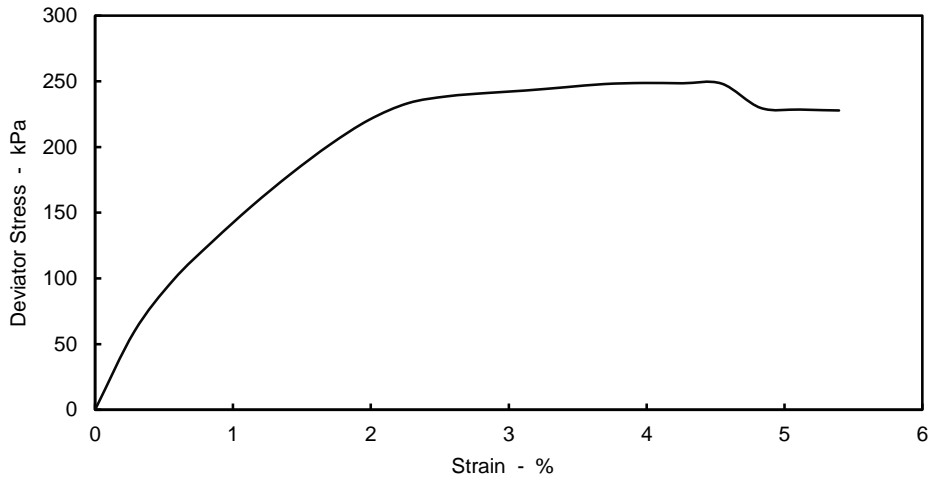
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	BH12B
Sample Ref	73
Depth (m)	29.50
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	176.1		
Diameter	mm	103.5		
Moisture Content	%	26		
Bulk Density	Mg/m <sup>3</sup>	2.00		
Dry Density	Mg/m <sup>3</sup>	1.58		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.31		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	600		
Strain at Failure	%	4.0		
Maximum Deviator Stress	kPa	249		
Shear Strength	kPa	124		
Mode of Failure			Brittle	
Non Engineering Description		Stiff fissured grey slightly sandy CLAY.		

**Comments**  
 Undisturbed specimen taken 30mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole BH12B

Sample Ref 73

Depth (m) 29.50

Sample Type UT



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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH12B
Sample Ref	76
Depth (m)	31.50
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	178.4		
Diameter	mm	103.2		
Moisture Content	%	26		
Bulk Density	Mg/m <sup>3</sup>	1.96		
Dry Density	Mg/m <sup>3</sup>	1.55		

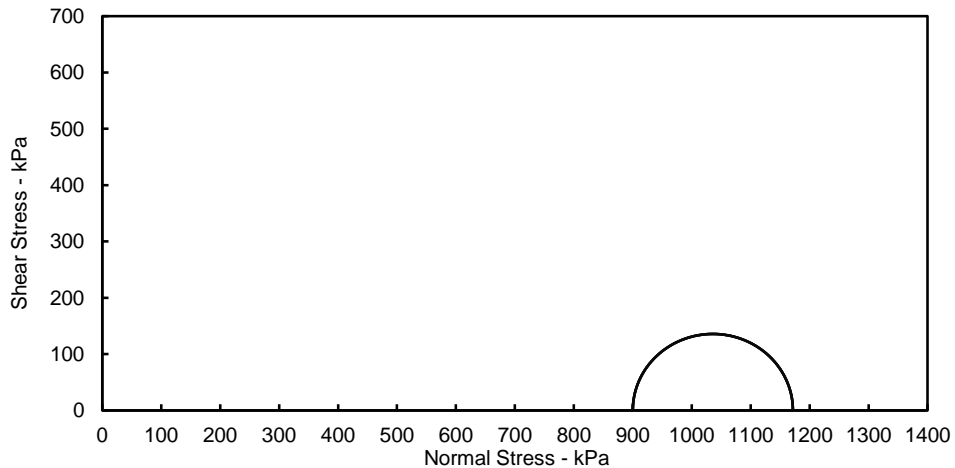
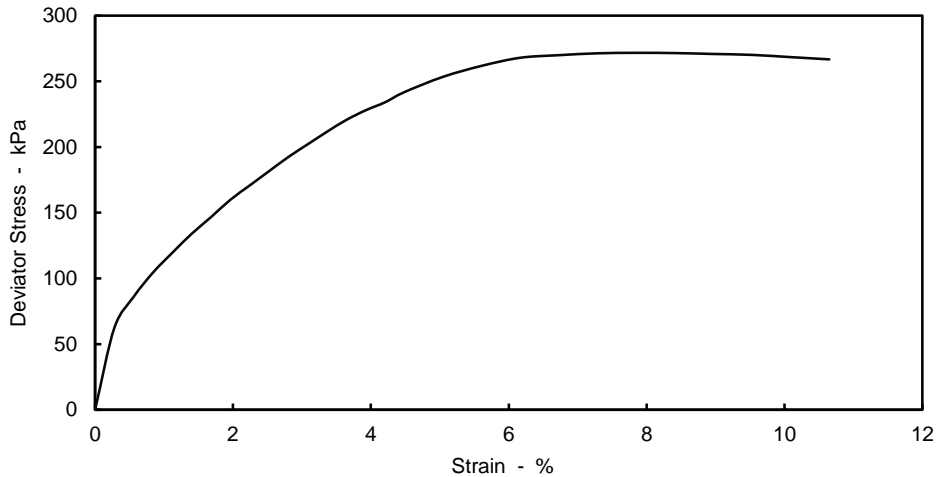
**Comments**  
 Undisturbed specimen taken  
 40mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.54		
Rate of Axial Displacement	%/min	2.28		
Cell Pressure	kPa	900		
Strain at Failure	%	7.8		
Maximum Deviator Stress	kPa	272		
Shear Strength	kPa	136		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Stiff fissured grey slightly sandy CLAY.



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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**


Hole BH12B

Sample Ref 76

Depth (m) 31.50

Sample Type UT



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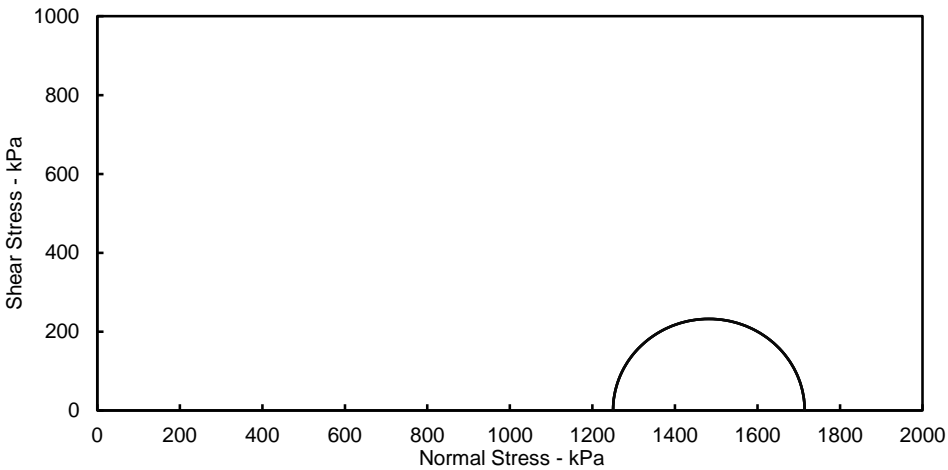
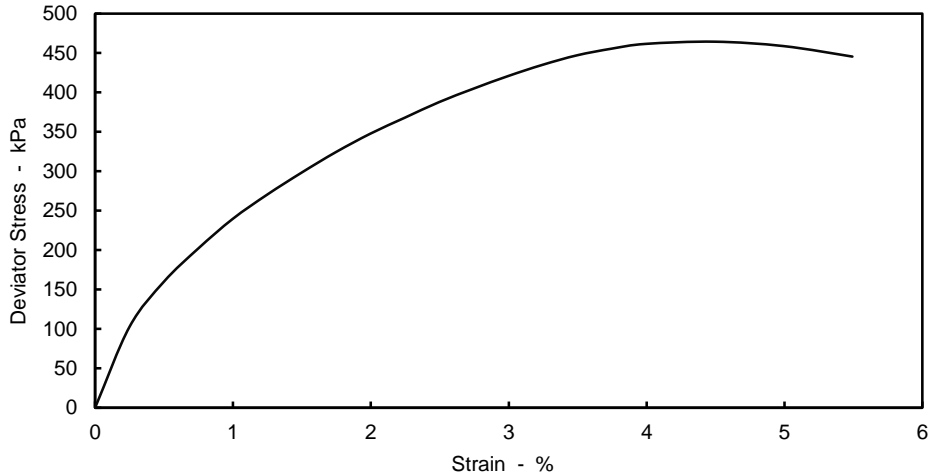
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH12B
Sample Ref	99
Depth (m)	46.50
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	200.3		
Diameter	mm	103.6		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	2.03		
Dry Density	Mg/m <sup>3</sup>	1.56		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.34		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	1250		
Strain at Failure	%	4.5		
Maximum Deviator Stress	kPa	464		
Shear Strength	kPa	232		
Mode of Failure			Compound	
Non Engineering Description	Very stiff fissured brown slightly sandy CLAY.			

**Comments**  
 Undisturbed specimen taken 210mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole BH12B

Sample Ref 99

Depth (m) 46.50

Sample Type UT



Originator

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SITE INVESTIGATION AND LABORATORY SERVICES

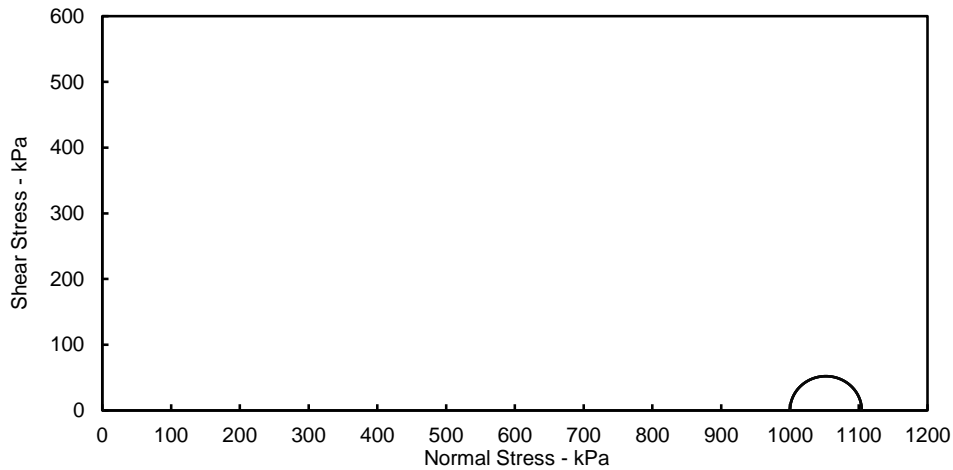
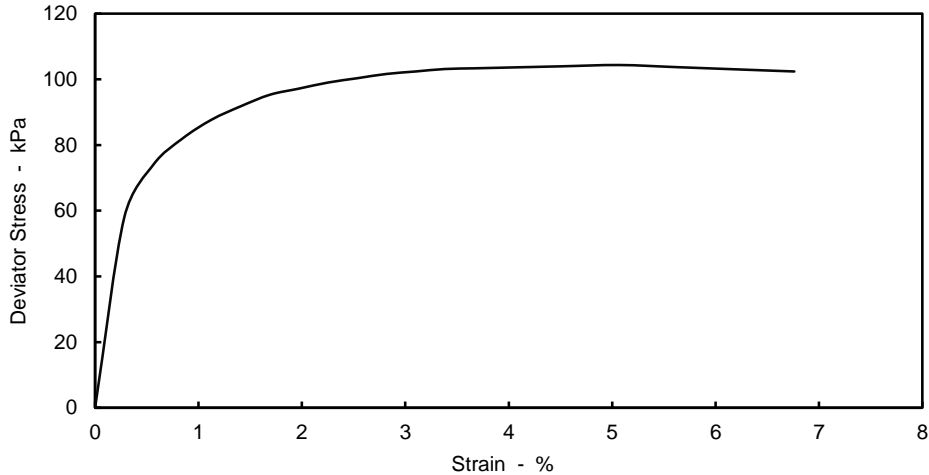
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH12B
Sample Ref	99
Depth (m)	46.50
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	177.5		
Diameter	mm	103.5		
Moisture Content	%	35		
Bulk Density	Mg/m <sup>3</sup>	1.87		
Dry Density	Mg/m <sup>3</sup>	1.39		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.38		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	1000		
Strain at Failure	%	5.1		
Maximum Deviator Stress	kPa	104		
Shear Strength	kPa	52		
Mode of Failure			Plastic	
Non Engineering Description	Firm fissured brown slightly sandy CLAY.			

**Comments**  
 Undisturbed specimen taken  
 30mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



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EH	8/2018

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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Hole BH12B

Sample Ref 99



Depth (m) 46.50

Sample Type UT

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory



Originator	Checked & Approved	Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.	 <p style="text-align: right;">Sheet 2 of 2</p>
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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH12B
Sample Ref	103
Depth (m)	48.50
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	175.5		
Diameter	mm	103.6		
Moisture Content	%	32		
Bulk Density	Mg/m <sup>3</sup>	1.95		
Dry Density	Mg/m <sup>3</sup>	1.47		

**Comments**

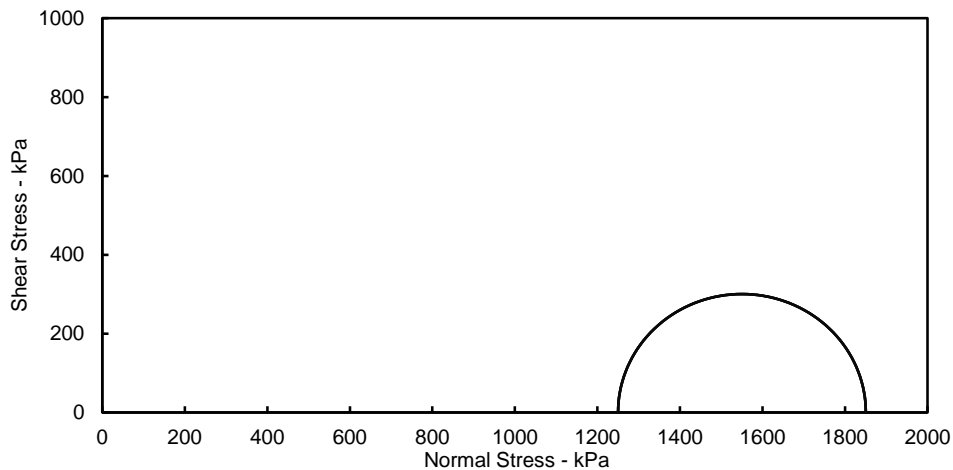
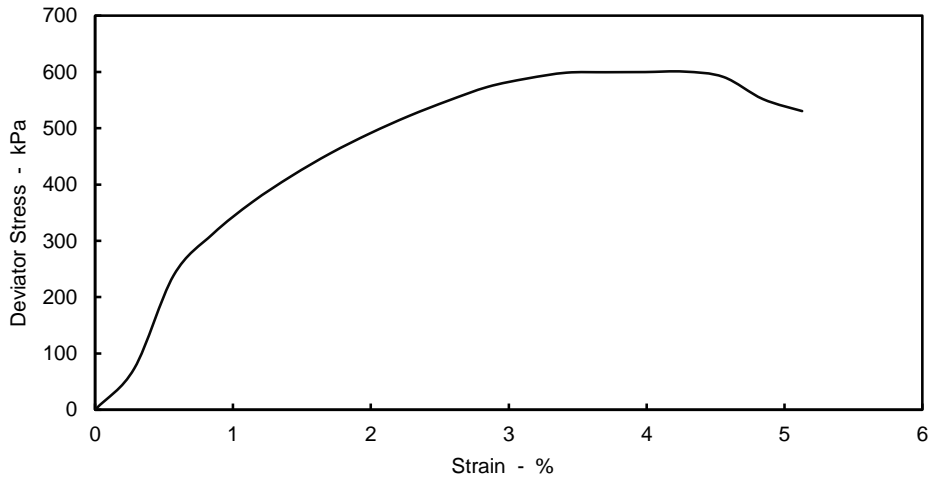
Undisturbed specimen taken 30mm below top of tube


**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.33		
Rate of Axial Displacement	%/min	0.87		
Cell Pressure	kPa	1250		
Strain at Failure	%	4.3		
Maximum Deviator Stress	kPa	601		
Shear Strength	kPa	300		
Mode of Failure			Brittle	

Non Engineering Description	Hard fissured brown slightly sandy CLAY.
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Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
EH	 15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole BH12B

Sample Ref 103

Depth (m) 48.50

Sample Type UT



Originator

Checked & Approved

EH

15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.







SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH12B
Sample Ref	103
Depth (m)	48.50
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	198.3		
Diameter	mm	103.4		
Moisture Content	%	31		
Bulk Density	Mg/m <sup>3</sup>	1.97		
Dry Density	Mg/m <sup>3</sup>	1.51		

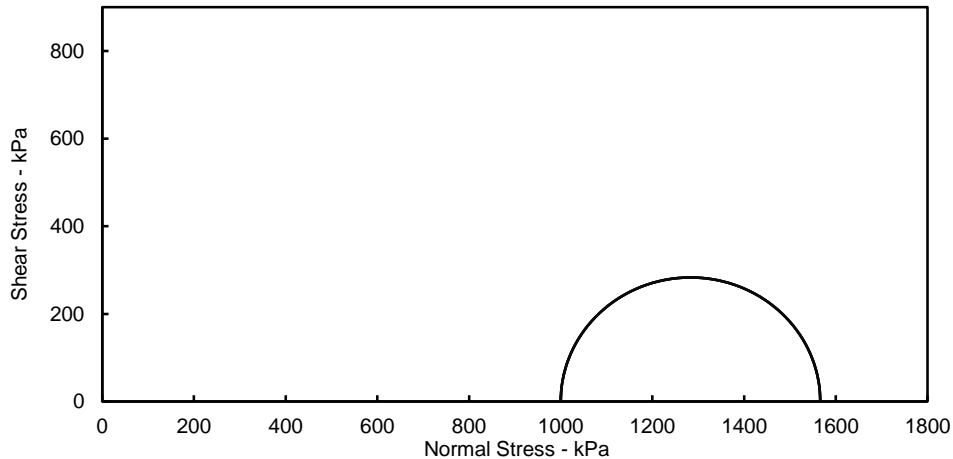
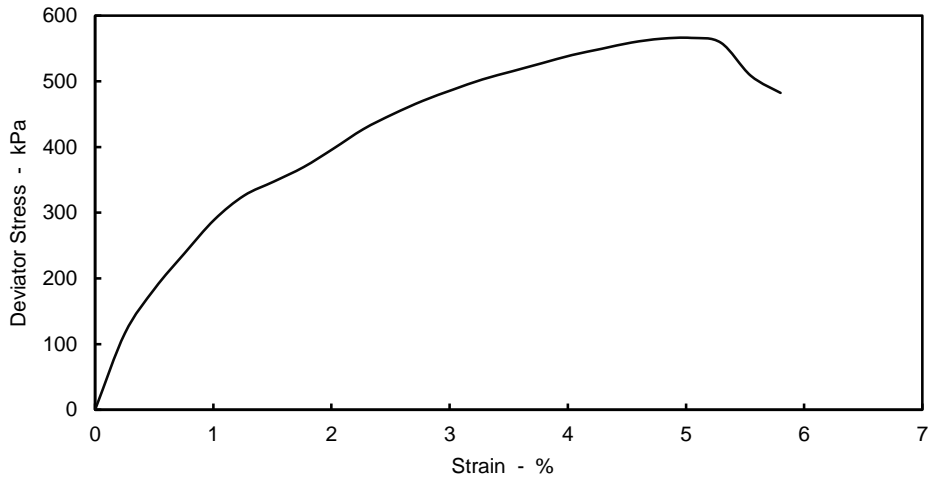
**Comments**  
 Undisturbed specimen taken 220mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.38		
Rate of Axial Displacement	%/min	0.77		
Cell Pressure	kPa	1000		
Strain at Failure	%	5.0		
Maximum Deviator Stress	kPa	566		
Shear Strength	kPa	283		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Very stiff fissured brown slightly sandy CLAY.



Originator	Checked & Approved
EH	15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole BH12B

Sample Ref 103

Depth (m) 48.50

Sample Type UT



Originator

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15/08/2018

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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH13
Sample Ref	78
Depth (m)	27.80
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	179.5		
Diameter	mm	100.3		
Moisture Content	%	22		
Bulk Density	Mg/m <sup>3</sup>	1.94		
Dry Density	Mg/m <sup>3</sup>	1.60		

**Comments**

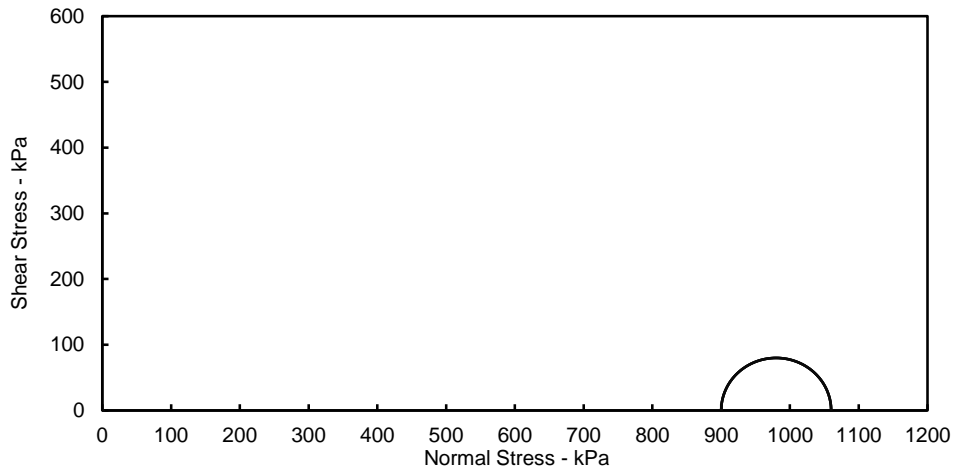
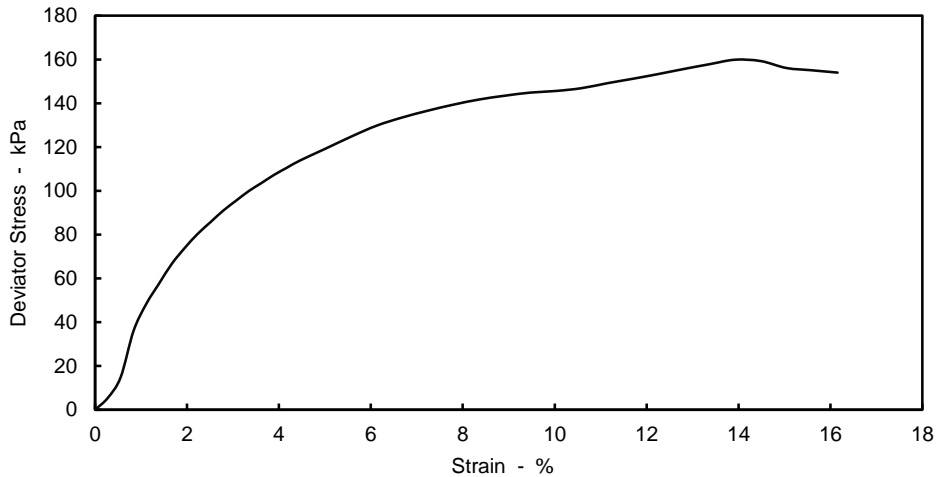
Undisturbed specimen taken 20mm below top of tube


**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.87		
Rate of Axial Displacement	%/min	2.26		
Cell Pressure	kPa	900		
Strain at Failure	%	13.9		
Maximum Deviator Stress	kPa	160		
Shear Strength	kPa	80		
Mode of Failure			Plastic	

Non Engineering Description	Stiff grey intact sandy CLAY.
-----------------------------	-------------------------------

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
EH	 15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole BH13



Sample Ref 78

Depth (m) 27.80

Engineer Norfolk Partnership Laboratory

Sample Type UT



Originator	Checked & Approved	Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.	 <p style="text-align: right;">Sheet 2 of 2</p>
EH	 15/08/2018		



SITE INVESTIGATION AND LABORATORY SERVICES

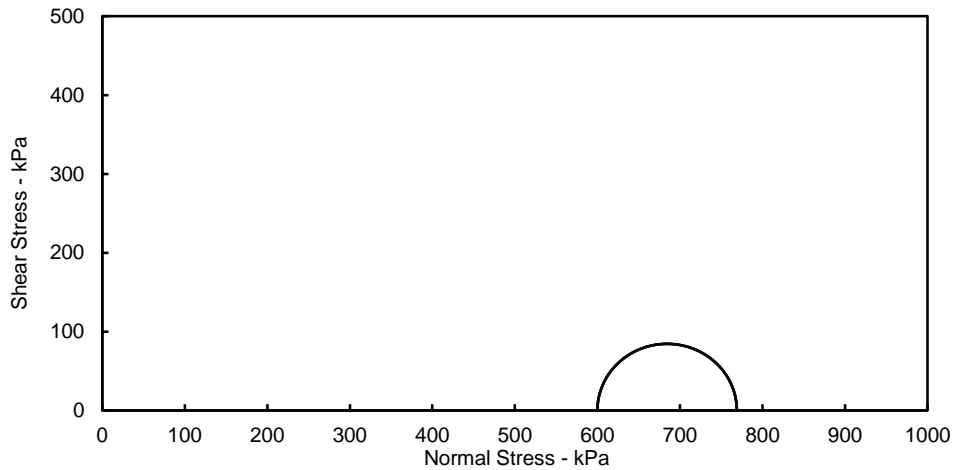
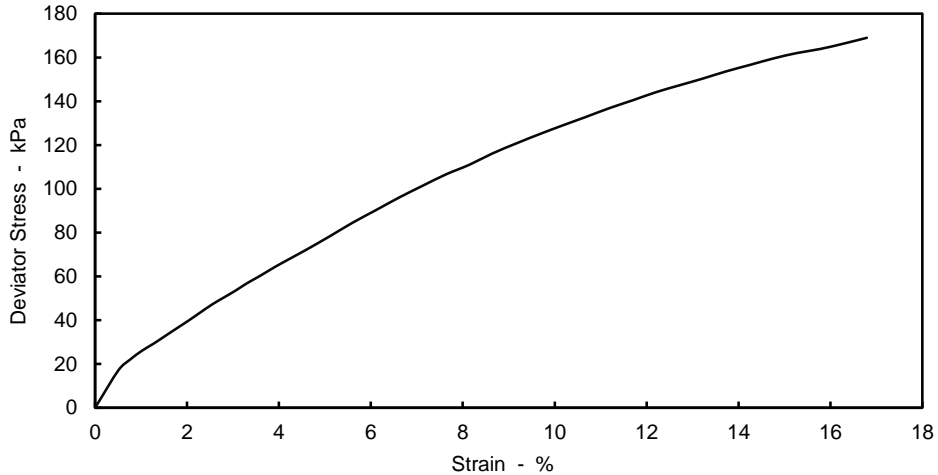
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	BH13
Sample Ref	78
Depth (m)	27.80
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	196.5		
Diameter	mm	100.9		
Moisture Content	%	23		
Bulk Density	Mg/m <sup>3</sup>	2.07		
Dry Density	Mg/m <sup>3</sup>	1.69		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.00		
Rate of Axial Displacement	%/min	0.77		
Cell Pressure	kPa	600		
Strain at Failure	%	16.8		
Maximum Deviator Stress	kPa	169		
Shear Strength	kPa	84		
Mode of Failure			Plastic	
Non Engineering Description		Stiff intact grey slightly clayey SAND.		

**Comments**  
 Undisturbed specimen taken  
 210mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
EH	 15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE  
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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole BH13

Sample Ref 78

Depth (m) 27.80

Sample Type UT



Originator

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15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.







SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH13
Sample Ref	106
Depth (m)	45.00
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	176.1		
Diameter	mm	101.3		
Moisture Content	%	34		
Bulk Density	Mg/m <sup>3</sup>	1.87		
Dry Density	Mg/m <sup>3</sup>	1.39		

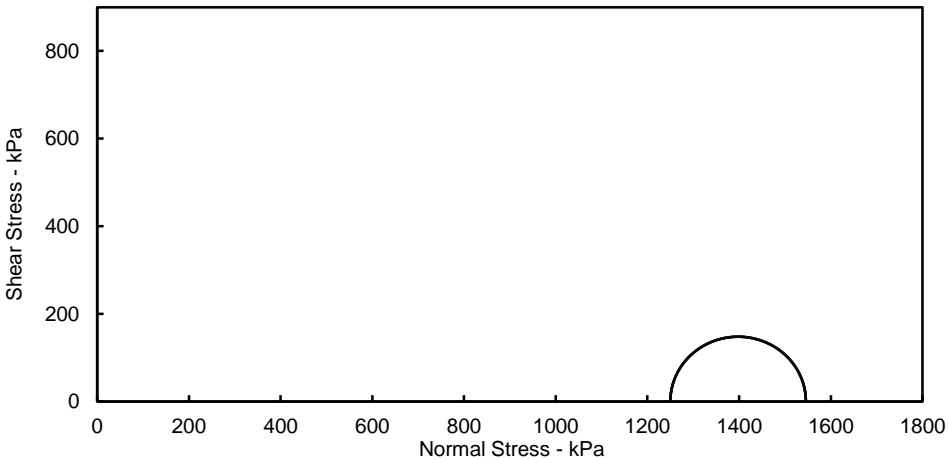
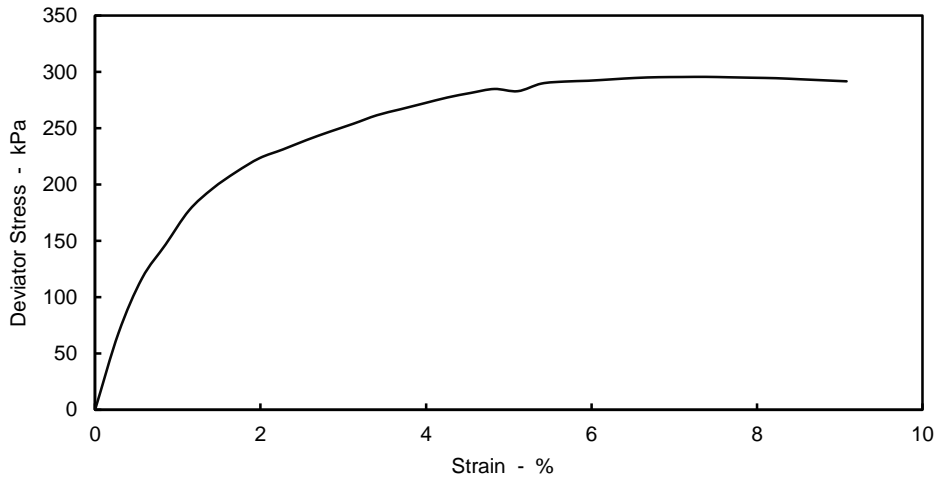
**Comments**  
 Undisturbed specimen taken 100mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.53		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	1250		
Strain at Failure	%	7.4		
Maximum Deviator Stress	kPa	296		
Shear Strength	kPa	148		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Stiff fissured grey slightly sandy CLAY.



Originator	Checked & Approved
EH	15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**


Hole BH13

Sample Ref 106

Depth (m) 45.00

Sample Type UT



Originator	Checked & Approved
EH	 15/08/2018

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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH13
Sample Ref	106
Depth (m)	45.00
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	163.3		
Diameter	mm	100.3		
Moisture Content	%	36		
Bulk Density	Mg/m <sup>3</sup>	1.89		
Dry Density	Mg/m <sup>3</sup>	1.40		

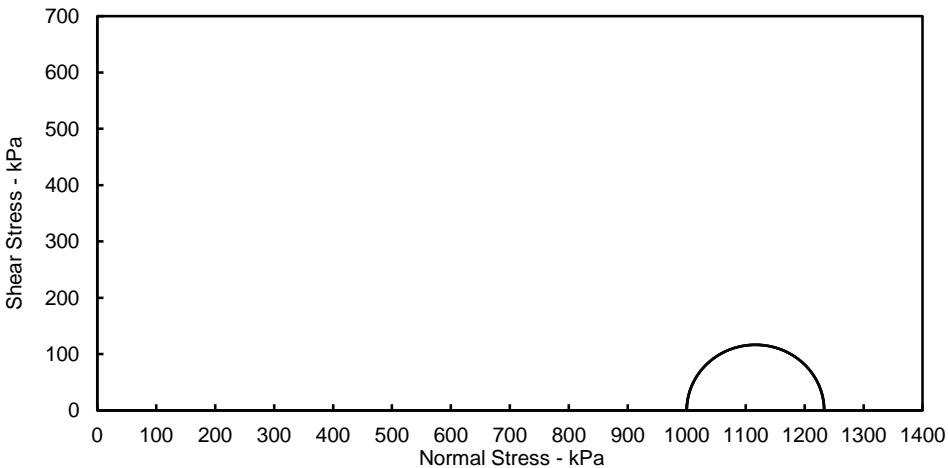
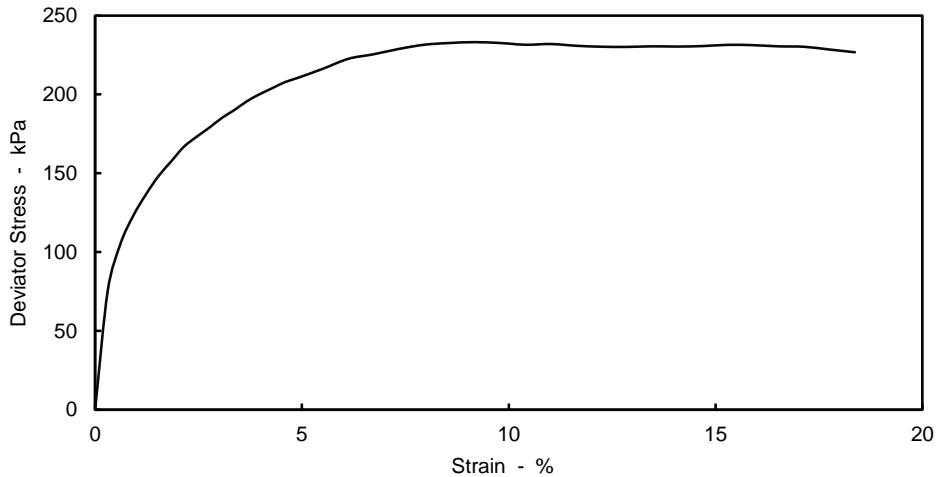
**Comments**  
 Undisturbed specimen taken  
 40mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.63		
Rate of Axial Displacement	%/min	0.93		
Cell Pressure	kPa	1000		
Strain at Failure	%	9.2		
Maximum Deviator Stress	kPa	233		
Shear Strength	kPa	117		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Stiff fissured grey sandy CLAY.



Originator	Checked & Approved
EH	/2018

**UNCONSOLIDATED UNDRAINED SINGLE  
 STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**



Hole BH13

Sample Ref 106

Depth (m) 45.00

Sample Type UT



Originator	Checked & Approved	Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.	 <p style="text-align: right;">Sheet 2 of 2</p>
EH	 15/08/2018		



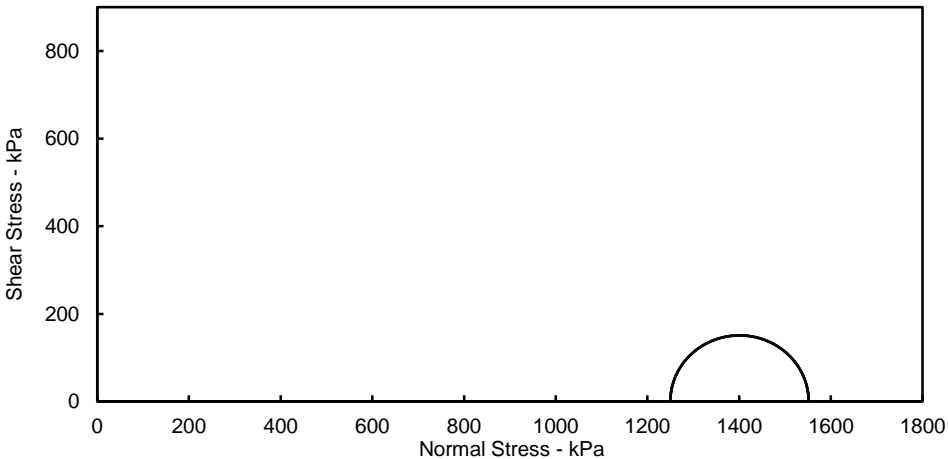
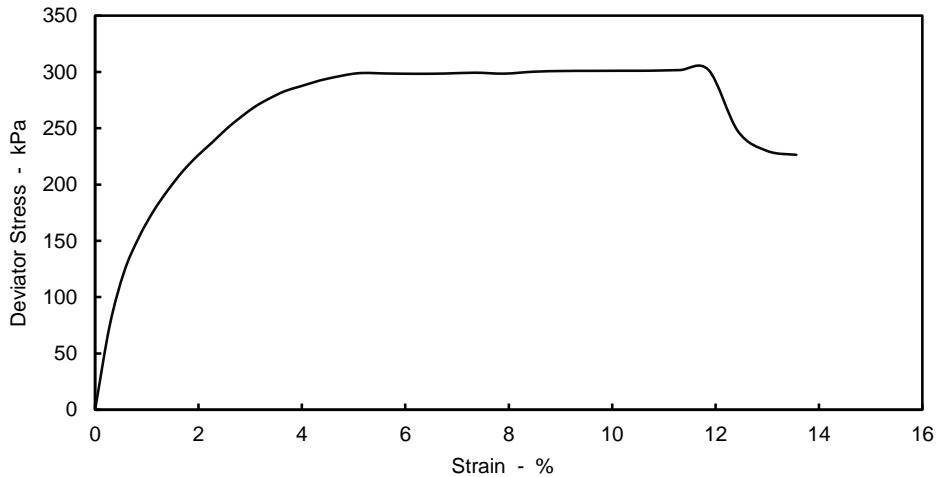
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	BH13
Sample Ref	110
Depth (m)	46.50
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	177.0		
Diameter	mm	102.8		
Moisture Content	%	34		
Bulk Density	Mg/m <sup>3</sup>	1.92		
Dry Density	Mg/m <sup>3</sup>	1.44		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.75		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	1250		
Strain at Failure	%	11.9		
Maximum Deviator Stress	kPa	302		
Shear Strength	kPa	151		
Mode of Failure			Compound	
Non Engineering Description	Very stiff fissured greyish brown slightly sandy CLAY.			

**Comments**  
 Undisturbed specimen taken 40mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
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Sheet 1 of 2

# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1



Hole BH13

Sample Ref 110

Depth (m) 46.50

Sample Type UT



Originator	Checked & Approved	Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.	 <p style="text-align: right;">Sheet 2 of 2</p>
EH	 15/08/2018		





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH13
Sample Ref	110
Depth (m)	46.50
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	197.3		
Diameter	mm	102.7		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	1.99		
Dry Density	Mg/m <sup>3</sup>	1.53		

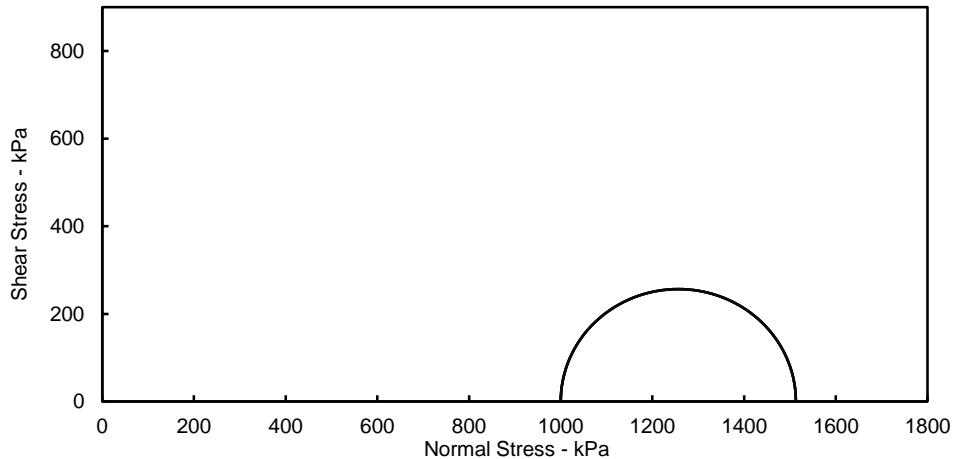
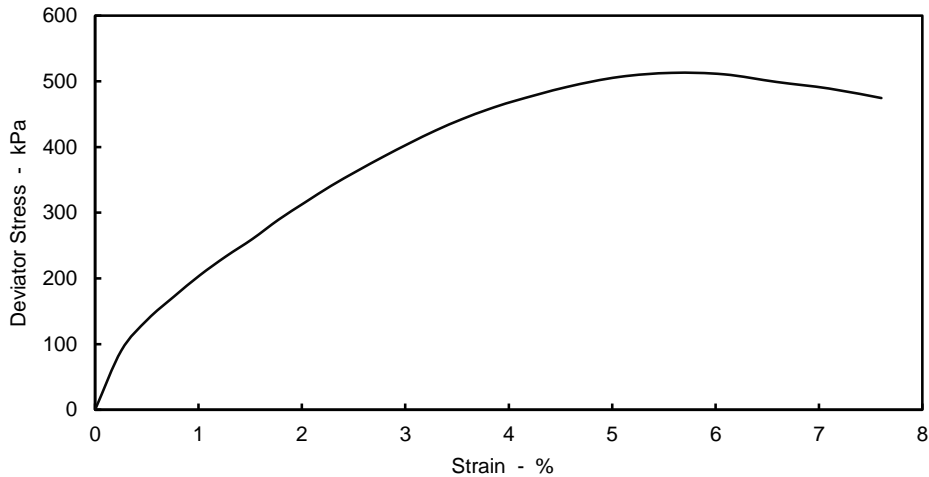
**Comments**  
Undisturbed specimen taken 240mm below top of tube


**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.41		
Rate of Axial Displacement	%/min	0.77		
Cell Pressure	kPa	1000		
Strain at Failure	%	5.6		
Maximum Deviator Stress	kPa	513		
Shear Strength	kPa	256		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Very stiff fissured grey slightly sandy CLAY.



Originator	Checked & Approved
EH	 15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole BH13

Sample Ref 110

Depth (m) 46.50

Sample Type UT



Originator

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15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

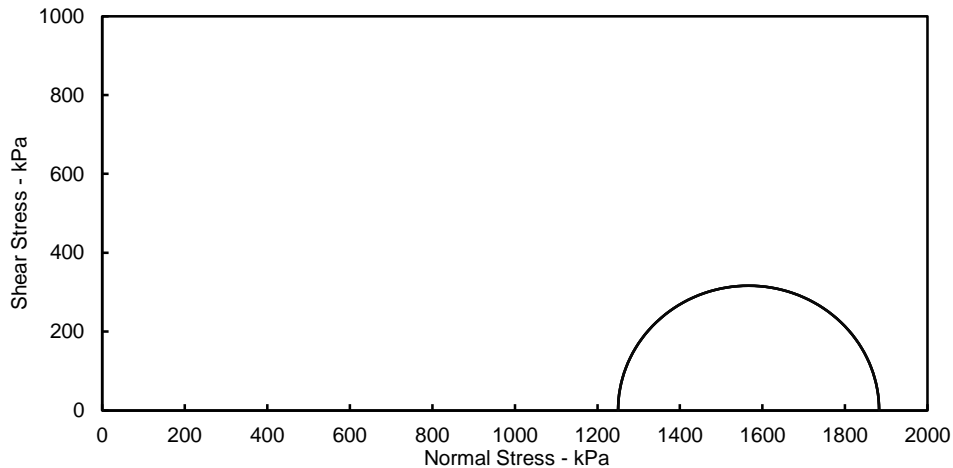
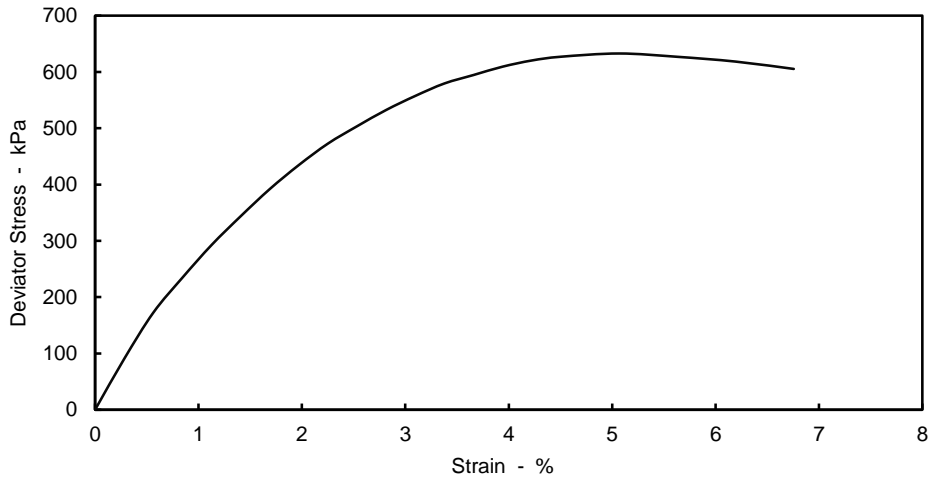
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	BH13
Sample Ref	115
Depth (m)	48.50
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	177.6		
Diameter	mm	102.4		
Moisture Content	%	28		
Bulk Density	Mg/m <sup>3</sup>	1.97		
Dry Density	Mg/m <sup>3</sup>	1.54		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.38		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	1250		
Strain at Failure	%	5.1		
Maximum Deviator Stress	kPa	633		
Shear Strength	kPa	316		
Mode of Failure			Brittle	
Non Engineering Description	Hard fissured greyish brown slightly sandy CLAY			

**Comments**  
 Undisturbed specimen taken 100mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
EH	 15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1



Hole BH13

Sample Ref 115

Depth (m) 48.50

Sample Type UT



Originator	Checked & Approved	Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.	 <p>Sheet 2 of 2</p>
EH	 15/08/2018		



SITE INVESTIGATION AND LABORATORY SERVICES

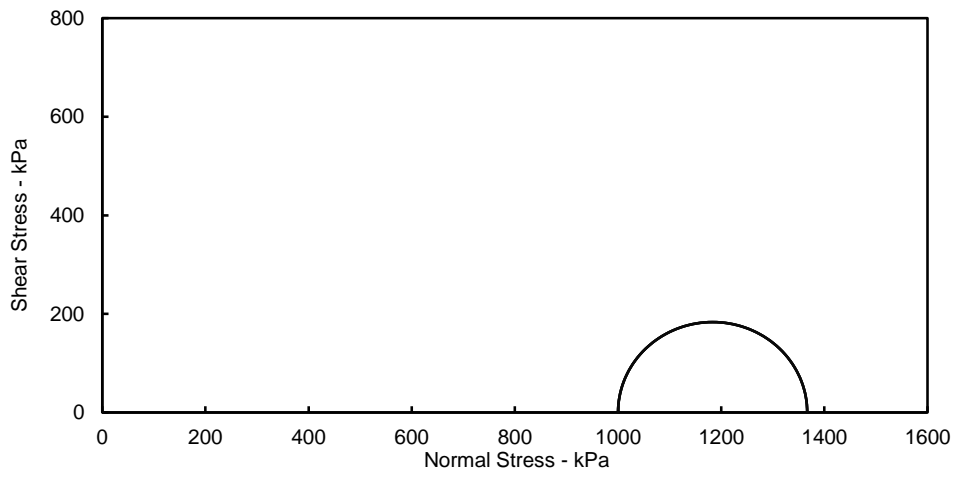
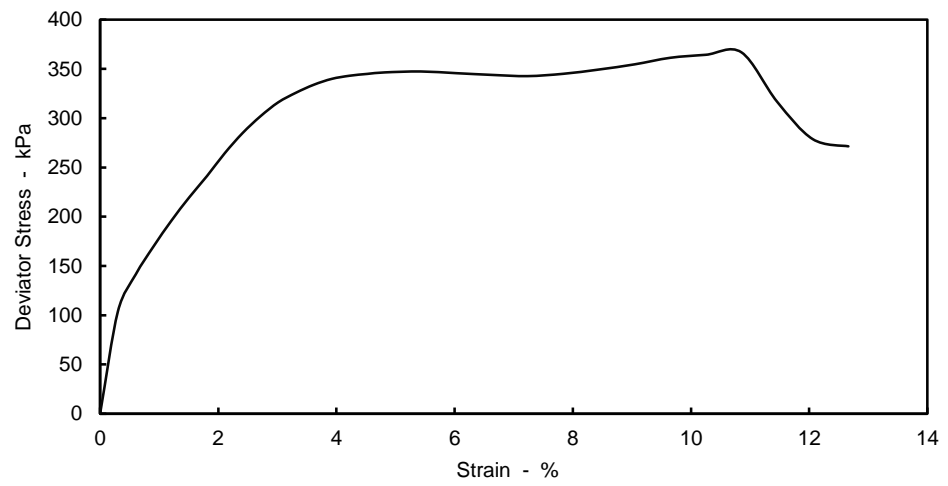
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH13
Sample Ref	115
Depth (m)	48.50
Sample Type	UT

Sample Details		Undisturbed		
Sample Condition		Undisturbed		
Height	mm	165.8		
Diameter	mm	102.7		
Moisture Content	%	35		
Bulk Density	Mg/m <sup>3</sup>	1.94		
Dry Density	Mg/m <sup>3</sup>	1.44		
Test Details				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.70		
Rate of Axial Displacement	%/min	0.92		
Cell Pressure	kPa	1000		
Strain at Failure	%	10.9		
Maximum Deviator Stress	kPa	367		
Shear Strength	kPa	183		
Mode of Failure			Plastic	
Non Engineering Description		Very stiff fissured greyish brown slightly sandy CLAY.		

**Comments**  
 Undisturbed specimen taken 100mm below top of tube

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**


Hole BH13

Sample Ref 115

Depth (m) 48.50

Sample Type UT



Originator	Checked & Approved
EH	 15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.







SITE INVESTIGATION AND LABORATORY SERVICES

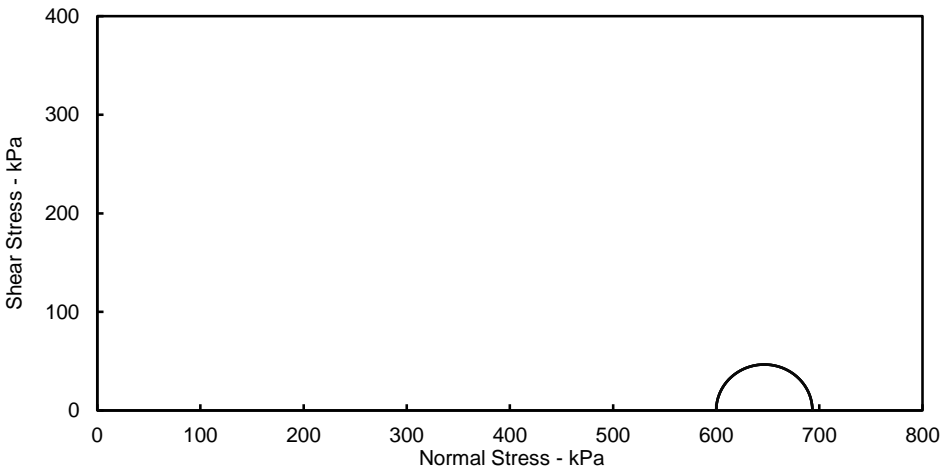
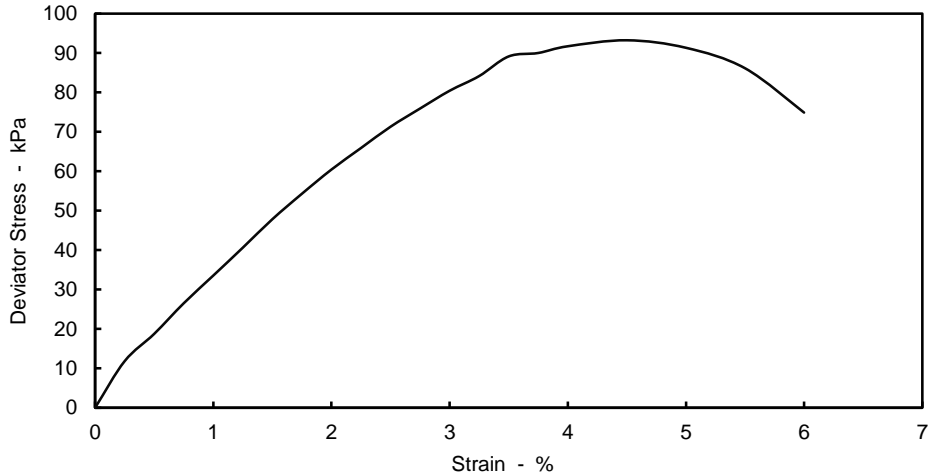
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH13A
Sample Ref	74
Depth (m)	28.00
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	200.0		
Diameter	mm	103.8		
Moisture Content	%	18		
Bulk Density	Mg/m <sup>3</sup>	2.15		
Dry Density	Mg/m <sup>3</sup>	1.82		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.34		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	600		
Strain at Failure	%	4.5		
Maximum Deviator Stress	kPa	93		
Shear Strength	kPa	47		
Mode of Failure			Plastic	
Non Engineering Description	Firm intact grey silty SAND.			

**Comments**  
 Undisturbed specimen taken 200mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
EH	15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**



Hole BH13A

Sample Ref 74

Depth (m) 28.00

Sample Type UT



Originator	Checked & Approved	Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.	 <p style="text-align: right;">Sheet 2 of 2</p>
EH	 15/08/2018		



SITE INVESTIGATION AND LABORATORY SERVICES

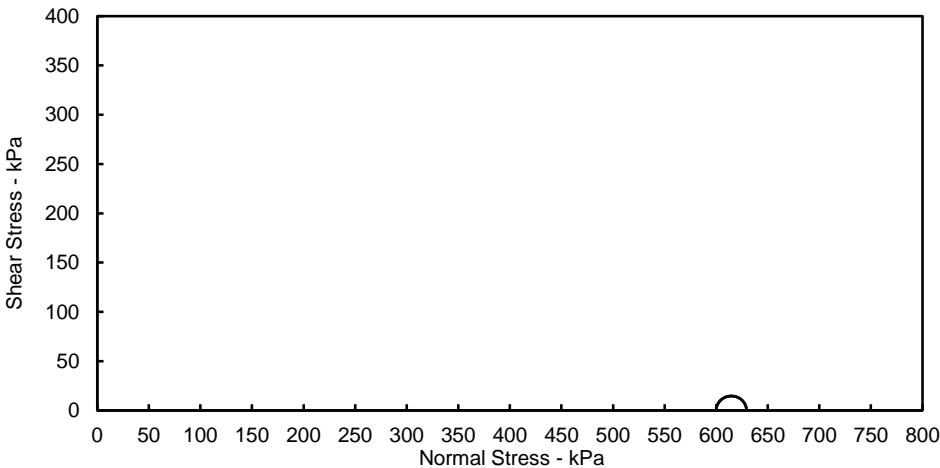
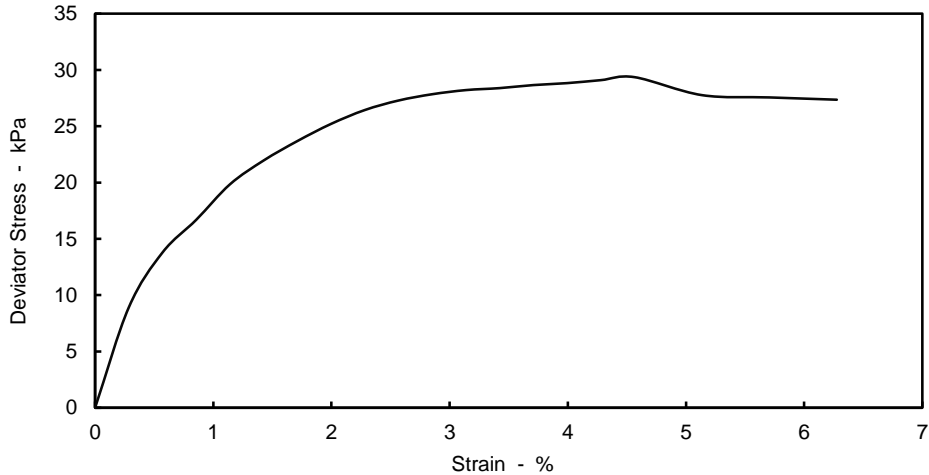
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH13A
Sample Ref	81
Depth (m)	31.00
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	175.3		
Diameter	mm	103.8		
Moisture Content	%	26		
Bulk Density	Mg/m <sup>3</sup>	2.04		
Dry Density	Mg/m <sup>3</sup>	1.62		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.35		
Rate of Axial Displacement	%/min	0.87		
Cell Pressure	kPa	600		
Strain at Failure	%	4.6		
Maximum Deviator Stress	kPa	29		
Shear Strength	kPa	15		
Mode of Failure			Plastic	
Non Engineering Description		Very soft intact sandy CLAY.		

**Comments**  
 Undisturbed specimen taken 100mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
EH	15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole BH13A

Sample Ref 81

Depth (m) 31.00

Sample Type UT



Originator

Checked & Approved

EH

15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





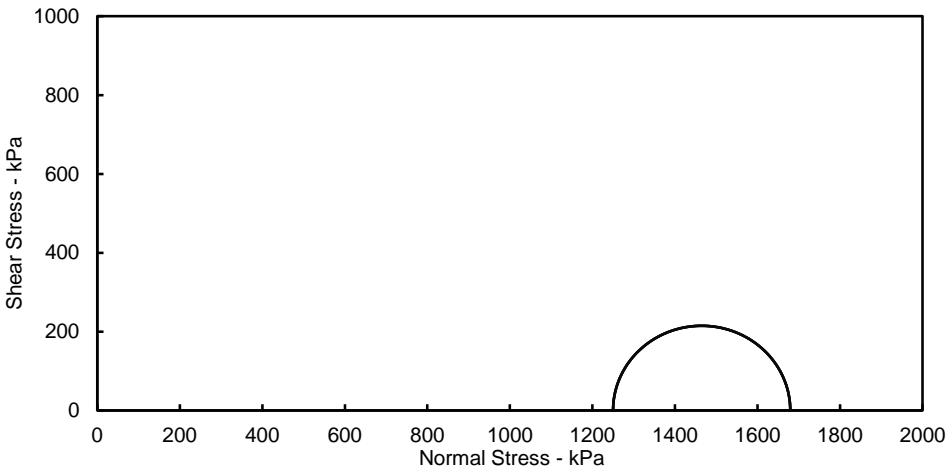
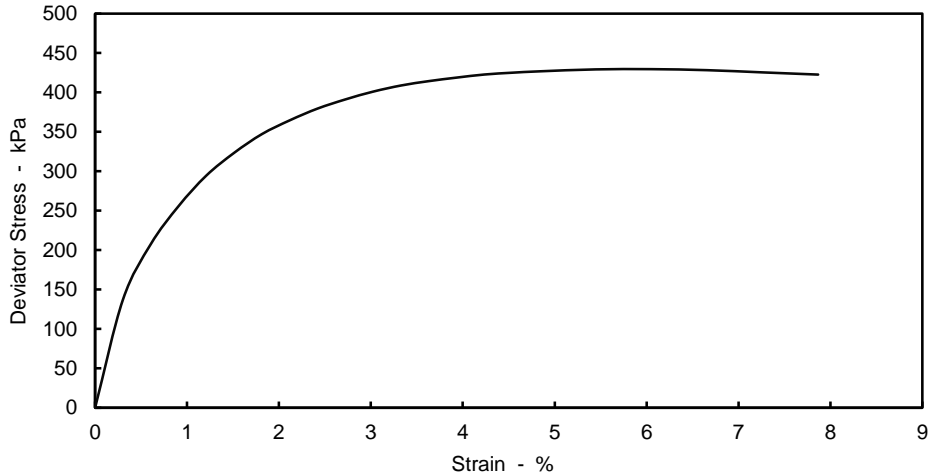
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	BH13A
Sample Ref	105
Depth (m)	46.00
Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	165.3		
Diameter	mm	103.5		
Moisture Content	%	33		
Bulk Density	Mg/m <sup>3</sup>	1.94		
Dry Density	Mg/m <sup>3</sup>	1.46		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.44		
Rate of Axial Displacement	%/min	0.92		
Cell Pressure	kPa	1250		
Strain at Failure	%	6.1		
Maximum Deviator Stress	kPa	430		
Shear Strength	kPa	215		
Mode of Failure			Compound	
Non Engineering Description	Very stiff fissured grey mottled brown slightly sandy CLAY.			

**Comments**  
 Undisturbed specimen taken 280mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
EH	 15/08/2018

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Sheet 1 of 2



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole BH13A


Sample Ref 105

Depth (m) 46.00

Engineer Norfolk Partnership Laboratory

Sample Type UT



Originator	Checked & Approved
EH	 15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.







SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH13A
Sample Ref	105
Depth (m)	46.00
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	176.0		
Diameter	mm	103.5		
Moisture Content	%	33		
Bulk Density	Mg/m <sup>3</sup>	1.96		
Dry Density	Mg/m <sup>3</sup>	1.47		

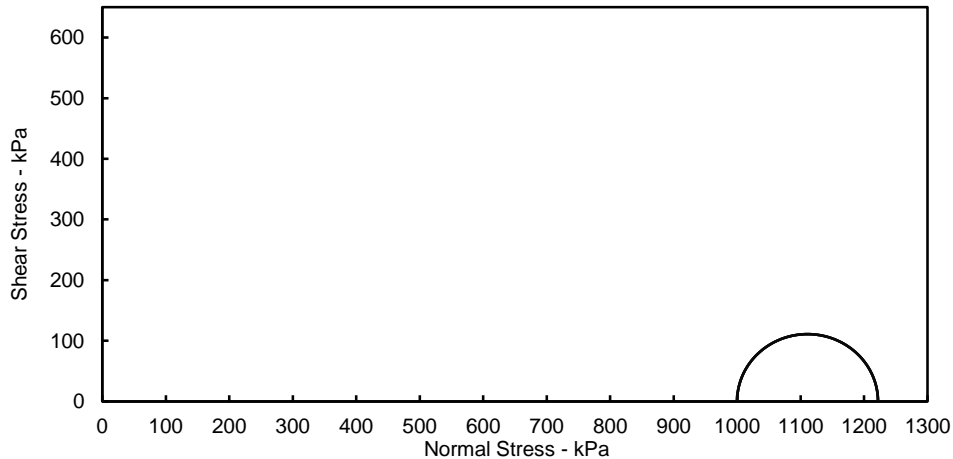
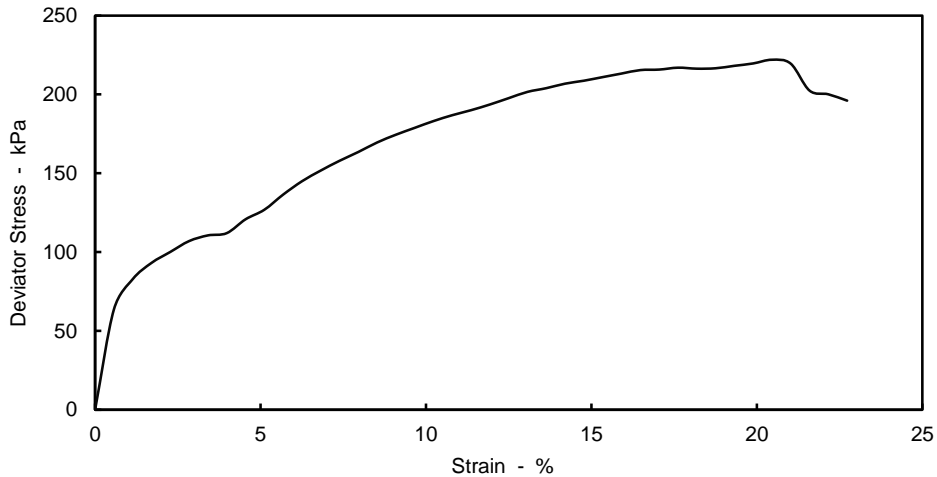
**Comments**  
 Undisturbed specimen taken  
 30mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.12		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	1000		
Strain at Failure	%	20.5		
Maximum Deviator Stress	kPa	222		
Shear Strength	kPa	111		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Stiff fissured grey mottled brown slightly sandy CLAY.



Originator	Checked & Approved
EH	15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole BH13A

Sample Ref 105

Depth (m) 46.00

Sample Type UT



Originator

Checked & Approved

EH

15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



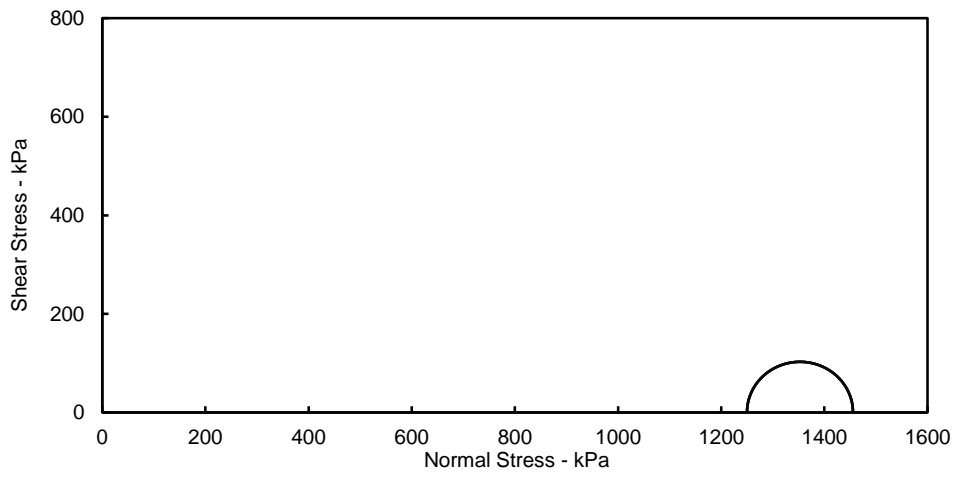
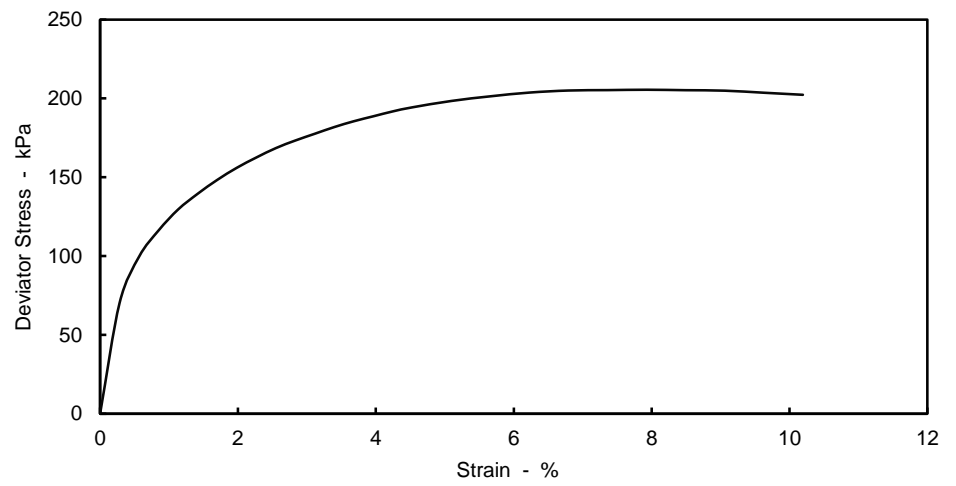


Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No.	<b>PZ1522D1</b>
Client	Norfolk County Council	Hole	BH13A
Engineer	Norfolk Partnership Laboratory	Sample Ref	115
		Depth (m)	49.50
		Sample Type	UT

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	176.6		
Diameter	mm	103.6		
Moisture Content	%	22		
Bulk Density	Mg/m <sup>3</sup>	1.85		
Dry Density	Mg/m <sup>3</sup>	1.51		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.55		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	1250		
Strain at Failure	%	7.9		
Maximum Deviator Stress	kPa	206		
Shear Strength	kPa	103		
Mode of Failure			Compound	
Non Engineering Description	Stiff fissured brown slightly sandy CLAY.			

**Comments**  
 Undisturbed specimen taken 50mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved	<b>UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION</b> BS 1377 : Part 7 : 1990 Clause 8	
EH	15/08/2018		

# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1


Hole BH13A

Sample Ref 115

Depth (m) 49.50

Sample Type UT



Originator	Checked & Approved
EH	 15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH13A
Sample Ref	115
Depth (m)	49.50
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	199.7		
Diameter	mm	103.0		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	1.98		
Dry Density	Mg/m <sup>3</sup>	1.53		

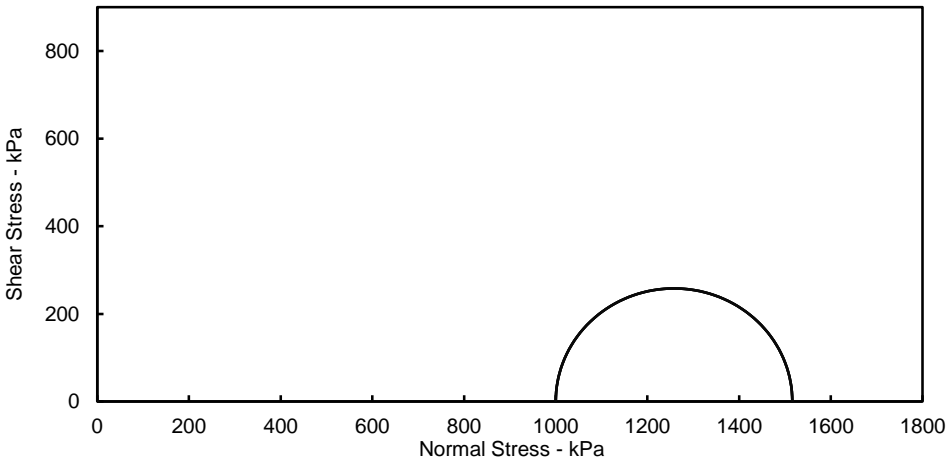
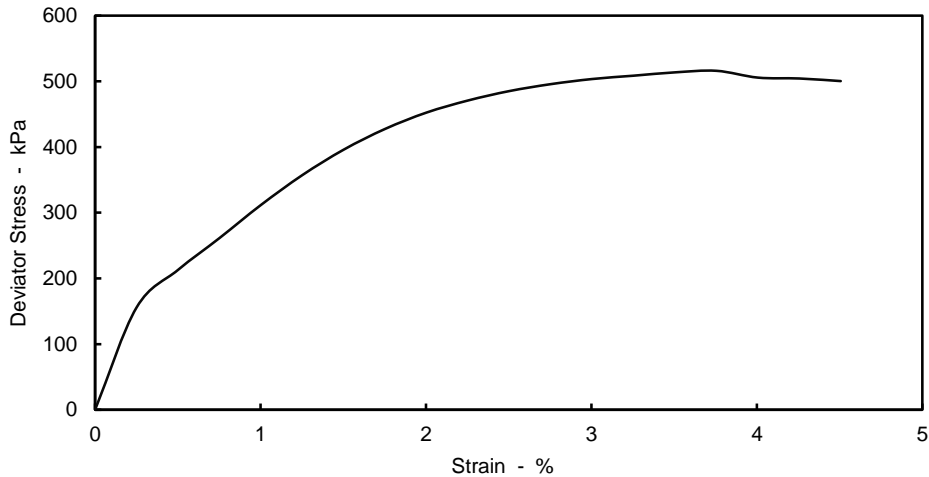
**Comments**  
 Undisturbed specimen taken  
 240mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.29		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	1000		
Strain at Failure	%	3.8		
Maximum Deviator Stress	kPa	516		
Shear Strength	kPa	258		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Very stiff fissured brown slightly sandy CLAY.



Originator	Checked & Approved
EH	15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1


Hole BH13A

Sample Ref 115

Depth (m) 49.50

Sample Type UT



Originator	Checked & Approved
EH	 15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.







SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH13A
Sample Ref	115
Depth (m)	49.50
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	175.5		
Diameter	mm	103.5		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	1.99		
Dry Density	Mg/m <sup>3</sup>	1.53		

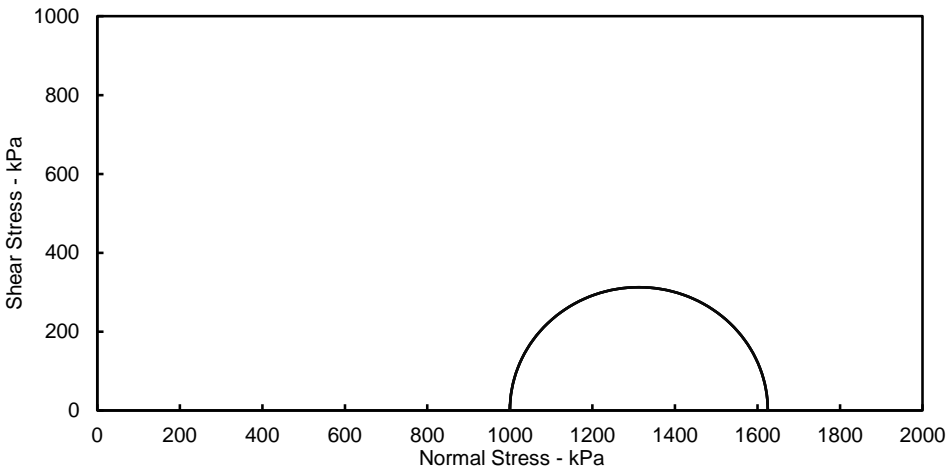
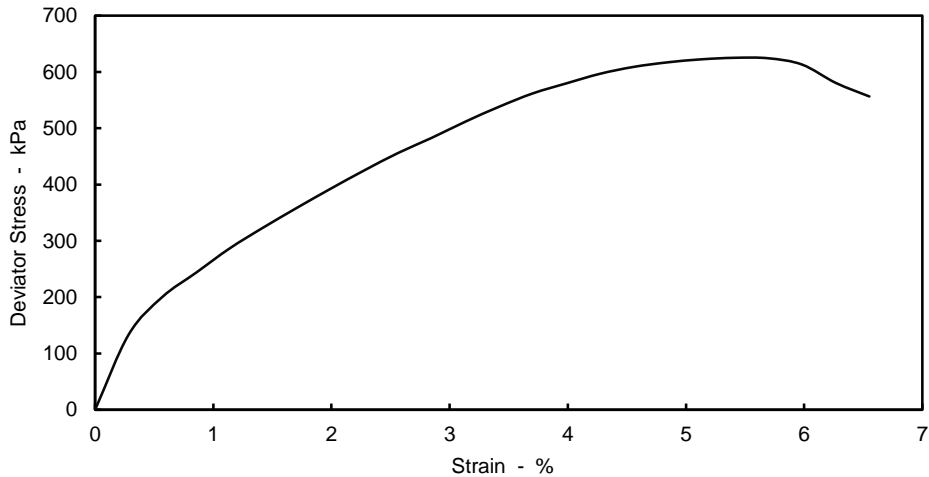
**Comments**  
Undisturbed specimen taken 20mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.40		
Rate of Axial Displacement	%/min	0.87		
Cell Pressure	kPa	1000		
Strain at Failure	%	5.4		
Maximum Deviator Stress	kPa	625		
Shear Strength	kPa	313		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Hard fissured dark brown slightly sandy CLAY.



Originator	Checked & Approved
EH	15/08/2018

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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole BH13A



Engineer Norfolk Partnership Laboratory

Sample Ref 115

Depth (m) 49.50

Sample Type UT



Originator	Checked & Approved	Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.	 <p style="text-align: right;">Sheet 2 of 2</p>
EH	 15/08/2018		



SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	BH13A
Sample Ref	115
Depth (m)	49.50
Sample Type	UT

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	167.1		
Diameter	mm	103.4		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	1.96		
Dry Density	Mg/m <sup>3</sup>	1.52		

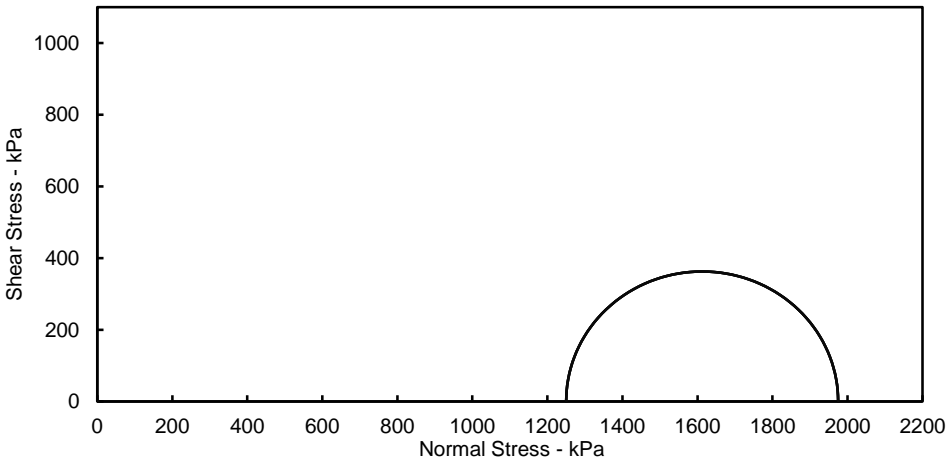
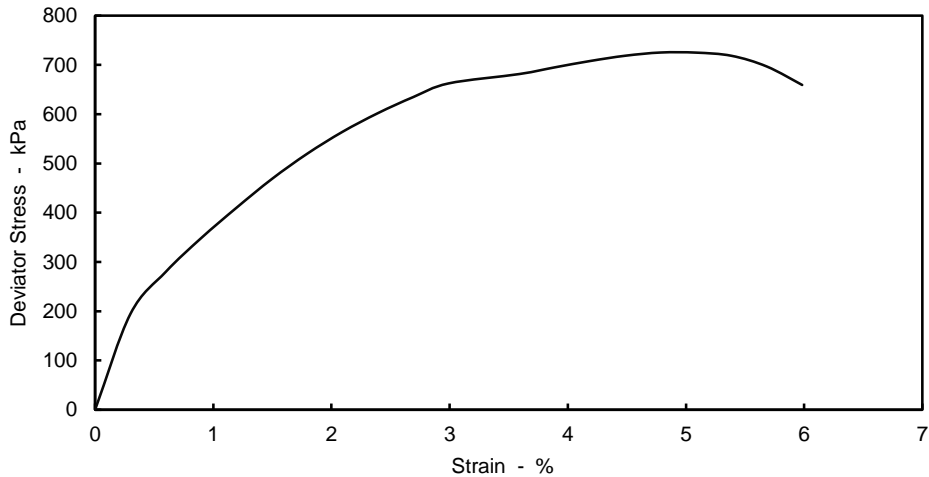
**Comments**  
 Undisturbed specimen taken  
 200mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.36		
Rate of Axial Displacement	%/min	0.91		
Cell Pressure	kPa	1250		
Strain at Failure	%	4.8		
Maximum Deviator Stress	kPa	725		
Shear Strength	kPa	363		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Hard fissured dark brown slightly sandy CLAY.



Originator	Checked & Approved
EH	15/08/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole BH13A

Sample Ref 115

Depth (m) 49.50

Sample Type UT



Originator

Checked & Approved

EH

15/08/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



# Great Yarmouth Third River Crossing

## Application for Development Consent Order

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### **Document 6.2: Environmental Statement Volume II: Technical Appendix 16C – Annex A and B – Part 2**

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**Planning Act 2008**

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure)  
Regulations 2009 (as amended) (“APFP”)**

APFP regulation Number: 5(2) (a)

Planning Inspectorate Reference Number: TR010043

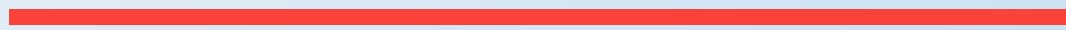
Author: Norfolk County Council

Document Reference: 6.2 – Technical Appendix 16C, Annex A and B

Version Number: 0 – Revision for Submission

Date: 30 April 2019

# Appendix H



**CONTAMINATED LAND TEST  
RESULTS**



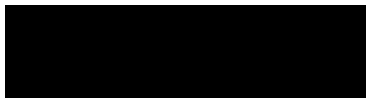
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/00986  
**Issue Number:** 1  
**Date:** 16 February, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt. Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 575260  
**Date Samples Received:** 09/02/18  
**Date Instructions Received:** 09/02/18  
**Date Analysis Completed:** 16/02/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Iain Haslock  
Analytical Consultant

Envirolab Job Number: 18/00986

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00986/1	18/00986/2	18/00986/3	18/00986/4	18/00986/5	18/00986/6	18/00986/7	18/00986/8	Units	Method ref
Client Sample No	4	13	23	30	42	43	58	73		
Client Sample ID	BH1	BH1	BH1	BH1	BH1	BH1	BH1	BH1		
Depth to Top	0.50	3.00	6.95	8.95	11.50	12.50	19.50	29.00		
Depth To Bottom										
Date Sampled	06-Dec-17	06-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	11-Dec-17	11-Dec-17		
Sample Type	Soil - B	Soil - D	Soil - D	Soil - D	Soil - B	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	4AE	5A	6A	6	5	5	5	5		
% Stones >10mm <sub>A</sub>	19.9	2.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub>	8.36	8.70	7.46	-	-	7.95	7.96	7.75	pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	3.52	<1.00	1.52	-	-	<1.00	33.5	85.5	mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	91	138	3570	-	-	78	25	321	mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	2.3	4.6	<0.4	-	-	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	33	115	977	-	-	101	55	172	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.03	0.03	0.37	-	-	0.04	<0.02	0.07	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.02	0.02	2.00	-	-	0.10	0.02	0.34	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	2	3	240	-	-	7	4	27	mg/l	A-T-SOLMET5
Organic matter <sub>D</sub> <sup>M#</sup>	-	-	-	61.5	0.4	-	-	-	% w/w	A-T-032 OM

Envirolab Job Number: 18/00986

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00986/9	18/00986/10	18/00986/11	18/00986/12	18/00986/13	18/00986/14	18/00986/15		Units	Method ref
Client Sample No	2	17	26	35	49	55	69			
Client Sample ID	BH2	BH2	BH2	BH2	BH2	BH2	BH2			
Depth to Top	0.50	5.00	9.00	11.50	17.90	21.90	29.00			
Depth To Bottom										
Date Sampled	06-Dec-17	06-Dec-17	07-Dec-17	09-Dec-17	08-Dec-17	11-Dec-17	11-Dec-17			
Sample Type	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D	Soil - D	Soil - B			
Sample Matrix Code	5A	5	6	4	5	5	5A			
% Stones >10mm <sub>A</sub>	2.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	% w/w		
pH BRE <sub>D</sub>	8.31	7.70	7.04	-	8.23	8.29	7.80	pH	A-T-031s	
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	3.66	1.29	2.64	-	<1.00	<1.00	<1.00	mg/l	A-T-033s	
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	71	2090	2970	-	188	151	618	mg/l	A-T-026s	
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	2.5	<0.4	<0.4	-	<0.4	<0.4	<0.4	mg/l	A-T-026s	
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	11	710	479	-	68	<10	258	mg/l	A-T-026s	
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	<0.02	0.33	0.40	-	0.04	<0.02	0.09	% w/w	A-T-028s	
Sulphur BRE (total) <sub>D</sub>	<0.01	1.87	3.59	-	0.11	0.04	0.42	% w/w	A-T-024s	
Magnesium BRE (water sol 2:1) <sub>D</sub>	<1	164	78	-	7	5	38	mg/l	A-T-SOLMETS	
Organic matter <sub>D</sub> <sup>M#</sup>	-	-	46.8	2.2	-	-	-	% w/w	A-T-032 OM	

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/01147  
**Issue Number:** 1  
**Date:** 22 February, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 581480  
**Date Samples Received:** 15/02/18  
**Date Instructions Received:** 15/02/18  
**Date Analysis Completed:** 22/02/18

**Prepared by:**



Gill Walker  
Laboratory Manager

**Approved by:**



Iain Haslock  
Analytical Consultant

Envirolab Job Number: 18/01147

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01147/1	18/01147/2	18/01147/3	18/01147/4					Units	Method ref
Client Sample No	13	19	28	37						
Client Sample ID	BH2	BH1	BH1	BH2						
Depth to Top	4.00	5.00	8.00	12.50						
Depth To Bottom	4.45	6.00	8.50	13.00						
Date Sampled	06-Dec-17	07-Dec-17	08-Dec-17	08-Dec-17						
Sample Type	Soil - D	Soil - B	Soil - B	Soil - B						
Sample Matrix Code	5	3	6E	6						
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1						
pH BRE <sub>D</sub>	-	-	-	7.44					pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	-	-	-	8.42					mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	237					mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	-	-	-	<0.4					mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	93					mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	-	0.07					% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	-	-	-	0.28					% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	-	7					mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	0.4	2.4	9.8	-					% w/w	A-T-032 OM



## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

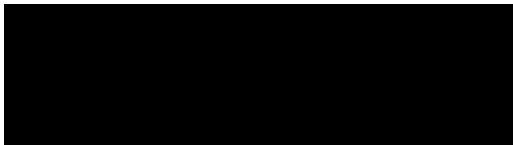
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 17/08296  
**Issue Number:** 1  
**Date:** 14 December, 2017

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

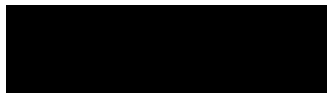
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 573823  
**Date Samples Received:** 30/11/17  
**Date Instructions Received:** 06/12/17  
**Date Analysis Completed:** 14/12/17

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Iain Haslock  
Analytical Consultant

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/1	17/08296/2	17/08296/3	17/08296/4	17/08296/5	17/08296/6	17/08296/7	17/08296/8	Units	Method ref		
Client Sample No	1	2	5	4	5	9	7	9				
Client Sample ID	BH7	BH4	BH4	BH7	BH7	BH6	BH7	BH4				
Depth to Top	0.20	0.30	0.50	0.80	1.00	1.20	1.40	1.60				
Depth To Bottom	0.45	0.50			1.20	1.65	1.80	2.00				
Date Sampled	30-Nov-17	30-Nov-17	28-Nov-17	28-Nov-17	30-Nov-17	23-Nov-17	29-Nov-17	30-Nov-17				
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - ES	Soil - B	Soil - D	Soil - B	Soil - B				
Sample Matrix Code	4A	1A	1A	4A	6A	5A	6	1A				
% Stones >10mm <sub>A</sub>	40.7	18.4	16.6	17.1	<0.1	13.2	29.3	31.7			% w/w	A-T-044
pH <sub>D</sub>	-	-	8.66	8.58	-	-	-	-	pH	A-T-031s		
pH BRE <sub>D</sub>	8.84	8.57	-	-	8.35	-	-	9.04	pH	A-T-031s		
Ammoniacal nitrogen <sub>D</sub>	-	-	0.7	0.7	-	-	-	-	mg/kg	A-T-033s		
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	<1.00	1.00	-	-	8.48	-	-	<1.00	mg/l	A-T-033s		
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	24	<7	-	-	31	-	-	12	mg/l	A-T-026s		
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	2.2	-	-	<0.4	-	-	<0.4	mg/l	A-T-026s		
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	<0.01	0.02	-	-	-	-	g/l	A-T-026s		
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	81	<10	-	-	31	-	-	18	mg/l	A-T-026s		
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	-	-	<200	1200	-	-	-	-	mg/kg	A-T-028s		
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.07	<0.02	-	-	0.05	-	-	<0.02	% w/w	A-T-028s		
Sulphur BRE (total) <sub>D</sub>	0.04	<0.01	-	-	0.04	-	-	<0.01	% w/w	A-T-024s		
Magnesium BRE (water sol 2:1) <sub>D</sub>	1	2	-	-	6	-	-	1	mg/l	A-T-SOLMETS		
Cyanide (total) <sub>A</sub> <sup>M#</sup>	-	-	<1	<1	-	-	-	-	mg/kg	A-T-042sTCN		
Phenols - Total by HPLC <sub>A</sub>	-	-	<0.2	<0.2	-	-	-	-	mg/kg	A-T-050s		
Sulphide <sub>A</sub>	-	-	<15	<15	-	-	-	-	mg/kg	A-T-S2-s		
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	-	-	<5	170	-	-	-	-	mg/kg	A-T-029s		
Organic matter <sub>D</sub> <sup>M#</sup>	-	-	0.3	4.9	-	2.3	2.5	-	% w/w	A-T-032 OM		
Arsenic <sub>D</sub> <sup>M#</sup>	-	-	3	3	-	-	-	-	mg/kg	A-T-024s		
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	-	-	<1.0	<1.0	-	-	-	-	mg/kg	A-T-027s		
Cadmium <sub>D</sub> <sup>M#</sup>	-	-	<0.5	<0.5	-	-	-	-	mg/kg	A-T-024s		
Copper <sub>D</sub> <sup>M#</sup>	-	-	5	40	-	-	-	-	mg/kg	A-T-024s		
Chromium <sub>D</sub> <sup>M#</sup>	-	-	7	7	-	-	-	-	mg/kg	A-T-024s		
Chromium (hexavalent) <sub>D</sub>	-	-	<1	<1	-	-	-	-	mg/kg	A-T-040s		
Lead <sub>D</sub> <sup>M#</sup>	-	-	13	104	-	-	-	-	mg/kg	A-T-024s		
Mercury <sub>D</sub>	-	-	<0.17	<0.17	-	-	-	-	mg/kg	A-T-024s		
Nickel <sub>D</sub> <sup>M#</sup>	-	-	6	8	-	-	-	-	mg/kg	A-T-024s		
Selenium <sub>D</sub> <sup>M#</sup>	-	-	<1	<1	-	-	-	-	mg/kg	A-T-024s		
Zinc <sub>D</sub> <sup>M#</sup>	-	-	24	81	-	-	-	-	mg/kg	A-T-024s		

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/1	17/08296/2	17/08296/3	17/08296/4	17/08296/5	17/08296/6	17/08296/7	17/08296/8	Units	Method ref		
Client Sample No	1	2	5	4	5	9	7	9				
Client Sample ID	BH7	BH4	BH4	BH7	BH7	BH6	BH7	BH4				
Depth to Top	0.20	0.30	0.50	0.80	1.00	1.20	1.40	1.60				
Depth To Bottom	0.45	0.50			1.20	1.65	1.80	2.00				
Date Sampled	30-Nov-17	30-Nov-17	28-Nov-17	28-Nov-17	30-Nov-17	23-Nov-17	29-Nov-17	30-Nov-17				
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - ES	Soil - B	Soil - D	Soil - B	Soil - B				
Sample Matrix Code	4A	1A	1A	4A	6A	5A	6	1A				
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	-	-	NAD	NAD	-	-	-	-		A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	-	-	N/A	N/A	-	-	-	-				

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/1	17/08296/2	17/08296/3	17/08296/4	17/08296/5	17/08296/6	17/08296/7	17/08296/8	Units	Method ref
Client Sample No	1	2	5	4	5	9	7	9		
Client Sample ID	BH7	BH4	BH4	BH7	BH7	BH6	BH7	BH4		
Depth to Top	0.20	0.30	0.50	0.80	1.00	1.20	1.40	1.60		
Depth To Bottom	0.45	0.50			1.20	1.65	1.80	2.00		
Date Sampled	30-Nov-17	30-Nov-17	28-Nov-17	28-Nov-17	30-Nov-17	23-Nov-17	29-Nov-17	30-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - ES	Soil - B	Soil - D	Soil - B	Soil - B		
Sample Matrix Code	4A	1A	1A	4A	6A	5A	6	1A		
PAH 16										
Acenaphthene <sub>A</sub> <sup>M#</sup>	-	-	<0.01	134	-	-	-	-	mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	-	-	<0.01	11.9	-	-	-	-	mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	-	-	<0.02	354	-	-	-	-	mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	-	-	<0.04	867	-	-	-	-	mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	-	-	0.04	510	-	-	-	-	mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	-	-	<0.05	615	-	-	-	-	mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	-	-	<0.05	250	-	-	-	-	mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	-	-	<0.07	282	-	-	-	-	mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	-	-	<0.06	1040	-	-	-	-	mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	-	-	<0.04	81.4	-	-	-	-	mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	-	-	<0.08	1510	-	-	-	-	mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	-	-	<0.01	136	-	-	-	-	mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	-	-	0.04	307	-	-	-	-	mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	-	-	<0.03	171	-	-	-	-	mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	-	-	<0.03	2110	-	-	-	-	mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	-	-	<0.07	1400	-	-	-	-	mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	-	-	0.13	9790	-	-	-	-	mg/kg	A-T-019s

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/1	17/08296/2	17/08296/3	17/08296/4	17/08296/5	17/08296/6	17/08296/7	17/08296/8	Units	Method ref
Client Sample No	1	2	5	4	5	9	7	9		
Client Sample ID	BH7	BH4	BH4	BH7	BH7	BH6	BH7	BH4		
Depth to Top	0.20	0.30	0.50	0.80	1.00	1.20	1.40	1.60		
Depth To Bottom	0.45	0.50			1.20	1.65	1.80	2.00		
Date Sampled	30-Nov-17	30-Nov-17	28-Nov-17	28-Nov-17	30-Nov-17	23-Nov-17	29-Nov-17	30-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - ES	Soil - B	Soil - D	Soil - B	Soil - B		
Sample Matrix Code	4A	1A	1A	4A	6A	5A	6	1A		
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	-	<0.002	<0.002	-	-	-	-	mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	-	<0.002	<0.002	-	-	-	-	mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	-	<0.004	<0.004	-	-	-	-	mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	-	-	<0.007	<0.007	-	-	-	-	mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	-	<0.006	<0.006	-	-	-	-	mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	-	<0.004	<0.004	-	-	-	-	mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	-	<0.004	<0.004	-	-	-	-	mg/kg	A-T-004s
PCB Total of EC7 <sub>A</sub> <sup>M#</sup>	-	-	<0.007	<0.007	-	-	-	-	mg/kg	A-T-004s



Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/1	17/08296/2	17/08296/3	17/08296/4	17/08296/5	17/08296/6	17/08296/7	17/08296/8	Units	Method ref
Client Sample No	1	2	5	4	5	9	7	9		
Client Sample ID	BH7	BH4	BH4	BH7	BH7	BH6	BH7	BH4		
Depth to Top	0.20	0.30	0.50	0.80	1.00	1.20	1.40	1.60		
Depth To Bottom	0.45	0.50			1.20	1.65	1.80	2.00		
Date Sampled	30-Nov-17	30-Nov-17	28-Nov-17	28-Nov-17	30-Nov-17	23-Nov-17	29-Nov-17	30-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - ES	Soil - B	Soil - D	Soil - B	Soil - B		
Sample Matrix Code	4A	1A	1A	4A	6A	5A	6	1A		
SVOC										
Hexachlorobenzene <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
Carbazole <sub>A</sub>	-	-	<100	19400	-	-	-	-	µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	-	-	<500	<5000	-	-	-	-	µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	-	-	<100	4970	-	-	-	-	µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	-	-	<100	9070	-	-	-	-	µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
Phenol <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	-	-	<500	<5000	-	-	-	-	µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
Isophorone <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	-	-	<100	<1000	-	-	-	-	µg/kg	A-T-052s

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/1	17/08296/2	17/08296/3	17/08296/4	17/08296/5	17/08296/6	17/08296/7	17/08296/8	Units	Method ref
Client Sample No	1	2	5	4	5	9	7	9		
Client Sample ID	BH7	BH4	BH4	BH7	BH7	BH6	BH7	BH4		
Depth to Top	0.20	0.30	0.50	0.80	1.00	1.20	1.40	1.60		
Depth To Bottom	0.45	0.50			1.20	1.65	1.80	2.00		
Date Sampled	30-Nov-17	30-Nov-17	28-Nov-17	28-Nov-17	30-Nov-17	23-Nov-17	29-Nov-17	30-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - ES	Soil - B	Soil - D	Soil - B	Soil - B		
Sample Matrix Code	4A	1A	1A	4A	6A	5A	6	1A		
Hexachlorocyclopentadiene <sub>A</sub>	-	-	<100	<1000	-	-	-	-		
Perylene <sub>A</sub>	-	-	<100	10300	-	-	-	-	µg/kg	A-T-052s

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/1	17/08296/2	17/08296/3	17/08296/4	17/08296/5	17/08296/6	17/08296/7	17/08296/8	Units	Method ref
Client Sample No	1	2	5	4	5	9	7	9		
Client Sample ID	BH7	BH4	BH4	BH7	BH7	BH6	BH7	BH4		
Depth to Top	0.20	0.30	0.50	0.80	1.00	1.20	1.40	1.60		
Depth To Bottom	0.45	0.50			1.20	1.65	1.80	2.00		
Date Sampled	30-Nov-17	30-Nov-17	28-Nov-17	28-Nov-17	30-Nov-17	23-Nov-17	29-Nov-17	30-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - ES	Soil - B	Soil - D	Soil - B	Soil - B		
Sample Matrix Code	4A	1A	1A	4A	6A	5A	6	1A		
VOC										
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Chloromethane <sub>A</sub>	-	-	<10	<10	-	-	-	-	µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	-	-	<5	<5	-	-	-	-	µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	-	-	<5	<5	-	-	-	-	µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	-	-	<2	<2	-	-	-	-	µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	-	-	<10	<10	-	-	-	-	µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	-	-	<3	<3	-	-	-	-	µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/1	17/08296/2	17/08296/3	17/08296/4	17/08296/5	17/08296/6	17/08296/7	17/08296/8	Units	Method ref
Client Sample No	1	2	5	4	5	9	7	9		
Client Sample ID	BH7	BH4	BH4	BH7	BH7	BH6	BH7	BH4		
Depth to Top	0.20	0.30	0.50	0.80	1.00	1.20	1.40	1.60		
Depth To Bottom	0.45	0.50			1.20	1.65	1.80	2.00		
Date Sampled	30-Nov-17	30-Nov-17	28-Nov-17	28-Nov-17	30-Nov-17	23-Nov-17	29-Nov-17	30-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - ES	Soil - B	Soil - D	Soil - B	Soil - B		
Sample Matrix Code	4A	1A	1A	4A	6A	5A	6	1A		
Chlorobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-		
1,1,1,2-Tetrachloroethane <sub>A</sub>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1,1,2,2-Tetrachloroethane <sub>A</sub>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	-	-	<2	<2	-	-	-	-	µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	-	-	<2	<2	-	-	-	-	µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	-	-	<3	<3	-	-	-	-	µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	-	-	<3	<3	-	-	-	-	µg/kg	A-T-006s

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/1	17/08296/2	17/08296/3	17/08296/4	17/08296/5	17/08296/6	17/08296/7	17/08296/8	Units	Method ref
Client Sample No	1	2	5	4	5	9	7	9		
Client Sample ID	BH7	BH4	BH4	BH7	BH7	BH6	BH7	BH4		
Depth to Top	0.20	0.30	0.50	0.80	1.00	1.20	1.40	1.60		
Depth To Bottom	0.45	0.50			1.20	1.65	1.80	2.00		
Date Sampled	30-Nov-17	30-Nov-17	28-Nov-17	28-Nov-17	30-Nov-17	23-Nov-17	29-Nov-17	30-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - ES	Soil - B	Soil - D	Soil - B	Soil - B		
Sample Matrix Code	4A	1A	1A	4A	6A	5A	6	1A		
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	-	-	<0.1	4.6	-	-	-	-	mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	-	-	<0.1	14.4	-	-	-	-	mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	-	-	<0.1	5.6	-	-	-	-	mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	-	-	<0.1	19.5	-	-	-	-	mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	-	-	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	-	-	<0.1	43.9	-	-	-	-	mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	-	-	<0.01	0.02	-	-	-	-	mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	-	-	<0.1	30.2	-	-	-	-	mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	-	-	<0.1	80.1	-	-	-	-	mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	-	-	0.4	613	-	-	-	-	mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	-	-	3.3	1380	-	-	-	-	mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	-	-	<0.1	79.8	-	-	-	-	mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	-	-	3.8	2100	-	-	-	-	mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	-	-	3.8	2150	-	-	-	-	mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	15.1	<0.1	<0.1	<0.1	0.2		
pH <sub>D</sub>	-	-	9.14	-	-	-	-	-	pH	A-T-031s
pH BRE <sub>D</sub>	-	-	-	8.97	8.47	8.03	-	8.81	pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	-	-	1.2	-	-	-	-	-	mg/kg	A-T-033s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	-	-	-	<1.00	6.26	13.4	-	2.99	mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	14	83	186	-	67	mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	-	-	-	<0.4	<0.4	<0.4	-	<0.4	mg/l	A-T-026s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	0.02	-	-	-	-	-	g/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	16	64	503	-	86	mg/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	-	-	230	-	-	-	-	-	mg/kg	A-T-028s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	-	0.03	0.08	0.22	-	<0.02	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	-	-	-	<0.01	0.06	1.34	-	0.03	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	-	2	7	55	-	4	mg/l	A-T-SOLMETS
Cyanide (total) <sub>A</sub> <sup>M#</sup>	-	-	<1	-	-	-	-	-	mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	-	-	<0.2	-	-	-	-	-	mg/kg	A-T-050s
Sulphide <sub>A</sub>	-	-	<15	-	-	-	-	-	mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	-	-	10	-	-	-	-	-	mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	1.3	23.5	<0.1	-	-	-	4.1	-	% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	-	-	4	-	-	-	-	-	mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	-	-	<1.0	-	-	-	-	-	mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	-	-	<0.5	-	-	-	-	-	mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	-	-	3	-	-	-	-	-	mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	-	-	16	-	-	-	-	-	mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	-	-	<1	-	-	-	-	-	mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	-	-	15	-	-	-	-	-	mg/kg	A-T-024s
Mercury <sub>D</sub>	-	-	<0.17	-	-	-	-	-	mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	-	-	11	-	-	-	-	-	mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>M#</sup>	-	-	<1	-	-	-	-	-	mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	-	-	16	-	-	-	-	-	mg/kg	A-T-024s
Leachate Prep NRA (10:1) <sub>A</sub>	-	-	*	-	-	-	-	-		A-T-001
pH (leachable) <sub>A</sub> <sup>#</sup>	-	-	7.20	-	-	-	-	-	pH	A-T-031w
Ammoniacal nitrogen (leachable) <sub>A</sub>	-	-	<0.02	-	-	-	-	-	mg/l	A-T-033w
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	-	-	3.63	-	-	-	-	-	mg/l	A-T-026w



Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
Cyanide (total) (leachable) <sub>A</sub>	-	-	<0.005	-	-	-	-	-		
Phenols (total by HPLC) (leachable) <sub>A</sub>	-	-	<0.01	-	-	-	-	-	mg/l	A-T-050w
Sulphide (leachable) <sub>A</sub>	-	-	<0.1	-	-	-	-	-	mg/l	A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	-	-	2.0	-	-	-	-	-	mg/l	A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	-	-	5	-	-	-	-	-	µg/l	A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	-	-	13	-	-	-	-	-	µg/l	A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/l	A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	-	-	2	-	-	-	-	-	µg/l	A-T-025w
Chromium (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/l	A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	-	-	<0.05	-	-	-	-	-	mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	-	-	8	-	-	-	-	-	µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	-	-	<0.1	-	-	-	-	-	µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	-	-	<0.1	-	-	-	-	-	mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	-	-	7	-	-	-	-	-	µg/l	A-T-025w

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Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref		
Client Sample No	11	11	11	12	13	10	13	15				
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7				
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0				
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45				
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17				
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D				
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5				
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	-	-	NAD	-	-	-	-	-		A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	-	-	N/A	-	-	-	-	-				

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Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
PAH 16										
Acenaphthene <sub>A</sub> <sup>M#</sup>	-	-	0.34	-	-	-	-	-	mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	-	-	0.05	-	-	-	-	-	mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	-	-	5.43	-	-	-	-	-	mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	-	-	27.2	-	-	-	-	-	mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	-	-	13.9	-	-	-	-	-	mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	-	-	15.3	-	-	-	-	-	mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	-	-	5.10	-	-	-	-	-	mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	-	-	7.11	-	-	-	-	-	mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	-	-	16.2	-	-	-	-	-	mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	-	-	1.27	-	-	-	-	-	mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	-	-	51.9	-	-	-	-	-	mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	-	-	0.43	-	-	-	-	-	mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	-	-	7.16	-	-	-	-	-	mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	-	-	<0.03	-	-	-	-	-	mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	-	-	15	-	-	-	-	-	mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	-	-	44.3	-	-	-	-	-	mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	-	-	211	-	-	-	-	-	mg/kg	A-T-019s

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Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
PAH 16MS (leachable)										
Acenaphthene (leachable) <sub>A</sub>	-	-	0.03	-	-	-	-	-	µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	-	-	0.02	-	-	-	-	-	µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	-	-	<0.02	-	-	-	-	-	µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	-	-	0.03	-	-	-	-	-	µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	-	-	0.08	-	-	-	-	-	µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	-	-	0.04	-	-	-	-	-	µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	-	-	0.07	-	-	-	-	-	µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	-	-	0.03	-	-	-	-	-	µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	-	-	<0.02	-	-	-	-	-	µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	-	-	0.11	-	-	-	-	-	µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	-	-	<0.02	-	-	-	-	-	µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	-	-	<0.02	-	-	-	-	-	µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	-	-	0.09	-	-	-	-	-	µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	-	-	0.17	-	-	-	-	-	µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	-	-	<0.02	-	-	-	-	-	µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	-	-	<0.02	-	-	-	-	-	µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	-	-	0.67	-	-	-	-	-	µg/l	A-T-019w

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Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
Speciated PCB-EC7										
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	-	-	<0.007	-	-	-	-	-	mg/kg	A-T-004s

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Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
Speciated PCB-WHO12										
PCB BZ 81 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s



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Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
SVOC (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Acenaphthene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Acenaphthylene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Anthracene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Benzo(a)anthracene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Benzo(a)pyrene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Benzo(ghi)perylene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	-	-	<4	-	-	-	-	-	µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w

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Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
Carbazole (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-		
Chrysene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
n-Dioctylphthalate (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-052w
Fluoranthene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Fluorene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Hexachloroethane (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Indeno(1,2,3-cd)pyrene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Naphthalene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Phenanthrene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w
Pyrene (leachable) <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/l	A-T-052w

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
SVOC										
Hexachlorobenzene <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Carbazole <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	-	-	<500	-	-	-	-	-	µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Phenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	-	-	<500	-	-	-	-	-	µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Isophorone <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	-	-	<100	-	-	-	-	-	µg/kg	A-T-052s

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
Hexachlorocyclopentadiene <sub>A</sub>	-	-	<100	-	-	-	-	-		
Perylene <sub>A</sub>	-	-	140	-	-	-	-	-	µg/kg	A-T-052s

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
VOC										
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Chloromethane <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	-	-	<5	-	-	-	-	-	µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	-	-	<5	-	-	-	-	-	µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	-	-	<2	-	-	-	-	-	µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	-	-	<10	-	-	-	-	-	µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	-	-	<3	-	-	-	-	-	µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
Chlorobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-		
1,1,1,2-Tetrachloroethane <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,1,1,2,2-Tetrachloroethane <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	-	-	<2	-	-	-	-	-	µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	-	-	<2	-	-	-	-	-	µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	-	-	<3	-	-	-	-	-	µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	-	-	<1	-	-	-	-	-	µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	-	-	<3	-	-	-	-	-	µg/kg	A-T-006s



Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	-	-	<0.1	-	-	-	-	-	mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	-	-	<0.1	-	-	-	-	-	mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	-	-	<0.1	-	-	-	-	-	mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	-	-	<0.1	-	-	-	-	-	mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	-	-	<0.1	-	-	-	-	-	mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	-	-	<0.1	-	-	-	-	-	mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	-	-	<0.1	-	-	-	-	-	mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	-	-	<0.1	-	-	-	-	-	mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	-	-	3.3	-	-	-	-	-	mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	-	-	2.6	-	-	-	-	-	mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	-	-	<0.1	-	-	-	-	-	mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	-	-	5.9	-	-	-	-	-	mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	-	-	5.9	-	-	-	-	-	mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	-	-	<0.01	-	-	-	-	-	mg/kg	A-T-022s

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/9	17/08296/10	17/08296/11	17/08296/12	17/08296/13	17/08296/14	17/08296/15	17/08296/16	Units	Method ref
Client Sample No	11	11	11	12	13	10	13	15		
Client Sample ID	BH6	BH7	BH4	BH4	BH4	BH7	BH7	BH7		
Depth to Top	2.00	2.00	2.00	2.00	2.30	2.45	3.00	4.0		
Depth To Bottom	2.50	2.50		2.30	2.70	2.60	3.50	4.45		
Date Sampled	23-Nov-17	30-Nov-17	28-Nov-17	30-Nov-17	30-Nov-17	29-Nov-17	30-Nov-17	29-Nov-17		
Sample Type	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - D	Soil - B	Soil - D		
Sample Matrix Code	6	6A	1A	1A	6	6AE	6AE	5		
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	-	-	6	-	-	-	-	-	µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	-	-	9	-	-	-	-	-	µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-023w
Total Aliphatics (leachable) <sub>A</sub>	-	-	15	-	-	-	-	-	µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/l	A-T-022w
Aro >C7-C8 (leachable) <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	-	-	15	-	-	-	-	-	µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	-	-	<10	-	-	-	-	-	µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	-	-	<1	-	-	-	-	-	µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	-	-	3	-	-	-	-	-	µg/l	A-T-022w

Envirolab Job Number: 17/08296

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08296/17	17/08296/18							Units	Method ref
Client Sample No	22	31								
Client Sample ID	BH4	BH4								
Depth to Top	4.40	7.0								
Depth To Bottom	4.90	7.50								
Date Sampled	30-Nov-17	29-Nov-17								
Sample Type	Soil - B	Soil - B								
Sample Matrix Code	6AE	1								
% Stones >10mm <sub>A</sub>	<0.1	<0.1							% w/w	A-T-044
pH BRE <sub>D</sub>	7.51	8.12							pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	55.3	<1.00							mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	855	41							mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4							mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	428	16							mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.38	<0.02							% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	2.76	0.07							% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	482	7							mg/l	A-T-SOLMET5

## **REPORT NOTES**

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If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## Final Test Report

Envirolab Job Number: 17/08296  
Issue Number: 1  
Date: 14-Dec-17

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 573823

Date Samples Received: 30-Nov-17  
Date Instructions Received: 6-Dec-17  
Date Analysis Completed: 14-Dec-17

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

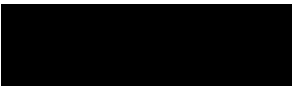
Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

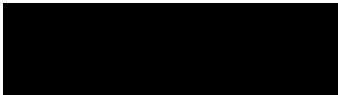
Please contact us if you need any further information.

Prepared by:

Approved by:



Holly Neary-King  
Administrative Assistant



Iain Haslock  
Analytical Consultant



Sample Details						Landfill Waste Acceptance Criteria Limits				
Lab Sample ID	Method	ISO17025	MCERTS	17/08296/11		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill		
Client Sample Number				11						
Client Sample ID				BH4						
Depth to Top				2						
Depth to Bottom										
Date Sampled				28/11/2017						
Sample Type				Soil - ES						
Sample Matrix Code				1A						
Solid Waste Analysis										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	9.14		-	>6	-		
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.04		-	to be evaluated	to be evaluated		
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.03		-	to be evaluated	to be evaluated		
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	<0.5		-	-	10		
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	<0.03		3	5	6		
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	211		100	-	-		
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10		500	-	-		
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007		1	-	-		
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01		6	-	-		
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	Y	N	0.003	0.003	0.007	0.030	0.5	2	25
Barium	A-T-025	Y	N	0.013	0.006	0.027	0.060	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70
Copper	A-T-025	Y	N	0.002	0.001	0.004	0.010	2	50	100
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.003	<0.001	0.006	<0.01	0.5	10	30
Nickel	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.4	10	40
Lead	A-T-025	Y	N	0.002	0.005	0.005	0.050	0.5	10	50
Antimony	A-T-025	Y	N	0.009	0.002	0.018	0.030	0.06	0.7	5
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	Y	N	0.009	0.008	0.020	0.080	4	50	200
Chloride	A-T-026	Y	N	16	2	34	28	800	15000	25000
Fluoride	A-T-026	Y	N	0.2	<0.10	0.5	<1	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	16	2	34	33	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	81	27	173	320	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	7.2	7.6					
Conductivity (µS/cm)	A-T-037	N	N	161	54					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	87.6						
<b>Stage 1</b>										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
<b>Stage 2</b>										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.400						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										



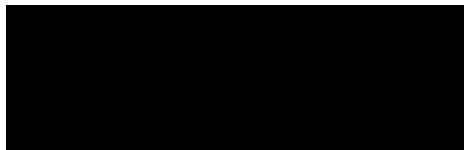
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 17/08396  
**Issue Number:** 1  
**Date:** 18 December, 2017

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 574561  
**Date Samples Received:** 11/12/17  
**Date Instructions Received:** 11/12/17  
**Date Analysis Completed:** 18/12/17

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Iain Haslock  
Analytical Consultant

Envirolab Job Number: 17/08396

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08396/1	17/08396/2	17/08396/3	17/08396/4	17/08396/5	17/08396/6	17/08396/7	17/08396/8	Units	Method ref
Client Sample No	42	54	65	71	75	3	9	12		
Client Sample ID	BH4	BH4	BH4	BH4	BH4	BH4A	BH4A	BH4A		
Depth to Top	12.0	17.0	22.0	26.0	28.0	0.50	2.10	3.0		
Depth To Bottom	12.45	17.45	22.45	26.45	28.45	1.00	2.50	3.50		
Date Sampled	01-Dec-17	04-Dec-17	01-Dec-17	05-Dec-17	05-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - B	Soil - B	Soil - B		
Sample Matrix Code	1A	4	5	4	5	6A	6AE	6AE		
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	13.3	3.8	<0.1		
pH BRE <sub>D</sub>	8.46	8.27	8.39	8.88	8.44	8.42	-	7.92	pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	<1.00	<1.00	<1.00	<1.00	<1.00	1.01	-	4.58	mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	179	1430	1490	95	193	9	-	93	mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4	<0.4	<0.4	<0.4	2.0	-	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	28	143	142	24	58	17	-	409	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	<0.02	0.03	0.03	<0.02	0.06	0.10	-	0.15	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	<0.01	0.01	0.01	0.07	0.36	0.06	-	0.56	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	10	78	78	6	17	4	-	62	mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	-	-	-	-	-	-	4.0	6.0	% w/w	A-T-032 OM

Envirolab Job Number: 17/08396

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08396/9	17/08396/10	17/08396/11						Units	Method ref
Client Sample No	2	7	14							
Client Sample ID	BH5	BH5	BH5							
Depth to Top	0.30	2.0	4.0							
Depth To Bottom	0.80	2.45	4.50							
Date Sampled	08-Dec-17	01-Dec-17	08-Dec-17							
Sample Type	Soil - B	Soil - D	Soil - B							
Sample Matrix Code	4AE	6	6AE							
% Stones >10mm <sub>A</sub>	5.9	<0.1	2.2							
pH BRE <sub>D</sub>	8.40	7.65	8.10						pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	1.09	7.45	2.71						mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	10	163	22						mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	7.9	<0.4	<0.4						mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	30	702	27						mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.09	0.35	0.04						% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.05	3.70	0.17						% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	7	84	7						mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	-	15.6	1.6						% w/w	A-T-032 OM

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All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

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Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

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Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

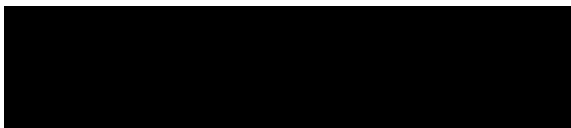
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 17/08632  
**Issue Number:** 1 **Date:** 05 January, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

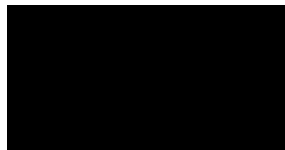
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 575575  
**Date Samples Received:** 14/12/17  
**Date Instructions Received:** 20/12/17  
**Date Analysis Completed:** 05/01/18

**Prepared by:**



Danielle Brierley  
Client Manager

**Approved by:**



Georgia King  
Admins & Client Services Supervisor





Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3						Units	Method ref
Client Sample No	14	27	3							
Client Sample ID	BH4D	BH4D	BH5A							
Depth to Top	3.90	9.90	0.50							
Depth To Bottom	4.00	10.00	0.60							
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6AE	1	4AB							
Chromium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-						µg/l	A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05	-	-						mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-						µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1	-	-						µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	3	-	-						µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-						µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1	-	-						mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	44	-	-						µg/l	A-T-025w

Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3						Units	Method ref		
Client Sample No	14	27	3									
Client Sample ID	BH4D	BH4D	BH5A									
Depth to Top	3.90	9.90	0.50									
Depth To Bottom	4.00	10.00	0.60									
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17									
Sample Type	Soil - ES	Soil - ES	Soil - ES									
Sample Matrix Code	6AE	1	4AB									
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	NAD	-	NAD							A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	N/A	-	N/A									

Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3							
Client Sample No	14	27	3							
Client Sample ID	BH4D	BH4D	BH5A							
Depth to Top	3.90	9.90	0.50							
Depth To Bottom	4.00	10.00	0.60							
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6AE	1	4AB							
PAH 16										
Acenaphthene <sub>A</sub> <sup>M#</sup>	0.08	<0.01	0.03						mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	0.05	<0.01	0.06						mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	0.21	<0.02	0.11						mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	0.78	<0.04	0.89						mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	0.68	<0.04	0.94						mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	1.06	<0.05	1.36						mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	0.44	<0.05	0.63						mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	0.36	<0.07	0.45						mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	0.89	<0.06	1.08						mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	0.11	<0.04	0.13						mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	2.05	<0.08	1.98						mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	0.11	<0.01	0.04						mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	0.52	<0.03	0.74						mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	0.06	<0.03	<0.03						mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	0.78	<0.03	0.72						mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	1.52	<0.07	1.63						mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	9.69	<0.08	10.8						mg/kg	A-T-019s

Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3							
Client Sample No	14	27	3							
Client Sample ID	BH4D	BH4D	BH5A							
Depth to Top	3.90	9.90	0.50							
Depth To Bottom	4.00	10.00	0.60							
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6AE	1	4AB							
<b>PAH 16MS (leachable)</b>										
Acenaphthene (leachable) <sub>A</sub>	0.11	-	-						µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	0.02	-	-						µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	0.10	-	-						µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	0.23	-	-						µg/l	A-T-019w

Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3						Units	Method ref
Client Sample No	14	27	3							
Client Sample ID	BH4D	BH4D	BH5A							
Depth to Top	3.90	9.90	0.50							
Depth To Bottom	4.00	10.00	0.60							
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6AE	1	4AB							
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	-	<0.002						mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	-	<0.002						mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	-	<0.004						mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	-	<0.007						mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	-	<0.006						mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	-	<0.004						mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	-	<0.004						mg/kg	A-T-004s
PCB Total of EC7 <sub>A</sub> <sup>M#</sup>	-	-	<0.007						mg/kg	A-T-004s

Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3						Units	Method ref
Client Sample No	14	27	3							
Client Sample ID	BH4D	BH4D	BH5A							
Depth to Top	3.90	9.90	0.50							
Depth To Bottom	4.00	10.00	0.60							
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6AE	1	4AB							
<b>Speciated PCB-WHO12</b>										
PCB BZ 81 <sub>A</sub>	<0.005	-	-						mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	<0.005	-	-						mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	<0.005	-	-						mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	<0.005	-	-						mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	<0.005	-	-						mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	<0.005	-	-						mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	<0.005	-	-						mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	<0.005	-	-						mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	<0.005	-	-						mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	<0.005	-	-						mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	<0.005	-	-						mg/kg	A-T-004s



Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3							Units	Method ref		
Client Sample No	14	27	3										
Client Sample ID	BH4D	BH4D	BH5A										
Depth to Top	3.90	9.90	0.50										
Depth To Bottom	4.00	10.00	0.60										
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17										
Sample Type	Soil - ES	Soil - ES	Soil - ES										
Sample Matrix Code	6AE	1	4AB										
SVOC excluding PAH-16 (leachable)													
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
2,4-Dichlorophenol (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
2,4-Dimethylphenol (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
2,4-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
2,6-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
2-Chloronaphthalene (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
2-Chlorophenol (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
2-Methylnaphthalene (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
2-Methylphenol (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
2-Nitrophenol (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
4-Methylphenol (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
4-Nitrophenol (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	<4	-	-							µg/l	A-T-052w		
Butylbenzyl phthalate (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
Carbazole (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
Dibenzofuran (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
Diethyl phthalate (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
Dimethyl phthalate (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
n-Dibutylphthalate (leachable) <sub>A</sub>	<12	-	-							µg/l	A-T-052w		
n-Dioctylphthalate (leachable) <sub>A</sub>	<10	-	-							µg/l	A-T-052w		
Hexachlorobenzene (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		
Hexachlorobutadiene (leachable) <sub>A</sub>	<2	-	-							µg/l	A-T-052w		

Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3						Units	Method ref
Client Sample No	14	27	3							
Client Sample ID	BH4D	BH4D	BH5A							
Depth to Top	3.90	9.90	0.50							
Depth To Bottom	4.00	10.00	0.60							
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6AE	1	4AB							
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<2	-	-							
Hexachloroethane (leachable) <sub>A</sub>	<2	-	-						µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	<2	-	-						µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	<2	-	-						µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<2	-	-						µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	<2	-	-						µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	<2	-	-						µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	<2	-	-						µg/l	A-T-052w



Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3												Units	Method ref
Client Sample No	14	27	3													
Client Sample ID	BH4D	BH4D	BH5A													
Depth to Top	3.90	9.90	0.50													
Depth To Bottom	4.00	10.00	0.60													
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17													
Sample Type	Soil - ES	Soil - ES	Soil - ES													
Sample Matrix Code	6AE	1	4AB													
<b>SVOC</b>																
Hexachlorobenzene <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Carbazole <sub>A</sub>	182	<100	<100												µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500												µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500												µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	<100												µg/kg	A-T-052s

Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3						Units	Method ref
Client Sample No	14	27	3							
Client Sample ID	BH4D	BH4D	BH5A							
Depth to Top	3.90	9.90	0.50							
Depth To Bottom	4.00	10.00	0.60							
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6AE	1	4AB							
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100						µg/kg	A-T-052s
Perylene <sub>A</sub>	1060	<100	502						µg/kg	A-T-052s

Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3							
Client Sample No	14	27	3							
Client Sample ID	BH4D	BH4D	BH5A							
Depth to Top	3.90	9.90	0.50							
Depth To Bottom	4.00	10.00	0.60							
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6AE	1	4AB							
VOC										
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10						µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	3	<1	<1						µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5	<5						µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5						µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2						µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10						µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3						µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1						µg/kg	A-T-006s

Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3							Units	Method ref
Client Sample No	14	27	3								
Client Sample ID	BH4D	BH4D	BH5A								
Depth to Top	3.90	9.90	0.50								
Depth To Bottom	4.00	10.00	0.60								
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17								
Sample Type	Soil - ES	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	1	4AB								
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1							µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1							µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2							µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1							µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2							µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3							µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	13	<1	<1							µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3							µg/kg	A-T-006s



Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3							
Client Sample No	14	27	3							
Client Sample ID	BH4D	BH4D	BH5A							
Depth to Top	3.90	9.90	0.50							
Depth To Bottom	4.00	10.00	0.60							
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6AE	1	4AB							
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	3.6	<0.1	<0.1						mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	10.5	<0.1	<0.1						mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	96.6	<0.1	<0.1						mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	8.9	<0.1	<0.1						mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	120	<0.1	<0.1						mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.02						mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	7.5	<0.1	1.2						mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	23.8	<0.1	5.7						mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	97.6	<0.1	21.6						mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	3.5	<0.1	1.8						mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	132	<0.1	30.4						mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	252	<0.1	30.4						mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s

Envirolab Job Number: 17/08632

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08632/1	17/08632/2	17/08632/3							
Client Sample No	14	27	3							
Client Sample ID	BH4D	BH4D	BH5A							
Depth to Top	3.90	9.90	0.50							
Depth To Bottom	4.00	10.00	0.60							
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6AE	1	4AB							
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Total Aliphatics (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Aro >C7-C8 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

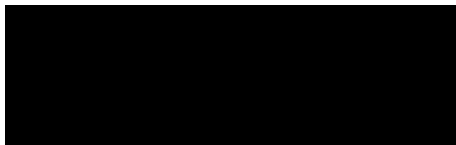
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/00015  
**Issue Number:** 1 **Date:** 10 January, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

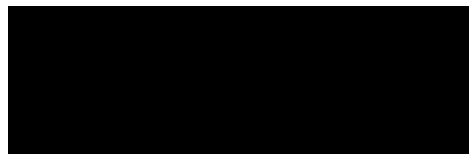
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 576269  
**Date Samples Received:** 03/01/18  
**Date Instructions Received:** 03/01/18  
**Date Analysis Completed:** 10/01/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/00015

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00015/1	18/00015/2	18/00015/3	18/00015/4	18/00015/5	18/00015/6	18/00015/7	18/00015/8	Units	Method ref		
Client Sample No	7	13	16	22	37	47	54	64				
Client Sample ID	BH5A	BH5A	BH5A	BH5A	BH5A	BH5A	BH5A	BH5A				
Depth to Top	1.20	2.50	3.0	5.0	10.0	15.0	18.0	23.0				
Depth To Bottom	1.65	3.00	3.50	5.45	10.45	15.45	18.45	23.50				
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17	13-Dec-17	13-Dec-17	13-Dec-17	14-Dec-17	14-Dec-17				
Sample Type	Soil - D	Soil - B	Soil - B	Soil - D	Soil - D	Soil - D	Soil - D	Soil - B				
Sample Matrix Code	6A	6E	6A	5A	1	1	1	1				
% Stones >10mm <sub>A</sub>	1.4	<0.1	4.0	<0.1	<0.1	<0.1	<0.1	<0.1			% w/w	A-T-044
pH BRE <sub>D</sub>	8.18	-	-	7.97	8.33	8.55	8.66	8.87	pH	A-T-031s		
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	4.45	-	-	3.77	<1.00	<1.00	1.26	<1.00	mg/l	A-T-033s		
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	36	-	-	36	324	791	734	369	mg/l	A-T-026s		
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	0.7	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s		
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	57	-	-	55	52	94	113	65	mg/l	A-T-026s		
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.09	-	-	<0.02	<0.02	0.04	0.03	<0.02	% w/w	A-T-028s		
Sulphur BRE (total) <sub>D</sub>	0.05	-	-	0.05	0.02	0.01	0.01	<0.01	% w/w	A-T-024s		
Magnesium BRE (water sol 2:1) <sub>D</sub>	5	-	-	8	17	51	38	17	mg/l	A-T-SOLMETS		
Organic matter <sub>D</sub> <sup>M#</sup>	-	19.5	4.4	-	-	-	-	-	% w/w	A-T-032 OM		

Envirolab Job Number: 18/00015

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00015/9								Units	Method ref
Client Sample No	74									
Client Sample ID	BH5A									
Depth to Top	29.0									
Depth To Bottom	29.45									
Date Sampled	14-Dec-17									
Sample Type	Soil - B									
Sample Matrix Code	5									
% Stones >10mm <sub>A</sub>	<0.1								% w/w	A-T-044
pH BRE <sub>D</sub>	8.59								pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	<1.00								mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	723								mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4								mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	137								mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.07								% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.54								% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	41								mg/l	A-T-SOLMET5



## **REPORT NOTES**

### **General:**

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All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

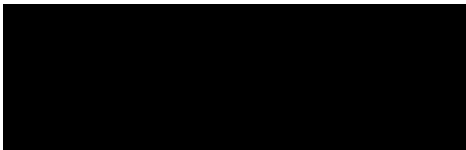
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/00042  
**Issue Number:** 1  
**Date:** 10 January, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

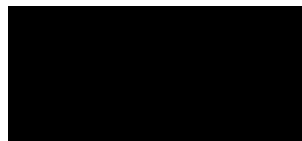
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 576388  
**Date Samples Received:** 04/01/18  
**Date Instructions Received:** 04/01/18  
**Date Analysis Completed:** 10/01/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Georgia King  
Admins & Client Services Supervisor

Envirolab Job Number: 18/00042

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00042/1	18/00042/2	18/00042/3	18/00042/4	18/00042/5	18/00042/6	18/00042/7		Units	Method ref
Client Sample No	6	19	25	39	50	56	65			
Client Sample ID	BH4D	BH4D	BH4D	BH4D	BH4D	BH4D	BH4D			
Depth to Top	1.20	6.0	9.0	16.0	22.0	26.0	28.45			
Depth To Bottom	1.65	6.45	9.45	16.45	22.45	26.45	28.60			
Date Sampled	12-Dec-17	12-Dec-17	12-Dec-17	13-Dec-17	14-Dec-17	14-Dec-17	14-Dec-17			
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D			
Sample Matrix Code	4AE	1A	1A	1	1	4	5			
% Stones >10mm <sub>A</sub>	9.5	1.9	0.8	<0.1	<0.1	<0.1	<0.1	% w/w		
pH BRE <sub>D</sub>	8.03	8.78	8.38	8.42	9.14	8.84	8.61	pH	A-T-031s	
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	1.11	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	mg/l	A-T-033s	
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	27	366	681	536	261	301	579	mg/l	A-T-026s	
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	7.5	<0.4	<0.4	1.0	<0.4	<0.4	<0.4	mg/l	A-T-026s	
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	341	57	80	64	37	70	136	mg/l	A-T-026s	
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.23	<0.02	<0.02	<0.02	<0.02	0.03	0.07	% w/w	A-T-028s	
Sulphur BRE (total) <sub>D</sub>	0.26	<0.01	<0.01	<0.01	<0.01	0.16	0.28	% w/w	A-T-024s	
Magnesium BRE (water sol 2:1) <sub>D</sub>	10	15	36	30	10	18	27	mg/l	A-T-SOLMET5	

## **REPORT NOTES**

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If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## Final Test Report

Envirolab Job Number: 17/08632  
Issue Number: 1 Date: 8-Jan-18

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Scott Viner/Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 575575

Date Samples Received: 14-Dec-17  
Date Instructions Received: 20-Dec-17  
Date Analysis Completed: 5-Jan-18

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

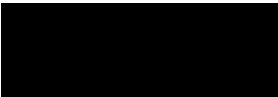
Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.


Please contact us if you need any further information.

Prepared by:

Approved by:



Holly Neary-King  
Administrative Assistant



Richard Wong  
Client Manager



Sample Details					Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	17/08632/1						
Client Sample Number				14				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				BH4D						
Depth to Top				3.9						
Depth to Bottom				4.00						
Date Sampled				12/12/2017						
Sample Type				Soil - ES						
Sample Matrix Code				6AE						
Solid Waste Analysis										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	7.78				-	>6	-
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.1				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.05				-	to be evaluated	to be evaluated
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	11.4				-	-	10
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	6.36				3	5	6
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	9.79				100	-	-
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	815				500	-	-
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	Y	N	0.009	0.002	0.032	0.030	0.5	2	25
Barium	A-T-025	Y	N	0.025	0.024	0.093	0.290	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70
Copper	A-T-025	Y	N	0.001	<0.001	0.004	0.010	2	50	100
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.073	0.026	0.268	0.360	0.5	10	30
Nickel	A-T-025	Y	N	0.003	0.002	0.010	0.030	0.4	10	40
Lead	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	50
Antimony	A-T-025	Y	N	0.007	0.004	0.024	0.050	0.06	0.7	5
Selenium	A-T-025	Y	N	0.001	<0.001	0.005	<0.01	0.1	0.5	7
Zinc	A-T-025	Y	N	0.006	0.018	0.024	0.200	4	50	200
Chloride	A-T-026	Y	N	153	32	565	531	800	15000	25000
Fluoride	A-T-026	Y	N	0.2	0.2	0.8	2.0	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	367	146	1354	1990	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	947	375	3497	5116	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	7.9	8.1					
Conductivity (µS/cm)	A-T-037	N	N	1893	749					
Mass Sample (kg)				0.201						
Dry Matter (%)	A-T-044	N	N	58.5						
Stage 1										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			0.940						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										



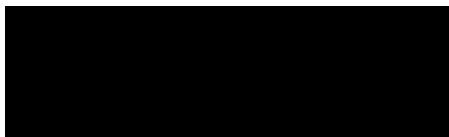
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 17/08066  
**Issue Number:** 1  
**Date:** 11 December, 2017

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 572985  
**Date Samples Received:** 27/11/17  
**Date Instructions Received:** 28/11/17  
**Date Analysis Completed:** 08/12/17

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Richard Wong  
Client Manager



Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3						Units	Method ref
Client Sample No	3	18	6							
Client Sample ID	BH6	BH6	BH6							
Depth to Top	0.50	2.00	1.00							
Depth To Bottom	0.60	2.10	1.10							
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4AE	4A	5A							
Chromium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-						µg/l	A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05	-	-						mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	67	-	-						µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1	-	-						µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	3	-	-						µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-						µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1	-	-						mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	24	-	-						µg/l	A-T-025w

Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3						Units	Method ref		
Client Sample No	3	18	6									
Client Sample ID	BH6	BH6	BH6									
Depth to Top	0.50	2.00	1.00									
Depth To Bottom	0.60	2.10	1.10									
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17									
Sample Type	Soil - ES	Soil - ES	Soil - ES									
Sample Matrix Code	4AE	4A	5A									
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	Chrysotile	NAD	Chrysotile							A-T-045		
Asbestos Matrix (microscope) <sub>A</sub>	Loose Fibres	-	Loose Fibres							A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A									
Asbestos in Soil Quantification % (Hand Picking & Weighing)												
Asbestos in soil % composition (hand picking and weighing) <sub>B</sub>	0.016	-	<0.001						% w/w	A-T-054		

Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3							
Client Sample No	3	18	6							
Client Sample ID	BH6	BH6	BH6							
Depth to Top	0.50	2.00	1.00							
Depth To Bottom	0.60	2.10	1.10							
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4AE	4A	5A							
PAH 16										
Acenaphthene <sub>A</sub> <sup>M#</sup>	0.62	0.01	-						mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	0.09	0.01	-						mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	1.20	0.06	-						mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	3.96	0.27	-						mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	3.17	0.20	-						mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	3.82	0.29	-						mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	1.70	0.15	-						mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	1.32	0.09	-						mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	3.88	0.31	-						mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	0.41	<0.04	-						mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	7.87	0.63	-						mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	0.63	0.02	-						mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	1.94	0.16	-						mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	1.18	<0.03	-						mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	4.87	0.35	-						mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	6.54	0.59	-						mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	43.2	3.16	-						mg/kg	A-T-019s

Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3							
Client Sample No	3	18	6							
Client Sample ID	BH6	BH6	BH6							
Depth to Top	0.50	2.00	1.00							
Depth To Bottom	0.60	2.10	1.10							
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4AE	4A	5A							
<b>PAH 16MS (leachable)</b>										
Acenaphthene (leachable) <sub>A</sub>	0.52	-	-						µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	0.04	-	-						µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	0.05	-	-						µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	0.06	-	-						µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	0.03	-	-						µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	0.07	-	-						µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	0.20	-	-						µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	0.23	-	-						µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	<0.02	-	-						µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	0.51	-	-						µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	0.20	-	-						µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	0.18	-	-						µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	2.09	-	-						µg/l	A-T-019w



Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3						Units	Method ref
Client Sample No	3	18	6							
Client Sample ID	BH6	BH6	BH6							
Depth to Top	0.50	2.00	1.00							
Depth To Bottom	0.60	2.10	1.10							
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4AE	4A	5A							
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	<0.002	-	-						mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	<0.002	-	-						mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	<0.004	-	-						mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007	-						mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	<0.006	-	-						mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	<0.004	-	-						mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	<0.004	-	-						mg/kg	A-T-004s
PCB Total of EC7 <sub>A</sub> <sup>M#</sup>	<0.007	-	-						mg/kg	A-T-004s

Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3						Units	Method ref
Client Sample No	3	18	6							
Client Sample ID	BH6	BH6	BH6							
Depth to Top	0.50	2.00	1.00							
Depth To Bottom	0.60	2.10	1.10							
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4AE	4A	5A							
Speciated PCB-WHO12										
PCB BZ 81 <sub>A</sub>	-	<0.005	-						mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	-	<0.005	-						mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	-	<0.005	-						mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	-	<0.005	-						mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	-	<0.005	-						mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	-	<0.005	-						mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	-	<0.005	-						mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	-	<0.005	-						mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	-	<0.005	-						mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	-	<0.005	-						mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	-	<0.005	-						mg/kg	A-T-004s



Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3						Units	Method ref
Client Sample No	3	18	6							
Client Sample ID	BH6	BH6	BH6							
Depth to Top	0.50	2.00	1.00							
Depth To Bottom	0.60	2.10	1.10							
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4AE	4A	5A							
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-052w
Hexachloroethane (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-052w

Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3							Units	Method ref
Client Sample No	3	18	6								
Client Sample ID	BH6	BH6	BH6								
Depth to Top	0.50	2.00	1.00								
Depth To Bottom	0.60	2.10	1.10								
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17								
Sample Type	Soil - ES	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A	5A								
SVOC											
Hexachlorobenzene <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	241	<100	-							µg/kg	A-T-052s
Carbazole <sub>A</sub>	165	<100	-							µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	-							µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	203	<100	-							µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
n-Dioctylphthalate <sub>A</sub>	<500	<500	-							µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	-							µg/kg	A-T-052s

Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3						Units	Method ref
Client Sample No	3	18	6							
Client Sample ID	BH6	BH6	BH6							
Depth to Top	0.50	2.00	1.00							
Depth To Bottom	0.60	2.10	1.10							
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4AE	4A	5A							
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	-						µg/kg	A-T-052s
Perylene <sub>A</sub>	632	266	-						µg/kg	A-T-052s



Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3							Units	Method ref		
Client Sample No	3	18	6										
Client Sample ID	BH6	BH6	BH6										
Depth to Top	0.50	2.00	1.00										
Depth To Bottom	0.60	2.10	1.10										
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17										
Sample Type	Soil - ES	Soil - ES	Soil - ES										
Sample Matrix Code	4AE	4A	5A										
VOC													
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Chloromethane <sub>A</sub>	<10	<10	-							µg/kg	A-T-006s		
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	1	-							µg/kg	A-T-006s		
Dichloromethane <sub>A</sub>	<5	<5	-							µg/kg	A-T-006s		
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	-							µg/kg	A-T-006s		
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	-							µg/kg	A-T-006s		
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	-							µg/kg	A-T-006s		
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	-							µg/kg	A-T-006s		
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	-							µg/kg	A-T-006s		

Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3																Units	Method ref		
Client Sample No	3	18	6																			
Client Sample ID	BH6	BH6	BH6																			
Depth to Top	0.50	2.00	1.00																			
Depth To Bottom	0.60	2.10	1.10																			
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17																			
Sample Type	Soil - ES	Soil - ES	Soil - ES																			
Sample Matrix Code	4AE	4A	5A																			
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	-																	µg/kg	A-T-006s	
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	-																		µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	-																		µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	-																		µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	-																		µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	-																		µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	-																		µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	-																		µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	-																		µg/kg	A-T-006s

Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3							
Client Sample No	3	18	6							
Client Sample ID	BH6	BH6	BH6							
Depth to Top	0.50	2.00	1.00							
Depth To Bottom	0.60	2.10	1.10							
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4AE	4A	5A							
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	-						mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	-						mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	0.05	<0.01	-						mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	4.4	<0.1	-						mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	28.6	<0.1	-						mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	57.2	<0.1	-						mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	43.8	<0.1	-						mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	1.6	<0.1	-						mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	136	<0.1	-						mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	-						mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	-						mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	-						mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	0.07	<0.01	-						mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	5.1	<0.1	-						mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	15.8	<0.1	-						mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	64.0	<0.1	-						mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	62.5	<0.1	-						mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	0.7	<0.1	-						mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	148	<0.1	-						mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	284	<0.1	-						mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	-						mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	-						mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	-						mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	-						mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	-						mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	-						mg/kg	A-T-022s

Envirolab Job Number: 17/08066

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08066/1	17/08066/2	17/08066/3							
Client Sample No	3	18	6							
Client Sample ID	BH6	BH6	BH6							
Depth to Top	0.50	2.00	1.00							
Depth To Bottom	0.60	2.10	1.10							
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4AE	4A	5A							
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	1	-	-						µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	4	-	-						µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Total Aliphatics (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Aro >C7-C8 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	11	-	-						µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	11	-	-						µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	11	-	-						µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	<10	-	-						µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	<1	-	-						µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	1	-	-						µg/l	A-T-022w

## **REPORT NOTES**

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### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

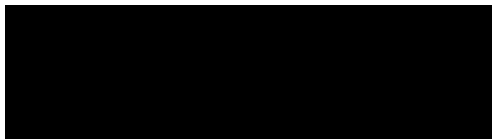
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 17/08196  
**Issue Number:** 1  
**Date:** 08 December, 2017

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

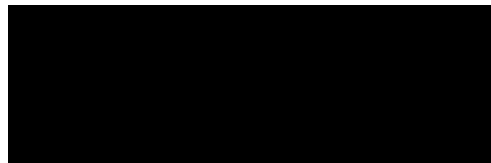
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 573343  
**Date Samples Received:** 01/12/17  
**Date Instructions Received:** 01/12/17  
**Date Analysis Completed:** 08/12/17

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Richard Wong  
Client Manager



Envirolab Job Number: 17/08196

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08196/1	17/08196/2	17/08196/3	17/08196/4	17/08196/5	17/08196/6	17/08196/7	17/08196/8	Units	Method ref
Client Sample No	7	19	21	23	29	38	47	55		
Client Sample ID	BH6	BH6	BH6	BH6	BH6	BH6	BH6	BH6		
Depth to Top	0.40	4.00	5.00	6.00	8.00	12.00	16.00	20.00		
Depth To Bottom	0.50	4.45	5.45	6.45	8.45	12.39	16.45	20.41		
Date Sampled	23-Nov-17	23-Nov-17	23-Nov-17	23-Nov-17	23-Nov-17	24-Nov-17	27-Nov-17	27-Nov-17		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	4A	4A	1A	1A	1	1	1	1A		
% Stones >10mm <sub>A</sub>	12.4	9.4	12.3	6.2	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub>	8.03	8.45	8.62	8.59	8.92	8.12	8.39	8.63	pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	10.8	<1.00	<1.00	<1.00	1.32	<1.00	<1.00	<1.00	mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	39	19	270	407	268	872	1400	633	mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	64	14	34	48	41	115	187	89	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.13	<0.02	<0.02	<0.02	<0.02	0.03	0.04	0.03	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.18	0.03	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	6	5	15	21	5	61	92	33	mg/l	A-T-SOLMETS

Envirolab Job Number: 17/08196

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08196/9	17/08196/10							Units	Method ref
Client Sample No	62	70								
Client Sample ID	BH6	BH6								
Depth to Top	24.00	28.00								
Depth To Bottom	24.45	28.45								
Date Sampled	27-Nov-17	27-Nov-17								
Sample Type	Soil - D	Soil - D								
Sample Matrix Code	1	5								
% Stones >10mm <sub>A</sub>	<0.1	<0.1						% w/w		
pH BRE <sub>D</sub>	8.57	8.36						pH	A-T-031s	
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	<1.00	1.03						mg/l	A-T-033s	
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	352	925						mg/l	A-T-026s	
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4						mg/l	A-T-026s	
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	61	164						mg/l	A-T-026s	
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.03	0.09						% w/w	A-T-028s	
Sulphur BRE (total) <sub>D</sub>	0.17	0.54						% w/w	A-T-024s	
Magnesium BRE (water sol 2:1) <sub>D</sub>	17	42						mg/l	A-T-SOLMET5	

## **REPORT NOTES**

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A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

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Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## Final Test Report

Envirolab Job Number: 17/08066  
Issue Number: 1  
Date: 11-Dec-17

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 572985

Date Samples Received: 27-Nov-17  
Date Instructions Received: 28-Nov-17  
Date Analysis Completed: 8-Dec-17

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

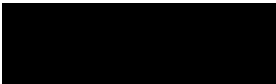
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Please contact us if you need any further information.

Prepared by:

Approved by:



Holly Neary-King  
Administrative Assistant



Richard Wong  
Client Manager



Sample Details					Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	17/08066/1						
Client Sample Number				3				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				BH6						
Depth to Top				0.5						
Depth to Bottom				0.60						
Date Sampled				23/11/2017						
Sample Type				Soil - ES						
Sample Matrix Code				4AE						
Solid Waste Analysis										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.11				-	>6	-
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.56				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.17				-	to be evaluated	to be evaluated
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	6.1				-	-	10
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	2.6				3	5	6
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	43.4				100	-	-
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	123				500	-	-
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	Y	N	0.009	0.006	0.019	0.060	0.5	2	25
Barium	A-T-025	Y	N	0.065	0.044	0.142	0.470	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70
Copper	A-T-025	Y	N	0.014	0.011	0.032	0.120	2	50	100
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.054	0.010	0.119	0.140	0.5	10	30
Nickel	A-T-025	Y	N	0.005	0.002	0.012	0.030	0.4	10	40
Lead	A-T-025	Y	N	0.067	0.101	0.147	1.000	0.5	10	50
Antimony	A-T-025	Y	N	0.023	0.014	0.051	0.150	0.06	0.7	5
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	Y	N	0.032	0.028	0.071	0.290	4	50	200
Chloride	A-T-026	Y	N	29	5	64	71	800	15000	25000
Fluoride	A-T-026	Y	N	0.4	0.2	0.9	2.0	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	50	11	110	146	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	262	73	575	909	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	27.7	<20.0	61	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	7.9	7.4					
Conductivity (µS/cm)	A-T-037	N	N	524	145					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	85.9						
Stage 1										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.380						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

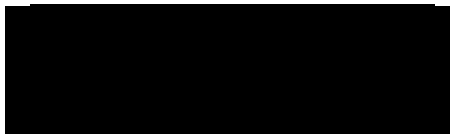
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/00646  
**Issue Number:** 1  
**Date:** 05 February, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

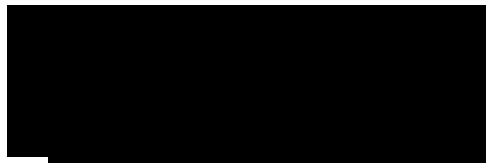
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 579331  
**Date Samples Received:** 25/01/18  
**Date Instructions Received:** 29/01/18  
**Date Analysis Completed:** 05/02/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Richard Wong  
Client Manager





Envirolab Job Number: 18/00646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00646/1	18/00646/2							Units	Method ref
Client Sample No	5	23								
Client Sample ID	BH8	BH8								
Depth to Top	1.0	4.90								
Depth To Bottom	1.10	5.0								
Date Sampled	23-Jan-18	23-Jan-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4A	1A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD	-								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	-								

Envirolab Job Number: 18/00646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00646/1	18/00646/2								Units	Method ref
Client Sample No	5	23									
Client Sample ID	BH8	BH8									
Depth to Top	1.0	4.90									
Depth To Bottom	1.10	5.0									
Date Sampled	23-Jan-18	23-Jan-18									
Sample Type	Soil - ES	Soil - ES									
Sample Matrix Code	4A	1A									
<b>PAH 16</b>											
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01								mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01								mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	<0.02								mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04								mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04								mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05								mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05								mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07								mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	<0.06								mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04								mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	<0.08								mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01								mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03								mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03								mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03								mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07								mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	<0.08	<0.08								mg/kg	A-T-019s

Envirolab Job Number: 18/00646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00646/1	18/00646/2							Units	Method ref
Client Sample No	5	23								
Client Sample ID	BH8	BH8								
Depth to Top	1.0	4.90								
Depth To Bottom	1.10	5.0								
Date Sampled	23-Jan-18	23-Jan-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4A	1A								
<b>Speciated PCB-WHO12</b>										
PCB BZ 81 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>MF</sup>	<0.007	-							mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
<b>Total Speciated PCB-WHO12<sub>A</sub></b>	<0.007	-							mg/kg	A-T-004s



Envirolab Job Number: 18/00646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00646/1	18/00646/2							Units	Method ref
Client Sample No	5	23								
Client Sample ID	BH8	BH8								
Depth to Top	1.0	4.90								
Depth To Bottom	1.10	5.0								
Date Sampled	23-Jan-18	23-Jan-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4A	1A								
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100						µg/kg	A-T-052s	
Perylene <sub>A</sub>	<100	<100						µg/kg	A-T-052s	



Envirolab Job Number: 18/00646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00646/1	18/00646/2																	Units	Method ref
Client Sample No	5	23																		
Client Sample ID	BH8	BH8																		
Depth to Top	1.0	4.90																		
Depth To Bottom	1.10	5.0																		
Date Sampled	23-Jan-18	23-Jan-18																		
Sample Type	Soil - ES	Soil - ES																		
Sample Matrix Code	4A	1A																		
VOC																				
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	<10	<10																	µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5																	µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5																	µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2																	µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10																	µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3																	µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s

Envirolab Job Number: 18/00646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00646/1	18/00646/2																	Units	Method ref
Client Sample No	5	23																		
Client Sample ID	BH8	BH8																		
Depth to Top	1.0	4.90																		
Depth To Bottom	1.10	5.0																		
Date Sampled	23-Jan-18	23-Jan-18																		
Sample Type	Soil - ES	Soil - ES																		
Sample Matrix Code	4A	1A																		
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1																	µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1																	µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2																	µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1																	µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2																	µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3																	µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3																	µg/kg	A-T-006s

Envirolab Job Number: 18/00646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00646/1	18/00646/2										Units	Method ref
Client Sample No	5	23											
Client Sample ID	BH8	BH8											
Depth to Top	1.0	4.90											
Depth To Bottom	1.10	5.0											
Date Sampled	23-Jan-18	23-Jan-18											
Sample Type	Soil - ES	Soil - ES											
Sample Matrix Code	4A	1A											
<b>TPH UKCWG</b>													
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1										mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1										mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1										mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1										mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1										mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1	<0.1										mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1										mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1										mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1										mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1										mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1										mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	<0.1	<0.1										mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	<0.1	<0.1										mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01										mg/kg	A-T-022s

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

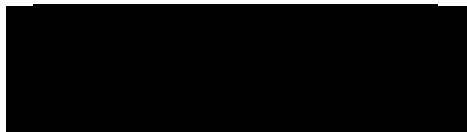
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/00786  
**Issue Number:** 1  
**Date:** 12 February, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

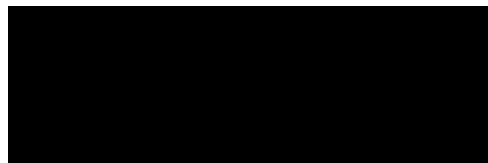
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 579974  
**Date Samples Received:** 02/02/18  
**Date Instructions Received:** 02/02/18  
**Date Analysis Completed:** 10/02/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/00786

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00786/1	18/00786/2	18/00786/3	18/00786/4	18/00786/5	18/00786/6	18/00786/7	18/00786/8	Units	Method ref
Client Sample No	13	15	41	51	69	79	85	93		
Client Sample ID	BH8	BH8	BH8	BH8	BH8	BH8	BH8	BH8		
Depth to Top	2.0	2.2	11.0	15.0	24.00	28.45	31.20	36.0		
Depth To Bottom										
Date Sampled	23-Jan-18	23-Jan-18	24-Jan-18	25-Jan-18	26-Jan-18	26-Jan-18	29-Jan-18	29-Jan-18		
Sample Type	Soil - D	Soil - B	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	6A	6A	5	5	5	5	5	5A		
% Stones >10mm <sub>A</sub>	<0.1	2.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub>	8.25	-	8.53	9.17	8.46	8.04	8.29	8.55	pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	5.71	-	<1.00	<1.00	<1.00	1.35	1.26	1.81	mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	97	-	435	160	675	1160	1040	572	mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	<0.4	-	<0.4	<0.4	<0.4	<0.4	21.5	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	157	-	65	33	91	203	299	97	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.16	-	<0.02	<0.02	0.04	0.10	0.10	0.07	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.85	-	<0.01	<0.01	0.08	0.56	0.29	0.32	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	21	-	19	6	46	45	56	27	mg/l	A-T-SOLMETs
Organic matter <sub>D</sub> <sup>M#</sup>	2.6	18.2	-	-	-	-	-	1.2	% w/w	A-T-032 OM
Organic Matter <sub>D</sub>	2.6	18.2	-	-	-	-	-	1.2	% w/w	A-T-032 OM



## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

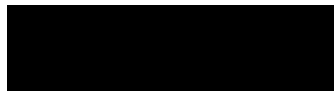
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/00786/1

**Envirolab Job Number:** 18/00786  
**Issue Number:** 2  
**Date:** 13 February, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

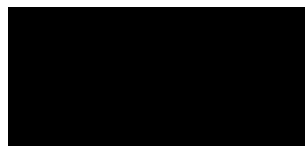
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 579974  
**Date Samples Received:** 02/02/18  
**Date Instructions Received:** 02/02/18  
**Date Analysis Completed:** 13/02/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/00786

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00786/1	18/00786/2	18/00786/3	18/00786/4	18/00786/5	18/00786/6	18/00786/7	18/00786/8	Units	Method ref
Client Sample No	13	15	41	51	69	79	85	93		
Client Sample ID	BH8	BH8	BH8	BH8	BH8	BH8	BH8	BH8		
Depth to Top	2.0	2.2	11.0	15.0	24.00	28.45	31.20	36.0		
Depth To Bottom										
Date Sampled	23-Jan-18	23-Jan-18	24-Jan-18	25-Jan-18	26-Jan-18	26-Jan-18	29-Jan-18	29-Jan-18		
Sample Type	Soil - D	Soil - B	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	6A	6A	5	5	5	5	5	5A		
% Stones >10mm <sub>A</sub>	<0.1	2.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub>	8.25	-	8.53	9.17	8.46	8.04	8.29	8.55	pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	5.71	-	<1.00	<1.00	<1.00	1.35	1.26	1.81	mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	97	-	435	160	675	1160	1040	572	mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	<0.4	-	<0.4	<0.4	<0.4	<0.4	21.5	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	157	-	65	33	91	203	299	97	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.16	-	<0.02	<0.02	0.04	0.10	0.10	0.07	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.85	-	<0.01	<0.01	0.08	0.56	0.29	0.32	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	21	-	19	6	46	45	56	27	mg/l	A-T-SOLMETs
Organic matter <sub>D</sub> <sup>M#</sup>	1.9	15.3	-	-	-	-	-	<0.1	% w/w	A-T-032 OM
Organic Matter <sub>D</sub>	2.6	18.2	-	-	-	-	-	1.2	% w/w	A-T-032 OM

## **REPORT NOTES**

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A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

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NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## Final Test Report

Envirolab Job Number: 18/00646  
Issue Number: 1  
Date: 5-Feb-18

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 579331

Date Samples Received: 25-Jan-18  
Date Instructions Received: 29-Jan-18  
Date Analysis Completed: 5-Feb-18

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

Approved by:

Holly Neary-King  
Administrative Assistant

Richard Wong  
Client Manager



Sample Details						Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/00646/1		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample Number				5							
Client Sample ID				BH8							
Depth to Top				1							
Depth to Bottom				1.10							
Date Sampled				23/01/2018							
Sample Type				Soil - ES							
Sample Matrix Code				4A							
Solid Waste Analysis											
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	7.71		-	>6	-			
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N			-	to be evaluated	to be evaluated			
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N			-	to be evaluated	to be evaluated			
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	9.3		-	-	10			
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	7.16		3	5	6			
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08		100	-	-			
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	35		500	-	-			
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007		1	-	-			
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01		6	-	-			
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
				mg/l		mg/kg					
Arsenic	A-T-025	Y	N	0.011	0.013	0.025	0.130	0.5	2	25	
Barium	A-T-025	Y	N	0.023	0.006	0.055	0.080	20	100	300	
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5	
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70	
Copper	A-T-025	Y	N	0.003	0.001	0.007	0.020	2	50	100	
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2	
Molybdenum	A-T-025	Y	N	0.066	0.010	0.155	0.160	0.5	10	30	
Nickel	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.4	10	40	
Lead	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	50	
Antimony	A-T-025	Y	N	0.010	0.003	0.024	0.040	0.06	0.7	5	
Selenium	A-T-025	Y	N	0.011	0.006	0.026	0.070	0.1	0.5	7	
Zinc	A-T-025	Y	N	0.001	<0.001	0.003	<0.01	4	50	200	
Chloride	A-T-026	Y	N	31	3	72	53	800	15000	25000	
Fluoride	A-T-026	Y	N	0.5	0.4	1.2	4.0	10	150	500	
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	47	7	109	105	1000	20000	50000	
Total Dissolved Solids	A-T-035	N	N	216	57	504	734	4000	60000	100000	
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-	
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000	
Leach Test Information											
pH (pH Units)	A-T-031	N	Y	7.7	8.0						
Conductivity (µS/cm)	A-T-037	N	N	432	113						
Mass Sample (kg)				0.200							
Dry Matter (%)	A-T-044	N	N	82.4							
Stage 1											
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350							
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150							
Stage 2											
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.320							
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation											



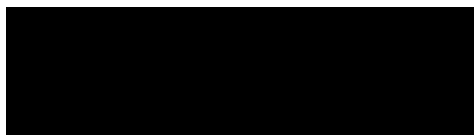
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/00839  
**Issue Number:** 1  
**Date:** 14 February, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

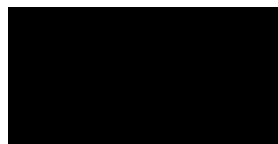
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 580346  
**Date Samples Received:** 05/02/18  
**Date Instructions Received:** 06/02/18  
**Date Analysis Completed:** 14/02/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/00839

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00839/1									Units	Method ref
Client Sample No	14										
Client Sample ID	BH9										
Depth to Top	3.50										
Depth To Bottom	3.60										
Date Sampled	31-Jan-18										
Sample Type	Soil - ES										
Sample Matrix Code	1A										
% Stones >10mm <sub>A</sub>	10.4									% w/w	A-T-044
pH <sub>D</sub>	8.56									pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	1.3									mg/kg	A-T-033s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	<0.01									g/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	<200									mg/kg	A-T-028s
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1									mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	<0.2									mg/kg	A-T-050s
Sulphide <sub>A</sub>	<5									mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	<5									mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	<0.1									% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	2									mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	<1.0									mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	<0.5									mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	<1									mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	4									mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	<1									mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	3									mg/kg	A-T-024s
Mercury <sub>D</sub>	<0.17									mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	3									mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>M#</sup>	<1									mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	<5									mg/kg	A-T-024s

Envirolab Job Number: 18/00839

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00839/1									Units	Method ref
Client Sample No	14										
Client Sample ID	BH9										
Depth to Top	3.50										
Depth To Bottom	3.60										
Date Sampled	31-Jan-18										
Sample Type	Soil - ES										
Sample Matrix Code	1A										
PAH 16											
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01									mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01									mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02									mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04									mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04									mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05									mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05									mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07									mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06									mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04									mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08									mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01									mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03									mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03									mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03									mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07									mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	<0.08									mg/kg	A-T-019s

Envirolab Job Number: 18/00839

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00839/1									Units	Method ref
Client Sample No	14										
Client Sample ID	BH9										
Depth to Top	3.50										
Depth To Bottom	3.60										
Date Sampled	31-Jan-18										
Sample Type	Soil - ES										
Sample Matrix Code	1A										
SVOC											
Hexachlorobenzene <sub>A</sub>	<100									µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100									µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100									µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100									µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100									µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100									µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500									µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100									µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100									µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100									µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100									µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100									µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100									µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100									µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100									µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100									µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100									µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100									µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100									µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100									µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100									µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100									µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100									µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100									µg/kg	A-T-052s
Phenol <sub>A</sub>	<100									µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100									µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100									µg/kg	A-T-052s
n-Dioctylphthalate <sub>A</sub>	<500									µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100									µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100									µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100									µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100									µg/kg	A-T-052s

Envirolab Job Number: 18/00839

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00839/1								Units	Method ref
Client Sample No	14									
Client Sample ID	BH9									
Depth to Top	3.50									
Depth To Bottom	3.60									
Date Sampled	31-Jan-18									
Sample Type	Soil - ES									
Sample Matrix Code	1A									
Hexachlorocyclopentadiene <sub>A</sub>	<100								µg/kg	A-T-052s
Perylene <sub>A</sub>	<100								µg/kg	A-T-052s

Envirolab Job Number: 18/00839

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00839/1									Units	Method ref
Client Sample No	14										
Client Sample ID	BH9										
Depth to Top	3.50										
Depth To Bottom	3.60										
Date Sampled	31-Jan-18										
Sample Type	Soil - ES										
Sample Matrix Code	1A										
VOC											
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	<10									µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	1									µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5									µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5									µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2									µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10									µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3									µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s



Envirolab Job Number: 18/00839

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00839/1									Units	Method ref
Client Sample No	14										
Client Sample ID	BH9										
Depth to Top	3.50										
Depth To Bottom	3.60										
Date Sampled	31-Jan-18										
Sample Type	Soil - ES										
Sample Matrix Code	1A										
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1									µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1									µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2									µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1									µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2									µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3									µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3									µg/kg	A-T-006s

Envirolab Job Number: 18/00839

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00839/1									Units	Method ref
Client Sample No	14										
Client Sample ID	BH9										
Depth to Top	3.50										
Depth To Bottom	3.60										
Date Sampled	31-Jan-18										
Sample Type	Soil - ES										
Sample Matrix Code	1A										
TPH UKCWG											
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1									mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1									mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1									mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	<0.1									mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	<0.1									mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s

## **REPORT NOTES**

### **General:**

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All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

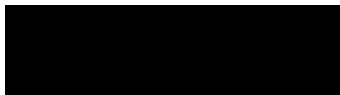
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/00961  
**Issue Number:** 1  
**Date:** 16 February, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

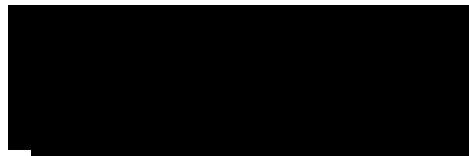
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 580605  
**Date Samples Received:** 08/02/18  
**Date Instructions Received:** 08/02/18  
**Date Analysis Completed:** 16/02/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/00961

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00961/1	18/00961/2	18/00961/3	18/00961/4					Units	Method ref
Client Sample No	11	38	83	86						
Client Sample ID	BH9	BH9	BH9	BH9						
Depth to Top	2.60	12.00	34.00	36.00						
Depth To Bottom	2.70	12.45	34.45	36.45						
Date Sampled	30-Jan-18	01-Feb-18	05-Feb-18	05-Feb-18						
Sample Type	Soil - B	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	6A	4A	5A	5A						
% Stones >10mm <sub>A</sub>	1.7	<0.1	11.1	4.0						
pH BRE <sub>D</sub>	-	8.49	8.79	8.61					pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	-	<1.00	<1.00	45.6					mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	505	165	289					mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	-	<0.4	<0.4	<0.4					mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	67	36	57					mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	<0.02	0.04	0.05					% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	-	<0.01	0.12	0.16					% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	31	11	16					mg/l	A-T-SOLMETs
Organic matter <sub>D</sub> <sup>M#</sup>	1.8	-	-	-					% w/w	A-T-032 OM

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For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

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### **TPH analysis of water by method A-T-007:**

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### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

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Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02024  
**Issue Number:** 1 **Date:** 27 March, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

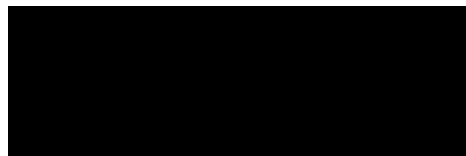
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 584698  
**Date Samples Received:** 15/03/18  
**Date Instructions Received:** 20/03/18  
**Date Analysis Completed:** 26/03/18

**Prepared by:**



Gill Walker  
Laboratory Manager

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/02024

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02024/1	18/02024/2	18/02024/3	18/02024/4	18/02024/5	18/02024/6	18/02024/7	18/02024/8	Units	Method ref
Client Sample No	21	45	52	66	76	92	104	108		
Client Sample ID	BH10A	BH10A	BH10A	BH10A	BH10A	BH10A	BH10A	BH10A		
Depth to Top	4.30	13.00	15.00	22.00	28.00	38.00	45.60	47.45		
Depth To Bottom	4.50	13.45	15.45	22.45	28.45	38.38	45.80	47.50		
Date Sampled	13-Mar-18	21-Feb-18	21-Feb-18	21-Feb-18	22-Feb-18	23-Feb-18	13-Mar-18	26-Feb-18		
Sample Type	Solid	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	7	4	1	4	5	1	5	3		
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub>	-	-	-	8.79	8.61	8.50	7.89	8.41	pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	-	-	-	<1.00	<1.00	<1.00	5.35	6.26	mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	528	1590	701	3430	928	mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	-	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	79	278	100	805	228	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	-	0.02	0.09	0.05	0.31	0.07	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	-	-	-	0.04	0.54	0.22	2.52	0.30	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	-	35	76	39	274	73	mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	0.1	<0.1	<0.1	-	-	-	-	-	% w/w	A-T-032 OM

Envirolab Job Number: 18/02024

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02024/9								Units	Method ref
Client Sample No	113									
Client Sample ID	BH10A									
Depth to Top	49.50									
Depth To Bottom	49.95									
Date Sampled	26-Feb-18									
Sample Type	Soil - D									
Sample Matrix Code	3									
% Stones >10mm <sub>A</sub>	<0.1								% w/w	A-T-044
pH BRE <sub>D</sub>	8.27								pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	7.71								mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	457								mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	<0.4								mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	483								mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.23								% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	4.68								% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	75								mg/l	A-T-SOLMETs

## **REPORT NOTES**

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All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

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If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

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Superscript # indicates method accredited to ISO 17025.

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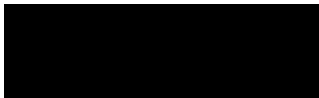
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02030  
**Issue Number:** 1 **Date:** 27 March, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 585199  
**Date Samples Received:** 19/03/18  
**Date Instructions Received:** 20/03/18  
**Date Analysis Completed:** 26/03/18

**Prepared by:**



Gill Walker  
Laboratory Manager

**Approved by:**



John Gustafson  
Director

Envirolab Job Number: 18/02030

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02030/1	18/02030/2	18/02030/3	18/02030/4	18/02030/5	18/02030/6	18/02030/7	18/02030/8	Units	Method ref		
Client Sample No	9	12	65	72	79	82	92	108				
Client Sample ID	BH10	BH10	BH10	BH10	BH10	BH10	BH10	BH10				
Depth to Top	2.00	3.45	24.00	28.00	32.00	34.00	40.00	49.45				
Depth To Bottom	2.50	3.60	24.45	28.45	32.45	34.45	40.45	49.50				
Date Sampled	20-Feb-18	20-Feb-18	22-Feb-18	22-Feb-18	23-Feb-18	23-Feb-18	26-Feb-18	26-Feb-18				
Sample Type	Soil - B	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	6A	6A	1	5	5	1	1	3				
% Stones >10mm <sub>A</sub>	<0.1	3.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			% w/w	A-T-044
pH BRE <sub>D</sub>	-	-	8.60	8.61	8.19	8.42	8.60	8.47	pH	A-T-031s		
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	-	-	<1.00	<1.00	1.68	<1.00	<1.00	6.26	mg/l	A-T-033s		
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	1180	1550	963	1020	608	412	mg/l	A-T-026s		
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s		
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	140	246	166	147	90	159	mg/l	A-T-026s		
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	0.04	0.09	0.06	0.07	0.06	0.07	% w/w	A-T-028s		
Sulphur BRE (total) <sub>D</sub>	-	-	0.07	0.47	0.44	0.13	0.16	0.32	% w/w	A-T-024s		
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	97	92	42	61	45	47	mg/l	A-T-SOLMET5		
Organic matter <sub>D</sub> <sup>M#</sup>	<0.1	<0.1	-	-	-	-	-	-	% w/w	A-T-032 OM		



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Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

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Please contact us if you need any further information.

## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02053  
**Issue Number:** 1  
**Date:** 04 April, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt. Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 584856  
**Date Samples Received:** 23/02/18  
**Date Instructions Received:** 21/03/18  
**Date Analysis Completed:** 04/04/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Gill Walker  
Laboratory Manager

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref	
Client Sample No	10	15	18	22	17						
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)						
Depth to Top	2.50	2.90	3.90	4.90	4.50						
Depth To Bottom		3.00	4.00	5.00							
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6A	4A	6A	4A	4A						
% Stones >10mm <sub>A</sub>	2.0	33.3	19.0	22.8	23.4			% w/w			A-T-044
pH <sub>D</sub>	7.98	11.62	9.39	9.11	8.65			pH			A-T-031s
Ammoniacal nitrogen <sub>D</sub>	8.7	<0.2	0.5	<0.2	0.2			mg/kg	A-T-033s		
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	0.13	0.02	0.03	0.02	0.03			g/l	A-T-026s		
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	750	340	380	<200	<200			mg/kg	A-T-028s		
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1			mg/kg	A-T-042sTCN		
Phenols - Total by HPLC <sub>A</sub>	<0.2	<0.2	<0.2	<0.2	<0.2			mg/kg	A-T-050s		
Sulphide <sub>A</sub>	<5	<5	50	5	5			mg/kg	A-T-S2-s		
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	19	<5	42	12	<5			mg/kg	A-T-029s		
Organic matter <sub>D</sub> <sup>M#</sup>	0.8	<0.1	0.6	<0.1	0.2			% w/w	A-T-032 OM		
Arsenic <sub>D</sub> <sup>M#</sup>	6	2	4	3	3			mg/kg	A-T-024s		
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	1.6	<1.0	<1.0	<1.0	<1.0			mg/kg	A-T-027s		
Cadmium <sub>D</sub> <sup>M#</sup>	<0.5	<0.5	<0.5	<0.5	<0.5			mg/kg	A-T-024s		
Copper <sub>D</sub> <sup>M#</sup>	6	3	6	5	<1			mg/kg	A-T-024s		
Chromium <sub>D</sub> <sup>M#</sup>	13	3	6	6	4			mg/kg	A-T-024s		
Chromium (hexavalent) <sub>D</sub>	<1	<1	<1	<1	<1			mg/kg	A-T-040s		
Lead <sub>D</sub> <sup>M#</sup>	25	4	13	12	4			mg/kg	A-T-024s		
Mercury <sub>D</sub>	<0.17	<0.17	<0.17	<0.17	<0.17			mg/kg	A-T-024s		
Nickel <sub>D</sub> <sup>M#</sup>	10	3	5	8	4			mg/kg	A-T-024s		
Selenium <sub>D</sub> <sup>M#</sup>	<1	<1	<1	<1	<1			mg/kg	A-T-024s		
Zinc <sub>D</sub> <sup>M#</sup>	26	9	23	12	<5			mg/kg	A-T-024s		

**Envirolab Job Number: 18/02053**
**Client Project Name: Gt. Yarmouth 3rd River Crossing**
**Client Project Ref: PZ1522D1**

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
Leachate Prep NRA (10:1) <sub>A</sub>	*	-	*	-	-					
pH (leachable) <sub>A</sub> <sup>#</sup>	7.28	-	7.66	-	-				pH	A-T-031w
Ammoniacal nitrogen (leachable) <sub>A</sub>	0.39	-	<0.02	-	-				mg/l	A-T-033w
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	52.47	-	39.11	-	-				mg/l	A-T-026w
Cyanide (total) (leachable) <sub>A</sub>	<0.005	-	<0.005	-	-				mg/l	A-T-042wTCN
Phenols (total by HPLC) (leachable) <sub>A</sub>	<0.01	-	<0.01	-	-				mg/l	A-T-050w
Sulphide (leachable) <sub>A</sub>	<0.1	-	<0.1	-	-				mg/l	A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	3.8	-	10.1	-	-				mg/l	A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	3	-	13	-	-				µg/l	A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	59	-	28	-	-				µg/l	A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-				µg/l	A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	2	-	1	-	-				µg/l	A-T-025w
Chromium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-				µg/l	A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05	-	<0.05	-	-				mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	2	-	1	-	-				µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1	-	0.1	-	-				µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	1	-	<1	-	-				µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-				µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1	-	<0.1	-	-				mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	12	-	7	-	-				µg/l	A-T-025w

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD	NAD	NAD	NAD	-					A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	-					

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	0.30	<0.01	<0.01				mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	<0.02	0.05	<0.02	<0.02				mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	0.10	<0.04	<0.04				mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	0.10	<0.04	<0.04				mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	0.13	<0.05	<0.05				mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	0.06	<0.05	<0.05				mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07	<0.07	<0.07				mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	<0.06	0.12	<0.06	<0.06				mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04	<0.04				mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	<0.08	0.28	<0.08	<0.08				mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	0.06	<0.01	<0.01				mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	0.06	<0.03	<0.03				mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	0.18	<0.03	<0.03				mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	0.12	<0.03	<0.03				mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	0.24	<0.07	<0.07				mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	<0.08	<0.08	1.78	<0.08	<0.08				mg/kg	A-T-019s



Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
PAH 16MS (leachable)										
Acenaphthene (leachable) <sub>A</sub>	0.16	-	2.60	-	-				µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	<0.02	-	<0.02	-	-				µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	0.04	-	0.10	-	-				µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	<0.02	-	<0.02	-	-				µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	<0.02	-	<0.02	-	-				µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	<0.02	-	<0.02	-	-				µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	<0.02	-	<0.02	-	-				µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	<0.02	-	<0.02	-	-				µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	<0.02	-	<0.02	-	-				µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<0.02	-	<0.02	-	-				µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	0.03	-	0.03	-	-				µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	0.14	-	0.98	-	-				µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	<0.02	-	<0.02	-	-				µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	1.12	-	3.75	-	-				µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	0.22	-	0.64	-	-				µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	<0.02	-	0.03	-	-				µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	1.71	-	8.13	-	-				µg/l	A-T-019w

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	<0.002	-	<0.002	-				mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	<0.002	-	<0.002	-				mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	<0.004	-	<0.004	-				mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007	<0.007	<0.007	-				mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	<0.006	-	<0.006	-				mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	<0.004	-	<0.004	-				mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	<0.004	-	<0.004	-				mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	-	<0.007	-	<0.007	-				mg/kg	A-T-004s

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
Speciated PCB-WHO12										
PCB BZ 81 <sub>A</sub>	<0.005	-	<0.005	-	-				mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	<0.005	-	<0.005	-	-				mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	<0.005	-	<0.005	-	-				mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	<0.005	-	<0.005	-	-				mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	<0.005	-	<0.005	-	-				mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	<0.005	-	<0.005	-	-				mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	<0.005	-	<0.005	-	-				mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	<0.005	-	<0.005	-	-				mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	<0.005	-	<0.005	-	-				mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	<0.005	-	<0.005	-	-				mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	<0.005	-	<0.005	-	-				mg/kg	A-T-004s
Total Speciated PCB-WHO12 <sub>A</sub>	<0.007	-	<0.007	-	-				mg/kg	A-T-004s

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
SVOC excluding PAH-16 (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<4	-	<2	-	-				µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	4	-	<8	-	-				µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Carbazole (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
n-Diethylphthalate (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<2	-	<2	-	-					
Hexachloroethane (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	<2	-	<2	-	-				µg/l	A-T-052w

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500	<500	<500				µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<200	<200	<200	<200	<200				µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500	<500	<500				µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<200	<200	<200	<200	<200				µg/kg	A-T-052s



Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Perylene <sub>A</sub>	<100	<100	<100	<100	<100				µg/kg	A-T-052s

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
VOC										
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10				µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	4	<1	3	2	<1				µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5				µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2				µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10				µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3				µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2				µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2	<2	<2				µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3				µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3				µg/kg	A-T-006s

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	1.2	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	5.2	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	11.8	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	18.2	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	18.2	<0.1	<0.1	<0.1	<0.1				mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/kg	A-T-022s

Envirolab Job Number: 18/02053

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02053/6	18/02053/7	18/02053/8	18/02053/9	18/02053/16				Units	Method ref
Client Sample No	10	15	18	22	17					
Client Sample ID	BH10	BH10A	BH10A	BH10A	BH10 (jar only)					
Depth to Top	2.50	2.90	3.90	4.90	4.50					
Depth To Bottom		3.00	4.00	5.00						
Date Sampled	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18	20-Feb-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	6A	4A	6A	4A	4A					
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
Total Aliphatics (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
Aro >C7-C8 (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	<10	-	<10	-	-				µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	<1	-	<1	-	-				µg/l	A-T-022w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



## Final Test Report

Envirolab Job Number: 18/02053  
Issue Number: 1 Date: 4-Apr-18

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Scott Viner/Sharon Woods; Simon Holden  
Project Name: Gt. Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 584856

Date Samples Received: 23-Feb-18  
Date Instructions Received: 21-Mar-18  
Date Analysis Completed: 4-Apr-18

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

Approved by:

Melanie Marshall  
Laboratory Coordinator

Gill Walker  
Laboratory Manager



Sample Details							Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/02053/7			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample Number				15								
Client Sample ID				BH10A								
Depth to Top				2.9								
Depth to Bottom				3.00								
Date Sampled				20/02/2018								
Sample Type				Soil - ES								
Sample Matrix Code				4A								
Solid Waste Analysis												
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	11.62			-	>6	-			
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	<0.01			-	to be evaluated	to be evaluated			
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	<0.01			-	to be evaluated	to be evaluated			
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	<0.5			-	-	10			
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	<0.03			3	5	6			
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08			100	-	-			
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10			500	-	-			
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007			1	-	-			
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01			6	-	-			
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)				
				mg/l		mg/kg						
Arsenic	A-T-025	Y	N	0.006	0.004	0.016	0.040	0.5	2	25		
Barium	A-T-025	Y	N	0.008	0.002	0.023	0.020	20	100	300		
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5		
Chromium	A-T-025	Y	N	0.001	<0.001	0.004	<0.01	0.5	10	70		
Copper	A-T-025	Y	N	0.006	0.001	0.016	0.020	2	50	100		
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2		
Molybdenum	A-T-025	Y	N	0.004	<0.001	0.010	0.010	0.5	10	30		
Nickel	A-T-025	Y	N	0.002	<0.001	0.005	<0.01	0.4	10	40		
Lead	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	50		
Antimony	A-T-025	Y	N	0.001	<0.001	0.003	<0.01	0.06	0.7	5		
Selenium	A-T-025	Y	N	0.001	<0.001	0.003	<0.01	0.1	0.5	7		
Zinc	A-T-025	Y	N	0.006	<0.001	0.016	<0.01	4	50	200		
Chloride	A-T-026	Y	N	9	2	26	32	800	15000	25000		
Fluoride	A-T-026	Y	N	<0.10	0.2	<0.2	<1	10	150	500		
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	5	2	13	24	1000	20000	50000		
Total Dissolved Solids	A-T-035	N	N	200	84	541	1028	4000	60000	100000		
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-		
Dissolved Organic Carbon	A-T-032	N	N	29	<20.0	78	<200	500	800	1000		
Leach Test Information												
pH (pH Units)	A-T-031	N	Y	10.9	10.4							
Conductivity (µS/cm)	A-T-037	N	N	399	167							
Mass Sample (kg)				0.150								
Dry Matter (%)	A-T-044	N	N	89.9								
Stage 1												
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350								
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150								
Stage 2												
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.080								
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation												

**Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication  
as to whether a waste may be hazardous or non-hazardous.**

Sample Details								Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/02053/9				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample Number				22									
Client Sample ID				BH10A									
Depth to Top				4.9									
Depth to Bottom				5.00									
Date Sampled				20/02/2018									
Sample Type				Soil - ES									
Sample Matrix Code				4A									
Solid Waste Analysis													
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	9.11				-	>6	-			
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.07				-	to be evaluated	to be evaluated			
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	<0.01				-	to be evaluated	to be evaluated			
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	<0.5				-	-	10			
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	<0.03				3	5	6			
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08				100	-	-			
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10				500	-	-			
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007				1	-	-			
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-			
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)					
				mg/l		mg/kg							
Arsenic	A-T-025	Y	N	0.005	0.005	0.014	0.050	0.5	2	25			
Barium	A-T-025	Y	N	0.007	<0.001	0.019	0.020	20	100	300			
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5			
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70			
Copper	A-T-025	Y	N	0.002	<0.001	0.004	<0.01	2	50	100			
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2			
Molybdenum	A-T-025	Y	N	0.010	0.001	0.025	0.020	0.5	10	30			
Nickel	A-T-025	Y	N	0.002	<0.001	0.004	<0.01	0.4	10	40			
Lead	A-T-025	Y	N	0.003	<0.001	0.007	<0.01	0.5	10	50			
Antimony	A-T-025	Y	N	0.003	<0.001	0.007	<0.01	0.06	0.7	5			
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7			
Zinc	A-T-025	Y	N	0.009	<0.001	0.025	0.010	4	50	200			
Chloride	A-T-026	Y	N	12	1	33	26	800	15000	25000			
Fluoride	A-T-026	Y	N	0.2	<0.10	0.4	<1	10	150	500			
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	17	7	45	82	1000	20000	50000			
Total Dissolved Solids	A-T-035	N	N	82	30	216	376	4000	60000	100000			
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-			
Dissolved Organic Carbon	A-T-032	N	N	26.6	<20.0	70	<200	500	800	1000			
Leach Test Information													
pH (pH Units)	A-T-031	N	Y	7.9	6.4								
Conductivity (µS/cm)	A-T-037	N	N	165	60								
Mass Sample (kg)				0.150									
Dry Matter (%)	A-T-044	N	N	91.6									
Stage 1													
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350									
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150									
Stage 2													
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.100									
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation													

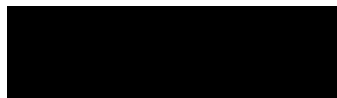
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/01819  
**Issue Number:** 1 **Date:** 19 March, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

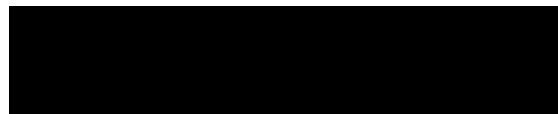
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 584179  
**Date Samples Received:** 13/03/18  
**Date Instructions Received:** 13/03/18  
**Date Analysis Completed:** 19/03/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Danielle Brierley  
Client Manager

Envirolab Job Number: 18/01819

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01819/1	18/01819/2	18/01819/3	18/01819/4	18/01819/5	18/01819/6			Units	Method ref
Client Sample No	14	65	89	104	114	119				
Client Sample ID	BH11	BH11	BH11	BH11	BH11	BH11				
Depth to Top	3.50	23.50	33.50	43.50	47.45	49.45				
Depth To Bottom	4.10	23.95	33.95	43.95	47.55	49.55				
Date Sampled	12-Feb-18	14-Feb-18	15-Feb-18	16-Feb-18	16-Feb-18	16-Feb-18				
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	5	5	5	5	3	3				
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			% w/w	A-T-044
pH BRE <sub>D</sub>	-	8.82	8.30	8.66	8.81	8.89			pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	-	<1.00	<1.00	<1.00	6.22	6.84			mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	1110	1180	809	1660	889			mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	-	<0.4	<0.4	<0.4	<0.4	<0.4			mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	134	206	137	379	239			mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	0.06	0.14	0.11	0.17	0.11			% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	-	0.12	0.32	0.28	0.41	0.21			% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	74	68	51	101	75			mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	1.0	-	-	-	-	-			% w/w	A-T-032 OM

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



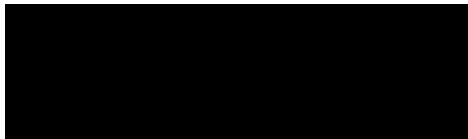
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/01967  
**Issue Number:** 1 **Date:** 26 March, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 584843  
**Date Samples Received:** 19/02/18  
**Date Instructions Received:** 16/03/18  
**Date Analysis Completed:** 26/03/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Richard Wong  
Client Manager



Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4					Units	Method ref
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
Chromium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	<1	-					µg/l	A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05	-	<0.05	-					mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	35	-	7	-					µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1	-	<0.1	-					µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	2	-	<1	-					µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	2	-	<1	-					µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1	-	<0.1	-					mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	13	-	2	-					µg/l	A-T-025w

Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4					Units	Method ref
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD	-	NAD	-						A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	-	N/A	-						

Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4					Units	Method ref
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
<b>PAH-16MS</b>										
Acenaphthene <sub>A</sub> <sup>M#</sup>	0.18	0.01	0.01	<0.01					mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	0.15	0.01	<0.01	<0.01					mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	0.41	0.04	0.02	<0.02					mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	2.42	0.19	0.23	<0.04					mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	2.57	0.22	0.24	<0.04					mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	2.68	0.17	0.20	<0.05					mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	1.32	0.10	0.11	<0.05					mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	1.03	0.11	0.11	<0.07					mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	2.60	0.20	0.27	<0.06					mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	0.29	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	5.00	0.35	0.23	<0.08					mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	0.13	<0.01	0.02	<0.01					mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	1.87	0.16	0.17	<0.03					mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	0.17	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	1.93	0.17	0.12	<0.03					mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	4.40	0.29	0.23	<0.07					mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	27.1	2.01	1.96	<0.08					mg/kg	A-T-019s

Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4					Units	Method ref
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
<b>PAH 16MS (leachable)</b>										
Acenaphthene (leachable) <sub>A</sub>	<0.02	-	0.12	-					µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	<0.02	-	0.10	-					µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	<0.02	-	0.05	-					µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	<0.02	-	<0.02	-					µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	<0.02	-	<0.02	-					µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	<0.02	-	<0.02	-					µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	<0.02	-	<0.02	-					µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	<0.02	-	<0.02	-					µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	0.02	-	<0.02	-					µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<0.02	-	<0.02	-					µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	0.05	-	<0.02	-					µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	<0.02	-	0.16	-					µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	<0.02	-	<0.02	-					µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	0.04	-	0.23	-					µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	<0.02	-	0.24	-					µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	0.04	-	<0.02	-					µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	0.15	-	0.90	-					µg/l	A-T-019w



Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4					Units	Method ref
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	<0.002	-	<0.002	-					mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	<0.002	-	<0.002	-					mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	<0.004	-	<0.004	-					mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	-	<0.007	-					mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	<0.006	-	<0.006	-					mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	<0.004	-	<0.004	-					mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	<0.004	-	<0.004	-					mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	<0.007	-	<0.007	-					mg/kg	A-T-004s

Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4						
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
SVOC excluding PAH-16 (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	<4	-	<4	-					µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Carbazole (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
n-Dioctylphthalate (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w

Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4					Units	Method ref
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Hexachloroethane (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	<2	-	<2	-					µg/l	A-T-052w

Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4						
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500	<500					µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500	<500					µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s

Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4					Units	Method ref
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Perylene <sub>A</sub>	<100	326	<100	<100					µg/kg	A-T-052s

Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4						
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
VOC										
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10					µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	7					µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<20	<20	<20	<20					µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10					µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3					µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s



Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4																Units	Method ref		
Client Sample No	9	13	15	21																			
Client Sample ID	BH11	BH11	BH11a	BH11a																			
Depth to Top	2.50	3.50	2.90	4.90																			
Depth To Bottom	2.60	3.60	3.00	5.00																			
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18																			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES																			
Sample Matrix Code	5A	5A	4A	6A																			
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																	µg/kg	A-T-006s	
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1																		µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2																		µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2	<2																		µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3																		µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3																		µg/kg	A-T-006s

Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4						
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	0.5	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	1.8	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	10.1	2.2	1.1	0.1					mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	23.3	1.6	1.9	8.1					mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	1.2	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	37.0	3.7	3.0	8.3					mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	37.0	3.7	3.0	8.3					mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

Envirolab Job Number: 18/01967

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01967/1	18/01967/2	18/01967/3	18/01967/4						
Client Sample No	9	13	15	21						
Client Sample ID	BH11	BH11	BH11a	BH11a						
Depth to Top	2.50	3.50	2.90	4.90						
Depth To Bottom	2.60	3.60	3.00	5.00						
Date Sampled	12-Feb-18	12-Feb-18	12-Feb-18	12-Feb-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5A	5A	4A	6A						
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
Total Aliphatics (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
Aro >C7-C8 (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	<10	-	<10	-					µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	<1	-	<1	-					µg/l	A-T-022w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## Final Test Report

Envirolab Job Number: 18/01967  
Issue Number: 1 Date: 26-Mar-18

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 584843

Date Samples Received: 19-Feb-18  
Date Instructions Received: 16-Mar-18  
Date Analysis Completed: 26-Mar-18

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.


Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

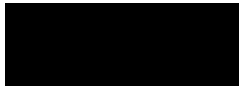
Please contact us if you need any further information.

Prepared by:

Approved by:



Holly Neary-King  
Administrative Assistant



Richard Wong  
Client Manager



Sample Details						Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/01967/1		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample Number				9							
Client Sample ID				BH11							
Depth to Top				2.5							
Depth to Bottom				2.60							
Date Sampled				12/02/2018							
Sample Type				Soil - ES							
Sample Matrix Code				5A							
Solid Waste Analysis											
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.38			-	>6			
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.6			-	to be evaluated			
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.07			-	to be evaluated			
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	2.1			-	10			
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.77			3	5			
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	27.4			100	-			
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	23			500	-			
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007			1	-			
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01			6	-			
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
				mg/l		mg/kg					
Arsenic	A-T-025	Y	N	0.004	0.004	0.008	0.050	0.5	2		
Barium	A-T-025	Y	N	0.022	0.021	0.049	0.220	20	100		
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1		
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10		
Copper	A-T-025	Y	N	0.015	0.013	0.034	0.130	2	50		
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2		
Molybdenum	A-T-025	Y	N	0.011	0.003	0.026	0.030	0.5	10		
Nickel	A-T-025	Y	N	0.002	0.002	0.005	0.020	0.4	10		
Lead	A-T-025	Y	N	0.040	0.054	0.091	0.540	0.5	10		
Antimony	A-T-025	Y	N	0.001	<0.001	0.003	<0.01	0.06	0.7		
Selenium	A-T-025	Y	N	0.002	0.002	0.005	0.020	0.1	0.5		
Zinc	A-T-025	Y	N	0.022	0.013	0.050	0.140	4	50		
Chloride	A-T-026	Y	N	20	3	45	46	800	15000		
Fluoride	A-T-026	Y	N	0.6	0.3	1.3	3.0	10	150		
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	39	9	88	117	1000	20000		
Total Dissolved Solids	A-T-035	N	N	203	63	464	773	4000	60000		
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-		
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800		
Leach Test Information											
pH (pH Units)	A-T-031	N	Y	7.9	7.8						
Conductivity (µS/cm)	A-T-037	N	N	406	125						
Mass Sample (kg)				0.200							
Dry Matter (%)	A-T-044	N	N	83.6							
<b>Stage 1</b>											
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350							
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150							
<b>Stage 2</b>											
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.340							
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation											



Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details					Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/01967/3						
Client Sample Number				15		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill		
Client Sample ID				BH11a						
Depth to Top				2.9						
Depth to Bottom				3.00						
Date Sampled				12/02/2018						
Sample Type				Soil - ES						
Sample Matrix Code				4A						
<b>Solid Waste Analysis</b>										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	9.84				-	>6	-
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.06				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	<0.01				-	to be evaluated	to be evaluated
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	1.3				-	-	10
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.07				3	5	6
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	1.98				100	-	-
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	13				500	-	-
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	Y	N	0.003	0.002	0.006	0.020	0.5	2	25
Barium	A-T-025	Y	N	0.021	0.004	0.042	0.060	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70
Copper	A-T-025	Y	N	0.002	0.002	0.005	0.020	2	50	100
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.011	0.002	0.022	0.030	0.5	10	30
Nickel	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.4	10	40
Lead	A-T-025	Y	N	0.004	0.011	0.008	0.100	0.5	10	50
Antimony	A-T-025	Y	N	0.001	<0.001	0.003	<0.01	0.06	0.7	5
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	Y	N	0.009	0.013	0.018	0.130	4	50	200
Chloride	A-T-026	Y	N	50	5	99	88	800	15000	25000
Fluoride	A-T-026	Y	N	0.2	<0.10	0.4	<1	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	14	2	28	31	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	170	35	339	460	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	7.8	8.5					
Conductivity (µS/cm)	A-T-037	N	N	340	69					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	91.8						
Stage 1										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.470						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

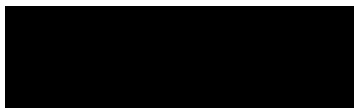
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/01391  
**Issue Number:** 1 **Date:** 05 March, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 582339  
**Date Samples Received:** 23/02/18  
**Date Instructions Received:** 23/02/18  
**Date Analysis Completed:** 01/03/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Iain Haslock  
Analytical Consultant

Envirolab Job Number: 18/01391

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01391/1	18/01391/2	18/01391/3	18/01391/4	18/01391/5	18/01391/6	18/01391/7	18/01391/8	Units	Method ref		
Client Sample No	19	22	68	77	92	104	115	119				
Client Sample ID	BH11A	BH11A	BH11A	BH11A	BH11A	BH11A	BH11A	BH11A				
Depth to Top	4.00	5.00	23.00	27.00	34.00	42.00	47.45	48.95				
Depth To Bottom	4.45	5.45	23.45	27.45	34.45	42.30	47.50	49.00				
Date Sampled	12-Feb-18	12-Feb-18	14-Feb-18	14-Feb-18	15-Feb-18	15-Feb-18	16-Feb-18	16-Feb-18				
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	5A	5A	5A	5A	5A	5A	3	3				
% Stones >10mm <sub>A</sub>	7.9	15.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			% w/w	A-T-044
pH BRE <sub>D</sub>	-	-	8.67	8.52	8.46	8.59	8.27	8.26	pH	A-T-031s		
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	-	-	<1.00	<1.00	<1.00	<1.00	5.74	6.16	mg/l	A-T-033s		
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	1020	1360	394	708	1270	719	mg/l	A-T-026s		
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	-	-	0.6	0.5	0.5	0.5	0.5	0.5	mg/l	A-T-026s		
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	111	183	71	101	236	198	mg/l	A-T-026s		
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	0.03	0.09	0.04	0.08	0.11	0.15	% w/w	A-T-028s		
Sulphur BRE (total) <sub>D</sub>	-	-	0.04	0.21	0.21	0.14	0.30	0.31	% w/w	A-T-024s		
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	63	109	18	48	96	74	mg/l	A-T-SOLMETs		
Organic matter <sub>D</sub> <sup>M#</sup>	0.3	0.6	-	-	-	-	-	-	% w/w	A-T-032 OM		

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

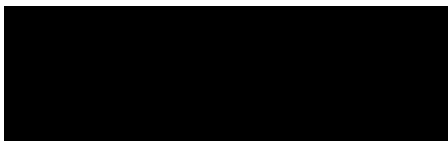
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/01838  
**Issue Number:** 1 **Date:** 21 March, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt. Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 584366  
**Date Samples Received:** 08/03/18  
**Date Instructions Received:** 13/03/18  
**Date Analysis Completed:** 21/03/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Danielle Brierley  
Client Manager

Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3							Units	Method ref
Client Sample No	11	8	10								
Client Sample ID	BH13	BH12	BH12								
Depth to Top	1.90	2.40	3.40								
Depth To Bottom	2.00	2.50	3.50								
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18								
Sample Type	Soil - ES	Soil - ES	Soil - ES								
Sample Matrix Code	5A	5A	5								
% Stones >10mm <sub>A</sub>	8.5	1.7	<0.1								
pH <sub>D</sub>	8.59	8.22	8.85							pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	14.5	25.0	11.0							mg/kg	A-T-033s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	0.09	0.17	0.10							g/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	530	980	600							mg/kg	A-T-028s
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	<1	<1							mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	<0.2	<0.2	0.3							mg/kg	A-T-050s
Sulphide <sub>A</sub>	<5	<5	33							mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	<5	<5	5							mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	1.4	2.8	0.9							% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	5	9	12							mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	1.8	3.4	4.6							mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	<0.5	<0.5	<0.5							mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	16	16	6							mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	17	27	19							mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	<1	<1	<1							mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	68	125	13							mg/kg	A-T-024s
Mercury <sub>D</sub>	<0.17	0.30	<0.17							mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	11	21	16							mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>M#</sup>	2	2	1							mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	29	53	38							mg/kg	A-T-024s
Leachate Prep NRA (10:1) <sub>A</sub>	-	*	-								A-T-001
pH (leachable) <sub>A</sub> <sup>#</sup>	-	7.05	-							pH	A-T-031w
Ammoniacal nitrogen (leachable) <sub>A</sub>	-	1.19	-							mg/l	A-T-033w
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	-	24.81	-							mg/l	A-T-026w
Cyanide (total) (leachable) <sub>A</sub>	-	<0.005	-							mg/l	A-T-042wTCN
Phenols (total by HPLC) (leachable) <sub>A</sub>	-	<0.01	-							mg/l	A-T-050w
Sulphide (leachable) <sub>A</sub>	-	<0.1	-							mg/l	A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	-	14.5	-							mg/l	A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	-	5	-							µg/l	A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	-	140	-							µg/l	A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	-	<1	-							µg/l	A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	-	13	-							µg/l	A-T-025w



Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3						Units	Method ref
Client Sample No	11	8	10							
Client Sample ID	BH13	BH12	BH12							
Depth to Top	1.90	2.40	3.40							
Depth To Bottom	2.00	2.50	3.50							
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5A	5A	5							
Chromium (leachable) <sub>A</sub> <sup>#</sup>	-	<1	-						µg/l	A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	-	<0.05	-						mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	-	27	-						µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	-	<0.1	-						µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	-	2	-						µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	-	<1	-						µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	-	<0.1	-						mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	-	22	-						µg/l	A-T-025w

Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3						Units	Method ref
Client Sample No	11	8	10							
Client Sample ID	BH13	BH12	BH12							
Depth to Top	1.90	2.40	3.40							
Depth To Bottom	2.00	2.50	3.50							
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5A	5A	5							
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	-	NAD	-							A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	-	N/A	-							

Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3							
Client Sample No	11	8	10							
Client Sample ID	BH13	BH12	BH12							
Depth to Top	1.90	2.40	3.40							
Depth To Bottom	2.00	2.50	3.50							
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5A	5A	5							
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	0.04	<0.02						mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	0.10	0.07	<0.04						mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	0.11	0.05	<0.04						mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	0.09	<0.05	<0.05						mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	<0.05						mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07						mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	0.12	0.08	<0.06						mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04						mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	0.11	0.12	<0.08						mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	0.01	<0.01						mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	0.06	<0.03	<0.03						mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03						mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	0.06	0.12	<0.03						mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	0.11	0.11	<0.07						mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	0.75	0.61	<0.08						mg/kg	A-T-019s

Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3							
Client Sample No	11	8	10							
Client Sample ID	BH13	BH12	BH12							
Depth to Top	1.90	2.40	3.40							
Depth To Bottom	2.00	2.50	3.50							
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5A	5A	5							
<b>PAH 16MS (leachable)</b>										
Acenaphthene (leachable) <sub>A</sub>	-	0.14	-						µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	-	<0.02	-						µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	-	0.03	-						µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	-	<0.02	-						µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	-	<0.02	-						µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	-	<0.02	-						µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	-	<0.02	-						µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	-	<0.02	-						µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	-	<0.02	-						µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	-	<0.02	-						µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	-	0.09	-						µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	-	0.07	-						µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	-	<0.02	-						µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	-	<0.02	-						µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	-	0.10	-						µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	-	0.07	-						µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	-	0.50	-						µg/l	A-T-019w

Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3						Units	Method ref
Client Sample No	11	8	10							
Client Sample ID	BH13	BH12	BH12							
Depth to Top	1.90	2.40	3.40							
Depth To Bottom	2.00	2.50	3.50							
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5A	5A	5							
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	<0.002	-						mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	<0.002	-						mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	<0.004	-						mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	-	<0.007	-						mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	<0.006	-						mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	<0.004	-						mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	<0.004	-						mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	-	<0.007	-						mg/kg	A-T-004s

Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3							Units	Method ref
Client Sample No	11	8	10								
Client Sample ID	BH13	BH12	BH12								
Depth to Top	1.90	2.40	3.40								
Depth To Bottom	2.00	2.50	3.50								
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18								
Sample Type	Soil - ES	Soil - ES	Soil - ES								
Sample Matrix Code	5A	5A	5								
SVOC (leachable)											
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Acenaphthene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Acenaphthylene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Anthracene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Benzo(a)anthracene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Benzo(a)pyrene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Benzo(ghi)perylene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	-	<28	-							µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w



Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3							Units	Method ref
Client Sample No	11	8	10								
Client Sample ID	BH13	BH12	BH12								
Depth to Top	1.90	2.40	3.40								
Depth To Bottom	2.00	2.50	3.50								
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18								
Sample Type	Soil - ES	Soil - ES	Soil - ES								
Sample Matrix Code	5A	5A	5								
Carbazole (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Chrysene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
n-Diethylphthalate (leachable) <sub>A</sub>	-	<10	-							µg/l	A-T-052w
Fluoranthene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Fluorene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Hexachloroethane (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Indeno(1,2,3-cd)pyrene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Naphthalene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Phenanthrene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w
Pyrene (leachable) <sub>A</sub>	-	<2	-							µg/l	A-T-052w

Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3							Units	Method ref
Client Sample No	11	8	10								
Client Sample ID	BH13	BH12	BH12								
Depth to Top	1.90	2.40	3.40								
Depth To Bottom	2.00	2.50	3.50								
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18								
Sample Type	Soil - ES	Soil - ES	Soil - ES								
Sample Matrix Code	5A	5A	5								
SVOC											
Hexachlorobenzene <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500							µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500							µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	<100							µg/kg	A-T-052s

Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3						Units	Method ref
Client Sample No	11	8	10							
Client Sample ID	BH13	BH12	BH12							
Depth to Top	1.90	2.40	3.40							
Depth To Bottom	2.00	2.50	3.50							
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5A	5A	5							
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100						µg/kg	A-T-052s
Perylene <sub>A</sub>	<100	<100	<100						µg/kg	A-T-052s



Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3							Units	Method ref
Client Sample No	11	8	10								
Client Sample ID	BH13	BH12	BH12								
Depth to Top	1.90	2.40	3.40								
Depth To Bottom	2.00	2.50	3.50								
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18								
Sample Type	Soil - ES	Soil - ES	Soil - ES								
Sample Matrix Code	5A	5A	5								
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1							µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1							µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2							µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1							µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2							µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3							µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1							µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3							µg/kg	A-T-006s

Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3							
Client Sample No	11	8	10							
Client Sample ID	BH13	BH12	BH12							
Depth to Top	1.90	2.40	3.40							
Depth To Bottom	2.00	2.50	3.50							
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5A	5A	5							
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.02	<0.02	<0.02						mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	1.8	2.5	<0.1						mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	2.2	1.6	<0.1						mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	4.1	4.0	<0.1						mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	4.1	4.1	<0.1						mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01						mg/kg	A-T-022s



Envirolab Job Number: 18/01838

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01838/1	18/01838/2	18/01838/3							
Client Sample No	11	8	10							
Client Sample ID	BH13	BH12	BH12							
Depth to Top	1.90	2.40	3.40							
Depth To Bottom	2.00	2.50	3.50							
Date Sampled	05-Mar-18	07-Mar-18	07-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5A	5A	5							
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
Total Aliphatics (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
Aro >C7-C8 (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	-	<10	-						µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	-	<1	-						µg/l	A-T-022w

## **REPORT NOTES**

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A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02217  
**Issue Number:** 1 **Date:** 05 April, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 585984  
**Date Samples Received:** 23/03/18  
**Date Instructions Received:** 26/03/18  
**Date Analysis Completed:** 04/04/18

**Prepared by:**



Gill Walker  
Laboratory Manager

**Approved by:**



Danielle Bescoby  
Quality Manager

Envirolab Job Number: 18/02217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02217/1	18/02217/2	18/02217/3	18/02217/4	18/02217/5	18/02217/6	18/02217/7	18/02217/8	Units	Method ref
Client Sample No	19	27	33	41	69	75	82	88		
Client Sample ID	BH13	BH13	BH13	BH13	BH13	BH13	BH13	BH13		
Depth to Top	3.40	6.00	8.00	10.00	22.00	26.00	30.00	34.00		
Depth To Bottom	3.85	6.45	8.45	10.50	22.45	26.45	30.45	34.45		
Date Sampled	05-Mar-18	06-Mar-18	06-Mar-18	06-Mar-18	07-Mar-18	07-Mar-18	07-Mar-18	08-Mar-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5A	4A	4A	4A	4A	4A	5	5A		
% Stones >10mm <sub>A</sub>	<0.1	12.9	2.4	26.5	0.6	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub>	-	-	-	-	8.52	8.41	8.28	8.27	pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	-	-	-	-	<1.00	<1.00	1.23	<1.00	mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	-	549	268	2400	652	mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	-	-	-	-	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	-	83	53	371	212	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	-	-	0.04	0.03	0.13	0.09	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	-	-	-	-	0.04	0.08	0.50	0.32	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	-	-	33	22	97	38	mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	0.4	<0.1	<0.1	<0.1	-	-	-	-	% w/w	A-T-032 OM

Envirolab Job Number: 18/02217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02217/9	18/02217/10	18/02217/11						Units	Method ref
Client Sample No	100	107	116							
Client Sample ID	BH13	BH13	BH13							
Depth to Top	42.00	45.45	48.95							
Depth To Bottom	42.38	45.50	49.00							
Date Sampled	09-Mar-18	09-Mar-18	09-Mar-18							
Sample Type	Soil - D	Soil - D	Soil - D							
Sample Matrix Code	4	3	3							
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1						% w/w	A-T-044
pH BRE <sub>D</sub>	8.48	8.81	8.90						pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	<1.00	5.16	6.13						mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	537	1670	553						mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4	<0.4						mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	79	374	228						mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.14	0.21	0.12						% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.25	0.51	0.31						% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	37	80	55						mg/l	A-T-SOLMET5

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Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

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Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

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### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

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Subscript "A" indicates analysis performed on the sample as received.

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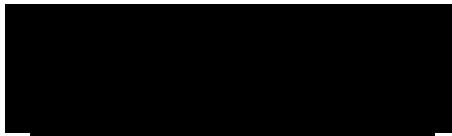
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02283  
**Issue Number:** 1 **Date:** 09 April, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

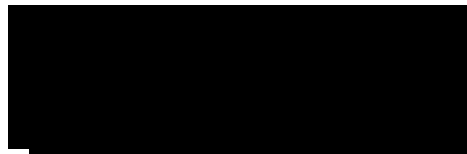
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 586294  
**Date Samples Received:** 12/03/18  
**Date Instructions Received:** 28/03/18  
**Date Analysis Completed:** 09/04/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/02283

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02283/1	18/02283/2							Units	Method ref
Client Sample No	50	55								
Client Sample ID	BH13	BH13								
Depth to Top	13.90	15.90								
Depth To Bottom	14.00	16.00								
Date Sampled	07-Mar-18	07-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	5	5								
% Stones >10mm <sub>A</sub>	<0.1	<0.1							% w/w	A-T-044

Envirolab Job Number: 18/02283

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02283/1	18/02283/2								
Client Sample No	50	55								
Client Sample ID	BH13	BH13								
Depth to Top	13.90	15.90								
Depth To Bottom	14.00	16.00								
Date Sampled	07-Mar-18	07-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	5	5								
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01							mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	<0.02							mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04							mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04							mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05							mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05							mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07							mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	<0.06							mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	<0.08							mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03							mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03							mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07							mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	<0.08	<0.08							mg/kg	A-T-019s

Envirolab Job Number: 18/02283

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02283/1	18/02283/2								Units	Method ref
Client Sample No	50	55									
Client Sample ID	BH13	BH13									
Depth to Top	13.90	15.90									
Depth To Bottom	14.00	16.00									
Date Sampled	07-Mar-18	07-Mar-18									
Sample Type	Soil - ES	Soil - ES									
Sample Matrix Code	5	5									
SVOC											
Hexachlorobenzene <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500								µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100								µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100								µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100								µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100								µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100								µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100								µg/kg	A-T-052s
n-Dioctylphthalate <sub>A</sub>	<500	<500								µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100								µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100								µg/kg	A-T-052s

Envirolab Job Number: 18/02283

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02283/1	18/02283/2							Units	Method ref
Client Sample No	50	55								
Client Sample ID	BH13	BH13								
Depth to Top	13.90	15.90								
Depth To Bottom	14.00	16.00								
Date Sampled	07-Mar-18	07-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	5	5								
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100						µg/kg	A-T-052s	
Perylene <sub>A</sub>	<100	<100						µg/kg	A-T-052s	

Envirolab Job Number: 18/02283

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02283/1	18/02283/2									Units	Method ref
Client Sample No	50	55										
Client Sample ID	BH13	BH13										
Depth to Top	13.90	15.90										
Depth To Bottom	14.00	16.00										
Date Sampled	07-Mar-18	07-Mar-18										
Sample Type	Soil - ES	Soil - ES										
Sample Matrix Code	5	5										
VOC												
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	<10	<10									µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5									µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5									µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2									µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10									µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3									µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s



Envirolab Job Number: 18/02283

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02283/1	18/02283/2																	Units	Method ref
Client Sample No	50	55																		
Client Sample ID	BH13	BH13																		
Depth to Top	13.90	15.90																		
Depth To Bottom	14.00	16.00																		
Date Sampled	07-Mar-18	07-Mar-18																		
Sample Type	Soil - ES	Soil - ES																		
Sample Matrix Code	5	5																		
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1																	µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1																	µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2																	µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1																	µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2																	µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3																	µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3																	µg/kg	A-T-006s

Envirolab Job Number: 18/02283

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02283/1	18/02283/2									Units	Method ref		
Client Sample No	50	55												
Client Sample ID	BH13	BH13												
Depth to Top	13.90	15.90												
Depth To Bottom	14.00	16.00												
Date Sampled	07-Mar-18	07-Mar-18												
Sample Type	Soil - ES	Soil - ES												
Sample Matrix Code	5	5												
<b>TPH UKCWG</b>														
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1									mg/kg	A-T-023s		
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1									mg/kg	A-T-023s		
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1									mg/kg	A-T-023s		
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1									mg/kg	A-T-023s		
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1									mg/kg	A-T-023s		
Total Aliphatics <sub>A</sub>	<0.1	<0.1									mg/kg	A-T-023s		
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1									mg/kg	A-T-023s		
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1									mg/kg	A-T-023s		
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1									mg/kg	A-T-023s		
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1									mg/kg	A-T-023s		
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1									mg/kg	A-T-023s		
Total Aromatics <sub>A</sub>	<0.1	<0.1									mg/kg	A-T-023s		
TPH (Ali & Aro) <sub>A</sub>	<0.1	<0.1									mg/kg	A-T-023s		
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01									mg/kg	A-T-022s		

## **REPORT NOTES**

### **General:**

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If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02403  
**Issue Number:** 1 **Date:** 10 April, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

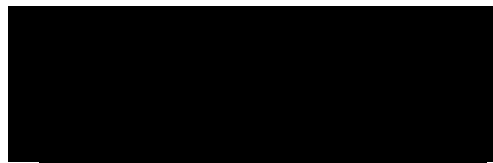
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 586952  
**Date Samples Received:** 03/04/18  
**Date Instructions Received:** 03/04/18  
**Date Analysis Completed:** 09/04/18

**Prepared by:**



Gill Walker  
Director/Laboratory Manager

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/02403

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02403/1	18/02403/2	18/02403/3	18/02403/4	18/02403/5	18/02403/6	18/02403/7	18/02403/8	Units	Method ref
Client Sample No	12	17	26	62	71	83	92	104		
Client Sample ID	BH12	BH12	BH12	BH12	BH12	BH12	BH12	BH12		
Depth to Top	3.50	5.50	8.50	22.50	28.50	36.50	42.50	48.95		
Depth To Bottom	4.00	5.95	8.95	22.91	28.95	36.90	42.95	49.00		
Date Sampled	07-Mar-18	07-Mar-18	09-Mar-18	12-Mar-18	12-Mar-18	13-Mar-18	13-Mar-18	13-Mar-18		
Sample Type	Soil - B	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	4A	5	5	5	5		
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub>	-	-	-	8.03	8.18	8.06	8.24	8.53	pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	-	-	-	<1.00	<1.00	<1.00	<1.00	6.32	mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	398	2220	385	210	402	mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	-	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	112	425	69	44	169	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	-	0.06	0.17	0.06	0.07	0.10	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	-	-	-	0.14	0.60	0.12	0.10	0.17	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	-	34	111	19	10	31	mg/l	A-T-SOLMETs
Organic matter <sub>D</sub> <sup>M#</sup>	0.5	<0.1	<0.1	-	-	-	-	-	% w/w	A-T-032 OM

## **REPORT NOTES**

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A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

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NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



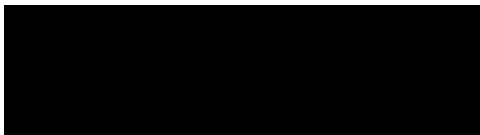
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02142  
**Issue Number:** 1 **Date:** 03 April, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

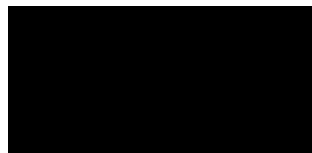
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 585493  
**Date Samples Received:** 19/03/18  
**Date Instructions Received:** 22/03/18  
**Date Analysis Completed:** 03/04/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2								Units	Method ref
Client Sample No	4	13									
Client Sample ID	BH12A	BH12A									
Depth to Top	1.40	4.40									
Depth To Bottom	1.50	4.50									
Date Sampled	15-Mar-18	15-Mar-18									
Sample Type	Soil - ES	Soil - ES									
Sample Matrix Code	1A	1A									
% Stones >10mm <sub>A</sub>	10.8	6.8								% w/w	A-T-044
pH <sub>D</sub>	8.43	9.62								pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	<0.2	<0.2								mg/kg	A-T-033s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	<0.01	0.03								g/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	<200	<200								mg/kg	A-T-028s
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	<1								mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	<0.2	<0.2								mg/kg	A-T-050s
Sulphide <sub>A</sub>	<5	<5								mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	<5	<5								mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	<0.1	<0.1								% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	3	3								mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	<1.0	<1.0								mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	<0.5	<0.5								mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	3	6								mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	4	4								mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	<1	<1								mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	5	13								mg/kg	A-T-024s
Mercury <sub>D</sub>	<0.17	<0.17								mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	7	3								mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>M#</sup>	<1	<1								mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	17	21								mg/kg	A-T-024s
Leachate Prep NRA (10:1) <sub>A</sub>	-	*									A-T-001
pH (leachable) <sub>A</sub> <sup>#</sup>	-	8.50								pH	A-T-031w
Ammoniacal nitrogen (leachable) <sub>A</sub>	-	<0.02								mg/l	A-T-033w
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	-	2.46								mg/l	A-T-026w
Cyanide (total) (leachable) <sub>A</sub>	-	<0.005								mg/l	A-T-042wTCN
Phenols (total by HPLC) (leachable) <sub>A</sub>	-	<0.01								mg/l	A-T-050w
Sulphide (leachable) <sub>A</sub>	-	<0.1								mg/l	A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	-	1.2								mg/l	A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	-	4								µg/l	A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	-	<10								µg/l	A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	-	<1								µg/l	A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	-	4								µg/l	A-T-025w

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2							Units	Method ref
Client Sample No	4	13								
Client Sample ID	BH12A	BH12A								
Depth to Top	1.40	4.40								
Depth To Bottom	1.50	4.50								
Date Sampled	15-Mar-18	15-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	1A								
Chromium (leachable) <sub>A</sub> <sup>#</sup>	-	<1						µg/l		
Chromium (hexavalent) (leachable) <sub>A</sub>	-	<0.05						mg/l	A-T-040w	
Lead (leachable) <sub>A</sub> <sup>#</sup>	-	7						µg/l	A-T-025w	
Mercury (leachable) <sub>A</sub> <sup>#</sup>	-	<0.1						µg/l	A-T-025w	
Nickel (leachable) <sub>A</sub> <sup>#</sup>	-	<1						µg/l	A-T-025w	
Selenium (leachable) <sub>A</sub> <sup>#</sup>	-	<1						µg/l	A-T-025w	
Sulphur (elemental/free) (leachable) <sub>A</sub>	-	<0.1						mg/l	A-T-029w	
Zinc (leachable) <sub>A</sub> <sup>#</sup>	-	3						µg/l	A-T-025w	

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2							Units	Method ref
Client Sample No	4	13								
Client Sample ID	BH12A	BH12A								
Depth to Top	1.40	4.40								
Depth To Bottom	1.50	4.50								
Date Sampled	15-Mar-18	15-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	1A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2								
Client Sample No	4	13								
Client Sample ID	BH12A	BH12A								
Depth to Top	1.40	4.40								
Depth To Bottom	1.50	4.50								
Date Sampled	15-Mar-18	15-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	1A								
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01							mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	0.02							mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	0.12							mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	0.12							mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	0.12							mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	0.06							mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07							mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	0.11							mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	0.17							mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	0.10							mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	0.06							mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	0.14							mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	<0.08	1.03							mg/kg	A-T-019s

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2								
Client Sample No	4	13								
Client Sample ID	BH12A	BH12A								
Depth to Top	1.40	4.40								
Depth To Bottom	1.50	4.50								
Date Sampled	15-Mar-18	15-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	1A								
<b>PAH 16MS (leachable)</b>										
Acenaphthene (leachable) <sub>A</sub>	-	1.27							µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	-	<0.02							µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	-	0.13							µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	-	<0.02							µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	-	<0.02							µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	-	<0.02							µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	-	<0.02							µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	-	<0.02							µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	-	<0.02							µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	-	<0.02							µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	-	0.04							µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	-	0.44							µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	-	<0.02							µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	-	1.08							µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	-	0.55							µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	-	0.04							µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	-	3.55							µg/l	A-T-019w



Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2							Units	Method ref
Client Sample No	4	13								
Client Sample ID	BH12A	BH12A								
Depth to Top	1.40	4.40								
Depth To Bottom	1.50	4.50								
Date Sampled	15-Mar-18	15-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	1A								
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	<0.002							mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	<0.002							mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	-	<0.007							mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	<0.006							mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	-	<0.007							mg/kg	A-T-004s

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2								
Client Sample No	4	13								
Client Sample ID	BH12A	BH12A								
Depth to Top	1.40	4.40								
Depth To Bottom	1.50	4.50								
Date Sampled	15-Mar-18	15-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	1A								
<b>Speciated PCB-WHO12</b>										
PCB BZ 81 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>MF</sup>	<0.007	-							mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
<b>Total Speciated PCB-WHO12<sub>A</sub></b>	<0.007	-							mg/kg	A-T-004s

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2								Units	Method ref
Client Sample No	4	13									
Client Sample ID	BH12A	BH12A									
Depth to Top	1.40	4.40									
Depth To Bottom	1.50	4.50									
Date Sampled	15-Mar-18	15-Mar-18									
Sample Type	Soil - ES	Soil - ES									
Sample Matrix Code	1A	1A									
SVOC excluding PAH-16 (leachable)											
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	-	<4								µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
Carbazole (leachable) <sub>A</sub>	-	6								µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
n-Dioctylphthalate (leachable) <sub>A</sub>	-	<10								µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	-	<2								µg/l	A-T-052w

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2							Units	Method ref
Client Sample No	4	13								
Client Sample ID	BH12A	BH12A								
Depth to Top	1.40	4.40								
Depth To Bottom	1.50	4.50								
Date Sampled	15-Mar-18	15-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	1A								
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	-	<2							µg/l	A-T-052w
Hexachloroethane (leachable) <sub>A</sub>	-	<2							µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	-	<2							µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	-	<2							µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	-	<2							µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	-	<2							µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	-	<2							µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	-	<2							µg/l	A-T-052w

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2																			Units	Method ref	
Client Sample No	4	13																					
Client Sample ID	BH12A	BH12A																					
Depth to Top	1.40	4.40																					
Depth To Bottom	1.50	4.50																					
Date Sampled	15-Mar-18	15-Mar-18																					
Sample Type	Soil - ES	Soil - ES																					
Sample Matrix Code	1A	1A																					
SVOC																							
Hexachlorobenzene <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500																				µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
n-Dioctylphthalate <sub>A</sub>	<500	<500																				µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100																				µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100																				µg/kg	A-T-052s

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2							Units	Method ref
Client Sample No	4	13								
Client Sample ID	BH12A	BH12A								
Depth to Top	1.40	4.40								
Depth To Bottom	1.50	4.50								
Date Sampled	15-Mar-18	15-Mar-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	1A								
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100						µg/kg	A-T-052s	
Perylene <sub>A</sub>	<100	146						µg/kg	A-T-052s	



Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2									Units	Method ref
Client Sample No	4	13										
Client Sample ID	BH12A	BH12A										
Depth to Top	1.40	4.40										
Depth To Bottom	1.50	4.50										
Date Sampled	15-Mar-18	15-Mar-18										
Sample Type	Soil - ES	Soil - ES										
Sample Matrix Code	1A	1A										
VOC												
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	<10	<10									µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5									µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5									µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2									µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10									µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3									µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1									µg/kg	A-T-006s

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2																	Units	Method ref
Client Sample No	4	13																		
Client Sample ID	BH12A	BH12A																		
Depth to Top	1.40	4.40																		
Depth To Bottom	1.50	4.50																		
Date Sampled	15-Mar-18	15-Mar-18																		
Sample Type	Soil - ES	Soil - ES																		
Sample Matrix Code	1A	1A																		
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1																	µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1																	µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2																	µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1																	µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2																	µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3																	µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3																	µg/kg	A-T-006s

Envirolab Job Number: 18/02142

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02142/1	18/02142/2								Units	Method ref
Client Sample No	4	13									
Client Sample ID	BH12A	BH12A									
Depth to Top	1.40	4.40									
Depth To Bottom	1.50	4.50									
Date Sampled	15-Mar-18	15-Mar-18									
Sample Type	Soil - ES	Soil - ES									
Sample Matrix Code	1A	1A									
TPH UKCWG											
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s	
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s	
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s	
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s	
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1							mg/kg	A-T-023s	
Total Aliphatics <sub>A</sub>	<0.1	<0.1							mg/kg	A-T-023s	
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s	
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s	
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s	
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s	
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1							mg/kg	A-T-023s	
Total Aromatics <sub>A</sub>	<0.1	<0.1							mg/kg	A-T-023s	
TPH (Ali & Aro) <sub>A</sub>	<0.1	<0.1							mg/kg	A-T-023s	
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s	



## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## Final Test Report

Envirolab Job Number: 18/02142  
Issue Number: 1 Date: 3-Apr-18

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 585493

Date Samples Received: 19-Mar-18  
Date Instructions Received: 22-Mar-18  
Date Analysis Completed: 3-Apr-18

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

Approved by:



Holly Neary-King  
Administrative Assistant

Georgia King  
Admin & Client Services Supervisor





Sample Details						Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/02142/1		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample Number				4							
Client Sample ID				BH12A							
Depth to Top				1.4							
Depth to Bottom				1.50							
Date Sampled				15/03/2018							
Sample Type				Soil - ES							
Sample Matrix Code				1A							
Solid Waste Analysis											
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.43		-	>6	-			
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.03		-	to be evaluated	to be evaluated			
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.03		-	to be evaluated	to be evaluated			
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	<0.5		-	-	10			
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	<0.03		3	5	6			
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08		100	-	-			
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10		500	-	-			
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007		1	-	-			
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01		6	-	-			
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
				mg/l		mg/kg					
Arsenic	A-T-025	Y	N	0.003	0.003	0.006	0.030	0.5	2	25	
Barium	A-T-025	Y	N	0.030	0.032	0.060	0.320	20	100	300	
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5	
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70	
Copper	A-T-025	Y	N	0.001	0.001	0.002	0.010	2	50	100	
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2	
Molybdenum	A-T-025	Y	N	0.011	0.001	0.023	0.020	0.5	10	30	
Nickel	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.4	10	40	
Lead	A-T-025	Y	N	<0.001	0.002	<0.002	<0.01	0.5	10	50	
Antimony	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5	
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7	
Zinc	A-T-025	Y	N	0.044	0.022	0.088	0.240	4	50	200	
Chloride	A-T-026	Y	N	105	10	211	177	800	15000	25000	
Fluoride	A-T-026	Y	N	0.5	<0.10	1.0	<1	10	150	500	
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	11	<1.00	23	<10	1000	20000	50000	
Total Dissolved Solids	A-T-035	N	N	271	36	545	553	4000	60000	100000	
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-	
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000	
Leach Test Information											
pH (pH Units)	A-T-031	N	Y	7.1	6.9						
Conductivity (µS/cm)	A-T-037	N	N	542	72						
Mass Sample (kg)				0.201							
Dry Matter (%)	A-T-044	N	N	91.1							
<b>Stage 1</b>											
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350							
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150							
<b>Stage 2</b>											
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.460							
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation											

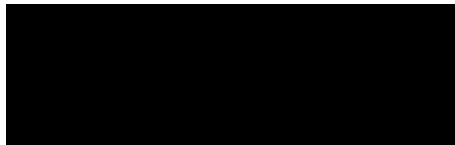
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02218  
**Issue Number:** 1 **Date:** 06 April, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

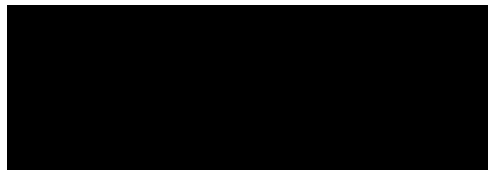
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 586162  
**Date Samples Received:** 19/03/18  
**Date Instructions Received:** 26/03/18  
**Date Analysis Completed:** 06/04/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4							
Client Sample No	8	7	20	16							
Client Sample ID	BH13A	BH12B	BH13A	BH12B							
Depth to Top	1.90	2.40	4.90	5.40							
Depth To Bottom	2.00	2.50	5.00	5.50							
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4A	1A	4A	5A							
										Units	Method ref
% Stones >10mm <sub>A</sub>	27.0	4.8	17.2	16.7						% w/w	A-T-044
pH <sub>D</sub>	9.78	9.22	9.15	9.13						pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	3.9	2.2	2.7	2.7						mg/kg	A-T-033s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	0.03	<0.01	<0.01	0.02						g/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	280	<200	280	330						mg/kg	A-T-028s
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1						mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	<0.2	<0.2	<0.2	<0.2						mg/kg	A-T-050s
Sulphide <sub>A</sub>	<5	<5	<5	<5						mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	<5	<5	14	32						mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	0.2	0.5	0.2	0.2						% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	4	3	2	2						mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	<1.0	<1.0	<1.0	<1.0						mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	<0.5	<0.5	<0.5	<0.5						mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	9	2	2	7						mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	6	3	135	5						mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	<1	<1	<1	<1						mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	19	6	9	19						mg/kg	A-T-024s
Mercury <sub>D</sub>	<0.17	<0.17	<0.17	<0.17						mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	6	3	80	4						mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>M#</sup>	<1	<1	<1	<1						mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	24	10	7	15						mg/kg	A-T-024s
Leachate Prep NRA (10:1) <sub>A</sub>	*	-	-	-							A-T-001
pH (leachable) <sub>A</sub> <sup>#</sup>	7.73	-	-	-						pH	A-T-031w
Ammoniacal nitrogen (leachable) <sub>A</sub>	<0.02	-	-	-						mg/l	A-T-033w
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	3.91	-	-	-						mg/l	A-T-026w
Cyanide (total) (leachable) <sub>A</sub>	<0.005	-	-	-						mg/l	A-T-042wTCN
Phenols (total by HPLC) (leachable) <sub>A</sub>	<0.01	-	-	-						mg/l	A-T-050w
Sulphide (leachable) <sub>A</sub>	<0.1	-	-	-						mg/l	A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	6.1	-	-	-						mg/l	A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	7	-	-	-						µg/l	A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	23	-	-	-						µg/l	A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-						µg/l	A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	6	-	-	-						µg/l	A-T-025w

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4					Units	Method ref
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
Chromium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-					µg/l	A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05	-	-	-					mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	4	-	-	-					µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1	-	-	-					µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-					µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-					µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1	-	-	-					mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	72	-	-	-					µg/l	A-T-025w

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4					Units	Method ref
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD	NAD	-	-						A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	-	-						

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4					Units	Method ref
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
<b>PAH-16MS</b>										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	0.04	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	0.03	<0.02	<0.02	<0.02					mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	0.10	<0.04	<0.04	0.06					mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	0.19	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	0.23	<0.05	0.06	0.07					mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	0.15	<0.05	<0.05	<0.05					mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	0.08	<0.07	<0.07	<0.07					mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	0.12	<0.06	<0.06	0.07					mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	0.16	<0.08	<0.08	0.12					mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	0.16	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	0.05	<0.03	<0.03	0.04					mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	0.17	<0.07	<0.07	0.09					mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	1.48	<0.08	0.09	0.48					mg/kg	A-T-019s



Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4					Units	Method ref
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
<b>PAH 16MS (leachable)</b>										
Acenaphthene (leachable) <sub>A</sub>	1.63	-	-	-					µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	0.04	-	-	-					µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	0.05	-	-	-					µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	0.03	-	-	-					µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	0.40	-	-	-					µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	0.17	-	-	-					µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	0.18	-	-	-					µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	0.02	-	-	-					µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	2.52	-	-	-					µg/l	A-T-019w

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4					Units	Method ref
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	<0.002	<0.002	-					mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	<0.002	<0.002	-					mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	<0.004	<0.004	-					mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007	<0.007	<0.007					mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	<0.006	<0.006	-					mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	<0.004	<0.004	-					mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	<0.004	<0.004	-					mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	-	<0.007	<0.007	-					mg/kg	A-T-004s

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4					Units	Method ref
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
<b>Speciated PCB-WHO12</b>										
PCB BZ 81 <sub>A</sub>	<0.005	-	-	<0.005					mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	<0.005	-	-	<0.005					mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	<0.005	-	-	<0.005					mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	<0.005	-	-	<0.005					mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	<0.005	-	-	<0.005					mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	<0.005	-	-	<0.005					mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	<0.005	-	-	<0.005					mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	<0.005	-	-	<0.005					mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	<0.005	-	-	<0.005					mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	<0.005	-	-	<0.005					mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	<0.005	-	-	<0.005					mg/kg	A-T-004s
Total Speciated PCB-WHO12 <sub>A</sub>	<0.007	-	-	<0.007					mg/kg	A-T-004s

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4						
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
SVOC excluding PAH-16 (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	<4	-	-	-					µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Carbazole (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
n-Dioctylphthalate (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4					Units	Method ref
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Hexachloroethane (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	<2	-	-	-					µg/l	A-T-052w

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4						
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500	<500					µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500	<500					µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100	<100	256					µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s



Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4					Units	Method ref
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Perylene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4															Units	Method ref			
Client Sample No	8	7	20	16																			
Client Sample ID	BH13A	BH12B	BH13A	BH12B																			
Depth to Top	1.90	2.40	4.90	5.40																			
Depth To Bottom	2.00	2.50	5.00	5.50																			
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18																			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES																			
Sample Matrix Code	4A	1A	4A	5A																			
VOC																							
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																µg/kg	A-T-006s		
Chloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10																	µg/kg	A-T-006s	
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	2	2																		µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5	<5	<5																		µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5																		µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2																		µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10																		µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3																		µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1																		µg/kg	A-T-006s

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4					Units	Method ref
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1					µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1	<1					µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2	<2					µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3					µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3					µg/kg	A-T-006s

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4						
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	0.6	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	0.6	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	1.3	1.3	<0.1	3.3					mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	4.8	2.6	<0.1	6.2					mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	6.2	3.9	<0.1	9.6					mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	6.8	3.9	<0.1	9.6					mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

Envirolab Job Number: 18/02218

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02218/1	18/02218/2	18/02218/3	18/02218/4						
Client Sample No	8	7	20	16						
Client Sample ID	BH13A	BH12B	BH13A	BH12B						
Depth to Top	1.90	2.40	4.90	5.40						
Depth To Bottom	2.00	2.50	5.00	5.50						
Date Sampled	15-Mar-18	20-Mar-18	15-Mar-18	20-Mar-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4A	1A	4A	5A						
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
Total Aliphatics (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Aro >C7-C8 (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



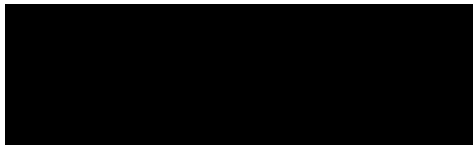
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02545  
**Issue Number:** 1  
**Date:** 16 April, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

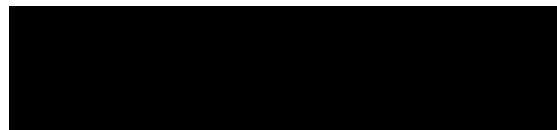
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 587599  
**Date Samples Received:** 06/04/18  
**Date Instructions Received:** 06/04/18  
**Date Analysis Completed:** 16/04/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Danielle Brierley  
Client Manager

Envirolab Job Number: 18/02545

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02545/1	18/02545/2	18/02545/3	18/02545/4	18/02545/5	18/02545/6	18/02545/7	18/02545/8	Units	Method ref		
Client Sample No	14	26	33	64	82	94	100	104				
Client Sample ID	BH12B	BH12B	BH12B	BH12B	BH12B	BH12B	BH12B	BH12B				
Depth to Top	4.50	8.50	10.50	23.50	35.50	43.50	46.95	48.95				
Depth To Bottom	4.95	8.95	10.95	23.95	35.92	43.89	47.00	49.00				
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	21-Mar-18	22-Mar-18	23-Mar-18	23-Mar-18	23-Mar-18				
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	5A	5	5A	5	5	5	3	5				
% Stones >10mm <sub>A</sub>	15.5	<0.1	12.4	<0.1	<0.1	<0.1	<0.1	<0.1			% w/w	A-T-044
pH BRE <sub>D</sub> <sup>M#</sup>	-	-	-	8.26	8.11	8.24	8.23	8.28	pH	A-T-031s		
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	-	-	-	<1.00	<1.00	<1.00	4.77	4.39	mg/l	A-T-033s		
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	505	504	445	1150	504	mg/l	A-T-026s		
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	-	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s		
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	84	83	76	222	221	mg/l	A-T-026s		
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	-	0.04	0.07	0.07	0.09	0.13	% w/w	A-T-028s		
Sulphur BRE (total) <sub>D</sub>	-	-	-	0.12	0.15	0.17	0.17	0.16	% w/w	A-T-024s		
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	-	34	28	25	62	48	mg/l	A-T-SOLMET5		
Organic matter <sub>D</sub> <sup>M#</sup>	3.0	0.3	<0.1	-	-	-	-	-	% w/w	A-T-032 OM		

## **REPORT NOTES**

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All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

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A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

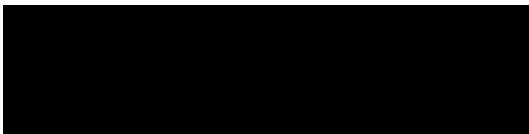
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02547  
**Issue Number:** 1 **Date:** 16 April, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

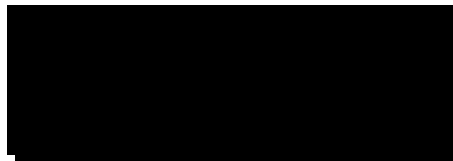
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt. Yarmouth  
**Project Ref:** PZ1522D1  
**Order No:** 587552  
**Date Samples Received:** 05/04/18  
**Date Instructions Received:** 06/04/18  
**Date Analysis Completed:** 16/04/18

**Prepared by:**



Danielle Brierley  
Client Manager

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/02547

Client Project Name: Gt. Yarmouth

Client Project Ref: PZ1522D1

Lab Sample ID	18/02547/1	18/02547/2	18/02547/3	18/02547/4	18/02547/5	18/02547/6	18/02547/7	18/02547/8	Units	Method ref		
Client Sample No	14	19	35	68	77	95	106	116				
Client Sample ID	BH13A	BH13A	BH13A	BH13A	BH13A	BH13A	BH13A	BH13A				
Depth to Top	3.25	4.60	9.00	24.00	28.60	40.00	46.45	49.95				
Depth To Bottom	3.70	4.90	9.50	24.45	29.05	40.45	46.50	50.00				
Date Sampled	15-Mar-18	15-Mar-18	16-Mar-18	19-Mar-18	19-Mar-18	20-Mar-18	21-Mar-18	21-Mar-18				
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	5A	5	5	5	5	5	3	5				
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			% w/w	A-T-044
pH BRE <sub>D</sub> <sup>M#</sup>	-	-	-	8.40	8.41	8.24	8.50	8.35	pH	A-T-031s		
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	-	-	-	<1.00	1.29	<1.00	4.64	5.48	mg/l	A-T-033s		
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	324	2340	480	1720	419	mg/l	A-T-026s		
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	-	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s		
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	52	418	83	466	231	mg/l	A-T-026s		
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	-	0.03	0.14	0.07	0.24	0.11	% w/w	A-T-028s		
Sulphur BRE (total) <sub>D</sub>	-	-	-	0.06	0.53	0.18	0.82	0.19	% w/w	A-T-024s		
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	-	17	79	27	62	48	mg/l	A-T-SOLMETs		
Organic matter <sub>D</sub> <sup>M#</sup>	0.6	1.6	<0.1	-	-	-	-	-	% w/w	A-T-032 OM		

## **REPORT NOTES**

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For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

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Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

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Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

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Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



## Final Test Report

Envirolab Job Number: 18/02218  
Issue Number: 1 Date: 6-Apr-18

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 586162

Date Samples Received: 19-Mar-18  
Date Instructions Received: 26-Mar-18  
Date Analysis Completed: 6-Apr-18

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

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**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

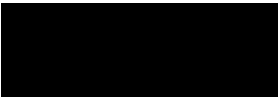
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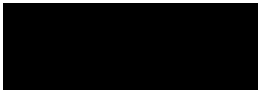
Please contact us if you need any further information.

Prepared by:

Approved by:



Holly Neary-King  
Administrative Assistant



Richard Wong  
Client Manager



Sample Details						Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/02218/1		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample Number				8							
Client Sample ID				BH13A							
Depth to Top				1.9							
Depth to Bottom				2.00							
Date Sampled				15/03/2018							
Sample Type				Soil - ES							
Sample Matrix Code				4A							
Solid Waste Analysis											
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	9.78		-	>6	-			
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.07		-	to be evaluated	to be evaluated			
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.02		-	to be evaluated	to be evaluated			
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	<0.5		-	-	10			
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.14		3	5	6			
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	1.5		100	-	-			
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	20		500	-	-			
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007		1	-	-			
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01		6	-	-			
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
				mg/l		mg/kg					
Arsenic	A-T-025	Y	N	0.011	0.004	0.022	0.040	0.5	2	25	
Barium	A-T-025	Y	N	0.024	0.006	0.050	0.070	20	100	300	
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5	
Chromium	A-T-025	Y	N	0.001	<0.001	0.003	<0.01	0.5	10	70	
Copper	A-T-025	Y	N	0.013	0.002	0.026	0.030	2	50	100	
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2	
Molybdenum	A-T-025	Y	N	0.003	<0.001	0.007	<0.01	0.5	10	30	
Nickel	A-T-025	Y	N	0.002	<0.001	0.004	<0.01	0.4	10	40	
Lead	A-T-025	Y	N	0.020	0.002	0.041	0.040	0.5	10	50	
Antimony	A-T-025	Y	N	0.001	<0.001	0.002	<0.01	0.06	0.7	5	
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7	
Zinc	A-T-025	Y	N	0.031	0.003	0.063	0.050	4	50	200	
Chloride	A-T-026	Y	N	16	2	33	29	800	15000	25000	
Fluoride	A-T-026	Y	N	0.2	<0.10	0.5	<1	10	150	500	
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	16	2	32	30	1000	20000	50000	
Total Dissolved Solids	A-T-035	N	N	94	31	191	363	4000	60000	100000	
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-	
Dissolved Organic Carbon	A-T-032	N	N	25.2	<20.0	51	<200	500	800	1000	
Leach Test Information											
pH (pH Units)	A-T-031	N	Y	7.0	7.0						
Conductivity (µS/cm)	A-T-037	N	N	189	62						
Mass Sample (kg)				0.201							
Dry Matter (%)	A-T-044	N	N	90.5							
Stage 1											
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350							
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150							
Stage 2											
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.450							
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation											

## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/00116  
**Issue Number:** 1 **Date:** 12 January, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 576692  
**Date Samples Received:** 08/01/18  
**Date Instructions Received:** 08/01/18  
**Date Analysis Completed:** 12/01/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Iain Haslock  
Analytical Consultant

Envirolab Job Number: 18/00116

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/00116/1	18/00116/2	18/00116/3	18/00116/4	18/00116/5	18/00116/6	18/00116/7	18/00116/8	Units	Method ref
Client Sample No	5	16	31	36	45	54	63	71		
Client Sample ID	BH15	BH15	BH15	BH15	BH15	BH15	BH15	BH15		
Depth to Top	1.20	5.00	10.00	12.00	15.00	19.00	24.00	28.00		
Depth To Bottom	1.65	5.45	10.45	12.45	15.45	19.45	24.45	28.45		
Date Sampled	18-Dec-17	18-Dec-17	20-Dec-17	18-Dec-17	19-Dec-17	19-Dec-17	19-Dec-17	20-Dec-17		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1A	1A	4A	4A	5A	5	5	5		
% Stones >10mm <sub>A</sub>	<0.1	13.8	11.5	22.3	3.0	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub>	8.69	8.68	8.66	9.00	8.63	8.53	8.47	8.55	pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	98	42	18	24	368	517	488	1300	mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	47	<10	12	<10	60	141	92	223	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.06	0.09	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.25	0.30	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	2	3	4	3	8	25	31	61	mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	-	-	<0.1	-	-	-	-	-	% w/w	A-T-032 OM

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A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

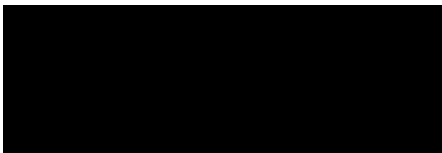
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02571  
**Issue Number:** 1  
**Date:** 17 April, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

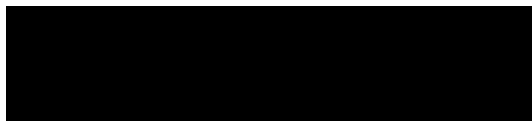
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 587433  
**Date Samples Received:** 09/04/18  
**Date Instructions Received:** 09/04/18  
**Date Analysis Completed:** 17/04/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Danielle Brierley  
Client Manager



Envirolab Job Number: 18/02571

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02571/1	18/02571/2	18/02571/3	18/02571/4	18/02571/5	18/02571/6	18/02571/7	18/02571/8	Units	Method ref
Client Sample No	9	68	13	13	17	27	40	37		
Client Sample ID	BH8	BH10A	BH11A	BH13	BH6	BH2	BH15	BH1		
Depth to Top	0.80	1.00	1.18	1.62	1.66	2.00	2.00	2.20		
Depth To Bottom										
Date Sampled	23-Jan-18	21-Feb-18	12-Feb-18	06-Mar-18	23-Nov-17	07-Dec-17	18-Dec-17	08-Dec-17		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
pH BRE (w) <sub>A</sub> <sup>#</sup>	7.77	6.75	6.59	7.17	7.41	6.97	7.84	7.30	pH	A-T-031w
Ammonium / Ammoniacal N as NH <sub>4</sub> BRE (w) <sub>A</sub> <sup>#</sup>	0.120	0.040	<0.026	<0.026	6.650	39.33	0.090	13	mg/l	A-T-033w
Chloride BRE (w) <sub>A</sub> <sup>#</sup>	989	2340	322	382	254	2500	1340	1190	mg/l	A-T-026w
Nitrate BRE (w) <sub>A</sub> <sup>#</sup>	<0.10	0.61	0.12	<0.10	<0.10	-0.020	<0.10	<0.10	mg/l	A-T-026w
Sulphate BRE (w) <sub>A</sub> <sup>#</sup>	214	391	128	157	<1	<1	240	20	mg/l	A-T-026w
Magnesium BRE (dissolved) <sub>A</sub> <sup>#</sup>	56.3	108	37.5	25.3	36.5	76.4	70.6	29.5	mg/l	A-T-049w
Sulphur (elemental/free) (w) <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/l	A-T-029w

Envirolab Job Number: 18/02571

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02571/9	18/02571/10	18/02571/11	18/02571/12	18/02571/13	18/02571/14	18/02571/15	18/02571/16	Units	Method ref
Client Sample No	15	11	19	30	16	42	28	19		
Client Sample ID	BH4	BH11	BH5A	BH12B	BH4A	BH12	BH4	BH7		
Depth to Top	2.24	2.50	2.60	3.00	3.20	3.20	3.50	3.60		
Depth To Bottom										
Date Sampled	28-Nov-17	12-Feb-18	13-Dec-17	20-Mar-18	05-Dec-17	07-Mar-18	29-Nov-17	30-Nov-17		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
pH BRE (w) <sub>A</sub> <sup>#</sup>	7.40	7.25	7.64	8.62	7.22	7.93	7.15	7.50		
Ammonium / Ammoniacal N as NH <sub>4</sub> BRE (w) <sub>A</sub> <sup>#</sup>	2.980	1.070	0.380	11.77	4.980	3.650	7.140	25.29	mg/l	A-T-033w
Chloride BRE (w) <sub>A</sub> <sup>#</sup>	309	1600	3620	496	899	628	743	7690	mg/l	A-T-026w
Nitrate BRE (w) <sub>A</sub> <sup>#</sup>	<0.10	<0.10	-0.020	<0.10	<0.10	<0.10	<0.10	<0.10	mg/l	A-T-026w
Sulphate BRE (w) <sub>A</sub> <sup>#</sup>	<1	269	518	143	202	103	<1	755	mg/l	A-T-026w
Magnesium BRE (dissolved) <sub>A</sub> <sup>#</sup>	29.8	92.0	195	10.0	69.0	18.5	78.8	396	mg/l	A-T-049w
Sulphur (elemental/free) (w) <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/l	A-T-029w

Envirolab Job Number: 18/02571

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02571/17								Units	Method ref
Client Sample No	40									
Client Sample ID	BH1									
Depth to Top	7.00									
Depth To Bottom										
Date Sampled	08-Dec-17									
Sample Type	Water - EW									
Sample Matrix Code	N/A									
pH BRE (w) <sub>A</sub> <sup>#</sup>	7.22								pH	A-T-031w
Ammonium / Ammoniacal N as NH <sub>4</sub> BRE (w) <sub>A</sub> <sup>#</sup>	14.16								mg/l	A-T-033w
Chloride BRE (w) <sub>A</sub> <sup>#</sup>	1150								mg/l	A-T-026w
Nitrate BRE (w) <sub>A</sub> <sup>#</sup>	<0.10								mg/l	A-T-026w
Sulphate BRE (w) <sub>A</sub> <sup>#</sup>	220								mg/l	A-T-026w
Magnesium BRE (dissolved) <sub>A</sub> <sup>#</sup>	34.6								mg/l	A-T-049w
Sulphur (elemental/free) (w) <sub>A</sub>	<0.1								mg/l	A-T-029w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

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All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

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Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

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Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/02216  
**Issue Number:** 1 **Date:** 06 April, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 585985  
**Date Samples Received:** 23/03/18  
**Date Instructions Received:** 26/03/18  
**Date Analysis Completed:** 06/04/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Iain Haslock  
Analytical Consultant

Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4						
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
									Units	Method ref
% Stones >10mm <sub>A</sub>	18.4	<0.1	12.2	<0.1					% w/w	A-T-044
pH <sub>D</sub>	9.10	8.08	9.05	8.58					pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	4.9	0.9	3.3	0.6					mg/kg	A-T-033s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	<0.01	0.09	<0.01	0.02					g/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	<200	720	<200	650					mg/kg	A-T-028s
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1					mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	<0.2	<0.2	<0.2	<0.2					mg/kg	A-T-050s
Sulphide <sub>A</sub>	<5	<5	<5	<5					mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	<5	14	<5	<5					mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	<0.1	3.2	<0.1	1.5					% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	2	8	2	1					mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	<1.0	2.5	<1.0	1.7					mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	<0.5	0.6	<0.5	<0.5					mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	3	23	<1	5					mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	2	10	2	2					mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	<1	<1	<1	<1					mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	11	141	3	25					mg/kg	A-T-024s
Mercury <sub>D</sub>	<0.17	0.46	<0.17	<0.17					mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	2	11	<1	2					mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>M#</sup>	<1	<1	<1	<1					mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	9	183	5	51					mg/kg	A-T-024s



Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4						
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
Leachate Prep NRA (10:1) <sub>A</sub>	-	*	-	-						A-T-001
pH (leachable) <sub>A</sub> <sup>#</sup>	-	7.23	-	-						pH A-T-031w
Ammoniacal nitrogen (leachable) <sub>A</sub>	-	<0.02	-	-						mg/l A-T-033w
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	-	33.42	-	-						mg/l A-T-026w
Cyanide (total) (leachable) <sub>A</sub>	-	<0.005	-	-						mg/l A-T-042wTCN
Phenols (total by HPLC) (leachable) <sub>A</sub>	-	<0.01	-	-						mg/l A-T-050w
Sulphide (leachable) <sub>A</sub>	-	<0.1	-	-						mg/l A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	-	7.8	-	-						mg/l A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	-	15	-	-						µg/l A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	-	153	-	-						µg/l A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	-	<1	-	-						µg/l A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	-	17	-	-						µg/l A-T-025w
Chromium (leachable) <sub>A</sub> <sup>#</sup>	-	<1	-	-						µg/l A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	-	<0.05	-	-						mg/l A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	-	29	-	-						µg/l A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	-	<0.1	-	-						µg/l A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	-	3	-	-						µg/l A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	-	<1	-	-						µg/l A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	-	<0.1	-	-						mg/l A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	-	26	-	-						µg/l A-T-025w

Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4					Units	Method ref		
Client Sample No	003	004	004	005								
Client Sample ID	CPT5	CPT3	CPT5	CPT3								
Depth to Top	0.50	0.50	1.00	1.00								
Depth To Bottom												
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18								
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D								
Sample Matrix Code	1A	6A	1A	6A								
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	NAD	Chrysotile	NAD	Chrysotile						A-T-045		
Asbestos Matrix (microscope) <sub>A</sub>	-	Loose Fibres	-	Loose Fibres						A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A								

Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4					Units	Method ref
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
<b>PAH-16MS</b>										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	0.82	<0.01	0.06					mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	0.08	<0.01	0.09					mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	2.87	<0.02	0.30					mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	0.05	2.77	<0.04	1.12					mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	0.08	1.93	<0.04	1.02					mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	0.10	2.46	<0.05	1.34					mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	0.80	<0.05	0.53					mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	0.93	<0.07	0.54					mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	0.07	2.76	<0.06	1.34					mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	0.22	<0.04	0.14					mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	9.18	<0.08	2.81					mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	1.32	<0.01	0.10					mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	0.05	1.02	<0.03	0.66					mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	0.64	<0.03	0.10					mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	9.50	<0.03	1.33					mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	0.08	7.14	<0.07	2.26					mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	0.56	44.5	<0.08	13.8					mg/kg	A-T-019s

Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4					Units	Method ref
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
<b>PAH 16MS (leachable)</b>										
Acenaphthene (leachable) <sub>A</sub>	-	0.29	-	-					µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	-	0.03	-	-					µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	-	0.05	-	-					µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	-	<0.02	-	-					µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	-	<0.02	-	-					µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	-	<0.02	-	-					µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	-	<0.02	-	-					µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	-	<0.02	-	-					µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	-	<0.02	-	-					µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	-	<0.02	-	-					µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	-	0.05	-	-					µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	-	0.14	-	-					µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	-	<0.02	-	-					µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	-	0.19	-	-					µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	-	0.16	-	-					µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	-	0.04	-	-					µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	-	0.95	-	-					µg/l	A-T-019w

Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4					Units	Method ref
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	<0.002	<0.002	-	-					mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	<0.002	<0.002	-	-					mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	<0.004	<0.004	-	-					mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007	<0.007	<0.007					mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	<0.006	<0.006	-	-					mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	<0.004	<0.004	-	-					mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	<0.004	<0.004	-	-					mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	-	<0.007	-	-					mg/kg	A-T-004s

Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4					Units	Method ref
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
<b>Speciated PCB-WHO12</b>										
PCB BZ 81 <sub>A</sub>	-	-	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	-	-	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	-	-	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	-	-	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	-	-	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	-	-	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	-	-	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	-	-	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	-	-	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	-	-	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	-	-	<0.005	<0.005					mg/kg	A-T-004s
Total Speciated PCB-WHO12 <sub>A</sub>	-	-	<0.007	<0.007					mg/kg	A-T-004s



Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4						
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
SVOC excluding PAH-16 (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	-	<4	-	-					µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Carbazole (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
n-Dioctylphthalate (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w

Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4					Units	Method ref
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	-	<2	-	-						
Hexachloroethane (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	-	<2	-	-					µg/l	A-T-052w



Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4					Units	Method ref
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Perylene <sub>A</sub>	<100	1500	<100	740					µg/kg	A-T-052s

Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4						
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
VOC										
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10					µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5	<5	<5					µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10					µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3					µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s

Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4					Units	Method ref
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1					µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1	<1					µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2	<2					µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3					µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3					µg/kg	A-T-006s



Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4						
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	1.5	<0.1					mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	4.6	<0.1					mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	3.2	0.7	<0.1					mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1	3.2	6.6	<0.1					mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	0.9	<0.1	<0.1					mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	3.7	<0.1	<0.1					mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	13.7	<0.1	5.2					mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	33.4	<0.1	4.6					mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1	0.8	<0.1	<0.1					mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	<0.1	52.4	<0.1	9.8					mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	<0.1	55.6	6.6	9.8					mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

Envirolab Job Number: 18/02216

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/02216/1	18/02216/2	18/02216/3	18/02216/4						
Client Sample No	003	004	004	005						
Client Sample ID	CPT5	CPT3	CPT5	CPT3						
Depth to Top	0.50	0.50	1.00	1.00						
Depth To Bottom										
Date Sampled	20-Mar-18	20-Mar-18	20-Mar-18	20-Mar-18						
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D						
Sample Matrix Code	1A	6A	1A	6A						
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
Total Aliphatics (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
Aro >C7-C8 (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	-	<10	-	-					µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	-	<1	-	-					µg/l	A-T-022w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## Final Test Report

Envirolab Job Number: 18/02216  
Issue Number: 1 Date: 6-Apr-18

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 585985

Date Samples Received: 23-Mar-18  
Date Instructions Received: 26-Mar-18  
Date Analysis Completed: 6-Apr-18

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

Approved by:



Melanie Marshall  
Laboratory Coordinator



Iain Haslock  
Analytical Consultant



Sample Details							Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/02216/1			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample Number				3								
Client Sample ID				CPT5								
Depth to Top				0.5								
Depth to Bottom												
Date Sampled				20/03/2018								
Sample Type				Soil - D								
Sample Matrix Code				1A								
Solid Waste Analysis												
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	9.10			-	>6	-			
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.03			-	to be evaluated	to be evaluated			
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.03			-	to be evaluated	to be evaluated			
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	<0.5			-	-	10			
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	<0.03			3	5	6			
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	0.57			100	-	-			
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	16			500	-	-			
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007			1	-	-			
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01			6	-	-			
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)				
				mg/l		mg/kg						
Arsenic	A-T-025	Y	N	0.009	0.003	0.017	0.040	0.5	2	25		
Barium	A-T-025	Y	N	0.025	0.002	0.047	0.040	20	100	300		
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5		
Chromium	A-T-025	Y	N	0.001	<0.001	0.003	<0.01	0.5	10	70		
Copper	A-T-025	Y	N	0.010	<0.001	0.020	0.010	2	50	100		
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2		
Molybdenum	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	30		
Nickel	A-T-025	Y	N	0.001	<0.001	0.002	<0.01	0.4	10	40		
Lead	A-T-025	Y	N	0.053	0.001	0.101	0.050	0.5	10	50		
Antimony	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5		
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7		
Zinc	A-T-025	Y	N	0.024	0.001	0.046	0.030	4	50	200		
Chloride	A-T-026	Y	N	6	<1.00	11	<10	800	15000	25000		
Fluoride	A-T-026	Y	N	0.1	<0.10	<0.2	<1	10	150	500		
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	3	<1.00	5	<10	1000	20000	50000		
Total Dissolved Solids	A-T-035	N	N	47	20	90	219	4000	60000	100000		
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-		
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000		
Leach Test Information												
pH (pH Units)	A-T-031	N	Y	7.0	7.3							
Conductivity (µS/cm)	A-T-037	N	N	95	40							
Mass Sample (kg)				0.200								
Dry Matter (%)	A-T-044	N	N	94.5								
Stage 1												
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350								
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150								
Stage 2												
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.520								
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation												

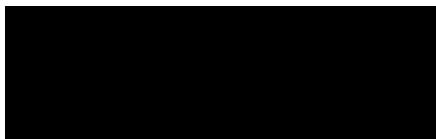
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 17/08502  
**Issue Number:** 1 **Date:** 21 December, 2017

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

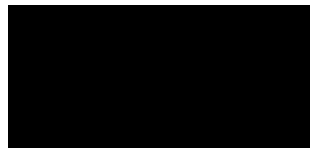
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 574728  
**Date Samples Received:** 06/12/17  
**Date Instructions Received:** 14/12/17  
**Date Analysis Completed:** 21/12/17

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Georgia King  
Admins & Client Services Supervisor



Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
% Stones >10mm <sub>A</sub>	13.7	<0.1	<0.1	30.3	<0.1	4.2	11.5	<0.1		
pH <sub>D</sub>	9.33	8.02	7.51	8.79	8.36	8.03	8.25	8.29	pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	2.2	54.3	60.9	0.6	5.4	3.6	3.5	8.6	mg/kg	A-T-033s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	0.14	0.90	3.28	0.02	0.06	0.37	<0.01	0.03	g/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	310	3700	9300	550	610	1200	850	400	mg/kg	A-T-028s
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	A-T-050s
Sulphide <sub>A</sub>	<15	<15	490	<15	<15	<15	<15	<15	mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	<5	40	<5	<5	<5	12	<5	<5	mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	<0.1	4.7	54.0	5.4	6.5	3.9	4.3	1.7	% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	2	13	24	7	10	8	9	7	mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	<1.0	10.8	43.9	<1.0	1.3	2.9	4.2	3.8	mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	<0.5	0.8	<0.5	<0.5	0.5	<0.5	1.9	<0.5	mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	8	11	2	68	44	22	19	13	mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	9	34	1	13	25	10	10	19	mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	6	17	1	187	77	94	101	41	mg/kg	A-T-024s
Mercury <sub>D</sub>	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	10	29	8	16	22	11	12	16	mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	14	67	<5	191	105	76	1900	57	mg/kg	A-T-024s
Leachate Prep NRA (10:1) <sub>A</sub>	-	-	*	-	*	-	*	-		A-T-001
pH (leachable) <sub>A</sub> <sup>#</sup>	-	-	7.63	-	7.18	-	7.28	-	pH	A-T-031w
Ammoniacal nitrogen (leachable) <sub>A</sub>	-	-	0.60	-	<0.02	-	0.03	-	mg/l	A-T-033w
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	-	-	106.11	-	8.04	-	14.99	-	mg/l	A-T-026w
Cyanide (total) (leachable) <sub>A</sub>	-	-	0.010	-	<0.005	-	<0.005	-	mg/l	A-T-042wTCN
Phenols (total by HPLC) (leachable) <sub>A</sub>	-	-	<0.01	-	<0.01	-	<0.01	-	mg/l	A-T-050w
Sulphide (leachable) <sub>A</sub>	-	-	<0.1	-	<0.1	-	<0.1	-	mg/l	A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	-	-	4.7	-	4.8	-	11.4	-	mg/l	A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	-	2	-	4	-	µg/l	A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	-	-	388	-	31	-	102	-	µg/l	A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	-	7	-	8	-	µg/l	A-T-025w

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Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
Chromium (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	-	1	-	<1	-		
Chromium (hexavalent) (leachable) <sub>A</sub>	-	-	<0.05	-	<0.05	-	<0.05	-	mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	-	7	-	25	-	µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	-	-	<0.1	-	<0.1	-	<0.1	-	µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	-	2	-	3	-	µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	-	-	<0.1	-	<0.1	-	<0.1	-	mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	-	-	5	-	6	-	644	-	µg/l	A-T-025w

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Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref		
Client Sample No	10	14	8	3	6	1	2	5				
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6				
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0				
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10				
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES				
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5				
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	-	-	NAD	NAD	-	NAD	NAD	-		A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	-	-	N/A	N/A	-	N/A	N/A	-				

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Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
PAH 16										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	0.06	0.03	0.02	<0.01	<0.01	mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	<0.02	<0.02	0.07	0.03	0.08	<0.02	<0.02	mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	0.91	0.16	0.54	0.09	<0.04	mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	1.06	0.21	0.58	0.09	<0.04	mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	<0.05	1.30	0.27	0.74	0.12	<0.05	mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	<0.05	0.85	0.32	0.48	0.08	<0.05	mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07	0.48	0.09	0.26	<0.07	<0.07	mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	<0.06	<0.06	0.90	0.21	0.55	0.11	<0.06	mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	0.19	0.05	0.11	<0.04	<0.04	mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	<0.08	<0.08	1.24	0.33	0.88	0.22	<0.08	mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01	0.01	0.02	<0.01	<0.01	mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	0.96	0.31	0.54	0.09	<0.03	mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	0.16	0.20	0.25	0.10	<0.03	mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07	1.22	0.33	0.78	0.18	<0.07	mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	<0.08	<0.08	<0.08	9.39	2.58	5.88	1.07	<0.08	mg/kg	A-T-019s

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Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
PAH 16MS (leachable)										
Acenaphthene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	-	-	0.06	-	0.05	-	0.10	-	µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	-	-	<0.02	-	<0.02	-	<0.02	-	µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	-	-	0.06	-	0.05	-	0.10	-	µg/l	A-T-019w

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Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	-	-	<0.002	-	-	<0.002	-	mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	-	-	<0.002	-	-	<0.002	-	mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	-	-	<0.004	-	-	<0.004	-	mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	-	-	<0.007	<0.007	-	<0.007	<0.007	-	mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	-	-	<0.006	-	-	<0.006	-	mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	-	-	<0.004	-	-	<0.004	-	mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	-	-	<0.004	-	-	<0.004	-	mg/kg	A-T-004s
PCB Total of EC7 <sub>A</sub> <sup>M#</sup>	-	-	-	<0.007	-	-	<0.007	-	mg/kg	A-T-004s



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Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
Speciated PCB-WHO12										
PCB BZ 81 <sub>A</sub>	-	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	-	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	-	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	-	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	-	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	-	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	-	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	-	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	-	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	-	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	-	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s

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Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
SVOC (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Acenaphthene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Acenaphthylene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Anthracene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Benzo(a)anthracene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Benzo(a)pyrene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Benzo(ghi)perylene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	-	-	<4	-	<4	-	<4	-	µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
Carbazole (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-		
Chrysene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	-	-	<2	-	<2	-	15	-	µg/l	A-T-052w
n-Dioctylphthalate (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-052w
Fluoranthene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Fluorene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Hexachloroethane (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Indeno(1,2,3-cd)pyrene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Naphthalene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Phenanthrene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w
Pyrene (leachable) <sub>A</sub>	-	-	<2	-	<2	-	<2	-	µg/l	A-T-052w

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500	<500	<500	<500	<500	<500	µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500	<500	<500	<500	<500	<500	µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100		
Perylene <sub>A</sub>	<100	<100	603	226	230	573	<100	<100	µg/kg	A-T-052s

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
VOC										
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10	<10	µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	21	29	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10	<10	µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s



Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1		
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2	<2	<2	<2	<2	<2	µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	<3	<3	<3	µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	<3	<3	<3	µg/kg	A-T-006s

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	0.8	1.7	<0.1	1.4	<0.1	mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	13.9	29.3	10.3	13.8	<0.1	mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	0.6	6.1	0.8	<0.1	<0.1	mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1	<0.1	<0.1	15.4	37.1	11.1	15.3	<0.1	mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	0.2	<0.1	0.8	<0.1	<0.1	mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	3.1	<0.1	<0.1	1.7	2.4	3.7	0.4	<0.1	mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	1.0	<0.1	<0.1	18.5	27.1	12.7	1.6	<0.1	mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	3.4	8.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	4.0	<0.1	<0.1	23.8	37.6	17.2	1.9	<0.1	mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	4.0	<0.1	<0.1	39.2	74.7	28.3	17.2	<0.1	mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/1	17/08502/2	17/08502/3	17/08502/4	17/08502/5	17/08502/6	17/08502/7	17/08502/8	Units	Method ref
Client Sample No	10	14	8	3	6	1	2	5		
Client Sample ID	BH1	BH2	BH4A	BH5	BH5	TP1	WS3	WS6		
Depth to Top	2.0	4.00	2.10	0.50	1.20	1.00	0.30	1.0		
Depth To Bottom	2.10		2.20	0.60	1.30	1.10	0.40	1.10		
Date Sampled	06-Dec-17	06-Dec-17	04-Dec-17	01-Dec-17	01-Dec-17	07-Dec-17	06-Dec-17	05-Dec-17		
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - B	Soil - ES	Soil - ES		
Sample Matrix Code	5A	3	6E	4A	6A	4A	6AE	5		
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	-	-	<1	-	<1	-	3	-	µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	-	-	<1	-	<1	-	1	-	µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-022w
Total Aliphatics (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
Aro >C7-C8 (leachable) <sub>A</sub>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	-	-	<10	-	<10	-	<10	-	µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	-	-	<1	-	<1	-	<1	-	µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	-	-	<1	-	<1	-	1	-	µg/l	A-T-022w

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9									Units	Method ref
Client Sample No	7										
Client Sample ID	WS7										
Depth to Top	1.0										
Depth To Bottom	1.10										
Date Sampled	06-Dec-17										
Sample Type	Soil - ES										
Sample Matrix Code	1										
% Stones >10mm <sub>A</sub>	<0.1									% w/w	A-T-044
pH <sub>D</sub>	9.12									pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	0.6									mg/kg	A-T-033s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	<0.01									g/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	<200									mg/kg	A-T-028s
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1									mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	<0.2									mg/kg	A-T-050s
Sulphide <sub>A</sub>	<15									mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	<5									mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	0.3									% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	3									mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	<1.0									mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	<0.5									mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	3									mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	5									mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	<1									mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	7									mg/kg	A-T-024s
Mercury <sub>D</sub>	<0.17									mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	4									mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>M#</sup>	<1									mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	15									mg/kg	A-T-024s
Leachate Prep NRA (10:1) <sub>A</sub>	*										A-T-001
pH (leachable) <sub>A</sub> <sup>#</sup>	7.02									pH	A-T-031w
Ammoniacal nitrogen (leachable) <sub>A</sub>	<0.02									mg/l	A-T-033w
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	1.39									mg/l	A-T-026w
Cyanide (total) (leachable) <sub>A</sub>	<0.005									mg/l	A-T-042wTCN
Phenols (total by HPLC) (leachable) <sub>A</sub>	<0.01									mg/l	A-T-050w
Sulphide (leachable) <sub>A</sub>	<0.1									mg/l	A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	4.6									mg/l	A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	5									µg/l	A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	23									µg/l	A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	3									µg/l	A-T-025w

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9								Units	Method ref
Client Sample No	7									
Client Sample ID	WS7									
Depth to Top	1.0									
Depth To Bottom	1.10									
Date Sampled	06-Dec-17									
Sample Type	Soil - ES									
Sample Matrix Code	1									
Chromium (leachable) <sub>A</sub> <sup>#</sup>	<1								µg/l	A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05								mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	4								µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1								µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	<1								µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	<1								µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1								mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	6								µg/l	A-T-025w

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9								Units	Method ref
Client Sample No	7									
Client Sample ID	WS7									
Depth to Top	1.0									
Depth To Bottom	1.10									
Date Sampled	06-Dec-17									
Sample Type	Soil - ES									
Sample Matrix Code	1									
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A									



Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9									Units	Method ref
Client Sample No	7										
Client Sample ID	WS7										
Depth to Top	1.0										
Depth To Bottom	1.10										
Date Sampled	06-Dec-17										
Sample Type	Soil - ES										
Sample Matrix Code	1										
PAH 16											
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01									mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01									mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02									mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04									mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04									mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05									mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05									mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07									mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06									mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04									mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08									mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01									mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03									mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03									mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03									mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07									mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	<0.08									mg/kg	A-T-019s

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9								Units	Method ref
Client Sample No	7									
Client Sample ID	WS7									
Depth to Top	1.0									
Depth To Bottom	1.10									
Date Sampled	06-Dec-17									
Sample Type	Soil - ES									
Sample Matrix Code	1									
<b>PAH 16MS (leachable)</b>										
Acenaphthene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	0.10								µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	<0.02								µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	0.10								µg/l	A-T-019w

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9								Units	Method ref
Client Sample No	7									
Client Sample ID	WS7									
Depth to Top	1.0									
Depth To Bottom	1.10									
Date Sampled	06-Dec-17									
Sample Type	Soil - ES									
Sample Matrix Code	1									
Speciated PCB-EC7										
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007								mg/kg	A-T-004s

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9								Units	Method ref
Client Sample No	7									
Client Sample ID	WS7									
Depth to Top	1.0									
Depth To Bottom	1.10									
Date Sampled	06-Dec-17									
Sample Type	Soil - ES									
Sample Matrix Code	1									
Speciated PCB-WHO12										
PCB BZ 81 <sub>A</sub>	<0.005							mg/kg	A-T-004s	
PCB BZ 105 <sub>A</sub>	<0.005							mg/kg	A-T-004s	
PCB BZ 114 <sub>A</sub>	<0.005							mg/kg	A-T-004s	
PCB BZ 123 <sub>A</sub>	<0.005							mg/kg	A-T-004s	
PCB BZ 126 <sub>A</sub>	<0.005							mg/kg	A-T-004s	
PCB BZ 156 <sub>A</sub>	<0.005							mg/kg	A-T-004s	
PCB BZ 157 <sub>A</sub>	<0.005							mg/kg	A-T-004s	
PCB BZ 167 <sub>A</sub>	<0.005							mg/kg	A-T-004s	
PCB BZ 169 <sub>A</sub>	<0.005							mg/kg	A-T-004s	
PCB BZ 189 <sub>A</sub>	<0.005							mg/kg	A-T-004s	
PCB BZ 77 <sub>A</sub>	<0.005							mg/kg	A-T-004s	



Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9									Units	Method ref
Client Sample No	7										
Client Sample ID	WS7										
Depth to Top	1.0										
Depth To Bottom	1.10										
Date Sampled	06-Dec-17										
Sample Type	Soil - ES										
Sample Matrix Code	1										
Carbazole (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Chrysene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	13									µg/l	A-T-052w
n-Dioctylphthalate (leachable) <sub>A</sub>	<10									µg/l	A-T-052w
Fluoranthene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Fluorene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Hexachloroethane (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Indeno(1,2,3-cd)pyrene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Naphthalene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Phenanthrene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	<2									µg/l	A-T-052w
Pyrene (leachable) <sub>A</sub>	<2									µg/l	A-T-052w



Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9									Units	Method ref
Client Sample No	7										
Client Sample ID	WS7										
Depth to Top	1.0										
Depth To Bottom	1.10										
Date Sampled	06-Dec-17										
Sample Type	Soil - ES										
Sample Matrix Code	1										
SVOC											
Hexachlorobenzene <sub>A</sub>	<100									µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100									µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100									µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100									µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100									µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100									µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500									µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100									µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100									µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100									µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100									µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100									µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100									µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100									µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100									µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100									µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100									µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100									µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100									µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100									µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100									µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100									µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100									µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100									µg/kg	A-T-052s
Phenol <sub>A</sub>	<100									µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100									µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100									µg/kg	A-T-052s
n-Dioctylphthalate <sub>A</sub>	<500									µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100									µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100									µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100									µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100									µg/kg	A-T-052s

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9								Units	Method ref
Client Sample No	7									
Client Sample ID	WS7									
Depth to Top	1.0									
Depth To Bottom	1.10									
Date Sampled	06-Dec-17									
Sample Type	Soil - ES									
Sample Matrix Code	1									
Hexachlorocyclopentadiene <sub>A</sub>	<100								µg/kg	A-T-052s
Perylene <sub>A</sub>	<100								µg/kg	A-T-052s

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9									Units	Method ref
Client Sample No	7										
Client Sample ID	WS7										
Depth to Top	1.0										
Depth To Bottom	1.10										
Date Sampled	06-Dec-17										
Sample Type	Soil - ES										
Sample Matrix Code	1										
VOC											
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	<10									µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<10									µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5									µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2									µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10									µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3									µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9									Units	Method ref
Client Sample No	7										
Client Sample ID	WS7										
Depth to Top	1.0										
Depth To Bottom	1.10										
Date Sampled	06-Dec-17										
Sample Type	Soil - ES										
Sample Matrix Code	1										
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1									µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1									µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2									µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1									µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2									µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3									µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1									µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3									µg/kg	A-T-006s

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9									Units	Method ref
Client Sample No	7										
Client Sample ID	WS7										
Depth to Top	1.0										
Depth To Bottom	1.10										
Date Sampled	06-Dec-17										
Sample Type	Soil - ES										
Sample Matrix Code	1										
TPH UKCWG											
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1									mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1									mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1									mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1									mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	<0.1									mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	<0.1									mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01									mg/kg	A-T-022s

Envirolab Job Number: 17/08502

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	17/08502/9									Units	Method ref
Client Sample No	7										
Client Sample ID	WS7										
Depth to Top	1.0										
Depth To Bottom	1.10										
Date Sampled	06-Dec-17										
Sample Type	Soil - ES										
Sample Matrix Code	1										
TPH UKCWG (leachable)											
Ali >C5-C6 (leachable) <sub>A</sub>	1								µg/l	A-T-022w	
Ali >C6-C8 (leachable) <sub>A</sub>	1								µg/l	A-T-022w	
Ali >C8-C10 (leachable) <sub>A</sub>	<1								µg/l	A-T-022w	
Ali >C10-C12 (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
Ali >C12-C16 (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
Ali >C16-C21 (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
Ali >C21-C35 (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
Ali >C35-C44 (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
Aro >C5-C7 (leachable) <sub>A</sub>	<1								µg/l	A-T-022w	
Total Aliphatics (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
Aro >C7-C8 (leachable) <sub>A</sub>	<1								µg/l	A-T-022w	
Aro >C8-C9 (leachable) <sub>A</sub>	<1								µg/l	A-T-022w	
Aro >C9-C10 (leachable) <sub>A</sub>	<1								µg/l	A-T-022w	
Aro >C10-C12 (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
Aro >C12-C16 (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
Aro >C16-C21 (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
Aro >C21-C35 (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
Aro >C35-C44 (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
Total Aromatics (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
TPH (Ali & Aro) (leachable) <sub>A</sub>	<10								µg/l	A-T-023w	
BTEX - Benzene (leachable) <sub>A</sub>	<1								µg/l	A-T-022w	
BTEX - Toluene (leachable) <sub>A</sub>	<1								µg/l	A-T-022w	
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	<1								µg/l	A-T-022w	
BTEX - o Xylene (leachable) <sub>A</sub>	<1								µg/l	A-T-022w	
BTEX - m & p Xylene (leachable) <sub>A</sub>	<1								µg/l	A-T-022w	
MTBE (leachable) <sub>A</sub>	<1								µg/l	A-T-022w	



## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

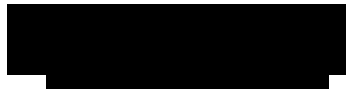
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/01112  
**Issue Number:** 1  
**Date:** 22 February, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

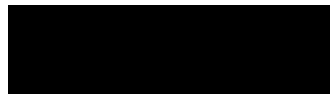
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 581299  
**Date Samples Received:** 14/02/18  
**Date Instructions Received:** 14/02/18  
**Date Analysis Completed:** 22/02/18

**Prepared by:**



Gill Walker  
Laboratory Manager

**Approved by:**



Iain Haslock  
Analytical Consultant

Envirolab Job Number: 18/01112

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01112/1	18/01112/2	18/01112/3	18/01112/4	18/01112/5	18/01112/6	18/01112/7	18/01112/8	Units	Method ref
Client Sample No	7	9	4	5	8	10	10	12		
Client Sample ID	WS3	WS3	WS7	WS7	WS7	WS7	WS7	WS7		
Depth to Top	2.50	4.50	1.50	2.90	3.50	5.60	5.80	7.50		
Depth To Bottom										
Date Sampled	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	3	6	5A	4A	5	6	6E	6		
% Stones >10mm <sub>A</sub>	<0.1	<0.1	2.2	10.6	<0.1	<0.1	<0.1	<0.1		
pH <sub>D</sub>	-	-	7.30	7.99	-	-	-	-	pH	A-T-031s
pH BRE <sub>D</sub>	-	-	-	-	7.21	-	6.43	5.94	pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	-	-	<0.2	12.2	-	-	-	-	mg/kg	A-T-033s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	-	-	-	-	71.5	-	80.1	86.2	mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	-	290	-	502	398	mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	-	-	-	-	<0.4	-	<0.4	<0.4	mg/l	A-T-026s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	<0.05	0.06	-	-	-	-	g/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	-	<10	-	1790	510	mg/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	-	-	<200	360	-	-	-	-	mg/kg	A-T-028s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	-	-	0.09	-	1.21	0.81	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	-	-	-	-	0.18	-	3.71	2.03	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	-	-	28	-	395	157	mg/l	A-T-SOLMETs
Cyanide (total) <sub>A</sub> <sup>M#</sup>	-	-	<1	<1	-	-	-	-	mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	-	-	<0.2	<0.2	-	-	-	-	mg/kg	A-T-050s
Sulphide <sub>A</sub>	-	-	<5	<5	-	-	-	-	mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	-	-	<5	21	-	-	-	-	mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	3.7	1.9	<0.1	0.7	6.7	20.1	-	-	% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	-	-	4	5	-	-	-	-	mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	-	-	<1.0	1.4	-	-	-	-	mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	-	-	<0.5	<0.5	-	-	-	-	mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	-	-	7	13	-	-	-	-	mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	-	-	9	9	-	-	-	-	mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	-	-	<1	<1	-	-	-	-	mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	-	-	8	111	-	-	-	-	mg/kg	A-T-024s
Mercury <sub>D</sub>	-	-	<0.17	0.20	-	-	-	-	mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	-	-	12	8	-	-	-	-	mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>M#</sup>	-	-	<1	<1	-	-	-	-	mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	-	-	28	111	-	-	-	-	mg/kg	A-T-024s

Envirolab Job Number: 18/01112

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01112/1	18/01112/2	18/01112/3	18/01112/4	18/01112/5	18/01112/6	18/01112/7	18/01112/8	Units	Method ref		
Client Sample No	7	9	4	5	8	10	10	12				
Client Sample ID	WS3	WS3	WS7	WS7	WS7	WS7	WS7	WS7				
Depth to Top	2.50	4.50	1.50	2.90	3.50	5.60	5.80	7.50				
Depth To Bottom												
Date Sampled	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	3	6	5A	4A	5	6	6E	6				
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	-	-	NAD	NAD	-	-	-	-		A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	-	-	N/A	N/A	-	-	-	-				

Envirolab Job Number: 18/01112

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Lab Sample ID	18/01112/1	18/01112/2	18/01112/3	18/01112/4	18/01112/5	18/01112/6	18/01112/7	18/01112/8	Units	Method ref
Client Sample No	7	9	4	5	8	10	10	12		
Client Sample ID	WS3	WS3	WS7	WS7	WS7	WS7	WS7	WS7		
Depth to Top	2.50	4.50	1.50	2.90	3.50	5.60	5.80	7.50		
Depth To Bottom										
Date Sampled	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	3	6	5A	4A	5	6	6E	6		
PAH 16										
Acenaphthene <sub>A</sub> <sup>M#</sup>	-	-	<0.01	0.06	-	-	-	-	mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	-	-	<0.01	0.03	-	-	-	-	mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	-	-	<0.02	0.13	-	-	-	-	mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	-	-	<0.04	0.43	-	-	-	-	mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	-	-	<0.04	0.42	-	-	-	-	mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	-	-	<0.05	0.53	-	-	-	-	mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	-	-	<0.05	0.22	-	-	-	-	mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	-	-	<0.07	0.24	-	-	-	-	mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	-	-	<0.06	0.48	-	-	-	-	mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	-	-	<0.04	0.05	-	-	-	-	mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	-	-	<0.08	1.05	-	-	-	-	mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	-	-	<0.01	0.04	-	-	-	-	mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	-	-	<0.03	0.26	-	-	-	-	mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	-	-	<0.03	<0.03	-	-	-	-	mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	-	-	<0.03	0.41	-	-	-	-	mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	-	-	<0.07	0.90	-	-	-	-	mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	-	-	<0.08	5.27	-	-	-	-	mg/kg	A-T-019s

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Lab Sample ID	18/01112/1	18/01112/2	18/01112/3	18/01112/4	18/01112/5	18/01112/6	18/01112/7	18/01112/8	Units	Method ref
Client Sample No	7	9	4	5	8	10	10	12		
Client Sample ID	WS3	WS3	WS7	WS7	WS7	WS7	WS7	WS7		
Depth to Top	2.50	4.50	1.50	2.90	3.50	5.60	5.80	7.50		
Depth To Bottom										
Date Sampled	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	3	6	5A	4A	5	6	6E	6		
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	-	<0.002	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	-	<0.002	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	-	<0.004	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	-	-	<0.007	<0.007	-	-	-	-	mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	-	<0.006	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	-	<0.004	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	-	<0.004	-	-	-	-	-	mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	-	-	<0.007	-	-	-	-	-	mg/kg	A-T-004s

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Client Project Ref: PZ1522D1

Lab Sample ID	18/01112/1	18/01112/2	18/01112/3	18/01112/4	18/01112/5	18/01112/6	18/01112/7	18/01112/8	Units	Method ref
Client Sample No	7	9	4	5	8	10	10	12		
Client Sample ID	WS3	WS3	WS7	WS7	WS7	WS7	WS7	WS7		
Depth to Top	2.50	4.50	1.50	2.90	3.50	5.60	5.80	7.50		
Depth To Bottom										
Date Sampled	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	3	6	5A	4A	5	6	6E	6		
Speciated PCB-WHO12										
PCB BZ 81 <sub>A</sub>	-	-	-	<0.005	-	-	-	-	mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	-	-	-	<0.005	-	-	-	-	mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	-	-	-	<0.005	-	-	-	-	mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	-	-	-	<0.005	-	-	-	-	mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	-	-	-	<0.005	-	-	-	-	mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	-	-	-	<0.005	-	-	-	-	mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	-	-	-	<0.005	-	-	-	-	mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	-	-	-	<0.005	-	-	-	-	mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	-	-	-	<0.005	-	-	-	-	mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	-	-	-	<0.005	-	-	-	-	mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	-	-	-	<0.005	-	-	-	-	mg/kg	A-T-004s
Total Speciated PCB-WHO12 <sub>A</sub>	-	-	-	<0.007	-	-	-	-	mg/kg	A-T-004s



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Lab Sample ID	18/01112/1	18/01112/2	18/01112/3	18/01112/4	18/01112/5	18/01112/6	18/01112/7	18/01112/8	Units	Method ref
Client Sample No	7	9	4	5	8	10	10	12		
Client Sample ID	WS3	WS3	WS7	WS7	WS7	WS7	WS7	WS7		
Depth to Top	2.50	4.50	1.50	2.90	3.50	5.60	5.80	7.50		
Depth To Bottom										
Date Sampled	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	3	6	5A	4A	5	6	6E	6		
SVOC										
Hexachlorobenzene <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Carbazole <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	-	-	<500	<500	-	-	-	-	µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Phenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	-	-	<500	<500	-	-	-	-	µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Isophorone <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	-	-	<100	<100	-	-	-	-	µg/kg	A-T-052s

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Lab Sample ID	18/01112/1	18/01112/2	18/01112/3	18/01112/4	18/01112/5	18/01112/6	18/01112/7	18/01112/8	Units	Method ref
Client Sample No	7	9	4	5	8	10	10	12		
Client Sample ID	WS3	WS3	WS7	WS7	WS7	WS7	WS7	WS7		
Depth to Top	2.50	4.50	1.50	2.90	3.50	5.60	5.80	7.50		
Depth To Bottom										
Date Sampled	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	3	6	5A	4A	5	6	6E	6		
Hexachlorocyclopentadiene <sub>A</sub>	-	-	<100	<100	-	-	-	-		
Perylene <sub>A</sub>	-	-	<100	119	-	-	-	-	µg/kg	A-T-052s

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Client Sample No	7	9	4	5	8	10	10	12		
Client Sample ID	WS3	WS3	WS7	WS7	WS7	WS7	WS7	WS7		
Depth to Top	2.50	4.50	1.50	2.90	3.50	5.60	5.80	7.50		
Depth To Bottom										
Date Sampled	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	3	6	5A	4A	5	6	6E	6		
VOC										
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	-	-	<10	<10	-	-	-	-	µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	-	-	<5	<5	-	-	-	-	µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	-	-	<5	<5	-	-	-	-	µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	-	-	<2	<2	-	-	-	-	µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	-	-	<10	<10	-	-	-	-	µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	-	-	<3	<3	-	-	-	-	µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s

Envirolab Job Number: 18/01112

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01112/1	18/01112/2	18/01112/3	18/01112/4	18/01112/5	18/01112/6	18/01112/7	18/01112/8	Units	Method ref
Client Sample No	7	9	4	5	8	10	10	12		
Client Sample ID	WS3	WS3	WS7	WS7	WS7	WS7	WS7	WS7		
Depth to Top	2.50	4.50	1.50	2.90	3.50	5.60	5.80	7.50		
Depth To Bottom										
Date Sampled	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	3	6	5A	4A	5	6	6E	6		
Chlorobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-		
1,1,1,2-Tetrachloroethane <sub>A</sub>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,1,1,2,2-Tetrachloroethane <sub>A</sub>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	-	-	<2	<2	-	-	-	-	µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	-	-	<2	<2	-	-	-	-	µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	-	-	<3	<3	-	-	-	-	µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	-	-	µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	-	-	<3	<3	-	-	-	-	µg/kg	A-T-006s

Envirolab Job Number: 18/01112

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01112/1	18/01112/2	18/01112/3	18/01112/4	18/01112/5	18/01112/6	18/01112/7	18/01112/8	Units	Method ref
Client Sample No	7	9	4	5	8	10	10	12		
Client Sample ID	WS3	WS3	WS7	WS7	WS7	WS7	WS7	WS7		
Depth to Top	2.50	4.50	1.50	2.90	3.50	5.60	5.80	7.50		
Depth To Bottom										
Date Sampled	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17	08-Dec-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	3	6	5A	4A	5	6	6E	6		
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	-	-	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	-	-	<0.1	0.2	-	-	-	-	mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	-	-	<0.1	2.9	-	-	-	-	mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	-	-	<0.1	16.6	-	-	-	-	mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	-	-	<0.1	0.6	-	-	-	-	mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	-	-	<0.1	20.4	-	-	-	-	mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	-	-	<0.1	<0.1	-	-	-	-	mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	-	-	<0.1	0.5	-	-	-	-	mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	-	-	<0.1	3.6	-	-	-	-	mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	-	-	<0.1	14.9	-	-	-	-	mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	-	-	<0.1	1.1	-	-	-	-	mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	-	-	<0.1	20.1	-	-	-	-	mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	-	-	<0.1	40.4	-	-	-	-	mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	-	-	<0.01	<0.01	-	-	-	-	mg/kg	A-T-022s

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

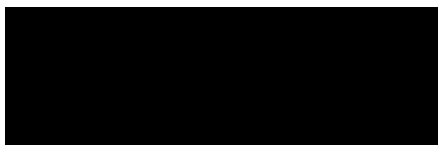
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/01160  
**Issue Number:** 1 **Date:** 28 February, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

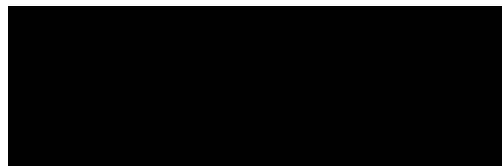
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 581534  
**Date Samples Received:** 15/02/18  
**Date Instructions Received:** 16/02/18  
**Date Analysis Completed:** 27/02/18

**Prepared by:**



Holly Neary-King  
Administrative Assistant

**Approved by:**



Richard Wong  
Client Manager



Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref		
Client Sample No	6	6	7	8	9	6	7	8				
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS				
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50				
Depth To Bottom		2.00										
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E				
% Stones >10mm <sub>A</sub>	0.9	35.1	<0.1	<0.1	<0.1	11.4	<0.1	<0.1			% w/w	A-T-044
pH <sub>D</sub>	7.10	-	7.54	-	-	8.00	7.63	-	pH	A-T-031s		
pH BRE <sub>D</sub>	-	-	-	6.38	6.69	-	-	6.19	pH	A-T-031s		
Ammoniacal nitrogen <sub>D</sub>	71.2	-	23.4	-	-	0.8	7.6	-	mg/kg	A-T-033s		
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	-	-	-	62.8	57.1	-	-	84.7	mg/l	A-T-033s		
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	182	264	-	-	818	mg/l	A-T-026s		
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	-	-	-	4.0	<0.4	-	-	<0.4	mg/l	A-T-026s		
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	0.25	-	0.17	-	-	<0.01	0.15	-	g/l	A-T-026s		
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	1680	183	-	-	1470	mg/l	A-T-026s		
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	1600	-	2800	-	-	<200	760	-	mg/kg	A-T-026s		
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	-	1.31	0.36	-	-	1.75	% w/w	A-T-028s		
Sulphur BRE (total) <sub>D</sub>	-	-	-	3.62	2.82	-	-	6.26	% w/w	A-T-024s		
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	-	652	68	-	-	1350	mg/l	A-T-SOLMETS		
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	-	<1	-	-	2	<1	-	mg/kg	A-T-042sTCN		
Phenols - Total by HPLC <sub>A</sub>	<0.2	-	<0.2	-	-	<0.2	<0.2	-	mg/kg	A-T-050s		
Sulphide <sub>A</sub>	<5	-	<5	-	-	<5	<5	-	mg/kg	A-T-S2-s		
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	110	-	<5	-	-	<5	55	-	mg/kg	A-T-029s		
Organic matter <sub>D</sub> <sup>M#</sup>	9.8	0.9	6.1	-	-	0.7	2.1	-	% w/w	A-T-032 OM		
Arsenic <sub>D</sub> <sup>M#</sup>	25	-	<1	-	-	4	3	-	mg/kg	A-T-024s		
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	7.1	-	6.8	-	-	<1.0	3.8	-	mg/kg	A-T-027s		
Cadmium <sub>D</sub> <sup>M#</sup>	1.9	-	1.3	-	-	<0.5	0.7	-	mg/kg	A-T-024s		
Copper <sub>D</sub> <sup>M#</sup>	79	-	13	-	-	14	8	-	mg/kg	A-T-024s		
Chromium <sub>D</sub> <sup>M#</sup>	30	-	34	-	-	6	17	-	mg/kg	A-T-024s		
Chromium (hexavalent) <sub>D</sub>	<1	-	<1	-	-	<1	<1	-	mg/kg	A-T-040s		
Lead <sub>D</sub> <sup>M#</sup>	261	-	14	-	-	62	22	-	mg/kg	A-T-024s		
Mercury <sub>D</sub>	0.55	-	0.52	-	-	<0.17	0.27	-	mg/kg	A-T-024s		
Nickel <sub>D</sub> <sup>M#</sup>	31	-	24	-	-	6	14	-	mg/kg	A-T-024s		
Selenium <sub>D</sub> <sup>M#</sup>	<1	-	<1	-	-	<1	<1	-	mg/kg	A-T-024s		
Zinc <sub>D</sub> <sup>M#</sup>	227	-	58	-	-	57	31	-	mg/kg	A-T-024s		
Leachate Prep NRA (10:1) <sub>A</sub>	*	-	-	-	-	*	-	-		A-T-001		
pH (leachable) <sub>A</sub> <sup>#</sup>	7.36	-	-	-	-	7.04	-	-	pH	A-T-031w		
Ammoniacal nitrogen (leachable) <sub>A</sub>	5.08	-	-	-	-	<0.02	-	-	mg/l	A-T-033w		
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	122	-	-	-	-	<1.00	-	-	mg/l	A-T-026w		

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
Cyanide (total) (leachable) <sub>A</sub>	<0.005	-	-	-	-	0.021	-	-		
Phenols (total by HPLC) (leachable) <sub>A</sub>	<0.01	-	-	-	-	<0.01	-	-	mg/l	A-T-050w
Sulphide (leachable) <sub>A</sub>	<0.1	-	-	-	-	<0.1	-	-	mg/l	A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	8.8	-	-	-	-	22.5	-	-	mg/l	A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	7	-	-	-	-	8	-	-	µg/l	A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	419	-	-	-	-	20	-	-	µg/l	A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-	-	<1	-	-	µg/l	A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	2	-	-	-	-	9	-	-	µg/l	A-T-025w
Chromium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-	-	<1	-	-	µg/l	A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05	-	-	-	-	<0.05	-	-	mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	4	-	-	-	-	17	-	-	µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1	-	-	-	-	<0.1	-	-	µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	6	-	-	-	-	1	-	-	µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-	-	<1	-	-	µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1	-	-	-	-	<0.1	-	-	mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	2	-	-	-	-	10	-	-	µg/l	A-T-025w

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref		
Client Sample No	6	6	7	8	9	6	7	8				
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS				
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50				
Depth To Bottom		2.00										
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E				
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	NAD	-	NAD	-	-	NAD	NAD	-		A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	N/A	-	N/A	-	-	N/A	N/A	-				

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
PAH 16										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	-	<0.01	-	-	0.03	<0.01	-	mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	-	<0.02	-	-	0.05	<0.02	-	mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	0.05	-	<0.04	-	-	0.39	<0.04	-	mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	0.07	-	<0.04	-	-	0.58	<0.04	-	mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	-	<0.05	-	-	0.50	<0.05	-	mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	-	<0.05	-	-	0.37	<0.05	-	mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	-	<0.07	-	-	0.27	<0.07	-	mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	-	<0.06	-	-	0.48	<0.06	-	mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	-	<0.04	-	-	0.10	<0.04	-	mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	0.20	-	<0.08	-	-	0.74	<0.08	-	mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	0.05	-	<0.03	-	-	0.46	<0.03	-	mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	-	<0.03	-	-	<0.03	<0.03	-	mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	0.07	-	<0.03	-	-	0.25	<0.03	-	mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	0.09	-	<0.07	-	-	0.65	<0.07	-	mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	0.55	-	<0.08	-	-	4.87	<0.08	-	mg/kg	A-T-019s

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
PAH 16MS (leachable)										
Acenaphthene (leachable) <sub>A</sub>	0.43	-	-	-	-	0.03	-	-	µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	<0.02	-	-	-	-	<0.02	-	-	µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	0.03	-	-	-	-	<0.02	-	-	µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	<0.02	-	-	-	-	<0.02	-	-	µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	<0.02	-	-	-	-	<0.02	-	-	µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-	-	<0.02	-	-	µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	<0.02	-	-	-	-	<0.02	-	-	µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-	-	<0.02	-	-	µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	<0.02	-	-	-	-	0.02	-	-	µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<0.02	-	-	-	-	<0.02	-	-	µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	0.04	-	-	-	-	0.05	-	-	µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	0.19	-	-	-	-	<0.02	-	-	µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	<0.02	-	-	-	-	<0.02	-	-	µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	0.11	-	-	-	-	0.11	-	-	µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	0.13	-	-	-	-	0.06	-	-	µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	0.03	-	-	-	-	0.04	-	-	µg/l	A-T-019w
PAH (total 16) (leachable) <sub>A</sub>	0.96	-	-	-	-	0.31	-	-	µg/l	A-T-019w

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
Speciated PCB-EC7 + PCB Total (WAC only)										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	<0.002	-	-	-	-	<0.002	<0.002	-	mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	<0.002	-	-	-	-	<0.002	<0.002	-	mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	<0.004	-	-	-	-	<0.004	<0.004	-	mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	-	<0.007	-	-	<0.007	<0.007	-	mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	<0.006	-	-	-	-	<0.006	<0.006	-	mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	<0.004	-	-	-	-	<0.004	<0.004	-	mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	<0.004	-	-	-	-	<0.004	<0.004	-	mg/kg	A-T-004s

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
Speciated PCB-WHO12										
PCB BZ 81 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	-	-	<0.005	-	-	-	-	-	mg/kg	A-T-004s
Total Speciated PCB-WHO12 <sub>A</sub>	-	-	<0.007	-	-	-	-	-	mg/kg	A-T-004s



Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
SVOC excluding PAH-16 (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	<4	-	-	-	-	<4	-	-	µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Carbazole (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	<4	-	-	-	-	<4	-	-	µg/l	A-T-052w
n-Dioctylphthalate (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-		
Hexachloroethane (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	<2	-	-	-	-	<2	-	-	µg/l	A-T-052w

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	-	<500	-	-	<500	<500	-	µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	-	<500	-	-	<500	<500	-	µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	-	<100	-	-	<100	<100	-	µg/kg	A-T-052s

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
Hexachlorocyclopentadiene <sub>A</sub>	<100	-	<100	-	-	<100	<100	-		
Perylene <sub>A</sub>	<100	-	190	-	-	177	<100	-	µg/kg	A-T-052s

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
VOC										
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Chloromethane <sub>A</sub> <sup>#</sup>	<10	-	<10	-	-	<10	<10	-	µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	-	5	-	-	<1	<1	-	µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<15	-	<15	-	-	<15	<15	-	µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	-	<5	-	-	<5	<5	-	µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	-	<2	-	-	<2	<2	-	µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	-	<10	-	-	<10	<10	-	µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	-	<3	-	-	<3	<3	-	µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-		
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	-	<2	-	-	<2	<2	-	µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	-	<2	-	-	<2	<2	-	µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	-	<3	-	-	<3	<3	-	µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	-	<1	<1	-	µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	-	<3	-	-	<3	<3	-	µg/kg	A-T-006s

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	-	<0.1	-	-	<0.1	<0.1	-	mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	-	<0.1	-	-	1.9	<0.1	-	mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	2.8	-	<0.1	-	-	12.4	<0.1	-	mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	13.6	-	<0.1	-	-	33.8	<0.1	-	mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	-	<0.1	-	-	0.6	<0.1	-	mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	16.5	-	<0.1	-	-	48.7	<0.1	-	mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	-	<0.1	-	-	<0.1	<0.1	-	mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	-	<0.1	-	-	2.2	0.9	-	mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	-	<0.1	-	-	18.7	3.0	-	mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	-	<0.1	-	-	54.4	14.1	-	mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1	-	<0.1	-	-	1.2	0.4	-	mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	<0.1	-	<0.1	-	-	76.5	18.3	-	mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	16.5	-	<0.1	-	-	125	18.3	-	mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	-	<0.01	<0.01	-	mg/kg	A-T-022s



Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/1	18/01160/2	18/01160/3	18/01160/4	18/01160/5	18/01160/6	18/01160/7	18/01160/8	Units	Method ref
Client Sample No	6	6	7	8	9	6	7	8		
Client Sample ID	WS9	WS2	WS9	WS9	WS9	BH4AS	BH4AS	BH4AS		
Depth to Top	1.40	1.55	2.30	3.10	4.70	1.50	2.30	3.50		
Depth To Bottom		2.00								
Date Sampled	04-Feb-17	06-Dec-17	04-Feb-17	04-Feb-17	04-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6A	5A	6E	6E	6E	5A	5A	6E		
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	<1	-	-	-	-	2	-	-	µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	<1	-	-	-	-	<1	-	-	µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	<1	-	-	-	-	<1	-	-	µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
Total Aliphatics (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	<1	-	-	-	-	<1	-	-	µg/l	A-T-022w
Aro >C7-C8 (leachable) <sub>A</sub>	<1	-	-	-	-	<1	-	-	µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	<1	-	-	-	-	<1	-	-	µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	<1	-	-	-	-	<1	-	-	µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	<10	-	-	-	-	<10	-	-	µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	<1	-	-	-	-	<1	-	-	µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	<1	-	-	-	-	<1	-	-	µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	<1	-	-	-	-	<1	-	-	µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	<1	-	-	-	-	<1	-	-	µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	<1	-	-	-	-	<1	-	-	µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	<1	-	-	-	-	1	-	-	µg/l	A-T-022w

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/9	18/01160/10	18/01160/11	18/01160/12	18/01160/13	18/01160/14			Units	Method ref
Client Sample No	9	10	6	8	10	1				
Client Sample ID	BH4AS	BH4AS	BH4B	BH4B	BH4B	WS6				
Depth to Top	4.40	5.60	1.90	2.50	4.50	3.10				
Depth To Bottom										
Date Sampled	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	05-Dec-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	5A	5	6A	6	1	5				
% Stones >10mm <sub>A</sub>	15.7	<0.1	18.5	<0.1	<0.1	<0.1		% w/w		
pH <sub>D</sub>	7.37	-	7.86	-	7.90	-		pH	A-T-031s	
pH BRE <sub>D</sub>	-	7.56	-	6.56	-	8.30		pH	A-T-031s	
Ammoniacal nitrogen <sub>D</sub>	5.1	-	21.5	-	0.9	-		mg/kg	A-T-033s	
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	-	9.51	-	51.4	-	29.2		mg/l	A-T-033s	
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	59	-	876	-	1050		mg/l	A-T-026s	
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	-	<0.4	-	<0.4	-	<0.4		mg/l	A-T-026s	
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	0.06	-	0.17	-	0.05	-		g/l	A-T-026s	
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	118	-	231	-	126		mg/l	A-T-026s	
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	240	-	770	-	<200	-		mg/kg	A-T-028s	
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	0.03	-	0.18	-	0.22		% w/w	A-T-028s	
Sulphur BRE (total) <sub>D</sub>	-	0.48	-	0.54	-	1.40		% w/w	A-T-024s	
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	14	-	45	-	40		mg/l	A-T-SOLMETs	
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	-	<1	-	<1	-		mg/kg	A-T-042sTCN	
Phenols - Total by HPLC <sub>A</sub>	<0.2	-	<0.2	-	<0.2	-		mg/kg	A-T-050s	
Sulphide <sub>A</sub>	<5	-	<5	-	<5	-		mg/kg	A-T-S2-s	
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	<5	-	20	-	<5	-		mg/kg	A-T-029s	
Organic matter <sub>D</sub> <sup>M#</sup>	0.5	-	2.4	8.2	<0.1	1.7		% w/w	A-T-032 OM	
Arsenic <sub>D</sub> <sup>M#</sup>	<1	-	10	-	<1	-		mg/kg	A-T-024s	
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	<1.0	-	1.4	-	<1.0	-		mg/kg	A-T-027s	
Cadmium <sub>D</sub> <sup>M#</sup>	<0.5	-	0.7	-	<0.5	-		mg/kg	A-T-024s	
Copper <sub>D</sub> <sup>M#</sup>	3	-	29	-	1	-		mg/kg	A-T-024s	
Chromium <sub>D</sub> <sup>M#</sup>	8	-	13	-	2	-		mg/kg	A-T-024s	
Chromium (hexavalent) <sub>D</sub>	<1	-	<1	-	<1	-		mg/kg	A-T-040s	
Lead <sub>D</sub> <sup>M#</sup>	4	-	147	-	2	-		mg/kg	A-T-024s	
Mercury <sub>D</sub>	<0.17	-	0.82	-	<0.17	-		mg/kg	A-T-024s	
Nickel <sub>D</sub> <sup>M#</sup>	9	-	13	-	4	-		mg/kg	A-T-024s	
Selenium <sub>D</sub> <sup>M#</sup>	<1	-	<1	-	<1	-		mg/kg	A-T-024s	
Zinc <sub>D</sub> <sup>M#</sup>	14	-	136	-	7	-		mg/kg	A-T-024s	

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/9	18/01160/10	18/01160/11	18/01160/12	18/01160/13	18/01160/14			Units	Method ref
Client Sample No	9	10	6	8	10	1				
Client Sample ID	BH4AS	BH4AS	BH4B	BH4B	BH4B	WS6				
Depth to Top	4.40	5.60	1.90	2.50	4.50	3.10				
Depth To Bottom										
Date Sampled	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	05-Dec-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	5A	5	6A	6	1	5				
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD	-	NAD	-	NAD	-				A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	-	N/A	-	N/A	-				

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/9	18/01160/10	18/01160/11	18/01160/12	18/01160/13	18/01160/14			Units	Method ref
Client Sample No	9	10	6	8	10	1				
Client Sample ID	BH4AS	BH4AS	BH4B	BH4B	BH4B	WS6				
Depth to Top	4.40	5.60	1.90	2.50	4.50	3.10				
Depth To Bottom										
Date Sampled	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	05-Dec-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	5A	5	6A	6	1	5				
PAH 16										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	-	0.03	-	<0.01	-			mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	-	0.05	-	<0.01	-			mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	-	0.14	-	<0.02	-			mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	-	0.62	-	<0.04	-			mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	-	0.83	-	<0.04	-			mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	-	0.78	-	<0.05	-			mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	-	0.54	-	<0.05	-			mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	-	0.38	-	<0.07	-			mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	-	0.74	-	<0.06	-			mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	-	0.13	-	<0.04	-			mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	-	1.44	-	<0.08	-			mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	-	0.03	-	<0.01	-			mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	-	0.67	-	<0.03	-			mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	-	<0.03	-	<0.03	-			mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	-	0.51	-	<0.03	-			mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	-	1.11	-	<0.07	-			mg/kg	A-T-019s
PAH (total 16) <sub>A</sub> <sup>M#</sup>	<0.08	-	7.99	-	<0.08	-			mg/kg	A-T-019s

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/9	18/01160/10	18/01160/11	18/01160/12	18/01160/13	18/01160/14			Units	Method ref
Client Sample No	9	10	6	8	10	1				
Client Sample ID	BH4AS	BH4AS	BH4B	BH4B	BH4B	WS6				
Depth to Top	4.40	5.60	1.90	2.50	4.50	3.10				
Depth To Bottom										
Date Sampled	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	05-Dec-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	5A	5	6A	6	1	5				
Speciated PCB-EC7 + PCB Total (WAC only)										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	-	<0.002	-	-	-			mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	-	<0.002	-	-	-			mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	-	<0.004	-	-	-			mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	-	<0.007	-	<0.007	-			mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	-	<0.006	-	-	-			mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	-	<0.004	-	-	-			mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	-	<0.004	-	-	-			mg/kg	A-T-004s

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/9	18/01160/10	18/01160/11	18/01160/12	18/01160/13	18/01160/14			Units	Method ref
Client Sample No	9	10	6	8	10	1				
Client Sample ID	BH4AS	BH4AS	BH4B	BH4B	BH4B	WS6				
Depth to Top	4.40	5.60	1.90	2.50	4.50	3.10				
Depth To Bottom										
Date Sampled	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	05-Dec-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	5A	5	6A	6	1	5				
<b>Speciated PCB-WHO12</b>										
PCB BZ 81 <sub>A</sub>	<0.005	-	-	-	<0.005	-			mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	<0.005	-	-	-	<0.005	-			mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	<0.005	-	-	-	<0.005	-			mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	<0.005	-	-	-	<0.005	-			mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	<0.005	-	-	-	<0.005	-			mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	<0.005	-	-	-	<0.005	-			mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	<0.005	-	-	-	<0.005	-			mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	<0.005	-	-	-	<0.005	-			mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	<0.005	-	-	-	<0.005	-			mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	<0.005	-	-	-	<0.005	-			mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	<0.005	-	-	-	<0.005	-			mg/kg	A-T-004s
Total Speciated PCB-WHO12 <sub>A</sub>	<0.007	-	-	-	<0.007	-			mg/kg	A-T-004s

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/9	18/01160/10	18/01160/11	18/01160/12	18/01160/13	18/01160/14			Units	Method ref
Client Sample No	9	10	6	8	10	1				
Client Sample ID	BH4AS	BH4AS	BH4B	BH4B	BH4B	WS6				
Depth to Top	4.40	5.60	1.90	2.50	4.50	3.10				
Depth To Bottom										
Date Sampled	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	05-Dec-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	5A	5	6A	6	1	5				
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Diethyl phthalate <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Dimethyl phthalate <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Dibenzofuran <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Carbazole <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Butylbenzyl phthalate <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	-	<500	-	<500	-		µg/kg	A-T-052s	
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Bis(2-chloroethyl)ether <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
4-Nitrophenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
4-Methylphenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
4-Chloro-3-methylphenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
2-Nitrophenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
2-Methylphenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
2-Chlorophenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
2,6-Dinitrotoluene <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
2,4-Dinitrotoluene <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
2,4-Dimethylphenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
2,4-Dichlorophenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
2,4,6-Trichlorophenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
2,4,5-Trichlorophenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
2-Chloronaphthalene <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
2-Methylnaphthalene <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Phenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Pentachlorophenol <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
n-Diethylphthalate <sub>A</sub>	<500	-	<500	-	<500	-		µg/kg	A-T-052s	
n-Dibutylphthalate <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Nitrobenzene <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Isophorone <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	
Hexachloroethane <sub>A</sub>	<100	-	<100	-	<100	-		µg/kg	A-T-052s	



Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/9	18/01160/10	18/01160/11	18/01160/12	18/01160/13	18/01160/14			Units	Method ref
Client Sample No	9	10	6	8	10	1				
Client Sample ID	BH4AS	BH4AS	BH4B	BH4B	BH4B	WS6				
Depth to Top	4.40	5.60	1.90	2.50	4.50	3.10				
Depth To Bottom										
Date Sampled	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	05-Dec-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	5A	5	6A	6	1	5				
Hexachlorocyclopentadiene <sub>A</sub>	<100	-	<100	-	<100	-			µg/kg	A-T-052s
Perylene <sub>A</sub>	3030	-	203	-	<100	-			µg/kg	A-T-052s

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/9	18/01160/10	18/01160/11	18/01160/12	18/01160/13	18/01160/14			Units	Method ref
Client Sample No	9	10	6	8	10	1				
Client Sample ID	BH4AS	BH4AS	BH4B	BH4B	BH4B	WS6				
Depth to Top	4.40	5.60	1.90	2.50	4.50	3.10				
Depth To Bottom										
Date Sampled	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	05-Dec-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	5A	5	6A	6	1	5				
VOC										
Dichlorodifluoromethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Chloromethane <sub>A</sub> <sup>#</sup>	<10	-	<10	-	<10	-		µg/kg	A-T-006s	
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Bromomethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Chloroethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	-	2	-	<1	-		µg/kg	A-T-006s	
Dichloromethane <sub>A</sub>	<15	-	<15	-	<15	-		µg/kg	A-T-006s	
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	-	<5	-	<5	-		µg/kg	A-T-006s	
Chloroform <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	-	<2	-	<2	-		µg/kg	A-T-006s	
Benzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	-	<10	-	<10	-		µg/kg	A-T-006s	
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Toluene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	-	<3	-	<3	-		µg/kg	A-T-006s	
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-		µg/kg	A-T-006s	

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/9	18/01160/10	18/01160/11	18/01160/12	18/01160/13	18/01160/14			Units	Method ref
Client Sample No	9	10	6	8	10	1				
Client Sample ID	BH4AS	BH4AS	BH4B	BH4B	BH4B	WS6				
Depth to Top	4.40	5.60	1.90	2.50	4.50	3.10				
Depth To Bottom										
Date Sampled	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	05-Dec-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	5A	5	6A	6	1	5				
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	-	<2	-	<2	-			µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	-	<2	-	<2	-			µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	-	<3	-	<3	-			µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	-	<1	-	<1	-			µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	-	<3	-	<3	-			µg/kg	A-T-006s

Envirolab Job Number: 18/01160

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01160/9	18/01160/10	18/01160/11	18/01160/12	18/01160/13	18/01160/14			Units	Method ref
Client Sample No	9	10	6	8	10	1				
Client Sample ID	BH4AS	BH4AS	BH4B	BH4B	BH4B	WS6				
Depth to Top	4.40	5.60	1.90	2.50	4.50	3.10				
Depth To Bottom										
Date Sampled	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	13-Feb-17	05-Dec-17				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	5A	5	6A	6	1	5				
<b>TPH UKCWG</b>										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	-	<0.1	-	0.2	-			mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	0.7	-	<0.1	-	1.1	-			mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	5.2	-	2.5	-	8.0	-			mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	22.1	-	14.0	-	23.8	-			mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	-	<0.1	-	<0.1	-			mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	27.9	-	16.4	-	33.2	-			mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	-	<0.1	-	<0.1	-			mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	0.5	-	1.1	-	<0.1	-			mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	2.7	-	4.0	-	<0.1	-			mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	22.9	-	17.1	-	<0.1	-			mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	0.6	-	<0.1	-	<0.1	-			mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	26.7	-	22.2	-	<0.1	-			mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	54.6	-	38.6	-	33.2	-			mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	-	<0.01	-	<0.01	-			mg/kg	A-T-022s

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

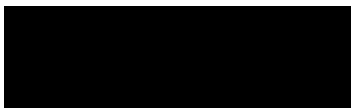
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/01393  
**Issue Number:** 1 **Date:** 05 March, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

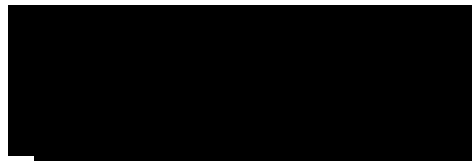
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt. Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 582355  
**Date Samples Received:** 23/02/18  
**Date Instructions Received:** 23/02/18  
**Date Analysis Completed:** 02/03/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/01393/1

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01393/1								Units	Method ref
Client Sample No	10									
Client Sample ID	WS6									
Depth to Top	3.10									
Depth To Bottom										
Date Sampled	05-Dec-18									
Sample Type	Soil									
Sample Matrix Code	6									
% Stones >10mm <sub>A</sub>	<0.1								% w/w	A-T-044
pH BRE <sub>D</sub>	8.32								pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	30.7								mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1290								mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	0.6								mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	848								mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.30								% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.94								% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	150								mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	2.0								% w/w	A-T-032 OM



## **REPORT NOTES**

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Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/01837  
**Issue Number:** 1 **Date:** 21 March, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

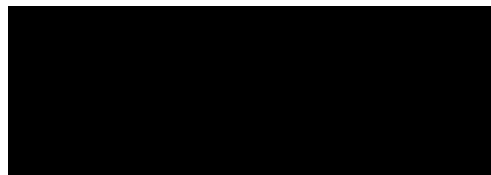
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 584433  
**Date Samples Received:** 27/02/18  
**Date Instructions Received:** 13/03/18  
**Date Analysis Completed:** 21/03/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Richard Wong  
Client Manager



Envirolab Job Number: 18/01837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01837/1	18/01837/2							Units	Method ref
Client Sample No										
Client Sample ID	WS TP1B	WS TP01								
Depth to Top	1.75	1.85								
Depth To Bottom	1.90	2.90								
Date Sampled	14-Dec-17	07-Dec-17								
Sample Type	Soil	Soil								
Sample Matrix Code	6A	6E								
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	-	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	-	N/A								



Envirolab Job Number: 18/01837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01837/1	18/01837/2							Units	Method ref
Client Sample No										
Client Sample ID	WS TP1B	WS TP01								
Depth to Top	1.75	1.85								
Depth To Bottom	1.90	2.90								
Date Sampled	14-Dec-17	07-Dec-17								
Sample Type	Soil	Soil								
Sample Matrix Code	6A	6E								
<b>Speciated PCB-EC7</b>										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	<0.002							mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	<0.002							mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	-	<0.007							mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	<0.006							mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
<b>Total Speciated PCB-EC7<sub>A</sub><sup>M#</sup></b>	-	<0.007							mg/kg	A-T-004s





Envirolab Job Number: 18/01837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/01837/1	18/01837/2							Units	Method ref
Client Sample No										
Client Sample ID	WS TP1B	WS TP01								
Depth to Top	1.75	1.85								
Depth To Bottom	1.90	2.90								
Date Sampled	14-Dec-17	07-Dec-17								
Sample Type	Soil	Soil								
Sample Matrix Code	6A	6E								
Hexachlorocyclopentadiene <sub>A</sub>	-	<100							µg/kg	A-T-052s
Perylene <sub>A</sub>	-	<100							µg/kg	A-T-052s







## **REPORT NOTES**

### **General:**

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All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## Final Test Report

Envirolab Job Number: 17/08502  
Issue Number: 1  
Date: 21-Dec-17

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 574728

Date Samples Received: 6-Dec-17  
Date Instructions Received: 14-Dec-17  
Date Analysis Completed: 21-Dec-17

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

Approved by:

Holly Neary-King  
Administrative Assistant

Georgia King  
Admins & Client Services Supervisor



Sample Details					Landfill Waste Acceptance Criteria Limits								
Lab Sample ID	Method	ISO17025	MCERTS	17/08502/3				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample Number				8									
Client Sample ID				BH4A									
Depth to Top				2.1									
Depth to Bottom				2.20									
Date Sampled				04/12/2017									
Sample Type				Soil - ES									
Sample Matrix Code				6E									
Solid Waste Analysis													
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	7.51				-	>6	-			
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.28				-	to be evaluated	to be evaluated			
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.03				-	to be evaluated	to be evaluated			
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	81.9				-	-	10			
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	31.3				3	5	6			
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08				100	-	-			
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10				500	-	-			
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007				1	-	-			
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-			
Eluate Analysis					2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)				
					mg/l		mg/kg						
Arsenic	A-T-025	Y	N	0.002	0.001	0.022	0.020	0.5	2	25			
Barium	A-T-025	Y	N	0.029	0.019	0.363	0.430	20	100	300			
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5			
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70			
Copper	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	2	50	100			
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2			
Molybdenum	A-T-025	Y	N	0.005	0.005	0.057	0.110	0.5	10	30			
Nickel	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.4	10	40			
Lead	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	50			
Antimony	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5			
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7			
Zinc	A-T-025	Y	N	0.012	0.002	0.145	0.070	4	50	200			
Chloride	A-T-026	Y	N	40	17	497	436	800	15000	25000			
Fluoride	A-T-026	Y	N	0.2	0.3	3.0	5.0	10	150	500			
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	539	305	6711	7095	1000	20000	50000			
Total Dissolved Solids	A-T-035	N	N	662	416	8249	9414	4000	60000	100000			
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-			
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000			
Leach Test Information													
pH (pH Units)	A-T-031	N	Y	7.5	7.5								
Conductivity (µS/cm)	A-T-037	N	N	1323	832								
Mass Sample (kg)				0.200									
Dry Matter (%)	A-T-044	N	N	20.4									
Stage 1													
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350									
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150									
Stage 2													
Volume Leachant, L <sub>8</sub> (l)	A-T-046			0.330									
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation													



Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details					Landfill Waste Acceptance Criteria Limits						
Lab Sample ID	Method	ISO17025	MCERTS	17/08502/5							
Client Sample Number				6					Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				BH5							
Depth to Top				1.2							
Depth to Bottom				1.30							
Date Sampled				01/12/2017							
Sample Type				Soil - ES							
Sample Matrix Code				6A							
Solid Waste Analysis											
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.36				-	>6	-	
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.66				-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.15				-	to be evaluated	to be evaluated	
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	3.8				-	-	10	
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	3.76				3	5	6	
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	2.66				100	-	-	
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	320				500	-	-	
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007				1	-	-	
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-	
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
				mg/l		mg/kg					
Arsenic	A-T-025	Y	N	0.003	0.003	0.007	0.030	0.5	2	25	
Barium	A-T-025	Y	N	0.038	0.023	0.101	0.260	20	100	300	
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5	
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70	
Copper	A-T-025	Y	N	0.013	0.009	0.033	0.100	2	50	100	
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2	
Molybdenum	A-T-025	Y	N	0.026	0.008	0.070	0.100	0.5	10	30	
Nickel	A-T-025	Y	N	0.005	0.003	0.014	0.030	0.4	10	40	
Lead	A-T-025	Y	N	0.007	0.014	0.020	0.150	0.5	10	50	
Antimony	A-T-025	Y	N	0.005	0.002	0.013	0.020	0.06	0.7	5	
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7	
Zinc	A-T-025	Y	N	0.008	0.020	0.020	0.200	4	50	200	
Chloride	A-T-026	Y	N	19	2	49	37	800	15000	25000	
Fluoride	A-T-026	Y	N	1.6	0.7	4.3	8.0	10	150	500	
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	39	8	103	111	1000	20000	50000	
Total Dissolved Solids	A-T-035	N	N	176	56	466	715	4000	60000	100000	
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-	
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000	
Leach Test Information											
pH (pH Units)	A-T-031	N	Y	7.5	7.6						
Conductivity (µS/cm)	A-T-037	N	N	351	112						
Mass Sample (kg)				0.201							
Dry Matter (%)	A-T-044	N	N	75.2							
Stage 1											
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350							
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150							
Stage 2											
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.210							
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation											

Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details					Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	17/08502/6						
Client Sample Number				1	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample ID				TP1						
Depth to Top				1						
Depth to Bottom				1.10						
Date Sampled				07/12/2017						
Sample Type				Soil - B						
Sample Matrix Code				4A						
<b>Solid Waste Analysis</b>										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.03	-	>6	-			
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.09	-	to be evaluated	to be evaluated			
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.05	-	to be evaluated	to be evaluated			
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	5.4	-	-	10			
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	2.26	3	5	6			
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	6.01	100	-	-			
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	67	500	-	-			
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007	1	-	-			
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01	6	-	-			
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	Y	N	0.002	0.002	0.004	0.020	0.5	2	25
Barium	A-T-025	Y	N	0.034	0.019	0.081	0.210	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70
Copper	A-T-025	Y	N	0.007	0.006	0.018	0.060	2	50	100
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.007	0.003	0.015	0.040	0.5	10	30
Nickel	A-T-025	Y	N	0.002	0.001	0.004	0.010	0.4	10	40
Lead	A-T-025	Y	N	0.001	0.019	0.003	0.180	0.5	10	50
Antimony	A-T-025	Y	N	0.002	0.001	0.005	0.010	0.06	0.7	5
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	Y	N	0.005	0.009	0.012	0.090	4	50	200
Chloride	A-T-026	Y	N	4	<1.00	10	<10	800	15000	25000
Fluoride	A-T-026	Y	N	0.7	0.5	1.5	5.0	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	287	43	683	675	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	363	89	863	1176	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	7.4	7.5					
Conductivity (µS/cm)	A-T-037	N	N	725	178					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	81.3						
Stage 1										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.300						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details					Landfill Waste Acceptance Criteria Limits						
Lab Sample ID	Method	ISO17025	MCERTS	17/08502/7							
Client Sample Number				2					Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				WS3							
Depth to Top				0.3							
Depth to Bottom				0.40							
Date Sampled				06/12/2017							
Sample Type				Soil - ES							
Sample Matrix Code				6AE							
Solid Waste Analysis											
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.25				-	>6	-	
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.35				-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.13				-	to be evaluated	to be evaluated	
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	5.6				-	-	10	
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	2.5				3	5	6	
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	1.1				100	-	-	
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10				500	-	-	
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007				1	-	-	
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-	
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
				mg/l		mg/kg					
Arsenic	A-T-025	Y	N	0.006	0.006	0.014	0.070	0.5	2	25	
Barium	A-T-025	Y	N	0.056	0.035	0.138	0.390	20	100	300	
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5	
Chromium	A-T-025	Y	N	0.002	<0.001	0.004	<0.01	0.5	10	70	
Copper	A-T-025	Y	N	0.018	0.012	0.044	0.130	2	50	100	
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2	
Molybdenum	A-T-025	Y	N	0.012	0.005	0.029	0.060	0.5	10	30	
Nickel	A-T-025	Y	N	0.006	0.003	0.015	0.040	0.4	10	40	
Lead	A-T-025	Y	N	0.046	0.048	0.113	0.500	0.5	10	50	
Antimony	A-T-025	Y	N	0.003	0.002	0.007	0.020	0.06	0.7	5	
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7	
Zinc	A-T-025	Y	N	0.768	0.777	1.884	8.120	4	50	200	
Chloride	A-T-026	Y	N	273	42	669	652	800	15000	25000	
Fluoride	A-T-026	Y	N	1.3	0.8	3.2	9.0	10	150	500	
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	51	15	125	190	1000	20000	50000	
Total Dissolved Solids	A-T-035	N	N	589	145	1446	1934	4000	60000	100000	
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-	
Dissolved Organic Carbon	A-T-032	N	N	26.2	<20.0	64	<200	500	800	1000	
Leach Test Information											
pH (pH Units)	A-T-031	N	Y	7.7	8.0						
Conductivity (µS/cm)	A-T-037	N	N	1178	290						
Mass Sample (kg)				0.201							
Dry Matter (%)	A-T-044	N	N	79.4							
Stage 1											
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350							
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150							
Stage 2											
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.280							
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation											

Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details					Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	17/08502/9						
Client Sample Number				7		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill		
Client Sample ID				WS7						
Depth to Top				1						
Depth to Bottom				1.10						
Date Sampled				06/12/2017						
Sample Type				Soil - ES						
Sample Matrix Code				1						
Solid Waste Analysis										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	9.12				-	>6	-
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.16				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.04				-	to be evaluated	to be evaluated
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	0.8				-	-	10
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.17				3	5	6
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08				100	-	-
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10				500	-	-
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	Y	N	0.013	0.004	0.025	0.050	0.5	2	25
Barium	A-T-025	Y	N	0.068	0.004	0.137	0.090	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	Y	N	0.002	<0.001	0.003	<0.01	0.5	10	70
Copper	A-T-025	Y	N	0.015	0.002	0.030	0.030	2	50	100
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.004	0.001	0.008	0.010	0.5	10	30
Nickel	A-T-025	Y	N	0.003	<0.001	0.006	<0.01	0.4	10	40
Lead	A-T-025	Y	N	0.023	0.002	0.046	0.040	0.5	10	50
Antimony	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5
Selenium	A-T-025	Y	N	0.002	<0.001	0.003	<0.01	0.1	0.5	7
Zinc	A-T-025	Y	N	0.034	0.003	0.069	0.060	4	50	200
Chloride	A-T-026	Y	N	26	2	53	40	800	15000	25000
Fluoride	A-T-026	Y	N	0.9	0.2	1.7	3.0	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	19	1	38	29	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	118	31	238	382	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	7.6	8.4					
Conductivity (µS/cm)	A-T-037	N	N	236	62					
Mass Sample (kg)				0.201						
Dry Matter (%)	A-T-044	N	N	91						
Stage 1										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.460						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

## Final Test Report

Envirolab Job Number: 18/01112  
Issue Number: 1 Date: 22-Feb-18

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 581299

Date Samples Received: 14-Feb-18  
Date Instructions Received: 14-Feb-18  
Date Analysis Completed: 22-Feb-18

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

Approved by:

Gill Walker  
Laboratory Manager

Iain Haslock  
Analytical Consultant



Sample Details						Landfill Waste Acceptance Criteria Limits				
Lab Sample ID	Method	ISO17025	MCERTS	18/01112/3		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill		
Client Sample Number				4						
Client Sample ID				WS7						
Depth to Top				1.5						
Depth to Bottom										
Date Sampled				08/12/2017						
Sample Type				Soil						
Sample Matrix Code				5A						
Solid Waste Analysis										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	7.30		-	>6	-		
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	<0.01		-	to be evaluated	to be evaluated		
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	<0.01		-	to be evaluated	to be evaluated		
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	0.8		-	-	10		
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	<0.03		3	5	6		
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08		100	-	-		
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10		500	-	-		
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007		1	-	-		
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01		6	-	-		
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	Y	N	0.006	0.002	0.012	0.020	0.5	2	25
Barium	A-T-025	Y	N	0.182	0.034	0.382	0.460	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	Y	N	0.006	<0.001	0.012	0.010	0.5	10	70
Copper	A-T-025	Y	N	0.015	0.003	0.031	0.040	2	50	100
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.004	0.002	0.008	0.020	0.5	10	30
Nickel	A-T-025	Y	N	0.007	0.001	0.015	0.020	0.4	10	40
Lead	A-T-025	Y	N	0.019	0.004	0.040	0.060	0.5	10	50
Antimony	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	Y	N	0.052	0.020	0.108	0.230	4	50	200
Chloride	A-T-026	Y	N	36	4	76	66	800	15000	25000
Fluoride	A-T-026	Y	N	0.7	0.4	1.4	4.0	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	19	3	40	48	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	175	46	369	574	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	7.8	8.0					
Conductivity (µS/cm)	A-T-037	N	N	350	93					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	88.6						
Stage 1										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.420						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

## Final Test Report

Envirolab Job Number: 18/01160  
Issue Number: 1 Date: 26-Feb-18

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Scott Viner/Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 581534

Date Samples Received: 15-Feb-18  
Date Instructions Received: 16-Feb-18  
Date Analysis Completed: 26-Feb-18

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

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Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

Approved by:

Melanie Marshall  
Laboratory Coordinator

Richard Wong  
Client Manager





Sample Details					Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/01160/1						
Client Sample Number				6		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill		
Client Sample ID				WS9						
Depth to Top				1.4						
Depth to Bottom										
Date Sampled				04/02/2017						
Sample Type				Soil						
Sample Matrix Code				6A						
Solid Waste Analysis										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	7.10			-	>6	-	
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.09			-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.04			-	to be evaluated	to be evaluated	
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	11.9			-	-	10	
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	5.7			3	5	6	
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	0.55			100	-	-	
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10			500	-	-	
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007			1	-	-	
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01			6	-	-	
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	Y	N	0.013	0.010	0.037	0.110	0.5	2	25
Barium	A-T-025	Y	N	0.059	0.045	0.162	0.500	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	Y	N	0.002	0.001	0.004	0.010	0.5	10	70
Copper	A-T-025	Y	N	0.011	0.017	0.030	0.170	2	50	100
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.073	0.040	0.199	0.460	0.5	10	30
Nickel	A-T-025	Y	N	0.011	0.009	0.031	0.100	0.4	10	40
Lead	A-T-025	Y	N	0.025	0.040	0.068	0.410	0.5	10	50
Antimony	A-T-025	Y	N	0.005	0.004	0.013	0.040	0.06	0.7	5
Selenium	A-T-025	Y	N	0.001	<0.001	0.003	<0.01	0.1	0.5	7
Zinc	A-T-025	Y	N	0.024	0.037	0.067	0.380	4	50	200
Chloride	A-T-026	Y	N	100	16	274	259	800	15000	25000
Fluoride	A-T-026	Y	N	0.7	0.5	1.8	6.0	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	141	75	387	872	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	486	219	1334	2626	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	40.6	22.30	111	258	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	7.3	7.5					
Conductivity (µS/cm)	A-T-037	N	N	972	438					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	73.4						
Stage 1										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.170						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details					Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/01160/6						
Client Sample Number				6		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill		
Client Sample ID				BH4AS						
Depth to Top				1.5						
Depth to Bottom										
Date Sampled				13/02/2017						
Sample Type				Soil						
Sample Matrix Code				5A						
Solid Waste Analysis										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.00				-	>6	-
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.13				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.04				-	to be evaluated	to be evaluated
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	1.3				-	-	10
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.43				3	5	6
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	4.96				100	-	-
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	12				500	-	-
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	Y	N	0.016	0.007	0.034	0.080	0.5	2	25
Barium	A-T-025	Y	N	0.139	0.033	0.285	0.420	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	Y	N	0.003	<0.001	0.006	<0.01	0.5	10	70
Copper	A-T-025	Y	N	0.085	0.019	0.174	0.240	2	50	100
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.004	<0.001	0.008	0.010	0.5	10	30
Nickel	A-T-025	Y	N	0.009	0.002	0.019	0.020	0.4	10	40
Lead	A-T-025	Y	N	0.341	0.072	0.698	0.950	0.5	10	50
Antimony	A-T-025	Y	N	0.003	<0.001	0.007	<0.01	0.06	0.7	5
Selenium	A-T-025	Y	N	0.002	<0.001	0.003	<0.01	0.1	0.5	7
Zinc	A-T-025	Y	N	0.439	0.103	0.900	1.310	4	50	200
Chloride	A-T-026	Y	N	39	4	80	66	800	15000	25000
Fluoride	A-T-026	Y	N	0.7	0.2	1.3	2.0	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	9	1	19	18	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	161	33	330	438	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	7.6	8.2					
Conductivity (µS/cm)	A-T-037	N	N	322	65					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	90.2						
Stage 1										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.440						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

Landfill WAC analysis must not be used for hazardous waste classification purposes.  
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Sample Details					Landfill Waste Acceptance Criteria Limits						
Lab Sample ID	Method	ISO17025	MCERTS	18/01160/7							
Client Sample Number				7					Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				BH4AS							
Depth to Top				2.3							
Depth to Bottom											
Date Sampled				13/02/2017							
Sample Type				Soil							
Sample Matrix Code				5A							
Solid Waste Analysis											
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	7.63				-	>6	-	
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.09				-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.03				-	to be evaluated	to be evaluated	
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	3.7				-	-	10	
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	1.22				3	5	6	
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08				100	-	-	
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10				500	-	-	
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007				1	-	-	
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-	
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
				mg/l		mg/kg					
Arsenic	A-T-025	Y	N	0.005	0.004	0.014	0.040	0.5	2	25	
Barium	A-T-025	Y	N	0.042	0.020	0.109	0.230	20	100	300	
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5	
Chromium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70	
Copper	A-T-025	Y	N	0.002	0.007	0.007	0.070	2	50	100	
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2	
Molybdenum	A-T-025	Y	N	0.015	0.003	0.039	0.040	0.5	10	30	
Nickel	A-T-025	Y	N	0.003	0.003	0.009	0.030	0.4	10	40	
Lead	A-T-025	Y	N	0.004	0.013	0.011	0.130	0.5	10	50	
Antimony	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5	
Selenium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7	
Zinc	A-T-025	Y	N	0.007	0.016	0.018	0.160	4	50	200	
Chloride	A-T-026	Y	N	117	7	303	182	800	15000	25000	
Fluoride	A-T-026	Y	N	1.1	0.5	2.9	6.0	10	150	500	
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	77	13	199	197	1000	20000	50000	
Total Dissolved Solids	A-T-035	N	N	426	73	1103	1119	4000	60000	100000	
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-	
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000	
Leach Test Information											
pH (pH Units)	A-T-031	N	Y	7.5	7.5						
Conductivity (µS/cm)	A-T-037	N	N	851	146						
Mass Sample (kg)				0.200							
Dry Matter (%)	A-T-044	N	N	76.6							
Stage 1											
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350							
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150							
Stage 2											
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.230							
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation											

Landfill WAC analysis must not be used for hazardous waste classification purposes.  
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Sample Details					Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/01160/11						
Client Sample Number				6		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill		
Client Sample ID				BH4B						
Depth to Top				1.9						
Depth to Bottom										
Date Sampled				13/02/2017						
Sample Type				Soil						
Sample Matrix Code				6A						
Solid Waste Analysis										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	7.86				-	>6	-
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.24				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.03				-	to be evaluated	to be evaluated
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	3.3				-	-	10
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	1.4				3	5	6
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	8.11				100	-	-
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	16				500	-	-
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	Y	N	0.010	0.010	0.024	0.100	0.5	2	25
Barium	A-T-025	Y	N	0.043	0.034	0.099	0.360	20	100	300
Cadmium	A-T-025	Y	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	Y	N	0.002	<0.001	0.004	<0.01	0.5	10	70
Copper	A-T-025	Y	N	0.014	0.014	0.032	0.140	2	50	100
Mercury	A-T-025	Y	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.068	0.039	0.158	0.430	0.5	10	30
Nickel	A-T-025	Y	N	0.008	0.007	0.019	0.070	0.4	10	40
Lead	A-T-025	Y	N	0.032	0.033	0.074	0.340	0.5	10	50
Antimony	A-T-025	Y	N	0.004	0.003	0.010	0.030	0.06	0.7	5
Selenium	A-T-025	Y	N	0.001	<0.001	0.003	<0.01	0.1	0.5	7
Zinc	A-T-025	Y	N	0.025	0.030	0.058	0.310	4	50	200
Chloride	A-T-026	Y	N	202	33	467	492	800	15000	25000
Fluoride	A-T-026	Y	N	0.6	0.4	1.4	5.0	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	99	43	229	495	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	613	228	1419	2699	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	45.2	26.20	105	287	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	Y	7.5	7.5					
Conductivity (µS/cm)	A-T-037	N	N	1225	456					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	82.9						
Stage 1										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.330						
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## FINAL ANALYTICAL TEST REPORT

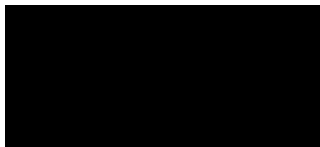
**Envirolab Job Number:** 18/07384  
**Issue Number:** 1

**Date:** 25 September, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

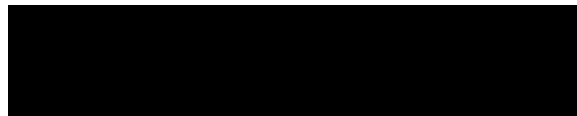
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 605028  
**Date Samples Received:** 13/09/18  
**Date Instructions Received:** 14/09/18  
**Date Analysis Completed:** 25/09/18

**Prepared by:**



Georgia King  
Admin & Client Services Supervisor

**Approved by:**



Danielle Brierley  
Client Manager

Envirolab Job Number: 18/07384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
% Stones >10mm <sub>A</sub>	<0.1	15.6	10.5	<0.1	<0.1	2.6	<0.1	<0.1		
pH <sub>D</sub> <sup>M#</sup>	8.72	11.01	10.31	8.64	8.29	8.82	8.25	9.02	pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	1.0	0.5	2.1	17.0	12.3	22.9	16.4	18.9	mg/kg	A-T-033s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	<0.01	0.24	0.07	<0.01	0.02	<0.01	0.02	<0.01	g/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	<200	2300	680	360	290	330	350	280	mg/kg	A-T-028s
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	A-T-050s
Sulphide <sub>A</sub>	<5	7	7	54	8	<5	9	<5	mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	<5	<5	<5	<5	130	45	30	35	mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	<0.1	0.3	0.9	1.3	1.1	0.7	1.3	0.9	% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	4	3	4	8	7	5	8	10	mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	<1.0	1.5	<1.0	1.9	1.8	<1.0	1.5	2.1	mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	<0.5	<0.5	<0.5	0.6	0.5	<0.5	<0.5	0.7	mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	1	59	13	6	7	5	8	6	mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	2	8	9	22	13	14	16	23	mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	5	18	70	14	29	20	31	10	mg/kg	A-T-024s
Mercury <sub>D</sub>	<0.17	0.19	0.20	<0.17	<0.17	<0.17	<0.17	<0.17	mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	2	6	8	17	11	11	13	17	mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	11	72	24	38	31	26	36	40	mg/kg	A-T-024s
Leachate Prep NRA (10:1) <sub>A</sub>	-	-	*	*	-	-	*	-		A-T-001
pH (leachable) <sub>A</sub> <sup>#</sup>	-	-	11.18	8.12	-	-	7.84	-	pH	A-T-031w
Ammoniacal nitrogen (leachable) <sub>A</sub>	-	-	0.04	0.84	-	-	0.03	-	mg/l	A-T-033w
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	-	-	11.28	10.94	-	-	14.51	-	mg/l	A-T-026w
Cyanide (total) (leachable) <sub>A</sub>	-	-	0.006	<0.005	-	-	<0.005	-	mg/l	A-T-042wTCN
Phenols (total by HPLC) (leachable) <sub>A</sub>	-	-	<0.01	<0.01	-	-	<0.01	-	mg/l	A-T-050w
Sulphide (leachable) <sub>A</sub>	-	-	<0.1	<0.1	-	-	<0.1	-	mg/l	A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	-	-	2.5	2.2	-	-	2.9	-	mg/l	A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	-	-	7	23	-	-	16	-	µg/l	A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	-	-	25	115	-	-	86	-	µg/l	A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	-	-	21	33	-	-	38	-	µg/l	A-T-025w

Envirolab Job Number: 18/07384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
Chromium (leachable) <sub>A</sub> <sup>#</sup>	-	-	3	2	-	-	1	-		
Chromium (hexavalent) (leachable) <sub>A</sub>	-	-	<0.05	<0.05	-	-	<0.05	-	mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	-	-	<1	42	-	-	145	-	µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	-	-	<0.1	<0.1	-	-	<0.1	-	µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	-	-	3	11	-	-	6	-	µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	-	-	3	1	-	-	2	-	µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	-	-	<0.1	<0.1	-	-	<0.1	-	mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	-	-	2	24	-	-	34	-	µg/l	A-T-025w



Envirolab Job Number: 18/07384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref		
Client Sample No	1	1	1	2	2	2	3	3				
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22				
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20				
Depth To Bottom												
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18				
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	1	4A	4A	3	5	5A	5	5				
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD		A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				

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Client Project Ref: PZ1522D1

Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	0.07	<0.01	0.11	<0.01	0.06	<0.01	mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	0.02	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	0.05	0.17	<0.02	0.13	<0.02	0.09	<0.02	mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	0.28	1.14	<0.04	0.31	0.05	0.31	<0.04	mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	0.33	1.47	<0.04	0.23	<0.04	0.37	<0.04	mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	0.50	2.04	<0.05	0.34	<0.05	0.57	<0.05	mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	0.22	0.84	<0.05	0.11	<0.05	0.25	<0.05	mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	0.16	0.74	<0.07	0.13	<0.07	0.21	<0.07	mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	0.36	1.25	<0.06	0.34	<0.06	0.38	<0.06	mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	0.05	0.25	<0.04	<0.04	<0.04	0.06	<0.04	mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	0.39	1.36	<0.08	1.02	<0.08	0.67	<0.08	mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	0.05	<0.01	0.18	<0.01	0.09	<0.01	mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	0.27	1.11	<0.03	0.15	<0.03	0.31	<0.03	mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	0.12	0.50	<0.03	0.52	<0.03	0.26	<0.03	mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	0.56	1.08	<0.07	0.86	<0.07	0.79	<0.07	mg/kg	A-T-019s
Total PAH-16MS <sub>A</sub> <sup>M#</sup>	<0.08	3.31	12.1	<0.08	4.43	<0.08	4.42	<0.08	mg/kg	A-T-019s

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Client Project Name: Gt Yarmouth 3rd River Crossing

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Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
PAH 16MS (leachable)										
Acenaphthene (leachable) <sub>A</sub>	-	-	0.79	0.45	-	-	<0.02	-	µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	-	-	<0.02	<0.02	-	-	<0.02	-	µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	-	-	0.02	0.05	-	-	0.04	-	µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	-	-	0.02	<0.02	-	-	<0.02	-	µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	-	-	0.03	<0.02	-	-	0.13	-	µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	-	-	0.04	<0.02	-	-	0.19	-	µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	-	-	<0.02	<0.02	-	-	0.04	-	µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	-	-	<0.02	<0.02	-	-	0.06	-	µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	-	-	0.02	<0.02	-	-	0.12	-	µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	-	-	<0.02	<0.02	-	-	<0.02	-	µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	-	-	0.07	0.07	-	-	0.12	-	µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	-	-	0.14	0.27	-	-	<0.02	-	µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	-	-	<0.02	<0.02	-	-	0.05	-	µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	-	-	0.08	<0.02	-	-	<0.02	-	µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	-	-	0.09	0.22	-	-	<0.02	-	µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	-	-	0.06	0.05	-	-	1.16	-	µg/l	A-T-019w
Total PAH 16MS (leachable) <sub>A</sub>	-	-	1.36	1.11	-	-	1.91	-	µg/l	A-T-019w

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Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	<0.002	-	<0.002	-	<0.002	<0.002	-	mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	<0.002	-	<0.002	-	<0.002	<0.002	-	mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	<0.004	-	<0.004	-	<0.004	<0.004	-	mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	<0.006	-	<0.006	-	<0.006	<0.006	-	mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	<0.004	-	<0.004	-	<0.004	<0.004	-	mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	<0.004	-	<0.004	-	<0.004	<0.004	-	mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	-	<0.007	-	<0.007	-	<0.007	<0.007	-	mg/kg	A-T-004s

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Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
Speciated PCB-WHO12										
PCB BZ 81 <sub>A</sub>	<0.005	-	<0.005	-	<0.005	-	-	<0.005	mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	<0.005	-	<0.005	-	<0.005	-	-	<0.005	mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	<0.005	-	<0.005	-	<0.005	-	-	<0.005	mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	<0.005	-	<0.005	-	<0.005	-	-	<0.005	mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	<0.005	-	<0.005	-	<0.005	-	-	<0.005	mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	<0.005	-	<0.005	-	<0.005	-	-	<0.005	mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	<0.005	-	<0.005	-	<0.005	-	-	<0.005	mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	<0.005	-	<0.005	-	<0.005	-	-	<0.005	mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	<0.005	-	<0.005	-	<0.005	-	-	<0.005	mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	<0.005	-	<0.005	-	<0.005	-	-	<0.005	mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	<0.005	-	<0.005	-	<0.005	-	-	<0.005	mg/kg	A-T-004s
Total Speciated PCB-WHO12 <sub>A</sub>	<0.007	-	<0.007	-	<0.007	-	-	<0.007	mg/kg	A-T-004s

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Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
SVOC excluding PAH-16 (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	-	-	<4	<4	-	-	<4	-	µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Carbazole (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
n-Dioctylphthalate (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w

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Client Project Ref: PZ1522D1

Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-		
Hexachloroethane (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	-	-	<2	<2	-	-	<2	-	µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	-	-	4	<2	-	-	<2	-	µg/l	A-T-052w



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Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100	168	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500	<500	<500	<500	<500	<500	µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	<100	161	<100	µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	<100	344	<100	µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<200	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500	<500	<500	<500	<500	<500	µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s

Envirolab Job Number: 18/07384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100		
Perylene <sub>A</sub>	<100	<100	711	<100	<100	<100	183	<100	µg/kg	A-T-052s

Envirolab Job Number: 18/07384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
VOC										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	<5	µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10	<10	µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s

Envirolab Job Number: 18/07384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1		
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2	<2	<2	<2	<2	<2	µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	<3	<3	<3	µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	<3	<3	<3	µg/kg	A-T-006s

Envirolab Job Number: 18/07384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	0.02	<0.01	mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	4.1	<0.1	4.7	<0.1	mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	35.8	<0.1	46.4	<0.1	mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	29.8	<0.1	50.9	<0.1	mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	6.5	<0.1	45.4	<0.1	mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	76.3	<0.1	147	<0.1	mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	1.0	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	9.1	<0.1	9.3	<0.1	mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	2.9	<0.1	16.8	<0.1	25.6	<0.1	mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	11.8	1.0	7.0	<0.1	20.4	<0.1	mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	<0.1	<0.1	14.7	1.0	33.8	<0.1	55.3	<0.1	mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	<0.1	<0.1	14.7	1.0	110	<0.1	202	<0.1	mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s

Envirolab Job Number: 18/07384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07384/1	18/07384/2	18/07384/3	18/07384/4	18/07384/5	18/07384/6	18/07384/7	18/07384/8	Units	Method ref
Client Sample No	1	1	1	2	2	2	3	3		
Client Sample ID	WS22	WS21	WS20	WS22	WS21	WS20	WS21	WS22		
Depth to Top	0.35	0.45	0.80	0.80	0.90	1.20	1.20	1.20		
Depth To Bottom										
Date Sampled	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	4A	4A	3	5	5A	5	5		
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
Total Aliphatics (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
Aro >C7-C8 (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	-	-	<10	<10	-	-	<10	-	µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	-	-	<1	<1	-	-	<1	-	µg/l	A-T-022w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/07536  
**Issue Number:** 1  
**Date:** 01 October, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

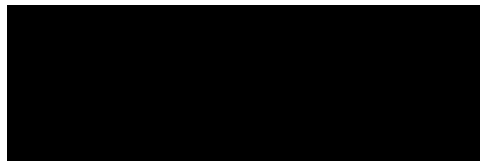
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 605482  
**Date Samples Received:** 17/09/18  
**Date Instructions Received:** 19/09/18  
**Date Analysis Completed:** 01/10/18

**Prepared by:**



Gill Walker  
Director/Laboratory Manager

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
pH <sub>D</sub> <sup>M#</sup>	8.55	8.91	9.03	9.26	8.94	9.12	8.51	9.35	pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	10.9	8.6	18.3	1.3	34.3	8.7	10.1	2.6	mg/kg	A-T-033s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	<0.01	<0.01	0.20	0.02	0.13	0.14	0.11	0.13	g/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	370	<200	1300	<200	1200	970	1300	2100	mg/kg	A-T-028s
Cyanide (total) <sub>A</sub> <sup>M#</sup>	1	<1	<1	<1	<1	<1	1	<1	mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	A-T-050s
Sulphide <sub>A</sub>	<5	<5	<5	<5	200	<5	<5	120	mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	<5	<5	62	<5	1600	<5	<5	380	mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	1.6	0.6	0.8	0.3	1.7	0.4	1.0	1.6	% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	15	6	5	1	7	3	5	12	mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	3.0	<1.0	2.0	<1.0	2.6	1.4	1.2	1.3	mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	0.6	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	10	4	4	2	7	3	3	5	mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	31	13	10	5	23	8	11	15	mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	19	15	8	6	16	7	8	10	mg/kg	A-T-024s
Mercury <sub>D</sub>	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	22	9	10	5	19	7	9	13	mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	49	22	24	11	45	18	23	32	mg/kg	A-T-024s
Leachate Prep NRA (10:1) <sub>A</sub>	-	*	-	-	-	*	*	*		A-T-001
pH (leachable) <sub>A</sub> <sup>#</sup>	-	7.79	-	-	-	7.48	7.50	8.77	pH	A-T-031w
Ammoniacal nitrogen (leachable) <sub>A</sub>	-	0.61	-	-	-	0.69	0.76	0.29	mg/l	A-T-033w
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	-	1.65	-	-	-	56.65	52.54	8.85	mg/l	A-T-026w
Cyanide (total) (leachable) <sub>A</sub>	-	<0.005	-	-	-	<0.005	<0.005	<0.005	mg/l	A-T-042wTCN
Phenols (total by HPLC) (leachable) <sub>A</sub>	-	<0.01	-	-	-	<0.01	<0.01	<0.01	mg/l	A-T-050w
Sulphide (leachable) <sub>A</sub>	-	0.8	-	-	-	0.2	<0.1	<0.1	mg/l	A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	-	12.5	-	-	-	5.2	3.4	4.0	mg/l	A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	-	7	-	-	-	4	2	18	µg/l	A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	-	50	-	-	-	86	54	36	µg/l	A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	-	22	-	-	-	4	2	2	µg/l	A-T-025w

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
Chromium (leachable) <sub>A</sub> <sup>#</sup>	-	<1	-	-	-	<1	<1	<1		
Chromium (hexavalent) (leachable) <sub>A</sub>	-	<0.05	-	-	-	<0.05	<0.05	<0.05	mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	-	14	-	-	-	3	<1	2	µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	-	<0.1	-	-	-	<0.1	<0.1	<0.1	µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	-	2	-	-	-	3	2	2	µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	-	1	-	-	-	2	<1	3	µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	-	<0.1	-	-	-	<0.1	<0.1	<0.1	mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	-	8	-	-	-	10	4	3	µg/l	A-T-025w

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	A-T-045	
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	0.08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	0.18	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	0.18	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	0.23	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	0.22	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	0.37	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	0.10	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	0.33	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	0.31	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	A-T-019s
Total PAH-16MS <sub>A</sub> <sup>M#</sup>	2.16	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	mg/kg	A-T-019s

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
PAH 16MS (leachable)										
Acenaphthene (leachable) <sub>A</sub>	-	0.06	-	-	-	<0.02	0.04	0.05	µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	-	<0.02	-	-	-	<0.02	<0.02	<0.02	µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	-	0.03	-	-	-	<0.02	0.04	<0.02	µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	-	<0.02	-	-	-	<0.02	<0.02	<0.02	µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	-	<0.02	-	-	-	<0.02	<0.02	<0.02	µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	-	<0.02	-	-	-	<0.02	<0.02	<0.02	µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	-	<0.02	-	-	-	<0.02	<0.02	<0.02	µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	-	<0.02	-	-	-	<0.02	<0.02	<0.02	µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	-	<0.02	-	-	-	<0.02	<0.02	<0.02	µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	-	<0.02	-	-	-	<0.02	<0.02	<0.02	µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	-	0.06	-	-	-	0.02	0.06	<0.02	µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	-	0.05	-	-	-	<0.02	0.04	<0.02	µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	-	<0.02	-	-	-	<0.02	<0.02	<0.02	µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	-	<0.02	-	-	-	<0.02	0.22	0.42	µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	-	0.06	-	-	-	<0.02	0.11	<0.02	µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	-	0.04	-	-	-	0.02	0.04	<0.02	µg/l	A-T-019w
Total PAH 16MS (leachable) <sub>A</sub>	-	0.30	-	-	-	0.04	0.55	0.47	µg/l	A-T-019w

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Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	<0.002	-	-	<0.002	-	<0.002	<0.002	mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	<0.002	-	-	<0.002	-	<0.002	<0.002	mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	<0.004	-	-	<0.004	-	<0.004	<0.004	mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	<0.006	-	-	<0.006	-	<0.006	<0.006	mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	<0.004	-	-	<0.004	-	<0.004	<0.004	mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	<0.004	-	-	<0.004	-	<0.004	<0.004	mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	-	<0.007	-	-	<0.007	-	<0.007	<0.007	mg/kg	A-T-004s



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Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
Speciated PCB-WHO12										
PCB BZ 81 <sub>A</sub>	<0.005	-	<0.005	<0.005	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	<0.005	-	<0.005	<0.005	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	<0.005	-	<0.005	<0.005	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	<0.005	-	<0.005	<0.005	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	<0.005	-	<0.005	<0.005	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	<0.005	-	<0.005	<0.005	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	<0.005	-	<0.005	<0.005	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	<0.005	-	<0.005	<0.005	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	<0.005	-	<0.005	<0.005	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	<0.005	-	<0.005	<0.005	-	<0.005	-	-	mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	<0.005	-	<0.005	<0.005	-	<0.005	-	-	mg/kg	A-T-004s
Total Speciated PCB-WHO12 <sub>A</sub>	<0.007	-	<0.007	<0.007	-	<0.007	-	-	mg/kg	A-T-004s

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Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
SVOC (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Acenaphthene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Acenaphthylene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Anthracene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Benzo(a)anthracene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Benzo(a)pyrene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Benzo(ghi)perylene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	-	<4	-	-	-	<8	<16	<4	µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w

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Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
Carbazole (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2		
Chrysene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
n-Dioctylphthalate (leachable) <sub>A</sub>	-	<10	-	-	-	<20	<40	<10	µg/l	A-T-052w
Fluoranthene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Fluorene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Hexachloroethane (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Indeno(1,2,3-cd)pyrene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Naphthalene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Phenanthrene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w
Pyrene (leachable) <sub>A</sub>	-	<2	-	-	-	<4	<8	<2	µg/l	A-T-052w

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500	<500	<500	<500	<500	<500	µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500	<500	<500	<500	<500	<500	µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100		
Perylene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100	<100	µg/kg	A-T-052s

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
VOC										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	2	<1	5	µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	<5	µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10	<10	µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1		
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	7	µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2	<2	<2	<2	<2	<2	µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	<3	<3	<3	µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	<3	<3	<3	µg/kg	A-T-006s



Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/1	18/07536/2	18/07536/3	18/07536/4	18/07536/5	18/07536/6	18/07536/7	18/07536/8	Units	Method ref
Client Sample No	3	4	4	5	4	5	6	5		
Client Sample ID	WS20	WS21	WS22	WS21	WS20	WS22	WS21	WS20		
Depth to Top	1.60	1.80	1.90	2.20	2.40	2.60	2.75	3.10		
Depth To Bottom										
Date Sampled	11-Sep-18	12-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18	10-Sep-18	12-Sep-18	11-Sep-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	1	6	5	5	5		
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
Ali >C8-C10 (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
Ali >C12-C16 (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
Ali >C16-C21 (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
Ali >C21-C35 (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
Ali >C35-C44 (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
Total Aliphatics (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
Aro >C5-C7 (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
Aro >C7-C8 (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
Aro >C8-C9 (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
Aro >C9-C10 (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
Aro >C10-C12 (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
Aro >C12-C16 (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
Aro >C16-C21 (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
Aro >C21-C35 (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
Aro >C35-C44 (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
Total Aromatics (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
TPH (Ali & Aro) (leachable) <sub>A</sub>	-	<10	-	-	-	<10	<10	<10	µg/l	A-T-023w
BTEX - Benzene (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	-	<1	-	-	-	<1	<1	<1	µg/l	A-T-022w



Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/9	18/07536/10							Units	Method ref
Client Sample No	6	7								
Client Sample ID	WS22	WS21								
Depth to Top	3.60	4.20								
Depth To Bottom										
Date Sampled	10-Sep-18	12-Sep-18								
Sample Type	Soil - D	Soil - D								
Sample Matrix Code	1	1								
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/9	18/07536/10							Units	Method ref
Client Sample No	6	7								
Client Sample ID	WS22	WS21								
Depth to Top	3.60	4.20								
Depth To Bottom										
Date Sampled	10-Sep-18	12-Sep-18								
Sample Type	Soil - D	Soil - D								
Sample Matrix Code	1	1								
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01						mg/kg	A-T-019s	
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01						mg/kg	A-T-019s	
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	<0.02						mg/kg	A-T-019s	
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04						mg/kg	A-T-019s	
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04						mg/kg	A-T-019s	
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05						mg/kg	A-T-019s	
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05						mg/kg	A-T-019s	
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07						mg/kg	A-T-019s	
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	<0.06						mg/kg	A-T-019s	
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04						mg/kg	A-T-019s	
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	<0.08						mg/kg	A-T-019s	
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01						mg/kg	A-T-019s	
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03						mg/kg	A-T-019s	
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03						mg/kg	A-T-019s	
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03						mg/kg	A-T-019s	
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07						mg/kg	A-T-019s	
Total PAH-16MS <sub>A</sub> <sup>M#</sup>	<0.08	<0.08						mg/kg	A-T-019s	

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/9	18/07536/10							Units	Method ref
Client Sample No	6	7								
Client Sample ID	WS22	WS21								
Depth to Top	3.60	4.20								
Depth To Bottom										
Date Sampled	10-Sep-18	12-Sep-18								
Sample Type	Soil - D	Soil - D								
Sample Matrix Code	1	1								
<b>Speciated PCB-EC7</b>										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	<0.002							mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	<0.002							mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007							mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	<0.006							mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	-	<0.007							mg/kg	A-T-004s

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/9	18/07536/10							Units	Method ref
Client Sample No	6	7								
Client Sample ID	WS22	WS21								
Depth to Top	3.60	4.20								
Depth To Bottom										
Date Sampled	10-Sep-18	12-Sep-18								
Sample Type	Soil - D	Soil - D								
Sample Matrix Code	1	1								
<b>Speciated PCB-WHO12</b>										
PCB BZ 81 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s
<b>Total Speciated PCB-WHO12<sub>A</sub></b>	<b>&lt;0.007</b>	<b>-</b>							<b>mg/kg</b>	<b>A-T-004s</b>





Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/9	18/07536/10							Units	Method ref
Client Sample No	6	7								
Client Sample ID	WS22	WS21								
Depth to Top	3.60	4.20								
Depth To Bottom										
Date Sampled	10-Sep-18	12-Sep-18								
Sample Type	Soil - D	Soil - D								
Sample Matrix Code	1	1								
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100						µg/kg		
Perylene <sub>A</sub>	<100	<100						µg/kg	A-T-052s	

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/9	18/07536/10								Units	Method ref
Client Sample No	6	7									
Client Sample ID	WS22	WS21									
Depth to Top	3.60	4.20									
Depth To Bottom											
Date Sampled	10-Sep-18	12-Sep-18									
Sample Type	Soil - D	Soil - D									
Sample Matrix Code	1	1									
VOC											
Dichlorodifluoromethane <sub>A</sub>	<1	<1								µg/kg	A-T-006s
Chloromethane <sub>A</sub>	<10	<10								µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5								µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
cis 1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5								µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2								µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10								µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3								µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/kg	A-T-006s

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/9	18/07536/10																			Units	Method ref			
Client Sample No	6	7																							
Client Sample ID	WS22	WS21																							
Depth to Top	3.60	4.20																							
Depth To Bottom																									
Date Sampled	10-Sep-18	12-Sep-18																							
Sample Type	Soil - D	Soil - D																							
Sample Matrix Code	1	1																							
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																					µg/kg	A-T-006s	
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1																						µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1																						µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2																						µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1																						µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2																						µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3																						µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1																						µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3																						µg/kg	A-T-006s

Envirolab Job Number: 18/07536

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07536/9	18/07536/10								
Client Sample No	6	7								
Client Sample ID	WS22	WS21								
Depth to Top	3.60	4.20								
Depth To Bottom										
Date Sampled	10-Sep-18	12-Sep-18								
Sample Type	Soil - D	Soil - D								
Sample Matrix Code	1	1								
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1							mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1	<0.1							mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1							mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1							mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	<0.1	<0.1							mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	<0.1	<0.1							mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01							mg/kg	A-T-022s

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## Final Test Report

Envirolab Job Number: 18/07384  
Issue Number: 1 Date: 25-Sep-18

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 605028

Date Samples Received: 13-Sep-18  
Date Instructions Received: 14-Sep-18  
Date Analysis Completed: 25-Sep-18

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

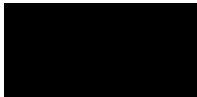
IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:



Georgia King  
Admin & Client Services Supervisor



Approved by:



Danielle Brierley  
Client Manager





Sample Details					Landfill Waste Acceptance Criteria Limits								
Lab Sample ID	Method	ISO17025	MCERTS	18/07384/5				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample Number				2									
Client Sample ID				WS21									
Depth to Top				0.9									
Depth to Bottom													
Date Sampled				10/09/2018									
Sample Type				Soil - D									
Sample Matrix Code				5									
Solid Waste Analysis													
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.29				-	>6	-			
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.36				-	to be evaluated	to be evaluated			
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.1				-	to be evaluated	to be evaluated			
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	1.9				-	-	10			
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.63				3	5	6			
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	4.44				100	-	-			
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	1100				500	-	-			
Sum of 7 PCBs (mg/kg) <sub>A</sub>	A-T-004	N	N	<0.007				1	-	-			
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-			
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)					
				mg/l		mg/kg							
Arsenic	A-T-025	N	N	0.005	0.004	0.012	0.040	0.5	2	25			
Barium	A-T-025	N	N	0.032	0.013	0.073	0.150	20	100	300			
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5			
Chromium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70			
Copper	A-T-025	N	N	0.005	0.004	0.013	0.050	2	50	100			
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2			
Molybdenum	A-T-025	N	N	0.043	0.010	0.100	0.130	0.5	10	30			
Nickel	A-T-025	N	N	0.003	0.002	0.007	0.020	0.4	10	40			
Lead	A-T-025	N	N	0.010	0.007	0.023	0.080	0.5	10	50			
Antimony	A-T-025	N	N	0.002	0.001	0.005	0.010	0.06	0.7	5			
Selenium	A-T-025	N	N	0.001	<0.001	0.002	<0.01	0.1	0.5	7			
Zinc	A-T-025	N	N	0.021	0.023	0.050	0.240	4	50	200			
Chloride	A-T-026	N	N	7	1	16	17	800	15000	25000			
Fluoride	A-T-026	N	N	0.6	0.3	1.5	3.0	10	150	500			
Sulphate as SO <sub>4</sub>	A-T-026	N	N	65	16	152	210	1000	20000	50000			
Total Dissolved Solids	A-T-035	N	N	204	79	475	929	4000	60000	100000			
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-			
Dissolved Organic Carbon	A-T-032	N	N	22.4	<20.0	52	<200	500	800	1000			
Leach Test Information													
pH (pH Units)	A-T-031	N	N	7.9	7.7								
Conductivity (µS/cm)	A-T-037	N	N	408	157								
Mass Sample (kg)				0.200									
Dry Matter (%)	A-T-044	N	N	82.6									
Stage 1													
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350									
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150									
Stage 2													
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.320									
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation													

Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details					Landfill Waste Acceptance Criteria Limits						
Lab Sample ID	Method	ISO17025	MCERTS	18/07384/6							
Client Sample Number				2		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample ID				WS20							
Depth to Top				1.2							
Depth to Bottom											
Date Sampled				10/09/2018							
Sample Type				Soil - D							
Sample Matrix Code				5A							
<b>Solid Waste Analysis</b>											
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.82				-	>6	-	
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.55				-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.21				-	to be evaluated	to be evaluated	
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	2				-	-	10	
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.37				3	5	6	
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08				100	-	-	
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10				500	-	-	
Sum of 7 PCBs (mg/kg) <sub>A</sub>	A-T-004	N	N	<0.007				1	-	-	
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-	
<b>Eluate Analysis</b>				2:1		8:1		2:1		Cumulative 10:1	
				mg/l		mg/kg		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
Arsenic	A-T-025	N	N	0.009	0.006	0.020	0.060	0.5	2	25	
Barium	A-T-025	N	N	0.131	0.045	0.289	0.540	20	100	300	
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5	
Chromium	A-T-025	N	N	0.005	<0.001	0.011	0.010	0.5	10	70	
Copper	A-T-025	N	N	0.020	0.008	0.043	0.090	2	50	100	
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2	
Molybdenum	A-T-025	N	N	0.010	0.004	0.023	0.050	0.5	10	30	
Nickel	A-T-025	N	N	0.012	0.003	0.025	0.040	0.4	10	40	
Lead	A-T-025	N	N	0.052	0.018	0.114	0.210	0.5	10	50	
Antimony	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5	
Selenium	A-T-025	N	N	0.001	<0.001	0.002	<0.01	0.1	0.5	7	
Zinc	A-T-025	N	N	0.027	0.010	0.059	0.110	4	50	200	
Chloride	A-T-026	N	N	30	3	65	52	800	15000	25000	
Fluoride	A-T-026	N	N	1.2	0.3	2.7	4.0	10	150	500	
Sulphate as SO <sub>4</sub>	A-T-026	N	N	14	<1.00	31	12	1000	20000	50000	
Total Dissolved Solids	A-T-035	N	N	162	59	357	692	4000	60000	100000	
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-	
Dissolved Organic Carbon	A-T-032	N	N	52.9	<20.0	117	<200	500	800	1000	
<b>Leach Test Information</b>											
pH (pH Units)	A-T-031	N	N	7.8	7.5						
Conductivity (µS/cm)	A-T-037	N	N	323	118						
Mass Sample (kg)				0.200							
Dry Matter (%)	A-T-044	N	N	85.8							
<b>Stage 1</b>											
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350							
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150							
<b>Stage 2</b>											
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.370							
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation											

Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details					Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/07384/8						
Client Sample Number				3		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill		
Client Sample ID				WS22						
Depth to Top				1.2						
Depth to Bottom										
Date Sampled				10/09/2018						
Sample Type				Soil - D						
Sample Matrix Code				5						
<b>Solid Waste Analysis</b>										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	9.02				-	>6	-
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.82				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.22				-	to be evaluated	to be evaluated
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	2.2				-	-	10
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.55				3	5	6
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08				100	-	-
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10				500	-	-
Sum of 7 PCBs (mg/kg) <sub>A</sub>	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-
<b>Eluate Analysis</b>				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	N	N	0.073	0.012	0.185	0.180	0.5	2	25
Barium	A-T-025	N	N	0.509	0.059	1.297	1.050	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	N	N	0.006	<0.001	0.015	0.010	0.5	10	70
Copper	A-T-025	N	N	0.111	0.013	0.284	0.230	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.010	0.005	0.027	0.050	0.5	10	30
Nickel	A-T-025	N	N	0.009	0.002	0.023	0.030	0.4	10	40
Lead	A-T-025	N	N	0.056	0.013	0.143	0.180	0.5	10	50
Antimony	A-T-025	N	N	0.001	<0.001	0.003	<0.01	0.06	0.7	5
Selenium	A-T-025	N	N	0.002	<0.001	0.005	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.026	0.009	0.066	0.110	4	50	200
Chloride	A-T-026	N	N	10	2	24	27	800	15000	25000
Fluoride	A-T-026	N	N	0.7	0.2	1.7	3.0	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	N	N	2	<1.00	5	<10	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	229	72	583	911	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	67.8	<20.0	173	<200	500	800	1000
<b>Leach Test Information</b>										
pH (pH Units)	A-T-031	N	N	8.0	7.7					
Conductivity (µS/cm)	A-T-037	N	N	457	144					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	77.5						
<b>Stage 1</b>										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
<b>Stage 2</b>										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.240						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

## Final Test Report

Envirolab Job Number: 18/07536  
Issue Number: 1 Date: 1-Oct-18

Client: Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk, NR1 2SG

Project Manager: Sharon Woods; Simon Holden  
Project Name: Gt Yarmouth 3rd River Crossing  
Project Ref: PZ1522D1  
Order No: 605482

Date Samples Received: 17-Sep-18  
Date Instructions Received: 19-Sep-18  
Date Analysis Completed: 1-Oct-18

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

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Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.


Superscript # indicates method accredited to ISO 17025.

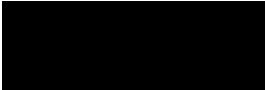
Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

Approved by:

  
Gill Walker  
Director/Laboratory Manager

  
Richard Wong  
Client Manager



Sample Details					Landfill Waste Acceptance Criteria Limits								
Lab Sample ID	Method	ISO17025	MCERTS	18/07536/2				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample Number				4									
Client Sample ID				WS21									
Depth to Top				1.8									
Depth to Bottom													
Date Sampled				12/09/2018									
Sample Type				Soil - D									
Sample Matrix Code				5									
Solid Waste Analysis													
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.91				-	>6	-			
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.17				-	to be evaluated	to be evaluated			
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.08				-	to be evaluated	to be evaluated			
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	1.7				-	-	10			
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.37				3	5	6			
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08				100	-	-			
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<30				500	-	-			
Sum of 7 PCBs (mg/kg) <sub>A</sub>	A-T-004	N	N	<0.007				1	-	-			
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-			
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)					
				mg/l		mg/kg							
Arsenic	A-T-025	N	N	0.011	0.005	0.025	0.060	0.5	2	25			
Barium	A-T-025	N	N	0.289	0.064	0.668	0.860	20	100	300			
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5			
Chromium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70			
Copper	A-T-025	N	N	0.045	0.011	0.105	0.140	2	50	100			
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2			
Molybdenum	A-T-025	N	N	0.024	0.007	0.056	0.090	0.5	10	30			
Nickel	A-T-025	N	N	0.004	0.001	0.008	0.020	0.4	10	40			
Lead	A-T-025	N	N	0.030	0.008	0.070	0.100	0.5	10	50			
Antimony	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5			
Selenium	A-T-025	N	N	0.002	<0.001	0.003	<0.01	0.1	0.5	7			
Zinc	A-T-025	N	N	0.022	0.010	0.050	0.110	4	50	200			
Chloride	A-T-026	N	N	10	2	24	29	800	15000	25000			
Fluoride	A-T-026	N	N	0.8	0.2	1.9	3.0	10	150	500			
Sulphate as SO <sub>4</sub>	A-T-026	N	N	<1.00	<1.00	<2	<10	1000	20000	50000			
Total Dissolved Solids	A-T-035	N	N	117	35	271	435	4000	60000	100000			
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-			
Dissolved Organic Carbon	A-T-032	N	N	32.6	<20.0	75	<200	500	800	1000			
Leach Test Information													
pH (pH Units)	A-T-031	N	N	7.5	7.6								
Conductivity (µS/cm)	A-T-037	N	N	234	71								
Mass Sample (kg)				0.200									
Dry Matter (%)	A-T-044	N	N	83									
Stage 1													
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350									
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150									
Stage 2													
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.330									
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation													

Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details					Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/07536/4						
Client Sample Number				5		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill		
Client Sample ID				WS21						
Depth to Top				2.2						
Depth to Bottom										
Date Sampled				12/09/2018						
Sample Type				Soil - D						
Sample Matrix Code				1						
Solid Waste Analysis										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	9.26				-	>6	-
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.15				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.05				-	to be evaluated	to be evaluated
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	0.9				-	-	10
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.16				3	5	6
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08				100	-	-
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10				500	-	-
Sum of 7 PCBs (mg/kg) <sub>A</sub>	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	N	N	0.021	0.009	0.047	0.100	0.5	2	25
Barium	A-T-025	N	N	0.120	0.019	0.269	0.280	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	N	N	0.001	<0.001	0.003	<0.01	0.5	10	70
Copper	A-T-025	N	N	0.022	0.004	0.049	0.050	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.009	0.002	0.019	0.020	0.5	10	30
Nickel	A-T-025	N	N	0.010	0.002	0.023	0.030	0.4	10	40
Lead	A-T-025	N	N	0.034	0.005	0.076	0.080	0.5	10	50
Antimony	A-T-025	N	N	0.002	<0.001	0.004	<0.01	0.06	0.7	5
Selenium	A-T-025	N	N	0.003	0.001	0.006	0.010	0.1	0.5	7
Zinc	A-T-025	N	N	0.034	0.007	0.076	0.100	4	50	200
Chloride	A-T-026	N	N	13	2	28	33	800	15000	25000
Fluoride	A-T-026	N	N	0.2	0.2	0.4	2.0	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	N	N	15	7	34	80	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	74	24	166	290	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	27.6	<20.0	62	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	N	7.2	7.1					
Conductivity (µS/cm)	A-T-037	N	N	147	49					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	84.7						
Stage 1										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.360						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details					Landfill Waste Acceptance Criteria Limits					
Lab Sample ID	Method	ISO17025	MCERTS	18/07536/6						
Client Sample Number				5		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill		
Client Sample ID				WS22						
Depth to Top				2.6						
Depth to Bottom										
Date Sampled				10/09/2018						
Sample Type				Soil - D						
Sample Matrix Code				5						
<b>Solid Waste Analysis</b>										
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	9.12				-	>6	-
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.49				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.1				-	to be evaluated	to be evaluated
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	1.8				-	-	10
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.23				3	5	6
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08				100	-	-
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10				500	-	-
Sum of 7 PCBs (mg/kg) <sub>A</sub>	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-
<b>Eluate Analysis</b>				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
				mg/l		mg/kg				
Arsenic	A-T-025	N	N	0.041	0.002	0.093	0.060	0.5	2	25
Barium	A-T-025	N	N	0.333	0.033	0.766	0.610	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	N	N	0.002	<0.001	0.004	<0.01	0.5	10	70
Copper	A-T-025	N	N	0.079	0.002	0.182	0.090	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.102	0.025	0.235	0.320	0.5	10	30
Nickel	A-T-025	N	N	0.034	0.002	0.079	0.050	0.4	10	40
Lead	A-T-025	N	N	0.081	<0.001	0.187	0.080	0.5	10	50
Antimony	A-T-025	N	N	0.005	0.001	0.012	0.020	0.06	0.7	5
Selenium	A-T-025	N	N	0.004	0.001	0.010	0.020	0.1	0.5	7
Zinc	A-T-025	N	N	0.072	0.007	0.165	0.130	4	50	200
Chloride	A-T-026	N	N	12	2	27	28	800	15000	25000
Fluoride	A-T-026	N	N	0.7	0.3	1.6	3.0	10	150	500
Sulphate as SO <sub>4</sub>	A-T-026	N	N	162	67	373	775	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	353	148	813	1710	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
<b>Leach Test Information</b>										
pH (pH Units)	A-T-031	N	N	8.0	7.9					
Conductivity (µS/cm)	A-T-037	N	N	705	295					
Mass Sample (kg)				0.200						
Dry Matter (%)	A-T-044	N	N	83.2						
<b>Stage 1</b>										
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350						
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150						
<b>Stage 2</b>										
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.330						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										



Landfill WAC analysis must not be used for hazardous waste classification purposes.  
This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details					Landfill Waste Acceptance Criteria Limits						
Lab Sample ID	Method	ISO17025	MCERTS	18/07536/8							
Client Sample Number				5		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill			
Client Sample ID				WS20							
Depth to Top				3.1							
Depth to Bottom											
Date Sampled				11/09/2018							
Sample Type				Soil - D							
Sample Matrix Code				5							
<b>Solid Waste Analysis</b>											
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	9.35				-	>6	-	
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.79				-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.2				-	to be evaluated	to be evaluated	
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	4.1				-	-	10	
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.91				3	5	6	
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08				100	-	-	
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10				500	-	-	
Sum of 7 PCBs (mg/kg) <sub>A</sub>	A-T-004	N	N	<0.007				1	-	-	
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01				6	-	-	
<b>Eluate Analysis</b>				2:1		8:1		2:1		Cumulative 10:1	
				mg/l		mg/kg		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
Arsenic	A-T-025	N	N	0.013	0.012	0.035	0.130	0.5	2	25	
Barium	A-T-025	N	N	0.030	0.012	0.080	0.140	20	100	300	
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5	
Chromium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70	
Copper	A-T-025	N	N	0.002	0.002	0.004	0.020	2	50	100	
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2	
Molybdenum	A-T-025	N	N	0.075	0.012	0.204	0.190	0.5	10	30	
Nickel	A-T-025	N	N	0.004	0.002	0.012	0.020	0.4	10	40	
Lead	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	50	
Antimony	A-T-025	N	N	0.002	0.001	0.005	0.010	0.06	0.7	5	
Selenium	A-T-025	N	N	0.006	0.003	0.017	0.030	0.1	0.5	7	
Zinc	A-T-025	N	N	0.003	0.004	0.009	0.040	4	50	200	
Chloride	A-T-026	N	N	217	79	590	982	800	15000	25000	
Fluoride	A-T-026	N	N	0.1	<0.10	0.3	<1	10	150	500	
Sulphate as SO <sub>4</sub>	A-T-026	N	N	50	3	137	81	1000	20000	50000	
Total Dissolved Solids	A-T-035	N	N	333	99	905	1298	4000	60000	100000	
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-	
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000	
<b>Leach Test Information</b>											
pH (pH Units)	A-T-031	N	N	9.0	7.6						
Conductivity (µS/cm)	A-T-037	N	N	666	197						
Mass Sample (kg)				0.200							
Dry Matter (%)	A-T-044	N	N	73.9							
<b>Stage 1</b>											
Volume Leachant, L <sub>2</sub> (l)	A-T-046			0.350							
Filtered Eluate Volume, VE <sub>1</sub> (l)	A-T-046			0.150							
<b>Stage 2</b>											
Volume Leachant, L <sub>8</sub> (l)	A-T-046			1.180							
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation											

## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/07889  
**Issue Number:** 1  
**Date:** 05 October, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 606418  
**Date Samples Received:** 27/09/18  
**Date Instructions Received:** 27/09/18  
**Date Analysis Completed:** 05/10/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Iain Haslock  
Analytical Consultant

Envirolab Job Number: 18/07889

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07889/1	18/07889/2	18/07889/3	18/07889/4	18/07889/5	18/07889/6	18/07889/7		Units	Method ref
Client Sample No	3	3	2	5	1	3	5			
Client Sample ID	WS20	WS20	WS21	WS21	WS22	WS22	WS22			
Depth to Top	2.30	2.60	1.40	4.00	0.55	2.00	4.50			
Depth To Bottom										
Date Sampled										
Sample Type	Soil - U	Soil - U	Soil - U	Soil - U	Soil - U	Soil - U	Soil - U			
Sample Matrix Code	3	3	5	5	5A	5	5			
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	14.8	<0.1	<0.1		% w/w	A-T-044
Organic matter <sub>D</sub> <sup>OM</sup>	1.7	1.1	0.9	0.2	0.6	0.8	<0.1		% w/w	A-T-032 OM

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

# Appendix H.1

## **CONTAMINATED LAND TESTING ON WATER SAMPLES**



## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/04384/1

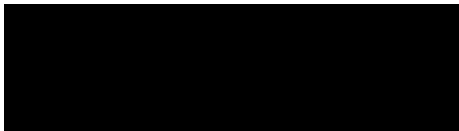
**Envirolab Job Number:** 18/04384  
**Issue Number:** 2

**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

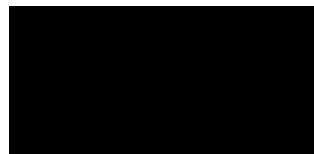
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 595010  
**Date Samples Received:** 05/06/18  
**Date Instructions Received:** 05/06/18  
**Date Analysis Completed:** 13/06/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/04384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04384/1	18/04384/2	18/04384/3	18/04384/4	18/04384/5				Units	Method ref
Client Sample No	0604-8	0604-7	0604-11 Deep	0604-10 Shallow	0604-9					
Client Sample ID	BH6	BH15	BH4D	BH4D	BH4					
Depth to Top	1.20	1.35	1.46	1.57	1.90					
Depth To Bottom										
Date Sampled	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18					
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW					
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A					
pH (w) <sup>#</sup>	7.74	8.28	7.90	7.91	8.00					
Ammoniacal nitrogen (w) <sup>#</sup>	1.60	0.78	1.78	6.37	0.75				mg/l	A-T-033w
Sulphate (w) <sup>#</sup>	2380	230	1280	513	977				mg/l	A-T-026w
Cyanide (free) (w) <sup>#</sup>	<0.005	<0.005	<0.005	<0.005	<0.005				mg/l	A-T-042wFCN
Cyanide (total) (w) <sup>#</sup>	<0.005	0.056	<0.005	0.050	<0.005				mg/l	A-T-042wTCN
Arsenic (dissolved) <sup>#</sup>	19	57	11	6	5				µg/l	A-T-025w
Boron (dissolved) <sup>#</sup>	4030	793	1800	427	475				µg/l	A-T-025w
Cadmium (dissolved) <sup>#</sup>	<1.0	<0.2	<1.0	<0.2	<0.4				µg/l	A-T-025w
Copper (dissolved) <sup>#</sup>	<5	<1	<5	<1	<2				µg/l	A-T-025w
Chromium (dissolved) <sup>#</sup>	<5	<1	<5	<1	<2				µg/l	A-T-025w
Chromium (hexavalent) (w) <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				mg/l	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01	<0.01				mg/l	Calc
Lead (dissolved) <sup>#</sup>	<5	<1	<5	<1	<2				µg/l	A-T-025w
Mercury (dissolved) <sup>#</sup>	<0.5	<0.1	<0.5	<0.1	<0.2				µg/l	A-T-025w
Nickel (dissolved) <sup>#</sup>	<5	<1	<5	2	4				µg/l	A-T-025w
Selenium (dissolved) <sup>#</sup>	<5	<1	<5	<1	<2				µg/l	A-T-025w
Zinc (dissolved) <sup>#</sup>	<5	2	<5	6	4				µg/l	A-T-025w



Envirolab Job Number: 18/04384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04384/1	18/04384/2	18/04384/3	18/04384/4	18/04384/5				Units	Method ref
Client Sample No	0604-8	0604-7	0604-11 Deep	0604-10 Shallow	0604-9					
Client Sample ID	BH6	BH15	BH4D	BH4D	BH4					
Depth to Top	1.20	1.35	1.46	1.57	1.90					
Depth To Bottom										
Date Sampled	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18					
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW					
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A					
<b>PAH 16MS (w)</b>										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.15	<0.01	0.09	<0.01				µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	0.02	0.02	<0.01	<0.01	<0.01				µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.03	0.04	0.02	0.03	0.01				µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	0.02	0.01	0.01	0.02	<0.01				µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	0.07	0.04	0.03	0.02	0.02				µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.02	0.06	0.01	0.02	0.01				µg/l	A-T-019w
<b>Total PAH 16MS (w)<sub>A</sub><sup>#</sup></b>	<b>0.18</b>	<b>0.32</b>	<b>0.07</b>	<b>0.18</b>	<b>0.04</b>				<b>µg/l</b>	<b>A-T-019w</b>

Envirolab Job Number: 18/04384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04384/1	18/04384/2	18/04384/3	18/04384/4	18/04384/5				Units	Method ref
Client Sample No	0604-8	0604-7	0604-11 Deep	0604-10 Shallow	0604-9					
Client Sample ID	BH6	BH15	BH4D	BH4D	BH4					
Depth to Top	1.20	1.35	1.46	1.57	1.90					
Depth To Bottom										
Date Sampled	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18					
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW					
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A					
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10	<10				µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
n-Dioctylphthalate <sub>A</sub>	<10	<10	<10	<10	<10				µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Phenol <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w

Envirolab Job Number: 18/04384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04384/1	18/04384/2	18/04384/3	18/04384/4	18/04384/5				Units	Method ref
Client Sample No	0604-8	0604-7	0604-11 Deep	0604-10 Shallow	0604-9					
Client Sample ID	BH6	BH15	BH4D	BH4D	BH4					
Depth to Top	1.20	1.35	1.46	1.57	1.90					
Depth To Bottom										
Date Sampled	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18					
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW					
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A					
Isophorone <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-052w

Envirolab Job Number: 18/04384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04384/1	18/04384/2	18/04384/3	18/04384/4	18/04384/5				Units	Method ref
Client Sample No	0604-8	0604-7	0604-11 Deep	0604-10 Shallow	0604-9					
Client Sample ID	BH6	BH15	BH4D	BH4D	BH4					
Depth to Top	1.20	1.35	1.46	1.57	1.90					
Depth To Bottom										
Date Sampled	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18					
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW					
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A					
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10				µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5				µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	9	<1	<1				µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2				µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10				µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	14	<1	<1				µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3				µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-006w

Envirolab Job Number: 18/04384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04384/1	18/04384/2	18/04384/3	18/04384/4	18/04384/5				Units	Method ref
Client Sample No	0604-8	0604-7	0604-11 Deep	0604-10 Shallow	0604-9					
Client Sample ID	BH6	BH15	BH4D	BH4D	BH4					
Depth to Top	1.20	1.35	1.46	1.57	1.90					
Depth To Bottom										
Date Sampled	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18					
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW					
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A					
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1				µg/l	A-T-006w
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2				µg/l	A-T-006w
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2				µg/l	A-T-006w
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3				µg/l	A-T-006w
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3				µg/l	A-T-006w
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-006w

Envirolab Job Number: 18/04384

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04384/1	18/04384/2	18/04384/3	18/04384/4	18/04384/5				Units	Method ref
Client Sample No	0604-8	0604-7	0604-11 Deep	0604-10 Shallow	0604-9					
Client Sample ID	BH6	BH15	BH4D	BH4D	BH4					
Depth to Top	1.20	1.35	1.46	1.57	1.90					
Depth To Bottom										
Date Sampled	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18	01-Jun-18					
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW					
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A					
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	<5	<5	<5	<5	<5				µg/l	A-T-022+23w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	<5	<5	<5	<5	<5				µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5	<5	<5	<5				µg/l	A-T-022+23w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/05033/1

**Envirolab Job Number:** 18/05033

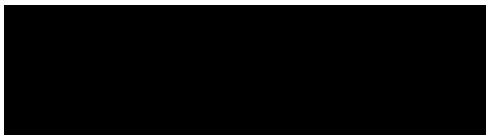
**Issue Number:** 2

**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

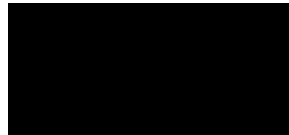
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 596974  
**Date Samples Received:** 25/06/18  
**Date Instructions Received:** 26/06/18  
**Date Analysis Completed:** 09/07/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/1	18/05033/2	18/05033/3	18/05033/4	18/05033/5	18/05033/6	18/05033/7	18/05033/8	Units	Method ref
Client Sample No	0622-4	0622-1	0622-9	0622-Shallow	0623-3 Deep	0622-8	0622-7	0622-0		
Client Sample ID	BH6	BH4A	BH15	BH4D	BH4D	BH13	BH12B	BH4		
Depth to Top	1.14	1.03	1.42	1.50	1.55	1.75	1.78	2.06		
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
pH (w) <sub>A</sub> <sup>#</sup>	7.61	8.36	8.17	8.02	7.81	8.49	8.10	7.87		
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	1.08	0.29	0.25	5.51	0.94	12.2	5.53	1.11	mg/l	A-T-033w
Sulphate (w) <sub>A</sub> <sup>#</sup>	2640	282	249	580	1300	134	102	942	mg/l	A-T-026w
Cyanide (free) (w) <sub>A</sub> <sup>#</sup>	<0.005	0.011	0.006	0.006	<0.005	<0.005	<0.005	<0.005	mg/l	A-T-042wFCN
Cyanide (total) (w) <sub>A</sub> <sup>#</sup>	<0.005	0.031	0.053	0.040	<0.005	0.016	0.025	<0.005	mg/l	A-T-042wTCN
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	21	4	53	13	10	12	9	<5	µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	3410	334	732	645	1720	996	452	771	µg/l	A-T-025w
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<1.0	<0.2	<0.2	<0.2	<1.0	<0.2	<0.2	<1.0	µg/l	A-T-025w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	<5	3	<1	<1	<5	<1	3	<5	µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	10	<1	1	2	6	1	<1	6	µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	A-T-040w
Chromium (trivalent) (w)	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Calc
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<5	<1	<1	<1	<5	<1	<1	<5	µg/l	A-T-025w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.5	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.5	µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	<5	4	2	4	8	2	3	<5	µg/l	A-T-025w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<5	<1	<1	<1	<5	<1	1	<5	µg/l	A-T-025w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	<5	6	<1	16	<5	7	8	<5	µg/l	A-T-025w

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/1	18/05033/2	18/05033/3	18/05033/4	18/05033/5	18/05033/6	18/05033/7	18/05033/8	Units	Method ref
Client Sample No	0622-4	0622-1	0622-9	0622-Shallow	0623-3 Deep	0622-8	0622-7	0622-0		
Client Sample ID	BH6	BH4A	BH15	BH4D	BH4D	BH13	BH12B	BH4		
Depth to Top	1.14	1.03	1.42	1.50	1.55	1.75	1.78	2.06		
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.10	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.01	0.02	<0.01	<0.01	<0.01	0.01	µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01	µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.01	0.03	<0.01	<0.01	<0.01	0.02	µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.02	0.03	<0.01	<0.01	<0.01	0.01	µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	0.05	0.06	0.02	<0.01	0.02	0.02	µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01	µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.03	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	0.04	<0.01	0.06	0.04	0.05	<0.01	<0.01	0.01	µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.06	0.05	0.02	<0.01	0.04	0.02	µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.08	<0.01	0.37	0.30	0.10	<0.01	0.06	0.11	µg/l	A-T-019w

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/1	18/05033/2	18/05033/3	18/05033/4	18/05033/5	18/05033/6	18/05033/7	18/05033/8	Units	Method ref
Client Sample No	0622-4	0622-1	0622-9	0622-Shallow	0623-3 Deep	0622-8	0622-7	0622-0		
Client Sample ID	BH6	BH4A	BH15	BH4D	BH4D	BH13	BH12B	BH4		
Depth to Top	1.14	1.03	1.42	1.50	1.55	1.75	1.78	2.06		
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10	<10	<20	<10	<10	µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
n-Dioctylphthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Phenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/1	18/05033/2	18/05033/3	18/05033/4	18/05033/5	18/05033/6	18/05033/7	18/05033/8	Units	Method ref
Client Sample No	0622-4	0622-1	0622-9	0622-Shallow	0623-3 Deep	0622-8	0622-7	0622-0		
Client Sample ID	BH6	BH4A	BH15	BH4D	BH4D	BH13	BH12B	BH4		
Depth to Top	1.14	1.03	1.42	1.50	1.55	1.75	1.78	2.06		
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Isophorone <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1		
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/1	18/05033/2	18/05033/3	18/05033/4	18/05033/5	18/05033/6	18/05033/7	18/05033/8	Units	Method ref
Client Sample No	0622-4	0622-1	0622-9	0622-Shallow	0623-3 Deep	0622-8	0622-7	0622-0		
Client Sample ID	BH6	BH4A	BH15	BH4D	BH4D	BH13	BH12B	BH4		
Depth to Top	1.14	1.03	1.42	1.50	1.55	1.75	1.78	2.06		
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	2	12	<1	<1	<1	µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	2	17	<1	<1	<1	µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/1	18/05033/2	18/05033/3	18/05033/4	18/05033/5	18/05033/6	18/05033/7	18/05033/8	Units	Method ref
Client Sample No	0622-4	0622-1	0622-9	0622-Shallow	0623-3 Deep	0622-8	0622-7	0622-0		
Client Sample ID	BH6	BH4A	BH15	BH4D	BH4D	BH13	BH12B	BH4		
Depth to Top	1.14	1.03	1.42	1.50	1.55	1.75	1.78	2.06		
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1		
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w



Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/1	18/05033/2	18/05033/3	18/05033/4	18/05033/5	18/05033/6	18/05033/7	18/05033/8	Units	Method ref
Client Sample No	0622-4	0622-1	0622-9	0622-Shallow	0623-3 Deep	0622-8	0622-7	0622-0		
Client Sample ID	BH6	BH4A	BH15	BH4D	BH4D	BH13	BH12B	BH4		
Depth to Top	1.14	1.03	1.42	1.50	1.55	1.75	1.78	2.06		
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	1	<1	<1	<1	<1	µg/l	A-T-022w

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/9	18/05033/10								Units	Method ref
Client Sample No	0622-6	0622-5									
Client Sample ID	BH11	BH10									
Depth to Top	2.30	2.37									
Depth To Bottom											
Date Sampled	21-Jun-18	21-Jun-18									
Sample Type	Water - EW	Water - EW									
Sample Matrix Code	N/A	N/A									
pH (w) <sub>A</sub> <sup>#</sup>	7.88	8.57									
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	1.97	1.48								mg/l	A-T-033w
Sulphate (w) <sub>A</sub> <sup>#</sup>	2720	43								mg/l	A-T-026w
Cyanide (free) (w) <sub>A</sub> <sup>#</sup>	<0.005	<0.005								mg/l	A-T-042wFCN
Cyanide (total) (w) <sub>A</sub> <sup>#</sup>	<0.005	<0.005								mg/l	A-T-042wTCN
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	23	5								µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	4220	290								µg/l	A-T-025w
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<2.0	<0.2								µg/l	A-T-025w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	<10	<1								µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	<10	<1								µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								mg/l	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01								mg/l	Calc
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<10	<1								µg/l	A-T-025w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<1.0	<0.1								µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	<10	1								µg/l	A-T-025w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<10	<1								µg/l	A-T-025w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	<10	<1								µg/l	A-T-025w

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/9	18/05033/10								Units	Method ref
Client Sample No	0622-6	0622-5									
Client Sample ID	BH11	BH10									
Depth to Top	2.30	2.37									
Depth To Bottom											
Date Sampled	21-Jun-18	21-Jun-18									
Sample Type	Water - EW	Water - EW									
Sample Matrix Code	N/A	N/A									
PAH 16MS (w)											
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.01								µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01								µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	<0.01	0.01								µg/l	A-T-019w

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/9	18/05033/10											Units	Method ref
Client Sample No	0622-6	0622-5												
Client Sample ID	BH11	BH10												
Depth to Top	2.30	2.37												
Depth To Bottom														
Date Sampled	21-Jun-18	21-Jun-18												
Sample Type	Water - EW	Water - EW												
Sample Matrix Code	N/A	N/A												
SVOC (excluding PAH-16) (w)														
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1											µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1											µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1											µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1											µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1											µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1											µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1											µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1											µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1											µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1											µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1											µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1											µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1											µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1											µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1	<1											µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1											µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1											µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1											µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10											µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1											µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1											µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1											µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1											µg/l	A-T-052w
n-Dioctylphthalate <sub>A</sub>	<10	<10											µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1											µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1											µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1											µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1											µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<1	<1											µg/l	A-T-052w
Phenol <sub>A</sub>	<2	<1											µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1											µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1											µg/l	A-T-052w

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/9	18/05033/10							Units	Method ref
Client Sample No	0622-6	0622-5								
Client Sample ID	BH11	BH10								
Depth to Top	2.30	2.37								
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18								
Sample Type	Water - EW	Water - EW								
Sample Matrix Code	N/A	N/A								
Isophorone <sub>A</sub>	<1	<1							µg/l	A-T-052w
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1							µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1							µg/l	A-T-052w

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/9	18/05033/10								Units	Method ref
Client Sample No	0622-6	0622-5									
Client Sample ID	BH11	BH10									
Depth to Top	2.30	2.37									
Depth To Bottom											
Date Sampled	21-Jun-18	21-Jun-18									
Sample Type	Water - EW	Water - EW									
Sample Matrix Code	N/A	N/A									
VOC (w)											
Dichlorodifluoromethane <sub>A</sub>	<1	<1								µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10	<10								µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5								µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5								µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2								µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10								µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3								µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1								µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1								µg/l	A-T-006w

Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/9	18/05033/10																	Units	Method ref
Client Sample No	0622-6	0622-5																		
Client Sample ID	BH11	BH10																		
Depth to Top	2.30	2.37																		
Depth To Bottom																				
Date Sampled	21-Jun-18	21-Jun-18																		
Sample Type	Water - EW	Water - EW																		
Sample Matrix Code	N/A	N/A																		
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1																	µg/l	A-T-006w
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
Styrene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1																	µg/l	A-T-006w
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2																	µg/l	A-T-006w
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2																	µg/l	A-T-006w
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3																	µg/l	A-T-006w
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3																	µg/l	A-T-006w
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1																	µg/l	A-T-006w



Envirolab Job Number: 18/05033

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05033/9	18/05033/10											Units	Method ref
Client Sample No	0622-6	0622-5												
Client Sample ID	BH11	BH10												
Depth to Top	2.30	2.37												
Depth To Bottom														
Date Sampled	21-Jun-18	21-Jun-18												
Sample Type	Water - EW	Water - EW												
Sample Matrix Code	N/A	N/A												
TPH CWG (w)														
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5											µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5											µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5											µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5											µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	<5	<5											µg/l	A-T-022+23w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5											µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5											µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5											µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5											µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	<5	<5											µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5											µg/l	A-T-022+23w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1											µg/l	A-T-022w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

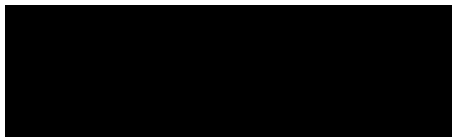
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/05361/1

**Envirolab Job Number:** 18/05361  
**Issue Number:** 2  
**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

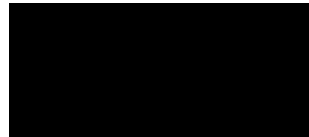
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598143  
**Date Samples Received:** 05/07/18  
**Date Instructions Received:** 05/07/18  
**Date Analysis Completed:** 16/07/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/05361

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05361/1	18/05361/2	18/05361/3	18/05361/4	18/05361/5	18/05361/6	18/05361/7		Units	Method ref
Client Sample No	0703-3	0703-1	0703-2	0703-7	0703-6 Shallow	0703-5 Deep	0703-4			
Client Sample ID	BH10	BH11	BH15	BH4	BH4D	BH4D	BH6			
Depth to Top	2.44	2.45	1.40	2.06	1.66	1.70	1.38			
Depth To Bottom										
Date Sampled	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
pH (w) <sup>#</sup>	8.31	8.47	8.31	8.04	7.98	7.91	7.83		pH	A-T-031w
Ammoniacal nitrogen (w) <sup>#</sup>	1.20	0.60	0.38	1.08	5.41	1.93	1.77		mg/l	A-T-033w
Sulphate (w) <sup>#</sup>	41	352	247	1140	629	1320	2380		mg/l	A-T-026w
Cyanide (free) (w) <sup>#</sup>	<0.005	<0.005	0.006	<0.005	0.007	<0.005	<0.005		mg/l	A-T-042wFCN
Cyanide (total) (w) <sup>#</sup>	<0.005	<0.005	0.045	<0.005	0.048	<0.005	<0.005		mg/l	A-T-042wTCN
Arsenic (dissolved) <sup>#</sup>	2	7	61	3	11	7	19		µg/l	A-T-025w
Boron (dissolved) <sup>#</sup>	273	961	798	768	578	2060	3350		µg/l	A-T-025w
Cadmium (dissolved) <sup>#</sup>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1.0		µg/l	A-T-025w
Copper (dissolved) <sup>#</sup>	2	<1	1	1	2	1	<5		µg/l	A-T-025w
Chromium (dissolved) <sup>#</sup>	4	<1	<1	<1	<1	<1	<5		µg/l	A-T-025w
Chromium (hexavalent) (w) <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/l	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/l	Calc
Lead (dissolved) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<5		µg/l	A-T-025w
Mercury (dissolved) <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5		µg/l	A-T-025w
Nickel (dissolved) <sup>#</sup>	2	2	2	4	4	4	<5		µg/l	A-T-025w
Selenium (dissolved) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<5		µg/l	A-T-025w
Zinc (dissolved) <sup>#</sup>	5	3	<1	2	13	2	45		µg/l	A-T-025w

Envirolab Job Number: 18/05361

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05361/1	18/05361/2	18/05361/3	18/05361/4	18/05361/5	18/05361/6	18/05361/7		Units	Method ref
Client Sample No	0703-3	0703-1	0703-2	0703-7	0703-6 Shallow	0703-5 Deep	0703-4			
Client Sample ID	BH10	BH11	BH15	BH4	BH4D	BH4D	BH6			
Depth to Top	2.44	2.45	1.40	2.06	1.66	1.70	1.38			
Depth To Bottom										
Date Sampled	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	0.11	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01		µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.03	0.02	0.01	0.01	0.01		µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.03		µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.06	<0.01	0.01	0.03	0.05		µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.04	0.02	0.01	0.01	0.01		µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.03	<0.01	0.30	0.06	0.03	0.05	0.11		µg/l	A-T-019w

Envirolab Job Number: 18/05361

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05361/1	18/05361/2	18/05361/3	18/05361/4	18/05361/5	18/05361/6	18/05361/7		Units	Method ref
Client Sample No	0703-3	0703-1	0703-2	0703-7	0703-6 Shallow	0703-5 Deep	0703-4			
Client Sample ID	BH10	BH11	BH15	BH4	BH4D	BH4D	BH6			
Depth to Top	2.44	2.45	1.40	2.06	1.66	1.70	1.38			
Depth To Bottom										
Date Sampled	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-052w	
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Carbazole <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Dibenzofuran <sub>A</sub>	<1	-	<1	<1	<1	<1	<1	µg/l	A-T-052w	
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
n-Diethylphthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-052w	
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Pentachlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Phenol <sub>A</sub>	<4	<4	<4	<4	<4	<4	<4	µg/l	A-T-052w	
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	

Envirolab Job Number: 18/05361

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05361/1	18/05361/2	18/05361/3	18/05361/4	18/05361/5	18/05361/6	18/05361/7			
Client Sample No	0703-3	0703-1	0703-2	0703-7	0703-6 Shallow	0703-5 Deep	0703-4			
Client Sample ID	BH10	BH11	BH15	BH4	BH4D	BH4D	BH6			
Depth to Top	2.44	2.45	1.40	2.06	1.66	1.70	1.38			
Depth To Bottom										
Date Sampled	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
Isophorone <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w



Envirolab Job Number: 18/05361

Client Project Name: Gt Yarmouth 3rd River Crossing

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Lab Sample ID	18/05361/1	18/05361/2	18/05361/3	18/05361/4	18/05361/5	18/05361/6	18/05361/7		Units	Method ref
Client Sample No	0703-3	0703-1	0703-2	0703-7	0703-6 Shallow	0703-5 Deep	0703-4			
Client Sample ID	BH10	BH11	BH15	BH4	BH4D	BH4D	BH6			
Depth to Top	2.44	2.45	1.40	2.06	1.66	1.70	1.38			
Depth To Bottom										
Date Sampled	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w	
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w	
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	2	11	<1	µg/l	A-T-006w	
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w	
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w	
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w	
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	3	20	<1	µg/l	A-T-006w	
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w	
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	

Envirolab Job Number: 18/05361

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05361/1	18/05361/2	18/05361/3	18/05361/4	18/05361/5	18/05361/6	18/05361/7		Units	Method ref
Client Sample No	0703-3	0703-1	0703-2	0703-7	0703-6 Shallow	0703-5 Deep	0703-4			
Client Sample ID	BH10	BH11	BH15	BH4	BH4D	BH4D	BH6			
Depth to Top	2.44	2.45	1.40	2.06	1.66	1.70	1.38			
Depth To Bottom										
Date Sampled	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2		µg/l	A-T-006w
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2		µg/l	A-T-006w
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3		µg/l	A-T-006w
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3		µg/l	A-T-006w
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w

Envirolab Job Number: 18/05361

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05361/1	18/05361/2	18/05361/3	18/05361/4	18/05361/5	18/05361/6	18/05361/7		Units	Method ref
Client Sample No	0703-3	0703-1	0703-2	0703-7	0703-6 Shallow	0703-5 Deep	0703-4			
Client Sample ID	BH10	BH11	BH15	BH4	BH4D	BH4D	BH6			
Depth to Top	2.44	2.45	1.40	2.06	1.66	1.70	1.38			
Depth To Bottom										
Date Sampled	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	1	<1	<1	µg/l	A-T-022w	
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Total Aliphatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w	
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Total Aromatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w	
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w	
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	1	<1	<1	µg/l	A-T-022w	

## **REPORT NOTES**

### **General:**

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All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

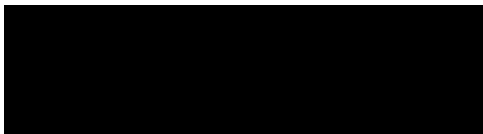
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/05864/1

**Envirolab Job Number:** 18/05864  
**Issue Number:** 2  
**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

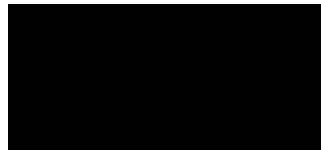
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt. Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 600180  
**Date Samples Received:** 23/07/18  
**Date Instructions Received:** 23/07/18  
**Date Analysis Completed:** 01/08/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/05864

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05864/1	18/05864/2	18/05864/3	18/05864/4	18/05864/5	18/05864/6	18/05864/7		Units	Method ref
Client Sample No	0720-8	0720-4	0720-7 Deep	0720-6 Shallow	0720-5	0720-9	0720-10			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.44	1.51	1.55	1.65	1.99	2.51	2.66			
Depth To Bottom										
Date Sampled	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
pH (w) <sup>#</sup>	7.86	7.42	7.41	7.03	7.34	7.82	7.90			
Ammoniacal nitrogen (w) <sup>#</sup>	0.23	1.95	1.95	5.30	1.30	1.54	1.69		mg/l	A-T-033w
Sulphate (w) <sup>#</sup>	224	2530	1380	618	1220	2540	40		mg/l	A-T-026w
Cyanide (free) (w) <sup>#</sup>	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		mg/l	A-T-042wFCN
Cyanide (total) (w) <sup>#</sup>	0.082	<0.005	<0.005	0.060	<0.005	<0.005	<0.005		mg/l	A-T-042wTCN
Arsenic (dissolved) <sup>#</sup>	58	15	5	13	3	15	2		µg/l	A-T-025w
Boron (dissolved) <sup>#</sup>	660	4050	1790	546	758	3490	308		µg/l	A-T-025w
Cadmium (dissolved) <sup>#</sup>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		µg/l	A-T-025w
Copper (dissolved) <sup>#</sup>	2	1	2	7	1	3	3		µg/l	A-T-025w
Chromium (dissolved) <sup>#</sup>	<1	1	2	<1	<1	1	<1		µg/l	A-T-025w
Chromium (hexavalent) (w) <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/l	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/l	Calc
Lead (dissolved) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-025w
Mercury (dissolved) <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		µg/l	A-T-025w
Nickel (dissolved) <sup>#</sup>	2	3	5	3	4	2	1		µg/l	A-T-025w
Selenium (dissolved) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-025w
Zinc (dissolved) <sup>#</sup>	1	4	10	6	5	8	5		µg/l	A-T-025w

Envirolab Job Number: 18/05864

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05864/1	18/05864/2	18/05864/3	18/05864/4	18/05864/5	18/05864/6	18/05864/7		Units	Method ref
Client Sample No	0720-8	0720-4	0720-7 Deep	0720-6 Shallow	0720-5	0720-9	0720-10			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.44	1.51	1.55	1.65	1.99	2.51	2.66			
Depth To Bottom										
Date Sampled	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.04	0.02	0.01	0.03	<0.01	0.01	<0.01		µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	0.05	0.05	0.02	0.02	<0.01	<0.01	0.02		µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.04	0.02	<0.01	0.03	<0.01	0.01	<0.01		µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.27	0.12	0.03	0.10	<0.01	0.02	0.02		µg/l	A-T-019w



Envirolab Job Number: 18/05864

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05864/1	18/05864/2	18/05864/3	18/05864/4	18/05864/5	18/05864/6	18/05864/7		Units	Method ref
Client Sample No	0720-8	0720-4	0720-7 Deep	0720-6 Shallow	0720-5	0720-9	0720-10			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.44	1.51	1.55	1.65	1.99	2.51	2.66			
Depth To Bottom										
Date Sampled	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10		µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
n-Diethylphthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10		µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Phenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w

Envirolab Job Number: 18/05864

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05864/1	18/05864/2	18/05864/3	18/05864/4	18/05864/5	18/05864/6	18/05864/7		Units	Method ref
Client Sample No	0720-8	0720-4	0720-7 Deep	0720-6 Shallow	0720-5	0720-9	0720-10			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.44	1.51	1.55	1.65	1.99	2.51	2.66			
Depth To Bottom										
Date Sampled	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
Isophorone <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1			
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w

Envirolab Job Number: 18/05864

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05864/1	18/05864/2	18/05864/3	18/05864/4	18/05864/5	18/05864/6	18/05864/7		Units	Method ref
Client Sample No	0720-8	0720-4	0720-7 Deep	0720-6 Shallow	0720-5	0720-9	0720-10			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.44	1.51	1.55	1.65	1.99	2.51	2.66			
Depth To Bottom										
Date Sampled	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10		µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	8	2	<1	<1	<1		µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2		µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10		µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	18	2	<1	<1	<1		µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3		µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w

Envirolab Job Number: 18/05864

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05864/1	18/05864/2	18/05864/3	18/05864/4	18/05864/5	18/05864/6	18/05864/7		Units	Method ref
Client Sample No	0720-8	0720-4	0720-7 Deep	0720-6 Shallow	0720-5	0720-9	0720-10			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.44	1.51	1.55	1.65	1.99	2.51	2.66			
Depth To Bottom										
Date Sampled	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2		µg/l	A-T-006w
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2		µg/l	A-T-006w
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3		µg/l	A-T-006w
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3		µg/l	A-T-006w
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w

Envirolab Job Number: 18/05864

Client Project Name: Gt. Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05864/1	18/05864/2	18/05864/3	18/05864/4	18/05864/5	18/05864/6	18/05864/7		Units	Method ref
Client Sample No	0720-8	0720-4	0720-7 Deep	0720-6 Shallow	0720-5	0720-9	0720-10			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.44	1.51	1.55	1.65	1.99	2.51	2.66			
Depth To Bottom										
Date Sampled	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18	19-Jul-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	1	<1	<1	<1	µg/l	A-T-022w	
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	2	µg/l	A-T-022w	
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Total Aliphatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w	
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w	
Total Aromatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w	
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w	
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w	
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	1	<1	<1	<1	µg/l	A-T-022w	

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

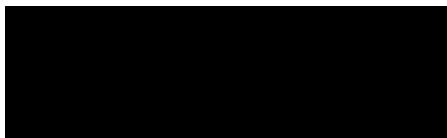
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/06265/1

**Envirolab Job Number:** 18/06265  
**Issue Number:** 2  
**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

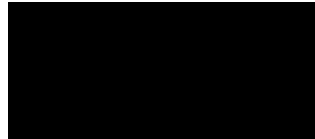
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 601544  
**Date Samples Received:** 06/08/18  
**Date Instructions Received:** 06/08/18  
**Date Analysis Completed:** 14/08/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor



Envirolab Job Number: 18/06265

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06265/1	18/06265/2	18/06265/3	18/06265/4	18/06265/5	18/06265/6	18/06265/7		Units	Method ref
Client Sample No	0803-4	0803-0	0803-3 Deep	0803-2 Shallow	0803-1	0803-6	0803-5			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.43									
Depth To Bottom										
Date Sampled	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
pH (w) <sub>A</sub> <sup>#</sup>	8.20	7.67	7.84	7.87	7.88	7.90	8.46			
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	0.27	1.36	1.83	5.14	1.19	1.71	1.00		mg/l	A-T-033w
Sulphate (w) <sub>A</sub> <sup>#</sup>	235	2480	1350	631	1180	2360	42		mg/l	A-T-026w
Cyanide (free) (w) <sub>A</sub> <sup>#</sup>	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		mg/l	A-T-042wFCN
Cyanide (total) (w) <sub>A</sub> <sup>#</sup>	0.048	<0.005	<0.005	0.043	<0.005	<0.005	<0.005		mg/l	A-T-042wTCN
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	57	13	6	11	3	3	2		µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	749	1730	1710	459	793	4920	273		µg/l	A-T-025w
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		µg/l	A-T-025w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	8	9	7	9	8	9	10		µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	<1	3	2	<1	1	2	<1		µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/l	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/l	Calc
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-025w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	2	3	4	3	3	2	2		µg/l	A-T-025w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-025w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	2	14	4	8	2	1	9		µg/l	A-T-025w

Envirolab Job Number: 18/06265

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06265/1	18/06265/2	18/06265/3	18/06265/4	18/06265/5	18/06265/6	18/06265/7		Units	Method ref
Client Sample No	0803-4	0803-0	0803-3 Deep	0803-2 Shallow	0803-1	0803-6	0803-5			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.43									
Depth To Bottom										
Date Sampled	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	0.14	0.04	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.03	<0.01	0.01	0.02	<0.01	<0.01	0.02		µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	0.03	0.03	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.03	0.06	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	0.07	0.06	0.01	0.02	<0.01	<0.01	0.02		µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.04	<0.01	<0.01	0.02	<0.01	<0.01	0.02		µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.39	0.19	0.02	0.06	<0.01	<0.01	0.06		µg/l	A-T-019w

Envirolab Job Number: 18/06265

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06265/1	18/06265/2	18/06265/3	18/06265/4	18/06265/5	18/06265/6	18/06265/7		Units	Method ref
Client Sample No	0803-4	0803-0	0803-3 Deep	0803-2 Shallow	0803-1	0803-6	0803-5			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.43									
Depth To Bottom										
Date Sampled	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-052w	
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Carbazole <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
n-Diethylphthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-052w	
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Pentachlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Phenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	

Envirolab Job Number: 18/06265

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06265/1	18/06265/2	18/06265/3	18/06265/4	18/06265/5	18/06265/6	18/06265/7		Units	Method ref
Client Sample No	0803-4	0803-0	0803-3 Deep	0803-2 Shallow	0803-1	0803-6	0803-5			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.43									
Depth To Bottom										
Date Sampled	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
Isophorone <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l		
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Perylene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	

Envirolab Job Number: 18/06265

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06265/1	18/06265/2	18/06265/3	18/06265/4	18/06265/5	18/06265/6	18/06265/7		Units	Method ref
Client Sample No	0803-4	0803-0	0803-3 Deep	0803-2 Shallow	0803-1	0803-6	0803-5			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.43									
Depth To Bottom										
Date Sampled	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10		µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	8	2	<1	<1	<1		µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2		µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10		µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	16	3	<1	<1	<1		µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3		µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w

Envirolab Job Number: 18/06265

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06265/1	18/06265/2	18/06265/3	18/06265/4	18/06265/5	18/06265/6	18/06265/7		Units	Method ref
Client Sample No	0803-4	0803-0	0803-3 Deep	0803-2 Shallow	0803-1	0803-6	0803-5			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.43									
Depth To Bottom										
Date Sampled	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l		
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w	
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w	
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w	
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w	
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	

Envirolab Job Number: 18/06265

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06265/1	18/06265/2	18/06265/3	18/06265/4	18/06265/5	18/06265/6	18/06265/7		Units	Method ref
Client Sample No	0803-4	0803-0	0803-3 Deep	0803-2 Shallow	0803-1	0803-6	0803-5			
Client Sample ID	BH15	BH6	BH4D	BH4D	BH4	BH11	BH10			
Depth to Top	1.43									
Depth To Bottom										
Date Sampled	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-022+23w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-022+23w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w



## **REPORT NOTES**

### **General:**

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All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

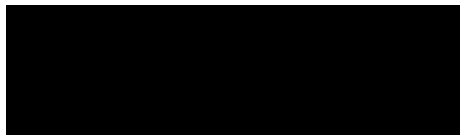
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/06637/1

**Envirolab Job Number:** 18/06637  
**Issue Number:** 2  
**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

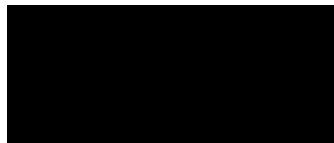
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 602780  
**Date Samples Received:** 17/08/18  
**Date Instructions Received:** 20/08/18  
**Date Analysis Completed:** 29/08/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/06637

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06637/1	18/06637/2	18/06637/3	18/06637/4	18/06637/5	18/06637/6	18/06637/7		Units	Method ref
Client Sample No	0817-0	0817-3 Deep	0817-2	0817-1	0817-4	0817-5	0817-6			
Client Sample ID	BH6	BH4D	BH4D	BH4	BH15	BH11	BH10			
Depth to Top	1.33	1.56	1.64	2.10	2.10	2.32	2.38			
Depth To Bottom										
Date Sampled	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
pH (w) <sub>A</sub> <sup>#</sup>	7.26	7.40	7.08	7.28	8.18	7.60	8.03			
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	1.26	0.74	5.31	1.27	0.22	1.56	0.88		mg/l	A-T-033w
Sulphate (w) <sub>A</sub> <sup>#</sup>	2380	1330	618	1160	238	2350	45		mg/l	A-T-026w
Cyanide (free) (w) <sub>A</sub> <sup>#</sup>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		mg/l	A-T-042wFCN
Cyanide (total) (w) <sub>A</sub> <sup>#</sup>	<0.005	<0.005	<0.005	0.063	0.019	<0.005	<0.005		mg/l	A-T-042wTCN
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	14	5	10	2	62	8	3		µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	2080	1760	635	766	780	3900	288		µg/l	A-T-025w
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<0.2	<0.2	<0.2	<0.2	<0.2	<1.0	<0.2		µg/l	A-T-025w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	6	5	5	5	5	5	7		µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	2	1	<1	1	<1	<5	<1		µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/l	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/l	Calc
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<5	<1		µg/l	A-T-025w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1		µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	3	3	3	3	2	<5	2		µg/l	A-T-025w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<5	<1		µg/l	A-T-025w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	<1	3	6	1	1	<5	4		µg/l	A-T-025w

Envirolab Job Number: 18/06637

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06637/1	18/06637/2	18/06637/3	18/06637/4	18/06637/5	18/06637/6	18/06637/7		Units	Method ref
Client Sample No	0817-0	0817-3 Deep	0817-2	0817-1	0817-4	0817-5	0817-6			
Client Sample ID	BH6	BH4D	BH4D	BH4	BH15	BH11	BH10			
Depth to Top	1.33	1.56	1.64	2.10	2.10	2.32	2.38			
Depth To Bottom										
Date Sampled	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01	0.13	<0.01	<0.01		µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	<0.01	<0.01	0.01	<0.01	<0.01		µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01		µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	0.02	0.04	0.01	0.02	<0.01		µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	0.02	0.04	<0.01	0.01	<0.01		µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.02	0.04	<0.01	0.01	<0.01		µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.01	0.02	<0.01	<0.01	<0.01		µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.01	0.02	<0.01	<0.01	<0.01		µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.02	0.03	0.01	0.01	<0.01		µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.03	<0.01	0.05	0.06	0.03	0.05	0.01		µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	<0.01	<0.01	0.01	<0.01	<0.01		µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.02	0.03	<0.01	<0.01	<0.01		µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	0.05	<0.01	0.03	0.03	0.06	0.03	<0.01		µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	0.04	0.05	0.03	0.04	0.01		µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.20	<0.01	0.24	0.36	0.31	0.17	0.02		µg/l	A-T-019w

Envirolab Job Number: 18/06637

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06637/1	18/06637/2	18/06637/3	18/06637/4	18/06637/5	18/06637/6	18/06637/7		Units	Method ref
Client Sample No	0817-0	0817-3 Deep	0817-2	0817-1	0817-4	0817-5	0817-6			
Client Sample ID	BH6	BH4D	BH4D	BH4	BH15	BH11	BH10			
Depth to Top	1.33	1.56	1.64	2.10	2.10	2.32	2.38			
Depth To Bottom										
Date Sampled	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10		µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
n-Diethylphthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10		µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Phenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-052w

Envirolab Job Number: 18/06637

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06637/1	18/06637/2	18/06637/3	18/06637/4	18/06637/5	18/06637/6	18/06637/7		Units	Method ref
Client Sample No	0817-0	0817-3 Deep	0817-2	0817-1	0817-4	0817-5	0817-6			
Client Sample ID	BH6	BH4D	BH4D	BH4	BH15	BH11	BH10			
Depth to Top	1.33	1.56	1.64	2.10	2.10	2.32	2.38			
Depth To Bottom										
Date Sampled	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
Isophorone <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l		
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	
Perylene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w	

Envirolab Job Number: 18/06637

Client Project Name: Gt Yarmouth 3rd River Crossing

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Lab Sample ID	18/06637/1	18/06637/2	18/06637/3	18/06637/4	18/06637/5	18/06637/6	18/06637/7		Units	Method ref
Client Sample No	0817-0	0817-3 Deep	0817-2	0817-1	0817-4	0817-5	0817-6			
Client Sample ID	BH6	BH4D	BH4D	BH4	BH15	BH11	BH10			
Depth to Top	1.33	1.56	1.64	2.10	2.10	2.32	2.38			
Depth To Bottom										
Date Sampled	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w	
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w	
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	4	1	<1	<1	<1	<1	µg/l	A-T-006w	
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w	
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w	
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w	
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	8	2	<1	<1	<1	<1	µg/l	A-T-006w	
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w	
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w	



Envirolab Job Number: 18/06637

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06637/1	18/06637/2	18/06637/3	18/06637/4	18/06637/5	18/06637/6	18/06637/7		Units	Method ref
Client Sample No	0817-0	0817-3 Deep	0817-2	0817-1	0817-4	0817-5	0817-6			
Client Sample ID	BH6	BH4D	BH4D	BH4	BH15	BH11	BH10			
Depth to Top	1.33	1.56	1.64	2.10	2.10	2.32	2.38			
Depth To Bottom										
Date Sampled	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	2	<1		µg/l	A-T-006w
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2		µg/l	A-T-006w
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2		µg/l	A-T-006w
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3		µg/l	A-T-006w
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3		µg/l	A-T-006w
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-006w

Envirolab Job Number: 18/06637

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/06637/1	18/06637/2	18/06637/3	18/06637/4	18/06637/5	18/06637/6	18/06637/7		Units	Method ref		
Client Sample No	0817-0	0817-3 Deep	0817-2	0817-1	0817-4	0817-5	0817-6					
Client Sample ID	BH6	BH4D	BH4D	BH4	BH15	BH11	BH10					
Depth to Top	1.33	1.56	1.64	2.10	2.10	2.32	2.38					
Depth To Bottom												
Date Sampled	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18	16-Aug-18					
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW					
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
TPH CWG (w)												
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w		
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w		
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w		
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w		
Total Aliphatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-022+23w		
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	7	<1		µg/l	A-T-022w		
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w		
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w		
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w		
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/l	A-T-023w		
Total Aromatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	7	<5		µg/l	A-T-022+23w		
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5	<5	<5	<5	7	<5		µg/l	A-T-022+23w		
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/l	A-T-022w		

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

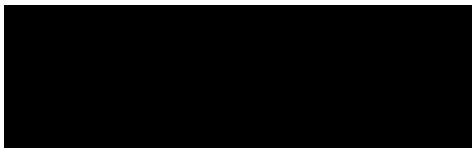
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/07049/1

**Envirolab Job Number:** 18/07049  
**Issue Number:** 2  
**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

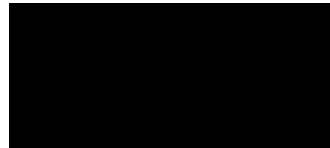
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 603950  
**Date Samples Received:** 03/09/18  
**Date Instructions Received:** 04/09/18  
**Date Analysis Completed:** 11/09/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/1	18/07049/2	18/07049/3	18/07049/4	18/07049/5	18/07049/6	18/07049/7	18/07049/8	Units	Method ref		
Client Sample No	0831-0	0831-3 Deep	0831-4	0831-2 Shallow	0831-6	0831-8	0831-1	0831-5				
Client Sample ID	BH6	BH4D	BH15	BH4D	BH13	BH12B	BH4	BH11				
Depth to Top	1.32	1.46	1.56	1.59	1.61	1.70	2.04	2.27				
Depth To Bottom												
Date Sampled	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
pH (w) <sup>#</sup>	7.30	7.61	8.08	7.37	8.23	8.60	7.67	7.73			pH	A-T-031w
Ammoniacal nitrogen (w) <sup>#</sup>	1.28	0.89	0.22	5.04	11.8	2.82	1.08	1.32			mg/l	A-T-033w
Sulphate (w) <sup>#</sup>	2400	1370	249	627	147	301	1180	2370	mg/l	A-T-026w		
Cyanide (free) (w) <sup>#</sup>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	A-T-042wFCN		
Cyanide (total) (w) <sup>#</sup>	<0.005	<0.005	0.027	0.045	0.019	0.026	<0.005	<0.005	mg/l	A-T-042wTCN		
Arsenic (dissolved) <sup>#</sup>	15	5	63	7	17	7	2	7	µg/l	A-T-025w		
Boron (dissolved) <sup>#</sup>	1910	1680	766	623	873	482	714	3350	µg/l	A-T-025w		
Cadmium (dissolved) <sup>#</sup>	<0.4	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<1.0	µg/l	A-T-025w		
Copper (dissolved) <sup>#</sup>	<2	<2	<1	<1	1	1	<1	<5	µg/l	A-T-025w		
Chromium (dissolved) <sup>#</sup>	3	2	<1	<1	<1	<1	2	7	µg/l	A-T-025w		
Chromium (hexavalent) (w) <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	A-T-040w		
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Calc		
Lead (dissolved) <sup>#</sup>	<2	<2	<1	<1	<1	<1	<1	<5	µg/l	A-T-025w		
Mercury (dissolved) <sup>#</sup>	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	µg/l	A-T-025w		
Nickel (dissolved) <sup>#</sup>	<2	3	1	2	4	4	3	<5	µg/l	A-T-025w		
Selenium (dissolved) <sup>#</sup>	<2	<2	<1	<1	<1	1	<1	<5	µg/l	A-T-025w		
Zinc (dissolved) <sup>#</sup>	<2	21	1	3	<1	2	1	35	µg/l	A-T-025w		
Ali >C5-C6 (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		
Ali >C6-C8 (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		
Ali >C8-C10 (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		
Aro >C5-C7 (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		
Aro >C7-C8 (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		
Aro >C8-C9 (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		
Aro >C9-C10 (w) <sup>#</sup>	<1	<1	<1	<1	1	<1	<1	<1	µg/l	A-T-022w		
BTEX - Benzene (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		
BTEX - Toluene (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		
BTEX - Ethyl Benzene (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		
BTEX - m & p Xylene (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		
BTEX - o Xylene (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		
MTBE (w) <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w		

Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/1	18/07049/2	18/07049/3	18/07049/4	18/07049/5	18/07049/6	18/07049/7	18/07049/8	Units	Method ref
Client Sample No	0831-0	0831-3 Deep	0831-4	0831-2 Shallow	0831-6	0831-8	0831-1	0831-5		
Client Sample ID	BH6	BH4D	BH15	BH4D	BH13	BH12B	BH4	BH11		
Depth to Top	1.32	1.46	1.56	1.59	1.61	1.70	2.04	2.27		
Depth To Bottom										
Date Sampled	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.13	<0.01	0.15	-	<0.01	<0.01	µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.01	<0.01	0.02	-	<0.01	<0.01	µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.02	<0.01	<0.01	-	<0.01	<0.01	µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.02	<0.01	-	0.02	<0.01	µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.02	<0.01	-	0.02	<0.01	µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.02	<0.01	-	0.02	<0.01	µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.01	<0.01	-	<0.01	<0.01	µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.01	<0.01	-	<0.01	<0.01	µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.02	<0.01	-	0.02	<0.01	µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.04	0.05	<0.01	-	0.03	<0.01	µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.02	<0.01	0.08	-	<0.01	<0.01	µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.01	<0.01	-	<0.01	<0.01	µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	<0.01	<0.01	1.27	-	<0.01	<0.01	µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	0.03	<0.01	0.07	0.02	0.04	-	0.01	<0.01	µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.05	0.04	0.01	-	0.03	<0.01	µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.05	<0.01	0.34	0.22	1.57	-	0.15	<0.01	µg/l	A-T-019w

Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/1	18/07049/2	18/07049/3	18/07049/4	18/07049/5	18/07049/6	18/07049/7	18/07049/8	Units	Method ref
Client Sample No	0831-0	0831-3 Deep	0831-4	0831-2 Shallow	0831-6	0831-8	0831-1	0831-5		
Client Sample ID	BH6	BH4D	BH15	BH4D	BH13	BH12B	BH4	BH11		
Depth to Top	1.32	1.46	1.56	1.59	1.61	1.70	2.04	2.27		
Depth To Bottom										
Date Sampled	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	3	<1	2	<1	<1	<1	<1	µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	8	<1	3	<1	<1	<1	<1	µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w



Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/1	18/07049/2	18/07049/3	18/07049/4	18/07049/5	18/07049/6	18/07049/7	18/07049/8	Units	Method ref		
Client Sample No	0831-0	0831-3 Deep	0831-4	0831-2 Shallow	0831-6	0831-8	0831-1	0831-5				
Client Sample ID	BH6	BH4D	BH15	BH4D	BH13	BH12B	BH4	BH11				
Depth to Top	1.32	1.46	1.56	1.59	1.61	1.70	2.04	2.27				
Depth To Bottom												
Date Sampled	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-006w
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w		
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w		
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w		
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w		
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		

Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/1	18/07049/2	18/07049/3	18/07049/4	18/07049/5	18/07049/6	18/07049/7	18/07049/8	Units	Method ref
Client Sample No	0831-0	0831-3 Deep	0831-4	0831-2 Shallow	0831-6	0831-8	0831-1	0831-5		
Client Sample ID	BH6	BH4D	BH15	BH4D	BH13	BH12B	BH4	BH11		
Depth to Top	1.32	1.46	1.56	1.59	1.61	1.70	2.04	2.27		
Depth To Bottom										
Date Sampled	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10	<10	-	<10	<10	µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
n-Diethylphthalate <sub>A</sub>	<10	<10	<10	<10	<10	-	<10	<10	µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Phenol <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w

Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/1	18/07049/2	18/07049/3	18/07049/4	18/07049/5	18/07049/6	18/07049/7	18/07049/8	Units	Method ref		
Client Sample No	0831-0	0831-3 Deep	0831-4	0831-2 Shallow	0831-6	0831-8	0831-1	0831-5				
Client Sample ID	BH6	BH4D	BH15	BH4D	BH13	BH12B	BH4	BH11				
Depth to Top	1.32	1.46	1.56	1.59	1.61	1.70	2.04	2.27				
Depth To Bottom												
Date Sampled	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Isophorone <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1			µg/l	A-T-052w
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1			µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1	<1	<1	<1	-	<1	<1	µg/l	A-T-052w		

Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/1	18/07049/2	18/07049/3	18/07049/4	18/07049/5	18/07049/6	18/07049/7	18/07049/8	Units	Method ref
Client Sample No	0831-0	0831-3 Deep	0831-4	0831-2 Shallow	0831-6	0831-8	0831-1	0831-5		
Client Sample ID	BH6	BH4D	BH15	BH4D	BH13	BH12B	BH4	BH11		
Depth to Top	1.32	1.46	1.56	1.59	1.61	1.70	2.04	2.27		
Depth To Bottom										
Date Sampled	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18	30-Aug-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
TPH CWG (w)										
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	-	<5	<5	µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	-	<5	<5	µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	-	<5	<5	µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	-	<5	<5	µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	-	<5	<5	µg/l	A-T-022+23w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	6	-	<5	<5	µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	-	<5	<5	µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	-	<5	<5	µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	-	<5	<5	µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	<5	<5	<5	<5	7	-	<5	<5	µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5	<5	<5	7	-	<5	<5	µg/l	A-T-022+23w

Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/9									Units	Method ref
Client Sample No	0831-7										
Client Sample ID	BH10										
Depth to Top	2.34										
Depth To Bottom											
Date Sampled	30-Aug-18										
Sample Type	Water - EW										
Sample Matrix Code	N/A										
pH (w) <sub>A</sub> <sup>#</sup>	8.18									pH	A-T-031w
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	0.74									mg/l	A-T-033w
Sulphate (w) <sub>A</sub> <sup>#</sup>	40									mg/l	A-T-026w
Cyanide (free) (w) <sub>A</sub> <sup>#</sup>	<0.005									mg/l	A-T-042wFCN
Cyanide (total) (w) <sub>A</sub> <sup>#</sup>	<0.005									mg/l	A-T-042wTCN
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	3									µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	299									µg/l	A-T-025w
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<0.2									µg/l	A-T-025w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	3									µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01									mg/l	A-T-040w
Chromium (trivalent) (w)	<0.01									mg/l	Calc
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-025w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1									µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	1									µg/l	A-T-025w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-025w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	5									µg/l	A-T-025w
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-022w

Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/9									Units	Method ref
Client Sample No	0831-7										
Client Sample ID	BH10										
Depth to Top	2.34										
Depth To Bottom											
Date Sampled	30-Aug-18										
Sample Type	Water - EW										
Sample Matrix Code	N/A										
PAH 16MS (w)											
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.03									µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	<0.01									µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.03									µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.06									µg/l	A-T-019w

Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/9									Units	Method ref
Client Sample No	0831-7										
Client Sample ID	BH10										
Depth to Top	2.34										
Depth To Bottom											
Date Sampled	30-Aug-18										
Sample Type	Water - EW										
Sample Matrix Code	N/A										
VOC (w)											
Dichlorodifluoromethane <sub>A</sub>	<1									µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10									µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5									µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5									µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2									µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10									µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3									µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1									µg/l	A-T-006w



Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/9									Units	Method ref
Client Sample No	0831-7										
Client Sample ID	BH10										
Depth to Top	2.34										
Depth To Bottom											
Date Sampled	30-Aug-18										
Sample Type	Water - EW										
Sample Matrix Code	N/A										
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1									µg/l	A-T-006w
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
m & p Xylene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Bromoform <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Styrene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1									µg/l	A-T-006w
o-Xylene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
Bromobenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2									µg/l	A-T-006w
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2									µg/l	A-T-006w
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3									µg/l	A-T-006w
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3									µg/l	A-T-006w
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1									µg/l	A-T-006w

Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/9									Units	Method ref
Client Sample No	0831-7										
Client Sample ID	BH10										
Depth to Top	2.34										
Depth To Bottom											
Date Sampled	30-Aug-18										
Sample Type	Water - EW										
Sample Matrix Code	N/A										
SVOC (excluding PAH-16) (w)											
2,4,5-Trichlorophenol <sub>A</sub>	<1									µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1									µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1									µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1									µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1									µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1									µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1									µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1									µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1									µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1									µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1									µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1									µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1									µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1									µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1									µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1									µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1									µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1									µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10									µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1									µg/l	A-T-052w
Carbazole <sub>A</sub>	<1									µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1									µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1									µg/l	A-T-052w
n-Dioctylphthalate <sub>A</sub>	<10									µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1									µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1									µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1									µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1									µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<1									µg/l	A-T-052w
Phenol <sub>A</sub>	<1									µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1									µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1									µg/l	A-T-052w

Envirolab Job Number: 18/07049

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/9								Units	Method ref
Client Sample No	0831-7									
Client Sample ID	BH10									
Depth to Top	2.34									
Depth To Bottom										
Date Sampled	30-Aug-18									
Sample Type	Water - EW									
Sample Matrix Code	N/A									
Isophorone <sub>A</sub>	<1								µg/l	A-T-052w
Hexachlorocyclopentadiene <sub>A</sub>	<1								µg/l	A-T-052w
Perylene <sub>A</sub>	<1								µg/l	A-T-052w

Envirolab Job Number: 18/07049/9

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/07049/9								Units	Method ref
Client Sample No	0831-7									
Client Sample ID	BH10									
Depth to Top	2.34									
Depth To Bottom										
Date Sampled	30-Aug-18									
Sample Type	Water - EW									
Sample Matrix Code	N/A									
TPH CWG (w)										
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5								µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5								µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5								µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5								µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	<5								µg/l	A-T-022+23w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5								µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5								µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5								µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5								µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	<5								µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	<5								µg/l	A-T-022+23w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

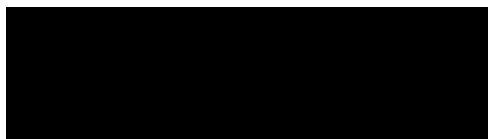
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/08232/1

**Envirolab Job Number:** 18/08232  
**Issue Number:** 2  
**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

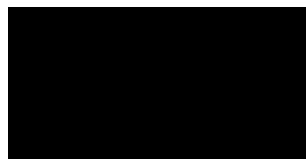
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 607569  
**Date Samples Received:** 08/10/18  
**Date Instructions Received:** 08/10/18  
**Date Analysis Completed:** 17/10/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/1	18/08232/2	18/08232/3	18/08232/4	18/08232/5	18/08232/6	18/08232/7	18/08232/8	Units	Method ref		
Client Sample No	1005-11	1005-10	1005-9	1005-4	1005-0	1005-3 Deep	1005-2 Shallow	1005-6				
Client Sample ID	WS22	WS21	WS20	BH15	BH6	BH4D	BH4D	BH13				
Depth to Top	0.95	1.19	1.22	1.36	1.40	1.55	1.60	1.73				
Depth To Bottom												
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
pH (w) <sub>A</sub> <sup>#</sup>	8.78	10.34	8.46	8.16	7.60	7.69	7.73	8.47			pH	A-T-031w
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	11.9	12.2	12	0.32	1.10	0.97	6.94	9.90			mg/l	A-T-033w
Sulphate (w) <sub>A</sub> <sup>#</sup>	62	62	62	218	2380	1240	644	84	mg/l	A-T-026w		
Cyanide (free) (w) <sub>A</sub> <sup>#</sup>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	A-T-042wFCN		
Cyanide (total) (w) <sub>A</sub> <sup>#</sup>	0.048	0.050	0.050	0.050	<0.005	<0.005	0.041	0.018	mg/l	A-T-042wTCN		
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	18	18	18	68	17	8	4	14	µg/l	A-T-025w		
Boron (dissolved) <sub>A</sub> <sup>#</sup>	180	187	184	704	3870	1800	591	878	µg/l	A-T-025w		
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<0.2	<0.2	<0.2	<0.2	<1.0	<1.0	<0.2	<0.2	µg/l	A-T-025w		
Copper (dissolved) <sub>A</sub> <sup>#</sup>	2	2	2	<1	<5	<5	<1	<1	µg/l	A-T-025w		
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<5	<5	<1	<1	µg/l	A-T-025w		
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	A-T-040w		
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Calc		
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<5	<5	<1	<1	µg/l	A-T-025w		
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	µg/l	A-T-025w		
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	6	6	6	<1	<5	<5	1	1	µg/l	A-T-025w		
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	2	1	1	<1	<5	<5	<1	<1	µg/l	A-T-025w		
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	7	2	2	4	13	13	4	4	µg/l	A-T-025w		



Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/1	18/08232/2	18/08232/3	18/08232/4	18/08232/5	18/08232/6	18/08232/7	18/08232/8	Units	Method ref
Client Sample No	1005-11	1005-10	1005-9	1005-4	1005-0	1005-3 Deep	1005-2 Shallow	1005-6		
Client Sample ID	WS22	WS21	WS20	BH15	BH6	BH4D	BH4D	BH13		
Depth to Top	0.95	1.19	1.22	1.36	1.40	1.55	1.60	1.73		
Depth To Bottom										
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	0.11	0.29	<0.01	0.15	<0.01	<0.01	0.10	<0.01	µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	0.09	0.06	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	0.25	0.08	0.07	0.02	0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	1.15	0.04	0.15	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	1.87	0.03	0.15	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	1.88	0.04	0.18	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	1.39	0.02	0.33	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.73	0.01	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	1.46	0.05	0.18	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	0.29	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	2.33	0.17	0.30	0.03	0.02	0.01	0.04	<0.01	µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	0.22	0.27	<0.01	0.01	<0.01	<0.01	0.02	<0.01	µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	1.46	0.03	0.21	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.23	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	1.19	0.43	0.04	0.06	0.05	0.03	0.02	<0.01	µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	1.94	0.14	0.50	0.04	0.02	0.01	0.03	<0.01	µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	16.6	1.69	2.23	0.31	0.10	0.05	0.21	<0.01	µg/l	A-T-019w

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/1	18/08232/2	18/08232/3	18/08232/4	18/08232/5	18/08232/6	18/08232/7	18/08232/8	Units	Method ref
Client Sample No	1005-11	1005-10	1005-9	1005-4	1005-0	1005-3 Deep	1005-2 Shallow	1005-6		
Client Sample ID	WS22	WS21	WS20	BH15	BH6	BH4D	BH4D	BH13		
Depth to Top	0.95	1.19	1.22	1.36	1.40	1.55	1.60	1.73		
Depth To Bottom										
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	2	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
n-Dioctylphthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Phenol <sub>A</sub>	13	3	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/1	18/08232/2	18/08232/3	18/08232/4	18/08232/5	18/08232/6	18/08232/7	18/08232/8	Units	Method ref		
Client Sample No	1005-11	1005-10	1005-9	1005-4	1005-0	1005-3 Deep	1005-2 Shallow	1005-6				
Client Sample ID	WS22	WS21	WS20	BH15	BH6	BH4D	BH4D	BH13				
Depth to Top	0.95	1.19	1.22	1.36	1.40	1.55	1.60	1.73				
Depth To Bottom												
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Isophorone <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-052w
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w		

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

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Lab Sample ID	18/08232/1	18/08232/2	18/08232/3	18/08232/4	18/08232/5	18/08232/6	18/08232/7	18/08232/8	Units	Method ref
Client Sample No	1005-11	1005-10	1005-9	1005-4	1005-0	1005-3 Deep	1005-2 Shallow	1005-6		
Client Sample ID	WS22	WS21	WS20	BH15	BH6	BH4D	BH4D	BH13		
Depth to Top	0.95	1.19	1.22	1.36	1.40	1.55	1.60	1.73		
Depth To Bottom										
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	4	2	<1	µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	5	2	<1	µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/1	18/08232/2	18/08232/3	18/08232/4	18/08232/5	18/08232/6	18/08232/7	18/08232/8	Units	Method ref		
Client Sample No	1005-11	1005-10	1005-9	1005-4	1005-0	1005-3 Deep	1005-2 Shallow	1005-6				
Client Sample ID	WS22	WS21	WS20	BH15	BH6	BH4D	BH4D	BH13				
Depth to Top	0.95	1.19	1.22	1.36	1.40	1.55	1.60	1.73				
Depth To Bottom												
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-006w
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	1	µg/l	A-T-006w		
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w		
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w		
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w		
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w		
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/1	18/08232/2	18/08232/3	18/08232/4	18/08232/5	18/08232/6	18/08232/7	18/08232/8	Units	Method ref
Client Sample No	1005-11	1005-10	1005-9	1005-4	1005-0	1005-3 Deep	1005-2 Shallow	1005-6		
Client Sample ID	WS22	WS21	WS20	BH15	BH6	BH4D	BH4D	BH13		
Depth to Top	0.95	1.19	1.22	1.36	1.40	1.55	1.60	1.73		
Depth To Bottom										
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	78	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	78	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	6	10	5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	14	10	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	6	24	15	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	85	24	15	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/9	18/08232/10	18/08232/11	18/08232/12					Units	Method ref
Client Sample No	1005-8	1005-1	1005-7	1005-5						
Client Sample ID	BH12B	BH4	BH10	BH11						
Depth to Top	1.76	2.09	2.74	2.76						
Depth To Bottom										
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
pH (w) <sub>A</sub> <sup>#</sup>	8.08	7.68	8.28	7.78						
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	4.96	1.47	1.07	1.41					mg/l	A-T-033w
Sulphate (w) <sub>A</sub> <sup>#</sup>	479	1100	40	2220					mg/l	A-T-026w
Cyanide (free) (w) <sub>A</sub> <sup>#</sup>	<0.005	<0.005	<0.005	<0.005					mg/l	A-T-042wFCN
Cyanide (total) (w) <sub>A</sub> <sup>#</sup>	0.026	<0.005	<0.005	<0.005					mg/l	A-T-042wTCN
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	6	<5	2	15					µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	720	934	244	4040					µg/l	A-T-025w
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<0.2	<1.0	<0.2	<1.0					µg/l	A-T-025w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	2	<5	3	<5					µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<5	<1	<5					µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/l	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01					mg/l	Calc
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<1	<5	<1	<5					µg/l	A-T-025w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.5					µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	5	<5	2	<5					µg/l	A-T-025w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<5	<1	<5					µg/l	A-T-025w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	5	11	16	<5					µg/l	A-T-025w



Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/9	18/08232/10	18/08232/11	18/08232/12					Units	Method ref
Client Sample No	1005-8	1005-1	1005-7	1005-5						
Client Sample ID	BH12B	BH4	BH10	BH11						
Depth to Top	1.76	2.09	2.74	2.76						
Depth To Bottom										
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.07	<0.01	0.01	<0.01				µg/l	A-T-019w	
Fluorene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.07	<0.01	<0.01	<0.01				µg/l	A-T-019w	
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.01	<0.01				µg/l	A-T-019w	
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.07	<0.01	0.01	<0.01				µg/l	A-T-019w	
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.23	<0.01	0.03	<0.01				µg/l	A-T-019w	

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/9	18/08232/10	18/08232/11	18/08232/12						
Client Sample No	1005-8	1005-1	1005-7	1005-5						
Client Sample ID	BH12B	BH4	BH10	BH11						
Depth to Top	1.76	2.09	2.74	2.76						
Depth To Bottom										
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10					µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
n-Dioctylphthalate <sub>A</sub>	<10	<10	<10	<10					µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Phenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/9	18/08232/10	18/08232/11	18/08232/12					Units	Method ref
Client Sample No	1005-8	1005-1	1005-7	1005-5						
Client Sample ID	BH12B	BH4	BH10	BH11						
Depth to Top	1.76	2.09	2.74	2.76						
Depth To Bottom										
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
Isophorone <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/9	18/08232/10	18/08232/11	18/08232/12						
Client Sample No	1005-8	1005-1	1005-7	1005-5						
Client Sample ID	BH12B	BH4	BH10	BH11						
Depth to Top	1.76	2.09	2.74	2.76						
Depth To Bottom										
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10	<10	<10	<10					µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5	<5	<5					µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10					µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3					µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-006w

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/9	18/08232/10	18/08232/11	18/08232/12					Units	Method ref
Client Sample No	1005-8	1005-1	1005-7	1005-5						
Client Sample ID	BH12B	BH4	BH10	BH11						
Depth to Top	1.76	2.09	2.74	2.76						
Depth To Bottom										
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1						
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-006w
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/l	A-T-006w
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/l	A-T-006w
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3					µg/l	A-T-006w
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3					µg/l	A-T-006w
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w

Envirolab Job Number: 18/08232

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08232/9	18/08232/10	18/08232/11	18/08232/12					Units	Method ref
Client Sample No	1005-8	1005-1	1005-7	1005-5						
Client Sample ID	BH12B	BH4	BH10	BH11						
Depth to Top	1.76	2.09	2.74	2.76						
Depth To Bottom										
Date Sampled	04-Oct-18	04-Oct-18	04-Oct-18	04-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-023w	
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-023w	
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-023w	
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	9	<5				µg/l	A-T-023w	
Total Aliphatics (w) <sub>A</sub>	<5	<5	9	<5				µg/l	A-T-022+23w	
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-023w	
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-023w	
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-023w	
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-023w	
Total Aromatics (w) <sub>A</sub>	<5	<5	<5	<5				µg/l	A-T-022+23w	
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5	9	<5				µg/l	A-T-022+23w	
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



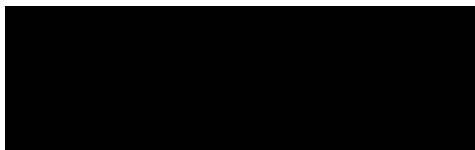
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/08736/1

**Envirolab Job Number:** 18/08736  
**Issue Number:** 2  
**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

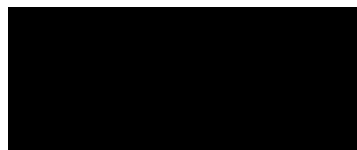
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 609131  
**Date Samples Received:** 22/10/18  
**Date Instructions Received:** 22/10/18  
**Date Analysis Completed:** 30/10/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/08736

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/1	18/08736/2	18/08736/3	18/08736/4	18/08736/5	18/08736/6	18/08736/7	18/08736/8	Units	Method ref
Client Sample No	1019-11	1019-9	1019-10	1019-4	1019-2 Deep	1019-0	1019-3 Shallow	1019-6		
Client Sample ID	WS22	WS20	WS21	BH15	BH4D	BH6	BH4D	BH13		
Depth to Top	0.94	1.23	1.29	1.34	1.39	1.46	1.52	1.66		
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
pH (w) <sub>A</sub> <sup>#</sup>	7.92	8.14	11.09	7.88	6.86	7.13	6.56	7.88		
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	1.21	6.52	6.03	0.42	1.92	1.27	4.45	12.6	mg/l	A-T-033w
Sulphate (w) <sub>A</sub> <sup>#</sup>	146	54	52	235	1300	2360	726	152	mg/l	A-T-026w
Cyanide (free) (w) <sub>A</sub> <sup>#</sup>	<0.005	0.027	0.033	<0.005	<0.005	<0.005	0.012	<0.005	mg/l	A-T-042wFCN
Cyanide (total) (w) <sub>A</sub> <sup>#</sup>	<0.005	0.227	0.231	0.027	<0.005	<0.005	0.036	0.022	mg/l	A-T-042wTCN
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	12	12	12	68	3	12	9	15	µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	434	166	153	854	1770	2770	750	919	µg/l	A-T-025w
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	µg/l	A-T-025w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	6	4	5	1	<1	<1	1	<1	µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	1	<1	<1	µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Calc
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-025w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	6	4	4	2	3	2	3	2	µg/l	A-T-025w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	1	2	2	<1	<1	<1	<1	<1	µg/l	A-T-025w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	10	2	1	2	15	<1	10	3	µg/l	A-T-025w

Envirolab Job Number: 18/08736

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/1	18/08736/2	18/08736/3	18/08736/4	18/08736/5	18/08736/6	18/08736/7	18/08736/8	Units	Method ref
Client Sample No	1019-11	1019-9	1019-10	1019-4	1019-2 Deep	1019-0	1019-3 Shallow	1019-6		
Client Sample ID	WS22	WS20	WS21	BH15	BH4D	BH6	BH4D	BH13		
Depth to Top	0.94	1.23	1.29	1.34	1.39	1.46	1.52	1.66		
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	0.24	0.14	<0.01	<0.01	<0.01	0.04	µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	0.01	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	0.02	0.03	0.07	0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	0.06	0.03	0.10	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	0.06	0.04	0.10	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.09	0.05	0.13	<0.01	<0.01	<0.01	0.01	<0.01	µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	0.07	0.08	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.03	0.02	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	0.09	0.04	0.12	<0.01	<0.01	<0.01	0.01	<0.01	µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.20	0.04	0.25	0.02	<0.01	0.01	0.02	<0.01	µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	0.03	<0.01	0.30	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	0.07	0.05	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	0.17	<0.01	0.23	0.05	<0.01	0.03	0.01	<0.01	µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.18	0.11	0.24	0.03	<0.01	<0.01	0.02	<0.01	µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	1.14	0.50	2.03	0.25	<0.01	0.04	0.07	0.04	µg/l	A-T-019w

Envirolab Job Number: 18/08736

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/1	18/08736/2	18/08736/3	18/08736/4	18/08736/5	18/08736/6	18/08736/7	18/08736/8	Units	Method ref
Client Sample No	1019-11	1019-9	1019-10	1019-4	1019-2 Deep	1019-0	1019-3 Shallow	1019-6		
Client Sample ID	WS22	WS20	WS21	BH15	BH4D	BH6	BH4D	BH13		
Depth to Top	0.94	1.23	1.29	1.34	1.39	1.46	1.52	1.66		
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
n-Diethylphthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-052w
Phenol <sub>A</sub>	<1	<1	2	<1	<1	<1	<1	<1	µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w

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Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/1	18/08736/2	18/08736/3	18/08736/4	18/08736/5	18/08736/6	18/08736/7	18/08736/8	Units	Method ref		
Client Sample No	1019-11	1019-9	1019-10	1019-4	1019-2 Deep	1019-0	1019-3 Shallow	1019-6				
Client Sample ID	WS22	WS20	WS21	BH15	BH4D	BH6	BH4D	BH13				
Depth to Top	0.94	1.23	1.29	1.34	1.39	1.46	1.52	1.66				
Depth To Bottom												
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Isophorone <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-052w
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w		

Envirolab Job Number: 18/08736

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Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/1	18/08736/2	18/08736/3	18/08736/4	18/08736/5	18/08736/6	18/08736/7	18/08736/8	Units	Method ref
Client Sample No	1019-11	1019-9	1019-10	1019-4	1019-2 Deep	1019-0	1019-3 Shallow	1019-6		
Client Sample ID	WS22	WS20	WS21	BH15	BH4D	BH6	BH4D	BH13		
Depth to Top	0.94	1.23	1.29	1.34	1.39	1.46	1.52	1.66		
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	1	<1	µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	2	<1	2	<1	µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w

Envirolab Job Number: 18/08736

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/1	18/08736/2	18/08736/3	18/08736/4	18/08736/5	18/08736/6	18/08736/7	18/08736/8	Units	Method ref		
Client Sample No	1019-11	1019-9	1019-10	1019-4	1019-2 Deep	1019-0	1019-3 Shallow	1019-6				
Client Sample ID	WS22	WS20	WS21	BH15	BH4D	BH6	BH4D	BH13				
Depth to Top	0.94	1.23	1.29	1.34	1.39	1.46	1.52	1.66				
Depth To Bottom												
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-006w
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w		
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w		
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w		
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w		
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		



Envirolab Job Number: 18/08736

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/1	18/08736/2	18/08736/3	18/08736/4	18/08736/5	18/08736/6	18/08736/7	18/08736/8	Units	Method ref
Client Sample No	1019-11	1019-9	1019-10	1019-4	1019-2 Deep	1019-0	1019-3 Shallow	1019-6		
Client Sample ID	WS22	WS20	WS21	BH15	BH4D	BH6	BH4D	BH13		
Depth to Top	0.94	1.23	1.29	1.34	1.39	1.46	1.52	1.66		
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	7	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	17	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	26	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	17	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	34	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	8	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	<5	<5	59	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	26	<5	59	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	1	<1	µg/l	A-T-022w

Envirolab Job Number: 18/08736

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/9	18/08736/10	18/08736/11	18/08736/12					Units	Method ref
Client Sample No	1019-8	1019-1	1019-5	1019-7						
Client Sample ID	BH12B	BH4	BH11	BH10						
Depth to Top	1.71	2.00	2.60	2.61						
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
pH (w) <sub>A</sub> <sup>#</sup>	7.72	6.82	7.43	7.61						
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	3.70	1.15	1.46	0.72					mg/l	A-T-033w
Sulphate (w) <sub>A</sub> <sup>#</sup>	473	1190	2100	42					mg/l	A-T-026w
Cyanide (free) (w) <sub>A</sub> <sup>#</sup>	0.009	<0.005	<0.005	<0.005					mg/l	A-T-042wFCN
Cyanide (total) (w) <sub>A</sub> <sup>#</sup>	0.033	<0.005	<0.005	<0.005					mg/l	A-T-042wTCN
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	7	2	3	2					µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	829	901	4220	279					µg/l	A-T-025w
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<0.2	<0.2	<0.2	<0.2					µg/l	A-T-025w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	4	<1	4	2					µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	1	<1					µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/l	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01					mg/l	Calc
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-025w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	6	4	2	1					µg/l	A-T-025w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-025w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	10	4	11	6					µg/l	A-T-025w

Envirolab Job Number: 18/08736

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/9	18/08736/10	18/08736/11	18/08736/12					Units	Method ref
Client Sample No	1019-8	1019-1	1019-5	1019-7						
Client Sample ID	BH12B	BH4	BH11	BH10						
Depth to Top	1.71	2.00	2.60	2.61						
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.07	0.01	<0.01	<0.01					µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	<0.01	<0.01					µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.29	<0.01	<0.01	<0.01					µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	0.02					µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.07	0.01	<0.01	<0.01					µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.48	0.02	<0.01	0.02					µg/l	A-T-019w

Envirolab Job Number: 18/08736

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/9	18/08736/10	18/08736/11	18/08736/12						
Client Sample No	1019-8	1019-1	1019-5	1019-7						
Client Sample ID	BH12B	BH4	BH11	BH10						
Depth to Top	1.71	2.00	2.60	2.61						
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10					µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
n-Dioctylphthalate <sub>A</sub>	<10	<10	<10	<10					µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<2	<2	<2	<2					µg/l	A-T-052w
Phenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w

Envirolab Job Number: 18/08736

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/9	18/08736/10	18/08736/11	18/08736/12					Units	Method ref
Client Sample No	1019-8	1019-1	1019-5	1019-7						
Client Sample ID	BH12B	BH4	BH11	BH10						
Depth to Top	1.71	2.00	2.60	2.61						
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
Isophorone <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w

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Lab Sample ID	18/08736/9	18/08736/10	18/08736/11	18/08736/12						
Client Sample No	1019-8	1019-1	1019-5	1019-7						
Client Sample ID	BH12B	BH4	BH11	BH10						
Depth to Top	1.71	2.00	2.60	2.61						
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10	<10	<10	<10					µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5	<5	<5					µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10					µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3					µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-006w

Envirolab Job Number: 18/08736

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/9	18/08736/10	18/08736/11	18/08736/12					Units	Method ref
Client Sample No	1019-8	1019-1	1019-5	1019-7						
Client Sample ID	BH12B	BH4	BH11	BH10						
Depth to Top	1.71	2.00	2.60	2.61						
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1						
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-006w
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/l	A-T-006w
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/l	A-T-006w
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3					µg/l	A-T-006w
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3					µg/l	A-T-006w
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w



Envirolab Job Number: 18/08736

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/08736/9	18/08736/10	18/08736/11	18/08736/12					Units	Method ref
Client Sample No	1019-8	1019-1	1019-5	1019-7						
Client Sample ID	BH12B	BH4	BH11	BH10						
Depth to Top	1.71	2.00	2.60	2.61						
Depth To Bottom										
Date Sampled	18-Oct-18	18-Oct-18	18-Oct-18	18-Oct-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	<5	<5	<5	<5					µg/l	A-T-022+23w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	<5	<5	<5	<5					µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5	<5	<5					µg/l	A-T-022+23w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/09217/1

**Envirolab Job Number:** 18/09217

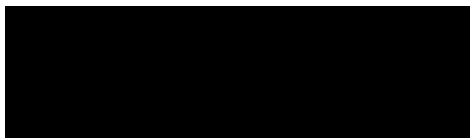
**Issue Number:** 2

**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

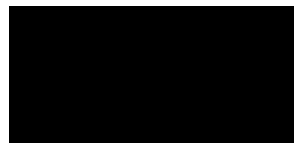
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 610527  
**Date Samples Received:** 05/01/18  
**Date Instructions Received:** 05/11/18  
**Date Analysis Completed:** 13/11/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/1	18/09217/2	18/09217/3	18/09217/4	18/09217/5	18/09217/6	18/09217/7	18/09217/8	Units	Method ref		
Client Sample No	1102-11	1102-10	1102-8	1102-9	1102-4	1102-0	1102-3 Deep	1102-2 Shallow				
Client Sample ID	WS22	WS21	BH12B	WS20	BH15	BH6	BH4D	BH4D				
Depth to Top	0.90	1.20	1.74	1.23	1.38	1.42	1.50	1.60				
Depth To Bottom												
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
pH (w) <sub>A</sub> <sup>#</sup>	7.69	11.56	7.64	8.47	7.81	6.92	6.74	6.48			pH	A-T-031w
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	2.50	2.73	4.66	2.48	0.32	1.87	1.15	0.95			mg/l	A-T-033w
Sulphate (w) <sub>A</sub> <sup>#</sup>	72	30	615	33	223	1830	1220	678	mg/l	A-T-026w		
Cyanide (free) (w) <sub>A</sub> <sup>#</sup>	0.022	0.022	0.008	0.024	<0.005	<0.005	<0.005	<0.005	mg/l	A-T-042wFCN		
Cyanide (total) (w) <sub>A</sub> <sup>#</sup>	0.044	0.043	0.031	0.043	0.046	0.025	<0.005	<0.005	mg/l	A-T-042wTCN		
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	5	6	7	6	71	12	6	6	µg/l	A-T-025w		
Boron (dissolved) <sub>A</sub> <sup>#</sup>	59	64	1010	58	810	4380	2060	2430	µg/l	A-T-025w		
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	µg/l	A-T-025w		
Copper (dissolved) <sub>A</sub> <sup>#</sup>	6	5	5	6	2	3	3	4	µg/l	A-T-025w		
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	4	4	1	4	<1	3	1	1	µg/l	A-T-025w		
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	A-T-040w		
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	Calc		
Lead (dissolved) <sub>A</sub> <sup>#</sup>	1	1	<1	1	<1	<1	<1	<1	µg/l	A-T-025w		
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	µg/l	A-T-025w		
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	3	3	6	3	<1	2	2	3	µg/l	A-T-025w		
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	1	1	<1	1	<1	<1	<1	<1	µg/l	A-T-025w		
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	3	4	9	6	22	3	6	6	µg/l	A-T-025w		

Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/1	18/09217/2	18/09217/3	18/09217/4	18/09217/5	18/09217/6	18/09217/7	18/09217/8	Units	Method ref
Client Sample No	1102-11	1102-10	1102-8	1102-9	1102-4	1102-0	1102-3 Deep	1102-2 Shallow		
Client Sample ID	WS22	WS21	BH12B	WS20	BH15	BH6	BH4D	BH4D		
Depth to Top	0.90	1.20	1.74	1.23	1.38	1.42	1.50	1.60		
Depth To Bottom										
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.28	<0.01	<0.01	0.17	<0.01	<0.01	0.01		
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.07	<0.01	0.03	0.03	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.03	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.02	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.02	0.16	0.10	0.04	0.04	0.02	0.01	0.02	µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	0.01	0.38	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.03	0.11	0.09	<0.01	<0.01	0.01	<0.01	<0.01	µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	0.02	0.37	<0.01	<0.01	0.07	0.03	0.03	<0.01	µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.02	0.15	0.10	0.10	0.05	0.02	<0.01	0.02	µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.10	1.63	0.31	0.32	0.36	0.08	0.04	0.05	µg/l	A-T-019w

Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/1	18/09217/2	18/09217/3	18/09217/4	18/09217/5	18/09217/6	18/09217/7	18/09217/8	Units	Method ref
Client Sample No	1102-11	1102-10	1102-8	1102-9	1102-4	1102-0	1102-3 Deep	1102-2 Shallow		
Client Sample ID	WS22	WS21	BH12B	WS20	BH15	BH6	BH4D	BH4D		
Depth to Top	0.90	1.20	1.74	1.23	1.38	1.42	1.50	1.60		
Depth To Bottom										
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1		
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
n-Dioctylphthalate <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Phenol <sub>A</sub>	<1	1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w

Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/1	18/09217/2	18/09217/3	18/09217/4	18/09217/5	18/09217/6	18/09217/7	18/09217/8	Units	Method ref		
Client Sample No	1102-11	1102-10	1102-8	1102-9	1102-4	1102-0	1102-3 Deep	1102-2 Shallow				
Client Sample ID	WS22	WS21	BH12B	WS20	BH15	BH6	BH4D	BH4D				
Depth to Top	0.90	1.20	1.74	1.23	1.38	1.42	1.50	1.60				
Depth To Bottom												
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Isophorone <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-052w
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-052w		



Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/1	18/09217/2	18/09217/3	18/09217/4	18/09217/5	18/09217/6	18/09217/7	18/09217/8	Units	Method ref
Client Sample No	1102-11	1102-10	1102-8	1102-9	1102-4	1102-0	1102-3 Deep	1102-2 Shallow		
Client Sample ID	WS22	WS21	BH12B	WS20	BH15	BH6	BH4D	BH4D		
Depth to Top	0.90	1.20	1.74	1.23	1.38	1.42	1.50	1.60		
Depth To Bottom										
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1		
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	1	1	µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10	<10	µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	4	µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w

Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/1	18/09217/2	18/09217/3	18/09217/4	18/09217/5	18/09217/6	18/09217/7	18/09217/8	Units	Method ref		
Client Sample No	1102-11	1102-10	1102-8	1102-9	1102-4	1102-0	1102-3 Deep	1102-2 Shallow				
Client Sample ID	WS22	WS21	BH12B	WS20	BH15	BH6	BH4D	BH4D				
Depth to Top	0.90	1.20	1.74	1.23	1.38	1.42	1.50	1.60				
Depth To Bottom												
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-006w
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1			µg/l	A-T-006w
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
n-propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w		
1,3-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
n-butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		
1,2-Dibromo-3-chloropropane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2	<2	µg/l	A-T-006w		
1,2,4-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w		
1,2,3-Trichlorobenzene <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3	<3	µg/l	A-T-006w		
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-006w		

Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/1	18/09217/2	18/09217/3	18/09217/4	18/09217/5	18/09217/6	18/09217/7	18/09217/8	Units	Method ref
Client Sample No	1102-11	1102-10	1102-8	1102-9	1102-4	1102-0	1102-3 Deep	1102-2 Shallow		
Client Sample ID	WS22	WS21	BH12B	WS20	BH15	BH6	BH4D	BH4D		
Depth to Top	0.90	1.20	1.74	1.23	1.38	1.42	1.50	1.60		
Depth To Bottom										
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	2	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	20	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	53	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	14	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	<5	89	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	<5	89	<5	<5	<5	<5	<5	<5	µg/l	A-T-022+23w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w

Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/9	18/09217/10	18/09217/11	18/09217/12					Units	Method ref
Client Sample No	1102-6	1102-1	1102-7	1102-5						
Client Sample ID	BH13	BH4	BH10	BH11						
Depth to Top	1.75	2.10	2.75	2.76						
Depth To Bottom										
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
pH (w) <sub>A</sub> <sup>#</sup>	7.84	6.65	7.45	7.21						
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	9.27	1.43	1.21	1.58					mg/l	A-T-033w
Sulphate (w) <sub>A</sub> <sup>#</sup>	82	1120	44	1830					mg/l	A-T-026w
Cyanide (free) (w) <sub>A</sub> <sup>#</sup>	<0.005	<0.005	<0.005	<0.005					mg/l	A-T-042wFCN
Cyanide (total) (w) <sub>A</sub> <sup>#</sup>	0.020	<0.005	<0.005	<0.005					mg/l	A-T-042wTCN
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	15	2	2	12					µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	751	859	272	667					µg/l	A-T-025w
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<0.2	<0.2	<0.2	<0.2					µg/l	A-T-025w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	2	1	9	2					µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	<1	1	<1	1					µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/l	A-T-040w
Chromium (trivalent) (w)	<0.01	<0.01	<0.01	<0.01					mg/l	Calc
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	1	<1					µg/l	A-T-025w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	2	4	1	3					µg/l	A-T-025w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-025w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	2	4	26	3					µg/l	A-T-025w

Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/9	18/09217/10	18/09217/11	18/09217/12					Units	Method ref
Client Sample No	1102-6	1102-1	1102-7	1102-5						
Client Sample ID	BH13	BH4	BH10	BH11						
Depth to Top	1.75	2.10	2.75	2.76						
Depth To Bottom										
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	<0.01	<0.01					µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	<0.01	<0.01					µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.04	<0.01	<0.01	<0.01					µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.11	<0.01	<0.01	<0.01					µg/l	A-T-019w

Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/9	18/09217/10	18/09217/11	18/09217/12						
Client Sample No	1102-6	1102-1	1102-7	1102-5						
Client Sample ID	BH13	BH4	BH10	BH11						
Depth to Top	1.75	2.10	2.75	2.76						
Depth To Bottom										
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4,6-Trichlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4-Dichlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4-Dimethylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,4-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2,6-Dinitrotoluene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Chloronaphthalene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Chlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Methylnaphthalene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Methylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
2-Nitrophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
4-Bromophenyl phenyl ether <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
4-Chloro-3-methylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-chloroisopropyl)ether <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
3+4-Methylphenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
4-Nitrophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-chloroethyl)ether <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-chloroethoxy)methane <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<10	<10	<10	<10					µg/l	A-T-052w
Butylbenzyl phthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Carbazole <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Dibenzofuran <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
n-Dibutylphthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
n-Diethylphthalate <sub>A</sub>	<10	<10	<10	<10					µg/l	A-T-052w
n-Nitroso-n-dipropylamine <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Diethyl phthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Dimethyl phthalate <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Hexachlorobenzene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Pentachlorophenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Phenol <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Hexachloroethane <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Nitrobenzene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w

Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/9	18/09217/10	18/09217/11	18/09217/12					Units	Method ref
Client Sample No	1102-6	1102-1	1102-7	1102-5						
Client Sample ID	BH13	BH4	BH10	BH11						
Depth to Top	1.75	2.10	2.75	2.76						
Depth To Bottom										
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
Isophorone <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Hexachlorocyclopentadiene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w
Perylene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-052w



Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/9	18/09217/10	18/09217/11	18/09217/12						
Client Sample No	1102-6	1102-1	1102-7	1102-5						
Client Sample ID	BH13	BH4	BH10	BH11						
Depth to Top	1.75	2.10	2.75	2.76						
Depth To Bottom										
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
VOC (w)										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-006w
Chloromethane <sub>A</sub>	<10	<10	<10	<10					µg/l	A-T-006w
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Dichloromethane <sub>A</sub>	<5	<5	<5	<5					µg/l	A-T-006w
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-006w
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/l	A-T-006w
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10					µg/l	A-T-006w
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	1	<1	<1	<1					µg/l	A-T-006w
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3					µg/l	A-T-006w
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-006w
Tetrachloroethene <sub>A</sub>	<1	<1	<1	<1					µg/l	A-T-006w



Envirolab Job Number: 18/09217

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09217/9	18/09217/10	18/09217/11	18/09217/12						
Client Sample No	1102-6	1102-1	1102-7	1102-5						
Client Sample ID	BH13	BH4	BH10	BH11						
Depth to Top	1.75	2.10	2.75	2.76						
Depth To Bottom										
Date Sampled	01-Nov-18	01-Nov-18	01-Nov-18	01-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	<5	<5	<5	<5					µg/l	A-T-022+23w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	<5	<5	<5	<5					µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5	<5	<5					µg/l	A-T-022+23w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

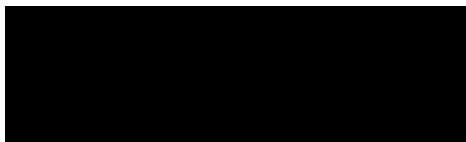
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/09646/1

**Envirolab Job Number:** 18/09646  
**Issue Number:** 2  
**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

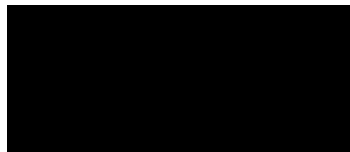
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 611989  
**Date Samples Received:** 16/11/18  
**Date Instructions Received:** 16/11/18  
**Date Analysis Completed:** 27/11/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/09646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09646/1	18/09646/2	18/09646/3	18/09646/4	18/09646/5	18/09646/6	18/09646/7	18/09646/8	Units	Method ref
Client Sample No	1115-16	1115-15	1115-8	1115-14	1115-3	1115-10	1115-13	1115-4		
Client Sample ID	WS22	WS21	BH15	WS20	BH6	BH13	BH12B	BH4		
Depth to Top	0.93	1.10	1.21	1.26	2.10	1.73	1.73	2.05		
Depth To Bottom										
Date Sampled	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
pH (w) <sub>A</sub> <sup>#</sup>	8.29	11.90	8.19	8.10	7.50	8.26	8.02	7.46	pH	A-T-031w
Electrical conductivity @ 20degC (w) <sub>A</sub> <sup>#</sup>	1434	1907	4480	860	41800	4830	12150	22200	µs/cm	A-T-037w
BOD (settled, 5 day) <sub>A</sub>	6	<1	<1	4	<1	<1	3	<1	mg/l	A-T-048
Alkalinity (total) (w) Colorimetry <sub>A</sub> <sup>#</sup>	450	293	189	135	75	414	220	123	mg/l Ca CO3	A-T-038w
Alkalinity by titration (bicarbonate) (w) <sub>A</sub>	845	<15	200	1090	125	520	260	175	mg/l Ca CO3	Titration w
Alkalinity by titration (carbonate) (w) <sub>A</sub>	<15	190	<15	<15	<15	<15	<15	<15	mg/l Ca CO3	Titration w
Hardness Total <sub>A</sub> <sup>#</sup>	383	369	597	425	4970	390	1690	2390	mg/l Ca CO3	A-T-049w
Total Suspended Solids (w) <sub>A</sub> <sup>#</sup>	1734	159	64	7276	202	18	30	44	mg/l	A-T-036w
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	2.64	1.86	0.42	1.44	1.05	12.9	5.52	1.39	mg/l	A-T-033w
Ammonium / Ammoniacal nitrogen as NH4 (w) <sub>A</sub> <sup>#</sup>	3.408	2.405	0.543	1.852	1.356	16.693	7.117	1.794	mg/l	A-T-033w
Chloride (w) <sub>A</sub> <sup>#</sup>	116	143	1320	155	18400	929	4320	10000	mg/l	A-T-026w
Bromine <sub>A</sub>	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/l	Test kit
Fluoride (w) <sub>A</sub> <sup>#</sup>	1.41	<0.10	0.54	0.47	<0.10	0.81	<0.10	<0.10	mg/l	A-T-026w
Nitrite (w) <sub>A</sub> <sup>#</sup>	0.2	9.9	<0.1	<5.0	<0.1	<0.1	<0.1	<0.1	mg/l	A-T-026w
Nitrate (w) <sub>A</sub> <sup>#</sup>	0.3	11.8	5.3	1.0	<0.1	14.4	2.9	<0.1	mg/l	A-T-026w
Nitrate as N (w) <sub>A</sub> <sup>#</sup>	0.077	2.658	1.197	0.231	<0.022	3.254	0.649	<0.022	mg/l	A-T-026w
Nitrogen, Total Oxidised TOxN (w) <sub>A</sub> <sup>#</sup>	0.1	5.7	1.2	1.2	<0.1	3.3	0.7	<0.1	mg/l	A-T-026w
Nitrogen, Total (w)	8.1	9.0	2.3	10.0	1.6	15.3	7.3	1.8	mg/l	Calc
Nitrogen (kjeldahl) (w) <sub>A</sub>	8.0	3.3	1.1	8.8	1.6	12.0	6.6	1.8	mg/l	Subcon DETS
Phosphate (orthophosphate) as P (w) <sub>A</sub> <sup>#</sup>	0.425	<0.007	0.583	<0.007	1.221	0.497	0.337	0.121	mg/l	A-T-026w
Phosphorus, Total (dissolved) <sub>A</sub>	<20	26	816	<20	322	940	377	159	µg/l	A-T-025w
Sulphate (w) <sub>A</sub> <sup>#</sup>	30	28	226	48	2380	141	591	1160	mg/l	A-T-026w
DOC (w) <sub>A</sub> <sup>#</sup>	5.2	4.9	2.4	4.8	1.0	14.3	9.1	1.2	mg/l	A-T-032w
Oil & Grease (total) (w) <sub>A</sub>	<1	<1	<1	<1	2	3	<1	<1	mg/l	A-T-039w
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	4	4	75	4	15	13	9	2	µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	57	61	753	76	4340	1150	1020	888	µg/l	A-T-025w
Cadmium (dissolved 0.08 ug/l) <sub>A</sub>	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	µg/l	A-T-025w
Calcium (dissolved) <sub>A</sub> <sup>#</sup>	153	147	94	170	351	96	347	277	mg/l	A-T-049w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	13	14	8	13	7	14	8	7	µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	15	15	<1	15	1	<1	1	1	µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	A-T-040w

Envirolab Job Number: 18/09646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09646/1	18/09646/2	18/09646/3	18/09646/4	18/09646/5	18/09646/6	18/09646/7	18/09646/8	Units	Method ref
Client Sample No	1115-16	1115-15	1115-8	1115-14	1115-3	1115-10	1115-13	1115-4		
Client Sample ID	WS22	WS21	BH15	WS20	BH6	BH13	BH12B	BH4		
Depth to Top	0.93	1.10	1.21	1.26	2.10	1.73	1.73	2.05		
Depth To Bottom										
Date Sampled	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Iron (dissolved) <sub>A</sub> <sup>#</sup>	10	17	594	<10	2950	2610	80	93		
Lead (dissolved) <sub>A</sub> <sup>#</sup>	1	2	<1	1	<1	<1	<1	<1	µg/l	A-T-025w
Manganese (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	266	<1	4660	236	1320	9460	µg/l	A-T-025w
Magnesium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	88	<1	993	37	199	413	mg/l	A-T-049w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	2	2	<1	2	2	2	6	4	µg/l	A-T-025w
Potassium (dissolved) <sub>A</sub> <sup>#</sup>	38	36	52	41	303	51	143	150	mg/l	A-T-049w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<1	1	<1	<1	<1	<1	<1	<1	µg/l	A-T-025w
Sodium (dissolved) <sub>A</sub> <sup>#</sup>	111	106	764	121	7950	544	2090	3920	mg/l	A-T-049w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	2	60	3	<1	4	6	4	4	µg/l	A-T-025w
Ethylene glycol (Monoethylene glycol) (w) <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/l	Subcon Chemtest



Envirolab Job Number: 18/09646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09646/1	18/09646/2	18/09646/3	18/09646/4	18/09646/5	18/09646/6	18/09646/7	18/09646/8	Units	Method ref
Client Sample No	1115-16	1115-15	1115-8	1115-14	1115-3	1115-10	1115-13	1115-4		
Client Sample ID	WS22	WS21	BH15	WS20	BH6	BH13	BH12B	BH4		
Depth to Top	0.93	1.10	1.21	1.26	2.10	1.73	1.73	2.05		
Depth To Bottom										
Date Sampled	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	0.01	0.05	0.15	<0.01	0.01	0.05	0.01	<0.01	µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.02	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.04	0.02	0.03	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.02	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.01	<0.01	0.06	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.08	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.02	<0.01	0.05	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.01	0.13	0.03	0.04	0.02	<0.01	0.08	<0.01	µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.12	<0.01	<0.01	0.02	0.04	0.02	<0.01	µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	0.06	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.04	0.02	<0.01	0.03	<0.01	0.12	0.02	µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.04	0.06	<0.01	0.06	<0.01	<0.01	<0.01	µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.01	0.13	0.04	0.10	0.02	<0.01	0.07	<0.01	µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.03	0.62	0.32	0.52	0.16	0.09	0.30	0.02	µg/l	A-T-019w

Envirolab Job Number: 18/09646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09646/1	18/09646/2	18/09646/3	18/09646/4	18/09646/5	18/09646/6	18/09646/7	18/09646/8	Units	Method ref
Client Sample No	1115-16	1115-15	1115-8	1115-14	1115-3	1115-10	1115-13	1115-4		
Client Sample ID	WS22	WS21	BH15	WS20	BH6	BH13	BH12B	BH4		
Depth to Top	0.93	1.10	1.21	1.26	2.10	1.73	1.73	2.05		
Depth To Bottom										
Date Sampled	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Total Aliphatics (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C8-C10 (w) <sub>A</sub>	<5	7	<5	<5	<5	6	<5	<5	µg/l	A-T-055w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	51	<5	6	<5	15	<5	<5	µg/l	A-T-055w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	121	<5	32	<5	17	6	<5	µg/l	A-T-055w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	71	35	32	16	50	29	22	µg/l	A-T-055w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<10	25	<10	<10	<10	<10	<10	<10	µg/l	A-T-055w
Total Aromatics (w) <sub>A</sub>	<10	275	35	80	16	93	35	22	µg/l	A-T-055w
TPH (Ali & Aro >C5-C35) (w) <sub>A</sub>	<10	275	35	80	16	93	35	22	µg/l	A-T-055w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w



Envirolab Job Number: 18/09646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09646/9	18/09646/10	18/09646/11	18/09646/12					Units	Method ref
Client Sample No	1115-5 Shallow	1115-6 Deep	1115-12	1115-9						
Client Sample ID	BH4D	BH4D	BH10	BH11						
Depth to Top	2.50	2.51	2.59	2.74						
Depth To Bottom										
Date Sampled	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
Iron (dissolved) <sub>A</sub> <sup>#</sup>	6910	1940	99	1380				µg/l		
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-025w	
Manganese (dissolved) <sub>A</sub> <sup>#</sup>	5200	5960	164	2180				µg/l	A-T-025w	
Magnesium (dissolved) <sub>A</sub> <sup>#</sup>	239	529	20	1050				mg/l	A-T-049w	
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1				µg/l	A-T-025w	
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	3	3	1	3				µg/l	A-T-025w	
Potassium (dissolved) <sub>A</sub> <sup>#</sup>	78	157	27	320				mg/l	A-T-049w	
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-025w	
Sodium (dissolved) <sub>A</sub> <sup>#</sup>	1610	4330	156	10100				mg/l	A-T-049w	
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	4	6	3	5				µg/l	A-T-025w	
Ethylene glycol (Monoethylene glycol) (w) <sub>A</sub>	<0.1	<0.1	<0.1	<0.1				mg/l	Subcon Chemtest	

Envirolab Job Number: 18/09646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09646/9	18/09646/10	18/09646/11	18/09646/12					Units	Method ref
Client Sample No	1115-5 Shallow	1115-6 Deep	1115-12	1115-9						
Client Sample ID	BH4D	BH4D	BH10	BH11						
Depth to Top	2.50	2.51	2.59	2.74						
Depth To Bottom										
Date Sampled	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	0.07	<0.01	0.01	<0.01					µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.04	<0.01	<0.01	<0.01					µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	0.03	<0.01					µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	0.02	0.03	<0.01	<0.01					µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.03	<0.01	<0.01	<0.01					µg/l	A-T-019w
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	0.22	0.03	0.04	<0.01					µg/l	A-T-019w

Envirolab Job Number: 18/09646

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/09646/9	18/09646/10	18/09646/11	18/09646/12					Units	Method ref
Client Sample No	1115-5 Shallow	1115-6 Deep	1115-12	1115-9						
Client Sample ID	BH4D	BH4D	BH10	BH11						
Depth to Top	2.50	2.51	2.59	2.74						
Depth To Bottom										
Date Sampled	14-Nov-18	14-Nov-18	14-Nov-18	14-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-055w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-055w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-055w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-055w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-055w
Total Aliphatics (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-055w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
Aro >C8-C10 (w) <sub>A</sub>	<5	<5	<5	<5					µg/l	A-T-055w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-055w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/l	A-T-055w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	30	22	35	15					µg/l	A-T-055w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10					µg/l	A-T-055w
Total Aromatics (w) <sub>A</sub>	30	22	35	15					µg/l	A-T-055w
TPH (Ali & Aro >C5-C35) (w) <sub>A</sub>	30	22	35	15					µg/l	A-T-055w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/l	A-T-022w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



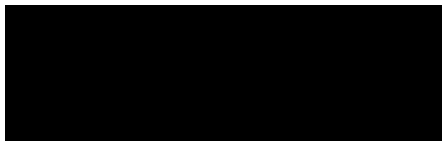
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/10170/1

**Envirolab Job Number:** 18/10170  
**Issue Number:** 2  
**Date:** 20 December, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

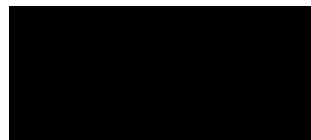
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 611989  
**Date Samples Received:** 03/12/18  
**Date Instructions Received:** 03/12/18  
**Date Analysis Completed:** 14/12/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/10170

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/10170/1	18/10170/2	18/10170/3	18/10170/4	18/10170/5	18/10170/6	18/10170/7	18/10170/8	Units	Method ref
Client Sample No	1115-16	1115-15	1115-8	115-14	1115-3	1115-10	1115-13	1115-4		
Client Sample ID	WS22	WS21	BH15	WS20	BH6	BH13	BH12B	BH4		
Depth to Top	0.95	1.17	1.36	1.23	1.51	1.87	1.83	1.15		
Depth To Bottom										
Date Sampled	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
pH (w) <sub>A</sub> <sup>#</sup>	7.95	11.88	8.40	8.47	7.73	8.53	8.10	7.75		
Electrical conductivity @ 20degC (w) <sub>A</sub> <sup>#</sup>	1455	1684	4490	819	43600	2620	13660	24000	µs/cm	A-T-037w
BOD (settled, 5 day) <sub>A</sub>	6	<1	<1	16	3	8	3	1	mg/l	A-T-048
Alkalinity (total) (w) Colorimetry <sub>A</sub> <sup>#</sup>	616	437	238	184	86	540	315	148	mg/l Ca CO <sub>3</sub>	A-T-038w
Alkalinity by titration (bicarbonate) (w) <sub>A</sub>	1570	<15	230	1255	185	520	315	185	mg/l Ca CO <sub>3</sub>	Titration w
Alkalinity by titration (carbonate) (w) <sub>A</sub>	<15	170	<15	<15	<15	<15	<15	<15	mg/l Ca CO <sub>3</sub>	Titration w
Hardness Total <sub>A</sub> <sup>#</sup>	400	405	615	403	5570	244	1900	2930	mg/l Ca CO <sub>3</sub>	A-T-049w
Total Suspended Solids (w) <sub>A</sub> <sup>#</sup>	1294	258	90	8822	147	11	17	37	mg/l	A-T-036w
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	5.70	6.09	0.21	6.16	1.37	8.07	3.69	1.22	mg/l	A-T-033w
Ammonium / Ammoniacal nitrogen as NH <sub>4</sub> (w) <sub>A</sub> <sup>#</sup>	7.357	7.856	0.272	7.945	1.769	10.4	4.758	1.569	mg/l	A-T-033w
Chloride (w) <sub>A</sub> <sup>#</sup>	113	198	1270	147	17400	472	4630	9130	mg/l	A-T-026w
Bromine <sub>A</sub>	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/l	Test kit
Fluoride (w) <sub>A</sub> <sup>#</sup>	1.59	<0.10	0.53	0.59	<0.10	1.53	<0.10	<0.10	mg/l	A-T-026w
Nitrite (w) <sub>A</sub> <sup>#</sup>	<0.1	19.0	<0.1	4.0	<0.1	<0.1	<0.1	<0.1	mg/l	A-T-026w
Nitrate (w) <sub>A</sub> <sup>#</sup>	<0.1	15.8	<0.1	1.6	<0.1	<0.1	7.3	<0.1	mg/l	A-T-026w
Nitrate as N (w) <sub>A</sub> <sup>#</sup>	<0.022	3.576	<0.022	0.371	<0.022	<0.022	1.640	<0.022	mg/l	A-T-026w
Nitrogen, Total Oxidised TOxN (w) <sub>A</sub> <sup>#</sup>	<0.1	9.4	<0.1	1.6	<0.1	<0.1	1.7	<0.1	mg/l	A-T-026w
Nitrogen, Total (w)	6.4	15.7	0.4	4.3	0.9	7.6	5.8	0.6	mg/l	Calc
Nitrogen (kjeldahl) (w) <sub>A</sub>	6.4	6.3	0.4	2.7	0.9	7.6	4.1	0.6	mg/l	Subcon DETS
Phosphate (orthophosphate) as P (w) <sub>A</sub> <sup>#</sup>	0.202	<0.007	0.564	0.024	<0.007	0.942	0.242	0.849	mg/l	A-T-026w
Phosphorus, Total (dissolved) <sub>A</sub>	26	25	798	<20	412	1247	405	214	µg/l	A-T-025w
Sulphate (w) <sub>A</sub> <sup>#</sup>	<1	34	237	47	2290	68	635	1180	mg/l	A-T-026w
DOC (w) <sub>A</sub> <sup>#</sup>	7.2	6.6	1.8	6.5	0.5	13.4	5.5	0.4	mg/l	A-T-032w
Oil & Grease (total) (w) <sub>A</sub>	3	<1	2	5	5	6	2	<1	mg/l	A-T-039w
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	6	6	69	6	24	15	7	2	µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	72	66	710	75	3690	680	767	855	µg/l	A-T-025w
Cadmium (dissolved 0.08 ug/l) <sub>A</sub>	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	µg/l	A-T-025w
Calcium (dissolved) <sub>A</sub> <sup>#</sup>	160	162	97	161	405	66	393	335	mg/l	A-T-049w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	19	21	7	21	7	7	12	12	µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	8	8	<1	8	1	<1	1	1	µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	A-T-040w

Envirolab Job Number: 18/10170

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/10170/1	18/10170/2	18/10170/3	18/10170/4	18/10170/5	18/10170/6	18/10170/7	18/10170/8	Units	Method ref
Client Sample No	1115-16	1115-15	1115-8	115-14	1115-3	1115-10	1115-13	1115-4		
Client Sample ID	WS22	WS21	BH15	WS20	BH6	BH13	BH12B	BH4		
Depth to Top	0.95	1.17	1.36	1.23	1.51	1.87	1.83	1.15		
Depth To Bottom										
Date Sampled	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Iron (dissolved) <sub>A</sub> <sup>#</sup>	33	27	498	27	5320	924	65	110		
Lead (dissolved) <sub>A</sub> <sup>#</sup>	1	1	<1	1	<1	<1	<1	<1	µg/l	A-T-025w
Manganese (dissolved) <sub>A</sub> <sup>#</sup>	5	2	248	2	3990	213	1180	8130	µg/l	A-T-025w
Magnesium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	90	<1	1110	19	223	508	mg/l	A-T-049w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	0.2	0.1	<0.1	<0.1	µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	5	5	<1	5	2	2	5	4	µg/l	A-T-025w
Potassium (dissolved) <sub>A</sub> <sup>#</sup>	48	48	52	48	268	48	155	139	mg/l	A-T-049w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	3	3	<1	2	<1	<1	1	<1	µg/l	A-T-025w
Sodium (dissolved) <sub>A</sub> <sup>#</sup>	125	124	786	122	9520	395	2220	4670	mg/l	A-T-049w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	1	1	<1	2	4	2	6	6	µg/l	A-T-025w
Ethylene glycol (Monoethylene glycol) (w) <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/l	Subcon Chemtest

Envirolab Job Number: 18/10170

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/10170/1	18/10170/2	18/10170/3	18/10170/4	18/10170/5	18/10170/6	18/10170/7	18/10170/8	Units	Method ref		
Client Sample No	1115-16	1115-15	1115-8	115-14	1115-3	1115-10	1115-13	1115-4				
Client Sample ID	WS22	WS21	BH15	WS20	BH6	BH13	BH12B	BH4				
Depth to Top	0.95	1.17	1.36	1.23	1.51	1.87	1.83	1.15				
Depth To Bottom												
Date Sampled	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
PAH 16MS (w)												
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.14	0.02	<0.01	0.79	<0.01	<0.01	µg/l	A-T-019w		
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.01	0.06	<0.01	0.07	<0.01	<0.01	µg/l	A-T-019w		
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.06	0.02	0.24	<0.01	0.04	<0.01	<0.01	µg/l	A-T-019w		
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.09	0.01	0.26	<0.01	<0.01	0.01	<0.01	µg/l	A-T-019w		
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.07	<0.01	0.30	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w		
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.10	<0.01	0.35	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w		
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.04	<0.01	0.59	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w		
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.04	<0.01	0.13	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w		
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.11	0.01	0.29	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w		
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.02	<0.01	0.07	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w		
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.25	0.03	0.48	0.02	0.01	0.07	0.01	µg/l	A-T-019w		
Fluorene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.06	<0.01	0.02	<0.01	0.53	0.01	<0.01	µg/l	A-T-019w		
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.05	<0.01	0.47	<0.01	<0.01	<0.01	<0.01	µg/l	A-T-019w		
Naphthalene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.03	0.03	0.02	0.02	<0.01	<0.01	0.01	µg/l	A-T-019w		
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.04	0.05	0.16	0.02	0.22	<0.01	<0.01	µg/l	A-T-019w		
Pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	0.23	0.04	0.58	0.01	<0.01	0.07	0.01	µg/l	A-T-019w		
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	<0.01	1.19	0.34	4.04	0.07	1.66	0.16	0.03	µg/l	A-T-019w		

Envirolab Job Number: 18/10170

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/10170/1	18/10170/2	18/10170/3	18/10170/4	18/10170/5	18/10170/6	18/10170/7	18/10170/8	Units	Method ref
Client Sample No	1115-16	1115-15	1115-8	115-14	1115-3	1115-10	1115-13	1115-4		
Client Sample ID	WS22	WS21	BH15	WS20	BH6	BH13	BH12B	BH4		
Depth to Top	0.95	1.17	1.36	1.23	1.51	1.87	1.83	1.15		
Depth To Bottom										
Date Sampled	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18		
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW		
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	1	<1	<1	µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<5	7	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	9	5	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	20	6	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	16	6	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	35	10	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Total Aliphatics (w) <sub>A</sub> <sup>#</sup>	80	35	<5	<5	<5	<5	<5	<5	µg/l	A-T-055w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
Aro >C8-C10 (w) <sub>A</sub>	9	17	<5	6	<5	31	<5	<5	µg/l	A-T-055w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	5	52	<5	5	<5	97	<5	<5	µg/l	A-T-055w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	11	163	<5	27	<5	61	10	<5	µg/l	A-T-055w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	6	110	21	29	9	67	<5	14	µg/l	A-T-055w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	16	45	<10	20	<10	23	<10	<10	µg/l	A-T-055w
Total Aromatics (w) <sub>A</sub>	47	388	21	87	<10	279	19	14	µg/l	A-T-055w
TPH (Ali & Aro >C5-C35) (w) <sub>A</sub>	127	422	21	87	<10	280	19	14	µg/l	A-T-055w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	1	<1	<1	µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1	<1	µg/l	A-T-022w

Envirolab Job Number: 18/10170

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/10170/9	18/10170/10	18/10170/11	18/10170/12						
Client Sample No	1115-5 Shallow	1115-6 Deep	1115-12	1115-9						
Client Sample ID	BH4D	BH4D	BH10	BH11						
Depth to Top	1.67	1.69	2.56	2.50						
Depth To Bottom										
Date Sampled	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
									Units	Method ref
pH (w) <sub>A</sub> <sup>#</sup>	7.51	7.64	8.22	7.86					pH	A-T-031w
Electrical conductivity @ 20degC (w) <sub>A</sub> <sup>#</sup>	10300	24900	1182	40300					µs/cm	A-T-037w
BOD (settled, 5 day) <sub>A</sub>	<1	2	4	2					mg/l	A-T-048
Alkalinity (total) (w) Colorimetry <sub>A</sub> <sup>#</sup>	337	163	391	165					mg/l Ca CO <sub>3</sub>	A-T-038w
Alkalinity by titration (bicarbonate) (w) <sub>A</sub>	385	175	340	185					mg/l Ca CO <sub>3</sub>	Titration w
Alkalinity by titration (carbonate) (w) <sub>A</sub>	<15	<15	<15	<15					mg/l Ca CO <sub>3</sub>	Titration w
Hardness Total <sub>A</sub> <sup>#</sup>	1576	2970	435	5670					mg/l Ca CO <sub>3</sub>	A-T-049w
Total Suspended Solids (w) <sub>A</sub> <sup>#</sup>	626	100	19	35					mg/l	A-T-036w
Ammoniacal nitrogen (w) <sub>A</sub> <sup>#</sup>	4.82	1.82	0.79	1.39					mg/l	A-T-033w
Ammonium / Ammoniacal nitrogen as NH4 (w) <sub>A</sub> <sup>#</sup>	6.217	2.348	1.019	1.796					mg/l	A-T-033w
Chloride (w) <sub>A</sub> <sup>#</sup>	3190	9450	158	16300					mg/l	A-T-026w
Bromine <sub>A</sub>	<0.05	<0.05	<0.05	<0.05					mg/l	Test kit
Fluoride (w) <sub>A</sub> <sup>#</sup>	<0.10	0.18	0.60	0.54					mg/l	A-T-026w
Nitrite (w) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	0.3	<0.1					mg/l	A-T-026w
Nitrate (w) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	2.3	<0.1					mg/l	A-T-026w
Nitrate as N (w) <sub>A</sub> <sup>#</sup>	<0.022	<0.022	0.528	<0.022					mg/l	A-T-026w
Nitrogen, Total Oxidised TOxN (w) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	0.6	<0.1					mg/l	A-T-026w
Nitrogen, Total (w)	4.3	0.8	1.3	1.3					mg/l	Calc
Nitrogen (kjeldahl) (w) <sub>A</sub>	4.3	0.8	0.7	1.3					mg/l	Subcon DETS
Phosphate (orthophosphate) as P (w) <sub>A</sub> <sup>#</sup>	<0.007	0.037	0.119	0.237					mg/l	A-T-026w
Phosphorus, Total (dissolved) <sub>A</sub>	307	81	164	633					µg/l	A-T-025w
Sulphate (w) <sub>A</sub> <sup>#</sup>	693	1190	49	2060					mg/l	A-T-026w
DOC (w) <sub>A</sub> <sup>#</sup>	3.6	0.5	3.1	0.6					mg/l	A-T-032w
Oil & Grease (total) (w) <sub>A</sub>	<1	<1	<1	<1					mg/l	A-T-039w
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	4	2	1	11					µg/l	A-T-025w
Boron (dissolved) <sub>A</sub> <sup>#</sup>	571	1470	230	3990					µg/l	A-T-025w
Cadmium (dissolved 0.08 ug/l) <sub>A</sub>	<0.08	<0.08	<0.08	<0.08					µg/l	A-T-025w
Calcium (dissolved) <sub>A</sub> <sup>#</sup>	249	305	137	400					mg/l	A-T-049w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	5	4	6	5					µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	<1	1	<1	2					µg/l	A-T-025w
Chromium (hexavalent) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/l	A-T-040w

Envirolab Job Number: 18/10170

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/10170/9	18/10170/10	18/10170/11	18/10170/12					Units	Method ref
Client Sample No	1115-5 Shallow	1115-6 Deep	1115-12	1115-9						
Client Sample ID	BH4D	BH4D	BH10	BH11						
Depth to Top	1.67	1.69	2.56	2.50						
Depth To Bottom										
Date Sampled	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
Iron (dissolved) <sub>A</sub> <sup>#</sup>	7690	435	37	1300				µg/l		
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-025w	
Manganese (dissolved) <sub>A</sub> <sup>#</sup>	4850	6090	64	2090				µg/l	A-T-025w	
Magnesium (dissolved) <sub>A</sub> <sup>#</sup>	232	536	23	1130				mg/l	A-T-049w	
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1				µg/l	A-T-025w	
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	2	4	1	3				µg/l	A-T-025w	
Potassium (dissolved) <sub>A</sub> <sup>#</sup>	74	246	27	150				mg/l	A-T-049w	
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-025w	
Sodium (dissolved) <sub>A</sub> <sup>#</sup>	1510	4960	159	9660				mg/l	A-T-049w	
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	7	29	32	6				µg/l	A-T-025w	
Ethylene glycol (Monoethylene glycol) (w) <sub>A</sub>	<0.1	<0.1	<0.1	<0.1				mg/l	Subcon Chemtest	



Envirolab Job Number: 18/10170

Client Project Name: Gt Yarmouth 3rd River Crossing

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Lab Sample ID	18/10170/9	18/10170/10	18/10170/11	18/10170/12					Units	Method ref
Client Sample No	1115-5 Shallow	1115-6 Deep	1115-12	1115-9						
Client Sample ID	BH4D	BH4D	BH10	BH11						
Depth to Top	1.67	1.69	2.56	2.50						
Depth To Bottom										
Date Sampled	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	0.01	<0.02				µg/l	A-T-019w	
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.02				µg/l	A-T-019w	
Anthracene (w) <sub>A</sub> <sup>#</sup>	0.02	<0.01	<0.01	<0.02				µg/l	A-T-019w	
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	0.09	0.01	<0.01	<0.02				µg/l	A-T-019w	
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	0.10	0.01	<0.01	<0.02				µg/l	A-T-019w	
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.12	0.02	<0.01	<0.02				µg/l	A-T-019w	
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	0.07	<0.01	<0.01	<0.02				µg/l	A-T-019w	
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.04	<0.01	<0.01	<0.02				µg/l	A-T-019w	
Chrysene (w) <sub>A</sub> <sup>#</sup>	0.11	0.01	<0.01	<0.02				µg/l	A-T-019w	
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.02				µg/l	A-T-019w	
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	0.18	0.04	<0.01	<0.02				µg/l	A-T-019w	
Fluorene (w) <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.02				µg/l	A-T-019w	
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	0.08	<0.01	<0.01	<0.02				µg/l	A-T-019w	
Naphthalene (w) <sub>A</sub> <sup>#</sup>	0.04	<0.01	0.02	<0.02				µg/l	A-T-019w	
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	0.06	0.02	<0.01	<0.02				µg/l	A-T-019w	
Pyrene (w) <sub>A</sub> <sup>#</sup>	0.15	0.03	<0.01	<0.02				µg/l	A-T-019w	
Total PAH 16MS (w) <sub>A</sub> <sup>#</sup>	1.11	0.14	0.03	<0.02				µg/l	A-T-019w	

Envirolab Job Number: 18/10170

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/10170/9	18/10170/10	18/10170/11	18/10170/12					Units	Method ref
Client Sample No	1115-5 Shallow	1115-6 Deep	1115-12	1115-9						
Client Sample ID	BH4D	BH4D	BH10	BH11						
Depth to Top	1.67	1.69	2.56	2.50						
Depth To Bottom										
Date Sampled	29-Nov-18	29-Nov-18	29-Nov-18	29-Nov-18						
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW						
Sample Matrix Code	N/A	N/A	N/A	N/A						
TPH CWG (w)										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-055w	
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-055w	
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-055w	
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-055w	
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-055w	
Total Aliphatics (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-055w	
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
Aro >C8-C10 (w) <sub>A</sub>	<5	<5	<5	<5				µg/l	A-T-055w	
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-055w	
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5				µg/l	A-T-055w	
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	17	39	<5	12				µg/l	A-T-055w	
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10				µg/l	A-T-055w	
Total Aromatics (w) <sub>A</sub>	22	46	<10	12				µg/l	A-T-055w	
TPH (Ali & Aro >C5-C35) (w) <sub>A</sub>	22	46	<10	12				µg/l	A-T-055w	
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1				µg/l	A-T-022w	

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

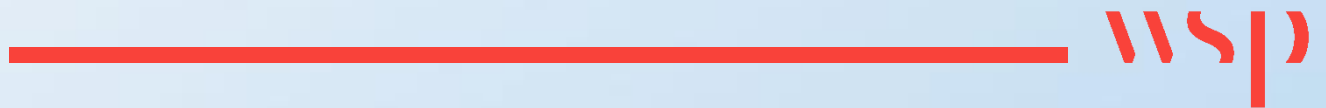
Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

# Appendix I

## **GAS AND GROUND WATER MONITORING**



**PZ1522D1:Gt Yarmouth 3rd River crossing - Piezometer readings**

Borehole No	04	04A	04Dshallow	04Ddeep	06	07	10	11	12B	13	15	20	21	22
01/06/2018	1.90	1.15	1.57	1.46	1.70	Inaccessible	Inaccessible	Inaccessible	Inaccessible	Inaccessible	1.35	x	x	x
21/06/2018	2.06	1.30	1.50	1.55	1.14	Inaccessible	2.37	2.30	1.78	1.75	1.42	x	x	x
03/07/2018	1.97	2.00	1.66	1.70	1.38	Inaccessible	2.44	2.45	Inaccessible	Inaccessible	1.40	x	x	x
19/07/2018	1.99	1.70	1.65	1.55	1.51	Inaccessible	2.66	2.51	Inaccessible	Inaccessible	1.44	x	x	x
02/08/2018	1.98	1.80	1.65	1.60	1.46	Inaccessible	2.70	2.66	Inaccessible	Inaccessible	1.43	x	x	x
17/08/2018	2.10	1.18	1.64	1.56	1.33	Inaccessible	2.38	2.32	Inaccessible	Inaccessible	2.10	x	x	x
30/08/2018	2.04	1.18	1.59	1.46	1.32	Inaccessible	2.34	2.27	1.70	1.61	1.56	x	x	x
04/10/2018	2.09	1.28	1.60	1.55	1.40	Inaccessible	2.74	2.76	1.76	1.73	1.36	1.22	1.19	0.95
18/10/2018	2.00	1.20	1.52	1.39	1.46	Inaccessible	2.61	2.60	1.71	1.66	1.34	1.23	1.29	0.94
01/11/2018	2.10	1.31	1.50	1.60	1.42	Inaccessible	2.75	2.76	1.74	1.75	1.38	1.23	1.20	0.90
14/11/2018	2.05	1.11	2.50	2.51	2.10	Inaccessible	2.59	2.74	1.73	1.73	1.30	1.26	1.10	0.93
29/11/2018	1.15	1.10	1.67	1.69	1.51	Inaccessible	2.56	2.50	1.83	1.87	1.36	1.23	1.17	0.95
11/12/2018	1.95	1.10	1.50	1.53	1.50	Inaccessible	2.43	2.40	1.91	1.96	1.26	1.2	1.15	0.86
20/12/2018	x	x	x	x	x	Dry	x	x	x	x	x	x	x	x

Readings are metres below existing ground level

**PZ1522D1:Gt Yarmouth 3rd River crossing - Methane readings**

<b>Borehole No</b>	<b>04</b>	<b>04A</b>	<b>04Dshallow</b>	<b>04Ddeep</b>	<b>06</b>	<b>07</b>	<b>10</b>	<b>11</b>	<b>12B</b>	<b>13</b>	<b>15</b>	<b>20</b>	<b>21</b>	<b>22</b>
17/08/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	Inaccessible	Inaccessible	0.0	x	x	x
30/08/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	1.1	0.0	0.8	0.0	x	x	x
04/10/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.1	0.0	0.4	0.0	0.0	0.0	0.0
18/10/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
01/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
11/12/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
20/12/2018	x	x	x	x	x	0.0	x	x	x	x	x	x	x	x

NOTE: A value of 0.0 represents a value that is below the limit of detection of 0.1%

**PZ1522D1:Gt Yarmouth 3rd River crossing - Carbon Dioxide readings**

Borehole No	04	04A	04Dshallow	04Ddeep	06	07	10	11	12B	13	15	20	21	22
17/08/2018	0.5	4.9	10.6	9.9	0.3	Inaccessible	1.5	0.5	Inaccessible	Inaccessible	0.1	x	x	x
30/08/2018	4.8	4.7	10.2	10.1	0.3	Inaccessible	1.2	6.1	3.6	0.1	0.5	x	x	x
04/10/2018	2.4	5.1	7.1	7.2	0.7	Inaccessible	1.0	5.3	0.4	0.1	0.4	0.1	0.0	0.1
18/10/2018	2.2	4.9	7.7	6.6	0.2	Inaccessible	1.1	5.4	0.0	0.0	0.4	0.0	0.0	0.2
01/11/2018	0.9	4.1	3.3	3.9	0.6	Inaccessible	0.9	6.1	0.1	0.3	0.3	0.1	0.0	0.1
14/11/2018	1.5	2.9	4.9	3.8	0.3	Inaccessible	0.6	2.8	0.1	0.0	0.1	0.1	0.1	0.1
29/11/2018	1.6	2.8	4.8	3.5	0.9	Inaccessible	0.6	2.4	0.2	0.1	0.2	0.1	0.1	0.1
11/12/2018	1.2	2.4	4.5	2.6	0.8	Inaccessible	0.5	3.1	0.2	0.1	0.1	0.1	0.1	0.1
20/12/2018	x	x	x	x	x	4.1	x	x	x	x	x	x	x	x

NOTE: A value of 0.0 represents a value that is below the limit of detection of 0.1%



**PZ1522D1:Gt Yarmouth 3rd River crossing - Oxygen readings**

Borehole No	04	04A	04Dshallow	04Ddeep	06	07	10	11	12B	13	15	20	21	22
17/08/2018	13.8	8.1	20.4	9.5	20.5	Inaccessible	4.9	19.8	Inaccessible	Inaccessible	18.8	x	x	x
30/08/2018	18.8	15.7	10.5	10.7	20.6	Inaccessible	6.0	3.8	17.5	18.9	19.4	x	x	x
04/10/2018	18.2	16.9	13.0	13.5	19.8	Inaccessible	7.4	3.0	17.7	19.6	18.8	19.7	18.5	19.6
18/10/2018	18.1	15.9	12.5	13.4	20.6	Inaccessible	5.4	2.9	16.6	20.3	19.1	20.5	21.1	20.6
01/11/2018	19.4	18.3	16.3	15.1	18.6	Inaccessible	9.6	3.9	17.9	20.3	20.0	19.7	19.8	20.1
14/11/2018	18.5	18.5	12.5	13.9	20.4	Inaccessible	19.9	9.7	20.6	20.8	15.7	19.6	19.9	20.1
29/11/2018	18.5	18.6	13.5	15.6	20.8	Inaccessible	20.3	9.6	20.6	19.8	20.2	19.9	20.1	20.2
11/12/2018	19.1	17.7	16.3	14.5	20.4	Inaccessible	20.2	11.6	20.6	19.9	20.6	20.4	20.3	20.5
20/12/2018	x	x	x	x	x	14.3	x	x	x	x	x	x	x	x

NOTE: A value of 0.0 represents a value that is below the limit of detection of 0.1%

**PZ1522D1:Gt Yarmouth 3rd River crossing - Flow readings**

Borehole No	04	04A	04Dshallow	04Ddeep	06	07	10	11	12B	13	15	20	21	22
17/08/2018	0.0	0.0	0.1	1.0	0.0	Inaccessible	0.1	0.2	Inaccessible	Inaccessible	0.0	x	x	x
30/08/2018	0.1	0.0	1.1	0.1	0.1	Inaccessible	0.1	1.1	0.1	0.1	0.0	x	x	x
04/10/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
18/10/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11/12/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20/12/2018	x	x	x	x	x	0.0	x	x	x	x	x	x	x	x

NOTE: A value of 0.0 represents a value that is below the limit of detection of 0.1 ltrs/hr

**PZ1522D1:Gt Yarmouth 3rd River crossing - Atmospheric Pressure readings**

<b>Borehole No</b>	<b>mbar</b>	<b>Status</b>
17/08/2018	1010	Steady
30/08/2018	1020	Steady
04/10/2018	1022	Steady
18/10/2018	1024	Steady
01/11/2018	1001	Steady
14/11/2018	1022-1021	Falling
29/11/2018	1002	Steady
11/12/2018	1026	Steady
20/12/2018	1003	Steady



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## **Annex B.2 2018 Gas and Groundwater Monitoring**

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PZ1522D1:Gt Yarmouth 3rd River crossing - Methane readings

Borehole No	04	04A	04Dshallow	04Ddeep	06	07	10	11	12B	13	15	20	21	22
17/08/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	Inaccessible	Inaccessible	0.0	x	x	x
30/08/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	1.1	0.0	0.8	0.0	x	x	x
04/10/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.1	0.0	0.4	0.0	0.0	0.0	0.0
18/10/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
01/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
11/12/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
20/12/2018	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-

NOTE: A value of 0.0 represents a value that is below the limit of detection of 0.1%



PZ1522D1:Gt Yarmouth 3rd River crossing - Carbon Dioxide readings

Borehole No	04	04A	04Dshallow	04Ddeep	06	07	10	11	12B	13	15	20	21	22
17/08/2018	0.5	4.9	10.6	9.9	0.3	Inaccessible	1.5	0.5	Inaccessible	Inaccessible	0.1	x	x	x
30/08/2018	4.8	4.7	10.2	10.1	0.3	Inaccessible	1.2	6.1	3.6	0.1	0.5	x	x	x
04/10/2018	2.4	5.1	7.1	7.2	0.7	Inaccessible	1.0	5.3	0.4	0.1	0.4	0.1	0.0	0.1
18/10/2018	2.2	4.9	7.7	6.6	0.2	Inaccessible	1.1	5.4	0.0	0.0	0.4	0.0	0.0	0.2
01/11/2018	0.9	4.1	3.3	3.9	0.6	Inaccessible	0.9	6.1	0.1	0.3	0.3	0.1	0.0	0.1
14/11/2018	1.5	2.9	4.9	3.8	0.3	Inaccessible	0.6	2.8	0.1	0.0	0.1	0.1	0.1	0.1
29/11/2018	1.6	2.8	4.8	3.5	0.9	Inaccessible	0.6	2.4	0.2	0.1	0.2	0.1	0.1	0.1
11/12/2018	1.2	2.4	4.5	2.6	0.8	Inaccessible	0.5	3.1	0.2	0.1	0.1	0.1	0.1	0.1
20/12/2018	-	-	-	-	-	4.1	-	-	-	-	-	-	-	-

NOTE: A value of 0.0 represents a value that is below the limit of detection of 0.1%

PZ1522D1:Gt Yarmouth 3rd River crossing - Oxygen readings

Borehole No	04	04A	04Dshallow	04Ddeep	06	07	10	11	12B	13	15	20	21	22
17/08/2018	13.8	8.1	20.4	9.5	20.5		4.9	19.8	Inaccessible	Inaccessible	18.8	x	x	x
30/08/2018	18.8	15.7	10.5	10.7	20.6		6.0	3.8	17.5	18.9	19.4	x	x	x
04/10/2018	18.2	16.9	13.0	13.5	19.8		7.4	3.0	17.7	19.6	18.8	19.7	18.5	19.6
18/10/2018	18.1	15.9	12.5	13.4	20.6		5.4	2.9	16.6	20.3	19.1	20.5	21.1	20.6
01/11/2018	19.4	18.3	16.3	15.1	18.6		9.6	3.9	17.9	20.3	20.0	19.7	19.8	20.1
14/11/2018	18.5	18.5	12.5	13.9	20.4		19.9	9.7	20.6	20.8	15.7	19.6	19.9	20.1
29/11/2018	18.5	18.6	13.5	15.6	20.8		20.3	9.6	20.6	19.8	20.2	19.9	20.1	20.2
11/12/2018	19.1	17.7	16.3	14.5	20.4		20.2	11.6	20.6	19.9	20.6	20.4	20.3	20.5
20/12/2018	-	-	-	-	-	14.3	-	-	-	-	-	-	-	-

NOTE: A value of 0.0 represents a value that is below the limit of detection of 0.1%

PZ1522D1:Gt Yarmouth 3rd River crossing - Flow readings

Borehole No	04	04A	04Dshallow	04Ddeep	06	07	10	11	12B	13	15	20	21	22
17/08/2018	0.0	0.0	0.1	1.0	0.0	Inaccessible	0.1	0.2	Inaccessible	Inaccessible	0.0	x	x	x
30/08/2018	0.1	0.0	1.1	0.1	0.1	Inaccessible	0.1	1.1	0.1	0.1	0.0	x	x	x
04/10/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
18/10/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29/11/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11/12/2018	0.0	0.0	0.0	0.0	0.0	Inaccessible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20/12/2018	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-

NOTE: A value of 0.0 represents a value that is below the limit of detection of 0.1 ltrs/hr

PZ1522D1:Gt Yarmouth 3rd River crossing - Atmospheric Pressure readings

Borehole No	mbar	Status
17/08/2018	1010	Steady
30/08/2018	1020	Steady
04/10/2018	1022	Steady
18/10/2018	1024	Steady
01/11/2018	1001	Steady
14/11/2018	1022-1021	Falling
29/11/2018	1002	Steady
11/12/2018	1026	Steady
20/12/2018	1003	Steady

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## **Annex B.3 2006 Ground Investigation Factual Report**

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## Appendices

- Appendix A - Extract from geological map
- Appendix B - Site Plan
- Appendix C - Borehole, Trialpit and Window Sample Logs
- Appendix D - Laboratory Test Results
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- Appendix H - UXO Desk Study
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- Appendix J - Historical Borehole Log, Fishermans Wharf
- Appendix K - Land owners and contacts



ii) Distribution

Planning & Transportation	2 copies
Mott Macdonald	1 copy
Norfolk Partnership Laboratory.	1 copy

Each party also received a copy in pdf format.

## 1.0. Introduction.

This ground investigation was carried out on land approximately 2 kilometres to the south of the centre Great Yarmouth. The site is approximately centred at OSGR 652620,305495. The area of investigation is approximately 1 kilometre in length north, south and extends to the east approximately 500 metres and approximately 350 metres to the west from the River Yare. The investigation was undertaken by Norfolk Partnership Laboratory on behalf of Norfolk County Council. Norfolk Partnership Laboratory provides a service within the Highways Operation Group of the Department of Planning and Transportation of Norfolk County Council.

It is proposed to construct a new River Yare crossing to ease the traffic congestion within Great Yarmouth town centre. At present the options being considered are;

- a) High level bridge crossings (deck level >8m above Spring Tide level)
- b) Low level bridge crossings
- c) Tunnel crossings

At this stage five different locations for a high or low level bridge and two locations for a tunnel are being considered. These combined give a total of twelve alternative crossing options.

This report covers a preliminary site investigation of the area. The principle purposes of this phase of the investigation were to:

- a) Carry out an early assessment of the actual ground conditions present and to determine their geotechnical properties.
- b) Carry out an early assessment of the actual ground conditions present with respect to contamination within the soil and water.
- c) Carry out an early assessment of the tidal influence on groundwater levels that are likely to affect construction.
- d) Carry out a UXO Desk Study and a preliminary UXO survey in the field during the site investigation works.

This report describes the expected geology of the region, the fieldwork carried out laboratory tests performed and the actual ground conditions encountered.

This site investigation data contained within this report is available in Association of Geotechnical Specialist (AGS) data format upon request.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

## 2.0 General Geology

The geology of the region may be summarised as follows :-

Recent	: Tidal River or Creek Deposits	
	: Blown Sand	
	: Breydon Formation	: Breydon Peat
		: Breydon Silts and Clays
	: North Denes Formation	
Pleistocene	: Corton Formation	: Corton Sand
	: Kesgrave Sand and Gravel	
	: Lowestoft Till	
	: Norwich Crag	
Eocene	: Walton Member	
	: Harwich Member	
	: Hales Clay	
Palaeocene	: Ormesby Clay	
Cretaceous	: Upper Chalk	

An extract from the geological map can be found in Appendix A.

The **Norwich Crag** was formed when, after a long period of standing above sea level, the area was submerged by a marine transgression caused by movements of the sea floor during a period of coastal instability in the region. The deposits are a variable series of yellowish or reddish brown sands, laminated clays and pebbly gravels. In places they are highly fossiliferous, shell fragments being especially prolific. The thickness of these deposits is variable between 5 and 60 metres.

**Lowestoft Till** is a heterogeneous mass of rock fragments, mainly chalk and flint, but with some material from further afield, suspended in a groundmass of grey sand, silt and clay which is usually derived from local sources. The glaciers which formed this material advanced from the west or north-west.

The **Corton Formation** is probably glacio-marine in origin and comprises of orange to buff, mostly fine grained sand with subordinate gravel, often gravely towards the base. A widespread sandy clay or till occurs at the base and is equivalent to the Cromer Till of North Norfolk. Thicknesses up to 10 metres may be present.

**North Denes Formation** comprises the deposits of a coastal barrier that extends in a tract up to about one kilometre wide between Caister-on-Sea and Gorleston-on-Sea, a distance of some eight kilometres. It consists of sand and subordinate gravel, and flanks the eastern limits of the Breydon Formation. Seawards, the formation extends to an arbitrary limit taken at the present coastline, where it is flanked by shoreface and beach sands.

The **Breydon Formation** is a series of older estuarine deposits of soft grey to dark grey silty clay and fine to medium grained sand. The materials are commonly laminated or bioturbated and include disseminated plant material and layers of peat. Bivalve shells occur locally. The upper 1-2 metres often forms a desiccated crust and is mottled and firm to stiff in nature. These materials may be up to 20 metres in thickness nearer the coast tapering to a thin veneer further inland.

Sands of a wind blown origin known as **Blown Sand** deposits which are locally up to 5 metres thick occurs at the surface in the coastal belt. This formation is common between Caister on Sea and Gorleston on Sea, and forms the foundation for much of the older part of the town of Great Yarmouth. The sand is typically buff in colour and fine in nature.

**Alluvium** is the material laid down in its channel and on the flood plain by modern day rivers. This material is generally silt, sand or clay. The presence of gravels represents times of flood. Where still conditions prevail then the growth of plant material may occur in or near the river channel, this facilitates the development of peat as this material dies and is buried.

According to the Regional Hydrogeology Map of Northern East Anglia, the Upper Chalk is the principle aquifer for the area.



#### 4.0 Geotechnical Laboratory Testing

A laboratory geotechnical testing schedule was drawn up to assist classification of the soils and to determine their physical and chemical properties. Norfolk Partnership Laboratory is a UKAS TESTING laboratory No. 0920.

- a) The determination of Natural Moisture Content by oven drying (BS1377:1990:Part 2: Clause 3).
- b) The determination of Liquid Limit using the four point cone penetrometer method (BS 1377: 1990: Part 2: Clause 4).
- c) The determination of the Plastic Limit (BS 1377: 1990: Part 2: Clause 5).
- d) The determination of Particle Size Distribution (BS1377:1990:Part 2: Clause 9.2).
- e) The determination of Particle Size Distribution by Sedimentation (BS1377:1990:Part 2: Clause 9.3).
- f) The determination of Plasticity Index (BS 1377: 1990: Part 2: Clause 5).
- g) The determination of the Californian Bearing Ratio value (B.S. 1377: Part 4: 1990: Clause 7).
- h) The determination of the Moisture Content / Density Relationship (B.S. 1377: Part 4: 1990: Clause 3).
- i) The determination of Particle Density by Gas Jar Method (BS1377:1990: Part 2 : Clause 8).
- j) The determination of organic matter content (BS1377: Part 3 :Section 3).

The laboratory does not hold accreditation for the following tests undertaken:

In addition the following tests were subcontracted to ALcontrol Geochem (UKAS TESTING laboratory No 1291)

- k) The determination of Total Sulphate, Water Soluble Sulphate and Total Potential Sulphur in accordance with TRL447.

Additional testing was subcontracted for the detection of potential soil and groundwater contamination. This is outlined in Section 7 of this report.

These results are included in Appendix D. The laboratory will retain remaining samples for 28 days from the date of issue of this report.

## 5.0 Ground Conditions

The exploratory holes substantially confirm the Geology outlined in Section 2.1 of this report and the soils are described below.

### 5.1 Surface Deposits and Made Ground

No Topsoil was recorded during this investigation.

Asphalt and intact concrete was recorded as the surface deposits in a number of holes. Thickness ranged between 0.10 metre up to 0.35 metres. Often the concrete was reinforced with steel. Flint cobbles were also noted in a small number of holes on the eastern side of the site.

Soft cover was noted in BH's 101, 107, 108, 111, 111A, 111B, 112, 113, TP's 101, 104, 109 and WS 111. Made Ground was recorded in all holes undertaken within the site. The thickness of Made Ground revealed ranged from 0.30 in BH 109 up to 3.00 metres in BH's 112, 115 and WS 108. The Made Ground deposits varied vastly across the site. Generally a fine and medium sand matrix was noted with numerous up to cobble size inclusions. These inclusions were noted as concrete, brick, flint, ash and metal. More detail can be found on the logs in Appendix C.

### 5.2 Tidal River or Creek Deposits

Tidal River and Creek deposits were revealed in BH's 103, 105, 106, 109, 114 and 117. This deposit was encountered at depths ranging from 0.30 metre in BH 109 up to 2.60 metres in BH 114. Colours included light brown, dark grey, black, greyish brown, brownish grey, brown, orangey brown and grey. This material comprised a sandy silt or a silty clayey sand. Organic lenses and material were also noted within this deposit. Thickness recorded ranged from 0.40 metres in BH 114 up to 3.90 metres in BH 105. The base of this deposit was proven in all holes where found at a maximum depth of 5.00 metres in BH 117.

SPT N values calculated within this material ranged from very loose through loose up to an occasional medium dense.

### 5.3 Blown Sand

Blown Sand was revealed in WS's 105, 106 and 111. This deposit was encountered at depths of 0.50 metre in WS's 105 and 111 and 0.60 metre in WS 106. This material comprised a light brown fine and medium sand. Occasional and a little fine and medium or fine medium and coarse rounded flint clasts were noted in some of this deposit. Thickness recorded ranged from 2.70 metres in WS 105 up to 3.40 metres in WS 106. The base of this deposit was proven in all holes where found at a maximum depth of 4.00 metres in WS 106.



#### 5.4 Breydon Formation : Breydon Peat

The Breydon Formation : Breydon Peat was encountered in BH's 101 and 108. This deposit was encountered at a depth of 1.50 metres in BH 108 and 1.70 metres in BH101. Colours were generally dark grey, black and greyish brown. This material generally comprised a soft dark grey amorphous peat. Soft organic silty clay with lenses of black fibrous peat was also noted. Thickness recorded ranged from 0.50 metre in BH 108 up to 1.10 metres in BH 101. The base of this deposit was proven in all holes where found at a maximum depth of 2.80 metres in BH 101.

#### 5.5 Breydon Formation : Breydon Silts and Clays

The Breydon Formation : Breydon Silts and Clays were encountered in BH's 101, 102, 104, 108, 110, 111, 111A, 113, TP's 101 and 104. This deposit was encountered at depths ranging from 1.10 metres in BH 102 up to 2.30 metres in BH 113. Colours included dark grey, black, greyish brown, brownish grey, brown, orangey brown and grey. This material was found to be a mixture of sands, sandy silty clay, peaty sands, clay and silt. Thickness recorded ranged from 0.10 metre in TP101 up to 5.00 metres in BH 110. The base of this deposit was not proven in TP's 101 and 104 at depths of 1.70 metres and 3.30 metres respectively. The deposit was proven in all other holes where identified at a maximum depth of 6.70 metres in BH 110.

#### 5.6 North Denes Formation

The North Denes Formation was identified in BH's 103, 105, 106, 107, 109, 114, 115, 116, 117, WS's 103, 104, 105, 106, 107, 108, 110 and 111. This deposit was encountered at depths ranging from 0.50 metre in WS's 103, 104 and 110 up to 5.00 metres in BH 117. Colours included light brown, greyish brown, brownish grey, brown, greyish brown and dark grey. This material was generally a sand with varying proportions of sub angular and rounded gravel. Clast content ranged from none through some and much up to equal proportions of fine, medium and coarse flint. Proven thickness recorded ranged from 3.95 metres in BH's 106 up to 14.00 metres in BH 107. The base of this deposit was not proven in BH 114 and all the window sample holes at a maximum depth of 5.00 metres. The deposit was proven in all other holes where identified at a maximum depth of 16.80 metres in BH 109.

N values calculated within this material ranged across the site with values increasing with depth. Densities recorded were loose, medium dense, dense and very dense.

#### 5.7 Corton Formation

The Corton Formation was identified in BH's 108, 110, 111, 111A, 112, 113 and TP109. This deposit was encountered at depths ranging from 0.30 metre in TP 109 up to 6.7 metres in BH 110. Colours included brown, orangey brown, yellowish brown and dark grey. This material was generally a fine and medium sand. Occasional clay and silt lenses were noted present within this deposit. Varying proportions of sub angular and rounded gravel were noted. Clast content ranged from none through a little up to some fine, medium and coarse flint and occasional

quartz. Thickness recorded ranged from 4.40 metres in BH 113 up to 8.00 metres in BH 112. The base of this deposit was not proven in TP 109 at a depth of 3.50 metres. The deposit was proven in all other holes where identified at a maximum depth of 12.00 metres in BH 112.

N values calculated within this material ranged across the site with values increasing with depth. Densities recorded were medium dense and dense.

#### 5.8 Corton Formation: Corton Sand

The Corton Formation : Corton Sand was identified in BH's 101, 102 and 104. This deposit was encountered at depths ranging from 2.80 metres in BH 101 up to 5.80 metres in BH 104. Colours included brown, orangey brown, yellowish brown, greyish brown and grey. This material was generally a fine and medium sand. Varying proportions of sub angular and rounded gravel Clast content ranged from none through a little up to some fine, medium and coarse flint. Thickness recorded ranged from 6.90 metres in BH 102 up to 9.20 metres in BH 104. The base of this deposit was proven in all holes where identified at a maximum depth of 15.00 metres in BH 104.

N values calculated ranged from medium dense through dense up to very dense.

#### 5.9 Kesgrave Sand and Gravel

The Kesgrave Sand and Gravel was identified in BH's 106 and 116. This deposit was encountered at depths ranging from 6.00 metres and 8.50 metres respectively. Colours included brown, orangey brown and reddish brown. This material was generally a fine, medium and coarse sand and gravel and varying proportions of sub rounded and rounded gravel. Clast content ranged from none through some up to much fine, medium and coarse flint and quartz. Thickness recorded ranged from 5.50 metres in BH 116 up to 10.00 metres in BH 106. The base of this deposit was proven in all holes where identified at a maximum depth of 16.00 metres in BH 106.

Although not identified in other holes, this material maybe present as it is difficult to distinguish from other granular deposits.

N values calculated ranged were generally medium dense to dense. It should be noted that occasional loose densities were recorded.

#### 5.10 Lowestoft Till

No Lowestoft Till deposits were positively identified during this investigation.

#### 5.11 Crag

Crag deposits were positively identified during this investigation in all cable percussion boreholes with the exception of BH's 111A and 111B. The Crag deposits were not discovered in any of the trialpits or any of the window sample hole.

This deposit was encountered at depths ranging from 7.00 metres in BH 111 up to 16.80 metres in BH 109. Colours included reddish brown, orangey brown and grey. This material was generally a fine and medium sand. Laminae, lenses and layers of silty clay and silt were also noted within this deposit. A little fine flint gravel and shell fragments were noted to be present within some areas of this deposit. A maximum thickness of 31.50 metres was recorded in BH 113. The base of this deposit was not proven in any of the holes where identified at a maximum depth of 40.00 metres in BH's 105, 109, 113 and 117.

N values calculated within this material indicate densities ranging from medium dense through dense up to very dense.

#### 5.12 Walton Member

No Walton Member deposits were positively identified during this investigation.

#### 5.13 Harwich Member

The Harwich Member was not encountered during this investigation.

#### 5.14 Hales Clay

No Hales Clay was recorded during this investigation.

#### 5.15 Ormesby Clay

The Ormesby Clay was not positively identified during this investigation.

#### 5.16 Upper Chalk

No Upper Chalk was revealed during this investigation.



Groundwater was subsequently monitored on five occasions. These results can be seen tabulated below.

Table 2. Piezometer readings

BH ID	Hole depth (m)	26/09/07	05/10/07	12/10/07	19/10/07	22/10/07
		Depth below ground level (m)				
101	3.20	1.60	1.69	1.44	1.60	1.57
101	9.00	1.51	1.73	1.55	1.57	1.60
102	3.10	2.30	1.81	2.19	2.23	2.36
102	24.65	2.04	1.84	2.27	2.51	2.30
103	1.62	0.79	0.92	0.86	0.78	0.86
103	35.00	1.01	1.05	1.04	1.00	1.12
104	5.50	1.37	2.43	1.42	1.73	1.87
104	28.50	1.34	2.52	1.44	1.72	1.86
105	3.00	1.14	1.16	1.08	1.10	1.10
105	26.40	1.14	1.21	1.09	1.07	1.12
105	40.00	1.33	1.09	1.09	1.07	1.12
106	3.57	1.15	1.21	1.19	1.22	1.20
106	11.90	1.17	1.23	1.19	1.23	1.22
107	2.95	2.49	2.51	2.52	2.52	2.55
107	10.00	2.56	2.51	2.53	2.53	2.54
107	19.80	2.52	2.51	2.52	2.52	2.53
108	2.80	1.12	1.06	1.01	1.02	1.02
108	19.90	1.35	1.31	0.95	1.11	1.11
109	2.50	1.27	1.24	1.17	1.21	1.22
109	39.00	1.29	1.29	0.77	1.25	1.24
110	2.60	2.04	1.99	1.95	1.97	1.95
110	28.10	1.55	2.83	2.52	2.73	2.59
111	1.85	Dry	Dry	Dry	Dry	Dry
111	19.50	2.70	2.75	2.60	2.73	2.68
112	2.60	2.57	2.56	2.55	2.55	2.55
112	19.70	2.65	3.01	2.74	2.77	2.79
113	1.62	n/a	Dry	2.09	2.24	2.11
113	4.20	n/a	2.34	1.99	2.21	2.06
114	2.80	1.64	1.97	1.77	1.88	1.84
115	3.00	2.85	2.84	2.88	2.84	2.86
115	27.70	2.85	2.83	2.89	2.83	2.86
116	2.50	2.02	2.00	1.92	1.98	2.00
116	7.30	2.02	2.00	1.93	1.97	2.01
117	5.80	1.91	2.01	1.92	1.92	1.91
117	40.00	1.94	1.96	1.75	1.90	1.87

More detail concerning the water level dips can be found in Appendix F.

## 7.0 Contamination Investigation

### 7.1 Contamination within the soil

The following tests were subcontracted ALcontrol Hawarden. ALcontrol Hawarden is a UKAS TESTING laboratory No. 1291.

The following samples were analysed.

Location Number	Depth (m)	Type	Testing undertaken
BH101	0.50	Soil	MM4, Speciated PAH
BH101	1.00	Soil	BRE SD1
BH101	8.00-8.45	Soil	BRE SD1
BH102	0.5	Soil	MM4, Speciated PAH
BH102	1.20-1.65	Soil	BRE SD1
BH102	3.0	Soil	MM4, Speciated PAH
BH102	10.00-10.45	Soil	BRE SD1
BH103	21.0	Soil	BRE SD1
BH103	0.5	Soil	MM4, Speciated TPH
BH103	5.0	Soil	BRE SD1
BH104	0.5	Soil	MM4
BH104	0.6	Soil	BRE SD1
BH104	25.5-25.95	Soil	BRE SD1
BH105	1.00	Soil	MM4, BRE SD1, Speciated PAH, Speciated TPH
BH 105	30.20	Soil	BRE SD1
BH 105	26.00	Soil	BRE SD1
BH 105	34.00	Soil	BRE SD1
BH106	0.2	Soil	MM4
BH 106	9.00	Soil	BRE SD1
BH 106	0.60	Soil	BRE SD1
BH107	1.00	Soil	MM4
BH 107	3.00	Soil	BRE SD1
BH108	1.00	Soil	MM4, BRE SD1, Speciated PAH, Speciated TPH
BH109	0.5	Soil	MM4
BH109	17.0	Soil	BRE SD1
BH109	9.5	Soil	BRE SD1
BH110	0.50	Soil	MM4, BRE SD1
BH110	1.00	Soil	MM4, BRE SD1
BH110	2.00	Soil	MM4
BH110	3.00	Soil	MM4
BH110	4.00	Soil	MM4
BH110	6.70	Soil	MM4

BH110	11.50	Soil	MM4
BH110	13.00	Soil	MM4
BH111	0.2	Soil	MM4, Speciated TPH
BH111	0.7	Soil	BRE SD1
BH112	0.5	Soil	MM4, Speciated PAH, Speciated TPH
BH112	1.4	Soil	BRE SD1
BH112	3.0	Soil	BRE SD1
BH112	4.0-4.45	Soil	BRE SD1
BH113	0.50	Soil	MM4, BRE SD1
BH114	1.20	Soil	BRE SD1
BH114	1.8	Soil	BRE SD1
BH 114	0.50	Soil	MM4, Speciated TPH
BH 114	2.20	Soil	MM4, Speciated TPH
BH115	0.5	Soil	BRE SD1
BH115	1.0	Soil	MM4, BRE SD1
BH115	3.0	Soil	MM4
BH115	6.50	Soil	BRE SD1
BH116	1.0	Soil	MM4, Speciated TPH
BH 116	24.50	Soil	BRE SD1
BH 116	28.50	Soil	BRE SD1
BH117	0.35	Soil	MM4
BH117	1.0	Soil	BRE SD1
BH117	10.0	Soil	BRE SD1
TP101	0.20	Soil	MM4
TP101	0.50	Soil	BRE SD1
TP104	0.20	Soil	MM4
TP104	0.50	Soil	BRE SD1
TP109	0.50	Soil	MM4, BRE SD1
WS104	0.50	Soil	MM4, BRE SD1, Speciated PAH, Speciated TPH
WS104	1.00	Soil	BRE SD1
WS 107	0.40	Soil	BRE SD1
WS 107	0.50	Soil	MM4
WS110	0.15	Soil	MM4, BRE SD1, Speciated PAH, Speciated TPH

MM4 suite = Sulphide Acid Soluble, Arsenic, Asbestos Screen, Boron Water Soluble, Barium, Beryllium, Cadmium, Chromium, Copper, Cyanide Free, Mercury, Nickel, Nitrate as NO<sub>3</sub> Kone, PAH Total GC-EZ, Lead, pH, Selenium, Cyanide Total, Sulphur Total, C6-40 (Band 1) EZ, Sulphate Total, Vanadium, Zinc.

BRE SD1 = Chloride 2:1 water/soil extract BRE, Magnesium 2:1 water/soil extract BRE, Nitrate 2:1 water/soil extract BRE, pH Value, Soluble Sulphate 2:1 Extract as SO<sub>4</sub> BRE, Total Sulphate BRE, Sulphur Total,

The samples were analysed in accordance with the methods detailed in ALcontrol method files.



Tabulated below are the minimum and maximum values recorded

Parameter	Minimum	Maximum	Units + LOD
Total Sulphate	160	23000	<100 mg/kg
Boron Water Soluble	<3.5	4.3	<3.5 mg/kg
Total Sulphate BRE	<0.01	1.3	<0.01%
Arsenic	<3	23	<3.0 mg/kg
Barium	<6	680	<6.0 mg/kg
Beryllium	<0.4	0	<0.4 mg/kg
Cadmium	<0.3	0.8	<0.3 mg/kg
Chromium	<4.5	57	<4.5 mg/kg
Copper	<6	330	<6 mg/kg
Lead	<2	1600	<2 mg/kg
Mercury	<0.6	0	<0.6 mg/kg
Nickel	<0.9	30	<0.9 mg/kg
Selenium	<3	0	<3 mg/kg
Vanadium	<1.5	59	<1.5 mg/kg
Zinc	<2.5	1500	<2.5 mg/kg
Ammonium as NH4 in 2:1 Extract BRE	<0.0003	0.0099	<0.0003 g/l
Nitrate (soluble) as NO3	<1	54	<1 mg/kg
Acid Soluble Sulphide	<50	1200	<50 mg/kg
Total Cyanide	<1	37	<1 mg/kg
Free Cyanide	<1	0	<1 mg/kg
Complex Cyanide	<1	37	<1 mg/kg
Asbestos Presence Screen	None	None	Detected
Chloride 2:1 water/soil extract BRE	0.002	1.7	<0.001 g/l
Magnesium 2:1 water/soil extract BRE	<0.001	0.072	<0.001 g/l
Nitrate 2:1 water/soil extract BRE	<0.0003	0.021	<0.0003 g/l
pH Value	7.47	11.52	<1.00 pH Units
Soluble Sulphate 2:1 Extract as SO4 BRE	<0.003	1.1	<0.003 g/l
Total Sulphur	<0.01	4.1	<0.01%
GRO (C4-C12)	<10	890	<10 ug/kg
MTBE	<10	0	<10 ug/kg
Benzene	<10	0	<10 ug/kg
Toluene	<10	180	<10 ug/kg
Ethyl benzene	<10	0	<10 ug/kg
m & p Xylene	<10	0	<10 ug/kg
o Xylene	<10	0	<10 ug/kg
Aliphatics C5-C6	<10	26	<10 ug/kg
Aliphatics >C6-C8	<10	670	<10 ug/kg
Aliphatics >C8-C10	<10	0	<10 ug/kg
Aliphatics >C10-C12	<10	0	<10 ug/kg
Aliphatics >C12-C16	<100	8400	<100 ug/kg
Aliphatics >C16-C21	<100	16000	<100 ug/kg
Aliphatics >C16-C35	<100	7800000	<100 ug/kg

Aliphatics >C21-C35	<100	110000	<100 ug/kg
Aliphatics >C35-C44	<100	17000000	<100 ug/kg
Total Aliphatics C5-C35	<100	130000	<100 ug/kg
Total Aliphatics C5-C44	<100	24000000	<100 ug/kg
Aromatics C6-C7	<10	<10	<10 ug/kg
Aromatics >C7-C8	<10	180	<10 ug/kg
Aromatics >EC8-EC10	<10	13	<10 ug/kg
Aromatics >EC10-EC12	<10	<10	<10 ug/kg
Aromatics >EC12-EC16	<100	15000	<100 ug/kg
Aromatics >EC16-EC21	<100	300000	<100 ug/kg
Aromatics >EC21-EC35	<100	18000000	<100 ug/kg
Aromatics >EC35-EC44	<100	35000000	<100 ug/kg
Total Aromatics C6-C35	19000	780000	<100 ug/kg
Total Aromatics C6-C44	<100	53000000	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C35)	19000	840000	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C44)	<100	78000000	<100 ug/kg
TPH C6-40	<10	770	<10 mg/kg
PAH Total	<10	210	<10 mg/kg
Naphthalene	17	4800	<10 ug/kg
Acenaphthylene	<5	170	<5 ug/kg
Acenaphthene	<14	2100	<14 ug/kg
Fluorene	<12	1500	<12 ug/kg
Phenanthrene	<21	25000	<21 ug/kg
Anthracene	<9	5000	<9 ug/kg
Fluoranthene	<25	42000	<25 ug/kg
Pyrene	<22	33000	<22 ug/kg
Benz(a)anthracene	21	19000	<12 ug/kg
Chrysene	<10	19000	<10 ug/kg
Benzo(b)fluoranthene	<16	26000	<16 ug/kg
Benzo(k)fluoranthene	<25	7700	<25 ug/kg
Benzo(a)pyrene	<12	20000	<12 ug/kg
Indeno(123cd)pyrene	<11	9800	<11 ug/kg
Dibenzo(ah)anthracene	<8	3100	<8 ug/kg
Benzo(ghi)perylene	16	11000	<10 ug/kg
PAH 16 Total	69	230000	<25 ug/kg

## 7.2 Contamination within the Groundwater

Groundwater was sampled and analysed from nine locations across the site. These locations were agreed at the end of the drilling works. All the boreholes were purged before sampling with three times the insitu volume being removed before sampling took place. In addition one water sample was taken from TP104 and was also sent for analysis.

The testing was subcontracted to ALcontrol Hawarden. ALcontrol Hawarden is a UKAS TESTING laboratory No. 1291.

The sampling points and testing can be seen tabulated below;

BH ID	Depth of bore (m)	Location	Tests
104 Shallow	5.50	West of River Yare	MM4, TPH total, PAH total, Speciated PAH
105 Deep	40.00	East of River Yare	MM4, TPH total, PAH total, Speciated PAH
107 Shallow	2.95	East of River Yare	MM4, TPH total, PAH total, Speciated PAH
108 Deep	19.90	West of River Yare	MM4, TPH total, PAH total, Speciated PAH
110 Shallow	2.60	West of River Yare	MM4, TPH total, PAH total, Speciated PAH
112 Deep	19.70	West of River Yare	MM4, TPH total, PAH total, Speciated PAH
114 Shallow	2.80	East of River Yare	MM4, TPH total, PAH total, Speciated PAH
115 Deep	27.70	East of River Yare	MM4, TPH total, PAH total, Speciated PAH
117 Deep	40.00	East of River Yare	MM4, TPH total, PAH total, Speciated PAH
TP 104	n/a	West of River Yare	MM4, TPH total, PAH total, Speciated PAH

Tabulated below are the minimum and maximum values recorded

Parameter	Minimum	Maximum	Units + LOD
Arsenic Dissolved (ICP-MS)	2	35	<1 ug/l
Barium Dissolved (ICP-MS)	10	430	<1 ug/l
Beryllium Dissolved (ICP-MS)	<1	<1	<1 ug/l
Boron Dissolved (ICP-MS)	74	3000	<10 ug/l
Cadmium Dissolved (ICP-MS)	<0.4	0.6	<0.4 ug/l
Chromium Dissolved (ICP-MS)	3	16	<1 ug/l
Copper Dissolved (ICP-MS)	<1	2	<1 ug/l
Lead Dissolved (ICP-MS)	<1	1	<1 ug/l
Nickel Dissolved (ICP-MS)	2	47	<1 ug/l
Selenium Dissolved (ICP-MS)	<1	130	<1 ug/l
Vanadium Dissolved (ICP-MS)	<1	25	<1 ug/l
Zinc Dissolved (ICP-MS)	<3	160	<3 ug/l
Mercury Dissolved (CVAA)	<0.05	0	<0.05 ug/l
Nitrate as NO <sub>3</sub>	<0.3	56	<0.3 mg/l
Sulphate (soluble)	8	1600	<3 mg/l
Sulphide	<0.5	<0.5	<0.5 mg/l
Total Cyanide	<0.05	3.5	<0.05 mg/l
Free Cyanide	<0.05	0.94	<0.05 mg/l
Complex Cyanide	0.18	0.18	<0.05 mg/l
Free Sulphur	<0.05	0.13	<0.05 mg/l
pH Value	7.64	8.16	<1.00 pH Units
EPH (DRO) (C10-C40) Aqueous	<10	4300	<10 ug/l
Naphthalene Aqueous	<26	67000	<26 ng/l
Acenaphthylene Aqueous	<11	1300	<11 ng/l
Acenaphthene Aqueous	<15	1900	<15 ng/l
Fluorene Aqueous	<14	3200	<14 ng/l
Phenanthrene Aqueous	<22	13000	<22 ng/l
Anthracene Aqueous	<15	1300	<15 ng/l
Fluoranthene Aqueous	<17	3600	<17 ng/l
Pyrene Aqueous	<15	2100	<15 ng/l
Benz(a)anthracene Aqueous	<17	180	<17 ng/l
Chrysene Aqueous	<13	130	<13 ng/l
Benzo(b)fluoranthene Aqueous	<23	63	<23 ng/l
Benzo(k)fluoranthene Aqueous	<27	<27	<27 ng/l
Benzo(a)pyrene Aqueous	<9	34	<9 ng/l
Indeno(123cd)pyrene Aqueous	<14	<14	<14 ng/l
Dibenzo(ah)anthracene Aqueous	<16	<16	<16 ng/l
Benzo(ghi)perylene Aqueous	<16	<16	<16 ng/l
PAH 16 Total Aqueous	<27	93000	<27 ng/l

The results of all these tests can be found in Appendix E.

An AGS file containing all these results has been issued accompanying this report.

## 8.0 Gas investigation

Monitoring of naturally occurring ground gasses was undertaken on thirty five installations across the site. Five sets of gas results were obtained. The maximum and minimum values can be found below. The complete results can be found in Appendix G.

### Minimum Values

BH No.	Depth	Atmospheric Pressure	CO2 (%)	CH4 (%)	O2 (%)	LEL (%)	Flow Rate
101	3.20	1000	0.5	0.0	3.6	0.0	0.0
101	9.00		0.0	0.0	1.0	0.0	0.0
102	3.10	1015	0.0	0.0	10.1	0.0	0.0
102	24.65		0.0	0.0	17.1	0.0	0.0
103	1.62	1008	0.0	0.0	20.3	0.0	0.0
103	35.00		0.0	0.0	20.4	0.0	0.0
104	5.50	1007	0.1	0.0	11.1	0.0	0.0
104	28.50		0.0	0.0	16.9	0.0	0.0
105	3.00	1007	0.0	0.0	16.2	0.0	-1.2
105	26.40		0.0	0.0	19.7	0.0	0.0
105	40.00		0.0	0.0	18.3	0.0	0.0
106	3.57	1015	0.0	0.0	18.3	0.0	0.0
106	11.90		0.0	0.0	18.4	0.0	0.0
107	2.95	1007	0.3	0.0	18.9	0.0	0.0
107	10.00		0.0	0.0	20.0	0.0	0.0
107	19.80		0.0	0.0	19.5	0.0	0.0
108	2.80	1015	0.0	0.0	11.8	0.0	0.0
108	19.90		0.0	0.0	20.1	0.0	0.0
109	2.50	1007	0.3	0.0	14.5	0.0	0.0
109	39.00		0.0	0.0	20.1	0.0	0.0
110	2.60	1015	0.0	0.0	9.9	0.0	0.0
110	28.10		0.0	0.0	15.2	0.0	0.0
111	1.85	1015	0.0	0.0	18.8	0.0	0.0
111	19.50		0.0	0.0	18.9	0.0	0.0
112	2.60	1016	0.0	0.0	18.1	0.0	0.0
112	19.70		0.0	0.0	19.4	0.0	0.0
113	1.62	1022	0.0	0.0	0.0	0.0	0.0
113	4.20		0.0	0.0	0.0	0.0	0.0
114	2.80	1008	0.0	0.0	7.5	0.0	0.0
115	3.00	1008	0.0	0.0	7.1	0.0	0.0
115	27.70		0.0	0.0	11.2	0.0	0.0
116	2.50	1008	0.0	0.0	19.3	0.0	0.0
116	7.30		0.0	0.0	20.3	0.0	0.0
117	5.80	1008	0.0	0.0	4.5	0.0	0.0
117	40.00		0.0	0.0	14.9	0.0	0.0

Maximum Values

BH No.	Depth	Atmospheric Pressure	CO2 (%)	CH4 (%)	O2 (%)	LEL (%)	Flow Rate
101	3.20	1033	1.7	0.0	15.4	0.5	0.2
101	9.00		1.7	0.0	21.0	0.0	0.0
102	3.10	1033	6.3	0.0	19.8	0.0	0.0
102	24.65		0.1	0.0	20.0	0.0	0.0
103	1.62	1033	0.0	0.0	20.7	0.0	0.1
103	35.00		0.0	0.0	20.7	0.0	0.0
104	5.50	1033	4.4	0.0	16.8	0.0	0.1
104	28.50		0.8	0.0	19.4	0.0	0.0
105	3.00	1033	0.4	0.1	20.1	2.0	0.1
105	26.40		0.0	0.0	20.4	0.0	0.0
105	40.00		0.0	0.0	20.5	0.0	0.0
106	3.57	1033	0.3	0.0	21.0	0.0	0.0
106	11.90		0.2	0.0	21.7	0.0	0.0
107	2.95	1033	6.4	0.0	19.7	0.0	0.0
107	10.00		0.0	0.0	20.2	0.0	0.0
107	19.80		0.0	0.0	20.4	0.0	0.0
108	2.80	1033	0.0	0.0	20.5	0.0	0.0
108	19.90		0.0	0.0	20.4	0.0	0.0
109	2.50	1033	1.6	0.0	19.3	0.0	0.1
109	39.00		0.0	0.0	20.7	0.0	0.0
110	2.60	1033	0.0	0.0	14.2	0.0	0.1
110	28.10		0.0	0.0	19.8	0.0	0.1
111	1.85	1033	0.4	0.0	20.4	0.0	0.0
111	19.50		0.0	0.0	20.3	0.0	0.0
112	2.60	1033	0.1	0.0	20.4	0.0	0.0
112	19.70		0.0	0.0	20.2	0.0	0.0
113	1.62	1033	0.4	0.0	18.6	0.0	0.0
113	4.20		2.4	0.0	16.8	0.0	0.0
114	2.80	1033	0.9	0.5	19.5	6.0	0.1
115	3.00	1033	0.3	0.0	20.0	0.0	0.0
115	27.70		0.1	0.0	20.2	0.0	0.0
116	2.50	1033	0.0	0.0	20.9	0.0	0.0
116	7.30		0.0	0.0	20.9	0.0	0.0
117	5.80	1033	1.0	2.6	18.4	46.0	0.1
117	40.00		0.1	0.2	19.5	9.6	0.0

## 9.0 Other Information

### 9.1 BH110 Gas House Quay

No geotechnical testing was undertaken on material from BH 110. A number of samples recovered from this borehole were seen to contain material associated with historical gas works. Contamination testing was undertaken on a number of these samples. The results of these tests can be found in Appendix E.

### 9.2 Tidal influences

It should be noted that the tidal River Yare dissects the area of investigation. This should be taken into consideration when any analysing the water level data is undertaken.

### 9.3 UXO investigation

A UXO survey was undertaken on all excavations. It should be noted that some excavation locations were moved and some terminated due to the findings of the UXO engineer.

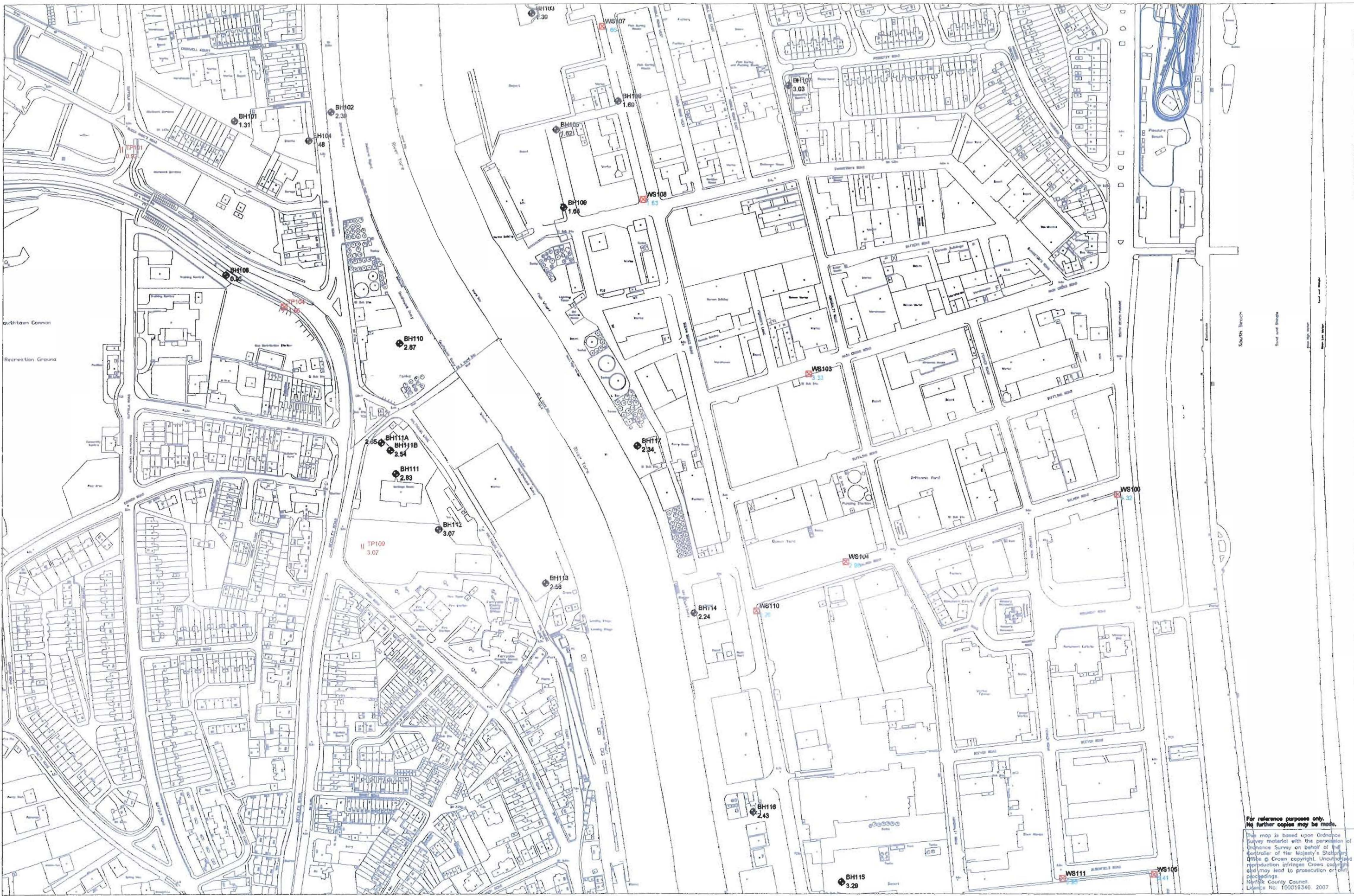
The UXO engineers reports can be found in Appendix I.





# Appendix A





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**Norfolk County Council**  
working with  
**Mott MacDonald** **MAYGURNEY**

**Mike Jackson**  
Director of Planning and Transportation  
Norfolk County Council  
County Hall  
Marineau Lane  
Norwich NR1 2SG

**DRAWING TITLE**  
Great Yarmouth Third River Crossing  
Exploratory Hole Location Plan

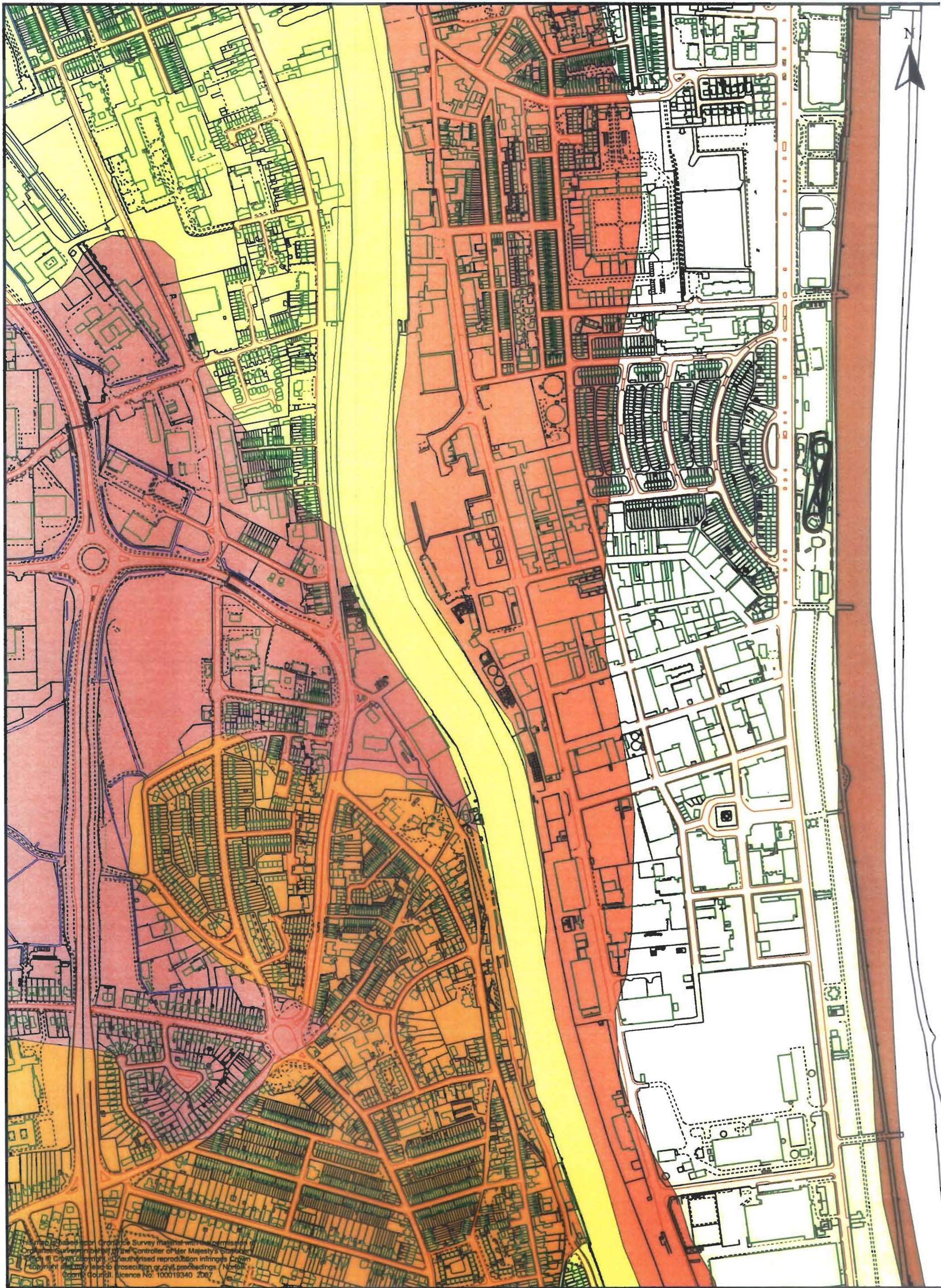
REV.	DESCRIPTION	CHECKED	DATE

SURVEYED BY	INITIALS	DATE	DRAWING No.
			GYTRCEH1
DESIGNED BY			PROJECT TITLE
DRAWN BY			Third river crossing Gt. Yarmouth
CHECKED BY			SCALE 1:3000
			FILE No. PTPZ0008



## **APPENDIX B**





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**Great Yarmouth Third River Crossing PTPZ0008**  
**Extract from Geological Map**

- Evnt02\_grat\_yarmouth\_v0\_superficial\_geology\_polygons.shp
- Beach Deposits
- Breyton Formation Clays and Silts
- Breyton Formation Peat
- Brown Sands
- Corran Formation Sand
- North Domes Formation Sand and Gravel
- Total River Deposits
- Evnt02\_grat\_yarmouth\_v0\_bedrock\_geology\_polygons.shp
- Norwich Crag

 **Norfolk County Council**

**Planning & Transportation GIS**  
 Scale 1: 5000 Centered on 652628 305758



## **APPENDIX C**

# NORFOLK PARTNERSHIP LABORATORY

## WINDOW SAMPLER LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Hole No. WS 103
Carried out for Planning & Transportation		Date Started 10/08/2007	Date Finished 10/08/2007
Diameter 128.0 mm	Type of Sampler Dando Terrier		
Remarks:	Depth 5.00	Height 3.330 mAOD	Logged by DJ
	Co-ords 652820E - 305713N		Drawn by Gra
	Checked by MB		

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl <sup>-</sup>	pH	Org.	CBR	Other			
		Asphalt																
		MADE GROUND : dark brown fine and medium sand with some up to medium gravel size concrete, asphalt, flint (MADE GROUND)				●	001											
		Greyish brown fine and medium SAND with a little coarse gravel. Gravel rounded. (NORTH DENES FORMATION)		0.50		●	002											
		Light brown fine and medium SAND (NORTH DENES FORMATION)		1.00														
		Light brown fine and medium SAND with some fine, medium and coarse flint and quartz gravel. Gravel rounded. (NORTH DENES FORMATION)		1.50		●	003 004											
				2.00														
				2.50														
				3.00														
				3.50														
				4.00														
		Light brown fine and medium SAND (NORTH DENES FORMATION)		4.50														
		Dark grey fine and medium SAND, thin		5.00														

Continued next sheet



NORFOLK PARTNERSHIP LABORATORY

WINDOW SAMPLER LOG

Sheet 1+ of 1



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Hole No. WS 103
Carried out for Planning & Transportation		Date Started 10/08/2007	Date Finished 10/08/2007
Diameter 128.0 mm	Type of Sampler Dando Terrier		
Remarks:	Depth 5.00	Height 3.330 mAOD	Logged by DJ
	Co-ords 652820E - 305713N		Drawn by Gra
	Checked by MB		

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests											
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other				
		dense of black organic silty fine and medium sand on top. (NORTH DENES FORMATION) End of Window Sampler at 5.00 m		5.50															
				6.00															
				6.50															
				7.00															
				7.50															
				8.00															
				8.50															
				9.00															
				9.50															
				10.00															

# NORFOLK PARTNERSHIP LABORATORY

## WINDOW SAMPLER LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Hole No. WS 104
Carried out for Planning & Transportation		Date Started 06/09/2007	Date Finished 06/09/2007
Diameter 113.0 mm	Type of Sampler Dando Terrier		
Remarks:	Depth 4.00	Height 2.980 mAOD	Logged by DJ
	Co-ords 652853E - 305553N		Drawn by geo
	Checked by MB		

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		Granite COBBLES with some intact concrete at base																
		MADE GROUND : dark brown fine, medium and coarse sand with a little fine, medium and coarse flint and brick gravel (MADE GROUND)																
		Light brown fine and medium SAND (NORTH DENES FORMATION)																
		Brown medium and coarse SAND with some fine, medium and coarse rounded flint and quartz gravel (NORTH DENES FORMATION)																
		Brown medium and coarse SAND with some fine, medium and coarse rounded flint and quartz gravel (NORTH DENES FORMATION)																
		Light brown fine and medium SAND with a little fine, medium and coarse rounded flint and quartz gravel (NORTH DENES FORMATION)																
		Light brown fine and medium SAND (NORTH DENES FORMATION)																
		End of Window Sampler at 4.00 m																

# NORFOLK PARTNERSHIP LABORATORY

## WINDOW SAMPLER LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Hole No. WS 105
Carried out for Planning & Transportation		Date Started 09/08/2007	Date Finished 09/08/2007
Diameter 128.0 mm	Type of Sampler Dando Terrier		
Remarks: Dry	Depth 5.00	Height 5.410 mAOD	Logged by DJ
	Co-ords 653120E - 305286N		Drawn by Gra
	Checked by MB		

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		Asphalt																
		MADE GROUND : orangey brown fine and medium sand and up to cobble size rounded flint gravel (MADE GROUND)				●	001											
		Light brown fine and medium SAND with a little up to coarse gravel size rounded flint (BLOWN SAND)		0.50		●	002											
		Light brown fine and medium SAND (BLOWN SAND)		1.00		●	003											
		Light brown fine and medium SAND with occasional fine and medium rounded flint gravel (BLOWN SAND)		1.50		●	004											
				2.00		●	005											
				2.50														
				3.00														
		Light brown fine and medium SAND with some fine, medium and coarse flint and quartz gravel. Gravel rounded. Much flint gravel 3.65 - 3.75, 4.80 - 4.95, a little fine and medium flint gravel 4.3 - 4.60 metres. (NORTH DENES FORMATION)		3.50														
				4.00														
				4.50														
				5.00														

End of Window Sampler at 5.00 m

# NORFOLK PARTNERSHIP LABORATORY

## WINDOW SAMPLER LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Hole No. WS 106
Carried out for Planning & Transportation		Date Started 09/08/2007	Date Finished 09/08/2007
Diameter 128.0 mm	Type of Sampler Dando Terrier		
Remarks: Dry	Depth 5.00	Height 5.320 mAOD	Logged by DJ
	Co-ords 653086E - 305611N		Drawn by Gra
	Checked by MB		

Beckfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Asphalt			●	001											
		MADE GROUND : dark brown fine and medium sand with some up to coarse gravel size flint and brick (MADE GROUND)		0.50	●	002											
		Light brown fine and medium SAND with a little fine, medium and coarse flint gravel. Gravel rounded. (BLOWN SAND)		1.00	●	003											
		Light brown fine and medium SAND with occasional fine, medium and coarse flint gravel. Gravel is rounded. (BLOWN SAND)		1.50		004											
		Light brown fine and medium SAND with occasional fine, medium and coarse flint and quartz gravel. Gravel is rounded. (BLOWN SAND)		2.00		005											
				2.50													
				3.00		006											
				3.50													
		Light brown fine and medium SAND with some fine, medium and coarse flint and quartz gravel. Gravel is rounded and sub rounded (NORTH DENES FORMATION)		4.00		007											
		Light brown fine and medium SAND (NORTH DENES FORMATION)		4.50													
				5.00													

End of Window Sampler at 5.00 m

# NORFOLK PARTNERSHIP LABORATORY

## WINDOW SAMPLER LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Hole No. WS 107
Carried out for Planning & Transportation		Date Started 07/09/2007	Date Finished 07/09/2007
Diameter 113.0 mm	Type of Sampler Dando Terrier		
Remarks:	Depth 2.00	Height 1.650 mAOD	Logged by DJ
	Co-ords 652641E - 306012N		Drawn by geo
	Checked by MB		

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		Intact CONCRETE with some evidence of former rail line (MADE GROUND)																
		Crushed broken CONCRETE (MADE GROUND)																
		MADE GROUND : dark brown fine and medium sand with some fine, medium and coarse flint gravel (MADE GROUND)		0.50	●	001												
		MADE GROUND : brown fine and medium sand with some fine, medium and coarse flint gravel (MADE GROUND)			●	002												
		MADE GROUND : brown fine and medium sand with some fine, medium and coarse flint gravel (MADE GROUND)			●	003												
		Light brown fine and medium SAND with some fine, medium and coarse rounded flint gravel (NORTH DENES FORMATION)		1.00														
				1.50														
				2.00														
		End of Window Sampler at 2.00 m																
				2.50														
				3.00														
				3.50														
				4.00														
				4.50														
				5.00														

# NORFOLK PARTNERSHIP LABORATORY

## WINDOW SAMPLER LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Hole No. WS 108
Carried out for Planning & Transportation	Date Started 09/08/2007	Date Finished 09/08/2007
Diameter 128.0 mm	Type of Sampler Dando Terrier	
Remarks: Water probably from possible soakaway	Depth 4.00	Height 1.630 mAOD
	Co-ords 652677E - 305863N	
	Logged by DJ	Drawn by Gra
		Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		CONCRETE															
		MADE GROUND : light brown fine and medium sand with much up to coarse gravel size granite, flint and asphalt (MADE GROUND)		0.50	●	001											
		MADE GROUND : light brown fine and medium SAND with some fine, medium and coarse flint and quartz gravel. Gravel is rounded (MADE GROUND)		1.00	●	002											
		MADE GROUND : brown fine, medium and coarse flint GRAVEL. Gravel is rounded to sub rounded. Geotextile at top and base. Appears to be a french drain / soakaway (MADE GROUND)		2.00	●	007											
		Light brown fine and medium SAND (NORTH DENES FORMATION)		3.00	●	008											
		End of Window Sampler at 4.00 m		4.00	●	009											
				4.50													
				5.00													

# NORFOLK PARTNERSHIP LABORATORY

## WINDOW SAMPLER LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008		Hole No. WS 110	
Carried out for Planning & Transportation		Date Started 22/08/2007		Date Finished 22/08/2007	
Diameter 113.0 mm		Type of Sampler Dando Terrier			
Remarks:	Depth 3.00		Height 2.260 mAOD		Logged by DJ
	Co-ords 652776E - 305511N				Drawn by Gra
					Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		Asphalt																
		CONCRETE (MADE GROUND)																
		MADE GROUND : dark brown fine, medium and coarse sand with much fine, medium and coarse rounded flint gravel (MADE GROUND)				●	001											
		Brown fine and medium SAND with some fine, medium and coarse flint gravel (NORTH DENES FORMATION)		0.50		●	002 004											
		Light brown medium and coarse SAND with some fine, medium and coarse rounded and sub-rounded flint gravel (NORTH DENES FORMATION)		1.00		●	003											
		Light brown medium SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)		1.50			005											
		Light brown fine, medium and coarse SAND with a little fine, medium and coarse rounded flint gravel (NORTH DENES FORMATION)		2.00			006											
		End of Window Sampler at 3.00 m		3.00														
				3.50														
				4.00														
				4.50														
				5.00														



# NORFOLK PARTNERSHIP LABORATORY

## WINDOW SAMPLER LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Hole No. WS 111
Carried out for Planning & Transportation		Date Started 10/08/2007	Date Finished 10/08/2007
Diameter 128.0 mm	Type of Sampler Dando Terrier		
Remarks: Dry	Depth 5.00	Height 5.950 mAOD	Logged by DJ
	Co-ords 653041E - 305283N		Drawn by Gra
			Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests												
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other					
		Asphalt																		
		MADE GROUND : orangey brown silty fine and medium sand with some up to coarse gravel size flint and asphalt (MADE GROUND)				●	001													
		Light brown fine and medium SAND (BLOWN SAND)		0.50		●	002													
								●	003											
						1.00		●	004											
									005											
						1.50														
				2.00			006													
				2.50																
				3.00			007													
		Light brown fine and medium SAND with some fine, medium and coarse flint gravel. Gravel is rounded (NORTH DENES FORMATION)		3.50																
				4.00			008													
		Light brown fine and medium SAND (NORTH DENES FORMATION)		4.50																
				5.00																

End of Window Sampler at 5.00 m

# NORFOLK PARTNERSHIP LABORATORY

# TRIAL PIT LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Trialpit No. TP 101
Carried out for Planning & Transportation		Date Started 20/09/2007	Date Finished 20/09/2007
Dimensions: 0.45 x 3.00		Type of Excavator JCB	
Remarks: Dry. Concrete slab from 0.1m to 1.1m on one side of pit. TP abandoned due to collapsing sides exposing 200mm pipe	Depth 1.70	Height 0.920 mAOB	Logged by AK
	Co-ords 652228E - 305904N		Drawn by geo
			Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests								
					Type	No.		MC%	w <sub>p</sub>	SO <sub>2</sub>	Cl-	pH	Org.	CBR	Other	
		MADE GROUND : grass, roots, topsoil and brown silty gravelly fine and medium sand. (MADE GROUND)			●	001										
		MADE GROUND : brown gravelly slightly silty fine and medium sand. Gravel is angular to sub-rounded, fine, medium and coarse flint, brick and concrete. Cobbles of concrete, half and whole red bricks (MADE GROUND)		0.50	●	002										
		MADE GROUND : brown and orangey brown gravelly fine and medium sand. Gravel is angular to rounded medium flint (MADE GROUND)		1.00	●	003 3									12.4	
		MADE GROUND : brown slightly silty, slightly clayey, gravelly fine and medium SAND. Gravel is angular to rounded, fine, medium and coarse brick, flint and concrete. Slate, half and whole red and yellow bricks. Cobbles and boulders of concrete. Some lenses of ash and clinker (MADE GROUND)		1.50	●	004 4		34							0.5	
		Firm dark grey very sandy SILT and CLAY. Weak hydrocarbon and chemical odour - possible spent oxide? (BREYDON FORMATION, SILTS AND CLAYS)		2.00												
		End of Trialpit at 1.70 m		2.00												
				2.50												
				3.00												
				3.50												
				4.00												
				4.50												
				5.00												

# NORFOLK PARTNERSHIP LABORATORY

# TRIAL PIT LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Trialpit No. TP 104
Carried out for Planning & Transportation	Date Started 20/09/2007	Date Finished 20/09/2007
Dimensions: 0.45 x 3.00	Type of Excavator JCB	
Remarks: TP abandoned at 3.3m due to collapsing sides	Depth 3.30	Height 1.660 mAOD
	Co-ords 652370E - 305771N	
	Logged by AK	Drawn by geo
		Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	p	SO <sub>2</sub>	Cl-	pH	Org.	CBR	Other			
		MADE GROUND : grass, roots, light brown and grey silty, slightly gravelly, fine sand. Gravel is angular to rounded, fine, medium and coarse flint. Some large roots (MADE GROUND)			↑													
		MADE GROUND : Light grey and greyish brown slightly silty gravelly fine and medium sand. Gravel is angular to rounded, fine, medium and coarse flint, brick, concrete, glass, tile, slate and clay pipe. Pockets of orangey brown fine and medium sand. Some large sheets of asbestos (MADE GROUND)		0.50	●													
				1.00	↑													
				1.50														
				2.00	↑													
		Grey and dark grey gravelly, very sandy, SILT and CLAY. Gravel is angular to sub-rounded, fine and medium flint. Pockets of dark grey and grey silty fine and medium sand. (BREYDON FORMATION.SILTS AND CLAYS)		2.00	●	003												
				2.50														
				3.00	↑													
		Brown and grey slightly silty, gravelly, fine, medium and coarse SAND. Gravel is angular to sub-rounded, medium flint. Pockets of grey soft sandy gravelly clay. Gravelly is angular to rounded, fine and medium flint. Some localised pockets of wood, plant remains and monocot reeds (BREYDON FORMATION.SILTS AND CLAYS)		3.00	●	004												
				3.50	↑													
		End of Trialpit at 3.30 m		3.50	●	005												
				4.00														
				4.50														
				5.00														

# NORFOLK PARTNERSHIP LABORATORY

# TRIAL PIT LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Trialpit No. TP 109
Carried out for Planning & Transportation	Date Started 20/09/2007	Date Finished 20/09/2007
Dimensions: 0.45 x 3.00	Type of Excavator JCB	
Remarks: Dry. TP abandoned at 3.5m due to collapsing sides	Depth 3.50	Height 3.090 mAOD
	Co-ords 652438E - 305569N	
	Logged by AK	Drawn by geo
		Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	ρ <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Crushed Asphalt			↑												
		MADE GROUND : brown, yellowish brown and grey slightly silty, gravelly, fine, medium and coarse sand. Gravel is angular to sub-rounded, fine, medium and coarse flint, brick and concrete. Half and whole bricks and pottery fragments (MADE GROUND)		0.50	↓	001											
		Orangey brown slightly silty, slightly gravelly, fine and medium SAND. Gravel is angular to sub-rounded medium and coarse flint (CORTON FORMATION)		1.00	↑	002										6.1	
		Yellowish and yellowish brown fine and medium SAND. Occasional lense of slightly gravelly fine and medium sand. Gravel is angular to sub-rounded, medium and coarse flint (CORTON FORMATION)		1.50	↓	003											
				2.00	↑	004											
				2.50	↓	005											
		End of Trialpit at 3.50 m		3.50													
				4.00													
				4.50													
				5.00													

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 1 of 3



Scheme Great Yarmouth Third River Crossing Job No. PTPZ0008 Borehole No. BH 101

Carried out for Planning & Transportation Date Started 20/08/2007 Date Finished 22/08/2007

Remarks: Type of Rig Dando 150

2.0 hours hand dug starter pit. Bomb test redrill - 4.0 hours.

Depth 20.45 Height 1.310 mAOD

Co-ords 652326E - 305931N

Logged by AE  
Drawn by geo  
Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests											
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other				
		MADE GROUND : up to cobble sized brick, flint and concrete in a matrix of orangey brown silty fine and medium sand (MADE GROUND)	[Cross-hatch pattern]		●	001													
		MADE GROUND : up to cobble sized flint and brick in a matrix of brown fine and medium sand (MADE GROUND)	[Cross-hatch pattern]		●	002													
		MADE GROUND : brown clayey silty fine and medium sand with much fine and medium flint and brick (MADE GROUND)	[Cross-hatch pattern]	1.00	●	001													
		MADE GROUND : brown clayey silty fine and medium sand with much fine and medium flint and brick (MADE GROUND)	[Cross-hatch pattern]		●	002	N=3												
		MADE GROUND : brown clayey silty fine and medium sand with much fine and medium flint and brick (MADE GROUND)	[Cross-hatch pattern]		●	003													
		Brown sandy, clayey SILT with much fine and medium flint gravel (BREYDON FORMATION.SILTS AND CLAYS)	[Silt pattern]	2.00	●	004	N=2												
		Soft dark grey amorphous PEAT (BREYDON FORMATION.PEAT)	[Peat pattern]		●	005													
		Soft dark grey amorphous PEAT with beds of black fibrous peat (BREYDON FORMATION.PEAT)	[Peat pattern]	3.00	●	005	N=4												
		Very loose light grey silty fine and medium SAND (CORTON SAND)	[Sand pattern]		●	006													
		Very loose grey fine, medium and coarse SAND with a little fine flint and quartz gravel (CORTON SAND)	[Sand pattern]	4.00	●	006	N=13												
		Medium dense greyish brown fine, medium and coarse SAND with some fine flint and quartz gravel (CORTON SAND)	[Sand pattern]		●	007													
		Medium dense greyish brown fine and medium SAND with some fine and medium flint and quartz gravel (CORTON SAND)	[Sand pattern]	5.00	●	007	N=12												
			[Sand pattern]		●	006													
			[Sand pattern]	6.00	●	006	N=18												
			[Sand pattern]		●	007													
			[Sand pattern]	7.00	●	007	N=39												
		Dense brown fine, medium and coarse SAND with some fine and medium flint and quartz gravel (CORTON SAND)	[Sand pattern]		●	008													
			[Sand pattern]		●	010													
			[Sand pattern]	8.00	●	008	N=47												
		Dense orangey brown fine and medium SAND (CORTON SAND)	[Sand pattern]		●	10													
			[Sand pattern]		●	8													
			[Sand pattern]	9.00	●	011													
		Very dense orangey brown fine and medium SAND with a little fine flint gravel (CORTON SAND)	[Sand pattern]		●	53/235mm													

Continued next sheet

10.00

FIG a

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 2 of 3



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 101
Carried out for Planning & Transportation	Date Started 20/08/2007	Date Finished 22/08/2007
Remarks: 2.0 hours hand dug starter pit. Bomb test redrill - 4.0 hours.	Type of Rig Dando 150	
	Depth 20.45	Height 1.310 mAOD
	Co-ords 652326E - 305931N	
	Logged by AE	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests								
					Type	No.		MC%	P <sub>v</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other	
	200 10.50	Very dense orangey brown fine and medium SAND with a little fine flint gravel (SORTON SAND)		11.00	●	009 012	N=36									
		Dense orangey brown clayey, silty fine and medium SAND (CRAG)		12.00	●	013	N=40									
		Very dense		13.00	●	010 014 14	N=37									
		Medium dense		15.00	●	011 015	50/220mm									
		Very dense orangey brown silty fine and medium SAND with numerous shell fragments (CRAG)		16.00	●	012 016	N=18									
				17.00	●	013 017 17	50/290mm									
		Very dense orangey brown silty fine and medium SAND with numerous shell fragments and a little fine flint gravel (CRAG)		18.00	●	014										
				19.00	●	015 018	50/270mm									
		Continued next sheet		20.00												

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 3 of 3



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 101
Carried out for Planning & Transportation	Date Started 20/08/2007	Date Finished 22/08/2007
Remarks: 2.0 hours hand dug starter pit. Bomb test redrill - 4.0 hours.	Type of Rig Dando 150	
	Depth 20.45	Height 1.310 mAOD
	Co-ords 652326E - 305931N	
	Logged by AE	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>a</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
	150 20.00	Very dense orangey brown silty fine and medium SAND with numerous shell fragments and a little fine flint gravel (CRAG)  End of Borehole at 20.45 m	⊗ ⊗ ⊗ ⊗		●	016	N=13											
				21.00														
				22.00														
				23.00														
				24.00														
				25.00														
				26.00														
				27.00														
				28.00														
				29.00														
				30.00														



# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 1 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 102
Carried out for Planning & Transportation	Date Started 12/09/2007	Date Finished 13/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.25 hours	Type of Rig Dando 150	
	Depth 35.00	Height 2.390 mAOD
	Co-ords 652410E - 305938N	
	Logged by AE	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		Brickweave				●	001											
		MADE GROUND : brown angular and sub-angular fine, medium and coarse concrete and flint gravel and fine, medium and coarse sand (MADE GROUND)				●	002											
		MADE GROUND : brown, red and light grey clayey fine, medium and coarse angular to rounded brick, flint and concrete gravel and fine, medium and coarse sand. Occasional brick cobble (MADE GROUND)		1.00		●	003											
		MADE GROUND : soft brown very sandy gravelly clay. Sand is fine, medium and coarse, gravel is angular to rounded fine, medium and coarse flint, brick, concrete and shells (MADE GROUND)		2.00		●	004	N=2										
		Very loose yellowish brown slightly silty, slightly gravelly fine, medium and coarse SAND. Gravel is angular to sub-rounded fine, medium and coarse flint. Occasional clayey lense. (BREYDON FORMATION. SILTS AND CLAYS)		3.00		●	006	N=2	37									
		Very soft brown and dark grey very sandy, silty CLAY. Organic odour. Sand is fine, medium and coarse (BREYDON FORMATION. SILTS AND CLAYS) Becoming grey very sandy, silty CLAY. Sand is fine		4.00		●	007	N=1	29									
		Loose yellowish brown gravelly fine, medium and coarse SAND. Gravel is angular to sub-rounded fine, medium and coarse flint (CORTON SAND)		5.00		●	008	N=6	25									
		Medium dense		6.00		●	009	N=13										
		Medium dense yellowish brown and light grey slightly gravelly fine and medium SAND. Gravel is angular to sub-rounded fine and medium flint (CORTON SAND)		7.00		●	010	N=15										
				8.00		●	010	N=16										
				9.00		●	011	N=18										
				10.00		●	012											

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 2 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 102
Carried out for Planning & Transportation	Date Started 12/09/2007	Date Finished 13/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.25 hours	Type of Rig Dando 150	
	Depth 35.00	Height 2.390 mAOD
	Co-ords 652410E - 305938N	
	Logged by AE	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Medium dense yellowish brown and light grey slightly gravelly fine and medium SAND. Gravel is angular to sub-rounded fine and medium flint (CORTON SAND) Becoming dense		11.00	●	012 013 12	N=22										
		Very dense reddish brown medium SAND. Occasional angular to sub-rounded fine and medium flint gravel and shells (CRAG)		12.00	●	013 014	50/225mm										
		Becoming slightly silty		13.00	●	014 015	N=48										
				14.00													
				15.00													
	200 15.00			15.00		015 016 16	50/285mm										
				16.00		016 017	50/270mm										
				17.00													
				18.00		017 018	50/275mm										
				19.00		018 019	50/220mm										
				20.00													

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 3 of 4



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Borehole No. BH 102	
Carried out for Planning & Transportation		Date Started 12/09/2007	Date Finished 13/09/2007	
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.25 hours		Type of Rig Dando 150		
		Depth 35.00	Height 2.390 mAOD	Logged by AE
		Co-ords 652410E - 305938N		Drawn by geo
				Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>s</sub>	SO <sub>2</sub>	Cl-	pH	Org.	CBR	Other		
		Very dense reddish brown medium SAND. Occasional angular to sub-rounded fine and medium flint gravel and shells (CRAG)		21.00	●	019 020	50/200mm										
		Dense reddish brown medium SAND. Occasional angular to sub-rounded fine and medium flint gravel. Some to many shell fragments (CRAG)		22.00	●	020 021	N=47										
		Dense grey slightly silty fine and medium SAND. Occasional crushed shells (CRAG)		23.00	●	021											
				24.00	●	022	N=40										
		Very dense		25.00	●	023 23	50/285mm										
				26.00													
				27.00	●	024	50/130mm										
				28.00	●	025 31.0	50/215mm 39										
				29.00	●	026											
		Very stiff grey thinly laminated CLAY. Bands of soft grey fine clayey sand (CRAG)		29.00	●	026 027	50/290mm										
				30.00	●	27		19									

Continued next sheet

NORFOLK PARTNERSHIP LABORATORY

BOREHOLE LOG

Sheet 4 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 102
Carried out for Planning & Transportation	Date Started 12/09/2007	Date Finished 13/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.25 hours	Type of Rig Dando 150	
	Depth 35.00	Height 2.390 mAOD
	Co-ords 652410E - 305938N	
	Logged by AE	
	Drawn by geo	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Very stiff grey thinly laminated CLAY. Bands of soft grey fine clayey sand (CRAG)		31.00	●	027 028	50/295mm										
				32.00													
				33.00	●	29 028 029	N=32	21									
		Very dense grey slightly silty fine and medium SAND. Occasional shell fragments (CRAG)		34.00	●	029 030 29	69/275mm										
				35.00	●	030											
		End of Borehole at 35.00 m		35.00	●	031	50/215mm										
				36.00													
				37.00													
				38.00													
				39.00													
				40.00													

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 1 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 103
Carried out for Planning & Transportation	Date Started 07/08/2007	Date Finished 16/08/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.5 hours	Type of Rig Dando 3000	
	Depth 35.00	Height 1.390 mAOD
	Co-ords 652581E - 306023N	
	Logged by RW	Drawn by geo
		Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Asphalt				01											
		MADE GROUND : crushed concrete and fine SAND (MADE GROUND)				1											
		Light brown and light grey fine and medium SAND (TIDAL AND RIVER CREEK DEPOSITS)				02											
		Dark grey slightly clayey fine and medium SAND (TIDAL AND RIVER CREEK DEPOSITS)		1.00		03											
		Soft to firm dark grey and grey CLAY (TIDAL AND RIVER CREEK DEPOSITS)				04		34									
		Very soft dark grey very sandy, silty CLAY (TIDAL AND RIVER CREEK DEPOSITS)				05											
		Medium dense dark grey, grey and light brown fine, medium and coarse SAND with occasional sub-rounded coarse flint gravel (NORTH DENES FORMATION)				06	N=11										
				2.00		07											
						08											
						09											
				3.00		10	N=30										
						11											
				4.00		13											
						14	N=12										
						15											
				5.00		16	N=29										
						17											
						18											
				6.00		19	N=34										
						20											
						21											
				7.00		22	N=17										
						23											
						24											
		Dense dark grey slightly gravelly silty fine SAND. Gravel is angular to sub-rounded. Fine to coarse flint. Occasional lenses of firm grey clay (NORTH DENES FORMATION)		8.00		26	N=37										
						27											
		Dense brown and grey gravelly, cobbly fine, medium and coarse SAND. Gravel is angular to rounded. Fine, medium and coarse flint (NORTH DENES FORMATION)		9.00		29	N=45										
						30											
		Dense brown and greyish brown slightly silty GRAVEL. Angular to sub-rounded fine, medium and coarse flint and fine, medium															
		Continued next sheet		10.00													

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 2 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 103
Carried out for Planning & Transportation	Date Started 07/08/2007	Date Finished 16/08/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.5 hours	Type of Rig Dando 3000	
	Depth 35.00	Height 1.390 mAOB
	Co-ords 652581E - 306023N	
	Logged by RW	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		and coarse sand (NORTH DENES FORMATION)			●	32	N=46										
				11.00	●	33											
		Very dense			●	35	N=57										
				12.00	●	36											
		Dense			●	38	N=45	30									
		Laminae of soft to firm greenish grey SILT with lenses of firm grey clay			●	39		24									
				14.00	●	41	N=51										
		Very dense			●	42		33									
		Firm to stiff greyish greenish brown sandy CLAY (CRAG)															
		Grey sandy fine, medium and coarse angular to sub-rounded flint GRAVEL (CRAG)															
200	15.90	Dense grey silty fine and medium SAND (CRAG)			●	43											
		Medium dense to dense slightly clayey fine and medium SAND (CRAG)			●	44											
				17.00	●	45											
							N=10										
				18.00	●	47											
					●	48	N=50										
		Very dense grey fine and medium SAND with occasional cobble (CRAG)			●	49											
					●	50											
				20.00													

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 3 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 103
Carried out for Planning & Transportation	Date Started 07/08/2007	Date Finished 16/08/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.5 hours	Type of Rig Dando 3000	
	Depth 35.00	Height 1.390 mAOD
	Co-ords 652581E - 306023N	
	Logged by RW	Drawn by geo
		Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>a</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Very dense grey fine and medium SAND with occasional cobble (CRAG)		21.00	●	51	N=64										
		Grey clayey fine and medium SAND (CRAG)		22.00	↕	52											
		Weak grey clay stone		24.00	●	53											
		Medium dense		25.00	●	54 55	N=16										
		Stiff grey sandy CLAY with occasional fine shell fragments (CRAG)		28.00	●	57 58	N=66	26									
				29.00	↕	59											
		Continued next sheet		30.00													



# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 4 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 103
Carried out for Planning & Transportation	Date Started 07/08/2007	Date Finished 16/08/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.5 hours	Type of Rig Dando 3000	
	Depth 35.00	Height 1.390 mAOD
	Co-ords 652581E - 306023N	
	Logged by RW	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests											
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other				
		Stiff grey sandy CLAY with occasional fine shell fragments (CRAG)		150															
					30.75														
					31.00														
						●	60	N=55											
						●	61												
					32.00	●	62												
					33.00														
					34.00														
						●	63	72/225mm 27											
						●	64												
		End of Borehole at 35.00 m		35.00	●	65													
				36.00															
				37.00															
				38.00															
				39.00															
				40.00															

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 1 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 104
Carried out for Planning & Transportation	Date Started 14/09/2007	Date Finished 19/09/2007
Remarks: 0.5 hours hand dug starter pit. Bomb test redrill - 1.5 hours.	Type of Rig Dando 150	Logged by JE
	Depth 30.45	Height 1.480 mAOD
	Co-ords 652390E - 305914N	Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		Reinforced CONCRETE																
		MADE GROUND : Greyish brown silty fine, medium and coarse sand and gravel. Gravel is fine, medium and coarse angular to sub-angular flint (MADE GROUND)		1.00		001 002 003												1.4
		MADE GROUND : greyish brown slightly clayey, gravelly, fine, medium and coarse sand. Gravel is fine, medium and coarse angular to sub-rounded flint and brick (MADE GROUND)				003 004	N=2											
		MADE GROUND : mottled greyish brown, grey and orangey brown sandy, gravelly, soft clay. Gravel is fine, medium and coarse angular to rounded flint and brick. Some black organic pockets. (MADE GROUND) Slight oil odour		2.00		005 006	N=11											
		Medium dense brown silty fine, medium and coarse SAND (BREYDON FORMATION.SILTS AND CLAYS)		3.00		006 007 6	N=12											
		Some angular to rounded, fine, medium and coarse flint gravel		4.00		007 008	N=10											
		Greyish brown and light grey very sandy thinly laminated CLAY (BREYDON FORMATION.SILTS AND CLAYS)		5.00		008 009	N=18											
		Medium dense orangey brown silty fine, medium and coarse SAND (CORTON SAND)		6.00		009 010	N=18			24								
		Occasional thin orangey brown and light grey CLAY and SILT bands		7.00		010 011	N=22											
				8.00														
				9.00		011 012	N=22											
				10.00														

Continued next sheet

NORFOLK PARTNERSHIP LABORATORY

BOREHOLE LOG

Sheet 2 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 104
Carried out for Planning & Transportation	Date Started 14/09/2007	Date Finished 19/09/2007
Remarks: 0.5 hours hand dug starter pit. Bomb test redrill - 1.5 hours.	Type of Rig Dando 150	
	Depth 30.45	Height 1.480 mAOD
	Co-ords 652390E - 305914N	
	Logged by JE	
	Drawn by geo	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests												
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other					
		Medium dense orangey brown silty fine, medium and coarse SAND (CORTON SAND)	X																	
		Very dense		11.00	●	013	N=45													
				12.00	●	014	N=54													
				14.00	●	015	N=51													
		Dense to very dense grey silty fine, medium and coarse SAND. Rare thin clay and silt lenses (CRAG)		15.00	●	016	N=45													
				16.00			16													
				17.00	●	017	N=42													
				18.00	●	018	N=42													
				19.00																
				20.00	●	019	50/185mm													

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 3 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 104
Carried out for Planning & Transportation	Date Started 14/09/2007	Date Finished 19/09/2007
Remarks: 0.5 hours hand dug starter pit. Bomb test redrill - 1.5 hours.	Type of Rig Dando 150	
	Depth 30.45	Height 1.480 mAOD
	Co-ords 652390E - 305914N	
	Logged by JE	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Dense to very dense grey silty fine, medium and coarse SAND. Rare thin clay and silt lenses (CRAG)	X	21.00	●	020	N=50										
			X	22.00	●	021	50/290mm										
			X	23.00	●	022	280/145mm										
			X	24.00	●	023	N=48										
			X	25.00	●	23											
			X	26.00	●	024	N=62										
			X	27.00	●	025	N=42										
		Occasional thin firm grey CLAY bands	X	28.00													
			X	29.00													
			X	30.00													

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 4 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 104
Carried out for Planning & Transportation	Date Started 14/09/2007	Date Finished 19/09/2007
Remarks: 0.5 hours hand dug starter pit. Bomb test redrill - 1.5 hours.	Type of Rig Dando 150	
	Depth 30.45	Height 1.480 mAOD
	Co-ords 652390E - 305914N	
	Logged by JE	
	Drawn by geo	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	p <sub>a</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Dense to very dense grey silty fine, medium and coarse SAND. Rare thin clay and silt lenses (CRAG)	X X X X		●	026	N=38										
		End of Borehole at 30.45 m															
	150			31.00													
	31.00			32.00													
				33.00													
				34.00													
				35.00													
				36.00													
				37.00													
				38.00													
				39.00													
				40.00													

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 1 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 105
Carried out for Planning & Transportation	Date Started 23/08/2007	Date Finished 03/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 1.5 hours	Type of Rig Dando 3000	
	Depth 40.00	Height 1.620 mAOD
	Co-ords 652602E - 305923N	
	Logged by AJ	
	Drawn by Gra	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests											
					Type	No.		MC%	P <sub>a</sub>	SO <sub>3</sub>	Cl-	pH	Org.	GBR	Other				
		Asphalt																	
		Flint COBBLES (MADE GROUND)																	
		CONCRETE (MADE GROUND)																	
		MADE GROUND : reddish brown and grey sandy silty clay with some fine, medium and coarse flint, concrete and brick (MADE GROUND)		1.00		001 002 003													
		Light brown fine and medium SAND with a little fine and medium flint gravel (TIDAL AND RIVER CREEK DEPOSITS)		2.00		004 005	N=2												
		Brown and black sandy SILT with some organic material (TIDAL AND RIVER CREEK DEPOSITS)		3.00		006 007	N=4												
		Very soft mottled grey, brown and brownish grey sandy, clayey SILT (TIDAL AND RIVER CREEK DEPOSITS)		4.00		008 009 010	N=16												
		Very soft brown and brownish grey very sandy, clayey SILT (TIDAL AND RIVER CREEK DEPOSITS)		5.00		011 012 013	N=21												
		Medium dense black, greyish brown and dark grey slightly clayey, slightly organic, fine, medium and coarse SAND (TIDAL AND RIVER CREEK DEPOSITS)		6.00		014 015 016	N=20												
		Medium dense brown fine and medium SAND (NORTH DENES FORMATION)		7.00		017 018 019	N=30												
		Medium dense brown and dark grey fine and medium SAND (NORTH DENES FORMATION)		8.00		020 021 022	N=30												
		Medium dense brown fine and medium SAND with a little fine and medium flint gravel (NORTH DENES FORMATION)		9.00		023 024	N=36												
		Dense brown fine and medium SAND with some fine, medium and coarse flint gravel (NORTH DENES FORMATION)		10.00		025 026													
		Dense brown fine and medium SAND with occasional flint cobbles (NORTH DENES FORMATION)				027 028													
		Dense brown fine, medium and coarse SAND (NORTH DENES FORMATION)																	
		Dense brown fine, medium and coarse SAND with some fine, medium and coarse flint gravel (NORTH DENES FORMATION)																	

Continued next sheet

NORFOLK PARTNERSHIP LABORATORY

BOREHOLE LOG

Sheet 2 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 105
Carried out for Planning & Transportation	Date Started 23/08/2007	Date Finished 03/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 1.5 hours	Type of Rig Dando 3000	
	Depth 40.00	Height 1.620 mAOD
	Co-ords 652602E - 305923N	
	Logged by AJ	
	Drawn by Gra	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>2</sub>	Cl-	pH	Org.	CBR	Other			
		Dense brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)				●	029											
				11.00		●	030 031	N=40										
				12.00		●	032	N=42										
				13.00		●	033											
				14.00		●	034 035	N=37										
		Dense orangey brown fine, medium and coarse SAND with some fine, medium and coarse flint gravel (NORTH DENES FORMATION) Bone		15.00		●	036 036A 037											
				16.00		●	038	49/295mm										
250	16.42	Dense orange fine and medium SAND (CRAG)		17.00		●	039											
				18.00		●	040	N=42										
				19.00		●	041											
		Dense reddish brown fine SAND with laminae of brown soft silty clay (CRAG)		19.00		●	042	N=41										
				20.00		●	043											

Continued next sheet



# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 3 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 105
Carried out for Planning & Transportation	Date Started 23/08/2007	Date Finished 03/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 1.5 hours	Type of Rig Dando 3000	
	Depth 40.00	Height 1.620 mAOD
	Co-ords 652602E - 305923N	
	Logged by AJ	
	Drawn by Gra	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>s</sub>	SO <sub>2</sub>	Cl-	pH	Org.	CBR	Other		
		Dense grey fine SAND (CRAG)			●	044	N=39										
				21.00	↑	045											
		Dense orange fine SAND (CRAG)			●	046	N=46										
				22.00	↑	047											
		Dense grey fine SAND (CRAG)			●	048	N=34										
				23.00	↑	049											
		Dense grey fine and medium SAND (CRAG)			●	050	N=35										
				24.00	↑	051											
				25.00	↑	052	N=41										
				26.00	↑	053											
				27.00	↑	054	N=45										
				28.00	↑	055											
				29.00	●	056	38/225mm										
		Stiff to firm grey silty CLAY (CRAG)			— x —												
				30.00	— x —												

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 4 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 105
Carried out for Planning & Transportation	Date Started 23/08/2007	Date Finished 03/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 1.5 hours	Type of Rig Dando 3000	
	Depth 40.00	Height 1.620 mAOD
	Co-ords 652602E - 305923N	
	Logged by AJ	
	Drawn by Gra	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Stiff to firm grey silty CLAY (CRAG)			●	057											
		Soft grey sandy, silty CLAY (CRAG)		31.00	●	058	N=50										
		Grey fine and medium SAND with laminae of soft grey silty clay (CRAG)		32.00	●	059 060											
		Very dense grey fine and medium SAND with some shell fragments (CRAG)		33.00	●	061	51/285mm										
				34.00	●	063	50/285mm										
				35.00	●	064											
				36.00	●	065	50/225mm										
				37.00	●	067	N=49										
		Dense grey slightly clayey fine and medium SAND with some shell fragments (CRAG)		38.00	●	068											
				39.00	●	069	N=48										
		Dense grey fine and medium SAND with some shell fragments (CRAG)		40.00	●	070											
150	39.80	End of Borehole at 40.00 m		40.00													

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 1 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 106
Carried out for Planning & Transportation	Date Started 29/08/2007	Date Finished 05/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill 3.0 hours	Type of Rig Dando 150	
	Depth 30.45	Height 1.690 mAOD
	Co-ords 652655E - 305947N	
	Logged by AE	Drawn by Gra
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests											
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other				
		MADE GROUND : dark brown fine, medium and coarse sand with some up to coarse gravel sized flint and concrete (MADE GROUND)			●	001													
		Light brown fine, medium and coarse SAND (TIDAL AND RIVER CREEK DEPOSITS)			●	002													
		Brown fine, medium and coarse SAND with lenses of dark brown and black organic silt (TIDAL AND RIVER CREEK DEPOSITS)		1.00	●	003	N=5												
		Mottled brown, orangey brown and dark grey very clayey fine, medium and coarse SAND with a little fine and medium flint gravel. Lenses of dark brown and black organic silt (TIDAL AND RIVER CREEK DEPOSITS)		2.00	●	002	N=7												
					●	003													
					●	007													
		Very soft mottled orangey brown, reddish brown and grey, very sandy, clayey SILT (TIDAL AND RIVER CREEK DEPOSITS)		3.00	●	004	N=22												
		Loose brown fine, medium and coarse SAND (NORTH DENES FORMATION)				008													
		Loose light brown fine, medium and coarse SAND with a little fine and medium rounded flint gravel (NORTH DENES FORMATION)		4.00		005	N=2												
						006	N=7												
						007	N=13												
		Loose to medium dense light brown fine, medium and coarse SAND with some fine, medium and coarse rounded flint and quartz gravel (KESGRAVE FORMATION)		6.00		008	N=21												
						009	N=9												
						010	N=11												
				7.00															
				8.00															
				9.00															
				10.00															

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 2 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 106
Carried out for Planning & Transportation	Date Started 29/08/2007	Date Finished 05/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill 3.0 hours	Type of Rig Dando 150	
	Depth 30.45	Height 1.690 mAOD
	Co-ords 652655E - 305947N	
	Logged by AE	
	Drawn by Gra	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Loose to medium dense light brown fine, medium and coarse SAND with some fine, medium and coarse rounded flint and quartz gravel (KESGRAVE FORMATION)			011	N=16											
		Loose orangey brown fine, medium and coarse rounded flint and quartz GRAVEL with much medium and coarse sand (KESGRAVE FORMATION)		11.00	012	N=5											
		Dense		12.00													
				13.00	013	N=50											
				14.00													
		Very soft mottled reddish brown, orangey brown and grey sandy, silty CLAY (KESGRAVE FORMATION)		15.00	009 014 010	N=29											
200	15.00			16.00	011 015	N=19											
		Medium dense orange fine and medium SAND (CRAG)		17.00													
				18.00	012 016	N=37											
				19.00	013 017	N=48											
		Dense orange fine, medium and coarse SAND (CRAG)		20.00													

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 3 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 106
Carried out for Planning & Transportation	Date Started 29/08/2007	Date Finished 05/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill 3.0 hours	Type of Rig Dando 150	
	Depth 30.45	Height 1.690 mAOD
	Co-ords 652655E - 305947N	
	Logged by AE	
	Drawn by Gra	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>2</sub>	Cl-	pH	Org.	CBR	Other			
		Dense orange fine, medium and coarse SAND (CRAG)																
		Medium dense grey fine and medium SAND (CRAG) Up to coarse gravel sized sandstone nodules		21.00	●	014 018 015	N=35											
				22.00	●	016 019	N=18											
		Laminae of soft grey silty CLAY		23.00														
				24.00	●	017 020	N=24											
		Dense		25.00	●	021	50/15mm											
				26.00	●	022												
		Dense		27.00	●	018 023	50/190mm											
				28.00														
		Laminated firm grey slightly sandy, clayey SILT (CRAG)	X X	29.00	●	019	N=46											
				30.00														

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 4 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 106
Carried out for Planning & Transportation	Date Started 29/08/2007	Date Finished 05/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill 3.0 hours	Type of Rig Dando 150	
	Depth 30.45	Height 1.690 mAOD
	Co-ords 652655E - 305947N	
	Logged by AE	
	Drawn by Gra	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>a</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		Laminated firm grey slightly sandy, clayey SILT (CRAG)	X · X · X · X · X X · X · X				N=30											
		----- End of Borehole at 30.45 m																
				31.00														
				32.00														
				33.00														
				34.00														
				35.00														
				36.00														
				37.00														
				38.00														
				39.00														
				40.00														

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 1 of 3



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 107
Carried out for Planning & Transportation	Date Started 05/09/2007	Date Finished 07/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.0 hours	Type of Rig Dando 150	
	Depth 30.00	Height 3.030 mAOD
	Co-ords 652801E - 305961N	
	Logged by AE	Drawn by Gra
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		MADE GROUND : dark brown sandy topsoil (MADE GROUND)			●	001												
		MADE GROUND : dark brown fine and medium sand (MADE GROUND)			●	002												
		MADE GROUND : light brown fine and medium SAND (MADE GROUND)			●	003												
		MADE GROUND : fine and medium sand with some up to coarse gravel sized brick, flint and granite (MADE GROUND)		1.00	●	003	N=16											
		Medium dense light brown fine and medium SAND with some fine, medium and coarse flint gravel (NORTH DENES FORMATION)		2.00	●	004	N=16											
		Loose light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)		3.00	●	005	N=5											
		Loose light brown fine, medium and coarse flint and quartz GRAVEL with much fine, medium and coarse sand (NORTH DENES FORMATION)		4.00	●	006	N=7											
		Medium dense		5.00	●	007	N=14											
		Medium dense light brown fine, medium and coarse SAND with much fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)		6.00	●	008	N=25											
		Medium dense light brown fine, medium and coarse SAND with much fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)		7.00	●	009	N=19											
		Medium dense light brown fine, medium and coarse flint GRAVEL with some fine, medium and coarse sand (NORTH DENES FORMATION)		8.00	●	010	N=16											
		Medium dense light brown fine, medium and coarse SAND with much fine, medium and coarse flint gravel (NORTH DENES FORMATION)		9.00	●	011	N=12											
		Continued next sheet		10.00														



# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 2 of 3



Scheme Great Yarmouth Third River Crossing Job No. PTPZ0008 Borehole No. BH 107

Carried out for Planning & Transportation Date Started 05/09/2007 Date Finished 07/09/2007

Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.0 hours  
 Type of Rig Dando 150  
 Depth 30.00 Height 3.030 mAOD  
 Co-ords 652801E - 305961N  
 Logged by AE  
 Drawn by Gra  
 Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Medium dense light brown fine, medium and coarse SAND with much fine, medium and coarse flint gravel (NORTH DENES FORMATION)			●	012	N=21										
		Light grey soft clayey SILT (NORTH DENES FORMATION)		11.00	●	007											
		Orangey brown medium and coarse SAND with much fine and medium rounded flint gravel (NORTH DENES FORMATION)			●	008											
		Medium dense orangey brown medium and coarse SAND with some fine, medium and coarse rounded flint gravel. Lenses of soft light grey silty clay (NORTH DENES FORMATION)		12.00	●	009	N=29										
		Dense orangey brown fine and medium SAND. Lenses of soft orangey brown sandy silt (NORTH DENES FORMATION)		13.00	●	010	N=30										
				14.00													
		Medium dense laminated orangey brown fine and medium SAND. Lenses of soft orangey brown sandy silt (NORTH DENES FORMATION)		15.00	●	011	N=28										
				16.00													
		Dense orangey brown fine and medium SAND (CRAG)		17.00	●	012	N=43										
				18.00													
		Dense laminated greyish brown, reddish brown and orange fine and medium SAND (CRAG)		19.00	●	013	N=43										
				20.00													
		Dense laminated greyish brown, reddish brown and orange fine and medium SAND. Some organic material (CRAG)		19.00	●	014	N=39										
				20.00													

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 3 of 3



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Borehole No. BH 107
Carried out for Planning & Transportation		Date Started 05/09/2007	Date Finished 07/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.0 hours		Type of Rig Dando 150	
		Depth 30.00	Height 3.030 mAOD
		Co-ords 652801E - 305961N	
		Logged by AE	
		Drawn by Gra	
		Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests								
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other	
		Dense laminated greyish brown, reddish brown and orange fine and medium SAND. Some organic material (CRAG)		21.00	●	015 019	N=43									
		Firm grey silty CLAY (CRAG)			●	017										
		Medium dense greyish brown fine and medium SAND with lenses of soft grey silty clay (CRAG)		22.00	●	016 020	N=17									
		Very dense greyish brown fine and medium SAND (CRAG)		24.00	●	018 021	50/225mm									
				25.00	●	019 022	50/225mm									
				26.00												
				27.00	●	020 023	50/225mm									
		Firm to stiff light grey silty CLAY (CRAG)			●	021										
		Dense greyish brown fine and medium SAND (CRAG)		28.00	●	022 024	N=37									
				29.00												
		Firm grey silty CLAY (CRAG)			●	023 025	N=46									
				30.00												

End of Borehole at 30.00 m

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 1 of 2



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 108
Carried out for Planning & Transportation	Date Started 23/08/2007	Date Finished 28/08/2007
Remarks: 2.5 hours hand dug starter pit. Bomb test redrill - 4.0 hours	Type of Rig Dando 150	
	Depth 20.00	Height 0.950 mAOD
	Co-ords 652319E - 305799N	
	Logged by AE	Drawn by Gra
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		MADE GROUND : brown fine and medium sand with some fine, medium and coarse flint and quartz gravel. Occasional brick fragments (MADE GROUND)		1.00	●	001											
		MADE GROUND : coarse flint and quartz gravel. Probably pipe bedding (MADE GROUND)			●	002	N=10										
		Soft grey organic silty CLAY with lenses of black fibrous peat (BREYDON FORMATION.PEAT)		2.00	●	003	N=11										
		Loose greyish brown silty fine and medium SAND with lenses of dark brown fibrous peat (BREYDON FORMATION.SILTS AND CLAYS)		3.00	●	004	N=9										
		Loose brown clayey, silty fine SAND with occasional quartzite gravel (CORTON FORMATION)		4.00	●	005											
		Medium dense brown silty fine SAND with some fine, medium and coarse flint and quartz gravel (CORTON FORMATION)		5.00	●	006	N=5										
		Very loose orangey brown silty fine and medium SAND with lenses of orange silty clay (CORTON FORMATION)		6.00	●	007	N=15										
		Very loose laminated brown silty fine SAND, brown clayey SILT and orangey brown silty CLAY (CORTON FORMATION)		7.00	●	008	N=3										
		Medium dense orangey brown silty fine and medium SAND (CORTON FORMATION)		8.00	●	009	N=28										
		Dense brown medium SAND (CORTON FORMATION)		9.00	●	010	N=36										
				10.00	●	011	N=36										

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 2 of 2



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 108
Carried out for Planning & Transportation	Date Started 23/08/2007	Date Finished 28/08/2007
Remarks: 2.5 hours hand dug starter pit. Bomb test redrill - 4.0 hours	Type of Rig Dando 150	
	Depth 20.00	Height 0.950 mAOD
	Co-ords 652319E - 305799N	
	Logged by AE	Drawn by Gra
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
	200 10.50	Very dense orangey brown silty fine and medium SAND (CRAG)	X	11.00	●	011 012	50/255mm										
			X	12.00	●	012 013	50/210mm										
			X	13.00													
			X	14.00	●	013 014	50/185mm										
			X	15.00	●	014 015	50/255mm										
		Medium dense	X	16.00													
			X	17.00	●	015 016	N=11										
		Very dense brown silty fine and medium SAND with lenses of grey clayey silt (CRAG)	X	18.00	●	016 017	50/295mm										
			X	19.00													
		Very dense brown silty fine and medium SAND with lenses of soft orangey brown Continued next sheet	X	20.00	●	017 018	50/295mm										

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 2+ of 2



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 108
Carried out for Planning & Transportation	Date Started 23/08/2007	Date Finished 28/08/2007
Remarks: 2.5 hours hand dug starter pit. Bomb test redrill - 4.0 hours	Type of Rig Dando 150	
	Depth 20.00	Height 0.950 mAOD
	Co-ords 652319E - 305799N	
	Logged by AE	Drawn by Gra
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
	150 20.00	clay (CRAG) End of Borehole at 20.00 m																
				21.00														
				22.00														
				23.00														
				24.00														
				25.00														
				26.00														
				27.00														
				28.00														
				29.00														
				30.00														

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 1 of 4



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Borehole No. BH 109	
Carried out for Planning & Transportation		Date Started 09/08/2007	Date Finished 16/08/2007	
Remarks: 1.5 hour hand dug starter pit. Bomb test redrill - 4.0 hours		Type of Rig Dando 3000		
		Depth 40.00	Height 1.650 mAOD	Logged by RW
		Co-ords 652609E - 305856N		Drawn by geo
			Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		CONCRETE (MADE GROUND)																
		Yellowish brown fine and medium SAND (TIDAL AND RIVER CREEK DEPOSITS)	X X			01												
		Mottled brown, grey and dark grey clayey, silty fine SAND (TIDAL AND RIVER CREEK DEPOSITS)	X X	1.00		02 03 2				25								
		Very loose soft brown and grey clayey SILT and fine SAND (TIDAL AND RIVER CREEK DEPOSITS)	X X X			04 05 5												
		Loose dark grey slightly clayey fine and medium SAND. Organic odour (TIDAL AND RIVER CREEK DEPOSITS)	X X X	2.00		06	N=3											
		Dense brown and grey slightly gravelly fine and medium SAND. Gravel is angular to rounded. Some fine flint (NORTH DENES FORMATION)	X X X			07 08 7												
		Dense brown and grey slightly clayey, silty, slightly gravelly fine and medium SAND. Gravel is sub-angular to rounded. Some fine and medium flint (NORTH DENES FORMATION)	X X X	3.00		09 10 9	N=6											
		Dense brown fine, medium and coarse SAND. Becoming slightly sandy angular to sub-rounded fine and medium flint gravel (NORTH DENES FORMATION)	X X X			11 12												
		Very dense brownish grey sandy, fine and medium flint, angular to sub-rounded flint GRAVEL (NORTH DENES FORMATION)	X X X	4.00		13 14	N=35											
		Dense brown and grey fine and medium SAND and fine, medium and coarse angular to sub-rounded flint gravel (NORTH DENES FORMATION)	X X X			15 16 17												
		Medium dense light brown, brown and greyish brown fine, medium and coarse SAND and angular to sub-rounded fine and medium flint gravel (NORTH DENES FORMATION)	X X X	5.00		18 19 20	N=43											
		Dense brown and grey fine and medium SAND and fine, medium and coarse angular to sub-rounded flint gravel (NORTH DENES FORMATION)	X X X			21 22 23	N=32											
		Very dense brownish grey sandy, fine and medium flint, angular to sub-rounded flint GRAVEL (NORTH DENES FORMATION)	X X X	6.00		24 25	N=47											
		Dense brown and grey fine and medium SAND and fine, medium and coarse angular to sub-rounded flint gravel (NORTH DENES FORMATION)	X X X			26 27												
		Medium dense light brown, brown and greyish brown fine, medium and coarse SAND and angular to sub-rounded fine and medium flint gravel (NORTH DENES FORMATION)	X X X	7.00		28 29												
		Continued next sheet				30 31	N=24											
				8.00														
				9.00														
				10.00														

NORFOLK PARTNERSHIP LABORATORY

BOREHOLE LOG

Sheet 2 of 4



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Borehole No. BH 109
Carried out for Planning & Transportation		Date Started 09/08/2007	Date Finished 16/08/2007
Remarks: 1.5 hour hand dug starter pit. Bomb test redrill - 4.0 hours		Type of Rig Dando 3000	
		Depth 40.00	Height 1.650 mAOD
		Co-ords 652609E - 305856N	
		Logged by RW	
		Drawn by geo	
		Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests								
					Type	No.		MC%	P <sub>s</sub>	SO <sub>2</sub>	Cl-	pH	Org.	CBR	Other	
		Medium dense light brown, brown and greyish brown fine, medium and coarse SAND and angular to sub-rounded fine and medium flint gravel (NORTH DENES FORMATION)		11.00	●	32	N=23									
				12.00	●	33										
	250	Very dense brown and grey very gravelly fine, medium and coarse SAND. Gravel is angular to sub-rounded fine and medium flint (NORTH DENES FORMATION)		13.00	●	34	50/210mm									
	13.00			13.00	●	35										
		Dense		14.00	●	36										
				15.00	●	37	N=34									
		Dense brown and grey very gravelly fine, medium and coarse SAND. Gravel is angular to sub-rounded fine and medium flint. Occasional thin lenses of firm to stiff very sandy gravelly clay (NORTH DENES FORMATION)		16.00	●	39										
				16.00	●	40	N=47									
				16.00	●	41										
		Very dense greenish blueish grey and brown silty fine and medium SAND (CRAG)		17.00	●	42										
				18.00	●	43	50/180mm									
				18.00	●	44										
		Very dense brown and orangey brown fine and medium SAND with occasional clay lense. (CRAG)		19.00	●	45	50/210mm									
				19.00	●	46										
		Continued next sheet		20.00												





# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 4 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 109
Carried out for Planning & Transportation	Date Started 09/08/2007	Date Finished 16/08/2007
Remarks: 1.5 hour hand dug starter pit. Bomb test redrill - 4.0 hours	Type of Rig Dando 3000	
	Depth 40.00	Height 1.650 mAOD
	Co-ords 652609E - 305856N	
	Logged by RW	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests								
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other	
		Firm to stiff grey sandy CLAY (CRAG)			●	61	N=49									
					●	62										
				31.00	●	63										
					▭	64										
		Some shell fragments		32.00	●	65		19								
					●	66										
		Dense slightly clayey fine and medium SAND and occasional fine shell fragments (CRAG)		33.00	●	67	N=39									
					●	68										
				34.00												
					●	69										
				35.00												
					●	70	27/150mm									
					●	71										
				36.00												
					●	72	48/150mm									
					●	73										
				37.00												
					●	74	50/155mm									
				38.00												
		Very dense			●											
				39.00												
				40.00												

End of Borehole at 40.00 m

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 1 of 4



Scheme Great Yarmouth Third River Crossing Job No. PTPZ0008 Borehole No. BH 110

Carried out for Planning & Transportation Date Started 14/09/2007 Date Finished 19/09/2007

Remarks: 3.0 hours hand dug starter pit. 2.0 hours chiselling 1.2 - 1.7 metres. Bomb test redrill - 1.75 hours

Type of Rig Dando 150

Depth 31.00 Height 2.870 mAOD

Co-ords 652470E - 305740N

Logged by AE  
 Drawn by geo  
 Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		Asphalt																
		MADE GROUND : brown slightly silty, gravelly fine, medium and coarse sand. Gravel is angular to rounded, fine, medium and coarse concrete, brick and flint (MADE GROUND) Chemical odour		1.00		001												
		MADE GROUND : brown silty fine, medium and coarse sand and angular to sub-rounded fine, medium and coarse flint, brick and concrete gravel (MADE GROUND)		2.00		002	N=13											
		MADE GROUND : red brick coloured silty fine, medium and coarse sand and angular to sub-angular, fine, medium and coarse brick, flint and concrete gravel (MADE GROUND)		3.00		001	6											
		Medium dense black slightly silty fine and medium SAND. Very heavily stained and strong spent oxide odour (BREYDON FORMATION.SILTS AND CLAYS)		3.00		003	N=11											
		Medium dense yellowish brown medium SAND (BREYDON FORMATION.SILTS AND CLAYS)		4.00		004	N=4											
		Soft dark grey and black very sandy SILT with pockets of very silty, slightly gravelly fine and medium sand. Gravel is angular to sub-rounded, fine, medium and coarse flint (BREYDON FORMATION.SILTS AND CLAYS)		5.00		005	N=3											
				6.00		002	3											
				7.00		006	6											
		Loose dark grey slightly silty fine, medium and coarse SAND and angular to rounded, fine, medium and coarse flint gravel. Occasional flint cobble (CORTON FORMATION)		7.00		009	N=8											
				8.00		010	N=11											
				9.00		011	N=12											
		Brown very sandy fine SILT (CORTON FORMATION)		9.00														
				10.00														

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 2 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 110
Carried out for Planning & Transportation	Date Started 14/09/2007	Date Finished 19/09/2007
Remarks: 3.0 hours hand dug starter pit. 2.0 hours chiselling 1.2 - 1.7 metres. Bomb test redrill - 1.75 hours	Type of Rig Dando 150	
	Depth 31.00	Height 2.870 mAOD
	Co-ords 652470E - 305740N	
	Logged by AE	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Dense orangey brown slightly silty fine and medium SAND and occasional fine and medium, angular to rounded flint gravel (CRAG)			●	007 012	N=38										
				11.00													
					●	008 013 8	N=25										
				12.00													
					●	009 014 9	N=26										
				13.00													
					●	010 015	N=46										
				14.00													
					●	011 016	50/150mm										
		Very dense		15.00													
					●	012 017	50/210mm										
				16.00													
					●	013 018	50/210mm										
				17.00													
				18.00													
				19.00													
				20.00													

Continued next sheet

NORFOLK PARTNERSHIP LABORATORY

BOREHOLE LOG

Sheet 3 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 110
Carried out for Planning & Transportation	Date Started 14/09/2007	Date Finished 19/09/2007
Remarks: 3.0 hours hand dug starter pit. 2.0 hours chiselling 1.2 - 1.7 metres. Bomb test redrill - 1.75 hours	Type of Rig Dando 150	
	Depth 31.00	Height 2.870 mAOD
	Co-ords 652470E - 305740N	
	Logged by AE	
	Drawn by geo	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	$\rho_s$	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Dense orangey brown slightly silty fine and medium SAND and occasional fine and medium, angular to rounded flint gravel (CRAG) Very dense		21.00	●	014 019	50/220mm										
		Dense grey silty fine and medium SAND. Occasional lense of clayey fine sand (CRAG)		22.00	●	015 020	N=40										
				23.00													
				24.00	●	016 021	N=40										
				25.00	●	017 022	N=30										
				26.00													
		Very dense		27.00	●	018 023	50/295mm										
				28.00	●	019 024	50/75mm										
				29.00													
				30.00	●	020 025	50/215mm										

Continued next sheet



# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 1 of 2



Scheme Great Yarmouth Third River Crossing

Job No. PTPZ0008

Borehole No. BH 111

Carried out for Planning & Transportation

Date Started 16/08/2007

Date Finished 20/08/2007

Remarks:

1.0 hour hand dug starter pit. Bomb test redrill - 3.0 hours.

Type of Rig Dando 150

Depth 20.00

Height 2.830 mAOD

Logged by AE

Drawn by geo

Co-ords 652467E - 305628N

Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>2</sub>	Cl-	pH	Org.	CBR	Other			
		MADE GROUND : very dense angular to rounded fine, medium and coarse flint, brick and concrete gravel and fine, medium and coarse sand (MADE GROUND)				1 01 02 2												
		MADE GROUND : brown dense gravelly fine and medium sand. Gravel is angular to sub-rounded, fine and medium flint (MADE GROUND)		1.00		01 03 3												
		MADE GROUND : brown slightly silty gravelly fine and medium sand. Gravel is angular to sub-rounded, fine, medium and coarse granite, flint, asphalt and concrete (MADE GROUND)		2.00		02 04 05 2	N=4											1.4
		Loose dark grey slightly silty fine SAND (BREYDON FORMATION. SILTS AND CLAYS)				03 06 2 3	N=7											
		Loose brown slightly clayey fine SAND (BREYDON FORMATION. SILTS AND CLAYS)				07 7		20										
		Loose gravelly brown fine, medium and coarse SAND (CORTON FORMATION)		3.00		04 08 4	N=5											
				4.00		05 09 5	N=7											
				5.00			N=14											
		Medium dense gravelly brown fine, medium and coarse SAND and angular to rounded fine, medium and coarse flint gravel (CORTON FORMATION)				06												
				6.00		07	N=13											
		Loose gravelly brown fine and medium SAND (CRAG)		7.00		08 10	N=6											
		Medium dense		8.00		09 11	N=21											
		Dense		9.00		10	N=43											
				10.00														

Continued next sheet



# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 2 of 2



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 111
Carried out for Planning & Transportation	Date Started 16/08/2007	Date Finished 20/08/2007
Remarks: 1.0 hour hand dug starter pit. Bomb test redrill - 3.0 hours.	Type of Rig Dando 150	
	Depth 20.00	Height 2.830 mAOB
	Co-ords 652467E - 305628N	
	Logged by AE	
	Drawn by geo	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	$\rho_s$	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
	200	Loose gravelly brown fine and medium SAND (CRAG)		10.50	●	11	N=40										
		Very dense Greyish brown		11.00	●	12	50/245mm										
				12.00	●	13	50/200mm										
		Medium dense Slightly silty		13.00	●	14	50/215mm										
				14.00	●	15	N=24										
		Very dense		15.00	●	16	50/280mm										
				16.00	●	17	50/225mm										
		Very dense reddish brown slightly silty fine and medium SAND (CRAG)		19.00	●	15	50/225mm										
				20.00	●	17											

End of Borehole at 20.00 m

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Borehole No. BH 111A	
Carried out for Planning & Transportation		Date Started 15/08/2007	Date Finished 15/08/2007	
Remarks: 0.75 hour hand dug starter pit. Hole abandoned at 5.0m - bomb survey		Type of Rig Dando 150		
		Depth 5.00	Height 2.650 mAOD	Logged by NB
		Co-ords 652454E - 305655N		Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		MADE GROUND : brown silty fine sand with much fine, medium and coarse gravel sized brick, flint and concrete (MADE GROUND)		1.00	●	001												
		MADE GROUND : dark brown silty fine and medium sand with much fine and medium flint gravel. Occasional brick fragments (MADE GROUND)		1.00 - 2.00	●	001 002	N=13											
		Loose brown silty fine SAND with laminae of grey very clayey silty fine sand (BREYDON FORMATION.SILTS AND CLAYS)		2.00 - 3.00	●	002 003	N=5											
		Loose to medium dense orangey brown fine and medium SAND with much fine and medium flint and quartz gravel (CORTON FORMATION)		3.00 - 4.00	●	003 004	N=9											
		End of Borehole at 5.00 m		4.00 - 5.00	●	004 005	N=11											
200	5.00			5.00														
				6.00														
				7.00														
				8.00														
				9.00														
				10.00														

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Borehole No. BH 111B	
Carried out for Planning & Transportation		Date Started 14/08/2007	Date Finished 14/08/2007	
Remarks: 0.75 hour hand dug starter pit. Hole abandoned at 1.25m - foul sewer pipe encountered		Type of Rig Dando 150		
		Depth 1.25	Height 2.540 mAOD	Logged by NB
		Co-ords 652462E - 305648N		Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		MADE GROUND : brown silty fine sand with much fine, medium and coarse gravel sized brick, flint and concrete (MADE GROUND)		1.00	↑	001												
	200 1.25	End of Borehole at 1.25 m		●	002	N=11												
				2.00														
				3.00														
				4.00														
				5.00														
				6.00														
				7.00														
				8.00														
				9.00														
				10.00														

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 1 of 3



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 112
Carried out for Planning & Transportation	Date Started 07/09/2007	Date Finished 13/09/2007
Remarks: 0.3 hour hand dug starter pit. 6.5 hours chiseling 1.05 - 1.80 metres. Bomb test redrill - 1.25 hours	Type of Rig Dando 150	
	Depth 30.00	Height 3.070 mAOD
	Co-ords 652503E - 305581N	
	Logged by JE	
	Drawn by geo	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		MADE GROUND : dark brown fine and medium sand with much up to cobble sized brick and plastic (MADE GROUND)		1.00	●	001											
	250 1.05				●	002											
				1.00	●	003											
					↑ ↓	002											
					↑ ↓	004											
		MADE GROUND : light brown fine and medium sand with much fine and medium concrete and brick (MADE GROUND)		2.00	●	005											24.0
					●	003											
					●	006											
				2.00	↑ ↓	002	75/20mm										
					↑ ↓	004											
					↑ ↓	007											
		Loose orangey brown fine and medium SAND (CORTON FORMATION)		3.00	●	004											42.7
					●	007											
					●	008											
				4.00	●	005											56.5
					●	008											
					●	005											
					●	008											
				4.00	↑ ↓	005	N=6										
					↑ ↓	008											
					↑ ↓	005											
					↑ ↓	008											
				5.00	●	006											
					●	009											
					●	006											
					●	009											
				5.00	↑ ↓	006	N=4										
					↑ ↓	009											
					↑ ↓	006											
					↑ ↓	009											
				6.00	●	007											
					●	010											
					●	007											
					●	010											
				6.00	↑ ↓	007	N=7										
					↑ ↓	010											
					↑ ↓	007											
					↑ ↓	010											
				7.00	●	008											
					●	011											
					●	008											
					●	011											
				8.00	↑ ↓	008											
					↑ ↓	011											
					↑ ↓	008											
					↑ ↓	011											
				9.00	●	009											
					●	012											
					●	009											
					●	012											
				9.00	↑ ↓	009	N=14										
					↑ ↓	012											
					↑ ↓	009											
					↑ ↓	012											
				10.00													

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 2 of 3



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 112
Carried out for Planning & Transportation	Date Started 07/09/2007	Date Finished 13/09/2007
Remarks: 0.3 hour hand dug starter pit. 6.5 hours chiseling 1.05 - 1.80 metres. Bomb test redrill - 1.25 hours	Type of Rig Dando 150	
	Depth 30.00	Height 3.070 mAOD
	Co-ords 652503E - 305581N	
	Logged by JE	
	Drawn by geo	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests											
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other				
		Loose to medium dense orangey brown fine, medium and coarse SAND with some fine, medium and coarse flint gravel (CORTON FORMATION)																	
		Medium dense to dense orangey brown fine and medium SAND (CORTON FORMATION)		11.00		010 013	N=29												
		Very dense orangey brown fine and medium SAND with a little fine and medium flint gravel (CRAG)		12.00		011 014	50/225mm												
				13.00															
				14.00		012 015	50/245mm												
				15.00		013 016	50/200mm												
		Dense orangey brown fine, medium and coarse SAND with a little fine and medium rounded flint gravel (CRAG)		16.00															
				17.00		014 017	N=40												
		Very dense brown fine and medium SAND (CRAG)		18.00		015 018	51/225mm												
				19.00															
		Dense orangey brown fine and medium SAND with a little fine, medium and coarse		20.00		016 019	N=40												
		Continued next sheet				020													

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 3 of 3



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Borehole No. BH 112	
Carried out for Planning & Transportation		Date Started 07/09/2007	Date Finished 13/09/2007	
Remarks: 0.3 hour hand dug starter pit. 6.5 hours chiseling 1.05 - 1.80 metres. Bomb test redrill - 1.25 hours		Type of Rig Dando 150		
		Depth 30.00	Height 3.070 mAOD	Logged by JE
		Co-ords 652503E - 305581N		Drawn by geo
			Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests											
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other				
		19.50m - 19.90m : rounded flint gravel. Laminae of soft grey silt (CRAG)	x x x																
		19.90m - 21.00m : Dense grey fine, medium and coarse SAND with laminae of soft grey silt (CRAG)	x x x																
		Very dense greenish grey fine and medium SAND with laminae of soft light grey silt. Some shell fragments (CRAG)	x x x	21.00	●	017 021	66/220mm												
		Very dense light grey fine SAND (CRAG)	x x x	22.00	●	018 022	50/145mm												
		Very dense laminated light grey and dark grey fine SAND and light grey SILT (CRAG)	x x x	24.00	●	019 023	50/265mm												
		Very dense light grey fine and medium SAND with a little weak silt stone (CRAG)	x x x	26.00	●	020 024	50/195mm												
		Very dense greyish brown fine and medium SAND (CRAG)	x x x	27.00	●	021 025	N=55												
				28.00															
				29.00															
				30.00	●														
				150 29.70															

End of Borehole at 30.00 m

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 1 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 113
Carried out for Planning & Transportation	Date Started 19/09/2007	Date Finished 27/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 1.75 hours.	Type of Rig Dando 3000	
	Depth 40.00	Height 2.560 mAOD
	Co-ords 652595E - 305535N	
	Logged by RW	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>r</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		MADE GROUND : compact dark reddish brown silty, gravelly fine and medium sand. Gravel is angular brick, concrete, flint and metal (MADE GROUND)	[Cross-hatch pattern]		●	002												
		MADE GROUND : dark brown silty, gravelly fine and medium sand. Gravel is angular to sub-angular fine, medium and coarse flint and brick (MADE GROUND)	[Cross-hatch pattern]	1.00	●	003												
		MADE GROUND : reddish brown silty, gravelly fine and medium sand. Gravel is angular to sub-angular fine, medium and coarse brick and flint (MADE GROUND)	[Cross-hatch pattern]	2.00	●	006												
		Stiff greyish brown slightly sandy, silty CLAY (BREYDON FORMATION.SILTS AND CLAYS)	[X pattern]	3.00	●	007												
		Firm greyish brown slightly sandy, silty CLAY (BREYDON FORMATION.SILTS AND CLAYS)	[X pattern]	3.00	●	008												
		Soft dark grey slightly sandy, clayey SILT (BREYDON FORMATION.SILTS AND CLAYS)	[X pattern]	3.00	●	009												
		Medium dense yellowish brown slightly silty, medium SAND with some fine and medium flint gravel (CORTON FORMATION)	[X pattern]	4.00	●	010												
		Medium dense yellowish brown slightly silty, gravelly fine, medium and coarse SAND. Gravel is angular to sub-rounded fine and medium flint (CORTON FORMATION)	[X pattern]	5.00	●	011												
		Dense yellowish brown slightly silty, slightly gravelly fine and medium SAND. Gravel is angular to sub-rounded fine and medium flint (CORTON FORMATION)	[X pattern]	7.00	●	012	15											
		Dense slightly silty, gravelly fine and medium SAND. Gravel is angular to sub-angular fine and medium flint (CRAG)	[X pattern]	9.00	●	013												
				10.00	●	014												
					●	015												
					●	016	N=11											
					●	017												
					●	018	N=7											
					●	019												
					●	020	N=33											
					●	021												
					●	022	N=35											
					●	023	N=34											
					●	024												
					●	025	N=30											
					●	026												
					●	027	N=40											

Continued next sheet



# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 2 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 113
Carried out for Planning & Transportation	Date Started 19/09/2007	Date Finished 27/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 1.75 hours.	Type of Rig Dando 3000	
	Depth 40.00	Height 2.560 mAOD
	Co-ords 652595E - 305535N	
	Logged by RW	
	Drawn by geo	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests											
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other				
		Dense slightly silty, gravelly fine and medium SAND. Gravel is angular to sub-angular fine and medium flint (CRAG)			●	028													
					↑	●	029	N=39											
				11.00		●	030												
						↑	●	031	N=35										
						●	032												
				12.00															
					↑	●	033	N=37											
					↓	●	33												
				13.00															
					↑	●	034	N=53											
		Very dense yellowish brown silty fine and medium SAND (CRAG)		14.00															
						●	035												
				15.00															
					↑	●	036	N=36											
		Dense greyish, yellowish brown silty fine SAND (CRAG)		16.00															
						●	037												
				17.00															
					↑	●	038	N=53											
		Very dense grey silty fine SAND (CRAG)		18.00															
						●	039												
				19.00															
250	19.00				↑	●	038	N=53											
					↓	●	039												
				20.00															

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 3 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 113
Carried out for Planning & Transportation	Date Started 19/09/2007	Date Finished 27/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 1.75 hours.	Type of Rig Dando 3000	
	Depth 40.00	Height 2.560 mAOD
	Co-ords 652595E - 305535N	
		Logged by RW
		Drawn by geo
		Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests													
					Type	No.		MC%	P <sub>s</sub>	SO <sub>2</sub>	Cl-	pH	Org.	CBR	Other						
		Very dense grey silty fine SAND (CRAG)	X	21.00	●	040															
		Very dense grey silty fine SAND with occasional flint cobble and shell fragments (CRAG)	X	22.00	●	041 042 42	N=75														
					●			043													
		Very dense grey slightly silty fine SAND. Occasional clay bands (CRAG)	X	23.00	●	044 045	N=60														
					●			046													
					●			047 048	N=58												
		●	049																		
		Dense	X	27.00	●	050 051	N=62														
					●			052													
					●			053 054 54	N=37												
				29.00																	
				30.00																	

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 4 of 4



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Borehole No. BH 113	
Carried out for Planning & Transportation		Date Started 19/09/2007	Date Finished 27/09/2007	
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 1.75 hours.		Type of Rig Dando 3000		
		Depth 40.00	Height 2.560 mAOD	Logged by RW
		Co-ords 652595E - 305535N		Drawn by geo
			Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
	200	Very dense grey slightly silty fine SAND. Occasional clay bands (CRAG)	[Symbol]	30.00	●	055												
	30.00																	
		Stiff grey CLAY (CRAG)	[Symbol]	31.00	●	056	100											
					●	057												
					●	058												
		Stiff grey sandy, clayey SILT (CRAG)	[Symbol]	32.00	●	059												
		Stiff grey CLAY (CRAG)	[Symbol]	33.00	●		150											
					●													
					●													
		Stiff grey CLAY (CRAG)	[Symbol]	34.00	●	061												
					●	062												
		Very dense grey silty fine SAND (CRAG)	[Symbol]	35.00	●	063												
		Very dense grey slightly silty fine and medium SAND with a little shell fragment (CRAG)	[Symbol]	36.00	●	064	55/225mm											
					●	065												
		Very dense grey silty fine SAND (CRAG)	[Symbol]	37.00	●	066												
			[Symbol]	38.00	●													
	150		[Symbol]	39.00	●	067	N=86											
	38.50				●	068												
				40.00	●													

End of Borehole at 40.00 m

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 1 of 1



Scheme Great Yarmouth Third River Crossing Job No. PTPZ0008 Borehole No. BH 114

Carried out for Planning & Transportation Date Started 04/09/2007 Date Finished 06/09/2007

Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 2.0 hours. Hole abandoned at 4.50m - bomb survey.

Type of Rig Dando 3000

Depth 4.50 Height 2.240 mAOD

Co-ords 652723E - 305509N

Logged by RW  
 Drawn by geo  
 Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		Intact CONCRETE (MADE GROUND)			●	001												
		MADE GROUND : crushed concrete (MADE GROUND)			●	002												
		MADE GROUND : dark brown fine and medium sand with some up to coarse gravel sized flint and concrete. Some shell fragments (MADE GROUND)		1.00	●	003												
		MADE GROUND : dark brown silty fine and medium sand with some up to coarse gravel sized flint and concrete. Some shell fragments (MADE GROUND)			●	004												
		MADE GROUND : dark brown silty fine and medium sand with some up to coarse gravel sized flint and concrete. Some shell fragments (MADE GROUND)			●	005												
		MADE GROUND : dark brown silty fine and medium sand with some up to coarse gravel sized flint and concrete. Some shell fragments (MADE GROUND)			●	006												
		MADE GROUND : dark brown silty fine and medium sand with some up to coarse gravel sized flint and concrete. Some shell fragments (MADE GROUND)			●	007												
		MADE GROUND : dark brown silty fine and medium sand with some up to coarse gravel sized flint and concrete. Some shell fragments (MADE GROUND)			●	008												
		MADE GROUND : dark brown silty fine and medium sand with some up to coarse gravel sized flint and concrete. Some shell fragments (MADE GROUND)			●	8												
		MADE GROUND : brown fine and medium sand with much up to coarse gravel sized flint. Some shell fragments (MADE GROUND)		2.00	●	009												
		MADE GROUND : brown fine and medium sand with much up to coarse gravel sized flint. Some shell fragments (MADE GROUND)			●	010												
		MADE GROUND : brown silty fine and medium sand with some up to coarse gravel sized brick (MADE GROUND)			●	011												
		MADE GROUND : brown silty fine and medium sand with some up to coarse gravel sized brick (MADE GROUND)			●	11												
		MADE GROUND : brown silty fine and medium sand with some up to coarse gravel sized brick (MADE GROUND)			●	012												
		MADE GROUND : brown silty fine and medium sand with some up to coarse gravel sized brick (MADE GROUND)		3.00	●	013												
		MADE GROUND : brown silty fine and medium sand with some up to coarse gravel sized brick (MADE GROUND)			●	12												
		MADE GROUND : soft to firm brown very sandy, silty clay with some fine, medium and coarse flint gravel (MADE GROUND)			●	014												
		MADE GROUND : soft to firm brown very sandy, silty clay with some fine, medium and coarse flint gravel (MADE GROUND)			●	015												
		MADE GROUND : soft to firm brown very sandy, silty clay with some fine, medium and coarse flint gravel (MADE GROUND)			●	15												
		Medium dense brown and dark grey silty fine and medium SAND with some fine, medium and coarse flint gravel. Some organic material (TIDAL AND RIVER CREEK DEPOSITS)		4.00	●	016												
		Medium dense brown and dark grey silty fine and medium SAND with some fine, medium and coarse flint gravel. Some organic material (TIDAL AND RIVER CREEK DEPOSITS)			●	16												
		Medium dense brown and dark grey silty fine and medium SAND with some fine, medium and coarse flint gravel. Some organic material (TIDAL AND RIVER CREEK DEPOSITS)			●	017												
		Medium dense brown and dark grey silty fine and medium SAND with some fine, medium and coarse flint gravel. Some organic material (TIDAL AND RIVER CREEK DEPOSITS)			●	17												
		Medium dense orangey brown medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)		5.00														
		Medium dense orangey brown medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)																
		Medium dense greyish brown medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)		6.00														
		Medium dense greyish brown medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)																
		Medium dense light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)		7.00														
		Medium dense light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)																
		Medium dense light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)		8.00														
		Medium dense light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)																
		Medium dense light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)		9.00														
		Medium dense light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)																
		Medium dense light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)		10.00														

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 1 of 3



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 115
Carried out for Planning & Transportation	Date Started 04/09/2007	Date Finished 13/09/2007
Remarks: 1.5 hours hand dug starter pit. 3.0 hours chiselling 2.0 - 2.4 metres. Bomb test redrill - 1.5 hours.	Type of Rig Dando 3000	
	Depth 30.00	Height 3.290 mAOD
	Co-ords 652851E - 305280N	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Asphalt			●	001											
		MADE GROUND : concrete, aggregate and metal (MADE GROUND)			●	002											
		MADE GROUND : Grey, brown and brick red angular to rounded, fine, medium and coarse brick, concrete and flint gravel and fine, medium and coarse sand. Occasional plastic fragments and brick cobbles (MADE GROUND)		1.00	●	003											
					●	004											
					●	005											
					4												
		Medium dense brown, light brown and grey slightly gravelly fine, medium and coarse SAND. Gravel is sub-angular to sub-rounded fine, medium and coarse flint (NORTH DENES FORMATION)		2.00	↑	006	N=42										
					↓	007											
					●	008											
		Dense		3.00	●	009	N=19										
					↑	010											
					●	011											
					↑	012	N=25										
					↓	013											
		Dense		4.00	↑	014	N=19										
					↓	015	N=22										
					●	016											
		Dense		5.00	●	017											
					●	018	N=22										
					↑	019											
		Dense		6.00	●	020	N=43										
					↑												
				7.00	●												
				8.00	●												
				9.00	●												
				10.00	●												

250  
6.00

96.8

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 2 of 3



Scheme Great Yarmouth Third River Crossing Job No. PTPZ0008 Borehole No. BH 115

Carried out for Planning & Transportation Date Started 04/09/2007 Date Finished 13/09/2007

Remarks: 1.5 hours hand dug starter pit. 3.0 hours chiselling 2.0 - 2.4 metres. Bomb test redrill - 1.5 hours.

Type of Rig Dando 3000

Depth 30.00 Height 3.290 mAOD

Co-ords 652851E - 305280N

Logged by PW  
Drawn by gso  
Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	p <sub>s</sub>	SO <sub>2</sub>	Cl-	pH	Org.	CBR	Other			
		Medium dense brown, light brown and grey slightly gravelly fine, medium and coarse SAND. Gravel is sub-angular to sub-rounded fine, medium and coarse flint (NORTH DENES FORMATION)				●	021											
		Dense reddish orangey brown slightly silty, slightly clayey fine and medium SAND (CRAG)		11.00		●	022											
				12.00		●	023	N=39										
				13.00		●	024	N=47										
				14.00		●	025											
				15.00		●	026	N=39										
				16.00		●	027											
				17.00		●	028 28	N=37										
				18.00		●	029											
				19.00		●	030	N=44										
				20.00		●	031											

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 3 of 3



Scheme Great Yarmouth Third River Crossing		Job No. PTPZ0008	Borehole No. BH 115	
Carried out for Planning & Transportation		Date Started 04/09/2007	Date Finished 13/09/2007	
Remarks: 1.5 hours hand dug starter pit. 3.0 hours chiselling 2.0 - 2.4 metres. Bomb test redrill - 1.5 hours.		Type of Rig Dando 3000		
		Depth 30.00	Height 3.290 mAOD	Logged by PW
		Co-ords 652851E - 305280N		Drawn by geo
			Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests								
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other	
		Dense reddish orangey brown slightly silty, slightly clayey fine and medium SAND (CRAG)	X	21.00	●	032 033	N=44									
		Fine and medium shell fragments	X	22.00	●	034 035 036	N=42									
			X	23.00	●	037										
			X	24.00												
		Very dense grey and greenish brown silty fine and medium SAND with some fine and medium shell fragments (CRAG)	X	25.00	●	038 039	N=68									
			X	26.00	●	040 041	N=65									
			X	27.00	●	042										
		Dense	X	28.00	●	043 044	N=40									
			X	29.00	●	045 046	N=16									
		Medium dense	X	30.00	●											

End of Borehole at 30.00 m



# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 1 of 3



Scheme Great Yarmouth Third River Crossing

Job No. PTPZ0008

Borehole No. BH 116

Carried out for Planning & Transportation

Date Started 28/08/2007

Date Finished 03/09/2007

Remarks:

1.5 hours hand dug starter pit. 0.6 hours chiselling GL - 0.08 metre.

Type of Rig Dando 3000

Depth 30.00

Height 2.430 mAOD

Logged by RW

Drawn by Gra

Co-ords 652774E - 305340N

Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests											
					Type	No.		MC%	P <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other				
		CONCRETE (MADE GROUND)				●	001												
		MADE GROUND : dark brown fine and medium sand with much fine, medium and coarse asphalt, flint and concrete (MADE GROUND)				●	002												
						●	003												
						●	004												
						●	005												
		Medium dense light brown fine and medium SAND with a little fine and medium flint gravel (NORTH DENES FORMATION)		1.00		●	007												
						●	008												
						●	006												
						●	009												
						●	010	N=19											
						●	011												
		Medium dense light brown fine, medium and coarse SAND with some fine, medium and coarse flint gravel (NORTH DENES FORMATION)		2.00		●	012												
						●	013												
						●	014	N=25											
		Medium dense light brown fine and medium SAND with a little fine and medium flint gravel (NORTH DENES FORMATION)		3.00		●	015												
						●	016												
						●	017	N=14											
		Medium dense light brown fine and medium SAND with some fine and medium flint gravel (NORTH DENES FORMATION)		4.00		●	018												
						●	019	N=17											
		Medium dense light brown fine, medium and coarse flint GRAVEL with a little fine and medium sand (NORTH DENES FORMATION)		5.00		●	020												
						●	021	N=17											
		Medium dense light brown medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (NORTH DENES FORMATION)		6.00		●	022												
						●	023												
						●	024	N=8											
		Loose dark brown silty fine and medium SAND with a little fine, medium and coarse flint gravel (NORTH DENES FORMATION)		7.00		●	025												
						●	026	N=26											
		Loose light brown fine and medium SAND with some fine and medium flint gravel (NORTH DENES FORMATION)		8.00		●	027												
						●	028	N=39											
		Medium dense light brown fine, medium and coarse flint GRAVEL with a little fine and medium sand (NORTH DENES FORMATION)		9.00		●	029												
						●	030	N=44											
		Dense light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (KESGRAVE FORMATION)		10.00		●													

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 2 of 3



Scheme Great Yarmouth Third River Crossing Job No. PTPZ0008 Borehole No. BH 116

Carried out for Planning & Transportation Date Started 28/08/2007 Date Finished 03/09/2007

Remarks: 1.5 hours hand dug starter pit. 0.6 hours chiselling GL - 0.08 metre.

Type of Rig Dando 3000

Depth 30.00 Height 2.430 mAOD

Co-ords 652774E - 305340N

Logged by RW  
Drawn by Gra  
Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	P <sub>a</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		Dense light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel (KESGRAVE FORMATION)			●	030												
		Medium dense orangey brown fine, medium and coarse SAND with a little fine, medium and coarse flint gravel (KESGRAVE FORMATION)		11.00	↑	031	N=19											
		Very dense		12.00	●	032												
				13.00	↑	033	50/175mm											
		Dense orangey brown fine and medium SAND (CRAG)		14.00	●	034												
		Very dense		15.00	↑	035	N=47											
				16.00	●	036												
		Very dense		17.00	↑	037	50/235mm											
				18.00	●	038												
		Very dense		19.00	↑	039	50/265mm											
				20.00	●	040												
		Dense orangey brown slightly silty fine SAND (CRAG)		18.50	↑	041	N=47											
		Very dense		19.00	●	042												
				20.00	●	042												

Continued next sheet



# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 1 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 117
Carried out for Planning & Transportation	Date Started 07/09/2007	Date Finished 14/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.0 hours.	Type of Rig Dando 3000	
	Depth 39.45	Height 2.340 mAOD
	Co-ords 652673E - 305652N	
	Logged by RW	
	Drawn by geo	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		CONCRETE (MADE GROUND)																
		MADE GROUND : brown, grey and white slightly clayey, gravelly, fine, medium and coarse sand. Gravel is angular to rounded, fine, medium and coarse flint, brick and concrete (MADE GROUND)		1.00		001 002 003 006												
		MADE GROUND : soft brown very sandy, gravelly clay. Gravel is fine, medium and coarse, angular to sub-rounded flint, brick and concrete (MADE GROUND)		2.00		004 005 007 4												
		MADE GROUND : soft brown very sandy, gravelly clay. Gravel is fine, medium and coarse, angular to sub-rounded flint, brick and concrete (MADE GROUND)		2.00		008 009 010	N=4											
		Very loose brown and grey clayey, slightly gravelly, fine, medium and coarse SAND. Gravel is angular to sub-rounded, fine, medium and coarse flint gravel (TIDAL AND RIVER CREEK DEPOSITS)		3.00		011 012												
		Very loose dark grey silty fine, medium and coarse SAND and angular to sub-rounded fine, medium and coarse flint gravel (TIDAL AND RIVER CREEK DEPOSITS)		3.00		013 014 14												
		Very loose dark grey fine, medium and coarse SAND and angular to sub-rounded fine, medium and coarse flint gravel (TIDAL AND RIVER CREEK DEPOSITS)		4.00		015 016 017 16 17	N=3	39										
		Dark grey organic SILT (TIDAL AND RIVER CREEK DEPOSITS)		5.00		018 019	N=26											
		Medium dense dark brownish grey medium SAND (NORTH DENES FORMATION)		6.00		020 20	N=16											
		Medium dense brownish grey fine, medium and coarse SAND and sub-angular to rounded fine and medium flint gravel (NORTH DENES FORMATION)		7.00		021 022 22	N=23											
		Dense yellowish brown fine and medium SAND (NORTH DENES FORMATION)		8.00		023 024	N=42											
				9.00		025	N=37											
				10.00														

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 2 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 117
Carried out for Planning & Transportation	Date Started 07/09/2007	Date Finished 14/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.0 hours.	Type of Rig Dando 3000	
	Depth 39.45	Height 2.340 mAOD
	Co-ords 652673E - 305652N	
	Logged by RW	
	Drawn by geo	
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
	250	Dense yellowish brown fine and medium SAND (NORTH DENES FORMATION)		10.10	●	026 26												
				11.00	●	027 028	N=38											
		Dense reddish brown slightly gravelly medium SAND. Occasional lenses of clayey medium sand. Gravel is sub-angular to sub-rounded, fine and medium flint. (CRAG)		12.00	●	029 030	N=49											
		Very dense		13.00														
		Becoming slightly silty		14.00	●	031 032	50/180mm											
				15.00	●	033 034	50/245mm											
				16.00														
		Dense		17.00	●	035 036 36	N=39											
				18.00	●	037 038	50/235mm											
		Very dense		19.00														
		Becoming silty		20.00	●	040												
		Continued next sheet																

# NORFOLK PARTNERSHIP LABORATORY

# BOREHOLE LOG

Sheet 3 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 117
Carried out for Planning & Transportation	Date Started 07/09/2007	Date Finished 14/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.0 hours.	Type of Rig Dando 3000	
	Depth 39.45	Height 2.340 mAOD
	Co-ords 652673E - 305652N	
	Logged by RW	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests									
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other		
		Stiff grey sandy CLAY (CRAG)	X X X X		●	039	50/275mm										
		Very dense grey slightly silty fine and medium SAND with many fine shell fragments (CRAG)	X X X X	21.00	●	041											
		Very dense brown and grey fine SAND (CRAG)	X X X X	22.00	●	042	50/275mm										
		Dense	X X X X	23.00	●	043											
			X X X X		●	044	N=47										
			X X X X	24.00		045											
		Medium dense	X X X X		●	046	N=18										
		Fine and medium sand	X X X X	25.00		047											
		Very dense brown and grey slightly silty fine and medium SAND (CRAG)	X X X X	26.00	●	048	50/240mm										
			X X X X	27.00		049											
		Stiff thinly laminated grey SILT and CLAY (CRAG)	X X X X	28.00	●	050	49/235mm										
		Dense grey medium SAND (CRAG)	X X X X		●	051											
			X X X X	29.00	●	052	N=45										
			X X X X		●	053											
			X X X X	30.00													

200  
29.50

Continued next sheet

# NORFOLK PARTNERSHIP LABORATORY

## BOREHOLE LOG

Sheet 4 of 4



Scheme Great Yarmouth Third River Crossing	Job No. PTPZ0008	Borehole No. BH 117
Carried out for Planning & Transportation	Date Started 07/09/2007	Date Finished 14/09/2007
Remarks: 1.5 hours hand dug starter pit. Bomb test redrill - 3.0 hours.	Type of Rig Dando 3000	
	Depth 39.45	Height 2.340 mAOD
	Co-ords 652673E - 305652N	
	Logged by RW	Drawn by geo
	Checked by MB	

Backfill	Water	Description	Legend	Depth (m)	Sample		Field Tests	Laboratory Tests										
					Type	No.		MC%	p <sub>s</sub>	SO <sub>3</sub>	Cl-	pH	Org.	CBR	Other			
		Dense grey medium SAND (CRAG)																
		Very dense				●	054	N=55										
		Becoming slightly clayey		31.00		●	055											
		Stiff grey sandy, SILT and CLAY (CRAG)		32.00		●	056	N=41										
						●	057											
				33.00														
						■	058	150										
		Very dense grey slightly silty fine and medium SAND (CRAG)		34.00		●	059											
				35.00		●	060	50/245mm										
						●	061											
				36.00														
						●	062	49/150mm										
						●	063											
				37.00														
						●	064	57/150mm										
						●	065											
				38.00														
						●	066	55/150mm										
				39.00														
		End of Borehole at 39.45 m																
				40.00														

150  
38.20



# Appendix D

Planning & Transportation  
County Hall  
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Norwich  
NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No 99692  
Your Sample Ref D4  
Your Project or Order No  
P&T Project No.  
Date Report Issued 10-Oct-07

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

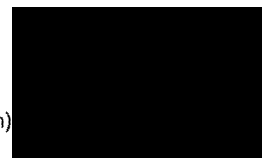
Scheme	Great Yarmouth Third River Crossing		
Location	BH 101	Depth	2 m
Date sampled		Date received	31-Aug-07
Date tested	05-Sep-07		
Sample type	D	Sample Mass	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
Material	Small disturbed sample		
Description	MADE GROUND brown sandy clayey SILT with much fine and medium flint gravel.		
Supplier	Not applicable	Source	Ex site
Conveyance note No.	Not applicable		

LOCATION	TEST SPECIMEN
ORIENTATION	Not applicable
METHOD OF DIVISION	PREPARATION DETAILS
PREPARATION METHOD	Ridffied
	Oven dried @ 105 -110°C
PASSING 2mm BS TEST SIEVE (%)	96
ORGANIC MATTER (%)	16

Test Code:620



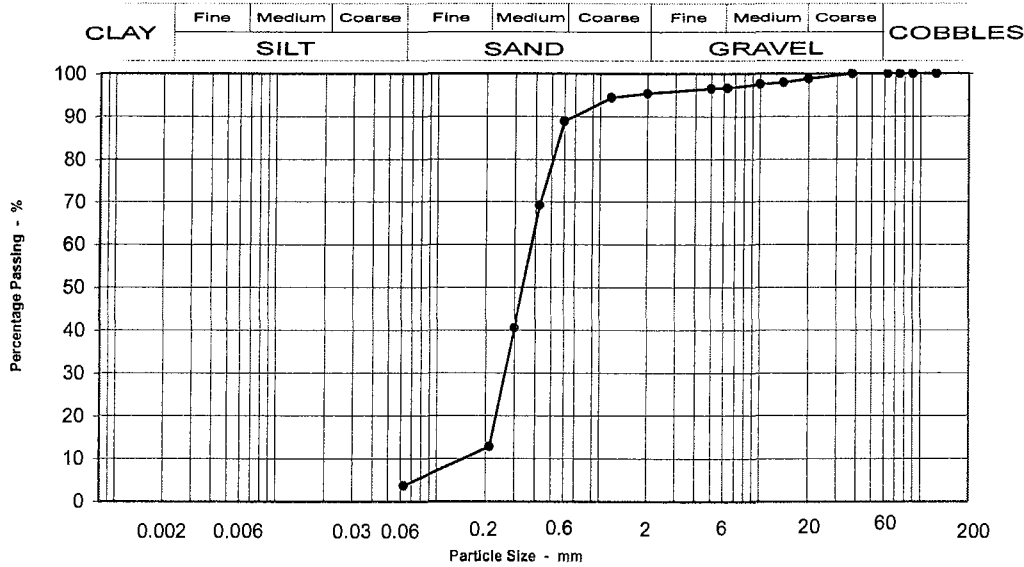
David Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 101 3 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	1B Suitable
90	100	
75	100	
63	100	
37.5	100	
20	99	
14	98	
10	98	
6.3	97	
5	97	
2	95	6E/6R Suitable
1.18	94	6M Suitable
0.6	89	
0.425	69	
0.3	40	
0.212	13	
0.063	4	
Moisture content %		23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	2
Fine GRAVEL	7
Coarse SAND	1
Medium SAND	76
Fine Sand	9
Silt & Clay	4

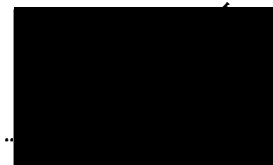
Grading Analysis	
D100	20
D60	0.4
D10	0.17
Uniformity Coefficient	2

Description	
Grey fine, medium and coarse SAND with some fine flint and quartz gravel.	

Test Code = 610

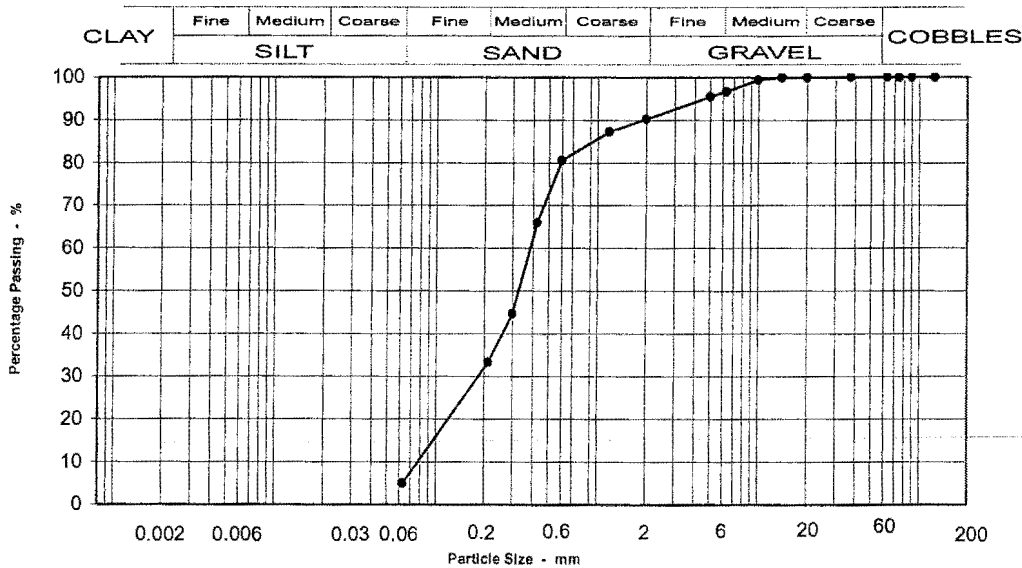


R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer)  
D N Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 101 17.5 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	1B Suitable
75	100	
63	100	
37.5	100	
20	100	
14	100	
10	99	
6.3	97	
5	96	
2	90	6E/6R Suitable
1.18	87	
0.600	81	
0.425	66	
0.300	45	
0.212	33	
0.063	5	6M Suitable
<b>Moisture content %</b>		<b>21</b>

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	10
Coarse SAND	7
Medium SAND	47
Fine SAND	28
Silt & Clay	5

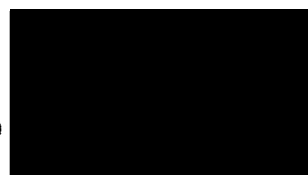
Grading Analysis	
D100	20
D60	0.39
D10	0.090
Uniformity Coefficient	4

Description	
Orangey brown clayey and silty fine and medium SAND with numerous shell fragments.	

Test Code = 610



D N Houseago (Lead Technician)



Planning & Transportation  
County Hall  
Martineau Lane  
Norwich  
NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No  
Your Sample Ref D6  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

Page 1 of 1

**DETERMINATION OF MOISTURE CONTENT TO BS1377 : PART2 : 1990 : SECTION 3.2**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 102	<b>Depth</b>	2.7 - m
<b>Date sampled</b>		<b>Date received</b>	29-Sep-07
<b>Sample type</b>	D	<b>Sample Mass</b>	Unknown
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Very soft brown and dark grey very sandy silty CLAY. Organic odour. Sand is fine, medium and coarse.		
<b>Supplier</b>	<b>Source</b>		
Conveyance note No.			

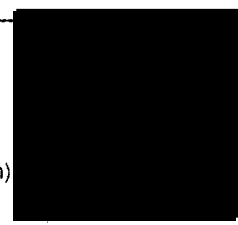
<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Riffled
	Oven dried @ 105 -110°C
<b>NATURAL MC (%)</b>	37

REMARKS

Test Code = 602



K Lawes (Lead Technician)



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Norwich  
NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No 100310  
Your Sample Ref D7  
Your Project or Order No  
P&T Project No.  
Date Report Issued 10-Oct-07

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 102	<b>Depth</b>	3 m
<b>Date sampled</b>		<b>Date received</b>	29-Sep-07
<b>Date tested</b>	05-Oct-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Very soft brown and dark grey very sandy silty CLAY. Organic odour. Sand is fine, medium and coarse		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

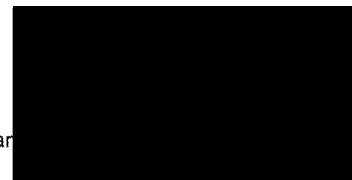
<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Ridffled
	Oven dried @ 105 -110°C

<b>PASSING 2mm BS TEST SIEVE (%)</b>	95
<b>ORGANIC MATTER (%)</b>	3

Test Code:620



David Houseago (Lead Technician)

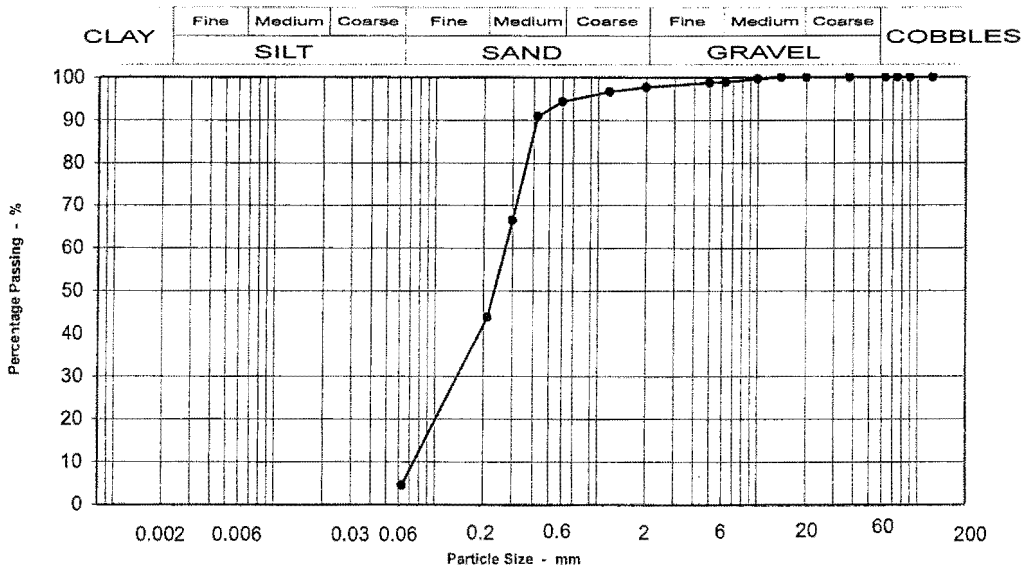


Planning & Transportation  
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 NR1 2SG

Our Project No PTP20008  
 Our Report and sample No 99681  
 Your Sample Ref B10  
 Your Project or Order No  
 P&T Project No.  
 Date Report Issued 10 September 2007

## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 101 8 - m**

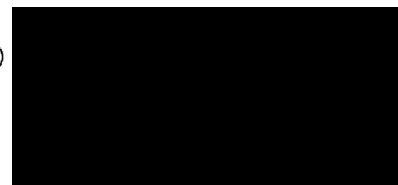


Seiving		Specification for Highway Works Classification		Sample Proportions	
Particle Size mm	% Passing				
125	100	1B	Suitable	BOULDERS	0
90	100			COBBLES	0
75	100			Coarse GRAVEL	0
63	100			Medium GRAVEL	1
37.5	100			Fine GRAVEL	3
20	100			Coarse SAND	1
14	100			Medium SAND	51
10	100			Fine Sand	39
6.3	99			Silt & Clay	5
5	99				
2	98	6E/6R	Suitable	Grading Analysis	
1.18	97			D100	10
0.6	94			D60	0.3
0.425	91			D10	0.08
0.3	67			Uniformity Coefficient	3
0.212	44			Description	
0.063	5	6M	Suitable	Orangey brown fine and medium SAND.	
Moisture content %		25			

Test Code = 610



R J Noakes (Group Manager)  
 M L Bumstead (Section Engineer)  
 I D Brown (Section Engineer)  
 D N Houseago (Lead Technician)





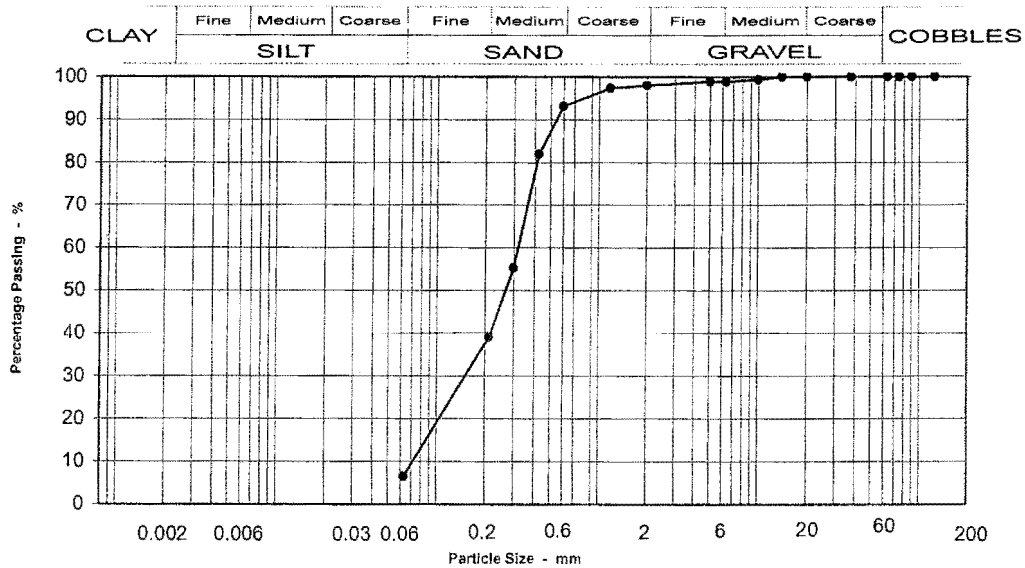
Planning & Transportation  
 County Hall  
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 Norwich  
 NR1 2SG

Our Project No PTPZ0008  
 Our Report and sample No 99682  
 Your Sample Ref B14  
 Your Project or Order No  
 P&T Project No.  
 Date Report Issued 10 September 2007

## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: Great Yarmouth Third River Crossing

Location: BH 101 13 - m



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	99
5	99
2	98
1.18	97
0.6	93
0.425	82
0.3	55
0.212	39
0.063	6

### Specification for Highway Works Classification

1B Suitable

6E/6R Suitable

6M Suitable

Moisture content % 24

### Sample Proportions

BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	5
Coarse SAND	1
Medium SAND	54
Fine Sand	33
Silt & Clay	6

### Grading Analysis

D100	10
D60	0.3
D10	0.08
Uniformity Coefficient	4

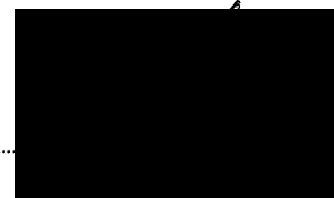
### Description

Orangey brown clayey and silty fine and medium SAND.

Test Code = 610



R J Noakes (Group Manager)  
 M L Bumstead (Section Engineer)  
 I D Brown (Section Engineer)  
 D N Houseago (Lead Technician)



Planning & Transportation  
County Hall  
Martineau Lane  
Norwich  
NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No 99806  
Your Sample Ref D7  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

Page 1 of 1

**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

Scheme	Great Yarmouth Third River Crossing		
Location	BH 102	Depth	3 - m
Date sampled		Date received	21-Sep-07
Date tested	12-Sep-07		
Sample type	D	Sample Mass	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
Material	Small disturbed sample		
Description	Very soft brown and dark grey very sandy silty CLAY. Organic odour. Sand is fine, medium and coarse		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

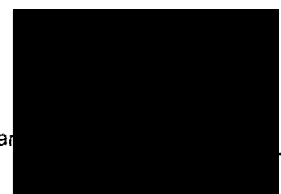
LOCATION	TEST SPECIMEN		
ORIENTATION	Not applicable		
	PREPARATION DETAILS		
METHOD OF DIVISION	Whole		
PREPARATION METHOD	Hand picking		
RETAINED 425µm (%)	0		
NATURAL MC (%)	29	OVEN DRIED @ 105°C	
LIQUID LIMIT (%)	30		
PLASTIC LIMIT (%)	13		
PLASTICITY INDEX (%)	17		
MODIFIED PI *(%)	17	*BRE Digest 240 : 1993	
SOIL CLASSIFICATION	CL		

REMARKS

Test Code = 604



David Houseago (Lead Technician)



Planning & Transportation  
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Norwich  
NR1 2SG  
FAO | Brown

Our Project No PTPZ0008  
Our Report and sample No 100367  
Your Sample Ref B7  
Your Project or Order No  
P&T Project No.  
Date Report Issued 10-Oct-07

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :**  
**Part 3 : SECTION 3.1**

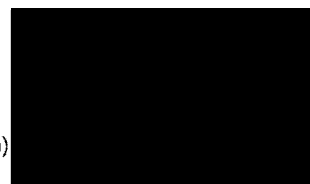
<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 102	<b>Depth</b>	4 m
<b>Date sampled</b>		<b>Date received</b>	01-Oct-07
<b>Date tested</b>	05-Oct-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Very soft grey very sandy silty CLAY. Organic odour. Sand is fine		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Ridffied
	Oven dried @ 105 -110°C
<b>PASSING 2mm BS TEST SIEVE (%)</b>	83
<b>ORGANIC MATTER (%)</b>	1

Test Code:620



David Houseago (Lead Technician)

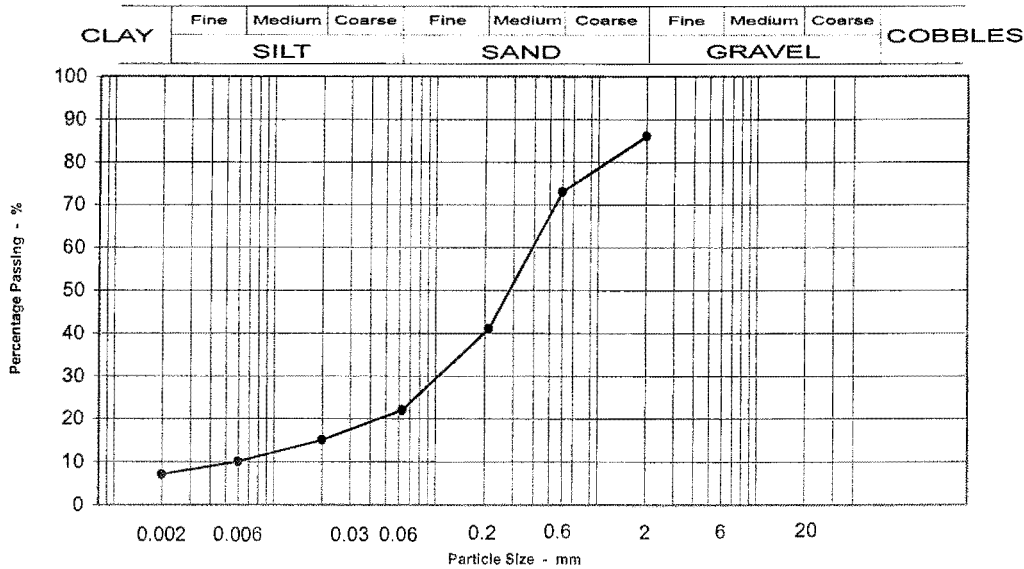


Planning & Transportation  
County Hall  
Martineau Lane  
Norwich  
NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 100312  
Your Sample Ref D8  
Your Project or Order No  
P&T Project No.  
Date Report Issued 12 October 2007

**Particle Size Distribution to BS 1377 : Part2 : 1990  
Sedimentation Method Section 9.4**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 102 4 - m**



Sieving	
Particle Size mm	% Passing
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	86
0.6	73
0.212	41
0.063	22
0.02	15
0.006	10
0.002	7

Moisture content % 29

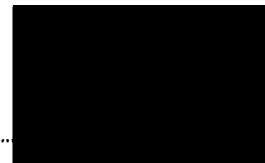
Sample Proportions	
GRAVEL	14
Coarse SAND	13
Medium SAND	32
Fine SAND	19
Coarse SILT	5
FINE SILT	3
CLAY	7

**Description**  
Very soft grey very sandy silty CLAY. Organic odour. Sand is fine

Test Code = 612



D N Houseago (Lead Technician)



Planning & Transportation  
County Hall  
Martineau Lane  
Norwich  
NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No  
Your Sample Ref D8  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

Page 1 of 1

**DETERMINATION OF MOISTURE CONTENT TO BS1377 : PART2 : 1990 : SECTION 3.2**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 102	<b>Depth</b>	4 - m
<b>Date sampled</b>		<b>Date received</b>	29-Sep-07
<b>Sample type</b>	D	<b>Sample Mass</b>	Unknown
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Very soft grey very sandy silty CLAY. Organic odour. Sand is fine		
<b>Supplier</b>	<b>Source</b>		
<b>Conveyance note No.</b>			

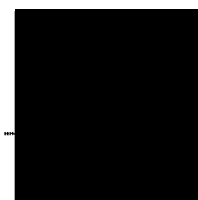
<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Riffled
	Oven dried @ 105 -110°C
<b>NATURAL MC (%)</b>	25

**REMARKS**

Test Code = 602

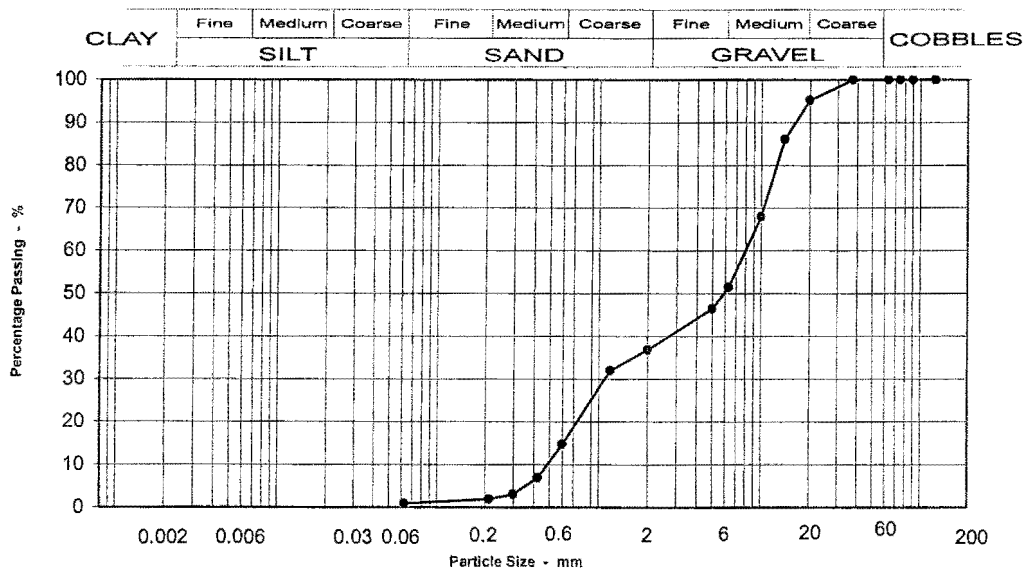


K Lawes (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 102 6 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	1A Suitable
90	100	
75	100	
63	100	
37.5	100	
20	95	
14	86	6A Suitable
10	68	
6.3	51	
5	46	
2	37	6E/6R Suitable
1.18	32	6F1 Suitable
0.600	15	
0.425	7	
0.300	3	6I Suitable
0.212	2	
0.063	1	
		6M Suitable
		6N/6P Suitable
Moisture content %		4

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	5
Medium GRAVEL	44
Fine GRAVEL	22
Coarse SAND	15
Medium SAND	13
Fine SAND	1
Silt & Clay	1

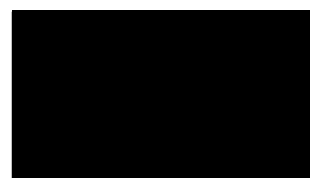
Grading Analysis	
D100	20
D60	8.23
D10	0.495
Uniformity Coefficient	17

Description	
Loose yellowish brown gravelly fine, medium and coarse SAND. Gravel is angular to sub-rounded fine, medium and coarse flint	

Test Code = 610

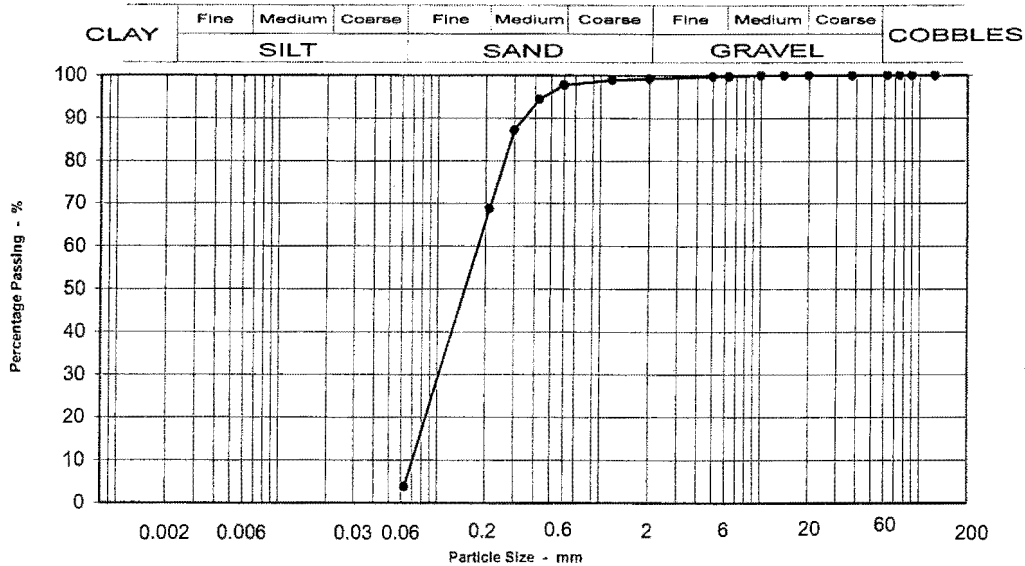


D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 102 14.5 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	98
0.425	94
0.300	87
0.212	69
0.063	4

Specification for Highway Works Classification	
1B	Suitable
6E/6R	Suitable
6M	Suitable

Moisture content % 23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	1
Medium SAND	29
Fine SAND	65
Silt & Clay	4

Grading Analysis	
D100	6
D60	0.19
D10	0.077
Uniformity Coefficient	2

Description	
Very dense reddish brown slightly silty medium SAND. Occasional angular to sub-rounded fine and medium flint gravel and shells	

Test Code = 610



D N Houseago (Lead Technician)



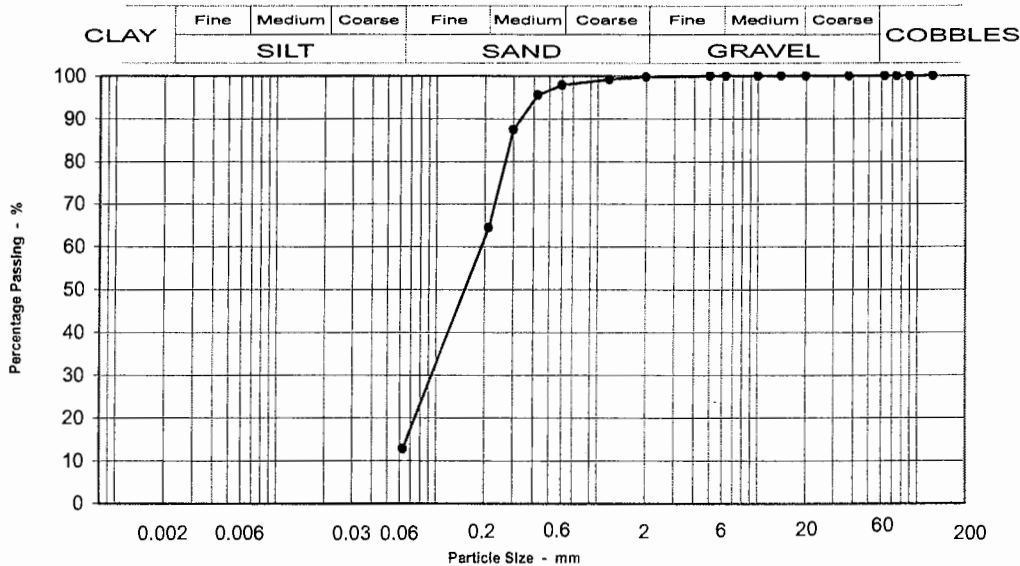




## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 102 25 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	
75	100	1B Suitable
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	100	6E/6R Suitable
1.18	99	
0.600	98	
0.425	96	
0.300	87	
0.212	64	
0.063	13	

Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	0
Medium SAND	33
Fine SAND	52
Silt & Clay	13

Grading Analysis	
D100	2
D60	0.20
D10	0.034
Uniformity Coefficient	6

Description
Very dense grey slightly silty fine and medium SAND. Occasional crushed shells

Test Code = 610



D N Houseago (Lead Technician)



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Our Report and sample No 100309  
Your Sample Ref D31  
Your Project or Order No  
P&T Project No.  
Date Report Issued 25-Oct-07

FAO I Brown

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**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY  
INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 102	<b>Depth</b>	28 - m
<b>Date sampled</b>		<b>Date received</b>	09-Oct-07
<b>Date tested</b>	02-Oct-07		
<b>Sample type</b>	Small disturbed sample	<b>Sample Mass</b>	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
<b>Material</b>			
<b>Description</b>	Very soft grey thinly laminated CLAY. Bands of soft grey fine clayey SAND		
<b>Supplier</b>		<b>Source</b>	Not applicable
<b>Conveyance note No.</b>	Not applicable		

<b>LOCATION</b>	TEST SPECIMEN		
<b>ORIENTATION</b>	Not applicable		
<b>METHOD OF DIVISION</b>	Not applicable		
<b>PREPARATION METHOD</b>	PREPARATION DETAILS		
<b>RETAINED 425µm (%)</b>	0		
<b>NATURAL MC (%)</b>	39		OVEN DRIED @ 105°C
<b>LIQUID LIMIT (%)</b>	38		
<b>PLASTIC LIMIT (%)</b>	23		
<b>PLASTICITY INDEX (%)</b>	15		
<b>MODIFIED PI *(%)</b>	15		*BRE Digest 240 : 1993
<b>SOIL CLASSIFICATION</b>	C I		

REMARKS

Test Code = 604



David Houseago (Lead Technician)



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Your Sample Ref D29  
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P&T Project No.  
Date Report Issued 16-Oct-07

Page 1 of 1

**DETERMINATION OF MOISTURE CONTENT TO BS1377 : PART2 : 1990 : SECTION 3.2**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 102	<b>Depth</b>	32.45 - m
<b>Date sampled</b>		<b>Date received</b>	29-Sep-07
<b>Sample type</b>	D	<b>Sample Mass</b>	Unknown
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Very soft grey thinly laminated CLAY. Bands of soft grey fine clayey SAND		
<b>Supplier</b>	<b>Source</b>		
<b>Conveyance note No.</b>			

<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Riffled
	Oven dried @ 105 -110°C

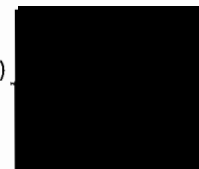
NATURAL MC (%) 21

**REMARKS**

Test Code = 602



K Lawes (Lead Technician)

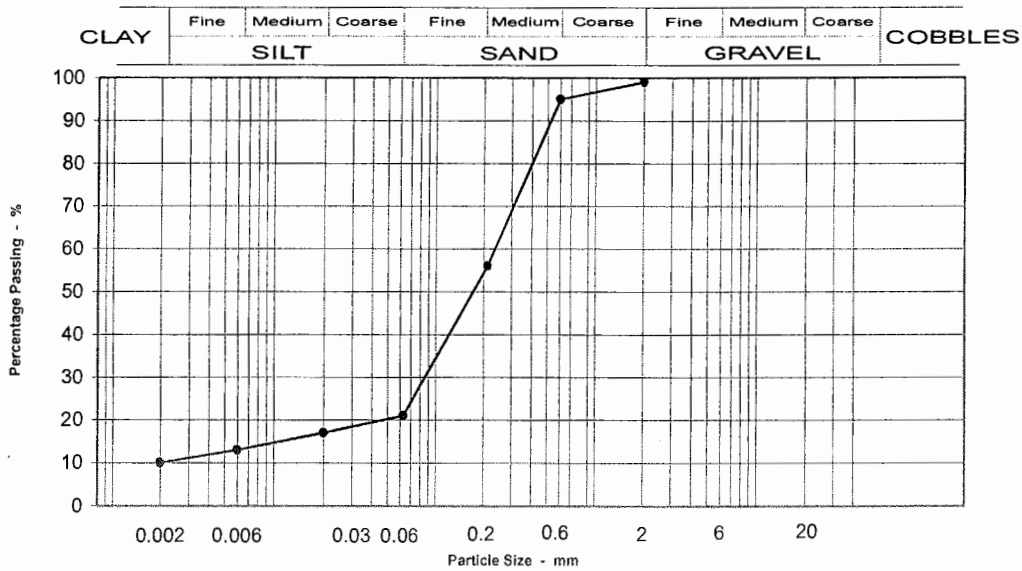


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Our Report and sample No 100314  
Your Sample Ref D31.0  
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P&T Project No.  
Date Report Issued 12 October 2007

**Particle Size Distribution to BS 1377 : Part2 : 1990  
Sedimentation Method Section 9.4**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 102 28 - m**



Sieving	
Particle Size mm	% Passing
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
0.6	95
0.212	56
0.063	21
0.02	17
0.006	13
0.002	10

Moisture content % 21

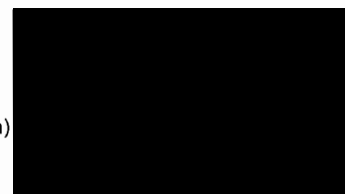
Sample Proportions	
GRAVEL	1
Coarse SAND	4
Medium SAND	39
Fine SAND	35
Coarse SILT	4
FINE SILT	3
CLAY	10

Description
Very soft grey thinly laminated CLAY. Bands of soft grey fine clayey SAND

Test Code = 612



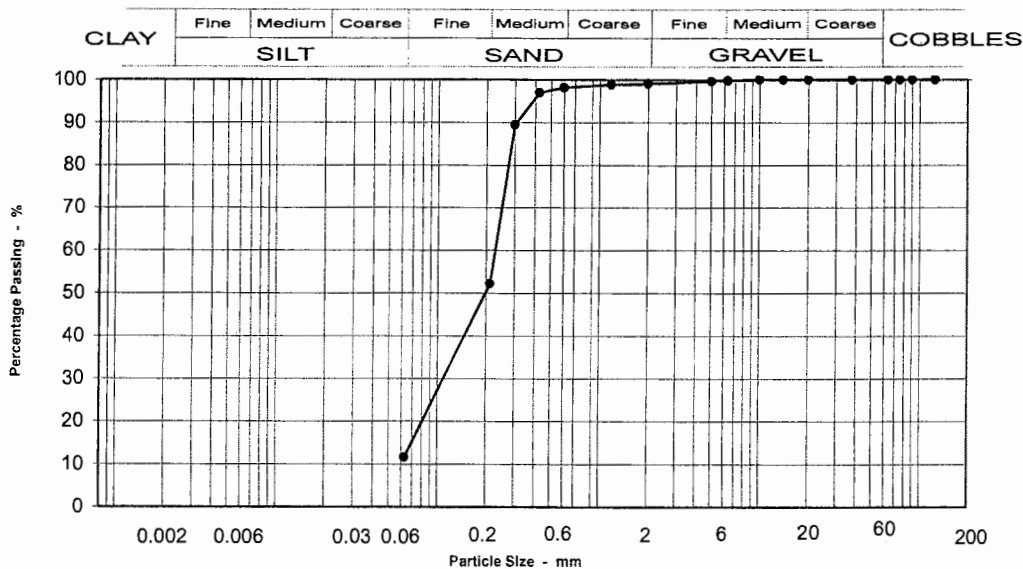
D N Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 102 34 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	98
0.425	97
0.300	89
0.212	52
0.063	12

Specification for Highway Works Classification
1B Suitable
6E/6R Suitable

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	1
Medium SAND	46
Fine SAND	41
Silt & Clay	12

Grading Analysis	
D100	6
D60	0.23
D10	0.041
Uniformity Coefficient	6

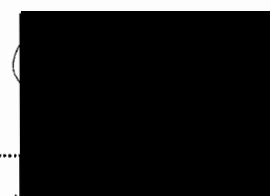
Description	
Very dense grey slightly silty fine and medium SAND. Occasional shell fragments	

Moisture content % 24

Test Code = 610



D N Houseago (Lead Technician)



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Your Project or Order No  
P&T Project No.  
Date Report Issued 25-Oct-07

Page 1 of 1

**DETERMINATION OF MOISTURE CONTENT TO BS1377 : PART2 : 1990 : SECTION 3.2**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 103	<b>Depth</b>	1.2 - 1.2m
<b>Date sampled</b>	7-Aug-07	<b>Date received</b>	22-Aug-07
<b>Sample type</b>	D	<b>Sample Mass</b>	Unknown
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Soft dark grey CLAY.		
<b>Supplier</b>			<b>Source</b>
<b>Conveyance note No.</b>			

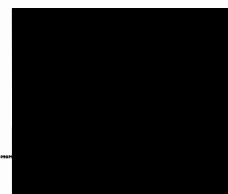
<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Riffled
	Oven dried @ 105 -110°C
<b>NATURAL MC (%)</b>	34

**REMARKS**

Test Code = 602



D N Houseago (Lead Technician)



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Our Project No PTPZ0008  
Our Report and sample No 99323  
Your Sample Ref B7  
Your Project or Order No  
P&T Project No.  
Date Report Issued 24-Oct-07

FAO I Brown

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

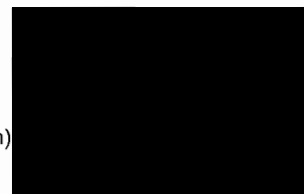
<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 103	<b>Depth</b>	1.7 m
<b>Date sampled</b>	07-Aug-07	<b>Date received</b>	20-Aug-07
<b>Date tested</b>	21-Aug-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Grey fine sandy SILT.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
	Not applicable
	PREPARATION DETAILS
<b>METHOD OF DIVISION</b>	Ridffled
<b>PREPARATION METHOD</b>	Oven dried @ 105 -110°C
<b>PASSING 2mm BS TEST SIEVE (%)</b>	100
<b>ORGANIC MATTER (%)</b>	3

Test Code:620



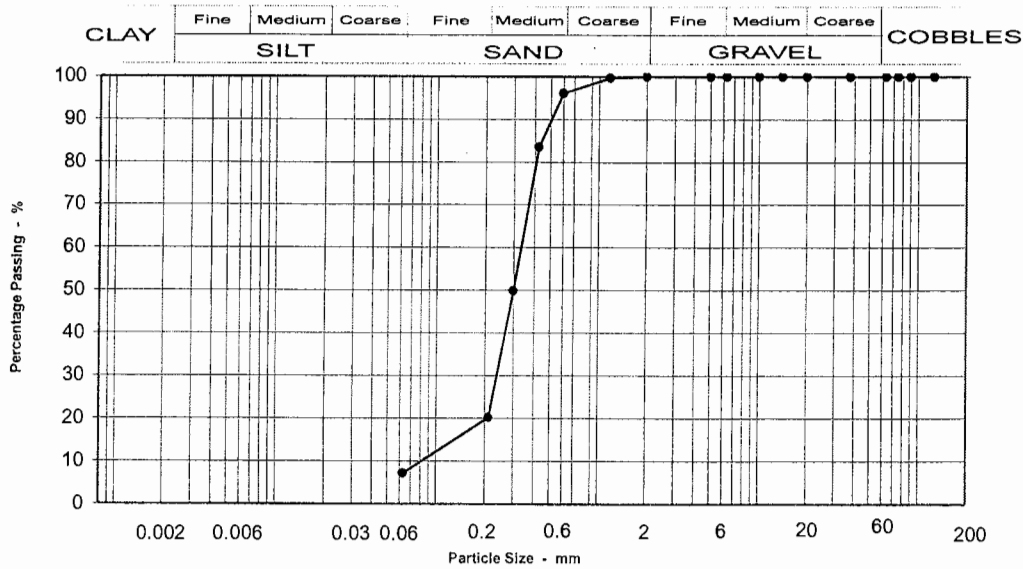
David Houseago (Lead Technician)





**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 103 4.2 - 4.2m**



Seiving Particle Size (mm)	% Passing	Specification for Highway Works Classification
125	100	1B Suitable
90	100	
75	100	
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	100	6E/6R Suitable
1.18	100	
0.6	96	6M Suitable
0.425	84	
0.3	50	
0.212	20	
0.063	7	
Moisture content %		22

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	4
Coarse SAND	0
Medium SAND	76
Fine Sand	13
Silt & Clay	7

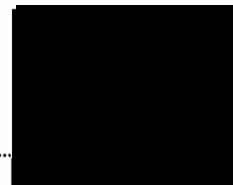
Grading Analysis	
D100	1
D60	0.3
D10	0.10
Uniformity Coefficient	4

Description	
Grey brown sltly silty medium SAND	

Test Code = 610



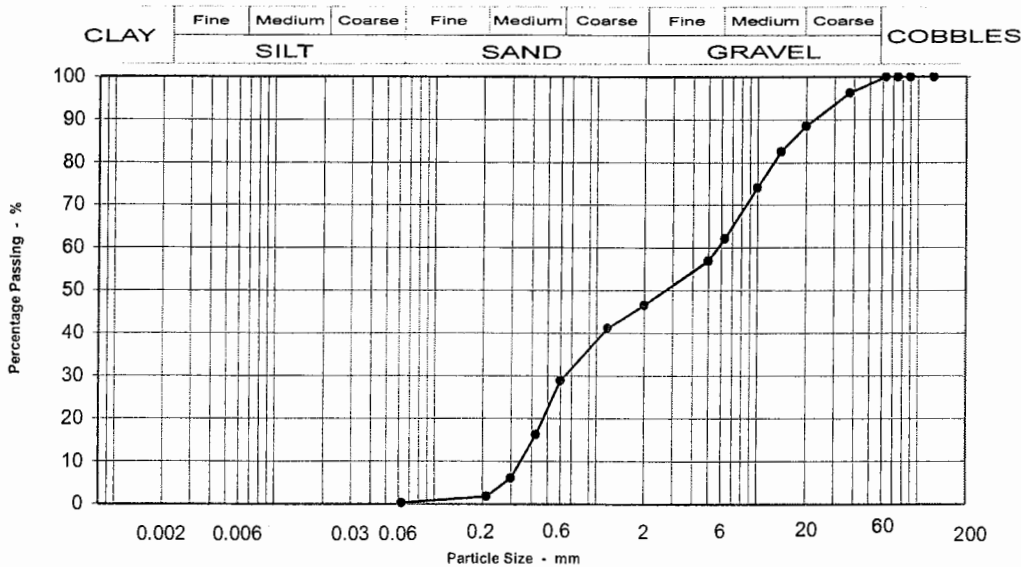
R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer)  
D N Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 103 10 - 10m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	1A Suitable
90	100	
75	100	
63	100	
37.5	96	
20	89	
14	83	6A Suitable
10	74	
6.3	62	
5	57	
2	47	6E/6R Suitable
1.18	41	6F1 Suitable
0.6	29	
0.425	16	
0.3	6	6I Suitable
0.212	2	
0.063	0	
		6M Suitable
		6N/6P Suitable
		Moisture content % 8

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	12
Medium GRAVEL	26
Fine GRAVEL	18
Coarse SAND	16
Medium SAND	27
Fine Sand	2
Silt & Clay	0

Grading Analysis	
D100	38
D60	5.8
D10	0.35
Uniformity Coefficient	17

Description
Grey SAND and GRAVEL

Test Code = 610



R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer)  
D N Houseago (Lead Technician)

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Our Project No PTPZ0008  
Our Report and sample No 96924  
Your Sample Ref D42  
Your Project or Order No  
P&T Project No.  
Date Report Issued 25-Oct-07

FAO I Brown

Page 1 of 1

**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

Scheme	Great Yarmouth Third River Crossing		
Location	BH 103	Depth	15 - 15m
Date sampled	07-Aug-07	Date received	09-Oct-07
Date tested	08-Oct-07		
Sample type	Small disturbed sample	Sample Mass	

Sampled by RW who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.

<b>Material</b>			
Description	Soft grey CLAY with occasional gravel.		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

LOCATION	TEST SPECIMEN		
ORIENTATION	Not applicable		
METHOD OF DIVISION	PREPARATION DETAILS		
PREPARATION METHOD	Whole		
RETAINED 425µm (%)	0		
NATURAL MC (%)	33	OVEN DRIED @ 105°C	
LIQUID LIMIT (%)	48		
PLASTIC LIMIT (%)	20		
PLASTICITY INDEX (%)	28		
MODIFIED PI *(%)	28	*BRE Digest 240 : 1993	
SOIL CLASSIFICATION	C I		

REMARKS

Test Code = 604



David Houseago (Lead Technician)

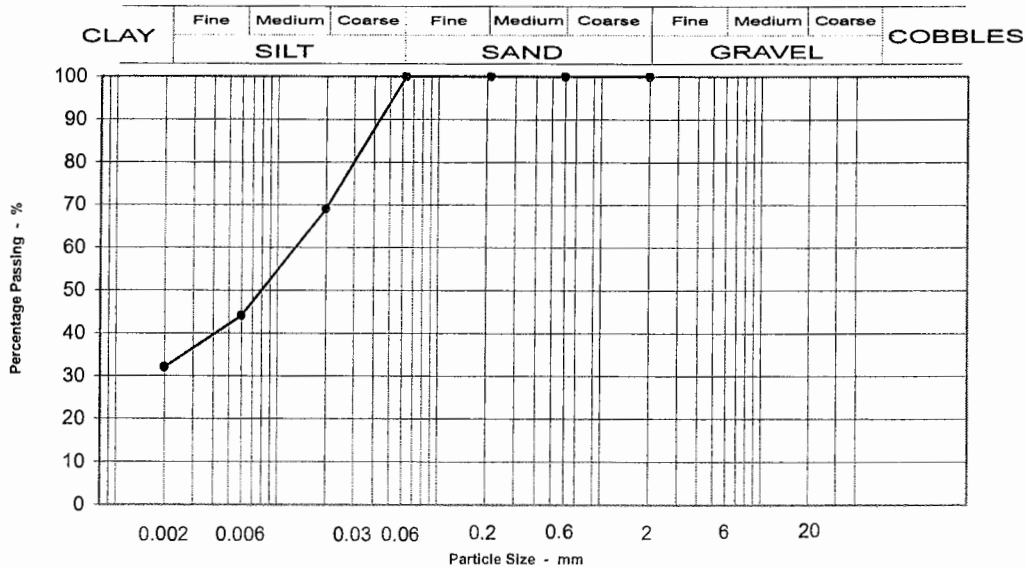


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Our Project No PTPZ0008  
Our Report and sample No  
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Your Project or Order No  
P&T Project No.  
Date Report Issued 12 October 2007

**Particle Size Distribution to BS 1377 : Part2 : 1990  
Sedimentation Method Section 9.4**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 103 15 - 15m**



Seiving	
Particle Size mm	% Passing
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
0.6	100
0.212	100
0.063	100
0.02	69
0.006	44
0.002	32

Moisture content % 35

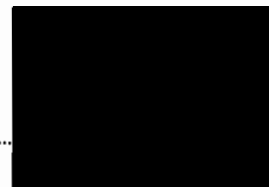
Sample Proportions	
GRAVEL	0
Coarse SAND	0
Medium SAND	0
Fine SAND	0
Coarse SILT	25
FINE SILT	12
CLAY	32

Description
Soft grey CLAY with occasional gravel.

Test Code = 612



D N Houseago (Lead Technician)



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FAO I Brown

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Our Report and sample No  
Your Sample Ref B38  
Your Project or Order No  
P&T Project No.  
Date Report Issued 25-Oct-07

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**DETERMINATION OF MOISTURE CONTENT TO BS1377 : PART2 : 1990 : SECTION 3.2**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 103	<b>Depth</b>	13 - 13m
<b>Date sampled</b>	7-Aug-07	<b>Date received</b>	22-Aug-07
<b>Sample type</b>	B	<b>Sample Mass</b>	Unknown
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Bulk Disturbed		
<b>Description</b>	Greenish grey soft to firm SILT with lenses of firm grey clay.		
<b>Supplier</b>	<b>Source</b>		
<b>Conveyance note No.</b>			

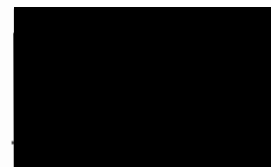
<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Riffled Oven dried @ 105 -110°C
<b>NATURAL MC (%)</b>	30

**REMARKS**

Test Code = 602



D N Houseago (Lead Technician)



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Our Project No PTPZ0008  
Our Report and sample No  
Your Sample Ref D39  
Your Project or Order No  
P&T Project No.  
Date Report Issued 25-Oct-07

Page 1 of 1

**DETERMINATION OF MOISTURE CONTENT TO BS1377 : PART2 : 1990 : SECTION 3.2**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 103	<b>Depth</b>	13.5 - 13.5m
<b>Date sampled</b>	7-Aug-07	<b>Date received</b>	22-Aug-07
<b>Sample type</b>	D	<b>Sample Mass</b>	Unknown
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Grey green brown sandy CLAY.		
<b>Supplier</b>	<b>Source</b>		
<b>Conveyance note No.</b>			

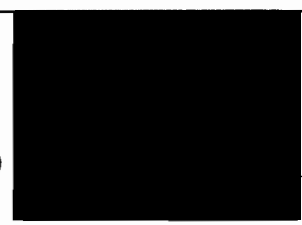
<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Riffled
	Oven dried @ 105 -110°C
<b>NATURAL MC (%)</b>	24

**REMARKS**

Test Code = 602

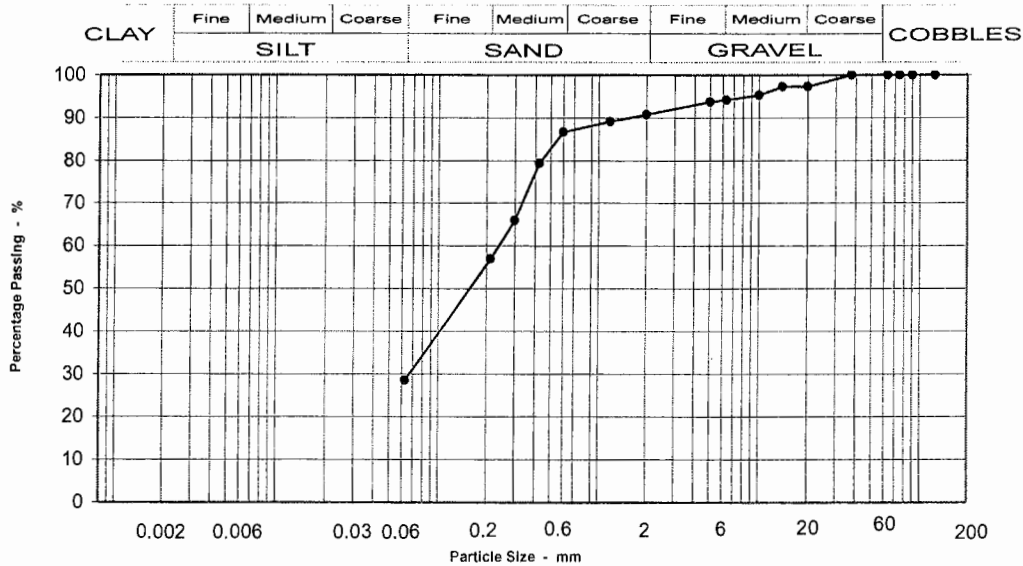


D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 103 18 - 18m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	97
14	97
10	95
6.3	94
5	94
2	91
1.18	89
0.6	87
0.425	79
0.3	66
0.212	57
0.063	29

Specification for Highway Works Classification	
2A/2B	Suitable

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	3
Medium GRAVEL	3
Fine GRAVEL	4
Coarse SAND	4
Medium SAND	30
Fine Sand	28
Silt & Clay	29

Grading Analysis	
D100	20
D60	0.2
D10	0.00
Uniformity Coefficient	>10

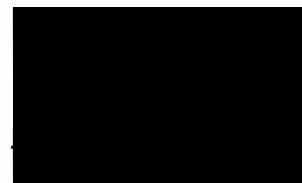
Description
Grey silty fine and medium SAND

Moisture content % 148

Test Code = 610



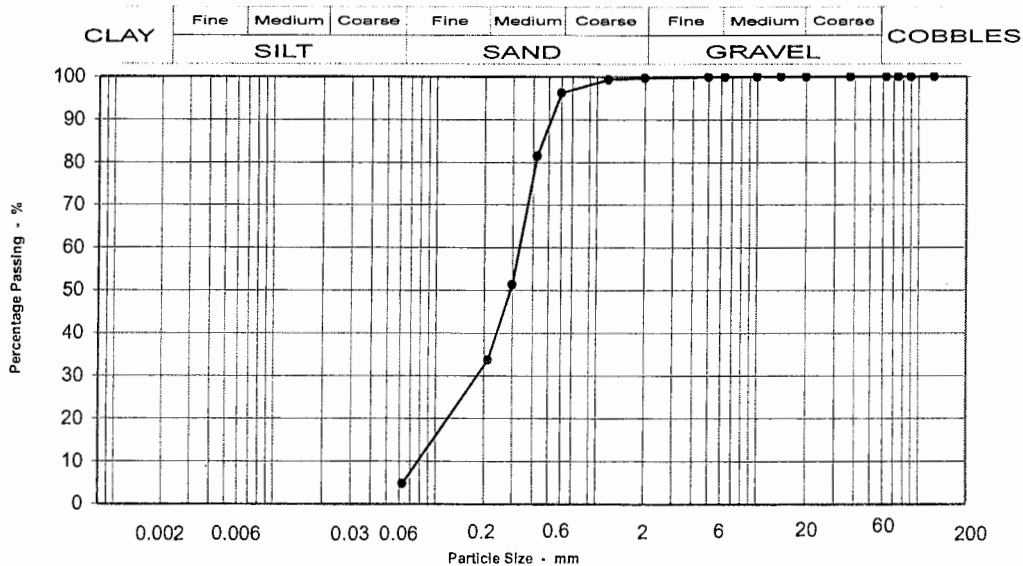
R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer)  
D N Houseago (Lead Technician)





## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 103 21.5 - 21.5m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	1B Suitable
90	100	
75	100	
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	100	6E/6R Suitable
1.18	99	
0.6	96	
0.425	81	6M Suitable
0.3	51	
0.212	34	
0.063	5	
Moisture content %		19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	4
Coarse SAND	0
Medium SAND	63
Fine Sand	29
Silt & Clay	5

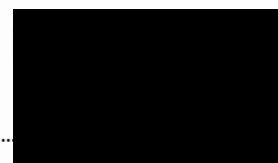
Grading Analysis	
D100	6
D60	0.3
D10	0.09
Uniformity Coefficient	4

Description	
Grey silty fine and medium SAND	

Test Code = 610



R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer) ✓  
D N Houseago (Lead Technician)



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Our Report and sample No 99321  
Your Sample Ref D57  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

Page 1 of 1

**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

Scheme	Great Yarmouth Third River Crossing		
Location	BH 103	Depth	28 - 28m
Date sampled	07-Aug-07	Date received	20-Sep-07
Date tested	24-Aug-07		
Sample type	D	Sample Mass	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
Material	Small disturbed sample		
Description	Stiff grey sandy CLAY with occasional fine shell fragments.		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

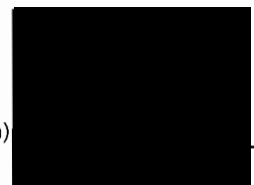
LOCATION	TEST SPECIMEN		
ORIENTATION	Not applicable		
	PREPARATION DETAILS		
METHOD OF DIVISION	Whole		
PREPARATION METHOD	Hand picking		
RETAINED 425µm (%)	7		
NATURAL MC (%)	26	OVEN DRIED @ 105°C	
LIQUID LIMIT (%)	33		
PLASTIC LIMIT (%)	15		
PLASTICITY INDEX (%)	18		
MODIFIED PI *(%)	17	*BRE Digest 240 : 1993	
SOIL CLASSIFICATION	CL		

REMARKS

Test Code = 604



David Houseago (Lead Technician)

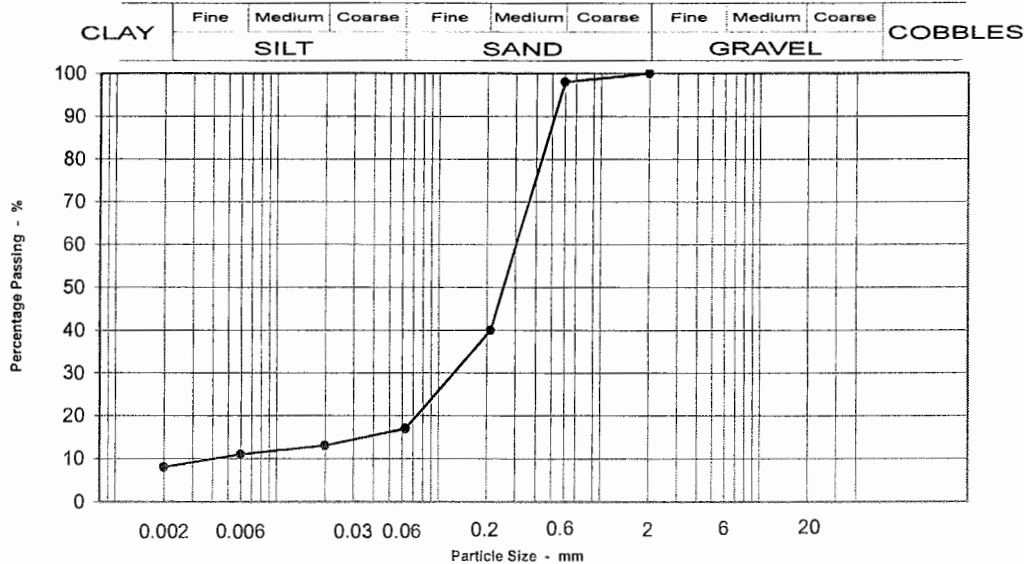


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Our Report and sample No  
Your Sample Ref D60  
Your Project or Order No  
P&T Project No.  
Date Report Issued 12 October 2007

**Particle Size Distribution to BS 1377 : Part2 : 1990  
Sedimentation Method Section 9.4**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 103 31.5 - 31.5m**



Seiving	
Particle Size	% Passing
mm	
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
0.6	98
0.212	40
0.063	17
0.02	13
0.006	11
0.002	8

Moisture content % 7

Sample Proportions	
GRAVEL	0
Coarse SAND	2
Medium SAND	58
Fine SAND	23
Coarse SILT	2
FINE SILT	3
CLAY	8

Description
Stiff grey sandy CLAY with occasional fine shell fragments.

Test Code = 612



D N Houseago (Lead Technician)



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Our Report and sample No  
Your Sample Ref D63  
Your Project or Order No  
P&T Project No.  
Date Report Issued 25-Oct-07

Page 1 of 1

**DETERMINATION OF MOISTURE CONTENT TO BS1377 : PART2 : 1990 : SECTION 3.2**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 103	<b>Depth</b>	34.5 - 34.5m
<b>Date sampled</b>	7-Aug-07	<b>Date received</b>	22-Aug-07
<b>Sample type</b>	D	<b>Sample Mass</b>	Unknown
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Stiff grey sandy CLAY with occasional fine shell fragments.		
<b>Supplier</b>	<b>Source</b>		
<b>Conveyance note No.</b>			

<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Riffled
	Oven dried @ 105 -110°C
<b>NATURAL MC (%)</b>	27

**REMARKS**

Test Code = 602



D N Houseago (Lead Technician)



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Our Report and sample No 100290  
Your Sample Ref B3  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

FAO I Brown

Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 104	<b>Depth</b>	0.7 m
<b>Date sampled</b>		<b>Date received</b>	24-Sep-07
<b>Sample type</b>	B	<b>Sample Mass</b>	

Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Bulk Disturbed
<b>Description</b>	Mottled greyish brown, grey and orangey brown sandy gravelly soft CLAY. Gravel is fine, medium and coarse angular to rounded flint and brick. Some black organic pockets. Slight hydrocarbon odour from 0.7 to 1.0 metre

<b>Supplier</b>	<b>Source</b>
Conveyance note No.	

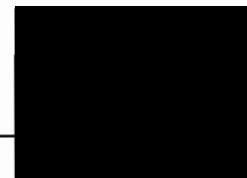
<b>LOCATION</b>	<b>TEST SPECIMEN</b>			
<b>ORIENTATION</b>	NOT APPLICABLE			
	NOT APPLICABLE			
	<b>PREPARATION DETAILS</b>			
<b>METHOD OF DIVISION</b>	QUARTERING			
<b>PREPARATION METHOD</b>	7.2.4.4 Rammer Compaction with specified effort			
<b>RETAINED 37.5mm</b>	%	0		
<b>RETAINED 20mm</b>	%	3		
<b>NO OF LAYERS</b>		3	<b>CBR VALUE TOP</b>	% 1.1
<b>BLOWS PER LAYER</b>		62 Blows	<b>CBR VALUE BOTTOM</b>	% 1.7
<b>METHOD</b>		2.5kg	<b>AVERAGE CBR VALUE</b>	% 1.4
<b>CONDITION</b>		UNSOAKED		
<b>BULK DENSITY</b>	Mg/m <sup>3</sup>	1.992	<b>MOISTURE CONT. TOP</b>	% 22
<b>DRY DENSITY</b>	Mg/m <sup>3</sup>	1.617	<b>MOISTURE CONT. BOT</b>	% 25
<b>INITIAL MOISTURE CONT.</b>	%	23	<b>MOISTURE CONT. METHOD</b>	Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)

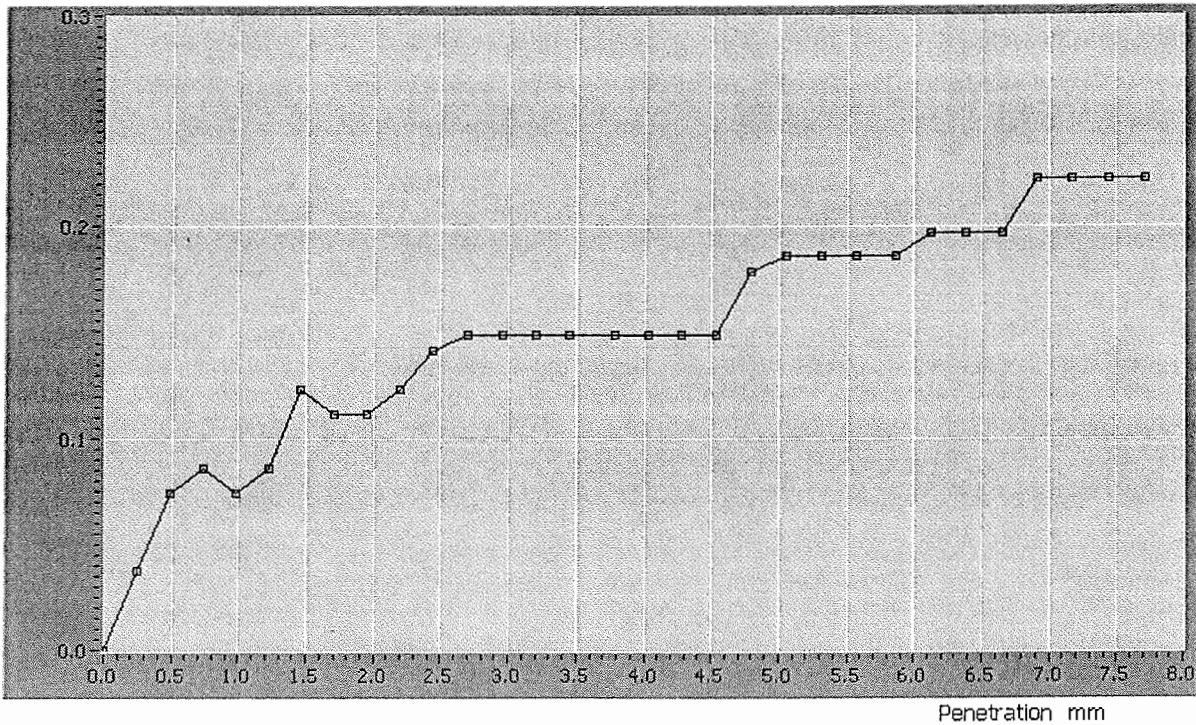


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	BH104 - B3	<b>Sample</b>	0000100290

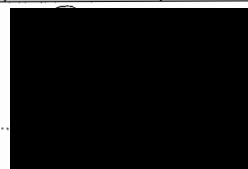
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	0.14	0.18	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	1.08	0.92	%

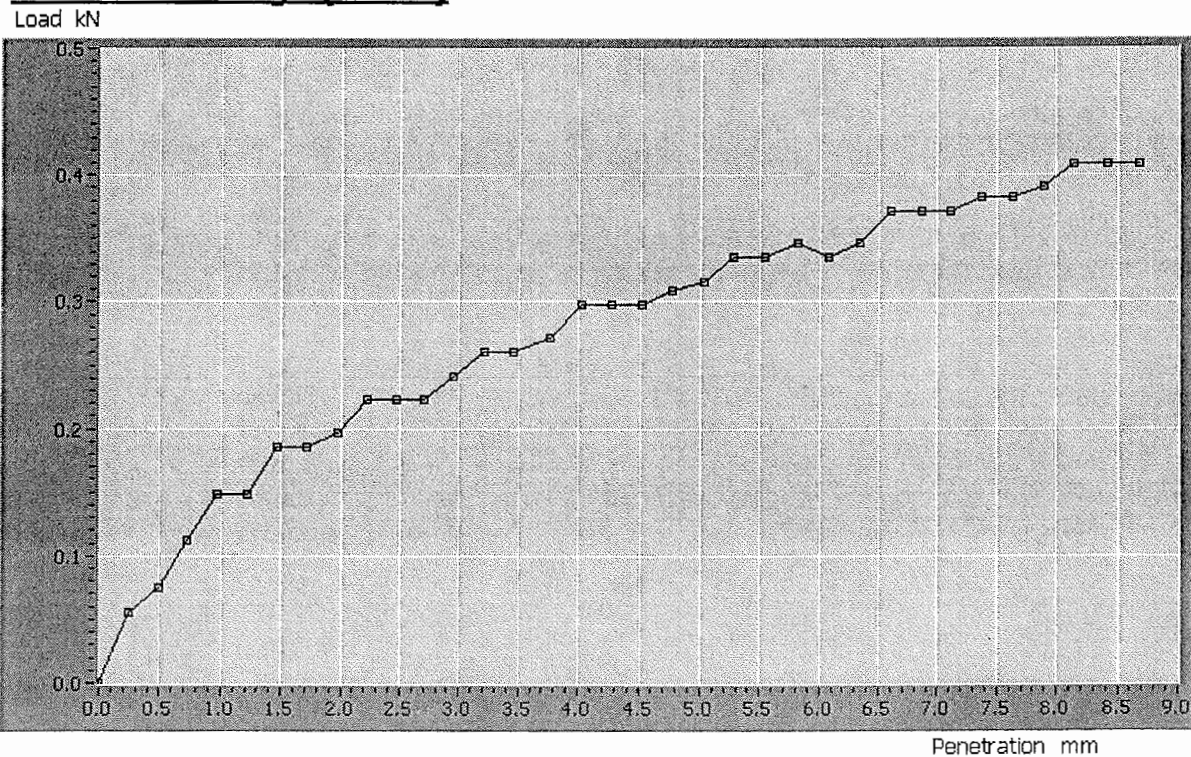
Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 I D Brown (Section Engineer)  
 D N Houseago (Lead Technician)



## Norfolk Partnership Laboratory California Bearing Ratio

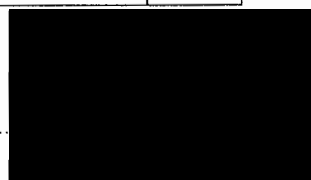
<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	BH104 - B3	<b>Sample</b>	0000100290

### Penetration Stage (side 2)



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	0.22	0.32	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	1.69	1.58	%

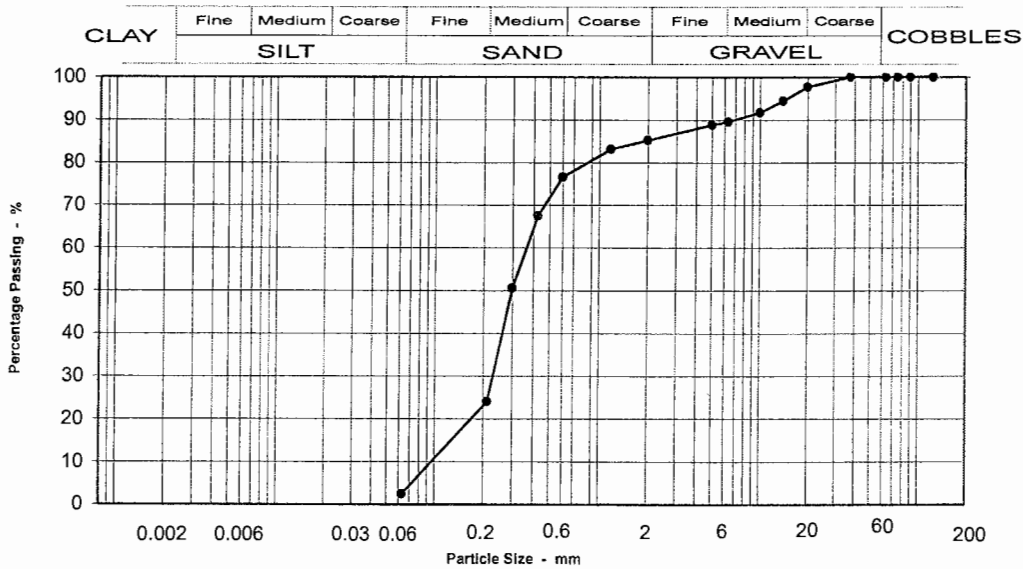
Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 J D Brown (Section Engineer)  
 D N Houseago (Lead Technician) ...





**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 104 3 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	1B Suitable
75	100	
63	100	
37.5	100	
20	98	
14	94	
10	92	
6.3	90	
5	89	
2	85	6E/6R Suitable
1.18	83	
0.600	77	
0.425	67	
0.300	51	
0.212	24	
0.063	2	6M Suitable
Moisture content %		17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	2
Medium GRAVEL	8
Fine GRAVEL	9
Coarse SAND	4
Medium SAND	53
Fine SAND	22
Silt & Clay	2

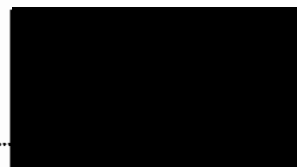
Grading Analysis	
D100	20
D60	0.37
D10	0.115
Uniformity Coefficient	3

Description	
Loose to medium dense brown silty fine, medium and coarse SAND	

Test Code = 610



D N Houseago (Lead Technician)



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Our Project No PTPZ0008  
Our Report and sample No 100301  
Your Sample Ref B9  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

Page 1 of 1

**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

Scheme	Great Yarmouth Third River Crossing		
Location	BH 104	Depth	5.5 - m
Date sampled		Date received	24-Sep-07
Date tested	02-Oct-07		
Sample type	B	Sample Mass	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
Material	Bulk Disturbed		
Description	Greyish brown and light grey very sandy thinly layered CLAY		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

LOCATION	TEST SPECIMEN		
ORIENTATION	Not applicable		
	PREPARATION DETAILS		
METHOD OF DIVISION	Whole		
PREPARATION METHOD	Hand picking		
RETAINED 425µm (%)	4		
NATURAL MC (%)	24	OVEN DRIED @	105°C
LIQUID LIMIT (%)	35		
PLASTIC LIMIT (%)	17		
PLASTICITY INDEX (%)	18		
MODIFIED PI *(%)	17	*BRE Digest 240 : 1993	
SOIL CLASSIFICATION	CL		

REMARKS

Test Code = 604



David Houseago (Lead Technician)



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Our Project No PTPZ0008  
Our Report and sample No 100302  
Your Sample Ref B9  
Your Project or Order No  
P&T Project No.  
Date Report Issued 10-Oct-07

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 104	<b>Depth</b>	5.5 m
<b>Date sampled</b>		<b>Date received</b>	24-Sep-07
<b>Date tested</b>	05-Oct-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Greyish brown and light grey very sandy thinly laminated CLAY		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

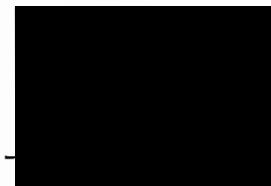
<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
	Not applicable
	PREPARATION DETAILS
<b>METHOD OF DIVISION</b>	Ridffled
<b>PREPARATION METHOD</b>	Oven dried @ 105 -110°C

<b>PASSING 2mm BS TEST SIEVE (%)</b>	98
<b>ORGANIC MATTER (%)</b>	0

Test Code:620



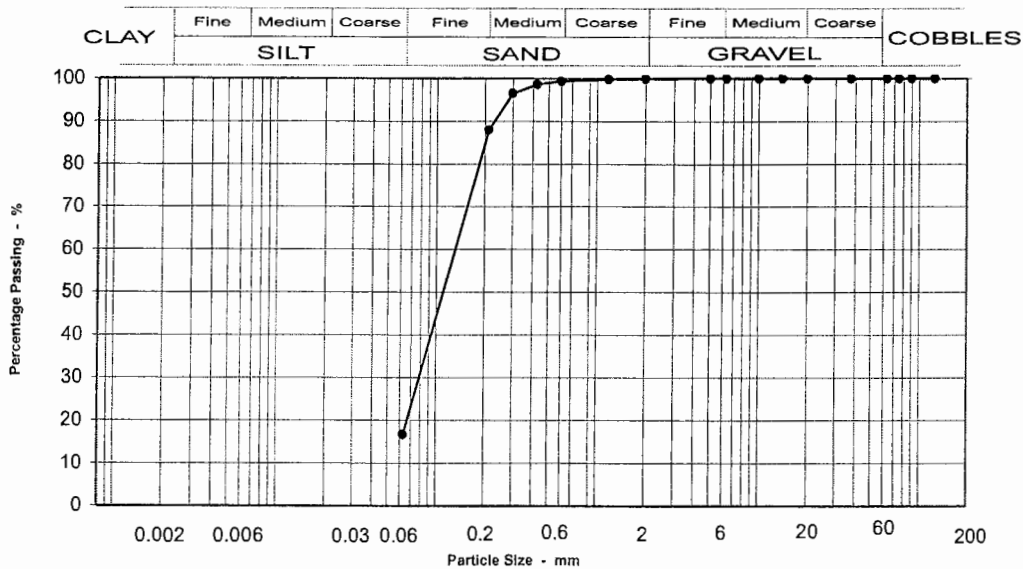
David Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 104 15 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	99
0.300	97
0.212	88
0.063	17

Specification for Highway Works Classification	
2A/2B	Suitable

Moisture content % 32

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	0
Medium SAND	11
Fine SAND	71
Silt & Clay	17

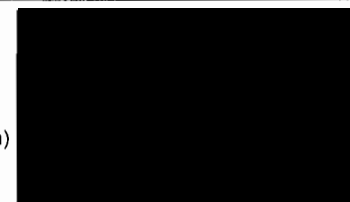
Grading Analysis	
D100	2
D60	0.15
D10	0.025
Uniformity Coefficient	6

Description	
Dense to very dense orangey brown silty fine to medium SAND	

Test Code = 610

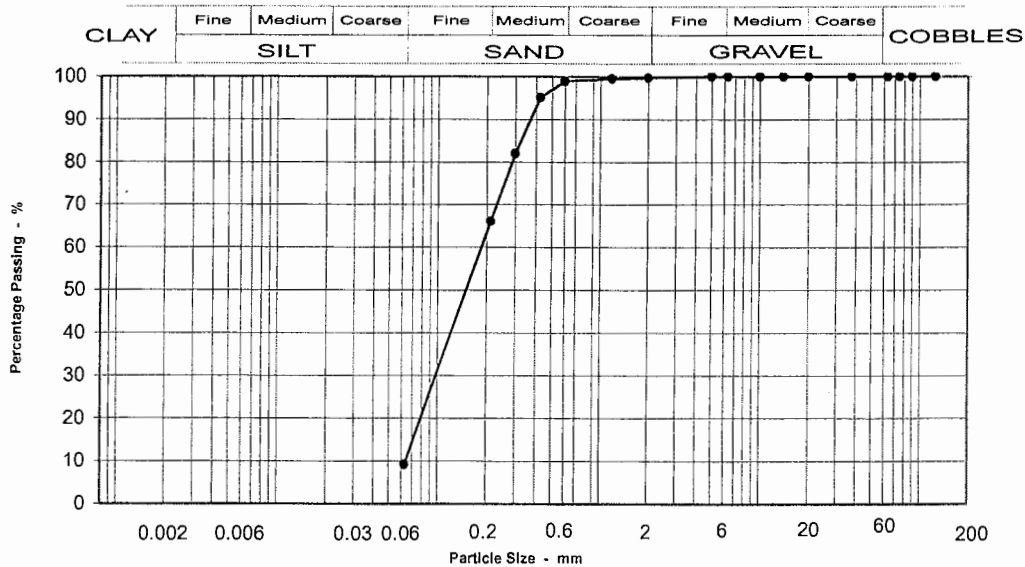


D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 104 25.5 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	1B Suitable
75	100	
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	100	6E/6R Suitable
1.18	100	
0.600	99	
0.425	95	
0.300	82	
0.212	66	
0.063	9	6M Suitable
Moisture content %		23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	0
Medium SAND	33
Fine SAND	57
Silt & Clay	9

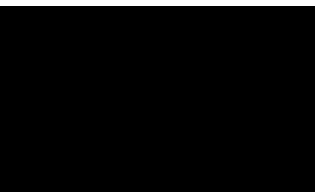
Grading Analysis	
D100	2
D60	0.20
D10	0.065
Uniformity Coefficient	3

Description	
Dense to very dense grey silty fine, medium and coarse SAND with thin clayey silty lenses	

Test Code = 610



D N Houseago (Lead Technician)





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Our Project No PTPZ0008

Our Report and sample No 99791

Your Sample Ref D4

Your Project or Order No

P&T Project No.

Date Report Issued 10-Oct-07

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

Scheme	Great Yarmouth Third River Crossing		
Location	BH105	Depth	0.95 m
Date sampled		Date received	10-Sep-07
Date tested	10-Sep-07		
Sample type	D	Sample Mass	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
Material	Small disturbed sample		
Description	Brown and black sandy SILT with some organic material		
Supplier	Not applicable	Source	Ex site
Conveyance note No.	Not applicable		

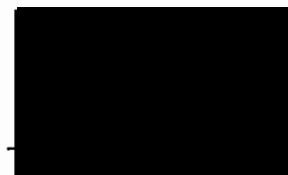
LOCATION	TEST SPECIMEN
ORIENTATION	Not applicable
METHOD OF DIVISION	PREPARATION DETAILS
PREPARATION METHOD	Ridffled
	Oven dried @ 105 -110°C

PASSING 2mm BS TEST SIEVE (%)	99
ORGANIC MATTER (%)	3

Test Code:620



David Houseago (Lead Technician)



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Our Project No PTPZ0008  
Our Report and sample No 99806  
Your Sample Ref D6  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

Page 1 of 1

**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

Scheme	Great Yarmouth Third River Crossing		
Location	BH105	Depth	1.5 - 1.95m
Date sampled		Date received	20-Sep-07
Date tested	12-Sep-07		
Sample type	D	Sample Mass	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
Material	Small disturbed sample		
Description	Mottled grey and greyish brown sandy clayey SILT		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

LOCATION	TEST SPECIMEN		
ORIENTATION	Not applicable		
	PREPARATION DETAILS		
METHOD OF DIVISION	Whole		
PREPARATION METHOD	Hand picking		
RETAINED 425µm (%)	0		
NATURAL MC (%)	29	OVEN DRIED @ 105°C	
LIQUID LIMIT (%)	30		
PLASTIC LIMIT (%)	18		
PLASTICITY INDEX (%)	12		
MODIFIED PI *(%)	12	*BRE Digest 240 : 1993	
SOIL CLASSIFICATION	CL		

REMARKS

Test Code = 604



David Houseago (Lead Technician)





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FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No 99805  
Your Sample Ref D9  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

## DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5

Scheme	Great Yarmouth Third River Crossing		
Location	BH105	Depth	2.5 - m
Date sampled		Date received	20-Sep-07
Date tested	11-Sep-07		
Sample type	D	Sample Mass	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
Material	Small disturbed sample		
Description	Very soft brown and brownish grey very sandy, clayey SILT		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

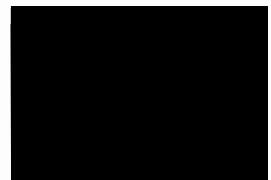
LOCATION	TEST SPECIMEN	
ORIENTATION	Not applicable	
	PREPARATION DETAILS	
METHOD OF DIVISION	Whole	
PREPARATION METHOD	Hand picking	
RETAINED 425µm (%)	0	
NATURAL MC (%)	28	OVEN DRIED @ 105°C
LIQUID LIMIT (%)	25	
PLASTIC LIMIT (%)	12	
PLASTICITY INDEX (%)	13	
MODIFIED PI *(%)	13	*BRE Digest 240 : 1993
SOIL CLASSIFICATION	CL	

### REMARKS

Test Code = 604



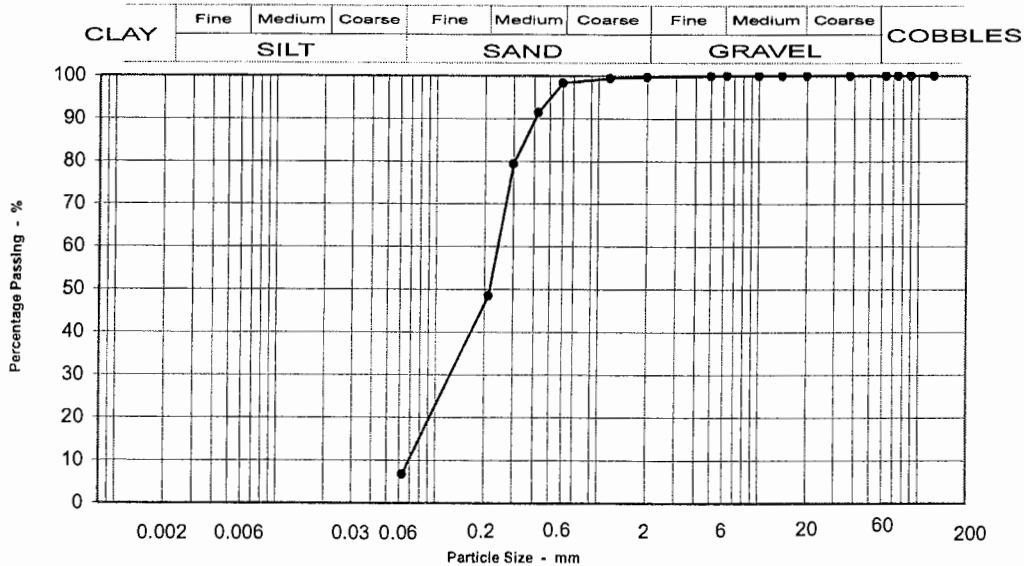
David Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: Great Yarmouth Third River Crossing

Location: BH105 27.5 - m



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	98
0.425	91
0.300	79
0.212	48
0.063	7

**Specification for Highway Works Classification**

1B Suitable

6E/6R Suitable

6M Suitable

Moisture content % 17

**Sample Proportions**

BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	0
Medium SAND	50
Fine SAND	42
Silt & Clay	7

**Grading Analysis**

D100	5
D60	0.25
D10	0.075
Uniformity Coefficient	3

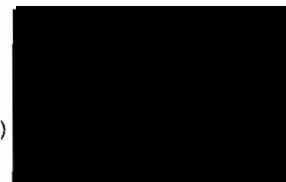
**Description**

Grey fine and medium SAND

Test Code = 610



D N Houseago (Lead Technician)



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Our Report and sample No 99804  
Your Sample Ref D56  
Your Project or Order No  
P&T Project No.  
Date Report Issued 09-Oct-07

Page 1 of 1

**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY  
INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

Scheme	Great Yarmouth Third River Crossing		
Location	BH105	Depth	29.2 - m
Date sampled		Date received	20-Sep-07
Date tested	11-Sep-07		
Sample type	D	Sample Mass	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
Material	Small disturbed sample		
Description	Soft to firm grey silty CLAY		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

LOCATION	TEST SPECIMEN		
ORIENTATION	Not applicable		
METHOD OF DIVISION	Whole		
PREPARATION METHOD	Hand picking		
RETAINED 425µm (%)	0		
NATURAL MC (%)	34	OVEN DRIED @ 105°C	
LIQUID LIMIT (%)	42		
PLASTIC LIMIT (%)	19		
PLASTICITY INDEX (%)	23		
MODIFIED PI *(%)	23	*BRE Digest 240 : 1993	
SOIL CLASSIFICATION	C I		

REMARKS

Test Code = 604



David Houseago (Lead Technician)

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Our Report and sample No 99803  
Your Sample Ref D58  
Your Project or Order No  
P&T Project No.  
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Page 1 of 1

**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH105	<b>Depth</b>	31 - m
<b>Date sampled</b>		<b>Date received</b>	20-Sep-07
<b>Date tested</b>	12-Sep-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
<b>Material Description</b>	Small disturbed sample Soft grey sandy silty CLAY		
<b>Supplier</b>		<b>Source</b>	Not applicable
<b>Conveyance note No.</b>	Not applicable		

<b>LOCATION</b>	TEST SPECIMEN Not applicable		
<b>ORIENTATION</b>	Not applicable		
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS Whole		
<b>PREPARATION METHOD</b>	Hand picking		
<b>RETAINED 425µm (%)</b>	0		
<b>NATURAL MC (%)</b>	19	<b>OVEN DRIED @ 105°C</b>	
<b>LIQUID LIMIT (%)</b>	29		
<b>PLASTIC LIMIT (%)</b>	13		
<b>PLASTICITY INDEX (%)</b>	16		
<b>MODIFIED PI *(%)</b>	16	<b>*BRE Digest 240 : 1993</b>	
<b>SOIL CLASSIFICATION</b>	CL		

REMARKS

Test Code = 604

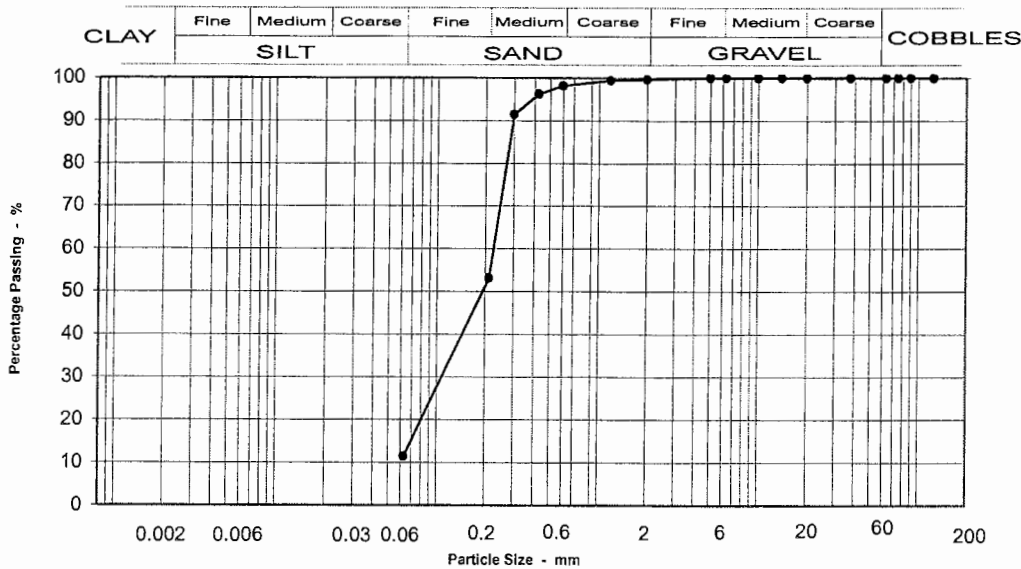


David Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH105 33.3 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	
75	100	1B Suitable
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	100	6E/6R Suitable
1.18	99	
0.600	98	
0.425	96	
0.300	91	
0.212	53	
0.063	11	

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	0
Medium SAND	45
Fine SAND	42
Silt & Clay	11

Grading Analysis	
D100	2
D60	0.23
D10	0.041
Uniformity Coefficient	6

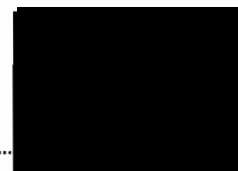
Description	
Grey fine and medium SAND with some shell fragments	

Moisture content % 26

Test Code = 610



D N Houseago (Lead Technician)





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Our Report and sample No 99792  
Your Sample Ref D3  
Your Project or Order No  
P&T Project No.  
Date Report Issued 10-Oct-07

## DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 : Part 3 : SECTION 3.1

Scheme	Great Yarmouth Third River Crossing		
Location	BH106	Depth	1 m
Date sampled		Date received	10-Sep-07
Date tested	10-Sep-07		
Sample type	D	Sample Mass	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
Material	Small disturbed sample		
Description	Brown fine, medium and coarse SAND. Lenses of dark brown and black organic silt		
Supplier	Not applicable	Source	Ex site
Conveyance note No.	Not applicable		

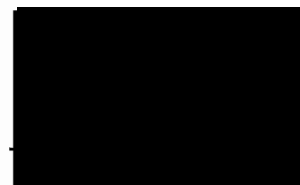
TEST SPECIMEN	
LOCATION	Not applicable
ORIENTATION	Not applicable
PREPARATION DETAILS	
METHOD OF DIVISION	Ridffled
PREPARATION METHOD	Oven dried @ 105 -110°C

PASSING 2mm BS TEST SIEVE (%)	98
ORGANIC MATTER (%)	2

Test Code:620



David Houseago (Lead Technician)



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Our Report and sample No 99885  
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Your Project or Order No  
P&T Project No.  
Date Report Issued 25-Oct-07

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Page 1 of 1

**DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP  
TO BS 1377 : PART 4 : 1990 : SECTION 3**

**Scheme** Great Yarmouth Third River Crossing

**Location** BH106

**Depth** 2

**Date received** 25-Oct-07

**Date tested**

**Sample type** B

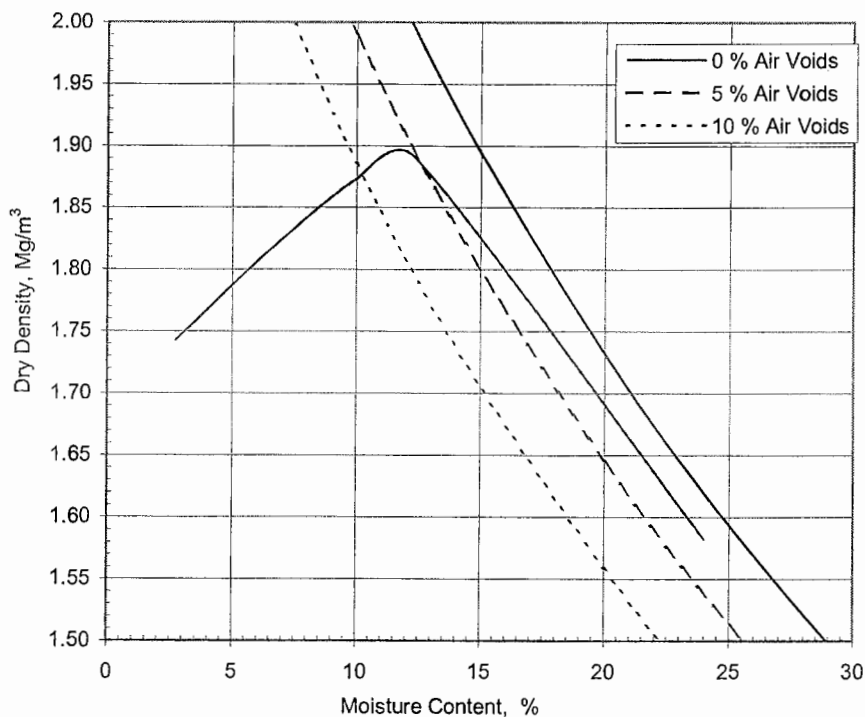
**Sample Mass**

Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.

**Description** Brown fine, medium and coarse SAND

**Supplier**

**Source**



<b>Method of division</b>	Quartering	<b>Retained on 37.5 mm Sieve</b>	%	0
<b>Preparation</b>	3.7	<b>Retained on 20.0 mm Sieve</b>	%	7
<b>Test Method</b>	Vib. Hammer	<b>Particle Density</b>		2.65
<b>Mould Type</b>	CBR	<b>Maximum Dry Density</b>	Mg/m <sup>3</sup>	1.89
<b>Samples Used</b>	Separate	<b>Optimum Moisture Content</b>	%	12

Test Code = 640



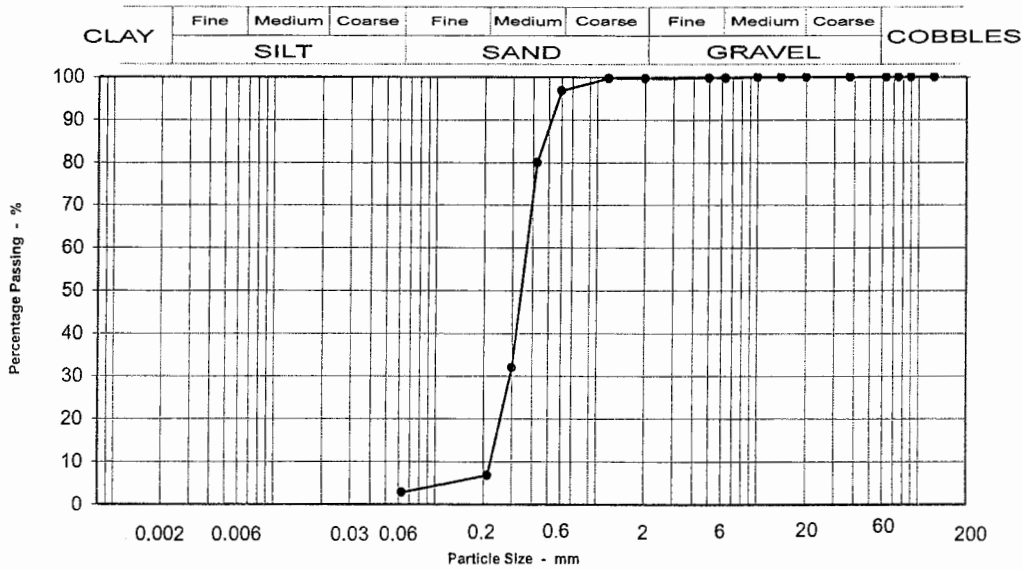
D N Houseago (Lead Technician)





**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH106 3 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	
75	100	1B Suitable
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	100	6E/6R Suitable
1.18	100	
0.600	97	
0.425	80	
0.300	32	
0.212	7	
0.063	3	6M Suitable
Moisture content %		18

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	3
Coarse SAND	0
Medium SAND	90
Fine SAND	4
Silt & Clay	3

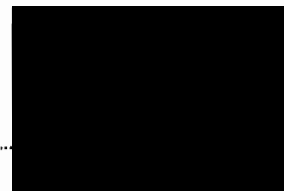
Grading Analysis	
D100	6
D60	0.37
D10	0.223
Uniformity Coefficient	2

Description	
Brown fine, medium and coarse SAND	

Test Code = 610

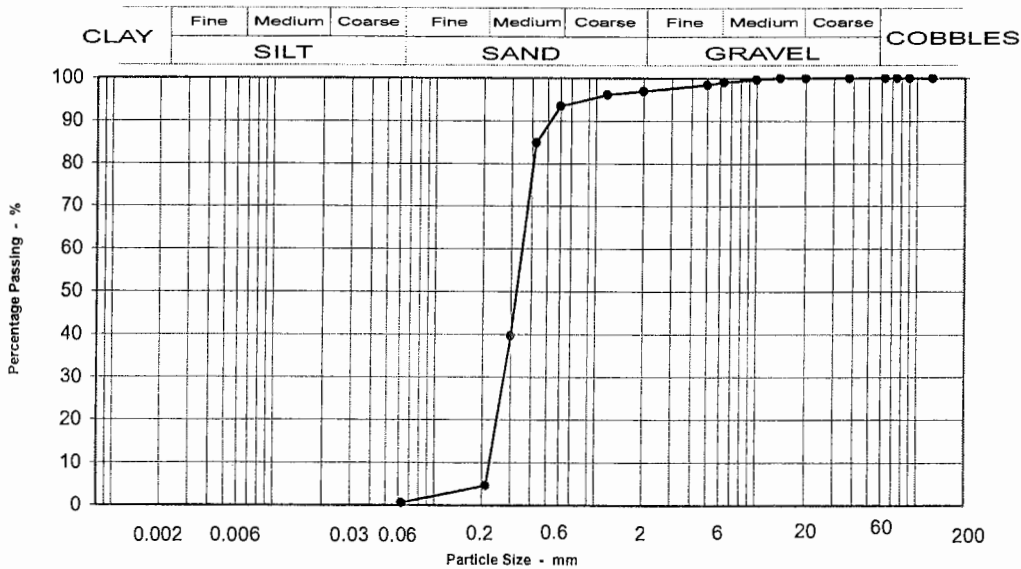


D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH106 5 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	
75	100	1B Suitable
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	99	
5	98	
2	97	6E/6R Suitable
1.18	96	
0.600	93	
0.425	85	
0.300	40	
0.212	5	
0.063	1	6M Suitable
Moisture content %		15

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	4
Coarse SAND	2
Medium SAND	89
Fine SAND	4
Silt & Clay	1

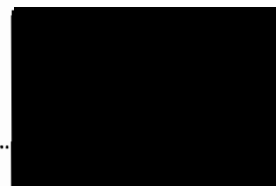
Grading Analysis	
D100	10
D60	0.36
D10	0.226
Uniformity Coefficient	2

Description	
Light brown fine, medium and coarse SAND with a little rounded flint gravel	

Test Code = 610

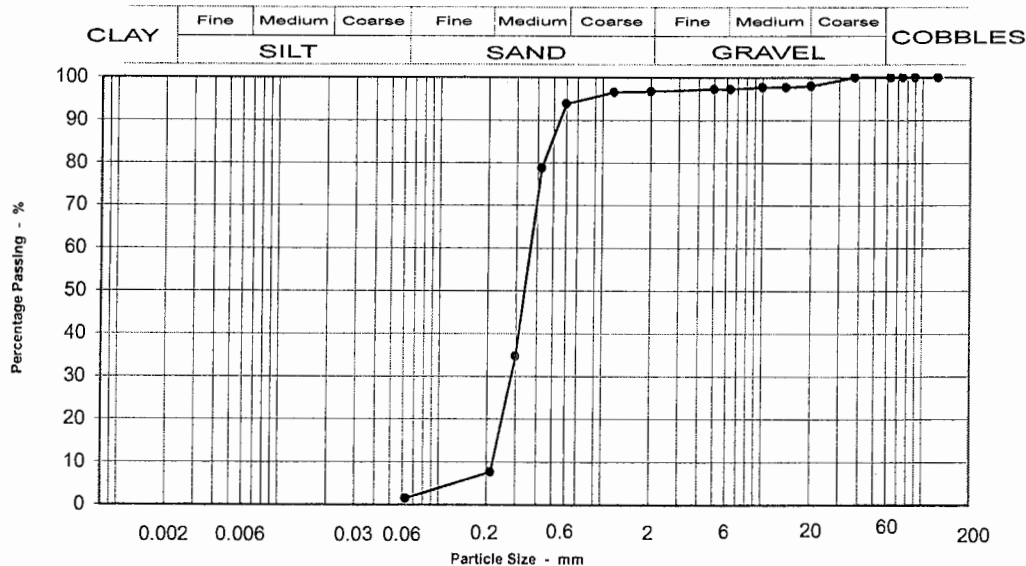


D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH107 0.55 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	1B Suitable
75	100	
63	100	
37.5	100	
20	98	
14	98	
10	98	
6.3	97	
5	97	
2	97	6E/6R Suitable
1.18	97	
0.600	94	
0.425	79	
0.300	35	
0.212	8	
0.063	1	6M Suitable
Moisture content %		3

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	2
Medium GRAVEL	1
Fine GRAVEL	3
Coarse SAND	1
Medium SAND	86
Fine SAND	6
Silt & Clay	1

Grading Analysis	
D100	20
D60	0.37
D10	0.220
Uniformity Coefficient	2

Description	
Light brown fine and medium SAND	

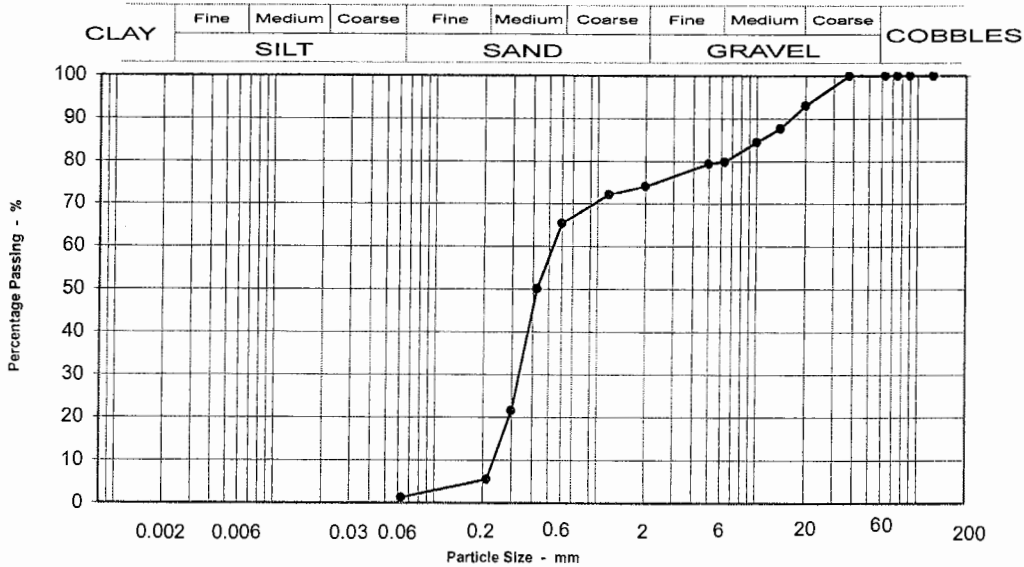
Test Code = 610



D N Houseago (Lead Technician)

**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH107 2 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	93
14	88
10	84
6.3	80
5	79
2	74
1.18	72
0.600	65
0.425	50
0.300	22
0.212	6
0.063	1

**Specification for Highway Works Classification**

1B Suitable

6E/6R Suitable

6M Suitable

Moisture content % 12

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	7
Medium GRAVEL	13
Fine GRAVEL	9
Coarse SAND	6
Medium SAND	60
Fine SAND	4
Silt & Clay	1

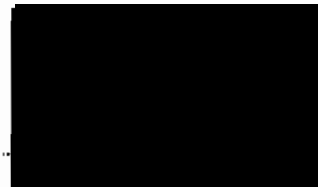
Grading Analysis	
D100	20
D60	0.54
D10	0.237
Uniformity Coefficient	2

Description	
Light brown fine and medium SAND with some fine, medium and coarse flint gravel	

Test Code = 610



D N Houseago (Lead Technician)



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P&T Project No.  
Date Report Issued 25-Oct-07

FAO I Brown

Page 1 of 1

**DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP  
TO BS 1377 : PART 4 : 1990 : SECTION 3**

**Scheme** Great Yarmouth Third River Crossing

**Location** BH107

**Depth** 3

**Date received** 25-Oct-07

**Date tested**

**Sample type** B

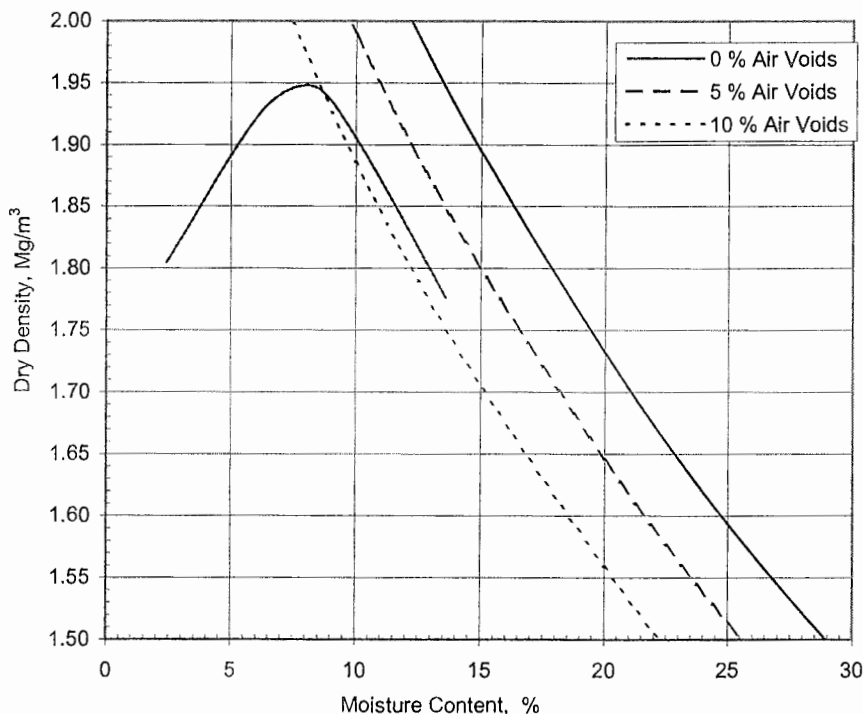
**Sample Mass**

Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.

**Description** Light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel

**Supplier**

**Source**



<b>Method of division</b>	Quartering	<b>Retained on 37.5 mm Sieve</b>	%	0
<b>Preparation</b>	3.7	<b>Retained on 20.0 mm Sieve</b>	%	0
<b>Test Method</b>	Vib.Hammer	<b>Particle Density</b>		2.65
<b>Mould Type</b>	CBR	<b>Maximum Dry Density</b>	Mg/m <sup>3</sup>	1.95
<b>Samples Used</b>	Separate	<b>Optimum Moisture Content</b>	%	8

Test Code = 640



D N Houseago (Lead Technician)



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 Our Report and sample Nr 99857  
 Your Sample Ref B5  
 Your Project or Order No  
 P&T Project No.  
 Date Report Issued 16-Oct-07

FAO I Brown

Page 1 of 3

## DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH107	<b>Depth</b>	3 m
<b>Date sampled</b>		<b>Date received</b>	10-Sep-07
<b>Sample type</b>	B	<b>Sample Mass</b>	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Bulk Disturbed		
<b>Description</b>	Light brown fine, medium and coarse SAND with some fine, medium and coarse flint and quartz gravel		

**Supplier** \_\_\_\_\_ **Source** \_\_\_\_\_  
**Conveyance note No.** \_\_\_\_\_

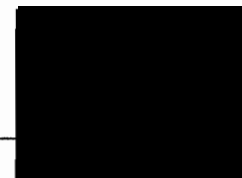
<b>LOCATION</b>	<b>TEST SPECIMEN</b>			
<b>ORIENTATION</b>	NOT APPLICABLE			
	NOT APPLICABLE			
	<b>PREPARATION DETAILS</b>			
<b>METHOD OF DIVISION</b>	QUARTERING			
<b>PREPARATION METHOD</b>	7.2.4.4 Rammer Compaction with specified effort			
<b>RETAINED 37.5mm</b>	%	43		
<b>RETAINED 20mm</b>	%	114		
<b>NO OF LAYERS</b>		3	<b>CBR VALUE TOP</b>	% 113
<b>BLOWS PER LAYER</b>		N/A	<b>CBR VALUE BOTTOM</b>	% 154
<b>METHOD</b>		Vib.Hammer	<b>AVERAGE CBR VALUE</b>	% 134
<b>CONDITION</b>		UNSOAKED		
<b>BULK DENSITY</b>	Mg/m <sup>3</sup>	2.174	<b>MOISTURE CONT. TOP</b>	% 6
<b>DRY DENSITY</b>	Mg/m <sup>3</sup>	2.07	<b>MOISTURE CONT. BOT</b>	% 4
<b>INITIAL MOISTURE CONT.</b>	%	5	<b>MOISTURE CONT. METHOD</b>	Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)

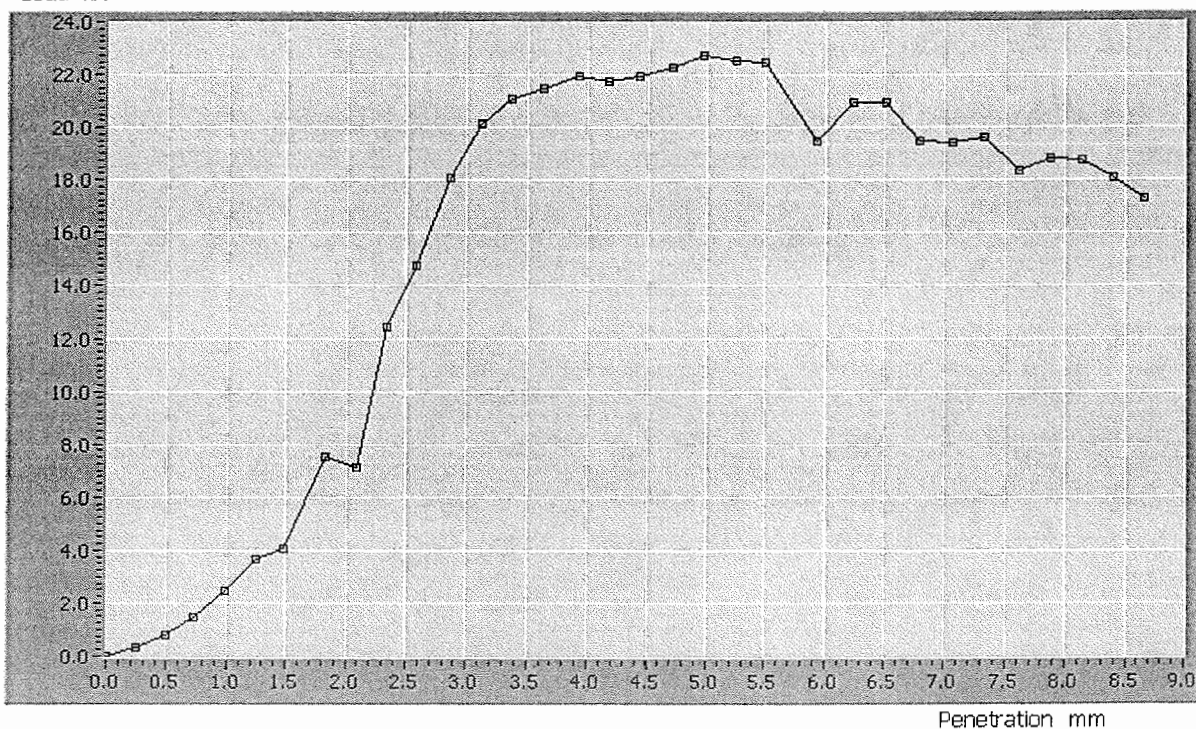


## Norfolk Partnership Laboratory California Bearing Ratio

Client	P & T	Lab Ref	N/A
Project	Gt Yarmouth Third River Crossing	Job	PTPZ0008
Borehole	BH107 -B5	Sample	0000099857

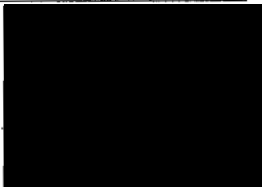
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	13.91	22.69	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	105.38	113.45	%

Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    I D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) .....



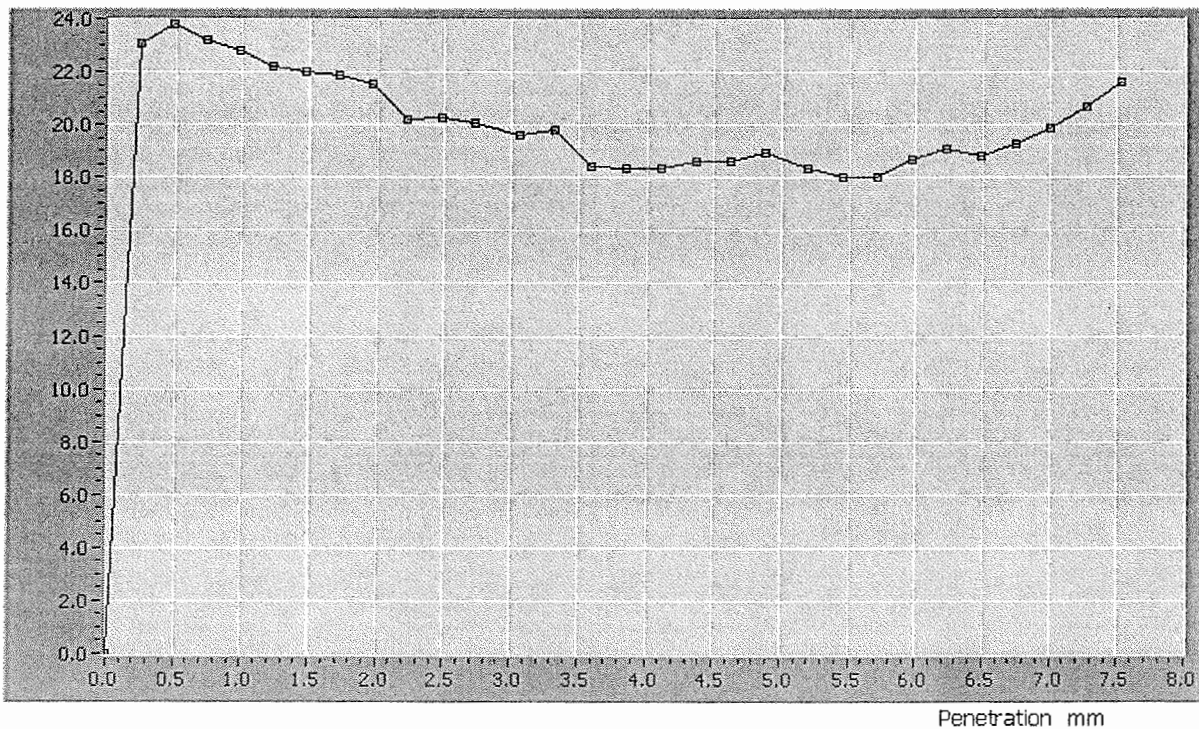


**Norfolk Partnership Laboratory  
California Bearing Ratio**

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	BH107 -B5	<b>Sample</b>	0000099857

**Penetration Stage (side 2)**

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	20.28	18.71	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	153.66	93.53	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 J D Brown (Section Engineer)  
 D N Houseago (Lead Technician) .....



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Our Project No PTPZ0008  
Our Report and sample No 99634  
Your Sample Ref D2  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

Page 1 of 1

**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

Scheme	Great Yarmouth Third River Crossing		
Location	BH108	Depth	1.5 - m
Date sampled		Date received	09-Oct-07
Date tested	31-Aug-07		
Sample type	D	Sample Mass	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
Material	Small disturbed sample		
Description	Soft grey silty CLAY		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

LOCATION	TEST SPECIMEN		
ORIENTATION	Not applicable		
	PREPARATION DETAILS		
METHOD OF DIVISION	Whole		
PREPARATION METHOD	Hand picking		
RETAINED 425µm (%)	0		
NATURAL MC (%)	34	OVEN DRIED @ 105°C	
LIQUID LIMIT (%)	53		
PLASTIC LIMIT (%)	27		
PLASTICITY INDEX (%)	26		
MODIFIED PI *(%)	26	*BRE Digest 240 : 1993	
SOIL CLASSIFICATION	C H		

REMARKS

Test Code = 604



David Houseago (Lead Technician)

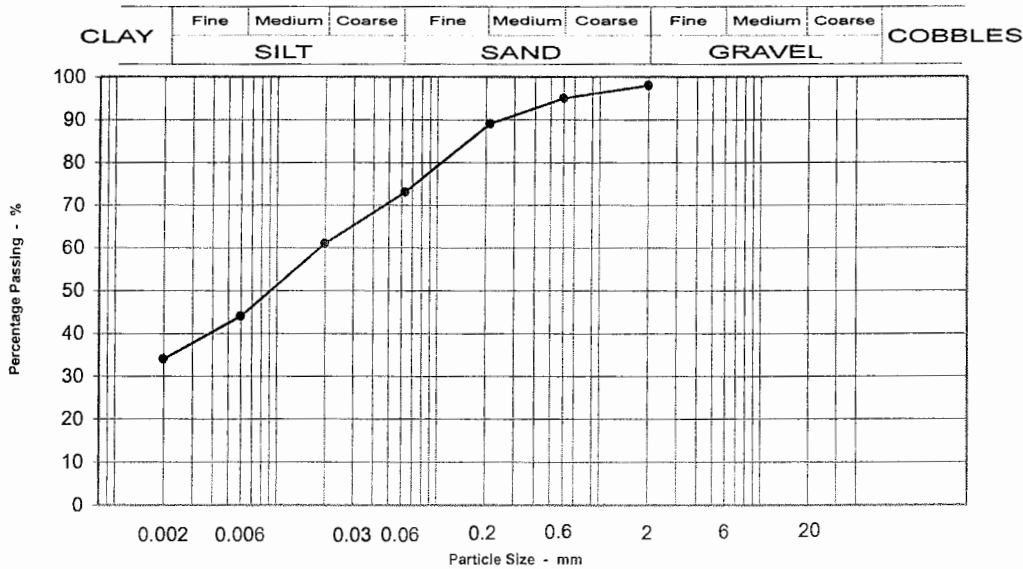


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Our Project No PTPZ0008  
Our Report and sample No  
Your Sample Ref D2  
Your Project or Order No  
P&T Project No.  
Date Report Issued 12 October 2007

## Particle Size Distribution to BS 1377 : Part2 : 1990 Sedimentation Method Section 9.4

Scheme: **Great Yarmouth Third River Crossing** Location: **BH108 1.5 - m**



Sieving	
Particle Size mm	% Passing
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
0.6	95
0.212	89
0.063	73
0.02	61
0.006	44
0.002	34

Moisture content %

Sample Proportions	
GRAVEL	2
Coarse SAND	3
Medium SAND	6
Fine SAND	16
Coarse SILT	17
FINE SILT	10
CLAY	34

Description
Soft grey silty CLAY

Test Code = 612



D N Houseago (Lead Technician)

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NR1 2SG  
FAO | Brown

Our Project No PTP20008  
Our Report and sample No 99636  
Your Sample Ref D2  
Your Project or Order No  
P&T Project No.  
Date Report Issued 10-Oct-07

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

Scheme	Great Yarmouth Third River Crossing		
Location	BH108	Depth	1.5 m
Date sampled		Date received	15-Sep-07
Date tested	05-Sep-07		
Sample type	D	Sample Mass	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
Material	Small disturbed sample		
Description	Soft grey silty CLAY		
Supplier	Not applicable	Source	Ex site
Conveyance note No.	Not applicable		

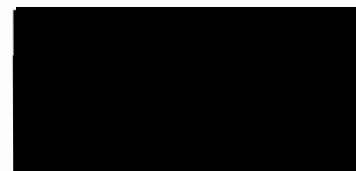
LOCATION	TEST SPECIMEN
ORIENTATION	Not applicable
METHOD OF DIVISION	PREPARATION DETAILS
PREPARATION METHOD	Ridffled
	Oven dried @ 105 -110°C

PASSING 2mm BS TEST SIEVE (%)	70
ORGANIC MATTER (%)	4

Test Code:620



David Houseago (Lead Technician)





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NR1 2SG

Our Project No PTPZ0008  
Our Report and sample Nr 100367  
Your Sample Ref B4  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

FAO I Brown

Page 1 of 3

## DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990

Scheme	Great Yarmouth Third River Crossing		
Location	BH108	Depth	2 m
Date sampled		Date received	21-Sep-07
Sample type	B	Sample Mass	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
Material	Bulk Disturbed		
Description	Very soft grey black sandy organic CLAY with wood and peat.		

Supplier Source  
Conveyance note No.

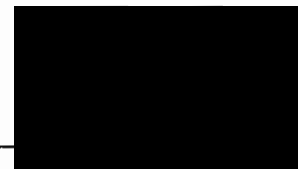
LOCATION	TEST SPECIMEN				
ORIENTATION	NOT APPLICABLE				
METHOD OF DIVISION	PREPARATION DETAILS				
PREPARATION METHOD	RIFFLING				
	7.2.4.4 Rammer Compaction with specified effort				
RETAINED 37.5mm	%	19			
RETAINED 20mm	%	19			
NO OF LAYERS		3	CBR VALUE TOP	%	19
BLOWS PER LAYER		N/A	CBR VALUE BOTTOM	%	19
METHOD		Vib.Hammer	AVERAGE CBR VALUE	%	19
CONDITION		UNSOAKED			
BULK DENSITY	Mg/m <sup>3</sup>	2.035	MOISTURE CONT. TOP	%	16
DRY DENSITY	Mg/m <sup>3</sup>	1.757	MOISTURE CONT. BOT	%	16
INITIAL MOISTURE CONT.	%	16	MOISTURE CONT. METHOD	Oven dried @ 105 -110°C	

REMARKS

Test Code = 642



David Houseago (Lead Technician)

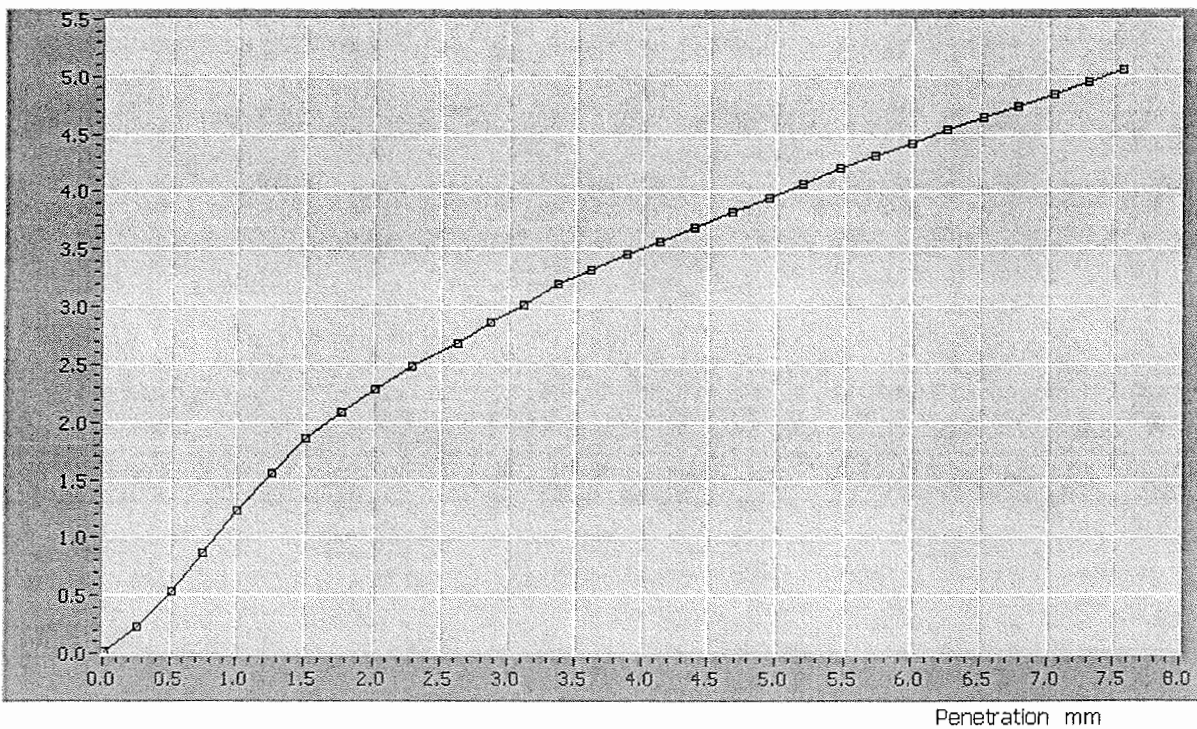


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	108 - B4	<b>Sample</b>	0000100367

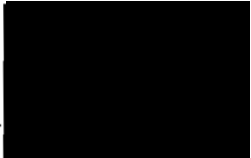
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	2.61	3.97	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	19.76	19.84	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 J D Brown (Section Engineer)  
 D N Houseago (Lead Technician) .....

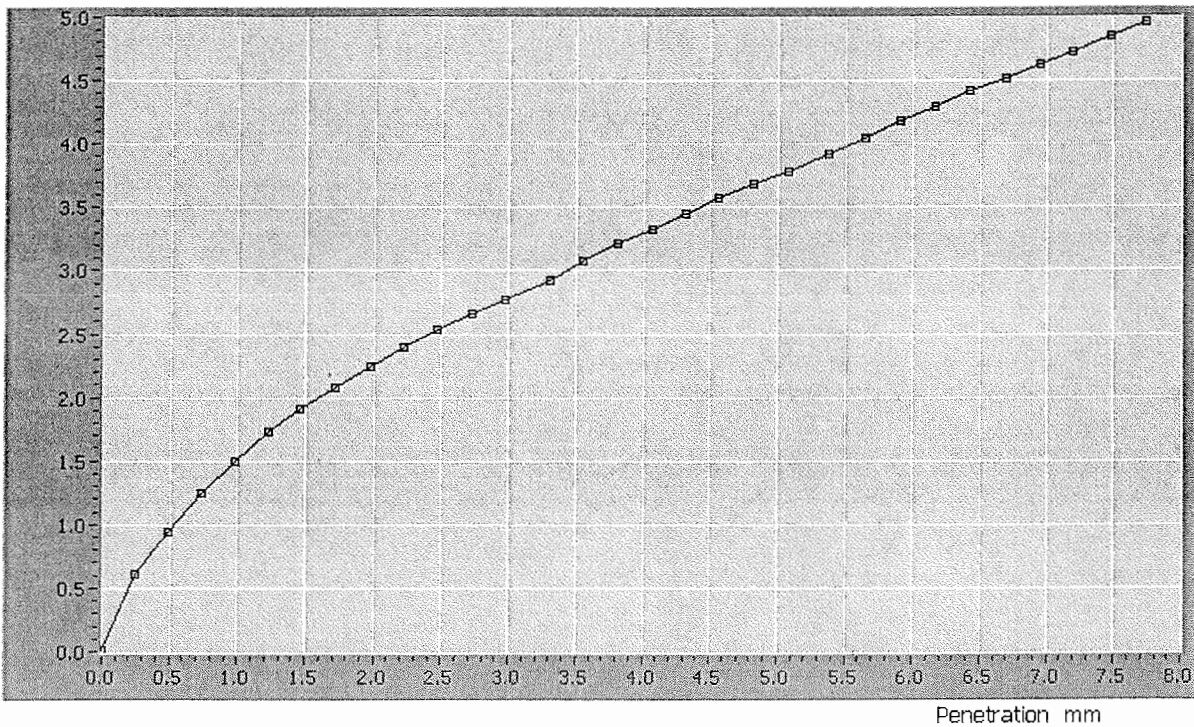


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	108 - B4	<b>Sample</b>	0000100367

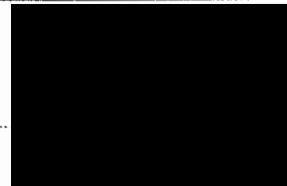
### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	2.54	3.75	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	19.28	18.76	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 J D Brown (Section Engineer)  
 D N Houseago (Lead Technician) ...



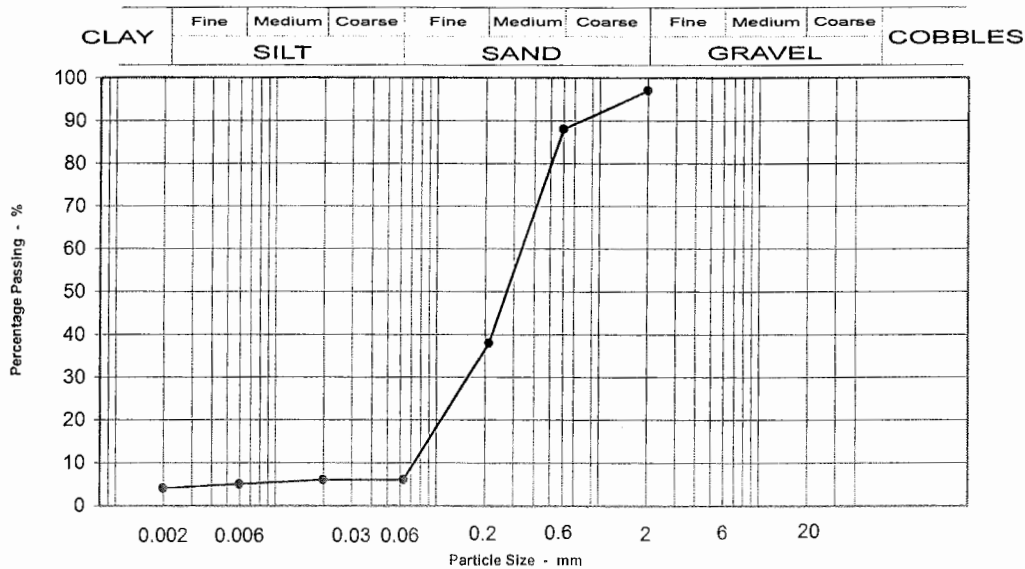


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Our Project No PTPZ0008  
Our Report and sample No  
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Your Project or Order No  
P&T Project No.  
Date Report Issued 12 October 2007

**Particle Size Distribution to BS 1377 : Part2 : 1990  
Sedimentation Method Section 9.4**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH108 3 - 3.45m**



Sieving	
Particle Size mm	% Passing
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	97
0.6	88
0.212	38
0.063	6
0.02	6
0.006	5
0.002	4

Moisture content %

Sample Proportions	
GRAVEL	3
Coarse SAND	9
Medium SAND	50
Fine SAND	32
Coarse SILT	1
FINE SILT	1
CLAY	4

Description
Greyish brown fine and medium SAND with occasional gravel.

Test Code = 612



D N Houseago (Lead Technician)



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NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No 99641  
Your Sample Ref D4  
Your Project or Order No  
P&T Project No.  
Date Report Issued 10-Oct-07

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH108	<b>Depth</b>	3 m
<b>Date sampled</b>		<b>Date received</b>	15-Sep-07
<b>Date tested</b>	05-Sep-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Greyish brown silty fine medium SAND		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

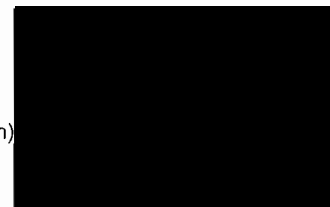
<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
	Not applicable
	PREPARATION DETAILS
<b>METHOD OF DIVISION</b>	Ridffled
<b>PREPARATION METHOD</b>	Oven dried @ 105 -110°C

<b>PASSING 2mm BS TEST SIEVE (%)</b>	82
<b>ORGANIC MATTER (%)</b>	1

Test Code:620

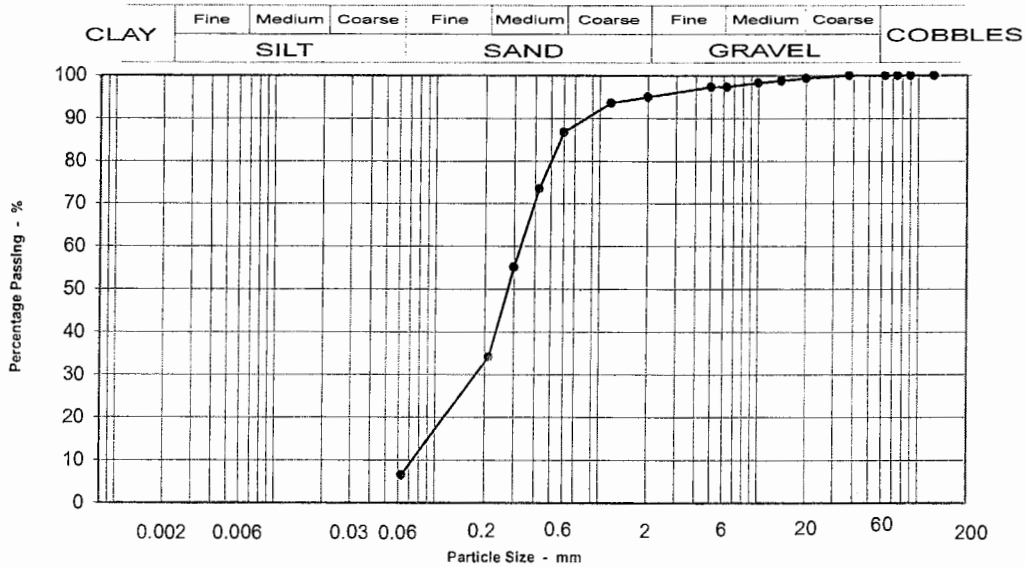


David Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH108 3 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	1B Suitable
75	100	
63	100	
37.5	100	
20	99	
14	99	
10	98	
6.3	97	
5	97	
2	95	6E/6R Suitable
1.18	94	
0.600	87	
0.425	74	
0.300	55	
0.212	34	
0.063	7	6M Suitable
Moisture content %		29

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	2
Fine GRAVEL	8
Coarse SAND	2
Medium SAND	53
Fine SAND	28
Silt & Clay	7

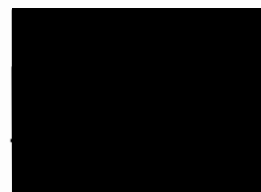
Grading Analysis	
D100	20
D60	0.33
D10	0.082
Uniformity Coefficient	4

Description	
Greyish brown fine and medium SAND with occasional gravel.	

Test Code = 610



D N Houseago (Lead Technician)



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Norwich  
NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No 99644  
Your Sample Ref B7  
Your Project or Order No  
P&T Project No.  
Date Report Issued 10-Oct-07

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

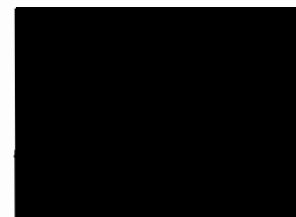
<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH108	<b>Depth</b>	5 m
<b>Date sampled</b>		<b>Date received</b>	21-Sep-07
<b>Date tested</b>	05-Sep-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Brown silty fine SAND with some fine, medium and coarse flint and quartz gravel		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
	Not applicable
	PREPARATION DETAILS
<b>METHOD OF DIVISION</b>	Ridffled
<b>PREPARATION METHOD</b>	Oven dried @ 105 -110°C
<b>PASSING 2mm BS TEST SIEVE (%)</b>	90
<b>ORGANIC MATTER (%)</b>	0

Test Code:620

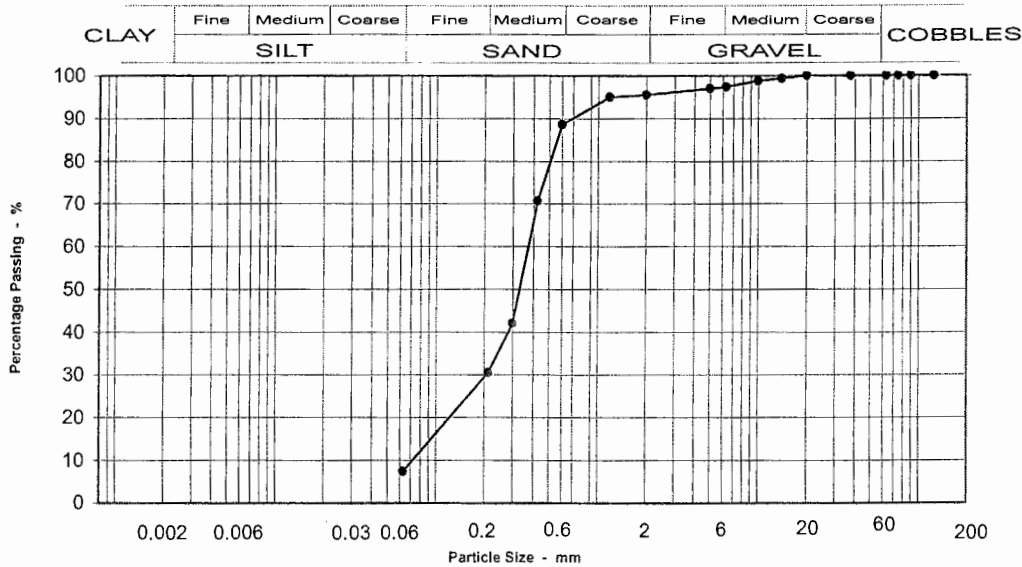


David Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH108 7 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	1B Suitable
90	100	
75	100	
63	100	
37.5	100	
20	100	
14	99	
10	99	
6.3	97	
5	97	
2	96	6E/6R Suitable
1.18	95	6M Suitable
0.600	89	
0.425	71	
0.300	42	
0.212	30	
0.063	7	
Moisture content %		17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	7
Coarse SAND	2
Medium SAND	58
Fine SAND	23
Silt & Clay	7

Grading Analysis	
D100	14
D60	0.38
D10	0.080
Uniformity Coefficient	5

Description	
Medium yellow brown SAND with fine to coarse gravel flint and rock.	

Test Code = 610



D N Houseago (Lead Technician)



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NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No 99508  
Your Sample Ref D5  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

Page 1 of 1

**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

Scheme	Great Yarmouth Third River Crossing		
Location	BH 109	Depth	1 - 1m
Date sampled	09-Aug-07	Date received	20-Sep-07
Date tested	28-Aug-07		
Sample type	D	Sample Mass	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
Material	Small disturbed sample		
Description	Dark grey clayey fine SAND.		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

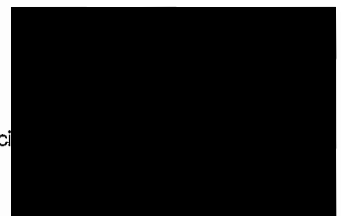
LOCATION	TEST SPECIMEN	
ORIENTATION	Not applicable	
	PREPARATION DETAILS	
METHOD OF DIVISION	Whole	
PREPARATION METHOD	Hand picking	
RETAINED 425µm (%)	0	
NATURAL MC (%)	25	OVEN DRIED @ 105°C
LIQUID LIMIT (%)	38	
PLASTIC LIMIT (%)	18	
PLASTICITY INDEX (%)	20	
MODIFIED PI *(%)	20	*BRE Digest 240 : 1993
SOIL CLASSIFICATION	C I	

REMARKS

Test Code = 604



David Houseago (Lead Technician)



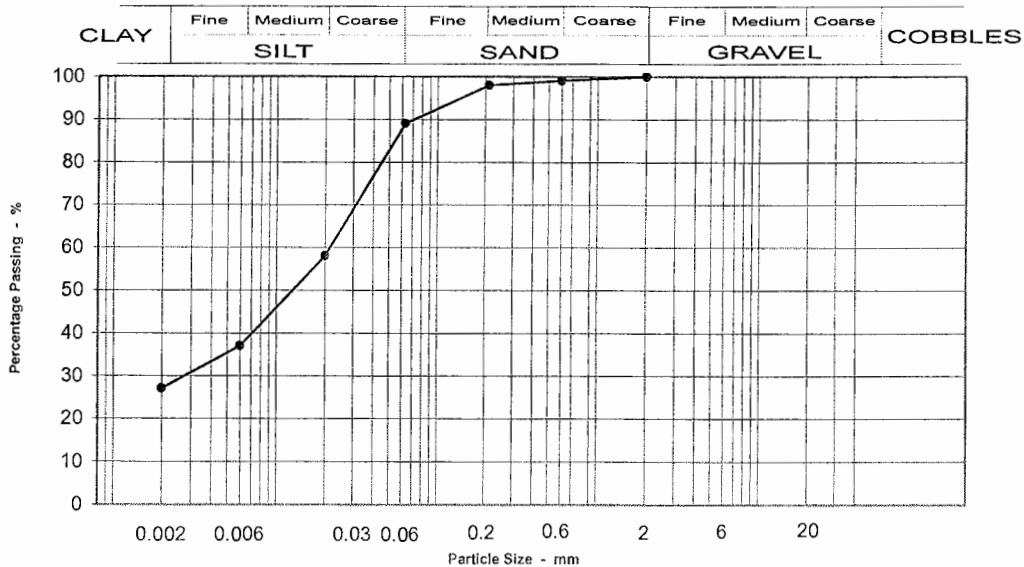
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 Norwich  
 NR1 2SG

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 Our Report and sample No  
 Your Sample Ref D7  
 Your Project or Order No  
 P&T Project No.  
 Date Report Issued 12 October 2007

## Particle Size Distribution to BS 1377 : Part2 : 1990 Sedimentation Method Section 9.4

Scheme: Great Yarmouth Third River Crossing

Location: BH 109 2 - 2m



Seiving	
Particle Size mm	% Passing
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
0.6	99
0.212	98
0.063	89
0.02	58
0.006	37
0.002	27

Moisture content %

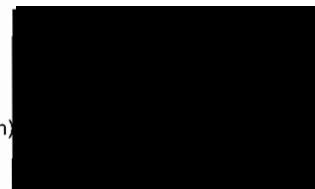
Sample Proportions	
GRAVEL	0
Coarse SAND	1
Medium SAND	1
Fine SAND	9
Coarse SILT	21
FINE SILT	10
CLAY	27

Description
Very soft grey very sandy CLAY.

Test Code = 612



D N Houseago (Lead Technician)





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Martineau Lane  
Norwich  
NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 99478  
Your Sample Ref D9  
Your Project or Order No  
P&T Project No.  
Date Report Issued 24-Oct-07

FAO I Brown

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

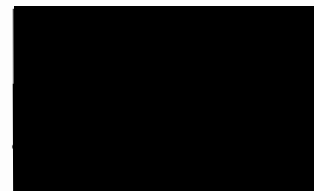
Scheme	Great Yarmouth Third River Crossing		
Location	BH 109	Depth	2.5 m
Date sampled	09-Aug-07	Date received	23-Aug-07
Date tested	05-Sep-07		
Sample type	D	Sample Mass	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
Material	Small disturbed sample		
Description	Grey silty fine to medium SAND.		
Supplier	Not applicable	Source	Ex site
Conveyance note No.	Not applicable		

LOCATION	TEST SPECIMEN
ORIENTATION	Not applicable
METHOD OF DIVISION	PREPARATION DETAILS
PREPARATION METHOD	Ridffled
	Oven dried @ 105 -110°C
PASSING 2mm BS TEST SIEVE (%)	98
ORGANIC MATTER (%)	0

Test Code:620



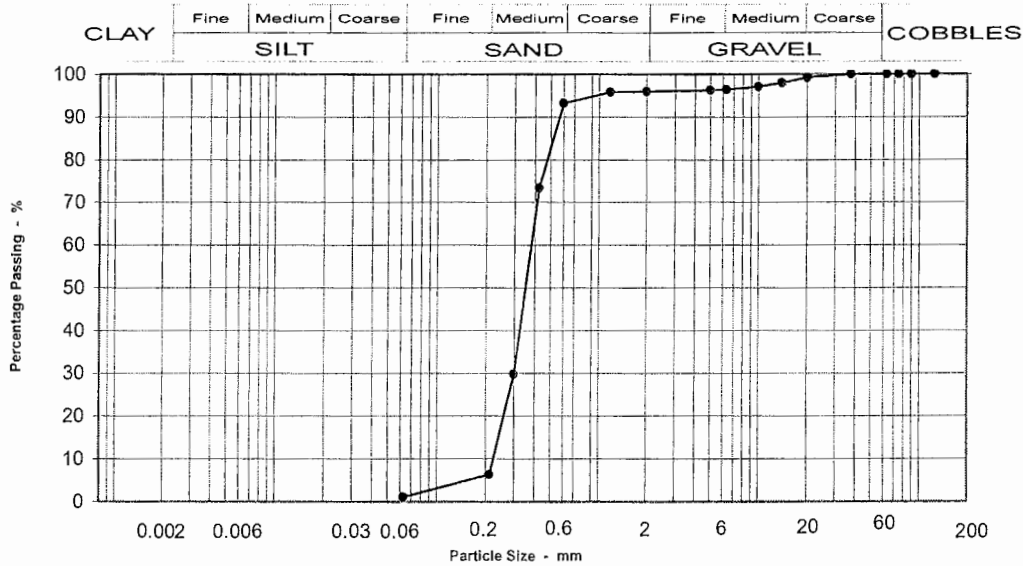
David Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 109 4.6 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	98
10	97
6.3	96
5	96
2	96
1.18	96
0.6	93
0.425	73
0.3	30
0.212	6
0.063	1

### Specification for Highway Works Classification

1B Suitable

6E/6R Suitable

6M Suitable

Moisture content % 23

### Sample Proportions

BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	3
Fine GRAVEL	3
Coarse SAND	0
Medium SAND	87
Fine Sand	5
Silt & Clay	1

### Grading Analysis

D100	20
D60	0.4
D10	0.23
Uniformity Coefficient	2

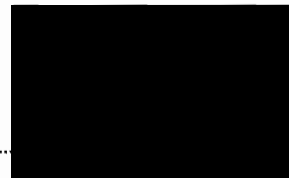
### Description

Grey medium SAND

Test Code = 610

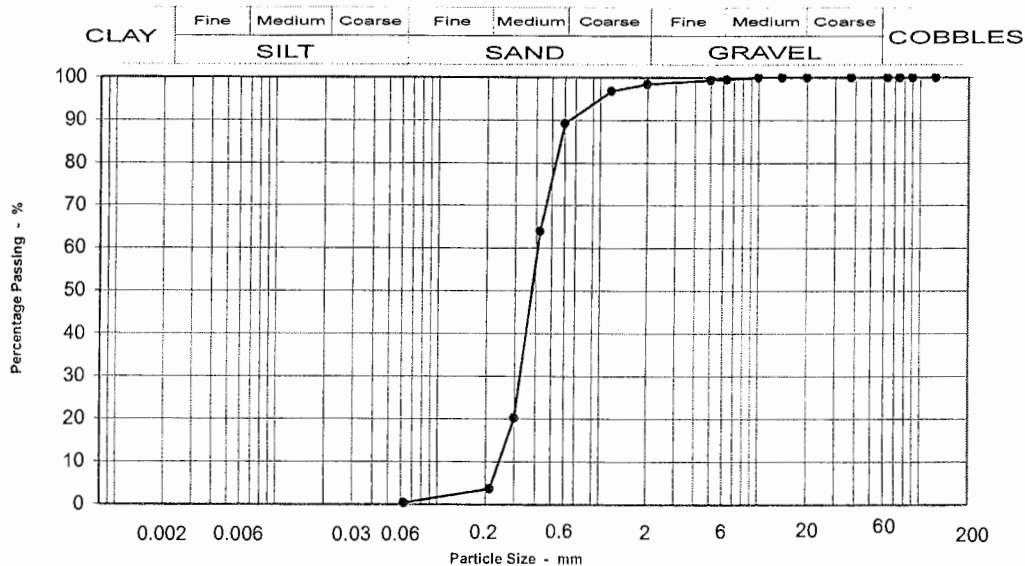


R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer)  
D N Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 109 9.6 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	1B Suitable
90	100	
75	100	
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	99	
2	98	6E/6R Suitable
1.18	97	
0.6	89	6M Suitable
0.425	64	
0.3	20	
0.212	4	
0.063	0	
Moisture content %		23

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	9
Coarse SAND	1
Medium SAND	86
Fine Sand	3
Silt & Clay	0

Grading Analysis	
D100	6
D60	0.4
D10	0.25
Uniformity Coefficient	2

Description
Grey medium SAND

Test Code = 610



R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer) ✓  
D N Houseago (Lead Technician)

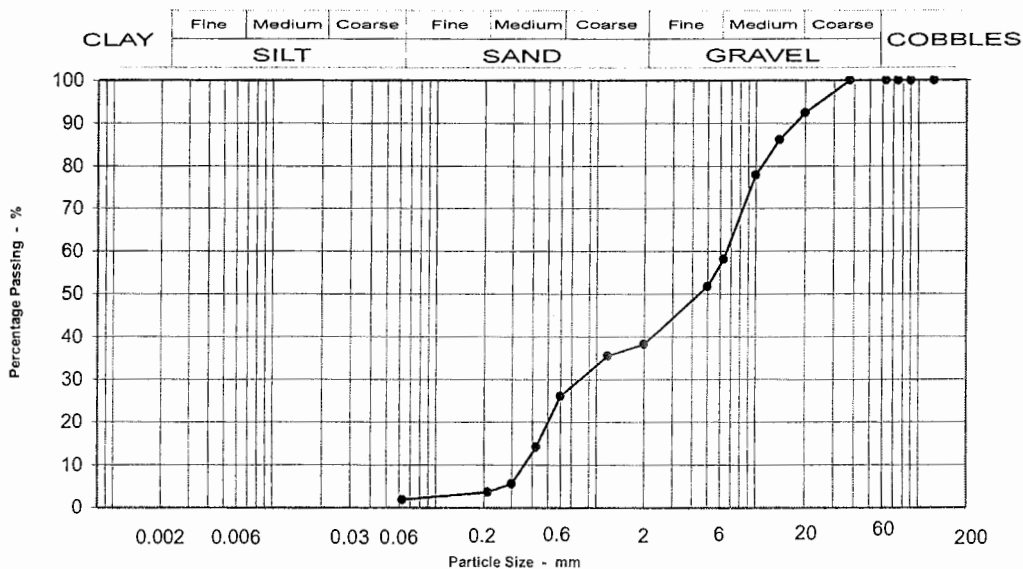


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Martineau Lane  
Norwich  
NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 99491  
Your Sample Ref B38  
Your Project or Order No  
P&T Project No.  
Date Report Issued 10 September 2007

## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 109 14.8 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	1A Suitable
90	100	
75	100	
63	100	
37.5	100	
20	92	
14	86	6A Suitable
10	78	
6.3	58	
5	52	
2	38	6E/6R Suitable
1.18	35	6F1 Suitable
0.6	26	
0.425	14	
0.3	6	6I Suitable
0.212	4	
0.063	2	
		6M Suitable
		6N/6P Suitable
Moisture content %		12

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	8
Medium GRAVEL	34
Fine GRAVEL	12
Coarse SAND	20
Medium SAND	22
Fine Sand	2
Silt & Clay	2

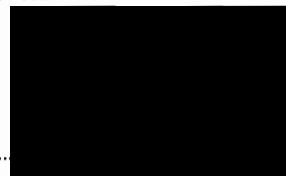
Grading Analysis	
D100	20
D60	6.7
D10	0.36
Uniformity Coefficient	18

Description	
Grey SAND and GRAVEL	

Test Code = 610



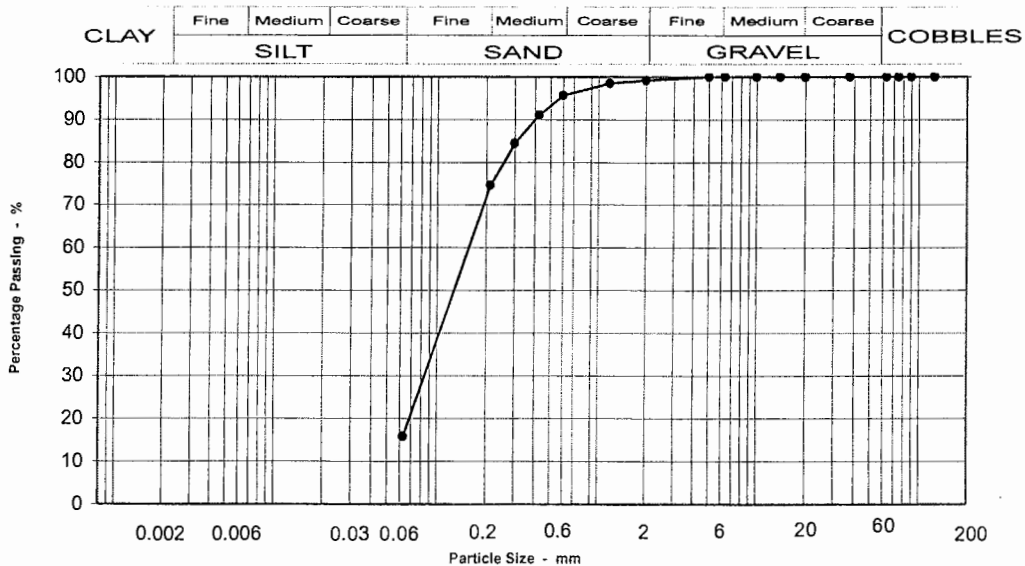
R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer)  
D N Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 109 22.5 - m**



Seiving		Specification for Highway Works Classification
Particle Size mm	% Passing	
125	100	2A/2B Suitable
90	100	
75	100	
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	99	
1.18	99	
0.6	96	
0.425	91	
0.3	84	
0.212	75	
0.063	16	

Moisture content % 25

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	4
Coarse SAND	1
Medium SAND	21
Fine Sand	59
Silt & Clay	16

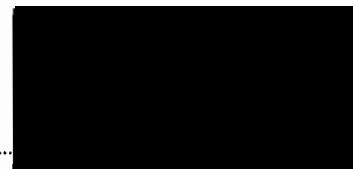
Grading Analysis	
D100	2
D60	0.2
D10	0.00
Uniformity Coefficient	>10

Description
Grey silty fine and medium SAND

Test Code = 610



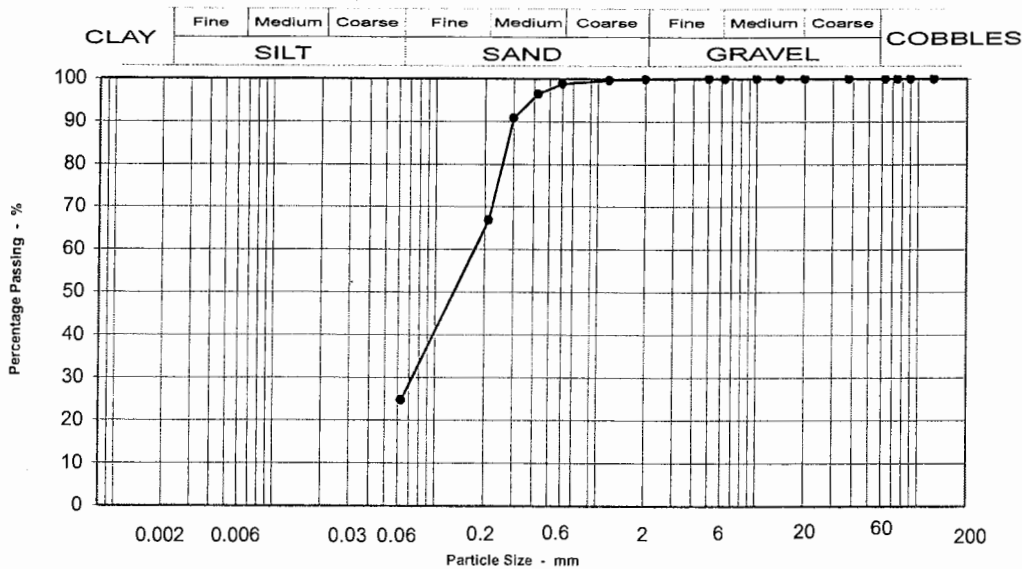
R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer) ✓  
D N Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 109 28.5 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.6	99
0.425	96
0.3	91
0.212	67
0.063	25

Specification for Highway Works Classification	
2A/2B	Suitable

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	0
Medium SAND	32
Fine Sand	42
Silt & Clay	25

Grading Analysis	
D100	2
D60	0.2
D10	0.00
Uniformity Coefficient	>10

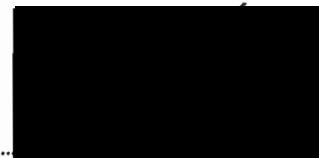
Description	
Grey silty fine and medium SAND	

Moisture content % 34

Test Code = 610



R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer)  
D N Houseago (Lead Technician)

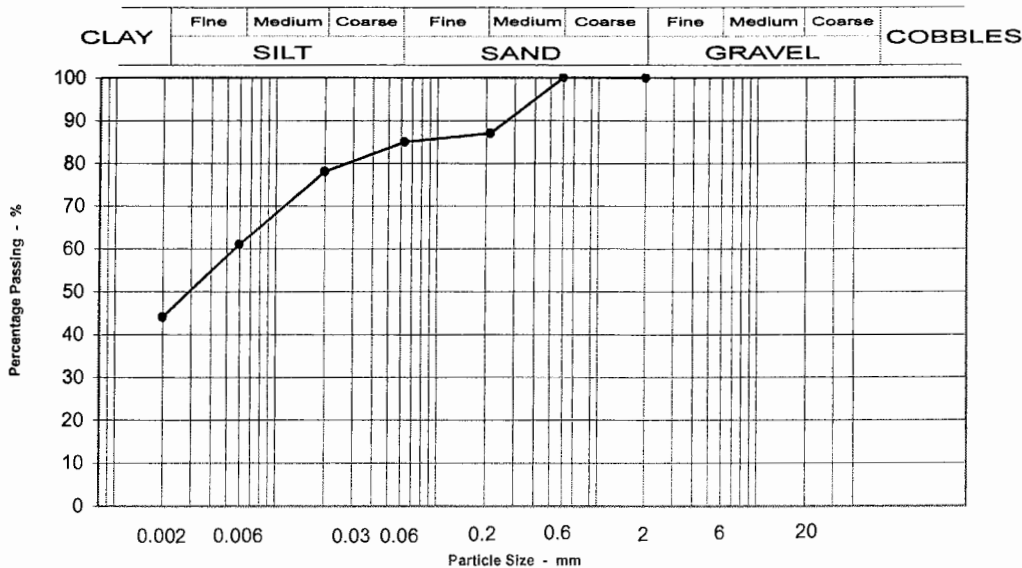


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Our Report and sample No  
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Your Project or Order No  
P&T Project No.  
Date Report Issued 12 October 2007

**Particle Size Distribution to BS 1377 : Part2 : 1990  
Sedimentation Method Section 9.4**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 109 32.2 - m**



Seiving	
Particle Size mm	% Passing
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
0.6	100
0.212	87
0.063	85
0.02	78
0.006	61
0.002	44

Moisture content %

Sample Proportions	
GRAVEL	0
Coarse SAND	0
Medium SAND	13
Fine SAND	2
Coarse SILT	17
FINE SILT	17
CLAY	44

Description
Firm to stiff grey sandy CLAY with fine shell fragments.

Test Code = 612



D N Houseago (Lead Technician)







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Martineau Lane  
Norwich  
NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No  
Your Sample Ref D65  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

## DETERMINATION OF MOISTURE CONTENT TO BS1377 : PART2 : 1990 : SECTION 3.2

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 109	<b>Depth</b>	32.2 - m
<b>Date sampled</b>	09 August 2007	<b>Date received</b>	23-Aug-07
<b>Sample type</b>	D	<b>Sample Mass</b>	Unknown
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Firm to stiff grey sandy CLAY with fine shell fragments.		
<b>Supplier</b>	<b>Source</b>		
<b>Conveyance note No.</b>			

<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Quartering
	Oven dried @ 105 -110°C
<b>NATURAL MC (%)</b>	19

### REMARKS

Test Code = 602



D N Houseago (Lead Technician)

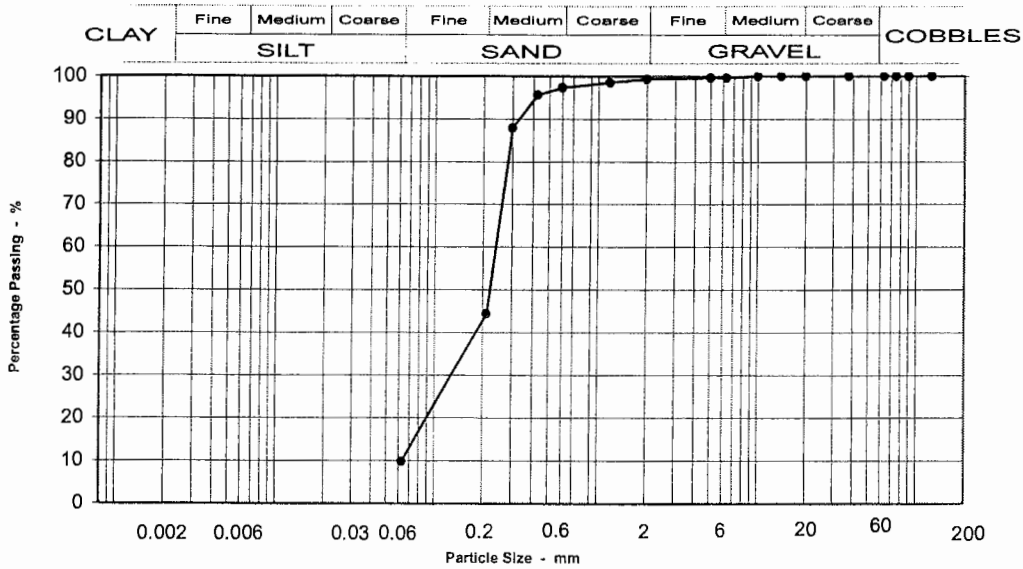




## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 109 35.3 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.6	97
0.425	96
0.3	88
0.212	44
0.063	10

### Specification for Highway Works Classification

1B Suitable

6E/6R Suitable

6M Suitable

Moisture content % 26

### Sample Proportions

BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	0
Medium SAND	53
Fine Sand	35
Silt & Clay	10

### Grading Analysis

D100	6
D60	0.2
D10	0.06
Uniformity Coefficient	4

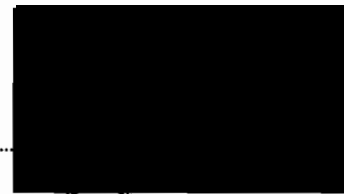
### Description

Grey silty fine and medium SAND

Test Code = 610



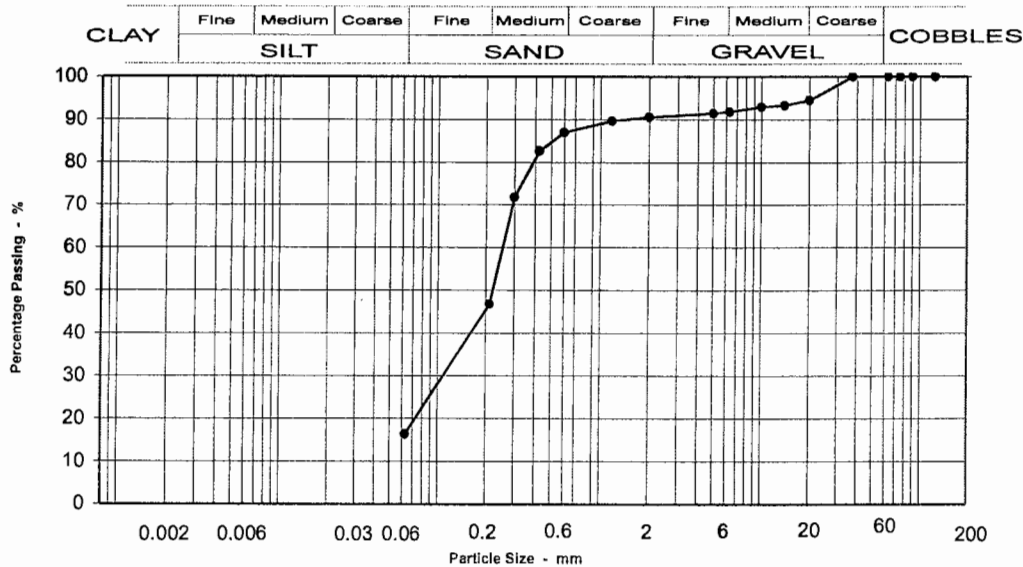
R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer)  
D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 111 2 - m**



Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	95
14	93
10	93
6.3	92
5	91
2	91
1.18	90
0.6	87
0.425	83
0.3	72
0.212	47
0.063	16

Specification for Highway Works Classification
2A/2B Suitable

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	6
Medium GRAVEL	3
Fine GRAVEL	4
Coarse SAND	1
Medium SAND	40
Fine Sand	30
Silt & Clay	16

Grading Analysis	
D100	20
D60	0.3
D10	0.00
Uniformity Coefficient	>10

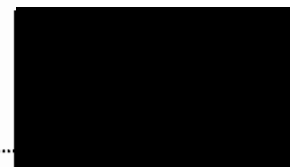
Description
Grey slightly silty fine SAND.

Moisture content % 13

Test Code = 610



R J Noakes (Group Manager)  
M L Bumstead (Section Engineer)  
I D Brown (Section Engineer)  
D N Houseago (Lead Technician)



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NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No  
Your Sample Ref D7  
Your Project or Order No  
P&T Project No.  
Date Report Issued 25-Oct-07

Page 1 of 1

**DETERMINATION OF MOISTURE CONTENT TO BS1377 : PART2 : 1990 : SECTION 3.2**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 111	<b>Depth</b>	2.6 - m
<b>Date sampled</b>	16-Aug-07	<b>Date received</b>	29-Sep-07
<b>Sample type</b>	D	<b>Sample Mass</b>	Unknown
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Brown slightly clayey fine SAND.		
<b>Supplier</b>	<b>Source</b>		
<b>Conveyance note No.</b>			

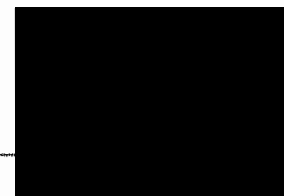
<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Riffled
	Oven dried @ 105 -110°C
<b>NATURAL MC (%)</b>	20

**REMARKS**

Test Code = 602

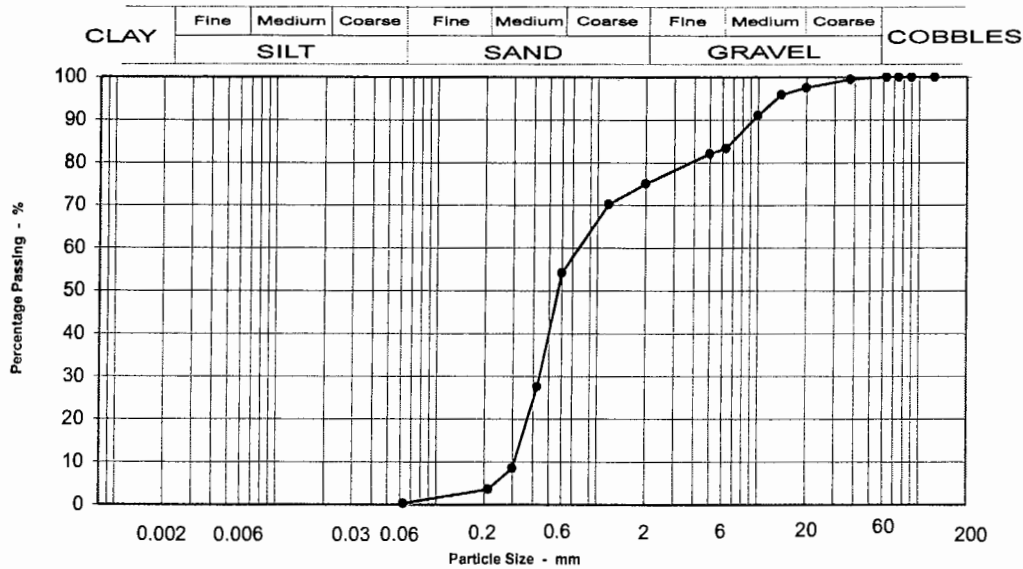


D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 111 4 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	98
14	96
10	91
6.3	83
5	82
2	75
1.18	70
0.600	54
0.425	28
0.300	9
0.212	4
0.063	0

**Specification for Highway Works Classification**

1B Suitable

6E/6R Suitable

6M Suitable

Moisture content % 14

**Sample Proportions**

BOULDERS	0
COBBLES	0
Coarse GRAVEL	3
Medium GRAVEL	14
Fine GRAVEL	21
Coarse SAND	8
Medium SAND	51
Fine SAND	3
Silt & Clay	0

**Grading Analysis**

D100	38
D60	0.81
D10	0.310
Uniformity Coefficient	3

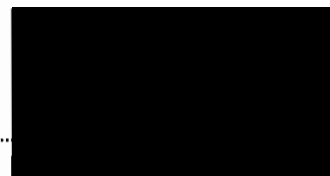
**Description**

Loose to medium dense gravelly fine SAND.

Test Code = 610

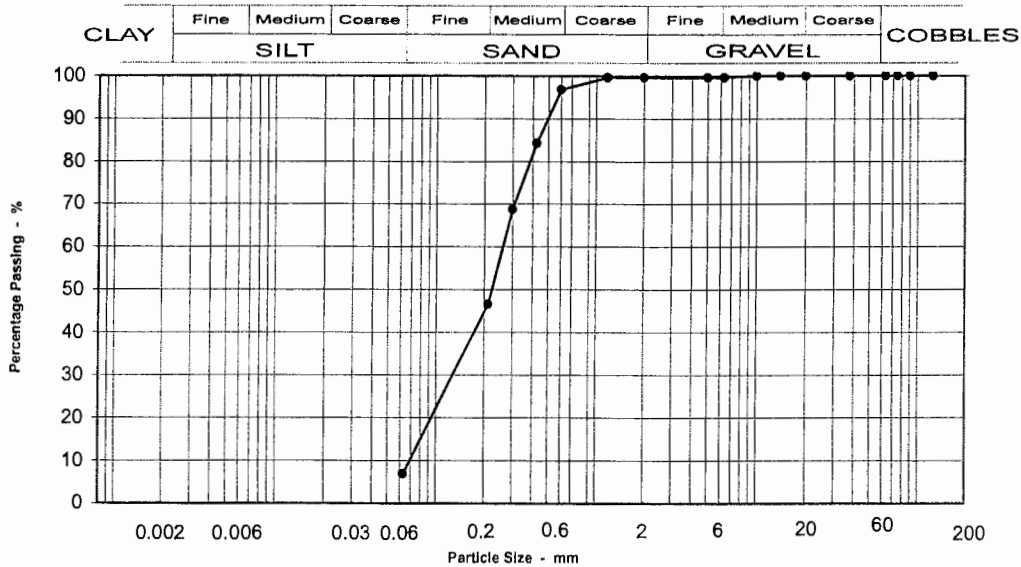


D N Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 112 3 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	97
0.425	84
0.300	69
0.212	47
0.063	7

**Specification for Highway Works Classification**

1B Suitable

6E/6R Suitable

6M Suitable

Moisture content % 22

**Sample Proportions**

BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	3
Coarse SAND	0
Medium SAND	50
Fine SAND	40
Silt & Clay	7

**Grading Analysis**

D100	6
D60	0.27
D10	0.075
Uniformity Coefficient	4

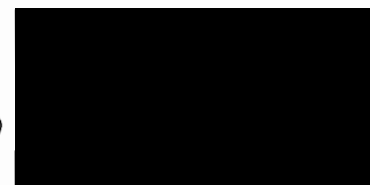
**Description**

Orangey brown fine and medium SAND

Test Code = 610



D N Houseago (Lead Technician)



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County Hall  
Martineau Lane  
Norwich  
NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No 100391  
Your Sample Ref D13  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

Page 1 of 1

**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 113	<b>Depth</b>	3 - m
<b>Date sampled</b>		<b>Date received</b>	02-Oct-07
<b>Date tested</b>	03-Oct-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Soft to firm dark grey sandy CLAY.		
<b>Supplier</b>		<b>Source</b>	Not applicable
<b>Conveyance note No.</b>	Not applicable		

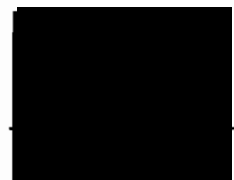
<b>LOCATION</b>	TEST SPECIMEN		
<b>ORIENTATION</b>	Not applicable		
	PREPARATION DETAILS		
<b>METHOD OF DIVISION</b>	Whole		
<b>PREPARATION METHOD</b>	Hand picking		
<b>RETAINED 425µm (%)</b>	7		
<b>NATURAL MC (%)</b>	35	<b>OVEN DRIED @ 105°C</b>	
<b>LIQUID LIMIT (%)</b>	43		
<b>PLASTIC LIMIT (%)</b>	19		
<b>PLASTICITY INDEX (%)</b>	24		
<b>MODIFIED PI *(%)</b>	22	<b>*BRE Digest 240 : 1993</b>	
<b>SOIL CLASSIFICATION</b>	C I		

REMARKS

Test Code = 604



David Houseago (Lead Technician)

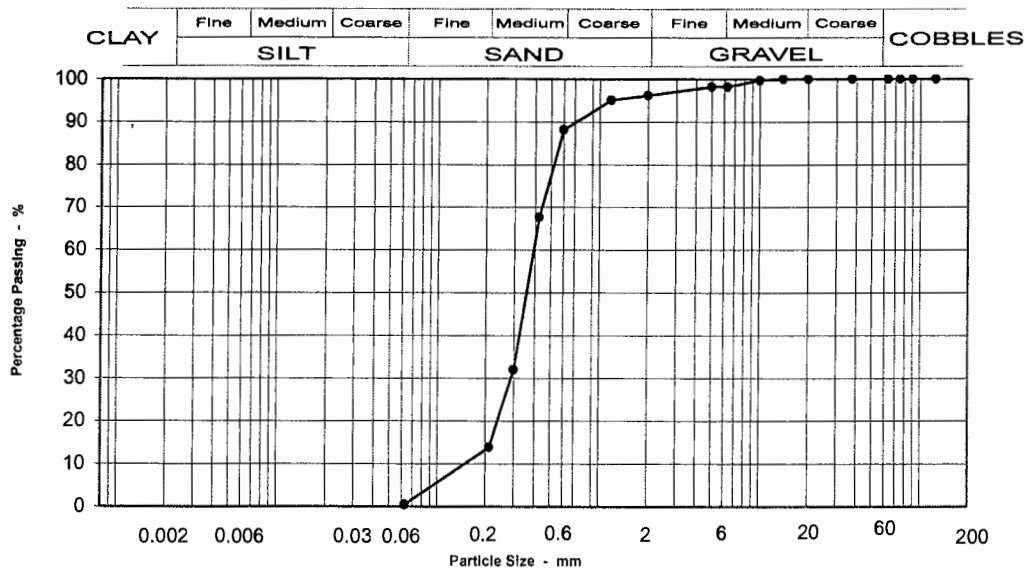




**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 113 7.3 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	98
5	98
2	96
1.18	95
0.600	88
0.425	68
0.300	32
0.212	14
0.063	0

Specification for Highway Works Classification	
1B	Suitable
6E/6R	Suitable
6M	Suitable
Moisture content % 18	

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	2
Coarse SAND	8
Medium SAND	74
Fine SAND	13
Silt & Clay	0

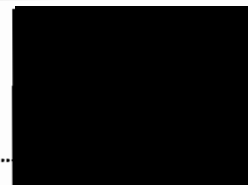
Grading Analysis	
D100	10
D60	0.40
D10	0.170
Uniformity Coefficient	2

Description	
Silty gravelly fine and medium SAND.	

Test Code = 610



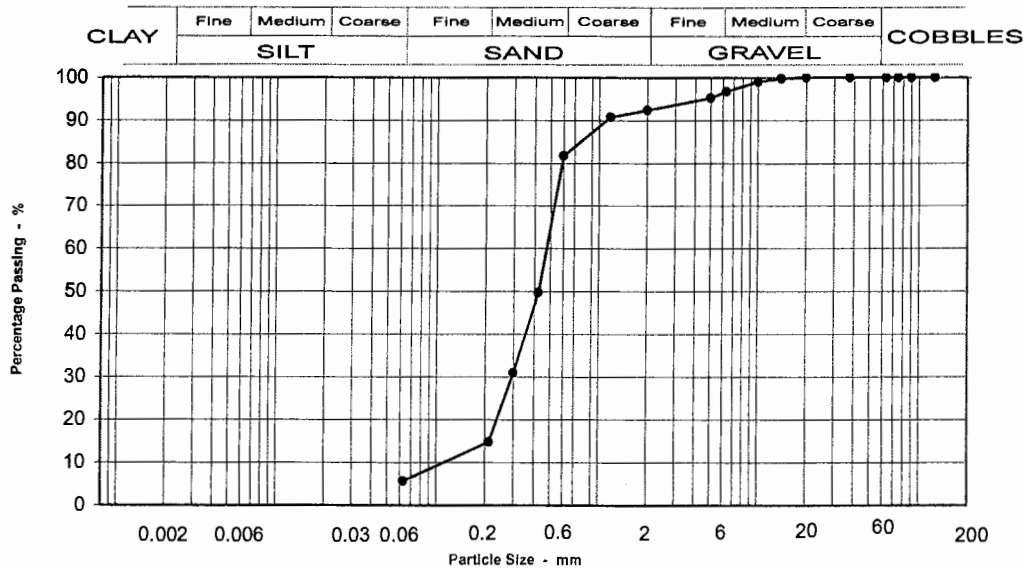
D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 113 13.5 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	97
5	95
2	92
1.18	91
0.600	82
0.425	50
0.300	31
0.212	15
0.063	6

Specification for Highway Works Classification	
1B	Suitable
6E/6R	Suitable
6M	Suitable

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	4
Coarse SAND	11
Medium SAND	67
Fine SAND	9
Silt & Clay	6

Grading Analysis	
D100	14
D60	0.48
D10	0.134
Uniformity Coefficient	4

Description	
Dense silty gravelly fine and medium SAND. Gravel is angular to subangular fine to medium flint.	

Test Code = 610

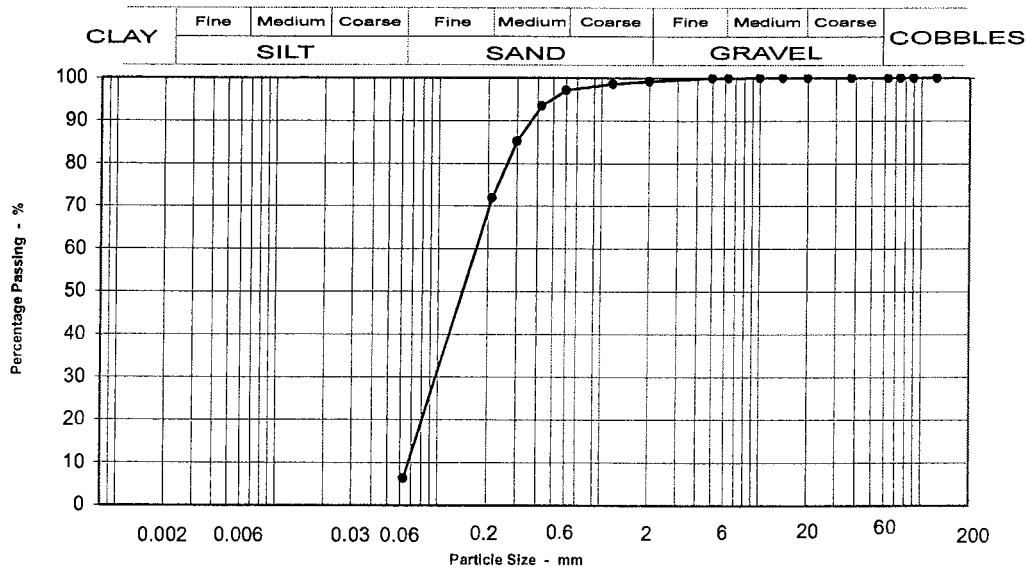


D N Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 113 21.5 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	97
0.425	93
0.300	85
0.212	72
0.063	6

### Specification for Highway Works Classification

1B	Suitable
6E/6R	Suitable
6M	Suitable
Moisture content % 23	

### Sample Proportions

BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	1
Medium SAND	25
Fine SAND	66
Silt & Clay	6

### Grading Analysis

D100	6
D60	0.19
D10	0.071
Uniformity Coefficient	3

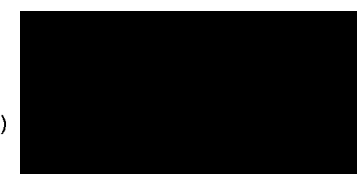
### Description

Silty fine SAND with occasional flint cobble and shell fragments.

Test Code = 610

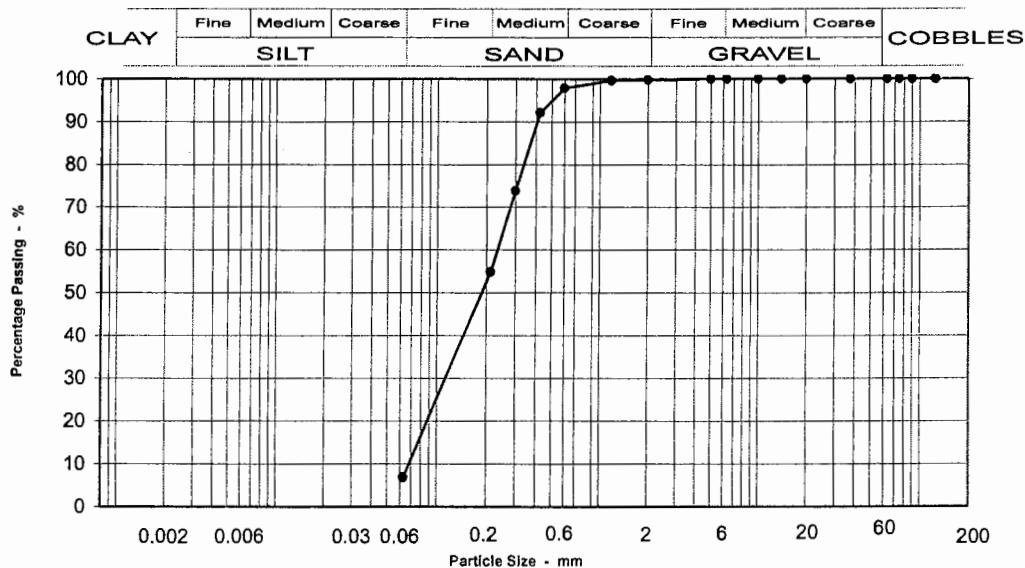


D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 113 29 - m**



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Our Project No PTPZ0008  
Our Report and sample No 99878  
Your Sample Ref B2  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

FAO I Brown

Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 111	<b>Depth</b>	1.2 m
<b>Date sampled</b>	16-Aug-07	<b>Date received</b>	23-Aug-07
<b>Sample type</b>	B	<b>Sample Mass</b>	

Sampled by AE who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Bulk Disturbed
<b>Description</b>	Loose dark grey slightly silty fine SAND.

**Supplier** **Source**  
Conveyance note No.

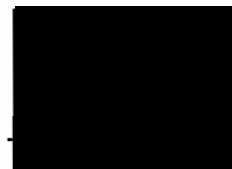
<b>LOCATION</b>	<b>TEST SPECIMEN</b>		
<b>ORIENTATION</b>	NOT APPLICABLE		
<b>METHOD OF DIVISION</b>	NOT APPLICABLE		
<b>PREPARATION METHOD</b>	<b>PREPARATION DETAILS</b>		
	QUARTERING		
	7.2.4.4 Rammer Compaction with specified effort		
<b>RETAINED 37.5mm</b>	%	0	
<b>RETAINED 20mm</b>	%	5	
<b>NO OF LAYERS</b>		3	<b>CBR VALUE TOP</b> % 1.3
<b>BLOWS PER LAYER</b>		62 Blows	<b>CBR VALUE BOTTOM</b> % 1.5
<b>METHOD</b>		2.5kg	<b>AVERAGE CBR VALUE</b> % 1.4
<b>CONDITION</b>		UNSOAKED	
<b>BULK DENSITY</b>	Mg/m <sup>3</sup>	2.029	<b>MOISTURE CONT. TOP</b> % 19
<b>DRY DENSITY</b>	Mg/m <sup>3</sup>	1.42	<b>MOISTURE CONT. BOT</b> % 67
<b>INITIAL MOISTURE CONT.</b>	%	43	<b>MOISTURE CONT. METHOD</b> Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)

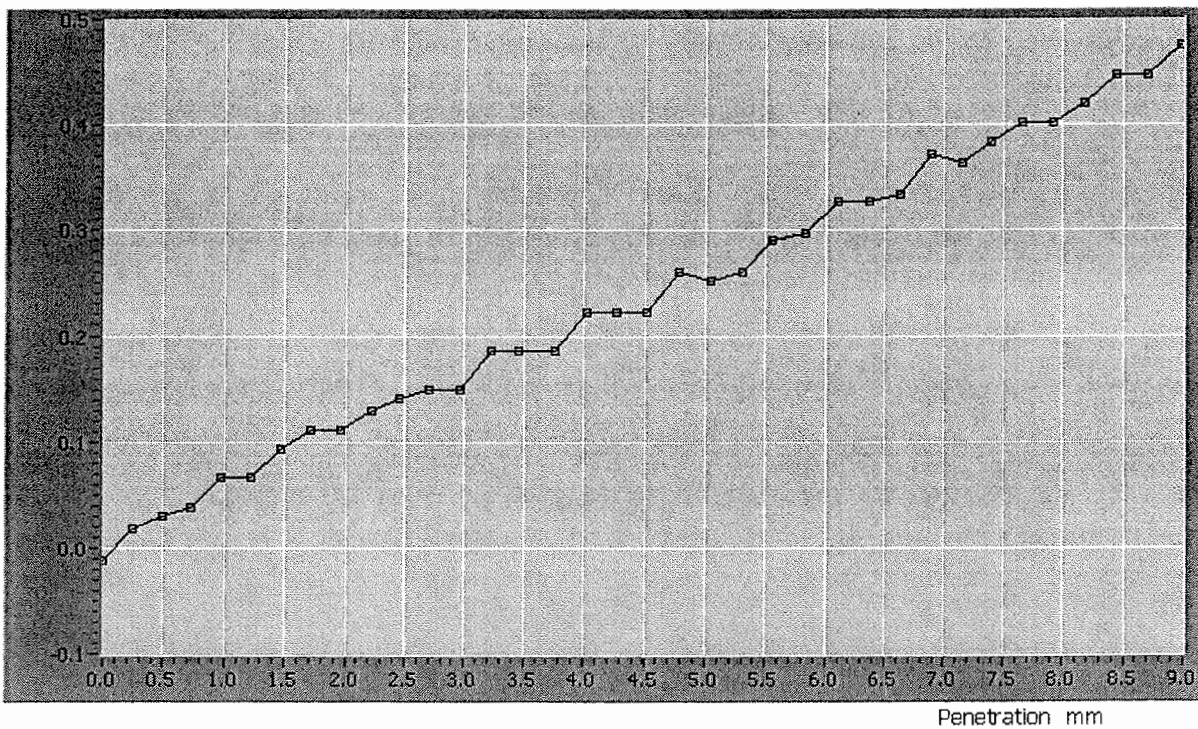


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	BH111 - B2	<b>Sample</b>	0000099878

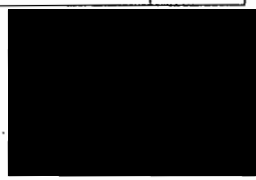
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	0.14	0.25	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	1.08	1.27	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 D Brown (Section Engineer)  
 D N Houseago (Lead Technician) ...

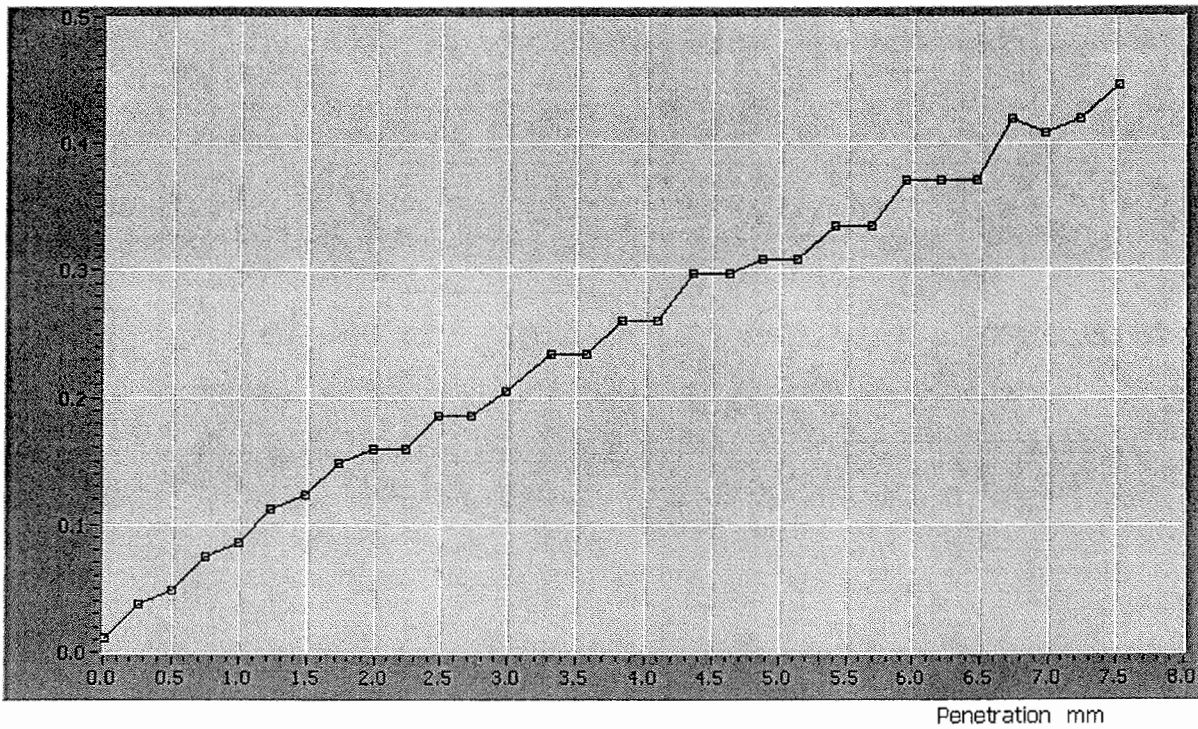


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	BH111 - B2	<b>Sample</b>	0000099878

### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	0.19	0.31	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	1.41	1.54	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 D Brown (Section Engineer)  
 D N Houseago (Lead Technician) .....





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Martineau Lane  
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NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 100287  
Your Sample Ref B2  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

FAO I Brown

Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 112	<b>Depth</b>	1.4 m
<b>Date sampled</b>		<b>Date received</b>	21-Sep-07
<b>Sample type</b>	B	<b>Sample Mass</b>	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Bulk Disturbed		
<b>Description</b>	Loose black grey medium to coarse silty SAND with much fine to medium gravel.		

**Supplier** **Source**  
**Conveyance note No.**

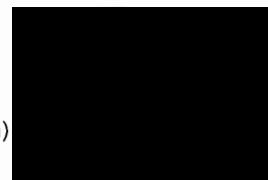
<b>LOCATION</b>	<b>TEST SPECIMEN</b>			
<b>ORIENTATION</b>	NOT APPLICABLE			
	NOT APPLICABLE			
	<b>PREPARATION DETAILS</b>			
<b>METHOD OF DIVISION</b>	QUARTERING			
<b>PREPARATION METHOD</b>	7.2.4.4 Rammer Compaction with specified effort			
<b>RETAINED 37.5mm</b>	%	9		
<b>RETAINED 20mm</b>	%	18		
<b>NO OF LAYERS</b>		3	<b>CBR VALUE TOP</b>	% 20
<b>BLOWS PER LAYER</b>		62 Blows	<b>CBR VALUE BOTTOM</b>	% 27
<b>METHOD</b>		2.5kg	<b>AVERAGE CBR VALUE</b>	% 24
<b>CONDITION</b>		UNSOAKED		
<b>BULK DENSITY</b>	Mg/m <sup>3</sup>	2.011	<b>MOISTURE CONT. TOP</b>	% 19
<b>DRY DENSITY</b>	Mg/m <sup>3</sup>	1.708	<b>MOISTURE CONT. BOT</b>	% 16
<b>INITIAL MOISTURE CONT.</b>	%	18	<b>MOISTURE CONT. METHOD</b>	Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)

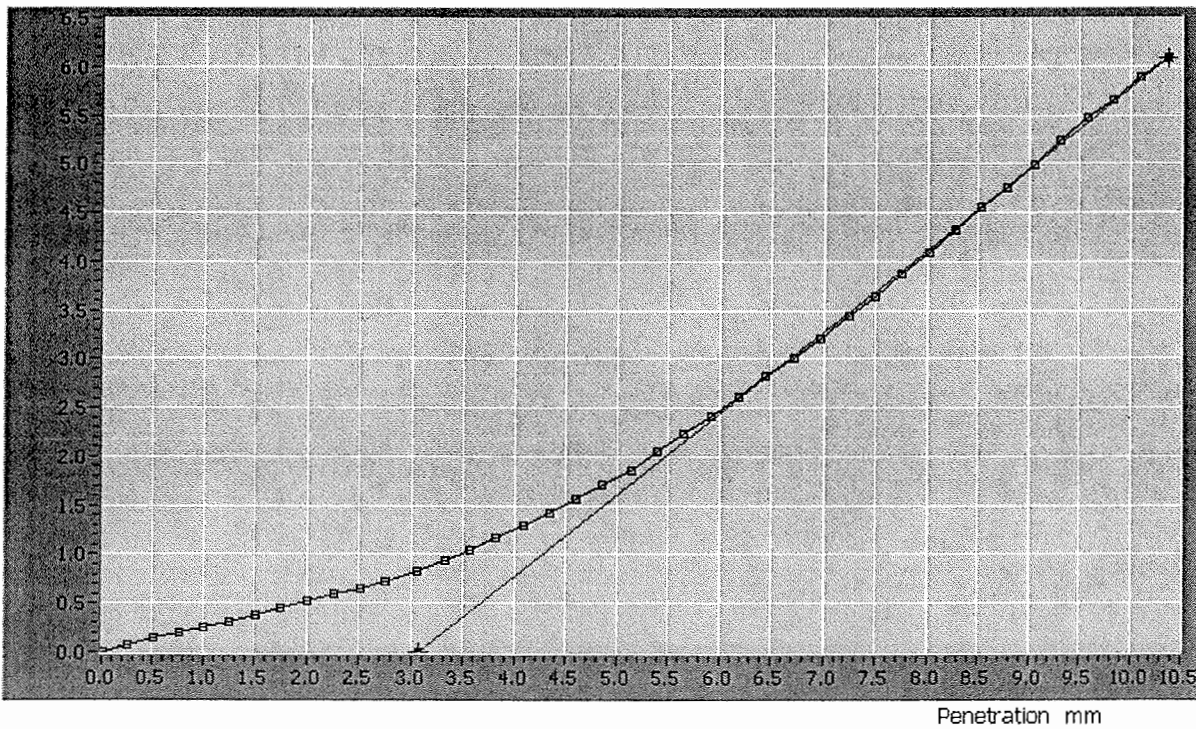


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	112 - B2	<b>Sample</b>	0000100287

### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	2.17	4.13	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	16.46	20.66	%

Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) .....

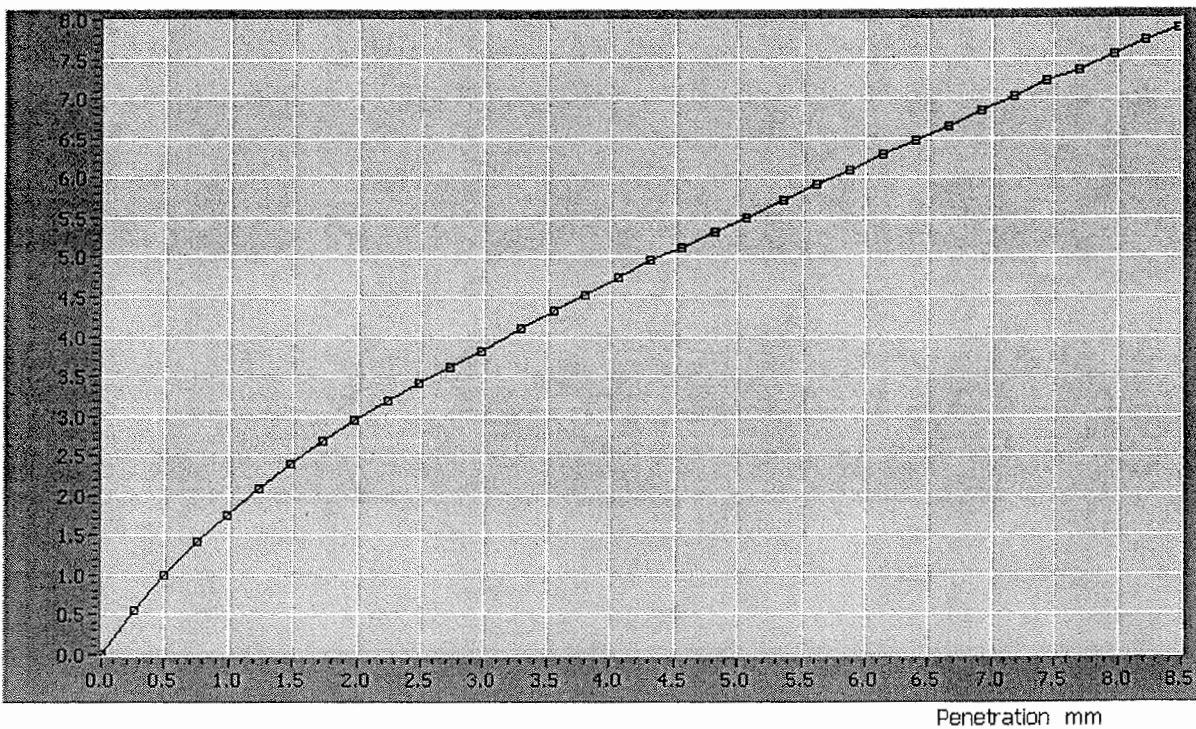


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	112 - B2	<b>Sample</b>	0000100287

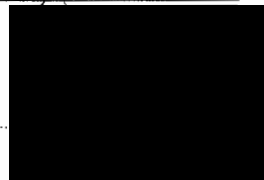
### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	3.43	5.46	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	26.00	27.28	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 I D Brown (Section Engineer)  
 M D N Houseago (Lead Technician) .....





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## DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990

Scheme	Great Yarmouth Third River Crossing		
Location	BH 112	Depth	3 m
Date sampled		Date received	21-Sep-07
Sample type	B	Sample Mass	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
Material	Bulk Disturbed		
Description	Orangey brown fine and medium SAND		

Supplier Source  
Conveyance note No.

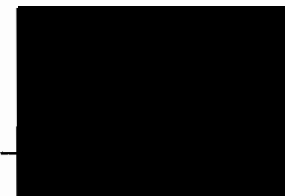
LOCATION	TEST SPECIMEN		
ORIENTATION	NOT APPLICABLE		
METHOD OF DIVISION	PREPARATION DETAILS		
PREPARATION METHOD	QUARTERING		
	7.2.4.4 Rammer Compaction with specified effort		
RETAINED 37.5mm	%	0	
RETAINED 20mm	%	2	
NO OF LAYERS		3	CBR VALUE TOP % 41
BLOWS PER LAYER		62 Blows	CBR VALUE BOTTOM % 44
METHOD		2.5kg	AVERAGE CBR VALUE % 42
CONDITION		UNSOAKED	
BULK DENSITY	Mg/m <sup>3</sup>	2.035	MOISTURE CONT. TOP % 16
DRY DENSITY	Mg/m <sup>3</sup>	1.76	MOISTURE CONT. BOT % 15
INITIAL MOISTURE CONT.	%	16	MOISTURE CONT. METHOD Oven dried @ 105 -110°C

REMARKS

Test Code = 642



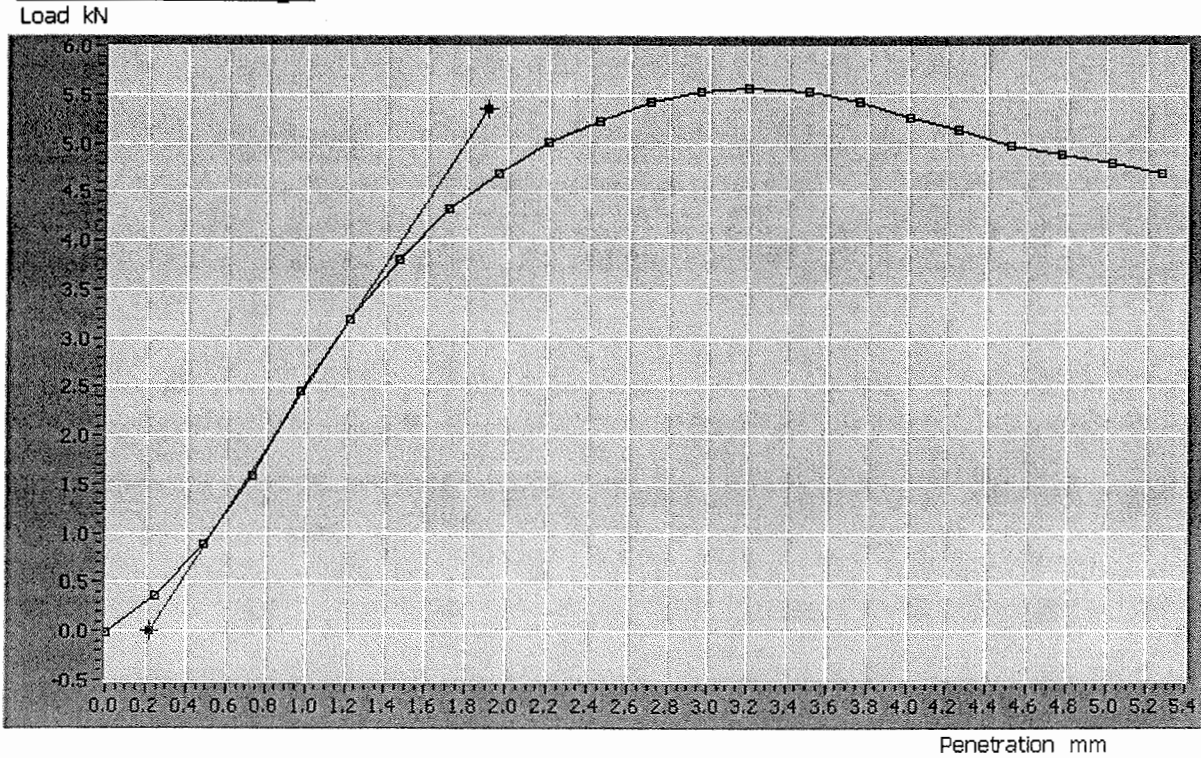
David Houseago (Lead Technician)



## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	112 - B3	<b>Sample</b>	0000100365

### Penetration Stage



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	5.43	4.71	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	41.16	23.54	%

Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) .....



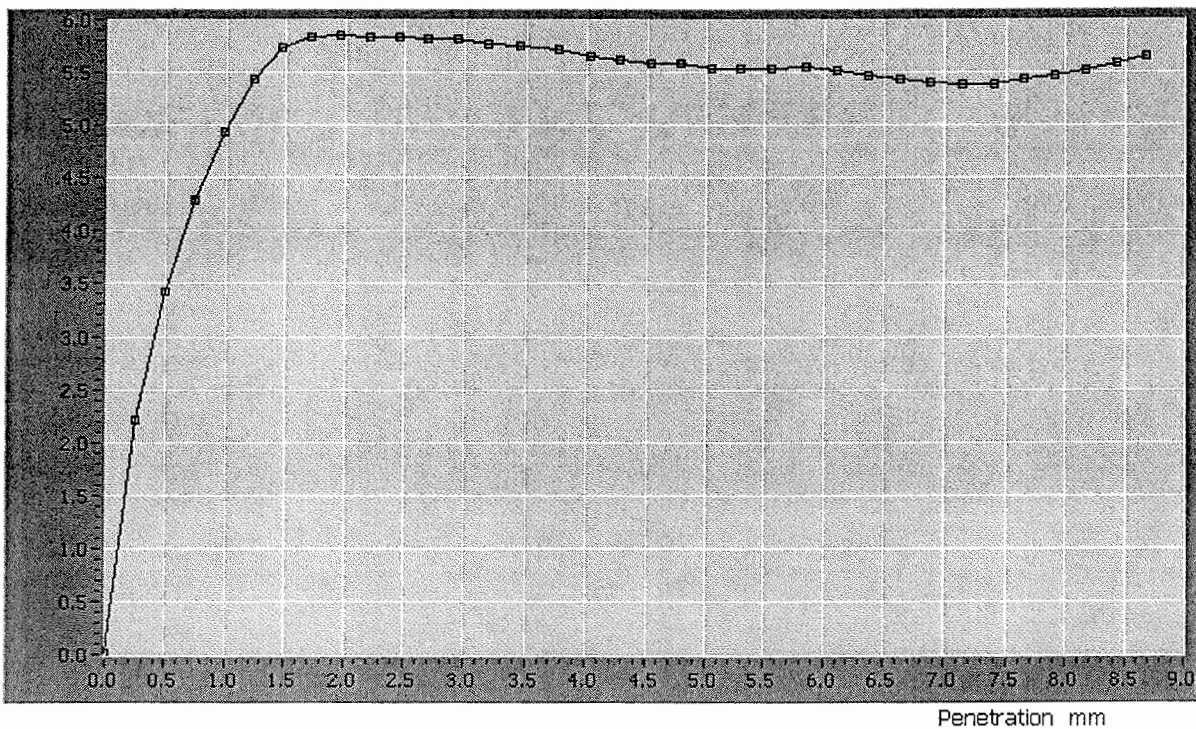


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	112 - B3	<b>Sample</b>	0000100365

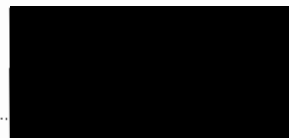
### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	5.83	5.55	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	44.18	27.73	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 D Brown (Section Engineer)  
 D N Houseago (Lead Technician) .....



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P&T Project No.  
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Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 112	<b>Depth</b>	4 m
<b>Date sampled</b>		<b>Date received</b>	01-Oct-07
<b>Sample type</b>	B	<b>Sample Mass</b>	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Bulk Disturbed		
<b>Description</b>	Orangey brown fine and medium SAND.		

**Supplier** \_\_\_\_\_ **Source** \_\_\_\_\_  
**Conveyance note No.** \_\_\_\_\_

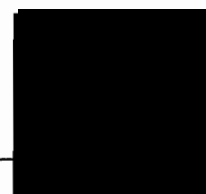
<b>LOCATION</b>	<b>TEST SPECIMEN</b>				
<b>ORIENTATION</b>	NOT APPLICABLE				
<b>METHOD OF DIVISION</b>	<b>PREPARATION DETAILS</b>				
<b>PREPARATION METHOD</b>	QUARTERING				
	7.2.4.4 Rammer Compaction with specified effort				
<b>RETAINED 37.5mm</b>	%	0	<b>CBR VALUE TOP</b>	%	<b>31</b>
<b>RETAINED 20mm</b>	%	0	<b>CBR VALUE BOTTOM</b>	%	<b>81</b>
<b>NO OF LAYERS</b>		3	<b>AVERAGE CBR VALUE</b>	%	<b>56</b>
<b>BLOWS PER LAYER</b>		62 Blows	<b>MOISTURE CONT. TOP</b>	%	<b>18</b>
<b>METHOD</b>		2.5kg	<b>MOISTURE CONT. BOT</b>	%	<b>13</b>
<b>CONDITION</b>		UNSOAKED	<b>MOISTURE CONT. METHOD</b>	Oven dried @ 105 -110°C	
<b>BULK DENSITY</b>	Mg/m <sup>3</sup>	2.106			
<b>DRY DENSITY</b>	Mg/m <sup>3</sup>	1.824			
<b>INITIAL MOISTURE CONT.</b>	%	16			

REMARKS

Test Code = 642



David Houseago (Lead Technician)

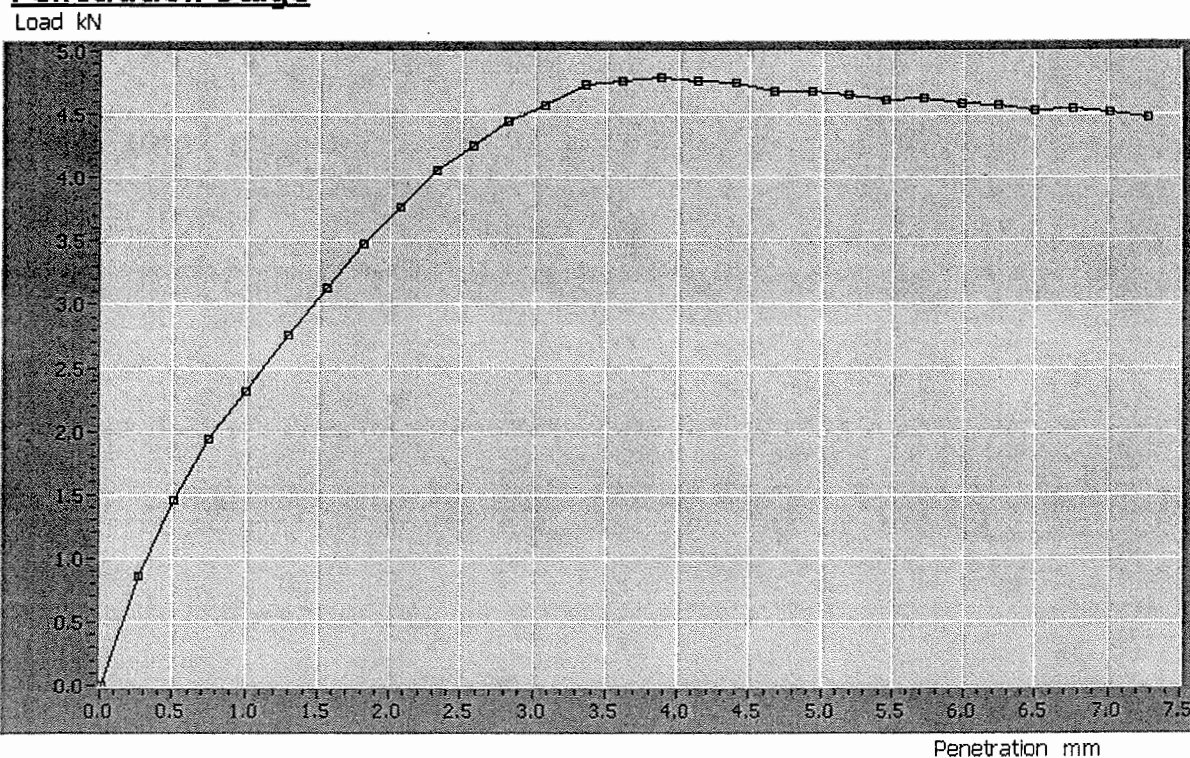




## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	BH112 - B5	<b>Sample</b>	0000100355

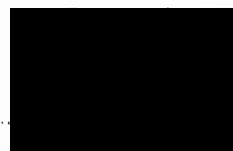
### Penetration Stage



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	4.19	4.67	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	31.75	23.37	%

Authorised signatory

- R J Noakes (Laboratory Manager)
- M L Burnstead (Section Engineer)
- D Brown (Section Engineer)
- D N Houseago (Lead Technician) .....

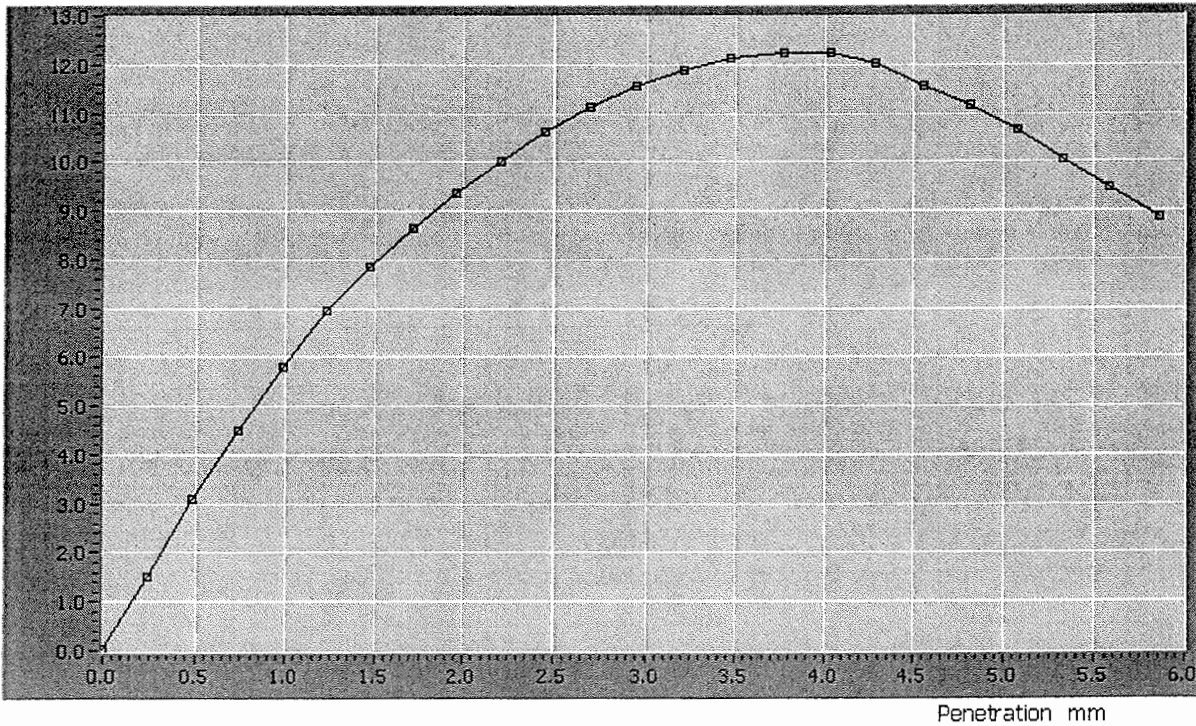


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	BH112 - B5	<b>Sample</b>	0000100355

### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	10.73	10.82	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	81.28	54.11	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 J D Brown (Section Engineer)  
 D N Houseago (Lead Technician) .....



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Your Sample Ref D11  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

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**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY  
INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

Scheme	Great Yarmouth Third River Crossing		
Location	BH 114	Depth	2.5 - m
Date sampled		Date received	21-Sep-07
Date tested	02-Oct-07		
Sample type	D	Sample Mass	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
Material	Small disturbed sample		
Description	Soft very sandy gravelly CLAY.		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

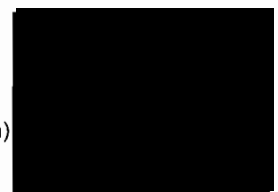
LOCATION	TEST SPECIMEN		
ORIENTATION	Not applicable		
	PREPARATION DETAILS		
METHOD OF DIVISION	Whole		
PREPARATION METHOD	Hand picking		
RETAINED 425µm (%)	47		
NATURAL MC (%)	16	OVEN DRIED @ 105°C	
LIQUID LIMIT (%)	27		
PLASTIC LIMIT (%)	15		
PLASTICITY INDEX (%)	12		
MODIFIED PI *(%)	7	*BRE Digest 240 : 1993	
SOIL CLASSIFICATION	CL		

REMARKS

Test Code = 604



David Houseago (Lead Technician)



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Our Report and sample No 100350  
Your Sample Ref B12  
Your Project or Order No  
P&T Project No.  
Date Report Issued 10-Oct-07

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

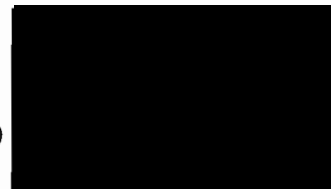
<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 114	<b>Depth</b>	2.6 m
<b>Date sampled</b>		<b>Date received</b>	21-Sep-07
<b>Date tested</b>	05-Oct-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Brown and dark grey silty fine and medium SAND with some fine, medium and coarse flint gravel. Some organ		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
	Not applicable
	PREPARATION DETAILS
<b>METHOD OF DIVISION</b>	Ridffled
<b>PREPARATION METHOD</b>	Oven dried @ 105 -110°C
<b>PASSING 2mm BS TEST SIEVE (%)</b>	47
<b>ORGANIC MATTER (%)</b>	1

Test Code:620



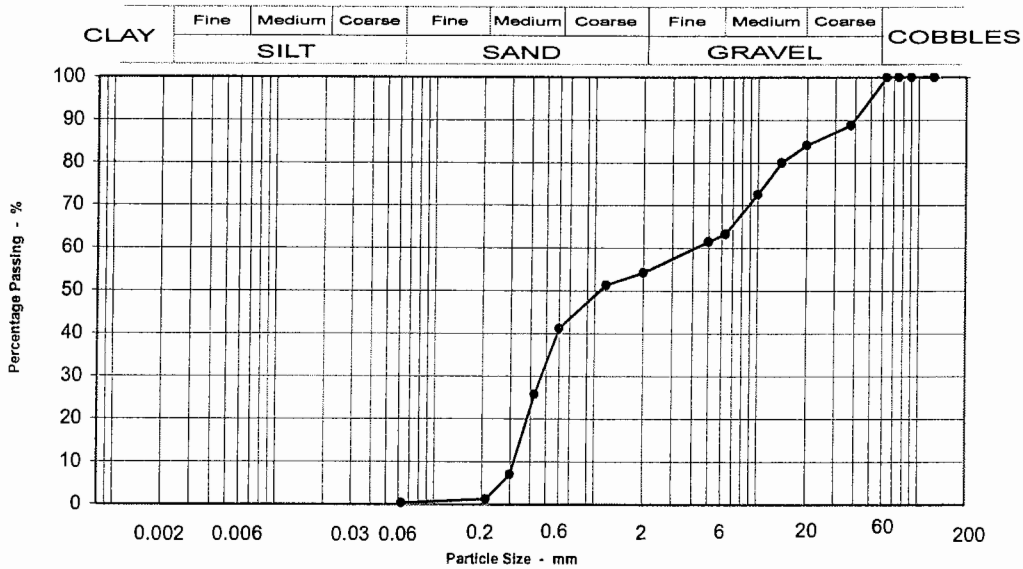
David Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: Great Yarmouth Third River Crossing

Location: BH 114 3 - m



Seiving		Specification for Highway Works Classification	
Particle Size mm	% Passing		
125	100	1A	Suitable
90	100		
75	100		
63	100		
37.5	89		
20	84		
14	80	6A	Suitable
10	73		
6.3	63		
5	61		
2	54	6E/6R	Suitable
1.18	51	6F1	Suitable
0.600	41		
0.425	26		
0.300	7	6I	Suitable
0.212	1		
0.063	0		
		6M	Suitable
		6N/6P	Suitable
		Moisture content %	7

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	16
Medium GRAVEL	21
Fine GRAVEL	13
Coarse SAND	9
Medium SAND	40
Fine SAND	1
Silt & Clay	0

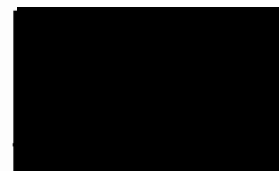
Grading Analysis	
D100	38
D60	4.42
D10	0.320
Uniformity Coefficient	14

Description	
Orangey brown medium and coarse SAND and fine, medium and coarse flint and quartz GRAVEL	

Test Code = 610



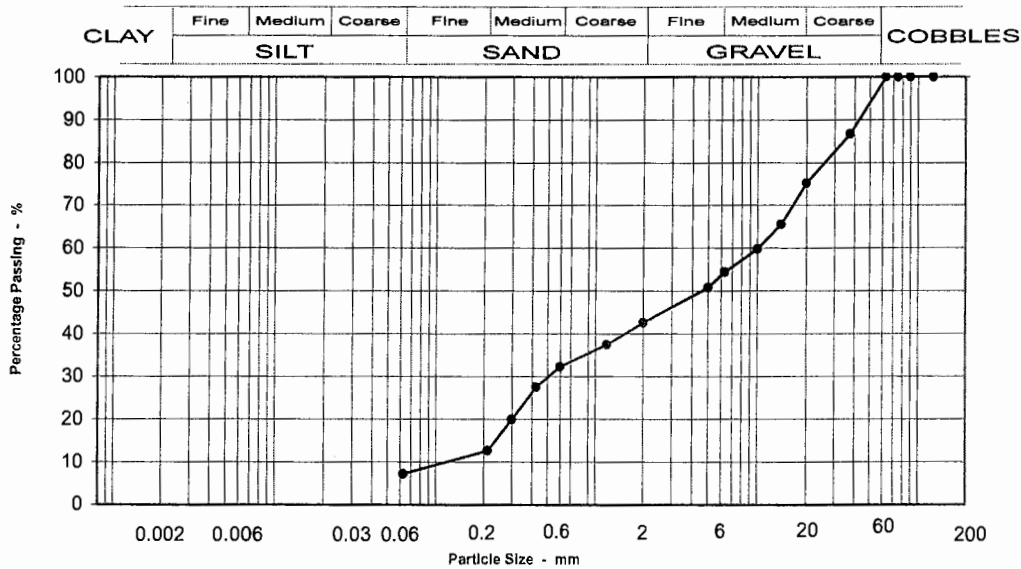
D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 114 3.8 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	1A Suitable
90	100	
75	100	
63	100	
37.5	87	
20	75	
14	66	
10	60	
6.3	54	
5	51	
2	43	6E/6R Suitable
1.18	37	6F1 Suitable
0.600	32	
0.425	27	
0.300	20	6I Suitable
0.212	13	
0.063	7	6M Suitable
		6N/6P Suitable
		Moisture content % 4

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	25
Medium GRAVEL	21
Fine GRAVEL	12
Coarse SAND	10
Medium SAND	20
Fine SAND	5
Silt & Clay	7

Grading Analysis	
D100	38
D60	10.21
D10	0.140
Uniformity Coefficient	73

Description	
Dark grey SAND and GRAVEL. Gravel is fine, medium and coarse. Sand is medium and coarse.	

Test Code = 610



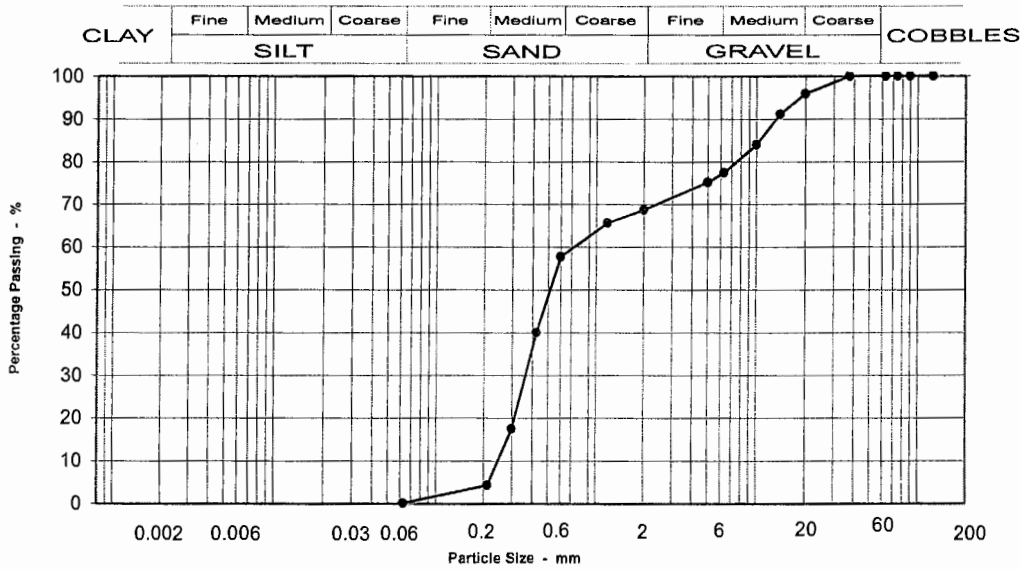
D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: Great Yarmouth Third River Crossing

Location: BH 115 4 - m



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	96
14	91
10	84
6.3	77
5	75
2	69
1.18	66
0.600	58
0.425	40
0.300	18
0.212	4
0.063	0

Specification for Highway Works Classification

1B Suitable

6E/6R Suitable

6M Suitable

Moisture content % 10

Sample Proportions

BOULDERS	0
COBBLES	0
Coarse GRAVEL	4
Medium GRAVEL	19
Fine GRAVEL	11
Coarse SAND	9
Medium SAND	53
Fine SAND	4
Silt & Clay	0

Grading Analysis

D100	20
D60	0.77
D10	0.250
Uniformity Coefficient	3

Description

Light brown and grey slightly gravelly medium and coarse SAND. Gravel is sub-angular to sub-rounded medium and coarse flint.

Test Code = 610



D N Houseago (Lead Technician)



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 Our Report and sample No 100361  
 Your Sample Ref B16  
 Your Project or Order No  
 P&T Project No.  
 Date Report Issued 25-Oct-07

FAO I Brown

Page 1 of 3

## DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 115	<b>Depth</b>	6 m
<b>Date sampled</b>		<b>Date received</b>	21-Sep-07
<b>Sample type</b>	B	<b>Sample Mass</b>	

Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.

<b>Material</b>	Bulk Disturbed
<b>Description</b>	Brown, light brown and grey slightly gravelly fine, medium and coarse SAND. Gravel is sub-angular to sub-rounded fine, medium and coarse flint

<b>Supplier</b>	<b>Source</b>	<b>Ex site</b>
Conveyance note No.		

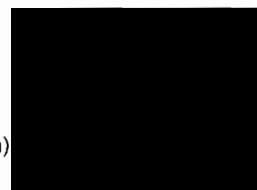
<b>LOCATION</b>	<b>TEST SPECIMEN</b>		
<b>ORIENTATION</b>	NOT APPLICABLE		
	NOT APPLICABLE		
	<b>PREPARATION DETAILS</b>		
<b>METHOD OF DIVISION</b>	QUARTERING		
<b>PREPARATION METHOD</b>	7.2.4.4 Rammer Compaction with specified effort		
<b>RETAINED 37.5mm</b>	%	12	
<b>RETAINED 20mm</b>	%	34	
<b>NO OF LAYERS</b>		3	<b>CBR VALUE TOP</b> % 71
<b>BLOWS PER LAYER</b>		N/A	<b>CBR VALUE BOTTOM</b> % 122
<b>METHOD</b>		Vib.Hammer	<b>AVERAGE CBR VALUE</b> % 96
<b>CONDITION</b>		UNSOAKED	
<b>BULK DENSITY</b>	Mg/m <sup>3</sup>	2.21	<b>MOISTURE CONT. TOP</b> % 7
<b>DRY DENSITY</b>	Mg/m <sup>3</sup>	2.05	<b>MOISTURE CONT. BOT</b> % 8
<b>INITIAL MOISTURE CONT.</b>	%	8	<b>MOISTURE CONT. METHOD</b> Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)

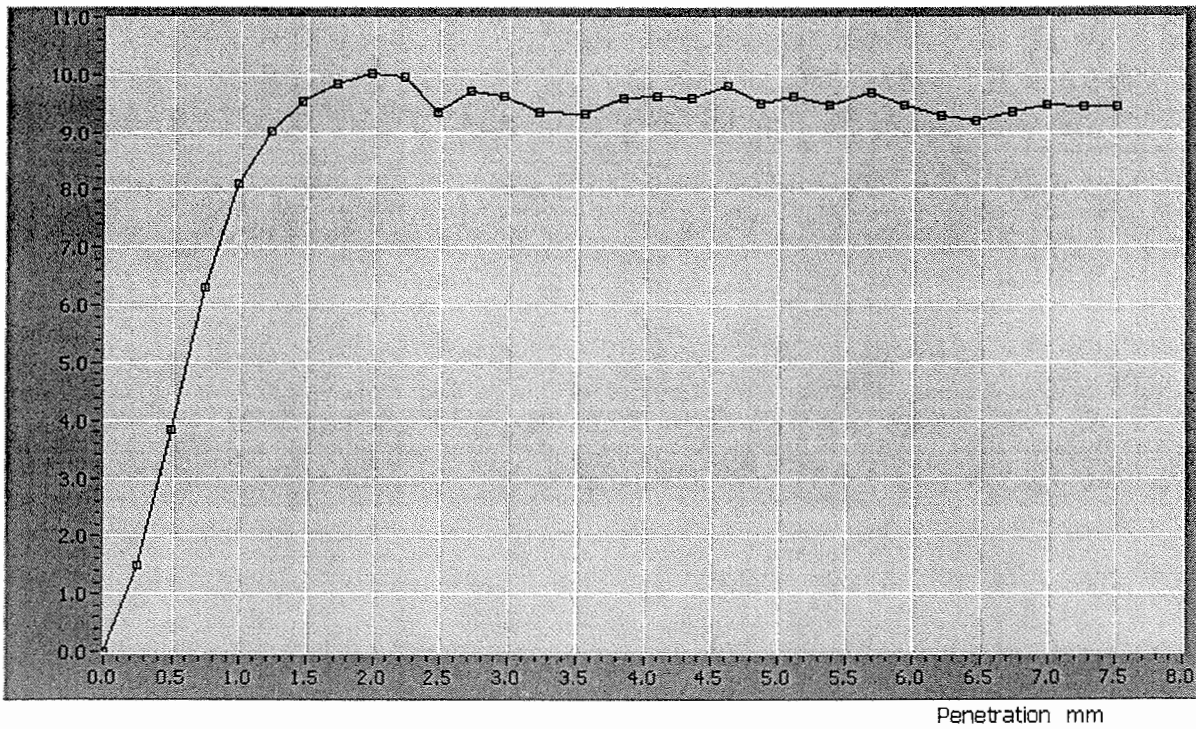


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	115 - B16	<b>Sample</b>	0000100361

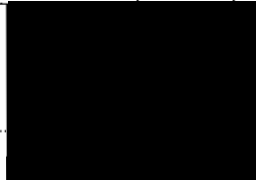
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	9.42	9.58	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	71.33	47.92	%

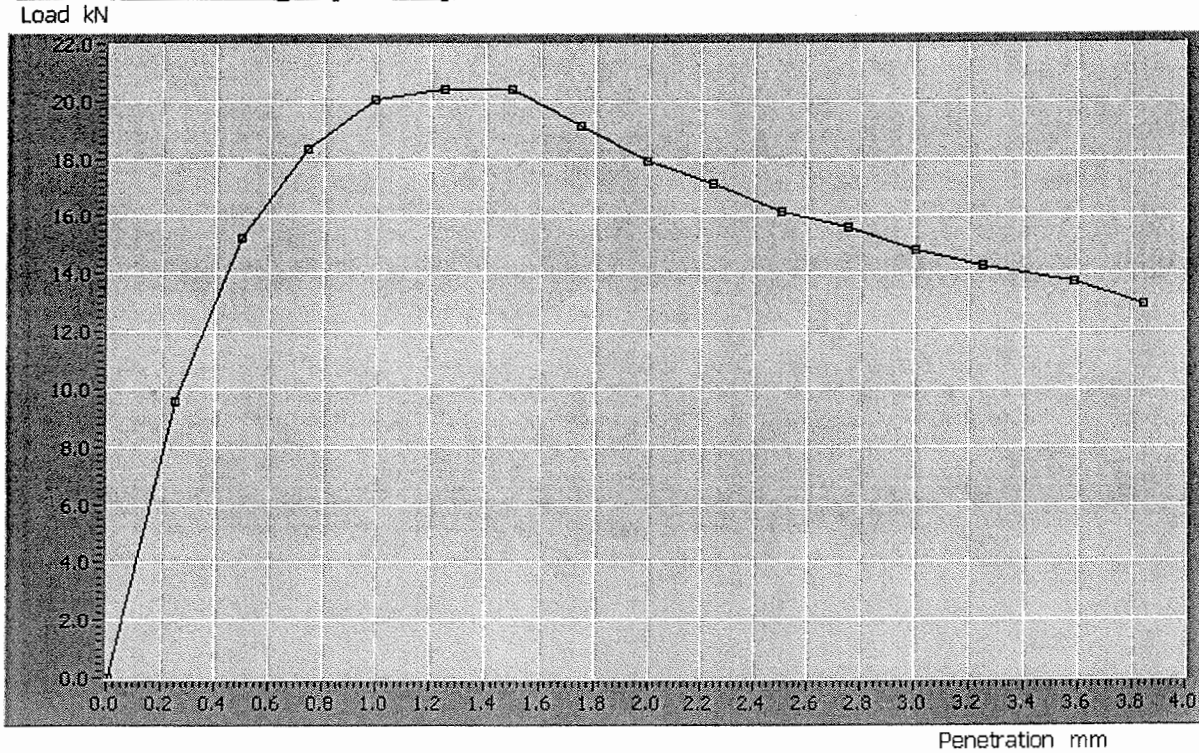
Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    I D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) .....



**Norfolk Partnership Laboratory  
California Bearing Ratio**

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	115 - B16	<b>Sample</b>	0000100361

**Penetration Stage (side 2)**



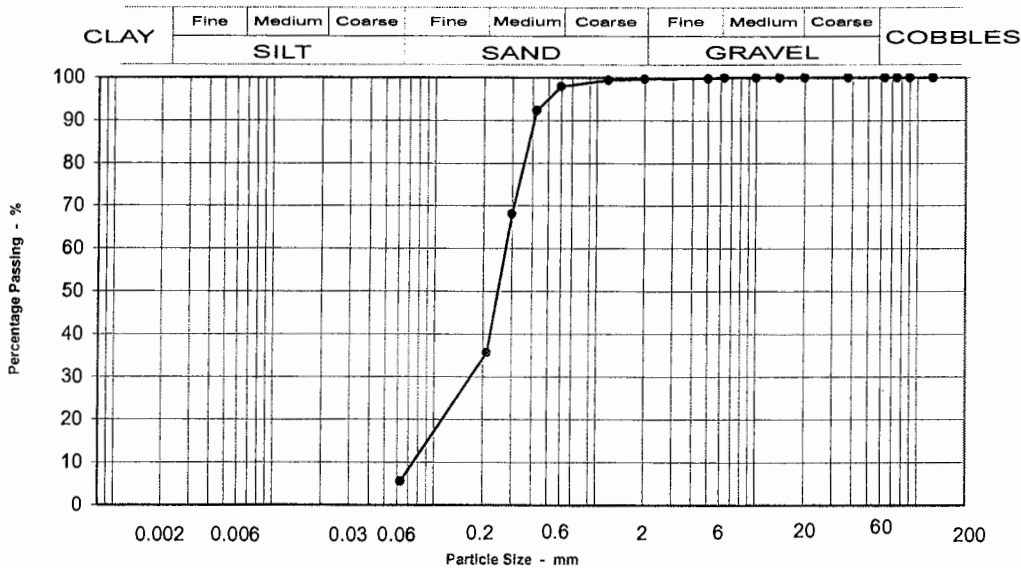
Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	16.13	12.91	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	122.22	64.55	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 J D Brown (Section Engineer)  
 D N Houseago (Lead Technician) ...



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 115 16.5 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	1B Suitable
75	100	
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	100	6E/6R Suitable
1.18	99	
0.600	98	
0.425	92	
0.300	68	
0.212	36	
0.063	6	6M Suitable
Moisture content %		26

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	0
Medium SAND	62
Fine SAND	30
Silt & Clay	6

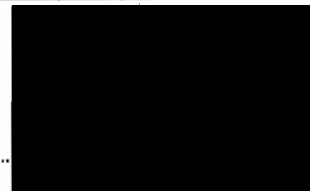
Grading Analysis	
D100	5
D60	0.28
D10	0.085
Uniformity Coefficient	3

Description	
Reddish orangey brown, slightly silty, slightly clayey fine and medium SAND	

Test Code = 610

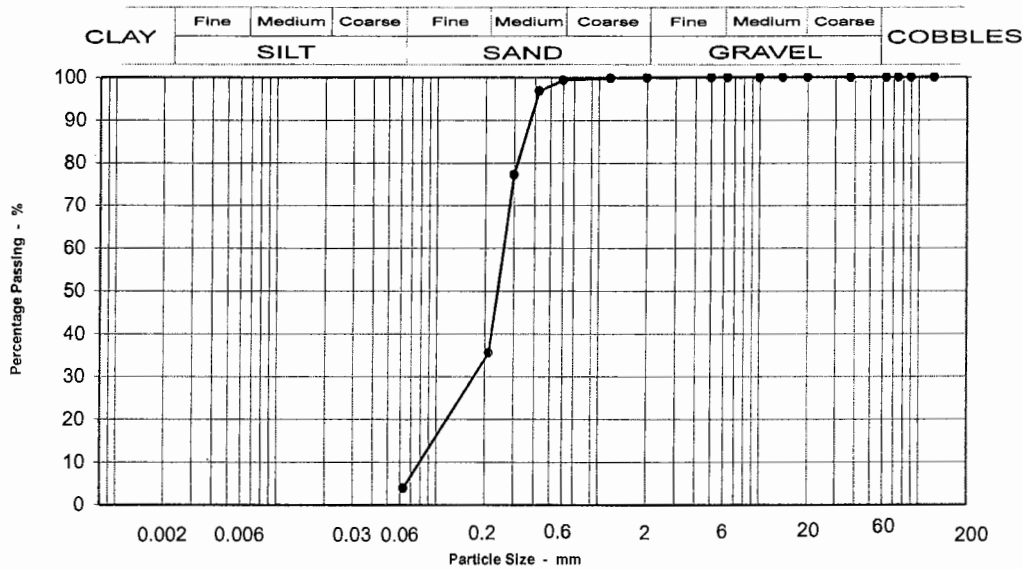


D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 115 21.5 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	
75	100	1B Suitable
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	100	6E/6R Suitable
1.18	100	
0.600	99	
0.425	97	
0.300	77	
0.212	36	
0.063	4	6M Suitable
Moisture content %		21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	0
Medium SAND	64
Fine SAND	32
Silt & Clay	4

Grading Analysis	
D100	2
D60	0.26
D10	0.092
Uniformity Coefficient	3

Description	
Reddish orangey brown, slightly silty, slightly clayey fine and medium SAND	

Test Code = 610



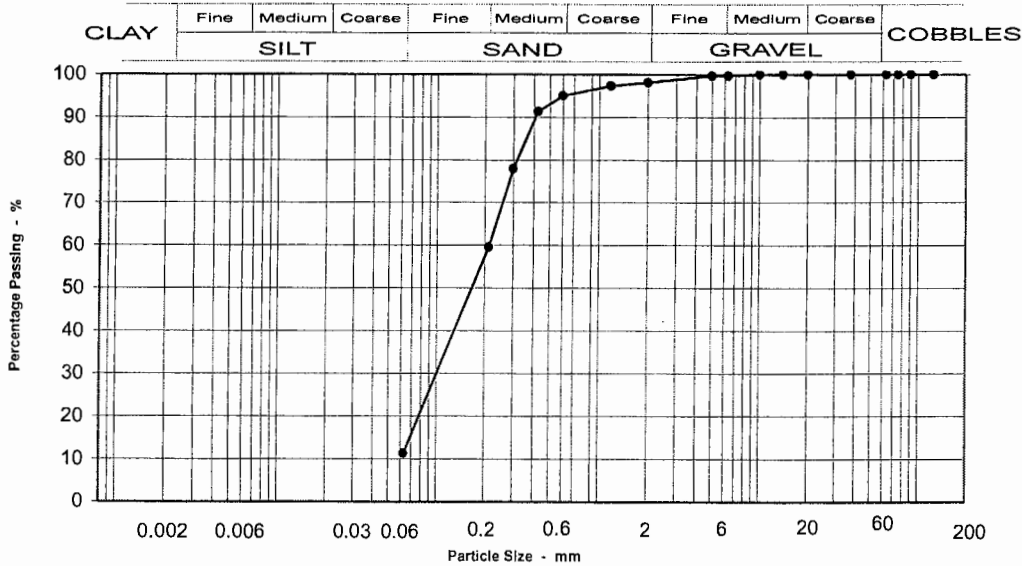
D N Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH116 24.5 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
1.18	97
0.600	95
0.425	91
0.300	78
0.212	60
0.063	11

**Specification for Highway Works Classification**

1B Suitable

6E/6R Suitable

Moisture content % 25

**Sample Proportions**

BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	3
Coarse SAND	2
Medium SAND	36
Fine SAND	48
Silt & Clay	11

**Grading Analysis**

D100	6
D60	0.21
D10	0.036
Uniformity Coefficient	6

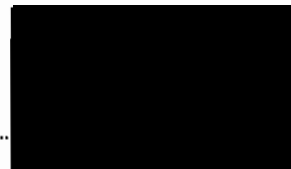
**Description**

Grey slightly silty clayey fine and medium SAND.

Test Code = 610

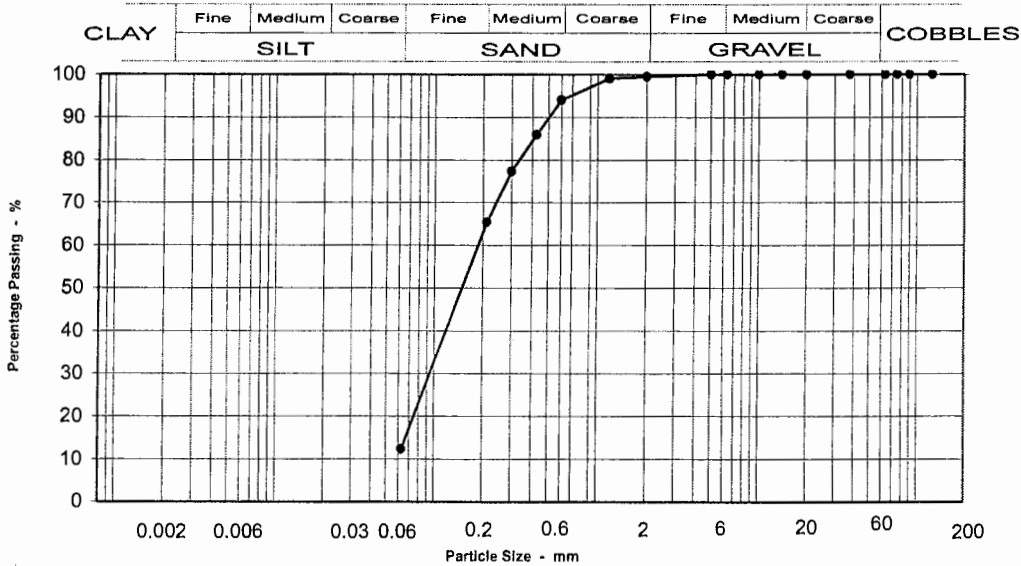


D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH116 27.5 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	1B Suitable
75	100	
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	100	6E/6R Suitable
1.18	99	
0.600	94	
0.425	86	
0.300	77	
0.212	65	
0.063	12	

Moisture content % 24

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	6
Coarse SAND	1
Medium SAND	29
Fine SAND	53
Silt & Clay	12

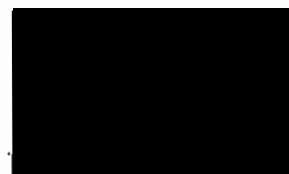
Grading Analysis	
D100	2
D60	0.20
D10	0.033
Uniformity Coefficient	6

Description	
Grey fine and medium SAND with laminae of soft grey silty clay. Some shell fragments	

Test Code = 610



D N Houseago (Lead Technician)

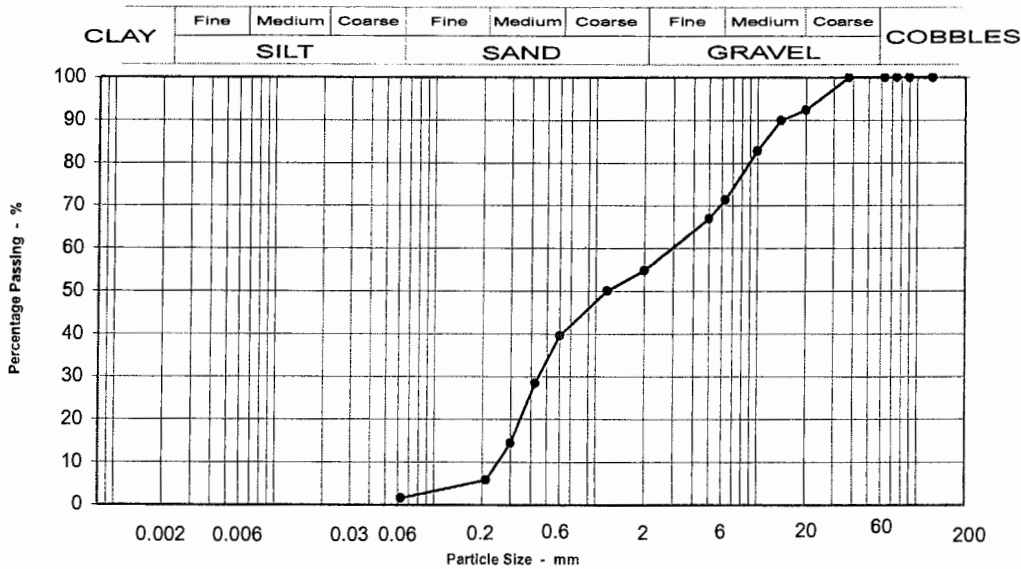




## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 117 3.1 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	1A Suitable
90	100	
75	100	
63	100	
37.5	100	
20	92	
14	90	6A Suitable
10	83	
6.3	71	
5	67	
2	55	6E/6R Suitable
1.18	50	6F1 Suitable
0.600	40	
0.425	28	
0.300	14	6I Suitable
0.212	6	
0.063	2	6M Suitable
		6N/6P Suitable
		Moisture content % 8

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	8
Medium GRAVEL	21
Fine GRAVEL	15
Coarse SAND	17
Medium SAND	34
Fine SAND	4
Silt & Clay	2

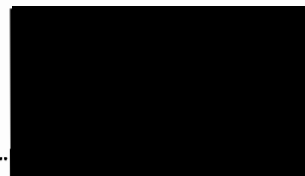
Grading Analysis	
D100	20
D60	3.29
D10	0.255
Uniformity Coefficient	13

Description
Dark grey fine, medium and coarse SAND and angular to sub-rounded fine, medium and coarse flint gravel

Test Code = 610



D N Houseago (Lead Technician)

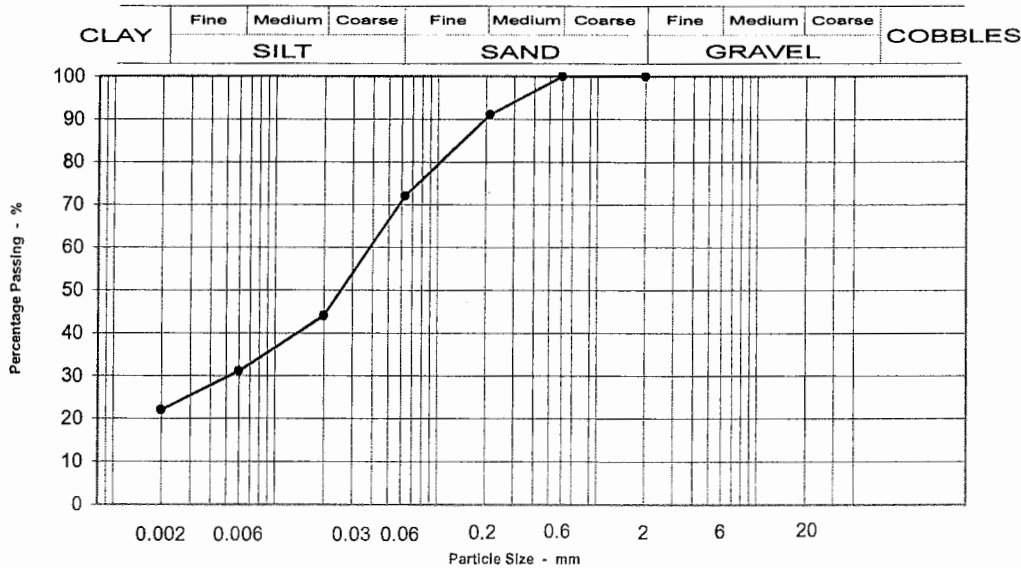


Planning & Transportation  
County Hall  
Martineau Lane  
Norwich  
NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 100317  
Your Sample Ref D16  
Your Project or Order No  
P&T Project No.  
Date Report Issued 12 October 2007

**Particle Size Distribution to BS 1377 : Part2 : 1990**  
**Sedimentation Method Section 9.4**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 117 4 - m**



Seiving	
Particle Size	% Passing
mm	
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
0.6	100
0.212	91
0.063	72
0.02	44
0.006	31
0.002	22

Moisture content % 42

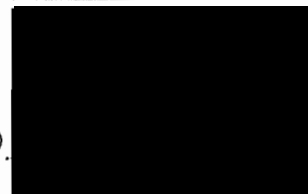
Sample Proportions	
GRAVEL	0
Coarse SAND	0
Medium SAND	9
Fine SAND	19
Coarse SILT	13
FINE SILT	9
CLAY	22

Description
Very soft dark grey gravelly CLAY.

Test Code = 612



D N Houseago (Lead Technician)





Planning & Transportation  
County Hall  
Martineau Lane  
Norwich  
NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No 100318  
Your Sample Ref D16  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

## DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5

Scheme	Great Yarmouth Third River Crossing		
Location	BH 117	Depth	4 - m
Date sampled		Date received	21-Sep-07
Date tested	02-Oct-07		
Sample type	D	Sample Mass	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
Material	Small disturbed sample		
Description	Very soft dark grey gravelly CLAY.		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

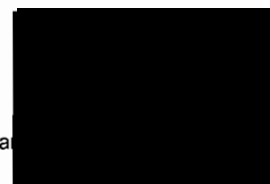
LOCATION	TEST SPECIMEN		
ORIENTATION	Not applicable		
	PREPARATION DETAILS		
METHOD OF DIVISION	Whole		
PREPARATION METHOD	Hand picking		
RETAINED 425µm (%)	28		
NATURAL MC (%)	39		OVEN DRIED @ 105°C
LIQUID LIMIT (%)	40		
PLASTIC LIMIT (%)	21		
PLASTICITY INDEX (%)	19		
MODIFIED PI *(%)	14		*BRE Digest 240 : 1993
SOIL CLASSIFICATION	C I		

### REMARKS

Test Code = 604



David Houseago (Lead Technician)



Planning & Transportation  
County Hall  
Martineau Lane  
Norwich  
NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No  
Your Sample Ref D16  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

**DETERMINATION OF MOISTURE CONTENT TO BS1377 : PART2 : 1990 : SECTION 3.2**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 117	<b>Depth</b>	4 - m
<b>Date sampled</b>		<b>Date received</b>	29-Sep-07
<b>Sample type</b>	D	<b>Sample Mass</b>	Unknown
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material Description</b>	Small disturbed sample Very soft dark grey gravelly CLAY.		
<b>Supplier</b>		<b>Source</b>	
<b>Conveyance note No.</b>			

**LOCATION** TEST SPECIMEN  
Not applicable  
**ORIENTATION** Not applicable  
**METHOD OF DIVISION** PREPARATION DETAILS  
Riffled  
**PREPARATION METHOD** Oven dried @ 105 -110°C

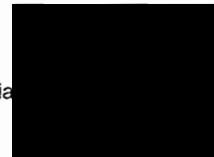
**NATURAL MC (%)** 42

**REMARKS**

Test Code = 602



K Lawes (Lead Technician)



Planning & Transportation  
County Hall  
Martineau Lane  
Norwich  
NR1 2SG  
FAO I Brown

Our Project No PTPZ0008  
Our Report and sample No 100307  
Your Sample Ref B17  
Your Project or Order No  
P&T Project No.  
Date Report Issued 10-Oct-07

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

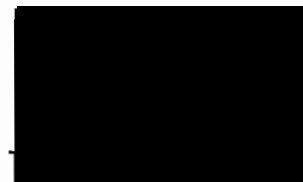
<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	BH 117	<b>Depth</b>	4 m
<b>Date sampled</b>		<b>Date received</b>	21-Sep-07
<b>Date tested</b>	05-Oct-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Dark grey organic SILT		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
	Not applicable
	PREPARATION DETAILS
<b>METHOD OF DIVISION</b>	Ridffled
<b>PREPARATION METHOD</b>	Oven dried @ 105 -110°C
<b>PASSING 2mm BS TEST SIEVE (%)</b>	95
<b>ORGANIC MATTER (%)</b>	2

Test Code:620



David Houseago (Lead Technician)







working with



Norfolk Partnership Laboratory  
County Hall, Martineau Lane  
NORWICH, Norfolk NR1 2SG  
Tel: 01603 222416  
Fax: 01603 222457

Email: [civil.laboratory@norfolk.gov.uk](mailto:civil.laboratory@norfolk.gov.uk)

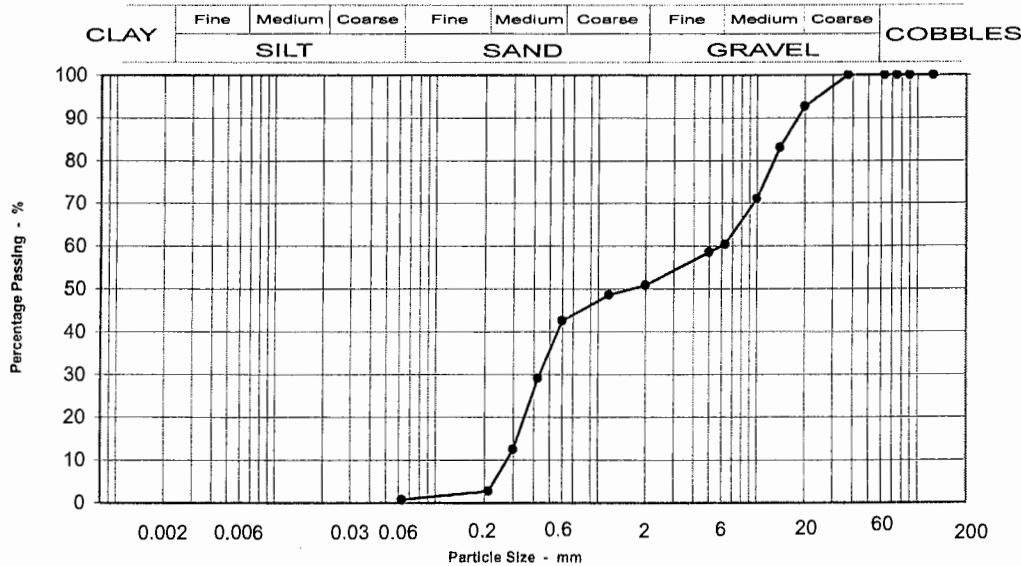
Planning & Transportation  
County Hall  
Martineau Lane  
Norwich  
NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 100293  
Your Sample Ref B22  
Your Project or Order No  
P&T Project No.  
Date Report Issued 08 October 2007

## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: Great Yarmouth Third River Crossing

Location: BH 117 7.5 - m



Seiving		Specification for Highway Works Classification	
Particle Size mm	% Passing		
125	100	1A	Suitable
90	100		
75	100		
63	100		
37.5	100		
20	93		
14	83	6A	Suitable
10	71		
6.3	60		
5	59		
2	51	6E/6R	Suitable
1.18	49	6F1	Suitable
0.600	43		
0.425	29		
0.300	13	6I	Suitable
0.212	3		
0.063	1		
		6M	Suitable
		6N/6P	Suitable
		Moisture content %	8

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	7
Medium GRAVEL	32
Fine GRAVEL	8
Coarse SAND	10
Medium SAND	40
Fine SAND	2
Silt & Clay	1

Grading Analysis	
D100	20
D60	6.03
D10	0.278
Uniformity Coefficient	22

Description	
Brownish grey sub-angular to rounded fine and medium flint gravel and fine, medium and coarse SAND	

Test Code = 610

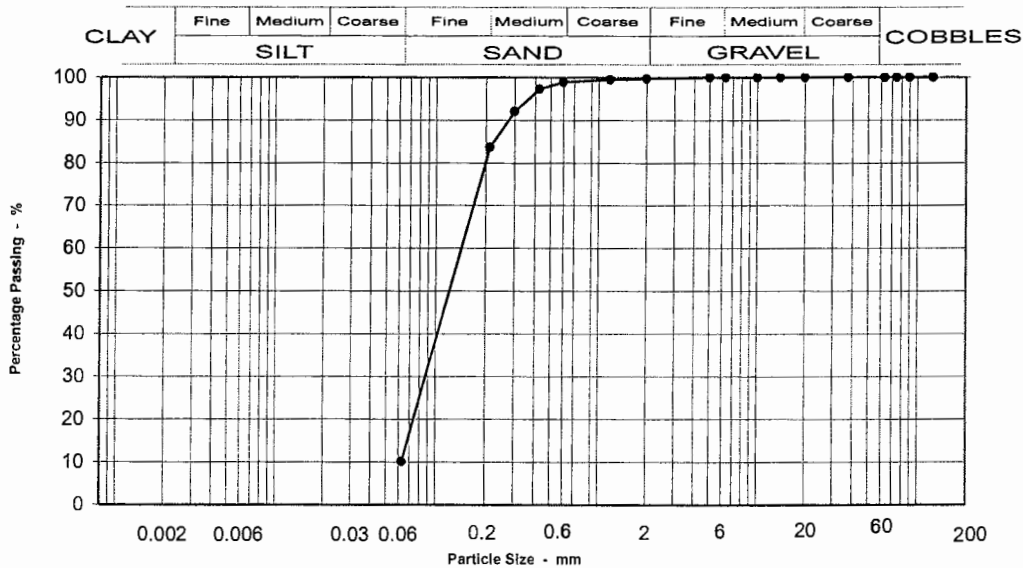


D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **BH 117 16.5 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	100
0.600	99
0.425	97
0.300	92
0.212	84
0.063	10

Specification for Highway Works Classification	
1B	Suitable
6E/6R	Suitable

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	0
Medium SAND	15
Fine SAND	74
Silt & Clay	10

Grading Analysis	
D100	2
D60	0.16
D10	0.026
Uniformity Coefficient	6

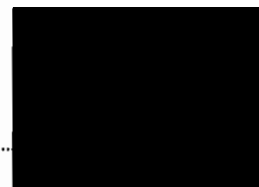
Description	
Orangey brown slightly clayey medium and coarse SAND.	

Moisture content % 26

Test Code = 610



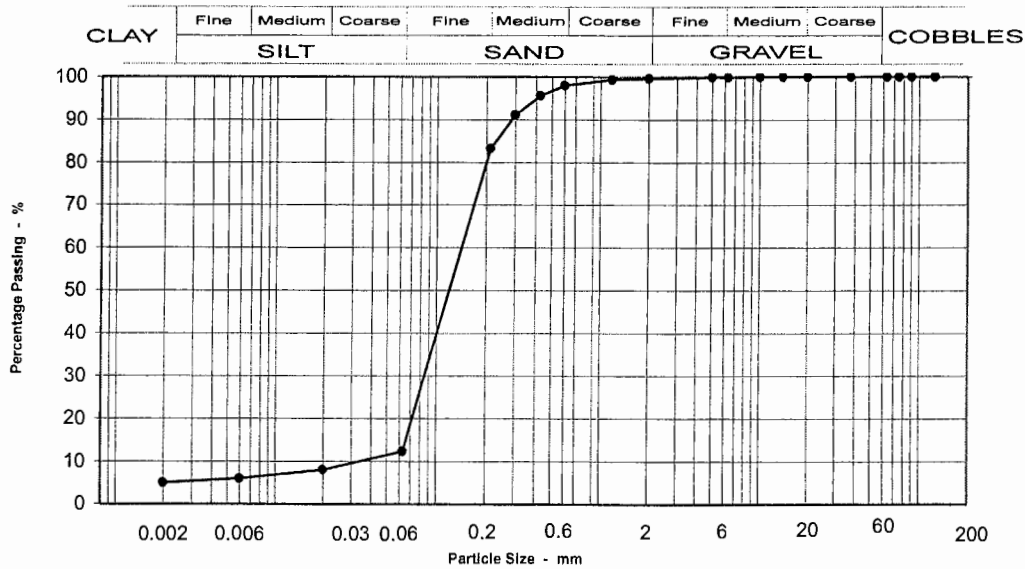
D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing**

Location: **BH 117 23 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	
75	100	1B Suitable
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	100	6E/6R Suitable
1.18	99	
0.600	98	
0.425	96	
0.300	91	
0.212	83	
0.063	12	
0.020	8	
0.060	6	
0.002	5	Moisture content % 25

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	0
Medium SAND	15
Fine SAND	71
Silt & Clay	12

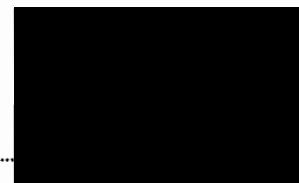
Grading Analysis	
D100	6
D60	0.16
D10	0.066
Uniformity Coefficient	2

Description	
Brown and grey fine SAND	

Test Code = 610



D N Houseago (Lead Technician)



Planning & Transportation  
 County Hall  
 Martineau Lane  
 Norwich  
 NR1 2SG

Our Project No PTPZ0008  
 Our Report and sample No 99852  
 Your Sample Ref D2  
 Your Project or Order No  
 P&T Project No.  
 Date Report Issued 16-Oct-07

FAO I Brown

Page 1 of 3

## DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	WS103	<b>Depth</b>	0.5 m
<b>Date sampled</b>		<b>Date received</b>	06-Sep-07
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Greyish brown fine and medium SAND with a little coarse rounded gravel		

**Supplier** \_\_\_\_\_ **Source** \_\_\_\_\_  
**Conveyance note No.** \_\_\_\_\_

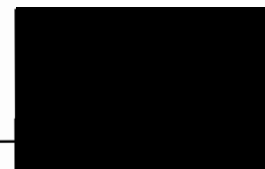
LOCATION		TEST SPECIMEN	
ORIENTATION		NOT APPLICABLE	
METHOD OF DIVISION		QUARTERING	
PREPARATION METHOD		7.2.4.4 Rammer Compaction with specified effort	
RETAINED 37.5mm	%	0	
RETAINED 20mm	%	3	
NO OF LAYERS		3	<b>CBR VALUE TOP</b> % <b>45</b>
BLOWS PER LAYER		62 Blows	<b>CBR VALUE BOTTOM</b> % <b>41</b>
METHOD		2.5kg	<b>AVERAGE CBR VALUE</b> % <b>43</b>
CONDITION		UNSOAKED	
BULK DENSITY	Mg/m <sup>3</sup>	1.344	<b>MOISTURE CONT. TOP</b> % <b>4</b>
DRY DENSITY	Mg/m <sup>3</sup>	1.286	<b>MOISTURE CONT. BOT</b> % <b>5</b>
INITIAL MOISTURE CONT.	%	5	<b>MOISTURE CONT. METHOD</b> Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)

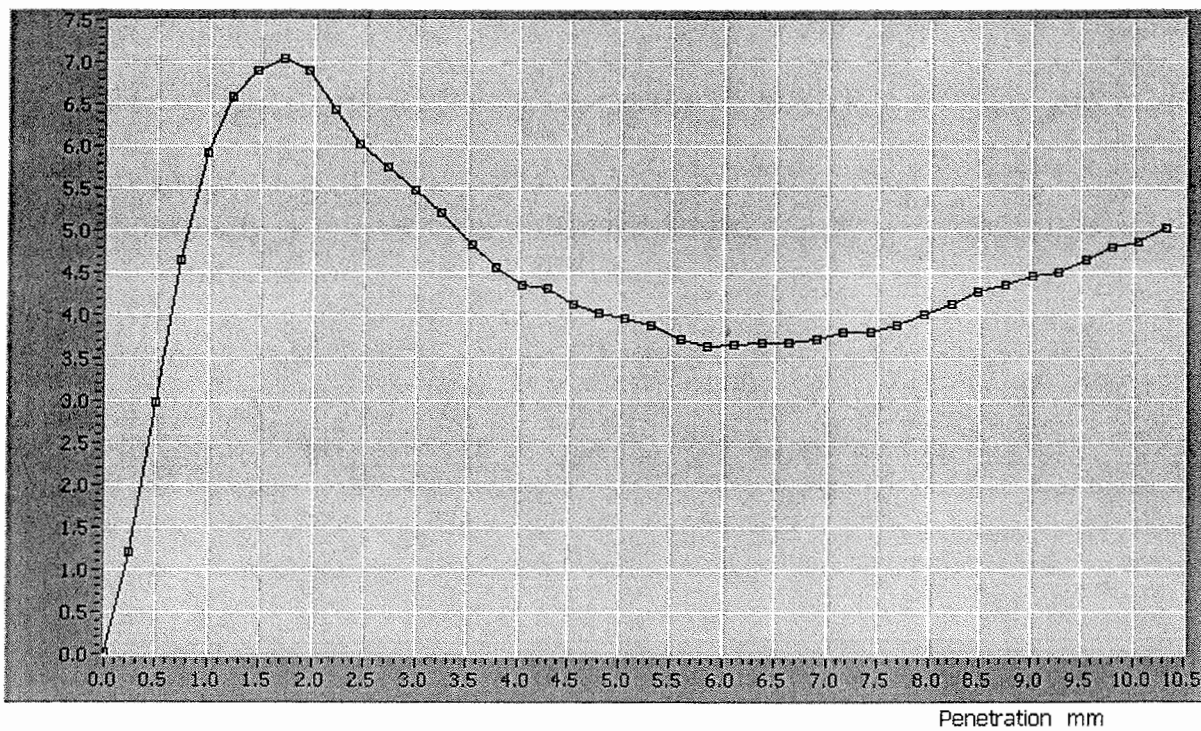


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTKZ0008
<b>Borehole</b>	WS 103 -D2	<b>Sample</b>	0000099852

### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	5.97	3.99	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	45.23	19.94	%

Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    I D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) .....

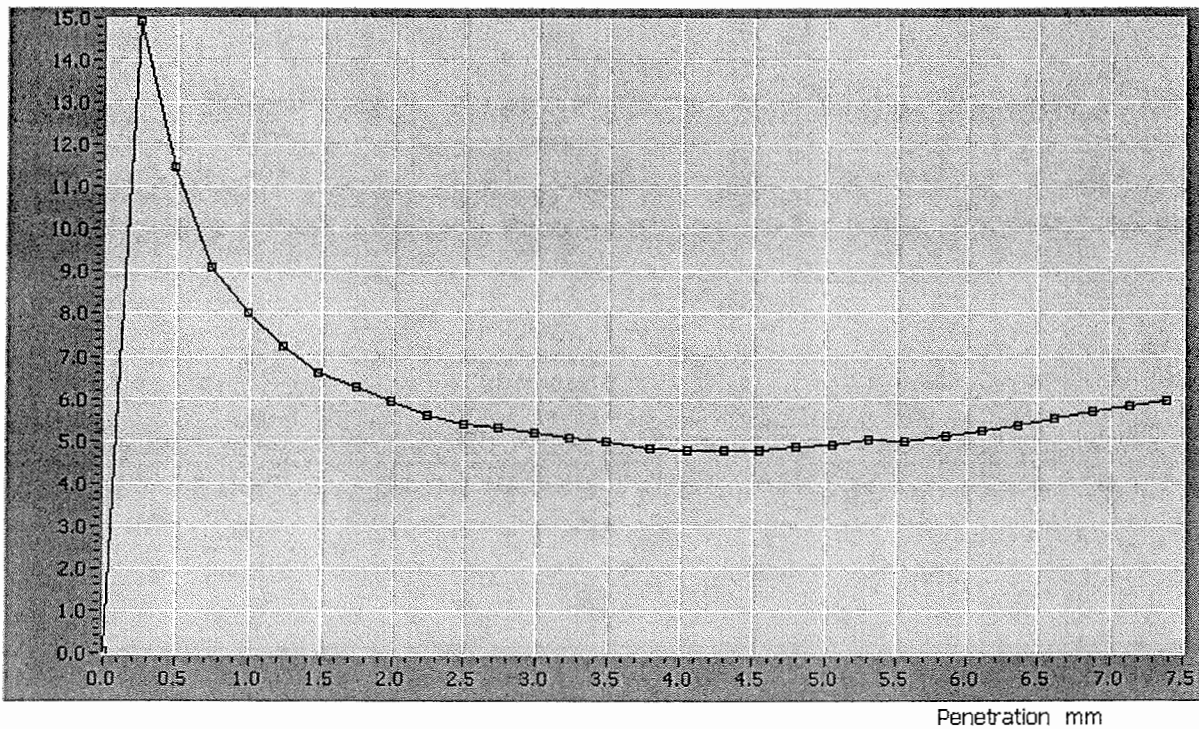


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 103 -D2	<b>Sample</b>	0000099852

### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	5.41	4.90	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	40.96	24.50	%

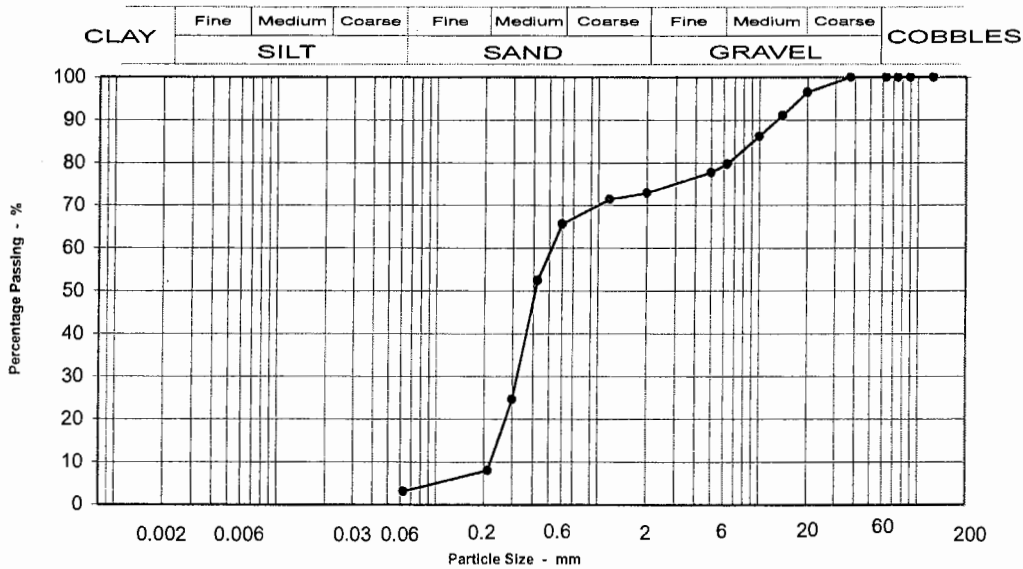
Authorised signatory

- R J Noakes (Laboratory Manager)
- M L Bumstead (Section Engineer)
- J D Brown (Section Engineer)
- D N Houseago (Lead Technician) .....



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing** Location: **WS103 1.2 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	97
14	91
10	86
6.3	80
5	78
2	73
1.18	71
0.600	66
0.425	52
0.300	25
0.212	8
0.063	3

### Specification for Highway Works Classification

1B Suitable

6E/6R Suitable

6M Suitable

Moisture content % 13

### Sample Proportions

BOULDERS	0
COBBLES	0
Coarse GRAVEL	4
Medium GRAVEL	17
Fine GRAVEL	7
Coarse SAND	7
Medium SAND	58
Fine SAND	5
Silt & Clay	3

### Grading Analysis

D100	20
D60	0.53
D10	0.223
Uniformity Coefficient	2

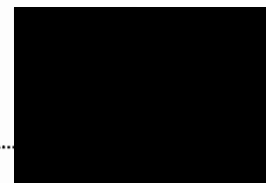
### Description

Light brown fine and medium SAND

Test Code = 610



D N Houseago (Lead Technician)



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FAO I Brown

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**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

Scheme	Great Yarmouth Third River Crossing		
Location	WS104	Depth	0.75 m
Date sampled		Date received	11-Sep-07
Sample type	B	Sample Mass	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
Material	Bulk Disturbed		
Description	Light brown fine and medium SAND		

Supplier Source  
Conveyance note No.

<b>LOCATION</b>	<b>TEST SPECIMEN</b>		
<b>ORIENTATION</b>	NOT APPLICABLE		
	NOT APPLICABLE		
<b>METHOD OF DIVISION</b>	<b>PREPARATION DETAILS</b>		
<b>PREPARATION METHOD</b>	QUARTERING		
	7.2.4.4 Rammer Compaction with specified effort		
RETAINED 37.5mm	%	0	
RETAINED 20mm	%	0	
NO OF LAYERS		3	<b>CBR VALUE TOP</b> % 50
BLOWS PER LAYER		N/A	<b>CBR VALUE BOTTOM</b> % 32
METHOD		Vib.Hammer	<b>AVERAGE CBR VALUE</b> % 41
CONDITION		UNSOAKED	
BULK DENSITY	Mg/m <sup>3</sup>	1.816	<b>MOISTURE CONT. TOP</b> % 4
DRY DENSITY	Mg/m <sup>3</sup>	1.751	<b>MOISTURE CONT. BOT</b> % 3
INITIAL MOISTURE CONT.	%	4	<b>MOISTURE CONT. METHOD</b> Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)



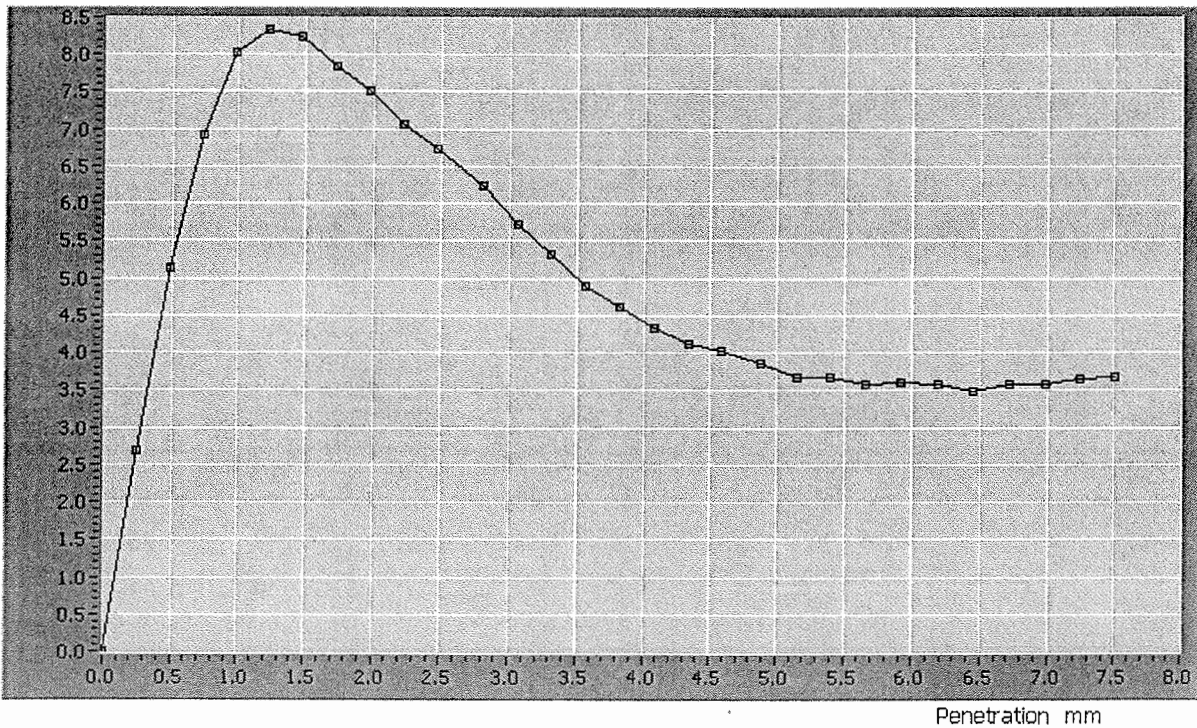


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPKZ0008
<b>Borehole</b>	Ws 104 - B1	<b>Sample</b>	0000099851

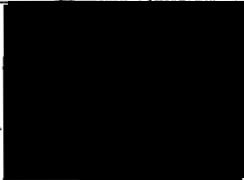
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	6.68	3.78	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	50.61	18.92	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 J D Brown (Section Engineer)  
 D N Houseago (Lead Technician) ...

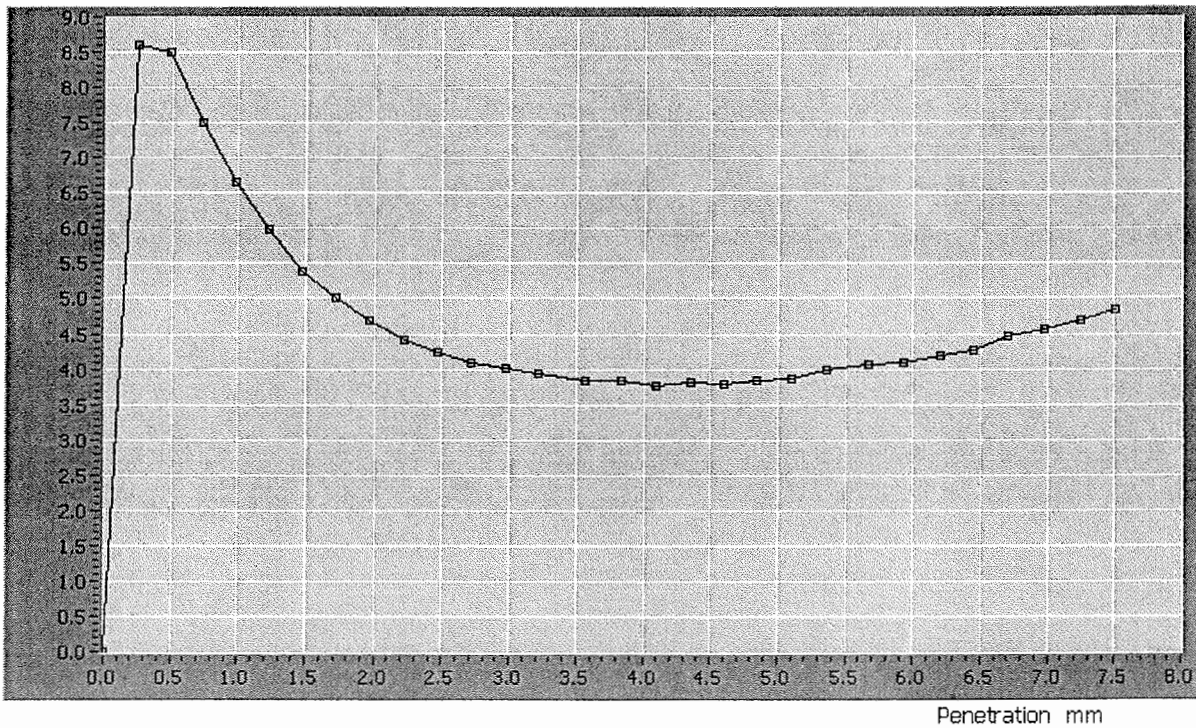


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPKZ0008
<b>Borehole</b>	Ws 104 - B1	<b>Sample</b>	0000099851

### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	4.22	3.85	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	31.95	19.25	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 I D Brown (Section Engineer)  
 D N Houseago (Lead Technician)



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Page 1 of 3

## DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990

Scheme	Great Yarmouth Third River Crossing		
Location	WS105	Depth	0.9 m
Date sampled		Date received	06-Sep-07
Sample type	D	Sample Mass	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
Material	Small disturbed sample		
Description	Light brown fine and medium SAND with a little up to coarse gravel size rounded flint		

Supplier Source  
 Conveyance note No.

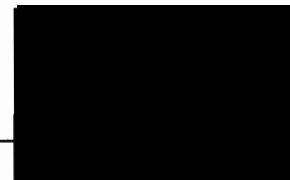
LOCATION	TEST SPECIMEN			
ORIENTATION	NOT APPLICABLE			
METHOD OF DIVISION	PREPARATION DETAILS			
PREPARATION METHOD	QUARTERING			
	7.2.4.4 Rammer Compaction with specified effort			
RETAINED 37.5mm	%	0	CBR VALUE TOP	% 51
RETAINED 20mm	%	0	CBR VALUE BOTTOM	% 23
NO OF LAYERS		3	AVERAGE CBR VALUE	% 37
BLOWS PER LAYER		62 Blows	MOISTURE CONT. TOP	% 3
METHOD		2.5kg	MOISTURE CONT. BOT	% 3
CONDITION		UNSOAKED	MOISTURE CONT. METHOD	Oven dried @ 105 -110°C
BULK DENSITY	Mg/m <sup>3</sup>	1.766		
DRY DENSITY	Mg/m <sup>3</sup>	1.716		
INITIAL MOISTURE CONT.	%	3		

REMARKS

Test Code = 642



David Houseago (Lead Technician)

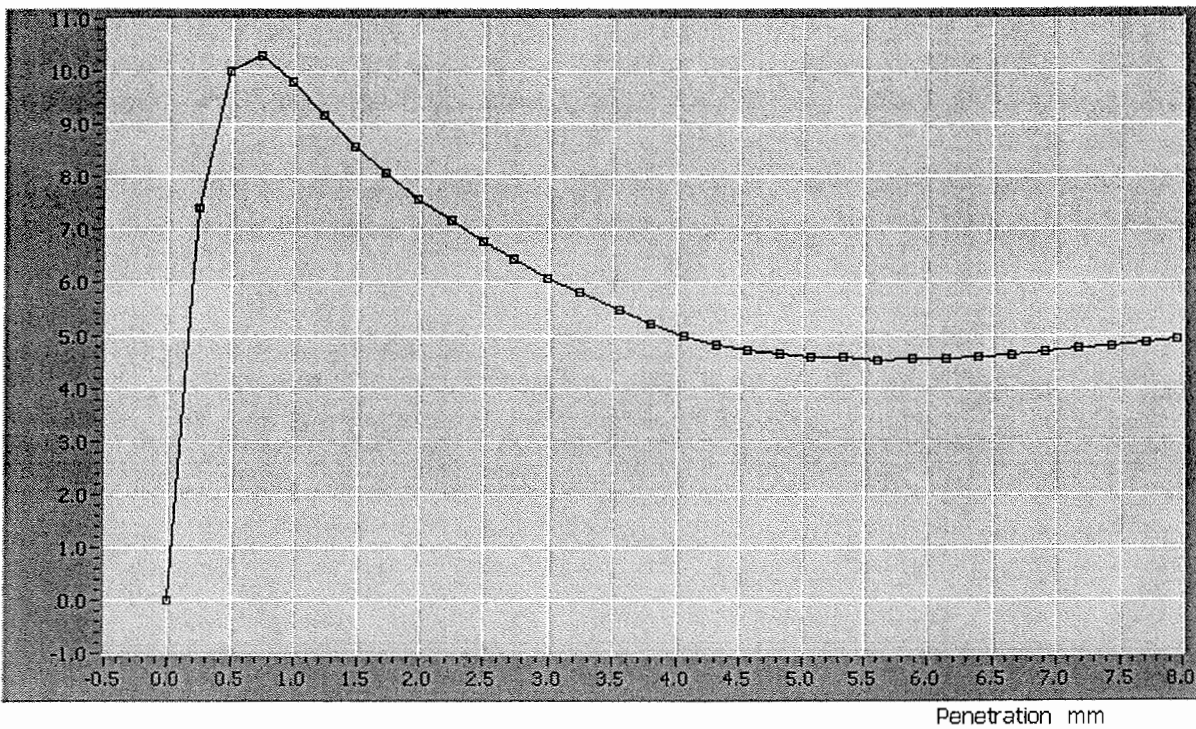


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 105 -D3	<b>Sample</b>	0000099853

### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	6.77	4.61	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	51.28	23.06	%

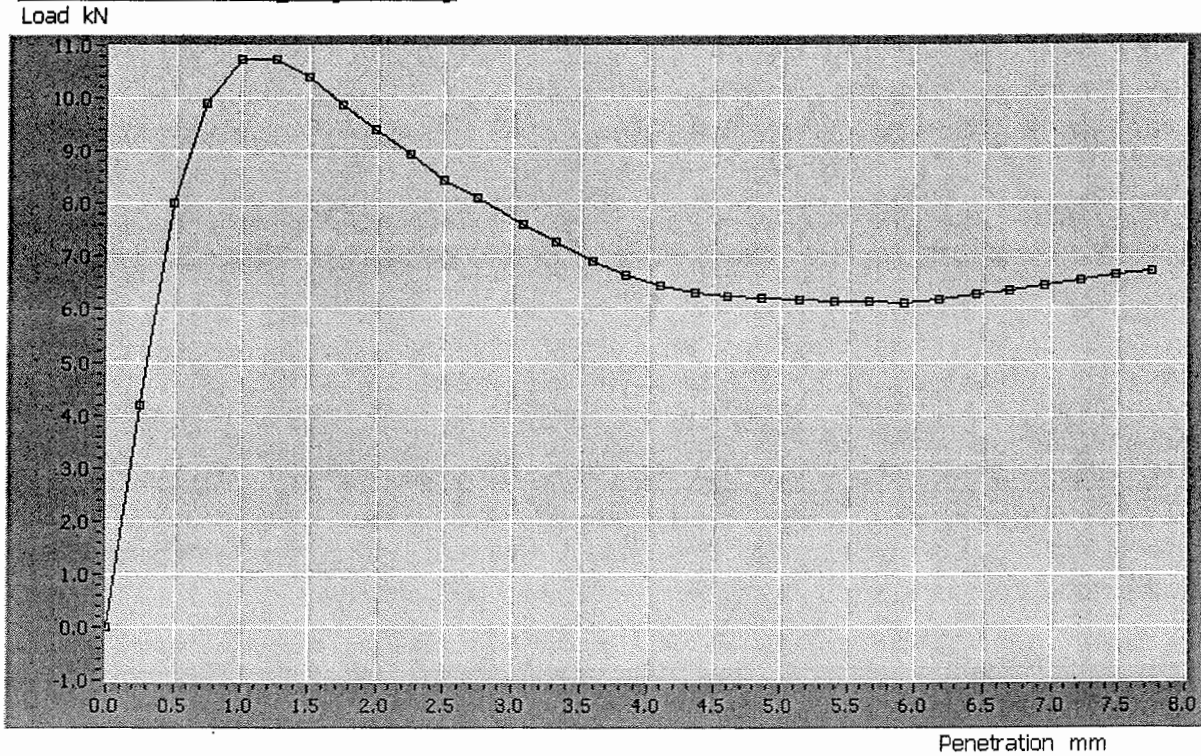
Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 D Brown (Section Engineer)  
 D N Houseago (Lead Technician)



## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 105 -D3	<b>Sample</b>	0000099853

### Penetration Stage (side 2)



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	8.43	6.18	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	63.88	30.91	%

Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    J D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician)





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Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	WS106	<b>Depth</b>	0.6 m
<b>Date sampled</b>		<b>Date received</b>	06-Sep-07
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Light brown fine and medium SAND with a little fine, medium and coarse flint gravel. Gravel rounded		

**Supplier** \_\_\_\_\_ **Source** \_\_\_\_\_  
**Conveyance note No.** \_\_\_\_\_

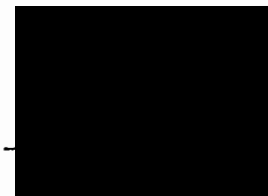
<b>LOCATION</b>	<b>TEST SPECIMEN</b>		
<b>ORIENTATION</b>	NOT APPLICABLE		
	NOT APPLICABLE		
	<b>PREPARATION DETAILS</b>		
<b>METHOD OF DIVISION</b>	QUARTERING		
<b>PREPARATION METHOD</b>	7.2.4.4 Rammer Compaction with specified effort		
<b>RETAINED 37.5mm</b>	%	0	
<b>RETAINED 20mm</b>	%	7	
<b>NO OF LAYERS</b>		3	<b>CBR VALUE TOP</b> % <b>71</b>
<b>BLOWS PER LAYER</b>		N/A	<b>CBR VALUE BOTTOM</b> % <b>65</b>
<b>METHOD</b>		Vib.Hammer	<b>AVERAGE CBR VALUE</b> % <b>68</b>
<b>CONDITION</b>		UNSOAKED	
<b>BULK DENSITY</b>	Mg/m <sup>3</sup>	1.795	<b>MOISTURE CONT. TOP</b> % <b>3</b>
<b>DRY DENSITY</b>	Mg/m <sup>3</sup>	1.74	<b>MOISTURE CONT. BOT</b> % <b>3</b>
<b>INITIAL MOISTURE CONT.</b>	%	8	<b>MOISTURE CONT. METHOD</b> Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)

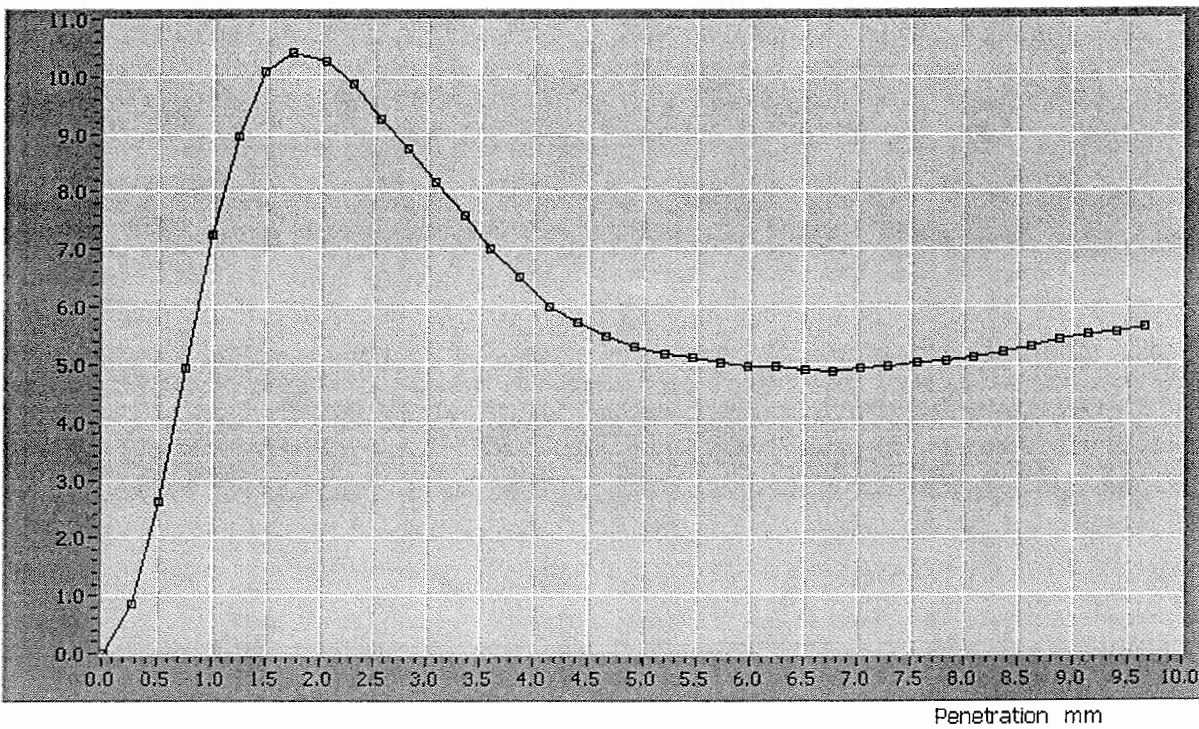


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 106 -D2	<b>Sample</b>	0000099854

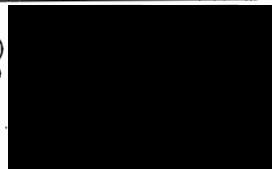
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	9.44	5.28	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	71.51	26.38	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 J D Brown (Section Engineer)  
 D N Houseago (Lead Technician)

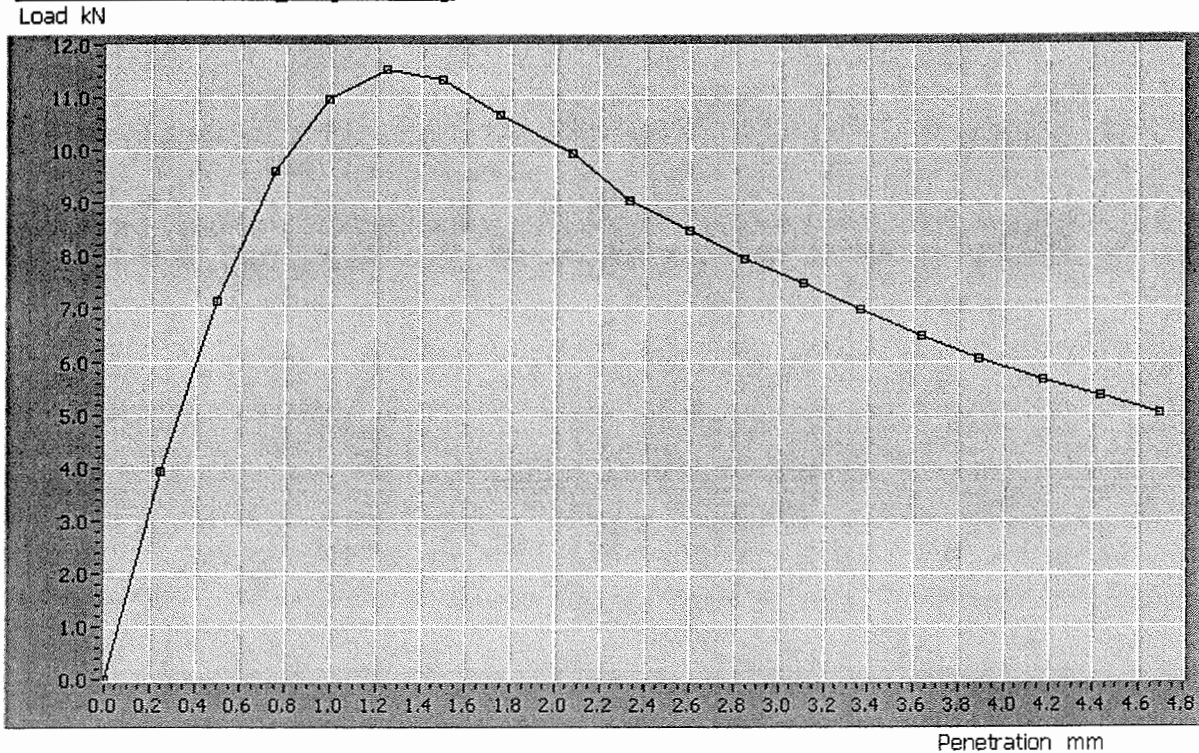




## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 106 -D2	<b>Sample</b>	0000099854

### Penetration Stage (side 2)



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	8.68	5.02	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	65.73	25.09	%

Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    J D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) ....



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FAO I Brown

Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

Scheme	Great Yarmouth Third River Crossing		
Location	BH106	Depth	8 m
Date sampled		Date received	10-Sep-07
Sample type	B	Sample Mass	

Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.

Material	Bulk Disturbed
Description	Light brown fine, medium and coarse SAND with some fine, medium and coarse rounded flint and quartz gravel

Supplier Source  
Conveyance note No.

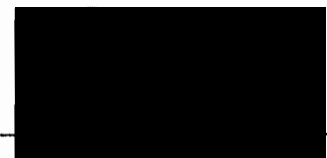
LOCATION	TEST SPECIMEN			
ORIENTATION	NOT APPLICABLE			
METHOD OF DIVISION	PREPARATION DETAILS			
PREPARATION METHOD	QUARTERING			
	7.2.4.4 Rammer Compaction with specified effort			
RETAINED 37.5mm	%	0	CBR VALUE TOP	% 52
RETAINED 20mm	%	0	CBR VALUE BOTTOM	% 92
NO OF LAYERS		3	AVERAGE CBR VALUE	% 72
BLOWS PER LAYER		62 Blows	MOISTURE CONT. TOP	% 9
METHOD		2.5kg	MOISTURE CONT. BOT	% 7
CONDITION		UNSOAKED	MOISTURE CONT. METHOD	Oven dried @ 105 -110°C
BULK DENSITY	Mg/m <sup>3</sup>	2.044		
DRY DENSITY	Mg/m <sup>3</sup>	1.892		
INITIAL MOISTURE CONT.	%	8		

REMARKS

Test Code = 642



David Houseago (Lead Technician)

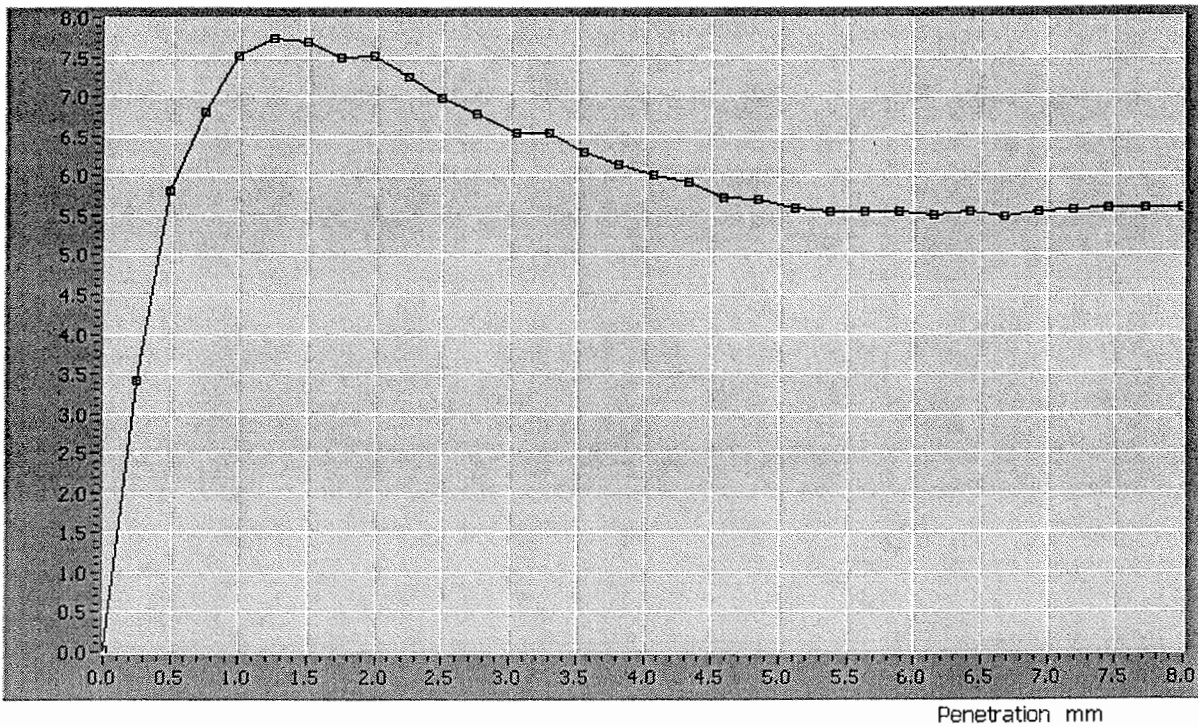


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 106 - B9	<b>Sample</b>	0000099856

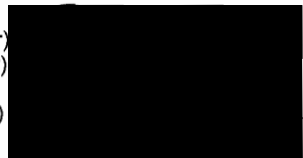
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	6.99	5.63	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	52.92	28.13	%

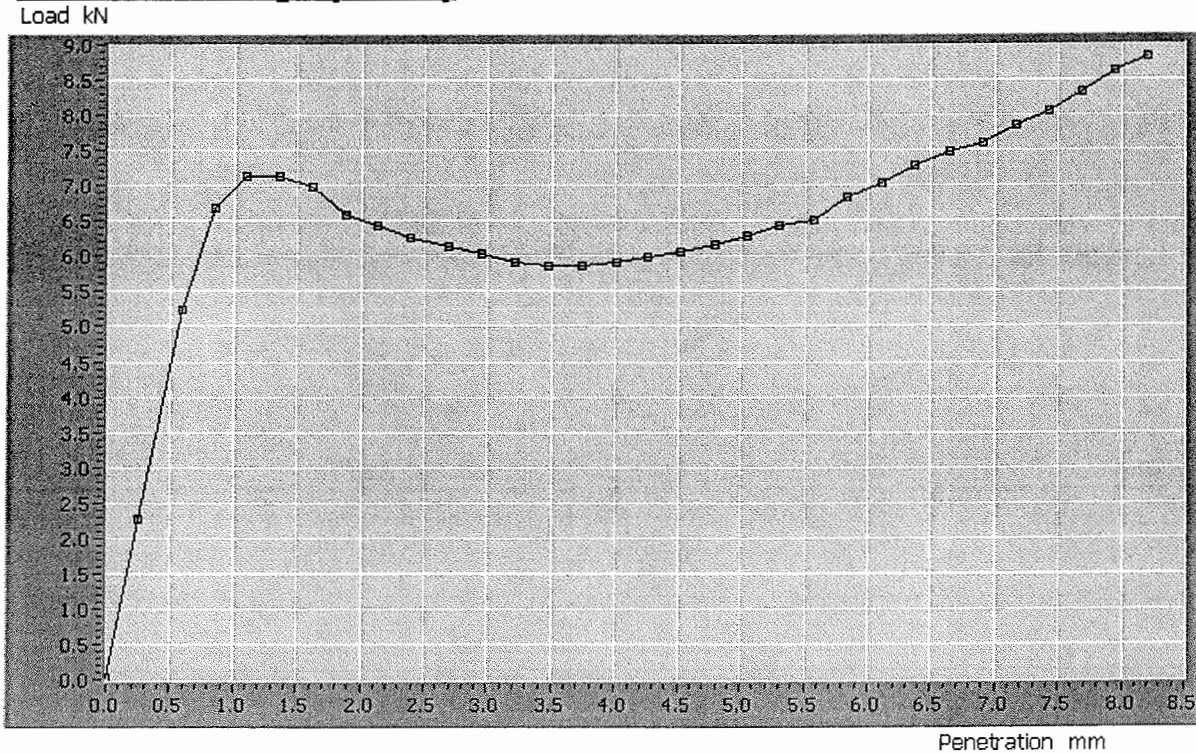
Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    J D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician)



## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 106 - B9	<b>Sample</b>	0000099856

### Penetration Stage (side 2)



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	12.23	12.23	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	92.66	61.15	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 J D Brown (Section Engineer)  
 D N Houseago (Lead Technician)



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FAO I Brown

Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

Scheme	Great Yarmouth Third River Crossing		
Location	WS107	Depth	0.75 m
Date sampled		Date received	11-Sep-07
Sample type	B	Sample Mass	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
Material	Bulk Disturbed		
Description	Light brown fine and medium SAND with some fine, medium and coarse rounded flint gravel		

Supplier Source  
Conveyance note No.

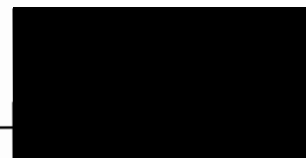
LOCATION ORIENTATION	<b>TEST SPECIMEN</b> NOT APPLICABLE NOT APPLICABLE			
METHOD OF DIVISION PREPARATION METHOD	<b>PREPARATION DETAILS</b> QUARTERING 7.2.4.4 Rammer Compaction with specified effort			
RETAINED 37.5mm %	0	CBR VALUE TOP %	58	
RETAINED 20mm %	8	CBR VALUE BOTTOM %	38	
NO OF LAYERS	3	AVERAGE CBR VALUE %	48	
BLOWS PER LAYER	N/A	MOISTURE CONT. TOP %	6	
METHOD	Vib.Hammer	MOISTURE CONT. BOT %	6	
CONDITION	UNSOAKED	MOISTURE CONT. METHOD	Oven dried @ 105 -110°C	
BULK DENSITY Mg/m <sup>3</sup>	2.038			
DRY DENSITY Mg/m <sup>3</sup>	1.921			
INITIAL MOISTURE CONT. %	6			

REMARKS

Test Code = 642



David Houseago (Lead Technician)



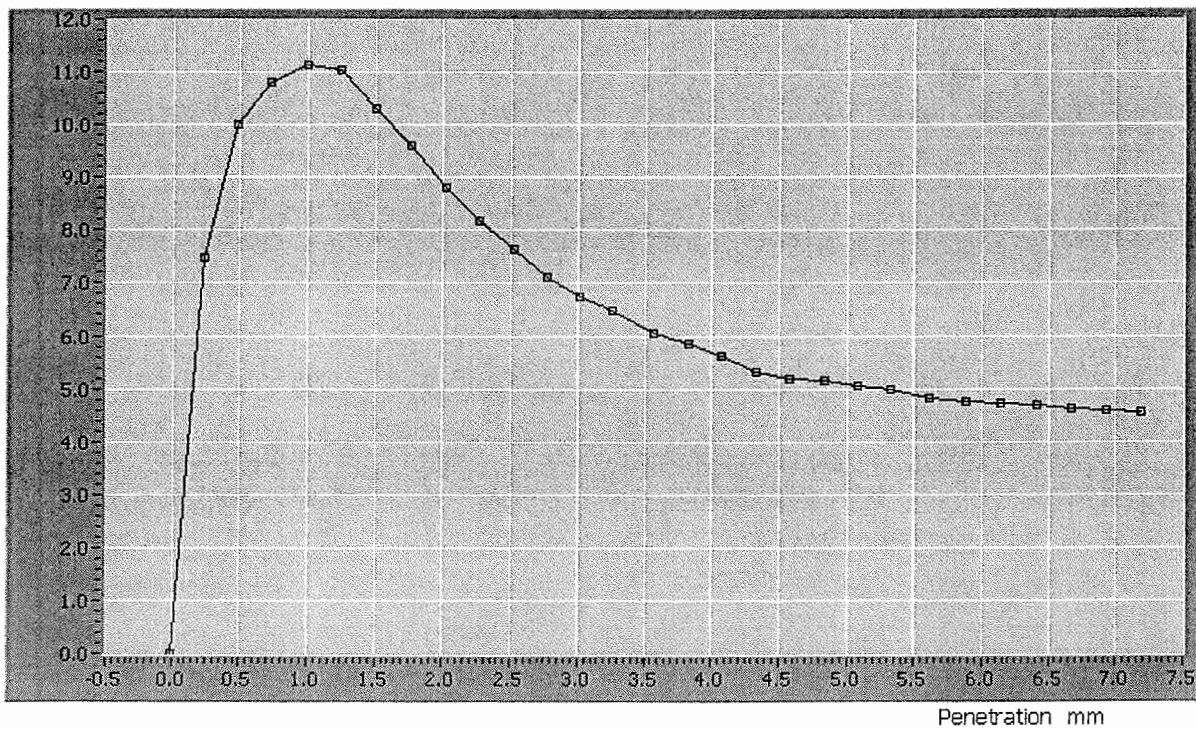


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 107 - B3	<b>Sample</b>	0000099850

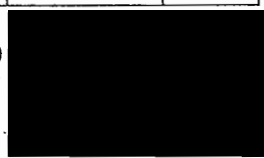
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	7.70	5.09	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	58.35	25.47	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 J D Brown (Section Engineer)  
 D N Houseago (Lead Technician)

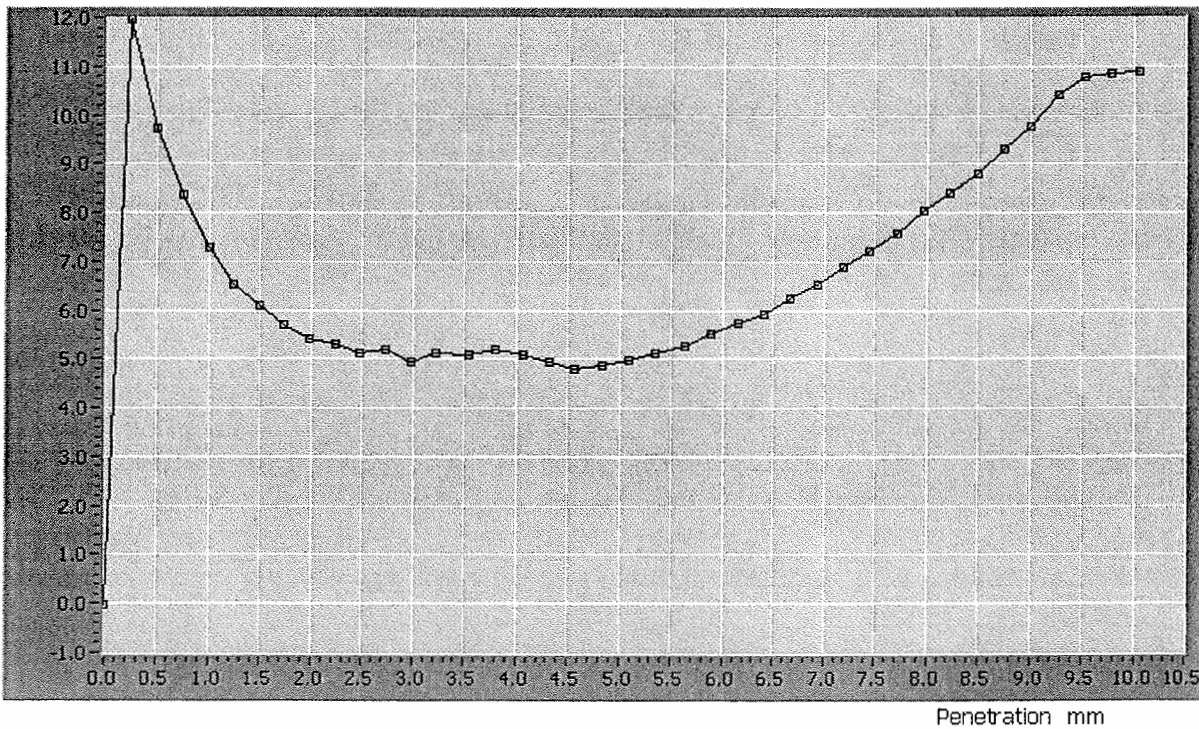


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 107 - B3	<b>Sample</b>	0000099850

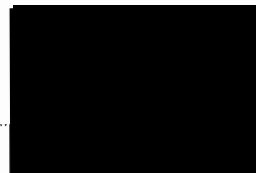
### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	5.13	4.93	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	38.84	24.64	%

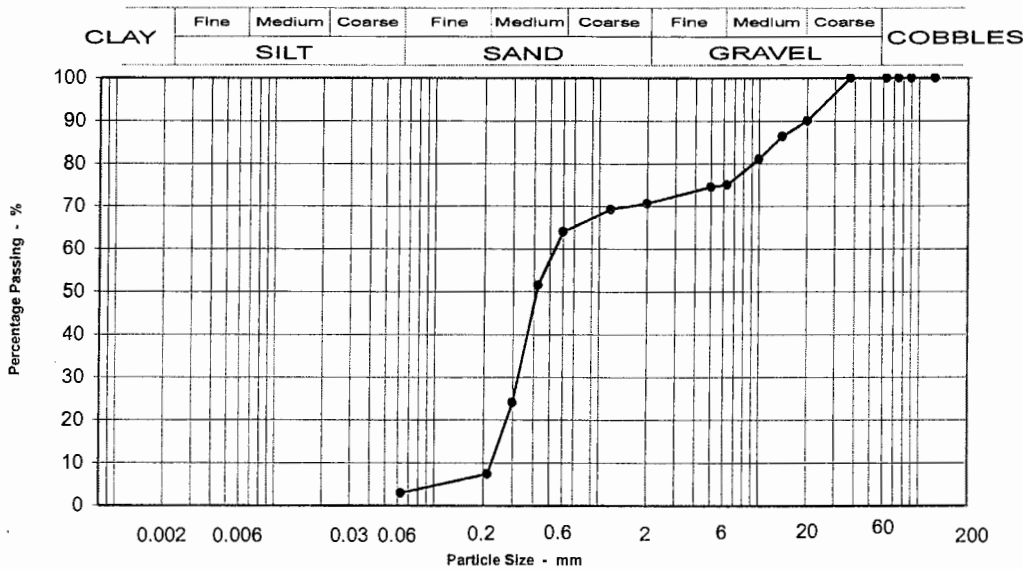
Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 D Brown (Section Engineer)  
 D N Houseago (Lead Technician) .....





**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **WS108 1.1 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	
75	100	1B Suitable
63	100	
37.5	100	
20	90	
14	86	
10	81	
6.3	75	
5	75	
2	71	6E/6R Suitable
1.18	69	
0.600	64	
0.425	52	
0.300	24	
0.212	7	
0.063	3	6M Suitable
Moisture content %		7

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	10
Medium GRAVEL	15
Fine GRAVEL	7
Coarse SAND	4
Medium SAND	57
Fine SAND	5
Silt & Clay	3

Grading Analysis	
D100	20
D60	0.54
D10	0.226
Uniformity Coefficient	2

Description	
Light brown fine and medium SAND with some fine, medium and coarse flint and quartz gravel. Gravel is rounded	

Test Code = 610



D N Houseago (Lead Technician)



Planning & Transportation  
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NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 99849  
Your Sample Ref B4  
Your Project or Order No  
P&T Project No.  
Date Report Issued 25-Oct-07

FAO I Brown

Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	WS110	<b>Depth</b>	0.5 m
<b>Date sampled</b>		<b>Date received</b>	06-Sep-07
<b>Sample type</b>	B	<b>Sample Mass</b>	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Bulk Disturbed		
<b>Description</b>	Light brown medium and coarse SAND with some fine, medium and coarse rounded and sub-rounded flint gravel		
<b>Supplier</b>		<b>Source</b>	Ex site
<b>Conveyance note No.</b>			

<b>LOCATION</b>	<b>TEST SPECIMEN</b>		
<b>ORIENTATION</b>	NOT APPLICABLE		
	NOT APPLICABLE		
	<b>PREPARATION DETAILS</b>		
<b>METHOD OF DIVISION</b>	QUARTERING		
<b>PREPARATION METHOD</b>	7.2.4.4 Rammer Compaction with specified effort		
<b>RETAINED 37.5mm</b>	%	0	
<b>RETAINED 20mm</b>	%	8	
<b>NO OF LAYERS</b>		3	<b>CBR VALUE TOP</b> % <b>56</b>
<b>BLOWS PER LAYER</b>		N/A	<b>CBR VALUE BOTTOM</b> % <b>85</b>
<b>METHOD</b>		Vib.Hammer	<b>AVERAGE CBR VALUE</b> % <b>71</b>
<b>CONDITION</b>		UNSOAKED	
<b>BULK DENSITY</b>	Mg/m <sup>3</sup>	2.01	<b>MOISTURE CONT. TOP</b> % <b>9</b>
<b>DRY DENSITY</b>	Mg/m <sup>3</sup>	1.85	<b>MOISTURE CONT. BOT</b> % <b>9</b>
<b>INITIAL MOISTURE CONT.</b>	%	9	<b>MOISTURE CONT. METHOD</b> Oven dried @ 105 -110°C

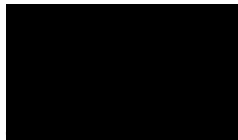
**REMARKS**

---

Test Code = 642



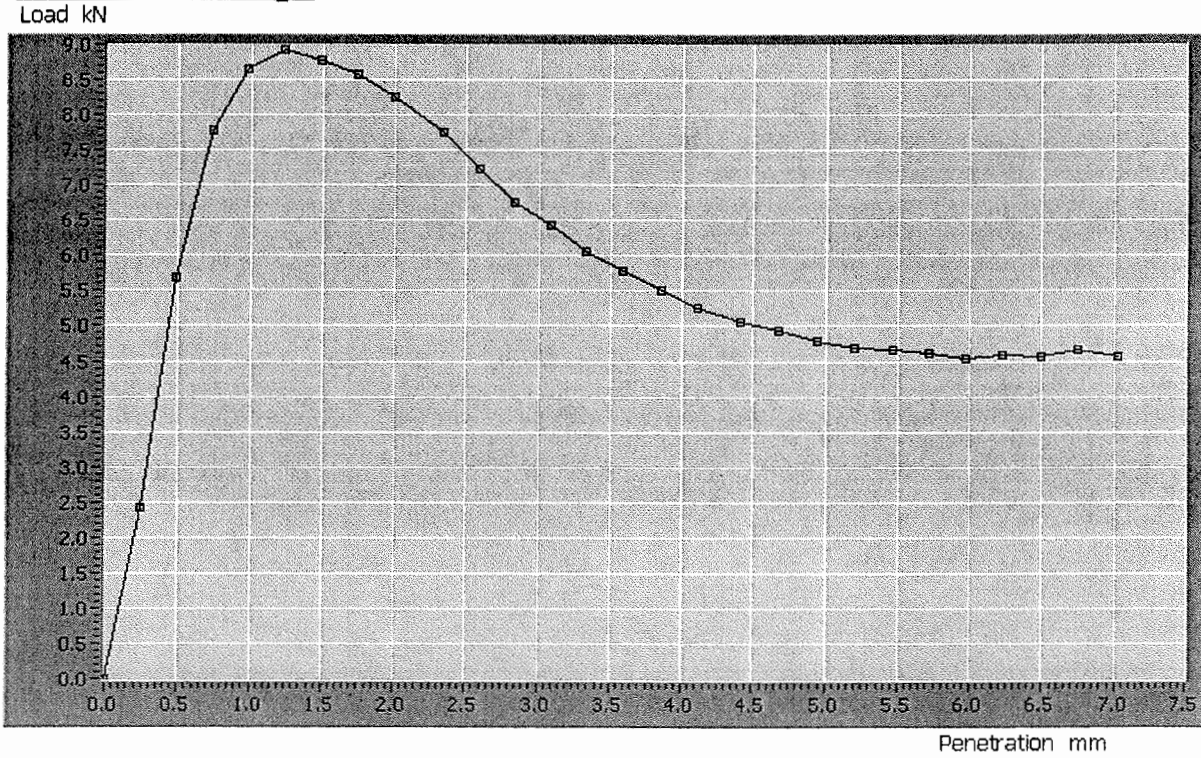
David Houseago (Lead Technician)



## Norfolk Partnership Laboratory California Bearing Ratio

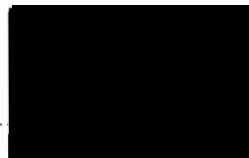
<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 110 - B4	<b>Sample</b>	0000099849

### Penetration Stage



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	7.41	4.77	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	56.17	23.86	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 I D Brown (Section Engineer)  
 D N Houseago (Lead Technician) ...

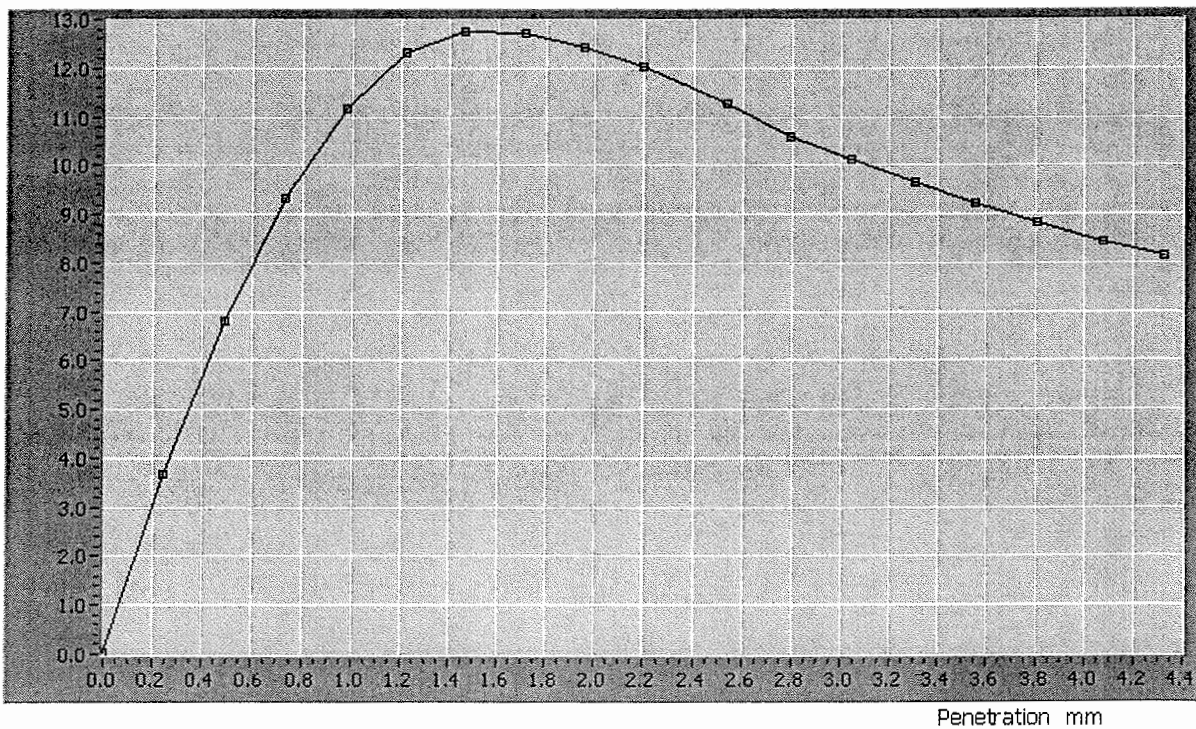


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 110 - B4	<b>Sample</b>	0000099849

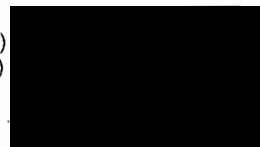
### Penetration Stage (side 2)

Load kN



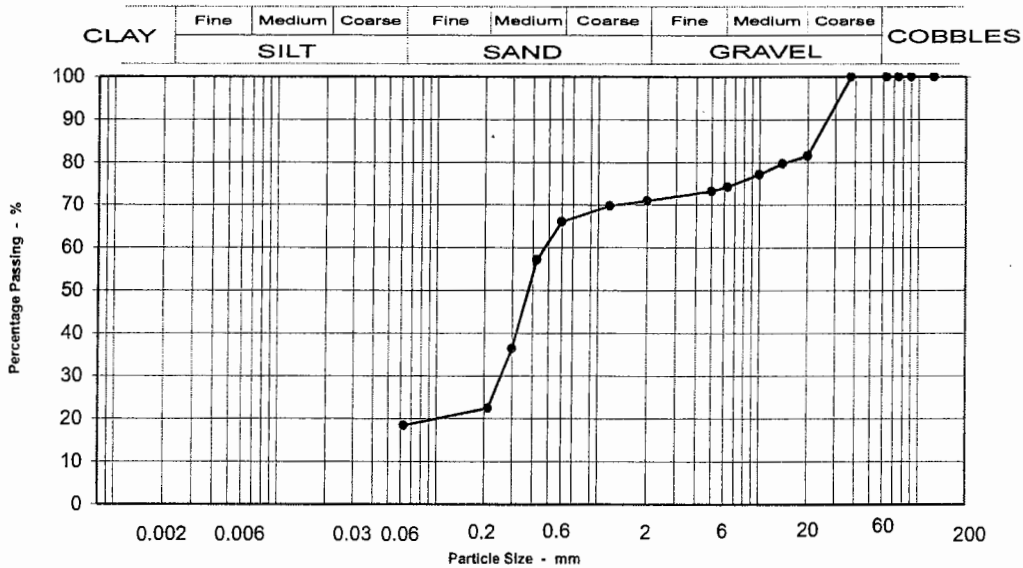
Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	11.35	8.15	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	85.97	40.76	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 I D Brown (Section Engineer)  
 D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **WS110 0.5 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	82
14	80
10	77
6.3	74
5	73
2	71
1.18	70
0.600	66
0.425	57
0.300	36
0.212	22
0.063	18

Specification for Highway Works Classification
2A/2B Suitable

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	19
Medium GRAVEL	7
Fine GRAVEL	5
Coarse SAND	3
Medium SAND	44
Fine SAND	4
Silt & Clay	18

Grading Analysis	
D100	20
D60	0.48
D10	0.070
Uniformity Coefficient	7

Description	
Light brown medium and coarse SAND with some fine, medium and coarse rounded and sub-rounded flint gravel	

Moisture content % 7

Test Code = 610



D N Houseago (Lead Technician)



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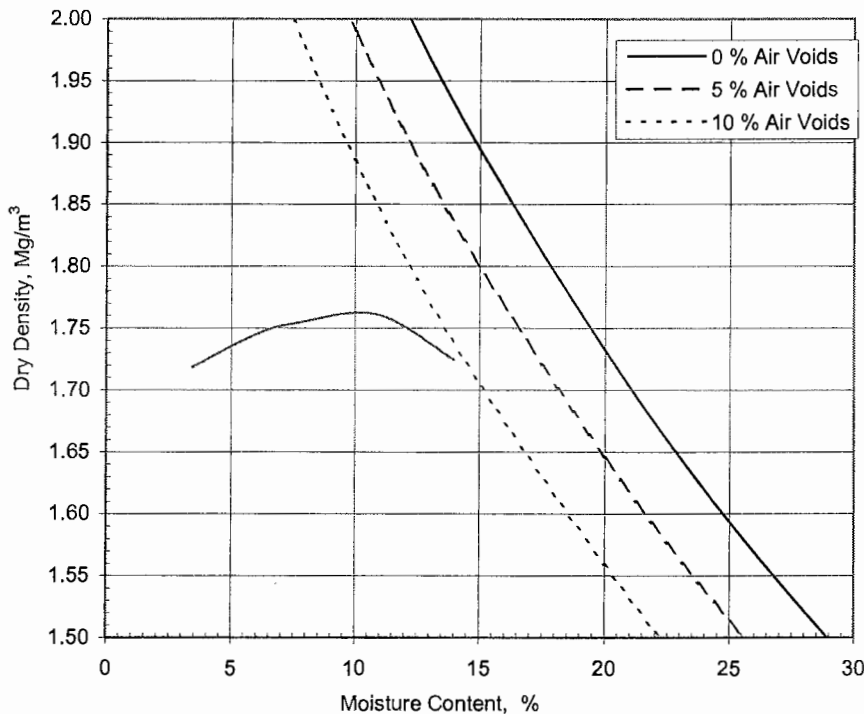
Our Project No PTPZ0008  
Our Report and sample No  
Your Sample Ref 2-5  
Your Project or Order No  
P&T Project No.  
Date Report Issued 25-Oct-07

FAO I Brown

Page 1 of 1

**DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP  
TO BS 1377 : PART 4 : 1990 : SECTION 3**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	WS111	<b>Depth</b>	0.4
<b>Date received</b>	25-Oct-07	<b>Date tested</b>	
<b>Sample type</b>	C	<b>Sample Mass</b>	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Description</b>	Light brown fine and medium SAND.		
<b>Supplier</b>	<b>Source</b>		

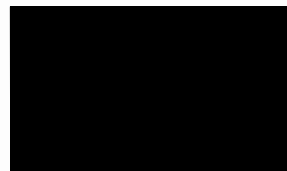


<b>Method of division</b>	Quartering	<b>Retained on 37.5 mm Sieve</b>	%	0
<b>Preparation</b>	3.7	<b>Retained on 20.0 mm Sieve</b>	%	0
<b>Test Method</b>	Vib.Hammer	<b>Particle Density</b>		2.65
<b>Mould Type</b>	CBR	<b>Maximum Dry Density</b>	Mg/m <sup>3</sup>	1.76
<b>Samples Used</b>	Seperate	<b>Optimum Moisture Content</b>	%	11

Test Code = 640

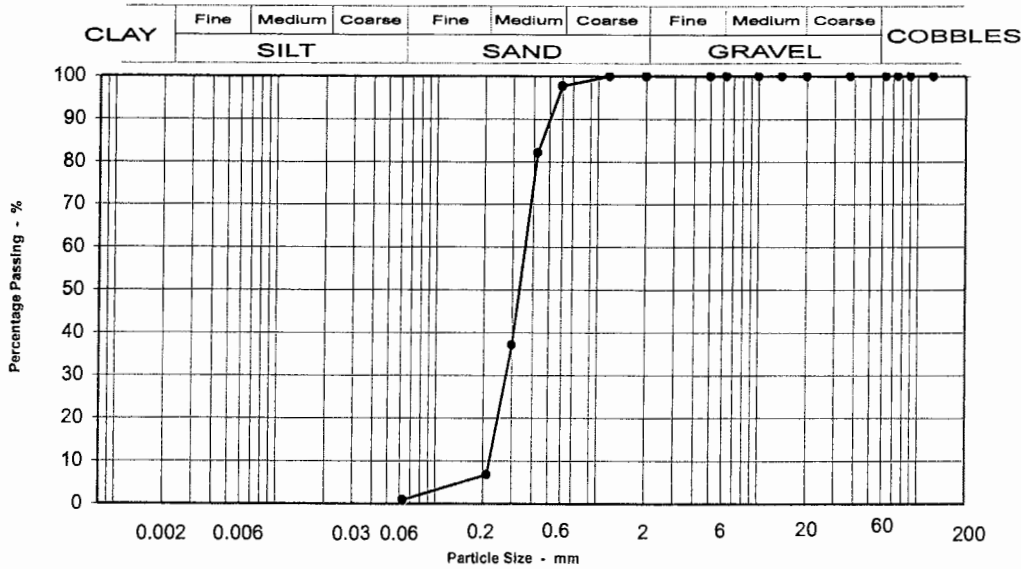


D N Houseago (Lead Technician)



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **WS111 0.5 - m**



Seiving Particle Size mm	% Passing	Specification for Highway Works Classification
125	100	
90	100	
75	100	1B Suitable
63	100	
37.5	100	
20	100	
14	100	
10	100	
6.3	100	
5	100	
2	100	6E/6R Suitable
1.18	100	
0.600	98	
0.425	82	
0.300	37	
0.212	7	
0.063	1	6M Suitable
Moisture content %		3

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	2
Coarse SAND	0
Medium SAND	91
Fine SAND	6
Silt & Clay	1

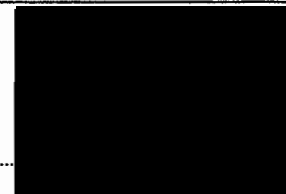
Grading Analysis	
D100	1
D60	0.36
D10	0.221
Uniformity Coefficient	2

Description	
Light brown fine and medium SAND	

Test Code = 610



D N Houseago (Lead Technician)





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NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No  
Your Sample Ref D3  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

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Page 1 of 1

**DETERMINATION OF PARTICLE DENSITY TO BS1377 : PART 2 : 1990 : SECTION 8.2**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	WS111	<b>Depth</b>	0.8 - m
<b>Date sampled</b>		<b>Date received</b>	06-Sep-07
<b>Date tested</b>	03-Oct-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material Description</b>	Small disturbed sample Light brown fine and medium SAND		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

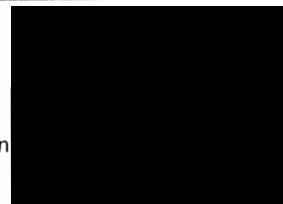
<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
	Not applicable
	PREPARATION DETAILS
<b>METHOD OF DIVISION</b>	Riffled
<b>PREPARATION METHOD</b>	Oven dried @ 105 -110°C
<b>TEST METHOD</b>	Gas jar method
<b>PARTICLE DENSITY</b>	2.65

**REMARKS**

Test Code = 605a

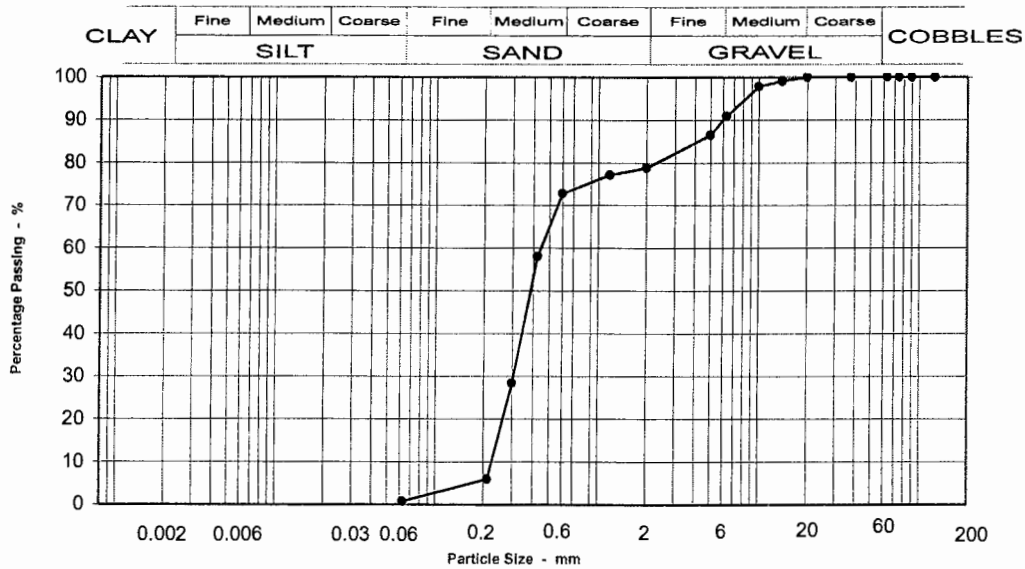


D N Houseago (Lead Technician



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing** Location: **WS111 1 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	98
6.3	91
5	87
2	79
1.18	77
0.600	73
0.425	58
0.300	28
0.212	6
0.063	1

Specification for Highway Works Classification	
1B	Suitable
6E/6R	Suitable
6M	Suitable
Moisture content % 5	

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	9
Fine GRAVEL	6
Coarse SAND	12
Medium SAND	67
Fine SAND	5
Silt & Clay	1

Grading Analysis	
D100	14
D60	0.45
D10	0.228
Uniformity Coefficient	2

Description
Light brown fine and medium SAND

Test Code = 610



D N Houseago (Lead Technician)



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County Hall  
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NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 99858  
Your Sample Ref B6  
Your Project or Order No  
P&T Project No.  
Date Report Issued 25-Oct-07

FAO I Brown

Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	WS111	<b>Depth</b>	3.3 m
<b>Date sampled</b>		<b>Date received</b>	06-Sep-07
<b>Sample type</b>	B	<b>Sample Mass</b>	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Bulk Disturbed		
<b>Description</b>	Light brown fine and medium SAND with some fine, medium and coarse rounded flint gravel		

Supplier Source Ex site  
Conveyance note No.

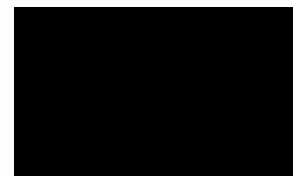
<b>LOCATION</b>	<b>TEST SPECIMEN</b>			
<b>ORIENTATION</b>	NOT APPLICABLE			
	NOT APPLICABLE			
	<b>PREPARATION DETAILS</b>			
<b>METHOD OF DIVISION</b>	QUARTERING			
<b>PREPARATION METHOD</b>	7.2.4.4 Rammer Compaction with specified effort			
<b>RETAINED 37.5mm</b>	%	0	<b>CBR VALUE TOP</b>	% 60
<b>RETAINED 20mm</b>	%	7	<b>CBR VALUE BOTTOM</b>	% 132
<b>NO OF LAYERS</b>		3	<b>AVERAGE CBR VALUE</b>	% 96
<b>BLOWS PER LAYER</b>		N/A	<b>MOISTURE CONT. TOP</b>	% 10
<b>METHOD</b>		Vib.Hammer	<b>MOISTURE CONT. BOT</b>	% 6
<b>CONDITION</b>		UNSOAKED	<b>MOISTURE CONT. METHOD</b>	Oven dried @ 105 -110°C
<b>BULK DENSITY</b>	Mg/m <sup>3</sup>	2.14		
<b>DRY DENSITY</b>	Mg/m <sup>3</sup>	1.98		
<b>INITIAL MOISTURE CONT.</b>	%	8		

REMARKS

Test Code = 642



David Houseago (Lead Technician)

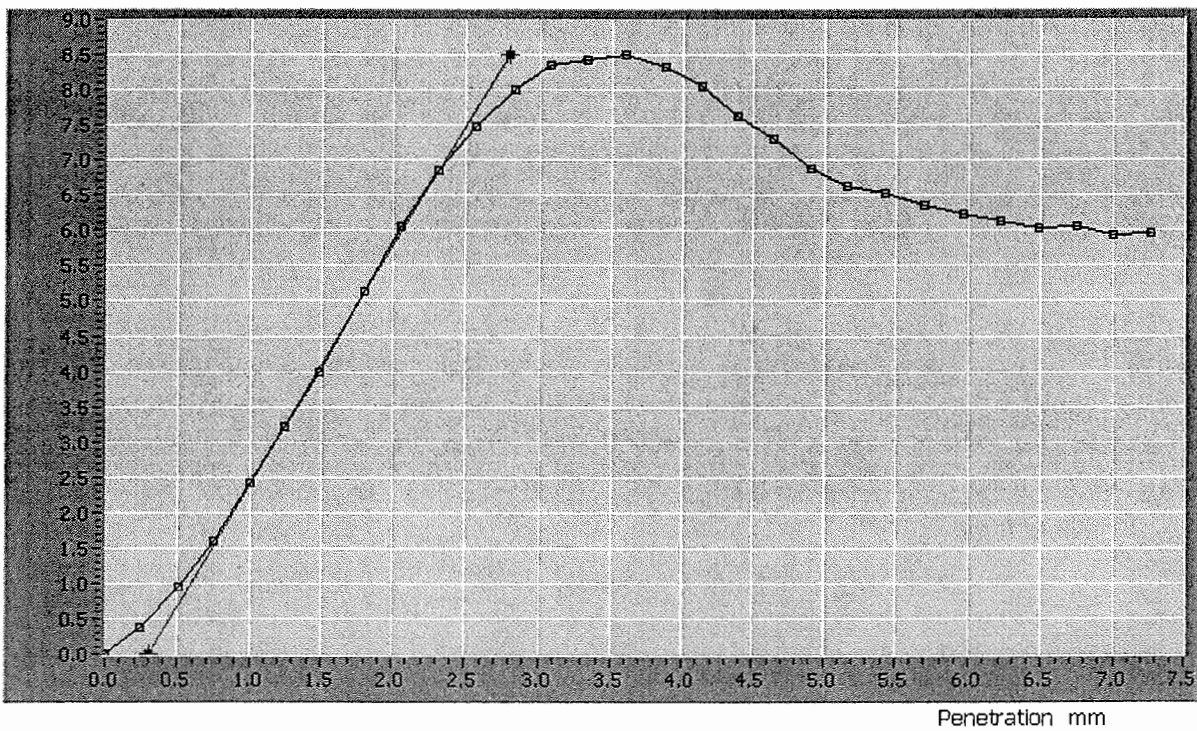


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 111 - B6	<b>Sample</b>	0000099858

### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	7.95	6.58	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	60.23	32.91	%

Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    T D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) .....

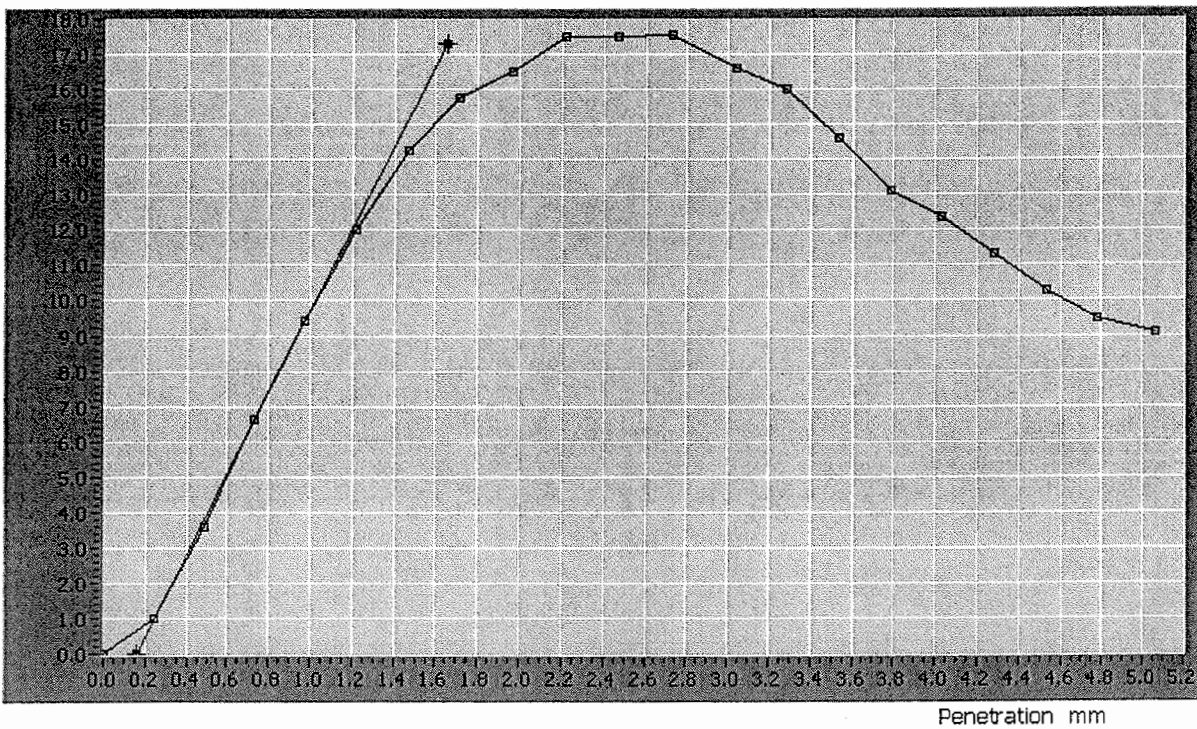


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 111 – B6	<b>Sample</b>	0000099858

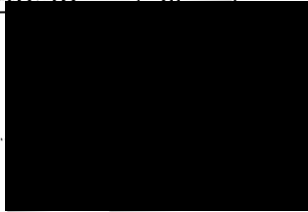
### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	17.54	9.09	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	132.87	45.45	%

Authorised signatory     R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 D Brown (Section Engineer)  
 D N Houseago (Lead Technician) .....



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Norwich  
NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 99855  
Your Sample Ref B7  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

FAO I Brown

Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

Scheme	Great Yarmouth Third River Crossing		
Location	WS111	Depth	4.7 m
Date sampled		Date received	06-Sep-07
Sample type	B	Sample Mass	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
Material	Bulk Disturbed		
Description	Light brown fine and medium SAND		

Supplier Source  
Conveyance note No.

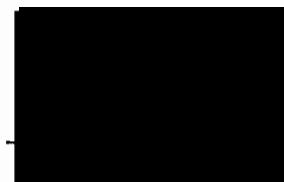
LOCATION	TEST SPECIMEN		
ORIENTATION	NOT APPLICABLE		
	NOT APPLICABLE		
	PREPARATION DETAILS		
METHOD OF DIVISION	QUARTERING		
PREPARATION METHOD	7.2.4.4 Rammer Compaction with specified effort		
RETAINED 37.5mm	%	0	
RETAINED 20mm	%	2	
NO OF LAYERS		3	CBR VALUE TOP % 40
BLOWS PER LAYER		62 Blows	CBR VALUE BOTTOM % 50
METHOD		2.5kg	AVERAGE CBR VALUE % 45
CONDITION		UNSOAKED	
BULK DENSITY	Mg/m <sup>3</sup>	1.909	MOISTURE CONT. TOP % 3
DRY DENSITY	Mg/m <sup>3</sup>	1.846	MOISTURE CONT. BOT % 3
INITIAL MOISTURE CONT.	%	3	MOISTURE CONT. METHOD Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)

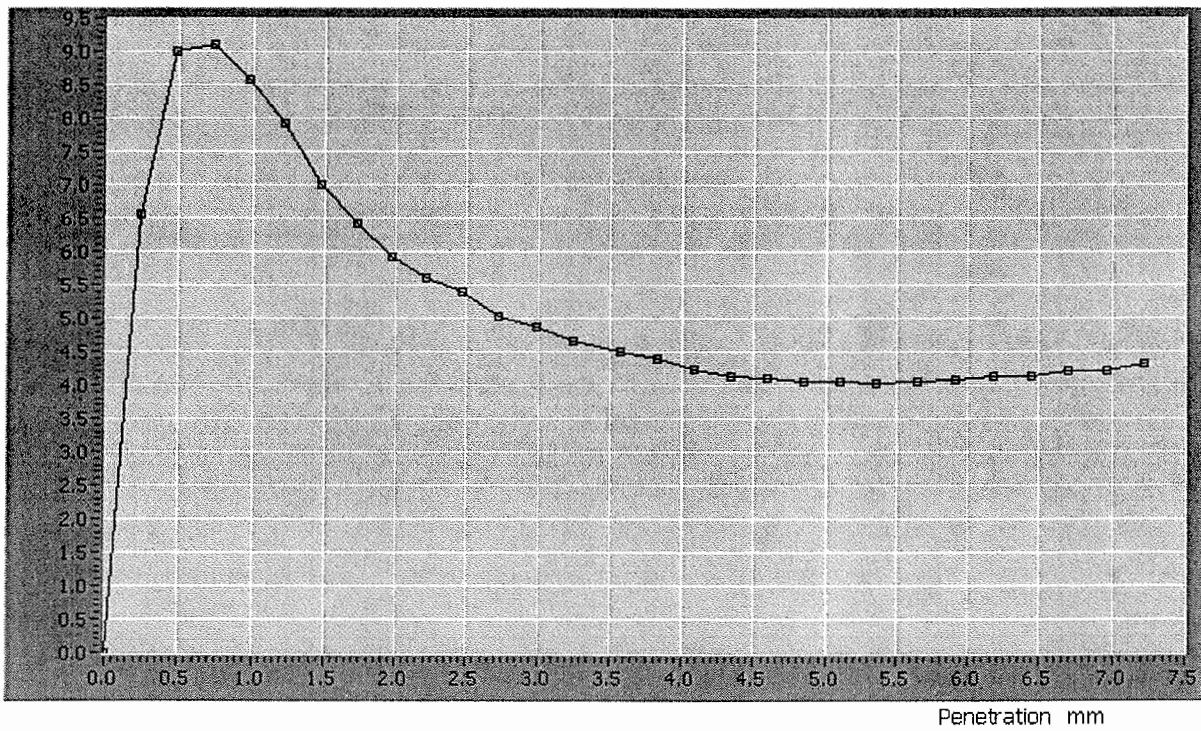


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 111 -B7	<b>Sample</b>	0000099855

### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	5.34	4.05	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	40.44	20.26	%

Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) .....

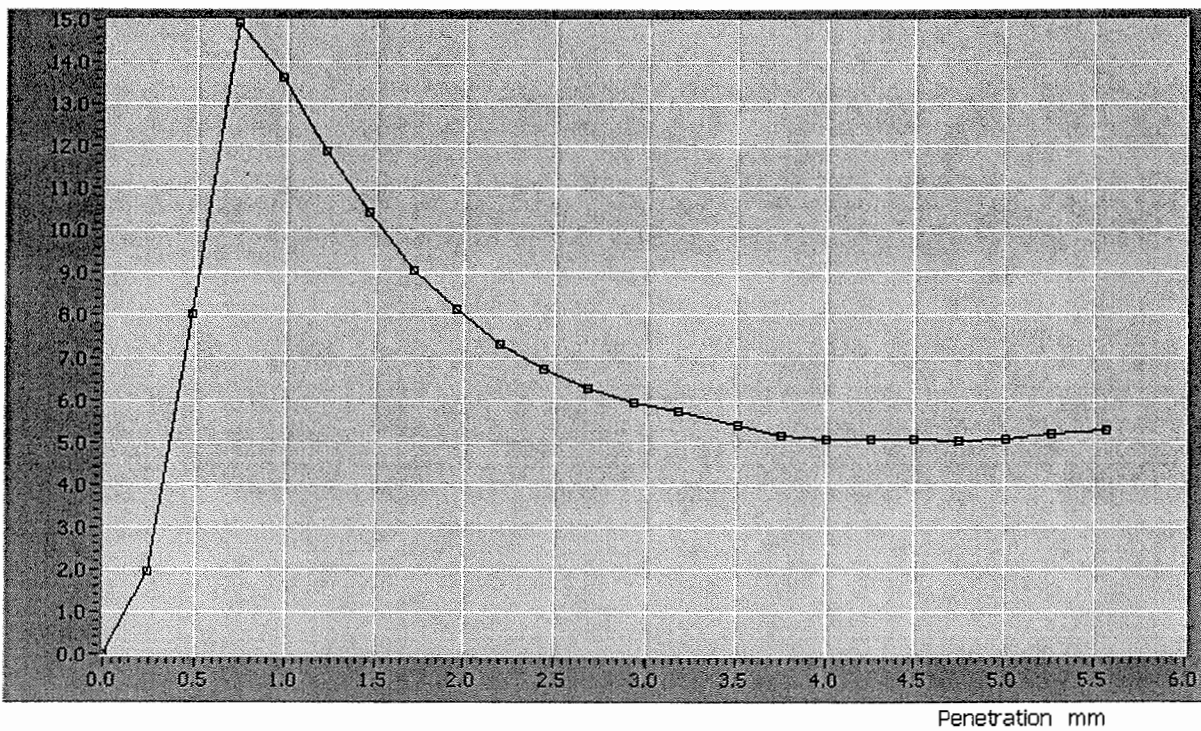


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	WS 111 -B7	<b>Sample</b>	0000099855

### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	6.63	5.07	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	50.20	25.33	%

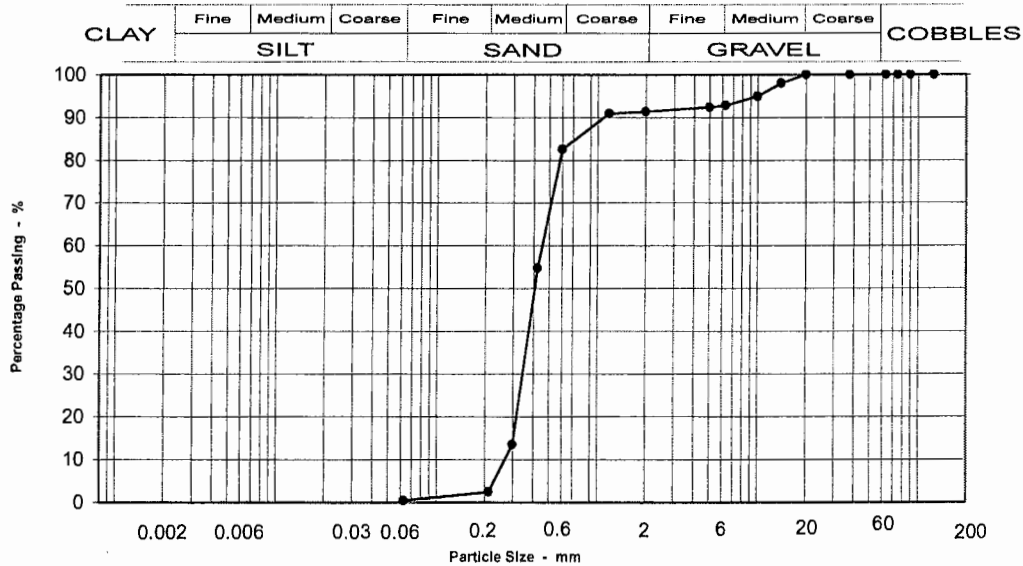
Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) .....



**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing**

Location: **WS111 4.7 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	95
6.3	93
5	92
2	91
1.18	91
0.600	83
0.425	55
0.300	14
0.212	2
0.063	0

Specification for Highway Works Classification	
1B	Suitable
6E/6R	Suitable
6M	Suitable
Moisture content % 4	

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	7
Fine GRAVEL	9
Coarse SAND	2
Medium SAND	80
Fine SAND	2
Silt & Clay	0

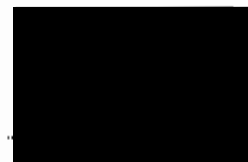
Grading Analysis	
D100	14
D60	0.46
D10	0.272
Uniformity Coefficient	2

Description	
Light brown fine and medium SAND	

Test Code = 610



D N Houseago (Lead Technician)



Planning & Transportation  
County Hall  
Martineau Lane  
Norwich  
NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 100298  
Your Sample Ref B3  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

FAO I Brown

Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

Scheme	Great Yarmouth Third River Crossing		
Location	TP 101	Depth	0.7 m
Date sampled		Date received	24-Sep-07
Sample type	B	Sample Mass	

Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.

Material	Bulk Disturbed
Description	Brown silty clayey gravelly fine and medium SAND. Gravel is angular to rounded medium to coarse flint and concrete.

Supplier	Source
Conveyance note No.	

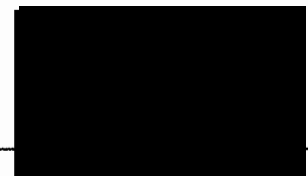
LOCATION	TEST SPECIMEN			
ORIENTATION	NOT APPLICABLE			
	PREPARATION DETAILS			
METHOD OF DIVISION	QUARTERING			
PREPARATION METHOD	7.2.4.4 Rammer Compaction with specified effort			
RETAINED 37.5mm	%	6		
RETAINED 20mm	%	12		
NO OF LAYERS		3	CBR VALUE TOP	% 10
BLOWS PER LAYER		62 Blows	CBR VALUE BOTTOM	% 14
METHOD		2.5kg	AVERAGE CBR VALUE	% 12
CONDITION		UNSOAKED		
BULK DENSITY	Mg/m <sup>3</sup>	2.038	MOISTURE CONT. TOP	% 15
DRY DENSITY	Mg/m <sup>3</sup>	1.776	MOISTURE CONT. BOT	% 15
INITIAL MOISTURE CONT.	%	15	MOISTURE CONT. METHOD	Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)

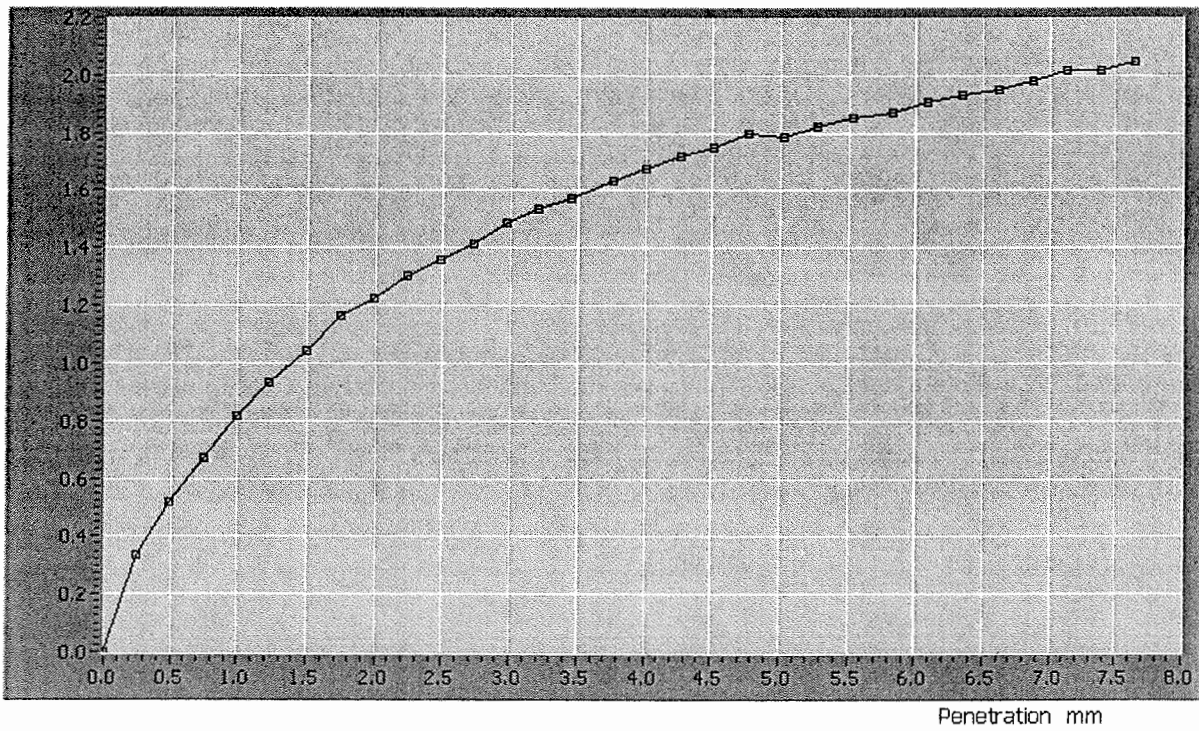


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	TP101 - B3	<b>Sample</b>	0000100298

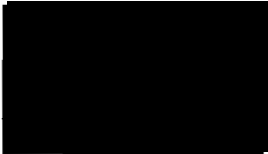
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	1.36	1.79	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	10.32	8.93	%

Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    J D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) .....

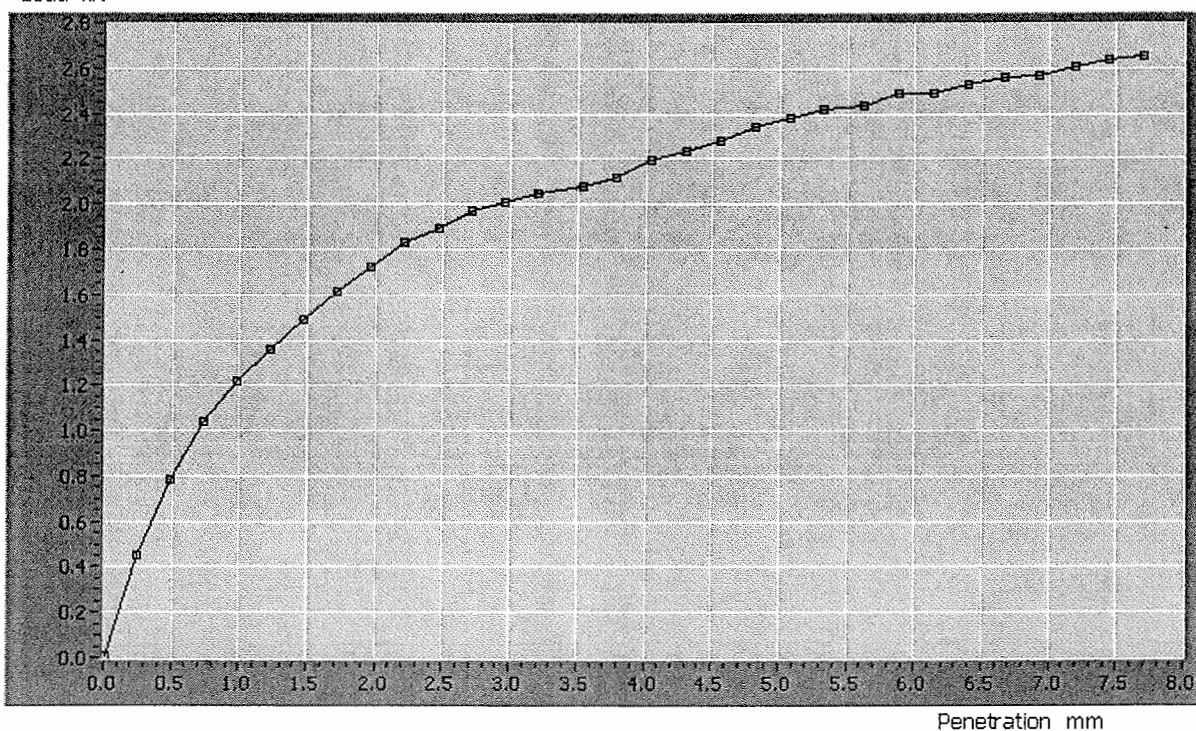


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	TP101 - B3	<b>Sample</b>	0000100298

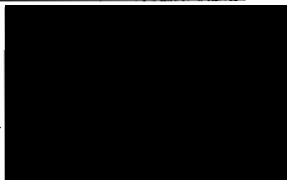
### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	1.91	2.37	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	14.44	11.84	%

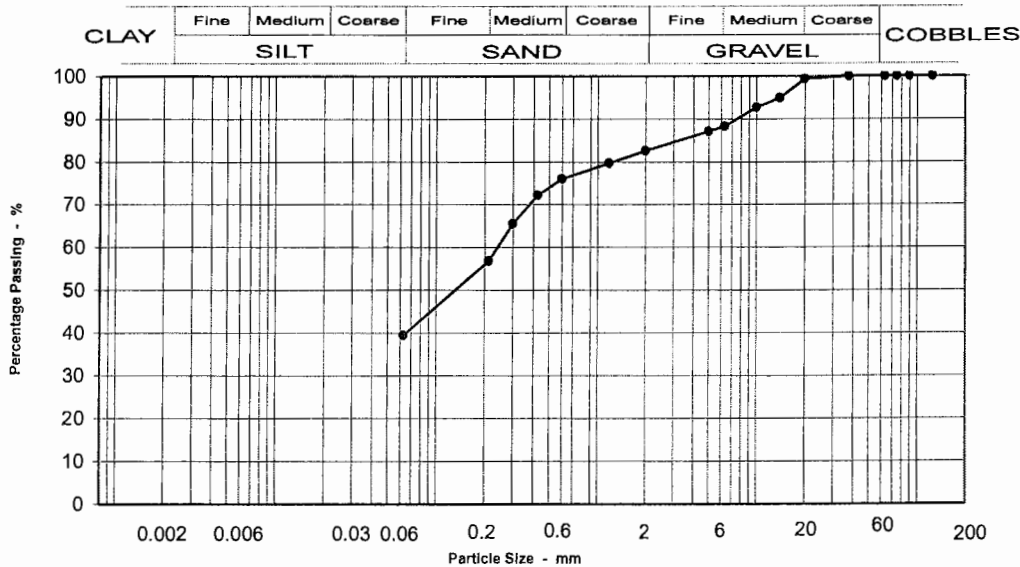
Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) ...



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **TP 101 0.7 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	95
10	93
6.3	88
5	87
2	83
1.18	80
0.600	76
0.425	72
0.300	66
0.212	57
0.063	39

Specification for Highway Works Classification	
2A/2B	Suitable

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	11
Fine GRAVEL	7
Coarse SAND	6
Medium SAND	19
Fine SAND	17
Silt & Clay	39

Grading Analysis	
D100	20
D60	0.25
D10	0.030
Uniformity Coefficient	8

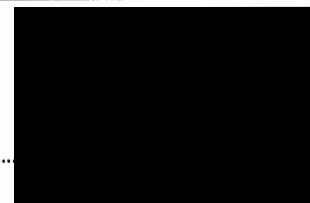
Description	

Moisture content % 32

Test Code = 610



D N Houseago (Lead Technician)





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Our Project No PTPZ0008  
Our Report and sample No 100304  
Your Sample Ref B4  
Your Project or Order No  
P&T Project No.  
Date Report Issued 24-Oct-07

FAO I Brown

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

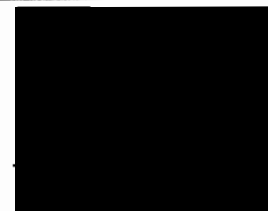
<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	TP 101	<b>Depth</b>	1.6 m
<b>Date sampled</b>		<b>Date received</b>	24-Sep-07
<b>Date tested</b>	05-Oct-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Firm dark grey very sandy SILT/CLAY.		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Ridffled
	Oven dried @ 105 -110°C
<b>PASSING 2mm BS TEST SIEVE (%)</b>	96
<b>ORGANIC MATTER (%)</b>	3

Test Code:620



David Houseago (Lead Technician)





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NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 100306  
Your Sample Ref B4  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

FAO I Brown

Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

Scheme	Great Yarmouth Third River Crossing		
Location	TP 101	Depth	1.6 m
Date sampled		Date received	24-Sep-07
Sample type	B	Sample Mass	

Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.

Material	Bulk Disturbed
Description	Firm dark grey very sandy SILT/CLAY.

Supplier	Source
Conveyance note No.	

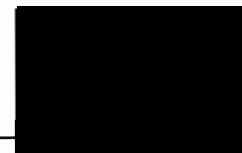
LOCATION	TEST SPECIMEN		
ORIENTATION	NOT APPLICABLE		
	NOT APPLICABLE		
	PREPARATION DETAILS		
METHOD OF DIVISION	QUARTERING		
PREPARATION METHOD	7.2.4.4 Rammer Compaction with specified effort		
RETAINED 37.5mm	%	0	
RETAINED 20mm	%	0	
NO OF LAYERS		3	CBR VALUE TOP % 0.4
BLOWS PER LAYER		62 Blows	CBR VALUE BOTTOM % 0.6
METHOD		2.5kg	AVERAGE CBR VALUE % 0.5
CONDITION		UNSOAKED	
BULK DENSITY	Mg/m <sup>3</sup>	1.841	MOISTURE CONT. TOP % 33
DRY DENSITY	Mg/m <sup>3</sup>	1.385	MOISTURE CONT. BOT % 33
INITIAL MOISTURE CONT.	%	33	MOISTURE CONT. METHOD Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)

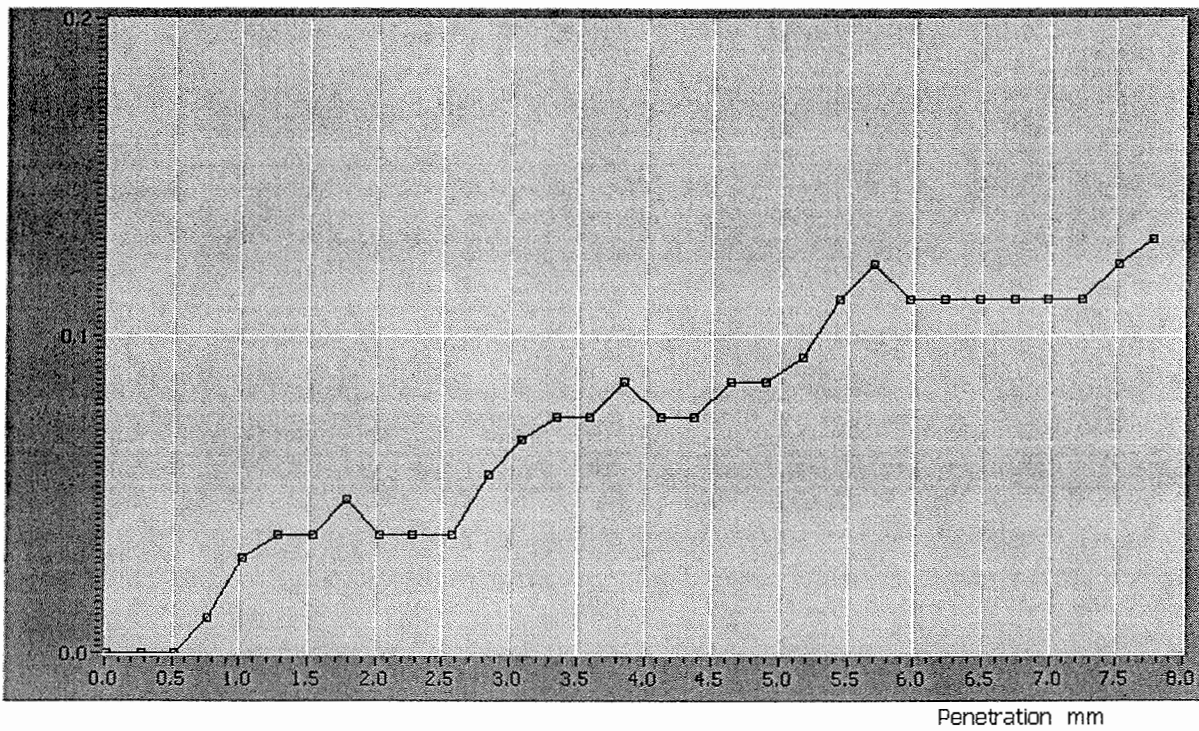


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	TP101 - B4	<b>Sample</b>	0000100306

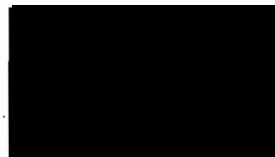
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	0.04	0.09	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	0.28	0.44	%

Authorised signatory  R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 J D Brown (Section Engineer)  
 D N Houseago (Lead Technician) ...

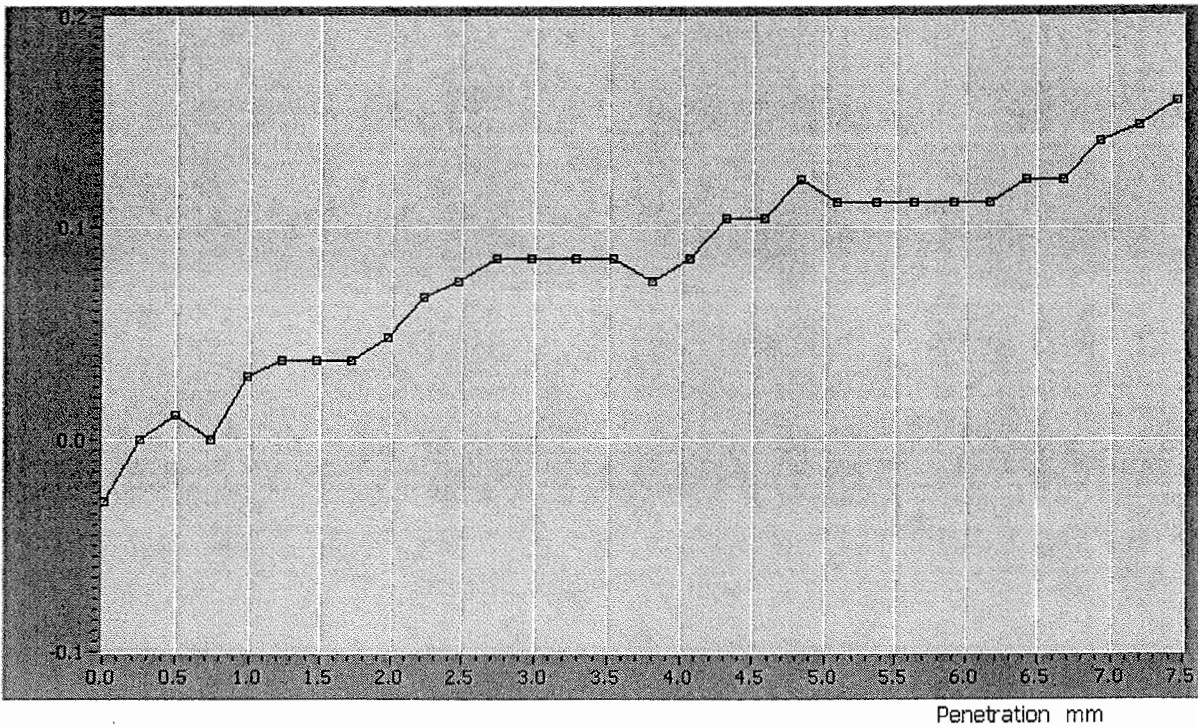


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	TP101 - B4	<b>Sample</b>	0000100306

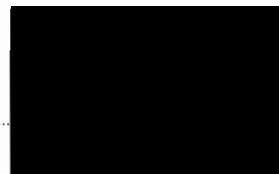
### Penetration Stage (side 2)

Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	0.08	0.12	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	0.57	0.58	%

Authorised signatory  R J Noakes (Laboratory Manager)  
 M L Bumstead (Section Engineer)  
 D Brown (Section Engineer)  
 D N Houseago (Lead Technician) .....



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Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

**DETERMINATION OF LIQUID LIMIT (cone penetrometer method), PLASTIC LIMIT AND PLASTICITY INDEX to BS 1377:Part 2: 1990 : CLAUSES 4.4 AND 5**

Scheme	Great Yarmouth Third River Crossing		
Location	TP 101	Depth	1.6 - m
Date sampled		Date received	24-Sep-07
Date tested	02-Oct-07		
Sample type	B	Sample Mass	
Sampled by driller who is not a member of Norfolk Partnership Laboratory. If a sample certificate was provided it is available for inspection. The accuracy of information provided by third parties can not be guaranteed.			
Material	Bulk Disturbed		
Description	Firm dark grey very sandy SILT/CLAY.		
Supplier		Source	Not applicable
Conveyance note No.	Not applicable		

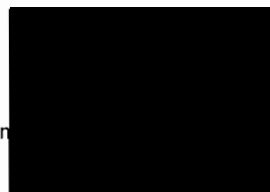
LOCATION	TEST SPECIMEN		
ORIENTATION	Not applicable		
	PREPARATION DETAILS		
METHOD OF DIVISION	Whole		
PREPARATION METHOD	Hand picking		
RETAINED 425µm (%)	5		
NATURAL MC (%)	34	OVEN DRIED @ 105°C	
LIQUID LIMIT (%)	41		
PLASTIC LIMIT (%)	24		
PLASTICITY INDEX (%)	17		
MODIFIED PI *(%)	16	*BRE Digest 240 : 1993	
SOIL CLASSIFICATION	C I		

REMARKS

Test Code = 604



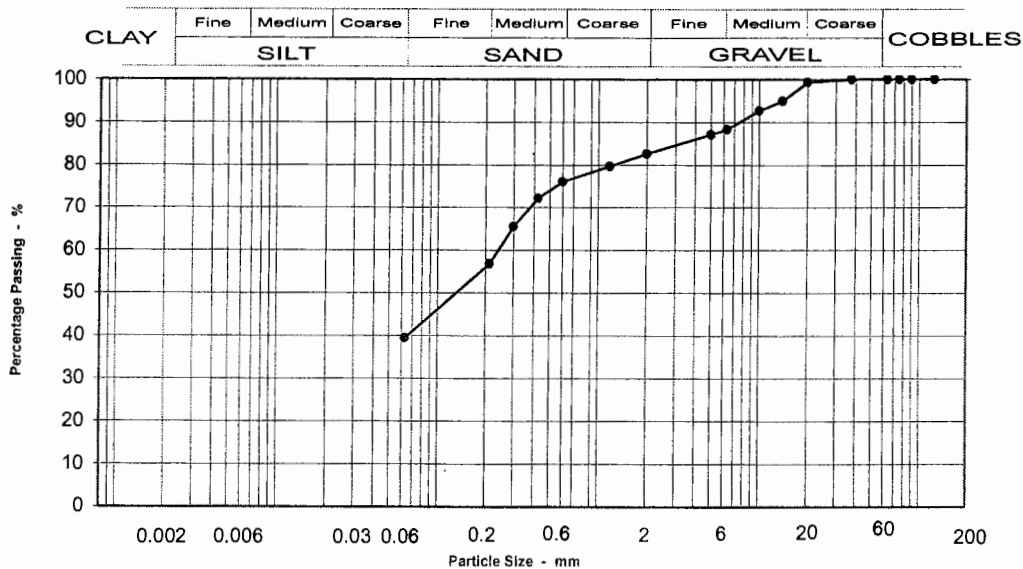
David Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: Great Yarmouth Third River Crossing

Location: TP 101 0.7 - m



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	95
10	93
6.3	88
5	87
2	83
1.18	80
0.600	76
0.425	72
0.300	66
0.212	57
0.063	39

Specification for Highway Works Classification
2A/2B Suitable

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	11
Fine GRAVEL	7
Coarse SAND	6
Medium SAND	19
Fine SAND	17
Silt & Clay	39

Grading Analysis	
D100	20
D60	0.25
D10	0.030
Uniformity Coefficient	8

Description
Brown silty clayey gravelly fine and medium SAND. Gravel is angular to rounded medium to coarse flint and concrete.

Moisture content % 32

Test Code = 610



D N Houseago (Lead Technician)

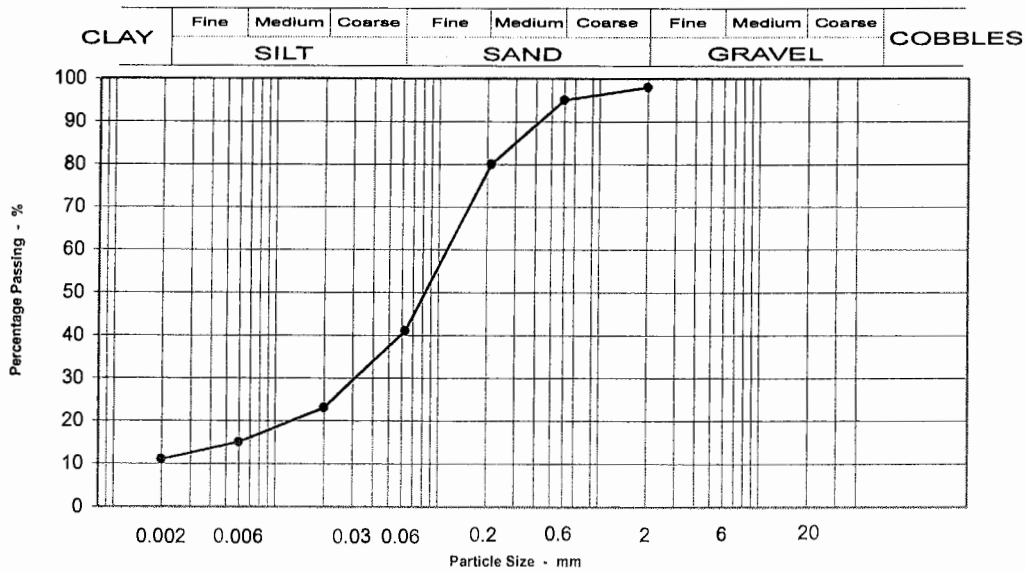


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NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No  
Your Sample Ref B4  
Your Project or Order No  
P&T Project No.  
Date Report Issued 12 October 2007

**Particle Size Distribution to BS 1377 : Part2 : 1990  
Sedimentation Method Section 9.4**

Scheme: **Great Yarmouth Third River Crossing** Location: **TP 101 1.6 - m**



Seiving	
Particle Size mm	% Passing
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	98
0.6	95
0.212	80
0.063	41
0.02	23
0.006	15
0.002	11

Moisture content % 33

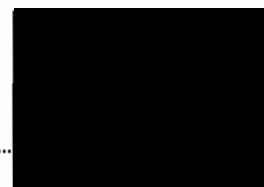
Sample Proportions	
GRAVEL	2
Coarse SAND	3
Medium SAND	15
Fine SAND	39
Coarse SILT	8
FINE SILT	4
CLAY	11

Description
Firm dark grey very sandy SILT/CLAY.

Test Code = 612



D N Houseago (Lead Technician)



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Norwich  
NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 100357  
Your Sample Ref B3  
Your Project or Order No  
P&T Project No.  
Date Report Issued 24-Oct-07

FAO I Brown

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

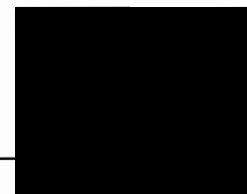
<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	TP 104	<b>Depth</b>	2 m
<b>Date sampled</b>		<b>Date received</b>	24-Sep-07
<b>Date tested</b>	05-Oct-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Grey and dark grey gravelly very sandy SILT/CLAY. Gravel is angular to subrounded fine and medium flint wi		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

	TEST SPECIMEN
<b>LOCATION</b>	Not applicable
<b>ORIENTATION</b>	Not applicable
	PREPARATION DETAILS
<b>METHOD OF DIVISION</b>	Ridffled
<b>PREPARATION METHOD</b>	Oven dried @ 105 -110°C
<b>PASSING 2mm BS TEST SIEVE (%)</b>	83
<b>ORGANIC MATTER (%)</b>	1

Test Code:620



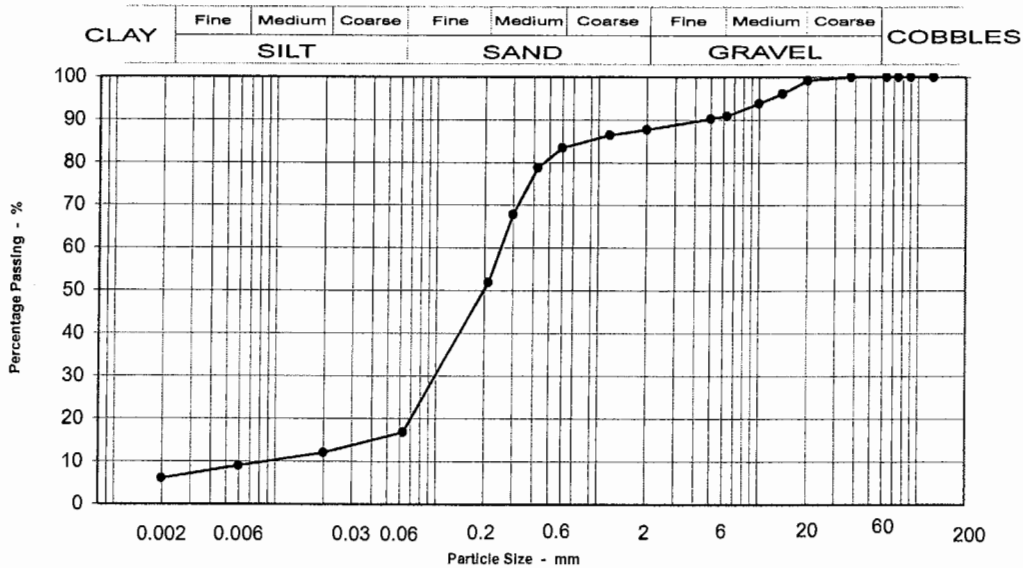
David Houseago (Lead Technician)





**Particle Size Distribution to BS 1377 : Part2 :1990**

Scheme: **Great Yarmouth Third River Crossing** Location: **TP 104 2 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	96
10	94
6.3	91
5	90
2	88
1.18	86
0.600	83
0.425	79
0.300	68
0.212	52
0.063	17
0.020	12
0.060	9
0.002	6

Specification for Highway Works Classification  
**2A/2B** Suitable

Moisture content % 19

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	8
Fine GRAVEL	4
Coarse SAND	3
Medium SAND	32
Fine SAND	35
Silt & Clay	17

Grading Analysis	
D100	20
D60	0.26
D10	0.051
Uniformity Coefficient	5

Description	

Test Code = 610



D N Houseago (Lead Technician)



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Our Project No PTPZ0008  
Our Report and sample No 100364  
Your Sample Ref **B4**  
Your Project or Order No  
P&T Project No.  
Date Report Issued 24-Oct-07

FAO I Brown

Page 1 of 1

**DETERMINATION OF ORGANIC MATTER CONTENT USING THE DICHROMATE METHOD TO BS 1377 :  
Part 3 : SECTION 3.1**

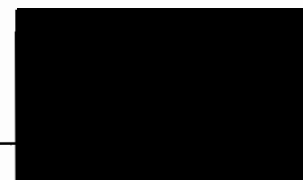
<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	TP 104	<b>Depth</b>	2.9 m
<b>Date sampled</b>		<b>Date received</b>	24-Sep-07
<b>Date tested</b>	05-Oct-07		
<b>Sample type</b>	D	<b>Sample Mass</b>	
Sampled by Client who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Small disturbed sample		
<b>Description</b>	Brown and grey silty gravelly medium and coarse SAND. Gravel is angular to subrounded medium flint with p		
<b>Supplier</b>	Not applicable	<b>Source</b>	Ex site
<b>Conveyance note No.</b>	Not applicable		

<b>LOCATION</b>	TEST SPECIMEN
<b>ORIENTATION</b>	Not applicable
<b>METHOD OF DIVISION</b>	PREPARATION DETAILS
<b>PREPARATION METHOD</b>	Ridffled
	Oven dried @ 105 -110°C
<b>PASSING 2mm BS TEST SIEVE (%)</b>	85
<b>ORGANIC MATTER (%)</b>	1

Test Code:620



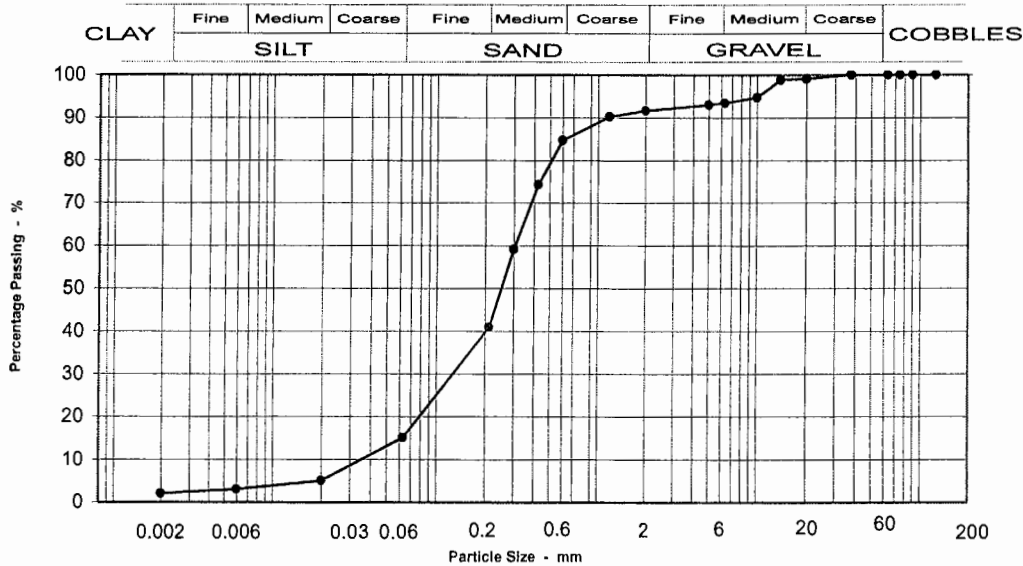
David Houseago (Lead Technician)



## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **TP 104 2.9 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	99
10	95
6.3	93
5	93
2	92
1.18	90
0.600	85
0.425	74
0.300	59
0.212	41
0.063	15
0.020	5
0.060	3
0.002	2

Specification for Highway Works Classification
2A/2B Suitable
Moisture content % 21

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	6
Fine GRAVEL	7
Coarse SAND	2
Medium SAND	44
Fine SAND	26
Silt & Clay	15

Grading Analysis	
D100	20
D60	0.31
D10	0.092
Uniformity Coefficient	3

Description
Brown and grey silty gravelly medium and coarse SAND. Gravel is angular to subrounded medium flint with pockets of soft grey sandy gravelly CLAY.

Test Code = 610

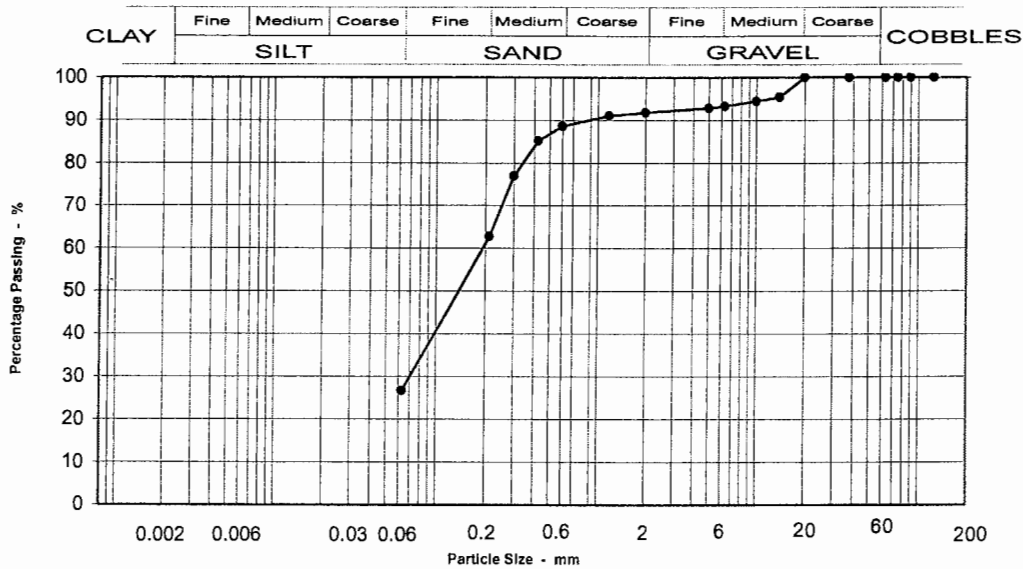


D N Houseago (Lead Technician)

## Particle Size Distribution to BS 1377 : Part2 :1990

Scheme: **Great Yarmouth Third River Crossing**

Location: **TP 109 0.3 - m**



Seiving Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	95
10	94
6.3	93
5	93
2	92
1.18	91
0.600	89
0.425	85
0.300	77
0.212	63
0.063	27

Specification for Highway Works Classification	
2A/2B	Suitable

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	7
Fine GRAVEL	3
Coarse SAND	2
Medium SAND	26
Fine SAND	36
Silt & Clay	27

Grading Analysis	
D100	14
D60	0.20
D10	0.032
Uniformity Coefficient	6

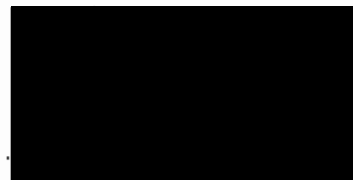
Description	

Moisture content % 12

Test Code = 610



D N Houseago (Lead Technician)



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Norwich  
NR1 2SG

Our Project No PTPZ0008  
Our Report and sample No 100300  
Your Sample Ref B2  
Your Project or Order No  
P&T Project No.  
Date Report Issued 16-Oct-07

FAO I Brown

Page 1 of 3

**DETERMINATION OF THE CALIFORNIA BEARING RATIO TO BS 1377 : PART 4 : 1990**

<b>Scheme</b>	Great Yarmouth Third River Crossing		
<b>Location</b>	TP 109	<b>Depth</b>	0.3 m
<b>Date sampled</b>		<b>Date received</b>	24-Sep-07
<b>Sample type</b>	B	<b>Sample Mass</b>	
Sampled by Driller who is not a member of Norfolk Partnership Laboratory. If a Sample Certificate was provided it is available for inspection. The accuracy of information provided by third parties cannot be guaranteed.			
<b>Material</b>	Bulk Disturbed		
<b>Description</b>	Orangey brown silty gravelly fine and medium SAND. Gravel is angular to subrounded medium and coarse flint.		
<b>Supplier</b>	<b>Source</b>		
<b>Conveyance note No.</b>			

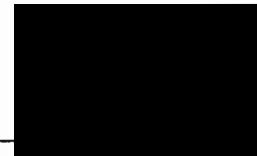
<b>LOCATION</b>	<b>TEST SPECIMEN</b>		
<b>ORIENTATION</b>	NOT APPLICABLE		
	NOT APPLICABLE		
<b>METHOD OF DIVISION</b>	<b>PREPARATION DETAILS</b>		
<b>PREPARATION METHOD</b>	QUARTERING		
	7.2.4.4 Rammer Compaction with specified effort		
<b>RETAINED 37.5mm</b>	%	0	
<b>RETAINED 20mm</b>	%	0	
<b>NO OF LAYERS</b>		3	<b>CBR VALUE TOP</b> % 7.5
<b>BLOWS PER LAYER</b>		62 Blows	<b>CBR VALUE BOTTOM</b> % 4.8
<b>METHOD</b>		2.5kg	<b>AVERAGE CBR VALUE</b> % 6.1
<b>CONDITION</b>		UNSOAKED	
<b>BULK DENSITY</b>	Mg/m <sup>3</sup>	2.114	<b>MOISTURE CONT. TOP</b> % 12
<b>DRY DENSITY</b>	Mg/m <sup>3</sup>	1.871	<b>MOISTURE CONT. BOT</b> % 14
<b>INITIAL MOISTURE CONT.</b>	%	13	<b>MOISTURE CONT. METHOD</b> Oven dried @ 105 -110°C

REMARKS

Test Code = 642



David Houseago (Lead Technician)

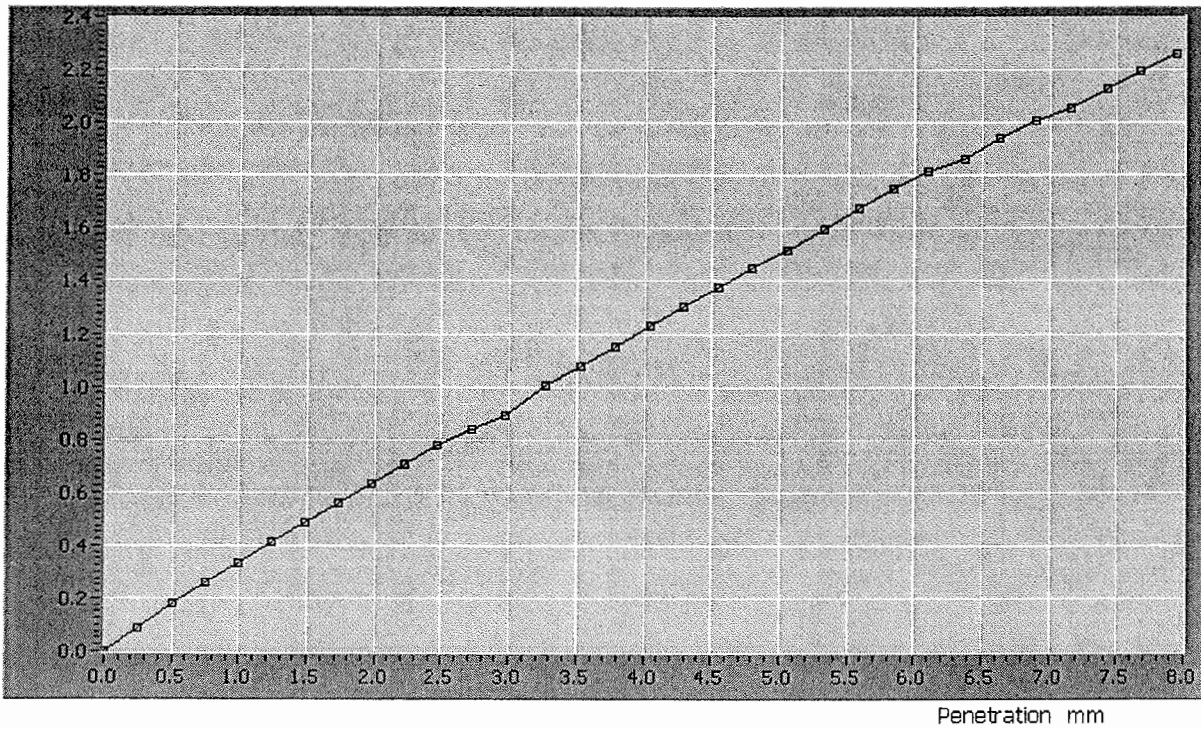


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	TP109 - B2	<b>Sample</b>	0000100300

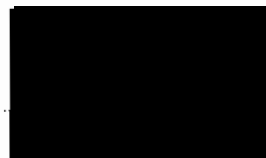
### Penetration Stage

Load kN



Results - Top			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	0.79	1.50	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	5.96	7.52	%

Authorised signatory     R J Noakes (Laboratory Manager)  
                                    M L Bumstead (Section Engineer)  
                                    D Brown (Section Engineer)  
                                    D N Houseago (Lead Technician) .....

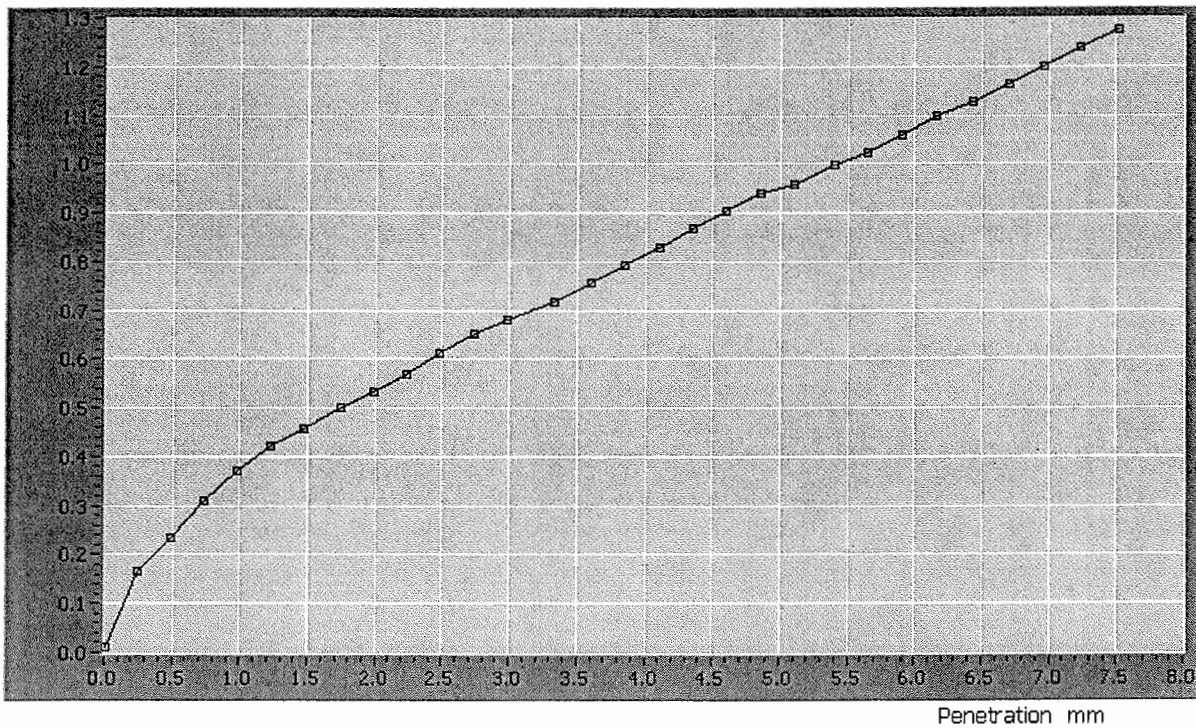


## Norfolk Partnership Laboratory California Bearing Ratio

<b>Client</b>	P & T	<b>Lab Ref</b>	N/A
<b>Project</b>	Gt Yarmouth Third River Crossing	<b>Job</b>	PTPZ0008
<b>Borehole</b>	TP109 - B2	<b>Sample</b>	0000100300

### Penetration Stage (side 2)

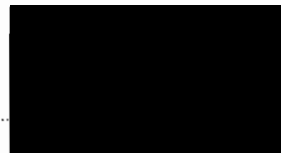
Load kN



Results - Bottom			
<b>Penetration</b>	2.50	5.00	mm
<b>Load</b>	0.62	0.95	kN
<b>Standard Load</b>	13.20	20.00	kN
<b>California Bearing Ratio</b>	4.66	4.76	%

Authorised signatory

- R J Noakes (Laboratory Manager)
- M L Bumstead (Section Engineer)
- J D Brown (Section Engineer)
- D N Houseago (Lead Technician) .....





# Appendix E


















**GEOTRACE - ANALYSIS REQUEST FORM AND SAMPLE CUSTODY SHEET**

 <b>Alcontrol Laboratories</b> Tel : 01244 528 700 Fax : 01244 528 701 Email: chester.schedulers@alcontrol.co.uk		Client: Norfolk County Laboratory Address: County Hall Annex Martineau Lane Norwich NR1 2SG Tel: 01603 223858 Fax: 01603 222457 Code / Project Name PTPZ0008 Great Yarmouth Third River Crossing Email: ian.brown@norfolk.gov.uk Contact Name: Ian Brown		Date Samples Despatched: 12-Sep-07 Sampler: <b>Unknown</b> Quotation - 3776-2 3776-2 Quotation Reference: Job Continuation - Yes <b>Yes</b> Continuation of ALcontrol job:		Sheet.. 1 of..... 1 Only one project per sheet please.	
---	--	---	--	---	--	--	--

Date of Sampling:	Borehole Ref. ID	Depth in metres	Sample Ref. ID	Suite Name/Analysis Required	(Soil or Water) (specify if other)	BRE SD1 Suite	MM4	TPH to WGC UK	Total PAH	Turnaround - please tick	Report format - please tick	Samplers Signature
11/09/2007	BH112	0.5			S	✓	✓	✓	✓	10 day turnaround <input type="checkbox"/>	Standard <input checked="" type="checkbox"/>	
11/09/2007	BH112	3.0			S		✓	✓	✓	5 day turnaround <input type="checkbox"/>	LPH <input type="checkbox"/>	
11/09/2007	BH102	0.5			S	✓	✓	✓	✓	4 day turnaround <input type="checkbox"/>	AGS <input type="checkbox"/>	
11/09/2007	BH102	3.0			S		✓	✓	✓	3 day turnaround <input type="checkbox"/>	Equis <input type="checkbox"/>	
										Other (please specify) _____ or	Other <input type="checkbox"/>	
										Date required by :	(please specify)	
										<b>Comments</b>		

**Special Instructions:** including known hazards e.g asbestos and overseas source

<b>P.O.Number</b>	PT41117H
<b>Date Received:</b>	<b>Time:</b>
<b>Invoice address if different from above :</b>	<b>Signature:</b>
	ALcontrol Job No.















## ALcontrol Geochem Analytical Services Sample Descriptions

**Job Number:** 07/14582/02/01

**Client:** Norfolk County Council

**Client Ref :** PTPZ0008

**Grain sizes**

<0.063mm      Very Fine

0.1mm - 0.063mm      Fine

0.1mm - 2mm      Medium

2mm - 10mm      Coarse

>10mm      Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
BH101	0.50	Brown	0.1mm - 2mm	Loamy Sand with some Stones	3
BH101	1.00	Brown	0.1mm - 2mm	Loamy Sand with some Stones	3
BH101	8.00-8.45	Brown	0.1mm - 2mm	Loamy Sand	3
BH102	0.5	Brown	0.1mm - 2mm	Sandy Clay with some Stones	6
BH102	1.20-1.65	Brown	0.1mm - 2mm	Sandy Loam with some Stones	7
BH102	3.0	Brown	0.1mm - 0.063mm	Silty Clay with some Stones	6
BH102	10.00-10.45	Light Brown	0.1mm - 2mm	Sandy Loam	7
BH103	21.0	Grey	0.1mm - 2mm	Sand	1
BH103 B1	0.5	Light Brown	0.1mm - 2mm	Sand with some Stones	1
BH103 B17	5.0	Grey	0.1mm - 2mm	Sand with some Stones	1
BH104	0.5	Brown	0.1mm - 0.063mm	Sandy Clay Loam with some Stones	7
BH104	0.6	Brown	0.1mm - 0.063mm	Silty Clay Loam with some Stones	9
BH104	25.5-25.95	Brown	0.1mm - 2mm	Sand	9
BH105	1.00	Grey	0.1mm - 0.063mm	Sandy Clay Loam	3
BH 105 B57	30.20	Grey	0.1mm - 0.063mm	Silty Clay	5
BH 105 D52	26.00	Brown	0.1mm - 2mm	Sand	5
BH 105 D63	34.00	Brown	0.1mm - 2mm	Sandy Clay with some Stones	5
BH106	0.2	Brown	0.1mm - 0.063mm	Silt Loam with some Vegetation	7
BH 106 B10	9.00	Beige	0.1mm - 2mm	Sand with some Stones	5
BH 106 D2	0.60	Beige	0.1mm - 2mm	Sand with some Stones	5
BH107	1.00	Light Brown	0.1mm - 2mm	Loamy Sand	7
BH 107 D6	3.00	Beige	0.1mm - 2mm	Sand	5
BH108	1.00	Light Brown	0.1mm - 2mm	Sand with some Stones	3
BH109	0.5	Light Brown	0.1mm - 2mm	Sand	2
BH109	17.0	Light Brown	0.1mm - 2mm	Sand with some Stones	2
BH109 B31	9.5	Light Brown	0.1mm - 2mm	Sand	2
BH110	0.50	Brown	0.1mm - 2mm	Loamy Sand with some Stones	7
BH110	1.00	Brown	0.1mm - 2mm	Sandy Loam with some Brick	7
BH110	2.00	Dark Grey	0.1mm - 0.063mm	Sandy Clay Loam	7
BH110	3.00	Brown	0.1mm - 0.063mm	Sandy Clay Loam	7
BH110 D4	4.00	Light Brown	0.1mm - 2mm	Sand with some Stones	8
BH110 D6	6.70	Brown	0.1mm - 2mm	Sand with some Stones	8
BH110 D8	11.50	Light Brown	0.1mm - 2mm	Sand	8

\* These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

<sup>1</sup> Sample Description supplied by client

## ALcontrol Geochem Analytical Services Sample Descriptions

Job Number: 07/14582/02/01

Client: Norfolk County Council

Client Ref : PTPZ0008

**Grain sizes**

<0.063mm	Very Fine
0.1mm - 0.063mm	Fine
0.1mm - 2mm	Medium
2mm - 10mm	Coarse
>10mm	Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
BH110 D9	13.00	Light Brown	0.1mm - 2mm	Sand with some Stones	8
BH111/TP5	0.2	Brown	0.1mm - 0.063mm	Silt with some Stones	2
BH111/TP5	0.7	Brown	0.1mm - 0.063mm	Silty Clay with some Stones	2
BH112	0.5	Brown	0.1mm - 0.063mm	Sandy Clay with some Crushed Brick	6
BH112	1.4	Brown	0.1mm - 2mm	Sandy Loam with some Brick	7
BH112	3.0	Brown	0.1mm - 2mm	Sandy Clay with some Stones	6
BH112	4.0-4.45	Brown	0.1mm - 2mm	Sandy Loam	7
BH113	0.50	Brown	0.1mm - 2mm	Sand with some Stones	8
BH114	1.20	Brown	0.1mm - 0.063mm	Sandy Clay Loam with some Stones	7
BH114	1.8	Light Brown	0.1mm - 2mm	Sand with some Stones	7
BH 114 SI 1288	0.50	Brown	0.1mm - 0.063mm	Silty Clay with some Stones	5
BH 114 SI 1288	2.20	Brown	0.1mm - 2mm	Sandy Clay with some Stones	5
BH115	0.5	Brown	0.1mm - 0.063mm	Sandy Clay Loam with some Stones	7
BH115	1.0	Brown	0.1mm - 2mm	Sand with some Stones	7
BH115	3.0	Brown	0.1mm - 2mm	Sandy Loam with some Stones	7
BH115	6.50	Brown	0.1mm - 2mm	Sand with some Stones	7
BH116	1.0	Black	n/a	Sand with some Plastic	4
BH 116 B50	24.50	Brown	0.1mm - 2mm	Sandy Clay	5
BH 116 B55	28.50	Brown	0.1mm - 2mm	Sandy Clay	5
BH117	0.35	Brown	0.1mm - 2mm	Sandy Loam with some Stones	7
BH117	1.0	Light Brown	0.1mm - 0.063mm	Sandy Clay Loam with some Stones	7
BH117	10.0	Brown	0.1mm - 2mm	Sandy Loam	7
TP101	0.20	Brown	0.1mm - 0.063mm	Loam (topsoil) with some Vegetation	8
TP101	0.50	Brown	0.1mm - 2mm	Sand with some Stones	8
TP104	0.20	Brown	0.1mm - 0.063mm	Loam (topsoil) with some Stones	8
TP104	0.50	Brown	0.1mm - 2mm	Sand with some Stones	8
TP109	0.50	Light Brown	0.1mm - 2mm	Sand with some Stones	8
WS104	0.50	Brown	0.1mm - 2mm	Loamy Sand	3
WS 104	0.50	Beige	0.1mm - 2mm	Sandy Clay	5
WS104	1.00	Light Brown	0.1mm - 2mm	Sand	3
WS 107	0.40	Brown	0.1mm - 2mm	Sandy Clay with some Stones	5
WS 107	0.50	Brown	0.1mm - 2mm	Sandy Clay with some Stones	5
WS110	0.15	Dark Brown	0.1mm - 2mm	Loamy Sand	3

\* These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

<sup>1</sup> Sample Description supplied by client

Validated   
 Preliminary

## ALcontrol Geochem Analytical Services

### Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01  
**Client:** Norfolk County Council  
**Client Ref. No.:** PTPZ0008

**Matrix:** SOLID  
**Location:** Great Yarmouth third river Crossing  
**Client Contact:** Ian Brown

Sample Identity	BH101	BH101	BH101	BH102	BH102	BH102	BH102	BH103	BH103 B1	Method Code	LoD/Units
Depth (m)	0.50	1.00	8.00-8.45	0.5	1.20-1.65	3.0	10.00-10.45	21.0	0.5		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	21.08.07	21.08.07	21.08.07	11.09.07	11.09.07	11.09.07	11.09.07	16.08.07	16.08.07		
Sample Received Date	05.09.07	05.09.07	05.09.07	13.09.07	21.09.07	13.09.07	21.09.07	22.08.07	22.08.07		
Batch	3	3	3	6	7	6	7	1	1		
Sample Number(s)	9 (1)	10 (1)	11 (1)	47-49 (1)	57 (1)	50-52 (1)	58 (1)	1 (1)	2 (1)		
Total Sulphate	590	-	-	1800	-	1000	-	-	<100	TM129 <sup>#</sup> <sub>M</sub>	<100 mg/kg
Boron Water Soluble	<3.5	-	-	<3.5	-	<3.5	-	-	<3.5	TM129 <sup>#</sup> <sub>M</sub>	<3.5 mg/kg
Total Sulphate BRE	-	0.12	0.05	-	0.02	-	0.04	0.03	-	TM149	<0.01 %
Arsenic	54	-	-	5	-	18	-	-	4	TM129 <sup>#</sup> <sub>M</sub>	<3.0 mg/kg
Barium	170	-	-	31	-	34	-	-	8	TM129 <sup>#</sup> <sub>M</sub>	<6.0 mg/kg
Beryllium	1.2	-	-	<0.4	-	<0.4	-	-	<0.4	TM129	<0.4 mg/kg
Cadmium	3.7	-	-	<0.3	-	<0.3	-	-	<0.3	TM129	<0.3 mg/kg
Chromium	16	-	-	8.0	-	19	-	-	<4.5	TM129 <sup>#</sup> <sub>M</sub>	<4.5 mg/kg
Copper	25	-	-	17	-	10	-	-	34	TM129 <sup>#</sup>	<6 mg/kg
Lead	24	-	-	26	-	13	-	-	10	TM129 <sup>#</sup> <sub>M</sub>	<2 mg/kg
Mercury	<0.6	-	-	<0.6	-	<0.6	-	-	<0.6	TM129 <sup>#</sup> <sub>M</sub>	<0.6 mg/kg
Nickel	41	-	-	7.8	-	18	-	-	2.6	TM129 <sup>#</sup> <sub>M</sub>	<0.9 mg/kg
Selenium	<3	-	-	<3	-	<3	-	-	<3	TM129 <sup>#</sup> <sub>M</sub>	<3 mg/kg
Vanadium	43	-	-	16	-	32	-	-	4.7	TM129 <sup>#</sup> <sub>M</sub>	<1.5 mg/kg
Zinc	200	-	-	31	-	53	-	-	6.4	TM129 <sup>#</sup> <sub>M</sub>	<2.5 mg/kg
Ammonium as NH4 in 2:1 Extract BRE	-	0.0004	0.0012	-	0.0009	-	<0.0003	0.0031	-	TM099 <sup>#</sup>	<0.0003 g/l
Nitrate (soluble) as NO3	3	-	-	9	-	54	-	-	13	TM102 <sup>#</sup>	<1 mg/kg
Acid Soluble Sulphide	<50	-	-	<50	-	<50	-	-	<50	TM101	<50 mg/kg
Total Cyanide	<1	-	-	<1	-	<1	-	-	<1	TM153 <sup>#</sup>	<1 mg/kg
Free Cyanide	<1	-	-	<1	-	<1	-	-	<1	TM153 <sup>#</sup>	<1 mg/kg
Complex Cyanide	<1	-	-	<1	-	<1	-	-	<1	TM153 <sup>#</sup>	<1 mg/kg
Asbestos Presence Screen	No Fibres Detected	-	-	No Fibres Detected	-	No Fibres Detected	-	-	No Fibres Detected	TM001	NONE
Chloride 2:1 water/soil extract BRE	-	0.014	1.3	-	0.009	-	1.2	0.29	-	TM097 <sup>#</sup>	<0.001 g/l
Magnesium 2:1 water/soil extract BRE	-	<0.001	0.072	-	0.001	-	0.036	0.014	-	TM129 <sup>#</sup>	<0.001 g/l
Nitrate 2:1 water/soil extract BRE	-	0.0021	<0.0003	-	0.0007	-	<0.0003	0.0090	-	TM102 <sup>#</sup>	<0.0003 g/l
pH Value	10.16	9.68	8.28	10.92	8.65	8.69	8.48	8.04	9.44	TM133 <sup>#</sup> <sub>M</sub>	<1.00 pH Units
Soluble Sulphate 2:1 Extract as SO4 BRE	-	0.091	0.17	-	0.021	-	0.21	0.11	-	TM098 <sup>#</sup>	<0.003 g/l
Total Sulphur	0.11	0.12	0.02	0.09	0.04	0.66	0.04	0.18	0.02	TM068 <sup>#</sup>	<0.01 %

All results expressed on a dry weight basis.

Date 19.10.2007

Validated   
Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
M MCERTS accredited  
\* Subcontracted test  
» Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH101	BH101	BH101	BH102	BH102	BH102	BH102	BH103	BH103 B1	Method Code	LoD/Units
Depth (m)	0.50	1.00	8.00-8.45	0.5	1.20-1.65	3.0	10.00-10.45	21.0	0.5		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	21.08.07	21.08.07	21.08.07	11.09.07	11.09.07	11.09.07	11.09.07	16.08.07	16.08.07		
Sample Received Date	05.09.07	05.09.07	05.09.07	13.09.07	21.09.07	13.09.07	21.09.07	22.08.07	22.08.07		
Batch	3	3	3	6	7	6	7	1	1		
Sample Number(s)	9 (1)	10 (1)	11 (1)	47-49 (1)	57 (1)	50-52 (1)	58 (1)	1 (1)	2 (1)		
GRO (C4-C12)	-	-	-	-	-	-	-	-	<10	TM089	<10 ug/kg
MTBE	-	-	-	-	-	-	-	-	<10	TM089 <sup>#</sup>	<10 ug/kg
Benzene	-	-	-	-	-	-	-	-	<10	TM089 <sup>#M</sup>	<10 ug/kg
Toluene	-	-	-	-	-	-	-	-	<10	TM089 <sup>#M</sup>	<10 ug/kg
Ethyl benzene	-	-	-	-	-	-	-	-	<10	TM089 <sup>#M</sup>	<10 ug/kg
m & p Xylene	-	-	-	-	-	-	-	-	<10	TM089 <sup>#M</sup>	<10 ug/kg
o Xylene	-	-	-	-	-	-	-	-	<10	TM089 <sup>#M</sup>	<10 ug/kg
Aliphatics C5-C6	-	-	-	-	-	-	-	-	<10	TM089	<10 ug/kg
Aliphatics >C6-C8	-	-	-	-	-	-	-	-	<10	TM089	<10 ug/kg
Aliphatics >C8-C10	-	-	-	-	-	-	-	-	<10	TM089	<10 ug/kg
Aliphatics >C10-C12	-	-	-	-	-	-	-	-	<10	TM089	<10 ug/kg
Aliphatics >C12-C16	-	-	-	-	-	-	-	-	<100	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C21	-	-	-	-	-	-	-	-	<100	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C35	-	-	-	-	-	-	-	-	-	TM173	<100 ug/kg
Aliphatics >C21-C35	-	-	-	-	-	-	-	-	<100	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C35-C44	-	-	-	-	-	-	-	-	-	TM173	<100 ug/kg
Total Aliphatics C5-C35	-	-	-	-	-	-	-	-	<100	TM61/89	<100 ug/kg
Total Aliphatics C5-C44	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Aromatics C6-C7	-	-	-	-	-	-	-	-	<10	TM089	<10 ug/kg
Aromatics >C7-C8	-	-	-	-	-	-	-	-	<10	TM089	<10 ug/kg
Aromatics >EC8-EC10	-	-	-	-	-	-	-	-	<10	TM089	<10 ug/kg
Aromatics >EC10-EC12	-	-	-	-	-	-	-	-	<10	TM089	<10 ug/kg
Aromatics >EC12-EC16	-	-	-	-	-	-	-	-	<100	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC16-EC21	-	-	-	-	-	-	-	-	300	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC21-EC35	-	-	-	-	-	-	-	-	19000	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC35-EC44	-	-	-	-	-	-	-	-	-	TM173	<100 ug/kg
Total Aromatics C6-C35	-	-	-	-	-	-	-	-	19000	TM61/89	<100 ug/kg
Total Aromatics C6-C44	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C35)	-	-	-	-	-	-	-	-	19000	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C44)	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg

All results expressed on a dry weight basis.

Date 19.10.2007



Validated   
 Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH101	BH101	BH101	BH102	BH102	BH102	BH102	BH103	BH103 B1	Method Code	LoD/Units
<b>Depth (m)</b>	0.50	1.00	8.00-8.45	0.5	1.20-1.65	3.0	10.00-10.45	21.0	0.5		
<b>Sample Type</b>	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
<b>Sampled Date</b>	21.08.07	21.08.07	21.08.07	11.09.07	11.09.07	11.09.07	11.09.07	16.08.07	16.08.07		
<b>Sample Received Date</b>	05.09.07	05.09.07	05.09.07	13.09.07	21.09.07	13.09.07	21.09.07	22.08.07	22.08.07		
<b>Batch</b>	3	3	3	6	7	6	7	1	1		
<b>Sample Number(s)</b>	9 (1)	10 (1)	11 (1)	47-49 (1)	57 (1)	50-52 (1)	58 (1)	1 (1)	2 (1)		
<b>PAH by GCMS</b>											
Naphthalene	64	-	-	190	-	330	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Acenaphthylene	9	-	-	21	-	8	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<5 ug/kg
Acenaphthene	39	-	-	45	-	<14	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<14 ug/kg
Fluorene	30	-	-	38	-	28	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Phenanthrene	240	-	-	480	-	62	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<21 ug/kg
Anthracene	52	-	-	120	-	<9	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<9 ug/kg
Fluoranthene	360	-	-	810	-	35	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg
Pyrene	310	-	-	610	-	28	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<22 ug/kg
Benz(a)anthracene	190	-	-	370	-	29	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Chrysene	220	-	-	360	-	21	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Benzo(b)fluoranthene	130	-	-	390	-	24	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<16 ug/kg
Benzo(k)fluoranthene	110	-	-	140	-	<25	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg
Benzo(a)pyrene	190	-	-	320	-	15	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Indeno(123cd)pyrene	92	-	-	170	-	<11	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<11 ug/kg
Dibenzo(ah)anthracene	24	-	-	46	-	<8	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<8 ug/kg
Benzo(ghi)perylene	120	-	-	210	-	16	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
PAH 16 Total	2200	-	-	4300	-	600	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg

All results expressed on a dry weight basis.

Date 19.10.2007



Validated   
 Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH103 B17	BH104	BH104	BH104	BH105	BH 105 B57	BH 105 D52	BH 105 D63	BH106	Method Code	LoD/Units
Depth (m)	5.0	0.5	0.6	25.5-25.95	1.00	30.20	26.00	34.00	0.2		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	16.08.07	14.09.07	14.09.07	19.09.07	23.08.07	31.08.07	31.08.07	31.08.07			
Sample Received Date	22.08.07	21.09.07	25.09.07	25.09.07	05.09.07	12.09.07	12.09.07	12.09.07	21.09.07		
Batch	1	7	9	9	3	5	5	5	7		
Sample Number(s)	3 (1)	59-60 (1)	124 (1)	125 (1)	12-14 (1)	29 (1)	30 (1)	31 (1)	61-63 (1)		
Total Sulphate	-	850	-	-	1700	-	-	-	980	TM129 <sup>M</sup>	<100 mg/kg
Boron Water Soluble	-	<3.5	-	-	4.3	-	-	-	<3.5	TM129 <sup>M</sup>	<3.5 mg/kg
Total Sulphate BRE	0.01	-	0.06	0.03	0.17	0.10	0.04	0.06	-	TM149	<0.01 %
Arsenic	-	6	-	-	6	-	-	-	4	TM129 <sup>M</sup>	<3.0 mg/kg
Barium	-	47	-	-	20	-	-	-	43	TM129 <sup>M</sup>	<6.0 mg/kg
Beryllium	-	<0.4	-	-	<0.4	-	-	-	<0.4	TM129	<0.4 mg/kg
Cadmium	-	<0.3	-	-	<0.3	-	-	-	<0.3	TM129	<0.3 mg/kg
Chromium	-	11	-	-	17	-	-	-	9.7	TM129 <sup>M</sup>	<4.5 mg/kg
Copper	-	72	-	-	9	-	-	-	84	TM129 <sup>M</sup>	<6 mg/kg
Lead	-	39	-	-	23	-	-	-	30	TM129 <sup>M</sup>	<2 mg/kg
Mercury	-	<0.6	-	-	<0.6	-	-	-	<0.6	TM129 <sup>M</sup>	<0.6 mg/kg
Nickel	-	15	-	-	13	-	-	-	6.5	TM129 <sup>M</sup>	<0.9 mg/kg
Selenium	-	<3	-	-	<3	-	-	-	<3	TM129 <sup>M</sup>	<3 mg/kg
Vanadium	-	20	-	-	29	-	-	-	15	TM129 <sup>M</sup>	<1.5 mg/kg
Zinc	-	29	-	-	39	-	-	-	45	TM129 <sup>M</sup>	<2.5 mg/kg
Ammonium as NH4 in 2:1 Extract BRE	0.0099	-	<0.0003	<0.0003	0.0021	<0.0003	<0.0003	<0.0003	-	TM099 <sup>E</sup>	<0.0003 g/l
Nitrate (soluble) as NO3	-	15	-	-	<1	-	-	-	28	TM102 <sup>E</sup>	<1 mg/kg
Acid Soluble Sulphide	-	<50	-	-	170	-	-	-	<50	TM101	<50 mg/kg
Total Cyanide	-	<1	-	-	<1	-	-	-	<1	TM153 <sup>F</sup>	<1 mg/kg
Free Cyanide	-	<1	-	-	<1	-	-	-	<1	TM153 <sup>F</sup>	<1 mg/kg
Complex Cyanide	-	<1	-	-	<1	-	-	-	<1	TM153 <sup>F</sup>	<1 mg/kg
Asbestos Presence Screen	-	No Fibres Detected	-	-	No Fibres Detected	-	-	-	No Fibres Detected	TM001	NONE
Chloride 2:1 water/soil extract BRE	0.098	-	0.015	0.98	0.018	1.7	0.55	0.83	-	TM097 <sup>F</sup>	<0.001 g/l
Magnesium 2:1 water/soil extract BRE	0.005	-	0.004	0.052	0.030	0.042	0.021	0.032	-	TM129 <sup>E</sup>	<0.001 g/l
Nitrate 2:1 water/soil extract BRE	0.0071	-	0.011	0.0091	<0.0003	<0.0003	<0.0003	<0.0003	-	TM102 <sup>E</sup>	<0.0003 g/l
pH Value	8.37	8.33	8.44	8.30	7.65	8.17	8.21	8.17	7.95	TM133 <sup>E</sup>	<1.00 pH Units
Soluble Sulphate 2:1 Extract as SO4 BRE	0.091	-	0.055	0.17	0.47	0.33	0.13	0.20	-	TM098 <sup>F</sup>	<0.003 g/l
Total Sulphur	0.04	0.06	0.05	0.07	0.20	0.40	0.17	0.22	0.08	TM068 <sup>E</sup>	<0.01 %

All results expressed on a dry weight basis.

Date 19.10.2007

Validated   
Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
M MCERTS accredited  
\* Subcontracted test  
» Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH103 B17	BH104	BH104	BH104	BH105	BH 105 B57	BH 105 D52	BH 105 D63	BH106	Method Code	LoD/Units
Depth (m)	5.0	0.5	0.6	25.5-25.95	1.00	30.20	26.00	34.00	0.2		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	16.08.07	14.09.07	14.09.07	19.09.07	23.08.07	31.08.07	31.08.07	31.08.07			
Sample Received Date	22.08.07	21.09.07	25.09.07	25.09.07	05.09.07	12.09.07	12.09.07	12.09.07	21.09.07		
Batch	1	7	9	9	3	5	5	5	7		
Sample Number(s)	3 (1)	59-60 (1)	124 (1)	125 (1)	12-14 (1)	29 (1)	30 (1)	31 (1)	61-63 (1)		
GRO (C4-C12)	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
MTBE	-	-	-	-	<10	-	-	-	-	TM089 <sup>#</sup>	<10 ug/kg
Benzene	-	-	-	-	<10	-	-	-	-	TM089 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Toluene	-	-	-	-	<10	-	-	-	-	TM089 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Ethyl benzene	-	-	-	-	<10	-	-	-	-	TM089 <sup>#</sup> <sub>M</sub>	<10 ug/kg
m & p Xylene	-	-	-	-	<10	-	-	-	-	TM089 <sup>#</sup> <sub>M</sub>	<10 ug/kg
o Xylene	-	-	-	-	<10	-	-	-	-	TM089 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Aliphatics C5-C6	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C6-C8	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C8-C10	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C10-C12	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C12-C16	-	-	-	-	<100	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C21	-	-	-	-	-	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C35	-	-	-	-	3100	-	-	-	-	TM173	<100 ug/kg
Aliphatics >C21-C35	-	-	-	-	-	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C35-C44	-	-	-	-	<100	-	-	-	-	TM173	<100 ug/kg
Total Aliphatics C5-C35	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Total Aliphatics C5-C44	-	-	-	-	3100	-	-	-	-	TM61/89	<100 ug/kg
Aromatics C6-C7	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aromatics >C7-C8	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aromatics >EC8-EC10	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aromatics >EC10-EC12	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aromatics >EC12-EC16	-	-	-	-	<100	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC16-EC21	-	-	-	-	<100	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC21-EC35	-	-	-	-	19000	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC35-EC44	-	-	-	-	4800	-	-	-	-	TM173	<100 ug/kg
Total Aromatics C6-C35	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Total Aromatics C6-C44	-	-	-	-	24000	-	-	-	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C35)	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C44)	-	-	-	-	27000	-	-	-	-	TM61/89	<100 ug/kg

All results expressed on a dry weight basis.

Date 19.10.2007



Validated   
Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
M MCERTS accredited  
\* Subcontracted test  
» Shown on prev. report

Job Number: 07/14582/02/01  
Client: Norfolk County Council  
Client Ref. No.: PTPZ0008

Matrix: SOLID  
Location: Great Yarmouth third river Crossing  
Client Contact: Ian Brown

Sample Identity	BH103 B17	BH104	BH104	BH104	BH105	BH 105 B57	BH 105 D52	BH 105 D63	BH106	Method Code	LoD/Units
Depth (m)	5.0	0.5	0.6	25.5-25.95	1.00	30.20	26.00	34.00	0.2		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	16.08.07	14.09.07	14.09.07	19.09.07	23.08.07	31.08.07	31.08.07	31.08.07			
Sample Received Date	22.08.07	21.09.07	25.09.07	25.09.07	05.09.07	12.09.07	12.09.07	12.09.07	21.09.07		
Batch	1	7	9	9	3	5	5	5	7		
Sample Number(s)	3 (1)	59-60 (1)	124 (1)	125 (1)	12-14 (1)	29 (1)	30 (1)	31 (1)	61-63 (1)		
<b>PAH by GCMS</b>											
Naphthalene	-	-	-	-	690	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Acenaphthylene	-	-	-	-	<5	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<5 ug/kg
Acenaphthene	-	-	-	-	17	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<14 ug/kg
Fluorene	-	-	-	-	21	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Phenanthrene	-	-	-	-	56	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<21 ug/kg
Anthracene	-	-	-	-	<9	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<9 ug/kg
Fluoranthene	-	-	-	-	<25	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg
Pyrene	-	-	-	-	<22	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<22 ug/kg
Benz(a)anthracene	-	-	-	-	27	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Chrysene	-	-	-	-	15	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Benzo(b)fluoranthene	-	-	-	-	<16	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<16 ug/kg
Benzo(k)fluoranthene	-	-	-	-	<25	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg
Benzo(a)pyrene	-	-	-	-	13	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Indeno(123cd)pyrene	-	-	-	-	16	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<11 ug/kg
Dibenzo(ah)anthracene	-	-	-	-	<8	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<8 ug/kg
Benzo(ghi)perylene	-	-	-	-	28	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
PAH 16 Total	-	-	-	-	890	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg

All results expressed on a dry weight basis.

Date 19.10.2007

Validated   
Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
M MCERTS accredited  
\* Subcontracted test  
» Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH 106 B10	BH 106 D2	BH107	BH 107 D6	BH108	BH109	BH109	BH109 B31	BH110	Method Code	LoD/Units
Depth (m)	9.00	0.60	1.00	3.00	1.00	0.5	17.0	9.5	0.50		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	30.08.07	29.08.07		05.09.07	23.08.07				17.09.07		
Sample Received Date	12.09.07	12.09.07	21.09.07	12.09.07	05.09.07	28.08.07	28.08.07	28.08.07	21.09.07		
Batch	5	5	7	5	3	2	2	2	7		
Sample Number(s)	<b>33 (1)</b>	<b>32 (1)</b>	<b>64-66 (1)</b>	<b>34 (1)</b>	<b>15-18 (1)</b>	<b>4 (1)</b>	<b>5 (1)</b>	<b>6 (1)</b>	<b>67-69 (1)</b>		
Total Sulphate	-	-	<100	-	<100	<100	-	-	3700	TM129 <sup>M</sup>	<100 mg/kg
Boron Water Soluble	-	-	<3.5	-	<3.5	<3.5	-	-	3.6	TM129 <sup>M</sup>	<3.5 mg/kg
Total Sulphate BRE	0.01	0.06	-	<0.01	<0.01	-	0.03	0.01	0.37	TM149	<0.01 %
Arsenic	-	-	<3	-	3	<3	-	-	3	TM129 <sup>M</sup>	<3.0 mg/kg
Barium	-	-	9	-	9	<6	-	-	260	TM129 <sup>M</sup>	<6.0 mg/kg
Beryllium	-	-	<0.4	-	<0.4	<0.4	-	-	<0.4	TM129	<0.4 mg/kg
Cadmium	-	-	<0.3	-	<0.3	<0.3	-	-	0.8	TM129	<0.3 mg/kg
Chromium	-	-	<4.5	-	<4.5	<4.5	-	-	57	TM129 <sup>M</sup>	<4.5 mg/kg
Copper	-	-	<6	-	<6	<6	-	-	330	TM129 <sup>M</sup>	<6 mg/kg
Lead	-	-	6	-	4	4	-	-	78	TM129 <sup>M</sup>	<2 mg/kg
Mercury	-	-	<0.6	-	<0.6	<0.6	-	-	<0.6	TM129 <sup>M</sup>	<0.6 mg/kg
Nickel	-	-	1.7	-	3.3	<0.9	-	-	29	TM129 <sup>M</sup>	<0.9 mg/kg
Selenium	-	-	<3	-	<3	<3	-	-	<3	TM129 <sup>M</sup>	<3 mg/kg
Vanadium	-	-	<1.5	-	4.5	2.9	-	-	59	TM129 <sup>M</sup>	<1.5 mg/kg
Zinc	-	-	22	-	8.8	4.2	-	-	1500	TM129 <sup>M</sup>	<2.5 mg/kg
Ammonium as NH4 in 2:1 Extract BRE	<0.0003	<0.0003	-	0.0008	<0.0003	-	<0.0003	<0.0003	0.0009	TM099 <sup>M</sup>	<0.0003 g/l
Nitrate (soluble) as NO3	-	-	<1	-	1	12	-	-	12	TM102 <sup>M</sup>	<1 mg/kg
Acid Soluble Sulphide	-	-	<50	-	<50	<50	-	-	1100	TM101	<50 mg/kg
Total Cyanide	-	-	<1	-	<1	<1	-	-	<1	TM153 <sup>M</sup>	<1 mg/kg
Free Cyanide	-	-	<1	-	<1	<1	-	-	<1	TM153 <sup>M</sup>	<1 mg/kg
Complex Cyanide	-	-	<1	-	<1	-	-	-	<1	TM153 <sup>M</sup>	<1 mg/kg
Asbestos Presence Screen	-	-	No Fibres Detected	-	No Fibres Detected	No Fibres Detected	-	-	No Fibres Detected	TM001	NONE
Chloride 2:1 water/soil extract BRE	0.031	0.061	-	0.008	0.016	-	0.51	0.052	0.15	TM097 <sup>M</sup>	<0.001 g/l
Magnesium 2:1 water/soil extract BRE	0.002	<0.001	-	<0.001	0.002	-	0.024	0.003	<0.001	TM129 <sup>M</sup>	<0.001 g/l
Nitrate 2:1 water/soil extract BRE	0.0012	0.0037	-	0.0048	0.0004	-	<0.0003	<0.0003	0.0054	TM102 <sup>M</sup>	<0.0003 g/l
pH Value	8.28	9.87	8.69	7.76	8.66	8.69	8.62	8.54	11.52	TM133 <sup>M</sup>	<1.00 pH Units
Soluble Sulphate 2:1 Extract as SO4 BRE	0.012	0.052	-	0.012	0.007	-	0.098	0.015	0.19	TM098 <sup>M</sup>	<0.003 g/l
Total Sulphur	0.03	0.04	0.02	0.01	0.03	0.01	0.04	0.02	0.27	TM068 <sup>M</sup>	<0.01 %

All results expressed on a dry weight basis.

Date 19.10.2007

Validated   
Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
M MCERTS accredited  
\* Subcontracted test  
» Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH 106 B10	BH 106 D2	BH107	BH 107 D6	BH108	BH109	BH109	BH109 B31	BH110	Method Code	LoD/Units
Depth (m)	9.00	0.60	1.00	3.00	1.00	0.5	17.0	9.5	0.50		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	30.08.07	29.08.07		05.09.07	23.08.07				17.09.07		
Sample Received Date	12.09.07	12.09.07	21.09.07	12.09.07	05.09.07	28.08.07	28.08.07	28.08.07	21.09.07		
Batch	5	5	7	5	3	2	2	2	7		
Sample Number(s)	33 (1)	32 (1)	64-66 (1)	34 (1)	15-18 (1)	4 (1)	5 (1)	6 (1)	67-69 (1)		
GRO (C4-C12)	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
MTBE	-	-	-	-	<10	-	-	-	-	TM089 <sup>#</sup>	<10 ug/kg
Benzene	-	-	-	-	<10	-	-	-	-	TM089 <sup>#M</sup>	<10 ug/kg
Toluene	-	-	-	-	<10	-	-	-	-	TM089 <sup>#M</sup>	<10 ug/kg
Ethyl benzene	-	-	-	-	<10	-	-	-	-	TM089 <sup>#M</sup>	<10 ug/kg
m & p Xylene	-	-	-	-	<10	-	-	-	-	TM089 <sup>#M</sup>	<10 ug/kg
o Xylene	-	-	-	-	<10	-	-	-	-	TM089 <sup>#M</sup>	<10 ug/kg
Aliphatics C5-C6	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C6-C8	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C8-C10	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C10-C12	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C12-C16	-	-	-	-	<100	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C21	-	-	-	-	-	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C35	-	-	-	-	<100	-	-	-	-	TM173	<100 ug/kg
Aliphatics >C21-C35	-	-	-	-	-	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C35-C44	-	-	-	-	<100	-	-	-	-	TM173	<100 ug/kg
Total Aliphatics C5-C35	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Total Aliphatics C5-C44	-	-	-	-	<100	-	-	-	-	TM61/89	<100 ug/kg
Aromatics C6-C7	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aromatics >C7-C8	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aromatics >EC8-EC10	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aromatics >EC10-EC12	-	-	-	-	<10	-	-	-	-	TM089	<10 ug/kg
Aromatics >EC12-EC16	-	-	-	-	<100	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC16-EC21	-	-	-	-	<100	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC21-EC35	-	-	-	-	<100	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC35-EC44	-	-	-	-	<100	-	-	-	-	TM173	<100 ug/kg
Total Aromatics C6-C35	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Total Aromatics C6-C44	-	-	-	-	<100	-	-	-	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C35)	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C44)	-	-	-	-	<100	-	-	-	-	TM61/89	<100 ug/kg

All results expressed on a dry weight basis.

Date 19.10.2007





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 Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH 106 B10	BH 106 D2	BH107	BH 107 D6	BH108	BH109	BH109	BH109 B31	BH110	Method Code	LOD/Units
<b>Depth (m)</b>	9.00	0.60	1.00	3.00	1.00	0.5	17.0	9.5	0.50		
<b>Sample Type</b>	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
<b>Sampled Date</b>	30.08.07	29.08.07		05.09.07	23.08.07				17.09.07		
<b>Sample Received Date</b>	12.09.07	12.09.07	21.09.07	12.09.07	05.09.07	28.08.07	28.08.07	28.08.07	21.09.07		
<b>Batch</b>	5	5	7	5	3	2	2	2	7		
<b>Sample Number(s)</b>	33 (1)	32 (1)	64-66 (1)	34 (1)	15-18 (1)	4 (1)	5 (1)	6 (1)	67-69 (1)		
<b>PAH by GCMS</b>											
Naphthalene	-	-	-	-	17	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Acenaphthylene	-	-	-	-	<5	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<5 ug/kg
Acenaphthene	-	-	-	-	<14	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<14 ug/kg
Fluorene	-	-	-	-	<12	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Phenanthrene	-	-	-	-	<21	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<21 ug/kg
Anthracene	-	-	-	-	<9	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<9 ug/kg
Fluoranthene	-	-	-	-	<25	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg
Pyrene	-	-	-	-	<22	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<22 ug/kg
Benz(a)anthracene	-	-	-	-	21	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Chrysene	-	-	-	-	<10	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Benzo(b)fluoranthene	-	-	-	-	<16	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<16 ug/kg
Benzo(k)fluoranthene	-	-	-	-	<25	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg
Benzo(a)pyrene	-	-	-	-	<12	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Indeno(123cd)pyrene	-	-	-	-	12	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<11 ug/kg
Dibenzo(ah)anthracene	-	-	-	-	<8	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<8 ug/kg
Benzo(ghi)perylene	-	-	-	-	19	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
PAH 16 Total	-	-	-	-	69	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg

All results expressed on a dry weight basis.

Date 19.10.2007

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 Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH110	BH110	BH110	BH110 D4	BH110 D6	BH110 D8	BH110 D9	BH111/TP 5	BH111/TP 5	Method Code	LoD/Units	
Depth (m)	1.00	2.00	3.00	4.00	6.70	11.50	13.00	0.2	0.7			
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID			
Sampled Date	17.09.07	17.09.07	17.09.07	17.09.07	17.09.07	17.09.07	17.09.07					
Sample Received Date	21.09.07	21.09.07	21.09.07	22.09.07	22.09.07	22.09.07	22.09.07	28.08.07	28.08.07			
Batch	7	7	7	8	8	8	8	2	2			
Sample Number(s)	70-72 (1)	73-75 (1)	76-78 (1)	97-99 (1)	100-102 (1)	103-105 (1)	106-108 (1)	7 (1)	8 (1)			
Total Sulphate	5400	1400	1300	1600	470	580	420	520	-	TM129 <sup>#</sup> <sub>M</sub>	<100 mg/kg	
Boron Water Soluble	3.6	4.3	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5	-	TM129 <sup>#</sup> <sub>M</sub>	<3.5 mg/kg	
Total Sulphate BRE	0.54	-	-	-	-	-	-	-	0.08	TM149	<0.01 %	
Arsenic	<3	8	6	<3	<3	23	14	7	-	TM129 <sup>#</sup> <sub>M</sub>	<3.0 mg/kg	
Barium	94	66	40	11	11	<6	<6	37	-	TM129 <sup>#</sup> <sub>M</sub>	<6.0 mg/kg	
Beryllium	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-	TM129	<0.4 mg/kg	
Cadmium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	TM129	<0.3 mg/kg	
Chromium	24	23	16	8.6	<4.5	<4.5	<4.5	11	-	TM129 <sup>#</sup> <sub>M</sub>	<4.5 mg/kg	
Copper	57	200	170	<6	<6	<6	<6	27	-	TM129 <sup>#</sup>	<6 mg/kg	
Lead	42	12	10	24	9	6	3	40	-	TM129 <sup>#</sup> <sub>M</sub>	<2 mg/kg	
Mercury	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	-	TM129 <sup>#</sup> <sub>M</sub>	<0.6 mg/kg	
Nickel	12	19	14	8.4	5.0	2.9	2.8	15	-	TM129 <sup>#</sup> <sub>M</sub>	<0.9 mg/kg	
Selenium	<3	<3	<3	<3	<3	<3	<3	<3	-	TM129 <sup>#</sup> <sub>M</sub>	<3 mg/kg	
Vanadium	22	42	27	16	8.0	11	9.4	18	-	TM129 <sup>#</sup> <sub>M</sub>	<1.5 mg/kg	
Zinc	190	83	45	24	13	11	9.7	55	-	TM129 <sup>#</sup> <sub>M</sub>	<2.5 mg/kg	
Ammonium as NH4 in 2:1 Extract BRE	0.0015	-	-	-	-	-	-	-	<0.0003	TM099 <sup>#</sup>	<0.0003 g/l	
Nitrate (soluble) as NO3	2	<1	<1	<1	<1	<1	<1	21	-	TM102 <sup>#</sup>	<1 mg/kg	
Acid Soluble Sulphide	<50	150	90	1200	<50	<50	<50	110	-	TM101	<50 mg/kg	
Total Cyanide	1	36	8	2	<1	<1	<1	<1	-	TM153 <sup>#</sup>	<1 mg/kg	
Free Cyanide	<1	<1	<1	<1	<1	<1	<1	<1	-	TM153 <sup>#</sup>	<1 mg/kg	
Complex Cyanide	1	36	8	2	<1	<1	<1	-	-	TM153 <sup>#</sup>	<1 mg/kg	
Asbestos Presence Screen	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	-	TM001	NONE
Chloride 2:1 water/soil extract BRE	0.18	-	-	-	-	-	-	-	0.018	TM097 <sup>#</sup>	<0.001 g/l	
Magnesium 2:1 water/soil extract BRE	<0.001	-	-	-	-	-	-	-	<0.001	TM129 <sup>#</sup>	<0.001 g/l	
Nitrate 2:1 water/soil extract BRE	0.0013	-	-	-	-	-	-	-	0.0075	TM102 <sup>#</sup>	<0.0003 g/l	
pH Value	11.34	9.02	8.58	8.93	8.59	8.03	8.15	8.76	8.22	TM133 <sup>#</sup> <sub>M</sub>	<1.00 pH Units	
Soluble Sulphate 2:1 Extract as SO4 BRE	0.45	-	-	-	-	-	-	-	0.060	TM098 <sup>#</sup>	<0.003 g/l	
Total Sulphur	0.22	0.49	0.79	0.38	0.07	0.05	0.05	0.05	0.09	TM068 <sup>#</sup>	<0.01 %	

All results expressed on a dry weight basis.

Date 19.10.2007

Validated   
Preliminary

## ALcontrol Geochem Analytical Services

### Table Of Results

# ISO 17025 accredited  
M MCERTS accredited  
\* Subcontracted test  
» Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH110	BH110	BH110	BH110 D4	BH110 D6	BH110 D8	BH110 D9	BH111/TP 5	BH111/TP 5	Method Code	LoD/Units
Depth (m)	1.00	2.00	3.00	4.00	6.70	11.50	13.00	0.2	0.7		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	17.09.07	17.09.07	17.09.07	17.09.07	17.09.07	17.09.07	17.09.07				
Sample Received Date	21.09.07	21.09.07	21.09.07	22.09.07	22.09.07	22.09.07	22.09.07	28.08.07	28.08.07		
Batch	7	7	7	8	8	8	8	2	2		
Sample Number(s)	70-72 (1)	73-75 (1)	76-78 (1)	97-99 (1)	100-102 (1)	103-105 (1)	106-108 (1)	7 (1)	8 (1)		
GRO (C4-C12)	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
MTBE	-	-	-	-	-	-	-	<10	-	TM089 <sup>f</sup>	<10 ug/kg
Benzene	-	-	-	-	-	-	-	<10	-	TM089 <sup>f</sup> <sub>M</sub>	<10 ug/kg
Toluene	-	-	-	-	-	-	-	<10	-	TM089 <sup>f</sup> <sub>M</sub>	<10 ug/kg
Ethyl benzene	-	-	-	-	-	-	-	<10	-	TM089 <sup>f</sup> <sub>M</sub>	<10 ug/kg
m & p Xylene	-	-	-	-	-	-	-	<10	-	TM089 <sup>f</sup> <sub>M</sub>	<10 ug/kg
o Xylene	-	-	-	-	-	-	-	<10	-	TM089 <sup>f</sup> <sub>M</sub>	<10 ug/kg
Aliphatics C5-C6	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aliphatics >C6-C8	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aliphatics >C8-C10	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aliphatics >C10-C12	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aliphatics >C12-C16	-	-	-	-	-	-	-	1800	-	TM173 <sup>f</sup>	<100 ug/kg
Aliphatics >C16-C21	-	-	-	-	-	-	-	16000	-	TM173 <sup>f</sup>	<100 ug/kg
Aliphatics >C16-C35	-	-	-	-	-	-	-	-	-	TM173	<100 ug/kg
Aliphatics >C21-C35	-	-	-	-	-	-	-	48000	-	TM173 <sup>f</sup>	<100 ug/kg
Aliphatics >C35-C44	-	-	-	-	-	-	-	-	-	TM173	<100 ug/kg
Total Aliphatics C5-C35	-	-	-	-	-	-	-	66000	-	TM61/89	<100 ug/kg
Total Aliphatics C5-C44	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Aromatics C6-C7	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aromatics >C7-C8	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aromatics >EC8-EC10	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aromatics >EC10-EC12	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aromatics >EC12-EC16	-	-	-	-	-	-	-	4100	-	TM173 <sup>f</sup>	<100 ug/kg
Aromatics >EC16-EC21	-	-	-	-	-	-	-	110000	-	TM173 <sup>f</sup>	<100 ug/kg
Aromatics >EC21-EC35	-	-	-	-	-	-	-	660000	-	TM173 <sup>f</sup>	<100 ug/kg
Aromatics >EC35-EC44	-	-	-	-	-	-	-	-	-	TM173	<100 ug/kg
Total Aromatics C6-C35	-	-	-	-	-	-	-	780000	-	TM61/89	<100 ug/kg
Total Aromatics C6-C44	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C35)	-	-	-	-	-	-	-	840000	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C44)	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg

All results expressed on a dry weight basis.

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Validated   
Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
M MCERTS accredited  
\* Subcontracted test  
» Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH112	BH112	BH112	BH112	BH113	BH114	BH114	BH 114 SI 1288	BH 114 SI 1288	Method Code	LoD/Units
Depth (m)	0.5	1.4	3.0	4.0-4.45	0.50	1.20	1.8	0.50	2.20		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	11.09.07	11.09.07	11.09.07		20.09.07	05.09.07	06.09.07	05.09.07	05.09.07		
Sample Received Date	13.09.07	21.09.07	13.09.07	21.09.07	22.09.07	21.09.07	21.09.07	12.09.07	12.09.07		
Batch	6	7	6	7	8	7	7	5	5		
Sample Number(s)	53-55 (1)	79 (1)	56 (1)	80 (1)	109-111 (1)	81 (1)	82 (1)	35-37 (1)	38-40 (1)		
Total Sulphate	2100	-	-	-	830	-	-	640	430	TM129 <sup>#</sup> <sub>M</sub>	<100 mg/kg
Boron Water Soluble	<3.5	-	-	-	<3.5	-	-	<3.5	<3.5	TM129 <sup>#</sup> <sub>M</sub>	<3.5 mg/kg
Total Sulphate BRE	-	0.59	0.04	0.01	0.08	0.03	0.01	-	-	TM149	<0.01 %
Arsenic	5	-	-	-	12	-	-	4	8	TM129 <sup>#</sup> <sub>M</sub>	<3.0 mg/kg
Barium	170	-	-	-	680	-	-	26	38	TM129 <sup>#</sup> <sub>M</sub>	<6.0 mg/kg
Beryllium	<0.4	-	-	-	<0.4	-	-	<0.4	<0.4	TM129	<0.4 mg/kg
Cadmium	0.3	-	-	-	<0.3	-	-	<0.3	<0.3	TM129	<0.3 mg/kg
Chromium	18	-	-	-	17	-	-	7.7	7.0	TM129 <sup>#</sup> <sub>M</sub>	<4.5 mg/kg
Copper	44	-	-	-	66	-	-	25	16	TM129 <sup>#</sup>	<6 mg/kg
Lead	95	-	-	-	1600	-	-	34	33	TM129 <sup>#</sup> <sub>M</sub>	<2 mg/kg
Mercury	<0.6	-	-	-	<0.6	-	-	<0.6	<0.6	TM129 <sup>#</sup> <sub>M</sub>	<0.6 mg/kg
Nickel	13	-	-	-	18	-	-	7.8	6.8	TM129 <sup>#</sup> <sub>M</sub>	<0.9 mg/kg
Selenium	<3	-	-	-	<3	-	-	<3	<3	TM129 <sup>#</sup> <sub>M</sub>	<3 mg/kg
Vanadium	24	-	-	-	32	-	-	14	14	TM129 <sup>#</sup> <sub>M</sub>	<1.5 mg/kg
Zinc	380	-	-	-	190	-	-	110	58	TM129 <sup>#</sup> <sub>M</sub>	<2.5 mg/kg
Ammonium as NH4 in 2:1 Extract BRE	-	0.0010	<0.0003	0.0009	<0.0003	0.0006	0.0012	-	-	TM099 <sup>#</sup>	<0.0003 g/l
Nitrate (soluble) as NO3	26	-	-	-	22	-	-	<1	<1	TM102 <sup>#</sup>	<1 mg/kg
Acid Soluble Sulphide	<50	-	-	-	<50	-	-	<50	<50	TM101	<50 mg/kg
Total Cyanide	<1	-	-	-	<1	-	-	<1	<1	TM153 <sup>#</sup>	<1 mg/kg
Free Cyanide	<1	-	-	-	<1	-	-	<1	<1	TM153 <sup>#</sup>	<1 mg/kg
Complex Cyanide	<1	-	-	-	<1	-	-	<1	<1	TM153 <sup>#</sup>	<1 mg/kg
Asbestos Presence Screen	No Fibres Detected	-	-	-	No Fibres Detected	-	-	No Fibres Detected	No Fibres Detected	TM001	NONE
Chloride 2:1 water/soil extract BRE	-	0.027	0.011	0.006	0.005	0.008	0.010	-	-	TM097 <sup>#</sup>	<0.001 g/l
Magnesium 2:1 water/soil extract BRE	-	<0.001	<0.001	<0.001	0.002	0.003	<0.001	-	-	TM129 <sup>#</sup>	<0.001 g/l
Nitrate 2:1 water/soil extract BRE	-	0.018	0.0013	0.0014	0.021	0.0028	<0.0003	-	-	TM102 <sup>#</sup>	<0.0003 g/l
pH Value	9.74	10.04	10.39	8.37	8.24	8.49	7.90	9.82	8.63	TM133 <sup>#</sup> <sub>M</sub>	<1.00 pH Units
Soluble Sulphate 2:1 Extract as SO4 BRE	-	0.72	0.047	0.032	0.035	0.048	0.026	-	-	TM098 <sup>#</sup>	<0.003 g/l
Total Sulphur	0.23	0.24	0.04	0.02	0.19	0.05	0.03	0.06	0.06	TM068 <sup>#</sup>	<0.01 %

All results expressed on a dry weight basis.

Date 19.10.2007

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## ALcontrol Geochem Analytical Services

### Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH112	BH112	BH112	BH112	BH113	BH114	BH114	BH 114 SI 1288	BH 114 SI 1288	Method Code	LoD/Units
Depth (m)	0.5	1.4	3.0	4.0-4.45	0.50	1.20	1.8	0.50	2.20		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	11.09.07	11.09.07	11.09.07		20.09.07	05.09.07	06.09.07	05.09.07	05.09.07		
Sample Received Date	13.09.07	21.09.07	13.09.07	21.09.07	22.09.07	21.09.07	21.09.07	12.09.07	12.09.07		
Batch	6	7	6	7	8	7	7	5	5		
Sample Number(s)	53-55 (1)	79 (1)	56 (1)	80 (1)	109-111 (1)	81 (1)	82 (1)	35-37 (1)	38-40 (1)		
GRO (C4-C12)	<10	-	-	-	-	-	-	31	890	TM089	<10 ug/kg
MTBE	<10	-	-	-	-	-	-	<10	<10	TM089 <sup>#</sup>	<10 ug/kg
Benzene	<10	-	-	-	-	-	-	<10	<10	TM089 <sup>#M</sup>	<10 ug/kg
Toluene	<10	-	-	-	-	-	-	12	180	TM089 <sup>#M</sup>	<10 ug/kg
Ethyl benzene	<10	-	-	-	-	-	-	<10	<10	TM089 <sup>#M</sup>	<10 ug/kg
m & p Xylene	<10	-	-	-	-	-	-	<10	<10	TM089 <sup>#M</sup>	<10 ug/kg
o Xylene	<10	-	-	-	-	-	-	<10	<10	TM089 <sup>#M</sup>	<10 ug/kg
Aliphatics C5-C6	<10	-	-	-	-	-	-	<10	26	TM089	<10 ug/kg
Aliphatics >C6-C8	<10	-	-	-	-	-	-	19	670	TM089	<10 ug/kg
Aliphatics >C8-C10	<10	-	-	-	-	-	-	<10	<10	TM089	<10 ug/kg
Aliphatics >C10-C12	<10	-	-	-	-	-	-	<10	<10	TM089	<10 ug/kg
Aliphatics >C12-C16	2700	-	-	-	-	-	-	8400	<100	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C21	16000	-	-	-	-	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C35	-	-	-	-	-	-	-	160000	2500	TM173	<100 ug/kg
Aliphatics >C21-C35	110000	-	-	-	-	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C35-C44	-	-	-	-	-	-	-	36000	<100	TM173	<100 ug/kg
Total Aliphatics C5-C35	130000	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Total Aliphatics C5-C44	-	-	-	-	-	-	-	210000	3200	TM61/89	<100 ug/kg
Aromatics C6-C7	<10	-	-	-	-	-	-	<10	<10	TM089	<10 ug/kg
Aromatics >C7-C8	<10	-	-	-	-	-	-	12	180	TM089	<10 ug/kg
Aromatics >EC8-EC10	<10	-	-	-	-	-	-	<10	13	TM089	<10 ug/kg
Aromatics >EC10-EC12	<10	-	-	-	-	-	-	<10	<10	TM089	<10 ug/kg
Aromatics >EC12-EC16	15000	-	-	-	-	-	-	880	<100	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC16-EC21	53000	-	-	-	-	-	-	7000	<100	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC21-EC35	400000	-	-	-	-	-	-	40000	1800	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC35-EC44	-	-	-	-	-	-	-	8600	<100	TM173	<100 ug/kg
Total Aromatics C6-C35	470000	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Total Aromatics C6-C44	-	-	-	-	-	-	-	56000	2000	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C35)	600000	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C44)	-	-	-	-	-	-	-	260000	5200	TM61/89	<100 ug/kg

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## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH112	BH112	BH112	BH112	BH113	BH114	BH114	BH 114 SI 1288	BH 114 SI 1288	Method Code	LoD/Units		
Depth (m)	0.5	1.4	3.0	4.0-4.45	0.50	1.20	1.8	0.50	2.20				
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID				
Sampled Date	11.09.07	11.09.07	11.09.07		20.09.07	05.09.07	06.09.07	05.09.07	05.09.07				
Sample Received Date	13.09.07	21.09.07	13.09.07	21.09.07	22.09.07	21.09.07	21.09.07	12.09.07	12.09.07				
Batch	6	7	6	7	8	7	7	5	5				
Sample Number(s)	53-55 (1)	79 (1)	56 (1)	80 (1)	109-111 (1)	81 (1)	82 (1)	35-37 (1)	38-40 (1)				
<b>PAH by GCMS</b>													
Naphthalene	4800	-	-	-	-	-	-	-	-			TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Acenaphthylene	170	-	-	-	-	-	-	-	-			TM074 <sup>#</sup> <sub>M</sub>	<5 ug/kg
Acenaphthene	2100	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<14 ug/kg		
Fluorene	1500	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg		
Phenanthrene	25000	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<21 ug/kg		
Anthracene	5000	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<9 ug/kg		
Fluoranthene	42000	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg		
Pyrene	33000	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<22 ug/kg		
Benz(a)anthracene	19000	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg		
Chrysene	19000	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg		
Benzo(b)fluoranthene	26000	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<16 ug/kg		
Benzo(k)fluoranthene	7700	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg		
Benzo(a)pyrene	20000	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg		
Indeno(123cd)pyrene	9800	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<11 ug/kg		
Dibenzo(ah)anthracene	3100	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<8 ug/kg		
Benzo(ghi)perylene	11000	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg		
PAH 16 Total	230000	-	-	-	-	-	-	-	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg		

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Date 19.10.2007

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## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH115	BH115	BH115	BH115	BH116	BH 116 B50	BH 116 B55	BH117	BH117	Method Code	LoD/Units
Depth (m)	0.5	1.0	3.0	6.50	1.0	24.50	28.50	0.35	0.35		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	14.09.07	04.09.07	06.09.07	07.09.07	29.08.07	03.09.07	03.09.07		07.09.07		
Sample Received Date	21.09.07	21.09.07	21.09.07	21.09.07	07.09.07	12.09.07	12.09.07	21.09.07	21.09.07		
Batch	7	7	7	7	4	5	5	7	7		
Sample Number(s)	94 (1)	83-86 (1)	87-89 (1)	90 (1)	26-28 (1)	41 (1)	42 (1)	92-93 (1)	91 (1)		
Total Sulphate	-	-	350	-	<100	-	-	-	23000	TM129 <sup>#</sup> <sub>M</sub>	<100 mg/kg
Boron Water Soluble	-	<3.5	<3.5	-	<3.5	-	-	-	<3.5	TM129 <sup>#</sup> <sub>M</sub>	<3.5 mg/kg
Total Sulphate BRE	0.06	0.25	-	<0.01	-	0.05	0.05	-	-	TM149	<0.01 %
Arsenic	-	5	<3	-	<3	-	-	-	8	TM129 <sup>#</sup> <sub>M</sub>	<3.0 mg/kg
Barium	-	55	12	-	<6	-	-	-	71	TM129 <sup>#</sup> <sub>M</sub>	<6.0 mg/kg
Beryllium	-	<0.4	<0.4	-	<0.4	-	-	-	<0.4	TM129	<0.4 mg/kg
Cadmium	-	<0.3	<0.3	-	<0.3	-	-	-	0.4	TM129	<0.3 mg/kg
Chromium	-	8.3	<4.5	-	<4.5	-	-	-	12	TM129 <sup>#</sup> <sub>M</sub>	<4.5 mg/kg
Copper	-	20	<6	-	14	-	-	-	14	TM129 <sup>#</sup>	<6 mg/kg
Lead	-	16	3	-	<2	-	-	-	72	TM129 <sup>#</sup> <sub>M</sub>	<2 mg/kg
Mercury	-	<0.6	<0.6	-	<0.6	-	-	-	<0.6	TM129 <sup>#</sup> <sub>M</sub>	<0.6 mg/kg
Nickel	-	4.6	1.5	-	<0.9	-	-	-	9.8	TM129 <sup>#</sup> <sub>M</sub>	<0.9 mg/kg
Selenium	-	<3	<3	-	<3	-	-	-	<3	TM129 <sup>#</sup> <sub>M</sub>	<3 mg/kg
Vanadium	-	11	2.7	-	<1.5	-	-	-	18	TM129 <sup>#</sup> <sub>M</sub>	<1.5 mg/kg
Zinc	-	80	94	-	<2.5	-	-	-	50	TM129 <sup>#</sup> <sub>M</sub>	<2.5 mg/kg
Ammonium as NH4 in 2:1 Extract BRE	0.0005	0.0009	-	0.0006	-	0.0010	0.0014	-	-	TM099 <sup>#</sup>	<0.0003 g/l
Nitrate (soluble) as NO3	-	6	<1	-	<1	-	-	-	<1	TM102 <sup>#</sup>	<1 mg/kg
Acid Soluble Sulphide	-	<50	<50	-	<50	-	-	200	-	TM101	<50 mg/kg
Total Cyanide	-	<1	<1	-	<1	-	-	37	-	TM153 <sup>#</sup>	<1 mg/kg
Free Cyanide	-	<1	<1	-	<1	-	-	<1	-	TM153 <sup>#</sup>	<1 mg/kg
Complex Cyanide	-	<1	<1	-	<1	-	-	37	-	TM153 <sup>#</sup>	<1 mg/kg
Asbestos Presence Screen	-	No Fibres Detected	No Fibres Detected	-	No Fibres Detected	-	-	No Fibres Detected	-	TM001	NONE
Chloride 2:1 water/soil extract BRE	0.013	0.078	-	0.017	-	0.39	0.53	-	-	TM097 <sup>#</sup>	<0.001 g/l
Magnesium 2:1 water/soil extract BRE	0.005	<0.001	-	<0.001	-	0.013	0.020	-	-	TM129 <sup>#</sup>	<0.001 g/l
Nitrate 2:1 water/soil extract BRE	0.0082	0.0036	-	<0.0003	-	<0.0003	<0.0003	-	-	TM102 <sup>#</sup>	<0.0003 g/l
pH Value	8.32	10.23	9.72	7.71	7.68	8.37	8.30	8.30	-	TM133 <sup>#</sup> <sub>M</sub>	<1.00 pH Units
Soluble Sulphate 2:1 Extract as SO4 BRE	0.049	0.13	-	0.010	-	0.12	0.13	-	-	TM098 <sup>#</sup>	<0.003 g/l
Total Sulphur	0.07	0.14	0.02	0.02	4.1	0.16	0.20	-	0.37	TM068 <sup>#</sup>	<0.01 %

All results expressed on a dry weight basis.

Date 19.10.2007

Validated   
Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
M MCERTS accredited  
\* Subcontracted test  
» Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH115	BH115	BH115	BH115	BH116	BH 116 B50	BH 116 B55	BH117	BH117	Method Code	LoD/Units
Depth (m)	0.5	1.0	3.0	6.50	1.0	24.50	28.50	0.35	0.35		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	14.09.07	04.09.07	06.09.07	07.09.07	29.08.07	03.09.07	03.09.07		07.09.07		
Sample Received Date	21.09.07	21.09.07	21.09.07	21.09.07	07.09.07	12.09.07	12.09.07	21.09.07	21.09.07		
Batch	7	7	7	7	4	5	5	7	7		
Sample Number(s)	94 (1)	83-86 (1)	87-89 (1)	90 (1)	26-28 (1)	41 (1)	42 (1)	92-93 (1)	91 (1)		
GRO (C4-C12)	-	-	-	-	<30	-	-	-	-	TM089	<10 ug/kg
MTBE	-	-	-	-	<30	-	-	-	-	TM089 <sup>#</sup>	<10 ug/kg
Benzene	-	-	-	-	<30	-	-	-	-	TM089 <sup>#M</sup>	<10 ug/kg
Toluene	-	-	-	-	<30	-	-	-	-	TM089 <sup>#M</sup>	<10 ug/kg
Ethyl benzene	-	-	-	-	<30	-	-	-	-	TM089 <sup>#M</sup>	<10 ug/kg
m & p Xylene	-	-	-	-	<30	-	-	-	-	TM089 <sup>#M</sup>	<10 ug/kg
o Xylene	-	-	-	-	<30	-	-	-	-	TM089 <sup>#M</sup>	<10 ug/kg
Aliphatics C5-C6	-	-	-	-	<30	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C6-C8	-	-	-	-	<30	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C8-C10	-	-	-	-	<30	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C10-C12	-	-	-	-	<30	-	-	-	-	TM089	<10 ug/kg
Aliphatics >C12-C16	-	-	-	-	<100	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C21	-	-	-	-	-	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C35	-	-	-	-	7800000	-	-	-	-	TM173	<100 ug/kg
Aliphatics >C21-C35	-	-	-	-	-	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C35-C44	-	-	-	-	17000000	-	-	-	-	TM173	<100 ug/kg
Total Aliphatics C5-C35	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Total Aliphatics C5-C44	-	-	-	-	24000000	-	-	-	-	TM61/89	<100 ug/kg
Aromatics C6-C7	-	-	-	-	<30	-	-	-	-	TM089	<10 ug/kg
Aromatics >C7-C8	-	-	-	-	<30	-	-	-	-	TM089	<10 ug/kg
Aromatics >EC8-EC10	-	-	-	-	<30	-	-	-	-	TM089	<10 ug/kg
Aromatics >EC10-EC12	-	-	-	-	<30	-	-	-	-	TM089	<10 ug/kg
Aromatics >EC12-EC16	-	-	-	-	<100	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC16-EC21	-	-	-	-	300000	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC21-EC35	-	-	-	-	18000000	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC35-EC44	-	-	-	-	35000000	-	-	-	-	TM173	<100 ug/kg
Total Aromatics C6-C35	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Total Aromatics C6-C44	-	-	-	-	53000000	-	-	-	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C35)	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C44)	-	-	-	-	78000000	-	-	-	-	TM61/89	<100 ug/kg

All results expressed on a dry weight basis.

Date 19.10.2007



Validated   
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## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH117	BH117	TP101	TP101	TP104	TP104	TP109	WS104	WS 104	Method Code	LoD/Units
Depth (m)	1.0	10.0	0.20	0.50	0.20	0.50	0.50	0.50	0.50		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	07.09.07	10.09.07	20.09.07	20.09.07	20.09.07	20.09.07	20.09.07	10.08.07	06.09.07		
Sample Received Date	21.09.07	21.09.07	22.09.07	22.09.07	22.09.07	22.09.07	22.09.07	05.09.07	12.09.07		
Batch	7	7	8	8	8	8	8	3	5		
Sample Number(s)	95 (1)	96 (1)	112-114 (1)	115 (1)	116-118 (1)	119 (1)	120-122 (1)	19-20 (1)	43 (1)		
Total Sulphate	-	-	850	-	660	-	910	160	-	TM129 <sup>#</sup> <sub>M</sub>	<100 mg/kg
Boron Water Soluble	-	-	<3.5	-	<3.5	-	<3.5	<3.5	-	TM129 <sup>#</sup> <sub>M</sub>	<3.5 mg/kg
Total Sulphate BRE	1.3	0.01	-	0.03	-	0.05	0.09	-	<0.01	TM149	<0.01 %
Arsenic	-	-	8	-	13	-	12	4	-	TM129 <sup>#</sup> <sub>M</sub>	<3.0 mg/kg
Barium	-	-	68	-	78	-	12	23	-	TM129 <sup>#</sup> <sub>M</sub>	<6.0 mg/kg
Beryllium	-	-	<0.4	-	<0.4	-	<0.4	<0.4	-	TM129	<0.4 mg/kg
Cadmium	-	-	<0.3	-	0.3	-	<0.3	<0.3	-	TM129	<0.3 mg/kg
Chromium	-	-	13	-	9.2	-	8.9	<4.5	-	TM129 <sup>#</sup> <sub>M</sub>	<4.5 mg/kg
Copper	-	-	14	-	26	-	14	65	-	TM129 <sup>#</sup>	<6 mg/kg
Lead	-	-	96	-	130	-	15	54	-	TM129 <sup>#</sup> <sub>M</sub>	<2 mg/kg
Mercury	-	-	<0.6	-	<0.6	-	<0.6	<0.6	-	TM129 <sup>#</sup> <sub>M</sub>	<0.6 mg/kg
Nickel	-	-	12	-	15	-	9.6	3.8	-	TM129 <sup>#</sup> <sub>M</sub>	<0.9 mg/kg
Selenium	-	-	<3	-	<3	-	<3	<3	-	TM129 <sup>#</sup> <sub>M</sub>	<3 mg/kg
Vanadium	-	-	26	-	13	-	18	8.2	-	TM129 <sup>#</sup> <sub>M</sub>	<1.5 mg/kg
Zinc	-	-	89	-	110	-	43	23	-	TM129 <sup>#</sup> <sub>M</sub>	<2.5 mg/kg
Ammonium as NH4 in 2:1 Extract BRE	0.0030	0.0013	-	0.0003	-	<0.0003	<0.0003	-	0.0003	TM099 <sup>#</sup>	<0.0003 g/l
Nitrate (soluble) as NO3	-	-	13	-	2	-	2	2	-	TM102 <sup>#</sup>	<1 mg/kg
Acid Soluble Sulphide	-	-	<50	-	<50	-	<50	<50	-	TM101	<50 mg/kg
Total Cyanide	-	-	<1	-	2	-	<1	<1	-	TM153 <sup>#</sup>	<1 mg/kg
Free Cyanide	-	-	<1	-	<1	-	<1	<1	-	TM153 <sup>#</sup>	<1 mg/kg
Complex Cyanide	-	-	<1	-	2	-	<1	<1	-	TM153 <sup>#</sup>	<1 mg/kg
Asbestos Presence Screen	-	-	No Fibres Detected	-	No Fibres Detected	-	No Fibres Detected	No Fibres Detected	-	TM001	NONE
Chloride 2:1 water/soil extract BRE	0.010	0.043	-	0.002	-	0.010	0.003	-	0.009	TM097 <sup>#</sup>	<0.001 g/l
Magnesium 2:1 water/soil extract BRE	0.003	0.003	-	0.001	-	0.002	<0.001	-	<0.001	TM129 <sup>#</sup>	<0.001 g/l
Nitrate 2:1 water/soil extract BRE	<0.0003	0.011	-	0.013	-	0.012	0.013	-	0.0016	TM102 <sup>#</sup>	<0.0003 g/l
pH Value	8.33	8.61	8.16	8.51	8.16	8.25	8.00	8.50	8.69	TM133 <sup>#</sup> <sub>M</sub>	<1.00 pH Units
Soluble Sulphate 2:1 Extract as SO4 BRE	1.1	0.034	-	0.009	-	0.043	0.020	-	0.004	TM098 <sup>#</sup>	<0.003 g/l
Total Sulphur	0.36	0.02	0.13	0.06	0.09	0.06	0.08	0.04	0.02	TM068 <sup>#</sup>	<0.01 %

All results expressed on a dry weight basis.

Date 19.10.2007

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## ALcontrol Geochem Analytical Services

### Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH117	BH117	TP101	TP101	TP104	TP104	TP109	WS104	WS 104	Method Code	LoD/Units
Depth (m)	1.0	10.0	0.20	0.50	0.20	0.50	0.50	0.50	0.50		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	07.09.07	10.09.07	20.09.07	20.09.07	20.09.07	20.09.07	20.09.07	10.08.07	06.09.07		
Sample Received Date	21.09.07	21.09.07	22.09.07	22.09.07	22.09.07	22.09.07	22.09.07	05.09.07	12.09.07		
Batch	7	7	8	8	8	8	8	3	5		
Sample Number(s)	95 (1)	96 (1)	112-114 (1)	115 (1)	116-118 (1)	119 (1)	120-122 (1)	19-20 (1)	43 (1)		
GRO (C4-C12)	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
MTBE	-	-	-	-	-	-	-	<10	-	TM089 <sup>#</sup>	<10 ug/kg
Benzene	-	-	-	-	-	-	-	<10	-	TM089 <sup>#M</sup>	<10 ug/kg
Toluene	-	-	-	-	-	-	-	<10	-	TM089 <sup>#M</sup>	<10 ug/kg
Ethyl benzene	-	-	-	-	-	-	-	<10	-	TM089 <sup>#M</sup>	<10 ug/kg
m & p Xylene	-	-	-	-	-	-	-	<10	-	TM089 <sup>#M</sup>	<10 ug/kg
o Xylene	-	-	-	-	-	-	-	<10	-	TM089 <sup>#M</sup>	<10 ug/kg
Aliphatics C5-C6	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aliphatics >C6-C8	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aliphatics >C8-C10	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aliphatics >C10-C12	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aliphatics >C12-C16	-	-	-	-	-	-	-	<100	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C21	-	-	-	-	-	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C35	-	-	-	-	-	-	-	<100	-	TM173	<100 ug/kg
Aliphatics >C21-C35	-	-	-	-	-	-	-	-	-	TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C35-C44	-	-	-	-	-	-	-	<100	-	TM173	<100 ug/kg
Total Aliphatics C5-C35	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Total Aliphatics C5-C44	-	-	-	-	-	-	-	<100	-	TM61/89	<100 ug/kg
Aromatics C6-C7	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aromatics >C7-C8	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aromatics >EC8-EC10	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aromatics >EC10-EC12	-	-	-	-	-	-	-	<10	-	TM089	<10 ug/kg
Aromatics >EC12-EC16	-	-	-	-	-	-	-	<100	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC16-EC21	-	-	-	-	-	-	-	<100	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC21-EC35	-	-	-	-	-	-	-	5800	-	TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC35-EC44	-	-	-	-	-	-	-	<100	-	TM173	<100 ug/kg
Total Aromatics C6-C35	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
Total Aromatics C6-C44	-	-	-	-	-	-	-	5800	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C35)	-	-	-	-	-	-	-	-	-	TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C44)	-	-	-	-	-	-	-	5800	-	TM61/89	<100 ug/kg

All results expressed on a dry weight basis.

Date 19.10.2007





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## ALcontrol Geochem Analytical Services

### Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH117	BH117	TP101	TP101	TP104	TP104	TP109	WS104	WS 104	Method Code	LoD/Units
Depth (m)	1.0	10.0	0.20	0.50	0.20	0.50	0.50	0.50	0.50		
Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID		
Sampled Date	07.09.07	10.09.07	20.09.07	20.09.07	20.09.07	20.09.07	20.09.07	10.08.07	06.09.07		
Sample Received Date	21.09.07	21.09.07	22.09.07	22.09.07	22.09.07	22.09.07	22.09.07	05.09.07	12.09.07		
Batch	7	7	8	8	8	8	8	3	5		
Sample Number(s)	95 (1)	96 (1)	112-114 (1)	115 (1)	116-118 (1)	119 (1)	120-122 (1)	19-20 (1)	43 (1)		
PAH by GCMS											
Naphthalene	-	-	-	-	-	-	-	150	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Acenaphthylene	-	-	-	-	-	-	-	13	-	TM074 <sup>#</sup> <sub>M</sub>	<5 ug/kg
Acenaphthene	-	-	-	-	-	-	-	<14	-	TM074 <sup>#</sup> <sub>M</sub>	<14 ug/kg
Fluorene	-	-	-	-	-	-	-	<12	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Phenanthrene	-	-	-	-	-	-	-	67	-	TM074 <sup>#</sup> <sub>M</sub>	<21 ug/kg
Anthracene	-	-	-	-	-	-	-	15	-	TM074 <sup>#</sup> <sub>M</sub>	<9 ug/kg
Fluoranthene	-	-	-	-	-	-	-	180	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg
Pyrene	-	-	-	-	-	-	-	160	-	TM074 <sup>#</sup> <sub>M</sub>	<22 ug/kg
Benz(a)anthracene	-	-	-	-	-	-	-	120	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Chrysene	-	-	-	-	-	-	-	150	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Benzo(b)fluoranthene	-	-	-	-	-	-	-	220	-	TM074 <sup>#</sup> <sub>M</sub>	<16 ug/kg
Benzo(k)fluoranthene	-	-	-	-	-	-	-	150	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg
Benzo(a)pyrene	-	-	-	-	-	-	-	130	-	TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Indeno(123cd)pyrene	-	-	-	-	-	-	-	99	-	TM074 <sup>#</sup> <sub>M</sub>	<11 ug/kg
Dibenzo(ah)anthracene	-	-	-	-	-	-	-	27	-	TM074 <sup>#</sup> <sub>M</sub>	<8 ug/kg
Benzo(ghi)perylene	-	-	-	-	-	-	-	140	-	TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
PAH 16 Total	-	-	-	-	-	-	-	1600	-	TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg

All results expressed on a dry weight basis.

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## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
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 \* Subcontracted test  
 » Shown on prev. report

Job Number: 07/14582/02/01

Matrix: SOLID

Client: Norfolk County Council

Location: Great Yarmouth third river Crossing

Client Ref. No.: PTPZ0008

Client Contact: Ian Brown

Sample Identity	WS104	WS 107	WS 107	WS110							Method Code	LoD/Units
Depth (m)	1.00	0.40	0.50	0.15								
Sample Type	SOLID	SOLID	SOLID	SOLID								
Sampled Date	10.08.07	06.09.07	06.09.07	10.08.07								
Sample Received Date	05.09.07	12.09.07	12.09.07	05.09.07								
Batch	3	5	5	3								
Sample Number(s)	21-23 (1)	44 (1)	45-46 (1)	24-25 (1)								
Total Sulphate	-	-	350	500							TM129 <sup>#</sup> <sub>M</sub>	<100 mg/kg
Boron Water Soluble	-	-	<3.5	<3.5							TM129 <sup>#</sup> <sub>M</sub>	<3.5 mg/kg
Total Sulphate BRE	<0.01	0.02	-	-							TM149	<0.01 %
Arsenic	-	-	<3	8							TM129 <sup>#</sup> <sub>M</sub>	<3.0 mg/kg
Barium	-	-	50	78							TM129 <sup>#</sup> <sub>M</sub>	<6.0 mg/kg
Beryllium	-	-	<0.4	<0.4							TM129	<0.4 mg/kg
Cadmium	-	-	<0.3	<0.3							TM129	<0.3 mg/kg
Chromium	-	-	<4.5	6.1							TM129 <sup>#</sup> <sub>M</sub>	<4.5 mg/kg
Copper	-	-	11	35							TM129 <sup>#</sup>	<6 mg/kg
Lead	-	-	20	89							TM129 <sup>#</sup> <sub>M</sub>	<2 mg/kg
Mercury	-	-	<0.6	<0.6							TM129 <sup>#</sup> <sub>M</sub>	<0.6 mg/kg
Nickel	-	-	3.8	30							TM129 <sup>#</sup> <sub>M</sub>	<0.9 mg/kg
Selenium	-	-	<3	<3							TM129 <sup>#</sup> <sub>M</sub>	<3 mg/kg
Vanadium	-	-	6.2	21							TM129 <sup>#</sup> <sub>M</sub>	<1.5 mg/kg
Zinc	-	-	39	120							TM129 <sup>#</sup> <sub>M</sub>	<2.5 mg/kg
Ammonium as NH4 in 2:1 Extract BRE	0.0003	0.0014	-	-							TM099 <sup>#</sup>	<0.0003 g/l
Nitrate (soluble) as NO3	-	-	5	9							TM102 <sup>#</sup>	<1 mg/kg
Acid Soluble Sulphide	-	-	<50	<50							TM101	<50 mg/kg
Total Cyanide	-	-	<1	<1							TM153 <sup>#</sup>	<1 mg/kg
Free Cyanide	-	-	<1	<1							TM153 <sup>#</sup>	<1 mg/kg
Complex Cyanide	-	-	<1	<1							TM153 <sup>#</sup>	<1 mg/kg
Asbestos Presence Screen	-	-	No Fibres Detected	No Fibres Detected							TM001	NONE
Chloride 2:1 water/soil extract BRE	0.006	0.016	-	-							TM097 <sup>#</sup>	<0.001 g/l
Magnesium 2:1 water/soil extract BRE	0.002	<0.001	-	-							TM129 <sup>#</sup>	<0.001 g/l
Nitrate 2:1 water/soil extract BRE	0.0008	0.0029	-	-							TM102 <sup>#</sup>	<0.0003 g/l
pH Value	7.47	8.59	8.59	9.11							TM133 <sup>#</sup> <sub>M</sub>	<1.00 pH Units
Soluble Sulphate 2:1 Extract as SO4 BRE	<0.003	0.018	-	-							TM098 <sup>#</sup>	<0.003 g/l
Total Sulphur	0.02	0.05	0.05	0.07							TM068 <sup>#</sup>	<0.01 %

All results expressed on a dry weight basis.

Date 19.10.2007

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## ALcontrol Geochem Analytical Services

### Table Of Results

# ISO 17025 accredited  
M MCERTS accredited  
\* Subcontracted test  
» Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** SOLID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	WS104	WS 107	WS 107	WS110							Method Code	LoD/Units
<b>Depth (m)</b>	1.00	0.40	0.50	0.15								
<b>Sample Type</b>	SOLID	SOLID	SOLID	SOLID								
<b>Sampled Date</b>	10.08.07	06.09.07	06.09.07	10.08.07								
<b>Sample Received Date</b>	05.09.07	12.09.07	12.09.07	05.09.07								
<b>Batch</b>	3	5	5	3								
<b>Sample Number(s)</b>	21-23 (1)	44 (1)	45-46 (1)	24-25 (1)								
GRO (C4-C12)	-	-	-	<10							TM089	<10 ug/kg
MTBE	-	-	-	<10							TM089 <sup>#</sup>	<10 ug/kg
Benzene	-	-	-	<10							TM089 <sup>#M</sup>	<10 ug/kg
Toluene	-	-	-	<10							TM089 <sup>#M</sup>	<10 ug/kg
Ethyl benzene	-	-	-	<10							TM089 <sup>#M</sup>	<10 ug/kg
m & p Xylene	-	-	-	<10							TM089 <sup>#M</sup>	<10 ug/kg
o Xylene	-	-	-	<10							TM089 <sup>#M</sup>	<10 ug/kg
Aliphatics C5-C6	-	-	-	<10							TM089	<10 ug/kg
Aliphatics >C6-C8	-	-	-	<10							TM089	<10 ug/kg
Aliphatics >C8-C10	-	-	-	<10							TM089	<10 ug/kg
Aliphatics >C10-C12	-	-	-	<10							TM089	<10 ug/kg
Aliphatics >C12-C16	-	-	-	<100							TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C21	-	-	-	-							TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C16-C35	-	-	-	62000							TM173	<100 ug/kg
Aliphatics >C21-C35	-	-	-	-							TM173 <sup>#</sup>	<100 ug/kg
Aliphatics >C35-C44	-	-	-	50000							TM173	<100 ug/kg
Total Aliphatics C5-C35	-	-	-	-							TM61/89	<100 ug/kg
Total Aliphatics C5-C44	-	-	-	110000							TM61/89	<100 ug/kg
Aromatics C6-C7	-	-	-	<10							TM089	<10 ug/kg
Aromatics >C7-C8	-	-	-	<10							TM089	<10 ug/kg
Aromatics >EC8-EC10	-	-	-	<10							TM089	<10 ug/kg
Aromatics >EC10-EC12	-	-	-	<10							TM089	<10 ug/kg
Aromatics >EC12-EC16	-	-	-	6600							TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC16-EC21	-	-	-	15000							TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC21-EC35	-	-	-	110000							TM173 <sup>#</sup>	<100 ug/kg
Aromatics >EC35-EC44	-	-	-	76000							TM173	<100 ug/kg
Total Aromatics C6-C35	-	-	-	-							TM61/89	<100 ug/kg
Total Aromatics C6-C44	-	-	-	210000							TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C35)	-	-	-	-							TM61/89	<100 ug/kg
TPH (Aliphatics and Aromatics C5-C44)	-	-	-	320000							TM61/89	<100 ug/kg

All results expressed on a dry weight basis.

Date 19.10.2007

Validated   
 Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01  
**Client:** Norfolk County Council  
**Client Ref. No.:** PTPZ0008

**Matrix:** SOLID  
**Location:** Great Yarmouth third river Crossing  
**Client Contact:** Ian Brown

Sample Identity	WS104	WS 107	WS 107	WS110							Method Code	LoD/Units
<b>Depth (m)</b>	1.00	0.40	0.50	0.15								
<b>Sample Type</b>	SOLID	SOLID	SOLID	SOLID								
<b>Sampled Date</b>	10.08.07	06.09.07	06.09.07	10.08.07								
<b>Sample Received Date</b>	05.09.07	12.09.07	12.09.07	05.09.07								
<b>Batch</b>	3	5	5	3								
<b>Sample Number(s)</b>	21-23 (1)	44 (1)	45-46 (1)	24-25 (1)								
<b>PAH by GCMS</b>												
Naphthalene	-	-	-	570							TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Acenaphthylene	-	-	-	150							TM074 <sup>#</sup> <sub>M</sub>	<5 ug/kg
Acenaphthene	-	-	-	36							TM074 <sup>#</sup> <sub>M</sub>	<14 ug/kg
Fluorene	-	-	-	39							TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Phenanthrene	-	-	-	890							TM074 <sup>#</sup> <sub>M</sub>	<21 ug/kg
Anthracene	-	-	-	220							TM074 <sup>#</sup> <sub>M</sub>	<9 ug/kg
Fluoranthene	-	-	-	2200							TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg
Pyrene	-	-	-	1900							TM074 <sup>#</sup> <sub>M</sub>	<22 ug/kg
Benz(a)anthracene	-	-	-	1200							TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Chrysene	-	-	-	1400							TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
Benzo(b)fluoranthene	-	-	-	1800							TM074 <sup>#</sup> <sub>M</sub>	<16 ug/kg
Benzo(k)fluoranthene	-	-	-	810							TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg
Benzo(a)pyrene	-	-	-	1500							TM074 <sup>#</sup> <sub>M</sub>	<12 ug/kg
Indeno(123cd)pyrene	-	-	-	940							TM074 <sup>#</sup> <sub>M</sub>	<11 ug/kg
Dibenzo(ah)anthracene	-	-	-	240							TM074 <sup>#</sup> <sub>M</sub>	<8 ug/kg
Benzo(ghi)perylene	-	-	-	1100							TM074 <sup>#</sup> <sub>M</sub>	<10 ug/kg
PAH 16 Total	-	-	-	15000							TM074 <sup>#</sup> <sub>M</sub>	<25 ug/kg

All results expressed on a dry weight basis.

Date 19.10.2007

Validated   
Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
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\* Subcontracted test  
» Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** LIQUID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH104 SHALLO W	BH105 DEEP	BH107 SHALLO W	BH108 DEEP	BH110 SHALLO W	BH112 DEEP	BH114 SHALLO W	BH115 DEEP	BH117 DEEP	Method Code	LoD/Units
Depth (m)	-	-	-	-	-	-	-	-	-		
Sample Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID		
Sampled Date	26.09.07	25.09.07	25.09.07	26.09.07	26.09.07	26.09.07	26.09.07	26.09.07	25.09.07		
Sample Received Date	29.09.07	29.09.07	29.09.07	29.09.07	29.09.07	29.09.07	29.09.07	29.09.07	29.09.07		
Batch	10	10	10	10	10	10	10	10	10		
Sample Number(s)	126-127 (1)	128-129 (1)	130-131 (1)	132-133 (1)	134-135 (1)	136-137 (1)	138-139 (1)	140-141 (1)	142-143 (1)		
Arsenic Dissolved (ICP-MS)	35	20	3	33	35	6	14	10	4	TM152 <sup>#</sup>	<1 ug/l
Barium Dissolved (ICP-MS)	370	110	10	430	290	86	61	49	47	TM152 <sup>#</sup>	<1 ug/l
Beryllium Dissolved (ICP-MS)	<1	<1	<1	<1	<1	<1	<1	<1	<1	TM152 <sup>#</sup>	<1 ug/l
Boron Dissolved (ICP-MS)	3000	1400	260	2700	840	570	74	950	630	TM152 <sup>#</sup>	<10 ug/l
Cadmium Dissolved (ICP-MS)	0.6	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	TM152 <sup>#</sup>	<0.4 ug/l
Chromium Dissolved (ICP-MS)	16	9	7	14	6	6	3	9	8	TM152 <sup>#</sup>	<1 ug/l
Copper Dissolved (ICP-MS)	1	<1	<1	1	<1	<1	<1	<1	2	TM152 <sup>#</sup>	<1 ug/l
Lead Dissolved (ICP-MS)	<1	<1	<1	<1	<1	<1	<1	<1	<1	TM152 <sup>#</sup>	<1 ug/l
Nickel Dissolved (ICP-MS)	31	14	2	47	26	15	4	5	10	TM152 <sup>#</sup>	<1 ug/l
Selenium Dissolved (ICP-MS)	100	66	5	130	53	19	<1	31	17	TM152 <sup>#</sup>	<1 ug/l
Vanadium Dissolved (ICP-MS)	4	5	<1	10	6	<1	2	2	<1	TM152 <sup>#</sup>	<1 ug/l
Zinc Dissolved (ICP-MS)	40	14	<3	160	<3	130	<3	<3	<3	TM152 <sup>#</sup>	<3 ug/l
Mercury Dissolved (CVAA)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	TM127 <sup>#</sup>	<0.05 ug/l
Nitrate as NO3	<0.3	<0.3	56	<0.3	<0.3	53	<0.3	<0.3	<0.3	TM102 <sup>#</sup>	<0.3 mg/l
Sulphate (soluble)	1100	1000	130	1600	1400	390	8	640	380	TM098 <sup>#</sup>	<3 mg/l
Sulphide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	TM101	<0.5 mg/l
Total Cyanide	<0.05	<0.05	<0.05	<0.05	3.5	0.16	<0.05	<0.05	<0.05	TM153 <sup>#</sup>	<0.05 mg/l
Free Cyanide	<0.05	<0.05	<0.05	<0.05	0.94	<0.05	<0.05	<0.05	<0.05	TM153 <sup>#</sup>	<0.05 mg/l
Complex Cyanide	-	-	-	-	-	-	-	-	-	TM153 <sup>#</sup>	<0.05 mg/l
Free Sulphur	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	<0.05	<0.05	<0.05	TM136 <sup>#</sup>	<0.05 mg/l
pH Value	7.91	8.00	8.07	7.72	7.89	8.12	8.10	8.08	8.16	TM133 <sup>#</sup>	<1.00 pH Units
EPH (DRO) (C10-C40) Aqueous	300	120	<10	140	3200	4300	490	<10	<10	TM172 <sup>#</sup>	<10 ug/l

Date 19.10.2007

Validated   
 Preliminary

## ALcontrol Geochem Analytical Services Table Of Results

# ISO 17025 accredited  
 M MCERTS accredited  
 \* Subcontracted test  
 » Shown on prev. report

**Job Number:** 07/14582/02/01      **Matrix:** LIQUID  
**Client:** Norfolk County Council      **Location:** Great Yarmouth third river Crossing  
**Client Ref. No.:** PTPZ0008      **Client Contact:** Ian Brown

Sample Identity	BH104 SHALLO W	BH105 DEEP	BH107 SHALLO W	BH108 DEEP	BH110 SHALLO W	BH112 DEEP	BH114 SHALLO W	BH115 DEEP	BH117 DEEP	Method Code	LoD/Units
Depth (m)	-	-	-	-	-	-	-	-	-		
Sample Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID		
Sampled Date	26.09.07	25.09.07	25.09.07	26.09.07	26.09.07	26.09.07	26.09.07	26.09.07	25.09.07		
Sample Received Date	29.09.07	29.09.07	29.09.07	29.09.07	29.09.07	29.09.07	29.09.07	29.09.07	29.09.07		
Batch	10	10	10	10	10	10	10	10	10		
Sample Number(s)	126-127 (1)	128-129 (1)	130-131 (1)	132-133 (1)	134-135 (1)	136-137 (1)	138-139 (1)	140-141 (1)	142-143 (1)		
<b>PAH by GCMS</b>											
Naphthalene Aqueous	28	<26	<26	<26	67000	<26	<26	<26	<26	TM074	<26 ng/l
Acenaphthylene Aqueous	120	<11	<11	<11	1300	<11	<11	<11	<11	TM074	<11 ng/l
Acenaphthene Aqueous	100	<15	<15	<15	1900	<15	<15	<15	<15	TM074	<15 ng/l
Fluorene Aqueous	26	<14	<14	<14	3200	<14	<14	<14	<14	TM074	<14 ng/l
Phenanthrene Aqueous	60	<22	35	24	13000	<22	<22	<22	<22	TM074	<22 ng/l
Anthracene Aqueous	17	<15	<15	<15	1300	<15	<15	<15	<15	TM074	<15 ng/l
Fluoranthene Aqueous	19	<17	<17	<17	3600	<17	<17	<17	<17	TM074	<17 ng/l
Pyrene Aqueous	18	<15	<15	<15	2100	<15	<15	16	<15	TM074	<15 ng/l
Benz(a)anthracene Aqueous	<17	<17	<17	<17	180	<17	<17	<17	<17	TM074	<17 ng/l
Chrysene Aqueous	<13	<13	<13	<13	130	<13	<13	<13	<13	TM074	<13 ng/l
Benzo(b)fluoranthene Aqueous	<23	<23	<23	<23	63	<23	<23	<23	<23	TM074	<23 ng/l
Benzo(k)fluoranthene Aqueous	<27	<27	<27	<27	<27	<27	<27	<27	<27	TM074	<27 ng/l
Benzo(a)pyrene Aqueous	<9	<9	<9	<9	34	<9	<9	<9	<9	TM074	<9 ng/l
Indeno(123cd)pyrene Aqueous	<14	<14	<14	<14	<14	<14	<14	<14	<14	TM074	<14 ng/l
Dibenzo(ah)anthracene Aqueous	<16	<16	<16	<16	<16	<16	<16	<16	<16	TM074	<16 ng/l
Benzo(ghi)perylene Aqueous	<16	<16	<16	<16	<16	<16	<16	<16	<16	TM074	<16 ng/l
PAH 16 Total Aqueous	390	<27	35	<27	93000	<27	<27	<27	<27	TM074	<27 ng/l

Date 19.10.2007





## ALcontrol Geochem Analytical Services Table Of Results - Appendix

Job Number: 07/14582/02/01  
 Client: Norfolk County Council  
 Client Ref. No.: PTPZ0008

### Report Key :

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10<sup>-7</sup>

NDP	No Determination Possible	*	Subcontracted test
NFD	No Fibres Detected	»	Result previously reported (Incremental reports only)
#	ISO 17025 accredited	M	MCERTS Accredited
PFD	Possible Fibres Detected	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

### Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample <sup>1</sup>	Surrogate Corrected
TM001	In - house Method	Screening of Soils for Fibres			WET	
TM068	ASTM D-1552	Total sulphur determination by combustion method	✓		DRY	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS. MCERTS Accreditation on Soils for Naphthalene except when Kerosene present.			NA	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS. MCERTS Accreditation on Soils for Naphthalene except when Kerosene present.	✓		DRY	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS. MCERTS Accreditation on Soils for Naphthalene except when Kerosene present.	✓	✓	DRY	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)			WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓		WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓	✓	WET	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser	✓		DRY	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser	✓		DRY	
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser	✓		WET	
TM101	Method 4500B & C, AWWA/APHA, 20th Ed., 1999	Determination of Sulphide in soil and water samples using the Kone Analyser			WET	
TM102	Method 4500H, AWWA/APHA, 20th Ed., 1999	Determination of Total Oxidised Nitrogen using the Kone Analyser	✓		DRY	
TM127	Method 3112B, AWWA/APHA, 20th Ed., 1999	The Determination of Trace Level Mercury in Aqueous Media and Soil Extracts by Atomic Absorption Spectroscopy	✓		NA	

<sup>1</sup> Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

## ALcontrol Geochem Analytical Services Table Of Results - Appendix

**Job Number:** 07/14582/02/01  
**Client:** Norfolk County Council  
**Client Ref. No.:** PTPZ0008

### Report Key :

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10<sup>-7</sup>

NDP	No Determination Possible	*	Subcontracted test
NFD	No Fibres Detected	»	Result previously reported (Incremental reports only)
#	ISO 17025 accredited	M	MCERTS Accredited
PFD	Possible Fibres Detected	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

### Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample <sup>1</sup>	Surrogate Corrected
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓		DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	
TM133	BS 1377: Part 3 1990	Determination of pH in Soil and Water using the GLpH pH Meter	✓		NA	
TM133	BS 1377: Part 3 1990	Determination of pH in Soil and Water using the GLpH pH Meter	✓	✓	WET	
TM136	Method 17.10, Second Site property, March 2003	Determination of Sulphur by HPLC	✓		NA	
TM149	BS 1377: Part 3 1990 ( Extraction)	Analysis of Total Sulphate using ICP-OES Spectrophotometer			DRY	
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS	✓		NA	
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser	✓		WET	
TM154	In - house Method	Determination of Petroleum Hydrocarbons by EZ Flash GC-FID in the Carbon range C6- C40			WET	
TM154	In - house Method	Determination of Petroleum Hydrocarbons by EZ Flash GC-FID in the Carbon range C6- C40	✓		WET	
TM172		EPH in Waters	✓		NA	
TM173		Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID			DRY	
TM173		Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID	✓		DRY	

<sup>1</sup> Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.





# Appendix F

BH No.	Depth	Dia meter (mm)	Water Level (mbgl)	Water Sample Taken? (Y/N)	date complete	time complete
101	3.20	50	1.60	n	24-Sep	11.00
101	9.00	19	1.51	n		
102	3.10	50	2.30	n	26-Sep	9.20
102	24.65	50	2.04	n		
103	1.62	50	0.79	n	25-Sep	11.00
103	35.00	19	1.01	n		
104	5.50	50	1.37	y	25-Sep	12.40
104	28.50	50	1.34	n		
105	3.00	50	1.14	n	25-Sep	14.55
105	26.40	19	1.14	y		
105	40.00	19	1.33	n		
106	3.57	50	1.15	n	26-Sep	11.00
106	11.90	19	1.17	n		
107	2.95	50	2.49	n	25-Sep	9.30
107	10.00	19	2.56	y		
107		19	2.52	n		
108	2.80	50	1.12	n	26-Sep	13.00
108	19.90	19	1.35	y		
109	2.50	50	1.27	n	25-Sep	17.15
109	39.00	19	1.29	n		
110	2.60	50	2.04	y	26-Sep	14.00
110	28.10	50	1.55	n		
111	1.85	50	dry	n	26-Sep	8.20
111	19.50	19	2.70	n		
112	2.60	50	2.57	n	26-Sep	13.00
112	19.70	19	2.65	y		
113		50		n		
113		50		n		
114	2.80	50	1.64	y	25-Sep	16.00
115	3.00	50	2.85	n	25-Sep	13.30
115	27.70	50	2.85	y		
116	2.50	50	2.02	n	25-Sep	8.10
116	7.30	19	2.02	n		
117	5.80	50	1.91	n	25-Sep	12.30
117	40.00	50	1.94	y		

BH No.	Depth	Diameter (mm)	Water Level (mbgl)	Water Sample Taken? (Y/N)	date complete	time complete
101	3.20	50	1.69	n	05-Oct	17.40
101	9.00	19	1.73	n		
102	3.10	50	1.81	n	05-Oct	16.35
102	24.65	50	1.84	n		
103	1.62	50	0.92	n	05-Oct	15.10
103	35.00	19	1.05	n		
104	5.50	50	2.43	n	05-Oct	17.30
104	28.50	50	2.52	n		
105	3.00	50	1.16	n	05-Oct	13.50
105	26.40	19	1.21	n		
105	40.00	19	1.09	n		
106	3.57	50	1.21	n	05-Oct	14.20
106	11.90	19	1.23	n		
107	2.95	50	2.51	n	05-Oct	14.55
107	10.00	19	2.51	n		
107	19.80	19	2.51	n		
108	2.80	50	1.06	n	05-Oct	16.15
108	19.90	19	1.31	n		
109	2.50	50	1.24	n	05-Oct	14.40
109	39.00	19	1.29	n		
110	2.60	50	1.99	n	05-Oct	17.05
110	28.10	50	2.83	n		
111	1.85	50	dry	n	05-Oct	15.30
111	19.50	19	2.75	n		
112	2.60	50	2.56	n	05-Oct	16.00
112	19.70	19	3.01	n		
113	1.62	50	dry	n	05-Oct	15.47
113	4.20	50	2.34	n		
114	2.80	50	1.97	n	05-Oct	13.15
115	3.00	50	2.84	n	05-Oct	12.15
115	27.70	50	2.83	n		
116	2.50	50	2.00	n	05-Oct	12.50
116	7.30	19	2.00	n		
117	5.80	50	2.01	n	05-Oct	13.35
117	40.00	50	1.96	n		



BH No.	Depth	Diameter (mm)	Water Level (mbgl)	Water Sample Taken? (Y/N)	date complete	time complete
101	3.20	50	1.44	n	12-Oct	14.00
101	9.00	19	1.55	n		
102	3.10	50	2.19	n	12-Oct	11.45
102	24.65	50	2.27	n		
103	1.62	50	0.86	n	12-Oct	16.25
103	35.00	19	1.04	n		
104	5.50	50	1.42	n	12-Oct	12.05
104	28.50	50	1.44	n		
105	3.00	50	1.08	n	12-Oct	15.45
105	26.40	19	1.09	n		
105	40.00	19	1.09	n		
106	3.57	50	1.19	n	12-Oct	15.55
106	11.90	19	1.19	n		
107	2.95	50	2.52	n	12-Oct	16.10
107	10.00	19	2.53	n		
107	19.80	19	2.52	n		
108	2.80	50	1.01	n	12-Oct	13.40
108	19.90	19	0.95	n		
109	2.50	50	1.17	n	12-Oct	15.20
109	39.00	19	0.77	n		
110	2.60	50	1.95	n	12-Oct	13.20
110	28.10	50	2.52	n		
111	1.85	50	dry	n	12-Oct	13.00
111	19.50	19	2.60	n		
112	2.60	50	2.55	n	12-Oct	12.20
112	19.70	19	2.74	n		
113	3.11	50	2.09	n	12-Oct	12.40
113	4.20	50	1.99	n		
114	2.80	50	1.77	n	12-Oct	14.20
115	3.00	50	2.88	n	12-Oct	14.40
115	27.70	50	2.89	n		
116	2.50	50	1.92	n	12-Oct	15.00
116	7.30	19	1.93	n		
117	5.80	50	1.92	n	12-Oct	16.30
117	40.00	50	1.75	n		

BH No.	Depth	Diameter (mm)	Water Level (mbgl)	Water Sample Taken? (Y/N)	Date complete	time complete
101	3.20	50	1.60	n	19.10.07	14.11
101	9.00	19	1.57	n		
102	3.10	50	2.23	n	19.10.07	14.30
102	24.65	50	2.51	n		
103	1.62	50	0.78	n	19.10.07	13.50
103	35.00	19	1.00	n		
104	5.50	50	1.73	n	19.10.07	14.55
104	28.50	50	1.72	n		
105	3.00	50	1.10	n	19.10.07	12.50
105	26.40	19	1.07	n		
105	40.00	19	1.07	n		
106	3.57	50	1.22	n	19.10.07	13.10
106	11.90	19	1.23	n		
107	2.95	50	2.52	n	19.10.07	13.30
107	10.00	19	2.53	n		
107	19.80	19	2.52	n		
108	2.80	50	1.02	n	19.10.07	15.10
108	19.90	19	1.11	n		
109	2.50	50	1.21	n	19.10.07	12.35
109	39.00	19	1.25	n		
110	2.60	50	1.97	n	19.10.07	15.00
110	28.10	50	2.73	n		
111	1.85	50	dry	n	19.10.07	15.20
111	19.50	19	2.73	n		
112	2.60	50	2.55	n	19.10.07	15.40
112	19.70	19	2.77	n		
113	3.11	50	2.24	n	19.10.07	1600.00
113	4.20	50	2.21	n		
114	2.80	50	1.88	n	19.10.07	11.40
115	3.00	50	2.84	n	19.10.07	11.15
115	27.70	50	2.83	n		
116	2.50	50	1.98	n	19.10.07	12.00
116	7.30	19	1.97	n		
117	5.80	50	1.92	n	19.10.07	12.15
117	40.00	50	1.90	n		

BH No.	Depth	Diameter (mm)	Water Level (mbgl)	Water Sample Taken? (Y/N)	Date complete	Time complete
101	3.20	50	1.57	n	22.10.07	12.05
101	9.00	19	1.60	n		
102	3.10	50	2.36	n	22.10.07	11.50
102	24.65	50	2.30	n		
103	1.62	50	0.86	n	22.10.07	9.20
103	35.00	19	1.12	n		
104	5.50	50	1.87	n	22.10.07	11.40
104	28.50	50	1.86	n		
105	3.00	50	1.10	n	22.10.07	9.30
105	26.40	19	1.12	n		
105	40.00	19	1.12	n		
106	3.57	50	1.20	n	22.10.07	110.00
106	11.90	19	1.22	n		
107	2.95	50	2.55	n	22.10.07	9.45
107	10.00	19	2.54	n		
107	19.80	19	2.53	n		
108	2.80	50	1.02	n	22.10.07	11.25
108	19.90	19	1.11	n		
109	2.50	50	1.22	n	22.10.07	9.10
109	39.00	19	1.24	n		
110	2.60	50	1.95	n	22.10.07	11.10
110	28.10	50	2.59	n		
111	1.85	50	dry	n	22.10.07	10.50
111	19.50	19	2.68	n		
112	2.60	50	2.55	n	22.10.07	10.30
112	19.70	19	2.79	n		
113	3.11	50	2.11	n	22.10.07	10.15
113	4.20	50	2.06	n		
114	2.80	50	1.84	n	22.10.07	9.00
115	3.00	50	2.86	n	22.10.07	8.00
115	27.70	50	2.86	n		
116	2.50	50	2.00	n	22.10.07	8.30
116	7.30	19	2.01	n		
117	5.80	50	1.91	n	22.10.07	8.45
117	40.00	50	1.87	n		

# Appendix G

BH No.	Depth	Diameter (mm)	Atmospheric Pressure	CO2 (%)	CH4 (%)	O2 (%)	LEL (%)	Flow Rate	Water Level (mbgl)	Water Sample Taken? (Y/N)	date complete	time complete
101	3.20	50	1000	1.7	0.0	15.4	0.5	0.1	1.60	n	24-Sep	11.00
101	9.00	19		1.7	0.0	1.0	0.0	0.0	1.51	n		
102	3.10	50	1015	0.2	0.0	15.4	0.0	0.0	2.30	n	26-Sep	9.20
102	24.65	50		0.0	0.0	18.9	0.0	0.0	2.04	n		
103	1.62	50	1008	0.0	0.0	20.7	0.0	0.0	0.79	n	25-Sep	11.00
103	35.00	19		0.0	0.0	20.7	0.0	0.0	1.01	n		
104	5.50	50	1007	2.9	0.0	14.4	0.0	0.1	1.37	y	25-Sep	12.40
104	28.50	50		0.1	0.0	19.2	0.0	0.0	1.34	n		
105	3.00	50	1007	0.4	0.1	16.2	2.0	-1.2	1.14	n	25-Sep	14.55
105	26.40	19		0.0	0.0	20.0	0.0	0.0	1.14	y		
105	40.00	19		0.0	0.0	19.7	0.0	0.0	1.33	n		
106	3.57	50	1015	0.0	0.0	21.0	0.0	0.0	1.15	n	26-Sep	11.00
106	11.90	19		0.0	0.0	21.7	0.0	0.0	1.17	n		
107	2.95	50	1007	6.4	0.0	19.5	0.0	0.0	2.49	n	25-Sep	9.30
107	10.00	19		0.0	0.0	20.0	0.0	0.0	2.56	y		
107		19		0.0	0.0	20.0	0.0	0.0	2.52	n		
108	2.80	50	1015	0.0	0.0	11.8	0.0	0.0	1.12	n	26-Sep	13.00
108	19.90	19		0.0	0.0	20.1	0.0	0.0	1.35	y		
109	2.50	50	1007	1.6	0.0	14.5	0.0	0.1	1.27	n	25-Sep	17.15
109	39.00	19		0.0	0.0	20.7	0.0	0.0	1.29	n		
110	2.60	50	1015	0.0	0.0	9.9	0.0	0.0	2.04	y	26-Sep	14.00
110	28.10	50		0.0	0.0	15.2	0.0	0.0	1.55	n		
111	1.85	50	1015	0.4	0.0	18.8	0.0	0.0	dry	n	26-Sep	8.20
111	19.50	19		0.0	0.0	18.9	0.0	0.0	2.70	n		
112	2.60	50	1016	0.0	0.0	19.6	0.0	0.0	2.57	n	26-Sep	13.00
112	19.70	19		0.0	0.0	19.4	0.0	0.0	2.65	y		
113		50		0.0	0.0	0.0	0.0	0.0		n		
113		50		0.0	0.0	0.0	0.0	0.0		n		
114	2.80	50	1008	0.4	0.1	9.4	2.0	0.0	1.64	y	25-Sep	16.00
115	3.00	50	1008	0.3	0.0	12.6	0.0	0.0	2.85	n	25-Sep	13.30
115	27.70	50		0.0	0.0	19.5	0.0	0.0	2.85	y		
116	2.50	50	1008	0.0	0.0	20.9	0.0	0.0	2.02	n	25-Sep	8.10
116	7.30	19		0.0	0.0	20.9	0.0	0.0	2.02	n		
117	5.80	50	1008	0.0	0.0	18.2	0.0	0.1	1.91	n	25-Sep	12.30
117	40.00	50		0.0	0.0	19.5	0.0	0.0	1.94	y		

BH No.	Depth	Diameter (mm)	Atmospheric Pressure	CO2 (%)	CH4 (%)	O2 (%)	LEL (%)	Flow Rate	Water Level (mbgl)	Water Sample Taken? (Y/N)	date complete	time complete
101	3.20	50	1022	1.3	0.0	6.7	0.0	0.0	1.69	n	05-Oct	17.40
101	9.00	19		0.0	0.0	19.8	0.0	0.0	1.73	n		
102	3.10	50	1022	6.3	0.0	10.1	0.0	0.0	1.81	n	05-Oct	16.35
102	24.65	50		0.0	0.0	20.0	0.0	0.0	1.84	n		
103	1.62	50	1022	0.0	0.0	20.3	0.0	0.0	0.92	n	05-Oct	15.10
103	35.00	19		0.0	0.0	20.5	0.0	0.0	1.05	n		
104	5.50	50	1022	0.1	0.0	16.8	0.0	0.0	2.43	n	05-Oct	17.30
104	28.50	50		0.0	0.0	19.4	0.0	0.0	2.52	n		
105	3.00	50	1022	0.1	0.0	18.8	0.0	0.1	1.16	n	05-Oct	13.50
105	26.40	19		0.0	0.0	19.7	0.0	0.0	1.21	n		
105	40.00	19		0.0	0.0	18.3	0.0	0.0	1.09	n		
106	3.57	50	1022	0.3	0.0	18.3	0.0	0.0	1.21	n	05-Oct	14.20
106	11.90	19		0.2	0.0	18.4	0.0	0.0	1.23	n		
107	2.95	50	1022	0.3	0.0	19.7	0.0	0.0	2.51	n	05-Oct	14.55
107	10.00	19		0.0	0.0	20.2	0.0	0.0	2.51	n		
107	19.80	19		0.0	0.0	19.5	0.0	0.0	2.51	n		
108	2.80	50	1022	0.0	0.0	20.5	0.0	0.0	1.06	n	05-Oct	16.15
108	19.90	19		0.0	0.0	20.4	0.0	0.0	1.31	n		
109	2.50	50	1022	0.4	0.0	18.0	0.0	0.0	1.24	n	05-Oct	14.40
109	39.00	19		0.0	0.0	20.4	0.0	0.0	1.29	n		
110	2.60	50	1022	0.0	0.0	11.5	0.0	0.0	1.99	n	05-Oct	17.05
110	28.10	50		0.0	0.0	19.4	0.0	0.0	2.83	n		
111	1.85	50	1022	0.0	0.0	20.4	0.0	0.0	dry	n	05-Oct	15.30
111	19.50	19		0.0	0.0	20.3	0.0	0.0	2.75	n		
112	2.60	50	1022	0.0	0.0	20.4	0.0	0.0	2.56	n	05-Oct	16.00
112	19.70	19		0.0	0.0	20.1	0.0	0.0	3.01	n		
113	1.62	50	1022	0.0	0.0	18.6	0.0	0.0	dry	n	05-Oct	15.47
113	4.20	50		0.3	0.0	16.8	0.0	0.0	2.34	n		
114	2.80	50	1022	0.7	0.0	8.1	0.0	0.0	1.97	n	05-Oct	13.15
115	3.00	50		0.0	0.0	20.0	0.0	0.0	2.84	n		
115	27.70	50		0.0	0.0	20.2	0.0	0.0	2.83	n		
116	2.50	50	1022	0.0	0.0	20.7	0.0	0.0	2.00	n	05-Oct	12.50
116	7.30	19		0.0	0.0	20.8	0.0	0.0	2.00	n		
117	5.80	50	1022	0.0	0.0	18.4	0.0	0.0	2.01	n	05-Oct	13.35
117	40.00	50		0.0	0.0	19.3	0.0	0.0	1.96	n		

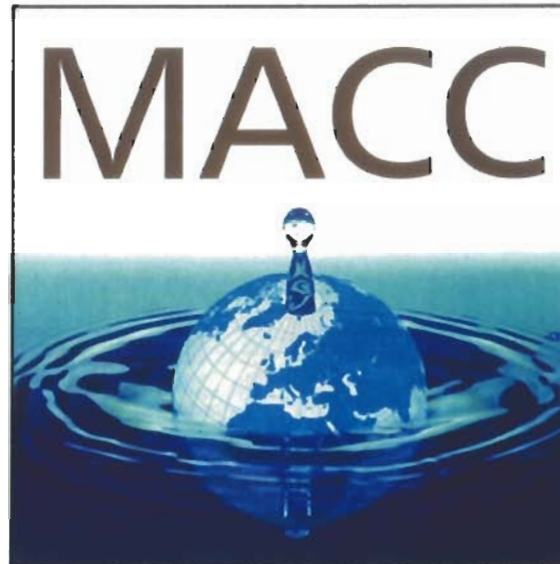
BH No.	Depth	Diameter (mm)	Atmospheric Pressure	CO2 (%)	CH4 (%)	O2 (%)	LEL (%)	Flow Rate	Water Level (mbgl)	Water Sample Taken? (Y/N)	date complete	time complete
101	3.20	50	1022	1.4	0.0	5.7	0.0	0.0	1.44	n	12-Oct	14.00
101	9.00	19		0.0	0.0	20.0	0.0	0.0	1.55	n		
102	3.10	50	1022	0.2	0.0	16.2	0.0	0.0	2.19	n	12-Oct	11.45
102	24.65	50		0.1	0.0	18.2	0.0	0.0	2.27	n		
103	1.62	50	1022	0.0	0.0	20.5	0.0	0.1	0.86	n	12-Oct	16.25
103	35.00	19		0.0	0.0	20.4	0.0	0.0	1.04	n		
104	5.50	50	1022	4.4	0.0	11.1	0.0	0.0	1.42	n	12-Oct	12.05
104	28.50	50		0.4	0.0	16.9	0.0	0.0	1.44	n		
105	3.00	50	1022	0.1	0.0	19.6	0.0	0.0	1.08	n	12-Oct	15.45
105	26.40	19		0.0	0.0	20.1	0.0	0.0	1.09	n		
105	40.00	19		0.0	0.0	20.0	0.0	0.0	1.09	n		
106	3.57	50	1022	0.1	0.0	19.7	0.0	0.0	1.19	n	12-Oct	15.55
106	11.90	19		0.0	0.0	19.1	0.0	0.0	1.19	n		
107	2.95	50	1022	3.2	0.0	18.9	0.0	0.0	2.52	n	12-Oct	16.10
107	10.00	19		0.0	0.0	20.0	0.0	0.0	2.53	n		
107	19.80	19		0.0	0.0	20.1	0.0	0.0	2.52	n		
108	2.80	50	1022	0.0	0.0	20.4	0.0	0.0	1.01	n	12-Oct	13.40
108	19.90	19		0.0	0.0	20.2	0.0	0.0	0.95	n		
109	2.50	50	1022	0.3	0.0	18.2	0.0	0.0	1.17	n	12-Oct	15.20
109	39.00	19		0.0	0.0	20.4	0.0	0.0	0.77	n		
110	2.60	50	1022	0.0	0.0	14.2	0.0	0.0	1.95	n	12-Oct	13.20
110	28.10	50		0.0	0.0	19.8	0.0	0.0	2.52	n		
111	1.85	50	1022	0.0	0.0	19.6	0.0	0.0	dry	n	12-Oct	13.00
111	19.50	19		0.0	0.0	19.5	0.0	0.0	2.60	n		
112	2.60	50	1022	0.1	0.0	18.1	0.0	0.0	2.55	n	12-Oct	12.20
112	19.70	19		0.0	0.0	19.8	0.0	0.0	2.74	n		
113	3.11	50	1022	0.2	0.0	17.8	0.0	0.0	2.09	n	12-Oct	12.40
113	4.20	50		2.4	0.0	10.0	0.0	0.0	1.99	n		
114	2.80	50	1022	0.0	0.0	19.5	0.0	0.0	1.77	n	12-Oct	14.20
115	3.00	50		0.3	0.0	12.0	0.0	0.0	2.88	n		
115	27.70	50		0.0	0.0	15.7	0.0	0.0	2.89	n		
116	2.50	50	1022	0.0	0.0	19.3	0.0	0.0	1.92	n	12-Oct	15.00
116	7.30	19		0.0	0.0	20.3	0.0	0.0	1.93	n		
117	5.80	50	1022	1.0	0.0	4.5	46.0	0.0	1.92	n	12-Oct	16.30
117	40.00	50		0.1	0.0	18.3	0.0	0.0	1.75	n		



BH No.	Depth	Diameter (mm)	Atmospheric Pressure	CO2 (%)	CH4 (%)	O2 (%)	LEL (%)	Flow Rate	Water Level (mbgl)	Water Sample Taken? (Y/N)	date complete	time complete
101	3.20	50	1033	0.50	0.00	3.60	0.00	0.00	1.60	n	19.10.07	14.11
101	9.00	19		0.10	0.00	21.00	0.00	0.00	1.57	n		
102	3.10	50	1033	0.00	0.00	19.80	0.00	0.00	2.23	n	19.10.07	14.30
102	24.65	50		0.10	0.00	17.10	0.00	0.00	2.51	n		
103	1.62	50	1033	0.00	0.00	20.30	0.00	0.00	0.78	n	19.10.07	13.50
103	35.00	19		0.00	0.00	20.50	0.00	0.00	1.00	n		
104	5.50	50	1033	3.20	0.00	13.20	0.00	0.00	1.73	n	19.10.07	14.55
104	28.50	50		0.80	0.00	18.20	0.00	0.00	1.72	n		
105	3.00	50	1033	0.00	0.00	20.10	0.00	0.00	1.10	n	19.10.07	12.50
105	26.40	19		0.00	0.00	20.40	0.00	0.00	1.07	n		
105	40.00	19		0.00	0.00	20.50	0.00	0.00	1.07	n		
106	3.57	50	1033	0.30	0.00	18.40	0.00	0.00	1.22	n	19.10.07	13.10
106	11.90	19		0.00	0.00	20.80	0.00	0.00	1.23	n		
107	2.95	50	1033	0.30	0.00	19.70	0.00	0.00	2.52	n	19.10.07	13.30
107	10.00	19		0.00	0.00	20.10	0.00	0.00	2.53	n		
107	19.80	19		0.00	0.00	20.40	0.00	0.00	2.52	n		
108	2.80	50	1033	0.00	0.00	20.30	0.00	0.00	1.02	n	19.10.07	15.10
108	19.90	19		0.00	0.00	20.30	0.00	0.00	1.11	n		
109	2.50	50	1033	0.30	0.00	19.30	0.00	0.00	1.21	n	19.10.07	12.35
109	39.00	19		0.00	0.00	20.40	0.00	0.00	1.25	n		
110	2.60	50	1033	0.00	0.00	13.60	0.00	0.00	1.97	n	19.10.07	15.00
110	28.10	50		0.00	0.00	16.70	0.00	0.00	2.73	n		
111	1.85	50	1033	0.00	0.00	20.30	0.00	0.00	dry	n	19.10.07	15.20
111	19.50	19		0.00	0.00	20.20	0.00	0.00	2.73	n		
112	2.60	50	1033	0.00	0.00	19.90	0.00	0.00	2.55	n	19.10.07	15.40
112	19.70	19		0.00	0.00	20.20	0.00	0.00	2.77	n		
113	3.11	50	1033	0.30	0.00	17.80	0.00	0.00	2.24	n	19.10.07	1600.00
113	4.20	50		1.70	0.00	14.00	0.00	0.00	2.21	n		
114	2.80	50	1033	0.80	0.50	7.50	6.00	0.10	1.88	n	19.10.07	11.40
115	3.00	50		0.30	0.00	7.10	0.00	0.00	2.84	n		
115	27.70	50		0.10	0.00	11.20	0.00	0.00	2.83	n		
116	2.50	50	1033	0.00	0.00	20.80	0.00	0.00	1.98	n	19.10.07	12.00
116	7.30	19		0.00	0.00	20.70	0.00	0.00	1.97	n		
117	5.80	50	1033	0.60	2.60	7.00	27.90	0.10	1.92	n	19.10.07	12.15
117	40.00	50		0.00	0.20	14.90	9.60	0.00	1.90	n		

BH No.	Depth	Diameter (mm)	Atmospheric Pressure	CO2 (%)	CH4 (%)	O2 (%)	LEL (%)	Flow Rate	Water Level (mbgl)	Water Sample Taken? (Y/N)	date complete	time complete
101	3.20	50	1023	1.0	0.0	4.7	0.1	0.2	1.57	n	22.10.07	12.05
101	9.00	19		0.0	0.0	19.6	0.0	0.0	1.60	n		
102	3.10	50	1023	0.4	0.0	17.7	0.0	0.0	2.36	n	22.10.07	11.50
102	24.65	50		0.0	0.0	19.3	0.0	0.0	2.30	n		
103	1.62	50	1023	0.0	0.0	20.5	0.0	0.0	0.86	n	22.10.07	9.20
103	35.00	19		0.0	0.0	20.4	0.0	0.0	1.12	n		
104	5.50	50	1023	3.1	0.0	14.6	0.0	0.1	1.87	n	22.10.07	11.40
104	28.50	50		0.3	0.0	19.3	0.0	0.0	1.86	n		
105	3.00	50	1023	0.2	0.0	19.8	0.0	0.1	1.10	n	22.10.07	9.30
105	26.40	19		0.0	0.0	20.0	0.0	0.0	1.12	n		
105	40.00	19		0.0	0.0	20.1	0.0	0.0	1.12	n		
106	3.57	50	1023	0.1	0.0	19.3	0.0	0.0	1.20	n	22.10.07	110.00
106	11.90	19		0.0	0.0	19.4	0.0	0.0	1.22	n		
107	2.95	50	1023	0.4	0.0	19.3	0.0	0.0	2.55	n	22.10.07	9.45
107	10.00	19		0.0	0.0	20.1	0.0	0.0	2.54	n		
107	19.80	19		0.0	0.0	20.2	0.0	0.0	2.53	n		
108	2.80	50	1023	0.0	0.0	20.3	0.0	0.0	1.02	n	22.10.07	11.25
108	19.90	19		0.0	0.0	20.4	0.0	0.0	1.11	n		
109	2.50	50	1023	0.5	0.0	18.2	0.0	0.0	1.22	n	22.10.07	9.10
109	39.00	19		0.0	0.0	20.1	0.0	0.0	1.24	n		
110	2.60	50	1023	0.0	0.0	14.2	0.0	0.1	1.95	n	22.10.07	11.10
110	28.10	50		0.0	0.0	18.6	0.0	0.1	2.59	n		
111	1.85	50	1023	0.0	0.0	19.7	0.0	0.0	dry	n	22.10.07	10.50
111	19.50	19		0.0	0.0	19.7	0.0	0.0	2.68	n		
112	2.60	50	1023	0.0	0.0	19.7	0.0	0.0	2.55	n	22.10.07	10.30
112	19.70	19		0.0	0.0	19.7	0.0	0.0	2.79	n		
113	3.11	50	1023	0.4	0.0	17.6	0.0	0.0	2.11	n	22.10.07	10.15
113	4.20	50		1.6	0.0	15.7	0.0	0.0	2.06	n		
114	2.80	50	1023	0.9	0.2	8.0	4.3	0.1	1.84	n	22.10.07	9.00
115	3.00	50		0.3	0.0	14.2	0.0	0.0	2.86	n		
115	27.70	50		0.0	0.0	14.8	0.0	0.0	2.86	n		
116	2.50	50	1023	0.0	0.0	20.2	0.0	0.0	2.00	n	22.10.07	8.30
116	7.30	19		0.0	0.0	20.3	0.0	0.0	2.01	n		
117	5.80	50	1023	0.4	2.0	9.0	31.7	0.0	1.91	n	22.10.07	8.45
117	40.00	50		0.0	0.0	15.6	6.1	0.0	1.87	n		

# Appendix H



**DESK STUDY  
FOR  
UNEXPLODED ORDNANCE  
FOR  
3<sup>RD</sup> RIVER CROSSING  
GREAT YARMOUTH**

Prepared for: Norfolk Partnership Laboratory

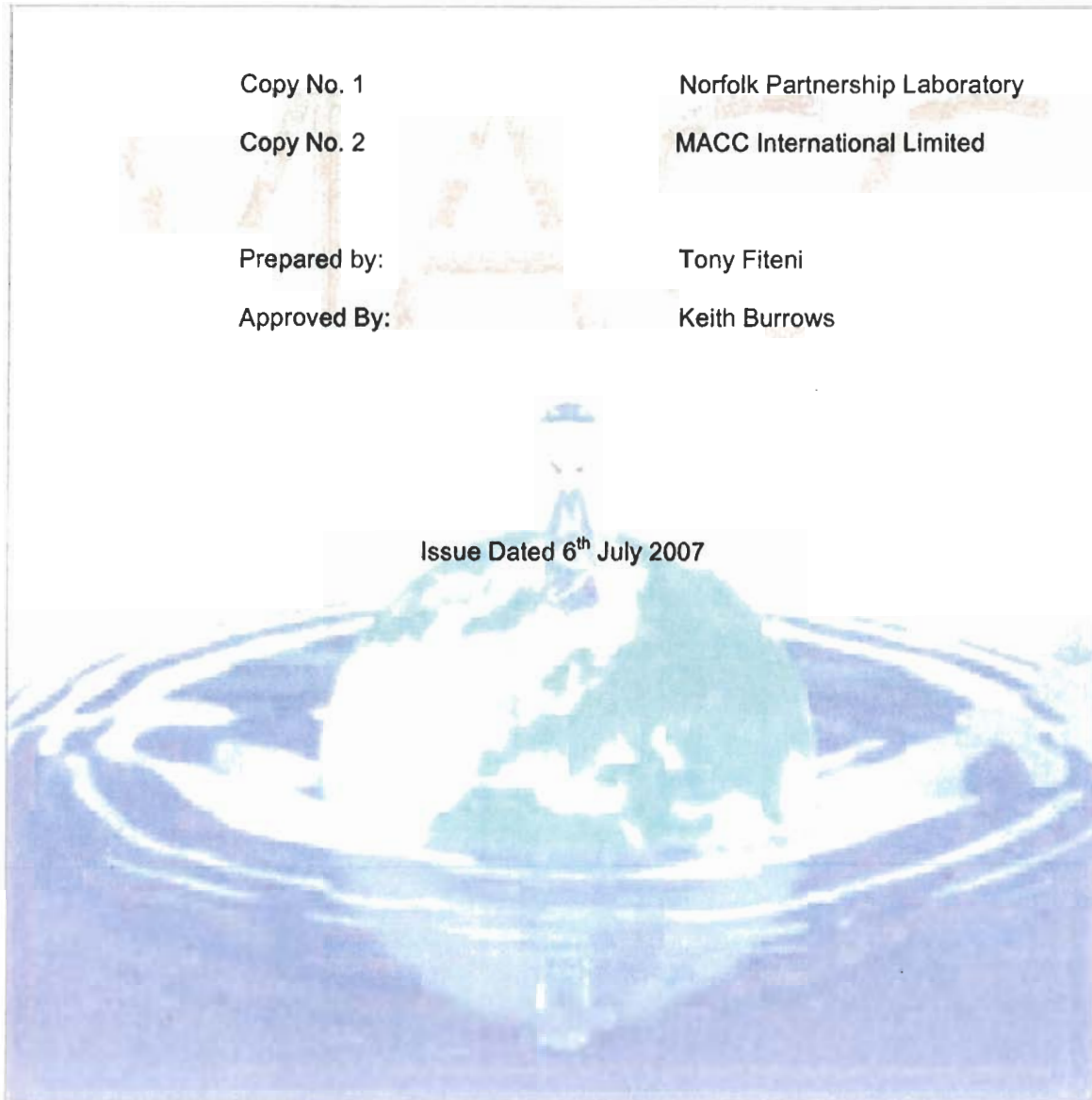
Project Number: 3154

Report Number: 3154/01

Dated: 6<sup>th</sup> July 2007

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## TERMS AND DEFINITIONS

### Anti Aircraft Shells (AA)

Small HE shells ranging up to 40mm in diameter.

### Anti Personnel Bomb (APB)

Small sub-munitions dispensed from a main carrier may be aimable or non-aimable these are highly dangerous and are to be treated with extreme caution,

### Battlefield Area Clearance (BAC)

The systematic clearance of munitions from military property or old battle sites e.g. ranges, airfields etc.

### Borehole Search

The placing of boreholes in a set pattern, then using a magnetometer to take readings at specific depths along each borehole. When used with a geophysical survey system this will give a magnetic signature of the area. The depth of the borehole and the pattern will depend upon the type of UXB and the geology of the ground.

### Doodle Bug (See Pilotless Aircraft)

### Explosive Ordnance (EO)

All munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads; guided and ballistic missiles; artillery, mortar, rocket and small arms ammunition; all mines, torpedoes and depth charges; pyrotechnics; clusters and dispensers; cartridge and propellant actuated devices; electro-explosive devices; clandestine and improvised explosive devices; and all similar or related items or components explosive in nature.

### Explosive Ordnance Disposal (EOD)

The detection, identification, field evaluation, render safe, recovery and disposal of UXO.

### Fragmentation Hazard Zone

The area that could be reached by fragmentation following detonation for a given explosive item, explosive storage or mine/UXO contaminated area.

Note: Several factors should be considered when determining this zone; the amount of explosive, body construction, type of material, ground conditions etc. See also [secondary fragmentation].

### Geophysical Survey

The survey of an area using a Magnetometer and geophysical gathering device, after interpretation, this will produce a geophysical map and an object list for any metallic hotspots.



### High Explosive (HE)

High explosives burn/detonate at rates of up to 9,000 m/per second.

### Incendiary Bomb (IB)

Incendiary bombs ranged from 1kg in size to 500kg the larger sizes were sometimes called Oil Bombs. Fills range from thermite mixtures, phosphorus to kerosene.

### Intrusive Search

The use of a cone penetrometer or boreholes to take magnetometer test in a set pattern (see borehole search)

### Land Service Ammunition (LSA)

LSA is defined as "All items containing explosives or pyrotechnic compounds which are placed, thrown or projected so as to cause damage to men and equipment during land warfare.

### Long Range Rocket (LRR)

The long range rocket sometimes codenamed Big Ben is the V2 rocket designed to deliver an approximate payload of 1000 kg.

### Oil Bomb (OB)

A bomb containing a flammable liquid normally the KC 250 Flam or the C 500 flam.

### Pilot less Aircraft (PAC)

A flying bomb (Fly) or doodlebug is the V1 rocket or predecessors designed to deliver an explosive payload of approximately 500kg - 800kg.

### Parachute Flare (PF)

### Parachute Mine (PM)

Air dropped mine may have been used as a blast effect bomb maximum explosive content 1600lb always fitted with anti-handling and anti-stripping equipment.

### Phosphorus (PH) see WP

### Secondary Fragmentation

In an explosive event, fragmentation that was not originally part of the UXO.

### Unexploded Bomb (UXB)

Any air dropped bomb that has failed to operate.

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**Unexploded Ordnance (UXO)**

Explosive ordnance that has been primed, fused, armed or otherwise prepared for use or used. It may have been fired, dropped, launched or projected yet remains unexploded either through malfunction or design or for any other cause.

**Unexploded Parachute Mine (UXPM)**

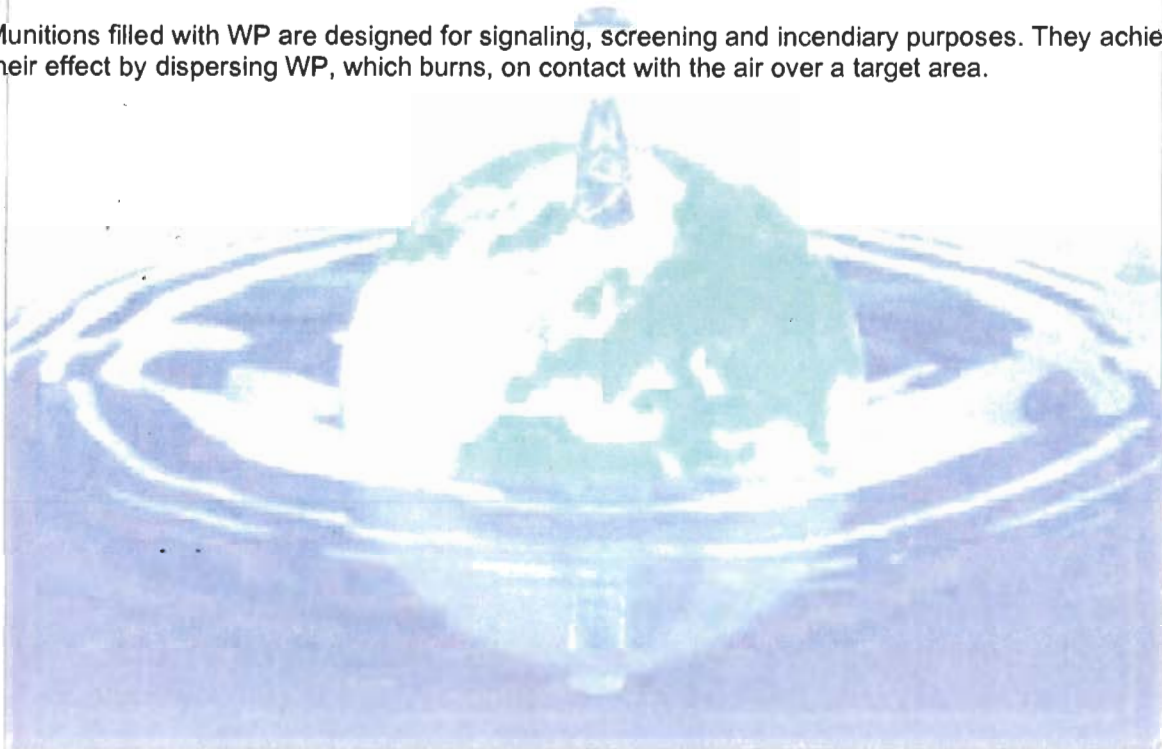
Any unexploded parachute mine.

**Vengeance Weapons (V)**

V1 see Pilot less Aircraft.  
V2 see Long Range Rocket.

**White Phosphorus (WP)**

Munitions filled with WP are designed for signaling, screening and incendiary purposes. They achieve their effect by dispersing WP, which burns, on contact with the air over a target area.



1        **INTRODUCTION**

1.1      **INSTRUCTION**

MACC International Limited, at the request of Norfolk Partnership Laboratory has conducted a Desk Study for Explosive Ordnance (EO)/Unexploded Ordnance (UXO) in the vicinity of the intended 3<sup>rd</sup> river crossing, Great Yarmouth.

This desk study is a collation and review of existing records and documentation.

1.2      **SCOPE OF WORK**

The purpose of this desk study is to assess the likelihood of buried EO/UXO within the vicinity of the intended 3<sup>rd</sup> river crossing, Great Yarmouth.

This report has been specifically prepared for Norfolk Partnership Laboratory, without the benefit of knowing the intentions of any third parties; therefore, it should not be used by such organizations without prior consultation with MACC International Limited.

1.3      **REPORTING CONDITIONS**

It must be emphasized that a desk study can only indicate the potential for EO/UXO to be present on the site. A Geophysical survey and intrusive investigation is fundamentally important to provide proof that the site is free of EO/UXO threat.

This report was written with the site conditions prevailing at the time of the study and no liability can be accepted by MACC International Limited for any change in the condition of the area.

The reader is reminded that the majority of military information from pre WWII has not been retained and the only available documentation is old maps, which rarely denote any specifics and sometimes are just a blank area.

This desk study relies on the information contained in the documents consulted and MACC International Limited will in no circumstances be held responsible for the accuracy of such information or data supplied (in some instances circa 1939/40 these documents were compiled in a wartime scenario).

The mapping system used throughout WWII is the War Office False Ordnance System (WOFO).

1.4      **SENSITIVE DOCUMENTATION**

Information may be classified, restricted or deemed to be confidential in nature to MACC International Limited, where such material has been gained a summary of the documentation has been approved.



## 2 SOURCES OF INFORMATION

Research of the sites history, with regard to military usage, bombing raids and bomb impacts has been undertaken to establish the following:

- Frequency and intensity of enemy bombing raids for the site and immediate vicinity up to 1000m radius.
- Bomb impacts and associated damage on the Site and in the immediate vicinity.
- The potential for UXO to remain on the Site and in the vicinity.
- Records of UXO removal activities for the Site and immediate vicinity.

Due to reasons of National Security defence related information, such as maps detailing wartime bombing campaigns, the location of unexploded bombs (UXB's) and military bases are generally not indicated on publicly available plans. It is for this reason that information regarding such sites is often difficult to locate and access.

The main sources of information consulted include:

- MACC International Limited defence related site records.
- MACC International Limited company records.
- Ministry of Defence records. The relevant records are attached.
- Specific research into the military history and development of the Site.
- Local Authority records.
- National Government Records Office.

## 3 LOCATION OF THE SITE

The site is located in Great Yarmouth and is centred on TG5256305773. The client provided the site location map, shown at Annex A, with an amended brief that the eastern boundary is to be extended to the adjoining North Sea coastline.

## 4 HISTORICAL INFORMATION

### 4.1 UK DEFENCE HISTORY

Records of air raids, bomb damage, casualties and the locations of UXO are rarely released into the public domain. Details relating to these records are often difficult to locate. Prior to WWII records of EO/UXO found are minimal and only the possible military usage of an area can be defined.

The records compiled during WWII were only as detailed and accurate as the availability of time, personnel and the ease of access to information would allow. Densely populated areas associated with the major cities tended to have a greater number of records than those produced for the more provincial or rural areas.

Prior to 1942, the mapping and information collation for bomb strikes/unexploded bombs was limited due to the ability of the persons recording the data. In April 1942 the Ministry of Home Security instigated a training programme for all personnel carrying out bomb census records, this standardised records and greatly improved the accuracy of the data.

Official records were often supplemented by press reports and local information. This source of information was sometimes discredited by being inadvertently inaccurate or purposely made inaccurate, in order to confuse enemy intelligence. Even the accuracy of classified official records is somewhat dubious. This stance has been borne out by the number of unrecorded UXO and part exploded ordnance discovered since 1945.

### 4.2 WORLD WAR I

The first attack on Great Yarmouth was on 3<sup>rd</sup> November 1914 when the town was shelled by the German Navy at 7am. No damage was done as the shells fell harmlessly on the beach. Two more bombardments followed later in the war, one on 25<sup>th</sup> April 1915 when some damage was sustained and a more serious attack on 14<sup>th</sup> January 1918 when 50 shells hit the town within 5 minutes, killing four people and injuring eight.

On 19<sup>th</sup> January 1915 at 8.30pm a Zeppelin airship of the German Navy passed slowly over the town and dropped ten bombs. The bombs fell in line from Albemarle Road to the South Denes, destroying buildings and causing fatalities.

### 4.3 WORLD WAR II

In 1939 the Royal Navy established a series of shore bases to protect the vital East Coast Convoy Route, a shipping lane from the Firth of Forth to the Thames. Through this channel convoys of merchant ships would carry essential supplies for the war effort. These convoys had to be protected and Great Yarmouth was one of the bases from which mine sweepers, motor torpedo boats, air sea rescue boats and salvage tugs operated throughout the war.

Also in 1939, precautions against possible invasion were put in place. The beaches were heavily mined, lined with barbed wire and tank traps constructed along the beaches to the north of the town. Three Gun batteries were also constructed to protect the harbour and beaches. In addition to these main batteries anti-aircraft guns were placed at strategic points around the town, including one on Stonecutters Quay and several along the sea front.

The first of over **ninety** air raids on Great Yarmouth was at 6.30am on 11<sup>th</sup> July 1940, a single German aircraft dropped bombs on the junction of Gordon Road and Wolseley Road, Southtown. The worst year of the war was 1941, during frequent air raids over 15,000 incendiary bombs and 800 high explosive bombs were dropped. The most severe of these raids began on 9<sup>th</sup> July when 68 HE bombs were dropped on the town.



*Admiralty Road, June 5th, 1941*

**An unexploded high explosive bomb recovered in Admiralty Road.  
This bomb was the only one dropped in a raid on 5<sup>th</sup> June 1941.**



*Fredrick Road, Gorleston, June 12th, 1941*

**A 4,000lb bomb which failed to explode in Fredrick Road, Gorleston.  
This was one of three bombs dropped on 12<sup>th</sup> June 1941.**



Extracts from publications and records for Great Yarmouth in 1941 include:

- Monday, March 31<sup>st</sup>

Another 26 aircraft (including two seeking alternative targets to Hull) attacked dock installations at Great Yarmouth with 29 tonnes of HE (14 SC 1000, 20 SC 500, 20 SD 500 and four LMB mines) and 7,956 incendiaries between 2017 and 2300 hours. Visual bombing was attempted, in the light of 40 LC 50 flares, and was seemingly successful. Crews reported explosions and fires in the target area, with one extraordinary large fire on the west bank of the River Yare. A ship was also seen to be on fire.

- Monday, April 21<sup>st</sup>

On the other side of the country 13 aircraft of Luftflotte 2 carried out an attack on Great Yarmouth, delivering 15 tonnes of HE (9 SC 1000, 5 SC 500 and 74 SD 50) and 6,336 incendiaries between 2135 and 2250 hours.

- 6<sup>th</sup>/7<sup>th</sup> July 1941 to 18<sup>th</sup> Feb 1942

Total HE bombs dropped - 159 of which 15 were UXBs.

During 1942, although there were fewer air raids, the destruction continued. On 25<sup>th</sup> June incendiary bombs destroyed the Parish Church, only the shell remaining at daybreak.



**St Nicholas Church**





**Aerial photograph of Great Yarmouth taken by the Luftwaffe 12<sup>th</sup> April 1942**

Low flying aircraft became a problem in 1943 and Barrage Balloons appeared over the town. During a raid on 11<sup>th</sup> May on the north end of town 49 people were killed and 41 injured.

By 1944 air raids were considerably reduced and evacuees returned to the town. Repairs to damaged property began and the council bought land at Gorleston for new housing (the Magdalen College Estate). The long task of clearing the beach of its mines did not commence until after hostilities in Europe had come to an end on 8<sup>th</sup> May 1945.

#### 4.4 AIR RAIDS

Classified records relating to local air raids have been examined. It should be noted that air records in no way constitute a full account of air raids that may have occurred during the war period.

Annex B details the cross referenced information by location, date, type and quantity of **ordnance dropped** during attacks within the area concerned. The resulting bomb plots are mapped in Annex C.

Annex D details additional bomb plots from a separate map. It has not been possible to verify these bomb plots by date, type and quantity, against written reports. They do however; replicate a number of known bomb plots detailed in Annex C.

At Annex E, the bomb plots from both maps have been transferred onto a current OS map for overall appreciation.

A record of overall quantity of **air dropped weapons** is listed as 938. What percentage of these were UXBs is unknown. It should be noted that this total does not include the large quantity of incendiary bombs dropped on Great Yarmouth, for which very few records were available.

#### 4.5 MACC INTERNATIONAL LIMITED RECORDS

MACC International Limited records indicate that a variety of bombs were delivered ranging from 50kg through to 500kg in addition to **PM's and incendiary bombs**. Details of the known range of ordnance used by the Germans can be seen at Annex F to this report.

#### 4.6 SITE DESCRIPTION

The site during the WW II was a mixture of civilian housing, military accommodation and installations, light industrial buildings, the Norfolk and Suffolk Joint Railway to the west, and the River Yare transecting the site north to south with its docks and wharfs situated along its length.

#### 4.7 SUMMARY OF BOMB DAMAGE

Bomb damage to the area is not fully apparent in the Aerial Photograph circa 1942 to 1954 shown in Annex G.



5 **UXO AND HAZARD INFORMATION**

5.1 **GENERAL**

Great Yarmouth suffered heavy bombing during the period of WW II, with bombs dropped on or within the vicinity of the site, of which at least 3 were UXBs. An unknown quantity of incendiary bombs were also dropped but cannot be accounted for.

Explosive Ordnance is inherently dangerous, further information on Explosive Ordnance and Safety is detailed in Annex F.

6 **ENVIRONMENTAL**

This site may have other environmental considerations. These have not been taken into consideration as they are outside the bailiwick of this report.

7 **CONCLUSIONS**

7.1 **GENERAL**

When drawing conclusions the reader is reminded that the WW II bomb census did not commence fully until November 1941. Great Yarmouth and the site at the time of WW II was primarily a naval shore base.

Where evidence of bombing runs exist the quantity, exact location and type of ordnance dropped cannot be verified so doubt remains as to what was actually delivered and failed to detonate.

7.2 **HISTORICAL USE**

The site was a naval shore base intermingled with light industry and civilian buildings with the River Yare transecting the site north to south. At the height of the war 220 officers and over 2,200 ratings were based at the port.

7.3 **BOMB CENSUS**

The bomb census indicates heavy bomb activity around and on the site. It is estimated that Great Yarmouth was subjected to over ninety air raids with an estimated 938 bombs being dropped. The total number of UXBs and incendiary bombs is unknown.

7.4 **FUTURE USE**

The proposed scheme is to either build a bridge or a submerged tube tunnel spanning the River Yare (the 3<sup>rd</sup> river crossing).

7.5 **OTHER NOTES OF INTEREST IN THE AREA**

- On the 10<sup>th</sup> February 1986 an unexploded 50 kg bomb was found in Blackwall Reach Road.
- There are several references to bombs, both exploded and unexploded, landing in the River Yare.

7.6 **RISK SUMMARY**

The risk factor to site personnel carrying out intrusive works:

- The potential for the discovery of UXBs on the proposed site of the 3<sup>rd</sup> River Crossing is HIGH.
- Records indicate that the total number of bombs dropped on Great Yarmouth was 938, not including incendiary bombs. An accepted failure rate for any type of EO, not to function as designed, is 10%.
- Despite having a Naval Bomb Disposal team based on Southgates Road during WW II, not all UXBs were accounted for; a 50 kg UXB was discovered in 1986.

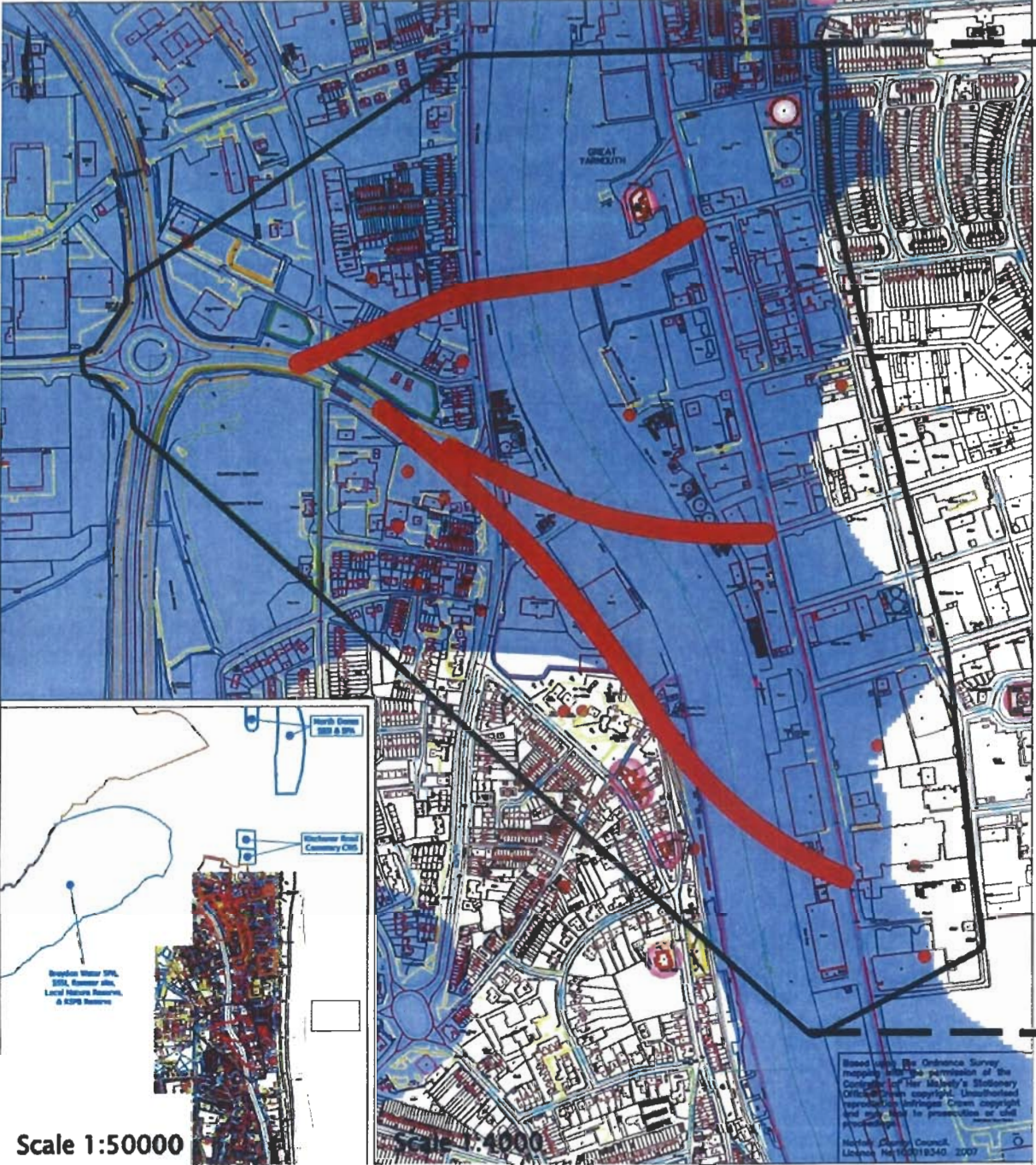
8 **RECOMMENDATIONS**

8.1 **GENERAL**

- Prior to excavation being carried out **ALL** ground workers are given an EO Safety and Awareness Briefing (Toolbox) as part of their Site Safety Induction.
- An EO Supervisor from a reputable EOD company supervises all excavation work below original ground level.
- The riverbed is surveyed, along the line of the proposed tunnel, for the presence of any remaining EO.



**BOUNDARY OF SITE LOCATION (Centred on TG5256305773)**



**RECORDED EVIDENCE OF BOMB ACTIVITY IN AND AROUND THE PROPOSED SITE**

Bomb No	Date	Type of Weapon	QTY	Location	Remarks
1	30/31 Oct 41	HE 250 kg	1	Admiralty Road - WG985242	Exploded bomb No 3 of 7
2	21/22 Oct 42	Fire Pot	4	North corner of T junction of Boundary Rd & Southtown Rd	Exploded bomb Nos 1, 2, 3 & 4 of 6
3	21/22 Oct 42	Fire Pot	1	Corner of Boundary Rd & Harfrey's RD	Exploded bomb No 5 of 6
4	21/22 Oct 42	Fire Pot	1	South West of Harfrey's Roundabout	Exploded bomb No 6 of 6
5	21/22 Jan 42	HE 500 kg	2	Between Alpha Rd & Common Rd - WG980234	Exploded bomb Nos 1 & 2 of 2
6	18/19 Mar 43	PM 'C' type	1	Between Malthouse Lane & Beccles Rd - WG982233	Exploded PM No 1 of 2
7	18/19 Mar 43	PM 'C' type	1	Fish Wharf - WG983235	Exploded PM No 2 of 2
8	30/31 Oct 41	HE 250 kg	1	Micawber Rd - WG987238	Exploded bomb No 4 of 7
9	15/16 Oct 41	HE 250 kg	1	Corner of South Denes Rd & Suffling Rd - WG985233	Exploded bomb No 1 of 7
10	15/16 Oct 41	HE 250 kg	1	South Denes Rd - WG986233	Exploded bomb No 2 of 7
11	15/16 Oct 41	HE 250 kg	2	Fell in open space - WG 986232	Exploded bomb Nos 3 & 4 of 7
12	30/31 Oct 41	HE 250 kg	1	South of Beevor Rd & Fenner Rd - WG987229	Exploded bomb No 5 of 7
13	15/16 Oct 41	HE 250 kg	1	South of Beevor Rd & Fenner Rd - WG987229	Exploded bomb No 5 of 7
14	29/30 May 42	HE 1200 kg	1	Pleasure Beach - WG977248	<b>Unexploded</b> bomb No 7 of 8

Note: Bomb numbers refer to locations in Annexes C, D and E.



**BOMB PLOT MAP 1**





**BOMB PLOT MAP 2**



<b>Annex D to Desk Study</b> Dated 6 <sup>th</sup> July 2007	<b>Job No:</b> 3154
<b>Client:</b> Norfolk Partnership Laboratory	<b>Contractor:</b>  MACC International Ltd Carnilla Court Nacton Ipswich IP10 0EU
<b>Project Title:</b> Proposed 3 <sup>rd</sup> River Crossing, Great Yarmouth	 MOODY INTERNATIONAL UKAS INTERNATIONAL CERT
<b>Key:</b> Red indicates Exploded bomb (XB) Green indicates Unexploded bomb (UXB)	





**EXPLOSIVE ORDNANCE SAFETY AND INFORMATION**

**1 UNEXPLODED ORDNANCE**

Since the end of WWII, there have been a limited number of recorded incidents in the UK where bombs have detonated during engineering works, though a significant number of bombs have been discovered. Intrusive works (piling operations) on a site in Berlin in September 1994 resulted in a bomb being struck. This initiation and subsequent detonation resulted in 3 workmen being killed and considerable damage to property.

The threat to any proposed investigation or development on the site may arise from the effects of a partial or full detonation of a bomb or ordnance item. The major effects usually being shock, blast, heat and shrapnel damage. It should be noted that the detonation of a 50kg buried bomb could damage brick/concrete structures up to 16m away and unprotected personnel on the surface up to 70m away from the blast. Larger ordnance is obviously more destructive. Table 2 denotes recommended safe distance for UXO.

**Table 2 Safety Distances for Personnel**

UXO (Kg)	Safety Distances (m)			
	Surface UXO		Buried UXO	
	Protected	Unprotected	Protected	Unprotected
<b>2</b>	20	200	10	20
<b>10</b>	50	400	20	50
<b>50</b>	70	900	40	70
<b>250</b>	185	1100	120	185
<b>500</b>	200	1250	140	200
<b>1000</b>	275	1375	185	275
<b>3000</b>	450	1750	300	450
<b>5000</b>	575	1850	400	575

Explosives rarely become inert or lose effectiveness with age. Over time, fuzing mechanisms can become more sensitive and therefore more prone to detonation.

This applies equally to items that have been submersed in water or embedded in silt, clay, peat or similar materials.

Once initiated, the effects of the detonation of the explosive ordnance such as shells or bombs are usually extremely fast, often catastrophic and invariably traumatic to the personnel involved.



The degradation of a shell or bomb may also offer a source of explosive contamination into the underlying soils. Although this contamination may still present an explosion hazard, it is not generally recognised that explosives offer a significant toxicological risk at concentrations well below that at which a detonation risk exists.

## 2 SUMMARY OF PENETRATION DEPTHS

The maximum penetration depth at the site of bombs between 50kg and 1000kg has been calculated based on the site geology.

The above information assumes:

- A high level release with an impact velocity of 260m/s (>5,000 ft altitude).
- A strike angle of 10 - 15° to the vertical.
- That the bomb is stable in flight and on penetration.
- That no retarder units are fitted to the bomb.

A typical high altitude release bomb will enter the ground at between 10 and 15° (to the vertical) and will travel on this trajectory until momentum is nearly lost. The bomb will then turn abruptly to the horizontal before coming to rest. The distance between the centre of the entry hole and the centre of the bomb at rest is known as the "offset". A marked lateral movement from the original line of entry is not uncommon.

The average offset is approximately one third of the penetration depth, i.e. an offset of 2.0m may be expected for a 50kg bomb in clay soils. Hard standing on the site can result in an offset increasing by some four times. It should be noted that bombs striking buildings might be deflected to give a wider variation in the impact angle.

The expected average bomb depths in normal ground and crater sizes are:

**Table 1: Average Bomb Depths and Crater Size.**

Serial	UXB <sup>1</sup> Weight (Kg)	Average Depth <sup>2</sup> (m)	Average Crater Size <sup>3</sup> (m)	
			Buried	Surface
1	50	3.7	6.1 x 1.8	2.75 x 1.8
2	250	7.6	10 x 3	4.6 x 1.5
3	500	9.1	13.7 x 3.7	5.5 x 1.8
4	1000	10.7	17 x 4.9	7.9 x 2.4
5	1800	12.2	22 x 6	10 x 3

Notes:

1. UXB is for a General Purpose iron bomb.

2. Specialised UXB's will differ in depth, e.g. a Deep Penetration bomb is designed to penetrate to a greater depth than a General Purpose bomb.
3. Average craters dimensions relate to clay and should be multiplied by 0.6 for chalk, sand or gravel.
4. Bombs may have settled over the past 55 - 60 years and with the geology and water table on this site a high likelihood of movement can be expected.

### 3 TYPES OF ORDNANCE

#### 3.1 HE Bombs

There are three types of HE bomb classification:

- HE Bombs:- GP (General Purpose) Thin Steel Cased 50kg, 250kg, 500kg, 1000kg and 1800kg.
- Semi Armour Piercing (SAP) Thick Steel Cased 50kg, 250kg, 500kg, 1000kg and 1400kg.
- Large Light Alloy Cased Bombs 1800kg or 2500kg.

#### 3.2 Incendiary Bombs

Different types of incendiary can be classed as:

- 1kg Incendiary Bomb.
- Oil Bombs – Flam c 250 and Flam c 500.
- 4lb Cylindrical Anti-Personnel Bomb.
- Mines, 'C' and 'D' types with parachute and the 'G' type without.

### 4 German Aircraft used to Deliver Bombs over England and their Bomb Loads

The principle bombers, which operated over this country during the war was:

- 4.1 **Dornier 17.** This was a light bomber of the Blenheim type. A typical bomb load would consist of 2 x 250kg, 16 x 50kg or approximately 550 x 1kg incendiary bombs. A combination of all three types was sometimes used. The average total load carried by this aircraft during operations varied between 600kg and 1000kg.
- 4.2 **Heinkel 111 Bomber.** This aircraft could carry either 2 x 500kg, 8 x 250kg, 32 x 50kg or approximately 1100 x 1kg incendiary bombs. It could carry a combination of any of these four types. The typical average load for this aircraft was 1500kg.

**4.3 Junkers 88.** This aircraft could carry either 4 x 500kg, 4 x 250kg, 28 x 50kg or 1100 x 1kg incendiary bombs or any combination of these types. The typical average load for this aircraft was 1500kg.

The He 111 and the Ju88 were retro fitted with external bomb racks carrying 2 x 1000kg bombs, 2 x 'C', 'D' or 'G' type mines or 1 x 1,800kg bomb. Both aircraft could carry three of the large type Incendiary containers, which held either 700 or 360 1kg incendiary bombs.

Reports indicated that the He111 could carry 3 x 'G' type mines; however, this was considered exceptional.

Any of these aircraft could carry the Flam C 250 Oil bomb as an alternative to the relevant number of 250kg HE bombs also the Flam C 500 could be carried by the He 111 and the Ju 88 as an alternative to the 500kg bombs.

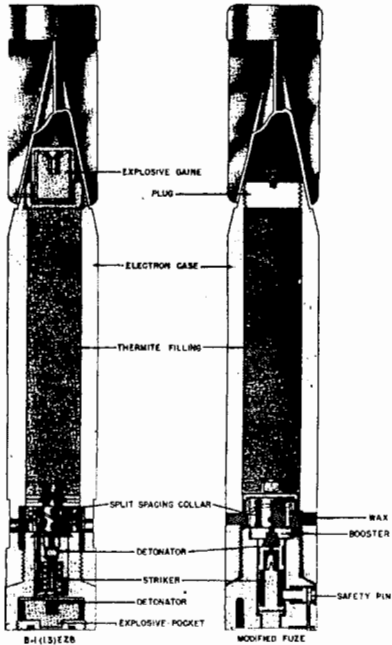
## **5 METHODS OF BOMB RELEASE**

All bombs in the loads referred to above could be released singly, in salvoes or in sticks.

It must be remembered that a stick of bombs would vary in length and or shape according to the altitude and speed variation of the aircraft. A straight stick at regular intervals could only be achieved by straight and level flying during the bombing run.

WWII GERMAN INCENDIARIES

1Kg and 1.3kg INCENDIARIES

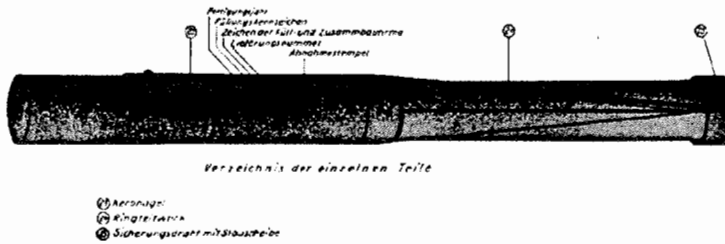


These are air dropped incendiary bomblets. The bomb is unpainted magnesium; the tail is dark green. The B1EZA and the B1.3EZA may have a red A stenciled on the nose and probably will have a Z stamped on the body near the tail. The B1EZB and the B1.3EZB may have a red B stenciled on the nose and a Z stamped on the body near the tail. The body is a cylindrical alloy casting, threaded internally at the nose to receive the fuze holder and fuze. The after body is tapered to receive the sheet metal, three-finned drum-shrouded tail assembly. The 1.3-kg and 1-kg bombs are identical except that the nose of the former is made of steel, while that of the latter is of light alloy.

Dimensions:

Diameter: 50.8mm  
Length: 248mm

2Kg

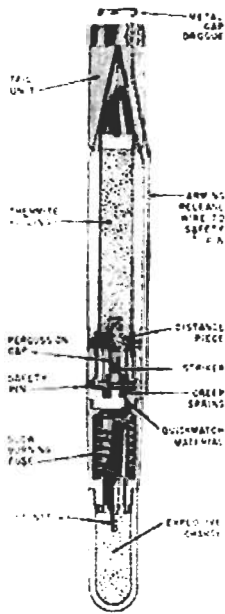


This is a small incendiary bomb that has a High Explosive burster. The incendiary body is painted olive green, the tail dark green, and the H.E. container black, unpainted, or dark red. A Z is stamped on the body near the tail, and a red Z is stenciled on the nose. This bomb

consists of three main components: a tail unit, an incendiary body, and an H.E. attachment. The incendiary body is tapered at the after end to fit into the long tail cone and is reduced in diameter at the forward end to fit into the steel H.E. container. A steel plug is fitted into the after end of the incendiary body, while at the forward end are located an igniter pellet, a distance piece, a relay pellet and a black powder separating charge and housing. The H.E. container accommodates the penthrite charge and the fuze. The fuze is armed by a long arming rod which passes through the tail section and locks a spring-out safety pin. A metal wind cap, or drogue, is attached to the after end of the rod. The main body is steel. Dimensions: Diameter: 50.8mm Length: 527mm.



2.2Kg



These are small incendiary bombs dropped from bomb containers. The incendiary bomb proper is painted green over-all, the tail unit is painted dark green; the sleeve is unpainted and the H.E. container is painted bright red. The letter Z is stamped on the incendiary body near the tail. This bomb is similar to the 1-kg incendiary bomb, with modifications to the fuze container. These alterations are: external threading on the nose to receive a sleeve; an additional hole to receive a spring-out safety pin; the addition of a train of burning composition leading to the sleeve. The sleeve contains a length of safety fuse wound on a metal spool. The H.E. container is threaded to the base of the sleeve and contains a detonator to which the safety fuse leads.

These bombs are carried in several different sizes and types of containers.

Dimensions:

Diameter: 50.8mm  
Length: 527mm

PARACHUTE MINE

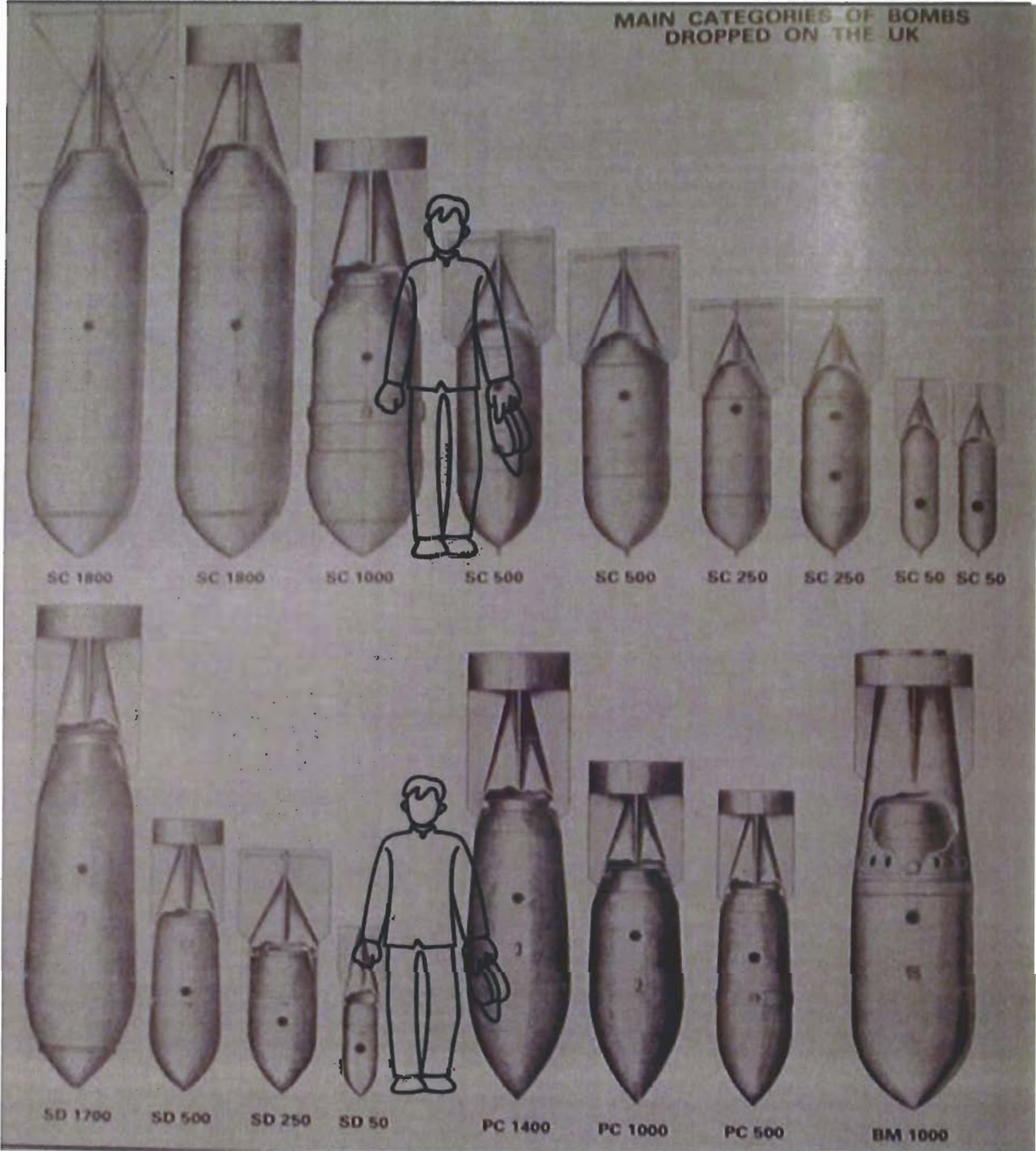


**Type 'C'** – 8ft 8in long weighing 1000kg with parachute.

**Type 'D'** – 5ft 8in long weighing 500kg with parachute.

**Type 'G'** – 6ft 6in long weighing 1000kg with bakelite tail unit.



The first intentional use of these mines against land targets commenced on the night of September 16, 1940, when numbers of both Type C and Type D mines were dropped in night raids. The mines, with their high charge ratio of 60 to 70 per cent explosive, created considerable blast damage in built-up areas.





Great Yarmouth Circa 1942 - 1954



<b>Annex G to Desk Study</b> Dated 6 <sup>th</sup> July 2007
Job No: 3154
Client: Norfolk Partnership Laboratory
Contractor:  MACC International Ltd Camilla Court Necton Ipswich IP10 0EU
 MOODY INTERNATIONAL U.S.A. INCORPORATED 1953
Project Title: Proposed 3 <sup>rd</sup> River Crossing, Great Yarmouth
Key:

# Appendix I

LOCATION AND RISK MAP



Annex E to Desk Study Dated 6 <sup>th</sup> July 2007	Client: Norfolk Partnership Laboratory	Contractor: <b>MACC</b> MACC International Ltd Camilla Court Necton Ipswich IP10 0EU	<b>MOODY</b> INTERNATIONAL	Project Title: Proposed 3 <sup>rd</sup> River Crossing, Great Yarmouth	Key: Red indicates Exploded bombs (XEB) Green indicates Unexploded bombs (UXB)
--	---	--	-------------------------------	---	--







## BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	3154   20
Location:	BOREHOLE 102	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH102	11.09.07	MAGNETOMETER CHECK AT 1.2M
	0930	CLEARED TO 3M
BH102	11.09.07	MAGNETOMETER CHECK AT 3M
	1000	CLEARED TO 7M
BH102	11.09.07	MAGNETOMETER CHECK AT 7M
	1210	CLEARED TO 11M
BH102	11.09.07	STP AT 11M, 50-REFUSAL
	1445	DENSE MATERIAL, CLEARED
		TO PROCEED BEYOND
		EXPLOSIVE ORDNANCE
		PENETRATION DEPTH.

Name:	T FITENI
Company Position:	MACC - ASSISTANT PROJECTS MANAGER
Signature:	

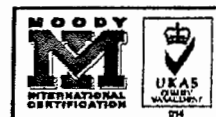
## BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC INTERNATIONAL LIMITED personnel have checked the following borehole/CPT positions.

Project No:	3154	Certificate No:	01
Location:	GREAT YARMOUTH		

BOREHOLE/CPT DESIGNATION	DATE	REMARKS
BH103	28/08/07	LOW READING AT
		8m. AVERAGE DENSITY
		OF GROUND GREATER
		THAN 20.

Name:	AE CANDLER
Company Position:	SENIOR TECHNICAL ADVISER
Signature:	[REDACTED]




### BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	3154/22
Location:	BOREHOLE 104	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH104	14.09.07	MAGNETOMETER CHECK AT 1.2M
	1450	CLEARED TO 5M
BH104	17.09.07	MAGNETOMETER CHECK AT 5M
	1100	CLEARED TO 9M
BH104	17.09.07	MAGNETOMETER CHECK AT 9M
	1330	CLEARED TO 15M +
		CONSIDERED TO BE BEYOND
		MAXIMUM PENETRATION DEPTH
		OF LARGE EXPLOSIVE ORDNANCE

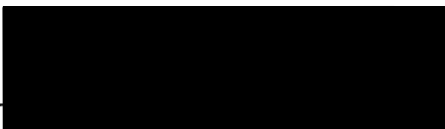
Name:	T. FITENI
Company Position:	MACC - ASSISTANT PROJECTS MANAGER
Signature:	

### BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	11
Location:	ST YARMOUTH	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH 105	24/8/07	CHECKED AT 9m LOW
/		READING AVERAGE END
		FIGURE > 20 THEREFORE
		CLEAR TO 13M

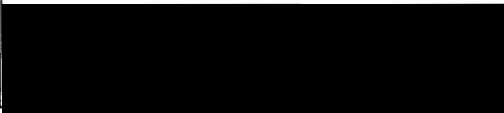
Name:	AE CAVDLET
Company Position:	SENIOR TECHNICAL ADVISER
Signature:	

### BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	13
Location:	GT YARMOUTH	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH106	30/8/07	CHECKED AT 9m END DENSITY AVERAGE 220


Name:	AE CANDLER
Company Position:	SENIOR TECHNICAL ADVISER
Signature:	

### BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	3154	15
Location:	BOREHOLE 107.	Grid Reference:		

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH107	05.09.07 0910	MAGNETOMETER CHECK AT 1.6M CLEARED TO 6M.
BH107	05.09.07 1330	MAGNETOMETER CHECK AT 6M CLEARED TO 10M.
BH107	06.09.07 0845	MAGNETOMETER CHECK AT 10M CLEARED TO 16M, CONSIDERED TO BE MAXIMUM PENETRATION DEPTH OF EXPLOSIVE ORDNANCE

Name:	T. FITENI
Company Position:	MACC - ASSISTANT PROJECTS MANAGER
Signature:	







## BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3134	Certificate No:	3134   23
Location:	BOREHOLE 110	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH110	14.09.07	MAGNETOMETER CHECK AT 1.2M
	1500	CLEARED TO 5M
BH110	17.09.07	MAGNETOMETER CHECK AT 5M
	1200	CLEARED TO 9M
BH110	17.09.07	MAGNETOMETER CHECK AT 9M
	1400	CLEARED TO 15M+
		CONSIDERED TO BE BEYOND MAXIMUM PENETRATION DEPTH OF LARGE EXPLOSIVE ORDNANCE

Name:	T. FITENI
Company Position:	MACC - ASSISTANT PROJECTS MANAGER
Signature:	




### BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	3154   21
Location:	BOREHOLE 112	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH112	11.09.07 0845	MAGNETOMETER CHECK AT 1.6M CLEARED TO 3M.
BH112	11.09.07 1050	MAGNETOMETER CHECK AT 3M CLEARED TO 7M.
BH112	11.09.07 1255	MAGNETOMETER CHECK AT 7M CLEARED TO 11M
BH112	12.09.07 1030	MAGNETOMETER CHECK AT 11M CLEARED TO 17M +.

Name:	T. FITENI
Company Position:	MACC - ASSISTANT PROJECTS MANAGER
Signature:	

## BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No: 3154	Certificate No: 3154/25
Location: BOREHOLE 113	Grid Reference:

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH113	20.09.07	MAGNETOMETER CHECK AT 1.2M
	1000	CLEARED TO 2.5M
BH113	20.09.07	MAGNETOMETER CHECK AT 2.5M
	1130	CLEARED TO 6.5M
BH113	20.09.07	MAGNETOMETER CHECK AT 6.2M
	1400	CLEARED TO 10.2M
BH113	20.09.07	MAGNETOMETER CHECK AT 9M
	1545	CLEARED TO 15M+
		CONSIDERED TO BE BEYOND
		MAXIMUM PENETRATION DEPTH
		OF EXPLOSIVE ORDNANCE
		LARGE (500KG)

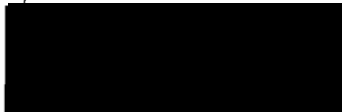
Name:	T. FITENI
Company Position:	MACC - ASSISTANT PROJECTS MANAGER
Signature:	

## BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	3154/26
Location:	BOREHOLE 114	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH114	05.09.07 1150	MAGNETOMETER CHECK AT 1.2M HIGH READING - RELOCATE.
BH114a	05.09.07 1300	MAGNETOMETER CHECK AT 1.2M HIGH READING - RELOCATE.
BH114b	05.09.07 1345	MAGNETOMETER CHECK AT 1.2M HIGHEST READING YET. REVERT TO BH114.
BH114	05.09.07 1415	MAGNETOMETER CHECK AT 1.6M HIGH READING BUT DECREASING.
BH114	05.09.07	MAGNETOMETER CHECK AT 2.5M CLEARED TO 4M.
BH114	06.09.07 1015	MAGNETOMETER CHECK AT 4.2M HIGH READING.
BH114	1045 06.09.07	ABANDONED.

Name:	T. FITENI
Company Position:	MACC - ASSISTANT PROJECTS MANAGER
Signature:	

## BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	3154/18
Location:	BOREHOLE 115	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH 115	05.09.07 0845	MAGNETOMETER CHECK AT 1.4M CLEARED TO 2M.
BH 115	05.09.07 1600	MAGNETOMETER CHECK AT 2M CLEARED TO 6M.
BH 115	06.09.07 1455	MAGNETOMETER CHECK AT 5M CLEARED TO 9M
BH 115	07.09.07 1520	MAGNETOMETER CHECK AT 8.8M CLEARED TO 14.8M, CONSIDERED TO BE MAXIMUM PENETRATION DEPTH OF EXPLOSIVE ORDNANCE.

Name:	T. FITENI
Company Position:	MACC - ASSISTANT PROJECTS MANAGER
Signature:	




### BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	14
Location:	ST YARMOUTH	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH116	30/08/07	CHECKED AT 9m AVERAGE DENSITY >20

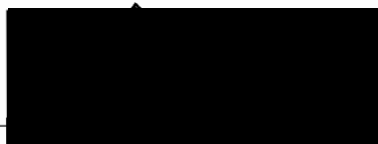
Name:	AE CANDLER
Company Position:	SENIOR TECHNICAL ADVISER
Signature:	

### BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	3154   19
Location:	BOREHOLE 117	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
BH 117	07.09.07	MAGNETOMETER CHECK AT 1.2M
	1245	CLEARED TO 5M.
BH 117	10.09.07	MAGNETOMETER CHECK AT 5M
	1045	CLEARED TO 9M.
BH 117	10.09.07	MAGNETOMETER CHECK AT 9M
	1425	CLEARED TO 15M, CONSIDERED TO BE MAXIMUM PENETRATION DEPTH OF EXPLOSIVE ORDNANCE.

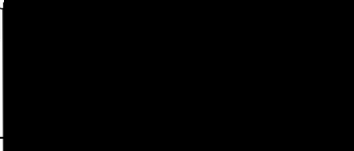
Name:	T. FITENI
Company Position:	MACC-ASSISTANT PROJECTS MANAGER
Signature:	

### BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	3154/16
Location:	WINDOW SAMPLE 104	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
WS 104	06.09.07 0940	MAGNETOMETER CHECK AT 1.2M CLEARED TO 2M
WS 104	06.09.07 1150	MAGNETOMETER CHECK AT 2M CLEARED TO 5M (MAX' DEPTH OF WS)

Name:	T FITENI
Company Position:	MACC - ASSISTANT PROJECTS MANAGER
Signature:	
















## BOREHOLE CLEARANCE CERTIFICATE

This is to certify as far as reasonably practicable MACC International Limited personnel have checked the following borehole and window sample positions for ferromagnetic anomalies.

Project No:	3154	Certificate No:	3154/24
Location:	TRIAL PITS	Grid Reference:	

BOREHOLE/WINDOW SAMPLE DESIGNATION	DATE	REMARKS
TP109	20.09.07 0925	CEASED AT 3M - CLEAR OF EXPLOSIVE ORDNANCE TO THIS DEPTH.
TP101	20.09.07 1110	CEASED AT 1.7M - CLEAR OF EXPLOSIVE ORDNANCE TO THIS DEPTH.
TP104	20.09.07 1345	CEASED AT 3.3M - CLEAR OF EXPLOSIVE ORDNANCE TO THIS DEPTH.

Name:	T. FITENI
Company Position:	MACC - ASSISTANT PROJECTS MANAGER
Signature:	


# APPENDIX J

Contract : Great Yarmouth Pipeline		Borehole No. ADD3	
Client : East Anglia Pipeline Ltd			
Dates : 17.1.97-28.1.97	Job Number: 7809	Ground Level 2.55 mAOD.	
Location : Great Yarmouth	Engineer : J. P. Kenny	Coordinates: 52660.00 E 5320.00 N	

Samples & Tests				STRATA				
Depth	Type No	Test Result, N. (Blow Counts)	Depth (Thickness)	DESCRIPTION	Red. Level G.L.	Legend	Water	Install/ Backfill
0.15-0.40	B1		0.15	Concrete (drillers description)	2.40			
0.40-0.80	B2		0.40	MADE GROUND: Brown/ grey silty very sandy fine to coarse subangular to subrounded gravel of concrete and brick fragments and gravel of lithologies, with occasional small subangular cobbles.	2.15			
1.20-1.65	SPT3	8 (1,0,2,2,2,2)	1.20	MADE GROUND: Brown slightly clayey silty sand, with much fine to coarse subangular to subrounded gravel (predominantly coarse) of mixed lithologies. Soft to firm brown/ black silty sandy CLAY, with some to much plant material present.	1.35			
2.00-2.45	SPT4	7 (1,1,2,2,1,2)	(1.80)	Below 2m depth, with occasional subrounded fine gravel, no plant material present.				
3.00-3.45	SPT5	17 (3,2,4,4,5,4)	3.00	Medium dense grey/ brown silty very sandy clayey fine subangular to subrounded GRAVEL of mixed lithologies.	-0.45			
4.00-4.45	B6	12 (2,1,3,2,4,3)	4.00	Medium dense brown very clayey silty fine to medium SAND, with some fine subangular to subrounded gravel of mixed lithologies.	-1.45			
4.80-5.10	B7		4.80	Medium dense brown very sandy fine to coarse subrounded to subangular GRAVEL of mixed lithologies, with occasional small subrounded to subangular cobbles. Medium dense to dense yellow brown fine to coarse predominantly fine to medium SAND with fine to much subangular to subrounded flint gravel.	-2.25			
5.10-5.50	B8		5.10		-2.55			
5.80-6.40	B9							
7.50-8.00	B10	55 (6,6,12,14,14,15)		Below 7.5m depth, becoming dense, with occasional small subangular to subrounded flint cobbles.				

Boring Progress and Water Observations						Groundwater			Chiselling		
Date	Time	Depth	Casing	Cas Dia	Water	Struck	Behaviour	Sealed	From	To	Hours
20.1.97	0900	4.40m	6.00m	200mm	2.10m	2.10m	Standing at 2.10 m				
20.1.97	1200	9.20m	9.20m	200mm	3.30m						
20.1.97	1730	15.00m	15.00m	200mm	6.20m						
21.1.97	0900	10.80m	15.00m	200mm	2.60m						
21.1.97	1600	15.20m	17.00m	200mm	2.70m						
24.1.97	0900	13.50m	18.00m	200mm	2.00m						
24.1.97	1230	25.30m	25.30m	150mm	6.40m						
24.1.97	1715	30.50m	30.50m	150mm	4.30m						
25.1.97	0900	30.50m	27.70m	150mm	2.00m						

Remarks: Equipment: Dando 175 percussion drilling rig, using 200mm and 150mm casing and tools.

 <b>THYSSEN GEOTECHNICAL</b>	Avonmouth, Bristol. Tel: 0117 9380100 Fax: 0117 9380200	Operator: I Brown	Sheet No. 1 Of 5	Scale: 1:50

Contract : Great Yarmouth Pipeline		Borehole No. ADD3	
Client : East Anglia Pipeline Ltd			
Dates : 17.1.97-28.1.97	Job Number: 7809	Ground Level	2.55 mAOD.
Location : Great Yarmouth	Engineer : J. P. Kenny	Coordinates:	52660.00 E 5320.00 N

Samples & Tests			STRATA					Water	Install/ Backfill
Depth	Type No	Test Result, N. (Blow Counts)	Depth (Thick- ness)	DESCRIPTION	Red. Level	Legend			
9	9.00-9.50	B11	44 (5,6,10,11,11,12)						
	9.60-9.70	D12							
10	10.00-10.45	SPT13	70 (8,8,18,18,17,17)						
11	11.00-11.30	SPT14	59 (9,7,16,12,19,12)						
	11.30-11.40	D15							
12	12.00-12.45	SPT16	47 (3,3,11,11,13,12)						
13	13.00-13.10	D17	43 (4,3,11,10,10,12)						
14	14.00-14.10	D18	38 (4,5,9,8,10,11)						
15	15.00-15.10	D19	40 (3,3,12,9,9,10)						

Boring Progress and Water Observations						Groundwater			Chiselling		
Date	Time	Depth	Casing	Cas Dia	Water	Struck	Behaviour	Sealed	From	To	Hours
20.1.97	0900	4.40m	6.00m	200mm	2.10m	2.10m	Standing at 2.10 m				
20.1.97	1200	9.20m	9.20m	200mm	3.30m						
20.1.97	1730	15.00m	15.00m	200mm	6.20m						
21.1.97	0900	10.80m	15.00m	200mm	2.60m						
21.1.97	1600	15.20m	17.00m	200mm	2.70m						
24.1.97	0900	13.50m	18.00m	200mm	2.00m						
24.1.97	1230	25.30m	25.30m	150mm	6.40m						
24.1.97	1715	30.50m	30.50m	150mm	4.30m						
25.1.970	0900	30.50m	27.70m	150mm	2.00m						

Remarks: Equipment: Dando 175 percussion drilling rig, using 200mm and 150mm casing and tools.



**THYSSEN GEOTECHNICAL**

Avonmouth, Bristol.  
Tel: 0117 9380100  
Fax: 0117 9380200

Operator:  
I Brown

Sheet No.  
2 Of 5

Scale:  
1:50

Contract : Great Yarmouth Pipeline		Borehole No. ADD3	
Client : East Anglia Pipeline Ltd			
Dates : 17.1.97-28.1.97	Job Number: 7809	Ground Level 2.55 mAOD.	
Location : Great Yarmouth	Engineer : J. P. Kenny	Coordinates: 52660.00 E 5320.00 N	

Samples & Tests			STRATA					Water	Install/ Backfill
Depth	Type No	Test Result, N. (Blow Counts)	Depth (Thick- ness)	DESCRIPTION	Red. Level	Legend			
17	16.50-16.60	D20	15 (1,1,2,4,5,4)	(25.05)	Below 16.5m depth, becoming medium dense.				
18	18.00-18.10	D22							
19	18.50-19.40	D22							
20									
21	20.50-20.60	SPT23	19 (2,2,5,4,5,5)						
22	22.00-22.10	SPT24	18 (1,2,4,4,5,5)						
23	23.00-23.10	SPT25	16 (1,1,5,3,4,4)						

Boring Progress and Water Observations						Groundwater			Chiselling		
Date	Time	Depth	Casing	Cas Dia	Water	Struck	Behaviour	Sealed	From	To	Hours
20.1.97	0900	4.40m	6.00m	200mm	2.10m	2.10m	Standing at 2.10 m				
20.1.97	1200	9.20m	9.20m	200mm	3.30m						
20.1.97	1730	15.00m	15.00m	200mm	6.20m						
21.1.97	0900	10.80m	15.00m	200mm	2.60m						
21.1.97	1600	15.20m	17.00m	200mm	2.70m						
24.1.97	0900	13.50m	18.00m	200mm	2.00m						
24.1.97	1230	25.30m	25.30m	150mm	6.40m						
24.1.97	1715	30.50m	30.50m	150mm	4.30m						
25.1.970	0900	30.50m	27.70m	150mm	2.00m						

Remarks: Equipment: Dando 175 percussion drilling rig, using 200mm and 150mm casing and tools.

	<b>THYSSEN GEOTECHNICAL</b>	Avonmouth, Bristol.	Operator:	Sheet No.	Scale:
		Tel: 0117 9380100	I Brown	3 Of 5	1:50
		Fax: 0117 9380200			



Contract : Great Yarmouth Pipeline		Borehole No. ADD3	
Client : East Anglia Pipeline Ltd			
Dates : 17.1.97-28.1.97	Job Number: 7809	Ground Level	2.55 mAOD.
Location : Great Yarmouth	Engineer : J. P. Kenny	Coordinates:	52660.00 E 5320.00 N

Samples & Tests				STRATA				Water	Install/ Backfill
Depth	Type No	Test Result, N. (Blow Counts)	Depth (Thick- ness)	DESCRIPTION	Red. Level	Legend			
24.00-25.50	D26								
25									
25.50-25.80	D27	21 (2,2,5,5,6,5)							
26									
27									
27.50-27.60	SPT28	30 (1,3,6,6,8,8)							
28									
28.50-28.80	SPT29	29 (3,4,7,7,8,7)							
29									
29.50-29.60	SPT30	26							
30									
30.20-30.30	D31	(2,2,6,6,6)	30.15	Soft to firm blueish grey silty slightly sandy (fine) CLAY.	-27.60				
31									
31.20-31.30	D32								
31.50-31.95	U33	Failed							

Boring Progress and Water Observations						Groundwater			Chiselling		
Date	Time	Depth	Casing	Cas Dia	Water	Struck	Behaviour	Sealed	From	To	Hours
20.1.97	0900	4.40m	6.00m	200mm	2.10m	2.10m	Standing at 2.10 m				
20.1.97	1200	9.20m	9.20m	200mm	3.30m						
20.1.97	1730	15.00m	15.00m	200mm	6.20m						
21.1.97	0900	10.80m	15.00m	200mm	2.60m						
21.1.97	1800	15.20m	17.00m	200mm	2.70m						
24.1.97	0900	13.50m	18.00m	200mm	2.00m						
24.1.97	1230	25.30m	25.30m	150mm	6.40m						
24.1.97	1715	30.50m	30.50m	150mm	4.30m						
25.1.970	0900	30.50m	27.70m	150mm	2.00m						

Remarks: Equipment: Dando 175 percussion drilling rig, using 200mm and 150mm casing and tools.



**THYSSEN GEOTECHNICAL**

Avonmouth, Bristol.  
Tel: 0117 9380100  
Fax: 0117 9380200

Operator:  
I Brown

Sheet No.  
4 Of 5

Scale:  
1:50

Contract : Great Yarmouth Pipeline		Borehole No. ADD3
Client : East Anglia Pipeline Ltd		
Dates : 17.1.97-28.1.97	Job Number: 7809	Ground Level 2.55 mAOD.
Location : Great Yarmouth	Engineer : J. P. Kenny	Coordinates: 52660.00 E 5320.00 N

Samples & Tests				STRATA				Water	Install/ Backfill
Depth	Type No	Test Result, N. (Blow Counts)	Depth (Thick- ness)	DESCRIPTION	Red. Level	Legend			
32.95-33.10	B34		(4.85)			X	///		
33						X	///		
33.10-33.40	D36					X	///		
33.40-33.85	U37	(57)				X	///		
33.85-34.00	D38					X	///		
34						X	///		
34.00-35.00	B39					X	///		
35			35.00	End of borehole at 35m	-32.45	X	///		

Boring Progress and Water Observations						Groundwater			Chiselling		
Date	Time	Depth	Casing	Cas Dia	Water	Struck	Behaviour	Sealed	From	To	Hours
20.1.97	0900	4.40m	6.00m	200mm	2.10m	2.10m	Standing at 2.10 m				
20.1.97	1200	9.20m	9.20m	200mm	3.30m						
20.1.97	1730	15.00m	15.00m	200mm	6.20m						
21.1.97	0900	10.80m	15.00m	200mm	2.60m						
21.1.97	1600	15.20m	17.00m	200mm	2.70m						
24.1.97	0900	13.50m	18.00m	200mm	2.00m						
24.1.97	1230	25.30m	25.30m	150mm	6.40m						
24.1.97	1715	30.50m	30.50m	150mm	4.30m						
25.1.970	0900	30.50m	27.70m	150mm	2.00m						

Remarks: Equipment: Dando 175 percussion drilling rig, using 200mm and 150mm casing and tools.



**THYSSEN GEOTECHNICAL**

Avonmouth, Bristol.  
Tel: 0117 9380100  
Fax: 0117 9380200

Operator:  
I Brown

Sheet No.  
5 Of 5

Scale:  
1:50

# Appendix K

number	landowner	occupier	surface	comments
BH 101	Regaland Ltd	Sprunt engineering	hardcore	suffolk road enterprise park, owner = Mr Low (02088061234), occupier Mark Maroini (01493 650 833)
BH 102	Port and Haven	GY Port Company	concrete	on quay, GYPC - John Saddington (01493 852480) - needs plan of locations
BH 103	ncc	GYBC	hardcore	see 112
BH 104	Venture Forth 2000	central tyres	concrete	see tp109 Mike Futter (01493 331112) has plans, call Friday 27th july
BH 105	ncc	GYBC	tarmac	Andy Dyson (01493 846479) haras fence
BH 106	ncc	east coast diesel	rough concrete	Andy Dyson (01493 846479) haras fence, East Coast Diesel (01493 332334)
BH 107	ncc	community centre	grass	Andy Dyson (01493 846479) haras fence, remove fencing community centre 07733034397
BH 108	ncc	GYBC	grass	Andy Dyson (01493 846479)
BH 109	ncc	GYBC	tarmac	Andy Dyson (01493 846479) haras fence
BH 110	ASCO	ASCO	prob asphalt	asco barbera aldous (01493 848058) <b>NOT ON THURSDAYS</b>
BH 111	Venture Forth 2000	gybc planning offices	soil	reinstatement = 0.5 m type 1 - use this area to site compound? See 112 as well
BH 112	Venture Forth 2000	4 < than	soil	see tp109 Mike Futter (01493 331112) has plans, call Friday 27th july
BH 113	Venture Forth 2000	DSL	soil	Mike Futter (01493 331112) has plans, call Friday 27th july
BH 114	ncc	port authority?	tarmac on quay	Andy Dyson (01493 846479) haras fence
BH 115	Venture Forth 2000	swire	asphalt on concrete	see 112 and swire manager Paul Edwards (01493 330307)
BH 116	GY warehouse Company	GY warehouse Company	tarmac	steven thorpe (01493 852411)
BH 117	ASCO	ASCO	concrete on quay	asco barbera aldous (01493 848058)
WS 103	ncc	GYBC	asphalt	Andy Dyson (01493 846479)
WS 104	ncc	car park	asphalt and cobbles	Andy Dyson (01493 846479) fencing
WS 105	ncc	GYBC	asphalt	Andy Dyson (01493 846479)
WS 106	ncc	GYBC	asphalt	Andy Dyson (01493 846479) fencing
WS 107	ncc	GYBC	rough concrete	Andy Dyson (01493 846479) easier to WS
WS 108	ncc	GYBC	Broken concrete	Andy Dyson (01493 846479) easier to WS on track used as parking
WS 110	ncc	GYBC	asphalt	Andy Dyson (01493 846479) chapter 8 needed, better to WS
WS 111	ncc	GYBC	grass	street light cables better for WS, Andy Dyson (01493 846479)
TP 101	Venture Forth 2000	central tyres	concrete	see tp109 Mike Futter (01493 331112) has plans, call Friday 27th july
TP 104	ncc	GYBC	grass	on verge, need board and ch8 fence Andy Dyson (01493 846479)
TP 109	Venture Forth 2000	4 < than	hardcore / chippings	and bh112 see bh 112 and call glen / tony from Freight Storage on 01493 663445 reinstate with 0.5 type 1

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## Annex C: Marine Sampling Factual Report

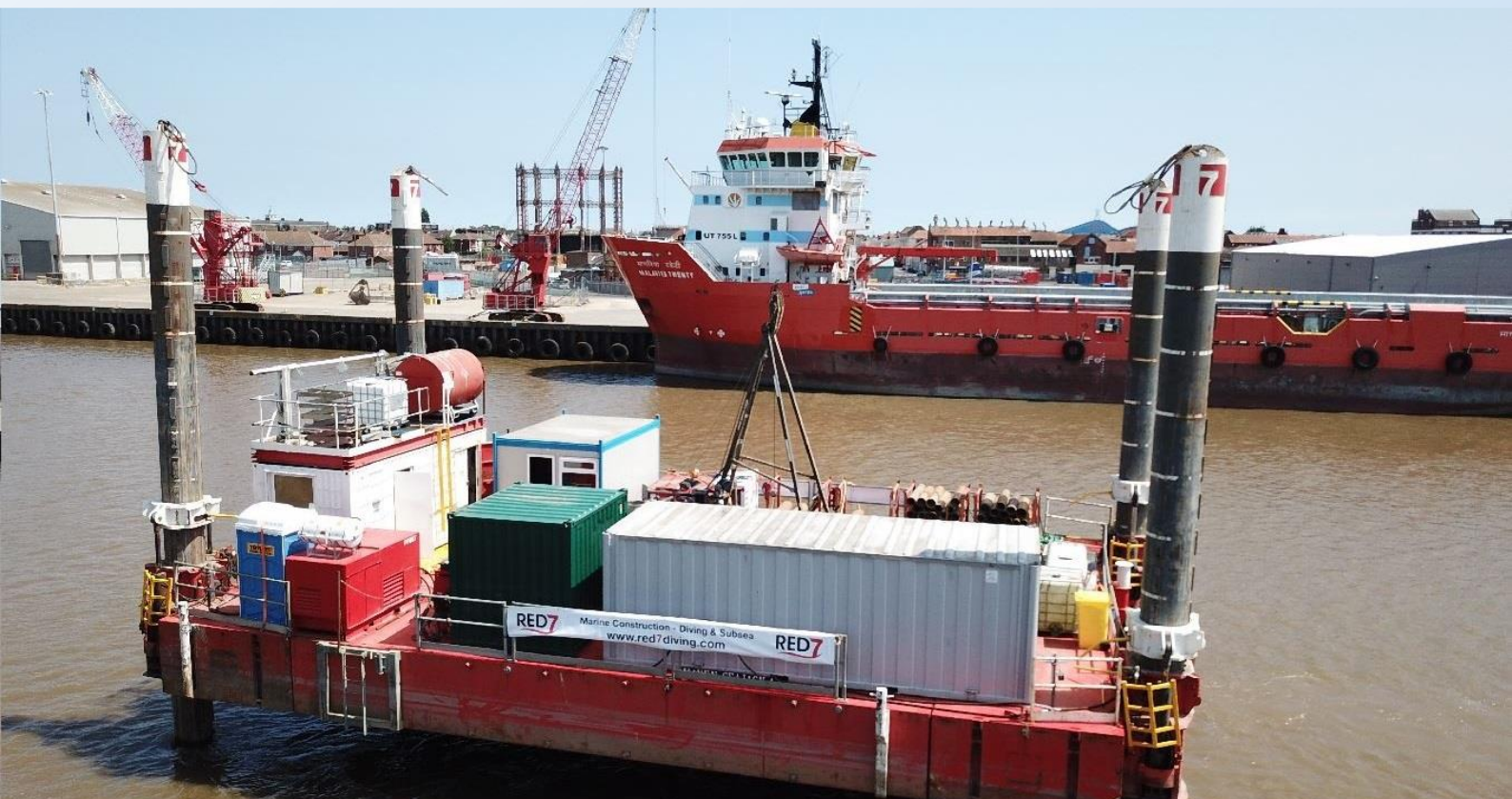
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Norfolk County Council

# GREAT YARMOUTH THIRD RIVER CROSSING

Offshore Ground Investigation - Factual Report





Norfolk County **Council**

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# **GREAT YARMOUTH THIRD RIVER CROSSING**

Offshore Ground Investigation - Factual Report

**TYPE OF DOCUMENT (VERSION) CONFIDENTIAL**

**PROJECT NO. 70046035**

**OUR REF. NO. GYTRC-WSP-VGT-XX-RP-GE-0002**

**DATE: NOVEMBER 2018**


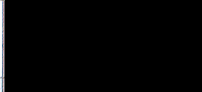
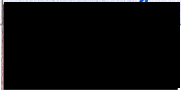
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# QUALITY CONTROL

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Date	October 2018	November 2018		
Prepared by	Samzu Agbaje	Samzu Agbaje		
Signature				
Checked by	Daniel Lee	Daniel Lee		
Signature				
Authorised by	Alexander Chmoulian	Alexander Chmoulian		
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Project number	70041951	70041951		
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File reference	GYTRC-VGT-XX-RP-GE-0002	GYTRC-VGT-XX-RP-GE-0002		



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Appendix B - Geological Mapping
Appendix C - Exploratory Hole Records
Appendix D - UXO Risk Mitigation Survey
Appendix E - Pressuremeter Testing
Appendix F - Geotechnical Laboratory Test Results
Appendix G - Contamination Laboratory Test Results



# 1 INTRODUCTION

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On the instructions and under the supervision of WSP (the Engineer), acting on behalf of Norfolk County Council (the Employer), a site investigation undertaken by Norfolk Partnership Laboratory (Main Contractor) and James and Milton Drilling Ltd (sub-contractor) at a single site crossing the River Yare in Great Yarmouth.

The Great Yarmouth Third Crossing Project comprises a bridge with a central bascule lifting section located centrally over River Yare, and the associated highway embankments, junctions and infrastructure. The proposed bridge alignment would provide an east-west connection between the Strategic Road Network (A47) and the South Denes Business Park, Enterprise Zone, Great Yarmouth Energy Park and the Outer Harbour, all of which are located on the South Denes peninsula

This factual report has been produced by WSP on behalf of Norfolk Partnership Laboratory for Norfolk County Council.

The objective of the investigation was to determine the ground, groundwater and ground contamination conditions at the site and to provide information that would assist the geotechnical and geoenvironmental design of the proposed works. The scope of the investigation was determined by WSP.

The site work at Great Yarmouth Third River Crossing was carried out between the 11<sup>th</sup> June 2018 and 04<sup>th</sup> July 2018 and comprised:

- Ten cable percussion boreholes
- Four in-situ pressuremeter tests
- In-situ and laboratory testing

The site plan Drawing Reference GYTRC-WSP-HGT-DR-GE-0006 is included in Appendix A.

## 2 THE SITE AND GEOLOGY

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The site is located at an off-shore location over the River Yare, immediately south of Great Yarmouth town centre. The site is approximately bounded to the west by the port authority berths 31A to 31D and to the east by berths 14B to 13A. The site area covers approximately 0.01 km<sup>2</sup> of over water locations and is centred on National Grid reference 652320, 306005. The location of the site is shown on the appended site location plan, WSP drawing No. GYTRC-WSP-HGT-DR-GE-0006 included in Appendix A.

The British Geology Survey Map Sheet 162 (British Geological Survey, 1991) for Great Yarmouth indicates that the site is underlain by a variety of superficial deposits:

- Tidal river or creek deposits
- Breydon Formation
- Happisburgh Formation

Solid geology underlying the site is shown on the BGS website to comprise sand and gravel of the Crag Group, underlain by London Clay.

Groundsure (Groundsure, 2017) records no historical overwater workings on site. Only ground investigations associated with the quay/ wharf immediately adjacent to the River Yare have been undertaken adjacent to the site.

Extracts from geological map are included in Appendix B

### 3 METHOD OF INVESTIGATION

#### 3.1 GENERAL

Details of in-situ sampling and testing carried out, together with the descriptions of the strata encountered, are given on the exploratory hole (borehole) records. The investigation was carried out in accordance with BS 5930:1999 (British Standard, 1999), BS EN ISO 14688-1:2018 (British Standard, 2018) and BS EN ISO 14689-1:2003 (British Standard, 2018).

Exploratory hole details including depths, surveyed coordinates and in situ testing locations are given in Appendix C.

All geotechnical samples were transported to the laboratories and offices of Norfolk Partnership Laboratory (NPL) for examination and testing as scheduled by the NPL and WSP. Chemical samples were couriered to the Envirolab laboratory in Cheshire for testing as scheduled by WSP.

#### 3.2 UNEXPLODED ORDNANCE RISK MITIGATION SURVEY

At each borehole location, a magnetometer survey was undertaken in order to identify the possible presence of unexploded ordnance (UXO). The testing was carried out by using a magnetic anomaly locator magnetometer or by inspection, in accordance with the guidance provided in CIRIA C681 (CIRIA, 2009). The results of the risk mitigation survey carried out for the ground investigation are given in Appendix D.

The UXO surveys on site were carried out by MACC International.

A MAGNEX 120 LW device was used, which serves for locating ferromagnetic objects which are buried underground or underwater. A further important field of use of the Magnex 120 LW lies in the probing of boreholes where magnetic anomalies have been encountered at relatively great depths or in detections fields with a lot of surface bound interference.

A total of two borehole locations were terminated before reaching their scheduled depth due to high magnetometer readings. At these locations scanned depths were increased but readings remained high. The MACC UXO specialist on site advised that the exploratory holes should be terminated immediately following continuous high readings. A summary of the locations terminated due to high magnetometer readings are provided in the Table 1.

**Table 1 - UXO Borehole Termination Summary**

Location	Date	Termination Depth (m BGL)	Note
MBH1	11/06/2018	4.00	Location moved 4.0m away from original location
MBH5	20/06/2018	0.00	Location moved 3.0m away from original location

#### 3.3 CONTAMINATED SITE PROCEDURES

The site was designated to be in the Institution of Civil Engineers Site Investigation Steering Group Yellow Category and appropriate protection measures were undertaken (Site Investigation Steering Group, 1993).

Hand held sampling tools were cleaned after each sample to prevent cross contamination between samples. Samples for chemical contamination testing were taken as appropriate for the intended analyses, as shown on the exploratory hole records.

Each borehole was cased, which was progressively reduced in diameter with depth. Environmental seals of bentonite pellets, adequately hydrated were installed with every change in casing diameter, in order to prevent downward migration of any contaminants within shallow Alluvial deposits at the river bed.



## 4 FACTUAL INFORMATION

### 4.1 CABLE PERCUSSION BORING

No information from land locations are included in this factual report. The land based ground investigation is presented in the 2018 Factual Report (REF:GYTRC-WSP-VGT-XX-RP-GE-0001).

### 4.2 MARINE CABLE PERCUSSION BORING

Ten cable percussion boreholes using three diameter casings 305mm, 250mm, 200mm and 150mm were sunk to depths below the riverbed level (bgl) between 1.00m and 41.70m using light cable tool percussion boring techniques. The borehole records are included in Appendix C.

The cable percussive boreholes are summarised in the table below:

**Table 2 - Borehole Summary**

Borehole ID	Date Completed	Depth (mbgl)	Location	Easting	Northing	Ground Level
MB01	12/06/2018	4.0	West Side of River Yare	652421	306010	-6.59
MB01A	19/06/2018	25.33	West Side of River Yare	652421	306014	-7.88
MB02	14/06/2018	40.60	West Side of River Yare	652432	305996	-7.87
MB03	18/06/2018	25.45	West Side of River Yare	652422	305978	-7.67
MB04	15/06/2018	1.00	West Side of River Yare	652434	305964	-8.10
MB04A	17/06/2018	41.70	West Side of River Yare	652435	305962	-7.99
MB05	21/06/2018	25.45	West Side of River Yare	652426	305946	-5.77
MB06	25/06/2018	25.60	East Side of River Yare	652494	306024	-6.56
MB07	27/06/2018	40.29	East Side of River Yare	652485	306003	-6.85
MB08	22/06/2018	25.44	East Side of River Yare	652499	305988	-6.70
MB09	04/07/2018	40.45	East Side of River Yare	652490	305973	-6.13
MB010	23/06/2018	25.44	East Side of River Yare	652502	305958	-5.87

A total of two locations, MB01 and MB04, were terminated before the scheduled depth due to an obstruction detected during drilling. Details of the termination are included on the log that are presented in Appendix C. A single borehole (BM05) was relocated before drilling was started due to high Magnetometer readings, as detailed in Section 3.2.

Disturbed samples were taken from the seabed sediment and after that at each change in soil type and at regular vertical intervals during boring in order to identify and give a record of the strata encountered. Environmental disturbed samples were also taken at varying depths within the boreholes which reduced in frequency at deeper depths.

In cohesive soils nominal 100mm diameter general purpose thin-wall driven open tube (U100) samples were taken and subsequently sealed to preserve their natural moisture content.



Standard penetration tests (SPT) using a split spoon (S) or a solid 60° cone (C) were carried out in granular deposits and alternating with U100 sampling in the cohesive materials. The results are shown on the borehole logs in Appendix C.

Where blowing sand were encountered during drilling, preventative measures were undertaken to reduce the negative effects of the blowing. This was achieved by altering the drilling method to reduce the build-up of negative pressures, as well as adding Drilling fluid, i.e. water or a 'Dandopol' polymer/water mix to aid drilling.

### **4.3 DYNAMIC WINDOW SAMPLING BOREHOLES**

No dynamic window samples were undertaken as part of this ground investigation.

### **4.4 TRIAL PITTING**

No Trial pits were undertaken as part of this ground investigation.

### **4.5 INSTRUMENTATION AND MONITORING**

No installations for monitoring purposes were undertaken as part of this overwater ground investigation.

### **4.6 SITE SURVEY**

A topographic survey was completed at locations along the west and east quay walls to aid in locating each off-shore borehole location and in manoeuvring the Jack up rig, prior to the start of the ground investigation. Each borehole was located during the manoeuvring of the jack up with the use of satellite locating equipment and the final surveyed location is derived from these individual surveys.

## 5 FIELD TESTING

### 5.1 STANDARD PENETRATION TESTING

Standard Penetration Tests (SPT's) were carried out using the split spoon (S) sampler or solid cone (C) attachment within the boreholes. The tests were carried out in accordance with BS EN ISO 22476-3:2005+A1:2011 (British Standard, 2006). The results are included on the appended borehole logs presented in Appendix C. The calibration / efficiency information for the relevant drilling rigs are summarised in the table below:

**Table 3 - SPT Efficiency Ratings**

SPT I.D	SPT Rod Type	Calibration Date	SPT Energy Ratio	Boreholes
D4000	Cable Percussive rig	17/11/2017	71.68	All Cable Percussive Boreholes

### 5.2 PRESSUREMETER TESTING

A total of 4 No. Pressuremeter Test locations were undertaken by Cambridge Insitu Limited, as set out by WSP on site. At each location testing was attempted at depths where suitably cohesive material was encountered. Details of the test results and interpretations are presented in Appendix E.

Tests had to be abandoned at many locations due to the borehole stability problems.

The locations of the pressuremeter testing completed is summarised in the table below.

**Table 4 – Pressuremeter Testing Summary**

Test ID	Date Completed	Depth (mbgl)	Remark	Easting	Northing	Riverbed Level
MBH 2	12/06/2018	13.5	Testing not completed - Arm 2 hits limit after one u/r cycle.	652432	305996	-7.87
MBH 2	13/06/2018	20.4	Test completed	652432	305996	-7.87
MBH 9	03/07/2018	23.0	Test completed	652490	305973	-6.13
MBH 9	04/7/2018	39.5	Test completed	652490	305973	-6.13

The scope of works included for 12 No. pressuremeter tests to be undertaken at 6 no. depths in boreholes MBH02 and MBH09. During drilling most of the scheduled test locations encountered ground conditions that were recorded as being too dense or not suitable for undertaking the test. Some locations where testing was attempted comprised low cohesive material and silty sands, which during the setting up of the tests blew around the equipment, resulting in the abandoning of the test. The methods for managing blowing sands during drilling could not be implemented during the setting up of the test equipment. Maintaining a head of water within the casing, with the use of a pump, could not be maintained during the assembly of the hydraulics and jacking system causing sand to blow within the casing around the testing apparatus before the test could be started.

The first test attempted in MBH2 at a depth of 13.50m was terminated after one reload cycle due to a sensor reaching the scale limit.

## 6 LABORATORY TESTING

### 6.1 GEOTECHNICAL LABORATORY TESTING

The laboratory testing schedules for geotechnical tests were prepared by WSP in coordination with the Norfolk Partnership Laboratory.

The information included in this report is taken from the results of tests undertaken by the NPL UKAS accredited testing laboratory No. 0920 and Terra Tek, UKAS accredited testing laboratory No. 0126. The results of the laboratory test certificates attached to this report may not include some of the data required by the test procedure. However, a full set of data is available from the NPL.

The following accredited test procedures were carried out:

- Natural Moisture Content
- Plasticity Index
- Liquid Limit
- Plastic limit
- Particle Size Distribution (PSD)
- Sedimentation
- Triaxial Testing (Quick Undrained Single Stage)

Testing was also scheduled and undertaken envirolab for sulphate suite in accordance with BRE Special Digest 1 (BRE, 2005), for which 57 No. tests were completed. Details of the testing included are listed below:

- Sulphate (total water soluble)
- Sulphate (acid soluble)
- Sulphur (Total)
- pH
- Ammonium (Water Sol 2:1)
- Chloride (Water Sol 2:1)
- Nitrate (Water Sol 2:1)
- Magnesium (Water Sol 2:1)

A summary of the completed testing is shown in the table below:

**Table 5 - Geotechnical Laboratory Testing Summary**

Test	Number	Standard
Natural Moisture Content	217	BS 1377: Part 2 :1990, Section 3
Liquid Limit/ Plasticity Index	31	BS1377-2:1990 CI 4.3 BS1377-2:1990 CI 5
Particle Size Distribution	200	BS 1377: Part 2 :1990, Section 9.1 & 9.4
Determination of Undrained Shear Strength - Definitive	33	BS1377: Part 7: 1990, Clause 8, Single Specimen

Geotechnical laboratory tests were carried out in the period between the June 2018 to August 2018. This report includes all completed geotechnical testing received up to 14<sup>th</sup> September 2018.

The geotechnical laboratory testing has been carried out in accordance with BS 1377: 1990 (British Standard, 1990) using calibrated equipment specified within the British Standard.

The geotechnical laboratory test results are included in this report as Appendix F.

## 6.2 CHEMICAL LABORATORY TESTING

Soil samples selected by WSP were tested against a geo-environmental testing suite as scheduled by WSP. The MCERTS accredited testing was undertaken by EnviroLab (UKAS Laboratory No. 1247).

The following accredited chemical testing test procedures were carried out on soil, water and for leachates:

**Table 6 – Chemical Laboratory Testing Summary**

Determinands	Soil	Soil Leachate
Metals (Arsenic, Boron, Cadmium, Chromium (total and hexavalent), Copper, Lead, Mercury, Nickel, Selenium and Zinc)	✓	✓
pH	✓	✓
TPH CWG (GC-MS aliphatic/aromatic split) inc BTEX and MTBC	✓	✓
VOCs by GCMS (including vinyl chloride)	✓	
SVOCs by GCMS excluding PAHs	✓	✓
speciated PAH (USEPA 16)	✓	✓
Ammonia as N	✓	✓
Phenol	✓	✓
Soil Organic Matter	Selected samples	
Cyanide - total	✓	✓
Cyanide - free	✓	✓
PCB's EC7 Congeners	Selected samples	
PCB's WHO 12 Congeners	Selected samples	
Sulphate - total	✓	
Sulphate - water soluble, 2:1 extract	✓	✓
Asbestos (screen only)	Selected samples	
Total WAC Suite	Selected samples	



Determinands	Soil	Soil Leachate
Leachate prep		✓

In addition to the laboratory testing outlined above selected samples were tested against the Waste Acceptance Criteria (WAC) suite of contaminants for classification for potential offsite disposal. The WAC testing was undertaken between June 2017 to July 2018 by EnviroLab.

Details of the standards used and the test results are presented in the Laboratory Test Results included in Appendix G. All chemical testing will be submitted in AGS format with the electronic version of the report.

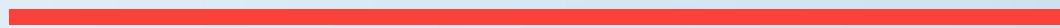
## REFERENCES

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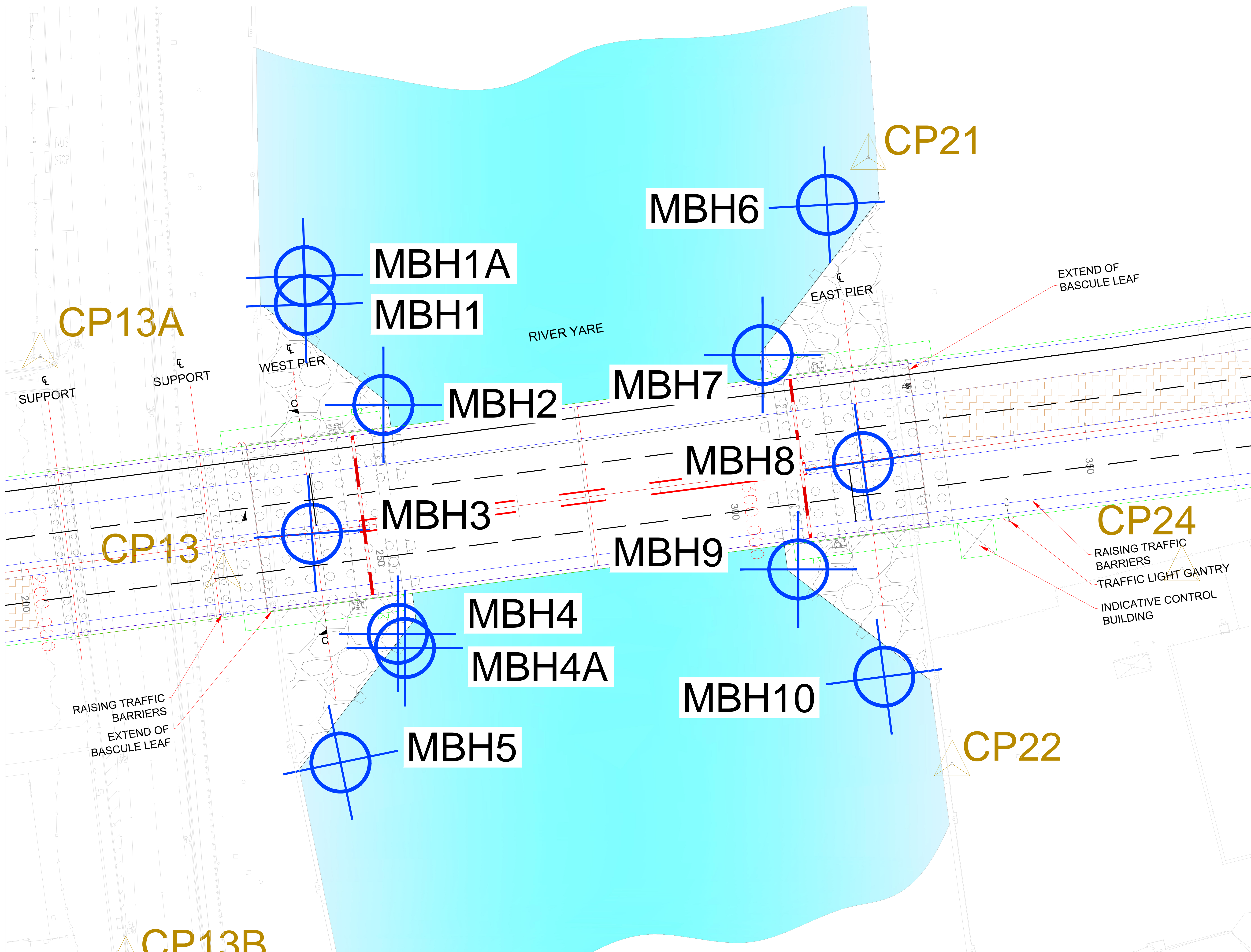
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# Appendix A

**SITE PLAN**







**KEY**

- MARINE BOREHOLE
- SURVEY CONTROL POINTS (CP) (APPROX)

**LOCATION CO-ORDINATES**

	REF	EASTING	NORTHING
MARINE BOREHOLE	MB01	652421	306010
	MB01A	652421	306014
	MB02	652432	305996
	MB03	652422	305978
	MB04	652434	305964
	MB04A	652435	305962
	MB05	652426	305946
	MB06	652494	306024
	MB07	652485	306003
	MB08	652499	305988
MB09	652490	305973	
MB010	652502	305958	

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 County Hall, Martineau Lane  
 Norwich NR1 2SG

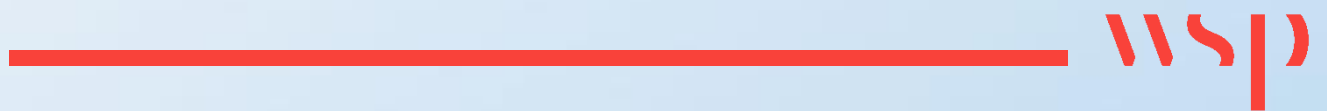
**DRAWING TITLE**  
 GREAT YARMOUTH THIRD RIVER CROSSING  
 PLAN SHOWING ACTUAL OFF-SHORE  
 EXPLORATORY HOLE LOCATIONS

REV.	DESCRIPTION	DRAWN BY	CHECKED	DATE
A	FIRST ISSUE	DL	AC	OCT18

	INITIALS	DATE	DRAWING No.
DESIGNED BY	DL	OCT 18	GYTRC-WSP-HGT-DR-GE-0006
DRAWN BY	DL	OCT 18	PROJECT TITLE
CHECKED BY	AC	OCT 18	GREAT YARMOUTH THIRD RIVER CROSSING
APPROVED BY	AC	OCT 18	SCALE FILE No.
			NTS 0006

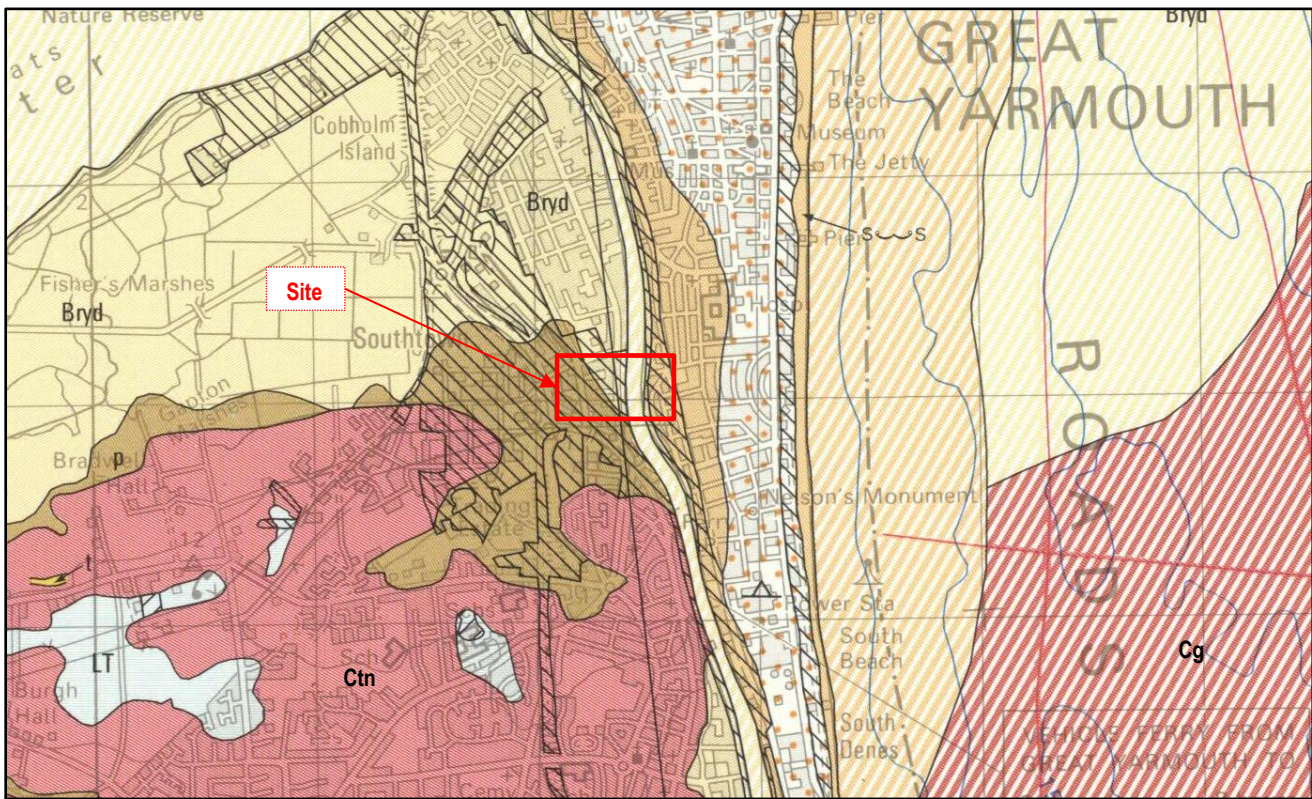
# Appendix B

**GEOLOGICAL MAP**





## APPENDIX B



### Key

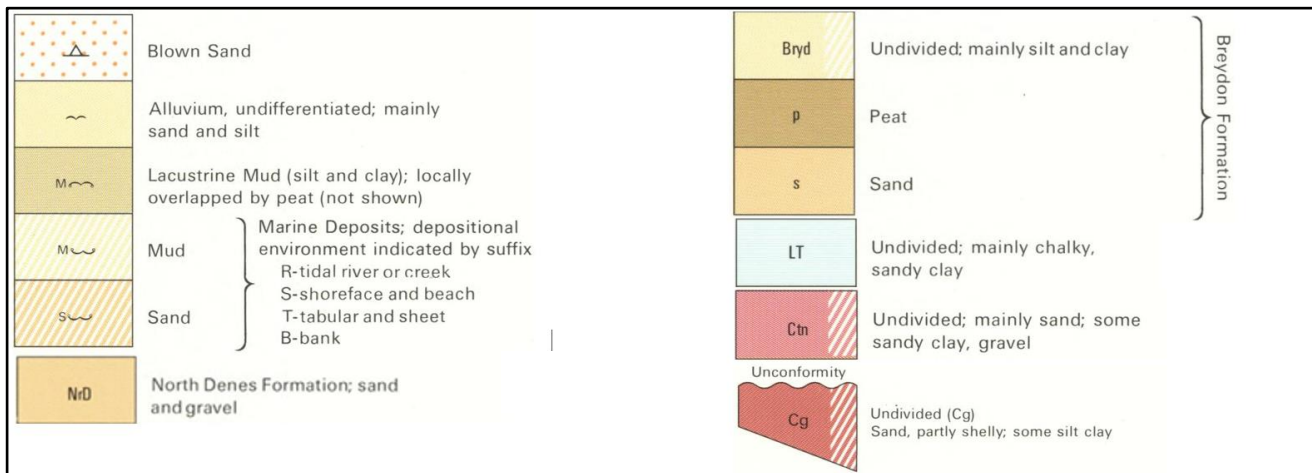
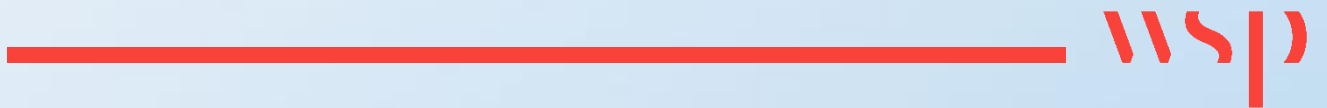


Figure 1- Quaternary and Pre-Quaternary Geology (C18/02 British Geological Survey © UKRI. All Rights Reserved 2018).



# Appendix C

## EXPLORATORY HOLE RECORDS





NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 1 of 3



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	MB01a		
Carried out for	Community & Environmental Services	Date Started	19/06/2018	Date Finished	19/06/2018		
Remarks:	Type of Rig			Cable percussion (shell and auger)	Logged by	NP	
	Depth (m)		25.33	Ground Level (m AOD)	-7.88	Drawn by	RK
	Co-ords			652421 - 306014		Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Very soft black silty sandy CLAY. Drillers Description. TIDAL RIVER or CREEK DEPOSITS				●	1								
			<i>Becoming soft grey gravelly, sandy, silty CLAY, from 1.00m Gravel is fine to medium sub-rounded flint &amp; quartz.</i>		1.00		●	2	S ↓ 35							
			Dense brownish grey gravelly, silty, clayey fine to medium SAND. Gravel is fine to medium sub-angular to sub-rounded flint. TIDAL RIVER or CREEK DEPOSITS		1.40		●	4								
			<i>With black organic lenses from 2.20m</i>		2.00		●	5								
			Very dense brown & olive slightly gravelly fine to medium SAND. Gravel is fine to medium angular to sub-rounded flint & sandstone. HAPPIBURGH GLACIGENIC FORMATION		2.50		●	6	S ↓ 33							
			<i>With beds of very soft very sandy, silty, organic CLAY from 3.50m to 4.00m</i>		3.00		●	8								
			Dense dark grey silty fine SAND. CRAG		4.00	4.00	●	9	S ↓ 50							
			<i>Becoming medium dense with laminae &amp; thin beds of brown fine sand &amp; dark brown slightly silty fine sand from 4.00m</i>		4.00		●	10	S ↓ 44							
			<i>Becoming brown fine sand from 6.00m</i>		5.00		●	12								
			Medium dense greyish brown silty fine SAND CRAG		6.00	4.00	●	13	S ↓ 29							
					5.00		●	14	S ↓ 44							
					6.00		●	16	S ↓ 29							
					6.00		●	17	S ↓ 29							
					7.00	7.00	●	18	S ↓ 28							
					7.00		●	20	S ↓ 28							
					8.00		●	21	S ↓ 24							
					8.00		●	22	S ↓ 24							
					9.00		●	23	S ↓ 28							
					9.00		●	24	S ↓ 28							
					9.00		●	25	S ↓ 28							
					10.00		●	27	S ↓ 28							
					10.00		●	28	S ↓ 28							
					10.00		●	29	S ↓ 24							
					10.00		●	32	S ↓ 24							
					10.00		●	33	S ↓ 28							
					10.00		●	34	S ↓ 28							
					10.00		●	36	S ↓ 28							
					10.00		●	37	S ↓ 28							



# NORFOLK PARTNERSHIP LABORATORY

## Borehole Log

Sheet 2 of 3



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	MB01a		
Carried out for	Community & Environmental Services	Date Started	19/06/2018	Date Finished	19/06/2018		
Remarks:	Type of Rig			Cable percussion (shell and auger)	Logged by	NP	
	Depth (m)		25.33	Ground Level (m AOD)	-7.88	Drawn by	RK
	Co-ords				652421 - 306014		Checked by

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Medium dense to dense orange & brown fine to medium SAND, some shell fragments. CRAG				●	38	S ↓ 27							
			<i>Becoming pinkish brown with numerous shell fragments from 11.00m</i>		11.00		●	40	↓							
			<i>With fine angular to sub-rounded flint &amp; quartz GRAVEL from 11.50m</i>				●	41	↓							
							●	42	S ↓ 33							
							●	43	↓							
							●	44	↓							
					12.00		●	45	S ↓ 29							
			Dense to medium dense light & dark grey silty fine to medium SAND, with occasional shell fragments. CRAG		12.40		●	46	↓							
							●	47	↓							
							●	48	S ↓ 30							
							●	49	↓							
							●	50	↓							
		305	<i>Becoming slightly silty from 14.00m</i>		14.00		●	51	S ↓ 31							
							●	52	↓							
			<i>With thin beds of soft dark grey very clayey SILT from 15.00m to 15.45m</i>		15.00		●	53	↓							
							●	54	S ↓ 24							
							●	55	↓							
			<i>With lenses of soft grey slightly silty CLAY from 16.00m to 16.50m</i>		16.00		●	56	↓							
							●	57	S ↓ 24							
							●	58	↓							
							●	59	↓							
							●	60	S ↓ 41							
			Medium dense laminated & thinly bedded grey fine SAND, dark grey very sandy SILT & soft light grey silty CLAY, with occasional shell fragments. CRAG		17.50		●	61	↓							
							●	62	↓							
							●	63	S ↓ 34							
							●	64	↓							
							●	65	↓							
							●	66	S ↓ 45							
			<i>With beds of grey silty fine to medium SAND from 19.5m</i>		19.00		●	67	↓							
							●	68	↓							





NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	MB02		
Carried out for	Community & Environmental Services	Date Started	14/06/2018	Date Finished	14/06/2018		
Remarks:	Type of Rig			Cable percussion (shell and auger)	Logged by	NP	
	Depth (m)		40.60	Ground Level (m AOD)	-7.87	Drawn by	RK
	Co-ords			652432 - 305996		Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			<i>Becoming very soft brown SILT from 10.00m</i>				●	40	S ↓ 34							
			Laminated & thinly bedded orangey brown silty medium to coarse SAND, firm brown silty CLAY & reddish brown clayey SILT, with some shell fragments. CRAG		10.30		●	41	↓							
			Very dense grey silty fine to coarse SAND, with numerous shell fragments. CRAG		11.00	11.00	●	42	S ↓ 50							
							●	43	↓							
			<i>With laminae of brownish grey very sandy SILT &amp; light grey clayey SILT from 12.00m</i>				●	45	S ↓ 25							
							●	46	↓							
							●	47	↓							
			Dense grey fine to medium SAND, with occasional shell fragments. CRAG		14.00	14.00	●	48	↓							
							●	49	S ↓ 35							
							●	50	↓							
							●	52	↓							
			<i>Becoming medium dense and slightly silty from 15.50m</i>				●	53	S ↓ 27							
							●	54	↓							
							●	55	↓							
							●	56	↓							
							●	57	S ↓ 22							
			<i>With thin bed of slightly gravelly, silty CLAY from 17.00m</i>				●	58	↓							
							●	59	↓							
							●	60	S ↓ 24							
							●	61	↓							
			Laminated & thinly bedded grey slightly silty CLAY, dark grey clayey SILT, & grey silty fine SAND, with occasional shell fragments. CRAG		18.50		●	62	S ↓ 26							
		305					●	63	↓							
							●	64	↓							
			Stiff grey silty CLAY, with numerous laminae of light grey silty fine SAND. CRAG		19.20	19.00	●	65	↓							
							●	66	↓							



















NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	MB04a		
Carried out for	Community & Environmental Services	Date Started	15/06/2018	Date Finished	17/06/2018		
Remarks:	Type of Rig			Cable percussion (shell and auger)	Logged by	NP	
	Depth (m)		41.70	Ground Level (m AOD)	-7.99	Drawn by	RK
	Co-ords			652435 - 305962		Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Dense reddish brown fine to coarse SAND, with laminae of soft light grey silty CLAY. CRAG		10.50		●	32	S ↓ 36							
			Orangey brown silty fine to coarse SAND, with some shell fragments. CRAG		11.00	11.00	●	34	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		12.00		●	35	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		12.50	12.00	●	36	S ↓ 50							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		13.00		●	37	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		13.50		●	38	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		14.00	12.00	●	39	S ↓ 35							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		14.30	12.50	●	40	S ↓ 35							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		15.00		●	41	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		15.30	13.00	●	42	S ↓ 45							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		16.00		●	43	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		16.30	14.00	●	44	S ↓ 45							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		17.00		●	45	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		17.30	14.30	●	46	S ↓ 45							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		18.00		●	47	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		18.30	15.00	●	48	S ↓ 38							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		19.00		●	49	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		19.30	16.00	●	50	S ↓ 41							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		20.00		●	51	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		20.30	17.00	●	52	S ↓ 26							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		21.00		●	53	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		21.30	18.00	●	54	S ↓ 37							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		22.00		●	55	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		22.30	19.00	●	56	S ↓ 40							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		23.00		●	57	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		23.30	20.00	●	58	S ↓ 40							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		24.00		●	59	↑ ↓							
			Very dense light brown fine to coarse SAND, with laminae of firm reddish brown silty CLAY & light grey silty CLAY, with numerous shell fragments. CRAG		24.30	21.00	●	60	↑ ↓							











NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 3



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	MB05		
Carried out for	Community & Environmental Services	Date Started	20/06/2018	Date Finished	21/06/2018		
Remarks:	Type of Rig			Cable percussion (shell and auger)	Logged by	NP	
	Depth (m)		25.45	Ground Level (m AOD)	-5.77	Drawn by	RK
	Co-ords			652426 - 305946		Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests					
							Type	No.		MC%	LL	PL	MPI	Org.	CBR
			Very dense yellowish brown fine to medium SAND. CRAG				●	34	S ↓ 50						
			Laminated & thinly bedded dense brown fine SAND & orangey brown sandy, silty CLAY. CRAG		11.00	11.00	●	36	S ↓ 34						
			Dense brown fine SAND. CRAG		12.30	12.00	●	41	S ↓ 40						
			<i>With laminae of dark red &amp; grey clayey SILT, brown fine to coarse SAND &amp; grey sandy CLAY from 13.00m</i>		13.00	13.00	●	44	S ↓ 50						
			Very dense orangey brown silty fine SAND, with lenses of soft brown CLAY & numerous shell fragments. CRAG		13.30	14.00	●	45	S ↓ 50						
			<i>Becoming brown from 14.50m</i>		15.00	15.00	●	49	S ↓ 50						
			Laminated & thinly bedded firm light grey silty CLAY, dark grey clayey SILT, dark grey silty fine SAND & orangey brown silty fine SAND, with some shell fragments. HAPPISBURGH GLACIGENIC FORMATION		15.00	15.00	●	50	S ↓ 50						
			<i>With some fine to medium sub-angular flint &amp; ironstone GRAVEL from 15.50m</i>		16.00	16.00	●	52	S ↓ 50						
		305	Laminated firm light grey silty CLAY, light grey silty fine SAND & dark grey sandy SILT. HAPPISBURGH GLACIGENIC FORMATION		16.00	16.00	●	53	S ↓ 50						
			Very dense grey fine to medium SAND, with laminae of orangey grey clayey, sandy SILT. HAPPISBURGH GLACIGENIC FORMATION		17.00	17.00	●	56	S ↓ 50						
			Very dense grey silty fine SAND, with some shell fragments. CRAG		18.00	18.00	●	59	S ↓ 50						
			<i>With some laminae of firm grey silty CLAY from 19.00m</i>		19.00	19.00	●	62	S ↓ 50						
							●	63							
							●	64							

# NORFOLK PARTNERSHIP LABORATORY

## Borehole Log

Sheet 3 of 3



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	MB05		
Carried out for	Community & Environmental Services	Date Started	20/06/2018	Date Finished	21/06/2018		
Remarks:	Type of Rig			Cable percussion (shell and auger)	Logged by	NP	
	Depth (m)		25.45	Ground Level (m AOD)	-5.77	Drawn by	RK
	Co-ords			652426 - 305946		Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests					
							Type	No.		MC%	LL	PL	MPI	Org.	CBR
			<i>With laminae of firm grey silty CLAY &amp; dark grey clayey SILT from 20.00m</i>		20.30		●	65	S ↓ 48						
			Medium dense greyish brown fine to medium SAND with some shell fragments. CRAG				●	66							
			<i>With lenses of firm grey silty CLAY &amp; occasional shell fragments from 21.30m</i>		21.00		●	67							
			<i>With lenses of firm grey silty CLAY &amp; occasional shell fragments from 21.30m</i>		22.00		●	68							
			<i>With lenses of firm grey silty CLAY &amp; occasional shell fragments from 21.30m</i>		22.40		●	69							
			Laminated stiff grey silty CLAY & light grey sandy SILT. CRAG		23.00		●	70	S ↓ 21						
			Laminated stiff grey silty CLAY & light grey sandy SILT. CRAG		23.40		●	71							
			Stiff grey silty CLAY with laminae of light grey fine SAND. CRAG		24.00		□	72							
			Stiff grey silty CLAY with laminae of light grey fine SAND. CRAG		24.40		●	73							
		250	Stiff grey silty CLAY with laminae of light grey fine SAND. CRAG		25.00		●	74	S ↓ 33						
			Stiff grey silty CLAY with laminae of light grey fine SAND. CRAG		25.45		●	75							
			<i>Becoming laminated &amp; thinly bedded grey silty fine to medium SAND &amp; firm to stiff grey silty CLAY from 25.00m</i>		26.00		●	76							
			<i>Becoming laminated &amp; thinly bedded grey silty fine to medium SAND &amp; firm to stiff grey silty CLAY from 25.00m</i>		27.00		●	77	S ↓ 36						
			<i>Becoming laminated &amp; thinly bedded grey silty fine to medium SAND &amp; firm to stiff grey silty CLAY from 25.00m</i>		28.00		●	78							
			<i>Becoming laminated &amp; thinly bedded grey silty fine to medium SAND &amp; firm to stiff grey silty CLAY from 25.00m</i>		29.00		●	79							







NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 3 of 3



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	MB06		
Carried out for	Community & Environmental Services	Date Started	24/06/2018	Date Finished	25/07/2018		
Remarks:	Type of Rig			Cable percussion (shell and auger)	Logged by	NP	
	Depth (m)		25.60	Ground Level (m AOD)	-6.56	Drawn by	RK
	Co-ords				652494 - 306024	Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests					
							Type	No.		MC%	LL	PL	MPI	Org.	CBR
			Laminated & thinly bedded firm to stiff grey silty CLAY & brownish grey fine to medium SAND with some shell fragments. CRAG		20.30		●	66	S ↓ 50						
			Grey slightly silty fine SAND. CRAG				●	67							
					21.00		↑								
			Stiff grey silty CLAY, with laminae of light grey silty fine SAND. CRAG		21.20		□	69							
					22.00		●	70	S ↓ 50						
							●	71							
					23.00		●	72							
			Becoming thinly bedded dark grey firm silty CLAY & Grey silty fine SAND from 23.00m				●	73							
					24.00		□	75							
					25.00		●	76	S ↓ 27						
			Laminated stiff grey silty CLAY, light grey fine SAND & dark grey clayey SILT. CRAG		24.00	24.00	●	77							
		250	Becoming very stiff from 24.30m				●	78							
					25.40		●	79							
					25.60		□	81							
			Laminated very stiff dark grey CLAY, with laminae of light grey fine SAND. CRAG				●	82							





















NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	MB09		
Carried out for	Community & Environmental Services	Date Started	02/07/2018	Date Finished	04/07/2018		
Remarks:	Type of Rig			Cable percussion (shell and auger)	Logged by	NP	
	Depth (m)		40.45	Ground Level (m AOD)	-6.13	Drawn by	RK
	Co-ords			652490 - 305973		Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests						
							Type	No.		MC%	LL	PL	MPI	Org.	CBR	
			Dense olive silty fine SAND, brown fine SAND, orangey brown sandy SILT & soft light grey silty CLAY. CRAG		10.30		●	35	S ↓ 36							
			Dense olive silty fine SAND, with lenses of soft grey CLAY, weathering to brown. CRAG				●	37	↓							
			<i>With laminae &amp; thin beds of light brown silty fine SAND, orange &amp; orangey brown very sandy SILT, reddish brown sandy SILT &amp; light grey silty CLAY from 11.00m to 11.30m</i>		11.00		●	38	↓							
							●	39	S ↓ 46							
							●	40	↓							
			Thinly bedded dense brown & light brown fine SAND. CRAG		12.00	12.00	●	41	↓							
			Dense olive silty fine SAND. CRAG		12.30		●	42	S ↓ 42							
							●	43	↓							
			Very dense olive silty fine to medium SAND, with lenses of reddish brown fine to medium SAND & soft grey CLAY. CRAG		13.00	13.00	●	44	↓							
							●	45	S ↓ 50							
			Orange brown slightly gravelly, clayey, silty fine SAND. Gravel is fine angular flint. CRAG		13.50		●	46	↓							
							●	47	↓							
			Very dense light grey clayey, silty fine SAND, with thin beds of brown silty fine to medium SAND & laminae of soft light grey silty CLAY. CRAG		14.00	14.00	●	48	S ↓ 50							
							●	49	↓							
			Blueish grey very clayey SILT, with thin beds of brown fine SAND. CRAG		14.50		●	50	↓							
							●	51	↓							
			Very dense brownish grey fine SAND with lenses of soft silty grey CLAY, & occasional shell fragments. CRAG		15.30		●	52	S ↓ 50							
							●	53	↓							
							●	54	S ↓ 50							
							●	55	↓							
							●	56	↓							
			<i>With thin beds of grey &amp; brown fine to medium SAND with laminae of soft light grey silty CLAY from 17.00m to 17.30m</i>		17.00		●	57	S ↓ 50							
							●	58	↓							
							●	59	↓							
			Very dense greyish brown fine to medium SAND. CRAG		18.00	18.00	●	60	S ↓ 50							
			<i>Becoming slightly silty from 18.30m to 18.50m</i>				●	61	↓							
							●	62	↓							
		305	Very dense grey silty fine to medium SAND. CRAG		19.00	19.00	●	63	S ↓ 50							
			Very dense grey silty fine to medium SAND, with thin beds of grey slightly sandy, very clayey SILT. CRAG		19.50		●	64	↓							





NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 5 of 5



Scheme	Gt Yarmouth 3rd River Crossing	Job No.	PZ1522D1	Borehole No.	MB09		
Carried out for	Community & Environmental Services	Date Started	02/07/2018	Date Finished	04/07/2018		
Remarks:	Type of Rig			Cable percussion (shell and auger)	Logged by	NP	
	Depth (m)		40.45	Ground Level (m AOD)	-6.13	Drawn by	RK
	Co-ords			652490 - 305973		Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample		Field Tests	Laboratory Tests					
							Type	No.		MC%	LL	PL	MPI	Org.	CBR
			Very stiff brown laminated fissured silty CLAY. LONDON CLAY		40.45		●	112	S ↓ 47						











# Appendix D

## UXO RISK MITIGATION SURVEY





# Explosive Ordnance Desktop Threat Assessment

Site: **Southtown, Great Yarmouth**

Client: **WSP UK Limited**

Ref: **7307TA**

Date: **19<sup>th</sup> September 2017**

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This Report has been produced in compliance with the Construction Industry Research and Information Association guidelines for the preparation of Detailed Risk Assessments in the management of UXO risks in the construction industry.

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## Glossary of Terms

AAA	Anti-Aircraft Artillery
ARP	Air-raid Precautions
BDO	Bomb Disposal Officer
EOD	Explosive Ordnance Disposal (current term for “bomb” disposal)
HE	High Explosive
HG	Home Guard
IB	Incendiary Bomb
kg	Kilogram
LCC	London County Council
LM	Land Mine
LSA	Land Service Ammunition (includes grenades, mortars, etc.)
Luftwaffe	German Air Force
m bgl	Metres Below Ground Level
MoD	Ministry of Defence
OB	Oil Bomb
PM	Parachute Mine
RAF	Royal Air Force
RN	Royal Navy
SI	Site Investigation
SAA	Small Arms Ammunition (small calibre cartridges used in rifles & machine guns)
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
V-1	“Doodlebug” the first cruise type missile, used against London from June 1944. Also known as ‘Flying Bomb’.
V-2	The first ballistic missile, used against London from September 1944
WWI	First World War (1914 -1918)
WWII	Second World War (1939 – 1945)

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## Executive Summary

**The Site:** The study area, centred on the approximate OS National Grid Reference: TG 52451 05820, is located in Great Yarmouth, approximately 10m north of Southtown Common Recreation Ground. The site is bound to the north by residential properties fronting Waveney Road, to the east by the Petersons Distribution Centre, to the south by residential properties fronting Alpha Road and to the west by the A12 Dual Carriageway

The study area is complex / varied, comprising industrial / commercial properties in the east and residential areas mixed with commercial units in the west, with the River Yare passing north to south through the site. The study area encompasses a number of highways; the A1243, Cromwell Road, Cromwell Crescent, Southtown Road, Queen Anne's Road, William Adams Way, Suffolk Road, Beccles Road and the A12. In the west, there is a variety of soft open ground including allotment gardens, residential gardens, areas of dense vegetation, mature woodland and the periphery of Southtown Common Recreation Ground.

**Proposed Works:** The proposed Site Investigation which shall include both onshore and offshore boreholes to a maximum depth of 50m bgl, CPT boreholes to a maximum depth of 30m bgl, trial pits to 3m bgl, observation trenches to 6m bgl and window samples to 6m bgl.

**Risk Assessment Methodology:** In accordance with CIRIA guidelines this assessment has carried out research, analysed the evidence and considered the risks that the site has been contaminated with unexploded ordnance; that such items remained on site; that they could be encountered during any intrusive works and the consequences that could result. Appropriate risk mitigation measures have been proposed.

**Explosive Ordnance Risk Assessment:** Taking into consideration the findings of this study, Dynasafe BACTEC considers the risk across the route to be heterogeneous and can therefore be divided into **Low**, **Medium** and **High** Risk Zones.

### **German UXO:**

- The site was located within central Great Yarmouth within an area of very high bombing density during WWII, with up to 8 x HE bombs likely to have landed on or adjacent to the site boundary. At least 12 further HE bombs are recorded within a 300m radius of the site. In addition, the site is likely to have been affected by 1kg incendiary bombing.
- The eastern extent of the site, comprising busy commercial / industrial areas would have been accessed on a daily basis thereby decreasing the risk of any UXB strike evidence going unnoticed. In addition, these areas may have been subject to post-raid checks for UXB entry holes.
- The western half of the site was occupied by large areas of ambiguous open ground and allotment gardens which are unlikely to have been accessed as regularly or frequently. Access to the allotments would have varied depending on the season and therefore, a UXB could conceivably have fallen here unobserved.
- Moreover, there are multiple areas of clearance and a ruin apparent on site, suggesting that these areas sustained serious bomb damage. As a result, the affected buildings will have been abandoned for a time, increasing the likelihood of subsequent UXO falling on site unnoticed. Therefore, it can be assumed that, for a time, significant quantities of rubble occupied this area and debris may have been strewn across the site, increasing the likelihood of a UXB remaining on site. However, had a UXB landed within the allotments, open ground soft, rubble, or area of open air storage on site it could have gone undetected. Note, that the entry hole of an SC50 (the most commonly deployed German HE bomb) could be as little as 20cm in diameter and therefore, easily obscured in dense vegetation.
- A UXB landing in the river during a night time raid will have been immediately obscured from view, beneath the waterline. Consequently, it is unlikely to have been observed, reported and mapped.
- A UXB entry hole within the river bank mud on site (revealed at low tide) is unlikely to have persisted; the next high tide filling in the hole with water and sediment. Even if evidence of a UXB was observed here and reported, it is highly unlikely to have been recovered by the local bomb disposal unit due to its insignificant location and the impracticalities of deep buried UXB removal in this environment.

### **British/Allied UXO:**

- Due to its coastal location in south-eastern England, Great Yarmouth was considered vulnerable to German invasion and consequently, was well defended by Army and HG units, with River Yare and beaches fortified with static defences, minefields and gun positions.
- A group of WWII anti-invasion defences, including four pillboxes, a road block and a Spigot Mortar emplacement were present within the northern section of the site on the junction of Queen Anne's Road and

Southtown Road. The central element of the site was a substantial road block, designed to check the progress of tanks rather than act as a check point. Further defences were located within the site boundary, located at the westernmost end of Cromwell Road a Spigot Mortar position and associated Type 24 Pillbox were located.

- Although these defence installations were located on site, it is considered highly likely that the risk of shallow buried UXO has been mitigated on site due to post war development.
- Note, that four HAA batteries were situated within a 5km radius of the site during WWII. For the same reasons as given above, it is quite possible that an unexploded AA shell or rocket could have landed in the river on site and remained there.

**The Risk that Unexploded Ordnance Remains on site: Land** - Within the footprint of post-war ground works, the risk of small, shallow buried UXO (LSA, SAA, AA shells and German 1kg incendiaries) remaining will have been partly mitigated since any such items could have been encountered and removed during soil stripping / levelling, foundations etc.

Only within the volume of any post-war basement level bulk excavations and at the precise locations of any post-war pile foundations / boreholes, will the risk from deeper buried German HE UXBs have been completely mitigated. Therefore, it is conceivable that such a weapon could reside within virgin / untouched geology, beneath and amongst any such post-WWII ground works, down to the maximum bomb penetration depth. The risk from UXO contamination within the eastern extent of the site and pre-war buildings has been assessed as minimal and therefore the risk from UXO remaining is minimal.

**River** - It has been assessed that a HE UXB falling in the river will likely have achieved full burial within the overburden sediment and may also have penetrated the Crag Group bedrock. Consequently, such a UXB will have remained in situ up to the present day, largely unaffected by environmental conditions. Also, any large partially buried UXBs on site are less likely to be affected by environmental conditions as a result of their significant mass.

Tidal riverbed environments are mobile in nature and therefore as a result of water currents, any small items of UXO (British AA shells and German 1kg IBs) residing on or near the riverbed surface could experience migration. This is evidenced by the large quantity of munitions that are washed up on beaches around the UK, every year. The wider River Yare environment will have been subject to the same UXO contamination conditions as the site during WWII and therefore although riverbed UXO could have migrated out of the site since WWII, equally, additional UXO could have migrated into the site.

**Bomb Penetration Assessment:** It has been assessed that a 500kg bomb would have had an approximate maximum bomb penetration depth of between **8-10m** below WWII ground level. Penetration depth could potentially have been greater if the UXB was larger (though only 4% of German bombs used in WWII over Britain were of that size). Note that UXBs may be found at any depth between just below the WWII ground level and the maximum penetration depth.

**Recommended Risk Mitigation Measures:** Dynasafe BACTEC believes the following risk mitigation measures should be deployed to support the proposed works at the Southtown, Great Yarmouth site:

- Site Specific Explosive Ordnance Safety and Awareness Briefings to all personnel conducting intrusive works.
- The Provision of Unexploded Ordnance Site Safety Instructions.
- Explosive Ordnance Disposal (EOD) Engineer presence on site to support shallow intrusive works.
- Handheld Intrusive Magnetometer Survey of all borehole locations down to the maximum bomb penetration depth.
- Non-Intrusive Magnetometer and Side Scan UXO Survey.
- Intrusive Magnetometer Survey - Down-hole Vallon Probing ahead of Marine Boreholes.

**Further Recommended Measures should the Scope of Works Change:**

- Intrusive Magnetometer Survey of all pile / boreholes locations down to the maximum bomb penetration depth.
- Pre-Piling Intrusive Magnetometer Survey: TFG Clearance ahead of Piling.
- Intrusive Magnetometer Survey: Down-hole Vallon Probing ahead of Piling.



**Annexes**

<b>Annex A</b>	Site Location Maps
<b>Annex B</b>	Recent Aerial Photograph
<b>Annex C</b>	Site Plan
<b>Annex D</b>	Historical OS Mapping
<b>Annex E</b>	Great Yarmouth Bomb Plot Map
<b>Annex F</b>	Great Yarmouth Bomb Census Map
<b>Annex G</b>	RAF Aerial Photograph - 1946
<b>Annex H</b>	1kg Incendiary Bomb Penetration Photograph - July 1942
<b>Annex I</b>	German Air-Delivered Ordnance
<b>Annex J</b>	UXO Press Articles – Recent Finds
<b>Annex K</b>	UXO Press Articles – Fatal Incidents at Construction Sites
<b>Annex L</b>	Anti-Aircraft Artillery
<b>Annex M</b>	Recent UXO Incidents - Home Guard Incendiary Grenades
<b>Annex N</b>	Land Service Ammunition
<b>Annex O</b>	Small Arms Ammunition
<b>Annex P</b>	Risk Map



# Explosive Ordnance Threat Assessment

In Respect of

## Southtown, Great Yarmouth

### 1 Introduction

#### 1.1 Background

WSP UK Limited has commissioned Dynasafe BACTEC Limited to conduct an Explosive Ordnance Threat Assessment for the Southtown, Great Yarmouth site.

Unexploded Ordnance (UXO) presents a significant threat to construction projects in parts of the UK as a result of enemy actions during the two 20<sup>th</sup> Century World Wars and historic British and Allied military activity.

It is estimated that over 20% of the UK landmass has been used for military training at some point and between 2006 and 2009, over 15,000 items of mainly British / Allied ordnance (excluding small arms ammunition) were found on UK construction sites.

In addition, one of the legacies of the two World Wars is buried unexploded air-dropped bombs or anti-aircraft projectiles resulting from the failure of a proportion of such weapons to function as designed. It is commonly accepted that the failure rate of these munitions was approximately 10% and, depending on their shape, weight, velocity and ground conditions many penetrated the ground and came to rest at depth.

Intensive efforts were made during and after the war to locate and render safe all UXO but, unsurprisingly, not all were found and dealt with. This is evidenced by the regular, on-going discoveries of UXO during construction-related intrusive ground works.

As a result of a generally increased risk awareness amongst professionals involved in ground engineering works and proactive health and safety measures, the threat to life and limb from UXO has been minimised. However even the simple discovery of a suspected device during on-going works can cause considerable disruption to production and cause unwanted delays and expense.

Such risks can be more fully addressed by a better understanding of the site-specific threat and the implementation of appropriate risk mitigation measures.

### 2 Construction Industry Duties and Responsibilities

#### 2.1 The UK Regulatory Environment

There is no specific legislation covering the management and control of the UXO risk in the UK construction industry but issues regarding health and safety are addressed under a number of regulatory instruments, as outlined below.

In practice, the regulations impose a responsibility on the construction industry to ensure that they discharge their obligations to protect those engaged in ground-intrusive operations (such as archaeology, site investigation, drilling, piling or excavations) from any reasonably foreseeable UXO risk.

## 2.2 The Health and Safety at Work Act, 1974

The Act places a duty of care on an employer to put in place safe systems of work to address, as far as is reasonably practicable, all risks (to employees and the general public) that are reasonably foreseeable.

## 2.3 Construction (Design and Management) Regulations 2015

CDM 2015 ensures that health and safety within the construction industry is continually improved:

- Works are sensibly planned and managed.
- Competent staff are engaged in the works.
- Risks are identified and managed.
- All parties cooperate and coordinate activities.
- Communication flows to those who require it.
- Workers are consulted and engaged about risks and how they are being managed.

In line with CDM 2015 legislation, Dynasafe BACTEC Limited are able to assist parties in their discharge of CDM duties as follows:

- Assist Principal Designers with pre-construction information and risk assessments
- Assist the Designer with the Designer's Risk Assessment.
- Issue UXO risks as have been identified, and manage risks accordingly.
- Assist the Principal Contractor with the construction phase information, in particular risk assessments and mitigation strategies.
- Plan, manage and monitor survey and clearance works under Dynasafe BACTEC Limited's control.

## 2.4 Other Legislation

Other relevant legislation includes the "Management of Health and Safety at Work Regulations 1999" and "The Corporate Manslaughter and Corporate Homicide Act 2007".

# 3 The Role of the Authorities and Commercial Contractors

## 3.1 The Authorities

The Police have the responsibilities for co-ordinating the emergency services in the case of an ordnance-related incident on a construction site. They will make an initial assessment (i.e. is there a risk that the find is ordnance or not?) and if they judge necessary impose a safety cordon and/or evacuation and call the military authorities (JSEODOC - Joint Services Explosive Ordnance Disposal Operations Centre) to arrange for investigation and/or disposal. In the absence of an EOD specialist on site many Police Officers will use the precautionary principle, impose cordon(s)/evacuation and await advice from the JSEODOC.

The priority given to the request by JSEODOC will depend on their judgement of the nature of the threat (ordnance, location, people and assets at risk) and the availability of resources. They will respond immediately or as resources are freed up. Depending on the on-site risk

assessment the item of ordnance may be removed or demolished (by controlled explosion) in situ. In the latter case additional cordons and/or evacuations may be necessary.

Note that the military authorities will only carry out further investigations or clearances in very high profile or high-risk situations. If there are regular ordnance finds on a site, the JSEODOC may not treat each occurrence as an emergency and will encourage the construction company to put in place alternative procedures (i.e. the appointment of a commercial contractor) to manage the situation and relieve pressure from the JSEOD disposal teams.

### 3.2 Commercial Contractors

In addition to pre-construction site surveys and follow-on clearance work, a commercial contractor is able to provide a reactive service on construction sites. The presence of a qualified EOD Engineer with ordnance recognition skills will avoid unnecessary call-outs to the authorities and the Contractor will be able to arrange for the removal and disposal of low risk ordnance. If high risk ordnance is discovered actions will be co-ordinated with the authorities with the objective of causing the minimum possible disruption to site operations whilst putting immediate, safe and appropriate measures in place.

## 4 This Report

### 4.1 Aims and Objectives

The aim of this report is to examine the possibility of encountering any explosive ordnance during any intrusive works at the Southtown, Great Yarmouth site. Risk mitigation measures will be recommended, if deemed necessary, to eliminate or reduce the threat from explosive ordnance during the envisaged works. The report follows the CIRIA Guidelines.

The following issues will be addressed in the report:

- The risk that the site was contaminated with unexploded ordnance.
- The risk that UXO remains on site.
- The risk that ordnance may be encountered during any intrusive works.
- The risk that ordnance may be initiated.
- The consequences of initiating or encountering ordnance.

Risk mitigation measures, appropriate to the assessed level of risk and site conditions, will be recommended if required.

### 4.2 Approach

In preparing this Explosive Ordnance Threat Assessment Report, Dynasafe BACTEC has considered general and, as far as possible, site specific factors including:

- Evidence of German bombing and delivery of UXBs.
- Site history, occupancy and conditions during WWII.
- The legacy of Allied military activity.
- Details of any known EOD clearance activity.
- The extent of any post war redevelopment.
- Scope of the current proposed works.

### 4.3 Sources of Information

Dynasafe BACTEC has carried out detailed historical research for this Explosive Ordnance Threat Assessment including accessing military records and archived material held in the public domain and in the MoD.

Material from the following sources has been consulted:

- The National Archives.
- Norfolk Record Office.
- Norfolk County Council.
- Landmark Maps.
- Peel Ports Great Yarmouth.
- Council for British Archaeology.
- Available material from 33 Engineer Regiment (EOD) Archive.
- Relevant information supplied by WSP UK Limited.
- Dynasafe BACTEC's extensive archives built up over many years of research and hands-on Explosive Ordnance Disposal activities in the UK.
- Open sources such as published books, local historical records and the internet.

### 4.4 General Considerations

This report is based upon research of historical evidence. Whilst every effort has been made to locate all relevant material Dynasafe BACTEC cannot be held responsible for any changes to the assessed level of risk or risk mitigation measures based on documentation or other information that may come to light at a later date.

The accuracy and comprehensiveness of wartime records is frequently difficult or impossible to verify. As a result, conclusions as to the exact location, quantity and nature of the ordnance threat can never be definitive but must be based on the accumulation and careful analysis of all accessible evidence. Dynasafe BACTEC cannot be held responsible for inaccuracies or gaps in the available historical information.

### 4.5 Bombing Records

During WWII, considerable efforts were expended in recording enemy air raids. Air Raid Precautions (ARP) wardens were responsible for making records of bomb strikes either through direct observation or by post-raid surveys. However, their immediate priority was to deal with casualties and limit damage, so it is to be expected that records are often incomplete and sometimes contradictory. Record keeping in the early days of bombing was not comprehensive and details of bombing in the early part of the war were sometimes destroyed in subsequent attacks. Some reports may cover a single attack, others a period of months or the entire war.

Records of raids that took place on sparsely or uninhabited areas were often based upon third party or hearsay information and are not always reliable; records of attacks on military or strategic targets were often maintained separately from the general records and have not always survived.

## 5 The Site

### 5.1 Site Location

The study area is located in Great Yarmouth, approximately 10m north of Southtown Common Recreation Ground. The site is bound to the north by residential properties fronting Waveney Road, to the east by the Petersons Distribution Centre, to the south by residential properties fronting Alpha Road and to the west by the A12 Dual Carriageway.

The site, centred on the approximate OS National Grid Reference: TG 52451 05820.

Site Location Maps are presented in **Annex A**.

### 5.2 Site Description

The study area is complex / varied, comprising industrial / commercial properties in the east and residential areas mixed with commercial units in the west, with the River Yare passing north to south through the site.

The study area encompasses a number of highways; the A1243, Cromwell Road, Cromwell Crescent, Southtown Road, Queen Anne's Road, William Adams Way, Suffolk Road, Beccles Road and the A12.

In the west, there is a variety of soft open ground including allotment gardens, residential gardens, areas of dense vegetation, mature woodland and the periphery of Southtown Common Recreation Ground.

A Recent Aerial Photograph of the site is presented in **Annex B**.

## 6 Scope of the Proposed Works

The proposed Site Investigation which shall include both onshore and offshore boreholes to a maximum depth of 50m bgl, CPT boreholes to a maximum depth of 30m bgl, trial pits to 3m bgl, observation trenches to 6m bgl and window samples to 6m bgl.

A Site Plan showing the proposed future development of the site is presented in **Annex C**.

## 7 Ground Conditions

Published British Geological Survey (BGS) scale mapping indicates that the western extent of the site is underlain by superficial Breydon Formation (Peat), whilst the River Yare and the eastern extent of the site is underlain with Tidal River or Creek Deposits (Clay and Silt). Whereas the entirety of the site is underlain by Crag Group bedrock.

Data supplied by the WSP UK Limited, for a borehole sunk on land in 2007, records the following shallow geology on site:

- 1m of Made Ground.
- 3m of Sand (Tidal and River Creek Deposits).
- >10m of Sand (dense brown fine medium and coarse Sand – North Denes Formation).

A (marine) log (dated 2007) for a borehole sunk on site records the following shallow geology:

- 1.39m of Sand (shelly Sand with occasional silt/clay).

- >8.21m of Sand (Sand with layers of gravel).

## 8 Site History

Latest available pre-WWII and earliest available post-WWII OS maps were obtained from Landmark Maps. These are presented in **Annex D** and described below:

### 8.1 Pre-WWII

The 1927 (1:2,500 scale) map shows the site split into two halves by the River Yare. The eastern half is occupied by multiple industrial buildings, areas of open ground, unlabelled roadways and part of *Fish Wharf*. A rail siding supplying the Wharf is present in three locations within the eastern half of the site.

The western half of the site is predominantly occupied by residential properties, open ground and *Allotment Gardens*. The western half of the site is crossed by *Southtown Road*, *Queen Anne's Road*, *Cromwell Road* and smaller unlabelled roadways. The southern section of the site occupied the peripheries of *Southtown Common Recreation Ground*.

Note, that a 1927 (1: 2,500 scale) map was reviewed (not annexed) which shows the westernmost section of the site to be occupied by open ground.

### 8.2 Post-WWII

The 1949 (1:2,500 scale) map shows the eastern half of the site to have undergone two small areas of clearance, whilst the south-easternmost section of the site encroaches upon an area of redevelopment. No further major changes have occurred on this part of the site.

The western half of the site has sustained five areas of clearance across the site, whilst a single *Ruin* is located to the centre of the site. Note, the westernmost section of the site remains open ground.

Within the immediate surrounding area, a number of examples of clearance, redevelopment and ruins are noted. Such observations are often indicative of serious bomb damage on early post-WWII OS maps.

## 9 The Threat from German Aerial Bombing and Artillery Shelling

### 9.1 Conflict History of Great Yarmouth

#### 9.1.1 First World War

##### 9.1.1.1 Air Raids

A WWI bomb census map, shows that the town was subject to aerial bombardment. Note however that the map does not allow an accurate assessment of the bomb strike locations in relation to the study area due to the small scale and lack of detail.

Great Yarmouth suffered the first aerial bombardment in the UK, inflicted by Zeppelin L3 on 19<sup>th</sup> January 1915. Humberside is thought to have been the intended target, however, due to navigational difficulties, Great Yarmouth was attacked.

The Zeppelin reportedly dropped 10 bombs across the town; one of which landed outside the First and Last Tavern in Southgate Road by Fish Wharf. No casualties were sustained, the damage was confined to broken windows and a hole in the road. A second bomb landed adjacent to a riverside restaurant at Fish Wharf causing extensive damage, inflicted one



casualty from shattering glass. Therefore, as Fish Wharf occupies the eastern extent of the site it is likely that these bombs landed on site. However, no UXBs were noted.

#### **9.1.1.2 Naval Bombardment**

On the 25<sup>th</sup> April 1916 Lowestoft was attacked by the German Navy. Four large German battle cruisers (SMS Lützow, Derfflinger, Moltke and Von der Tann) supported by U-Boats bombarded the town with 6", 11" and 12" projectiles from a distance of approximately 6.5km. The attack commenced at 04:10 and lasted for 10 minutes.

The secondary target for this raid was to be Great Yarmouth however, the Royal Navy were made aware of the Germans actions and the British fleet engaged the German ships. This, coupled with heavy fog meant that only a few shells were fired at Great Yarmouth before the German warships pulled back.

#### **9.1.1.3 Deductions**

Although this study recognises the threat posed by WWI bombs and shells, it cannot be quantified to the same degree as the WWII threat due to the lack of complete and accurate incident records.

WWI bombs were generally smaller than those used in WWII and were dropped from a lower altitude, resulting in limited UXB penetration depths. Aerial bombing was often such a novelty at the time that it attracted public interest and even spectators to watch the raids in progress.

As only a few shells landed in Great Yarmouth it is unlikely that any failed to explode. Therefore, the risk of a German WWI unexploded bomb or shell landing on site unobserved, and subsequently going unreported, is considered minimal and therefore the risk from German WWI UXO is considered low and will not be further addressed in this report.

### **9.1.2 Second World War**

The Luftwaffe reportedly carried out more bombing raids on Great Yarmouth than any other coastal town, due in part to the presence of an important port with a large fishing fleet and associated industries.

Moreover, due to the town's position on the east coast, where it was difficult to detect an incoming attack en route to the Midlands, it would have been vulnerable to 'tip and run' incidents, whereby an enemy aircraft under heavy AA fire or fighter interception would prematurely jettison its bomb load in order to evade the defences or indiscriminately deposit unused ordnance whilst returning to bases in northern Europe.

Consequently, the town was frequently attacked by German bombers. In a total of 237 properties were destroyed, 1,598 were severely damaged and subsequently demolished, 1,816 were seriously damaged but repairable and 19,818 were slightly damaged.

The available records of bombing incidents for Great Yarmouth are presented in the following sections.

## **9.2 Second World War Bombing Records**

### **9.2.1 Bombing Statistics**

The following table summarises the quantity of German bombs (excluding 1kg incendiaries and anti-personnel bombs) falling on the Municipal Borough of Great Yarmouth (within which the site was historically located) between 1940 and 1945: (source: National Archives)



<b>Record of German Ordnance Dropped on the Municipal Borough of Great Yarmouth</b>	
Area Acreage	3,598
High Explosive Bombs (all types)	910
Parachute Mines	9
Oil Bombs	1
Phosphorus Bombs	8
Fire Pot	10
V1 Flying Bomb	0
V2 Long Range Rocket	0
Total	938
<b>Items Per 1,000 Acres</b>	<b>260.7</b>

Evidence from a secondary source shows the statistics regarding the quantity of UXO dropped on Great Yarmouth<sup>1</sup>:

<b>Record of German UXO Dropped on the Municipal Borough of Great Yarmouth</b>	
High Explosive (all types)	221 (12)
Parachute Mines	7 (2)
Phosphorus Bombs	7 (1)
Fire Pot	10
Oil Bomb	1
V1 Flying Bomb	0
Unclassified HE Bombs	653 (60)

*N.B. Number denoted in brackets are Unexploded Bombs*

Detailed records of the quantity and locations of the 1kg incendiary and anti-personnel bombs were not routinely maintained by the authorities as they were frequently too numerous to record. However, an estimated 1,590 of these IBs were recorded in the Municipal Borough of Great Yarmouth.

Although the incendiaries are not particularly significant in the threat they pose, they nevertheless are items of ordnance that were designed to cause damage and inflict injury and should not be overlooked in assessing the general risk to personnel and equipment. The anti-personnel bombs were used in much smaller quantities and are rarely found today but are potentially more dangerous. This table does not include UXO found during or after WWII.

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<sup>1</sup> Bowyer, M. *Air Raid the Emergency air offensive against East Anglia 1939-1945* (1986)

### 9.2.2 Great Yarmouth Bomb Plot Map

This Great Yarmouth Bomb Plot Map (presented in **Annex E**) only records 28 raids between 11/10/1941 and 31/05/1944, taken from the National Archives. It records the closest HE bomb strike to be approximately 115m south-west of the site. Note, this map only depicts a small quantity of the ordnance dropped on the town as Luftwaffe activity was greater between the summers of 1940 and 1941.

### 9.2.3 Great Yarmouth Bomb Census Map

A bomb census map for the wider area included within a publication (*J. P. Foynes 1994*) was reviewed. A section of this small-scale map (presented in **Annex F**) depicts the locations of bombs and mines dropped on Great Yarmouth throughout the duration of WWII.

It records approximately 8 x HE bomb strikes on or within the site boundary and multiple 1kg IBs to have fallen on site.

However, this map has very few geographical indicators and is of poor quality, therefore should not be considered an accurate representation of the distribution of bomb strikes in and around Great Yarmouth. Note, however it is possible to apply some accuracy when plotting the site due to the gas works location immediately to the east of the site.

### 9.2.4 WWII-era RAF Aerial Photography

Historical RAF aerial photography of the site was supplied by Norfolk County Council. A post-WWII image is presented in **Annex F**.

This photography, was taken in 1946, and shows the site in its entirety, much as it appears in the OS Mapping. Although of small scale and low resolution it shows the western half of the site to be occupied by large areas of unused open ground, allotment gardens, hard-surfaced roadways and residential properties.

The eastern half of the site is occupied by a number of industrial buildings and hard-surfaced roadways, which appear to have survived the war intact. Note, that there are two smaller areas set back from the quayside which appear to be occupied by open soft ground which may have been used for the storage of materials during the war. An area of clearance is apparent within the western section of the site as is consistent to post-war OS Mapping, and is likely a result of bomb damage.

Note, no HE bomb craters are visible within the open soft ground, however, such features on worked ground (allotments) are likely to have been infilled during the war. Therefore, a UXB entry hole could have gone unnoticed on site.

### 9.2.5 Abandoned Bombs

A post-air raid survey of buildings, facilities and installations would have included a search for evidence of bomb entry holes. If evidence were encountered, Bomb Disposal Officer teams would normally have been requested to attempt to locate, render safe and dispose of the bomb. Occasionally evidence of UXBs was discovered but due to a relatively benign position, access problems or a shortage of resources the UXB could not be exposed and rendered safe. Such an incident may have been recorded and noted as an Abandoned Bomb.

Given the inaccuracy of WWII records and the fact that these bombs were 'abandoned', their locations cannot be considered definitive, nor the lists exhaustive. The MoD states that 'action to make the devices safe would be taken only if it was thought they were unstable'. It should be noted that other than the 'officially' abandoned bombs, there will inevitably be UXBs that

were never recorded. Dynasafe BACTEC holds no records of officially registered abandoned bombs at or near the site.

### 9.3 Likelihood of Post-raid UXO Detection

Utilising the available historical bombing records as reviewed in *Section 9.2*, it is possible to make an assessment of the likelihood that evidence of UXO would have been noted on a site during the war and the incident dealt with or recorded at the time. Factors such as bombing density, frequency of access, ground cover, damage and failure rate have been taken into consideration.

#### 9.3.1 Density of WWII Bombing

Bombing density is an important consideration for assessing the possibility that UXO remains in an area. A very high density can for example result in increased levels of damage sustained to structures, greater likelihood of errors in record keeping and a higher risk that UXBs fell over the area.

The site was located within an area of very high bombing density during WWII, with up to 8 x HE bombs likely to have landed on or adjacent to the site boundary. At least 12 further HE bombs are recorded within a 300m radius of the site. In addition, the site is likely to have been affected by 1kg incendiary bombing.

#### 9.3.2 Damage

If structures on a site have been subject to significant bomb or fire damage, rubble and debris are likely to have been present; similarly, a HE bomb strike on open ground is likely to have resulted in a degree of soil disturbance. Under such conditions there is a greater risk of the entry holes of UXBs dropped during subsequent raids being obscured and going unnoticed.

A review of the historical resources suggests that many of the buildings on site survived the war largely intact. Note however, the available aerial photograph does not allow for an accurate assessment of bomb damage to all buildings.

Note, there are multiple areas of clearance apparent within the western section of the site, and a single ruin, suggesting that these areas sustained serious bomb damage. As a result, the affected buildings will have been abandoned for a time, increasing the likelihood of subsequent UXO falling on site unnoticed. Therefore, it can be assumed that, for a time, significant quantities of rubble occupied this area and debris may have been strewn across the site.

#### 9.3.3 Frequency of Access

UXO at sites where human access was infrequent would have a higher chance of being overlooked than at those sites which were subject to greater occupancy. The importance of a site or facility to the war effort is also an important consideration as such sites are likely to have been both frequently accessed and are also likely to have been subject to post-raid checks for evidence of UXO.

The eastern extent of the site was occupied by Fish Wharf, comprising quayside areas and associated buildings / structures during the war. Note, however there is an area of open ground that may have possibly been occupied by dense vegetation/bare earth or used for open air storage during the war. Therefore, decreasing the likelihood of regular / frequent access.

These busy commercial / industrial areas would have been accessed on a daily basis thereby decreasing the risk of any UXB strike evidence going unnoticed. In addition, these areas may have been subject to post-raid checks for UXB entry holes.

The western half of the site was occupied by large areas of ambiguous open ground and allotment gardens. These areas are unlikely to have been accessed as regularly or frequently as the developed portion of the site. Access to the allotments would have varied depending on the season and therefore a UXB could conceivably have fallen here unobserved. This is especially pertinent since many of the German air raids over Great Yarmouth took place at night. Furthermore, the undeveloped parts of the site would not have been subject to specific post-raid searches for UXO.

#### 9.3.4 Ground Cover

The degree and type of groundcover present during WWII would have a significant effect on the visual evidence at ground level which may have indicated the presence of buried UXO.

Evidence of German UXO will have been obvious within the developed, undamaged parts of the study area, as a UXB strike to buildings and hard-standing will still have caused significant damage or an obvious, persistent entry hole, even without detonating. Following any such incident, the UXB would have been reported and subsequently exhumed / removed.

However, had a UXB landed within the allotments, open ground soft, rubble, or area of open air storage on site it could have gone undetected. Note, that the entry hole of an SC50 (the most commonly deployed German HE bomb) could be as little as 20cm in diameter and therefore, easily obscured in dense vegetation.

A UXB entry hole within the river bank mud on site (revealed at low tide) is unlikely to have persisted; the next high tide filling in the hole with water and sediment. Even if evidence of a UXB was observed, it is unlikely to have been reported due to its insignificant position.

A UXB striking the water on site will have been immediately obscured from view and therefore, is unlikely to have been observed, reported and mapped.

Also noteworthy is that during WWII German 1kg incendiary bombs were observed to penetrate to a significant depth when dropped into soft ground. The photograph presented in **Annex H** shows how such a sub-munition (known to have been deployed locally), could have remained undetected in the post-war period.

#### 9.3.5 Bomb Failure Rate

There is no evidence to suggest that the bomb failure rate in the vicinity of the site would have been different from the “approximately 10%” figure normally used.

### 9.4 Generic Types of WWII German Air-delivered Ordnance

The nature and characteristics of the ordnance used by the Luftwaffe allows an informed assessment of the hazards posed by any unexploded items that may remain today. Detailed illustrations of German air delivered ordnance are presented at **Annex I**.

- **HE Bombs:** In terms of weight of ordnance dropped, HE bombs were the most frequent weapon deployed. Most bombs were 50kg, 250kg or 500kg (overall weight, about half of which was the high explosive) though large bombs of up to 2,000kg were also used. HE bombs had the weight, velocity and shape to easily penetrate the ground intact if they failed to explode. Post-raid surveys would not always have spotted the entry hole or other indications that a bomb penetrated the ground and failed to explode and contemporary ARP documents describe the danger of assuming that damage, actually caused by a large UXB, was due to an exploded 50kg bomb. Unexploded HE bombs therefore present the greatest risk to present-day intrusive works.

- Blast Bombs/Parachute Mines: Blast bombs generally had a slow rate of descent and were extremely unlikely to have penetrated the ground. Non-retarded mines would have shattered on most ground types, if they had failed to explode. There have been extreme cases when these items have been found unexploded, but this was where the ground was either very soft or where standing water had reduced the impact. BACTEC does not consider there to be a significant threat from this type of munition on land.
- Large incendiary bombs: This type of bomb ranged in size from 36kg to 255kg and had a number of inflammable fill materials (including oil and white phosphorus), and a small explosive charge. They were designed to explode and burn close to the surface but their shape and weight meant that they did have penetration capability. If they penetrated the ground complete combustion did not always occur and in such cases, they remain a risk to intrusive works.
- 1kg Incendiary Bombs (IB): These bombs, which were jettisoned from air-dropped containers, were unlikely to penetrate the ground and in urban areas would usually have been located in post-raid surveys. However, if bombs did not initiate and fell in water or dense vegetation, or became mixed with rubble in bomb damaged areas they could have been overlooked. Some variants had explosive heads and these present a risk of detonation during intrusive works.
- Anti-personnel (AP) Bomblets: AP bombs had little ground penetration ability and should have been located by the post-raid survey unless they fell into water, dense vegetation or bomb rubble.
- Specialist Bombs (smoke, flare, etc): These types do not contain high explosive and therefore a detonation consequence is unlikely. They were not designed to penetrate the ground.

## 9.5 German Air-delivered Ordnance Failure Rate

Based on empirical evidence, it is generally accepted that 10% of the German HE bombs dropped during WWII failed to explode as designed. This estimate is probably based on the statistics of wartime recovered UXBs and therefore will not have taken account of the unknown numbers of UXBs that were not recorded at the time, and is probably an underestimate.

The reasons for failures include:

- Fuze or gain malfunction due to manufacturing fault, sabotage (by forced labour) or faulty installation.
- Clockwork mechanism failure in delayed action bombs.
- Failure of the bomber aircraft to arm the bombs (charge the electrical condensers which supplied the energy to initiate the detonation sequence) due to human error or equipment defect.
- Jettison of the bomb before it was armed or from a very low altitude. Most likely if the bomber was under attack or crashing.

War Office Statistics document that a daily average of 84 bombs which failed to function were dropped on civilian targets in Great Britain between 21<sup>st</sup> September 1940 and 5<sup>th</sup> July 1941. 1 in 12 of these (probably mostly fitted with time delay fuzes) exploded sometime after they fell - the remainder were unintentional failures.

There is no evidence to suggest that the bomb failure rate in the vicinity of the study area would have been different from the “approximately 10%” figure normally used.

From 1940 to 1945 bomb disposal teams dealt with a total of 50,000 explosive items of 50kg and over (i.e. German bombs), 7,000 AAA shells and 300,000 beach mines. These operations resulted in the deaths of 394 officers and men.

Media articles relating to recent German UXB finds on land and underwater are presented in **Annex J**.

## 9.6 Initiation of Unexploded Bombs

Unexploded bombs do not spontaneously explode. All high explosive requires significant energy to create the conditions for detonation to occur. In the case of unexploded German bombs discovered within the construction site environment, there are a number of potential initiation mechanisms:

- Direct impact onto the main body of the bomb: Unless the fuze or fuze pocket is struck, there needs to be a significant impact (e.g. from piling or large and violent mechanical excavation) to initiate a buried iron bomb. Such violent action can cause the bomb to detonate.
- Re-starting the clock timer in the fuze: Only a small proportion of German WWII bombs employed clockwork fuzes. It is probable that significant corrosion has taken place within the fuze mechanism over the last 60 years that would prevent clockwork mechanisms from functioning, nevertheless it was reported that the fuze in a UXB dealt with by 33 EOD Regiment in Surrey in 2002 did re-commence.
- Induction of a static charge, causing a current in an electric fuze: The majority of German WWII bombs employed electric fuzes. It is probable that significant corrosion has taken place within the fuze mechanism over the last 60 years such that the fuze circuit could not be activated.
- Friction impact initiating the (shock-sensitive) fuze explosive: This is the most likely scenario resulting in the bomb detonating.

**Annex K** details UXB incidents where intrusive works have caused UXBs to detonate, resulting in death or injury and damage to plant.

## 10 Unexploded Bomb Penetration

### 10.1 General Considerations

The actual penetration depth of aerial delivered bombs into the ground will have been determined by the mass and shape of the bomb, the velocity and angle of the bomb on impact (dependent on the height of release) and the nature of the ground and ground cover; the softer the ground, the greater the potential penetration. Peat, alluvium and soft clays are easier to penetrate than gravel and sand. Bombs are brought to rest or are commonly deflected by bedrock or large boulders.

### 10.2 The “j” Curve Effect

An air-dropped bomb falling from normal bombing altitude (say 5,000m) into homogeneous ground will continue its line of flight but turn in an upwards curve towards the surface as it comes to rest. This offset from vertical is generally thought to be about one third of the penetration depth, but can be up to 15m depending on ground conditions or the bomb’s angle of impact.



### 10.3 Second World War UXB Land Penetration Studies

During WWII, the Ministry of Home Security undertook a major study on actual bomb penetration depths, carrying out statistical analysis on the measured depths of 1,328 bombs as reported by Bomb Disposal, mostly in the London area. They then came to conclusions as to the likely average and maximum depths of penetration of different sized bombs in different geological strata.

The median penetration of 430 x 50kg German bombs in London Clay was 4.6m and the maximum penetration observed for the SC50 bomb was 9m.

They concluded that the largest common German bomb, 500kg, had a likely penetration depth of 6m in sand or gravel but 8.7m in clay. The maximum observed depth for a 500kg bomb was 10.2m and for a 1,000kg bomb 12.7m. Theoretical calculations suggested that significantly greater penetration depths were probable.

### 10.4 Maximum Bomb Penetration Depth - Land

To assess the maximum bomb penetration depth at the eastern and western (land) extents of the site, the following parameters have been used:

- WWII Geology - 1m of Made Ground, >13m of Sand.
- Impact Angle and Velocity - 80-90° from horizontal and 267 metres per second.
- Bomb Mass and Configuration - The 500kg SC (General Purpose) HE bomb, without retarder units or armour piercing nose. This was the largest of the common bombs used against Britain.

Taking into account the above-mentioned factors it has been assessed that a 500kg bomb would have had an approximate maximum bomb penetration depth of **8-10m** below WWII land level. Penetration depth could potentially have been greater if the UXB was larger (though only 4% of German bombs used in WWII over Britain were of that size). Note that UXBs may be found at any depth between just below the WWII ground level and the maximum penetration depth.

### 10.5 UXB Penetration through Water

UXB penetration of riverbed (through water) provides a more challenging scenario to model. The key considerations are:

- Bombs hit the water at the terminal velocity of air: 267 metres per second.
- Ignoring surface tension there will be an immediate loss of inertia due to rapid energy losses; sound, wave, splash, bubble formation and cavitation.
- The drag force rapidly decelerates the bomb. If there is sufficient water depth then acceleration will become 0m/s<sup>2</sup> and terminal velocity through water will be achieved: 11m/s.
- Once the terminal velocity in water is reached the bomb impacts the riverbed as a free-fall penetrator, not necessarily in a nose down orientation.

Analysis of the air-water-soil regime is complex. The current model assumes that 5m of water is required in order to achieve the terminal velocity in water of a 500kg UXB. Impacts at this speed will cause a penetration of 2.3m assuming a riverbed bearing capacity of 75kPa (*Department of The US Army, TM 5-855-1*). However, the bearing capacity of the riverbed sediment within the site boundary is not known.



In order to assess the bomb penetration depth within the river environment, the extreme water depth scenario must be considered; that is, the deepest point of the river at low tide. A current Admiralty Chart for the site was reviewed. This confirms the deepest Chart Datum water depth within the site boundary to be 4.3m.

As the depth is <5m, it can be assumed that a 500kg German UXB landing at any location within the river, at any time of day will strike the river bed with a force sufficient to impact the river bed in a vertical / nose down orientation. As opposed to the “tumbling” nature of items falling through the water column once the terminal velocity has been achieved.

However, the nature of the river sediment within the site boundary is not known both in terms of its precise composition and thickness. This, coupled with the lack of an accurate mathematical model for bomb behaviour through the water column, makes calculation of a maximum penetration depth value within the river environment impossible.

However, the significant decelerating effect caused by the water column on site indicates that even a large German UXB would not be able to penetrate a substantial distance into the Crag Group bedrock underlying the overburden sediment.

## **11 The Threat from British / Allied Military Ordnance**

### **11.1 General**

The following historical and modern facilities / activities / incidents have been considered:

- Army, Navy and RAF Bases / Installations
- Military Training Areas / Weapons Ranges
- Ordnance / Explosives Factories and Storage Depots
- Sites requisitioned for military use
- Military Fortifications and Coastal Defences
- Locations of Army Explosive Ordnance Clearance Tasks
- WWII Anti-Aircraft Batteries
- WWII Pipe Mined Locations and Beach Minefields

The most likely source of British / Allied ordnance is anti-aircraft fire/Home Guard activity, as discussed below.

### **11.2 Potential Sources of Explosive Ordnance**

#### **11.2.1 Anti-Aircraft Artillery**

At the start of the war two types of AAA guns were deployed: Heavy Anti-Aircraft Artillery (HAA), using large calibre weapons such as the 3.7” QF (Quick Firing) gun and Light Anti-Aircraft Artillery (LAA) using smaller calibre weapons such as 40mm Bofors gun.

During the early war period, there was a severe shortage of AAA available and older WWI 3” and modified naval 4.5” guns were deployed alongside those available 3.7” weapons. The maximum ceiling height of fire at that time was around 11,000m (for the 3.7” gun and less for other weapons). As the war progressed improved variants of the 3.7” gun was introduced and, from 1942, large 5.25-inch weapons began to be brought into service. These had significantly improved ceiling heights of fire reaching over 18,000m.

The LAA batteries were intended to engage fast low flying aircraft and were typically deployed around airfields or strategic installations. These batteries were mobile and could be moved to new positions with relative ease when required. The most numerous of these was the 40mm Bofors gun which could fire up to 120 x 40mm HE shells per minute to over 1,800m.

The HAA projectiles were high explosive shells, usually fitted with a time delay or barometric pressure fuze to make them explode at a pre-determined height. Before the war all the clockwork fuses used by the Royal Artillery had come from Switzerland. When that source of supply was cut off, Britain had been forced to make its own. After four years of war, the country still lacked the engineering skills to produce a reliable fuse.

This resulted in a considerable number of AA projectiles either exploding prematurely, killing the gunners or failing to explode at all; falling to the ground as UXBs. In January 1944 more people in London were killed by HAA shells than by German bombs. Details of the most commonly deployed WWII AAA projectiles are shown below:

Gun type	Calibre	Shell Dimensions	Shell Weight	HE Fill Weight
3.7 Inch	94mm	94mm x 438mm	12.7kg	1.1kg
4.5 Inch	114mm	114mm x 578mm	24.7kg	1.7kg
40mm	40mm	40mm x 311mm	0.84kg	70g

Although the larger unexploded projectiles could enter the ground they did not have great penetration ability and are therefore likely to be found close to WWII ground level. These shells are frequently mistakenly identified as small German air-delivered bombs, but are differentiated by the copper driving band found in front of the base. With a high explosive fill and fragmentation hazard these items of UXO present a significant risk if encountered. The smaller 40mm projectiles are similar in appearance and effect to small arms ammunition and, although still dangerous, present a lower risk.

Four static HAA batteries were operational within 5km of the site during WWII. With four guns per battery, firing up to ten rounds a minute, HAA batteries could expend numerous shells during even short air raids and therefore as the town was frequently attacked by the Luftwaffe, the risk of unexploded HAA shell contamination within study area is elevated.

Numerous unexploded AA shells were recovered during and following WWII, and are still occasionally encountered on sites today. Illustrations of Anti-Aircraft projectiles and rockets are presented in **Annex L**. Any unexploded AA shell landing in the river would have remained there for a time could have become subsequently buried in sediment.

## 11.2.2 Home Guard Activity

The Home Guard (HG) was a defence organisation of the British Army, operational between 1940 and 1944. It comprised 1.5 million local volunteers, otherwise ineligible for military service, and acted as a secondary defence force, in case of enemy invasion which was expected during 1940 and 1941. The HG guarded the coastal areas of Britain and other important facilities such as RAF airfields, weapons factories, explosives stores, radar sites, etc.

Due to its coastal location in south-eastern England, Great Yarmouth was considered vulnerable to German invasion and consequently was well defended by Army and HG units, with River Yare and beaches fortified with static defences, minefields and gun positions.

A group of WWII anti-invasion defences, including four pillboxes, a road block and a Spigot Mortar emplacement were present within the northern section of the site on the junction of

Queen Anne's Road and Southtown Road. The central element of the site was a substantial road block, designed to check the progress of tanks rather than act as a check point.

To the south, the road block was flanked by two pillboxes, a Type 22 on the easternmost extent of site boundary, and a Type 24 or variant pillbox on the north side of Queen Anne's Road. The defences were removed and the road resurfaced in August 1945.

Located at the westernmost end of Cromwell Road a Spigot Mortar position and associated Type 24 Pillbox were located. It can be assumed that the installation was sited to guard trackways and bridges across the drains that lay to the north of Queen Anne's Road.

Today, items of WWII ordnance related to the HG are occasionally encountered by members of the public and the construction industry. Experience has shown that the 'housekeeping' of WWII soldiers was often poor with items of faulty, surplus or expended ammunition often burnt, buried, misplaced or otherwise discarded on civilian land (see *Section 12.2*).

Furthermore, HG personnel are known to have purposefully buried caches of ammunition and weapons in tactical positions, to be exhumed and used in case of invasion. This is substantiated by several recent HG UXO finds (see *Annex M*).

Details of the most commonly encountered WWII-era British ammunition (Land Service Ammunition and Small Arms Ammunition) are presented in *Annex N* and *Annex O* respectively.

## 12 Ordnance Clearance and Post-WWII Ground Works

### 12.1 General

The extent to which any ordnance clearance activities have taken place on site or extensive ground works have occurred is relevant since on the one hand they may indicate previous ordnance contamination but also may have reduced the risk that ordnance remains undiscovered.

### 12.2 EOD Bomb Disposal and Clearance Tasks

Dynasafe BACTEC holds a number of official records of explosive ordnance disposal operations during and following WWII, obtained from the Explosive Ordnance Disposal (EOD) Archive Information Office at 33 Engineer Regiment (EOD), British Army. However, no records could be found to indicate that any Army EOD tasks have taken place on site.

No evidence of Royal Navy EOD divers carrying out any UXO disposal tasks in the River Yare (in close proximity to the site) was found.

Note, however that two gardeners discovered a live grenade at Dicken Court (approximately 330m north-east of the site) during garden maintenance operations. This would have likely been buried by the HG as part of a cache that of weapons in case of invasion, and often occurred within vulnerable coastal areas.

### 12.3 Post War Redevelopment

The eastern half of the site has undergone two phases of post war redevelopment, the first in the 1970's and the second during the 1980's when the site took its current form. Whilst the western half of the site appears to have remained largely untouched since the war, apart from the A12 roundabout and A147 installation during the 1980's and larger commercial properties to the north and east of the site.

Note, that minor dredging works are reported to have occurred on the River Yare in the post-war period. However, the extents of which are unknown at the time of writing this report.

## 13 The Overall Explosive Ordnance Threat Assessment

### 13.1 General Considerations

Taking into account the quality of the historical evidence, the assessment of the overall threat to any intrusive works from UXO must evaluate the following risks:

- That the site was contaminated with unexploded ordnance
- That UXO remains on site
- That such items could be encountered during any intrusive works
- That ordnance may be activated by the works operations
- The consequences of encountering or initiating ordnance

### 13.2 The Risk that the Site was Contaminated with Unexploded Ordnance

For the reasons discussed in *Sections 9 and 11* Dynasafe BACTEC believes that there is a risk that UXO contaminated the study area. This is based on the following:

#### **German UXO:**

- The site was located within central Great Yarmouth within an area of very high bombing density during WWII, with up to 8 x HE bombs likely to have landed on or adjacent to the site boundary. At least 12 further HE bombs are recorded within a 300m radius of the site. In addition, the site is likely to have been affected by 1kg incendiary bombing.
- The eastern extent of the site, comprising busy commercial / industrial areas would have been accessed on a daily basis thereby decreasing the risk of any UXB strike evidence going unnoticed. In addition, these areas may have been subject to post-raid checks for UXB entry holes.
- The western half of the site was occupied by large areas of ambiguous open ground and allotment gardens which are unlikely to have been accessed as regularly or frequently. Access to the allotments would have varied depending on the season and therefore, a UXB could conceivably have fallen here unobserved.
- Moreover, there are multiple areas of clearance and a ruin apparent on site, suggesting that these areas sustained serious bomb damage. As a result, the affected buildings will have been abandoned for a time, increasing the likelihood of subsequent UXO falling on site unnoticed. Therefore, it can be assumed that, for a time, significant quantities of rubble occupied this area and debris may have been strewn across the site, increasing the likelihood of a UXB remaining on site. However, had a UXB landed within the allotments, open ground soft, rubble, or area of open air storage on site it could have gone undetected. Note, that the entry hole of an SC50 (the most commonly deployed German HE bomb) could be as little as 20cm in diameter and therefore, easily obscured in dense vegetation.
- A UXB landing in the river during a night time raid will have been immediately obscured from view, beneath the waterline. Consequently, it is unlikely to have been observed, reported and mapped.
- A UXB entry hole within the river bank mud on site (revealed at low tide) is unlikely to have persisted; the next high tide filling in the hole with water and sediment. Even if evidence of

a UXB was observed here and reported, it is highly unlikely to have been recovered by the local bomb disposal unit due to its insignificant location and the impracticalities of deep buried UXB removal in this environment.

**British/Allied UXO:**

- Due to its coastal location in south-eastern England, Great Yarmouth was considered vulnerable to German invasion and consequently, was well defended by Army and HG units, with River Yare and beaches fortified with static defences, minefields and gun positions.
- A group of WWII anti-invasion defences, including four pillboxes, a road block and a Spigot Mortar emplacement were present within the northern section of the site on the junction of Queen Anne's Road and Southtown Road. The central element of the site was a substantial road block, designed to check the progress of tanks rather than act as a check point. Further defences were located within the site boundary, located at the westernmost end of Cromwell Road a Spigot Mortar position and associated Type 24 Pillbox were located.
- Although these defence installations were located on site, it is considered highly likely that the risk of shallow buried UXO has been mitigated on site due to post war development.
- Note, that four HAA batteries were situated within a 5km radius of the site during WWII. For the same reasons as given above, it is quite possible that an unexploded AA shell or rocket could have landed in the river on site and remained there.

### 13.3 The Risk that Unexploded Ordnance Remains on Site

**Land** - Within the footprint of post-war ground works, the risk of small, shallow buried UXO (LSA, SAA, AA shells and German 1kg incendiaries) remaining will have been partly mitigated since any such items could have been encountered and removed during soil stripping / levelling, foundations etc.

Only within the volume of any post-war basement level bulk excavations and at the precise locations of any post-war pile foundations / boreholes, will the risk from deeper buried German HE UXBs have been completely mitigated. Therefore, it is conceivable that such a weapon could reside within virgin / untouched geology, beneath and amongst any such post-WWII ground works, down to the maximum bomb penetration depth.

The risk from UXO contamination within the eastern extent of the site and pre-war buildings has been assessed as minimal and therefore the risk from UXO remaining is minimal.

**River** - It has been assessed that a HE UXB falling in the river will likely have achieved full burial within the overburden sediment and may also have penetrated the Crag Group bedrock. Consequently, such a UXB will have remained in situ up to the present day, largely unaffected by environmental conditions. Also, any large partially buried UXBs on site are less likely to be affected by environmental conditions as a result of their significant mass.

Tidal riverbed environments are mobile in nature and therefore as a result of water currents, any small items of UXO (British AA shells and German 1kg IBs) residing on or near the riverbed surface could experience migration. This is evidenced by the large quantity of munitions that are washed up on beaches around the UK, every year. The wider River Yare environment will have been subject to the same UXO contamination conditions as the site during WWII and therefore although riverbed UXO could have migrated out of the site since WWII, equally, additional UXO could have migrated into the site.



### 13.4 The Risk that Ordnance may be Encountered during the Works

**Land** - The most likely scenarios under which a UXO could be encountered during construction works is during piling, drilling operations or bulk excavations for basement levels. The overall risk will depend on the extent of the works, such as the numbers of boreholes/piles (if required) and the volume of the excavations.

Since an air-dropped bomb may come to rest at any depth between just below ground level and its approximate penetration depth there is also a chance that such an item could be encountered during shallow excavations (for services or site investigations) into the original WWII ground level.

If the proposed works are due to be undertaken within post war fill material / made ground, the risk of encountering WWII UXBs is low. However, if works are to be undertaken below WWII ground level this risk is significantly higher.

The risk of UXO remaining within the eastern extent of the site and pre-war buildings has been assessed as minimal, therefore the risk from UXO being encountered during the proposed works is minimal.

**River** – Minor dredging works on the River Yare have been identified to have taken place, however it is not known to what extent these would have occurred within the site boundary. Therefore, these activities could have partly mitigated the risk from UXO within the river environment, however it is conceivable that UXO could have subsequently been washed into the site boundary. Therefore, the risk of encountering UXO during the proposed works remains partially unmitigated. The proposed investigatory works will be to a depth beyond the maximum bomb penetration depth, therefore if UXO is situated at the location of the borehole, it will be encountered.

### 13.5 The Risk that Ordnance may be Initiated

The risk that UXO could be initiated if encountered will depend on its condition, how it is found and the energy with which it is struck. The most violent activity on most construction sites is percussive piling. As a result, items that are shallow buried present a slightly lower risk than those that are deep buried, since the force of impact is usually lower and they are more likely to be observed – when immediate mitigating actions can be taken.

### 13.6 The Consequences of Encountering or Initiating Ordnance

Clearly the consequences of an inadvertent detonation of UXO during construction operations would be catastrophic with a serious risk to life, damage to plant and a total site shutdown during follow-up investigations.

Since the risk of initiating ordnance is significantly reduced if appropriate mitigation measures are undertaken, the most important consequence of the discovery of ordnance will be economic. This would be particularly so in the case of high profile locations and could involve the evacuation of the public.

The unexpected discovery of ordnance may require the closing of the site for any time between a few hours and a week with a potentially significant cost in lost time. Note also that the suspected find of ordnance, if handled solely through the authorities, may also involve loss of production since the first action of the Police in most cases will be to isolate the locale whilst awaiting military assistance, even if this turns out to have been unnecessary.

### 13.7 Dynasafe BACTEC's Assessment

Taking into consideration the findings of this study, Dynasafe BACTEC considers the risk on the site to be heterogeneous and can therefore be divided into **Low**, **Medium** and **High** Risk Zones. These are described below and illustrated on a Risk Map, presented in **Annex P**.

#### Low Risk Zone:

- Buildings and hard standing that survived the war intact.

Type of Ordnance	Level of Risk			
	Negligible	Low	Medium	High
German WWII High Explosive Bombs		✓		
German WWII 1kg Incendiary Bombs		✓		
British Anti-Aircraft Shells		✓		
British Small Arms and Land Service Ammunition		✓		

#### Medium Risk Zone:

- Open soft ground that would not have been accessed regularly nor frequently.
- Areas of substantial bomb damage.
- Buffer Area to incorporate the "J-Curve" Buffer Zone.

Type of Ordnance	Level of Risk			
	Negligible	Low	Medium	High
German WWII High Explosive Bombs			✓	
German WWII 1kg Incendiary Bombs			✓	
British Anti-Aircraft Shells			✓	
British Small Arms and Land Service Ammunition			✓	

#### High Risk Zone:

- Occupied by the River Yare.

Type of Ordnance	Level of Risk			
	Negligible	Low	Medium	High
German WWII High Explosive Bombs				✓
German WWII 1kg Incendiary Bombs			✓	
British Anti-Aircraft Shells			✓	
British Small Arms and Land Service Ammunition		✓		



## 14 Proposed Risk Mitigation Strategy

### 14.1 General

Dynasafe BACTEC believes the following risk mitigation measures should be deployed to support the proposed works at the Southtown, Great Yarmouth site.

### 14.2 Scope Specific Risk Mitigation Measures

*All Risk Zones:*

- **Site Specific Explosive Ordnance Safety and Awareness Briefings to all personnel conducting intrusive works:** A specialised briefing is always advisable when there is a possibility of explosive ordnance contamination. It is an essential component of the Health & Safety Plan for the site and conforms to requirements of CDM Regulations 2015. All personnel working on the site should be instructed on the identification of UXB, actions to be taken to alert site management and to keep people and equipment away from the hazard. Posters and information of a general nature on the UXB threat should be held in the site office for reference and as a reminder.
- **The Provision of Unexploded Ordnance Site Safety Instructions:** These written instructions contain information detailing actions to be taken in the event that unexploded ordnance is discovered. They are to be retained on site and will both assist in making a preliminary assessment of a suspect object and provide guidance on the immediate steps to be taken in the event that ordnance is believed to have been found.

*Medium Risk Zones:*

- **Explosive Ordnance Disposal (EOD) Engineer presence on site to support shallow intrusive works:** When on site the role of the EOD Engineer would include; monitoring works using visual recognition and instrumentation and immediate response to reports of suspicious objects or suspected items of ordnance that have been recovered by the ground workers on site; providing Explosive Ordnance Safety and Awareness briefings to any staff that have not received them earlier and advise staff of the need to modify working practices to take account of the ordnance threat, and finally to aid Incident Management which would involve liaison with the local authorities and Police should ordnance be identified and present an explosive hazard.
- **Handheld Intrusive Magnetometer Survey of all borehole locations down to the maximum bomb penetration depth:** As part of the EOD Engineer presence on site, Dynasafe BACTEC can deploy intrusive magnetometry techniques to provide staged clearance ahead of all the borehole locations.

*High Risk Zone:*

- **Non-Intrusive Magnetometer and Side Scan UXO Survey:** A Magnetometer and high-resolution Side Scan Survey should be conducted over the proposed works area to identify any ferrous anomalies (potential UXO) on or near to the riverbed surface. This will provide clear areas for the placement of barge legs or anchors. It also allows for the identification of non-ferrous near surface obstructions which may hamper the proposed works.
- **Intrusive Magnetometer Survey - Down-hole Vallon Probing ahead of Marine Boreholes:** A down-hole Vallon magnetometer is lowered to the estuary bed first to scan a radius for ferrous anomalies. Provided the river bed is clear, boreholing is conducted to 1m. Nonferrous sleeving must be used with the Vallon lowered down the sleeve to clear the next metre ahead of the borehole. This sequence is repeated until bomb penetration depth is reached, then boreholing can continue unrestricted. Sleeving would be expected to extend from the JU Barge deck to river bed to ensure drill bit relocates the borehole each time it is withdrawn.

**14.3 Further Recommended Measures should the Scope of Works Change:**

- **Intrusive Magnetometer Survey of all pile / boreholes locations down to the maximum bomb penetration depth:** Dynasafe BACTEC can deploy a range of intrusive magnetometry techniques to clear ahead of all the pile locations. The appropriate technique is governed by a number of factors, but most importantly the site's ground conditions. The appropriate survey methodology would be confirmed once the enabling works have been completed. A site meeting would be required between BACTEC and the client to determine the methodology suitable for this site. Target investigation or avoidance will be recommended as appropriate.
- **Pre-Piling Intrusive Magnetometer Survey: TFG Clearance ahead of Piling:** A TFG magnetometer survey probe will scan 1m at a time for ferrous anomalies ahead of a rotary drill. This process is repeated down to the max bomb penetration depth. If a ferrous mass is located the TFG survey would have to relocate however, this would clear the way prior to the borehole survey. Having cleared the location, piling can then be conducted on that position unrestricted.
- **Intrusive Magnetometer Survey: Down-hole Vallon Probing ahead of Piling:** A down-hole Vallon magnetometer is lowered to the estuary bed first to scan a radius for ferrous anomalies. Provided the river bed is clear, piling is conducted to 1m. Nonferrous sleeving must be used with the Vallon lowered down the sleeve to clear the next metre ahead of the borehole. This sequence is repeated until bomb penetration depth is reached, then piling can continue unrestricted.

Dynasafe BACTEC Limited

19<sup>th</sup> September 2017

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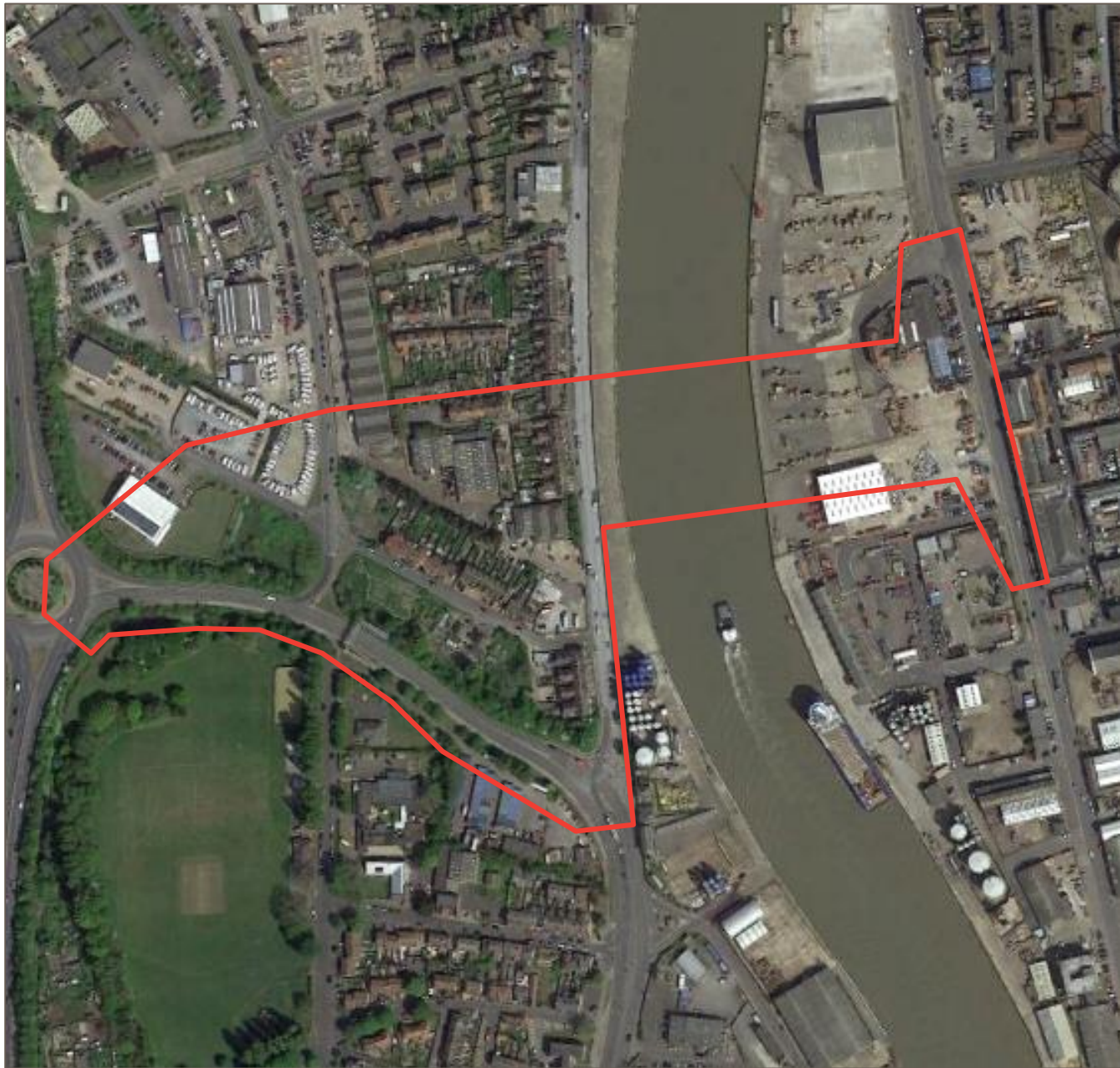
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Ramsey, W., *The Blitz Then and Now, Volume 3, Battle of Britain Prints International Limited*. 1990.

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— Approximate site boundary

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7307TA

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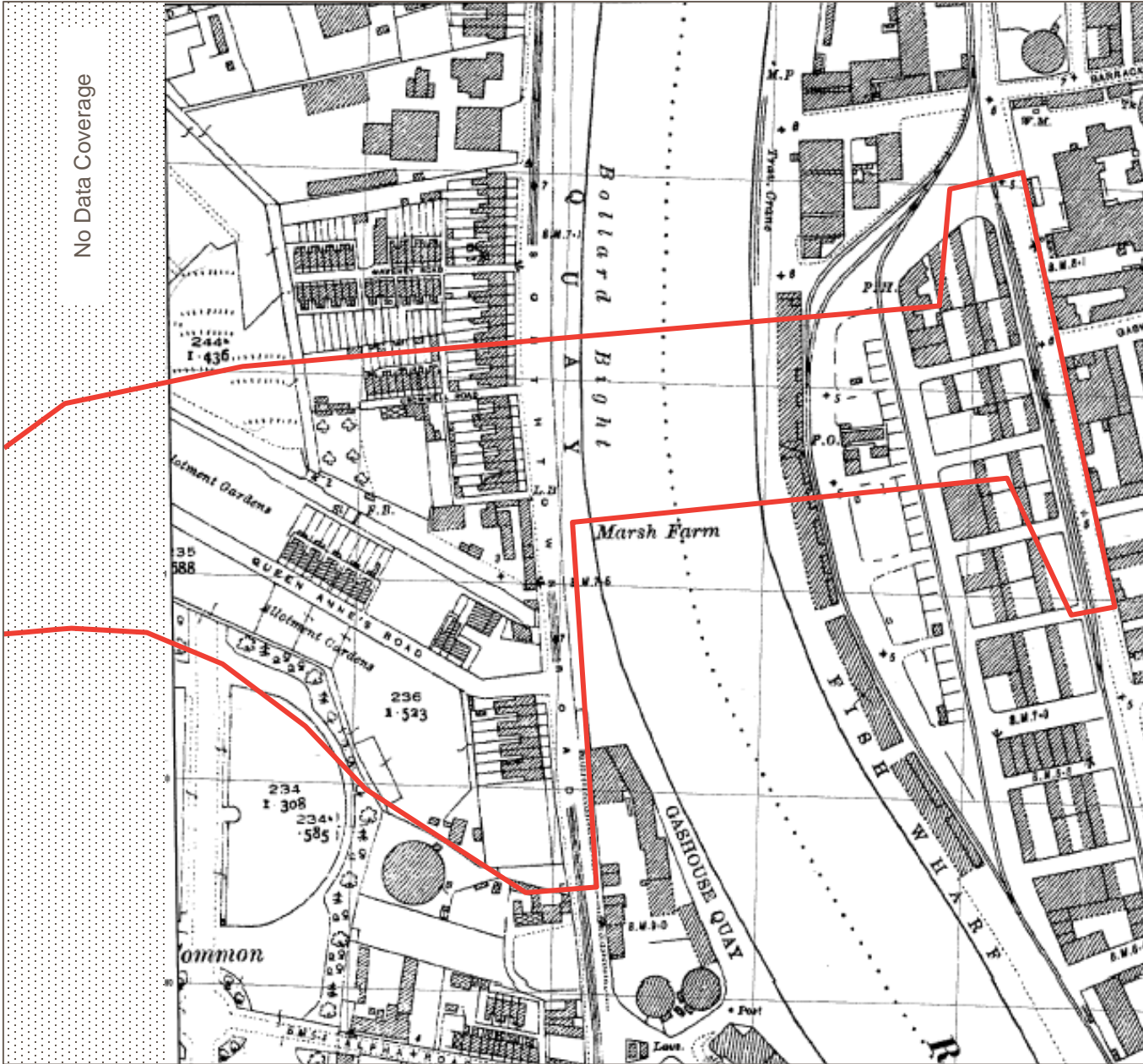
Southtown, Great Yarmouth



Source: Google Earth™ Mapping Services







— Approximate site boundary

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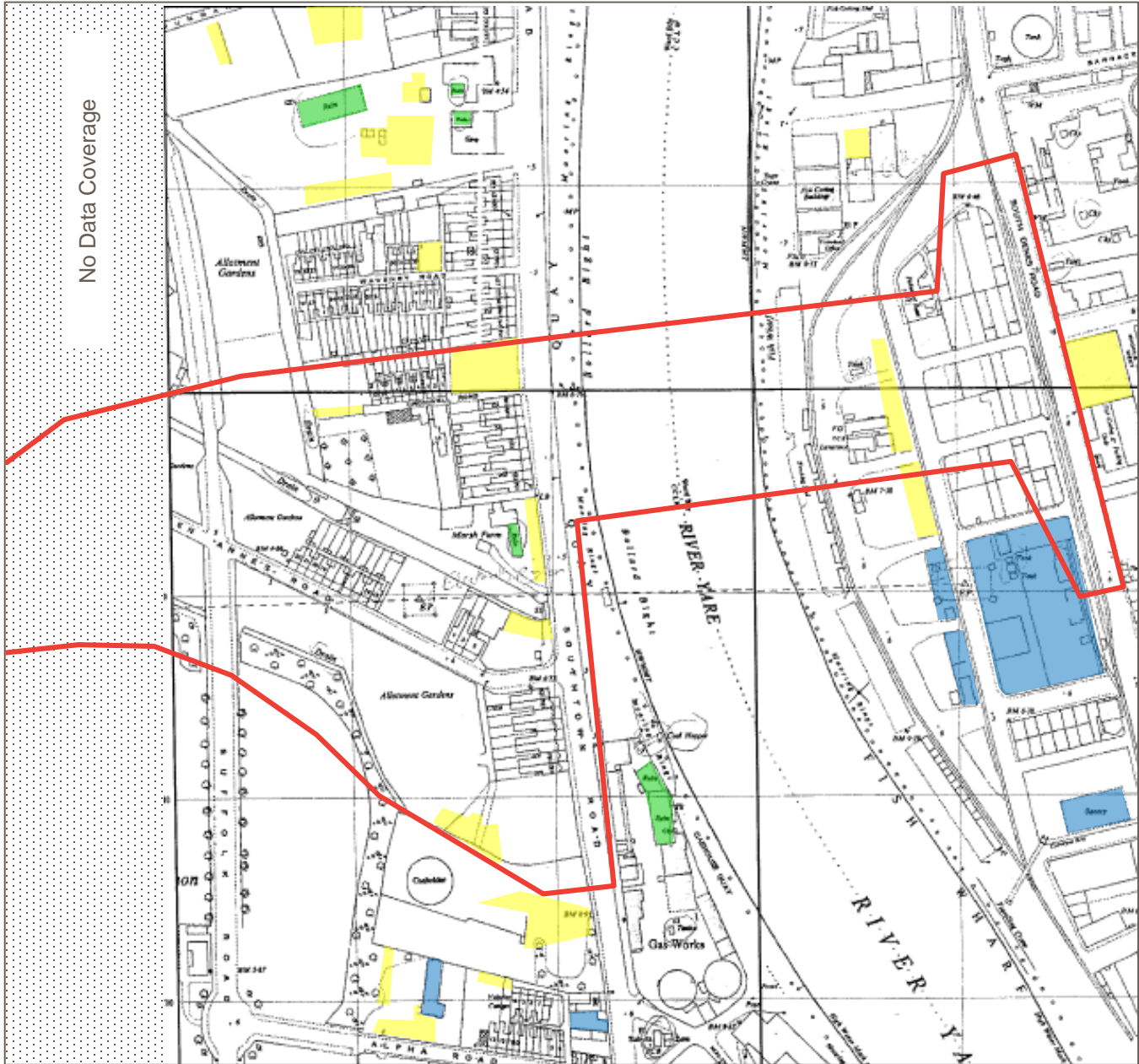
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


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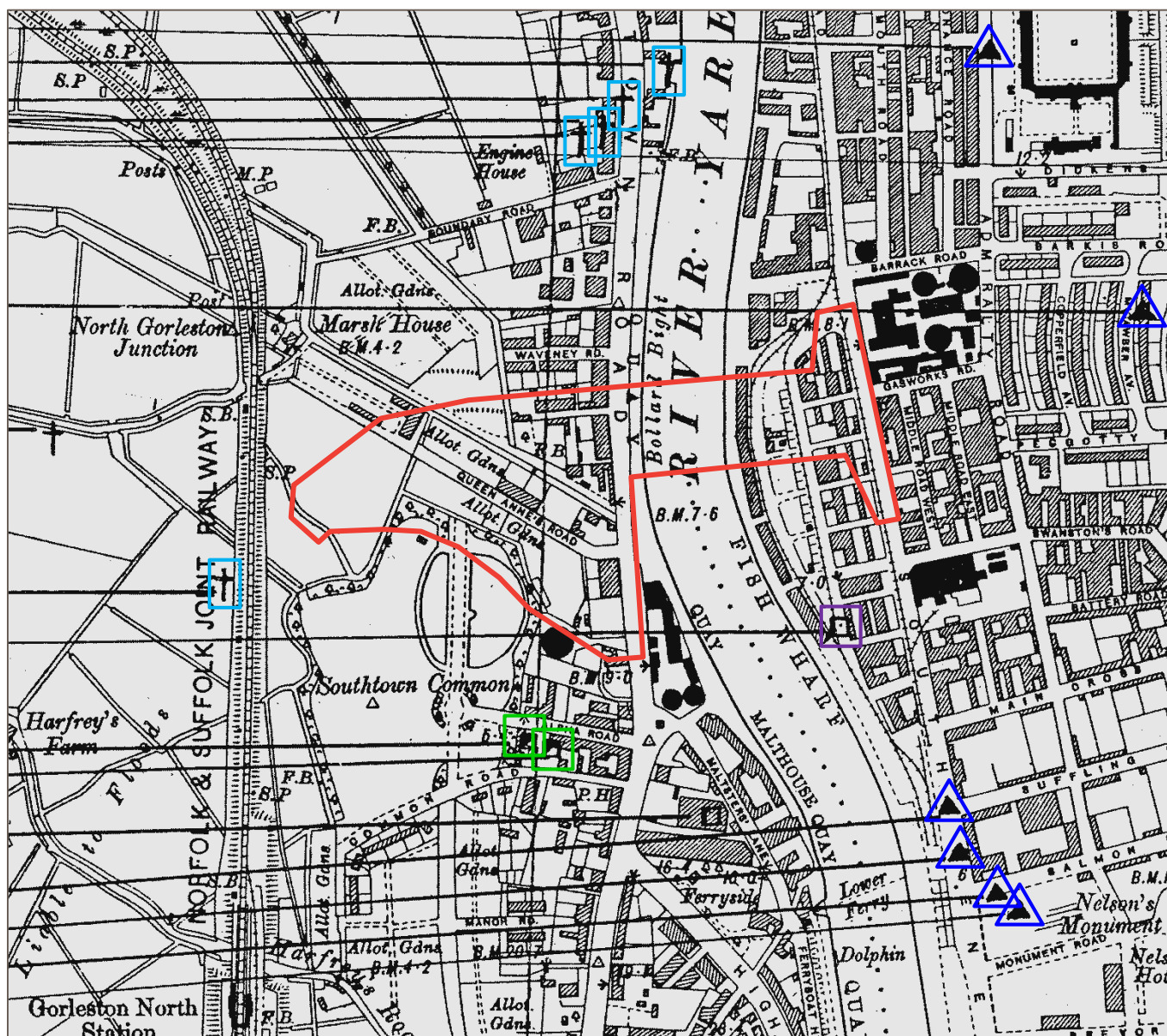
Source: Landmark Maps





	Approximate site boundary
	Clearance
	Redevelopment
	Ruins

Report Reference: 7307TA	Client: WSP UK Limited	
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- Approximate site boundary
- 250kg HE bomb strike
- 500kg HE bomb strike
- Parachute Mine strike
- Unclassified HE bomb strike

EXPLODED		UNEXPLODED	
	OIL BOMB		
	50 KG.		
	250 KG.		
	500 KG.		
	1000 KG.		
	PARA MINE		
	1800 KG.		
	2500 KG. OR LARGER		

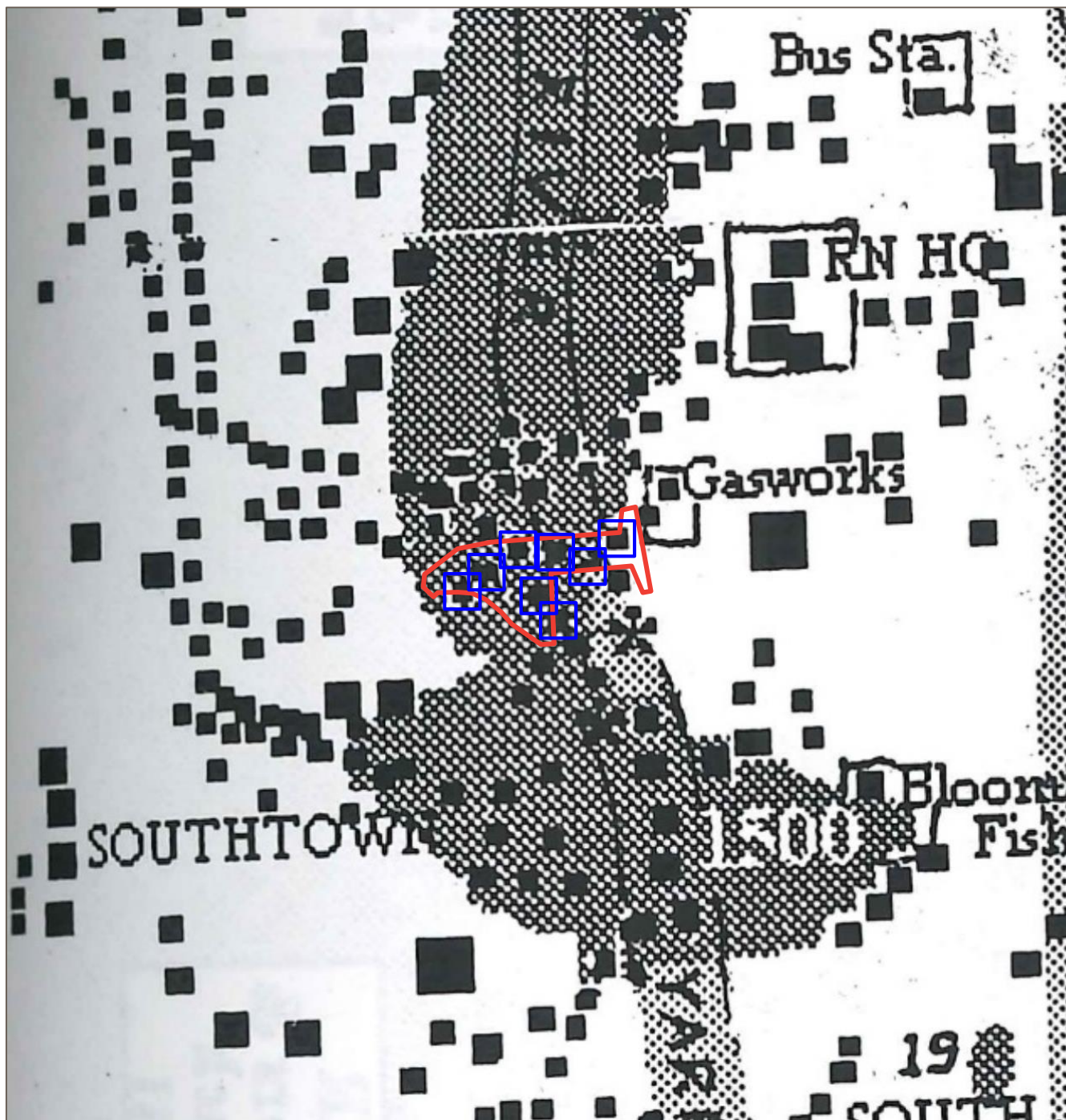
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— Approximate site boundary  
— HE Bomb Strike

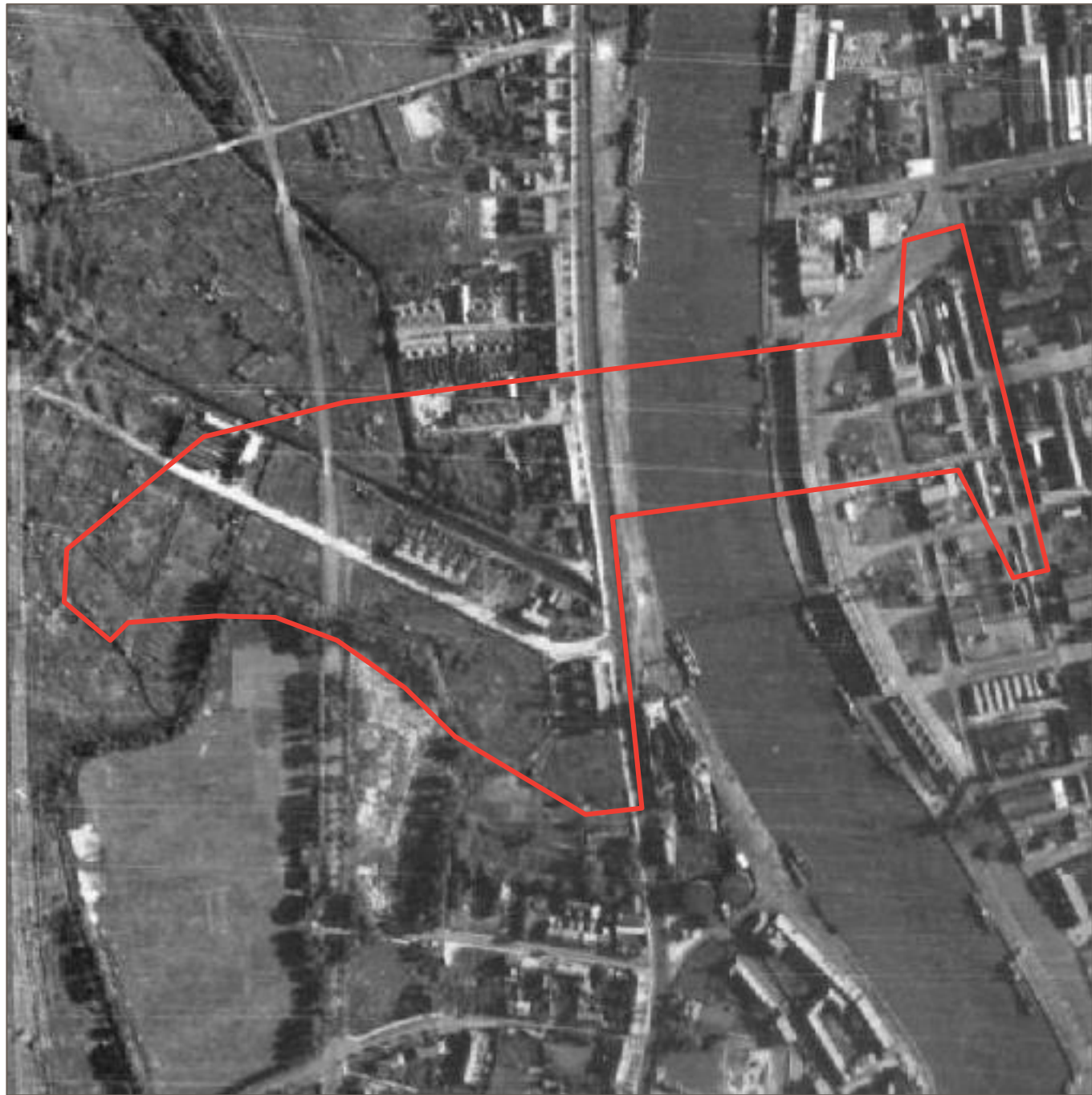
■ HE bomb  
 \* Mine  
 ■ Incendiary bomb cluster (& number)  
 0      1/2      1 mile

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— Approximate site boundary

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Source: Norfolk County Council





1kg German Incendiary Bomb next to a 30cm ruler

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Southtown, Great Yarmouth



Source: Heritage-Images

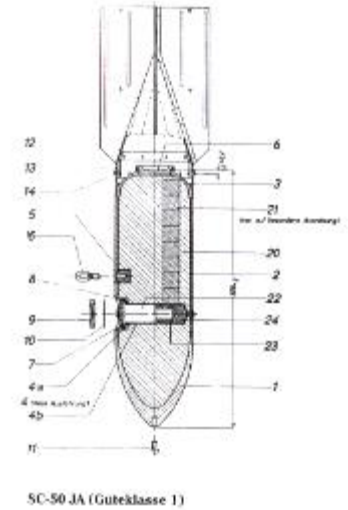
**Most Commonly Deployed German Bombs**

**SC 50**

**Bomb Weight:** 40-54kg (110-119lb)  
**Explosive Weight:** c25kg (55lb)  
**Fuze Type:** Impact fuze/electro-mechanical time delay fuze  
**Bomb Dimensions:** 1,090 x 280mm (42.9 x 11.0in)  
**Body Diameter:** 200mm (7.87in)  
**Use:** Against lightly damageable materials, hangars, railway rolling stock, ammunition depots, light bridges and buildings up to three stories.  
**Remarks:** The smallest and most common conventional German bomb. Nearly 70% of bombs dropped on the UK were 50kg.



50kg bomb, London Docklands



**SC 250**

**Bomb weight:** 245-256kg (540-564lb)  
**Explosive weight:** 125-130kg (276-287lb)  
**Fuze type:** Electrical impact/mechanical time delay fuze.  
**Bomb dimensions:** 1640 x 512mm (64.57 x 20.16in)  
**Body diameter:** 368mm (14.5in)  
**Use:** Against railway installations, embankments, flyovers, underpasses, large buildings and below-ground installations.



250kg bomb, Hawkinge

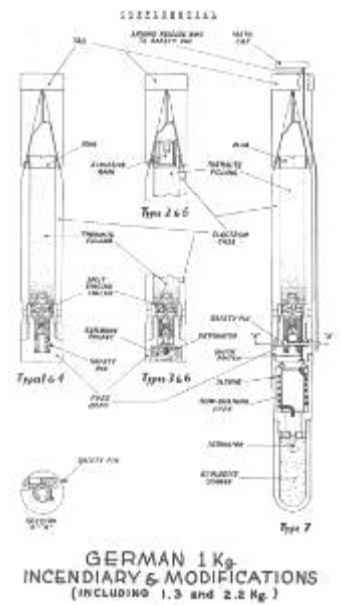


**1kg Incendiary Bomb**

**Bomb weight:** 1.0 and 1.3kg (2.2 and 2.87lb)  
**Filling:** 680gm (1.3lb) Thermite  
**Fuze type:** Impact fuze  
**Bomb dimensions:** 350 x 50mm (13.8 x 1.97in)  
**Body diameter:** 50mm (1.97in)  
**Use:** As incendiary – dropped in clusters against towns and industrial complexes  
**Remarks:** Jettisoned from air-dropped containers. Magnesium alloy case. Sometimes fitted with high explosive charge



1. Scaffold pipe
2. Incendiary 1kg bomb
3. Incendiary bomb recently found on site in UK



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Giant WWII bomb dug up by builders in London

A massive evacuation procedure is carried out in Bermondsey, south London, after the 1,000lb explosive measuring 5ft long was uncovered



Mother-of-two digs up unexploded WWII bomb in garden and casually flings it on the rubbish thinking it was an old exhaust pipe

- Carole Fisher-White, 56, unearthed a mortar shell in her back garden
• It was only when sons said it looked like a bomb that the penny dropped
• Royal Navy bomb disposal team called to defuse the device
• The 29mm Spigot Mortar was an infantry anti-tank weapon
• Also known as the Blacker Bombard it was used by the Home Guard



Unexploded Second World War grenade discovered by a curious dog

2008, 27 March 2013 By Charlotte Cox

Police and Army bomb disposal experts were called to the address in Peakdale Avenue, Heald Green. A dog called Snop has sniffed out a suspected Second World War grenade in a Stockport garden. Police and Army bomb disposal experts were called to the address in Peakdale Avenue, Heald Green. The dog took the grenade to nearby parkland and destroyed it in a controlled explosion.



Page last updated at 14:23 GMT, Thursday, 5 June 2008 15:23 UK BBC

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Unexploded bomb 'started to tick'

An unexploded World War II bomb started to tick and ooze liquid as experts tried to defuse it, police have said.

The large bomb was found in a river at Sugar House Lane, near Bromley-by-Bow Tube station in east London, on Monday.

Rush-hour travel was disrupted as overnight work to make the bomb safe continued into Thursday morning.



"It measures approximately the size and length of a man, and weighs around 1,000kg (2,200lb).

Express & Echo newspaper header with navigation menu and weather information.

Road closed after German bomb found in Axminster garden

By Exeter Express and Echo | Posted: June 03, 2014



A major road in Axminster has been closed after an air-dropped German bomb was found in a garden.

Page last updated at 14:45 GMT, Friday, 22 May 2009 15:45 UK

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Building site WWII bomb exploded



Building site WWII bomb exploded

A controlled explosion has been carried out on a World War II bomb found on a building site in East Sussex.

The 110lb (50kg) SC50 bomb, thought to have been dropped from a German aircraft in 1940 or 1941, was found at the Hollenden House

Royal Navy clearance divers dispose of 70-year old German bomb

Posted on August 8, 2013



The team of four from the Southern Diving Unit 1 at HM Naval Base Devonport, Plymouth, blew up the air-dropped bomb in-situ in a controlled explosion where it was found by contractors for SW Water laying a mats in a field at St Eval Kart Circuit near Wadebridge, north Cornwall yesterday.

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## WW2 bomb found in Portsmouth harbour

22 February 2017 | Hampshire &amp; Isle of Wight



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**A World War Two bomb containing 290lb (131kg) of "high explosives" has been found in Portsmouth harbour.**

The ordnance was discovered by a dredger in the water at about 03:00 GMT, the Royal Navy said.

Specialist divers at the scene said the bomb posed a "very serious threat". It was towed out to sea and detonated.

All ferries were stopped and trains between Portsmouth and Southsea station and Portsmouth Harbour were suspended, but have since started running again.

There were also extensive road closures in the area, affecting access to Gunwharf Quays.

The Royal Navy said the device, believed to be a German SC250 that weighs 500lb (227kg), was removed from the harbour before being "safely" blown up in the sea off the Isle of Wight.

Lt Mike St Pierre, the officer leading the bomb disposal team, had said: "Despite being old, these devices can pose a very serious threat."

MailOnline

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By JOSEPH CURTIS FOR MAILONLINE

PUBLISHED: 17:00, 16 November 2016 | UPDATED: 19:49, 16 November 2016



## Portsmouth harbour is sealed off with hundreds of people evacuated and ferries halted after a 500lb unexploded WWII bomb was found on the sea bed

The Royal Navy today destroyed an unexploded 500lb German World War Two bomb which closed Portsmouth harbour for six hours when dredging workers discovered it on the sea bed.

Contractors completing works ready for the arrival of the Royal Navy's new 65,000 tonne state-of-the-art ship HMS Queen Elizabeth discovered the German UXB torpedo while dredging Portsmouth Harbour, Hampshire, this morning.

Bomb disposal experts rushed to the scene after it was brought to the surface while work was carried out west of Victory Jetty.

The bomb was towed from Portsmouth Harbour, Hants, out to open waters 1.5 miles east of the Isle of Wight.

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## NEWS

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## World War Two bomb removed from River Thames and exploded

© 20 January 2017 | London



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**An unexploded 50kg World War Two bomb found in the River Thames has been removed and exploded.**

The operation by the Royal Navy and Metropolitan Police forced Waterloo Bridge, Westminster Bridge and Victoria Embankment in central London to shut.

A Ministry of Defence spokesman said the WW2 device had been towed along the river to Tilbury, Essex, where it was safely detonated.

Police had been called to the river at 17:15 GMT on Thursday.

The device has been identified as a German SD 50kg bomb, a small armour-piercing ordnance dropped from an aircraft.

The Port of London Authority said the suspected bomb measured 2ft by 1ft (60cm x 30cm).

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Southtown, Great Yarmouth

Source: [www.bbc.co.uk](http://www.bbc.co.uk)





1994

RESCUE workers search for survivors after a Second World War bomb exploded at a building site in Berlin, killing three people and injuring at least eight others. A fire brigade spokesman said he feared the final death toll could be higher. One worker was still missing, believed to be trapped under a machine. "We've

### Blown up by history

found human remains 100 metres away but we can't tell if they belong to the dead already found," the spokesman said. The blast, set off by drilling work on Frankfurter Allee, one of east Berlin's busiest avenues, trapped

workers under building machinery and sent huge chunks of concrete tumbling through the air. A large office block was being built on the site of the explosion which sent shoppers scrambling for shelter and paralysed

dense afternoon traffic. One eyewitness said: "There was a bang, then silence, and then it started raining stones and dirt." Dozens of cars within a 250-metre radius were wrecked and the top two floors of a nearby apartment block caved in. Radio reports claimed that the total number of injured stood at 14.



2008



2006

### World War II bomb kills three in Germany

Three people have been killed and six injured trying to defuse a World War II bomb in central Germany.

Workers building a sports stadium had earlier unearthed the bomb in the town of Goettingen.

It was not immediately clear why the bomb, reportedly weighing 500kg (1,100lb), had detonated.

Unexploded WWII bombs dropped by Allied planes are frequently found in Germany, though it is unusual for them to explode unexpectedly.

2010



2014

The bomb went off as the machine lifted up earth and debris

A World War Two bomb has exploded at a construction site near a west German town, killing a man and injuring eight others, police say.

The explosion occurred after a digger accidentally struck the device during excavation work in Euskirchen in the state of North Rhine-Westphalia.

The machine's operator died on the spot. Two of those hurt were critically wounded, the dpa news agency reports.

#### Related



2006

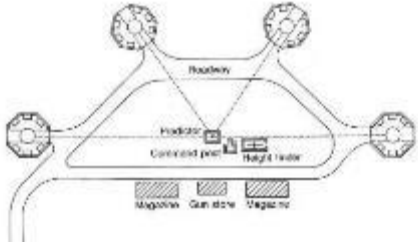
**Top Left:** WWII bomb killed 3 and injured 8 in Berlin – 1994.  
**Middle Left:** WWII bomb killed 3 in Goettingen, Germany – 2010.  
**Bottom Left:** Excavator operator killed by WWII bomb in Euskirchen, Germany – 2014.  
**Top Right:** WWII bomb injures 17 at construction site in Hattingen, Germany - 2008.  
**Middle Right:** A highway construction worker in Germany accidentally struck a WWII bomb, killing himself and wrecking several passing cars - 2006.  
**Bottom Right:** Destroyed piling rig and dump truck after detonation of WWII UXB in Austria - 2006.

Report Reference:	Client:	WSP UK Limited
7307TA	Project:	
		Southtown, Great Yarmouth



### 3.7 inch Anti-Aircraft Projectile

Weight: 12.7kg (28lb)  
 Dimensions: 94 x 360mm (3.7 x 14.7in)  
 Carriage: Mobile and Static Versions  
 Rate of Fire: 10-20 rounds per minute  
 Ceiling: 9-18,000m (29-59,000ft)  
 Muzzle Velocity: 792m/s (2,598ft/s)  
 Remarks: 4.5 inch projectiles were also commonly utilised



Layout plan for a typical HAA battery site.



This AA shell was uncovered on a construction site in North London in February 2009.



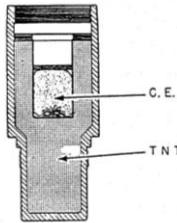
Hyde Park 1939 3.7 Inch QF gun on mobile mounting



3.7 inch AA Projectile Minus Fuze

### Rockets / Unrotating Projectiles

Weight: Overall: 24.5kg (54lb) Warhead: 1.94kg (4.28lb)  
 Dimensions: 1930mm x 82.6mm (76 x 3.25in)  
 Carriage: Mobile – transported on trailers  
 Ceiling: 6770m (22,200ft)  
 Maximum Velocity: 457mps (1,500 fps)



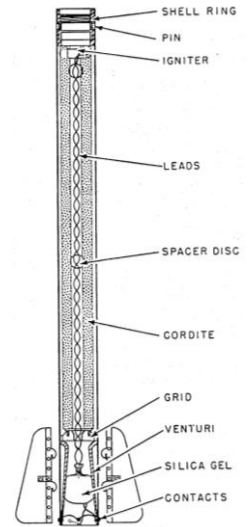
MK II HE Shell (3.5kg)



Rocket Battery in action



Home Guard soldiers load an anti-aircraft rocket at a 'Z' Battery



2" U.P. AA Rocket

### 40mm Bofors Gun Projectile

Weight: 0.86kg (1.96lb)  
 Dimensions: 40mm x 310mm (1.6in x 12.2in)  
 Rate of Fire: 120 rounds per minute  
 Ceiling: 23,000ft (7000m )  
 Muzzle Velocity: 2,890 ft/s (881m/s)  
 Remarks: Mobile batteries – normally few records of where these guns were located



Unexploded 40mm Bofors projectile



40mm Bofors gun and crew at Stanmore in Middlesex, 28 June 1940.



Report Reference:  
7307TA

Client:  
Project:

WSP UK Limited

Southtown, Great Yarmouth





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# NEWS

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23 July 2010 Last updated at 18:28

## Covert British troops 'could have buried' WWII devices

**World War II incendiary devices found on a building site in Gloucestershire could have been left by covert British troops, according to researchers.**

More than 20 phosphorus bombs were unearthed in Birdlip after a digger hit one, causing it to burst into flames.

A former worker at the site said he saw a Home Guard officer burying objects there 65 years ago.

The Coleshill Auxiliary Research Team said auxiliary officers often used Home Guard uniforms as cover.



The bombs were put into vats of water to make them safe

Thursday, September 10 2015

**KM KentOnline**  
The UK's fastest-growing regional news network


## Army bomb disposal team called to Blacksole Bridge in Herne Bay

by Aidan Barlow [abarlow@thekmgroupp.co.uk](mailto:abarlow@thekmgroupp.co.uk) 08 July 2015

It was like a scene from Dad's Army when Army bomb disposal experts found wartime explosives made by the Home Guard in makeshift bottles.

A team was called to the Blacksole Bridge in Herne Bay after the wartime bombs were found.

The team from the Royal Logistics Corps set up a 30 metre exclusion zone for pedestrians around the railway embankment after the suspected homemade phosphorous bombs were found.



**MailOnline**

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## Treasure hunter stumbles on deadly Dad's Army bomb cache


By MAIL ONLINE REPORTER  
Last updated at 4:06 PM on 9th July 2010

Comments (0) Add to My Stories

A treasure hunter escaped serious injury when he unearthed a cache of bombs that were buried by the Home Guard during the darkest days of World War 2.

The weapons - primed to go off when they made contact with the air - were secreted on a beach by a Captain Mainwaring of the day.

Loaded with dangerous benzene and phosphorus, the Dad's Army-style team would have used them in battle against Nazi troops in the event of invasion.




'Are you sure that's wise?': The Home Guard's stash of bombs finally goes off, 70 years later

**Eastbourne Herald**

10/09/15 11°C to 21°C Sunny Like us Follow us Place your Ad Subscribe

## VIDEO: Explosion after 80 grenades detonated in Eastbourne



16:31 Monday 13 April 2015

Marked 'AW Bomb 1940' the grenades were thought to have been phosphorus incendiary grenades created as improvised anti-tank weapons when Britain was facing invasion following the army's evacuation from Dunkirk in 1940.

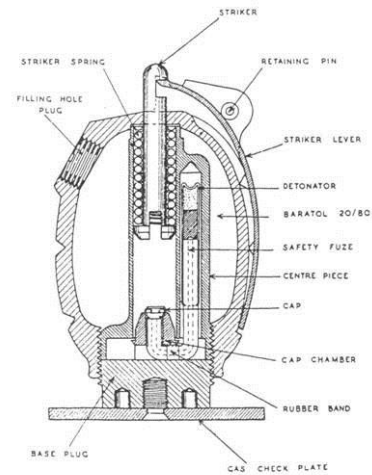
He said, "I remember the grenades being buried. It was part of the Home Guard stash, it was put there in case we were invaded. It had to be in 1943. There were a lot of them [stashes], they were all over the place."

Report Reference: 7307TA	Client: WSP UK Limited
	Project: Southtown, Great Yarmouth



**No. 36 'Mills' Grenade**

Weight: 0.7kg filled (1lb 6oz)  
 Type: Hand or discharger, fragmentation  
 Dimensions: 95 x 61mm (3.7 x 2.4in)  
 Filling: Alumatol, Amatol 2 or TNT  
 Remarks: 4 second hand-throwing fuse with approximate 30m range. First introduced May 1918.



Grenade, .303 inch rifle, No. 36M, Mark I.

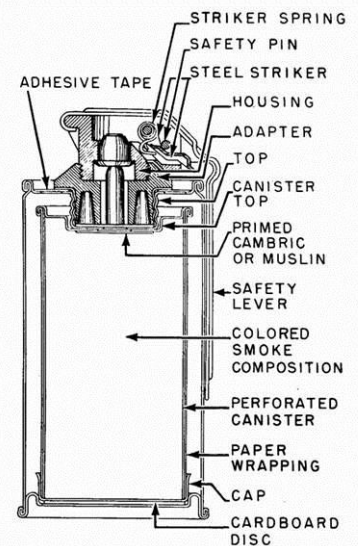
**No. 69 Grenade**

Weight: 0.38kg filled (0.8lb)  
 Type: Percussion/Blast  
 Date Introduced: December 1940  
 Remarks: Black Bakelite body. Blast rather than fragmentation type. After unscrewing the safety cap, a tape is held when throwing the grenade releasing the safety bolt in the throwing motion. Detection is problematic due to its very low metal content.



**Typical Smoke Grenade**

Dimensions: Approx. 65 x 115mm (2.5 x 4.5in)  
 Type: Smoke  
 Date Introduced: Current MoD issue  
 Remarks: Smoke grenades are used as ground-to-ground or ground-to-air signalling devices, target or landing zone marking devices, and screening devices for unit movement.



Report Reference:  
7307TA

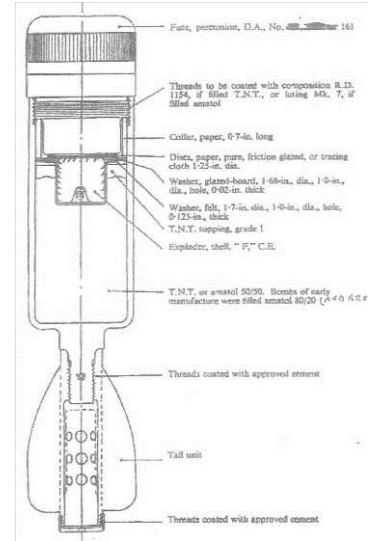
Client: WSP UK Limited  
 Project: Southtown, Great Yarmouth





### Typical 2 inch High Explosive Mortar

- Bomb Weight: 1.02kg (2.25lb)
- Type: High Explosive
- Dimensions: 51 x 290mm (2in x 11.4in)
- Filling: 200g RDX/TNT
- Maximum Range: 457m (500yds)
- Remarks: Fitted with an impact fuze which detonates the fuze booster charge (exploder) and, in turn, the high explosive charge. The main charge shatters the mortar bomb body, producing near optimum fragmentation and blast effect at the target.



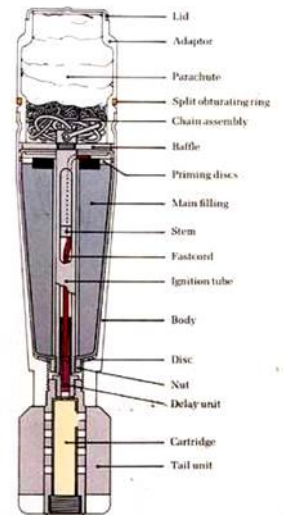
### Typical 3 inch Smoke Mortar

- Type: Smoke
- Dimensions: c490 x 76mm (19.3in x 3in)
- Filling: Typically white phosphorous
- Maximum Range: 2515m (2,750yds)
- Remarks: On impact, the fuze functions and initiates the bursting charge. The bursting charge ruptures the mortar bomb body and disperses the white phosphorous filler. The white phosphorous produces smoke upon exposure to the air.



### Typical 2 inch Illuminating Mortar

- Type: Illum.
- Dimensions: 51 x 290mm
- Filling: Various
- Remarks: The expulsion charge ignites and ejects the candle assembly. A spring ejects the parachute from the tail cone. The parachute opens, slowing the descent of the burning candle which illuminates the target.



Report Reference:  
7307TA

Client:  
WSP UK Limited

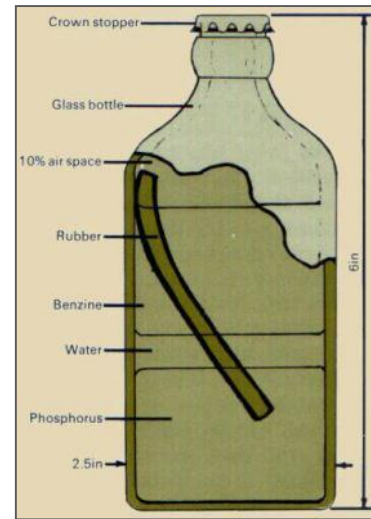
Project:  
Southtown, Great Yarmouth





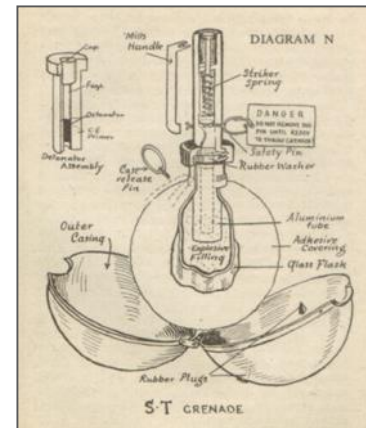
### Self Igniting Phosphorous (SIP) Grenades

**Filling:** White Phosphorous and Benzene  
**Remarks:** The grenade comprised a glass bottle with a total volume of approximately one pint. It was filled with White Phosphorus, benzene, a piece of rubber and water. Over time the rubber dissolved to create a sticky fluid which would self ignite when the bottle broke. Fired by hand or Northover Projector. Sometimes called the "A & W" (Albright & Wilson) grenade.



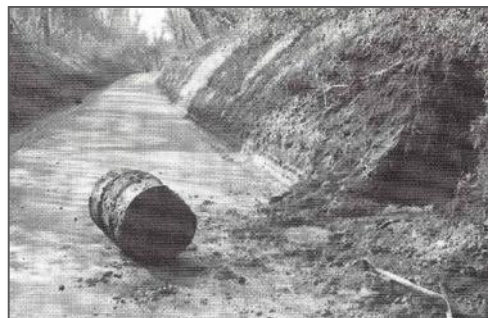
### No 74 Grenade (Sticky Bomb)

**Remarks:** Designed as an anti-tank grenade and used by the Home Guard. The grenade consisted of a glass ball on the end of a Bakelite (plastic) handle. Inside the glass ball was an explosive filling whilst on the outside was a very sticky adhesive covering. Until used, this adhesive covering was encased in a metal outer casing.



### Flame Fougasse Bomb

**Remarks:** A Flame Fougasse was a weapon in which the projectile was a flammable liquid, typically a mixture of petrol and oil. It was usually constructed from a 40-gallon drum dug into the roadside and camouflaged. Ammonal provided the propellant charge which, when triggered, caused the weapon to shoot a flame 3m (10ft) wide and 27m (30 yards) long. Initially a mixture of 40% petrol and 60% gas oil was used, this was later replaced by an adhesive gel of tar, lime and petrol known as 5B.



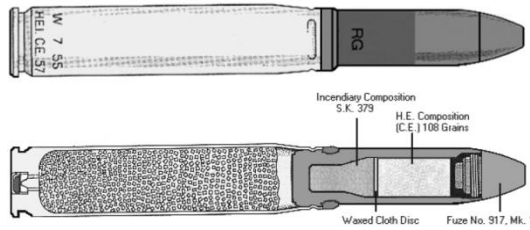
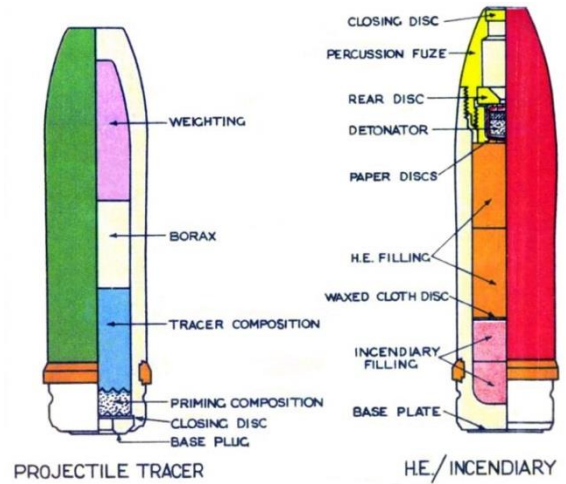
Report Reference:  
7307TA

Client:  
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Southtown, Great Yarmouth



### 20mm Hispano HEI Ammunition

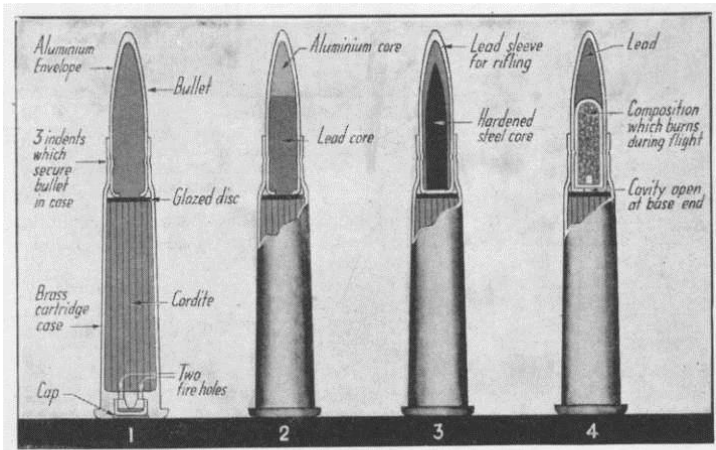
Type: Live canon round  
 Markings: Upper half of projectile painted 'buff' colour, lower half is red.  
 Cartridge Weight: 256 grams  
 Dimensions: Total cartridge / projectile length - 182mm  
 Fuzed: Contact fuze – No.253, No.254 or No.917  
 Filling: 108 grains of contact explosive + 68 grains of SR.379 incendiary composition.  
 Threat: Explosives within unspent cartridge as well as the projectile.  
 Deployment: Royal Navy, RAF and British Army Light Anti-Aircraft guns. Also RAF aircraft canons.  
 Remarks: Cartridges are belted or supplied lose in cartons.



COLOUR IDENTIFICATION		
BRITISH		
NATURE OF SHELL	H.E. FILLING	COLOUR
H.E. TRACER	T.N.T.	Blue
H.E.	T.N.T.	Orange
PROJ. PRACTICE		Purple
PROJ. TRACER		Green
H.E. INCENDIARY	T.N.T.	Red
H.E. INCENDIARY TRACER	T.N.T.	Green

### .303" Ammunition

Type: Rifle / machine gun round  
 Markings: Regular round - none. Tracer round – red Primer  
 Bullet Weight: 150 - 180 grams  
 Dimensions: Total cartridge /projectile length - 78mm  
 Filling: Regular round – none. Tracer round - small incendiary fill  
 Threat: Explosive cordite within unspent cartridge  
 Deployment: Royal Navy, RAF and British Army Light Anti-Aircraft guns, machine guns and rifles. Standard British and Commonwealth military cartridge from 1889 until the 1950s.  
 Remarks: Cartridges are belted or supplied lose in cartons.

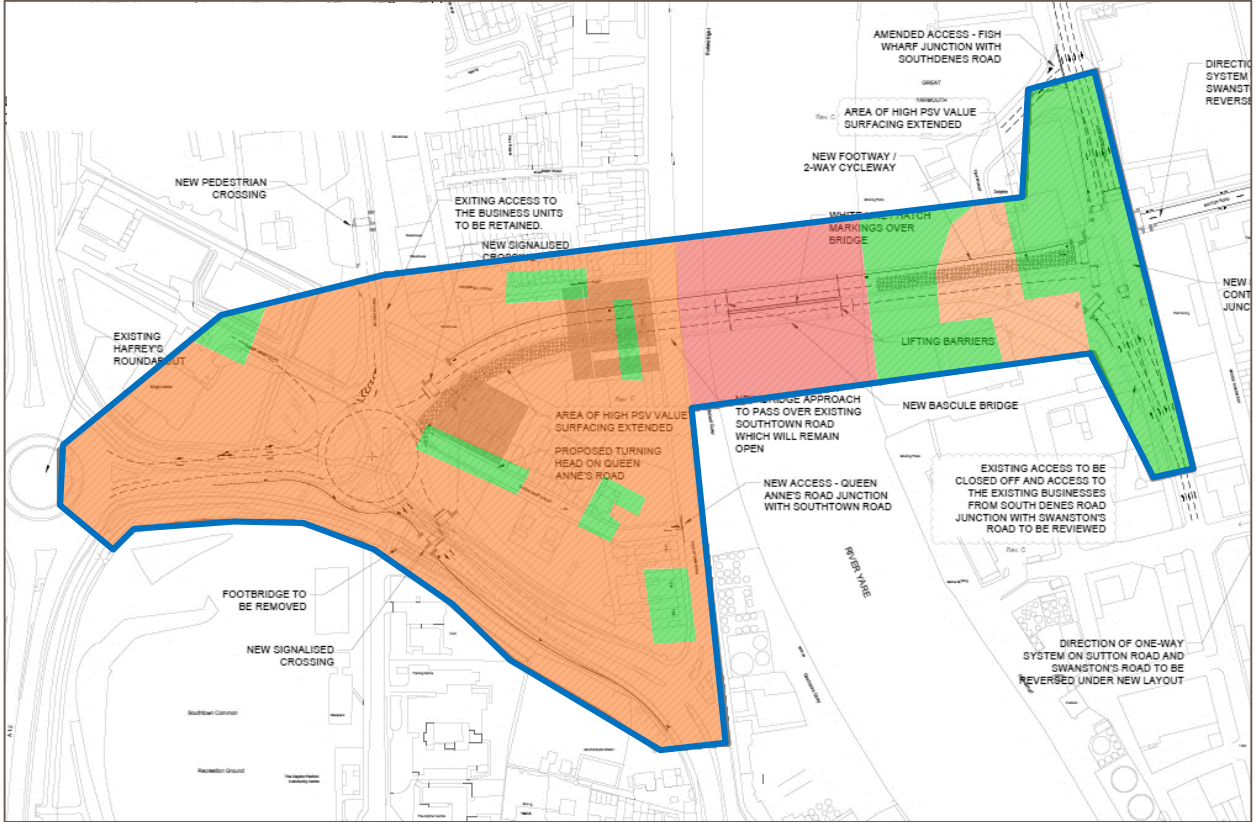





TYPES OF SMALL ARMS AMMUNITION  
 Fig. 1. Four types of ammunition used by modern infantry. 1 and 2 are ball cartridges, 3 is an armour-piercing bullet, and 4 a tracer bullet which burns and makes its flight visible.

Report Reference: 7307TA	Client: WSP UK Limited
	Project: Southtown, Great Yarmouth







 <p><b>Low Risk Zone</b></p> <p>Buildings and hard standing that survived the war intact.</p>	 <p><b>Medium Risk Zone</b></p> <ul style="list-style-type: none"> <li>• Open Soft Ground that would not have been accessed regularly nor frequently.</li> <li>• Areas of substantial bomb damage.</li> <li>• Buffer area to account for the “J-Curve” Effect.</li> </ul>	 <p><b>High Risk Zone</b></p> <p>The River Yare</p>
--	--	--

**Scope Specific Risk Mitigation Measures:**

*All Risk Zone:*

- Site Specific Explosive Ordnance Safety and Awareness Briefings to all personnel conducting intrusive works.
- The Provision of Unexploded Ordnance Site Safety Instructions.

*Medium Risk Zone:*

- Explosive Ordnance Disposal (EOD) Engineer presence on site to support shallow intrusive works.
- Handheld Intrusive Magnetometer Survey of all borehole locations down to the maximum bomb penetration depth

*High Risk Zone:*

- Non-Intrusive Magnetometer and Side Scan UXO Survey.
- Intrusive Magnetometer Survey - Down-hole Vallon Probing ahead of Marine Borehole.



# Appendix E

## **PRESSUREMETER TESTING**



# Great Yarmouth Third River Crossing

Borehole: BH02

Date: 15<sup>th</sup> June 2018

Revision No: 1

Pressuremeter tests

Preliminary analysis

Report reference: CIR1420/18

Cambridge Insitu Limited

[DETAILS OF TEST]

Project :  
Site : Gt Yarmouth 3RC  
Borehole : BH02  
Test name : BH02 Test 1  
Test date : 13 Jun 18  
Test depth : 13.50 mBML  
Water table : Nothing entered  
Ambient PWP : Nothing entered  
Material : Silty sand  
Probe : Digital 3 arm weak rock self boring pressuremeter  
Diameter : 88.1 mm  
Data analysed using average arm displacement curve  
A non-linear analysis of the rebound cycles has been carried out

Analysed by SDB on 15 Jun 18

Remarks: Deck to mud = 11m. Water depth = 8.4m above mudline. Flush coming up casing for most of drilling causing a cavity on one side. Arm 2 hits limit after one u/r cycle.

[RESULTS FOR CAVITY REFERENCE PRESSURE]

Po from Lift off (kPa) : "Arm ave=206.5"

[LINEAR INTERPRETATION OF SHEAR MODULUS G]

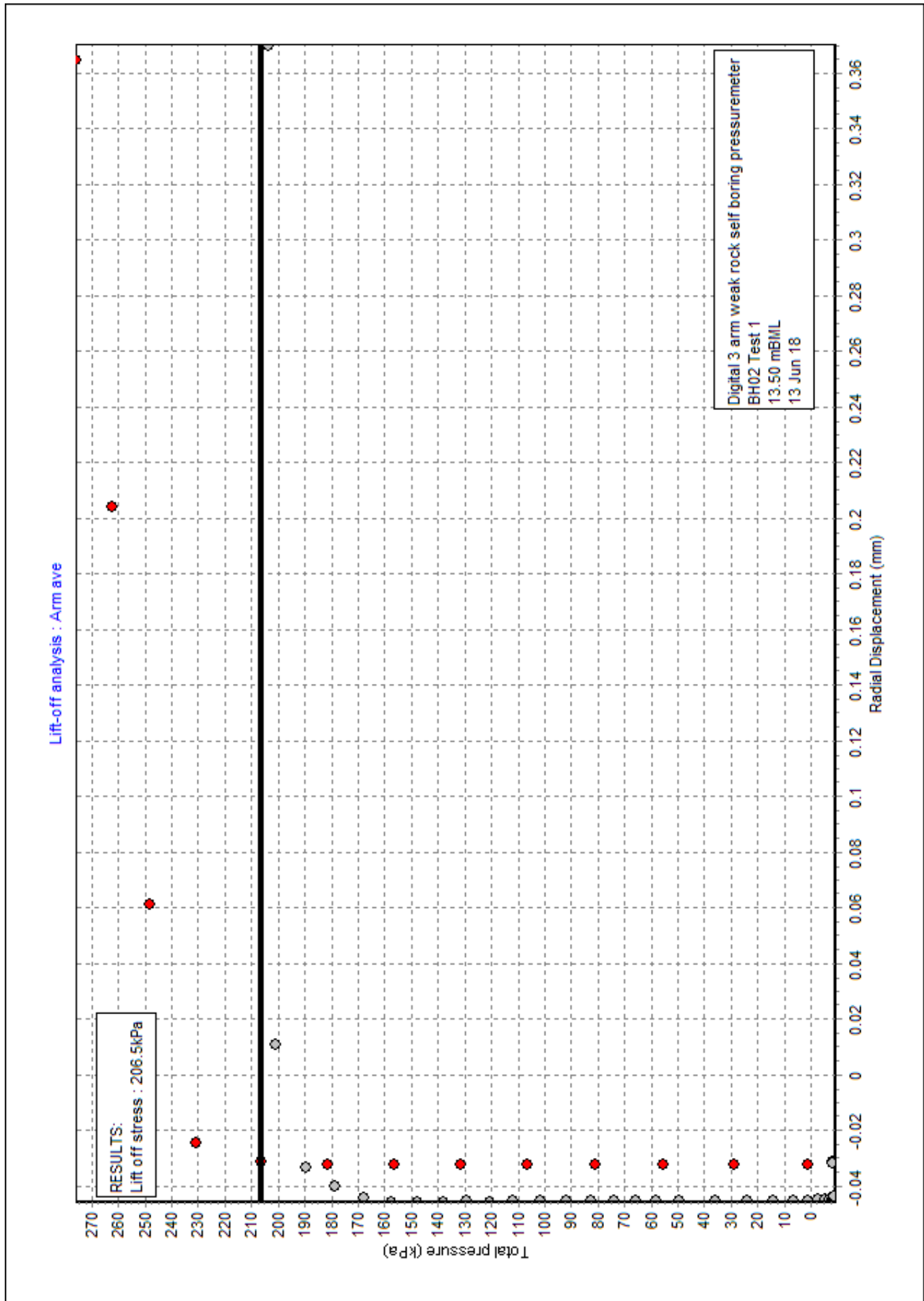
Initial slope shear modulus (MPa) : "Arm ave=1.6"

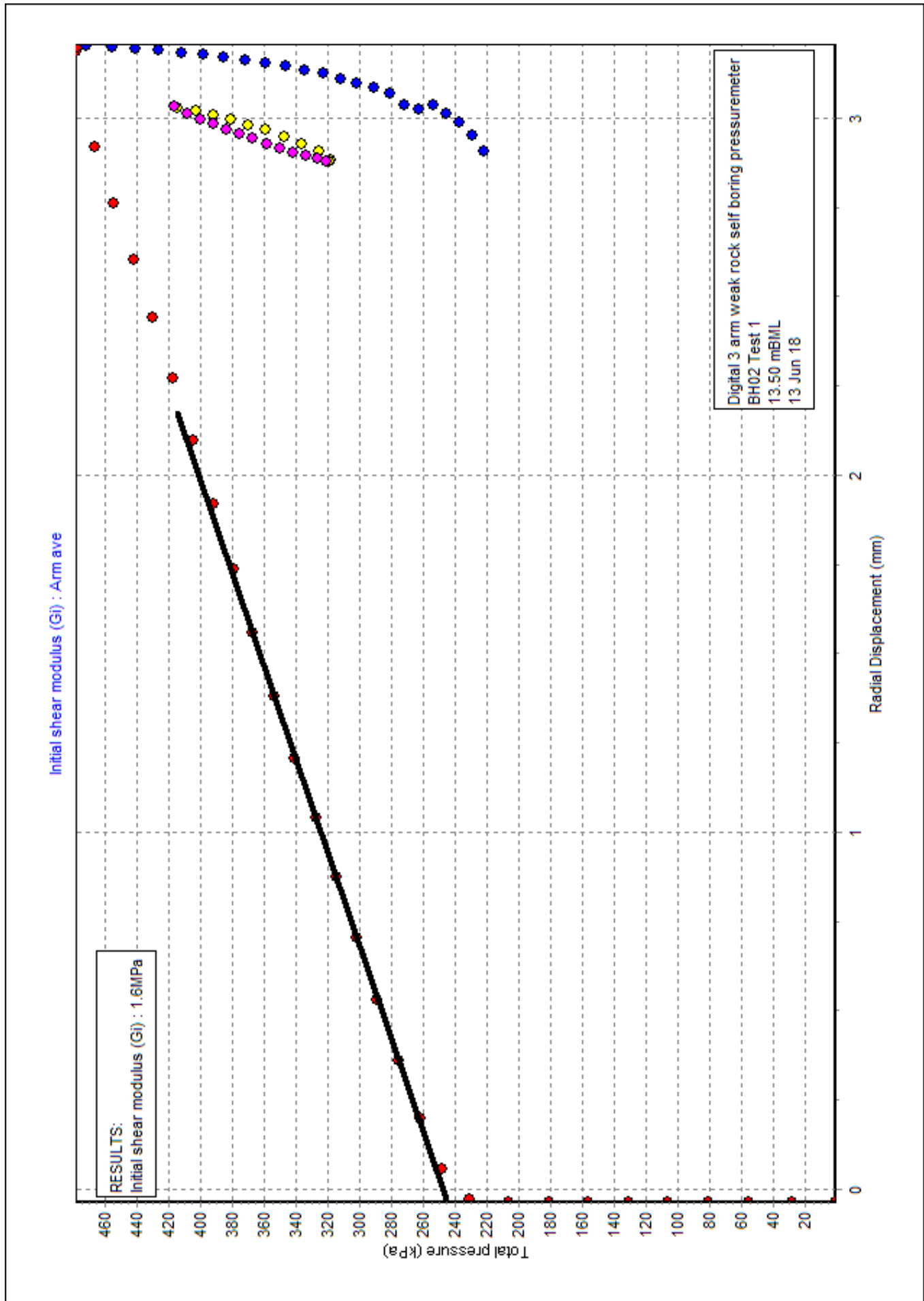
Axis	Loop	Value	Mean Strain	Mean Pc	dE	dPc
	No	(MPa)	(%)	(kPa)	(%)	(kPa)
Arm ave	1	14.9		368	0.649	97

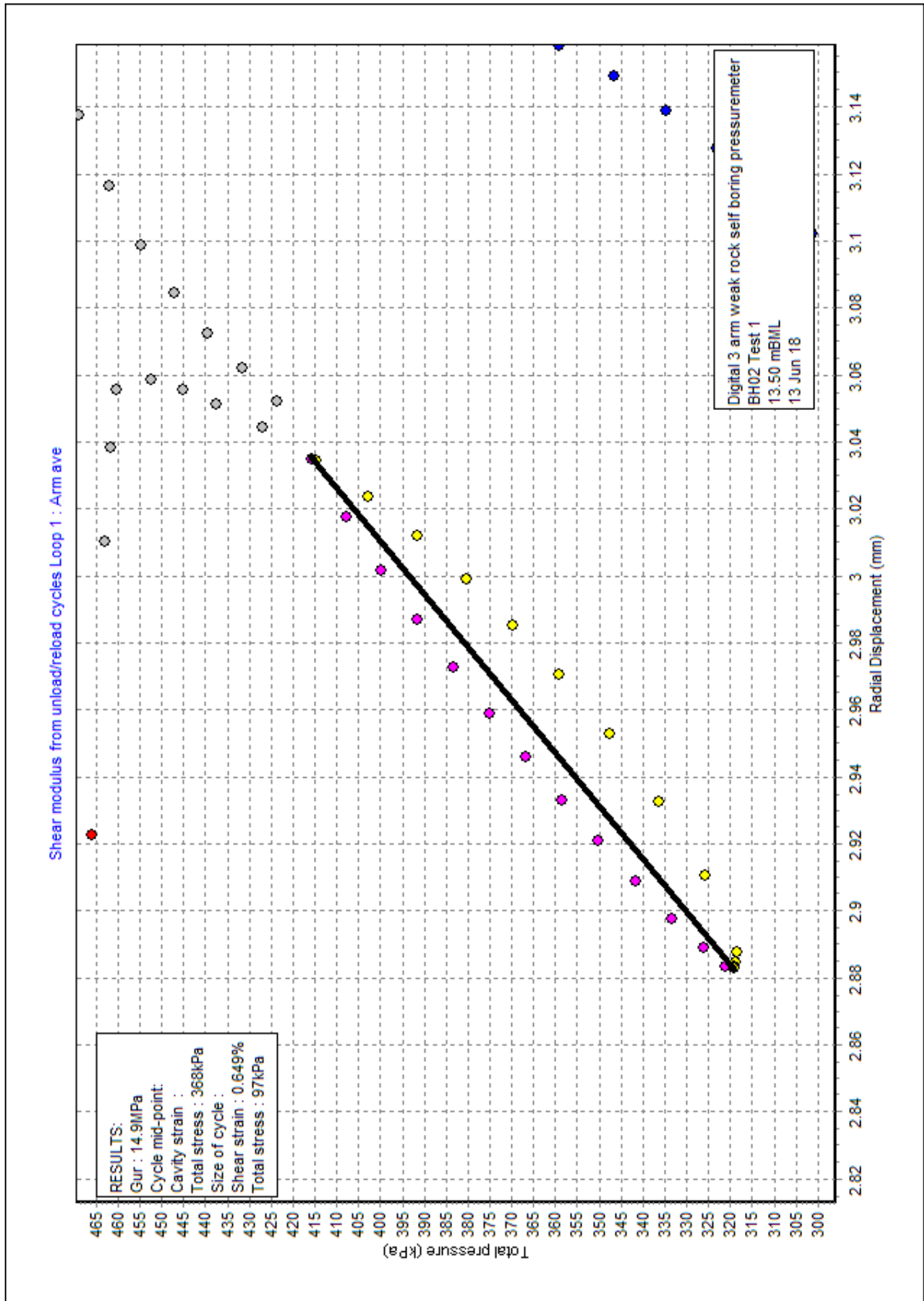
[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

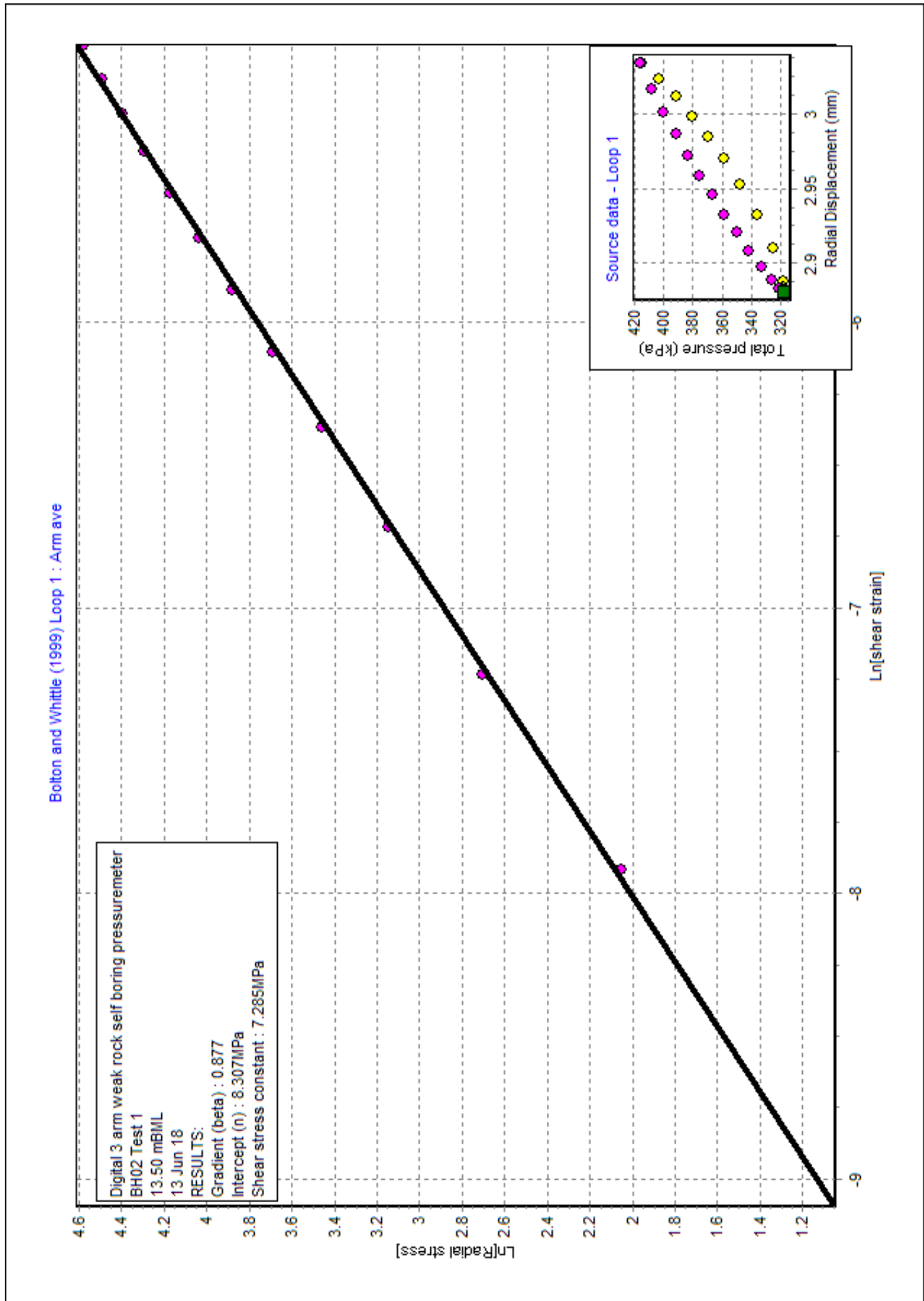
Axis	Loop	Intercept	Alpha	Gradient
	No	(MPa)	(MPa)	
Arm ave	1	8.307	7.285	0.877

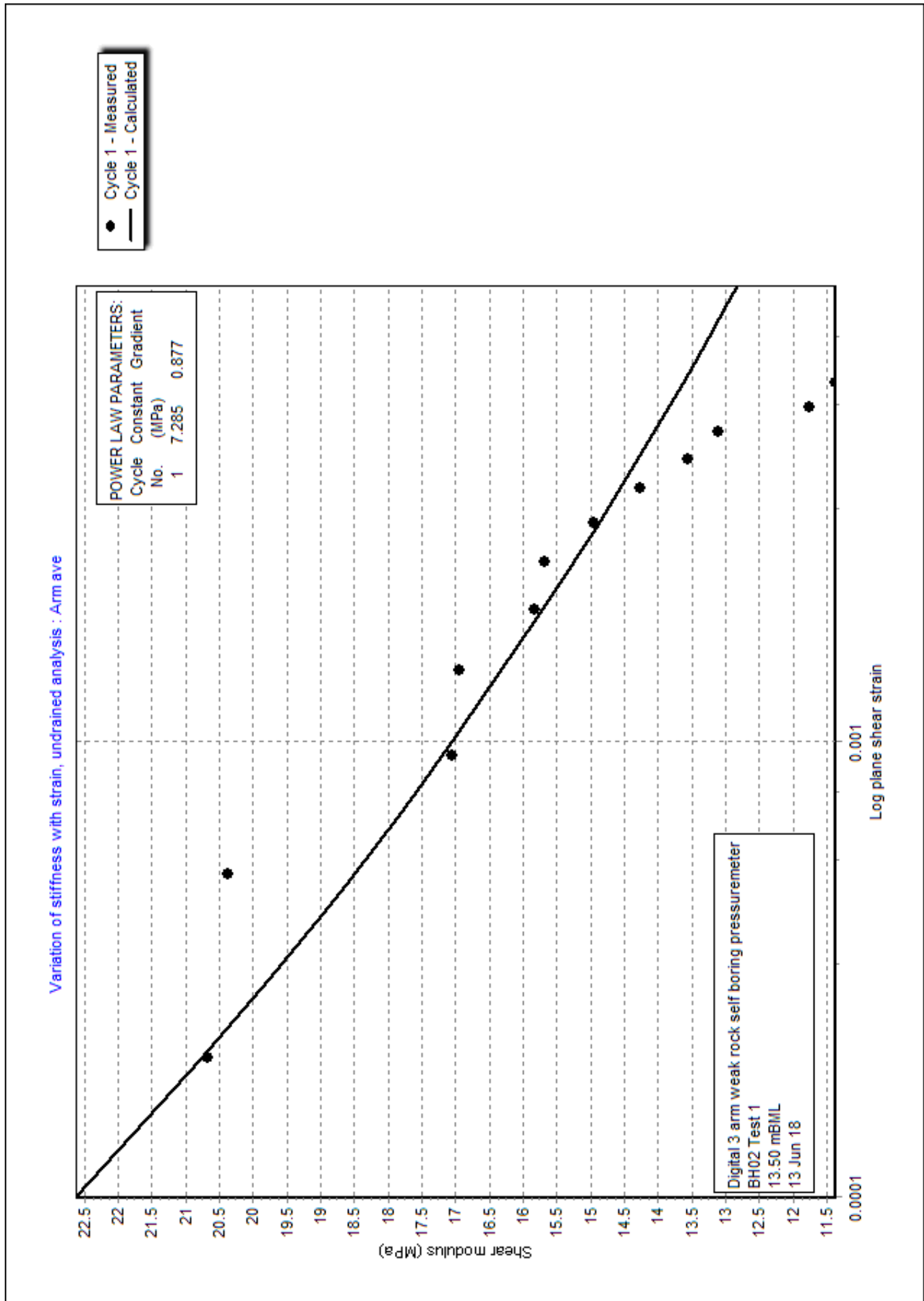


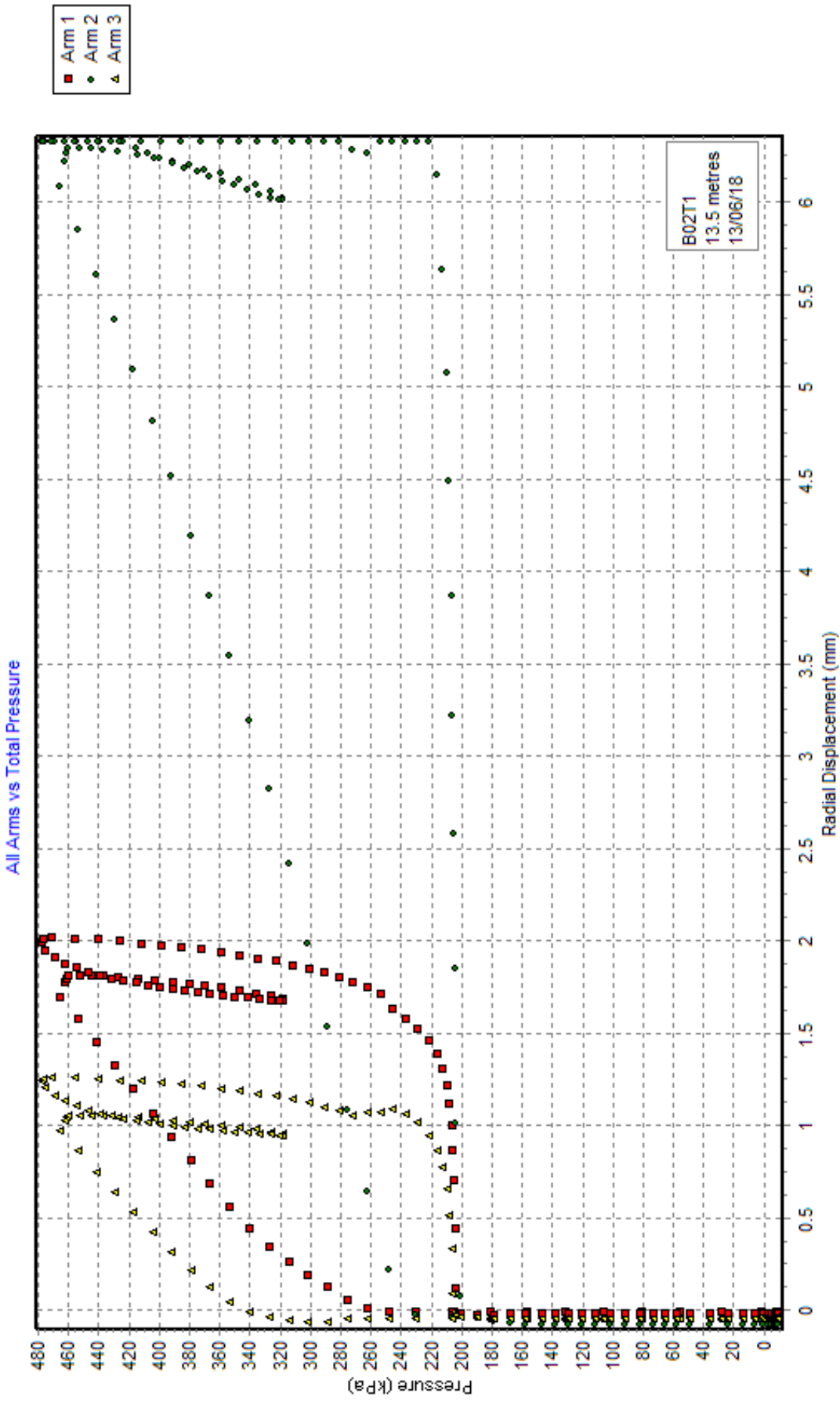


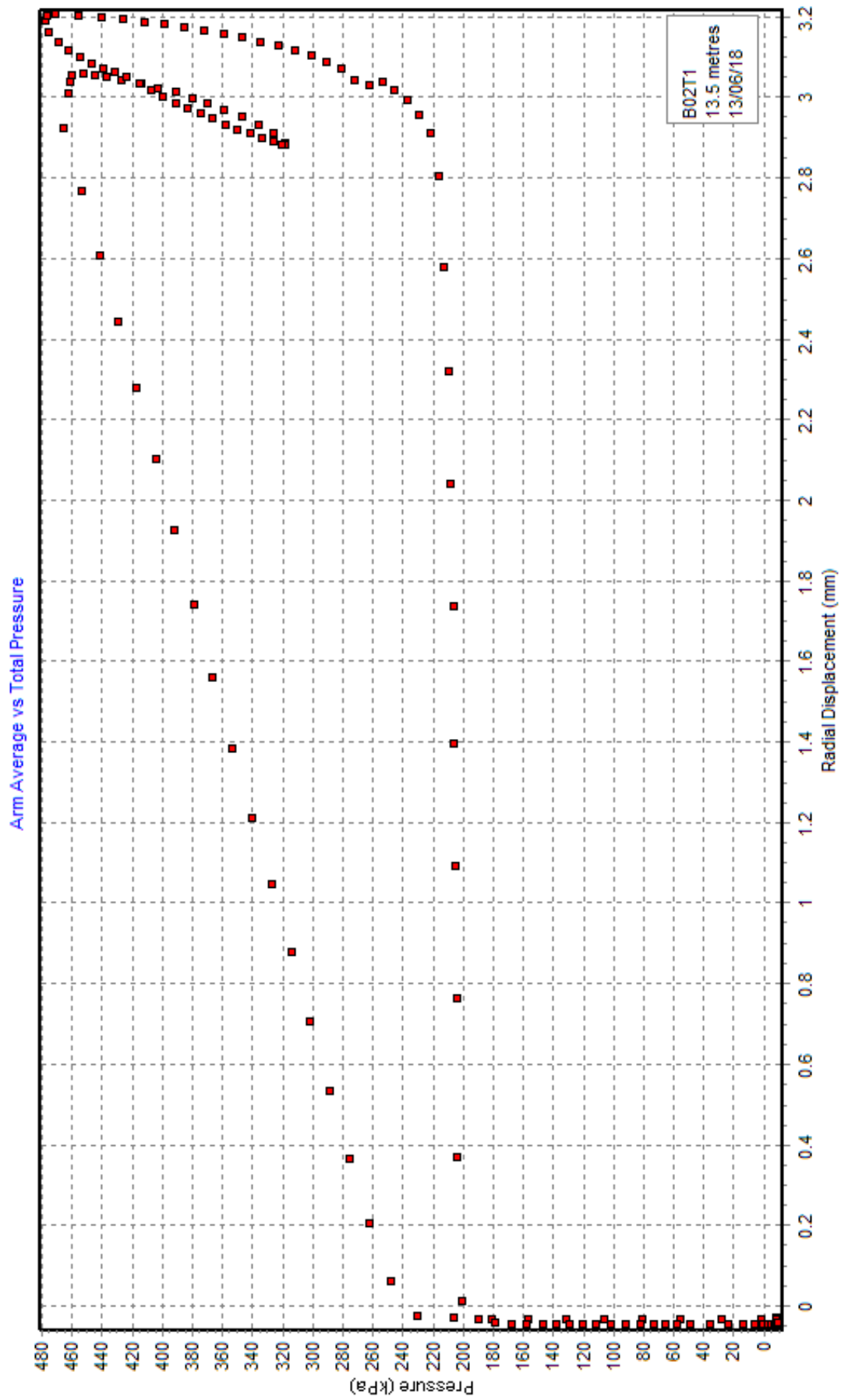




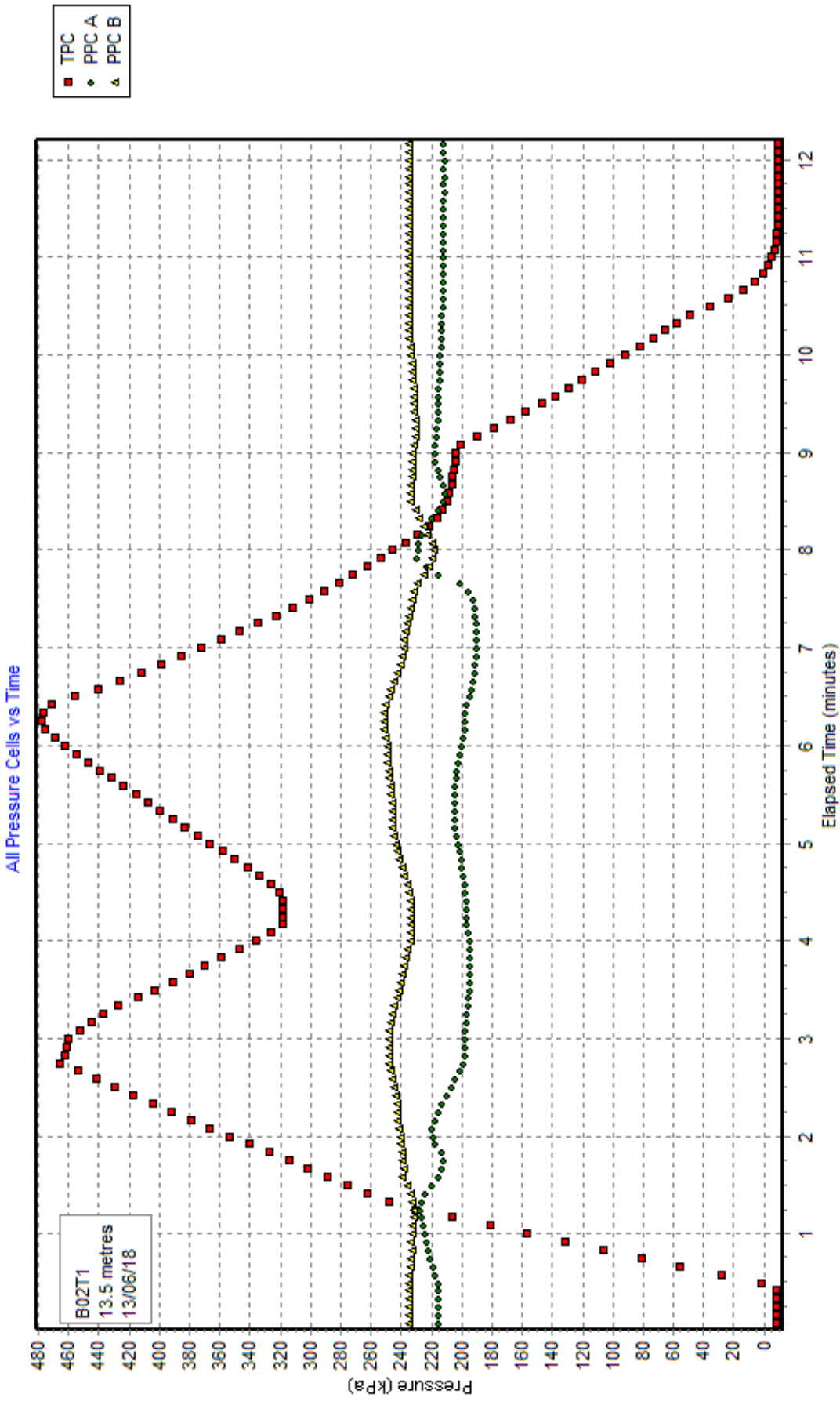


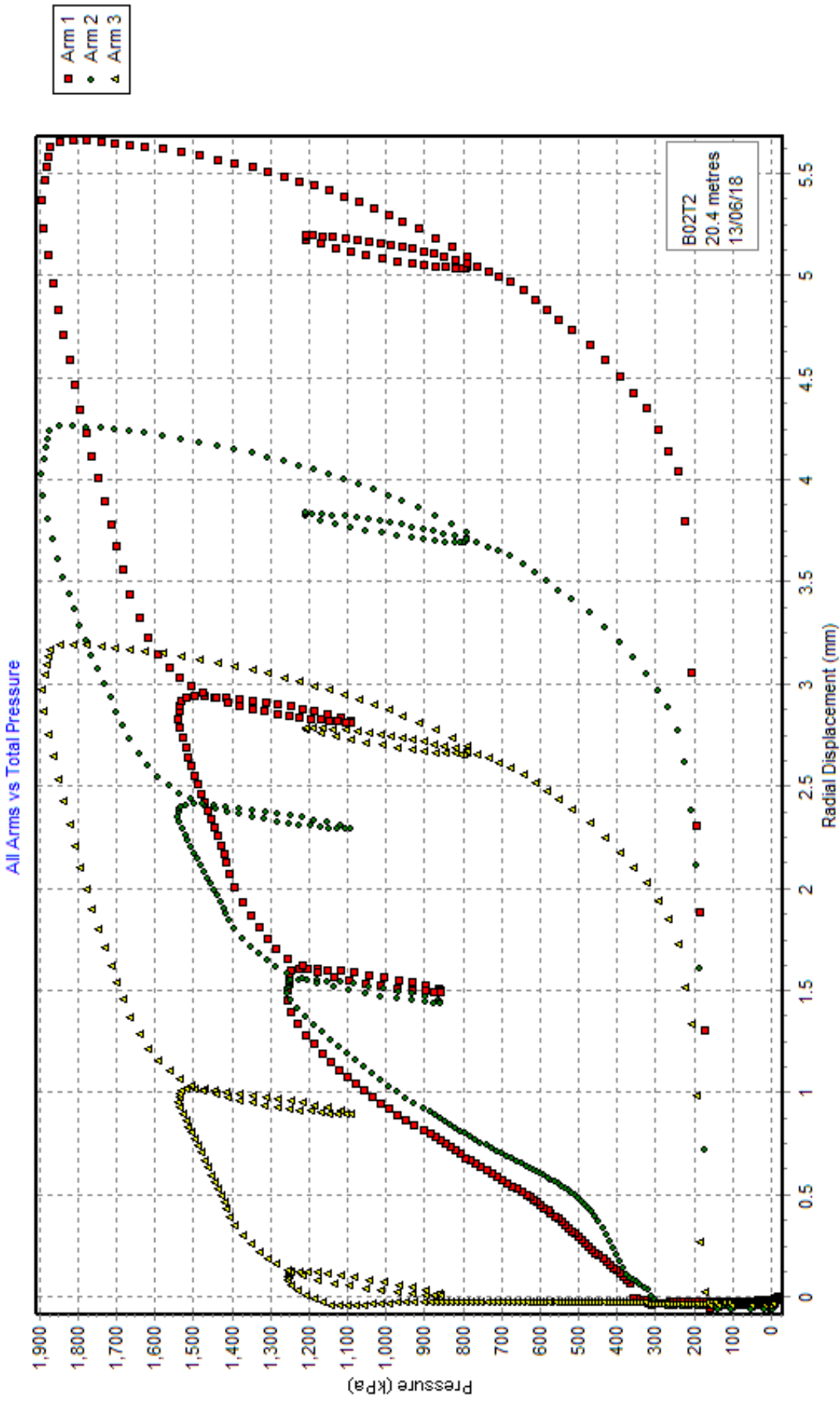


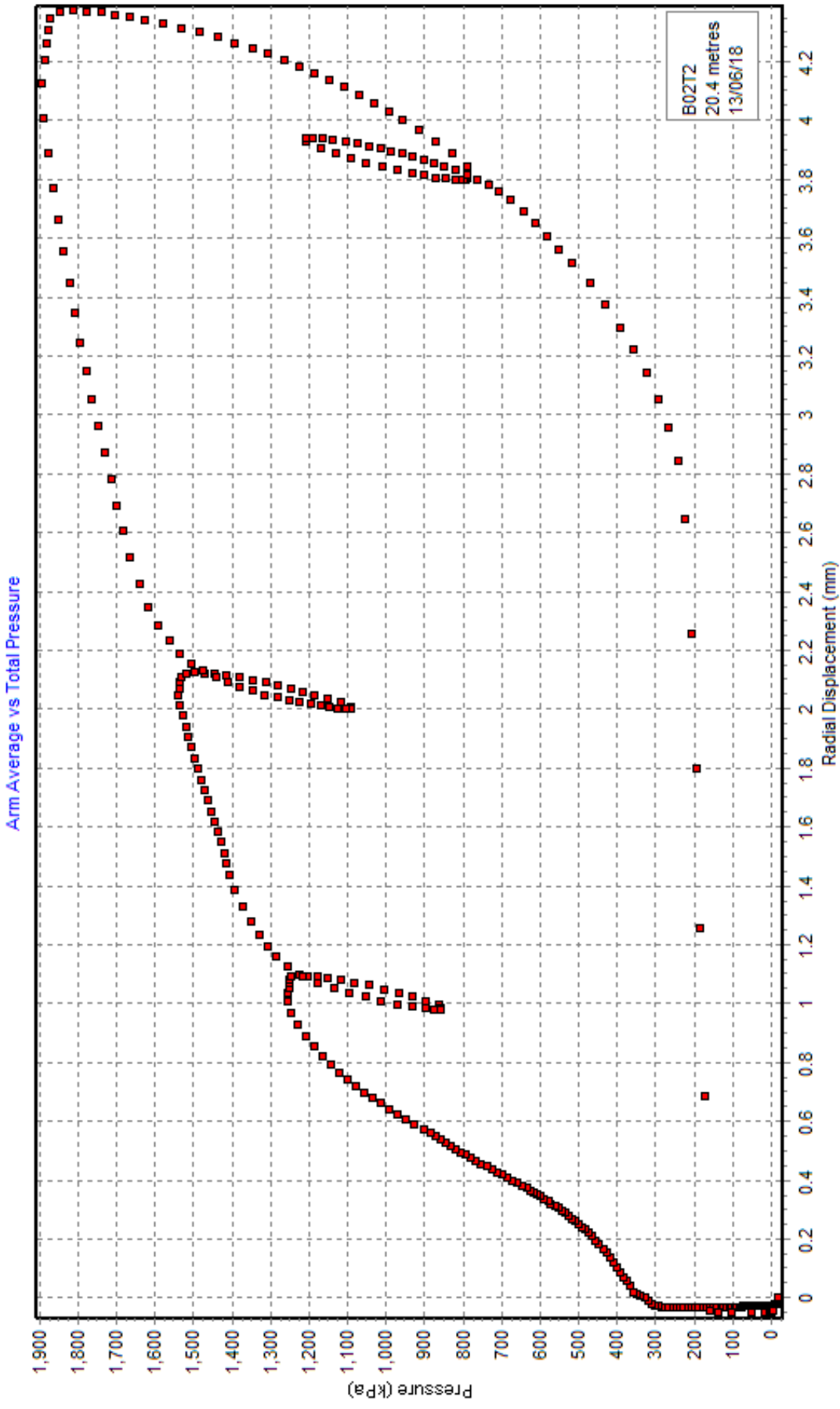


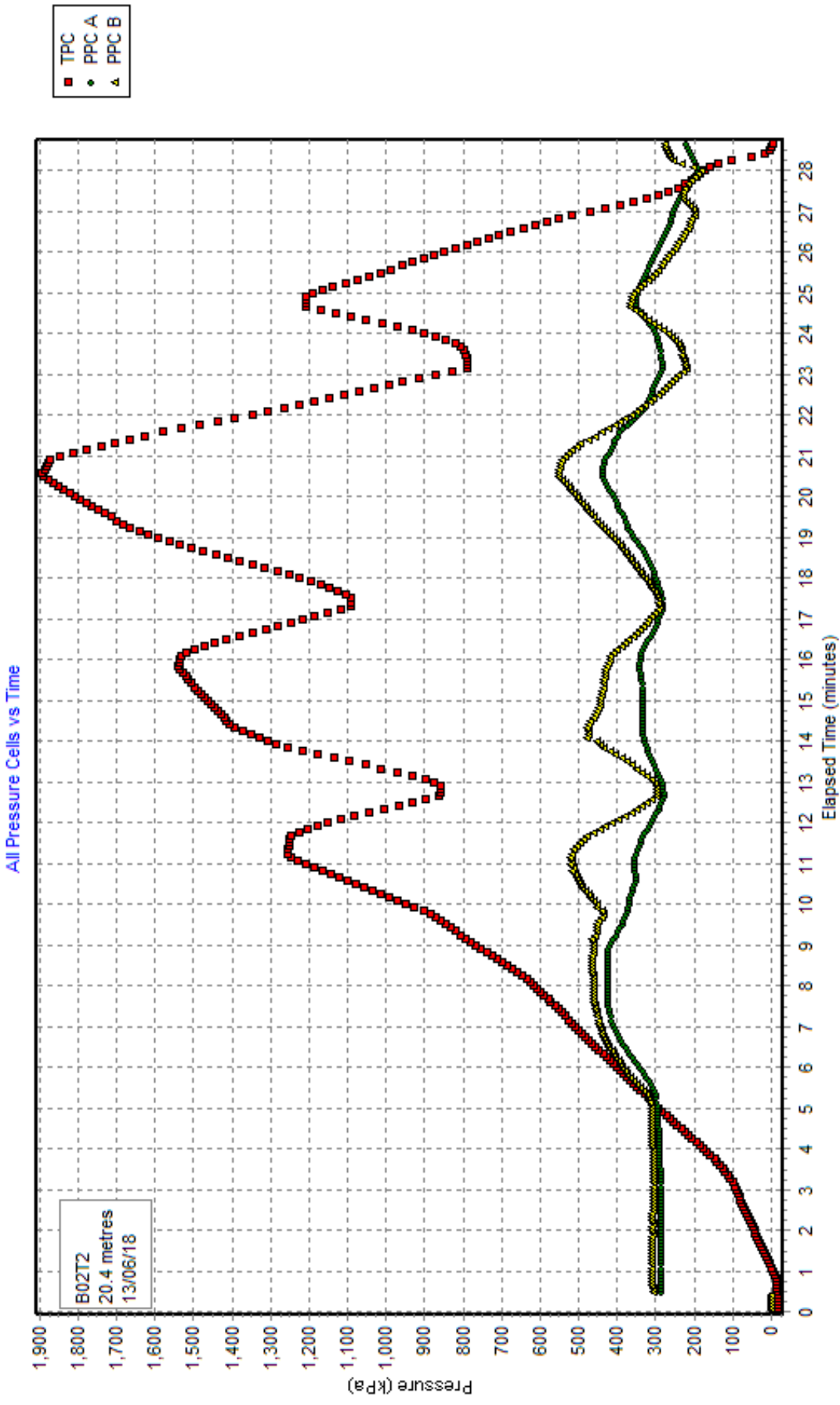












[DETAILS OF TEST]

Project :  
Site : Gt Yarmouth 3RC  
Borehole : BH02  
Test name : BH02 Test 2  
Test date : 13 Jun 18  
Test depth : 20.40 Metres  
Water table : Nothing entered  
Ambient PWP : Nothing entered  
Material : Sandy clay  
Probe : Digital 3 arm weak rock self boring pressuremeter  
Diameter : 88.1 mm  
Data analysed using average arm displacement curve  
A non-linear analysis of the rebound cycles has been carried out  
The file includes results from a curve fitting analysis

Analysed by SDB on 15 Jun 18

Remarks:

[RESULTS FOR CAVITY REFERENCE PRESSURE]

Strain Origin (mm) : "Arm ave=0.87"  
Po from Marsland & Randolph (kPa) : "Arm ave=554.5"  
Po from Lift off (kPa) : "Arm ave=275.6"  
Best estimate of Po (kPa) : "Arm ave=555.0"

[UNDRAINED STRENGTH PARAMETERS]

Gibson & Anderson 1961 - Cu (kPa) : "Arm ave=279.7"  
Limit pressure (kPa) : "Arm ave=2471"  
Jefferies 1988 - Cu (kPa) : "Arm ave=279.6"  
Undrained yield stress (kPa) : "Arm ave=765.2"

[LINEAR INTERPRETATION OF SHEAR MODULUS G]

Initial slope shear modulus (MPa) : "Arm ave=32.0"

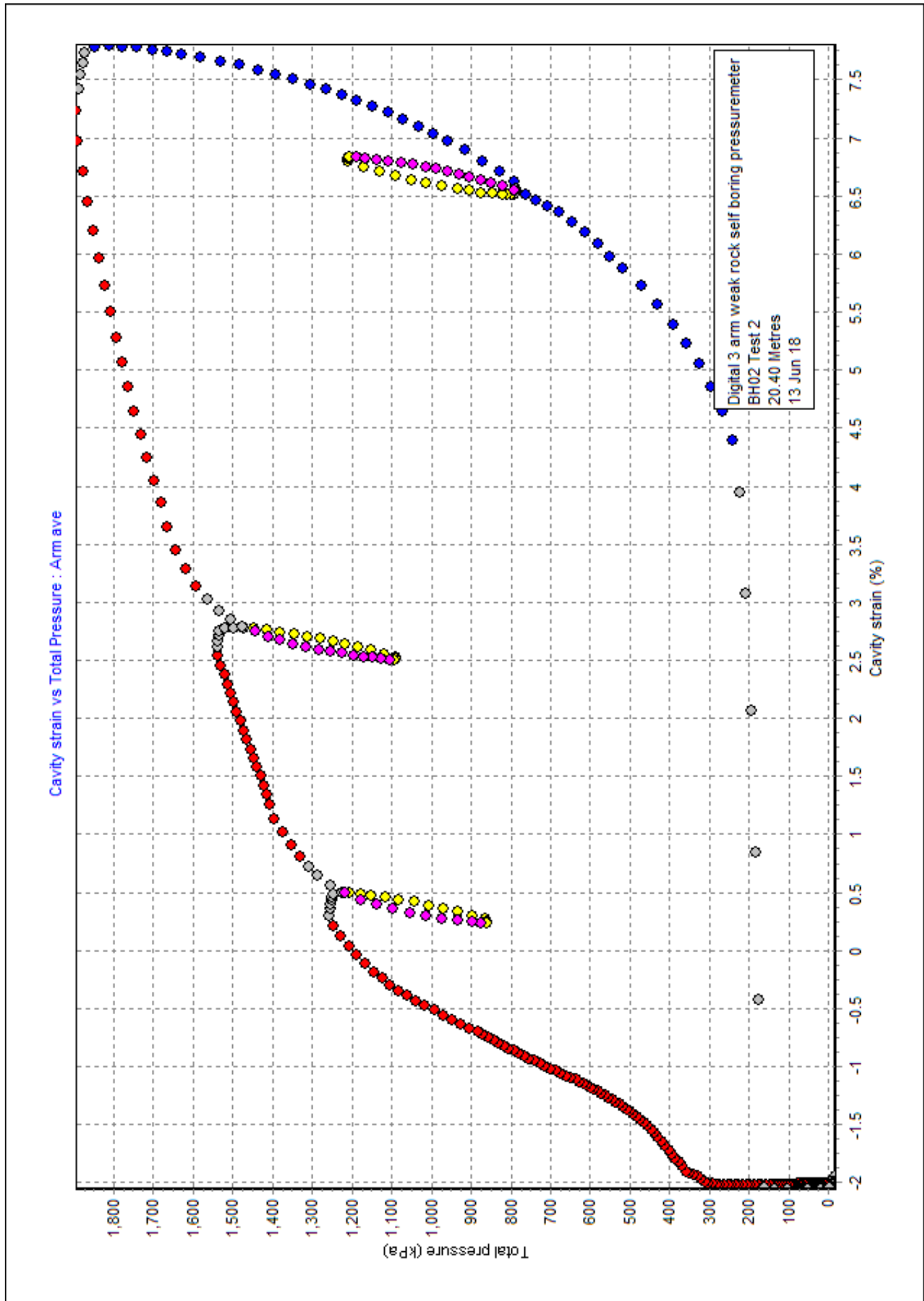
Axis	Loop No	Value (MPa)	Mean Strain (%)	Mean Pc (kPa)	dE (%)	dPc (kPa)
Arm ave	1	69.8	0.374	1038	0.509	357
Arm ave	2	72.1	2.648	1275	0.510	369
Arm ave	3	68.4	6.681	1001	0.601	412

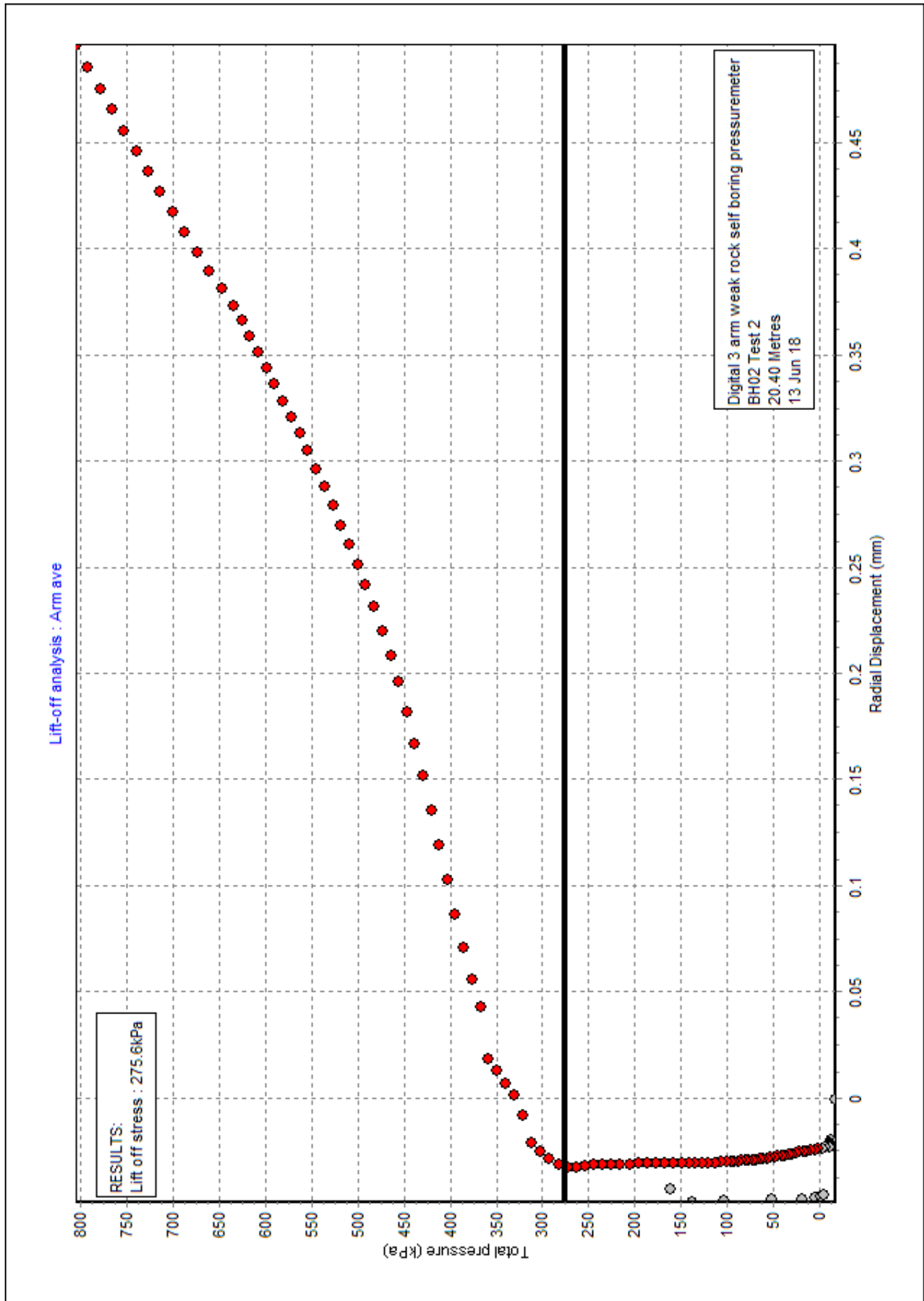
[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

Axis	Loop No	Intercept (MPa)	Alpha (MPa)	Gradient
Arm ave	1	12.631	8.429	0.667
Arm ave	2	16.059	11.259	0.701
Arm ave	3	15.259	10.375	0.680

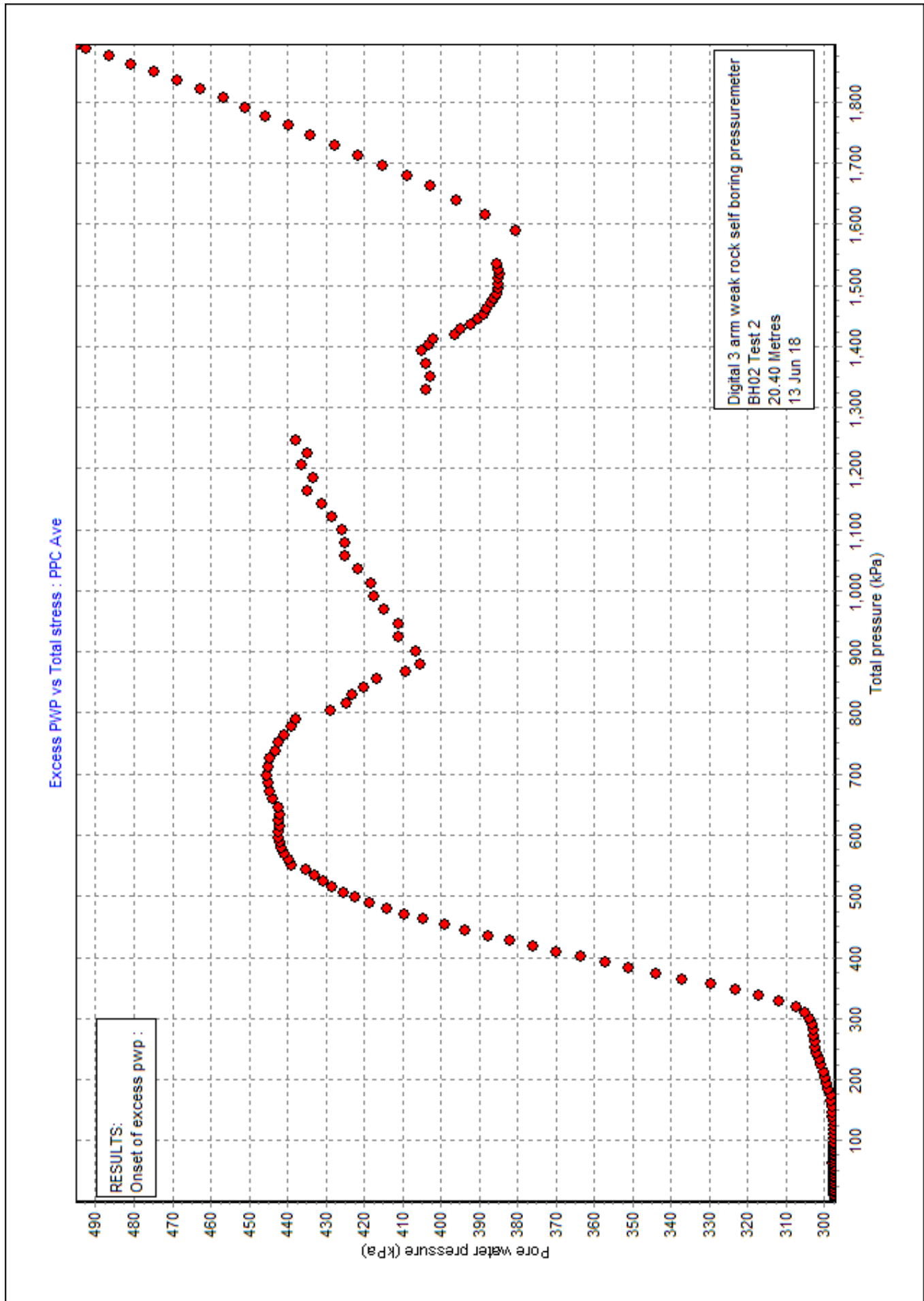
[PARAMETERS USED FOR UNDRAINED CURVE MODELLING]

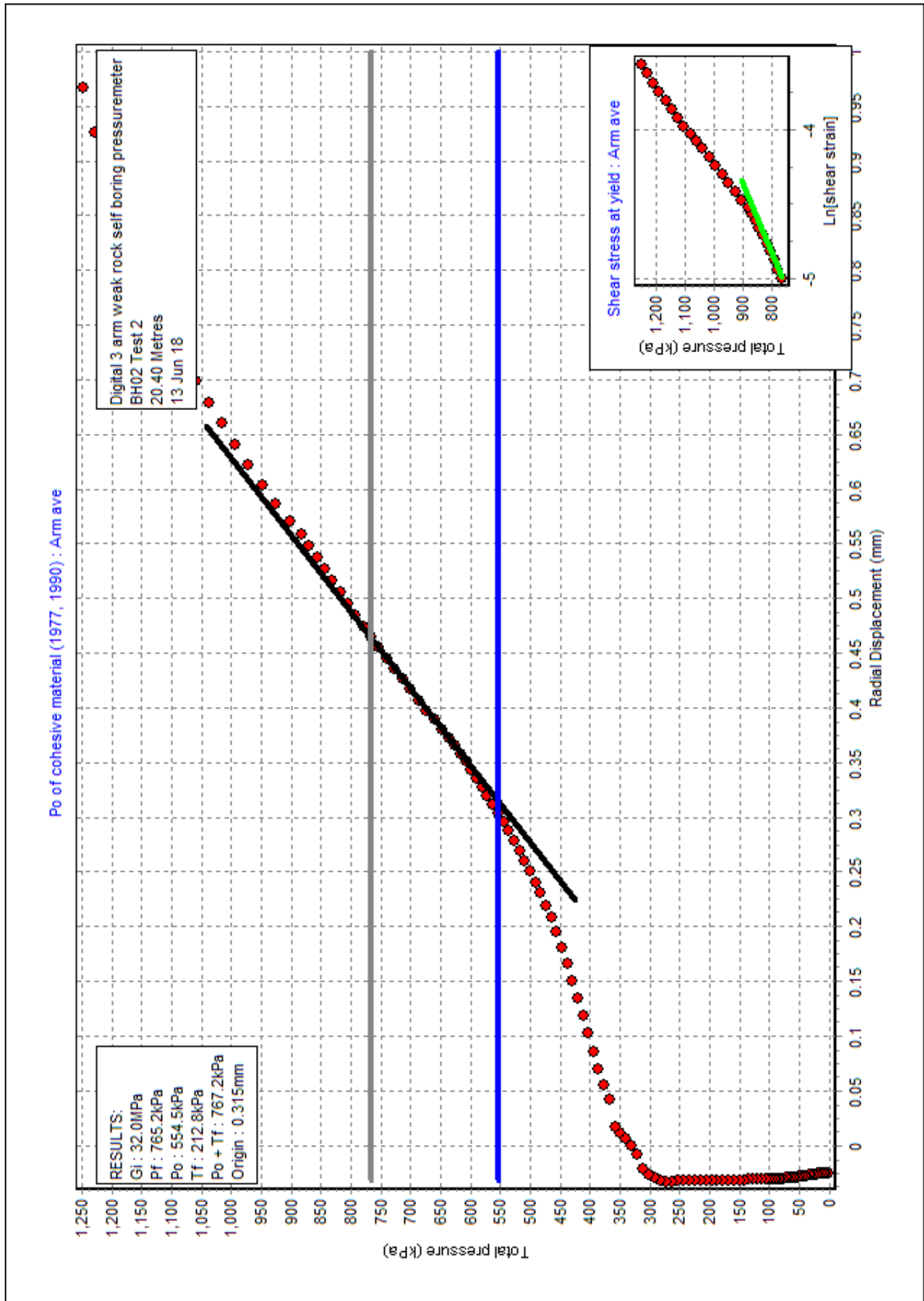
{Axis is Arm ave}  
Strain Origin (mm) : 0.87  
Po (kPa) : 555  
Cu (kPa) : 279.7  
Limit pressure (kPa) : 2471  
Non-linear exponent : 0.680  
Calculated alpha (MPa) : 10.837  
G at yield (MPa) : 60.6

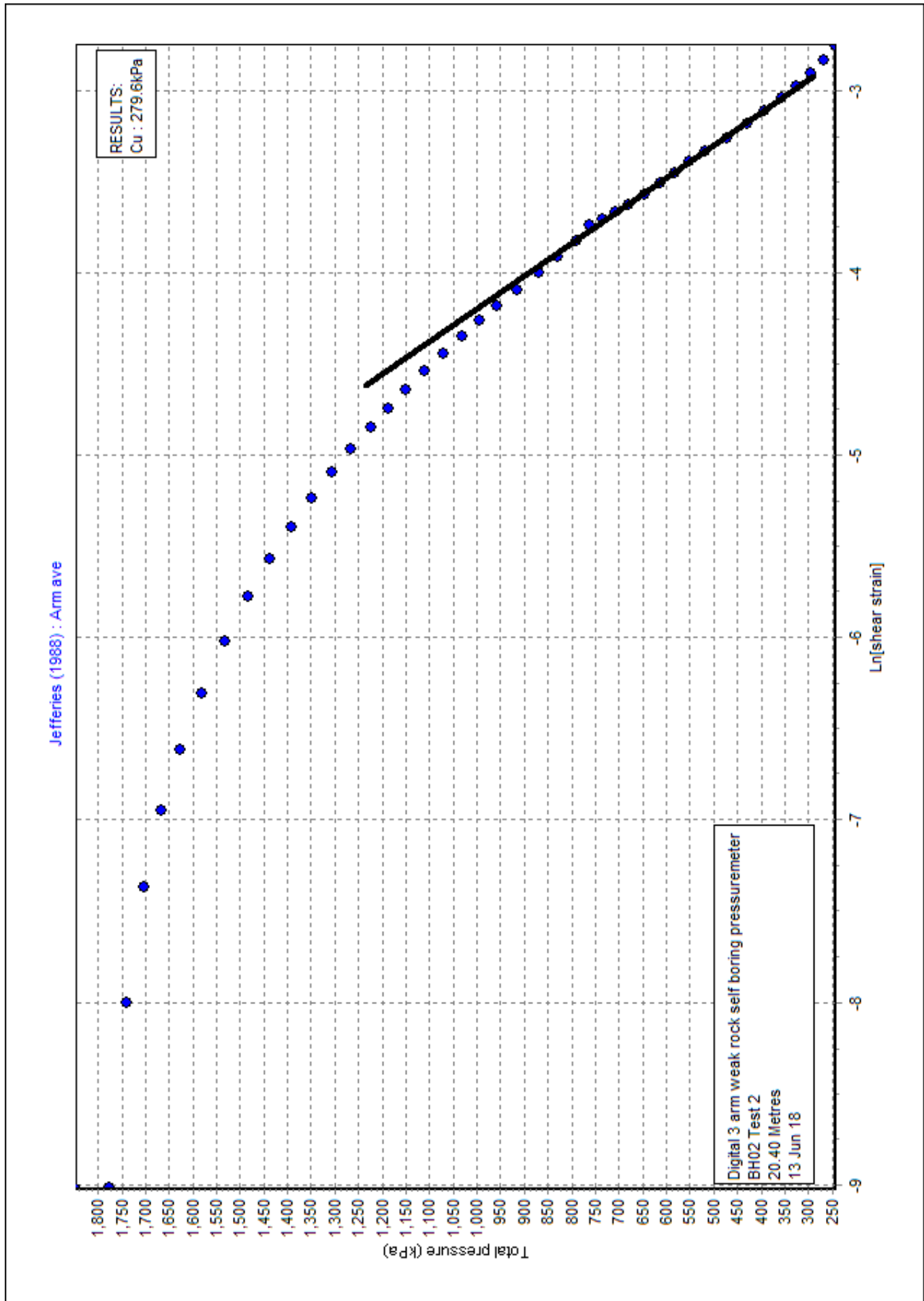


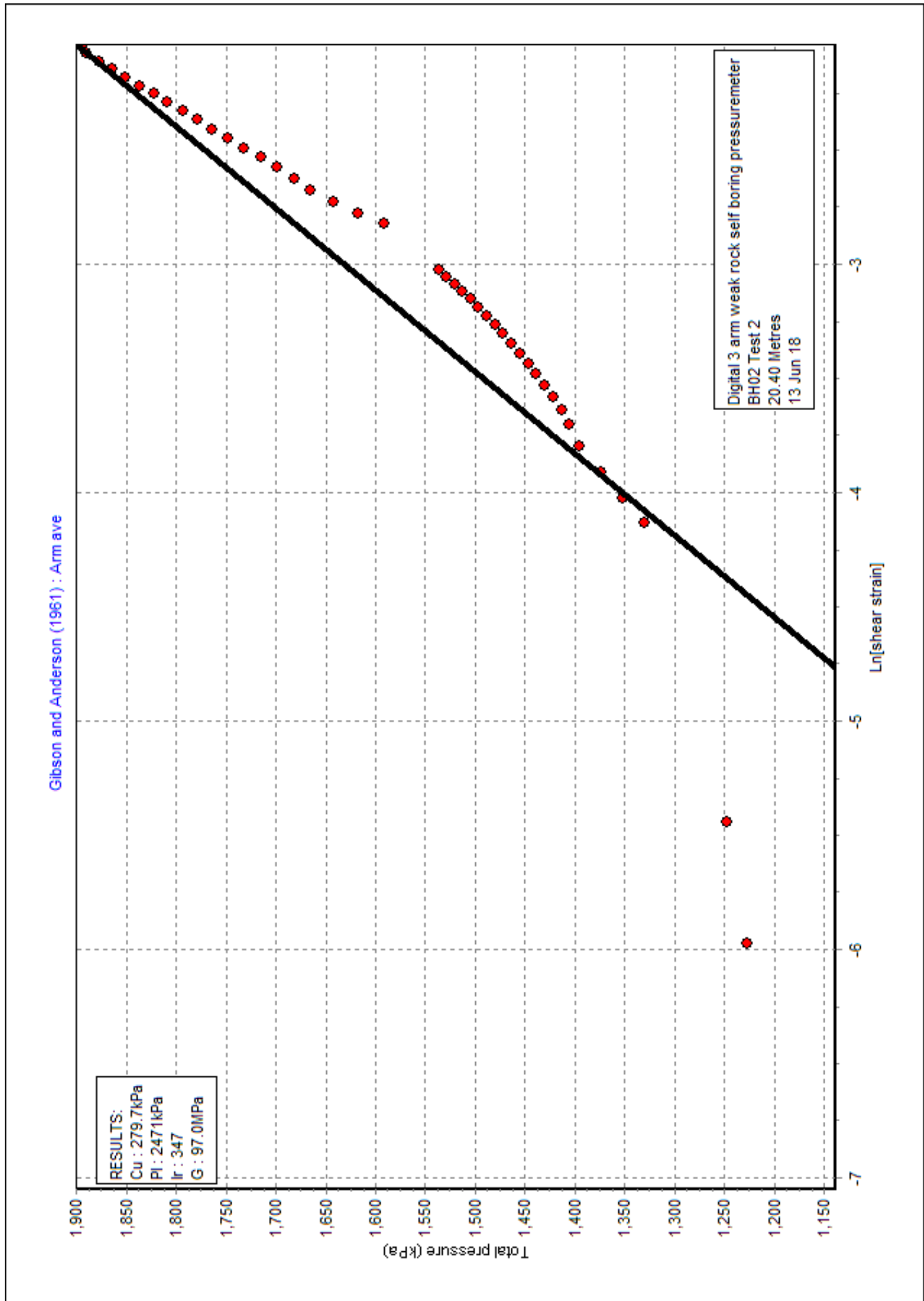


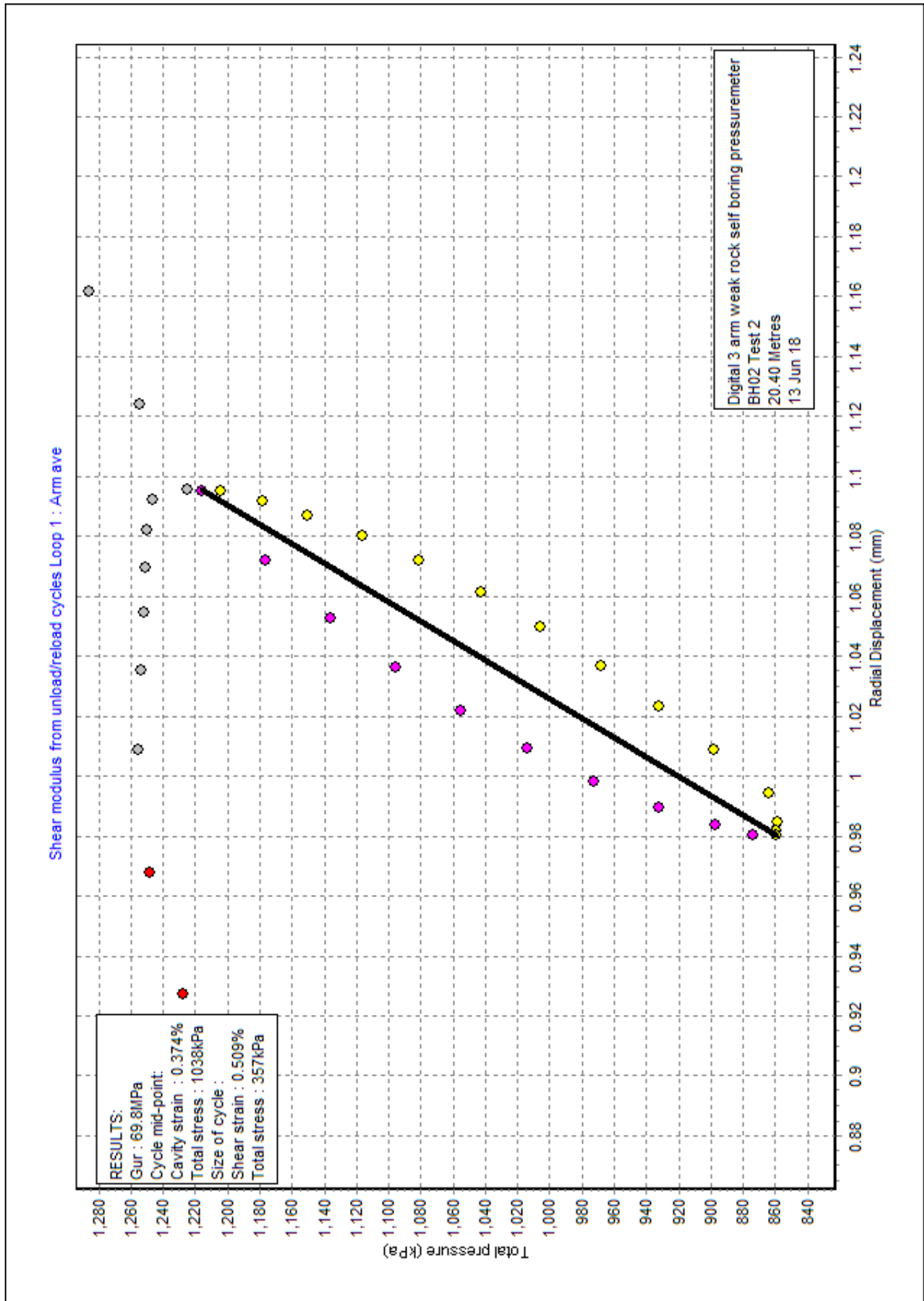


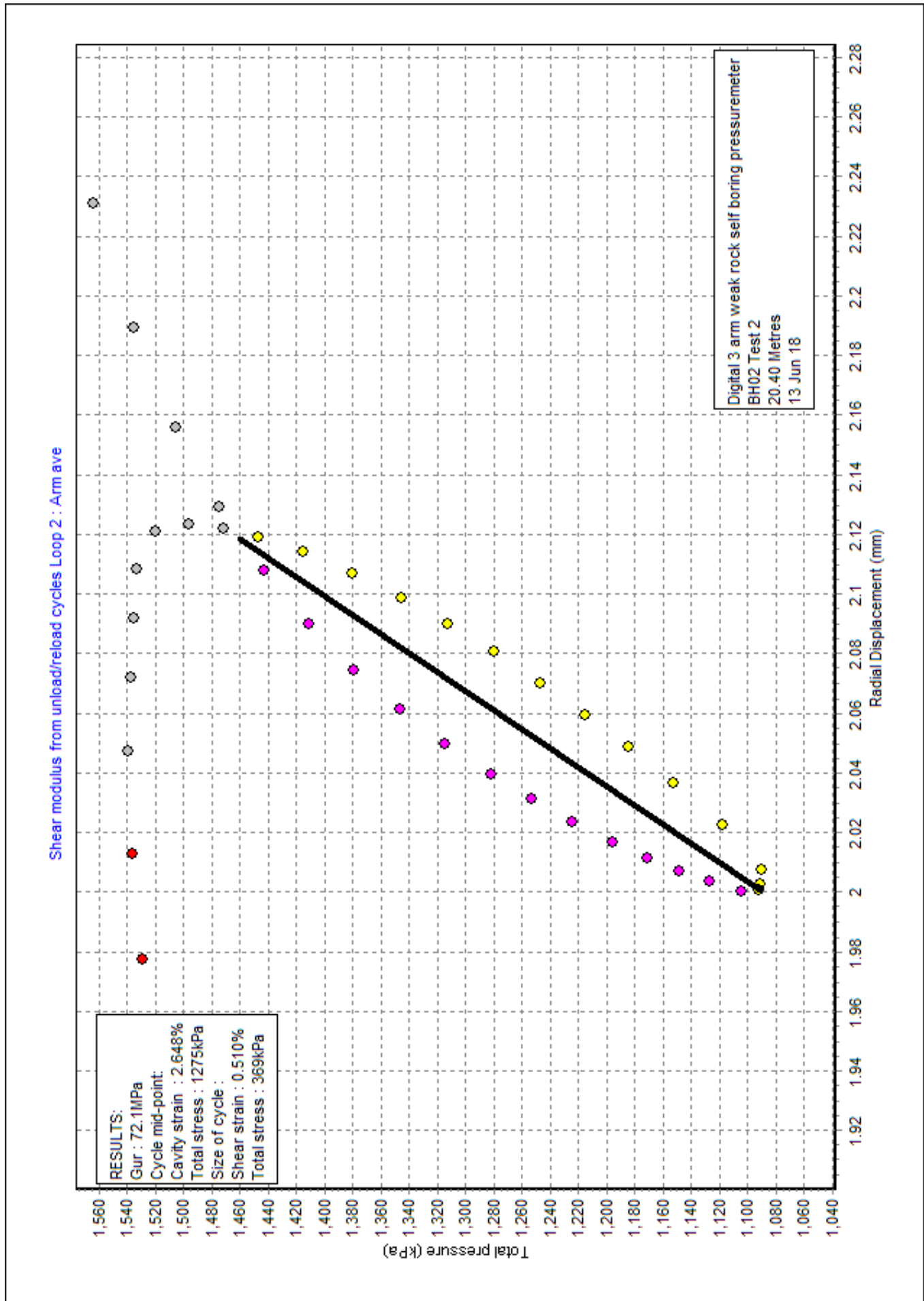


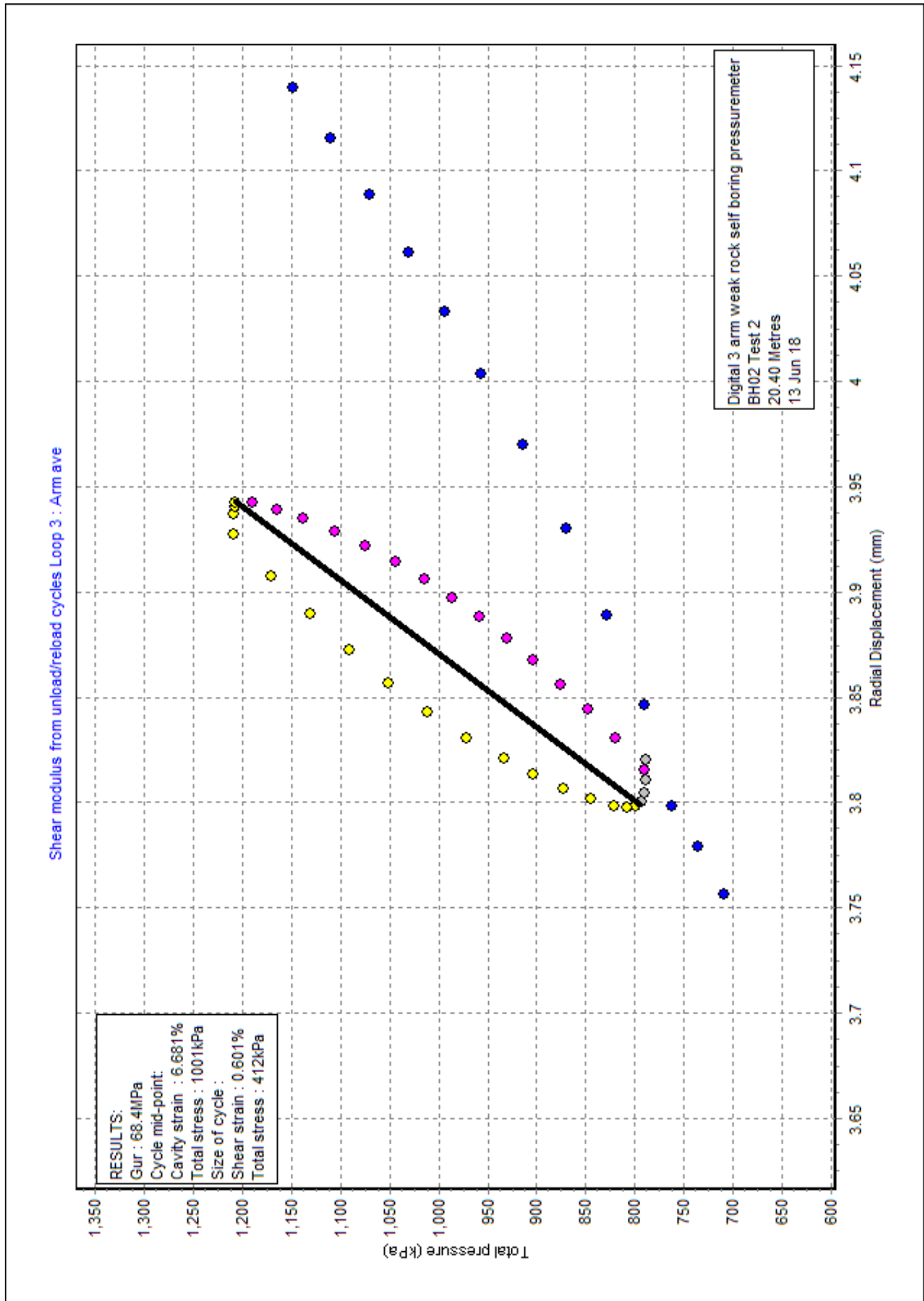




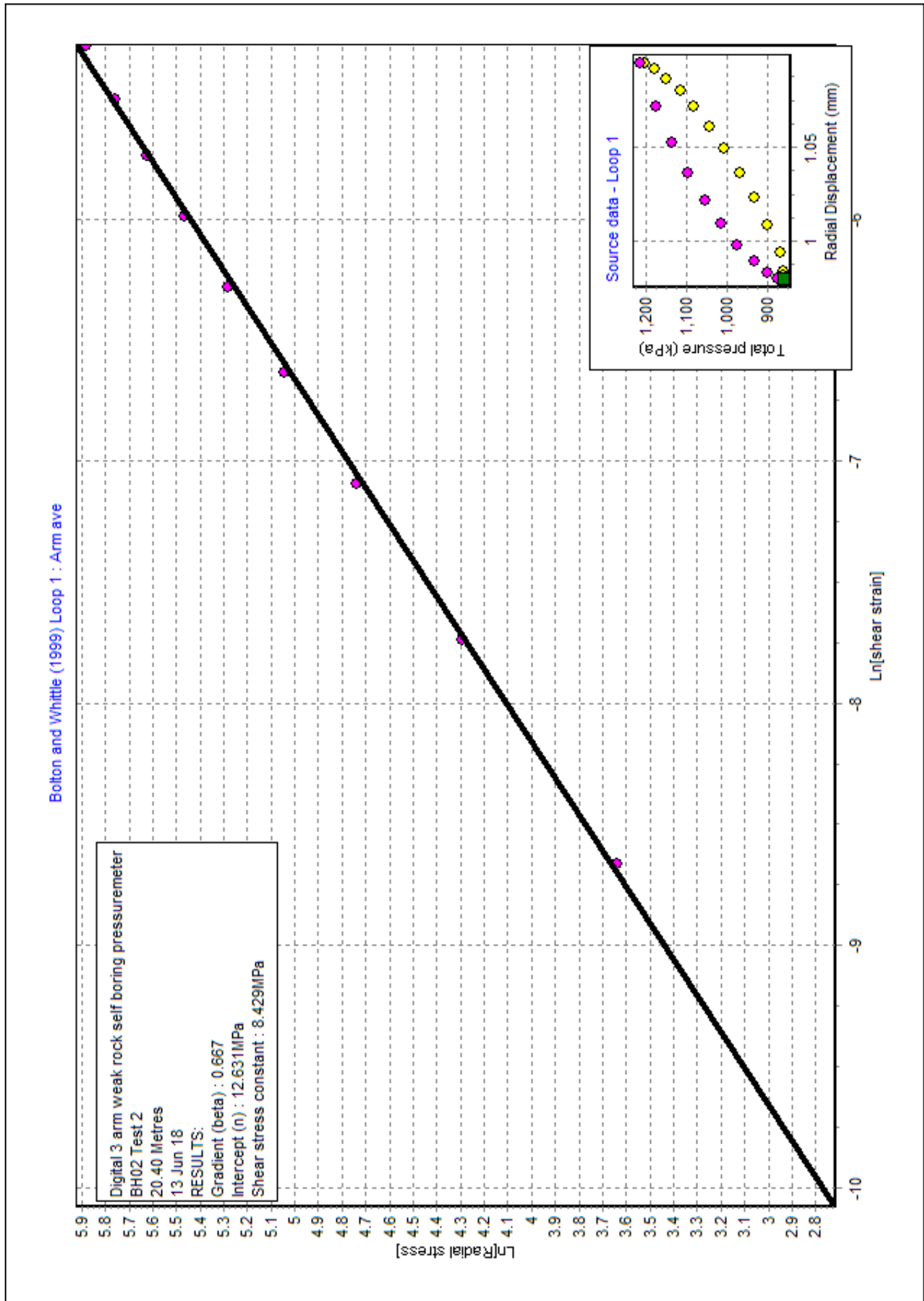


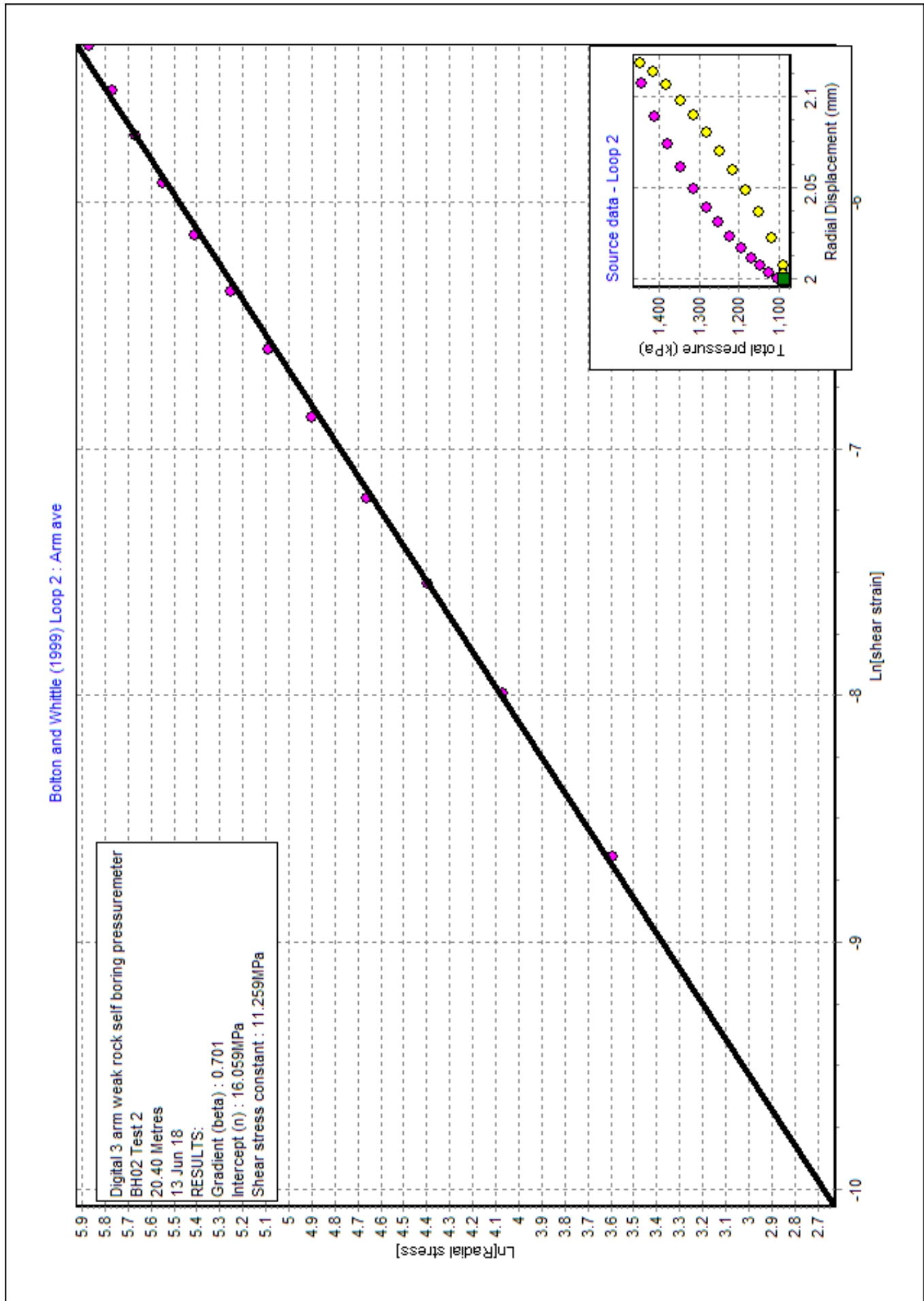


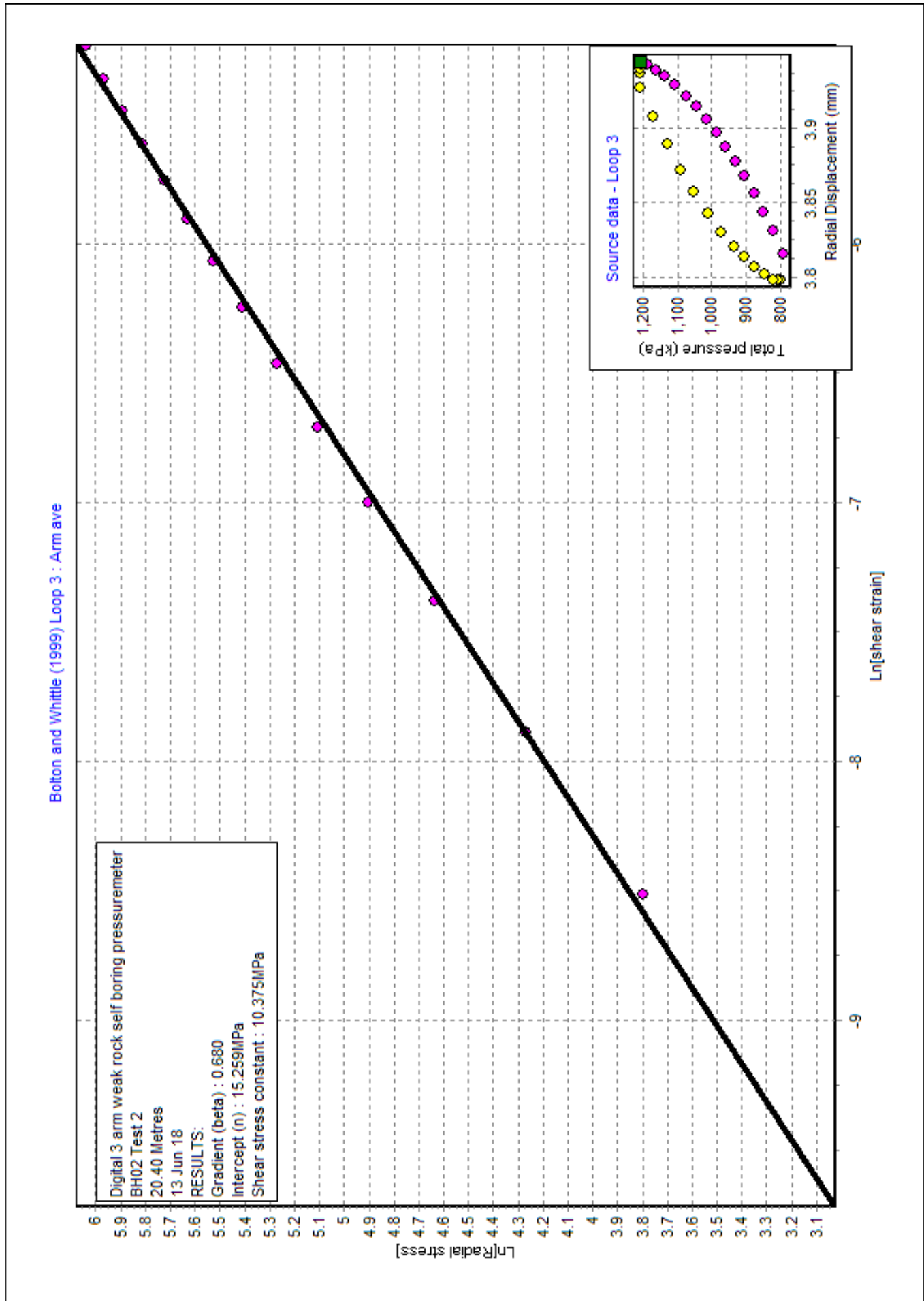


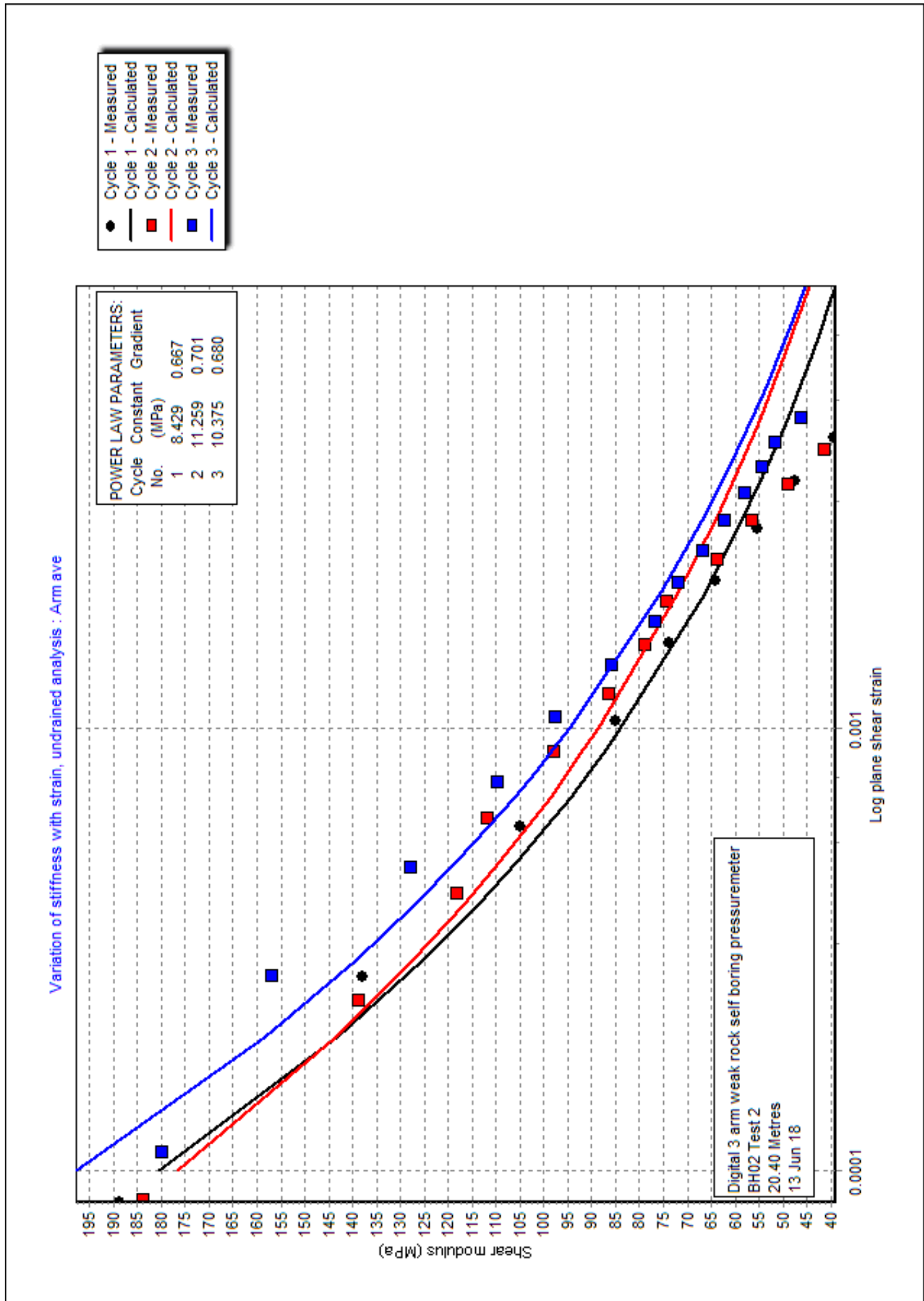


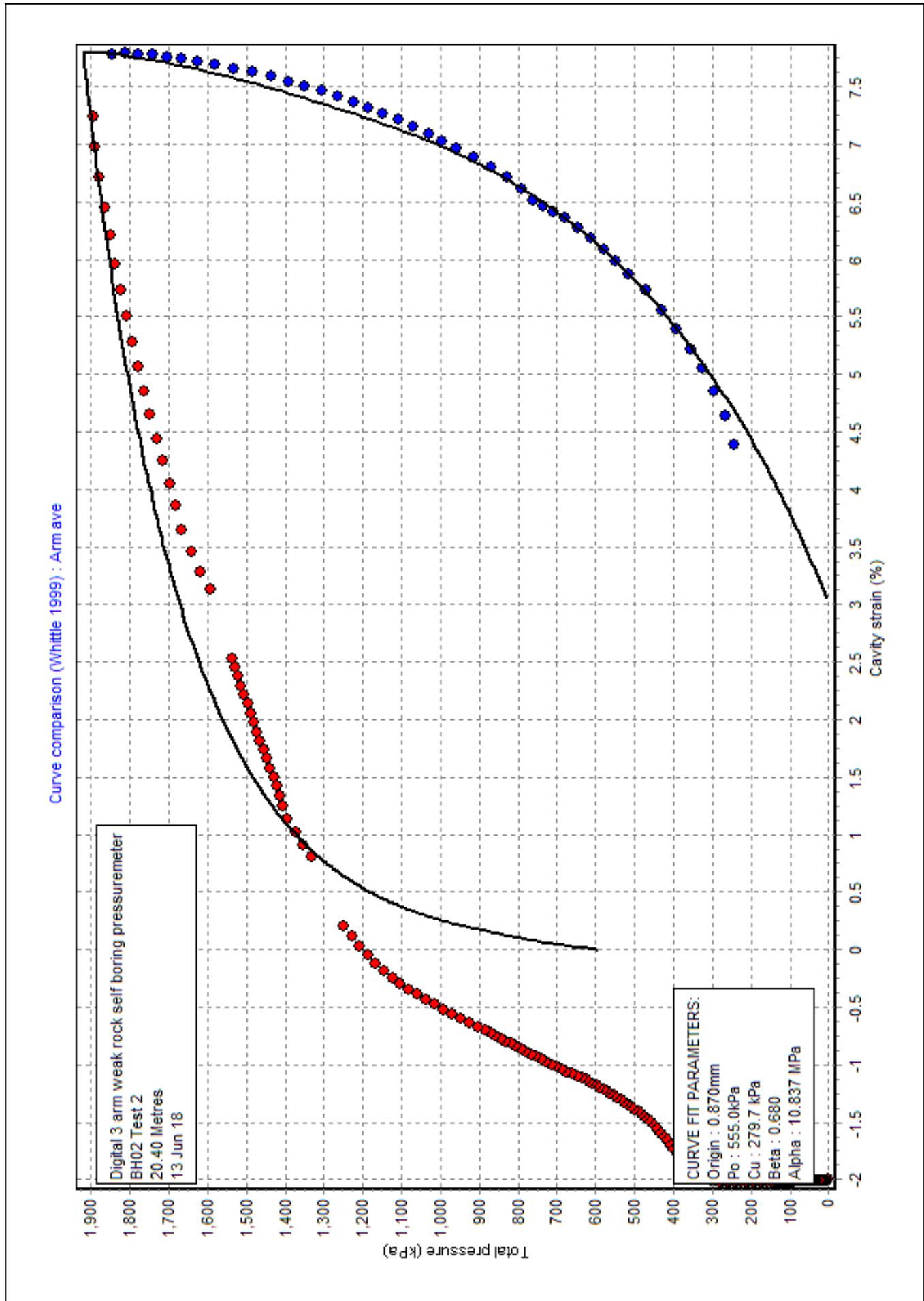












# Great Yarmouth Third River Crossing

Borehole: MB09

Date: 13<sup>th</sup> July 2018

Revision No: 1

Pressuremeter tests

Preliminary analysis

Report reference: CIR1420/18

Cambridge Insitu Limited

[DETAILS OF TEST]

Project :  
Site : Gt Yarmouth 3RC  
Borehole : MB09  
Test name : MB09 Test 1  
Test date : 3 Jul 18  
Test depth : 23.00 Metres  
Water table : Nothing entered  
Ambient PWP : Nothing entered  
Material : Sandy clay  
Probe : Digital 3 arm weak rock self boring pressuremeter  
Diameter : 88.1 mm  
Data analysed using average arm displacement curve  
A non-linear analysis of the rebound cycles has been carried out

Analysed by SDB on 13 Jul 18

Remarks:

[RESULTS FOR CAVITY REFERENCE PRESSURE]

Strain Origin (mm) : "Arm ave=0.20"  
Po from Marsland & Randolph (kPa) : "Arm ave=587.5"  
Po from Lift off (kPa) : "Arm ave=359.4"  
Best estimate of Po (kPa) : "Arm ave=587.0"

[UNDRAINED STRENGTH PARAMETERS]

Gibson & Anderson 1961 - Cu (kPa) : "Arm ave=389.1"  
Limit pressure (kPa) : "Arm ave=2531"  
Jefferies 1988 - Cu (kPa) : "Arm ave=240.6"  
Undrained yield stress (kPa) : "Arm ave=680.9"

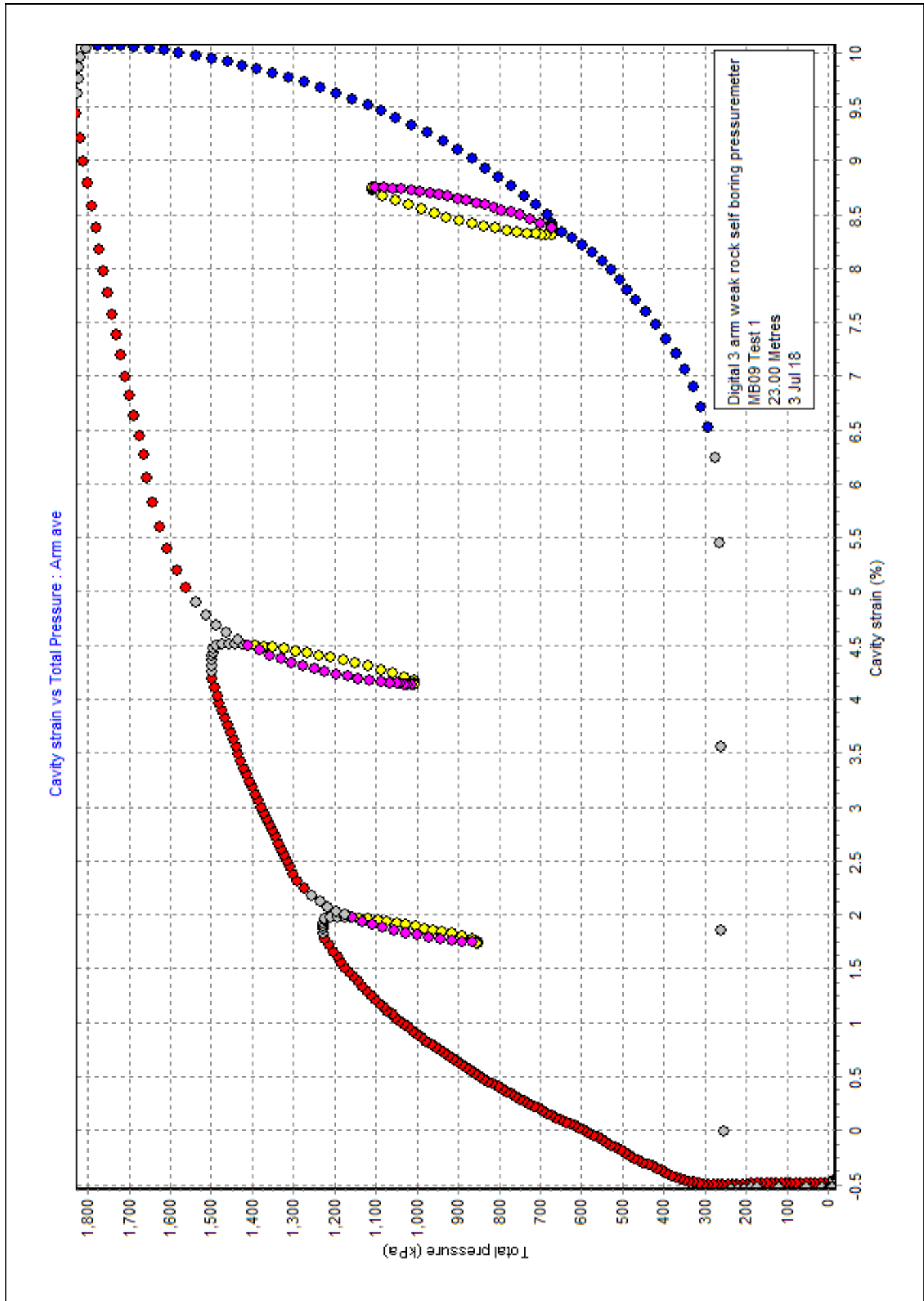
[LINEAR INTERPRETATION OF SHEAR MODULUS G]

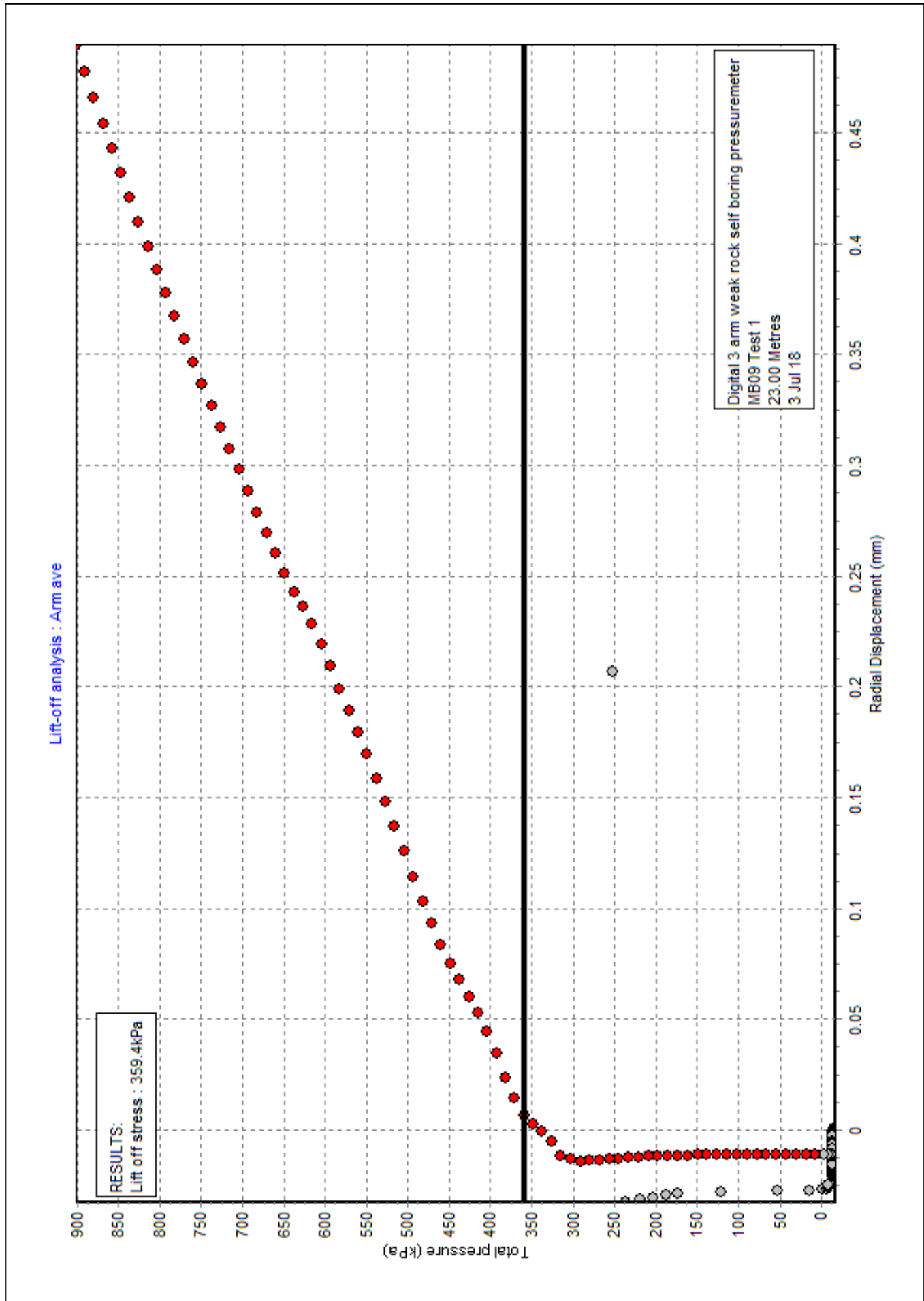
Initial slope shear modulus (MPa) : "Arm ave=29.4"  
Axis Loop Value Mean Strain Mean Pc dE dPc  
No (MPa) (%) (kPa) (%) (kPa)  
Arm ave 1 67.6 1.868 1005 0.453 307  
Arm ave 2 58.1 4.331 1206 0.693 404  
Arm ave 3 53.4 8.541 891 0.809 434

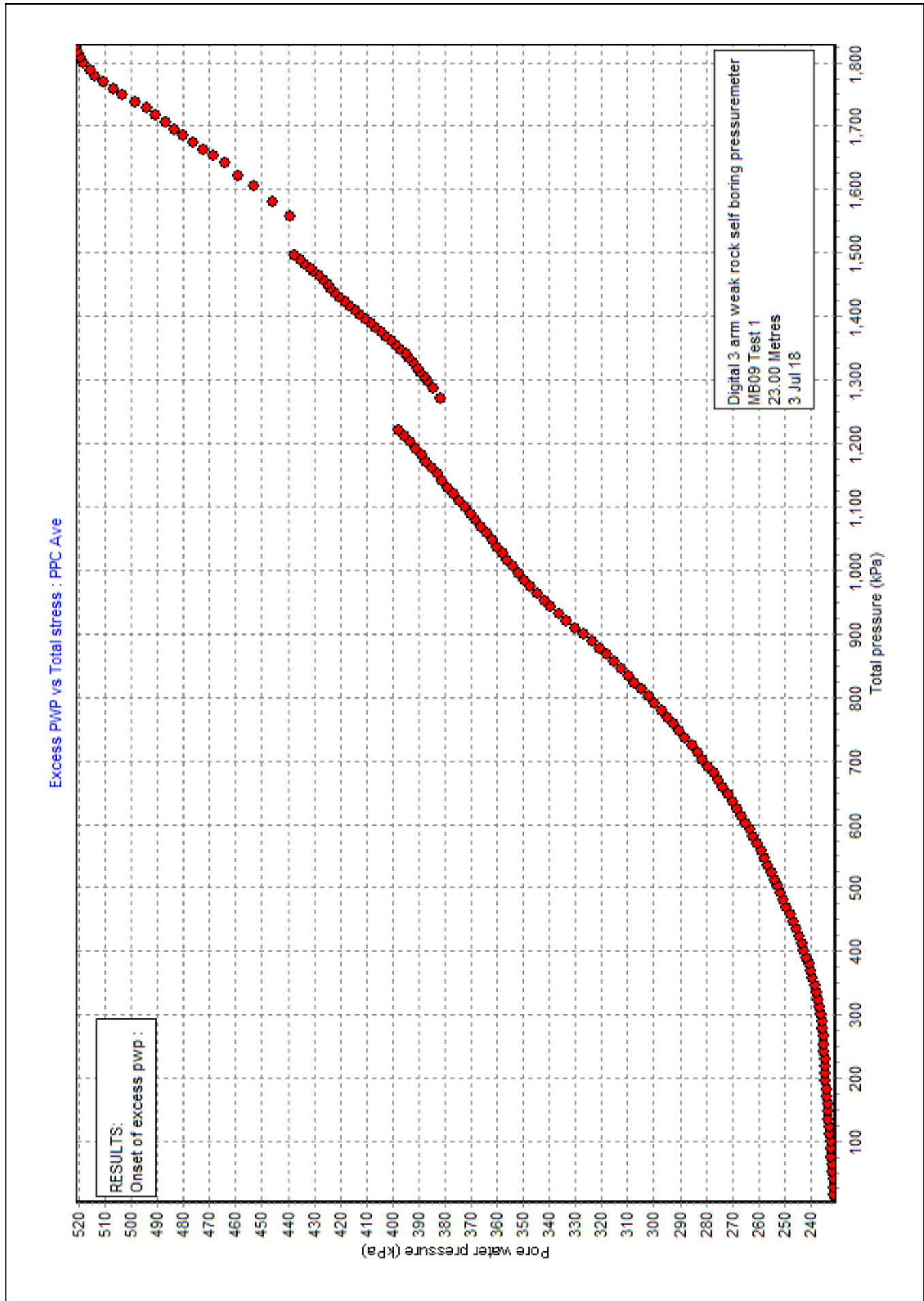
[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

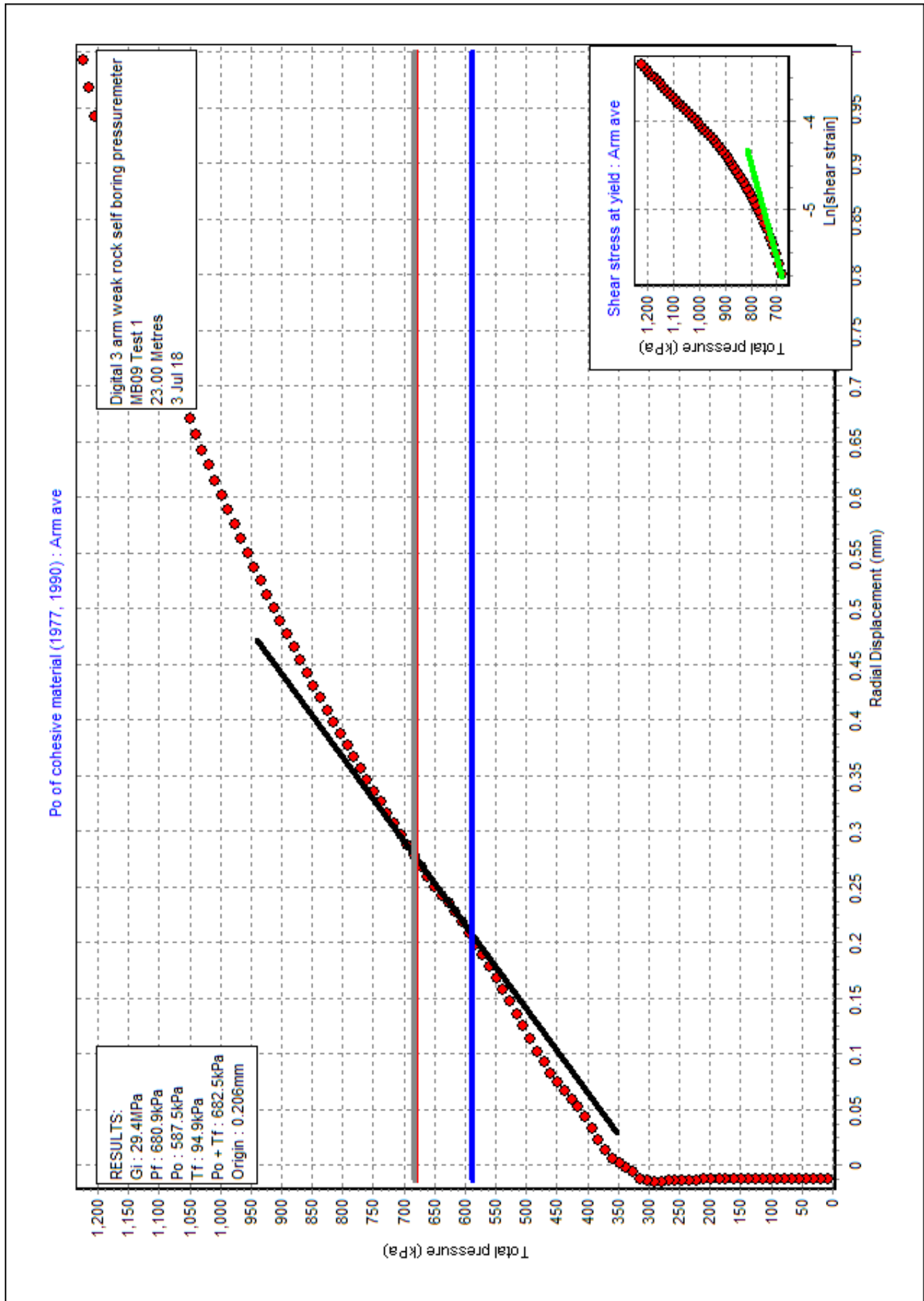
Axis Loop Intercept Alpha Gradient  
No (MPa) (MPa)  
Arm ave 1 9.602 6.106 0.636  
Arm ave 2 12.102 8.086 0.668  
Arm ave 3 11.007 7.055 0.641

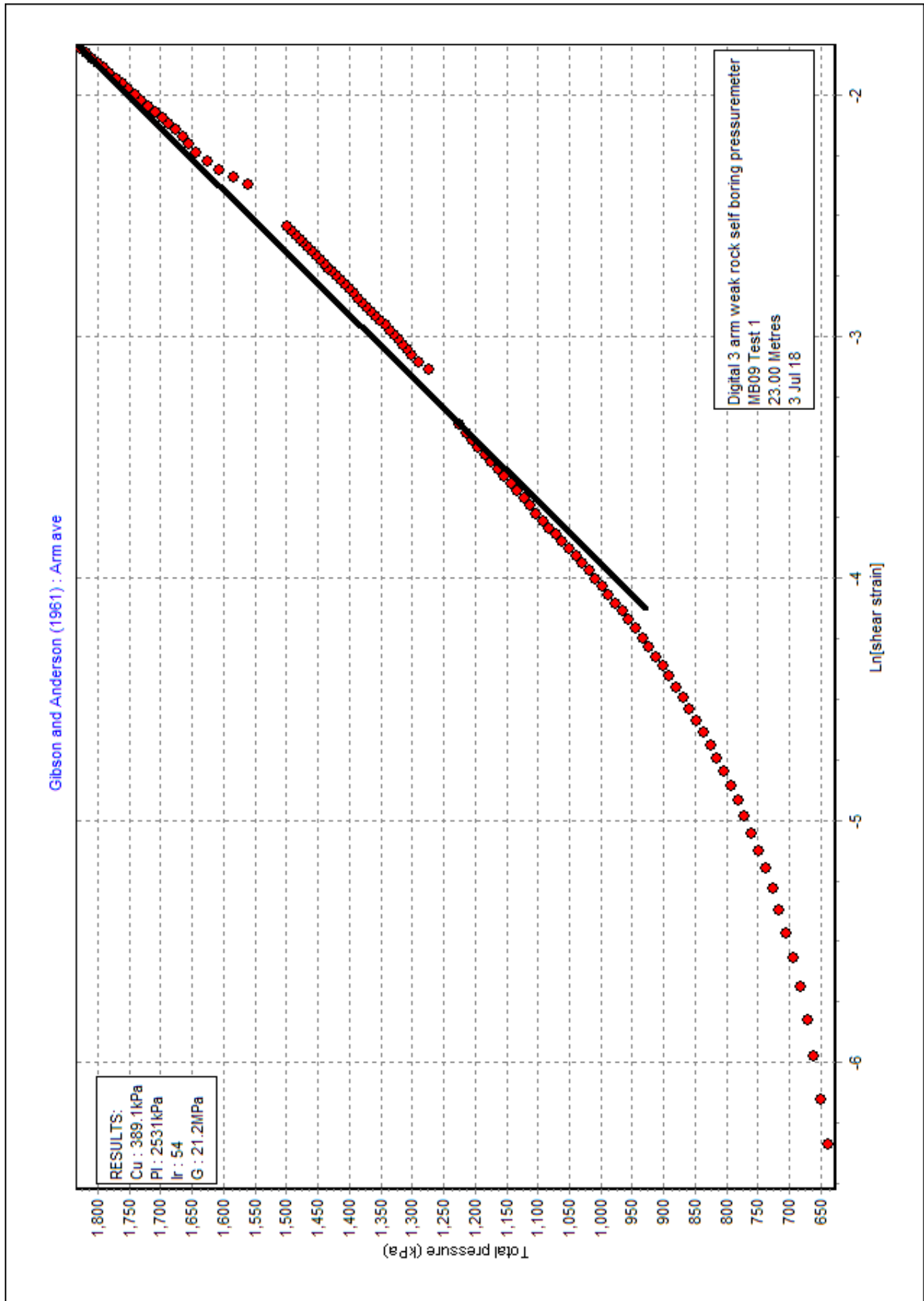


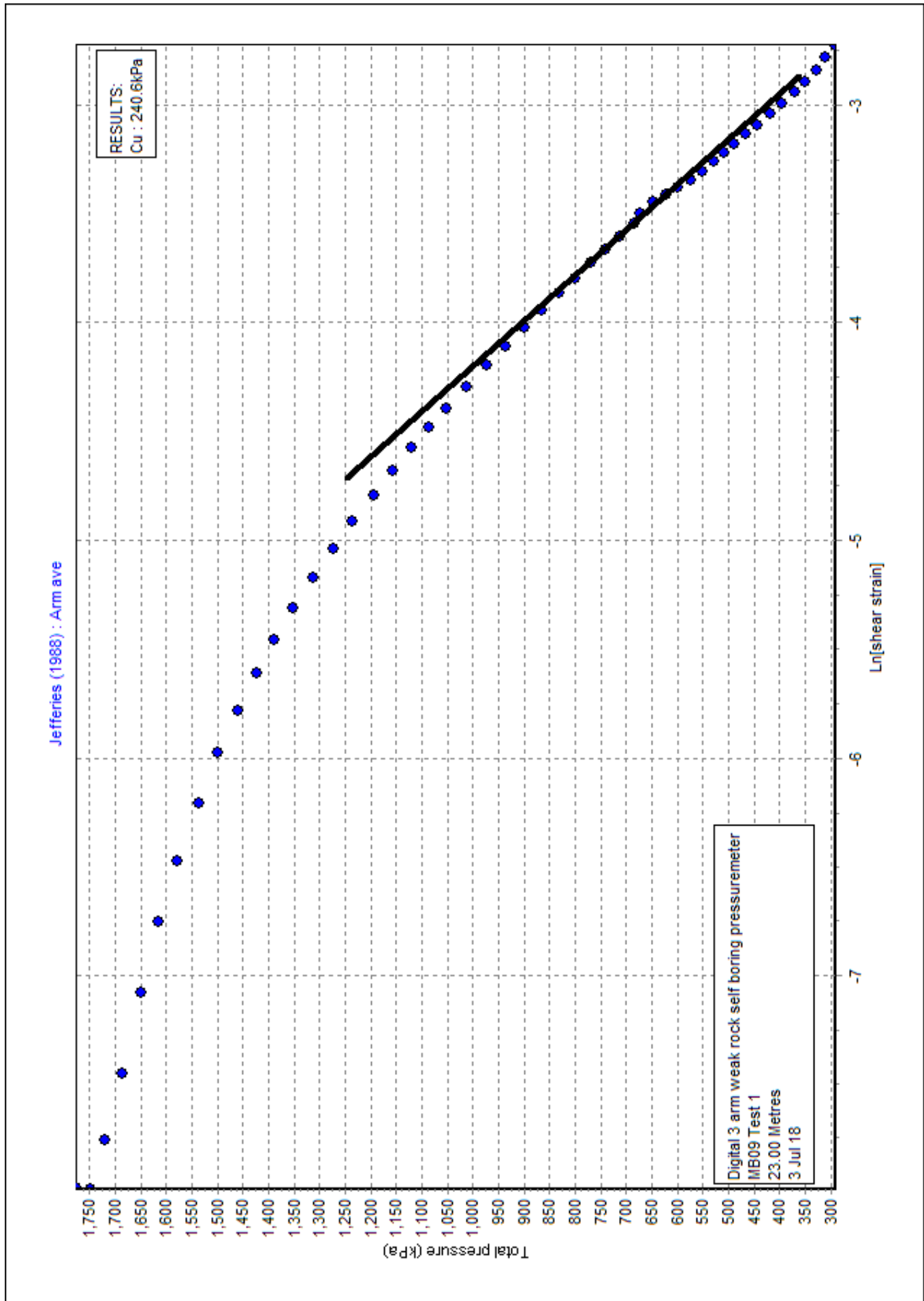


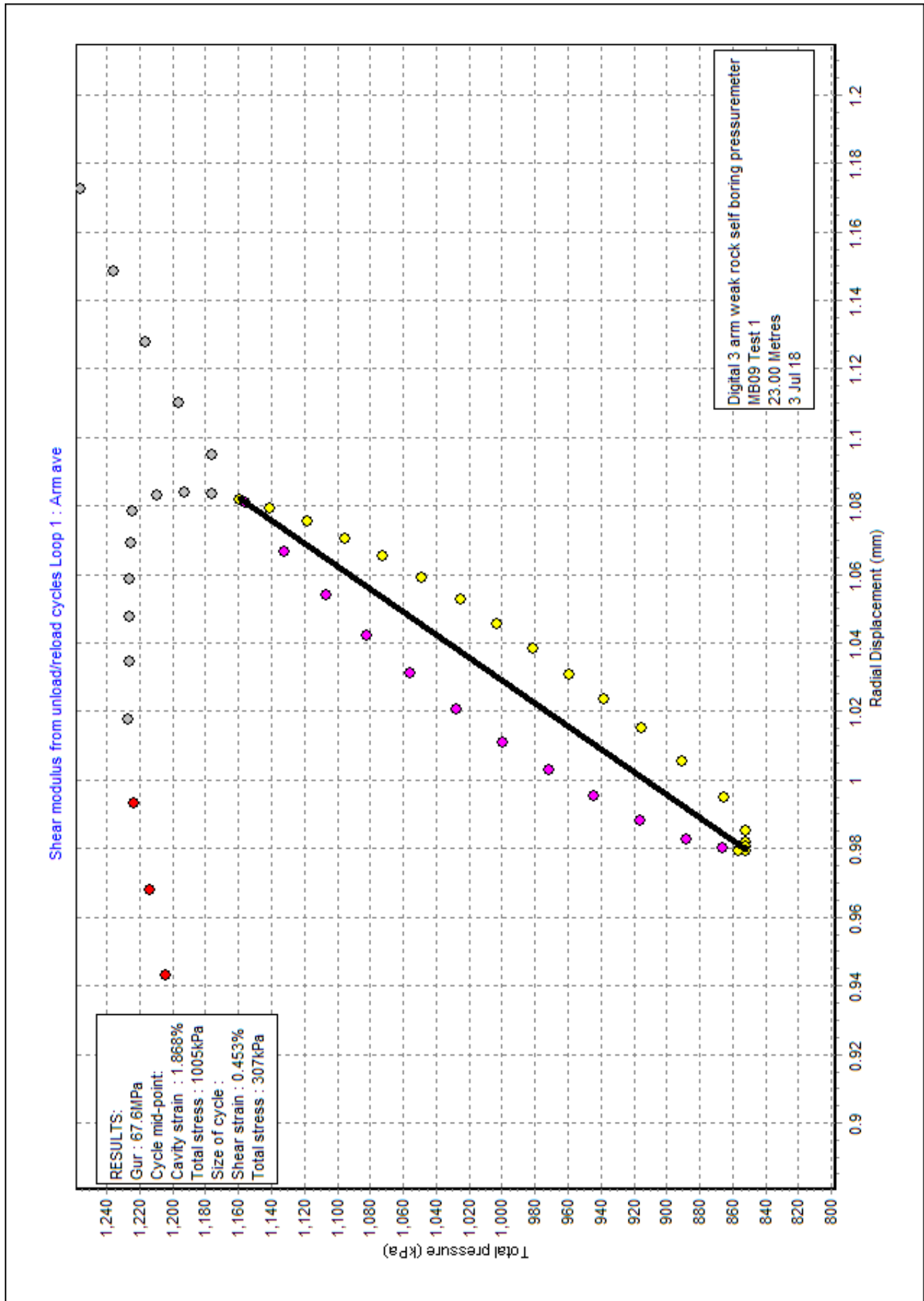




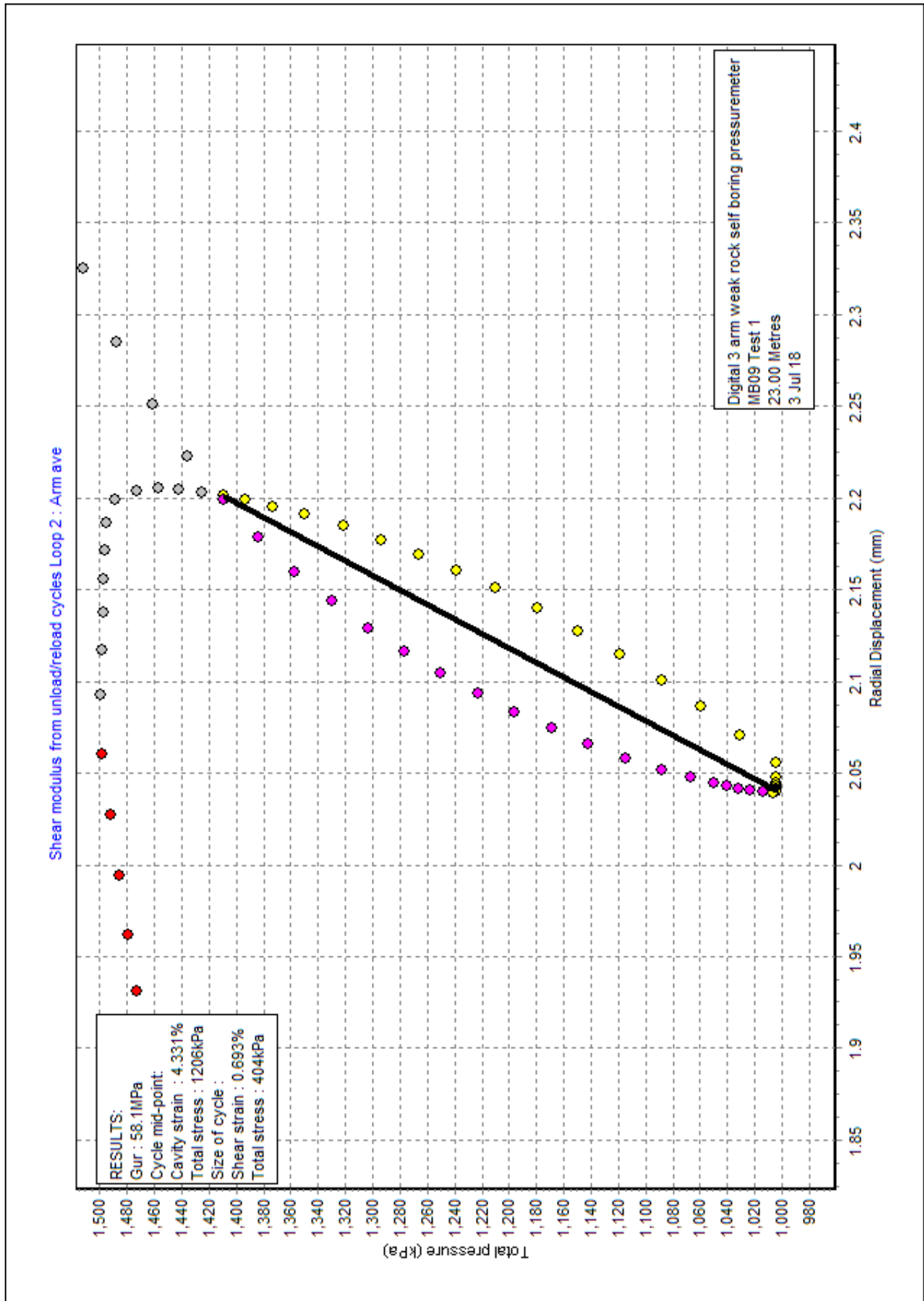




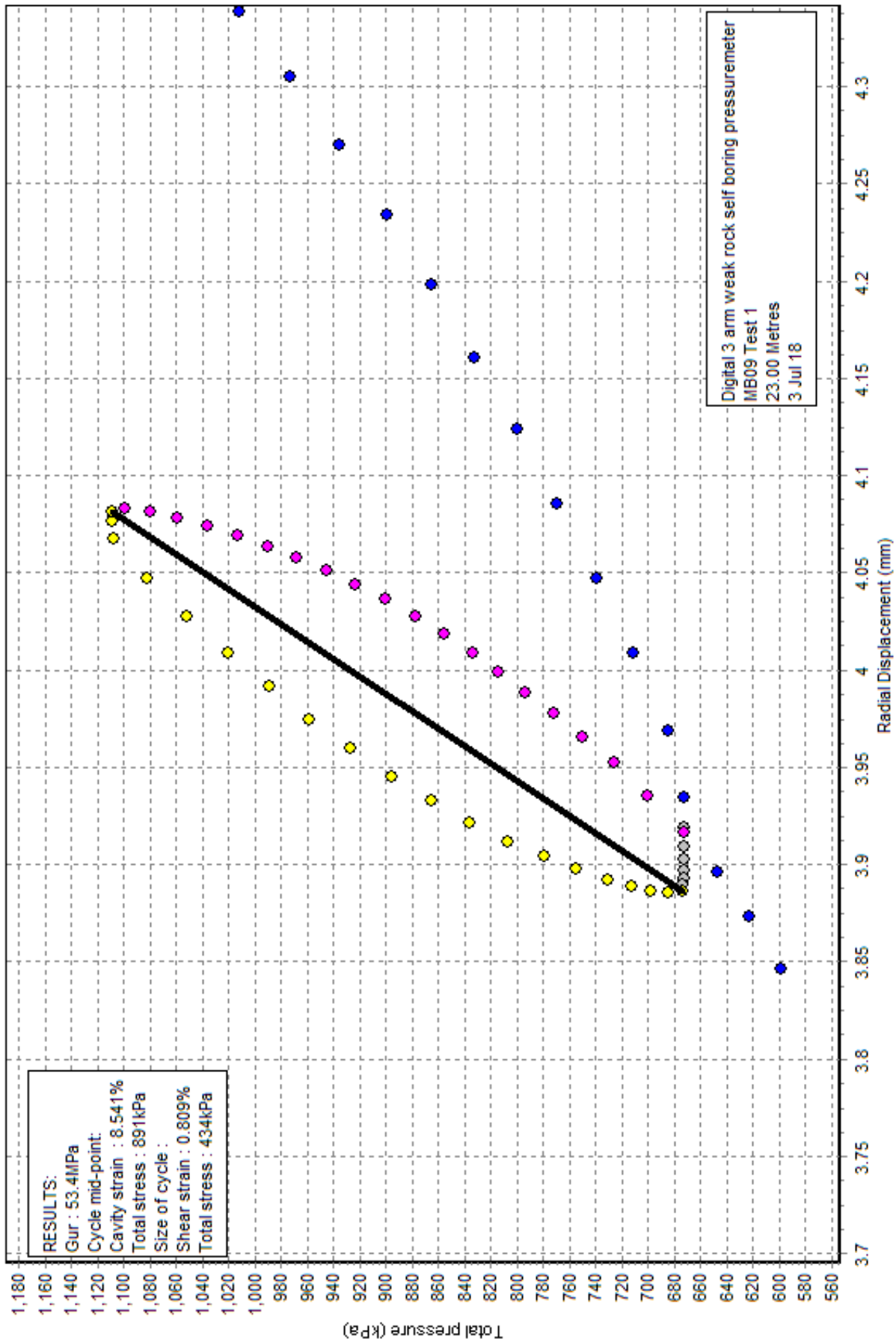


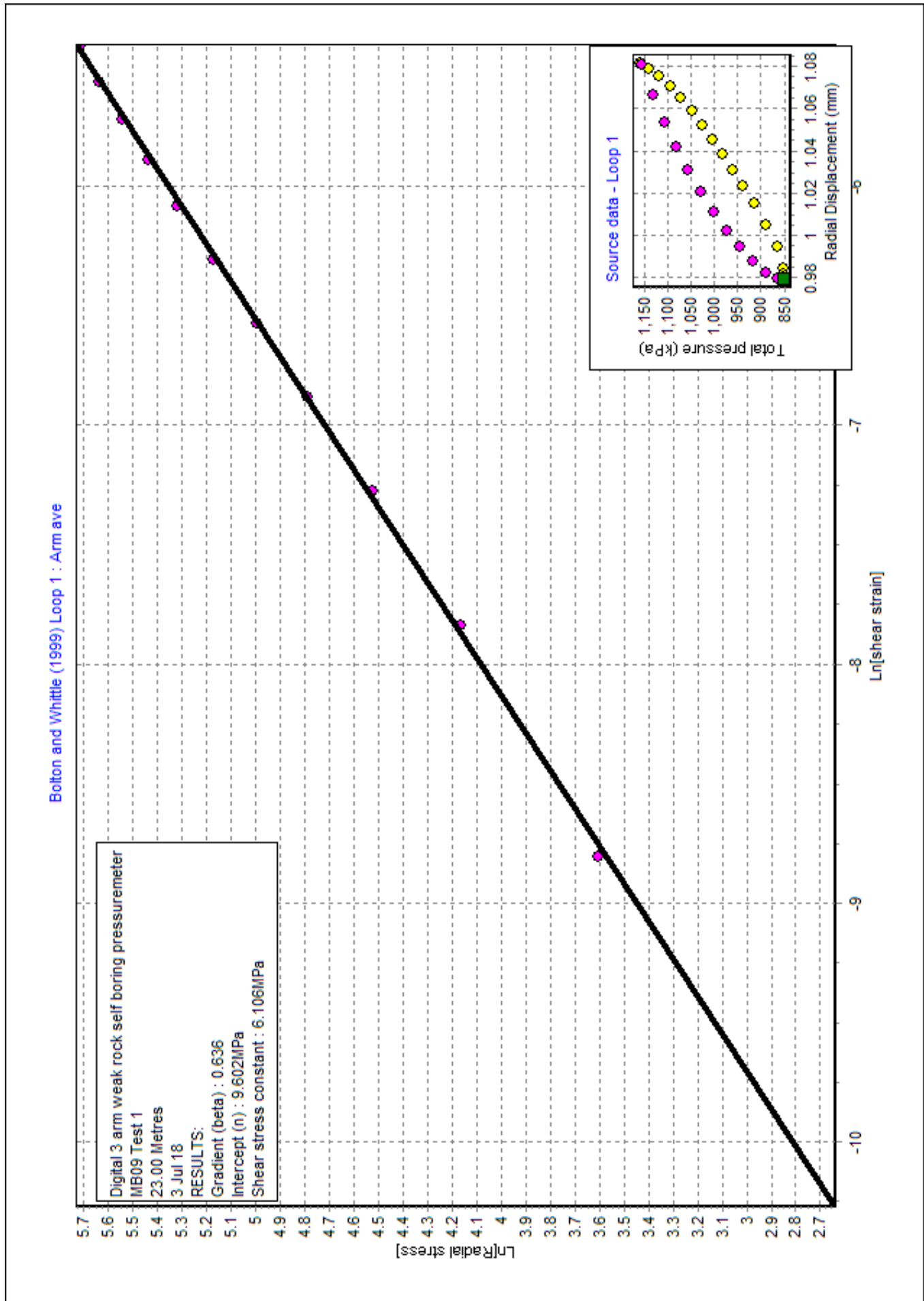


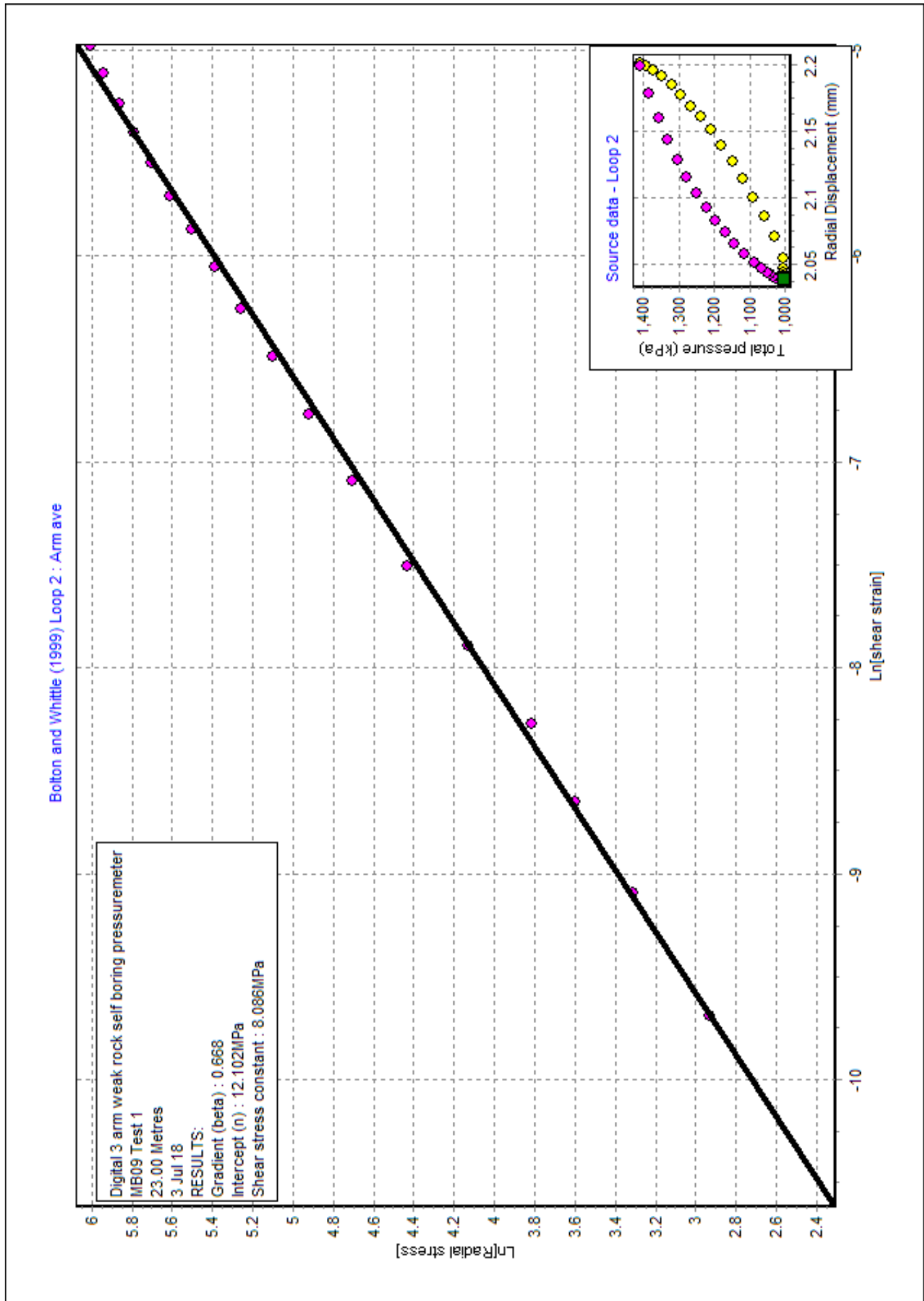


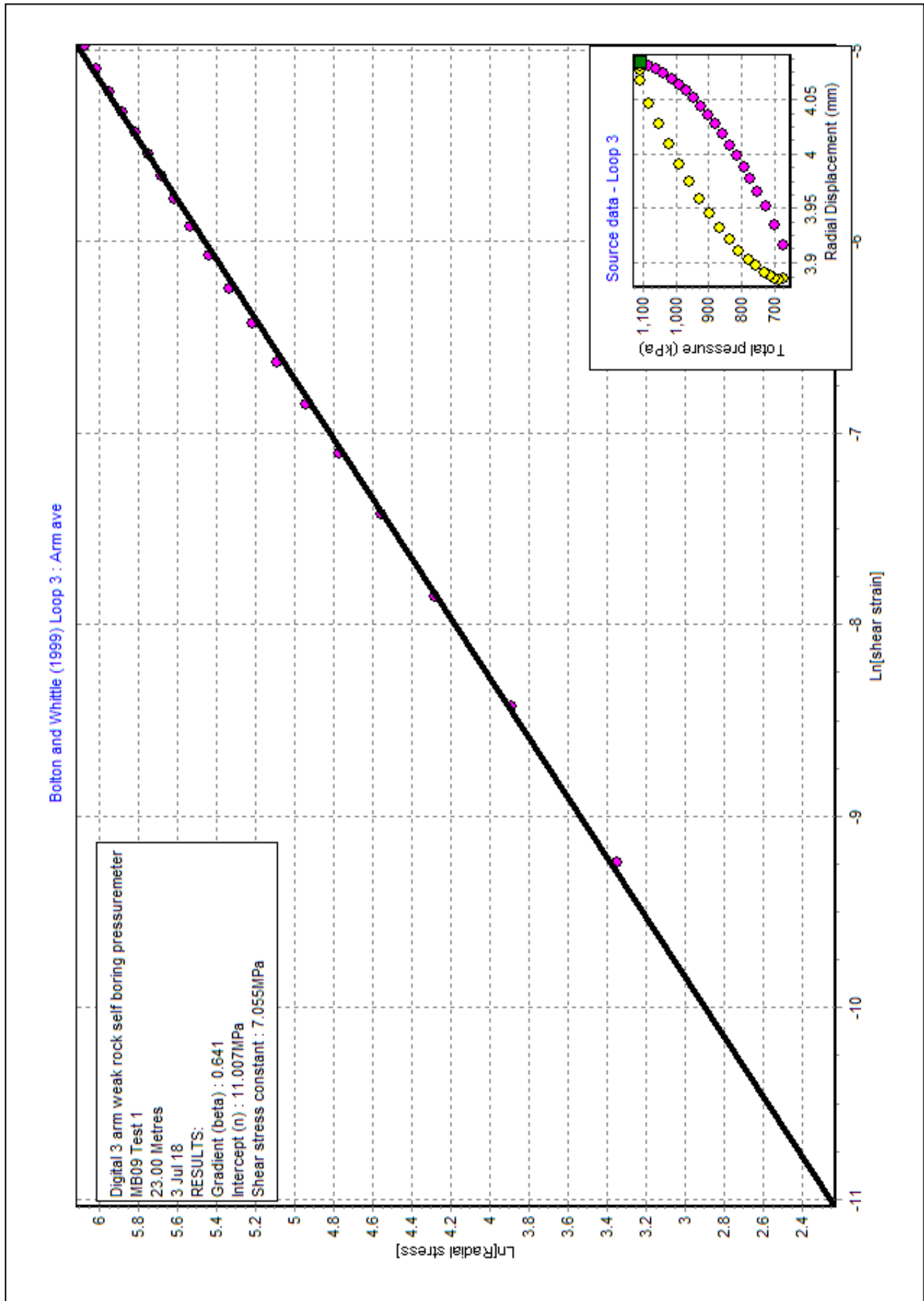


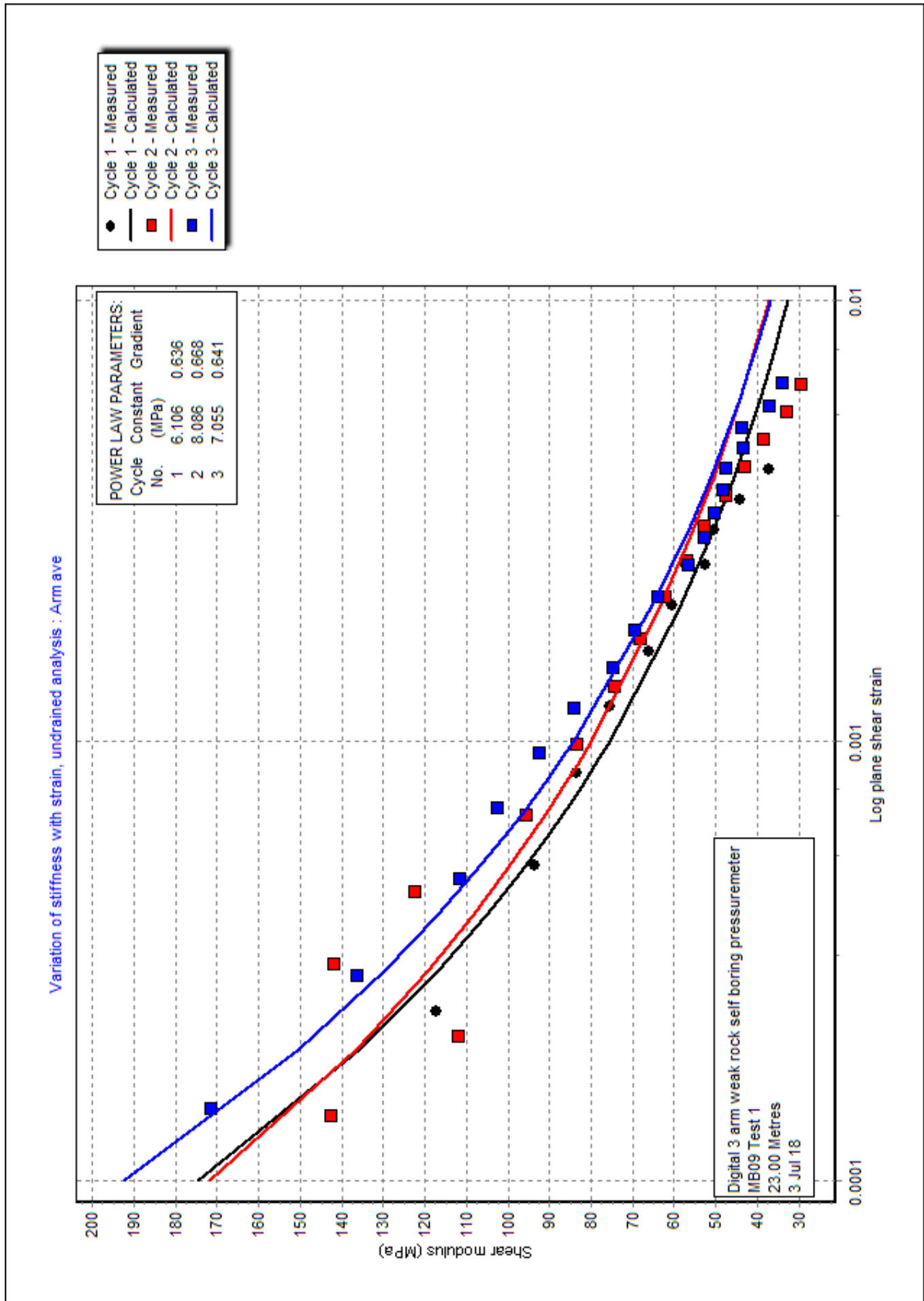
Shear modulus from unload/reload cycles Loop 3 : Arm ave

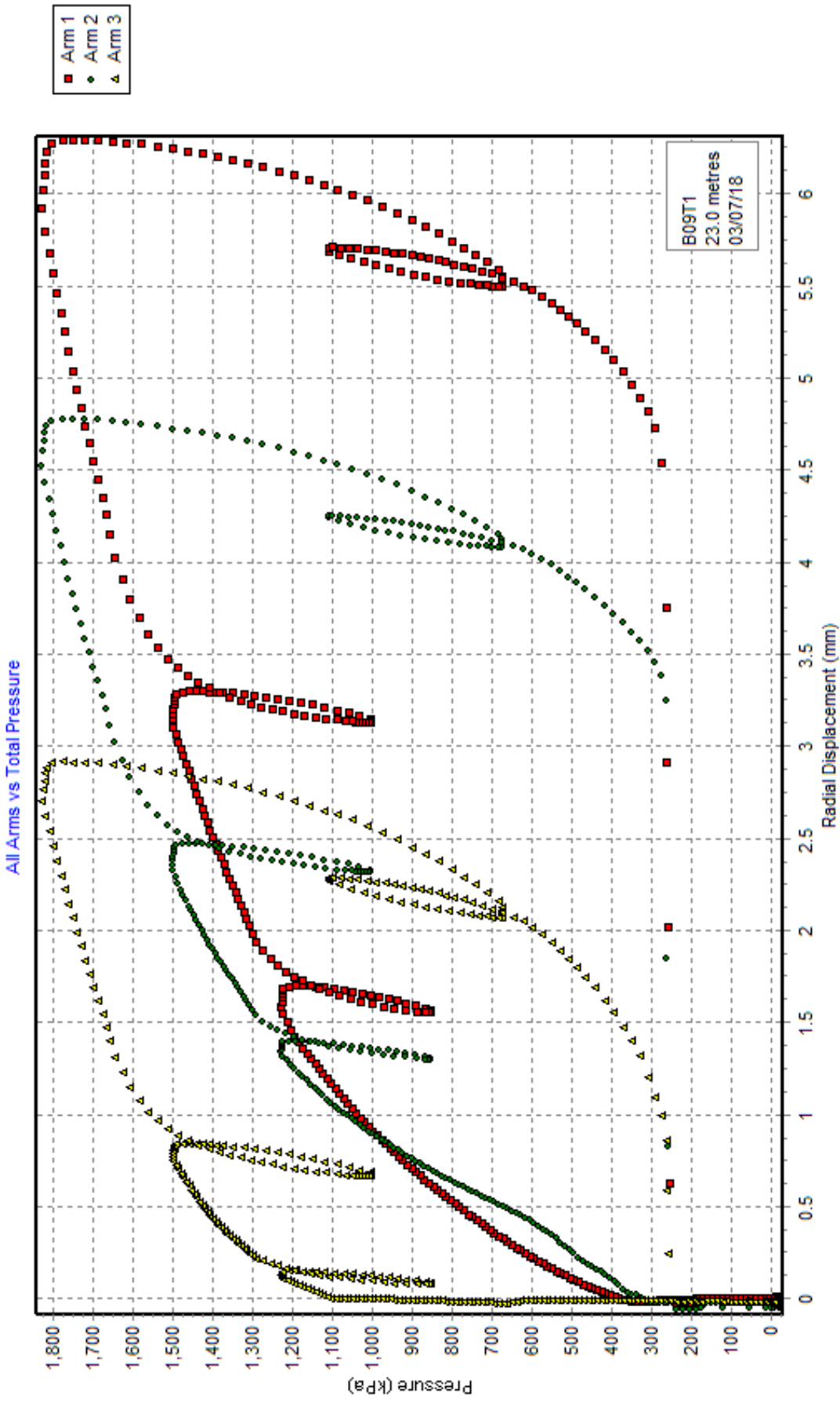




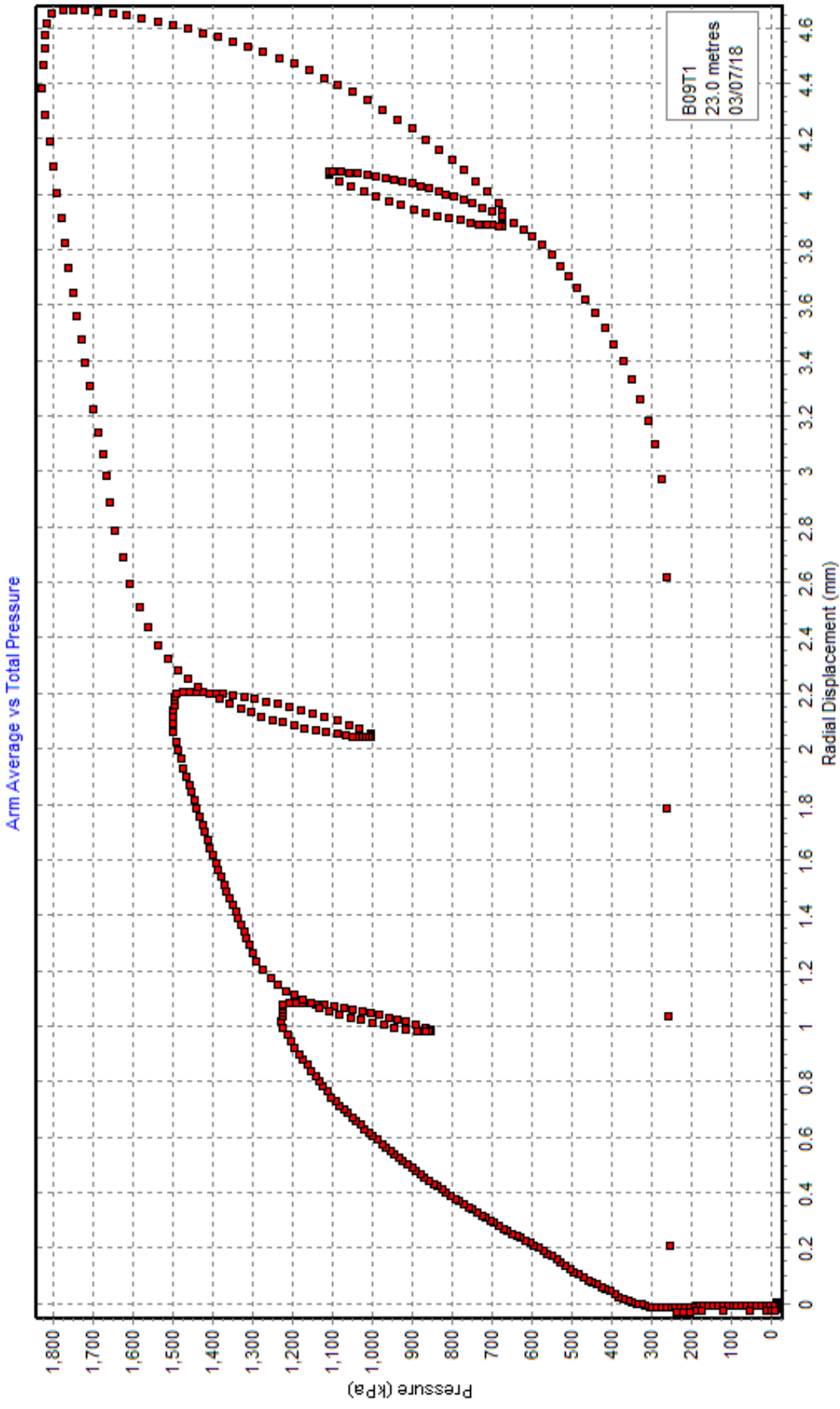


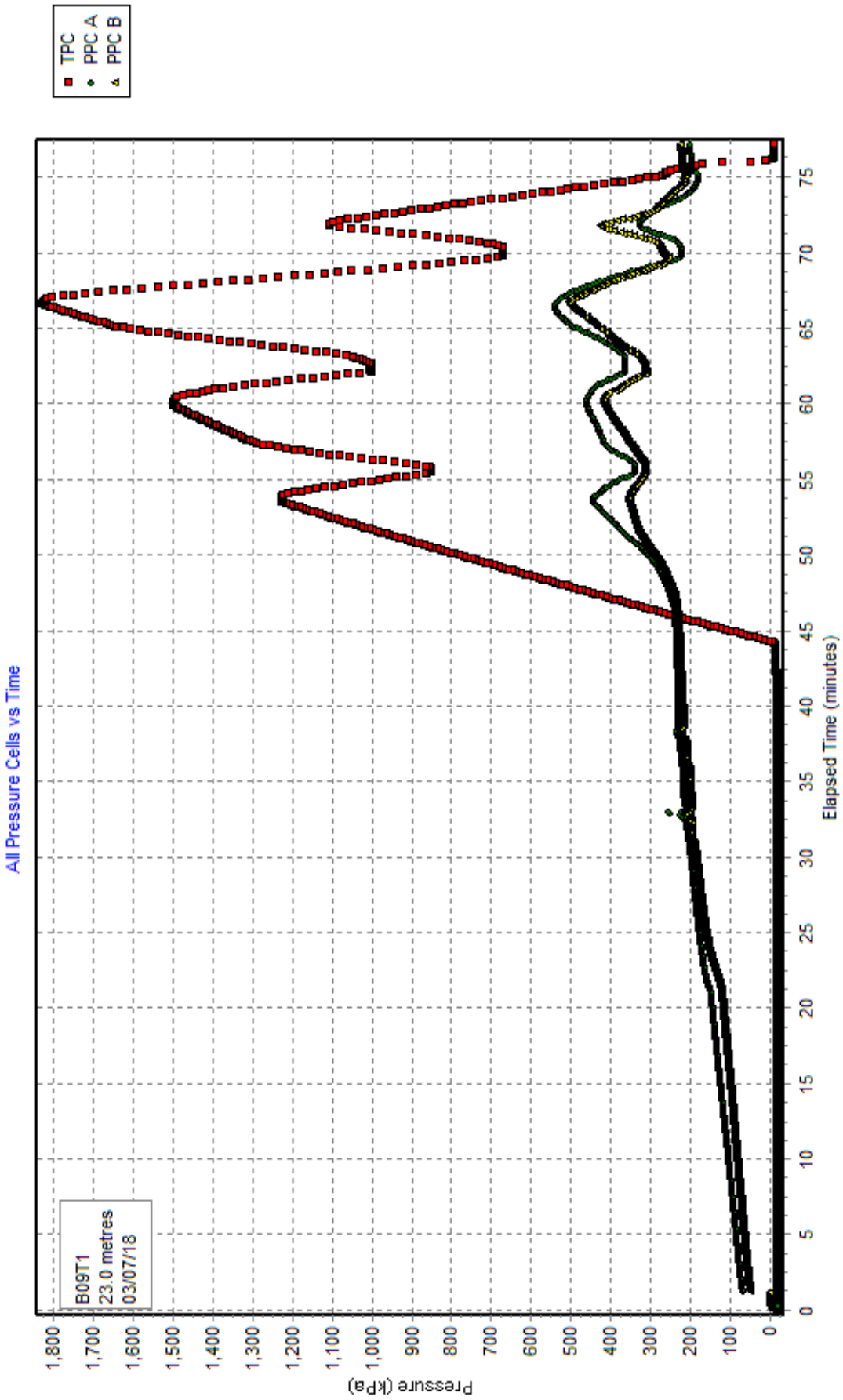












[DETAILS OF TEST]

Project :  
Site : Gt Yarmouth 3RC  
Borehole : MB09  
Test name : MB09 Test 2  
Test date : 4 Jul 18  
Test depth : 39.50 Metres  
Water table : Nothing entered  
Ambient PWP : Nothing entered  
Material : London Clay  
Probe : Digital 3 arm weak rock self boring pressuremeter  
Diameter : 88.1 mm  
Data analysed using average arm displacement curve  
A non-linear analysis of the rebound cycles has been carried out  
The file includes results from a curve fitting analysis

Analysed by SDB on 13 Jul 18

Remarks: 0.5m of clay left in casing so drilled 1.5m.

[RESULTS FOR CAVITY REFERENCE PRESSURE]

Strain Origin (mm) : "Arm ave=0.38"  
Po from Marsland & Randolph (kPa) : "Arm ave=814.6"  
Po from Lift off (kPa) : "Arm ave=803.9"  
Best estimate of Po (kPa) : "Arm ave=964.0"

[UNDRAINED STRENGTH PARAMETERS]

Gibson & Anderson 1961 - Cu (kPa) : "Arm ave=371.6"  
Limit pressure (kPa) : "Arm ave=3129"  
Jefferies 1988 - Cu (kPa) : "Arm ave=371.0"  
Undrained yield stress (kPa) : "Arm ave=1038.1"

[LINEAR INTERPRETATION OF SHEAR MODULUS G]

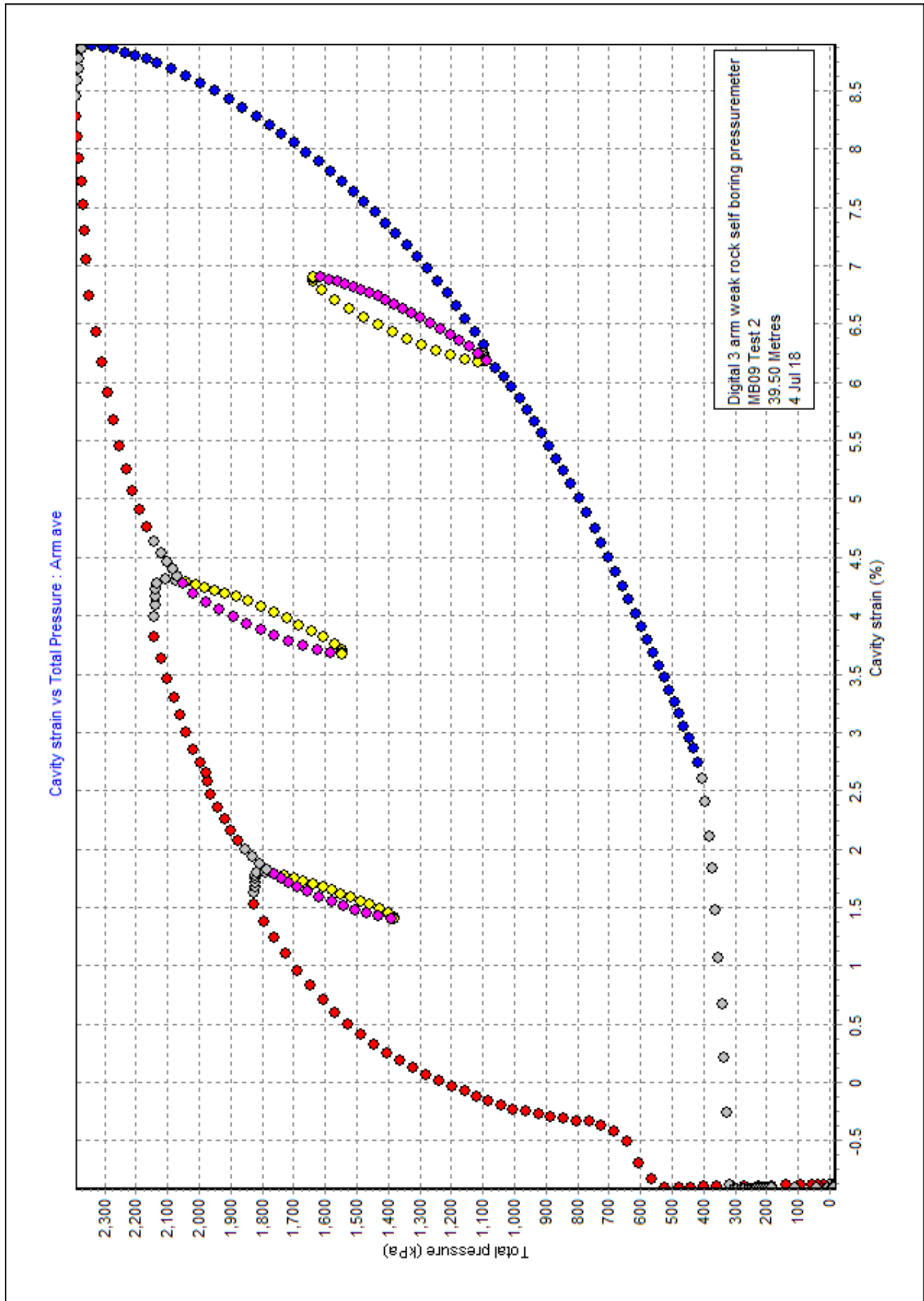
Initial slope shear modulus (MPa) : "Arm ave=99.3"  
Axis Loop Value Mean Strain Mean Pc dE dPc  
No (MPa) (%) (kPa) (%) (kPa)  
Arm ave 1 50.1 1.604 1571 0.760 382  
Arm ave 2 42.8 3.987 1799 1.189 511  
Arm ave 3 39.5 6.553 1368 1.362 542

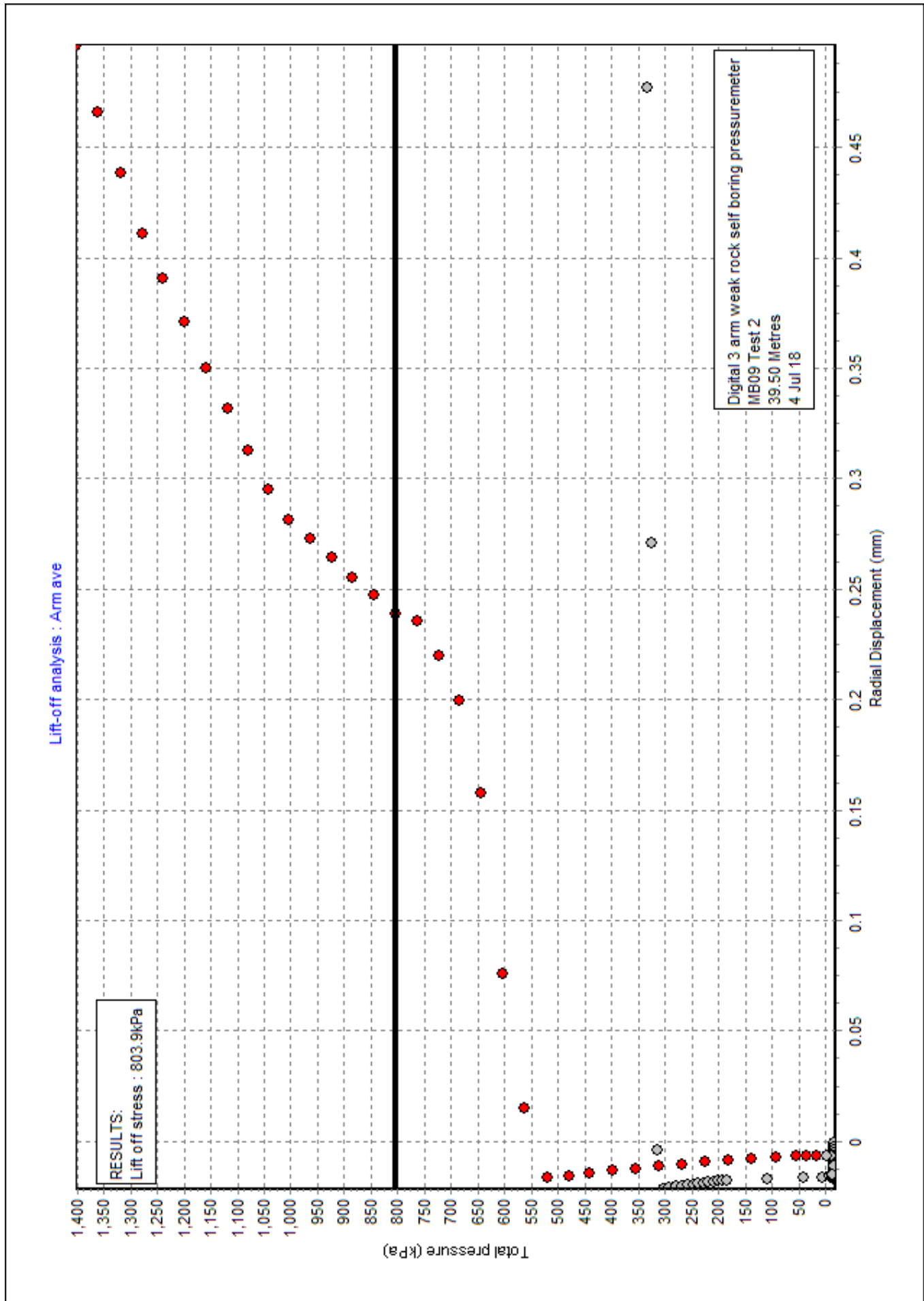
[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

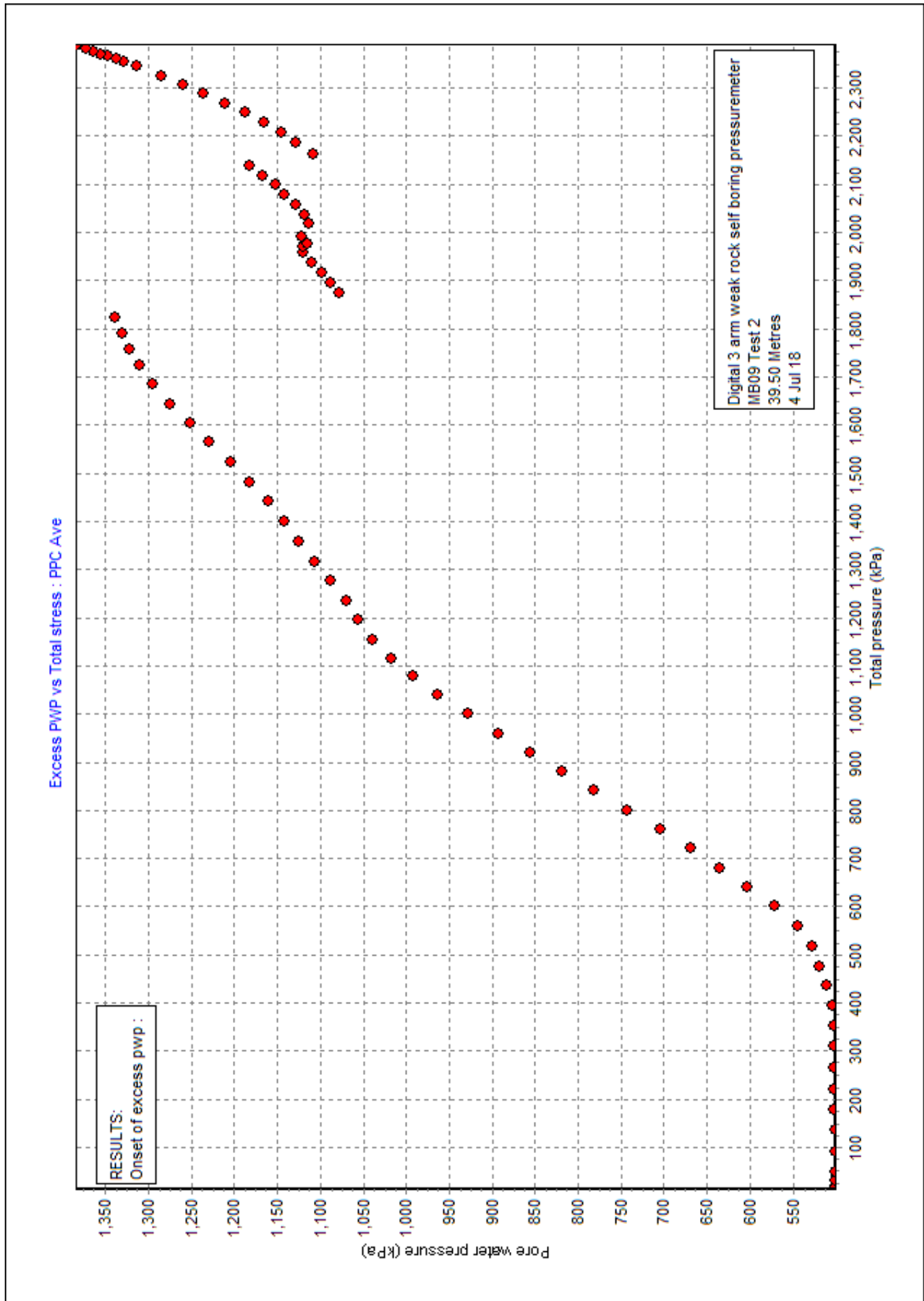
Axis Loop Intercept Alpha Gradient  
No (MPa) (MPa)  
Arm ave 1 14.346 10.577 0.737  
Arm ave 2 11.494 7.957 0.692  
Arm ave 3 11.616 8.162 0.703

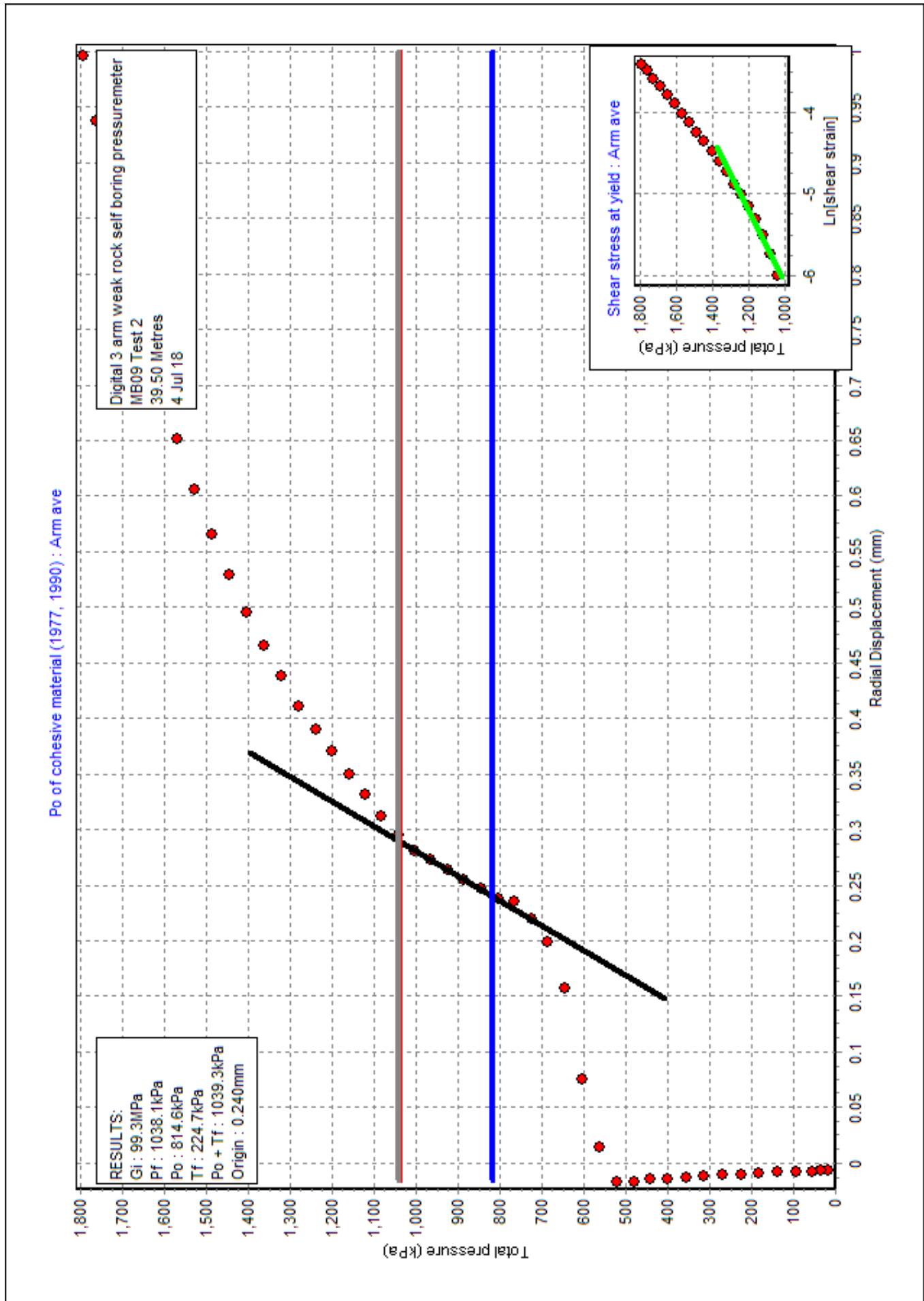
[PARAMETERS USED FOR UNDRAINED CURVE MODELLING]

{Axis is Arm ave}  
Strain Origin (mm) : 0.38  
Po (kPa) : 964  
Cu (kPa) : 371.6  
Limit pressure (kPa) : 3129  
Non-linear exponent : 0.703  
Calculated alpha (MPa) : 8.216  
G at yield (MPa) : 30.4

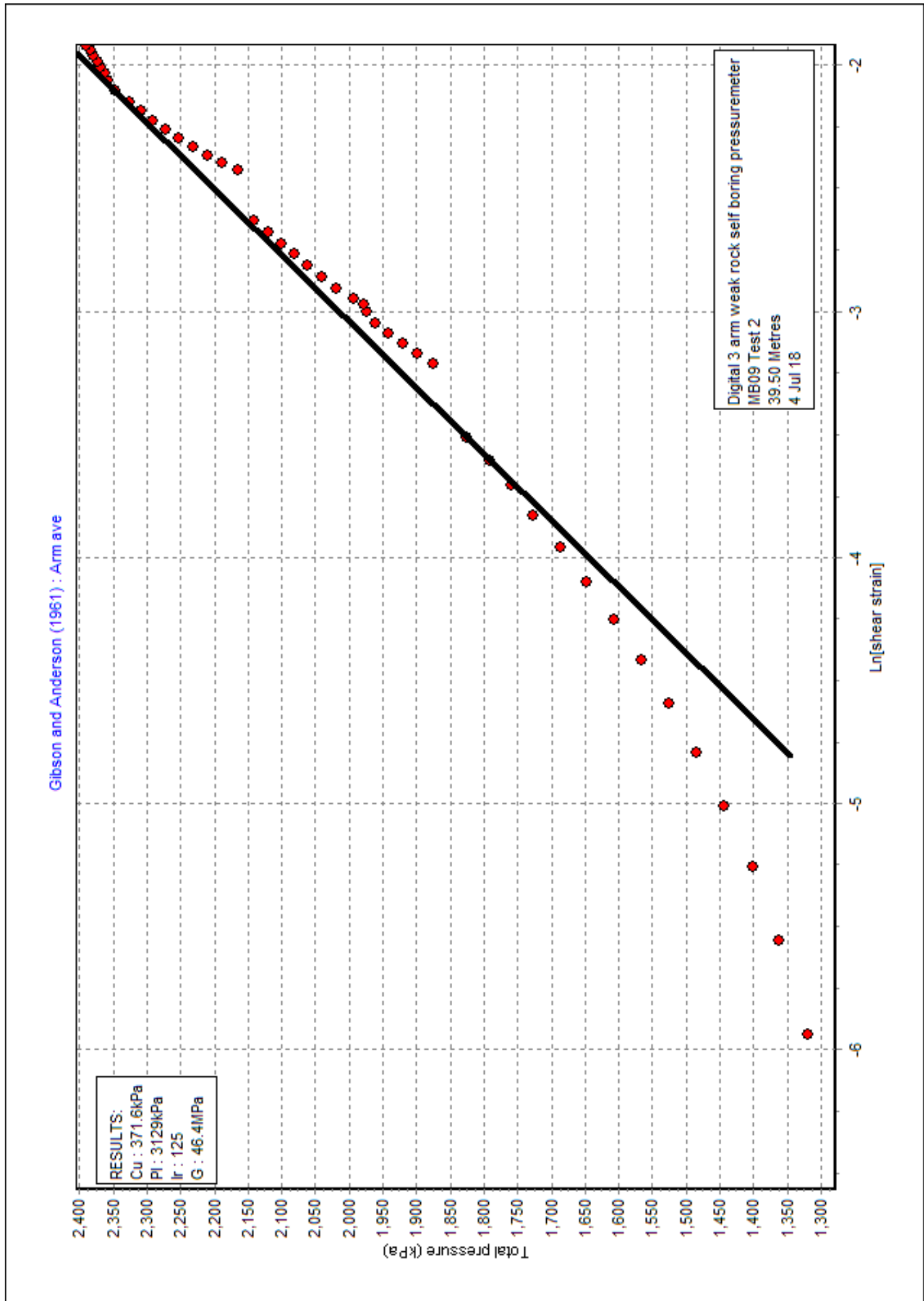


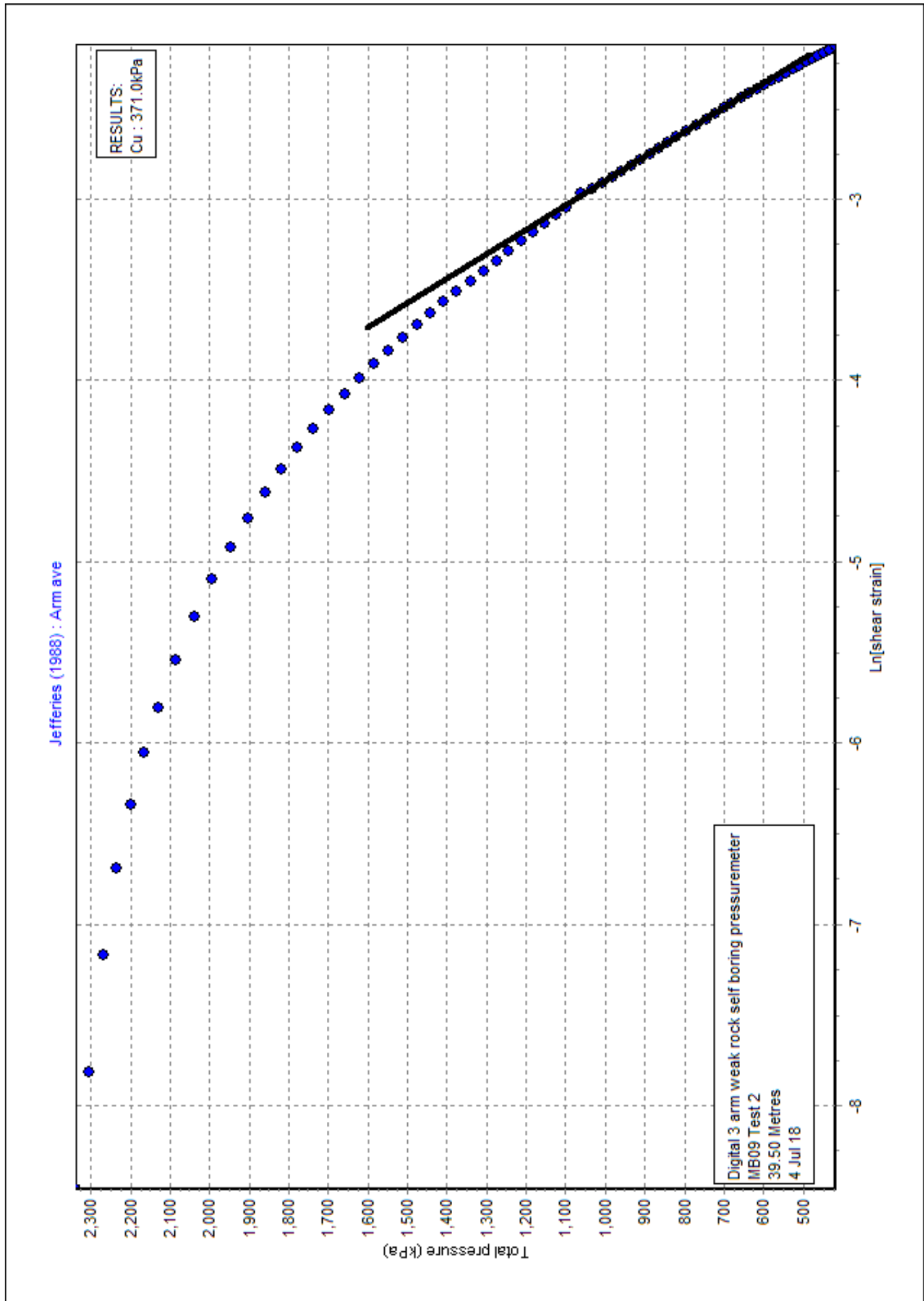


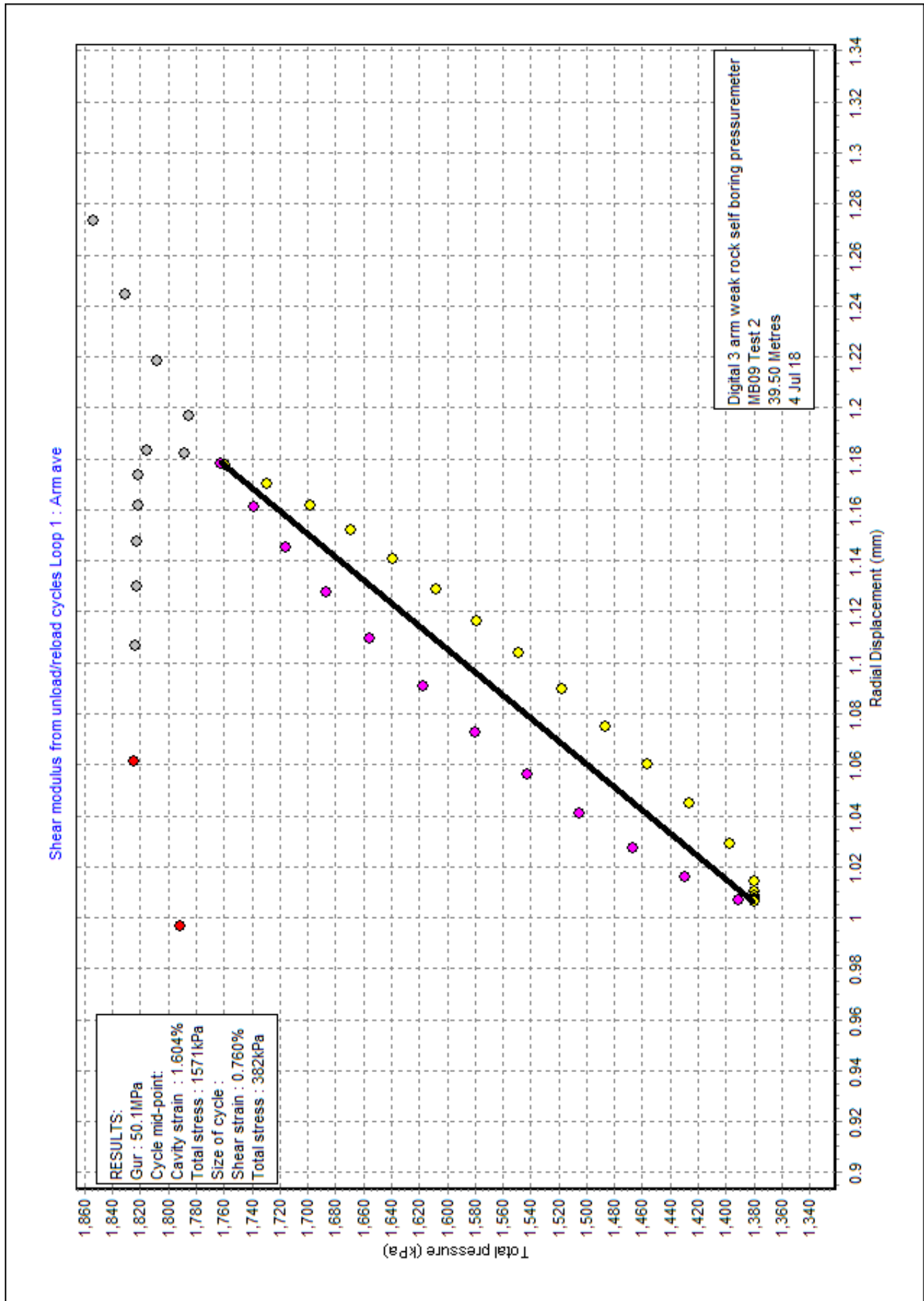


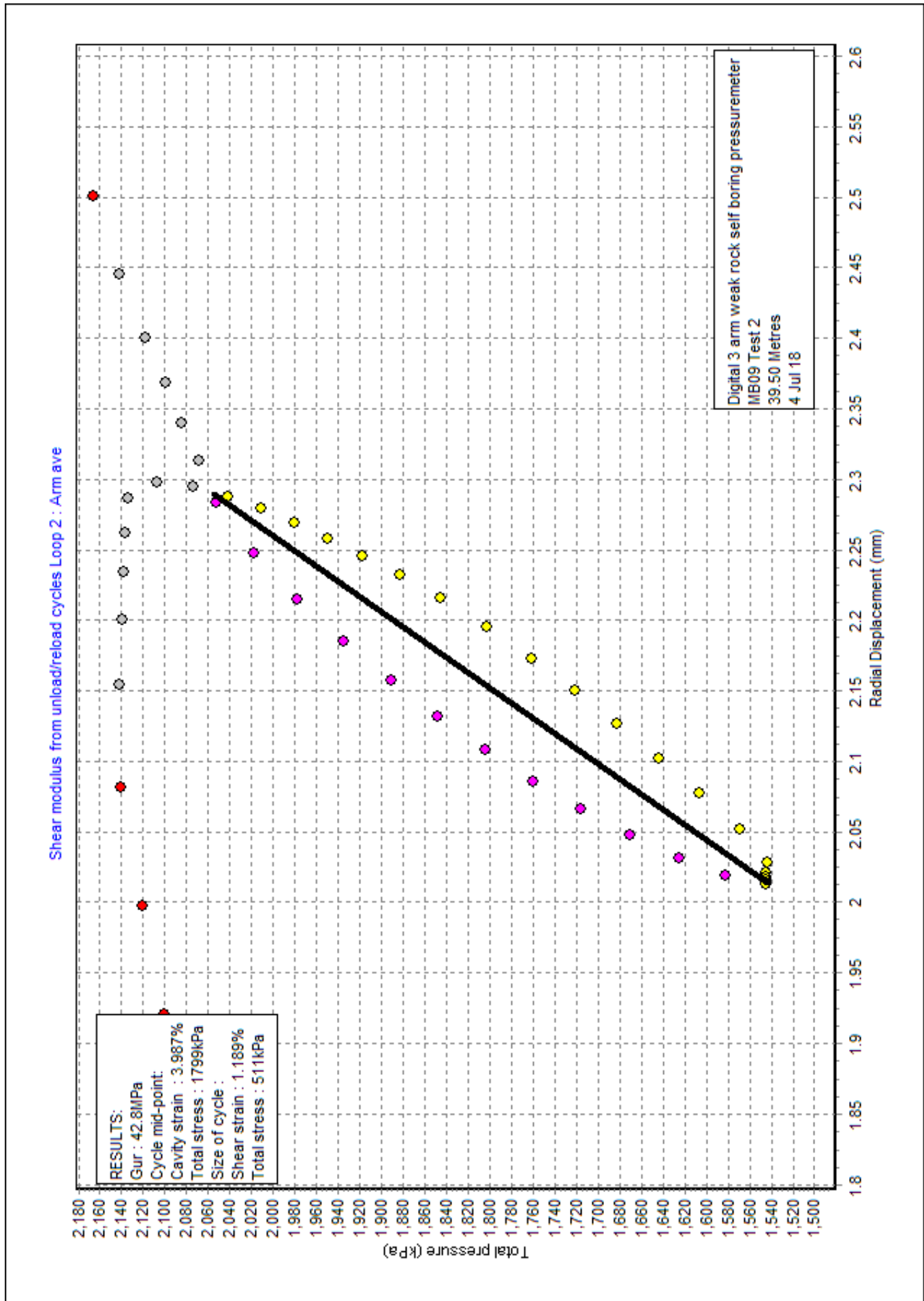


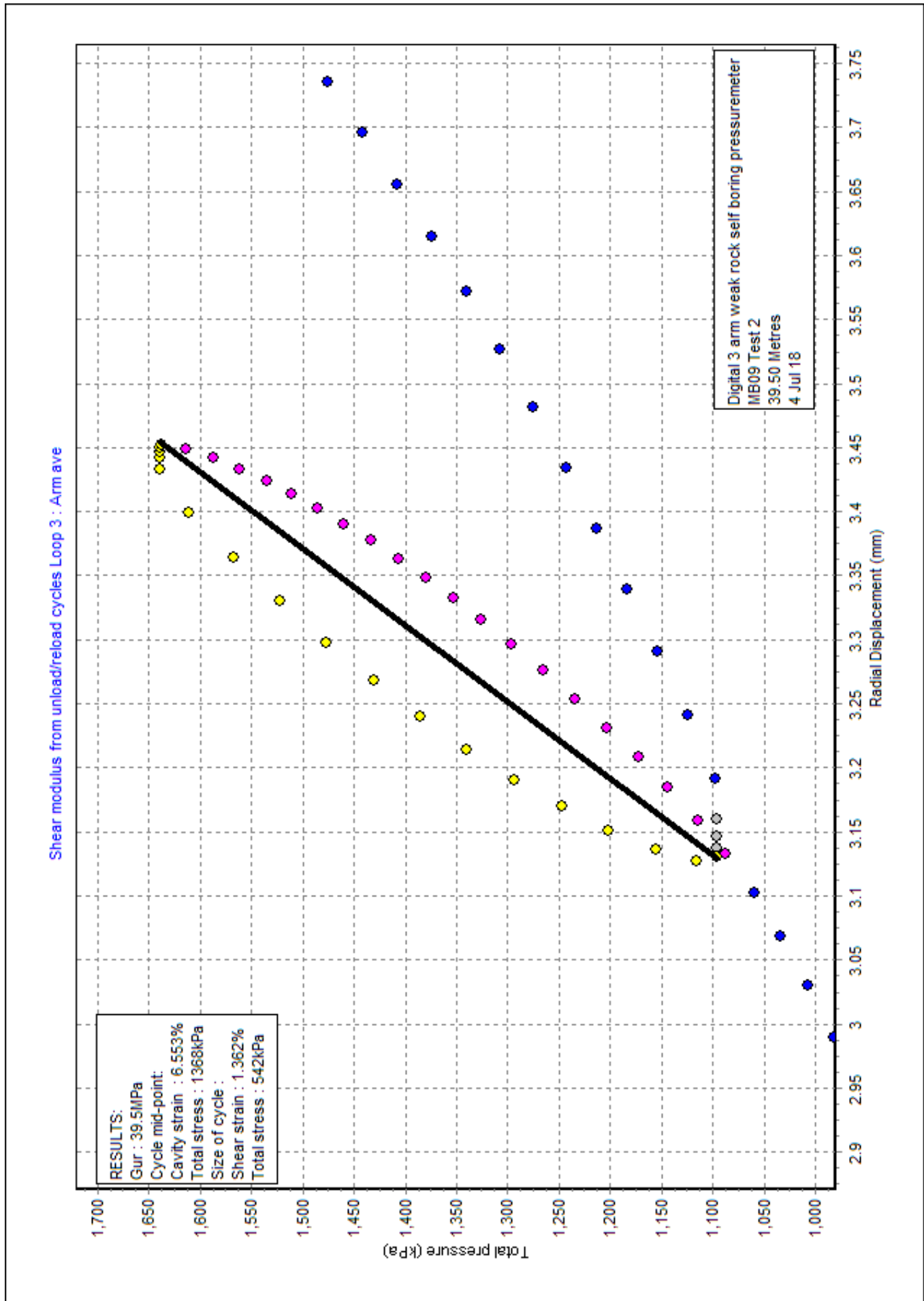


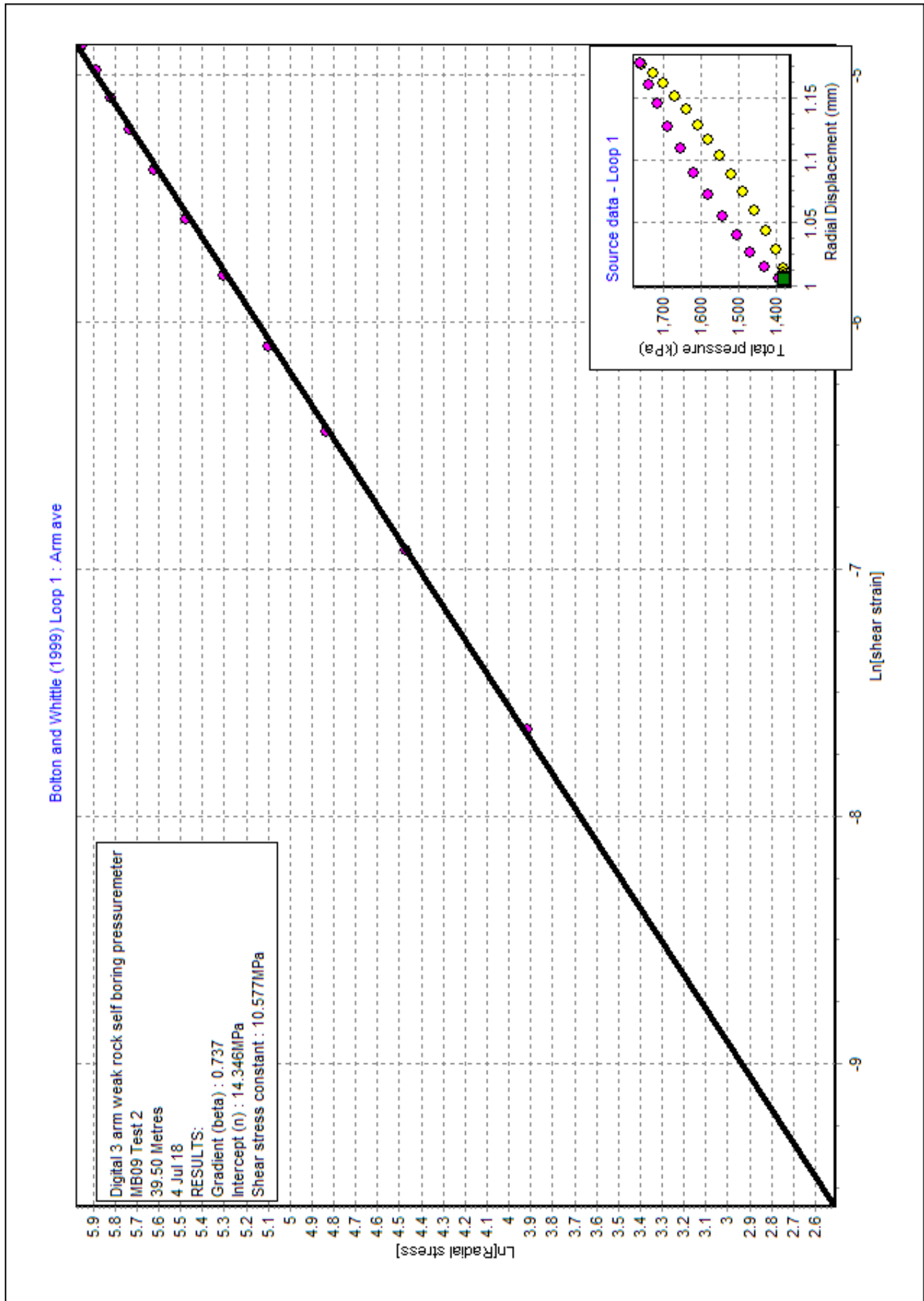


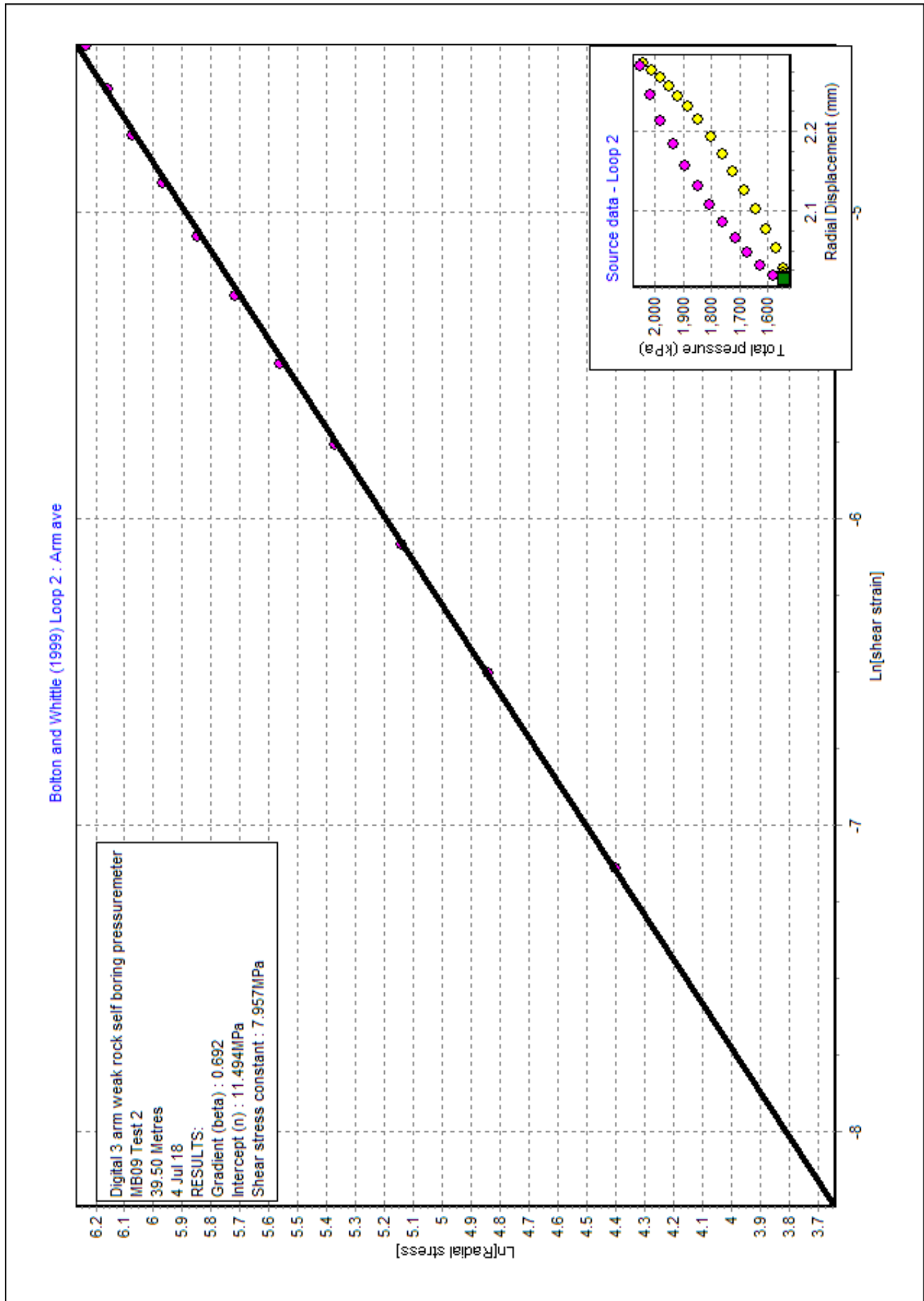




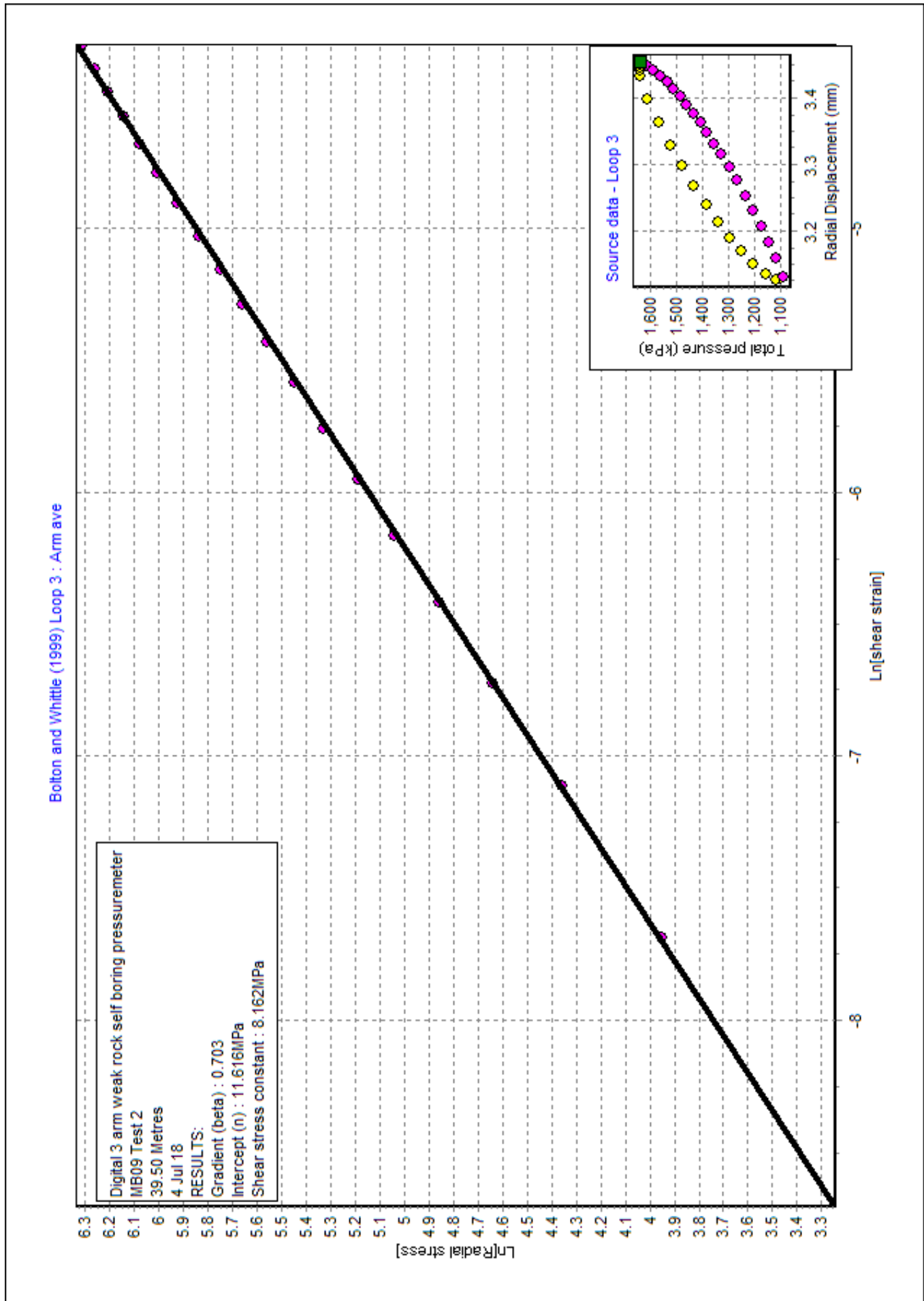


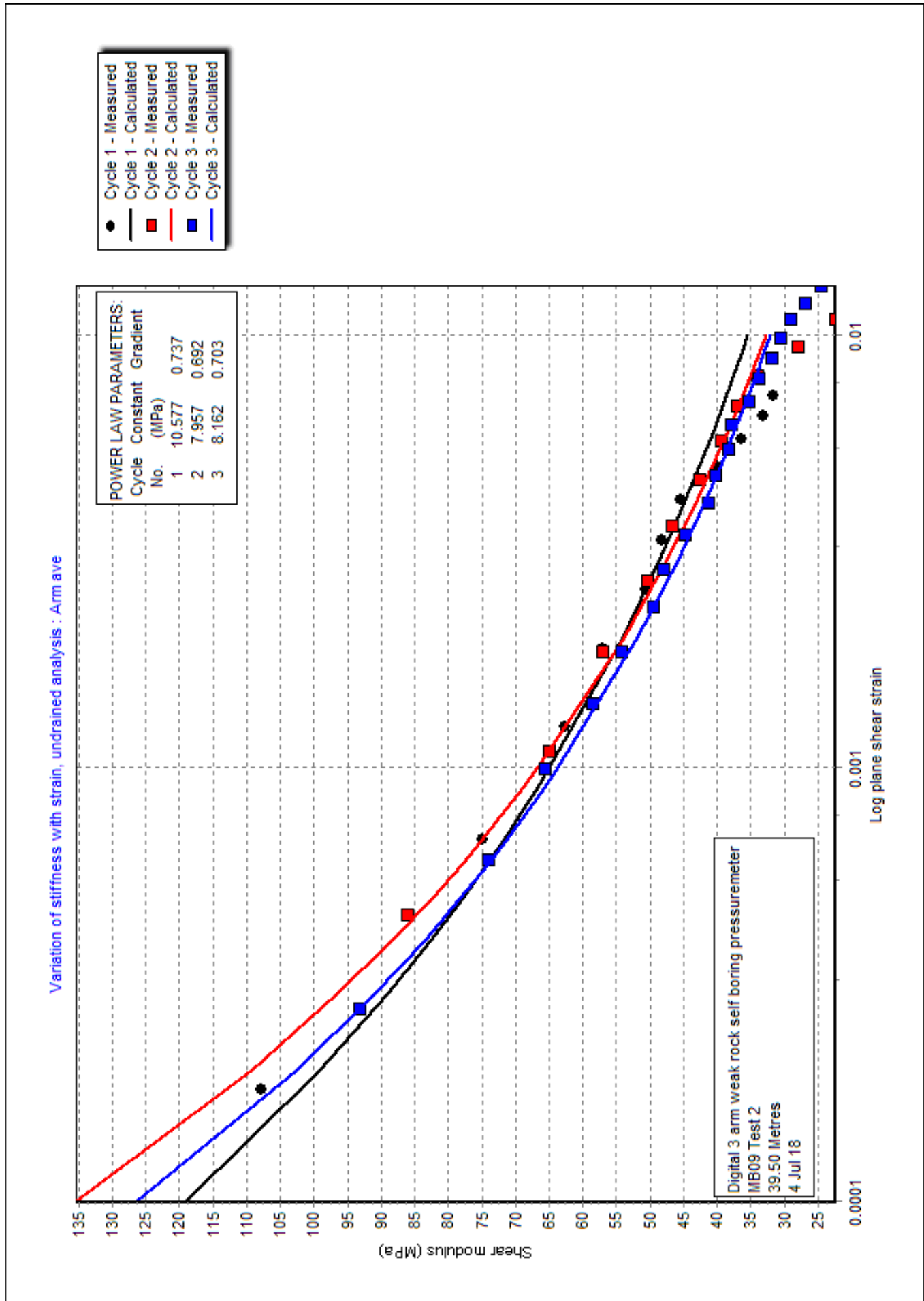


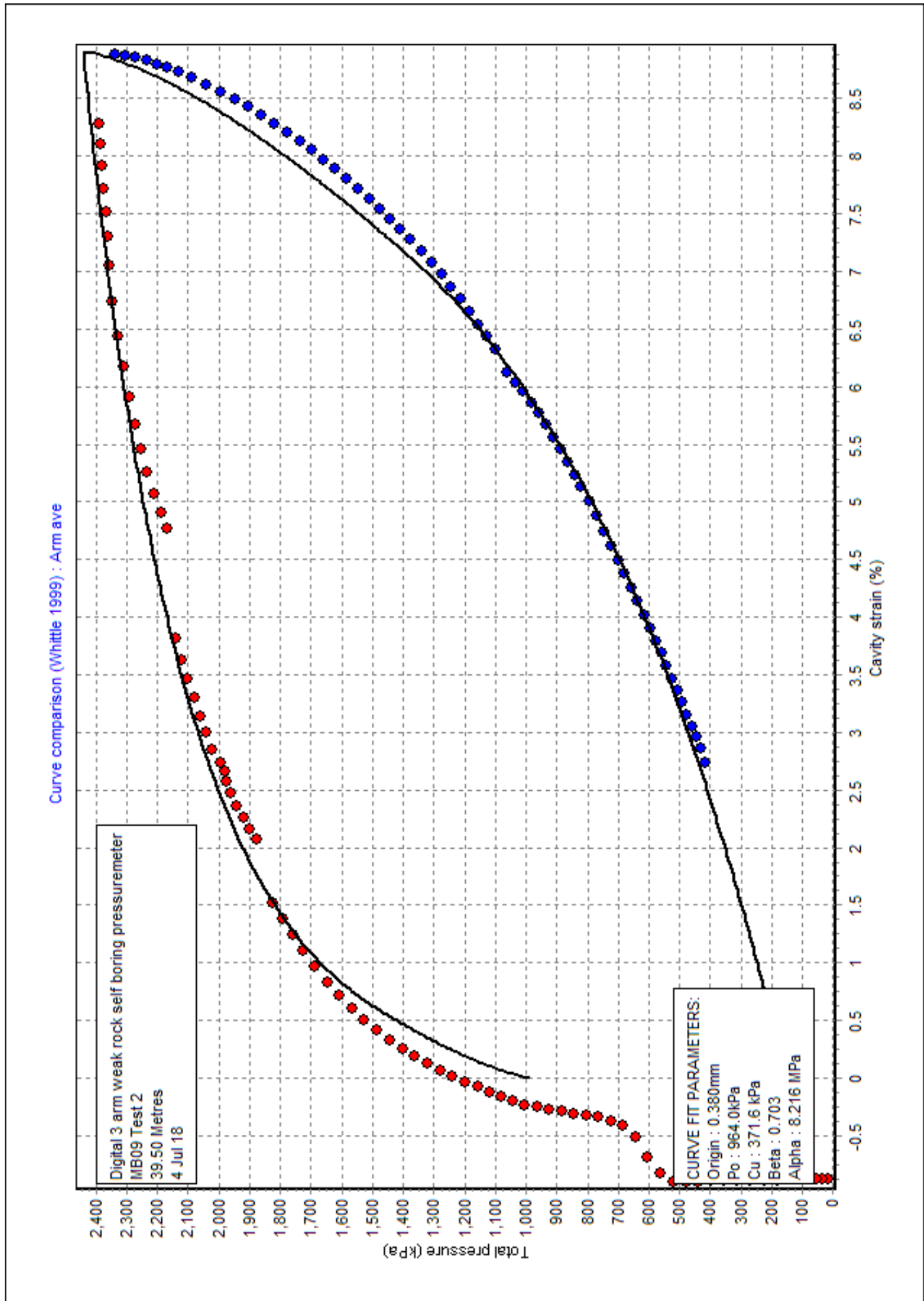


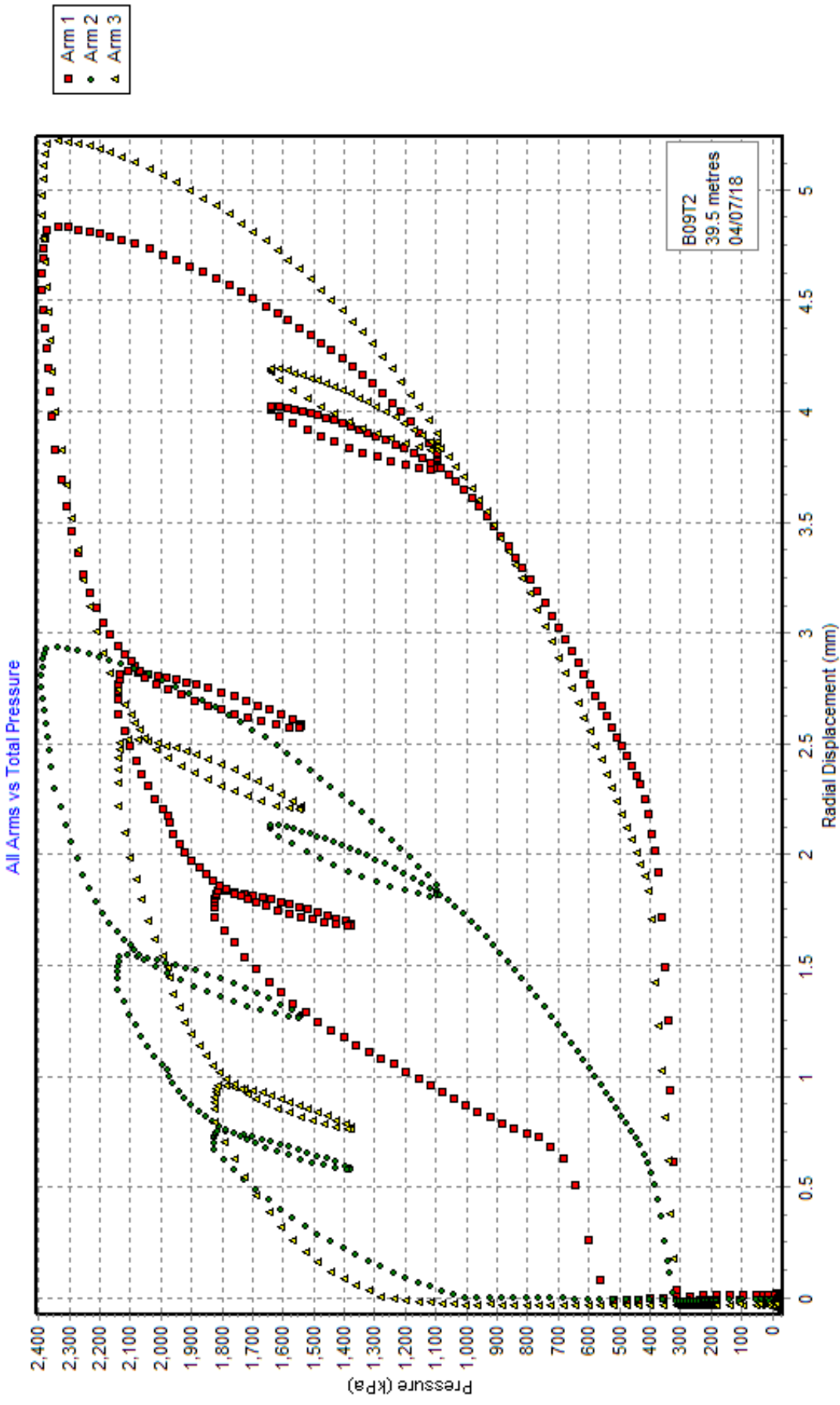


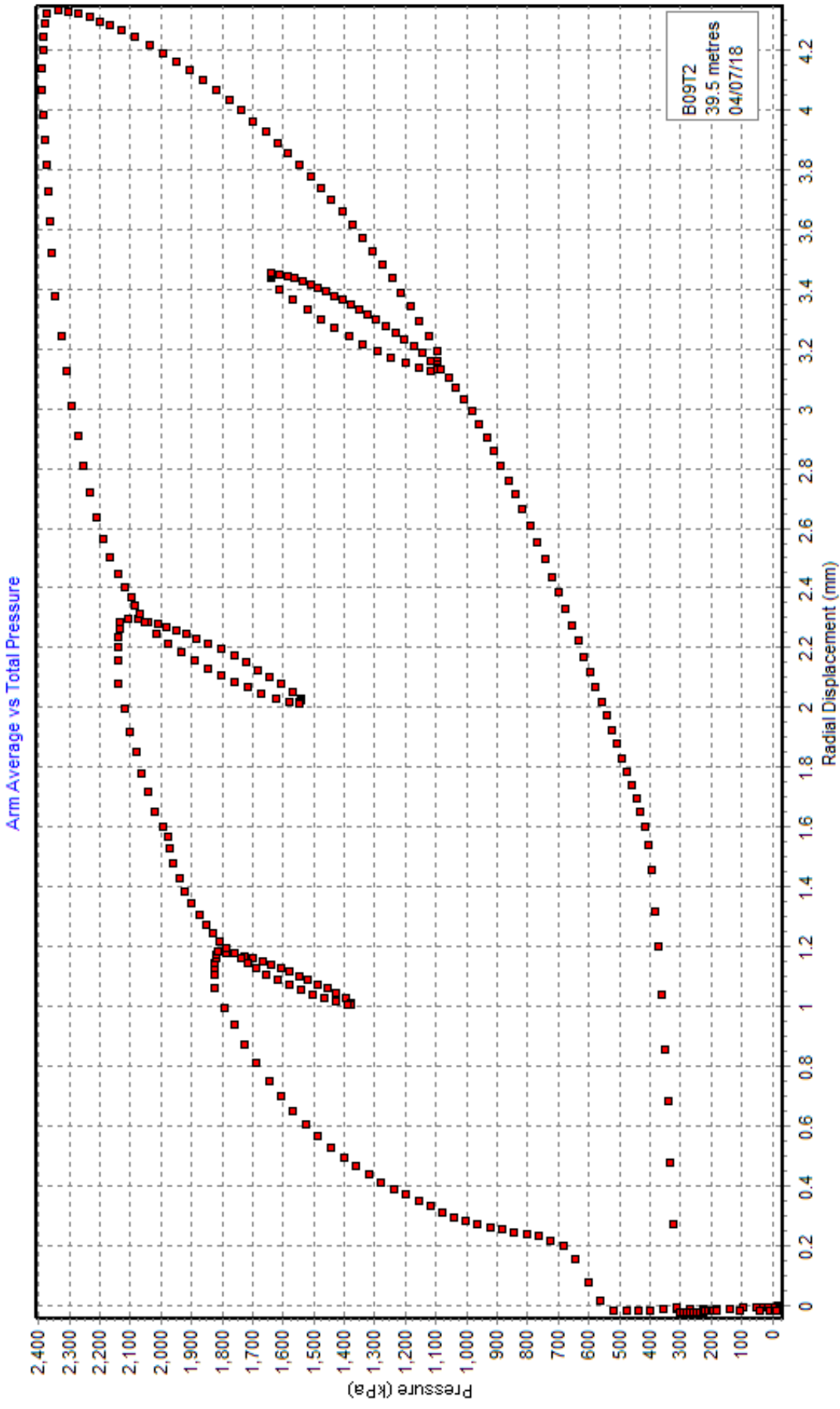


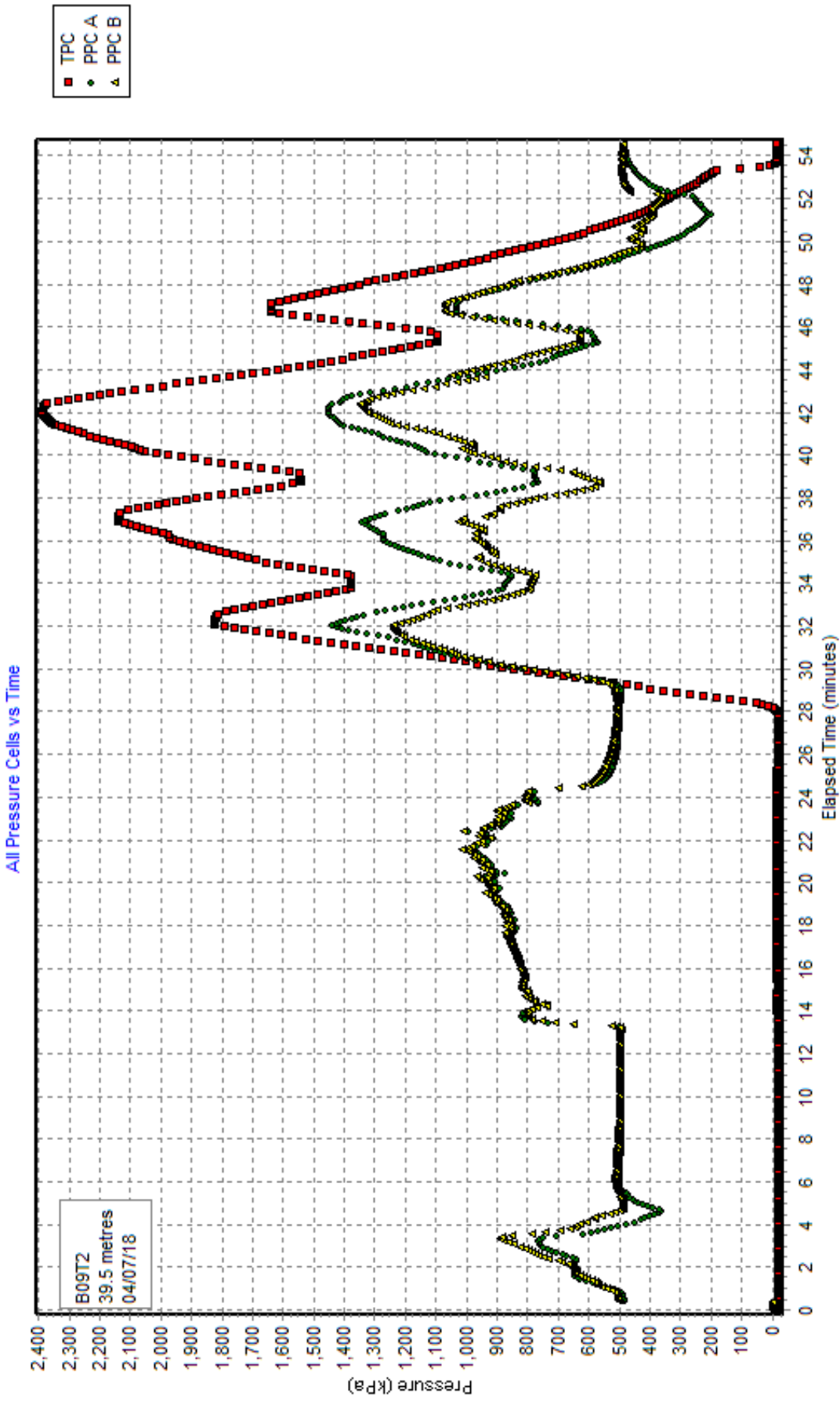










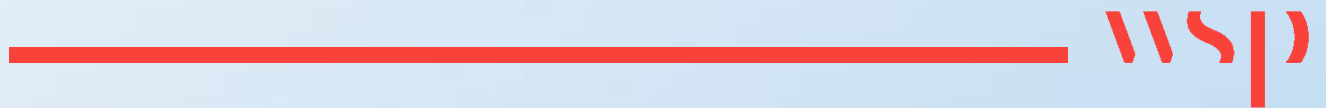






# Appendix F

**GEOTECHNICAL LABORATORY TEST**



**RESULTS**






Site Investigation & Laboratory Services

Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
Client	Norfolk County Council	
Engineer	Norfolk Partnership Laboratory	

Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB01	0.50-1.00	15	B	338167	Very dark grey slightly sandy gravelly SILT/CLAY with an odour of hydrocarbons. Gravel is fine to coarse.	29
MB01	0.50	2	D	338163	Dark grey slightly clayey silty very gravelly SAND with occasional fine shell fragments. Gravel is fine to coarse. Sample has a distinct odour of hydrocarbons.	16
MB01	1.40	6	D	338164	Orange brown slightly sandy gravelly CLAY. Gravel is fine to medium.	37
MB01	1.50	9	D	338165	Yellowish brown mottled greyish brown slightly clayey slightly gravelly silty SAND with occasional fine shell fragments. Gravel is fine to medium with a strong smell of hydrocarbons.	21
MB01	2.50-3.00	13	B	338166	Grey slightly gravelly slightly clayey very silty SAND with a slight smell of hydrocarbons. Gravel is fine to medium.	31
MB01A	1.50-2.00	5	B	338168	Grey clayey silty gravelly SAND. Gravel is fine to coarse. Sample has a distinct smell of hydrocarbons.	19
MB01A	2.50-3.00	9	B	338169	Dark grey gravelly silty SAND with a slight odour of hydrocarbons. Gravel is fine to medium.	18
MB01A	3.50-4.00	13	B	338170	Greyish brown clayey silty gravelly SAND with a slight odour of hydrocarbons. Gravel is fine to medium.	14
MB01A	5.50-6.00	21	B	338171	Greyish brown slightly gravelly slightly clayey slightly silty SAND with an odour of hydrocarbons. Gravel is fine.	16
MB01A	6.50-7.00	25	B	338172	Yellow brown slightly sandy SILT with a slight odour of hydrocarbons.	22
MB01A	8.50-9.00	31	B	338173	Light greyish brown silty SAND with a slight smell of hydrocarbons.	18
MB01A	9.50-10.00	37	B	338174	Light brown silty SAND with a slight odour of hydrocarbons.	22
MB01A	10.50-11.00	41	B	338175	Light brown slightly silty SAND.	17
MB01A	11.50-12.00	44	B	338176	Brown slightly gravelly silty SAND with occasional fine shell fragments. Gravel is fine to medium.	16

Notes

Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	Sheet 1 of 7
LA	07/09/2018		

 Site Investigation & Laboratory Services				Site GREAT YARMOUTH 3RD RIVER CROSSING		Contract No <b>PZ1522D1</b>	
				Client Norfolk County Council			
				Engineer Norfolk Partnership Laboratory			
Sample Identification							
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Description	Moisture Content %	
MB01A	12.50-13.00	47	B	338177	Brown mottled grey clayey silty SAND with occasional fine shell fragments.	18	
MB01A	13.50-14.00	50	B	338178	Greyish brown silty SAND with occasional shell fragments.	19	
MB01A	16.50-17.00	59	B	338179	Light greyish brown slightly silty SAND.	18	
MB01A	18.50-19.00	65	B	338180	Grey clayey silty SAND with occasional fine shell fragments.	19	
MB01A	19.50-20.00	68	B	338181	Grey very clayey SAND with occasional shell fragments.	16	
MB01A	20.50-21.00	71	B	338182	Light grey slightly sandy SILT.	31	
MB01A	21.60	73	D	338183	Grey slightly sandy SILT.	28	
MB01A	22.50-23.00	77	B	338184	Olive grey slightly sandy silty CLAY.	32	
MB01A	24.00-24.50	81	D	338185	Grey sandy SILT.	21	
MB01A	24.30	82	D	338186	Grey slightly clayey silty SAND with rare fine shell fragments.	20	
MB02	0.30	3	B	338187	Grey slightly gravelly sandy CLAY with pockets of orange brown sand. Gravel is fine to medium.	34	
MB02	1.30-1.80	5	B	338188	Light brown silty gravelly SAND with some shell fragmetns. Gravel is fine to coarse.	17	
MB02	2.30-2.80	9	B	338189	Greyish brown slightly gravelly slightly silty SAND with occasional shell fragments and a strong smell of hydrocarbons. Gravel is fine to medium.	21	
MB02	3.30-3.80	13	B	338190	Light orange brown slightly silty SAND.	24	
Notes							
Originator		Checked & Approved		<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2		 Sheet 2 of 7	
LA		 07/09/2018					






Site Investigation & Laboratory Services




Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
Client	Norfolk County Council	
Engineer	Norfolk Partnership Laboratory	




Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB02	4.30-4.80	17	B	338191	Yellowish brown slightly silty SAND wit some shell fragments.	24
MB02	7.30-7.80	29	B	338192	Yellowish brown slightly silty SAND.	26
MB02	9.30-9.80	37	B	338193	Brown silty clayey SAND.	27
MB02	10.30-10.80	41	B	338194	Dark grey clayey silty SAND with a strong smell of hydrocarbons.	37
MB02	11.30-11.80	43	B	338195	Dark greyish brown silty SAND with occasional fine shell fragments and a strong odour of hydrocarbons.	37
MB02	12.30-12.80	46	B	338196	Dark grey slightly clayey silty SAND with some fine to medium shell fragments and a strong odour of hydrocarbons.	26
MB02	13.50-14.00	47	B	338197	Grey slightly silty SAND with rare fine shell fragments.	25
MB02	14.50-15.00	50	B	338198	Grey silty SAND. Strong smell of hydrocarbons.	23
MB02	15.50-16.00	54	B	338199	Dark grey silty SAND with a smell of hydrocarbons.	22
MB02	16.50-17.00	57	B	338200	Grey SAND with occasional pockets of silt.	17
MB02	17.50-18.00	60	B	338201	Grey sandy SILT/CLAY with rare fine to medium shell fragments and an odour of hydrocarbons.	24
MB02	18.50-19.00	63	B	338202	Grey clayey silty SAND with rare fine shell fragments and a strong odour of hydrocarbons.	20
MB02	19.20-19.70	65	B	338203	Grey very sandy SILT with rare fine shell fragments.	21
MB02	21.60	70	D	338205	Grey SILT.	29

Notes

Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	Sheet 3 of 7
LA	07/09/2018		

				Site GREAT YARMOUTH 3RD RIVER CROSSING		Contract No <b>PZ1522D1</b>		
				Client Norfolk County Council				
				Engineer Norfolk Partnership Laboratory				
Sample Identification								
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Description	Moisture Content %		
MB02	22.90	72	D	338206	Grey slightly sandy silty CLAY.	32		
MB02	23.50-24.00	74	B	338207	Light grey slightly silty SAND with occasional fine shell fragments and one cobble.	20		
MB02	27.30-27.80	82	B	338208	Grey slightly clayey slightly gravelly silty SAND. Gravel is fine to medium.	21		
MB02	28.30-28.80	84	B	338209	Grey silty SAND with rare fine shell fragments.	21		
MB02	29.30-29.80	87	B	338210	Grey silty SAND.	18		
MB02	32.30-32.80	94	B	338211	Light grey slightly silty SAND with a strong smell of hydrocarbons.	21		
MB02	33.30-33.80	96	B	338212	Grey silty SAND.	18		
MB02	34.30-34.80	98	B	338213	Greyish brown slightly silty SAND.	22		
MB02	36.00	102	D	338214	Dark grey slightly silty CLAY.	30		
MB02	36.30-36.80	105	B	338215	Grey slightly sandy CLAY with rare fine gravel.	42		
MB02	39.30-39.80	110	B	338216	Dark grey slightly gravelly slightly sandy CLAY. Gravel is fine to medium.	35		
MB03	1.50-2.00	5	B	338217	Greyish brown slightly gravelly very silty SAND with occasional shell fragments. Gravel is fine to medium. Smel of hydrocarbon.	32		
MB03	2.50-3.00	9	B	338218	Yellowish brown silty gravelly SAND with shell fragments. Gravel is fine to coarse.	22		
MB03	3.50-4.00	13	B	338219	Yellowish brown slightly silty SAND with occasional fine shell fragments.	22		
Notes								
Originator		Checked & Approved		<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2				 Sheet 4 of 7
LA		 07/09/2018						

 Site Investigation & Laboratory Services				Site GREAT YARMOUTH 3RD RIVER CROSSING		Contract No <b>PZ1522D1</b>	
				Client Norfolk County Council			
				Engineer Norfolk Partnership Laboratory			
Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %	
Exploratory Hole	Depth m	Sample Ref	Sample Type				
MB03	4.50-5.00	17	B	338220	Yellowish brown slightly silty SAND.	22	
MB03	7.50-8.00	29	B	338221	Yellowish brown silty SAND.	24	
MB03	8.50-9.00	33	B	338222	Yellowish brown slightly silty SAND.	21	
MB03	11.50-12.00	43	B	338223	Yellowish brown slightly silty SAND with occasional fine shell fragments.	18	
MB03	12.50	45	D	338224	Yellowish brown slightly silty SAND with occasional fine shell fragments.	19	
MB03	13.50-14.00	49	B	338225	Light brown silty SAND with occasional fine shell fragments.	17	
MB03	14.50-15.00	52	B	338226	Light brown silty SAND.	18	
MB03	16.50-17.00	58	B	338227	Light brown slightly gravelly slightly silty SAND. Gravel is fine to medium.	19	
MB03	18.50-19.00	64	B	338228	Grey clayey silty SAND with occasional fine to medium shell fragments.	17	
MB03	19.70	67	D	338229	Grey slightly sandy silty CLAY.	31	
MB03	21.00-21.50	70	B	338230	Light grey sandy SILT with rare fine shell fragments.	30	
MB03	23.50-24.00	76	B	338231	Grey slightly clayey silty SAND.	19	
MB03	24.50-25.00	77	B	338232	Light grey silty SAND with occasional shell fragments.	16	
MB04	0.50-1.00	2	B	338233	Greyish brown mottled very dark grey slightly clayey silty very gravelly SAND with occasional fine to medium shell fragments. Gravel is fine to coarse.	19	
Notes							
Originator		Checked & Approved		<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2		 Sheet 5 of 7	
LA		 07/09/2018					

				Site GREAT YARMOUTH 3RD RIVER CROSSING		Contract No <b>PZ1522D1</b>		
				Client Norfolk County Council				
				Engineer Norfolk Partnership Laboratory				
Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %		
Exploratory Hole	Depth m	Sample Ref	Sample Type					
MB04	1.00	4	D	338234	Brown slightly silty very gravelly SAND with occasional fine to coarse shell fragments. Gravel is fine to coarse.	15		
MB06	0.00-0.50	2	B	338235	Dark grey slightly silty SAND with occasional fine to medium shell fragments and a slight odour of hydrocarbons.	19		
MB06	1.50-2.00	6	B	338236	Brown slightly silty SAND with occasional fine to medium shell fragments.	17		
MB06	2.50-3.00	10	B	338237	Grey slightly gravelly very sandy SILT with an odour of hydrocarbons. Gravel is fine to medium.	25		
MB06	3.50-4.00	14	B	338238	Greyish brown clayey silty SAND with an odour of hydrocarbons. Gravel is fine.	22		
MB06	4.50-5.00	18	B	338239	Greyish brown slightly gravelly silty SAND with an odour of hydrocarbons. Gravel is fine.	20		
MB06	7.50-8.00	28	B	338240	Yellowish brown silty SAND with a strong odour of hydrocarbons.	13		
MB06	10.50-11.00	38	B	338241	Greyish brown silty SAND and strong smell of hydrocarbons.	12		
MB06	13.50-14.00	47	B	338242	Greyish brown silty SAND. With occasional fine to medium shell fragments.	16		
MB06	14.50-15.00	50	B	338243	Light greyish brown slightly silty SAND with occasional shell fragments.	18		
MB06	17.50-18.00	59	B	338244	Light greyish brown slightly silty SAND with rare shell fragments.	19		
MB06	19.50-20.00	65	B	338245	Light greyish brown silty SAND with rare shell fragments.	19		
MB06	20.00	66	D	338246	Grey slightly sandy silty CLAY.	19		
MB06	21.50-22.00	70	B	338247	Light grey slightly sandy SILT.	30		
Notes								
Originator		Checked & Approved		<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2				 Sheet 6 of 7
LA		 07/09/2018						






Site Investigation & Laboratory Services

Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
Client	Norfolk County Council	
Engineer	Norfolk Partnership Laboratory	

Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB06	22.00-22.45	72	D	338248	Grey slightly sandy silty CLAY.	23
MB06	23.60	77	D	338249	Grey slightly sandy SILT.	25
MB06	24.45	78	D	338250	Grey silty CLAY.	25

Notes


Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	Sheet 7 of 7
LA	07/09/2018		

 Site Investigation & Laboratory Services	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
	Client	Norfolk County Council	
	Engineer	Norfolk Partnership Laboratory	

Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB04A	1.00-1.50	3	B	338520	Orange brown slightly silty slightly gravelly SAND. Gravel is fine.	16
MB04A	2.50-3.00	7	B	338521	Orange brown slightly silty gravelly SAND with occasional shell fragments. Gravel is fine to medium.	16
MB04A	3.50-4.00	11	B	338522	Light orange brown slightly silty gravelly SAND. Gravel is fine to medium.	20
MB04A	4.50-5.00	15	B	338523	Yellowish brown slightly silty SAND.	22
MB04A	7.50-8.00	25	B	338524	Orange brown slightly silty SAND.	25
MB04A	10.50-11.00	35	B	338525	Orangey brown slightly silty SAND.	20
MB04A	12.50-13.00	41	B	338526	Grey mottled brown slightly gravelly clayey silty SAND. Gravel is fine.	15
MB04A	14.50-15.00	47	B	338527	Light brown slightly silty SAND.	13
MB04A	16.50-17.00	52	B	338528	Grey clayey silty SAND.	21
MB04A	17.50-18.00	54	B	338529	Light grey mottled light brown slightly gravelly silty SAND. Gravel is fine.	16
MB04A	18.50-19.00	57	B	338530	Brown slightly gravelly very sandy CLAY. Gravel is fine to medium.	26
MB04A	21.20	64	D	338531	Grey slightly sandy CLAY.	25
MB04A	21.50-22.00	65	B	338532	Grey mottled light brown slightly sandy CLAY.	33
MB04A	23.30	70	D	338533	Olive grey slightly sandy CLAY with some shell fragments.	33



Notes

Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	 Sheet 1 of 10
ACW	 11/09/2018		

 Site Investigation & Laboratory Services	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
	Client	Norfolk County Council	
	Engineer	Norfolk Partnership Laboratory	

Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB04A	24.50-25.00	73	B	338534	Grey clayey silty SAND with rare fine gravel.	16
MB04A	26.50-27.00	78	B	338535	Brown slightly clayey silty SAND.	24
MB04A	29.50-30.00	85	B	338536	Dark grey mottled brown slightly clayey silty SAND.	18
MB04A	31.50-32.00	90	B	338537	Light brown slightly silty SAND.	16
MB04A	33.50-34.00	95	B	338538	Grey mottled brown slightly clayey silty SAND with rare fine gravel.	18
MB04A	35.50-36.00	100	B	338539	Dark brown mottled light brown clayey silty SAND. Dark brown mottled light brown slightly clayey silty SAND.	19
MB04A	37.50-38.00	105	B	338540	Very dark brown clayey silty SAND.	26
MB04A	38.00-38.45	106	D	338542	Orange brown slightly gravelly silty CLAY. Gravel is fine to medium.	29
MB04A	38.50-39.00	107	B	338541	Very dark grey mottled brown slightly sandy CLAY with rare fine gravel.	31
MB04A	40.00-40.45	110	D	338543	Brown silty CLAY.	51
MB05	1.50-2.00	6	B	338544	Light brown slightly silty SAND.	17
MB05	2.50-3.00	10	B	338545	Dark brown slightly gravelly slightly silty SAND. Gravel is fine to medium.	12
MB05	3.50-4.00	14	B	338546	Orange brown slightly gravelly slightly silty SAND.	15
MB05	4.50-5.00	18	B	338547	Orange brown slightly clayey slightly gravelly silty SAND. Gravel is fine to medium.	21

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Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	 Sheet 2 of 10
ACW	 11/09/2018		




Site Investigation & Laboratory Services

Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
Client	Norfolk County Council	
Engineer	Norfolk Partnership Laboratory	

Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB05	5.50-6.00	22	B	338548	Orangey brown slightly silty SAND with rare fine shell fragments.	21
MB05	6.50-7.00	25	B	338549	Orange brown slightly silty SAND.	17
MB05	8.50-9.00	30	B	338550	Light brown slightly silty SAND.	20
MB05	12.50-13.00	43	B	338551	Orange brown slightly silty SAND.	19
MB05	13.50-14.00	46	B	338552	Orange brown slightly gravelly silty SAND with occasional fine shell fragments. Gravel is fine to medium.	20
MB05	15.50-16.00	52	B	338553	Orange brown slightly gravelly very sandy CLAY with some fine shell fragments. Gravel is fine.	20
MB05	16.00-16.33	53	D	338554	Grey sandy CLAY/SILT.	25
MB05	16.50-17.00	55	B	338555	Dark brown clayey silty SAND.	16
MB05	18.50-19.00	61	B	338557	Dark brown clayey silty SAND.	19
MB05	19.50-20.00	64	B	338558	Light brown slightly silty SAND with rare fine gravel.	16
MB05	21.50-22.00	69	B	338559	Dark grey clayey silty SAND.	17
MB05	22.00-22.45	70	D	338560	Olive grey slightly sandy silty CLAY.	27
MB05	22.50-23.00	72	B	338561	Grey mottled light brown slightly gravelly sandy CLAY. Gravel is fine to medium.	29
MB05	23.50-24.00	75	B	338563	Olive mottled light brown slightly sandy CLAY.	33

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Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	 Sheet 3 of 10
ACW	 11/09/2018		

 Site Investigation & Laboratory Services	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
	Client	Norfolk County Council	
	Engineer	Norfolk Partnership Laboratory	

Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB05	23.60	74	D	338562	Grey slightly sandy silty CLAY.	24
MB05	24.50-25.00	78	B	338564	Greyish brown slightly gravelly clayey silty SAND. Gravel is fine.	18
MB07	0.50-1.00	3	B	338565	Brown silty gravelly SAND. Gravel is fine to medium.	15
MB07	1.30	6	D	338566	Orange brown slightly silty SAND.	15
MB07	2.30	10	D	338567	Orange brown slightly silty SAND.	18
MB07	3.40-4.00	15	B	338568	Orange brown slightly gravelly slightly clayey silty SAND. Gravel is fine to medium.	19
MB07	5.30	22	D	338569	Light brown clayey silty SAND.	22
MB07	6.50-7.00	26	B	338570	Light brown slightly silty SAND with rare fine gravel.	20
MB07	8.50-9.00	32	B	338571	Brown slightly silty SAND.	21
MB07	10.50-11.00	39	B	338572	Light orange brown silty SAND.	21
MB07	11.30	41	D	338573	Brown slightly gravelly silty SAND. Gravel is fine to medium.	23
MB07	11.50-12.00	42	B	338574	Light brown slightly silty SAND with organic odour and rare fine gravel.	3.8
MB07	13.50-14.00	48	B	338575	Light brown slightly silty SAND with rare fine shell fragments.	19
MB07	15.50-16.00	54	B	338576	Brown slightly silty SAND with rare fine shell fragments.	17



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Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	 Sheet 4 of 10
ACW	11/09/2018		

 Site Investigation & Laboratory Services	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
	Client	Norfolk County Council	
	Engineer	Norfolk Partnership Laboratory	

Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB07	18.50-19.00	63	B	338577	Brown slightly clayey silty SAND with rare fine gravel.	19
MB07	19.00-19.45	64	D	338578	Grey slightly sandy CLAY.	29
MB07	19.50-20.00	66	B	338579	Dark grey sandy CLAY.	27
MB07	20.60	69	D	338580	Grey slightly sandy SILT/CLAY.	30
MB07	21.00-21.45	70	D	338581	Grey slightly sandy silty CLAY.	22
MB07	24.50-25.00	80	B	338582	Dark grey clayey silty SAND with rare shell fragments.	18
MB07	25.50-26.00	82	B	338583	Grey mottled light brown clayey silty SAND with rare fine shell fragments.	18
MB07	27.50-28.00	87	B	338584	Dark grey slightly clayey slightly gravelly silty SAND. Gravel is fine.	20
MB07	28.50-29.00	90	B	338585	Light grey silty SAND with rare fine gravel.	18
MB07	30.50-31.00	95	B	338586	Light brown silty SAND.	19
MB07	33.50-34.00	102	B	338587	Dark brown slightly clayey slightly silty SAND.	14
MB07	34.50-35.00	105	B	338588	Light brown slightly silty SAND.	16
MB07	36.50-37.00	110	B	338589	Grey mottled brown slightly silty SAND.	21
MB07	37.50-38.00	112	B	338590	Olive mottled dark brown slightly gravelly slightly sandy CLAY. Gravel is fine to medium.	29

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Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	 Sheet 5 of 10
ACW	 11/09/2018		

 Site Investigation & Laboratory Services	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
	Client	Norfolk County Council	
	Engineer	Norfolk Partnership Laboratory	

Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB07	38.60	114	D	338591	Greyish brown slightly gravelly slightly sandy CLAY. Gravel is fine.	29
MB07	39.00-39.45	116	D	338592	Brown slightly sandy CLAY.	32
MB08	0.50-1.00	3	B	338593	Dark brown mottled very dark grey slightly gravelly clayey silty SAND. Gravel is fine.	30
MB08	1.50-2.00	7	B	338594	Orange brown slightly clayey silty gravelly SAND. Gravel is fine to medium.	20
MB08	4.50-5.00	19	B	338595	Orange brown SAND with pockets of dark grey silty sand.	15
MB08	7.50-8.00	29	B	338596	Orange brown slightly silty SAND.	23
MB08	9.50-10.00	35	B	338597	Orange brown slightly silty SAND	27
MB08	11.50-12.00	41	B	338598	Orange brown slightly silty SAND.	19
MB08	12.50-13.00	44	B	338599	Orange brown slightly gravelly slightly silty SAND. Gravel is fine to medium.	16
MB08	13.50-14.00	48	B	338601	Orange brown slightly silty gravelly SAND. Gravel is fine to medium.	17
MB08	15.50-16.00	53	B	338602	Brown silty SAND with rare fine gravel.	17
MB08	17.50-18.00	58	B	338603	Light brown slightly silty SAND.	13
MB08	18.90	62	D	338604	Grey slightly sandy CLAY.	31
MB08	19.30-19.70	63	B	338605	Grey clayey silty SAND.	57

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Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	 Sheet 6 of 10
ACW	09/2018		





Site Investigation & Laboratory Services

Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
Client	Norfolk County Council	
Engineer	Norfolk Partnership Laboratory	

Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB08	21.00-21.45	67	D	338606	Grey silt/CLAY.	25
MB08	22.00-22.60	71	B	338607	Greyish brown slightly sandy CLAY.	31
MB08	23.00-23.45	72	D	338608	Grey sandy silty CLAY.	25
MB08	24.00-24.50	75	B	338610	Brown slightly gravelly clayey silty SAND. Gravel is fine to medium.	24
MB08	25.00-25.4B	74	D	338609	Greyish brown silty SAND with rare fine to medium gravel.	23
MB09	0.50-1.00	3		338611	Light brown silty SAND with occasional fine to medium shell fragments.	18
MB09	1.50-2.00	6	B	338612	Brown slightly silty slightly gravelly SAND with some fine shell fragments. Gravel is fine to medium.	12
MB09	2.50-3.00	10	B	338613	Very dark grey mottled brown clayey silty gravelly SAND. Gravel is fine to medium.	17
MB09	3.50-4.00	14	B	338614	Greyish brown silty gravelly SAND. Gravel is fine to medium.	15
MB09	4.50-5.00	17	B	338615	Orange brown clayey silty SAND with occasional fine shell fragments.	22
MB09	5.30-6.00	22	B	338616	Greyish brown silty SAND with occasional fine to medium shell fragments.	17
MB09	6.50-7.00	25	B	338617	Orange brown slightly gravelly slightly silty SAND. Gravel is fine.	22
MB09	10.50-11.00	38	B	338618	Orange brown slightly gravelly silty SAND. Gravel is fine.	20
MB09	12.50-13.00	44	B	338651	Dark brown mottled orange brown silty SAND with rare fine gravel.	16

Notes

Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	
ACW	 11/09/2018		




Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
Client	Norfolk County Council	
Engineer	Norfolk Partnership Laboratory	

Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB09	13.30	46	B	338652	Orange brown silty SAND with occasional fine gravel.	16
MB09	14.50-15.00	50	B	338619	Orange brown mottled dark grey slightly silty SAND.	19
MB09	17.50-18.00	59	B	338620	Orange brown slightly silty SAND.	18
MB09	18.50-19.00	62	B	338621	Light brown slightly silty SAND.	23
MB09	19.50-20.00	64	B	338622	Dark grey mottled brown slightly clayey silty SAND with occasional fine to medium shell fragments.	21
MB09	21.50-22.00	69	B	338623	Dark brown sandy CLAY.	38
MB09	23.50-24.00	72	B	338625	Dark grey mottled dark brown slightly sandy SILT/CLAY with rare fine gravel.	37
MB09	23.60	71	D	338624	Grey silty CLAY.	25
MB09	24.50-25.00	75	B	338626	Grey slightly gravelly clayey silty SAND. Gravel is fine to medium.	24
MB09	27.50-28.00	82	B	338627	Dark grey clayey silty SAND with some fine shell fragments.	19
MB09	28.50-29.00	85	B	338628	Greyish brown slightly clayey silty SAND.	18
MB09	31.50-32.00	92	B	338629	Dark grey silty SAND with rare fine shell fragments.	18
MB09	33.50-34.00	97	B	338630	Grey slightly silty SAND.	15
MB09	36.50-37.00	105	B	338631	Grey silty SAND.	15

Notes


Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	 Sheet 8 of 10
ACW	 09/2018		

 Site Investigation & Laboratory Services	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No <b>PZ1522D1</b>
	Client	Norfolk County Council	
	Engineer	Norfolk Partnership Laboratory	

Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB09	37.40	107	B	338632	Dark brown slightly sandy SILT/CLAY.	36
MB09	40.00-40.45	112	B	338633	Dark brown mottled brown slightly gravelly slightly sandy CLAY. Gravel is fine to medium.	30
MB09	40.00-40.45	113	D	338634	Orange brown slightly sandy CLAY.	28
MB10	2.00	5	B	338635	Dark brown slightly gravelly silty SAND with pockets of organic material. Gravel is fine to medium.	31
MB10	4.00	13	B	338636	Dark grey mottled brown slightly silty SAND.	18
MB10	5.00	17	B	338637	Brown mottled dark grey silty gravelly SAND. Gravel is fine to medium.	16
MB10	7.00	24	B	338638	Light brown slightly silty SAND with rare fine gravel.	21
MB10	10.00	33	B	338639	Orange brown slightly silty SAND.	20
MB10	12.00	40	B	338640	Orange brown slightly silty SAND.	22
MB10	14.00	47	B	338641	Orange brown silty SAND.	15
MB10	14.50	49	B	338642	Orange brown slightly silty gravelly SAND. Gravel is fine to coarse.	19
MB10	15.50	51	B	338643	Orange brown slightly gravelly slightly silty SAND. Gravel is fine to medium.	16
MB10	17.50	55	B	338644	Light brown slightly silty SAND.	14
MB10	19.30	60	B	338645	Brown slightly silty SAND.	14



Notes

Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	 Sheet 9 of 10
ACW	 09/2018		

 Site Investigation & Laboratory Services	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No	PZ1522D1
	Client	Norfolk County Council		
	Engineer	Norfolk Partnership Laboratory		

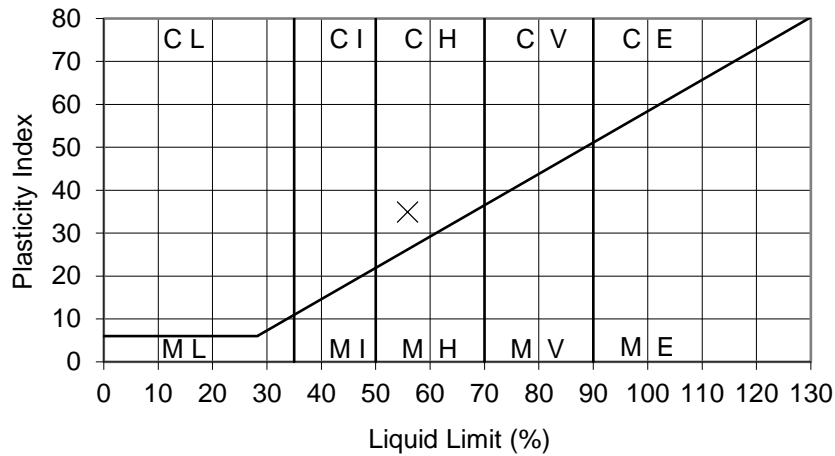
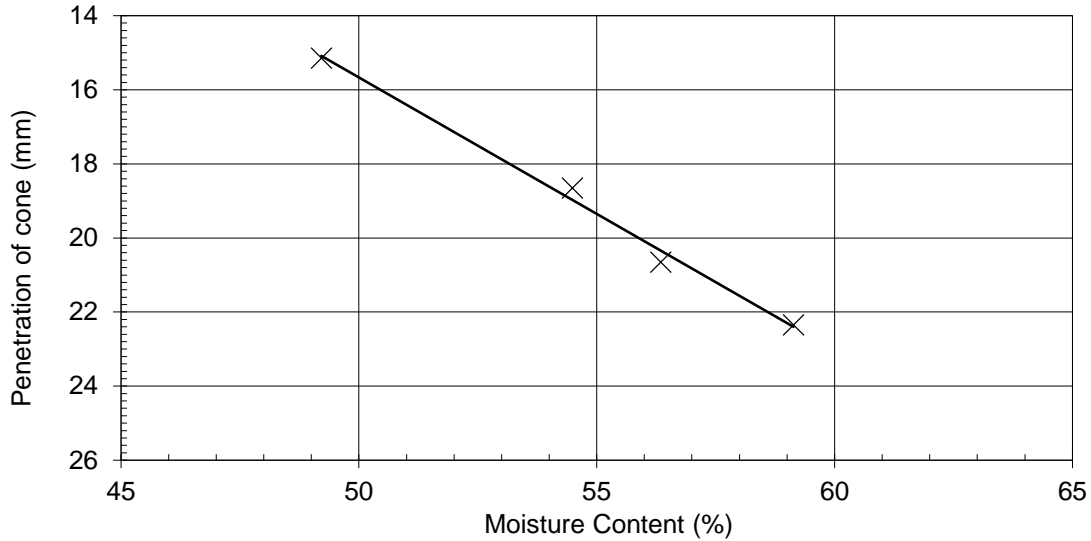
Sample Identification				Lab Sample ID	Non Engineering Description	Moisture Content %
Exploratory Hole	Depth m	Sample Ref	Sample Type			
MB10	20.50	63	D	338646	Grey very sandy SILT/CLAY.	18
MB10	21.50	65	D	338647	Grey sandy CLAY.	26
MB10	22.50	68	B	338648	Greyish brown slightly sandy CLAY with rare fine gravel.	38
MB10	23.37	69	D	338649	Grey slightly sandy silty CLAY.	22

Notes

Originator	Checked & Approved	<b>MOISTURE CONTENT</b> BS1377:Part 2:1990 Clause 3.2	 Sheet 10 of 10
ACW	 11/09/2018		


Non Engineering Description : Orange brown slightly sandy gravelly CLAY. Gravel is fine to medium.

Preparation : Sample washed and air dried



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 37 %  
 Percentage retained on 425µm sieve : 20 %  
 Liquid Limit : 56 %  
 Plastic Limit : 21 %  
 Plasticity Index : 35  
 Equivalent moisture content of material passing 425µm sieve : 46 %  
 Liquidity Index : 0.71

Originator	Checked & Approved
PD	 04/09/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB01A

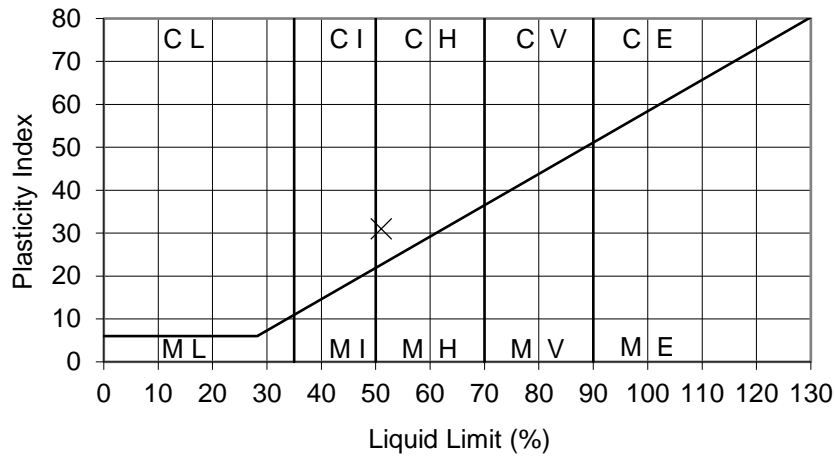
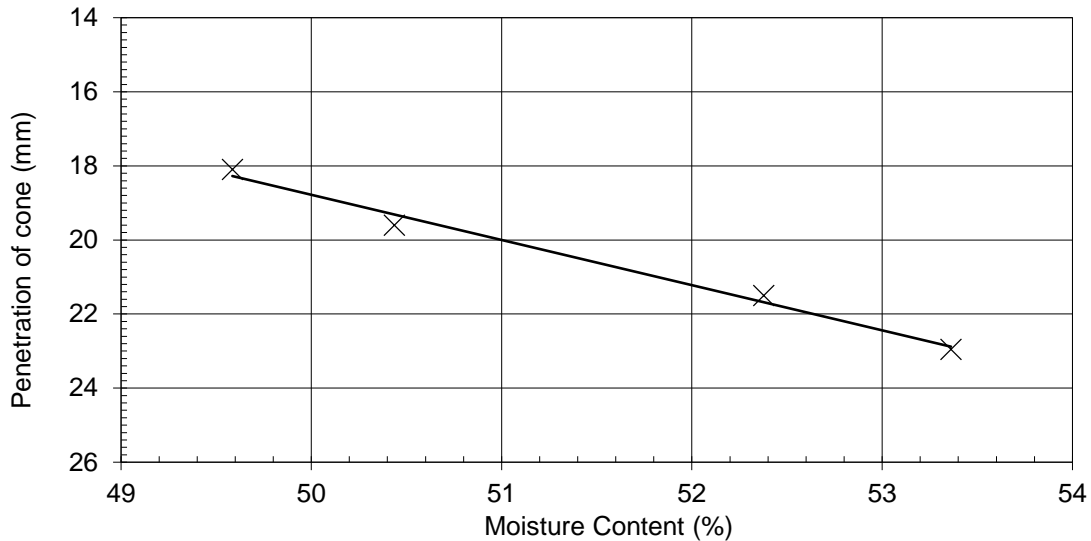
Sample Ref 73

Depth (m) 21.60

Sample Type D


Non Engineering Description : Grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	28 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	51 %
Plastic Limit :	20 %
Plasticity Index :	31
Equivalent moisture content of material passing 425µm sieve :	28 %
Liquidity Index :	0.26

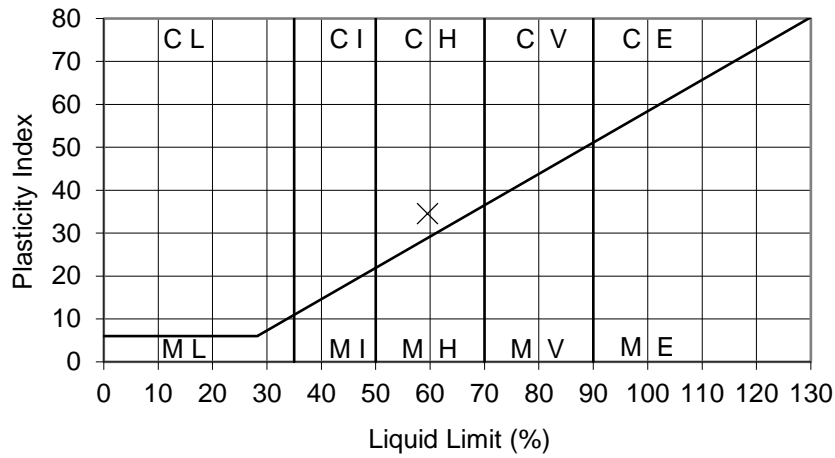
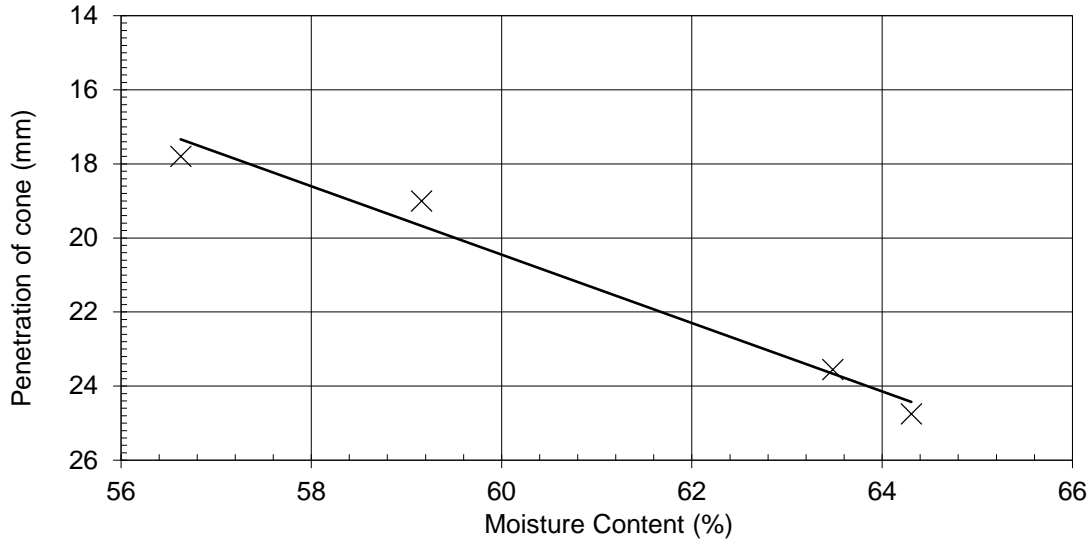
Originator	Checked & Approved
PD	 23/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990




Non Engineering Description : Olive grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 32 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 60 %  
 Plastic Limit : 25 %  
 Plasticity Index : 35  
 Equivalent moisture content of material passing 425µm sieve : 32 %  
 Liquidity Index : 0.20

Originator	Checked & Approved
PD	 23/08/2018

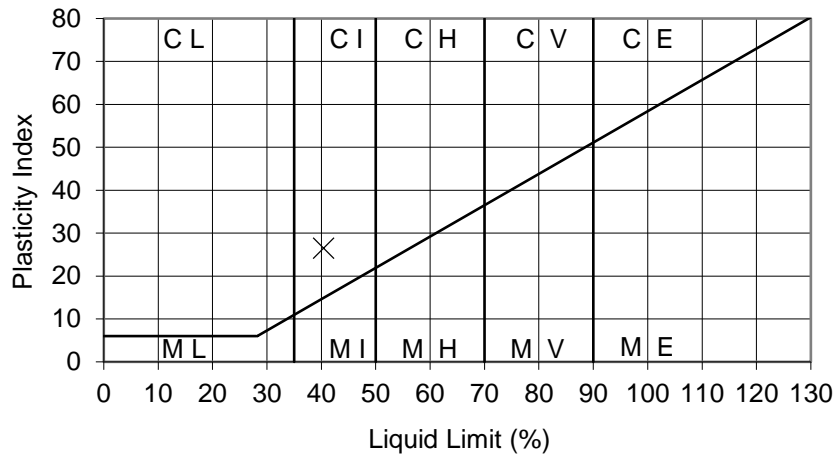
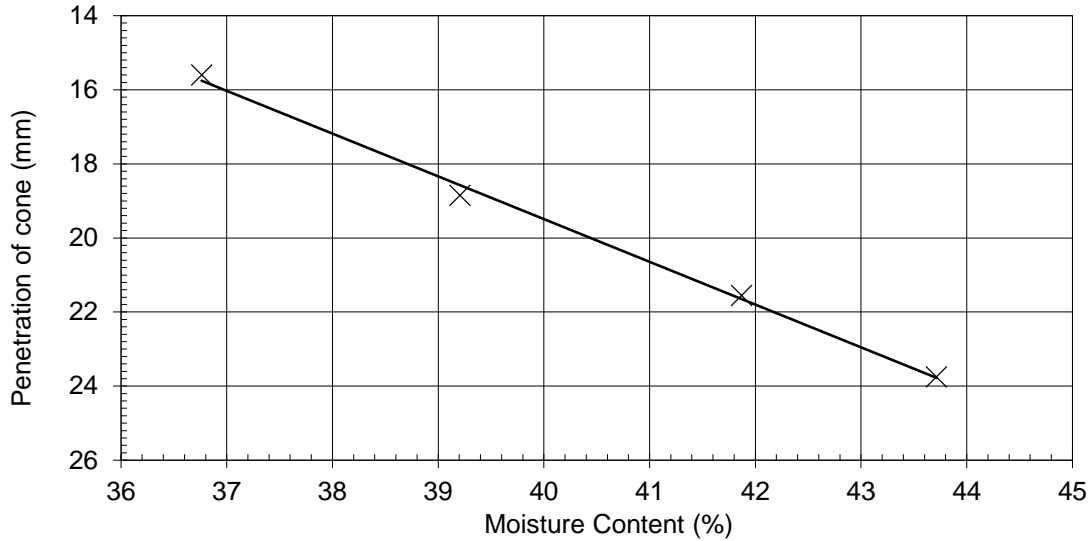
**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





Non Engineering Description : Grey slightly gravelly sandy CLAY with pockets of orange brown sand. Gravel is fine to medium.


Preparation : Sample washed and air dried



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 34 %  
 Percentage retained on 425µm sieve : 23 %  
 Liquid Limit : 40 %  
 Plastic Limit : 14 %  
 Plasticity Index : 26

Equivalent moisture content of material passing 425µm sieve : 44 %  
 Liquidity Index : 1.15

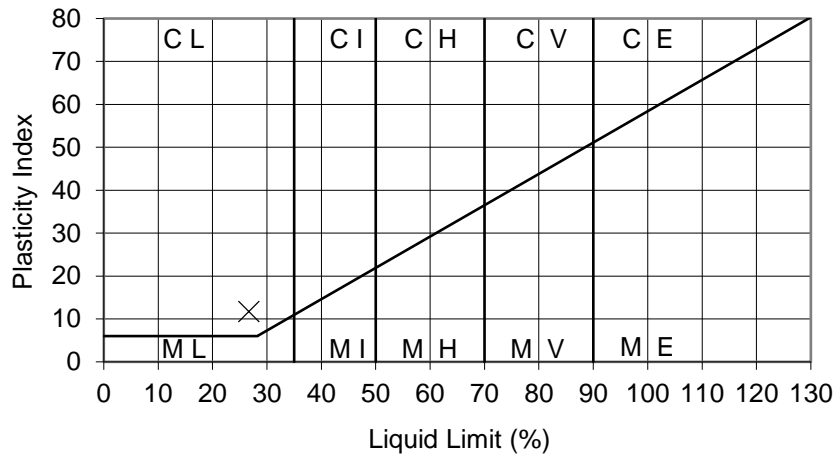
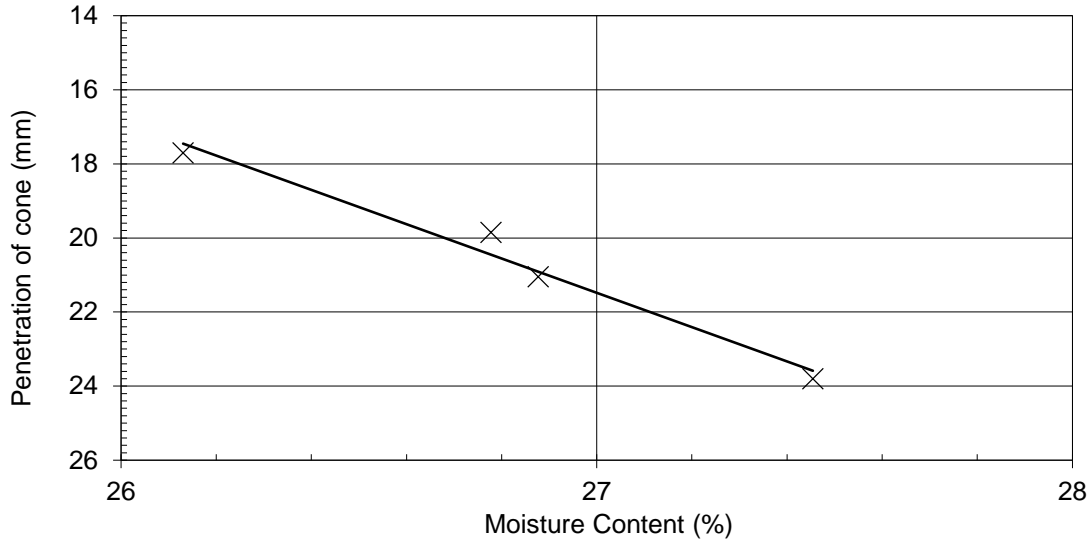
Originator	Checked & Approved
PD	 /09/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990



Non Engineering Description : Brown silty clayey SAND.


Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 27 %  
 Percentage retained on 425µm sieve : 1 %  
 Liquid Limit : 27 %  
 Plastic Limit : 15 %  
 Plasticity Index : 12

Equivalent moisture content of material passing 425µm sieve : 27 %  
 Liquidity Index : 1.00

Originator	Checked & Approved
PD	 04/09/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB02

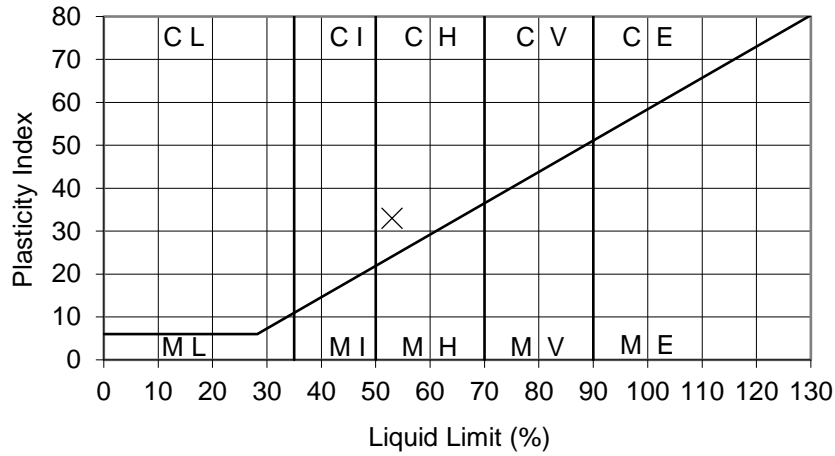
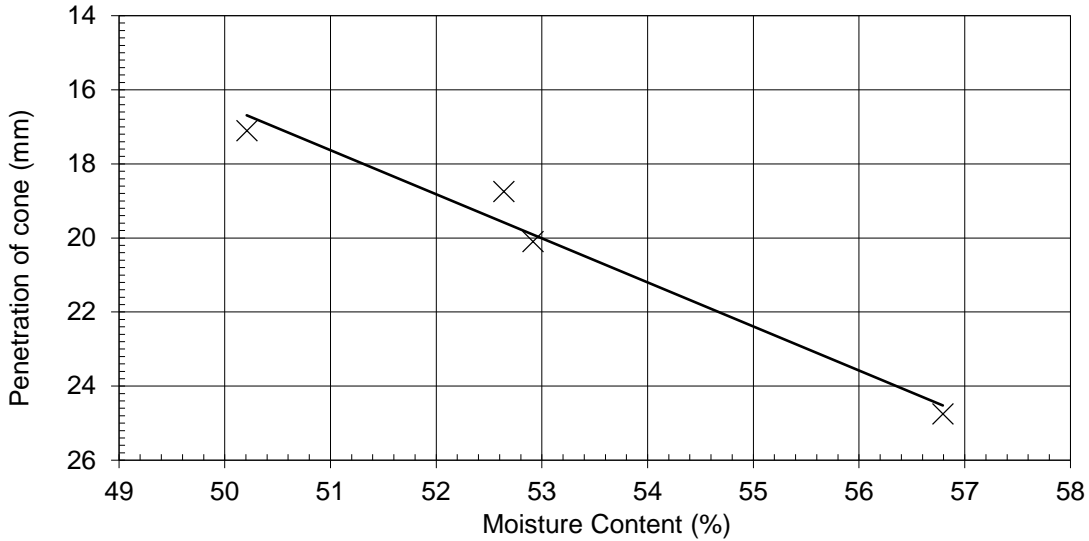
Sample Ref 70

Depth (m) 21.60

Sample Type D


Non Engineering Description : Grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	29 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	53 %
Plastic Limit :	20 %
Plasticity Index :	33
Equivalent moisture content of material passing 425µm sieve :	29 %
Liquidity Index :	0.27

Originator	Checked & Approved
PD	 23/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
BS 1377:Part 2:Clause 4.3:1990  
BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB02

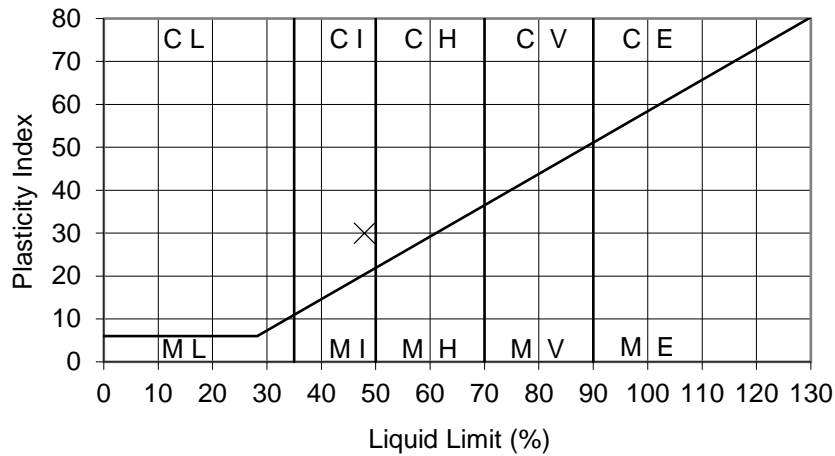
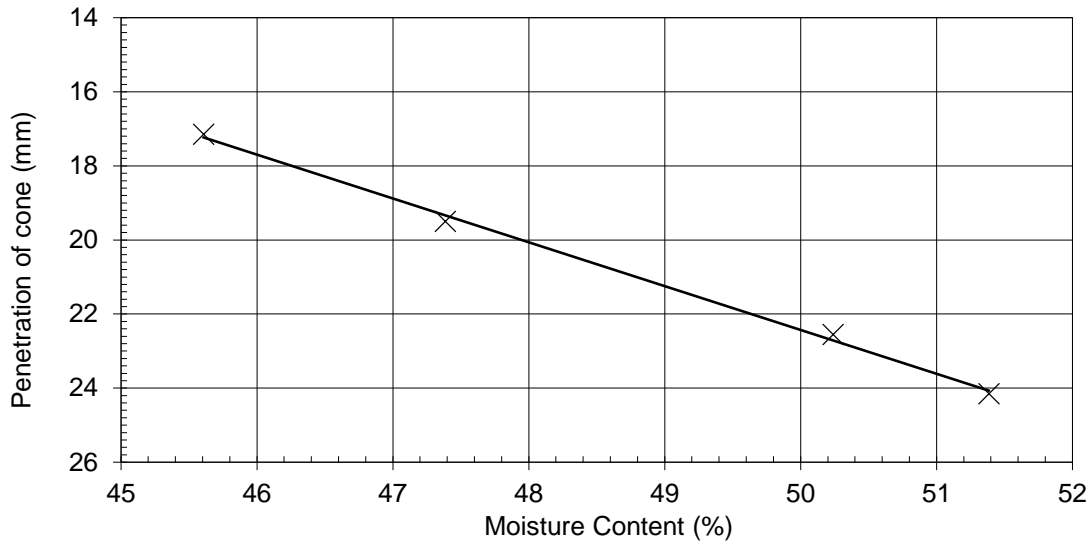
Sample Ref 72

Depth (m) 22.90

Sample Type D


Non Engineering Description : Grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	32 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	48 %
Plastic Limit :	18 %
Plasticity Index :	30
Equivalent moisture content of material passing 425µm sieve :	32 %
Liquidity Index :	0.47

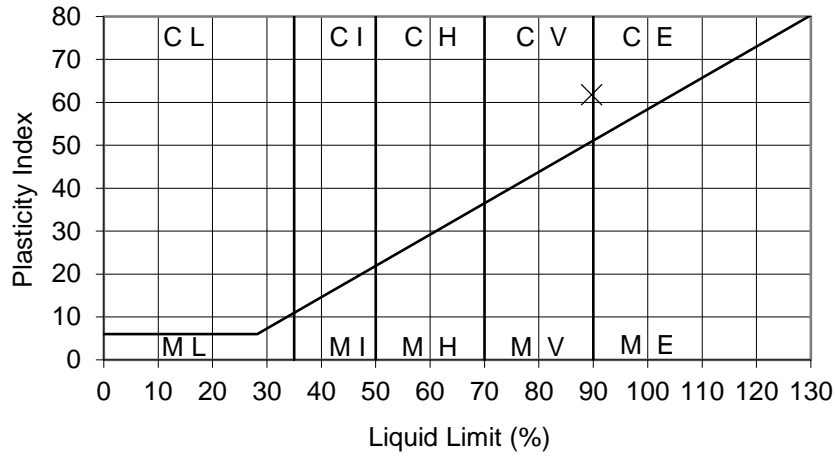
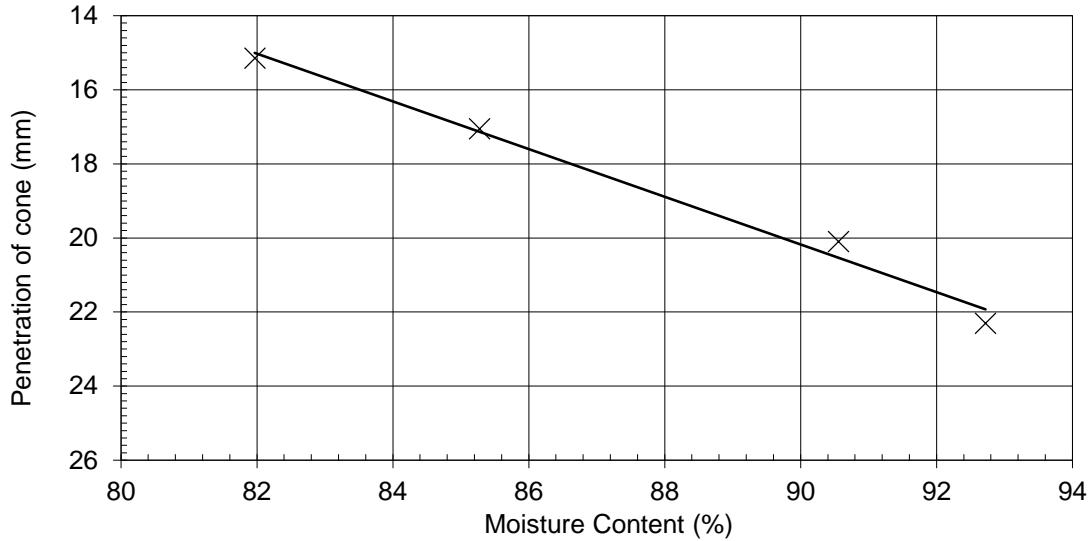
Originator	Checked & Approved
PD	 23/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990




Non Engineering Description : Dark grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 30 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 90 %  
 Plastic Limit : 28 %  
 Plasticity Index : 62  
 Equivalent moisture content of material passing 425µm sieve : 30 %  
 Liquidity Index : 0.03

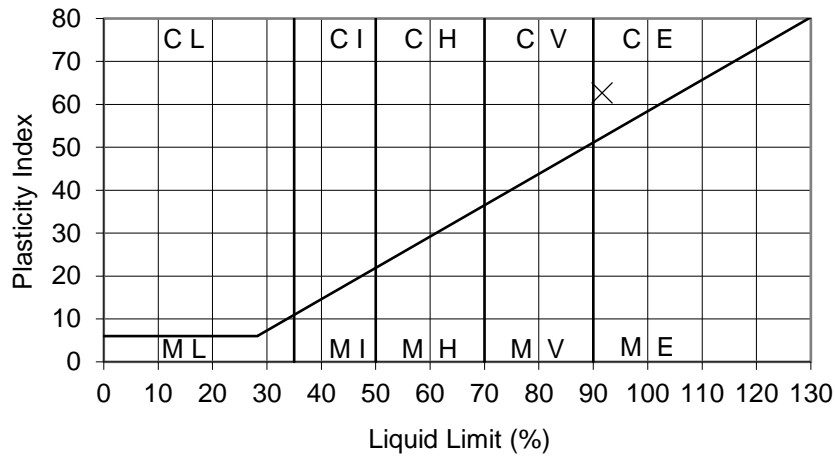
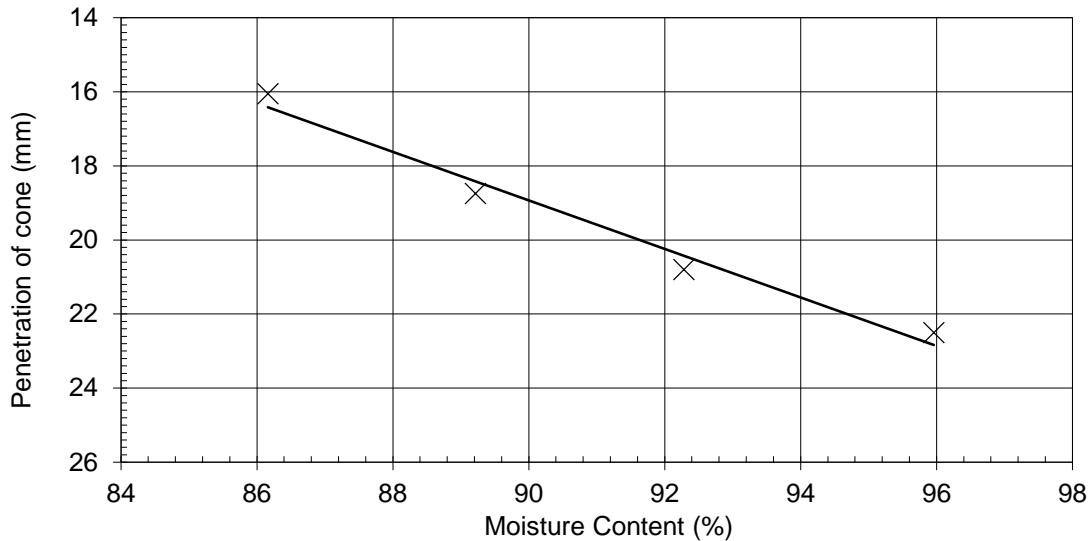
Originator	Checked & Approved
PD	 23/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990




Non Engineering Description : Dark grey slightly gravelly slightly sandy CLAY. Gravel is fine to medium.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 35 %  
 Percentage retained on 425µm sieve : 2 %  
 Liquid Limit : 92 %  
 Plastic Limit : 29 %  
 Plasticity Index : 63  
 Equivalent moisture content of material passing 425µm sieve : 36 %  
 Liquidity Index : 0.11

Originator	Checked & Approved
PD	 04/09/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





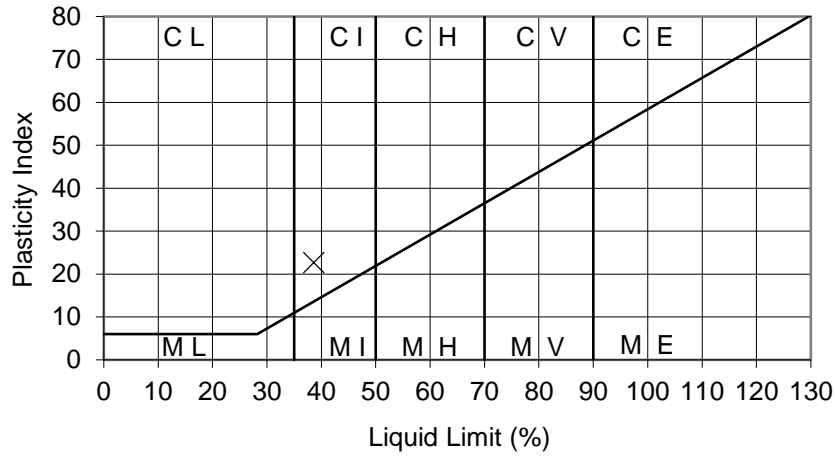
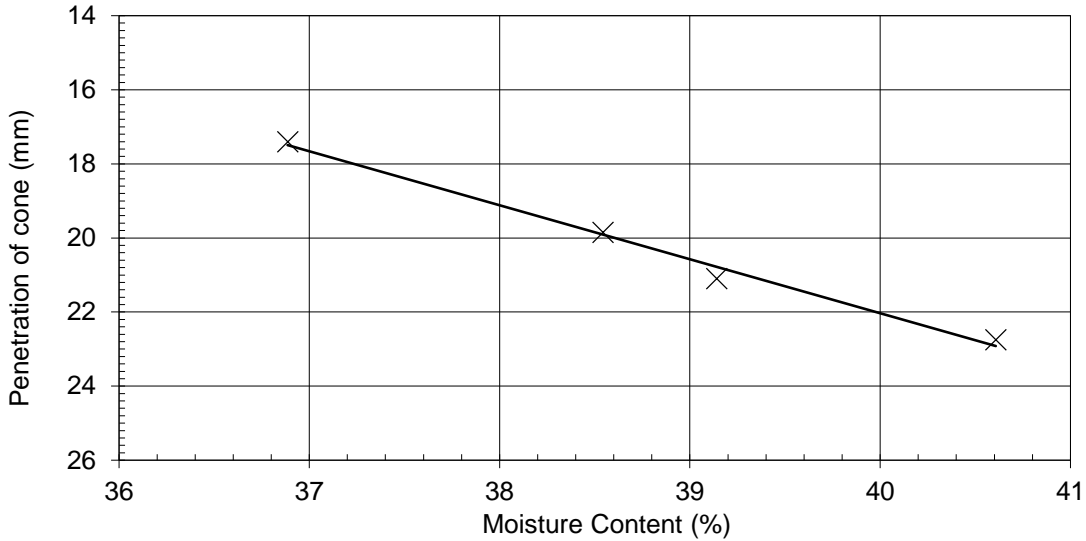
SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

<b>Contract No.</b>	<b>PZ1522D1</b>
Hole ID	MB03
Sample Ref	67
Depth (m)	19.70
Sample Type	D

Non Engineering Description : Grey slightly sandy CLAY.

Preparation : Sample as received



**Results :**

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	31 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	39 %
Plastic Limit :	16 %
Plasticity Index :	23
Equivalent moisture content of material passing 425µm sieve :	31 %
Liquidity Index :	0.65

Originator	Checked & Approved
PD	23/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990







SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB04A

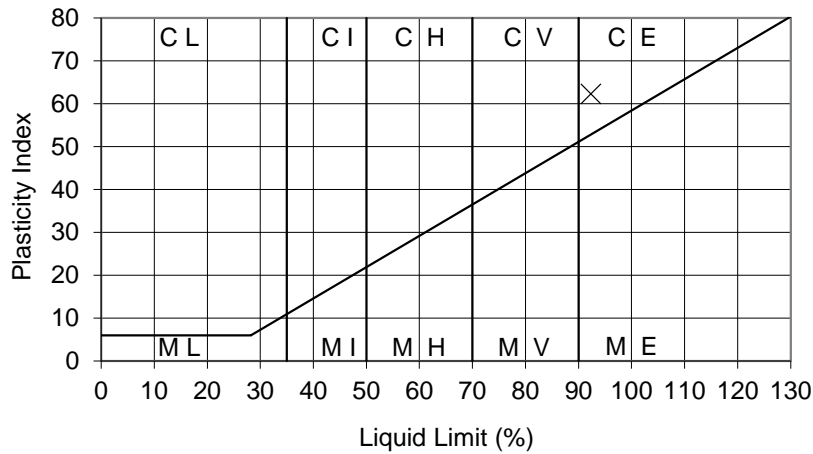
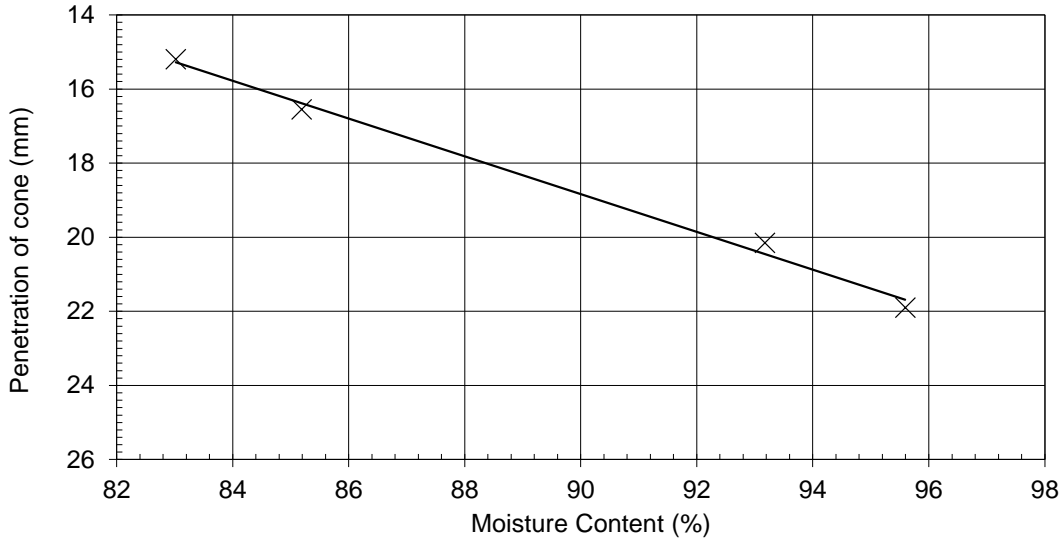
Sample Ref 110

Depth (m) 40.00-40.45

Sample Type D

Non Engineering Description : Brown slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	51 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	92 %
Plastic Limit :	30 %
Plasticity Index :	62
Equivalent moisture content of material passing 425µm sieve :	51 %
Liquidity Index :	0.34

Originator	Checked & Approved
PD	[Redacted] 18

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB04A

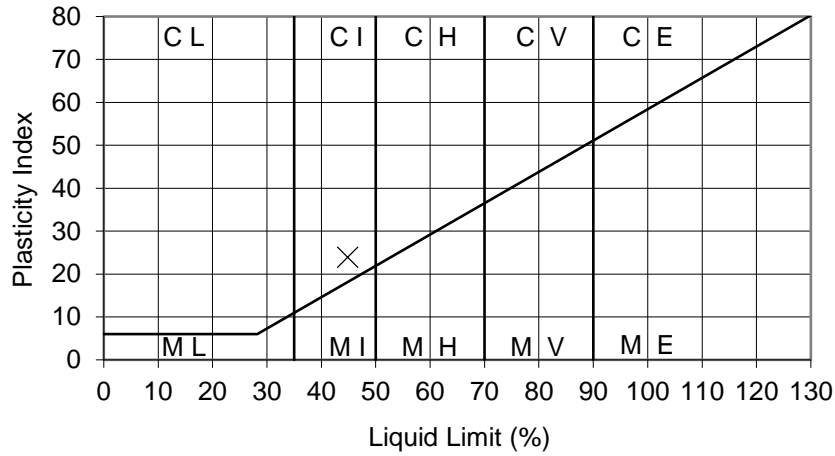
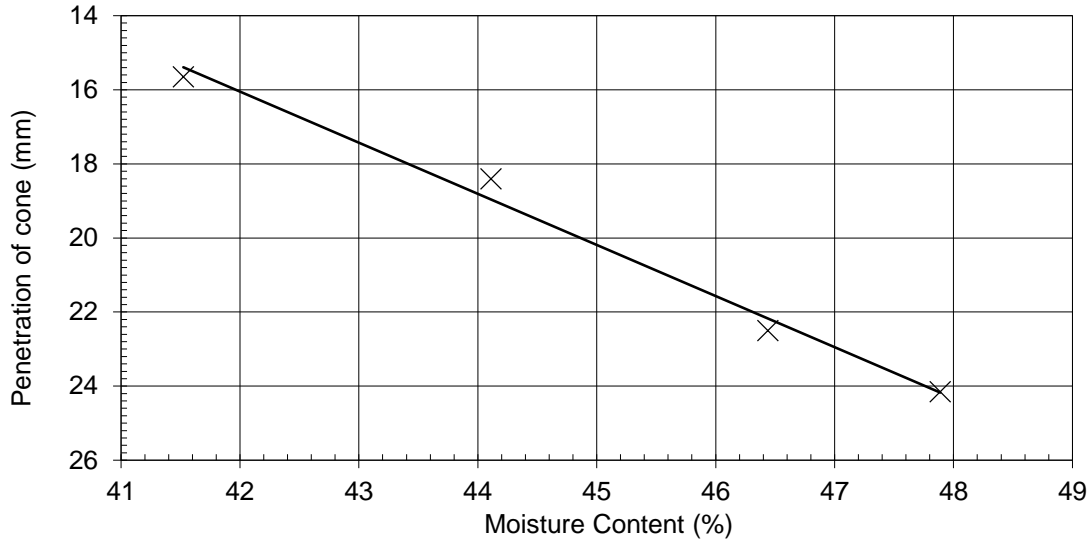
Sample Ref 64

Depth (m) 21.20

Sample Type D


Non Engineering Description : Grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	25 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	45 %
Plastic Limit :	21 %
Plasticity Index :	24
Equivalent moisture content of material passing 425µm sieve :	25 %
Liquidity Index :	0.17

Originator	Checked & Approved
PD	 24/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





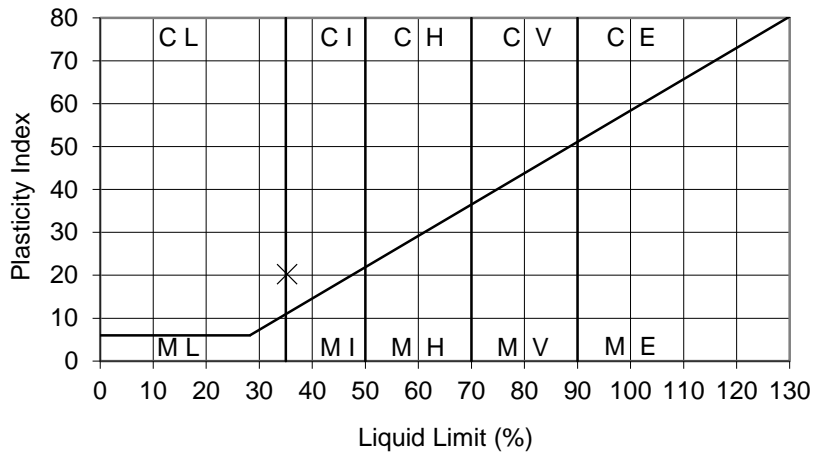
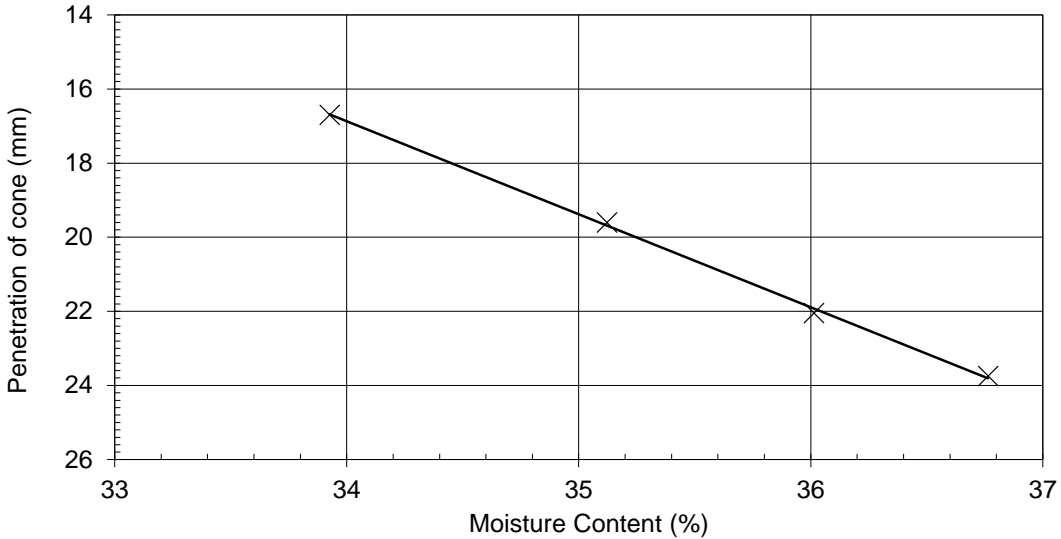
SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING  
Client Norfolk County Council  
Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1  
Hole ID MB04A  
Sample Ref 70  
Depth (m) 23.30  
Sample Type D


Non Engineering Description : Olive grey slightly sandy CLAY with some shell fragments.

Preparation : Sample washed and air dried



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 33 %  
 Percentage retained on 425µm sieve : 25 %  
 Liquid Limit : 35 %  
 Plastic Limit : 15 %  
 Plasticity Index : 20  
 Equivalent moisture content of material passing 425µm sieve : 44 %  
 Liquidity Index : 1.45

Originator	Checked & Approved
PD	 10/09/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

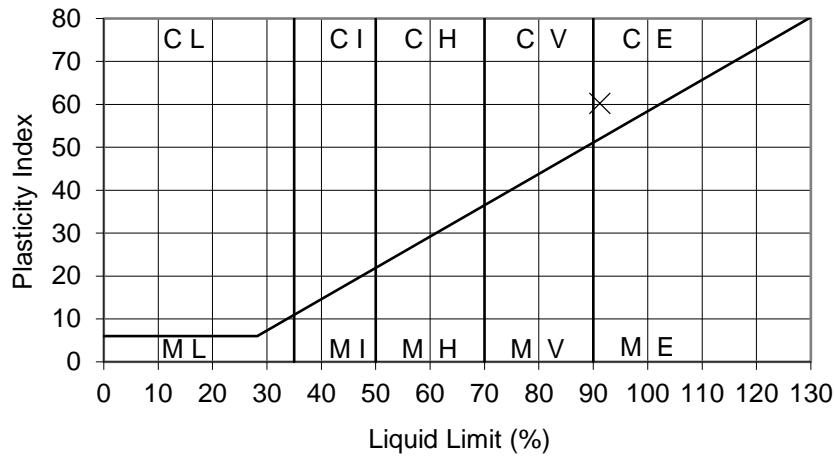
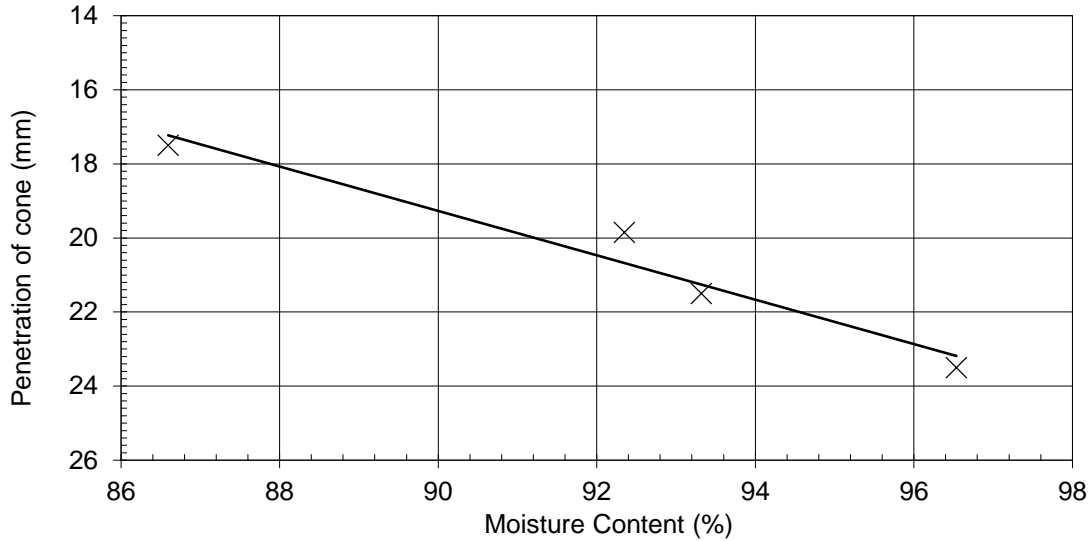
Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB04A  
 Sample Ref 106  
 Depth (m) 38.00-38.45  
 Sample Type D

Non Engineering Description : Orange brown slightly gravelly slightly sandy CLAY. Gravel is fine to medium.


Preparation : Sample washed and air dried



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 29 %  
 Percentage retained on 425µm sieve : 2 %  
 Liquid Limit : 91 %  
 Plastic Limit : 31 %  
 Plasticity Index : 60

Equivalent moisture content of material passing 425µm sieve : 30 %  
 Liquidity Index : -0.02

Originator	Checked & Approved
PD	 05/09/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

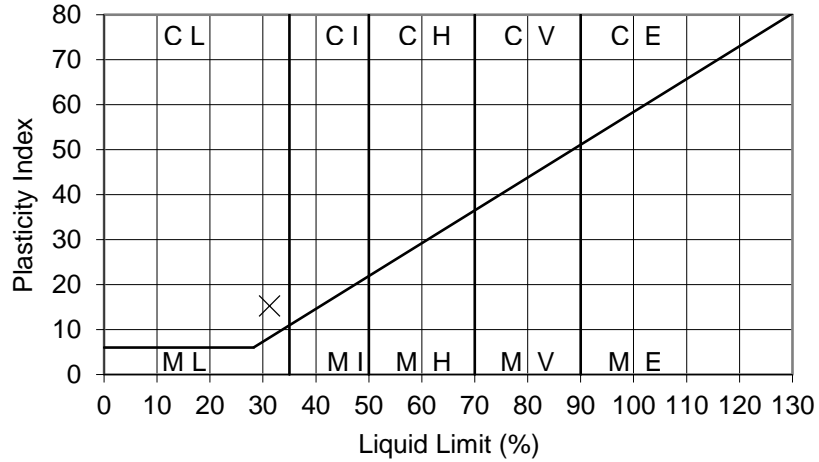
Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB05  
 Sample Ref 53  
 Depth (m) 16.00-16.33  
 Sample Type D

Non Engineering Description : Grey sandy CLAY.

Preparation : Sample washed and air dried




Note: Insufficient material for a four point liquid limit test.

Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 25 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 31 %  
 Plastic Limit : 16 %  
 Plasticity Index : 15

Equivalent moisture content of material passing 425µm sieve : 25 %  
 Liquidity Index : 0.60

Originator	Checked & Approved
PD	 05/09/2018

**Liquid Limit (One Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.4:1990  
 BS 1377:Part 2:Clause 5:1990



Sheet 1 of 1



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

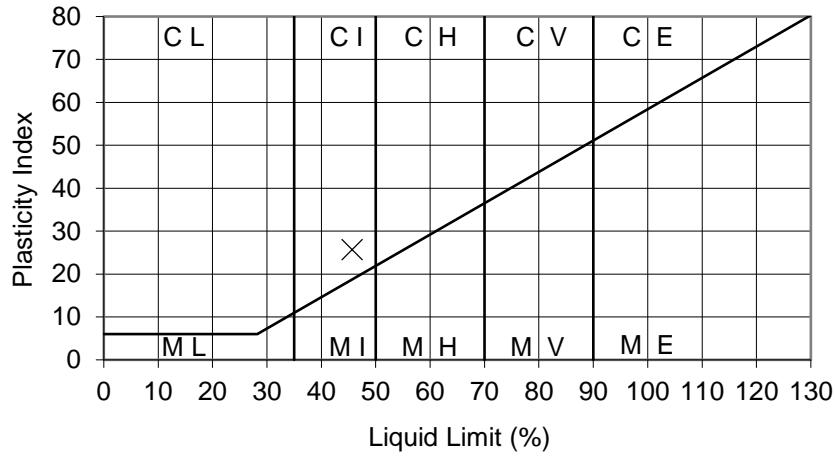
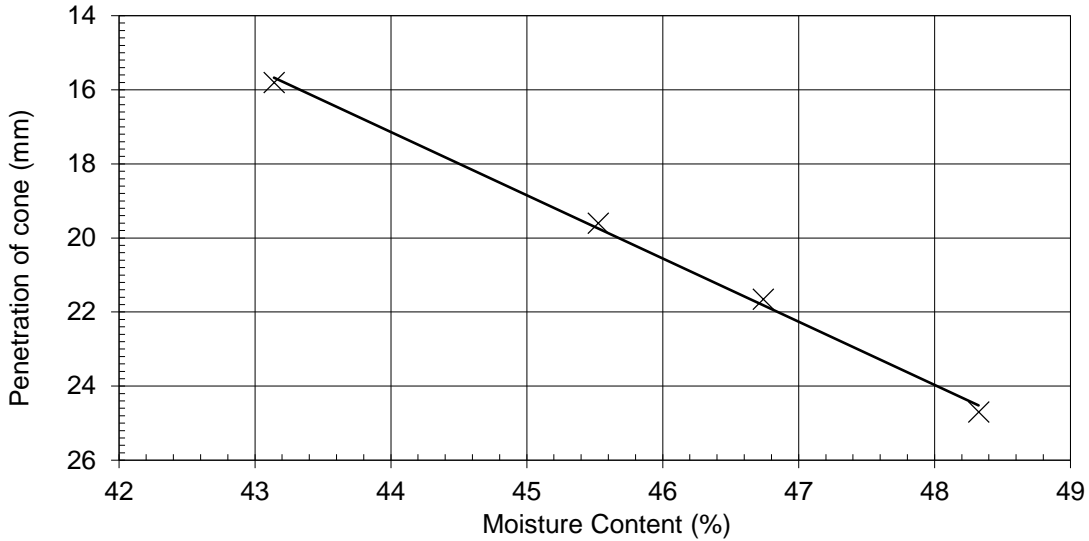
Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB05  
 Sample Ref 70  
 Depth (m) 22.00-22.45  
 Sample Type D

Non Engineering Description : Olive grey slightly sandy CLAY.


Preparation : Sample washed and air dried



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 27 %  
 Percentage retained on 425µm sieve : 2 %  
 Liquid Limit : 46 %  
 Plastic Limit : 20 %  
 Plasticity Index : 26

Equivalent moisture content of material passing 425µm sieve : 28 %  
 Liquidity Index : 0.31

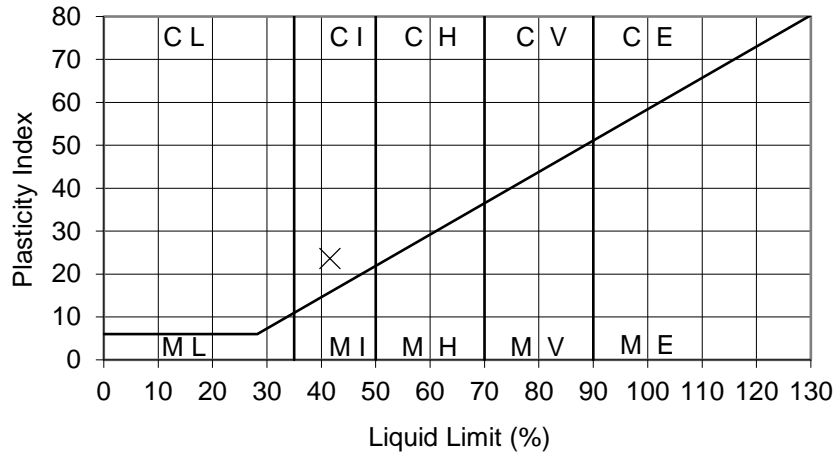
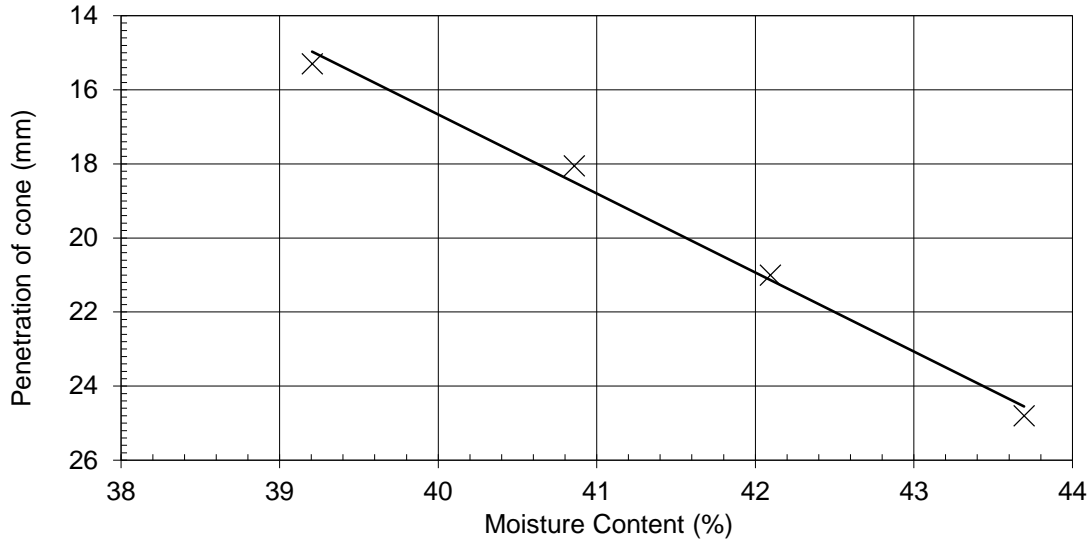
Originator	Checked & Approved
PD	 06/09/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990




Non Engineering Description : Grey slightly sandy sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 24 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 42 %  
 Plastic Limit : 18 %  
 Plasticity Index : 24  
 Equivalent moisture content of material passing 425µm sieve : 24 %  
 Liquidity Index : 0.25

Originator	Checked & Approved
PD	 24/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990







SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB06

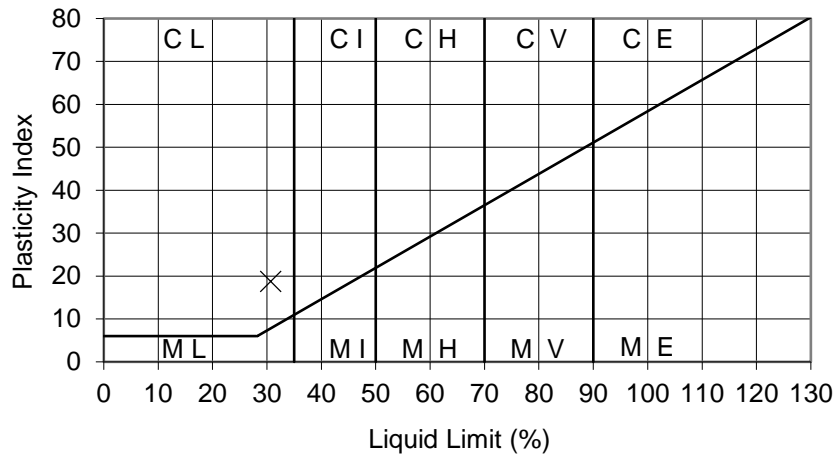
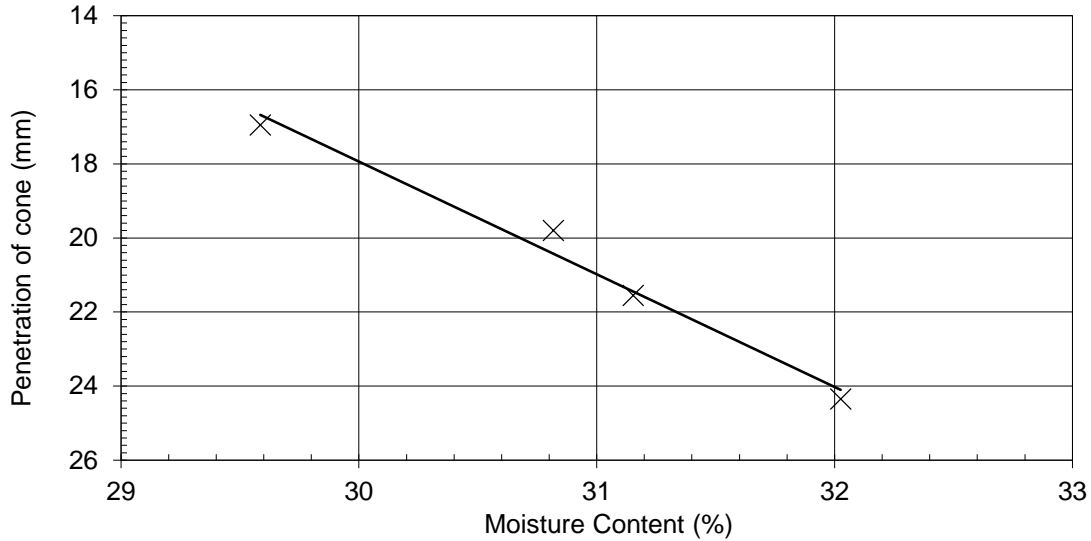
Sample Ref 66

Depth (m) 20.00

Sample Type D


Non Engineering Description : Grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	19 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	31 %
Plastic Limit :	12 %
Plasticity Index :	19
Equivalent moisture content of material passing 425µm sieve :	19 %
Liquidity Index :	0.37

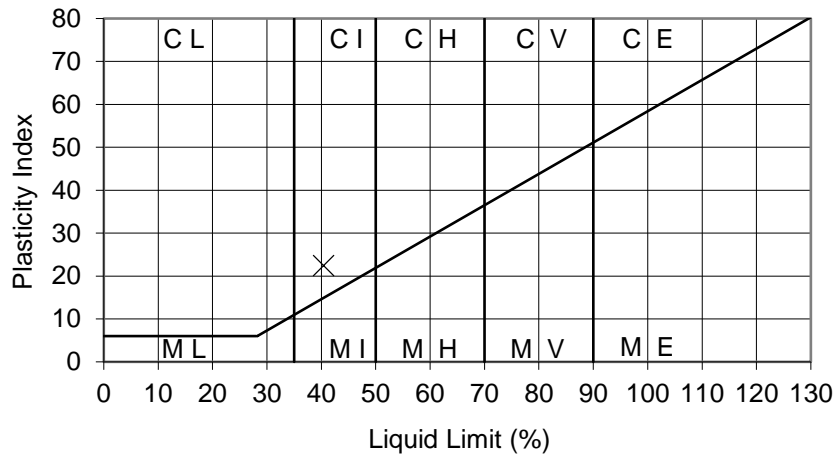
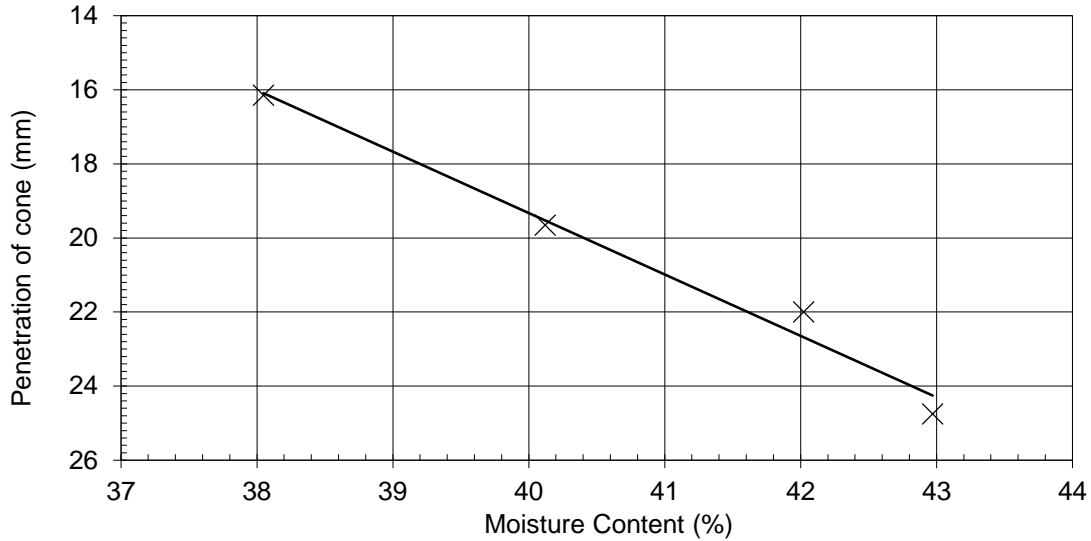
Originator	Checked & Approved
PD	 23/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
BS 1377:Part 2:Clause 4.3:1990  
BS 1377:Part 2:Clause 5:1990




Non Engineering Description : Grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 23 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 40 %  
 Plastic Limit : 18 %  
 Plasticity Index : 22  
 Equivalent moisture content of material passing 425µm sieve : 23 %  
 Liquidity Index : 0.23

Originator	Checked & Approved
PD	 23/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

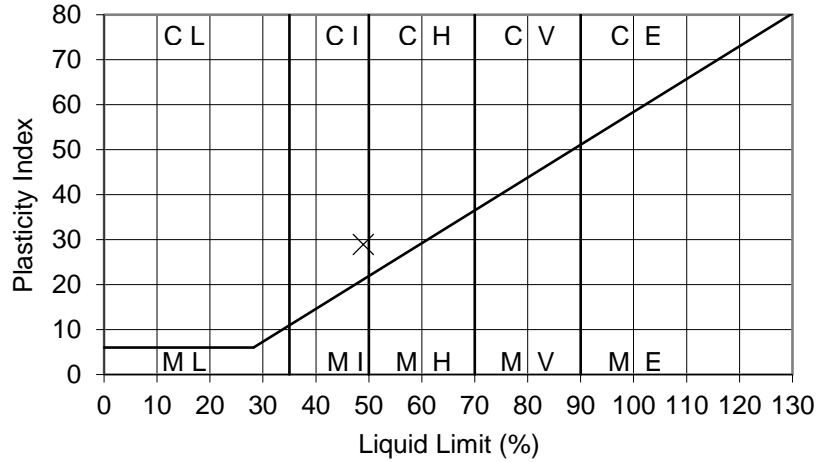
Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB06  
 Sample Ref 78  
 Depth (m) 24.45  
 Sample Type D

Non Engineering Description : Grey sandy CLAY.


Preparation : Sample as received



Note: Insufficient material for a four point liquid limit test.

Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 25 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 49 %  
 Plastic Limit : 20 %  
 Plasticity Index : 29  
 Equivalent moisture content of material passing 425µm sieve : 25 %  
 Liquidity Index : 0.17

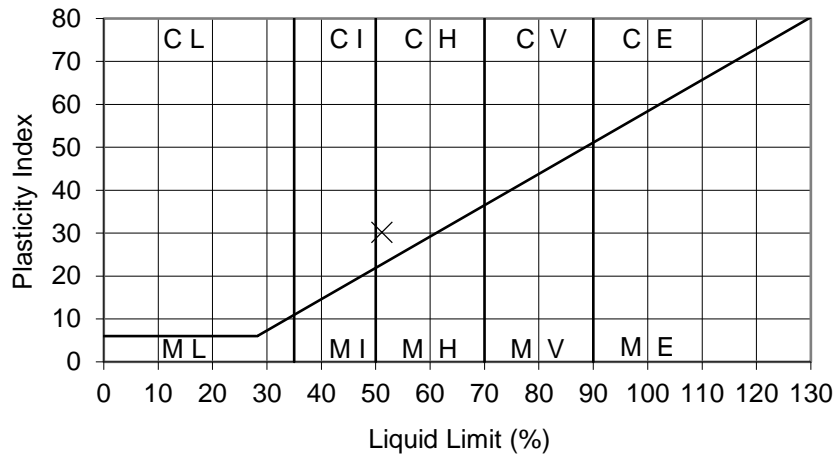
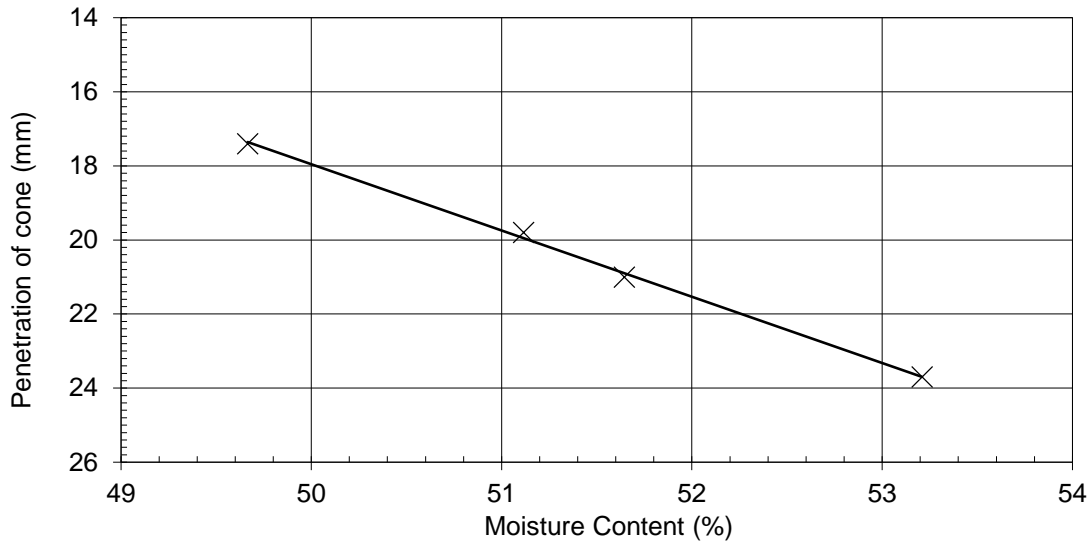
Originator	Checked & Approved
PD	 23/08/2018

**Liquid Limit (One Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.4:1990  
 BS 1377:Part 2:Clause 5:1990




Non Engineering Description : Grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 29 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 51 %  
 Plastic Limit : 21 %  
 Plasticity Index : 30  
 Equivalent moisture content of material passing 425µm sieve : 29 %  
 Liquidity Index : 0.27

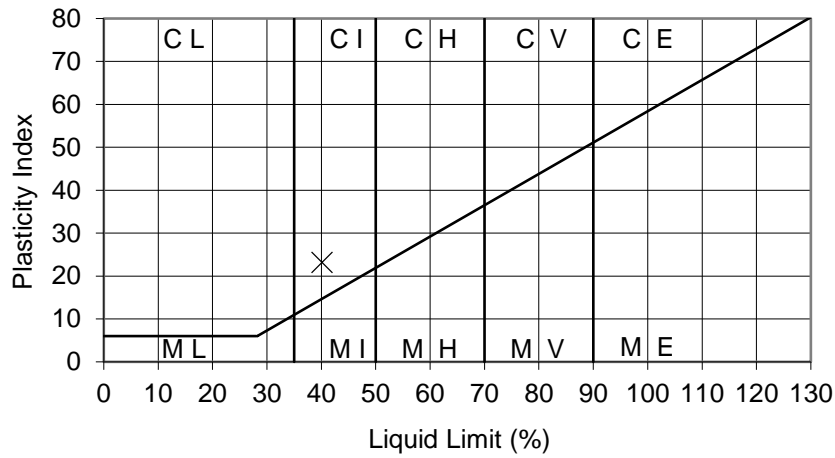
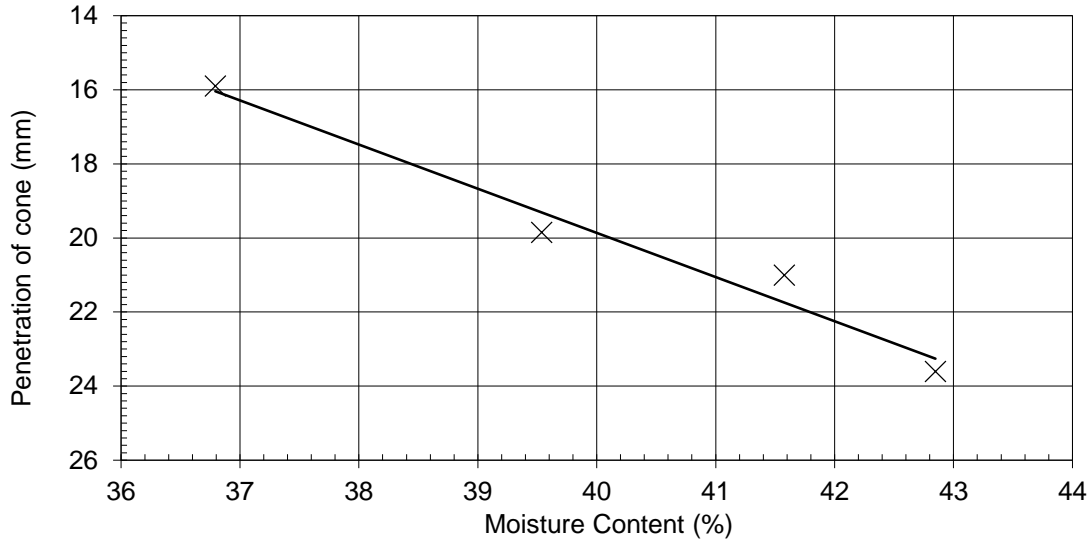
Originator	Checked & Approved
PD	 24/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990




Non Engineering Description : Grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 22 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 40 %  
 Plastic Limit : 17 %  
 Plasticity Index : 23  
 Equivalent moisture content of material passing 425µm sieve : 22 %  
 Liquidity Index : 0.22

Originator	Checked & Approved
PD	 24/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

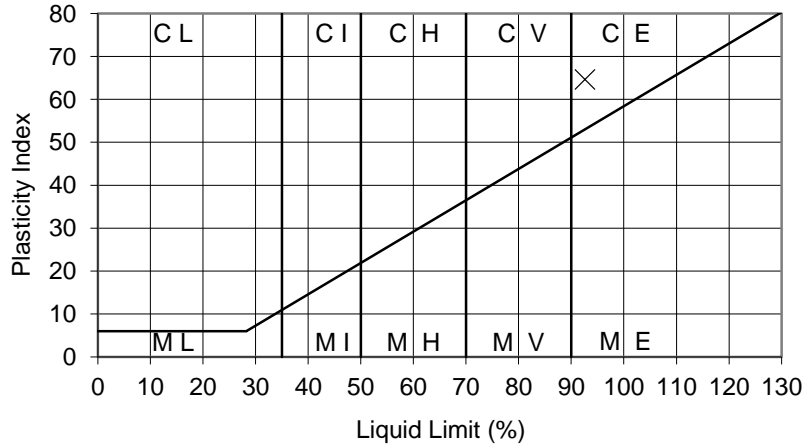
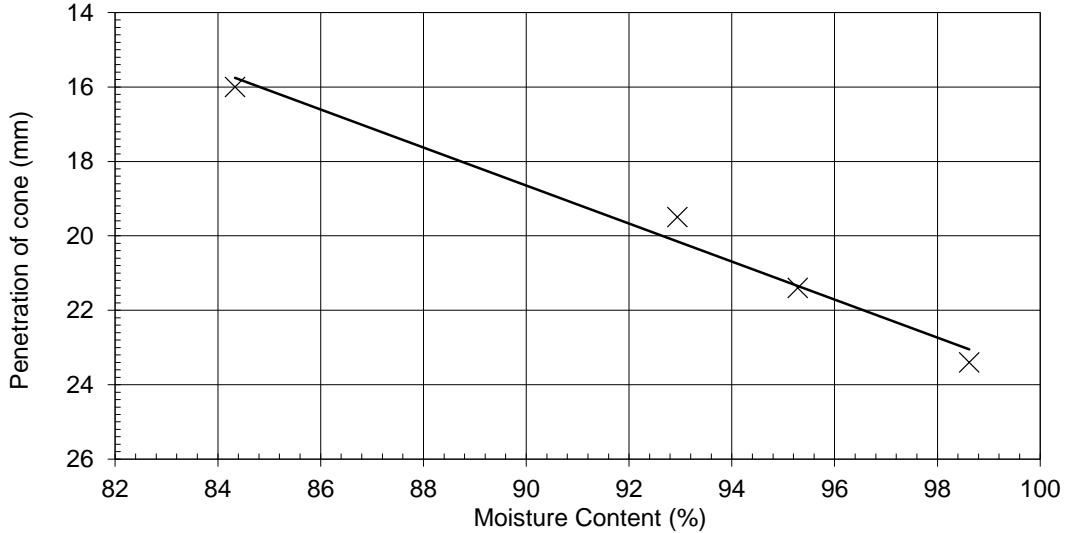
Site GREAT YARMOUTH 3RD RIVER CROSSING  
Client Norfolk County Council  
Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB07  
Sample Ref 116  
Depth (m) 39.00-39.45  
Sample Type D


Non Engineering Description : Brown slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 32 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 93 %  
 Plastic Limit : 28 %  
 Plasticity Index : 65  
 Equivalent moisture content of material passing 425µm sieve : 32 %  
 Liquidity Index : 0.06

Originator	Checked & Approved
EH	 10/09/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB08

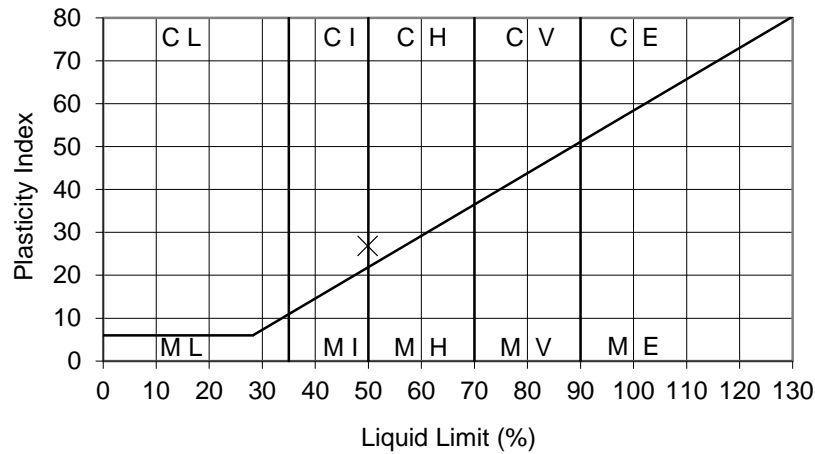
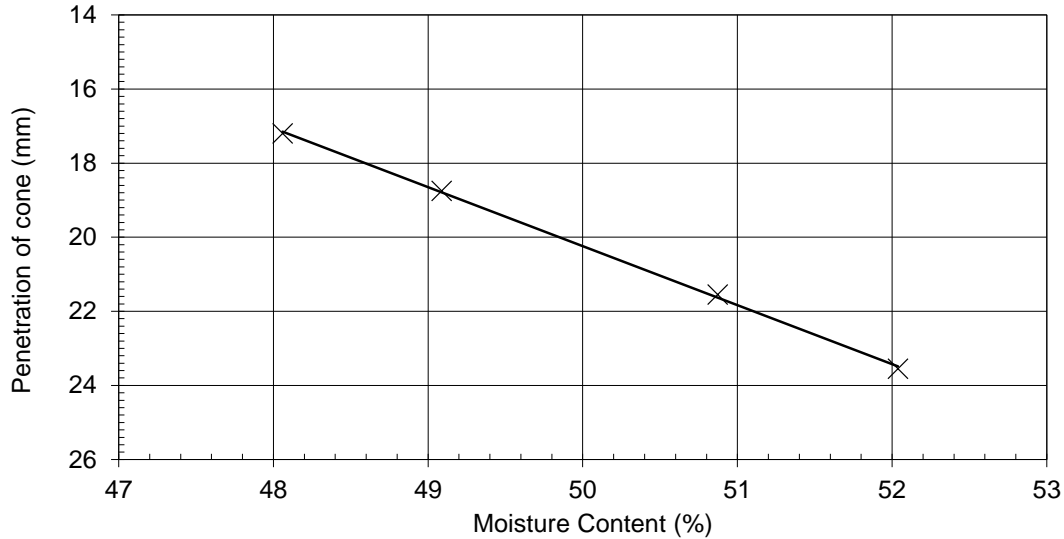
Sample Ref 62

Depth (m) 18.90

Sample Type D


Non Engineering Description : Grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	31 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	50 %
Plastic Limit :	23 %
Plasticity Index :	27
Equivalent moisture content of material passing 425µm sieve :	31 %
Liquidity Index :	0.30

Originator	Checked & Approved
PD	 10/09/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990







SITE INVESTIGATION AND LABORATORY SERVICES

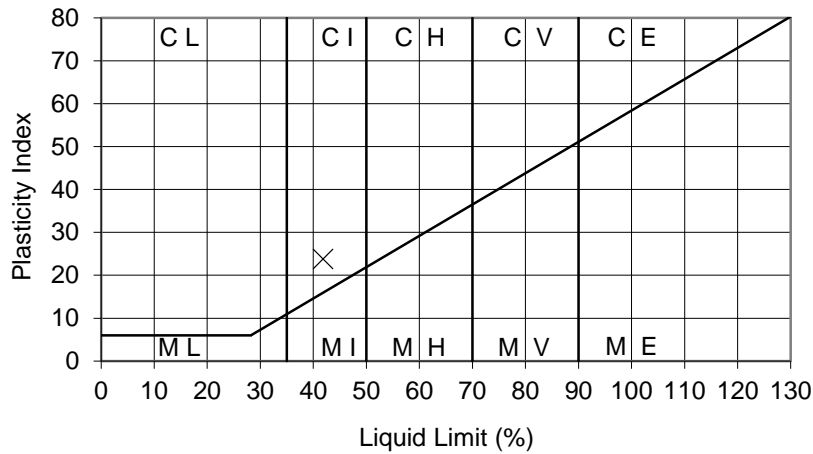
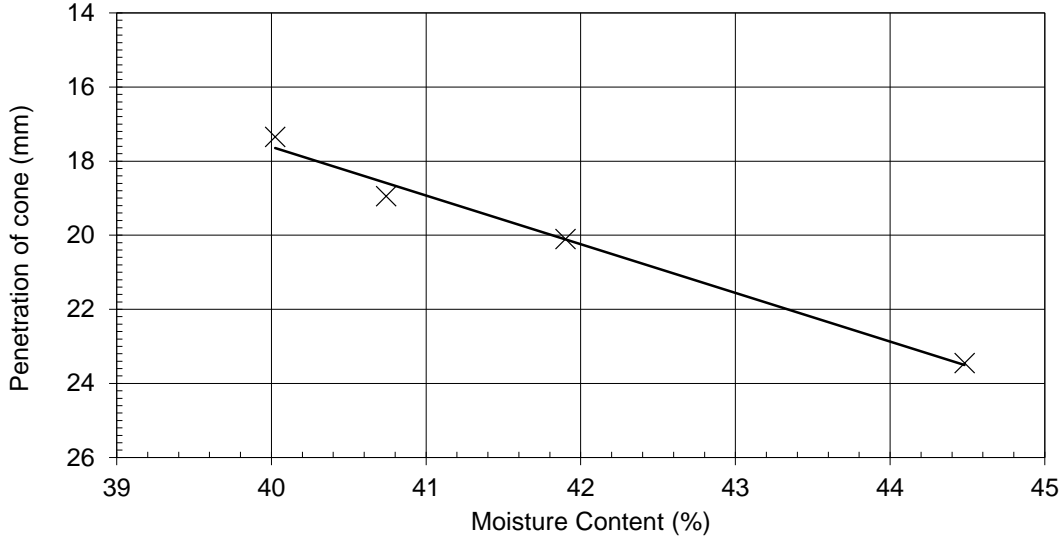
Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB08  
 Sample Ref 67  
 Depth (m) 21.00-21.45  
 Sample Type D

Non Engineering Description : Grey SILT/CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 25 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 42 %  
 Plastic Limit : 18 %  
 Plasticity Index : 24  
 Equivalent moisture content of material passing 425µm sieve : 25 %  
 Liquidity Index : 0.29

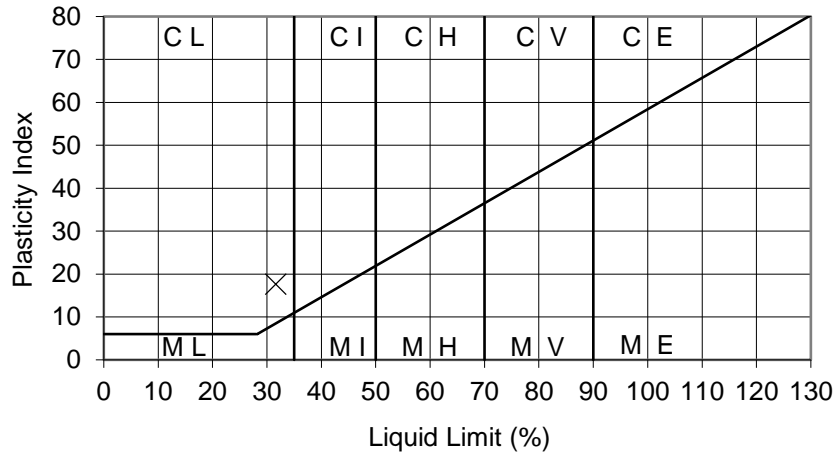
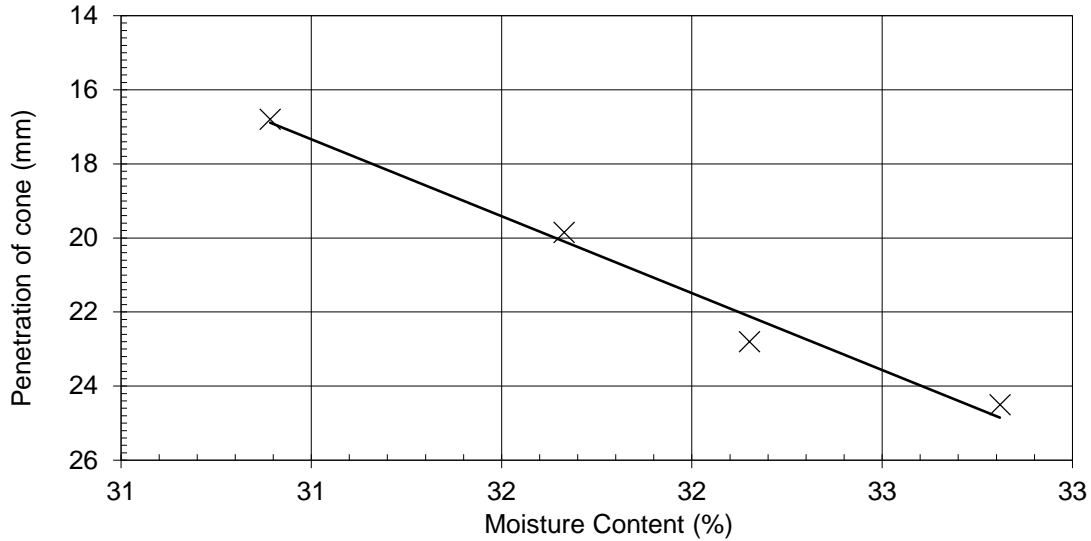
Originator	Checked & Approved
PD	[Redacted] 018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990



Non Engineering Description : Grey sandy CLAY.


Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 25 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 32 %  
 Plastic Limit : 14 %  
 Plasticity Index : 18

Equivalent moisture content of material passing 425µm sieve : 25 %  
 Liquidity Index : 0.61

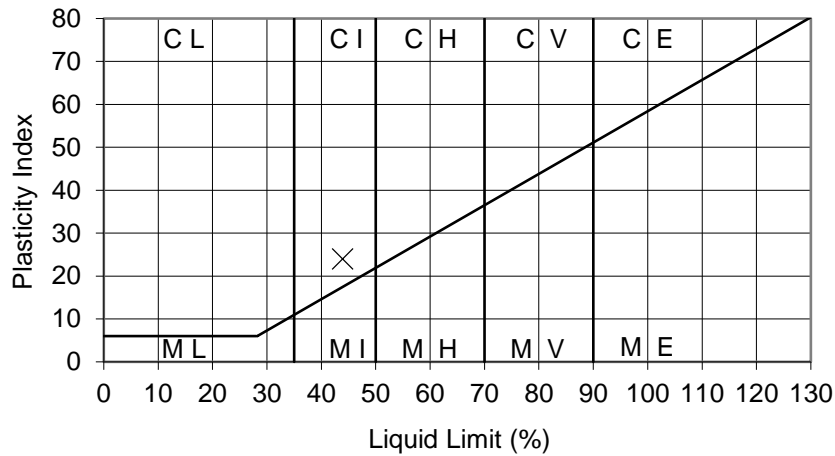
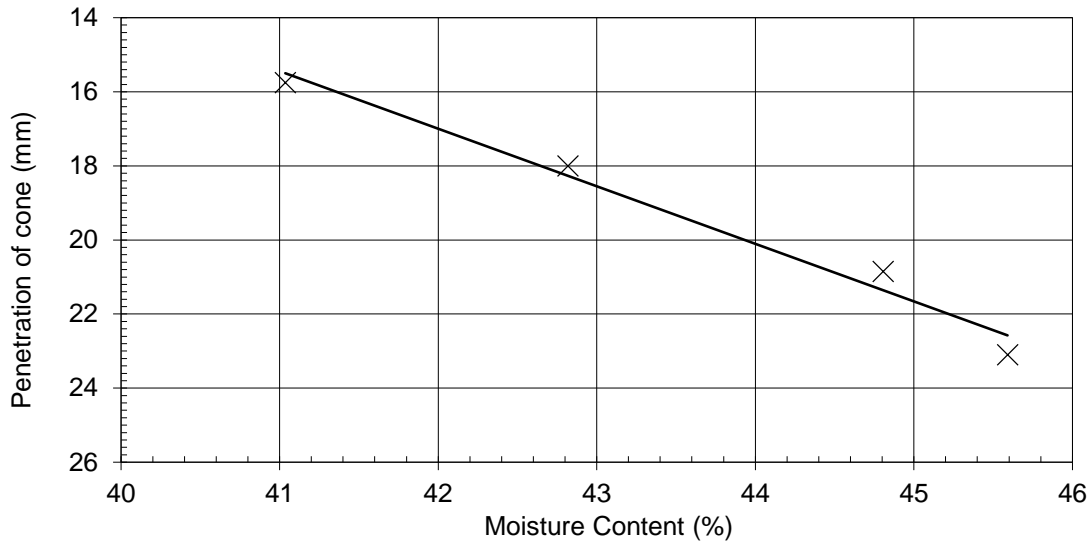
Originator	Checked & Approved
PD	 05/09/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990



Non Engineering Description : Grey slightly sandy CLAY.


Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 25 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 44 %  
 Plastic Limit : 20 %  
 Plasticity Index : 24

Equivalent moisture content of material passing 425µm sieve : 25 %  
 Liquidity Index : 0.21

Originator	Checked & Approved
PD	 3/2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB09

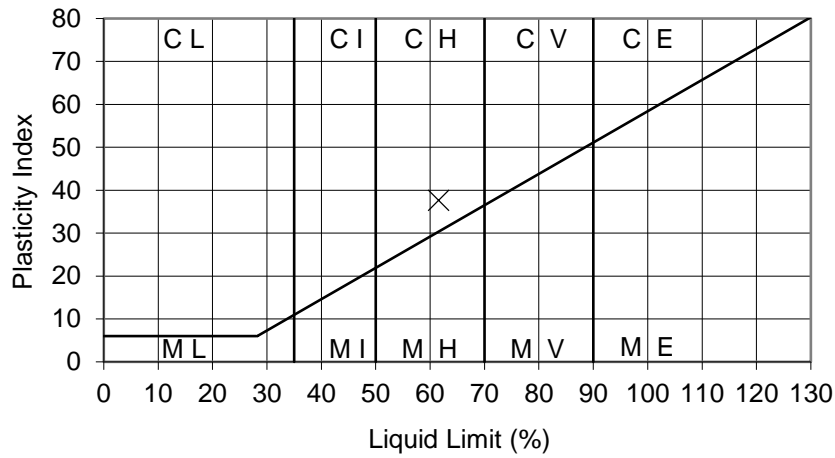
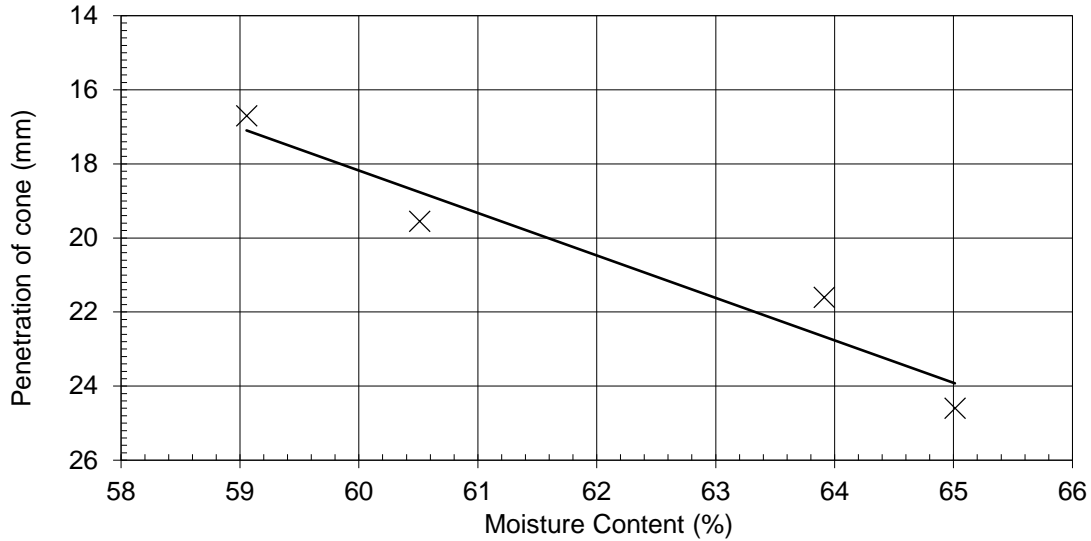
Sample Ref 107

Depth (m) 37.40

Sample Type B


Non Engineering Description : Brown slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	36 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	62 %
Plastic Limit :	24 %
Plasticity Index :	38
Equivalent moisture content of material passing 425µm sieve :	36 %
Liquidity Index :	0.32

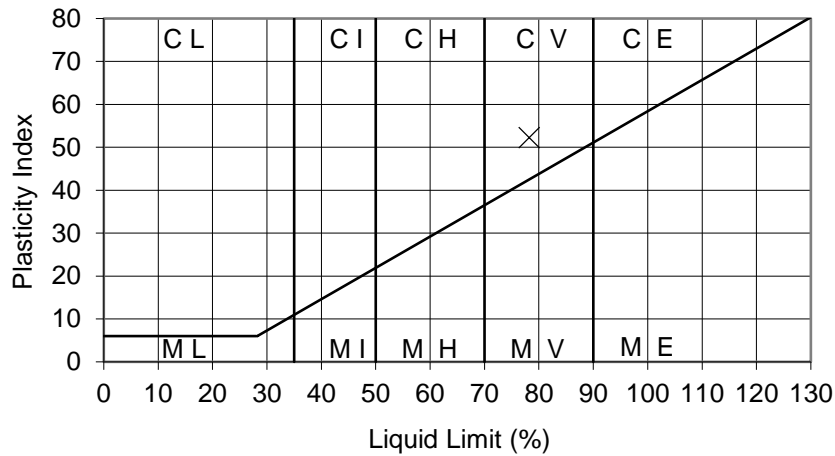
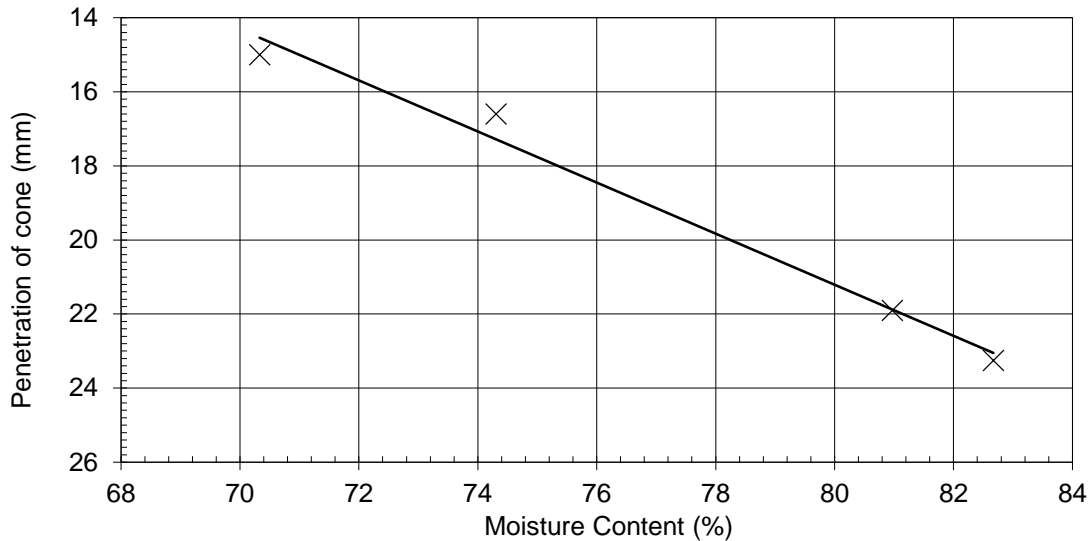
Originator	Checked & Approved
PD	 24/08/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990




Non Engineering Description : Orange brown slightly sandy CLAY.

Preparation : Sample washed and air dried



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 28 %  
 Percentage retained on 425µm sieve : 0 %  
 Liquid Limit : 78 %  
 Plastic Limit : 26 %  
 Plasticity Index : 52  
 Equivalent moisture content of material passing 425µm sieve : 28 %  
 Liquidity Index : 0.04

Originator	Checked & Approved
PD	 /2018

**Liquid Limit (Four Point Cone Penetrometer Method)  
 Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB10

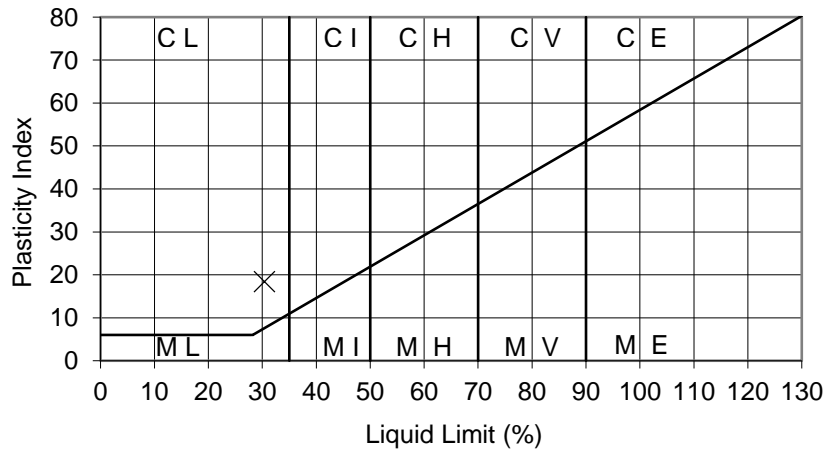
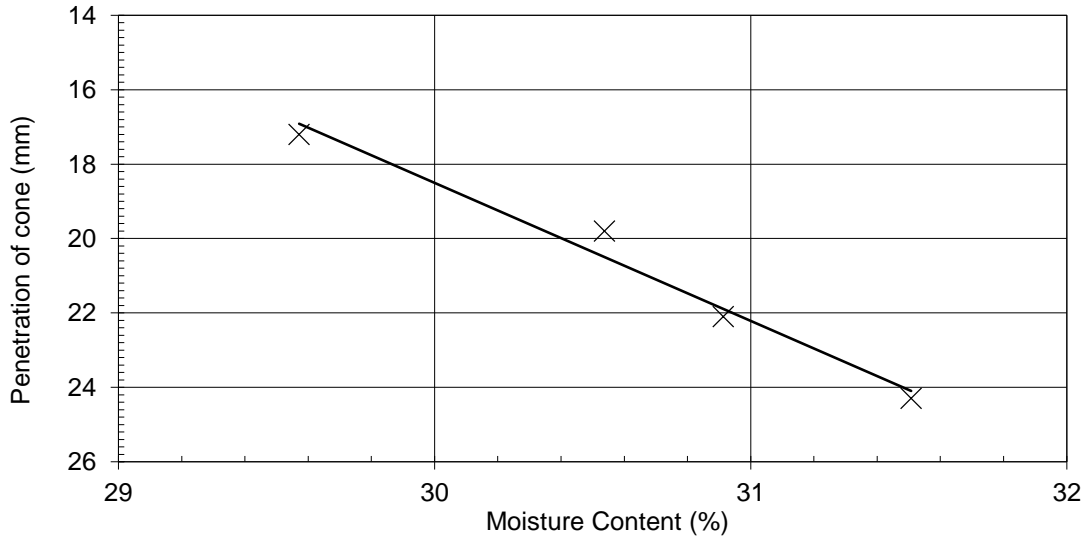
Sample Ref 65

Depth (m) 21.50

Sample Type D


Non Engineering Description : Grey sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	26 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	30 %
Plastic Limit :	12 %
Plasticity Index :	18
Equivalent moisture content of material passing 425µm sieve :	26 %
Liquidity Index :	0.78

Originator	Checked & Approved
EH	 24/06/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





SITE INVESTIGATION AND LABORATORY SERVICES

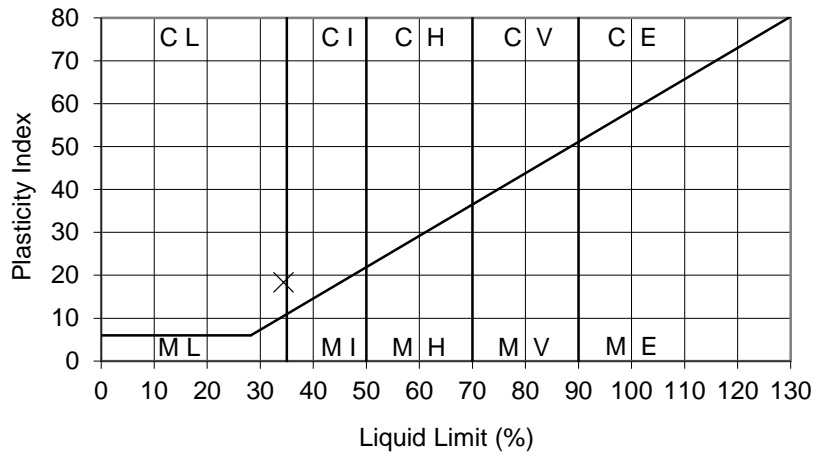
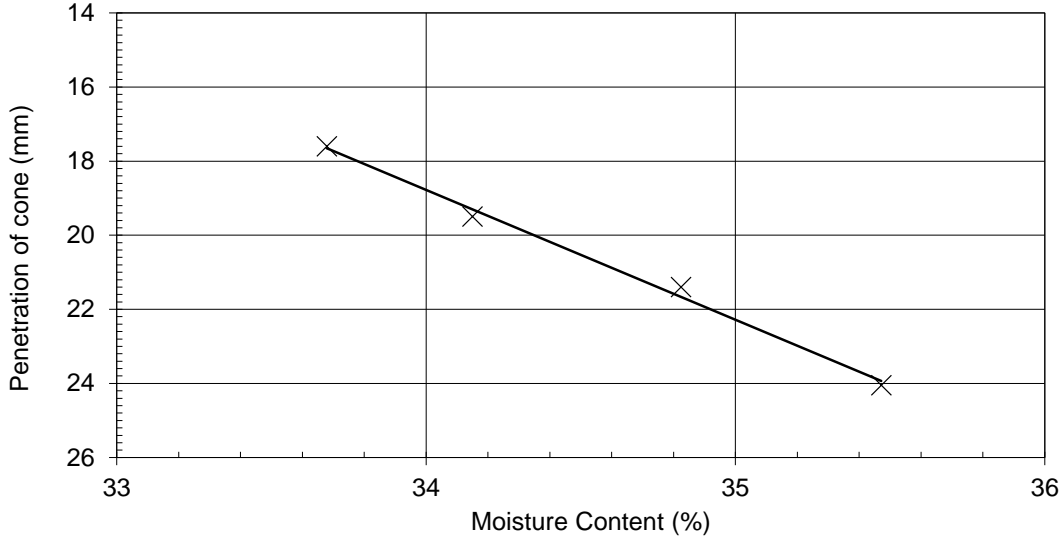
Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No. PZ1522D1

Hole ID MB10  
 Sample Ref 69  
 Depth (m) 23.37  
 Sample Type D


Non Engineering Description : Grey slightly sandy CLAY.

Preparation : Sample as received



Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990) 22 %  
 Percentage retained on 425µm sieve : 2 %  
 Liquid Limit : 34 %  
 Plastic Limit : 16 %  
 Plasticity Index : 18  
 Equivalent moisture content of material passing 425µm sieve : 22 %  
 Liquidity Index : 0.33

Originator	Checked & Approved
PD	 10/09/2018

**Liquid Limit (Four Point Cone Penetrometer Method)**  
**Plastic Limit, Plasticity Index & Liquidity Index**  
 BS 1377:Part 2:Clause 4.3:1990  
 BS 1377:Part 2:Clause 5:1990





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2018062216-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 1  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 20-Jul-18

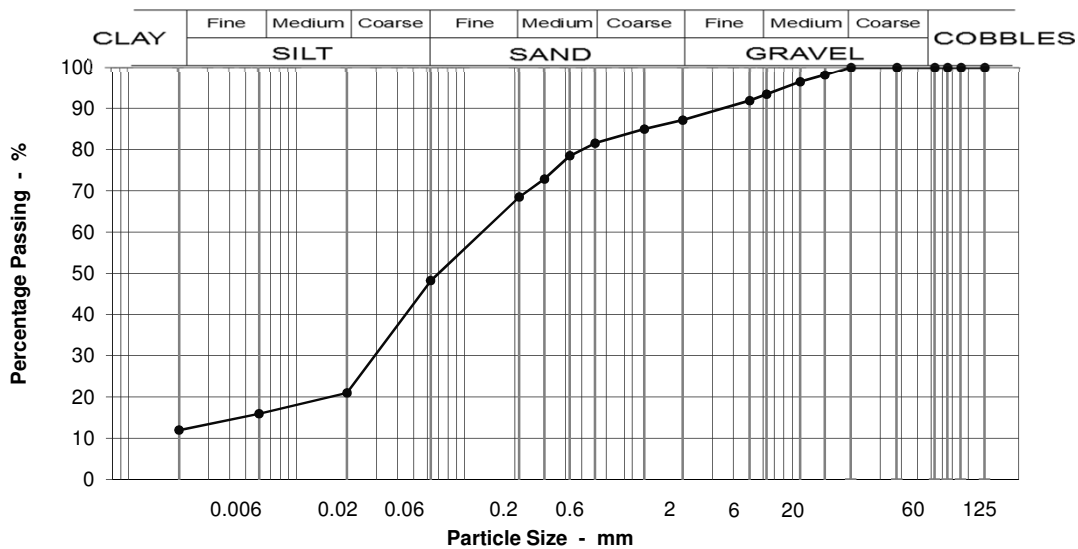
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** MB01a @ 0m **Specimen:** 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	7
37.5	100		Fine GRAVEL	6
20	100		Coarse SAND	6
14	98		Medium SAND	13
10	96		Fine SAND	20
6.3	93		Silt & Clay	48
5	92			
2	87			
1.18	85			
0.600	82			
0.425	78			
0.300	73			
0.212	68			
0.063	48			
0.020	21			
0.006	16			
0.002	12			
		<b>Moisture content %</b>	85	

Grading Analysis	
D100	14
D60	0.15
D10	0.00
Uniformity Coefficient	>10*

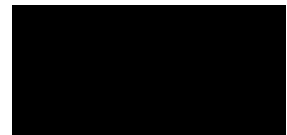
Description	
Soft grey clayey gravelly very silty fine to coarse SAND. Gravel is fine to medium subrounded flint and quartz.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB01

Sample Ref 15

Depth (m) 0.50-1.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	97
20.0 mm	90
14.0 mm	82
10.0 mm	73
6.30 mm	65
5.00 mm	62
3.35 mm	58
2.00 mm	55
1.18 mm	53
600 µm	50
425 µm	46
300 µm	40
212 µm	37
150 µm	34
63 µm	29
20 µm	21
6 µm	14
2 µm	8

**Non Engineering Description**

Very dark grey slightly sandy gravelly SILT/CLAY with an odour of hydrocarbons. Gravel is fine to coarse.

**Sample Proportions - %**

Cobbles	0.0
Gravel	45.1
Sand	26.2
Silt	20.6
Clay	8.1

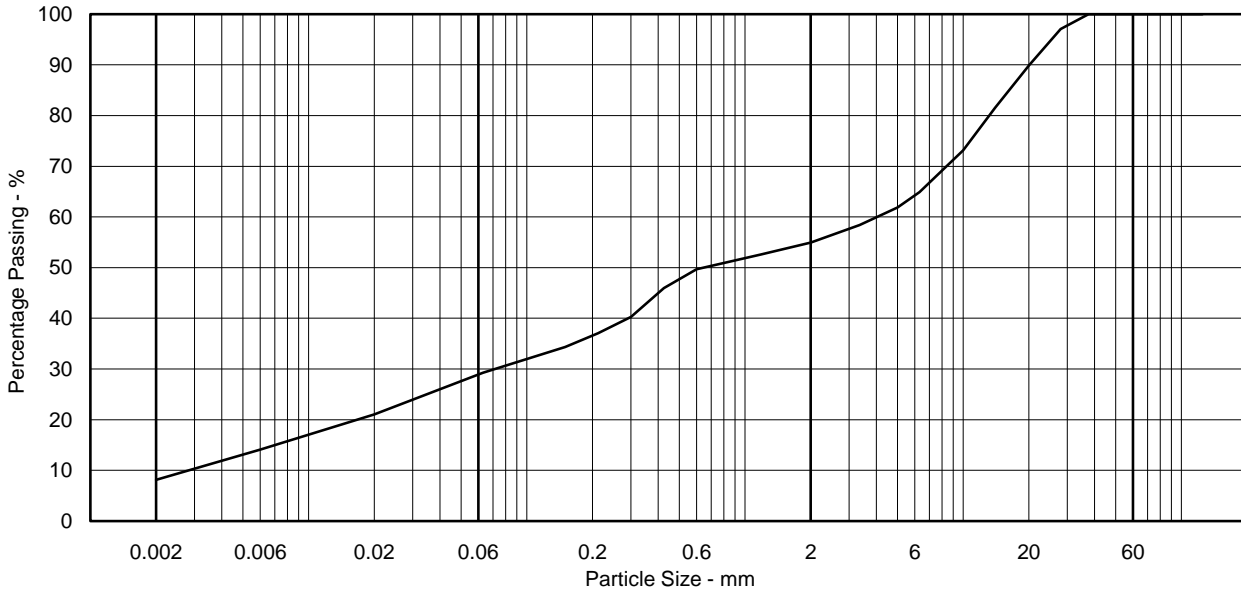
**Particle Diameter - mm**

D100	38
D60	4.0
D10	0.0028
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	1428.6

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
LA	U4/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1



Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB01

Engineer Norfolk Partnership Laboratory

Sample Ref 2

Depth (m) 0.50

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	97
14.0 mm	91
10.0 mm	88
6.30 mm	79
5.00 mm	76
3.35 mm	72
2.00 mm	67
1.18 mm	64
600 µm	58
425 µm	50
300 µm	32
212 µm	18
150 µm	12
63 µm	8

**Non Engineering Description**

Dark grey slightly clayey silty very gravelly SAND with occasional fine shell fragments. Gravel is fine to coarse. Sample has a distinct odour of hydrocarbons.

**Sample Proportions - %**

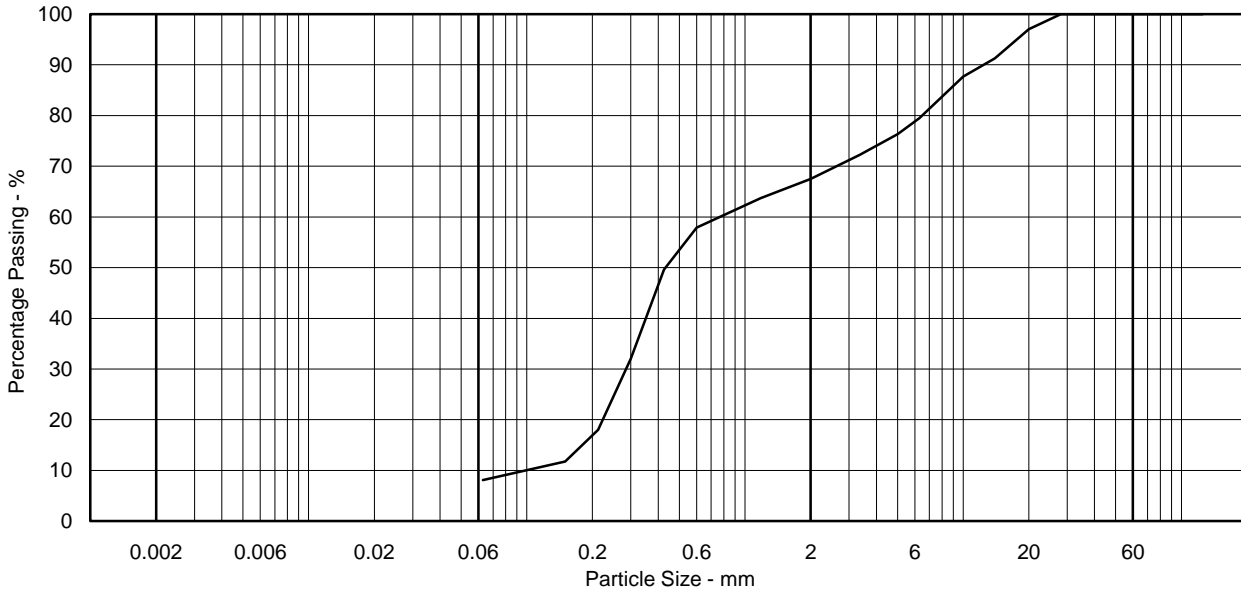
Cobbles	0.0
Gravel	32.5
Sand	59.4
Silt & Clay	8.1

**Particle Diameter - mm**

D100	28
D60	0.77
D10	0.099
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	7.8

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB01

Engineer Norfolk Partnership Laboratory

Sample Ref 9

Depth (m) 1.50

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	98
6.30 mm	96
5.00 mm	95
3.35 mm	94
2.00 mm	92
1.18 mm	90
600 µm	86
425 µm	81
300 µm	58
212 µm	36
150 µm	22
63 µm	14
20 µm	11
6 µm	8
2 µm	6

**Non Engineering Description**

Yellowish brown mottled greyish brown clayey silty gravelly SAND with occasional fine shell fragments. Gravel is fine to medium with a strong smell of hydrocarbons.

**Sample Proportions - %**

Cobbles	0.0
Gravel	7.7
Sand	78.7
Silt	7.2
Clay	6.4

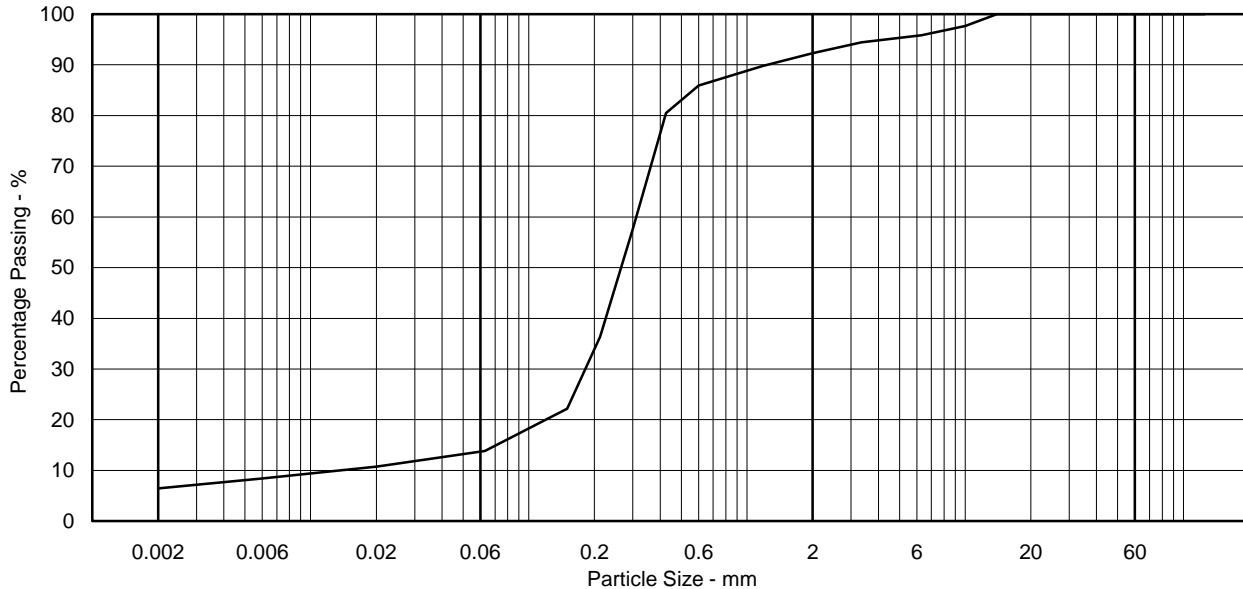
**Particle Diameter - mm**

D100	14
D60	0.31
D10	0.014
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	22.1

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB01

Sample Ref 13

Depth (m) 2.50-3.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	98
2.00 mm	96
1.18 mm	95
600 µm	93
425 µm	90
300 µm	73
212 µm	51
150 µm	38
63 µm	30
20 µm	27
6 µm	23
2 µm	19

**Non Engineering Description**

Grey slightly gravelly silty clayey SAND with a slight smell of hydrocarbons. Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	3.7
Sand	66.7
Silt	10.1
Clay	19.4

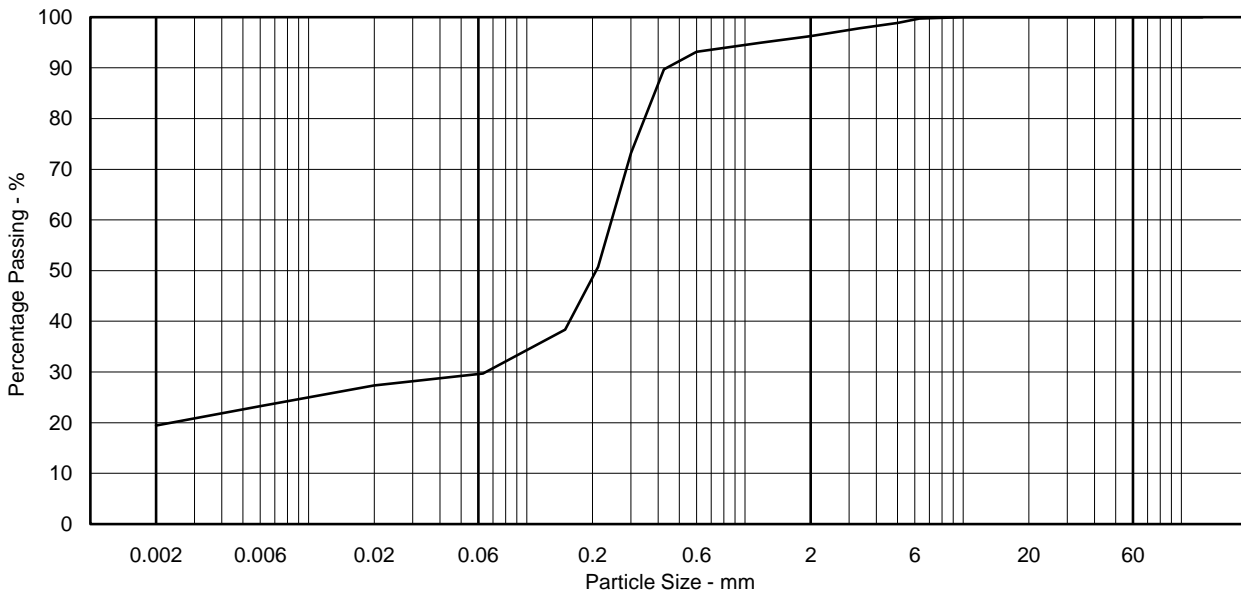
**Particle Diameter - mm**

D100	10
D60	0.24
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB01A

Sample Ref 5

Depth (m) 1.50-2.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	98
6.30 mm	94
5.00 mm	92
3.35 mm	89
2.00 mm	87
1.18 mm	84
600 µm	80
425 µm	72
300 µm	54
212 µm	38
150 µm	27
63 µm	18
20 µm	15
6 µm	12
2 µm	9

**Non Engineering Description**

Grey silty clayey gravelly SAND. Gravel is fine to coarse. Sample has a distinct smell of hydrocarbons.

**Sample Proportions - %**

Cobbles	0.0
Gravel	13.1
Sand	69.1
Silt	8.4
Clay	9.4

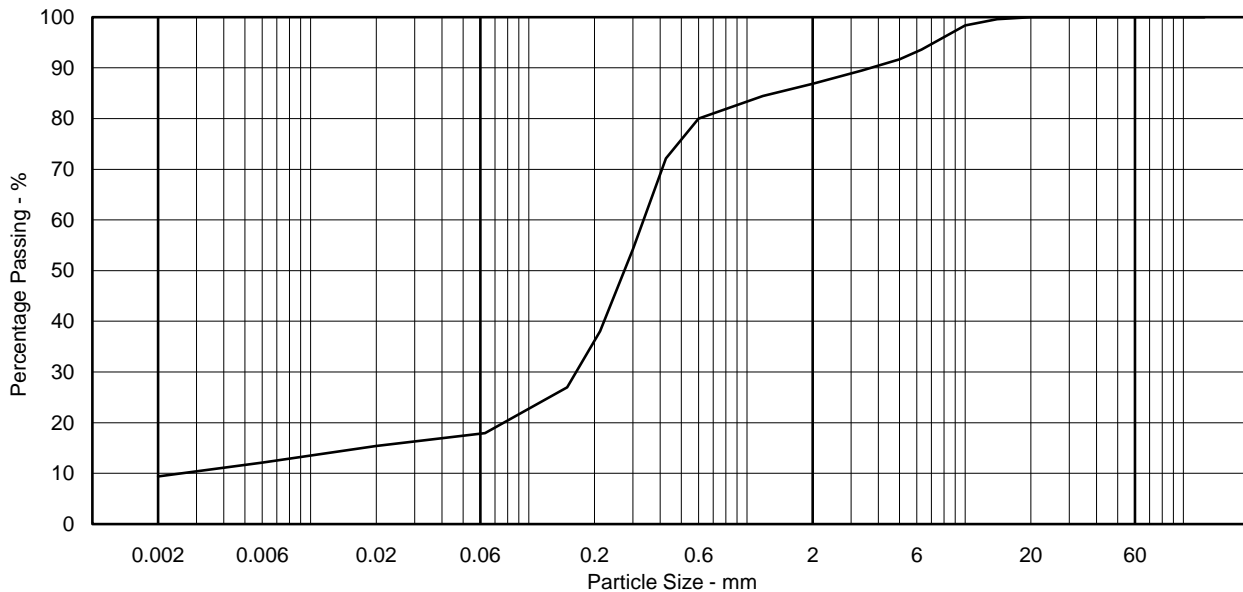
**Particle Diameter - mm**

D100	20
D60	0.34
D10	0.0025
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	136.0

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1



Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB01A

Engineer Norfolk Partnership Laboratory

Sample Ref 9

Depth (m) 2.50-3.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	97
5.00 mm	96
3.35 mm	95
2.00 mm	92
1.18 mm	91
600 µm	87
425 µm	82
300 µm	64
212 µm	36
150 µm	21
63 µm	12
20 µm	10
6 µm	8
2 µm	6

**Non Engineering Description**

Dark grey silty clayey gravelly SAND with a slight odour of hydrocarbons. Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	7.7
Sand	80.2
Silt	5.9
Clay	6.2

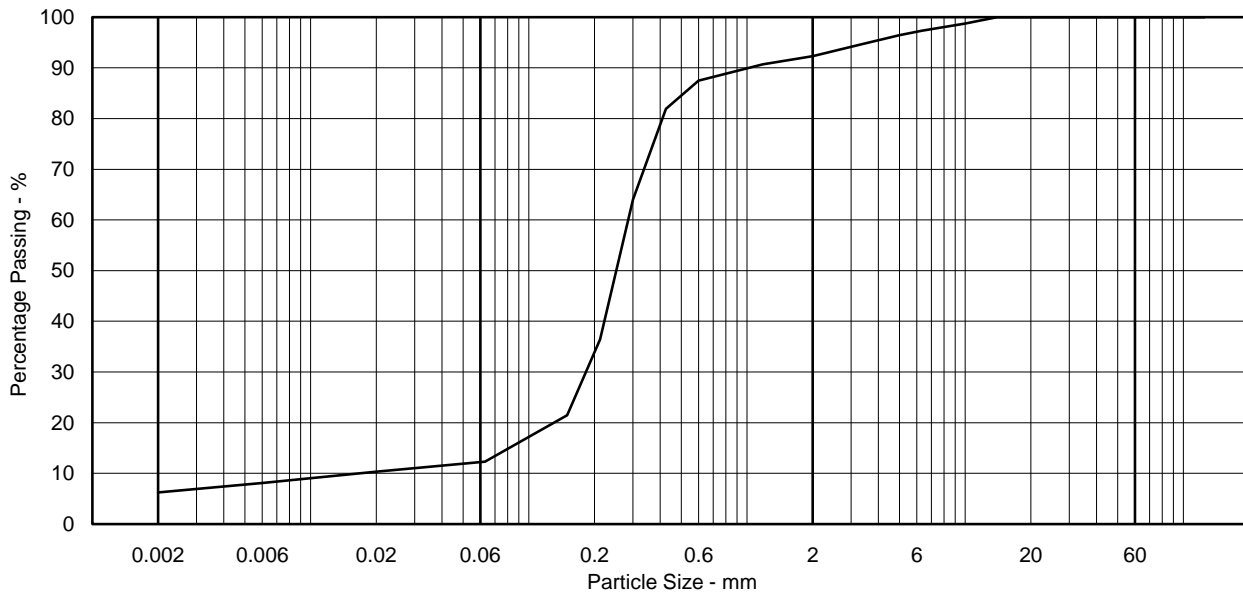
**Particle Diameter - mm**

D100	14
D60	0.29
D10	0.017
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	17.1

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB01A

Engineer Norfolk Partnership Laboratory

Sample Ref 13

Depth (m) 3.50-4.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	99
10.0 mm	98
6.30 mm	94
5.00 mm	92
3.35 mm	89
2.00 mm	86
1.18 mm	83
600 µm	80
425 µm	74
300 µm	57
212 µm	32
150 µm	17
63 µm	10
20 µm	8
6 µm	7
2 µm	5

**Non Engineering Description**

Greyish brown clayey silty gravelly SAND with a slight odour of hydrocarbons. Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	14.4
Sand	75.5
Silt	5.0
Clay	5.0

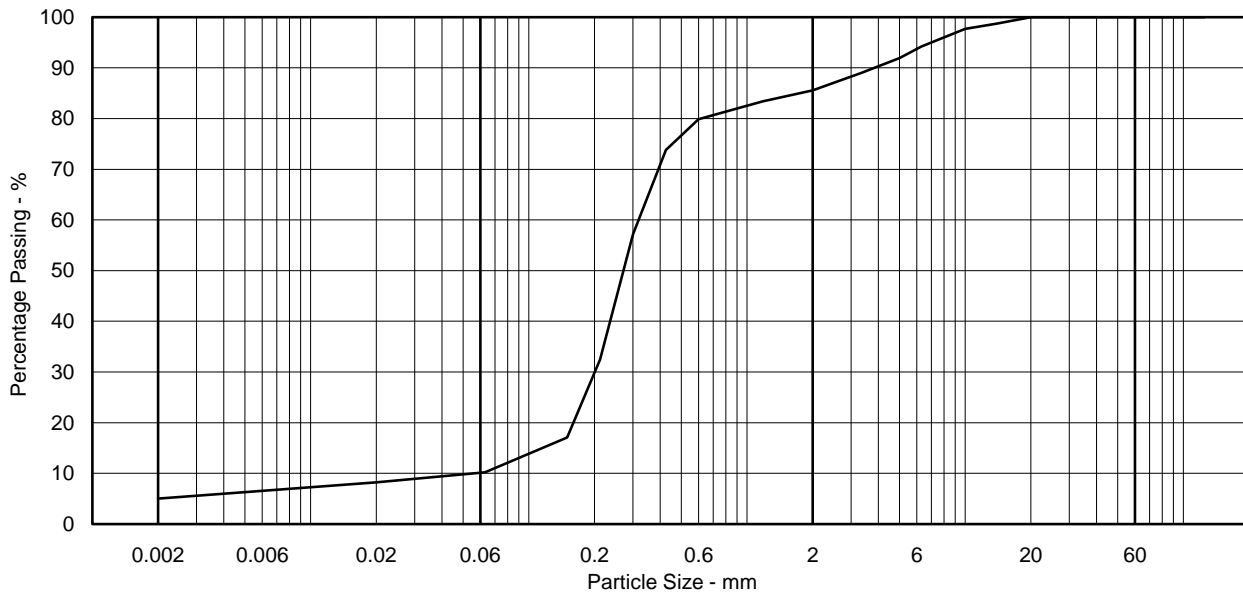
**Particle Diameter - mm**

D100	20
D60	0.32
D10	0.056
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	5.7

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB01A

Sample Ref 25

Depth (m) 6.50-7.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	98
425 µm	98
300 µm	93
212 µm	74
150 µm	30
63 µm	5

**Non Engineering Description**

Yellow brown slightly gravelly silty SAND with a slight odour of hydrocarbons. Gravel is fine.

**Sample Proportions - %**

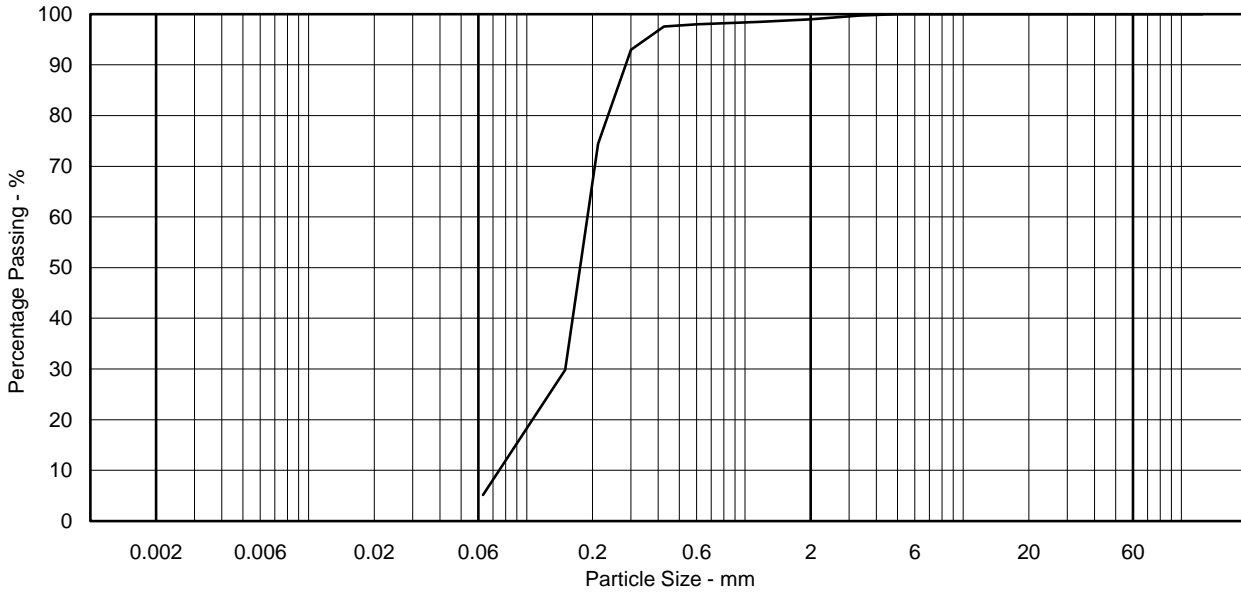
Cobbles	0.0
Gravel	1.0
Sand	93.8
Silt & Clay	5.2

**Particle Diameter - mm**

D100	5.0
D60	0.19
D10	0.075
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB01A

Engineer Norfolk Partnership Laboratory

Sample Ref 31

Depth (m) 8.50-9.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	99
425 µm	98
300 µm	93
212 µm	66
150 µm	24
63 µm	6

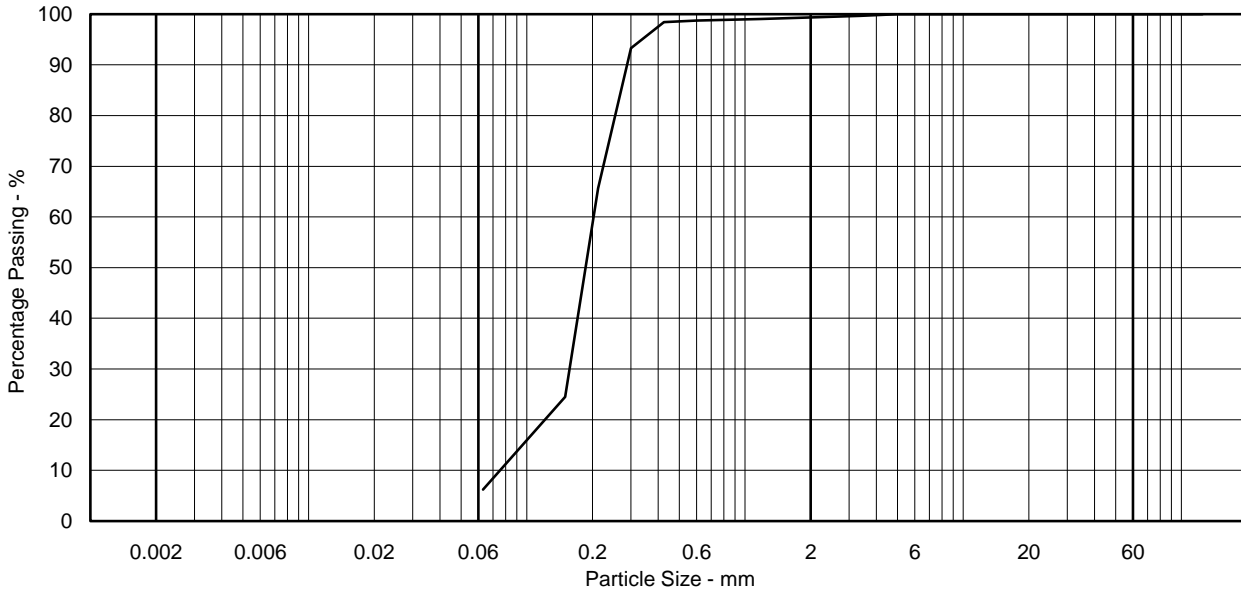
Non Engineering Description
Light greyish brown silty SAND with a slight smell of hydrocarbons.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.7
Sand	93.1
Silt & Clay	6.2

Particle Diameter - mm	
D100	5.0
D60	0.20
D10	0.075
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.7

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB01A  
 Sample Ref 37  
 Depth (m) 9.50-10.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	99
300 µm	93
212 µm	67
150 µm	22
63 µm	6

**Non Engineering Description**  
 Light brown silty SAND with a slight odour of hydrocarbons.

**Sample Proportions - %**

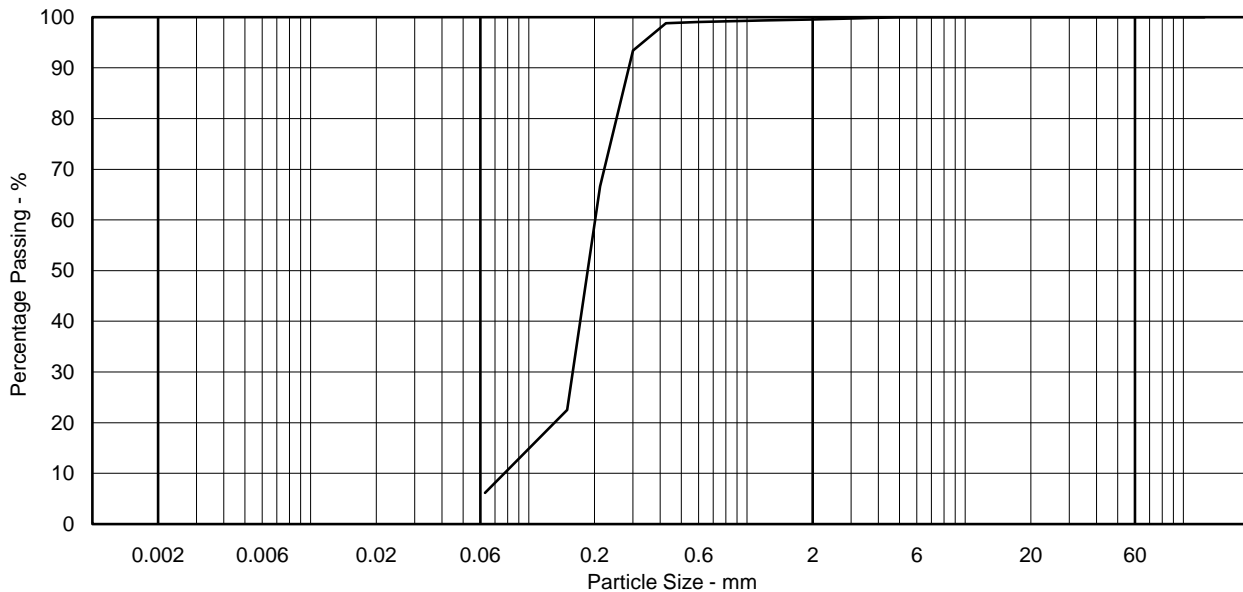
Cobbles	0.0
Gravel	0.4
Sand	93.4
Silt & Clay	6.2

**Particle Diameter - mm**

D100	5.0
D60	0.20
D10	0.077
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.6

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB01A  
 Sample Ref 41  
 Depth (m) 10.50-11.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	97
425 µm	89
300 µm	76
212 µm	51
150 µm	20
63 µm	5

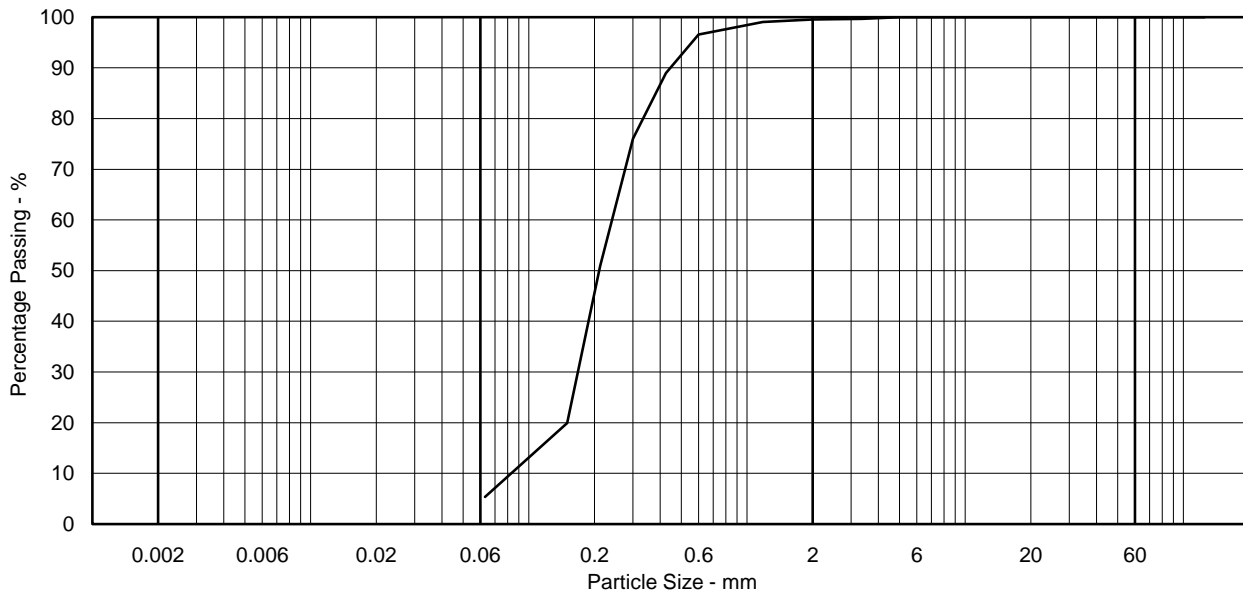
Non Engineering Description
Light brown silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.5
Sand	94.2
Silt & Clay	5.4

Particle Diameter - mm	
D100	5.0
D60	0.24
D10	0.083
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.9

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB01A  
 Sample Ref 44  
 Depth (m) 11.50-12.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	99
5.00 mm	98
3.35 mm	97
2.00 mm	95
1.18 mm	94
600 µm	89
425 µm	71
300 µm	49
212 µm	32
150 µm	15
63 µm	6

**Non Engineering Description**

Brown slightly gravelly silty SAND with occasional fine shell fragments. Gravel is fine to medium.

**Sample Proportions - %**

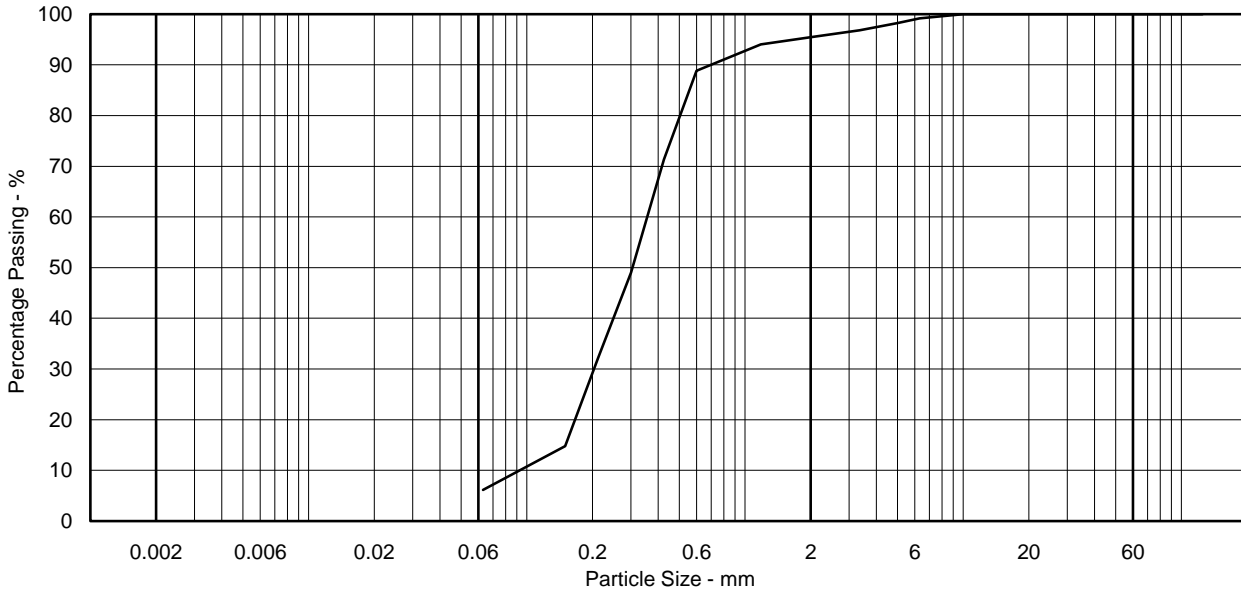
Cobbles	0.0
Gravel	4.6
Sand	89.3
Silt & Clay	6.1

**Particle Diameter - mm**

D100	10
D60	0.36
D10	0.093
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.9

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB01A

Sample Ref 47

Depth (m) 12.50-13.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	96
425 µm	87
300 µm	63
212 µm	44
150 µm	30
63 µm	18
20 µm	14
6 µm	11
2 µm	7

**Non Engineering Description**

Brown mottled grey clayey silty SAND with occasional fine shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.3
Sand	81.1
Silt	10.2
Clay	7.4

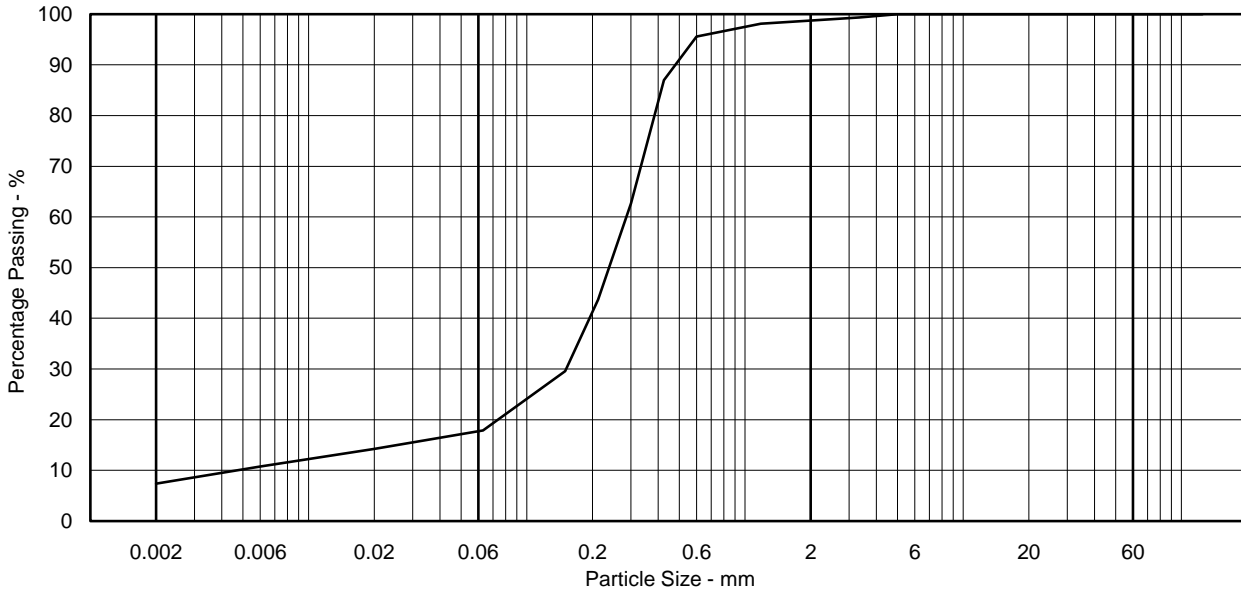
**Particle Diameter - mm**

D100	5.0
D60	0.29
D10	0.0047
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	61.7

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB01A  
 Sample Ref 50  
 Depth (m) 13.50-14.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	97
425 µm	91
300 µm	70
212 µm	43
150 µm	21
63 µm	8

**Non Engineering Description**

Greyish brown silty SAND with occasional shell fragments.

**Sample Proportions - %**

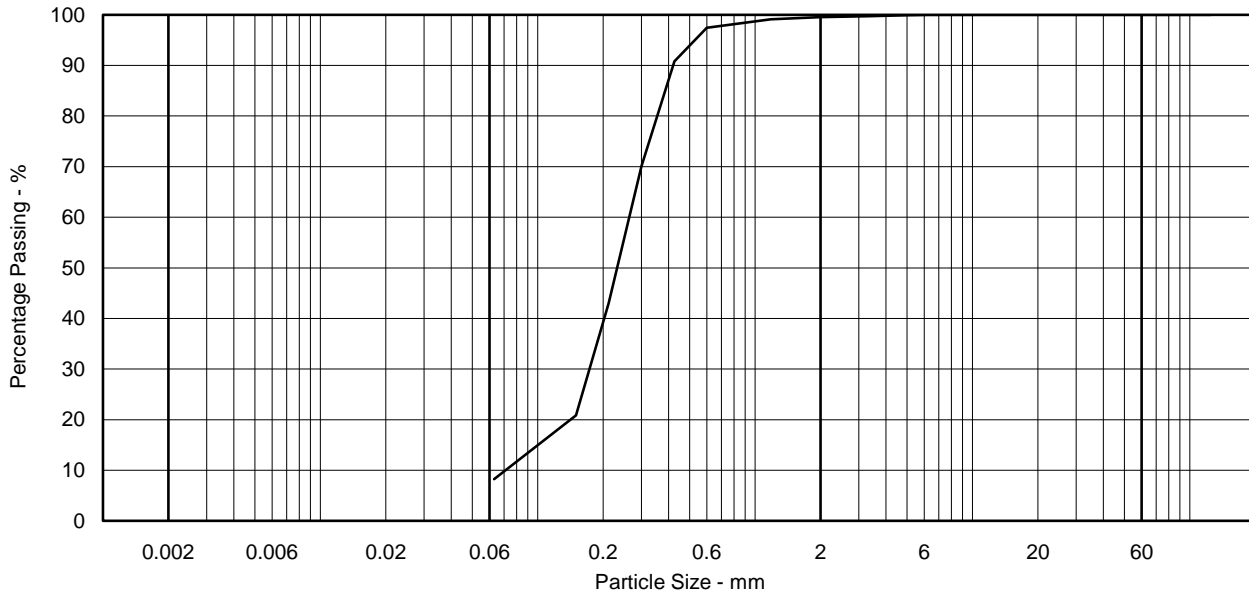
Cobbles	0.0
Gravel	0.5
Sand	91.3
Silt & Clay	8.2

**Particle Diameter - mm**

D100	6.3
D60	0.26
D10	0.071
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.7

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
EH	24/08/2018

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB01A  
 Sample Ref 59  
 Depth (m) 16.50-17.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	97
425 µm	82
300 µm	56
212 µm	38
150 µm	22
63 µm	4

**Non Engineering Description**

Light greyish brown slightly silty SAND.

**Sample Proportions - %**

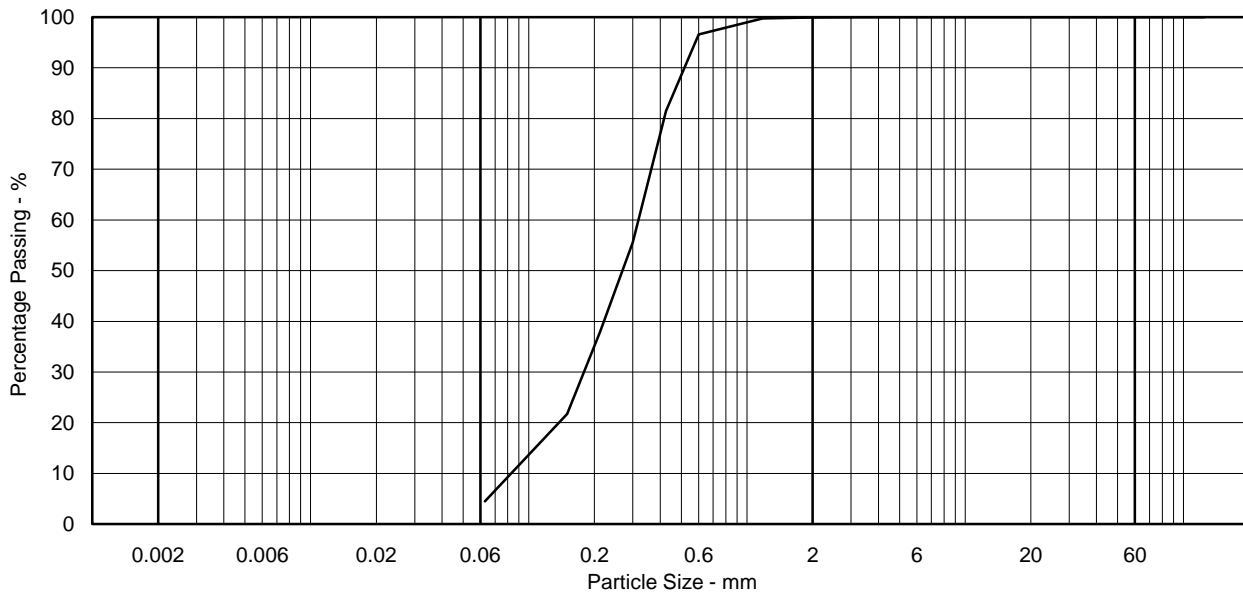
Cobbles	0.0
Gravel	0.1
Sand	95.4
Silt & Clay	4.5

**Particle Diameter - mm**

D100	3.4
D60	0.32
D10	0.083
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.9

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB01A  
 Sample Ref 65  
 Depth (m) 18.50-19.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	99
5.00 mm	99
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	96
425 µm	85
300 µm	64
212 µm	52
150 µm	38
63 µm	23
20 µm	15
6 µm	10
2 µm	6

**Non Engineering Description**

Grey clayey silty SAND with occasional fine shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.5
Sand	76.1
Silt	16.7
Clay	5.8

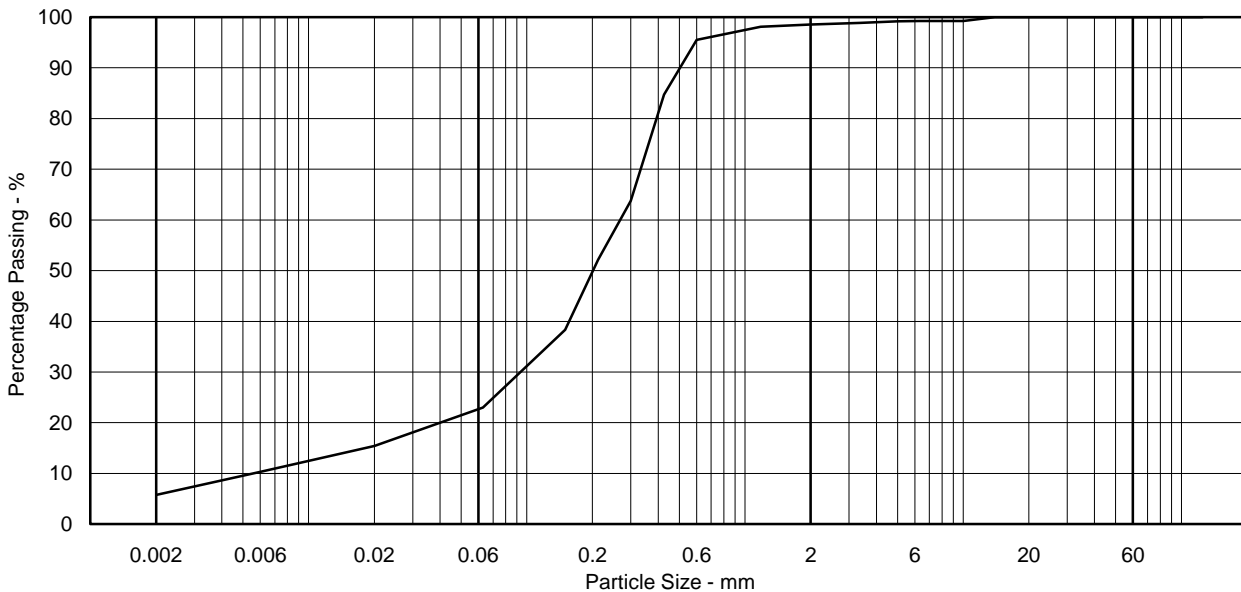
**Particle Diameter - mm**

D100	14
D60	0.27
D10	0.0055
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	49.1

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
LA	04/09/2018

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 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB01A

Sample Ref 68

Depth (m) 19.50-20.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	99
5.00 mm	99
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	94
425 µm	80
300 µm	58
212 µm	44
150 µm	28
63 µm	15
20 µm	11
6 µm	7
2 µm	4

**Non Engineering Description**

Grey slightly clayey silty SAND with occasional fine to medium shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.3
Sand	83.7
Silt	10.7
Clay	4.3

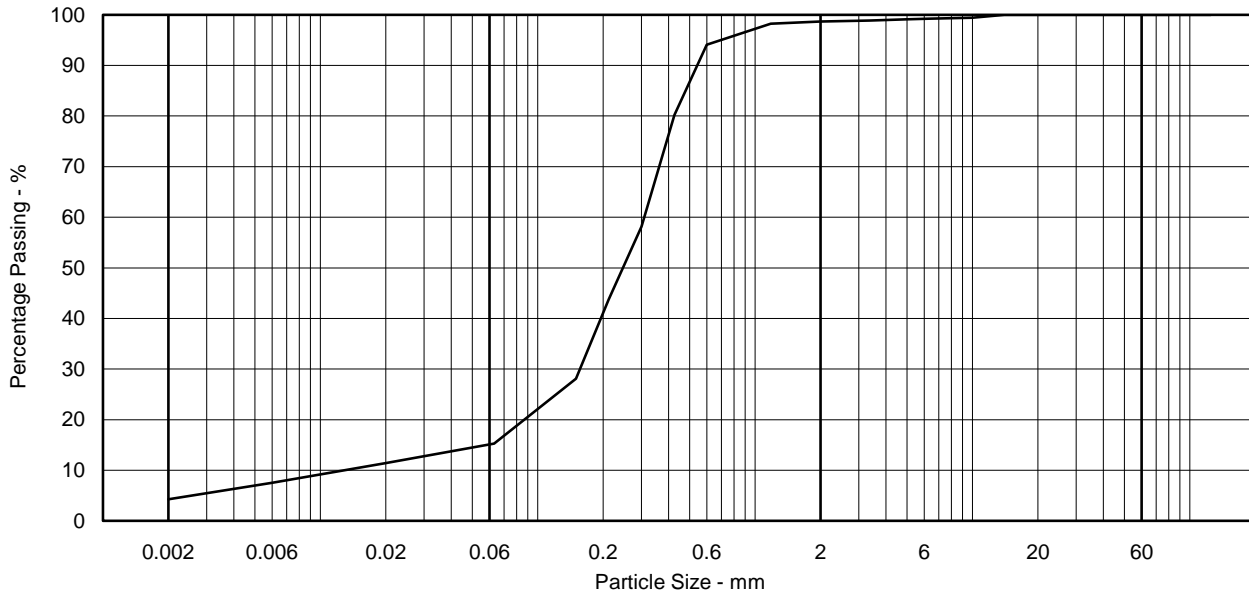
**Particle Diameter - mm**

D100	14
D60	0.31
D10	0.013
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	23.8

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
EH	
EH	06/09/2018

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 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB01A  
 Sample Ref 71  
 Depth (m) 20.50-21.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	98
425 µm	98
300 µm	97
212 µm	95
150 µm	93
63 µm	88
20 µm	62
6 µm	38
2 µm	21

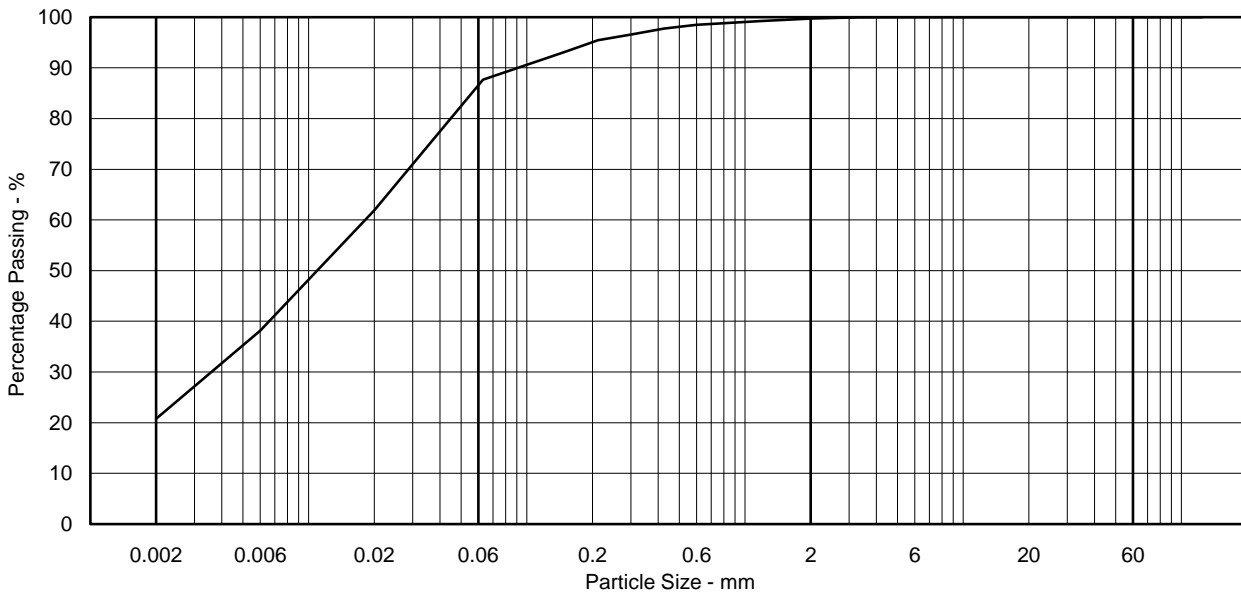
Non Engineering Description
Light grey slightly sandy SILT/CLAY.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	13.9
Silt	65.1
Clay	20.8

Particle Diameter - mm	
D100	5.0
D60	0.018
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	29/08/2018

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB01A  
 Sample Ref 81  
 Depth (m) 24.00-24.50  
 Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	98
425 µm	96
300 µm	83
212 µm	68
150 µm	64
63 µm	58
20 µm	45
6 µm	25
2 µm	12

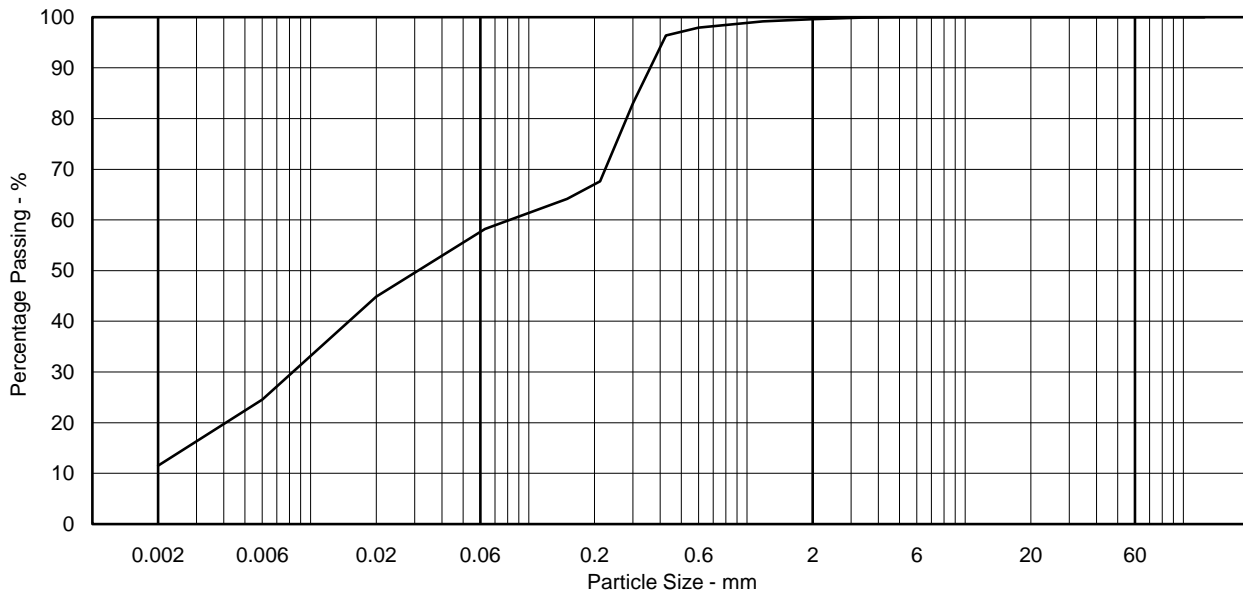
Non Engineering Description	
Grey sandy SILT.	

Sample Proportions - %	
Cobbles	0.0
Gravel	0.4
Sand	42.3
Silt	45.8
Clay	11.5

Particle Diameter - mm	
D100	5.0
D60	0.082
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes	
Sedimentation sample not pre-treated	

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	06/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole MB01A

Engineer Norfolk Partnership Laboratory

Sample Ref 82

Depth (m) 24.30

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	96
425 µm	82
300 µm	59
212 µm	45
150 µm	30
63 µm	18
20 µm	14
6 µm	10
2 µm	5

**Non Engineering Description**

Grey slightly clayey silty SAND with rare fine shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	0.6
Sand	81.8
Silt	12.7
Clay	4.9

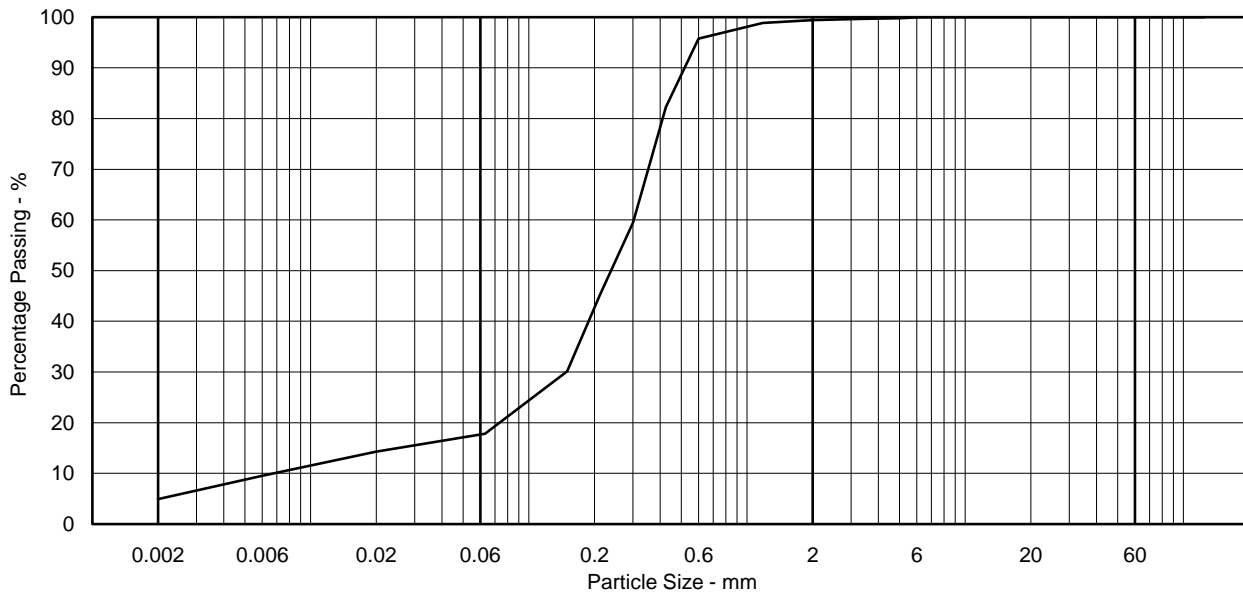
**Particle Diameter - mm**

D100	6.3
D60	0.30
D10	0.0067
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	44.8

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
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**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
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Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018062212-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **2**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **20-Jul-18**

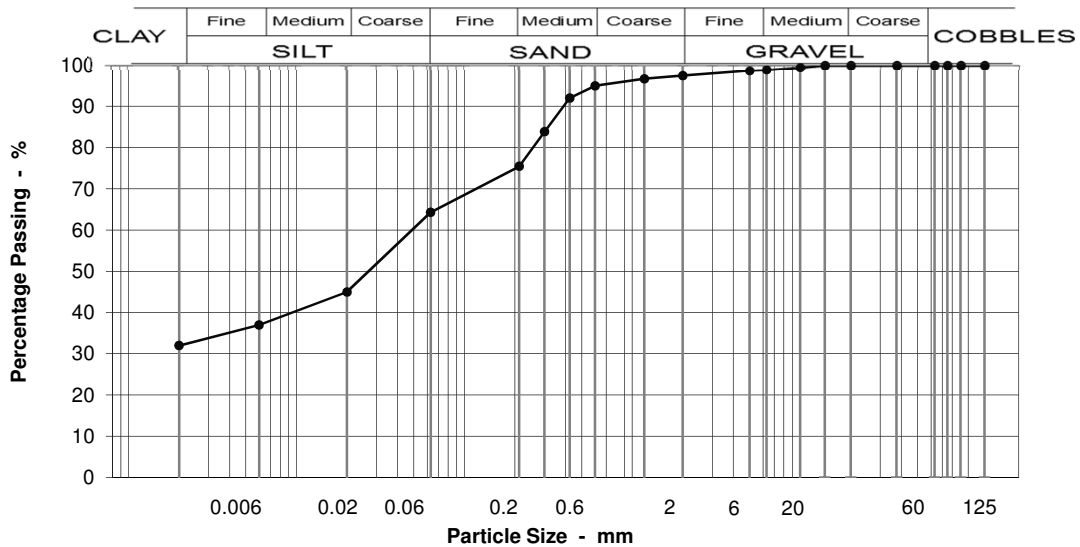
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: MB02 @ 0m Specimen: 2

Location and orientation within sample not applicable

Disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	1
37.5	100		Fine GRAVEL	1
20	100		Coarse SAND	2
14	100		Medium SAND	20
10	99		Fine SAND	11
6.3	99		Silt & Clay	64
5	99			
2	97			
1.18	97			
0.600	95			
0.425	92			
0.300	84			
0.212	75			
0.063	64			
0.020	45			
0.006	37			
0.002	32			
		Moisture content %		37

Grading Analysis	
D100	10
D60	0.05
D10	0.00
Uniformity Coefficient	>10*

Description	
Soft brownish-grey very sandy, very silty CLAY.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB02

Sample Ref 3

Depth (m) 0.30

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	98
10.0 mm	96
6.30 mm	94
5.00 mm	90
3.35 mm	88
2.00 mm	86
1.18 mm	84
600 µm	81
425 µm	77
300 µm	63
212 µm	51
150 µm	45
63 µm	41
20 µm	38
6 µm	33
2 µm	26

**Non Engineering Description**

Grey slightly gravelly sandy CLAY with pockets of orange brown sand. Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	14.3
Sand	45.0
Silt	14.3
Clay	26.4

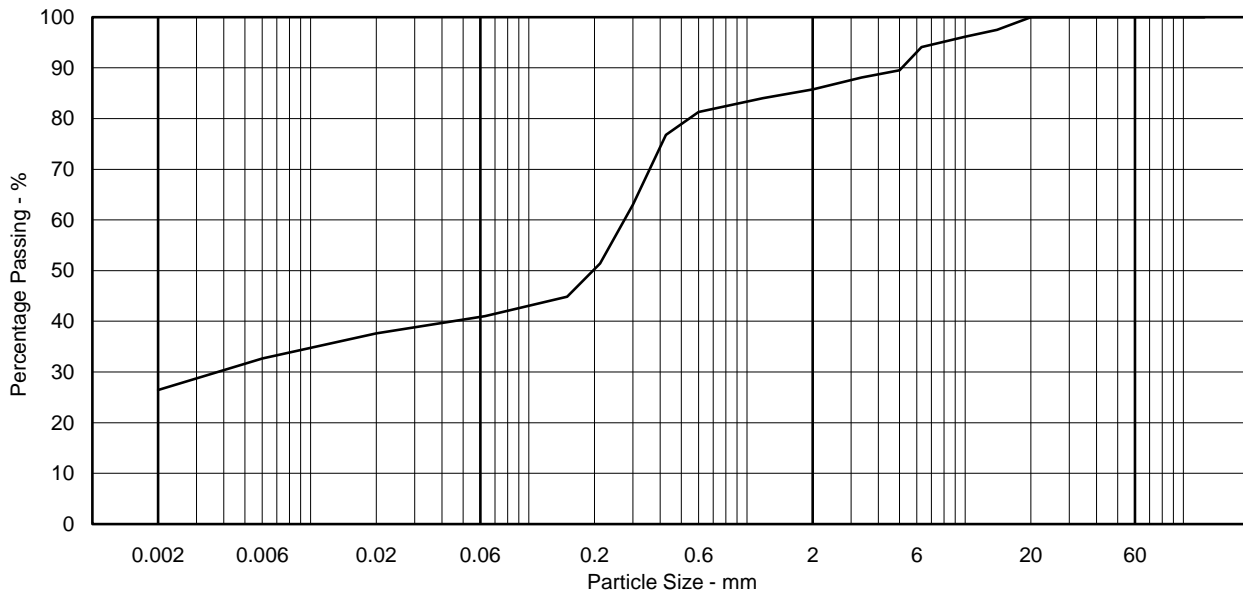
**Particle Diameter - mm**

D100	20
D60	0.27
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
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Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB02  
 Sample Ref 5  
 Depth (m) 1.30-1.80  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	97
10.0 mm	94
6.30 mm	88
5.00 mm	86
3.35 mm	81
2.00 mm	78
1.18 mm	76
600 µm	73
425 µm	68
300 µm	50
212 µm	27
150 µm	15
63 µm	12
20 µm	10
6 µm	8
2 µm	6

**Non Engineering Description**  
 Light brown silty clayey very gravelly SAND with some shell fragments. Gravel is fine medium.

**Sample Proportions - %**

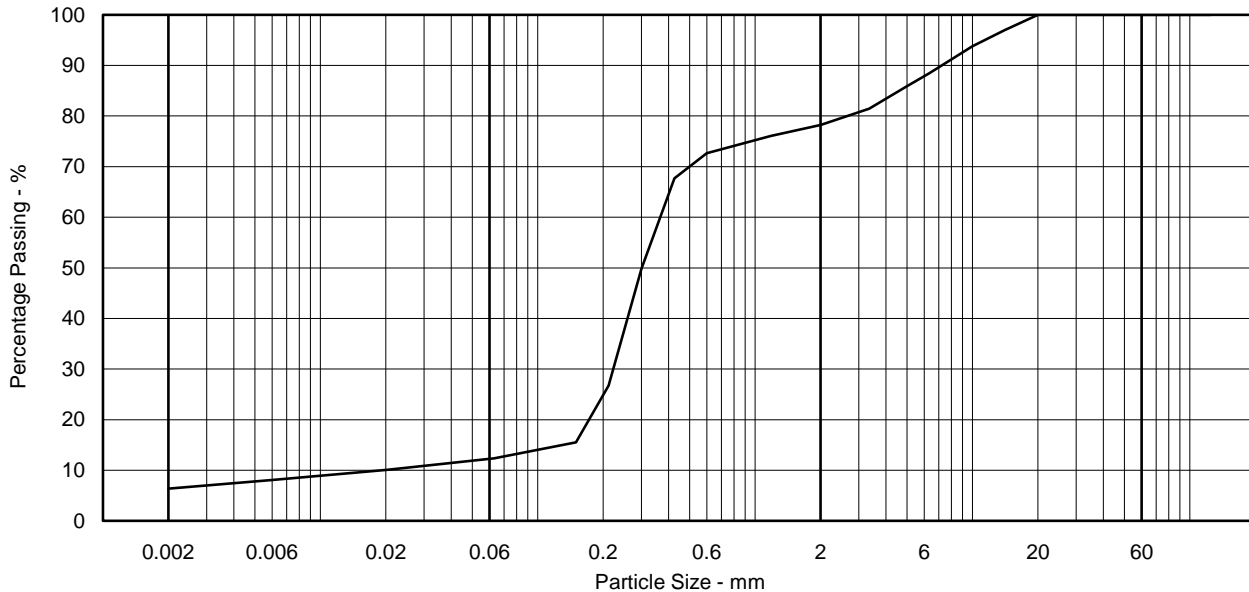
Cobbles	0.0
Gravel	21.8
Sand	66.1
Silt	5.8
Clay	6.4

**Particle Diameter - mm**

D100	20
D60	0.37
D10	0.019
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	19.5

**Notes**  
 Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB02

Sample Ref 9

Depth (m) 2.30-2.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	98
5.00 mm	97
3.35 mm	97
2.00 mm	95
1.18 mm	94
600 µm	90
425 µm	86
300 µm	67
212 µm	40
150 µm	16
63 µm	5

**Non Engineering Description**

Greyish brown slightly gravelly slightly silty SAND with occasional shell fragments and a strong smell of hydrocarbons. Gravel is fine to medium.

**Sample Proportions - %**

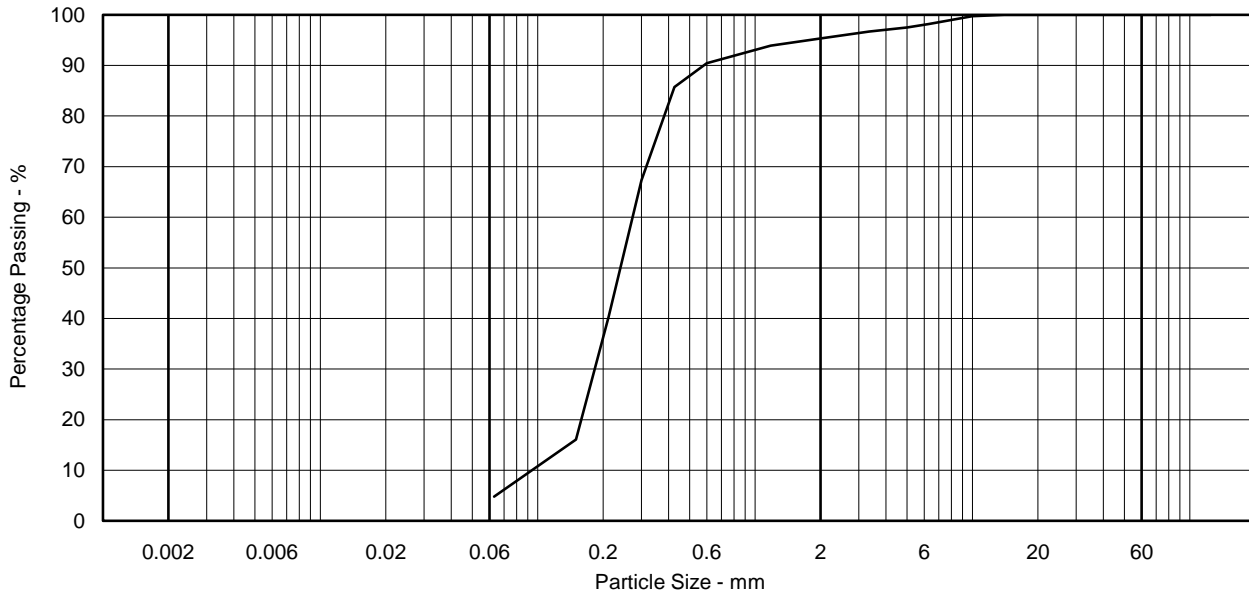
Cobbles	0.0
Gravel	4.7
Sand	90.5
Silt & Clay	4.8

**Particle Diameter - mm**

D100	14
D60	0.27
D10	0.094
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.9

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB02  
 Sample Ref 13  
 Depth (m) 3.30-3.80  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	99
300 µm	94
212 µm	79
150 µm	29
63 µm	3

**Non Engineering Description**  
 Light orange brown slightly silty SAND.

**Sample Proportions - %**

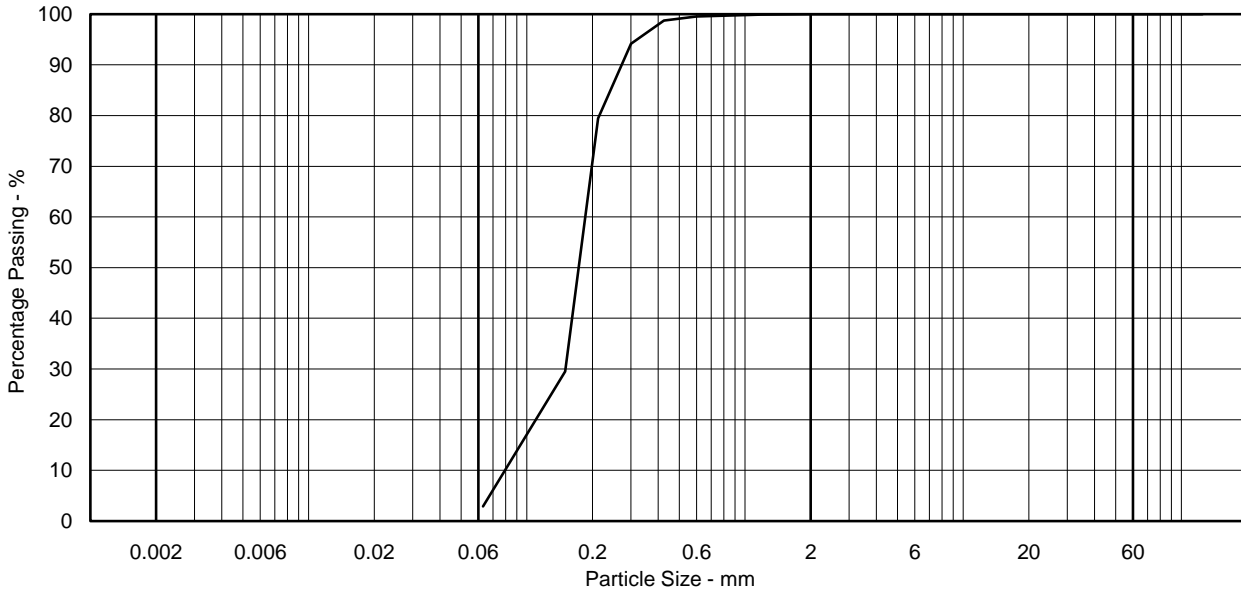
Cobbles	0.0
Gravel	0.0
Sand	97.1
Silt & Clay	2.9

**Particle Diameter - mm**

D100	2.0
D60	0.19
D10	0.079
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.4

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB02

Sample Ref 17

Depth (m) 4.30-4.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	99
2.00 mm	99
1.18 mm	99
600 µm	98
425 µm	97
300 µm	94
212 µm	79
150 µm	25
63 µm	4

**Non Engineering Description**

Yellowish brown slightly silty SAND wit some shell fragments.

**Sample Proportions - %**

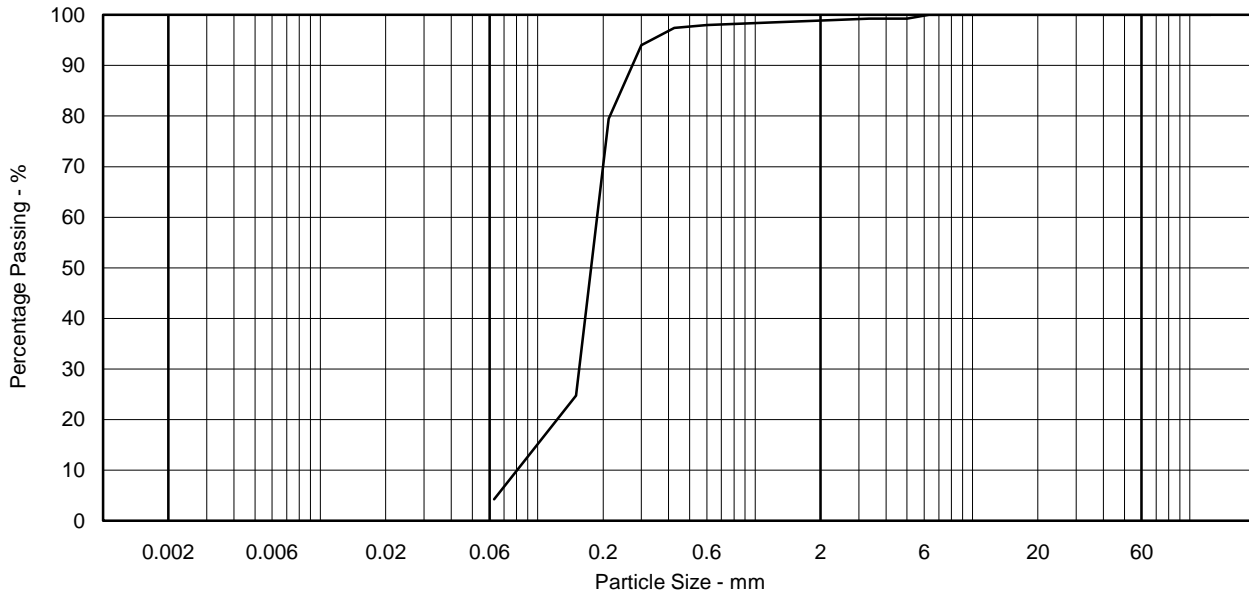
Cobbles	0.0
Gravel	1.1
Sand	94.6
Silt & Clay	4.2

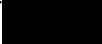
**Particle Diameter - mm**

D100	6.3
D60	0.19
D10	0.080
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.4

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB02

Engineer Norfolk Partnership Laboratory

Sample Ref 29

Depth (m) 7.30-7.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	100
300 µm	97
212 µm	78
150 µm	31
63 µm	3

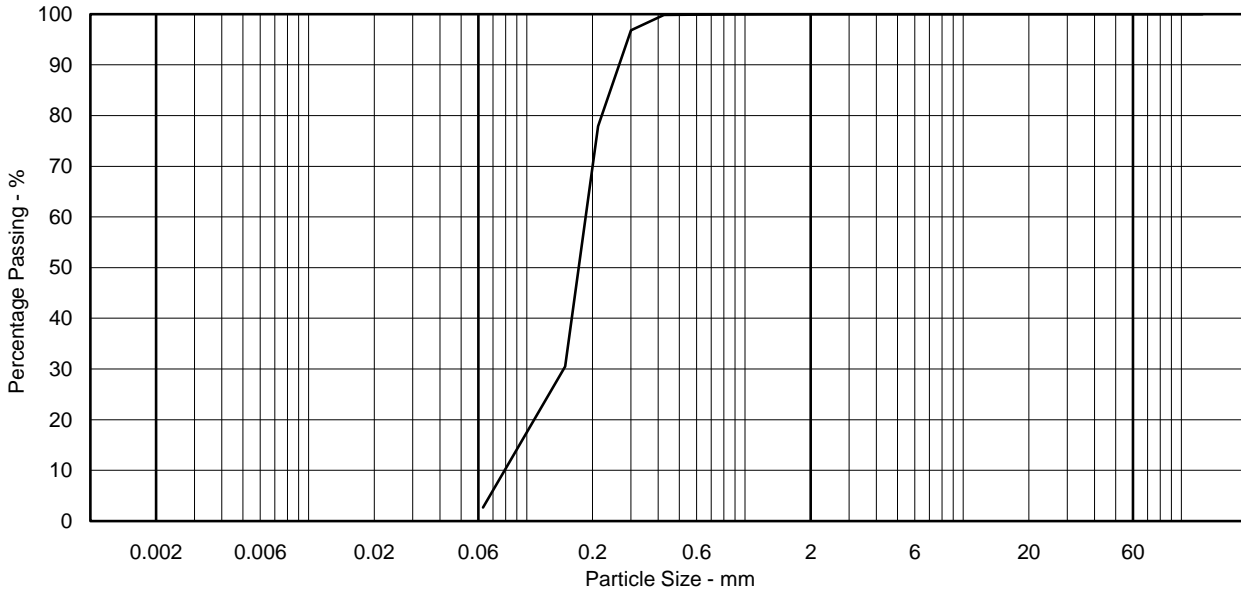
Non Engineering Description
Yellowish brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.0
Sand	97.3
Silt & Clay	2.7

Particle Diameter - mm	
D100	2.0
D60	0.19
D10	0.079
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.4

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		





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Hole MB02

Engineer Norfolk Partnership Laboratory

Sample Ref 37

Depth (m) 9.30-9.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	99
300 µm	95
212 µm	78
150 µm	38
63 µm	22
20 µm	19
6 µm	17
2 µm	14

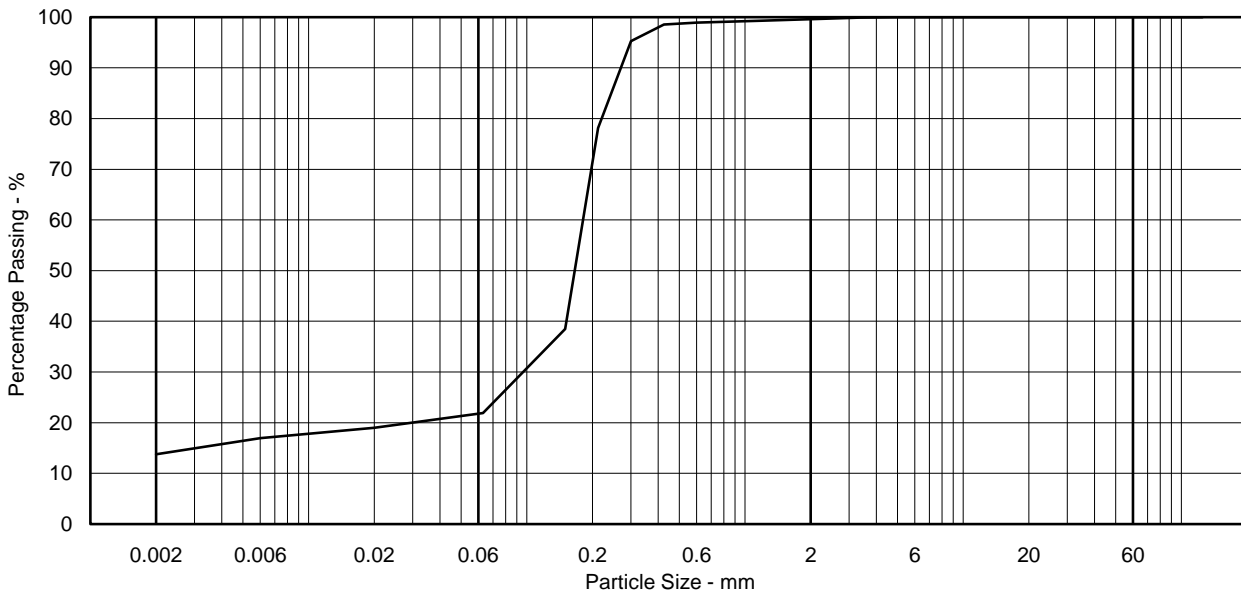
Non Engineering Description	
Brown silty clayey SAND.	

Sample Proportions - %	
Cobbles	0.0
Gravel	0.4
Sand	77.9
Silt	8.0
Clay	13.8

Particle Diameter - mm	
D100	5.0
D60	0.18
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes	
Sedimentation sample not pre-treated	

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Engineer Norfolk Partnership Laboratory

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Hole MB02

Sample Ref 41

Depth (m) 10.30-10.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	97
300 µm	92
212 µm	80
150 µm	46
63 µm	25
20 µm	22
6 µm	16
2 µm	12

**Non Engineering Description**

Dark grey clayey silty SAND with a strong smell of hydrocarbons.

**Sample Proportions - %**

Cobbles	0.0
Gravel	0.1
Sand	75.0
Silt	12.7
Clay	12.1

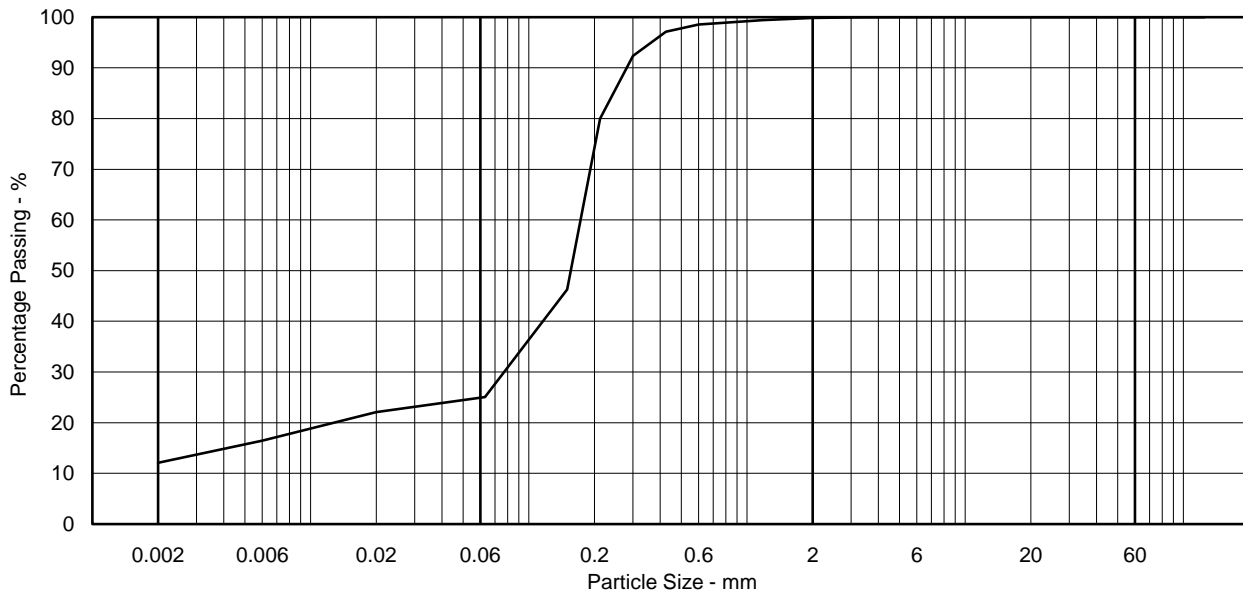
**Particle Diameter - mm**

D100	5.0
D60	0.17
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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Client Norfolk County Council

Hole MB02

Engineer Norfolk Partnership Laboratory

Sample Ref 43

Depth (m) 11.30-11.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	98
1.18 mm	96
600 µm	86
425 µm	68
300 µm	51
212 µm	39
150 µm	25
63 µm	12
20 µm	9
6 µm	5
2 µm	3

**Non Engineering Description**

Dark greyish brown slightly clayey silty SAND with occasional fine shell fragments and a strong odour of hydrocarbons.

**Sample Proportions - %**

Cobbles	0.0
Gravel	2.2
Sand	86.2
Silt	8.4
Clay	3.2

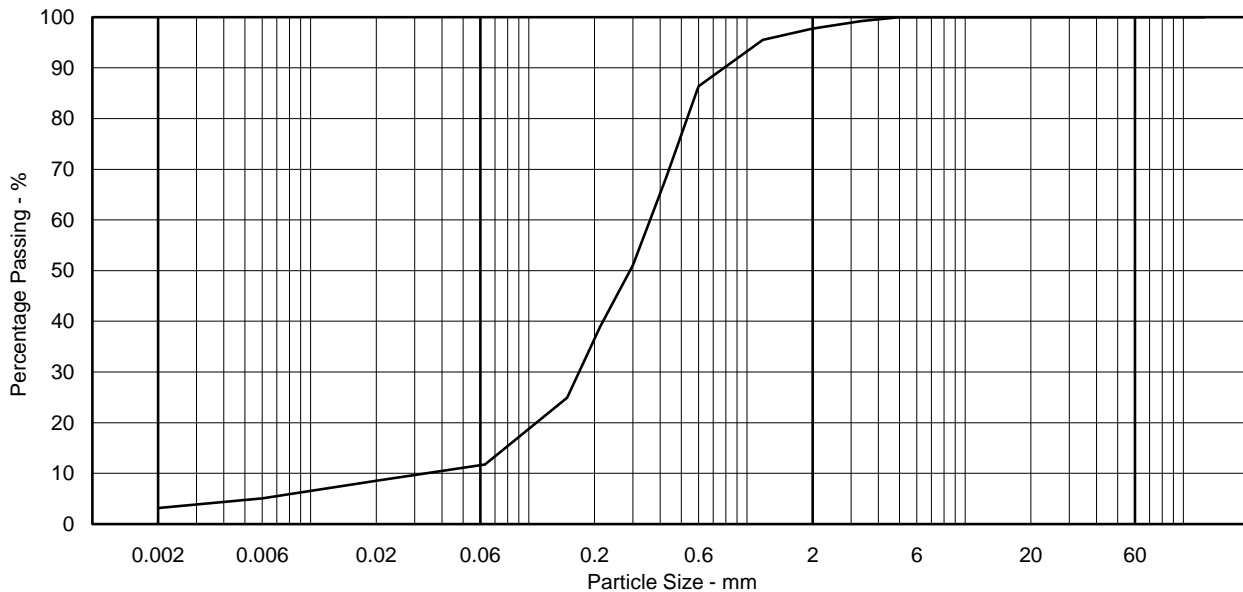
**Particle Diameter - mm**

D100	5.0
D60	0.36
D10	0.033
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	10.9

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB02  
 Sample Ref 46  
 Depth (m) 12.30-12.80  
 Sample Type B

Engineer Norfolk Partnership Laboratory

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	97
6.30 mm	96
5.00 mm	96
3.35 mm	94
2.00 mm	93
1.18 mm	92
600 µm	88
425 µm	78
300 µm	55
212 µm	36
150 µm	22
63 µm	12
20 µm	9
6 µm	7
2 µm	3

**Non Engineering Description**

Dark grey slightly clayey silty SAND with some fine to medium shell fragments and a strong odour of hydrocarbons.

**Sample Proportions - %**

Cobbles	0.0
Gravel	6.7
Sand	81.9
Silt	8.3
Clay	3.2

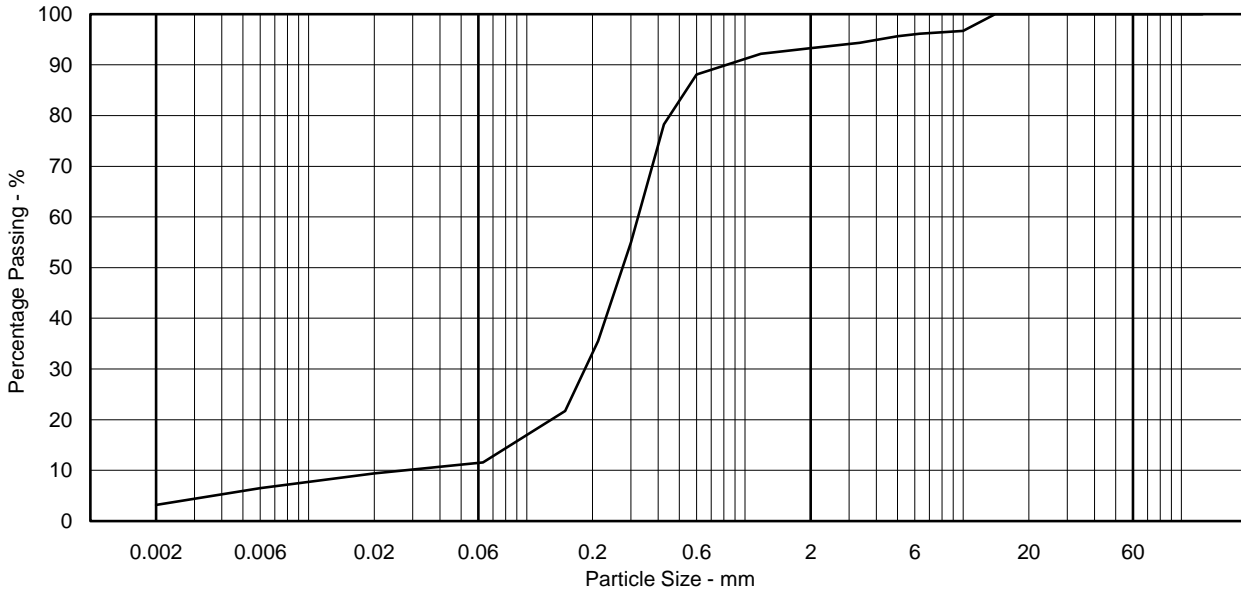
**Particle Diameter - mm**

D100	14
D60	0.32
D10	0.027
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	11.9

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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Hole MB02  
 Sample Ref 47  
 Depth (m) 13.50-14.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	98
425 µm	91
300 µm	52
212 µm	20
150 µm	9
63 µm	5

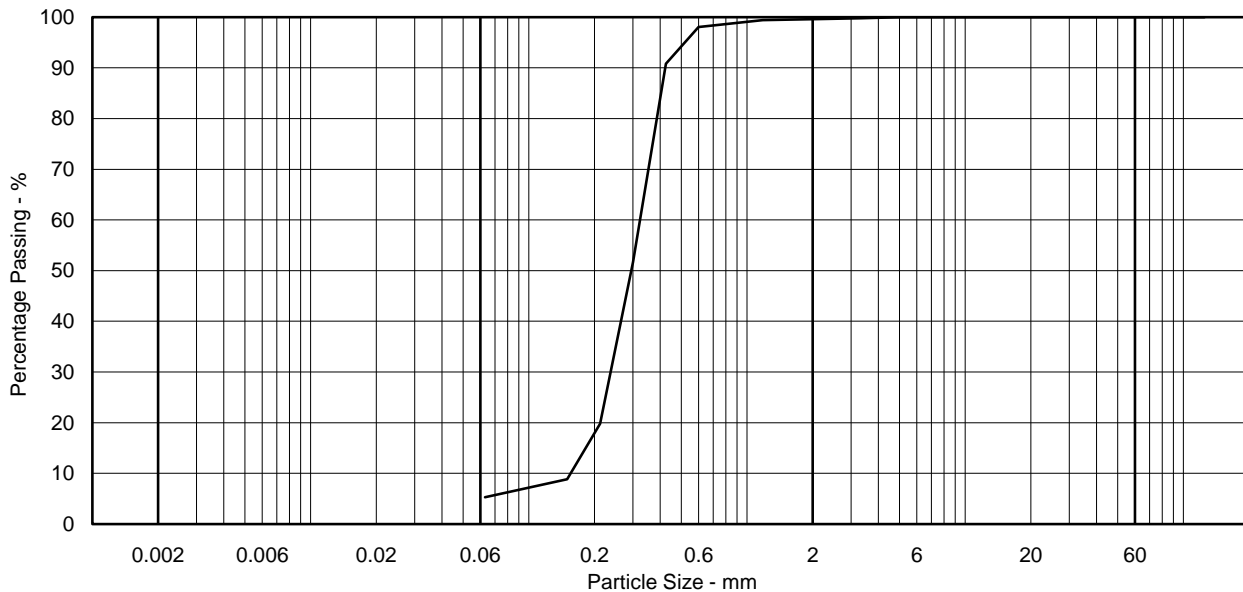
Non Engineering Description
Grey silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.4
Sand	94.3
Silt & Clay	5.3

Particle Diameter - mm	
D100	5.0
D60	0.32
D10	0.16
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.0

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB02  
 Sample Ref 50  
 Depth (m) 14.50-15.00  
 Sample Type B

Engineer Norfolk Partnership Laboratory

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	98
425 µm	90
300 µm	54
212 µm	31
150 µm	20
63 µm	6

**Non Engineering Description**

Grey silty SAND with a strong smell of hydrocarbons.

**Sample Proportions - %**

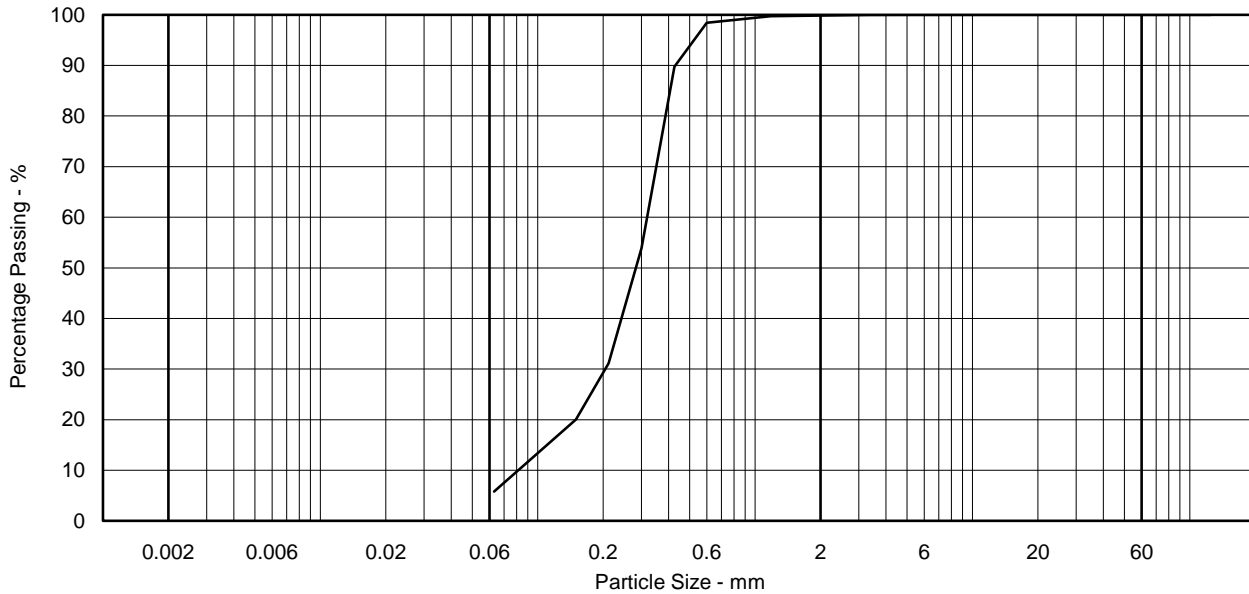
Cobbles	0.0
Gravel	0.1
Sand	94.1
Silt & Clay	5.8

**Particle Diameter - mm**

D100	5.0
D60	0.32
D10	0.081
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	4.0

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Contract No PZ1522D1

Hole MB02

Sample Ref 54

Depth (m) 15.50-16.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	98
425 µm	86
300 µm	47
212 µm	26
150 µm	16
63 µm	5

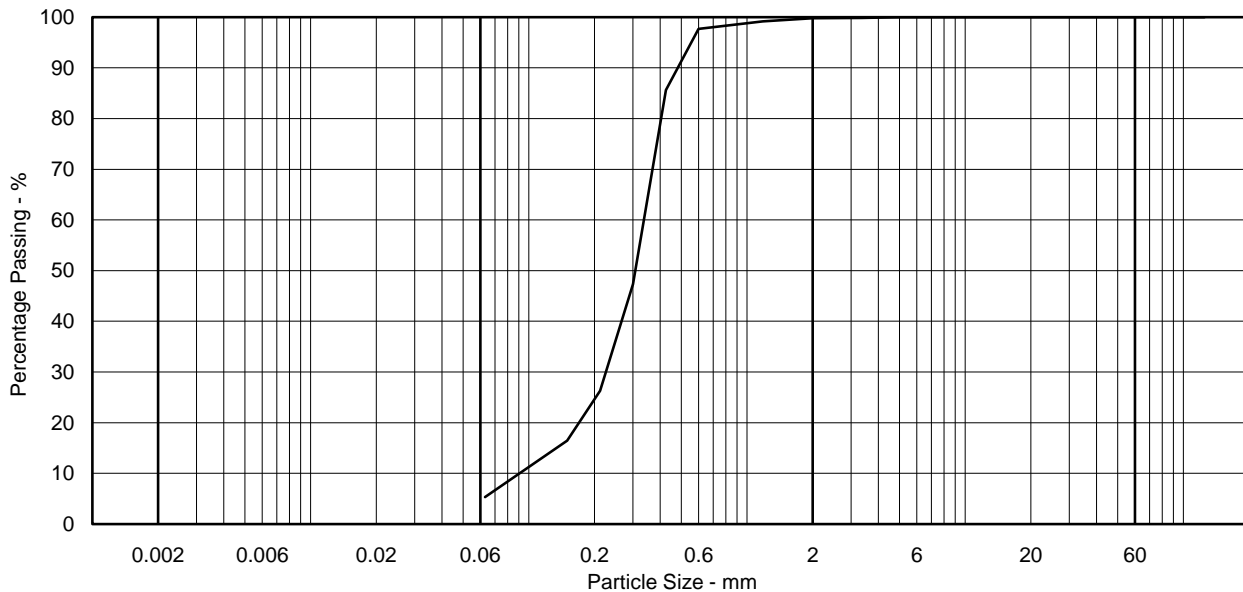
Non Engineering Description
Dark grey silty SAND with a smell of hydrocarbons.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	94.4
Silt & Clay	5.3

Particle Diameter - mm	
D100	5.0
D60	0.34
D10	0.091
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.7

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB02

Sample Ref 57

Depth (m) 16.50-17.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	96
425 µm	77
300 µm	41
212 µm	28
150 µm	16
63 µm	7

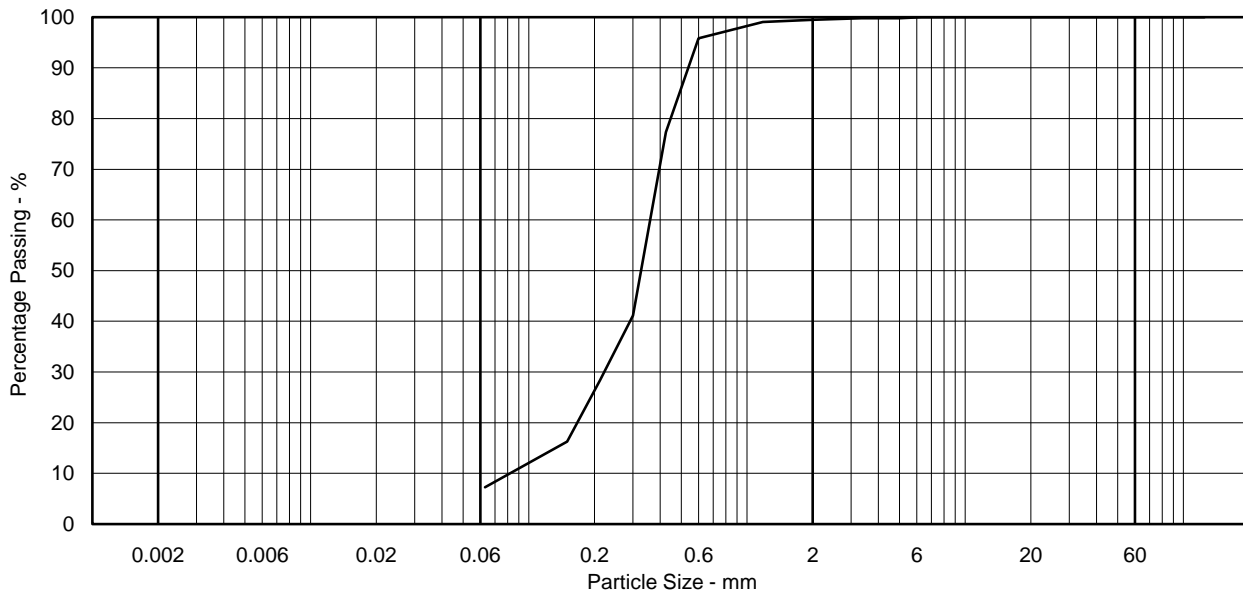
Non Engineering Description
Grey SAND with occasional pockets of silt.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.5
Sand	92.2
Silt & Clay	7.3

Particle Diameter - mm	
D100	6.3
D60	0.36
D10	0.082
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	4.4

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB02

Sample Ref 63

Depth (m) 18.50-19.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	97
425 µm	91
300 µm	72
212 µm	58
150 µm	40
63 µm	22
20 µm	17
6 µm	12
2 µm	6

**Non Engineering Description**

Grey clayey silty SAND with a strong odour of hydrocarbons.

**Sample Proportions - %**

Cobbles	0.0
Gravel	0.4
Sand	77.8
Silt	15.6
Clay	6.3

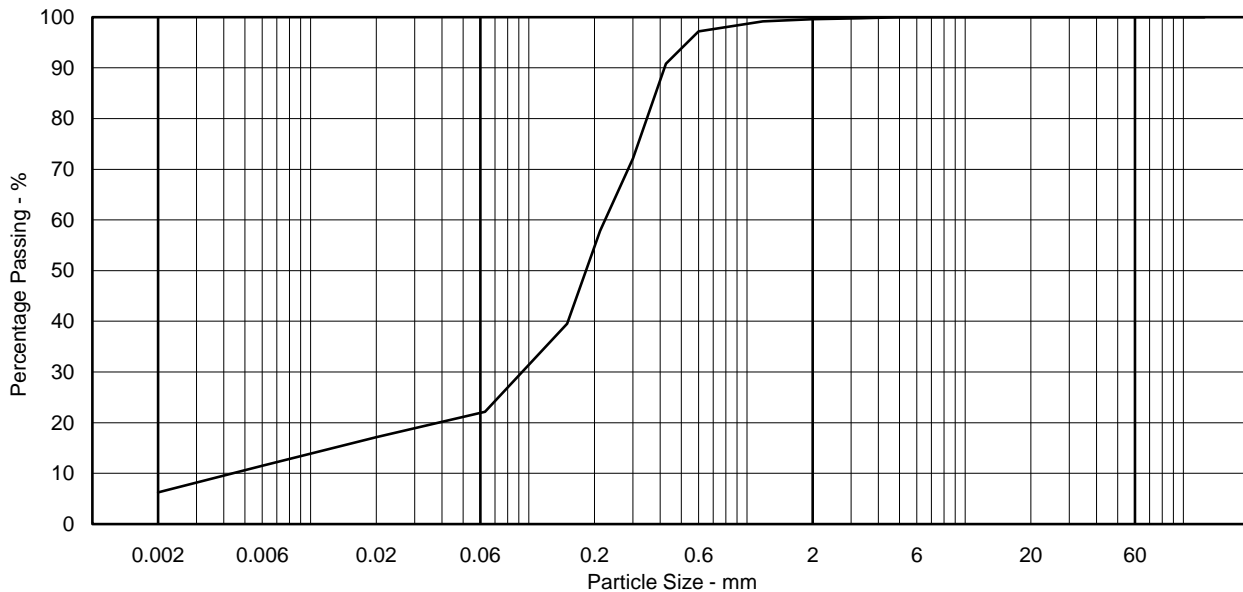
**Particle Diameter - mm**

D100	5.0
D60	0.22
D10	0.0044
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	50.0

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
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 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB02

Sample Ref 65

Depth (m) 19.20-19.70

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	98
425 µm	94
300 µm	83
212 µm	67
150 µm	45
63 µm	30
20 µm	20
6 µm	13
2 µm	7

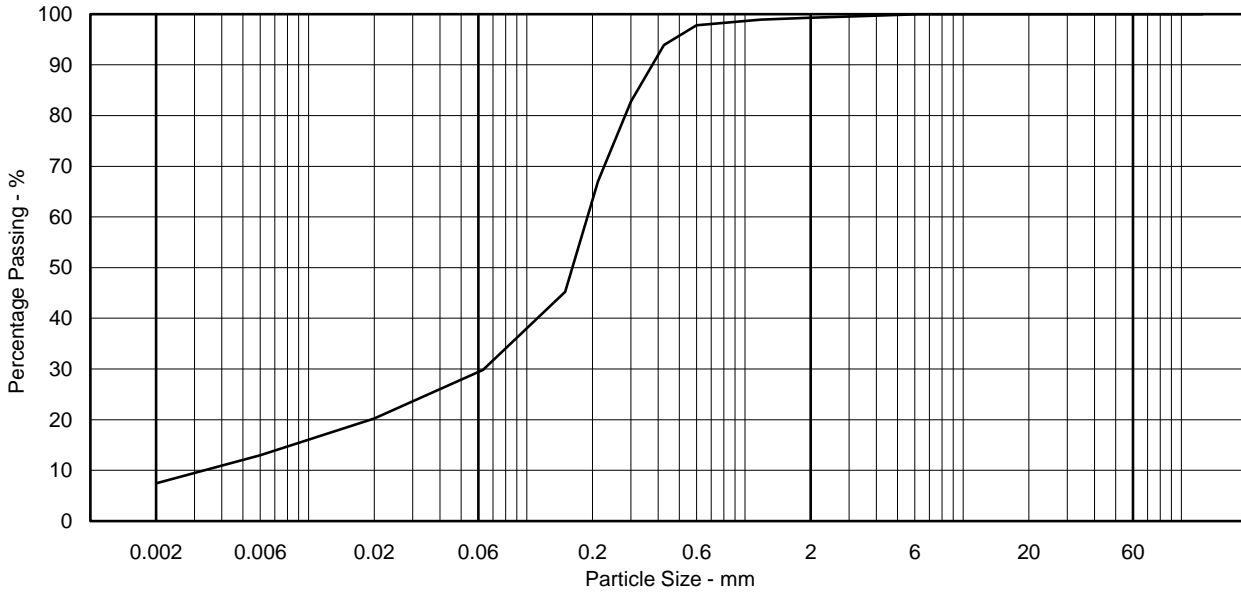
Non Engineering Description
Grey very sandy SILT/CLAY with rare fine shell fragments.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.7
Sand	70.1
Silt	21.7
Clay	7.4

Particle Diameter - mm	
D100	6.3
D60	0.19
D10	0.0033
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	57.6

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB02  
 Sample Ref 74  
 Depth (m) 23.50-24.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	99
2.00 mm	98
1.18 mm	97
600 µm	95
425 µm	92
300 µm	79
212 µm	32
150 µm	8
63 µm	4

**Non Engineering Description**  
 Light grey slightly silty SAND with occasional fine shell fragments and one cobble.

**Sample Proportions - %**

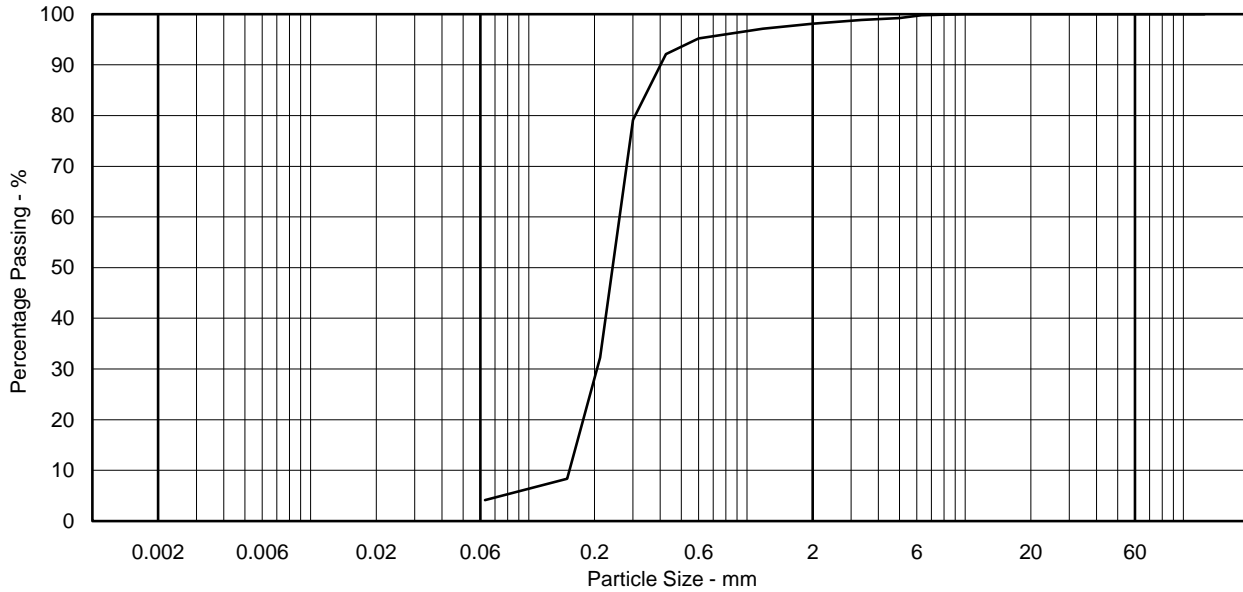
Cobbles	0.0
Gravel	1.9
Sand	94.0
Silt & Clay	4.1

**Particle Diameter - mm**

D100	10
D60	0.26
D10	0.15
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	1.7

**Notes**  
 Cobble weighing 2607.5g retained on the 90mm test sieve was removed from sample prior to testing.

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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**PARTICLE SIZE DISTRIBUTION**  
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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB02

Sample Ref 82

Depth (m) 27.30-27.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	99
5.00 mm	99
3.35 mm	99
2.00 mm	98
1.18 mm	97
600 µm	94
425 µm	90
300 µm	77
212 µm	42
150 µm	21
63 µm	13
20 µm	11
6 µm	9
2 µm	7

**Non Engineering Description**

Grey slightly gravelly silty clayey SAND. Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	2.1
Sand	85.2
Silt	5.9
Clay	6.8

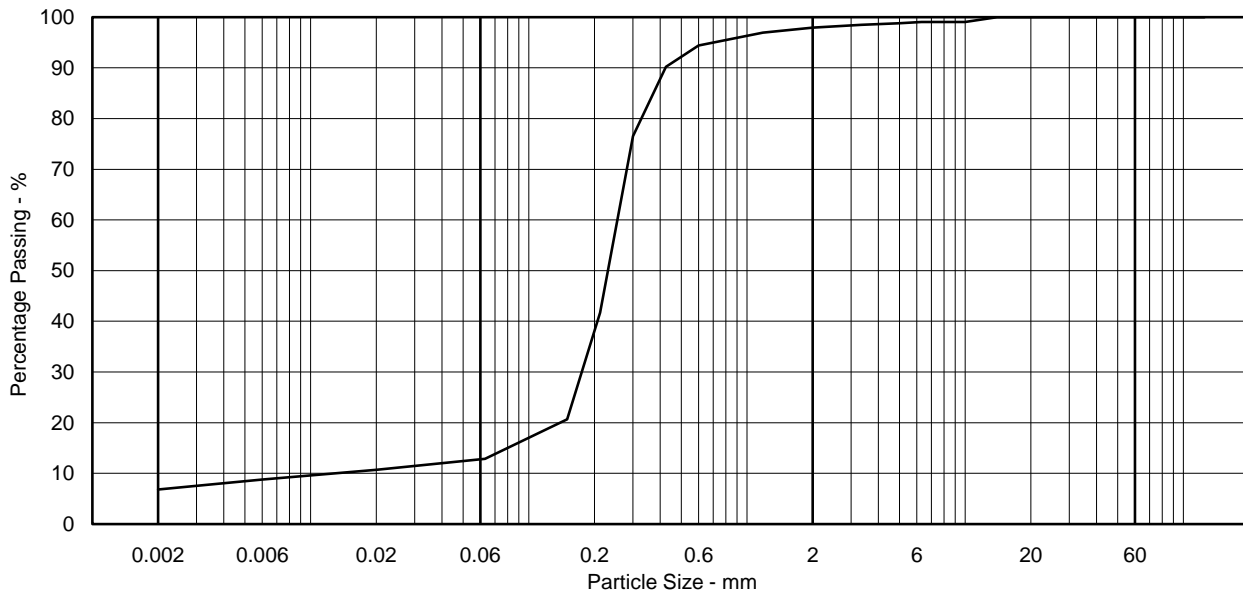
**Particle Diameter - mm**

D100	14
D60	0.25
D10	0.013
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	19.2

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB02

Sample Ref 84

Depth (m) 28.30-28.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	94
425 µm	87
300 µm	62
212 µm	33
150 µm	19
63 µm	11
20 µm	10
6 µm	8
2 µm	6

**Non Engineering Description**

Grey slightly silty clayey SAND with rare fine shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	0.9
Sand	88.0
Silt	4.9
Clay	6.1

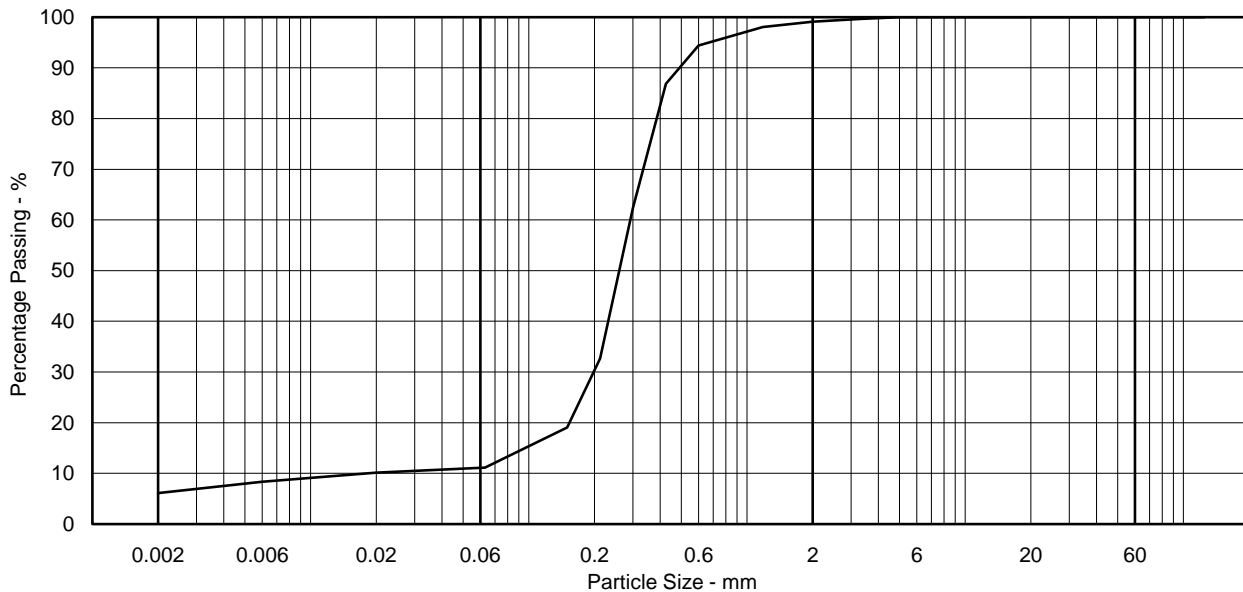
**Particle Diameter - mm**

D100	5.0
D60	0.29
D10	0.018
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	16.1

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB02  
 Sample Ref 87  
 Depth (m) 29.30-29.80  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	95
425 µm	89
300 µm	67
212 µm	37
150 µm	18
63 µm	7

**Non Engineering Description**

Grey silty SAND.

**Sample Proportions - %**

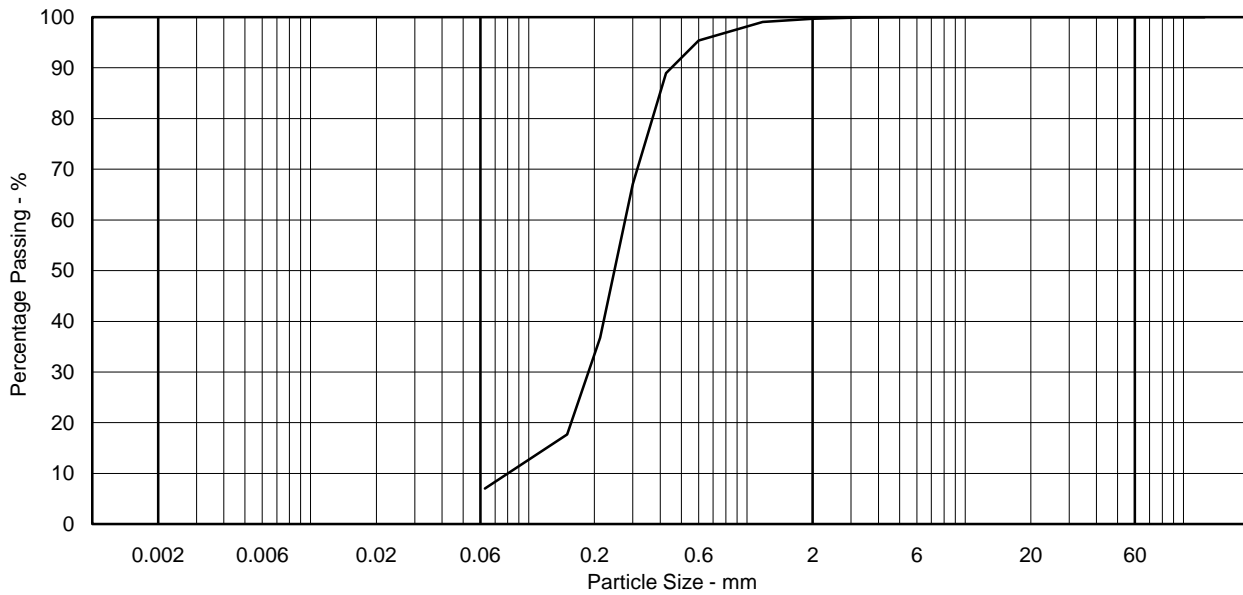
Cobbles	0.0
Gravel	0.3
Sand	92.7
Silt & Clay	7.0

**Particle Diameter - mm**

D100	5.0
D60	0.28
D10	0.080
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.5

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB02  
 Sample Ref 94  
 Depth (m) 32.30-32.80  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	95
425 µm	85
300 µm	60
212 µm	31
150 µm	17
63 µm	4

**Non Engineering Description**

Light grey slightly silty SAND with a strong smell of hydrocarbons.

**Sample Proportions - %**

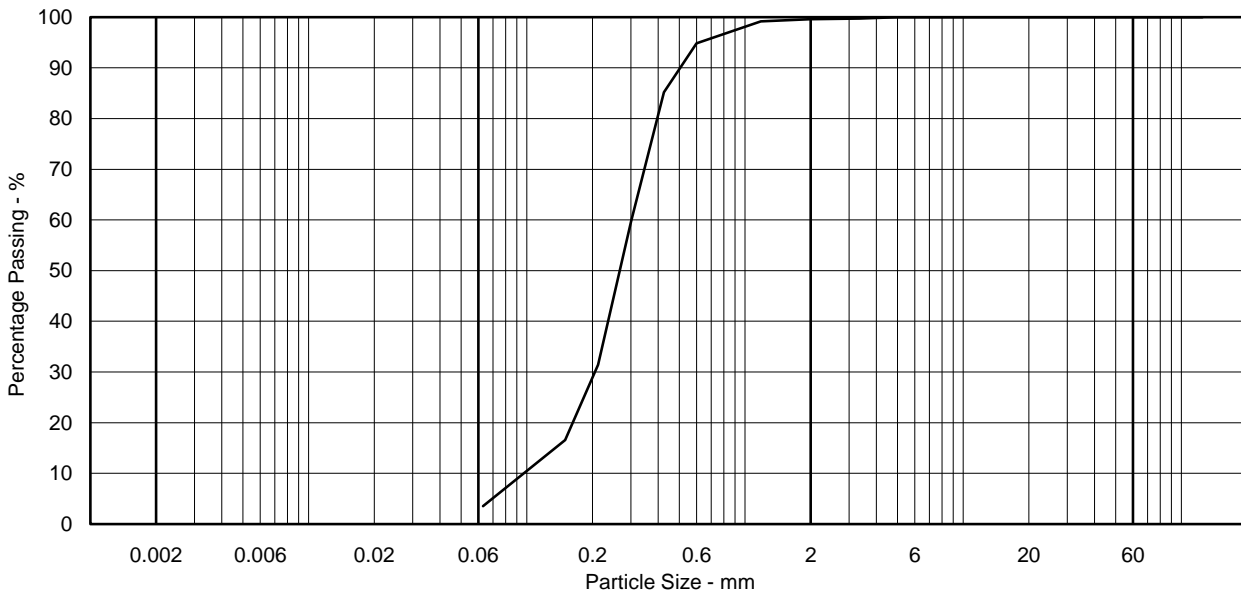
Cobbles	0.0
Gravel	0.4
Sand	96.1
Silt & Clay	3.5

**Particle Diameter - mm**

D100	5.0
D60	0.30
D10	0.097
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.1

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving

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Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB02  
 Sample Ref 96  
 Depth (m) 33.30-33.80  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	96
425 µm	89
300 µm	72
212 µm	48
150 µm	21
63 µm	9

**Non Engineering Description**  
 Grey silty SAND.

**Sample Proportions - %**

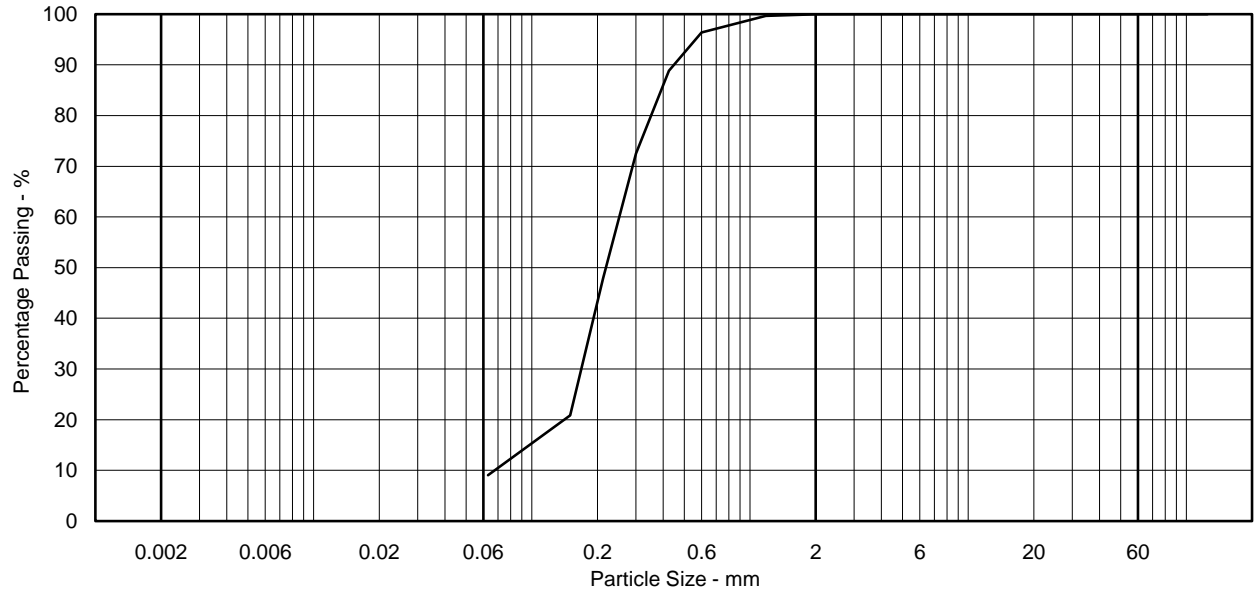
Cobbles	0.0
Gravel	0.0
Sand	90.9
Silt & Clay	9.1

**Particle Diameter - mm**

D100	3.4
D60	0.25
D10	0.068
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.7

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB02  
 Sample Ref 98  
 Depth (m) 34.30-34.80  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	97
425 µm	90
300 µm	69
212 µm	45
150 µm	17
63 µm	5

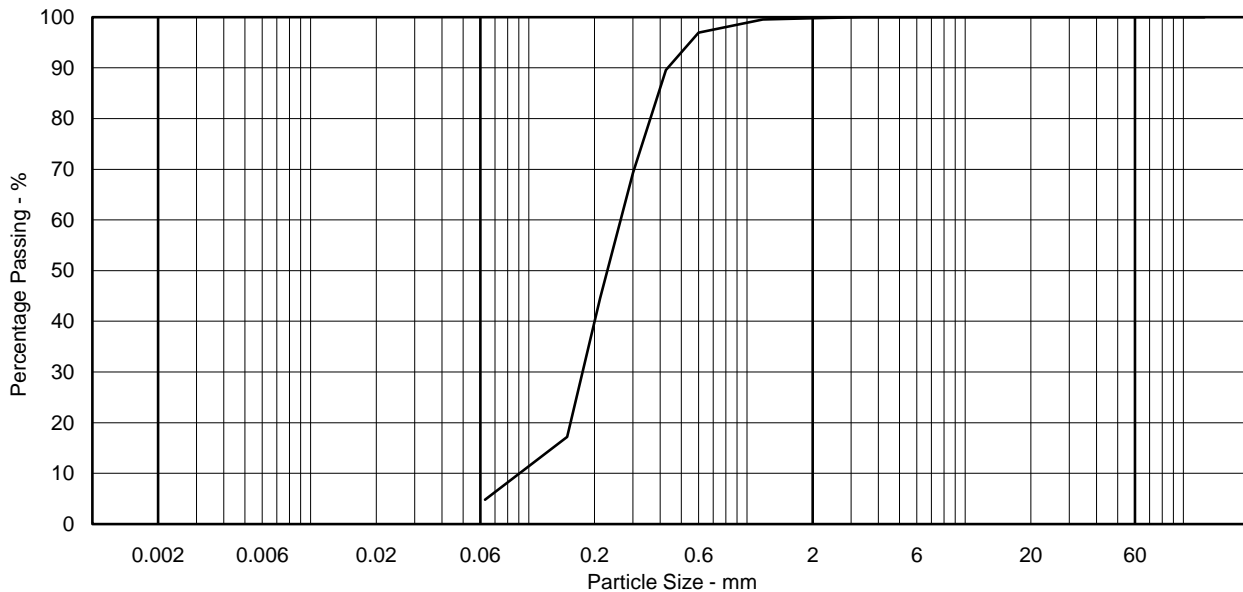
Non Engineering Description
Greyish brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	95.0
Silt & Clay	4.8

Particle Diameter - mm	
D100	3.4
D60	0.26
D10	0.091
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.9

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB02

Sample Ref 105

Depth (m) 36.30-36.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	99
600 µm	98
425 µm	97
300 µm	94
212 µm	90
150 µm	85
63 µm	80
20 µm	69
6 µm	55
2 µm	38

**Non Engineering Description**

Grey slightly sandy CLAY with rare fine gravel.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.0
Sand	19.4
Silt	41.2
Clay	38.5

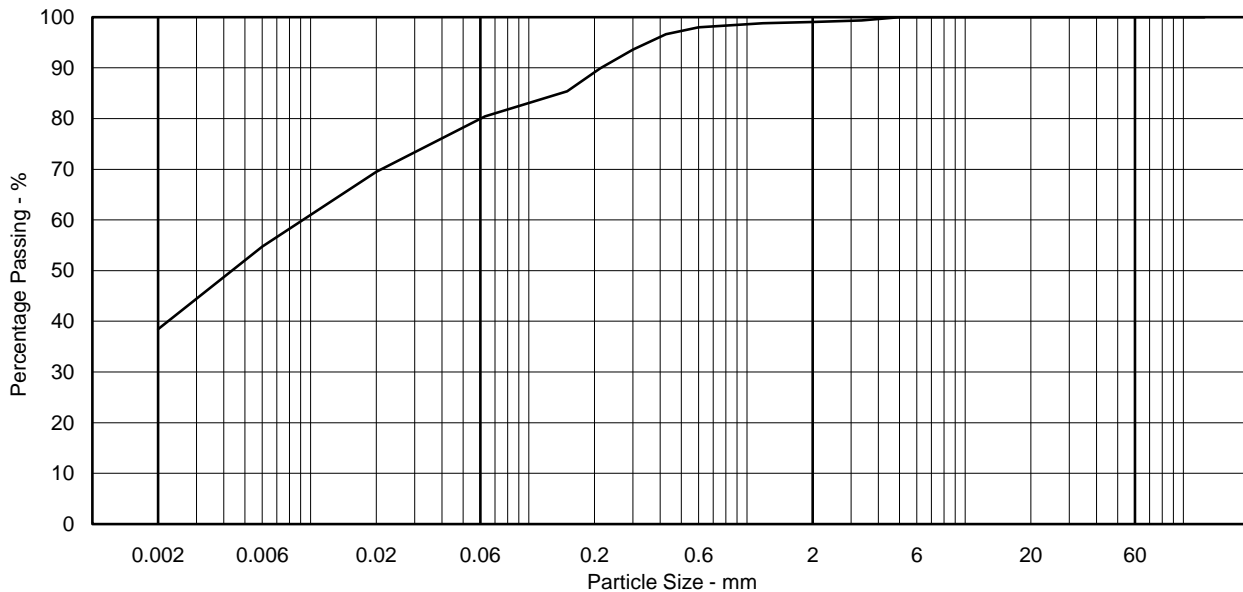
**Particle Diameter - mm**

D100	5.0
D60	0.0092
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB02

Sample Ref 110

Depth (m) 39.30-39.80

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	99
5.00 mm	99
3.35 mm	99
2.00 mm	98
1.18 mm	98
600 µm	98
425 µm	98
300 µm	97
212 µm	96
150 µm	94
63 µm	92
20 µm	79
6 µm	58
2 µm	38

**Non Engineering Description**

Dark grey slightly gravelly slightly sandy CLAY. Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.6
Sand	7.4
Silt	53.3
Clay	37.7

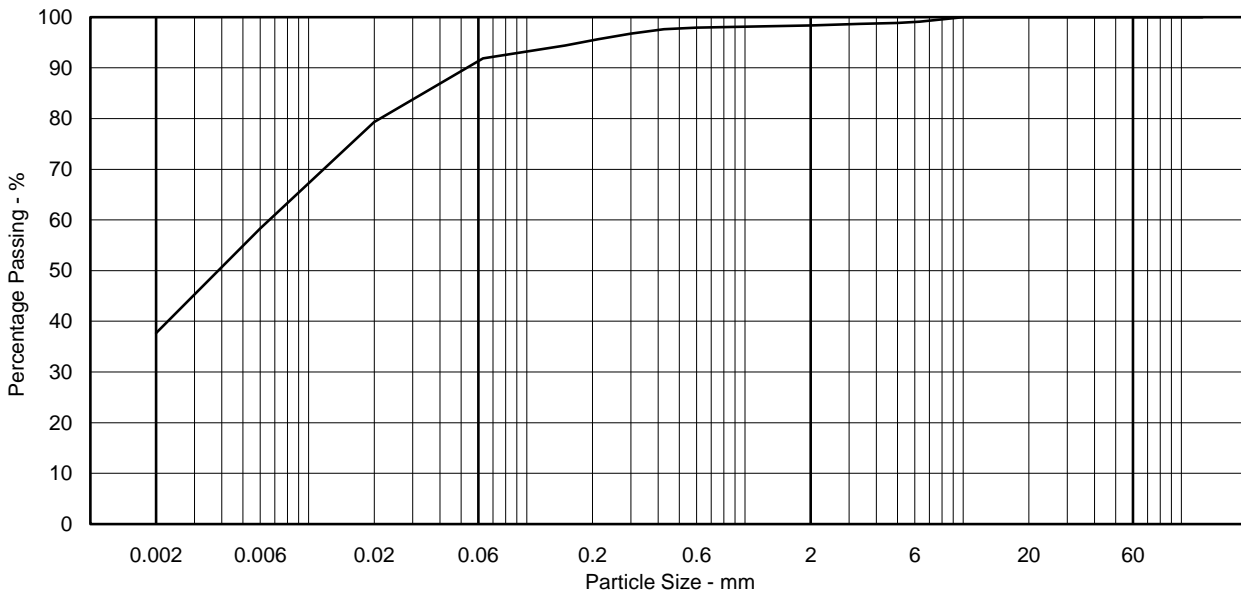
**Particle Diameter - mm**

D100	10
D60	0.0066
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

Our reference No. **NCCL2018062215-610**  
Our Project No. **PZ1522D1**  
Your Sample Ref **1**  
Your Project or Order No. **PZ1522**  
Date Tested  
Date Report Issued **20-Jul-18**

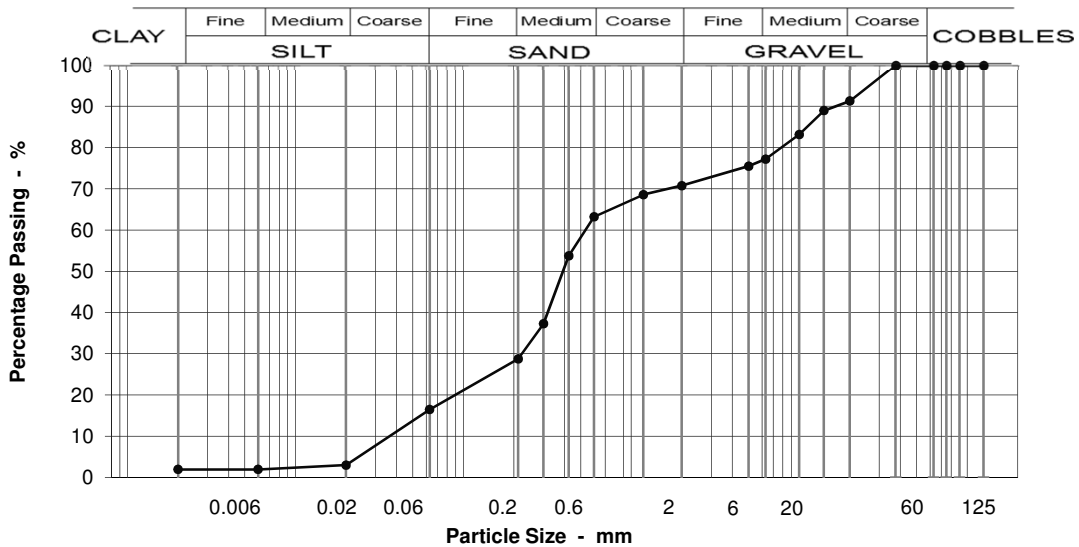
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

Scheme: Gt Yarmouth 3rd River Crossing

Location: MB03 @ 0m Specimen: 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	91
14	89
10	83
6.3	77
5	75
2	71
1.18	69
0.600	63
0.425	54
0.300	37
0.212	29
0.063	17
0.020	3
0.006	2
0.002	2

Specification for Highway Works Classification  
Table 6/2

**This material complies with the following material classes 2C.**

Moisture content % 35

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	9
Medium GRAVEL	14
Fine GRAVEL	6
Coarse SAND	8
Medium SAND	34
Fine SAND	12
Silt & Clay	17

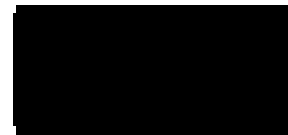
Grading Analysis	
D100	20
D60	0.54
D10	0.11
Uniformity Coefficient	5

**Description**  
Dark grey very gravelly silty fine to coarse SAND. Gravel is fine to coarse subrounded flint.

Test Code = 610



Simon Holden (Project Technician)







SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB03

Sample Ref 5

Depth (m) 1.50-2.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	99
10.0 mm	95
6.30 mm	91
5.00 mm	88
3.35 mm	84
2.00 mm	78
1.18 mm	75
600 µm	70
425 µm	64
300 µm	56
212 µm	50
150 µm	43
63 µm	32
20 µm	26
6 µm	21
2 µm	16

**Non Engineering Description**

Greyish brown slightly gravelly sandy CLAY with occasional fine shell fragments. Gravel is fine to medium with a strong odour of hydrocarbons.

**Sample Proportions - %**

Cobbles	0.0
Gravel	21.5
Sand	46.6
Silt	16.0
Clay	15.9

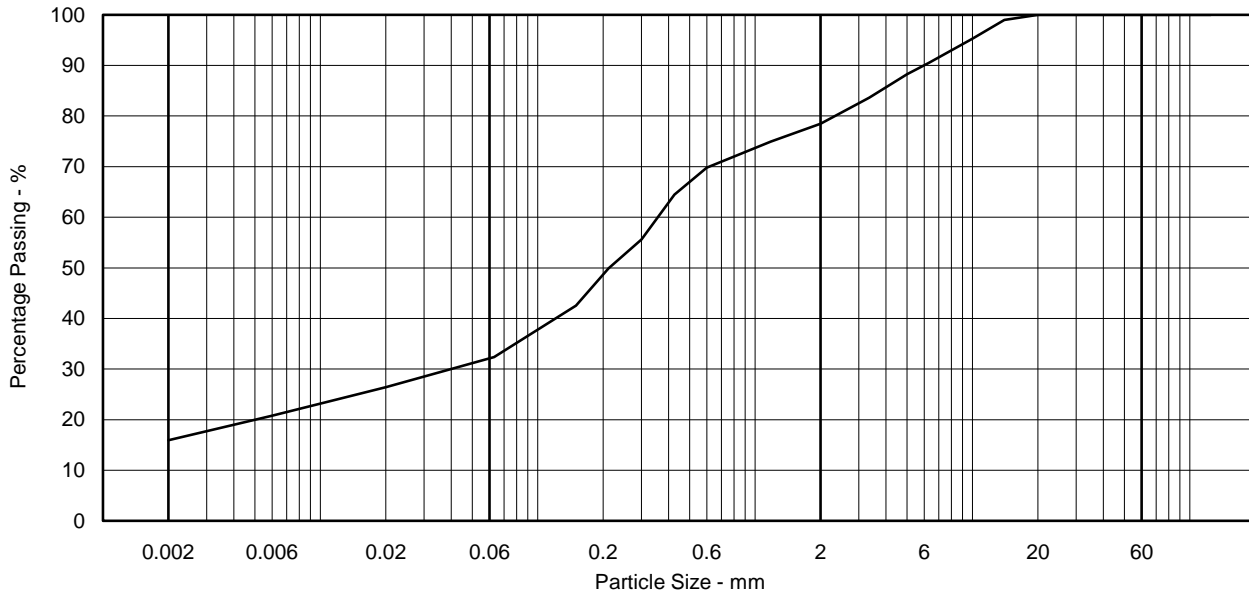
**Particle Diameter - mm**

D100	20
D60	0.36
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
EH	29/08/2018

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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB03

Sample Ref 9

Depth (m) 2.50-3.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	95
20.0 mm	94
14.0 mm	92
10.0 mm	89
6.30 mm	85
5.00 mm	83
3.35 mm	79
2.00 mm	76
1.18 mm	74
600 µm	70
425 µm	62
300 µm	42
212 µm	27
150 µm	19
63 µm	13
20 µm	11
6 µm	9
2 µm	7

**Non Engineering Description**

Yellowish brown clayey silty very gravelly gravelly SAND with occasional fine shell fragments. Gravel is fine to coarse.

**Sample Proportions - %**

Cobbles	0.0
Gravel	23.8
Sand	63.0
Silt	6.6
Clay	6.6

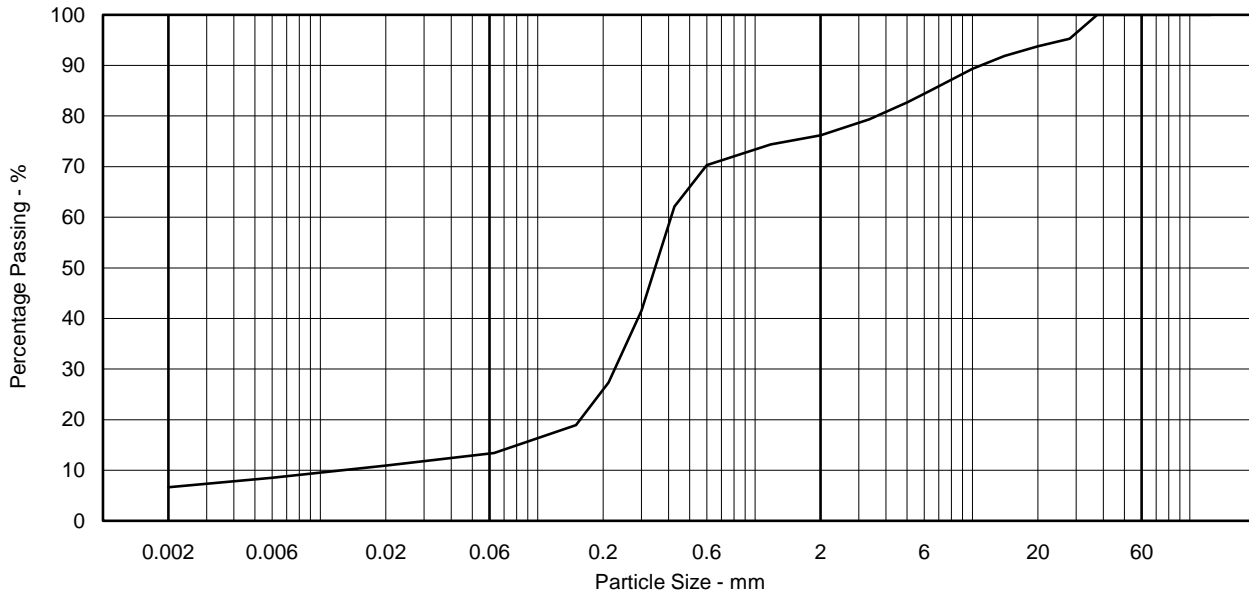
**Particle Diameter - mm**

D100	38
D60	0.41
D10	0.013
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	31.5

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
EH EH	 29/08/2018

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 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB03  
 Sample Ref 13  
 Depth (m) 3.50-4.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	98
2.00 mm	98
1.18 mm	97
600 µm	94
425 µm	87
300 µm	60
212 µm	34
150 µm	13
63 µm	4

**Non Engineering Description**  
 Yellowish brown slightly silty SAND with occasional fine shell fragments.

**Sample Proportions - %**

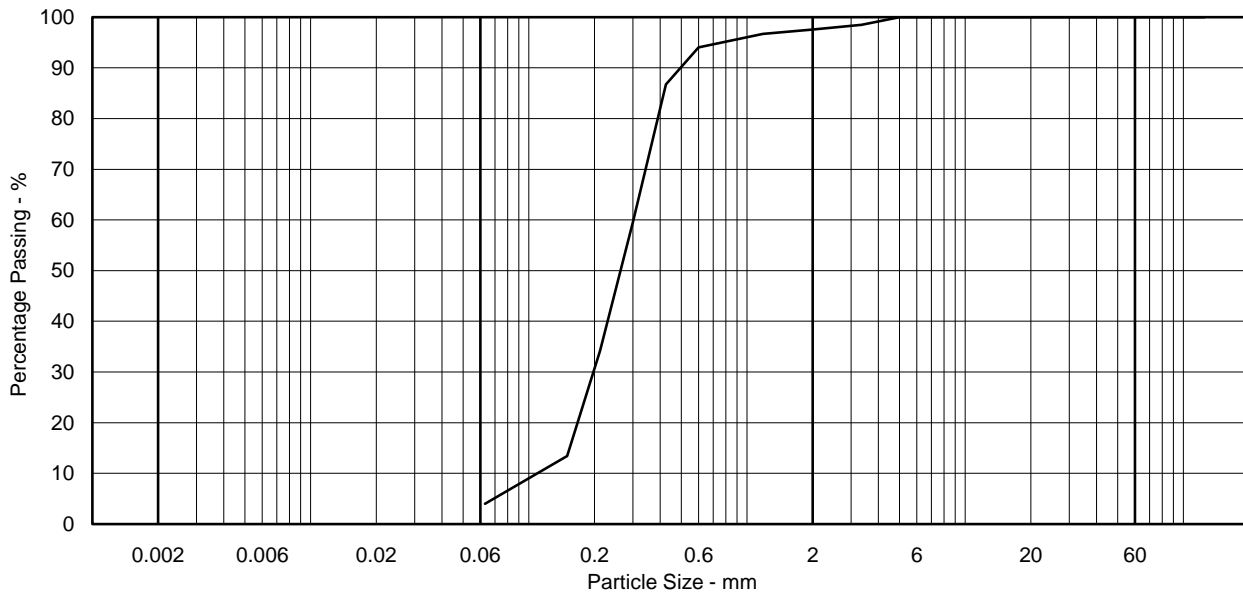
Cobbles	0.0
Gravel	2.4
Sand	93.6
Silt & Clay	4.0

**Particle Diameter - mm**

D100	5.0
D60	0.30
D10	0.11
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.7

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB03

Sample Ref 17

Depth (m) 4.50-5.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	97
300 µm	80
212 µm	57
150 µm	20
63 µm	4

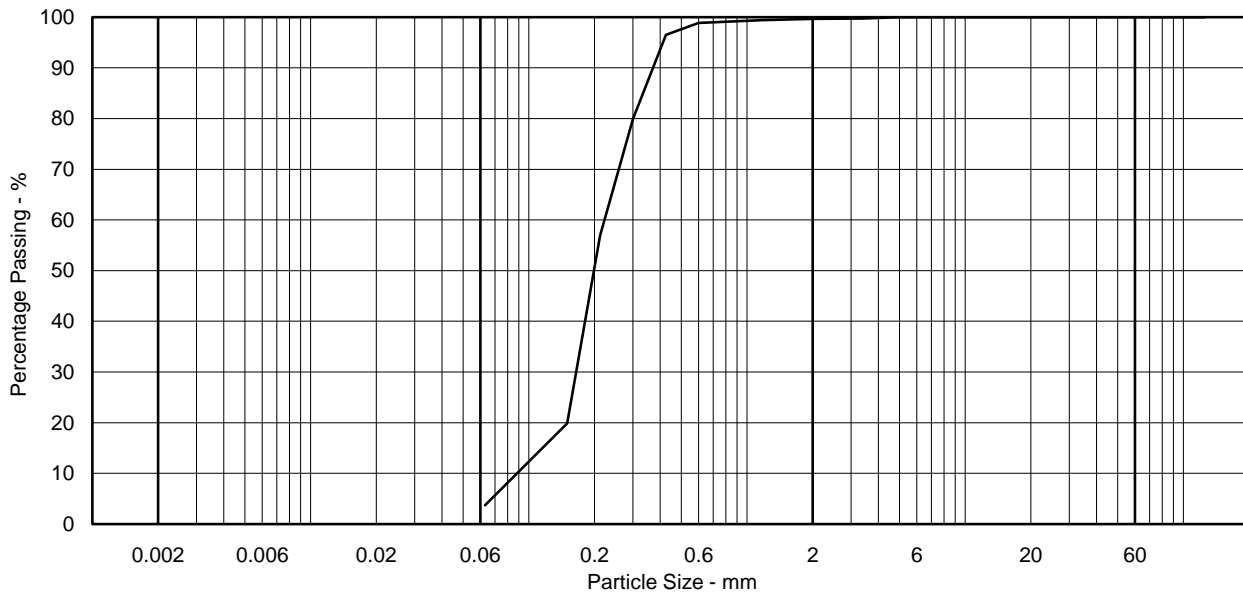
Non Engineering Description
Yellowish brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	96.0
Silt & Clay	3.7

Particle Diameter - mm	
D100	5.0
D60	0.22
D10	0.088
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB03

Sample Ref 29

Depth (m) 7.50-8.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	99
300 µm	96
212 µm	83
150 µm	36
63 µm	4

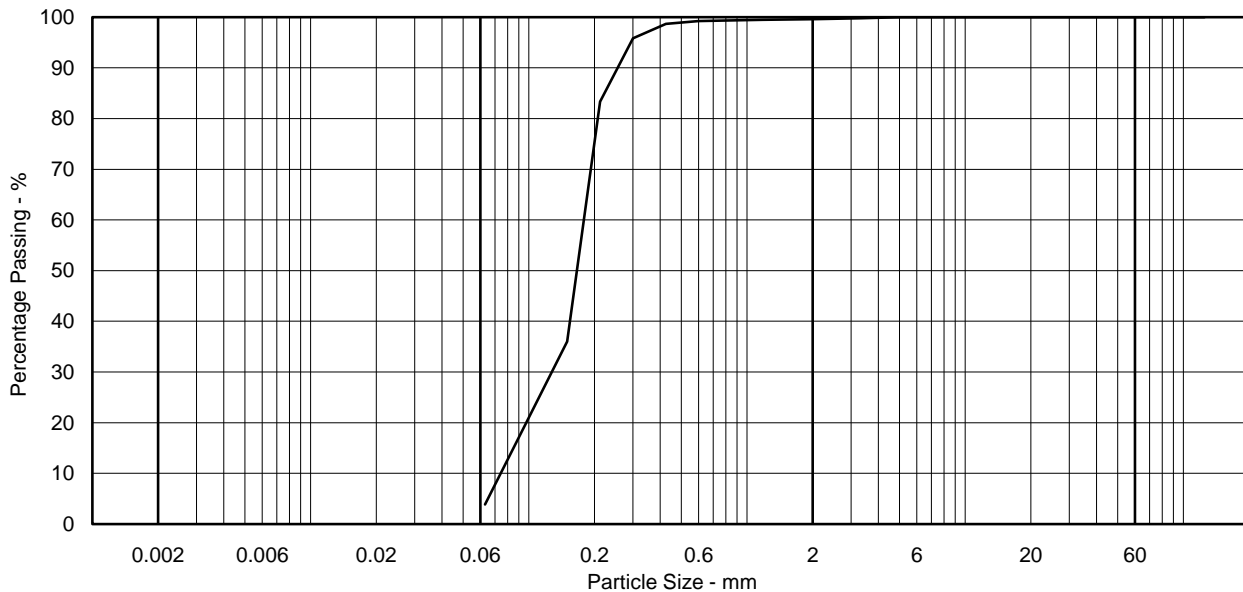
Non Engineering Description
Yellowish brown slightly silty SAND.


Sample Proportions - %	
Cobbles	0.0
Gravel	0.4
Sand	95.8
Silt & Clay	3.9

Particle Diameter - mm	
D100	5.0
D60	0.18
D10	0.074
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.4

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB03

Sample Ref 33

Depth (m) 8.50-9.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	99
300 µm	95
212 µm	78
150 µm	41
63 µm	5

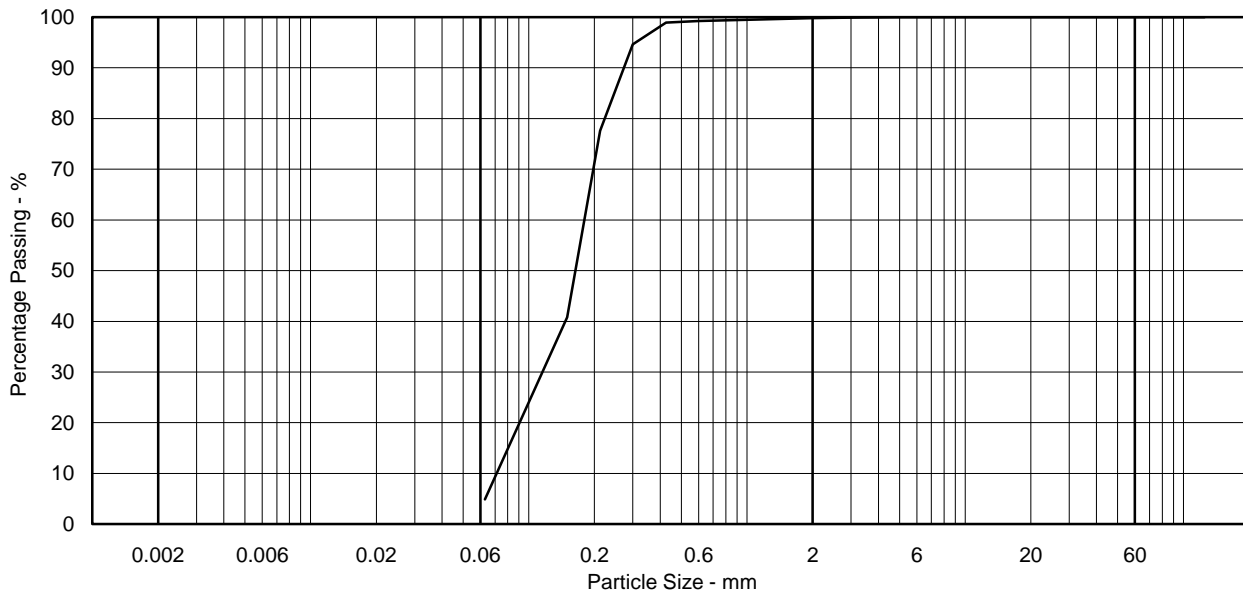
Non Engineering Description
Yellowish brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	94.9
Silt & Clay	4.9

Particle Diameter - mm	
D100	5.0
D60	0.18
D10	0.071
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Site GREAT YARMOUTH 3RD RIVER CROSSING

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Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB03

Sample Ref 43

Depth (m) 11.50-12.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	94
425 µm	82
300 µm	68
212 µm	53
150 µm	20
63 µm	4

**Non Engineering Description**

Yellowish brown slightly silty SAND with occasional fine shell fragments.

**Sample Proportions - %**

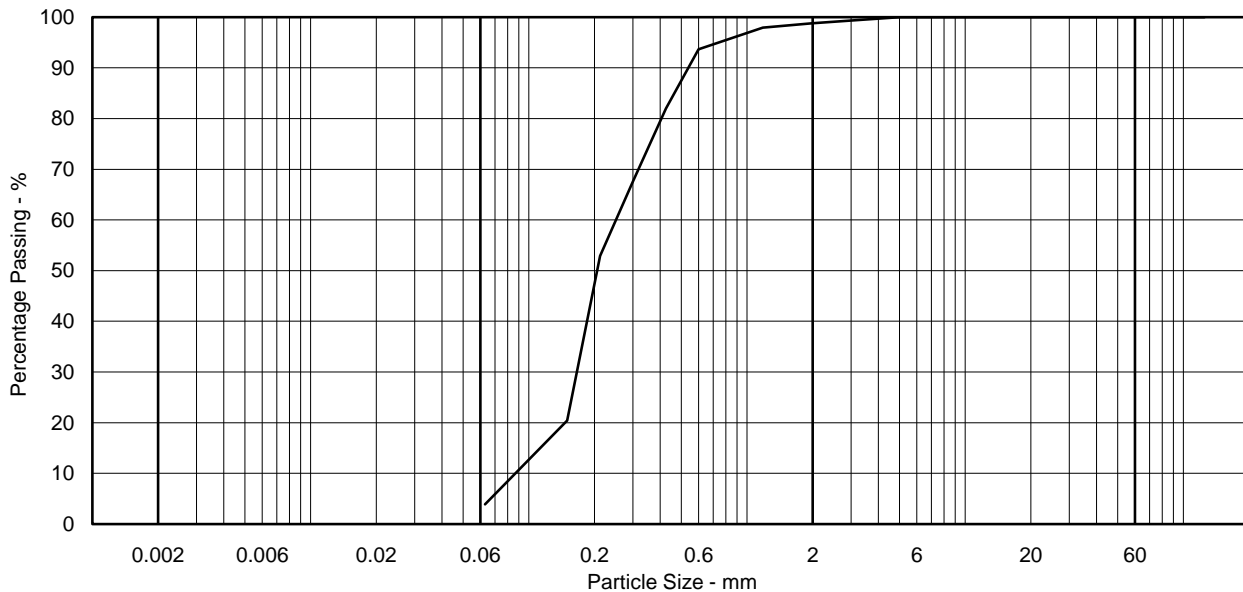
Cobbles	0.0
Gravel	1.2
Sand	94.9
Silt & Clay	3.9

**Particle Diameter - mm**

D100	5.0
D60	0.25
D10	0.087
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.9

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB03

Engineer Norfolk Partnership Laboratory

Sample Ref 45

Depth (m) 12.50

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	90
425 µm	69
300 µm	41
212 µm	26
150 µm	13
63 µm	4

**Non Engineering Description**

Yellowish brown slightly silty SAND with occasional fine shell fragments.

**Sample Proportions - %**

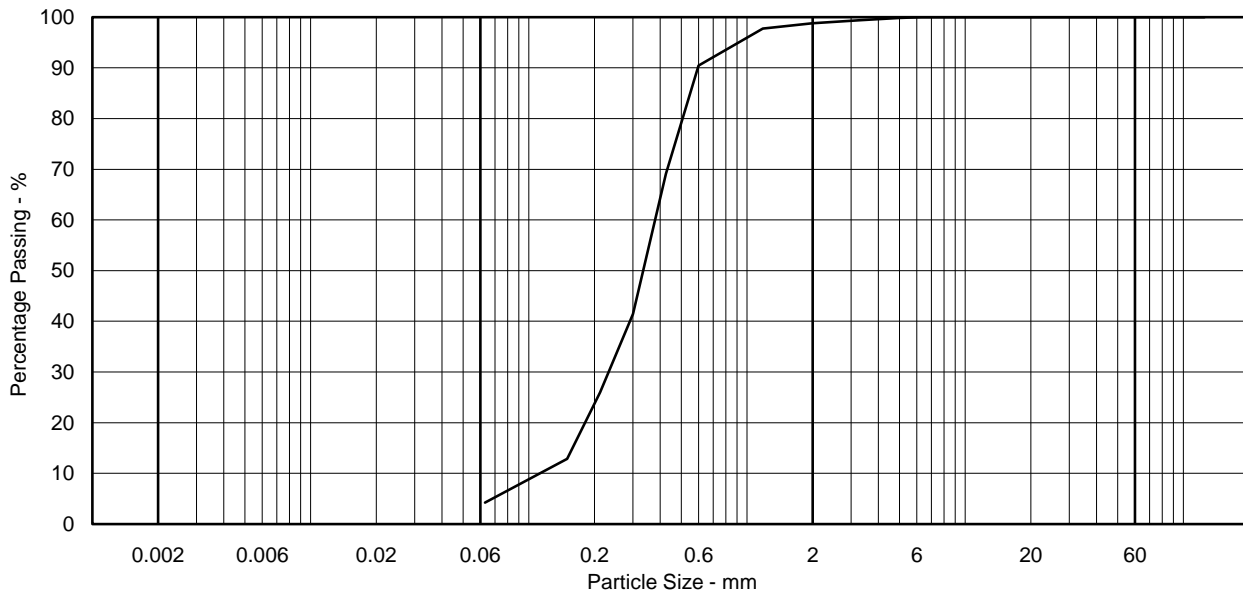
Cobbles	0.0
Gravel	1.2
Sand	94.5
Silt & Clay	4.2

**Particle Diameter - mm**

D100	6.3
D60	0.38
D10	0.11
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.5

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Site GREAT YARMOUTH 3RD RIVER CROSSING

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Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB03  
 Sample Ref 49  
 Depth (m) 13.50-14.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	95
425 µm	88
300 µm	70
212 µm	47
150 µm	25
63 µm	8
20 µm	7
6 µm	5
2 µm	3

**Non Engineering Description**

Light brown slightly clayey silty SAND with occasional fine shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.1
Sand	90.6
Silt	5.4
Clay	3.0

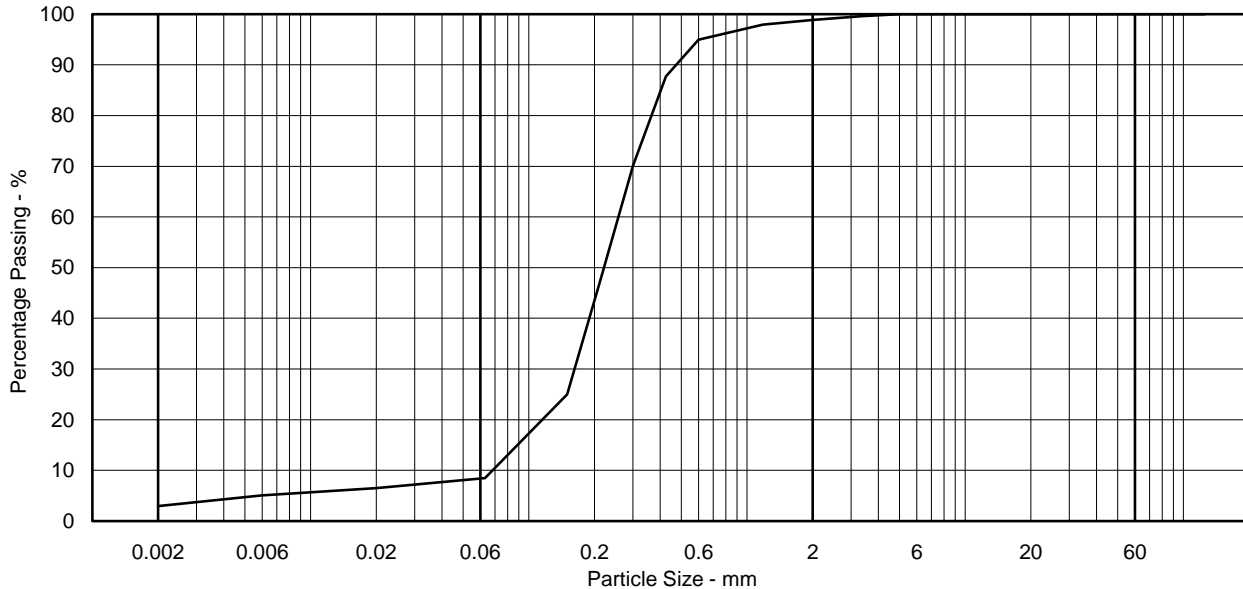
**Particle Diameter - mm**

D100	5.0
D60	0.26
D10	0.068
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.8

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB03

Sample Ref 52

Depth (m) 14.50-15.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	98
425 µm	91
300 µm	74
212 µm	44
150 µm	22
63 µm	5

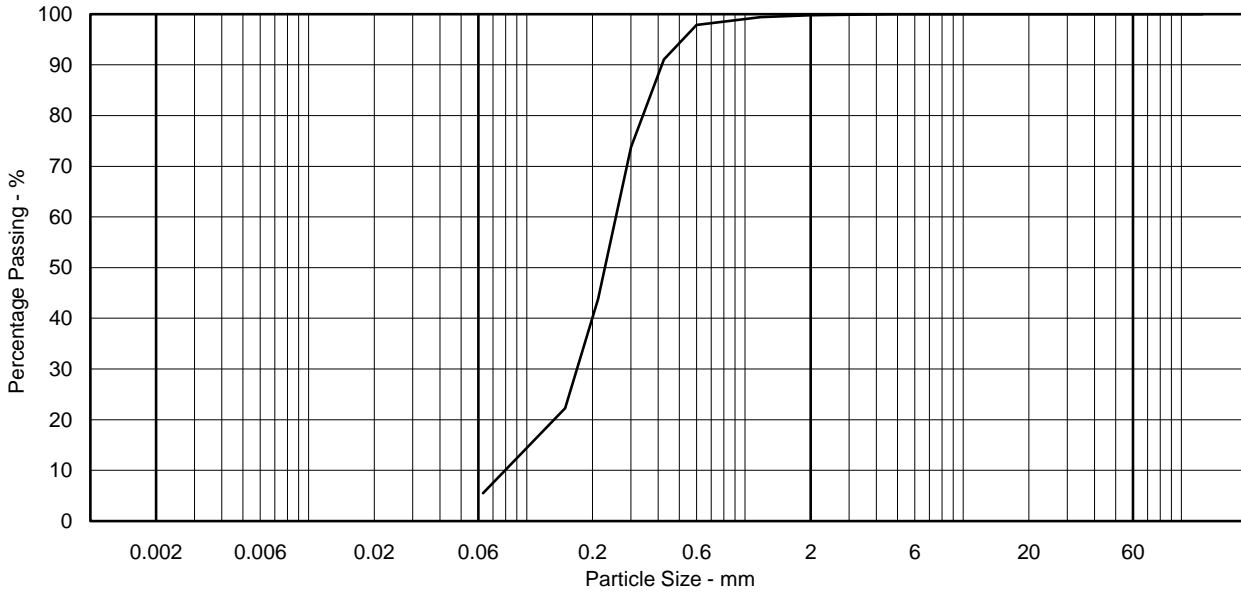
Non Engineering Description
Light brown silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	94.3
Silt & Clay	5.5

Particle Diameter - mm	
D100	5.0
D60	0.26
D10	0.079
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.3

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB03

Sample Ref 58

Depth (m) 16.50-17.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	98
10.0 mm	98
6.30 mm	97
5.00 mm	97
3.35 mm	97
2.00 mm	97
1.18 mm	97
600 µm	96
425 µm	91
300 µm	72
212 µm	52
150 µm	30
63 µm	5

**Non Engineering Description**

Light brown slightly gravelly slightly silty SAND. Gravel is fine to medium.

**Sample Proportions - %**

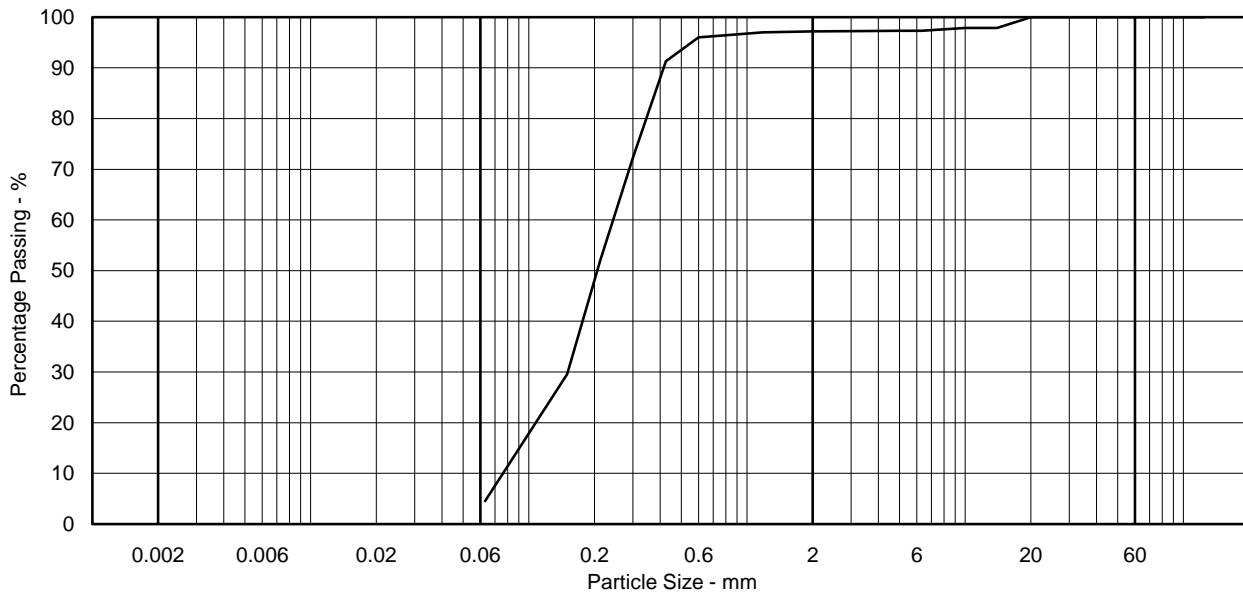
Cobbles	0.0
Gravel	2.8
Sand	92.7
Silt & Clay	4.5

**Particle Diameter - mm**

D100	20
D60	0.24
D10	0.076
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.2

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB03  
 Sample Ref 64  
 Depth (m) 18.50-19.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	99
5.00 mm	98
3.35 mm	97
2.00 mm	96
1.18 mm	94
600 µm	90
425 µm	86
300 µm	68
212 µm	52
150 µm	34
63 µm	19
20 µm	14
6 µm	10
2 µm	5

**Non Engineering Description**

Grey clayey silty SAND with occasional fine to medium shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	4.0
Sand	77.4
Silt	13.2
Clay	5.4

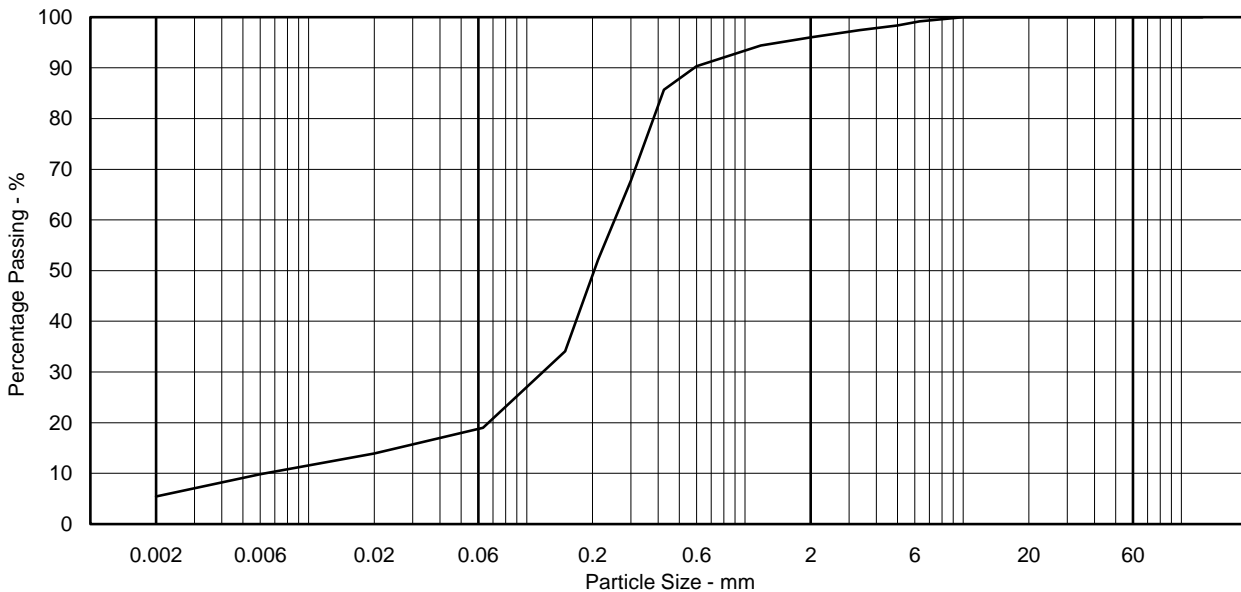
**Particle Diameter - mm**


D100	10
D60	0.25
D10	0.0063
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	39.7

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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Hole MB03

Sample Ref 70

Depth (m) 21.00-21.50

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	97
600 µm	95
425 µm	93
300 µm	87
212 µm	78
150 µm	67
63 µm	54
20 µm	44
6 µm	28
2 µm	14

**Non Engineering Description**

Light grey sandy SILT/CLAY with rare fine shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.4
Sand	45.0
Silt	39.3
Clay	14.4

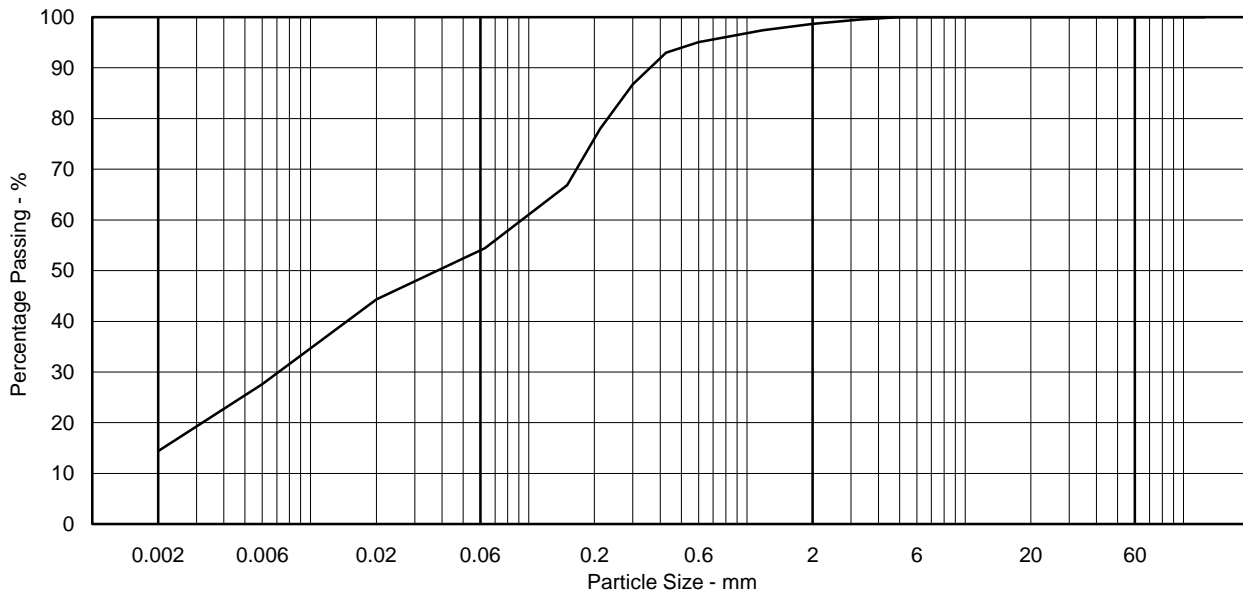
**Particle Diameter - mm**

D100	5.0
D60	0.093
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

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Hole MB03

Sample Ref 76

Depth (m) 23.50-24.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	97
300 µm	89
212 µm	51
150 µm	29
63 µm	19
20 µm	13
6 µm	9
2 µm	5

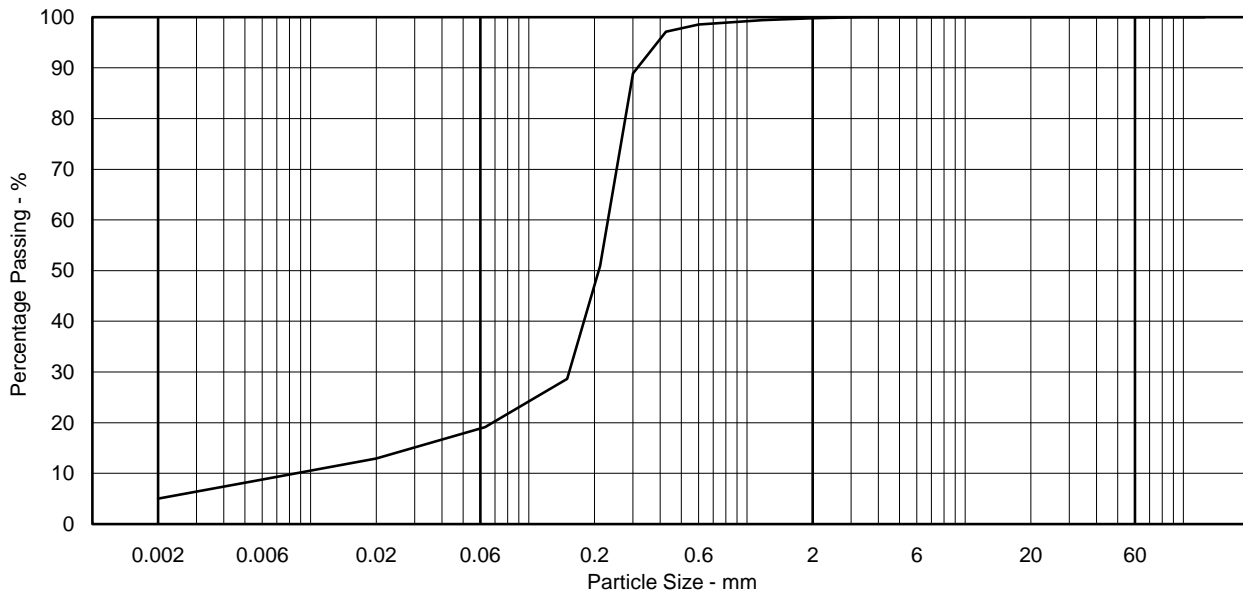
Non Engineering Description
Grey clayey silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	81.1
Silt	13.7
Clay	5.0

Particle Diameter - mm	
D100	3.4
D60	0.23
D10	0.0085
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	27.1

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB03

Sample Ref 77

Depth (m) 24.50-25.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	99
5.00 mm	99
3.35 mm	98
2.00 mm	98
1.18 mm	98
600 µm	97
425 µm	96
300 µm	87
212 µm	33
150 µm	16
63 µm	10
20 µm	8
6 µm	5
2 µm	3

**Non Engineering Description**

Light grey slightly clayey silty SAND with occasional fine shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.9
Sand	88.3
Silt	6.4
Clay	3.4

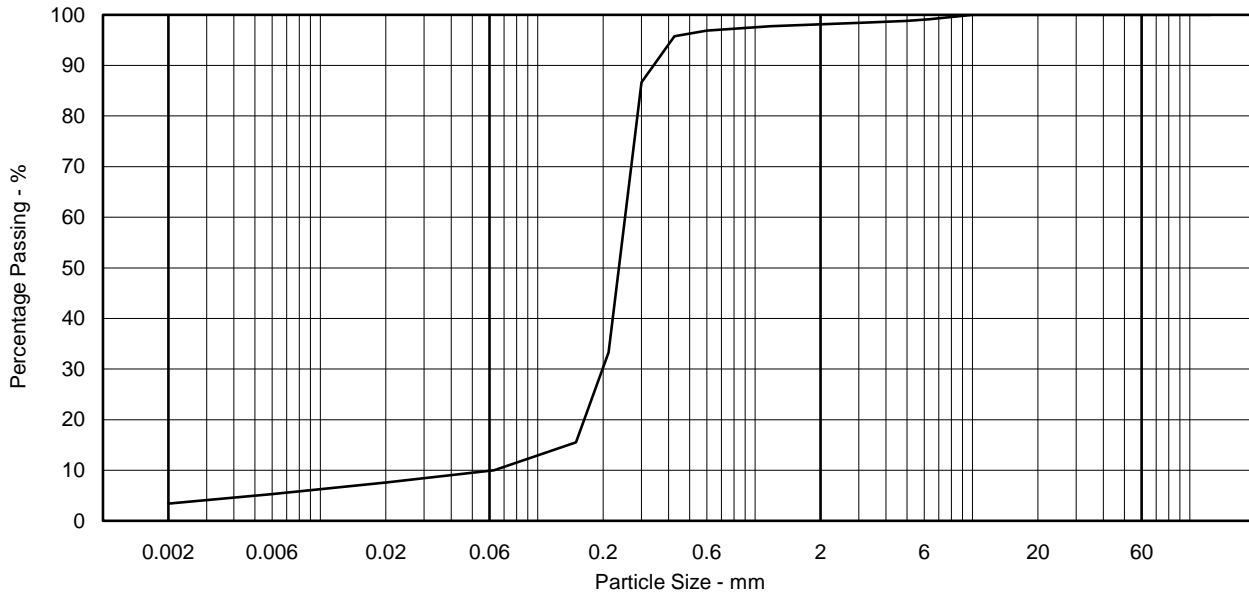
**Particle Diameter - mm**

D100	10
D60	0.25
D10	0.062
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	4.0

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
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County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2018062213-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 1  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 20-Jul-18

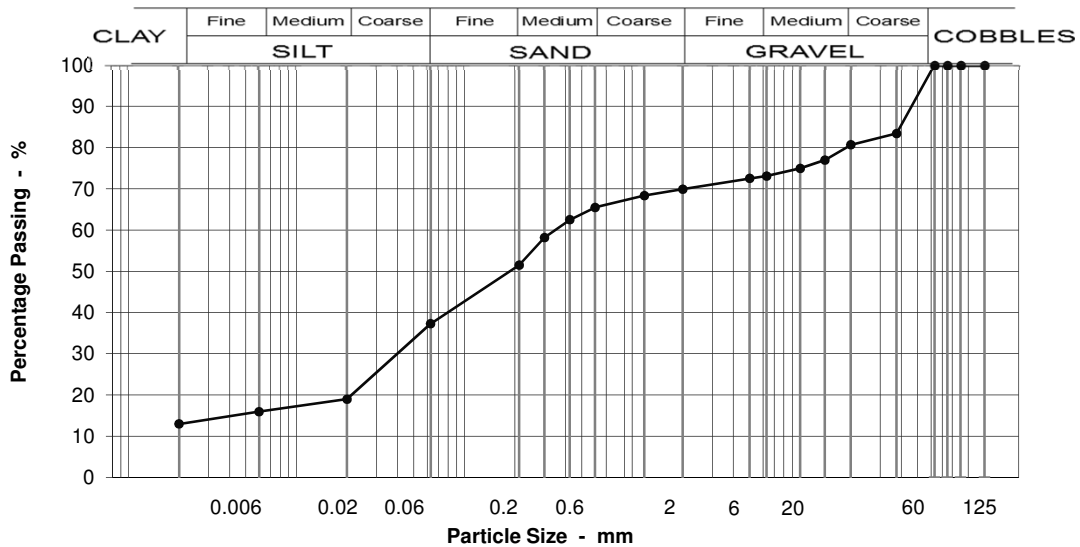
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** MB04 @ 0m **Specimen:** 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	19
63	100		Medium GRAVEL	8
37.5	83		Fine GRAVEL	3
20	81		Coarse SAND	4
14	77		Medium SAND	14
10	75		Fine SAND	14
6.3	73		Silt & Clay	37
5	72			
2	70			
1.18	68			
0.600	65			
0.425	62			
0.300	58			
0.212	52			
0.063	37			
0.020	19			
0.006	16			
0.002	13			
		<b>Moisture content %</b>		28

Grading Analysis	
D100	38
D60	0.35
D10	0.00
Uniformity Coefficient	>10*

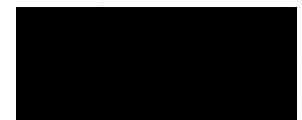
Description	
Soft grey very silty very gravelly clayey fine and medium SAND. Gravel is medium to coarse subrounded to subangular flint, concrete and sandstone. Some shell fragments.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)





Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB04

Engineer Norfolk Partnership Laboratory

Sample Ref 2

Depth (m) 0.50-1.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	94
20.0 mm	91
14.0 mm	86
10.0 mm	82
6.30 mm	77
5.00 mm	74
3.35 mm	71
2.00 mm	68
1.18 mm	64
600 µm	57
425 µm	48
300 µm	35
212 µm	26
150 µm	20
63 µm	16
20 µm	15
6 µm	12
2 µm	10

**Non Engineering Description**

Greyish brown mottled very dark grey silty clayey very gravelly SAND with occasional fine to medium shell fragments. Gravel is fine to coarse.

**Sample Proportions - %**

Cobbles	0.0
Gravel	32.4
Sand	51.5
Silt	6.4
Clay	9.8

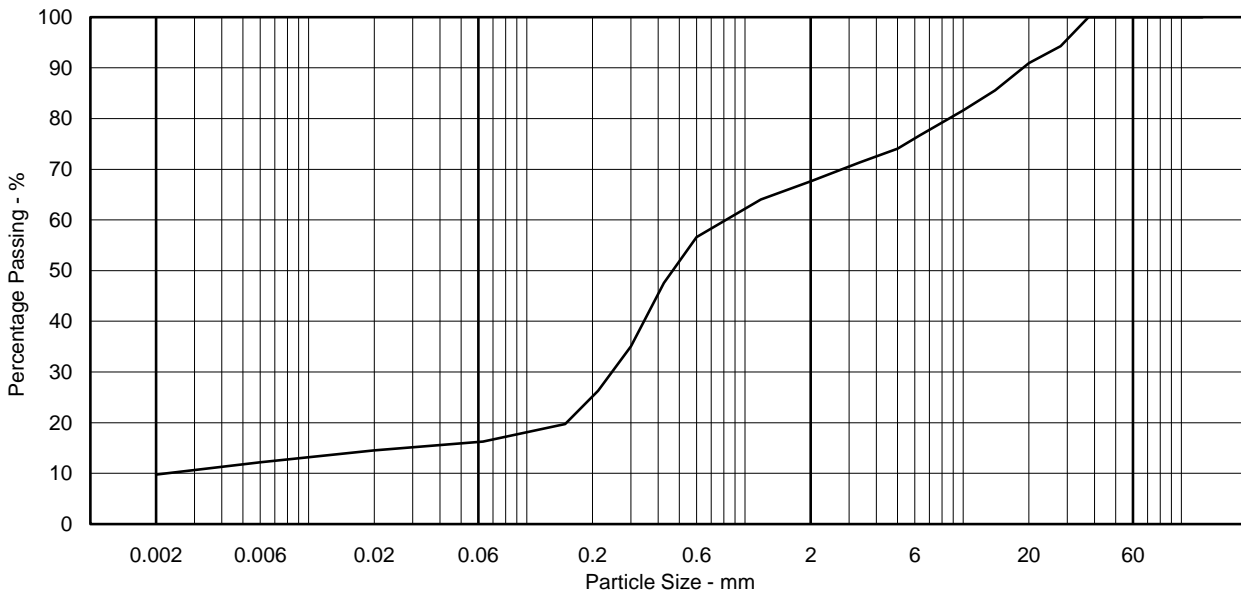
**Particle Diameter - mm**


D100	38
D60	0.82
D10	0.0022
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	372.7

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
VH	 29/08/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Sheet 1 of 1



Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB04  
 Sample Ref 4  
 Depth (m) 1.00  
 Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	95
20.0 mm	94
14.0 mm	89
10.0 mm	81
6.30 mm	71
5.00 mm	67
3.35 mm	61
2.00 mm	54
1.18 mm	50
600 µm	43
425 µm	33
300 µm	19
212 µm	11
150 µm	7
63 µm	4

**Non Engineering Description**  
 Brown slightly silty very gravelly SAND with occasional fine to coarse shell fragments. Gravel is fine to coarse.

**Sample Proportions - %**

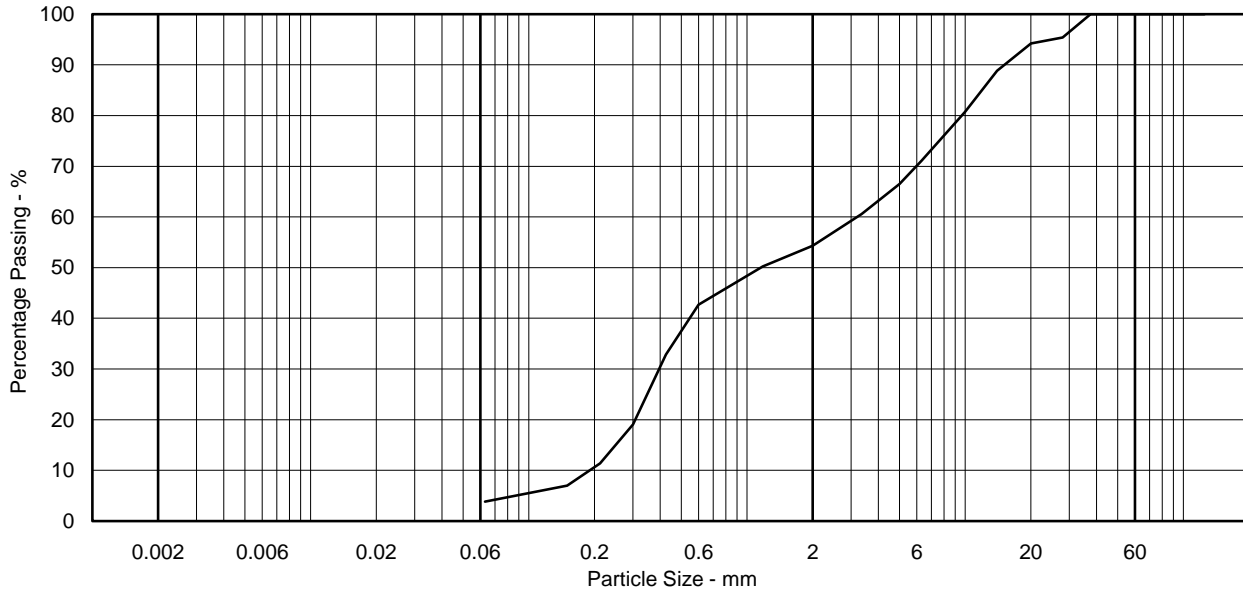
Cobbles	0.0
Gravel	45.7
Sand	50.5
Silt & Clay	3.8

**Particle Diameter - mm**

D100	38
D60	3.2
D10	0.19
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	16.8

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
JAH	29/08/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2018062214-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 1  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 16-Jul-18

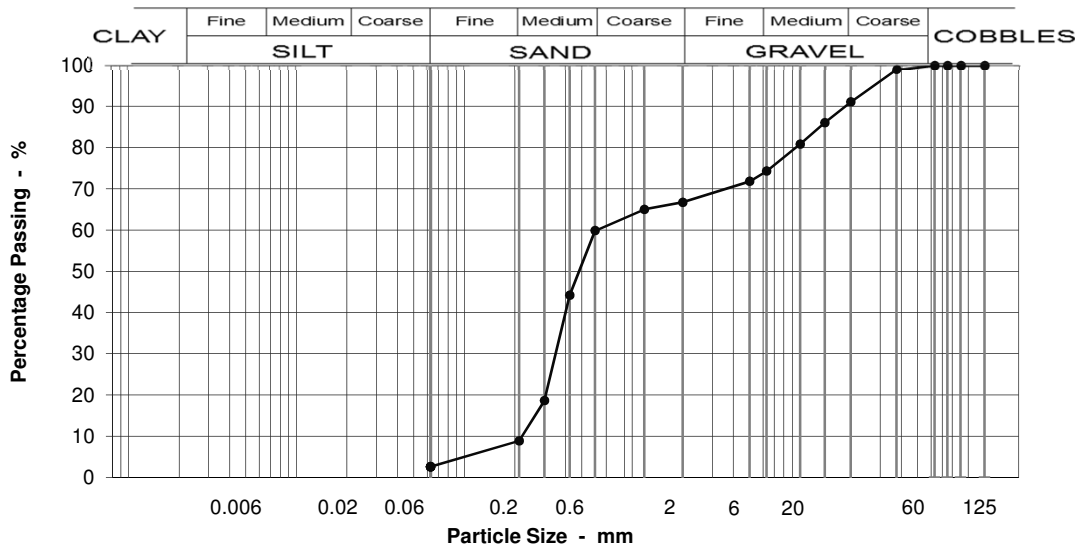
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** MB04a @ 0m **Specimen:** 2

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	99
20	91
14	86
10	81
6.3	74
5	72
2	67
1.18	65
0.600	60
0.425	44
0.300	19
0.212	9
0.063	3

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	9
Medium GRAVEL	17
Fine GRAVEL	8
Coarse SAND	7
Medium SAND	51
Fine SAND	6
Silt & Clay	3

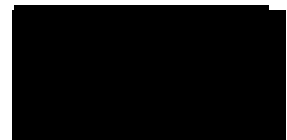
Grading Analysis	
D100	38
D60	0.62
D10	0.22
Uniformity Coefficient	3

Description	
Olive rapidly weathering to brown very gravelly medium SAND. Gravel is fine to coarse subrounded to angular flint.	

Test Code = 610



Simon Holden (Project Technician)





Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB04A  
 Sample Ref 7  
 Depth (m) 2.50-3.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	92
10.0 mm	88
6.30 mm	86
5.00 mm	85
3.35 mm	82
2.00 mm	80
1.18 mm	79
600 µm	76
425 µm	69
300 µm	42
212 µm	23
150 µm	11
63 µm	5

**Non Engineering Description**

Orange brown slightly silty gravelly SAND with occasional shell fragments. Gravel is fine to medium.

**Sample Proportions - %**

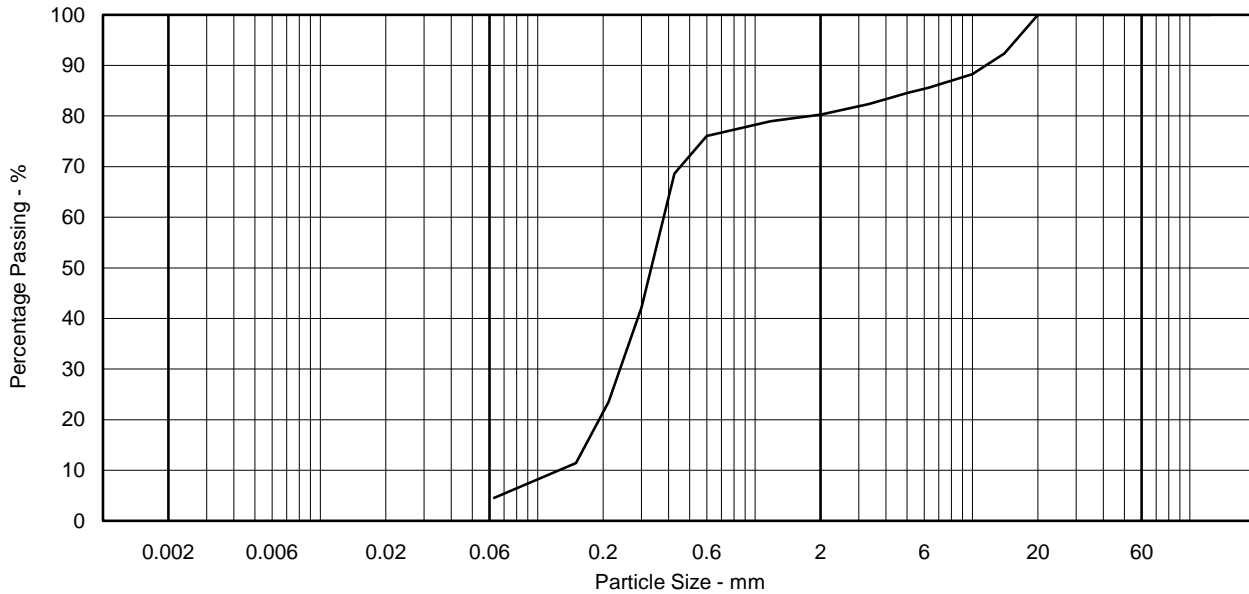
Cobbles	0.0
Gravel	19.7
Sand	75.8
Silt & Clay	4.5

**Particle Diameter - mm**

D100	20
D60	0.38
D10	0.13
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.9

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator  
 Checked & Approved  
 EH  
 24/08/2018

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 3

Depth (m) 1.00-1.50

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	98
2.00 mm	97
1.18 mm	96
600 µm	94
425 µm	83
300 µm	38
212 µm	13
150 µm	4
63 µm	2

**Non Engineering Description**

Orange brown slightly silty slightly gravelly SAND. Gravel is fine.

**Sample Proportions - %**

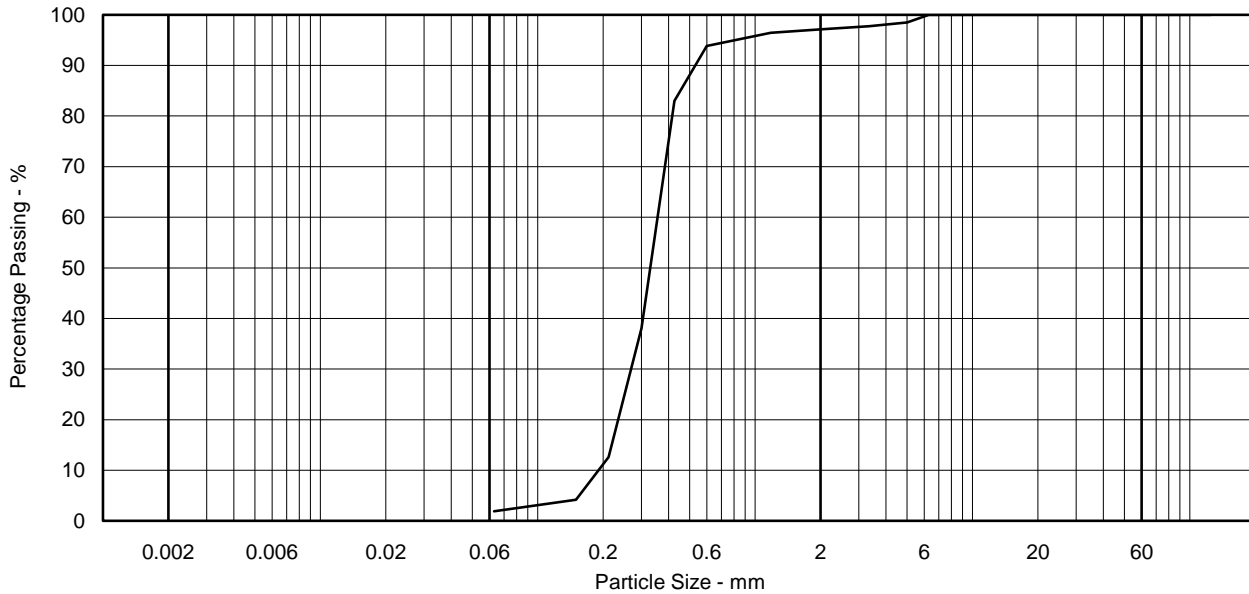
Cobbles	0.0
Gravel	2.9
Sand	95.2
Silt & Clay	1.9

**Particle Diameter - mm**

D100	6.3
D60	0.36
D10	0.19
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	1.9

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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PD	04/09/2018

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BS1377:Part 2:1990 Clause 9.2 - Wet Sieving







SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 7

Depth (m) 2.50-3.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	92
10.0 mm	88
6.30 mm	86
5.00 mm	85
3.35 mm	82
2.00 mm	80
1.18 mm	79
600 µm	76
425 µm	69
300 µm	42
212 µm	23
150 µm	11
63 µm	5

**Non Engineering Description**

Orange brown slightly silty gravelly SAND with occasional shell fragments. Gravel is fine to medium.

**Sample Proportions - %**

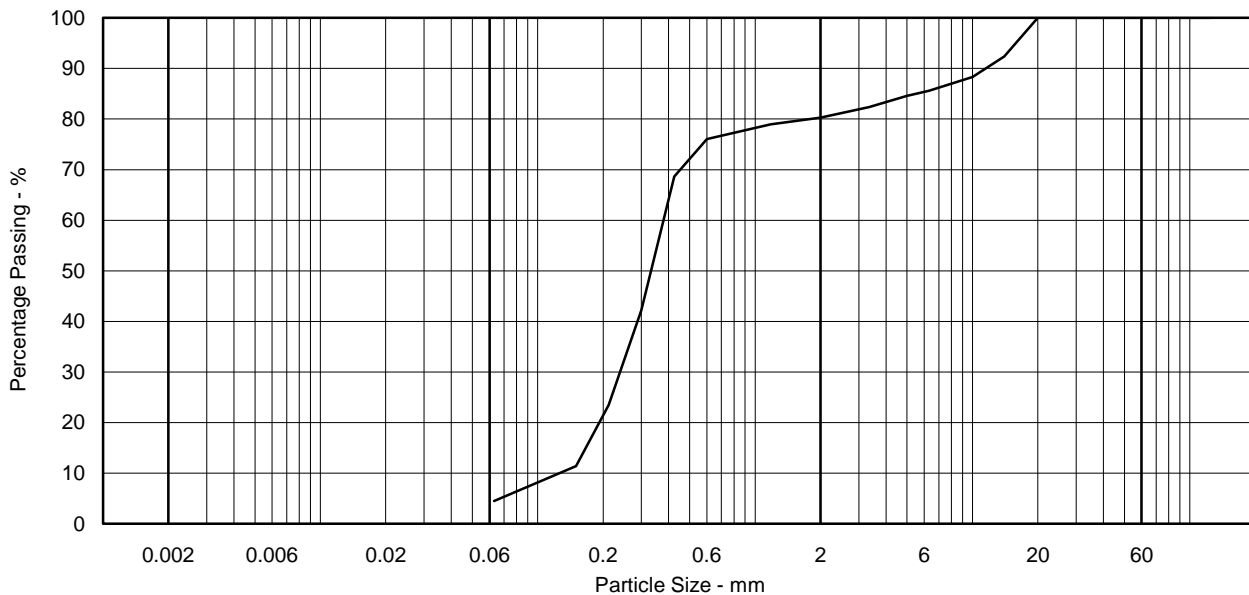
Cobbles	0.0
Gravel	19.7
Sand	75.8
Silt & Clay	4.5

**Particle Diameter - mm**

D100	20
D60	0.38
D10	0.13
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.9

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
EH	11/09/2018

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BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB04A

Sample Ref 11

Depth (m) 3.50-4.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	97
5.00 mm	96
3.35 mm	95
2.00 mm	93
1.18 mm	92
600 µm	90
425 µm	88
300 µm	77
212 µm	55
150 µm	20
63 µm	3

**Non Engineering Description**

Light orange brown slightly silty gravelly SAND. Gravel is fine to medium.

**Sample Proportions - %**

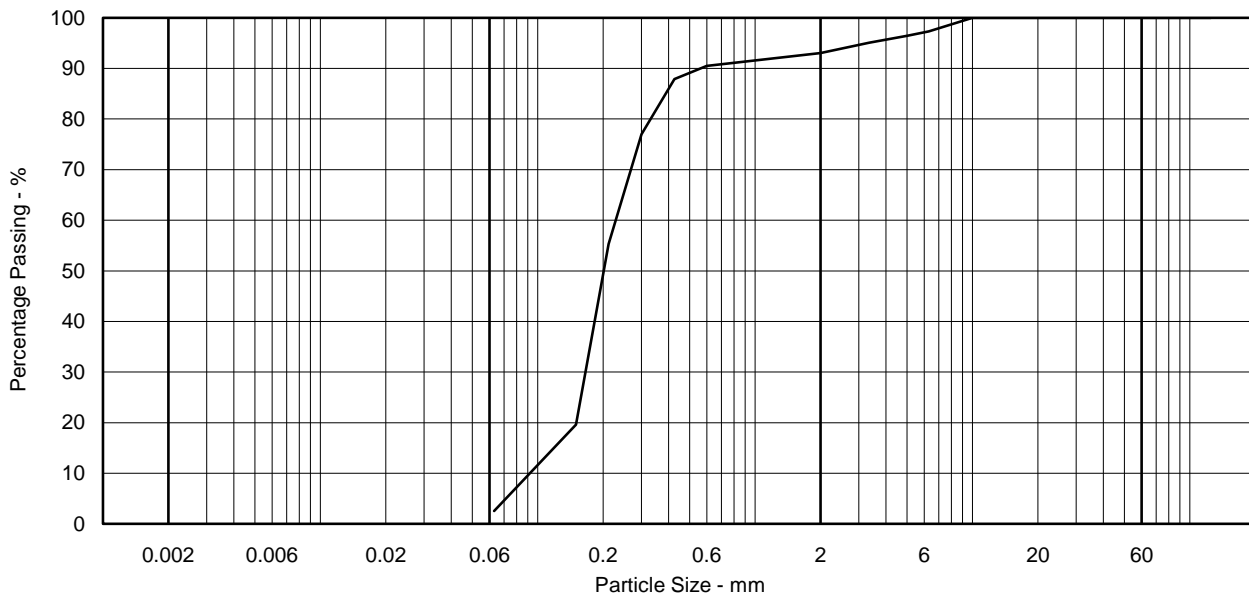
Cobbles	0.0
Gravel	6.9
Sand	90.5
Silt & Clay	2.5

**Particle Diameter - mm**

D100	10
D60	0.23
D10	0.092
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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PD	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 15

Depth (m) 4.50-5.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	98
300 µm	91
212 µm	74
150 µm	30
63 µm	5

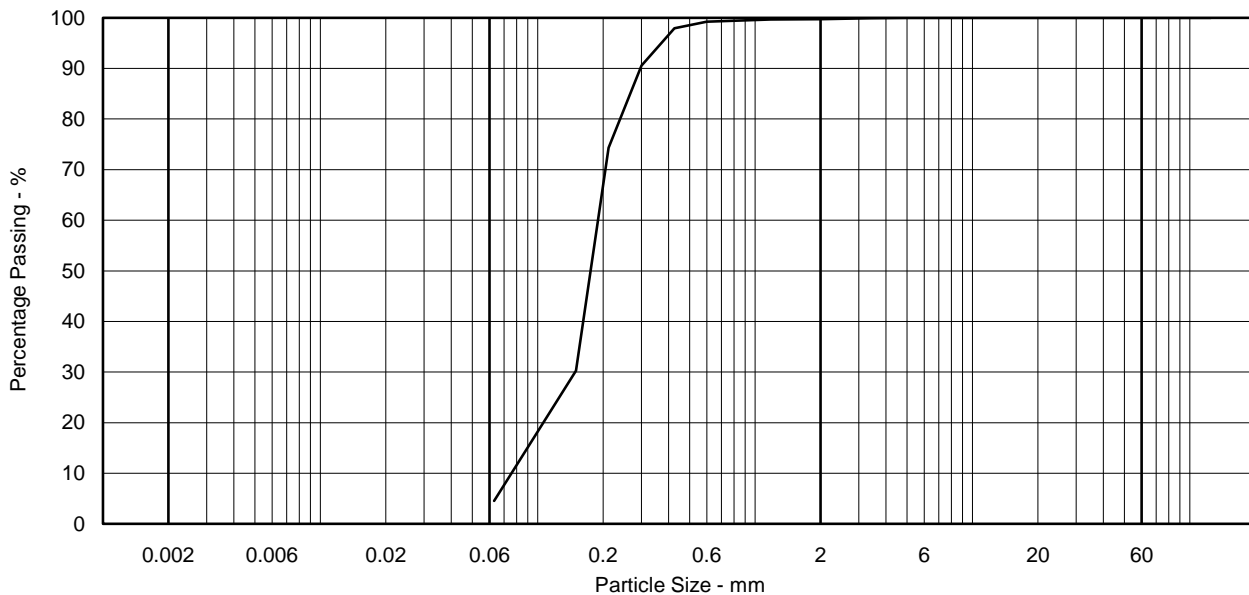
Non Engineering Description
Yellowish brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	95.2
Silt & Clay	4.5

Particle Diameter - mm	
D100	5.0
D60	0.19
D10	0.076
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB04A

Sample Ref 25

Depth (m) 7.50-8.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	99
300 µm	97
212 µm	88
150 µm	40
63 µm	4

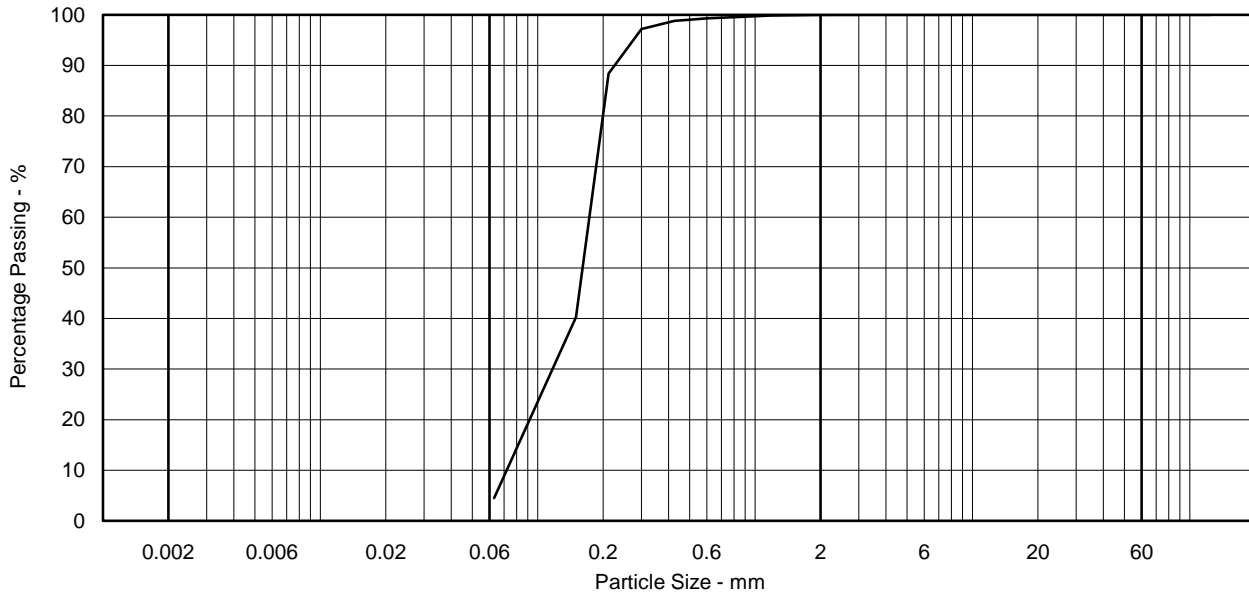
Non Engineering Description
Orange brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.0
Sand	95.5
Silt & Clay	4.5

Particle Diameter - mm	
D100	3.4
D60	0.17
D10	0.072
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.4

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB04A  
 Sample Ref 35  
 Depth (m) 10.50-11.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	95
425 µm	84
300 µm	70
212 µm	53
150 µm	20
63 µm	4

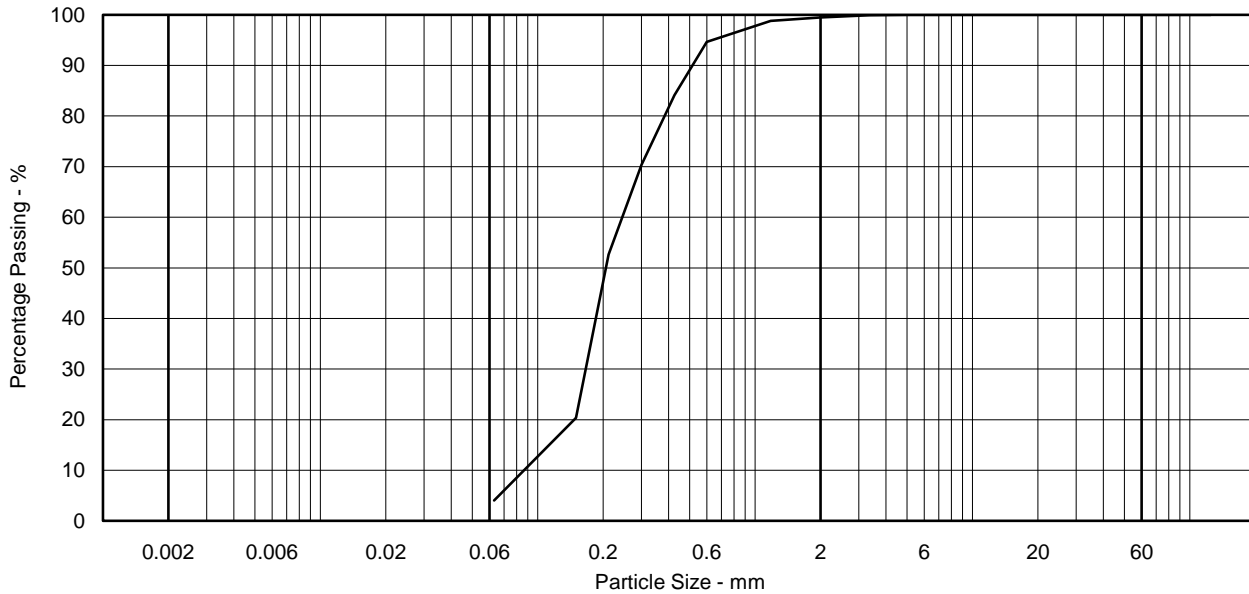
Non Engineering Description
Orangey brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.5
Sand	95.5
Silt & Clay	4.0

Particle Diameter - mm	
D100	5.0
D60	0.24
D10	0.087
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.8

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	U4/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 41

Depth (m) 12.50-13.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	98
1.18 mm	96
600 µm	93
425 µm	80
300 µm	51
212 µm	34
150 µm	23
63 µm	13
20 µm	11
6 µm	9
2 µm	6

**Non Engineering Description**

Grey mottled brown slightly gravelly clayey silty SAND.  
Gravel is fine.

**Sample Proportions - %**

Cobbles	0.0
Gravel	2.1
Sand	85.2
Silt	7.0
Clay	5.7

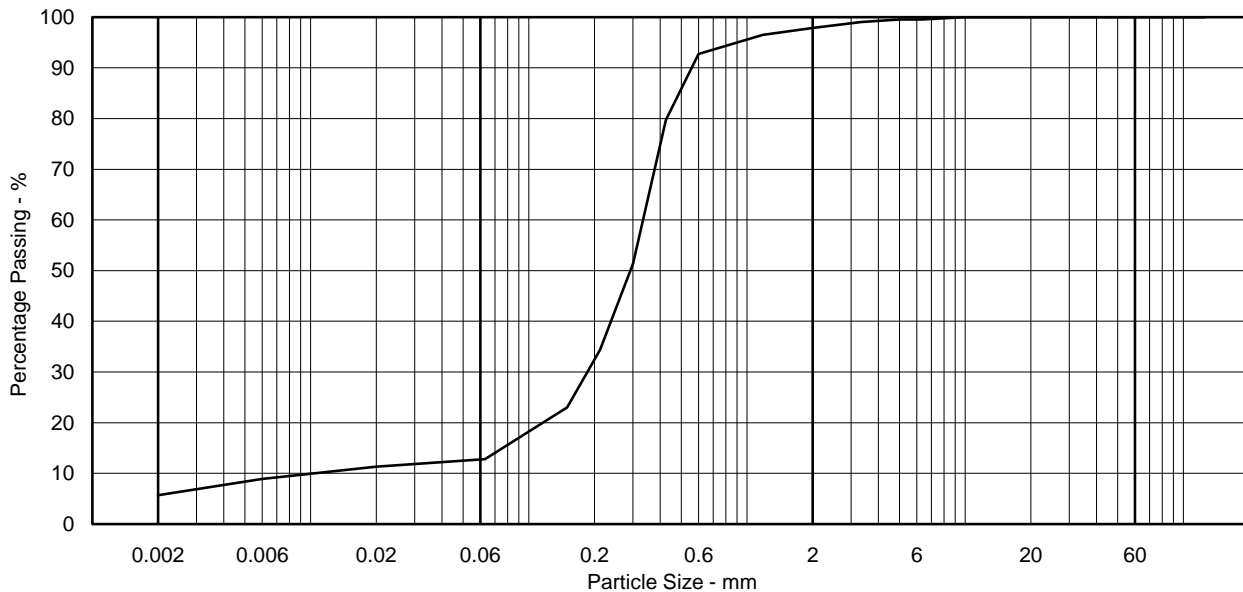
**Particle Diameter - mm**

D100	10
D60	0.33
D10	0.010
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	33.0

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 47

Depth (m) 14.50-15.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	93
300 µm	70
212 µm	45
150 µm	22
63 µm	4

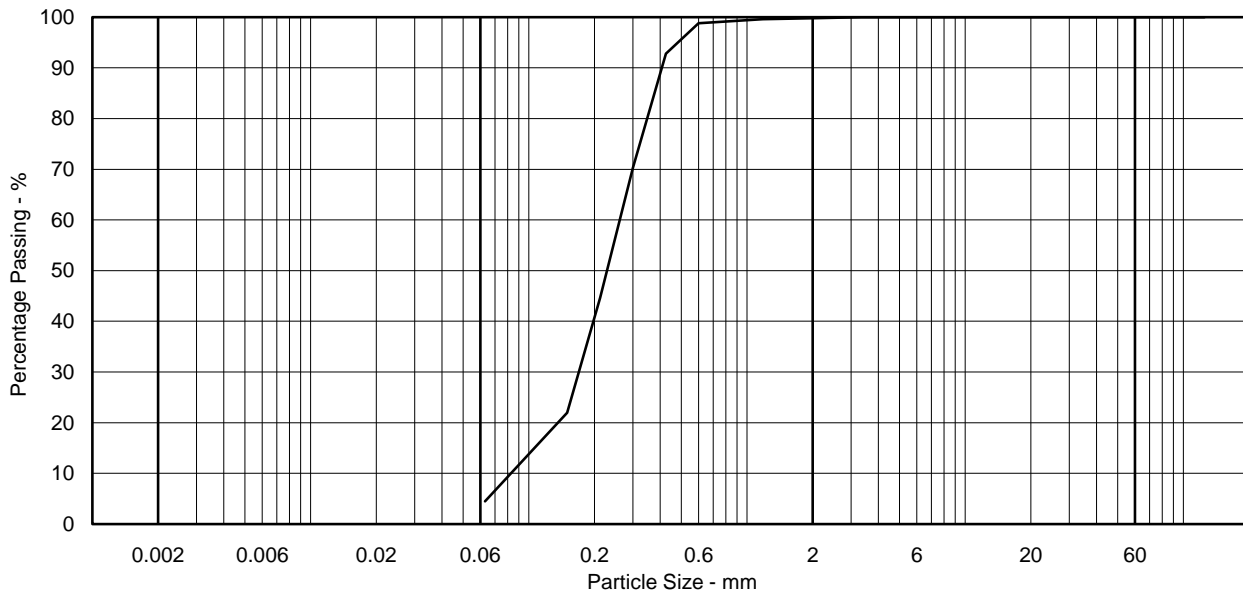
Non Engineering Description
Light brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	95.3
Silt & Clay	4.5

Particle Diameter - mm	
D100	3.4
D60	0.26
D10	0.083
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.1

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving







SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 52

Depth (m) 16.50-17.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	98
300 µm	93
212 µm	56
150 µm	30
63 µm	15
20 µm	13
6 µm	9
2 µm	6

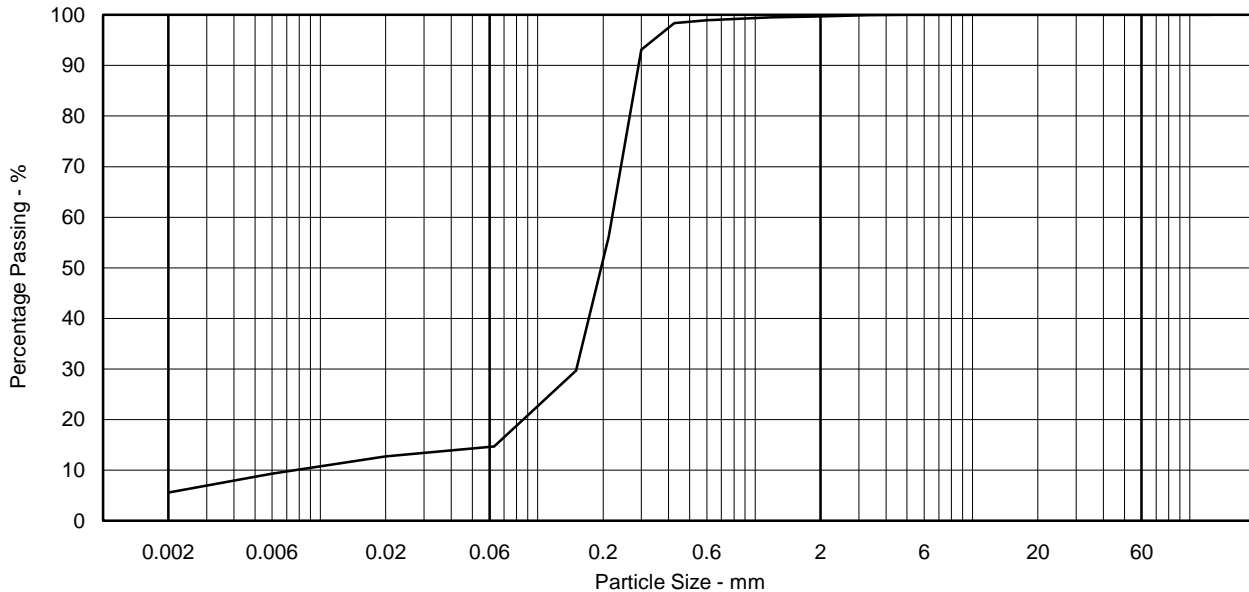
Non Engineering Description	
Grey clayey silty SAND.	

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	85.1
Silt	9.0
Clay	5.6

Particle Diameter - mm	
D100	5.0
D60	0.22
D10	0.0077
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	28.6

Notes	
Sedimentation sample not pre-treated	

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 54

Depth (m) 17.50-18.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	99
5.00 mm	99
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	97
425 µm	86
300 µm	51
212 µm	34
150 µm	17
63 µm	5

**Non Engineering Description**

Light grey mottled light brown slightly gravelly silty SAND.  
Gravel is fine.

**Sample Proportions - %**

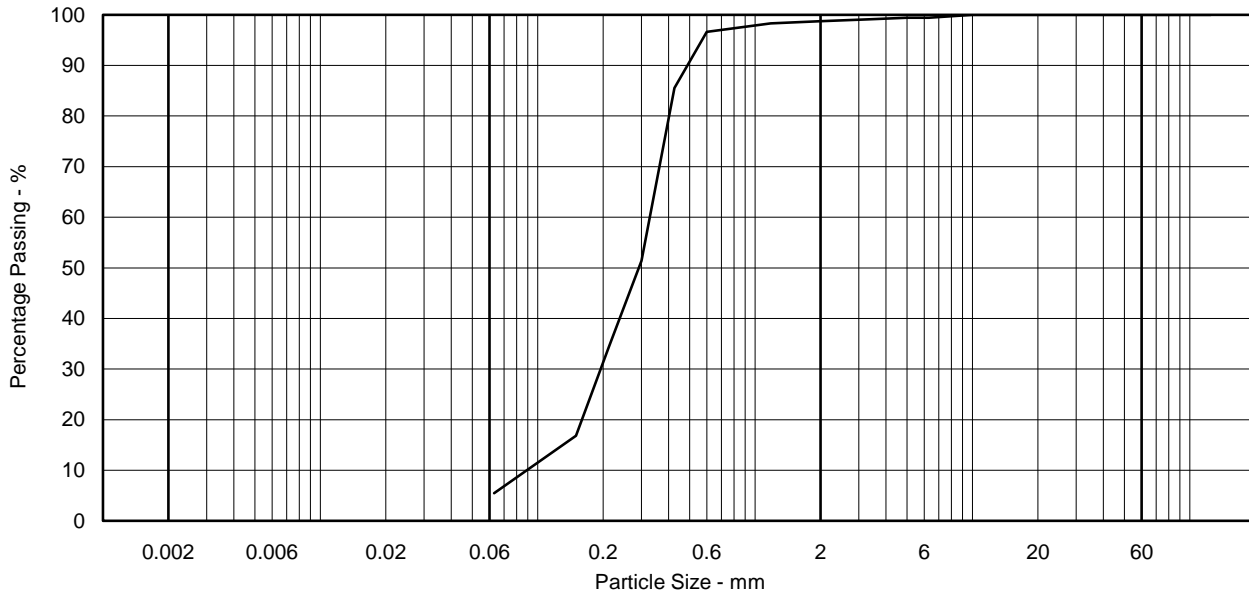
Cobbles	0.0
Gravel	1.2
Sand	93.3
Silt & Clay	5.5

**Particle Diameter - mm**

D100	10
D60	0.33
D10	0.089
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.7

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
PD	U4/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB04A  
 Sample Ref 57  
 Depth (m) 18.50-19.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	98
2.00 mm	97
1.18 mm	96
600 µm	93
425 µm	90
300 µm	77
212 µm	60
150 µm	46
63 µm	32
20 µm	27
6 µm	20
2 µm	13

**Non Engineering Description**  
 Brown slightly gravelly very sandy CLAY. Gravel is fine to medium.

**Sample Proportions - %**

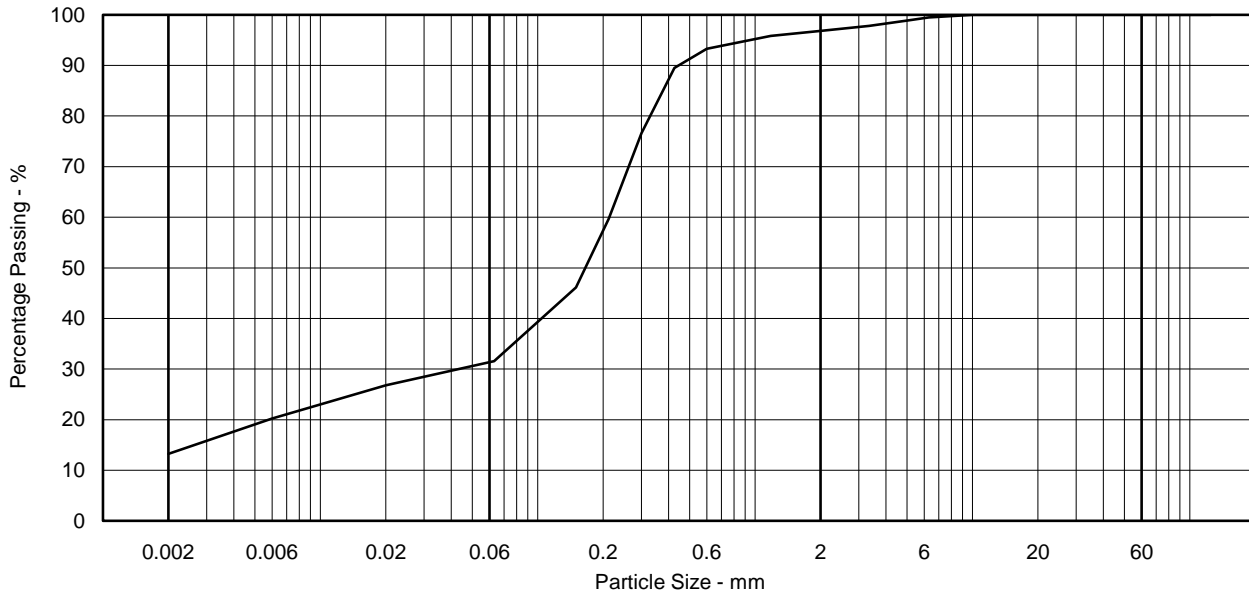
Cobbles	0.0
Gravel	3.2
Sand	65.6
Silt	18.0
Clay	13.2

**Particle Diameter - mm**

D100	10
D60	0.21
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**  
 Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
PD	 04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB04A  
 Sample Ref 65  
 Depth (m) 21.50-22.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	99
300 µm	95
212 µm	88
150 µm	85
63 µm	81
20 µm	63
6 µm	44
2 µm	20

**Non Engineering Description**  
 Grey mottled light brown slightly sandy CLAY.

**Sample Proportions - %**

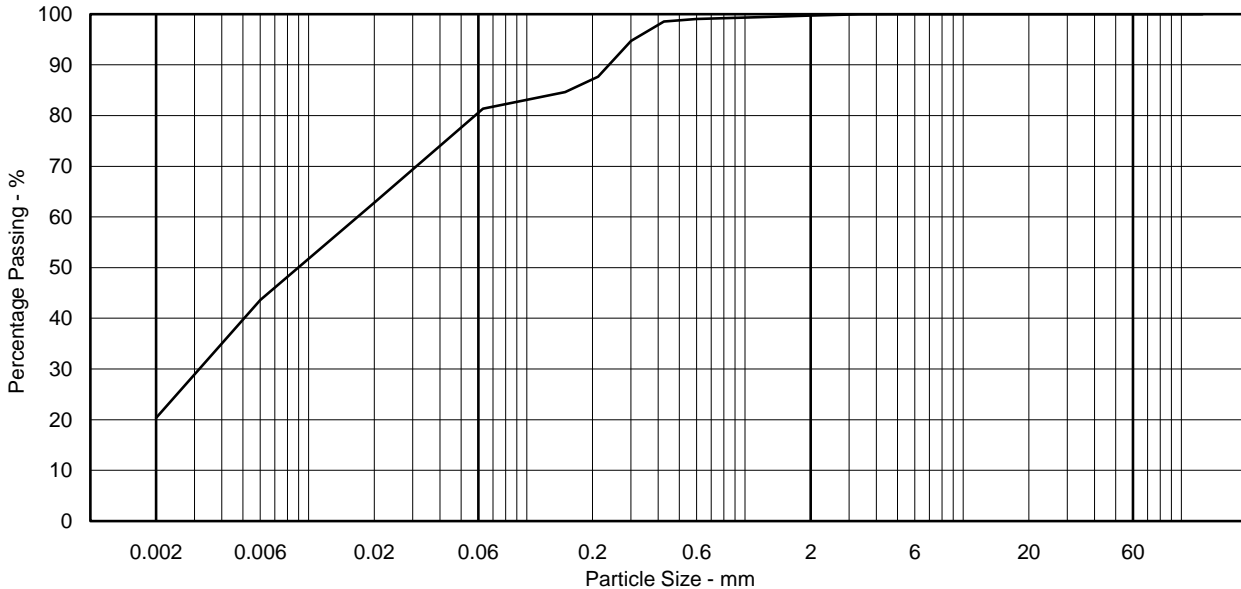
Cobbles	0.0
Gravel	0.3
Sand	19.7
Silt	59.7
Clay	20.4

**Particle Diameter - mm**

D100	5.0
D60	0.017
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**  
 Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
LA	018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 73

Depth (m) 24.50-25.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	98
425 µm	97
300 µm	92
212 µm	48
150 µm	20
63 µm	14
20 µm	12
6 µm	9
2 µm	6

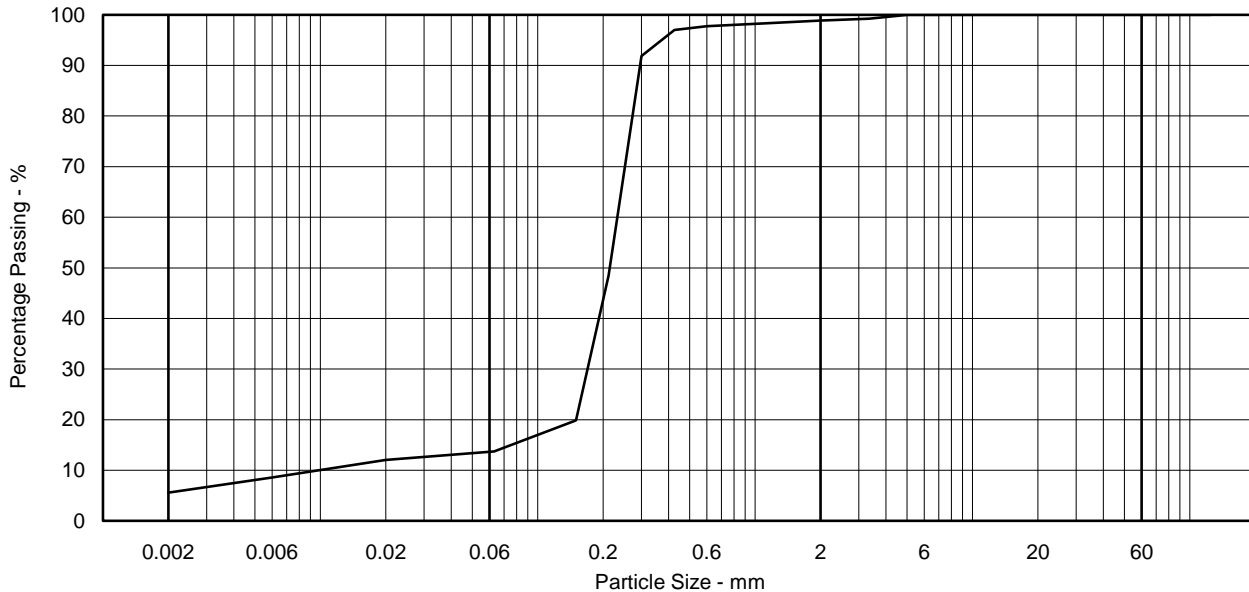
Non Engineering Description
Grey clayey silty SAND with rare fine gravel.

Sample Proportions - %	
Cobbles	0.0
Gravel	1.1
Sand	85.3
Silt	8.0
Clay	5.6

Particle Diameter - mm	
D100	5.0
D60	0.23
D10	0.0099
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	23.2

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
AW	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 78

Depth (m) 26.50-27.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	99
425 µm	97
300 µm	90
212 µm	48
150 µm	23
63 µm	11
20 µm	8
6 µm	6
2 µm	4

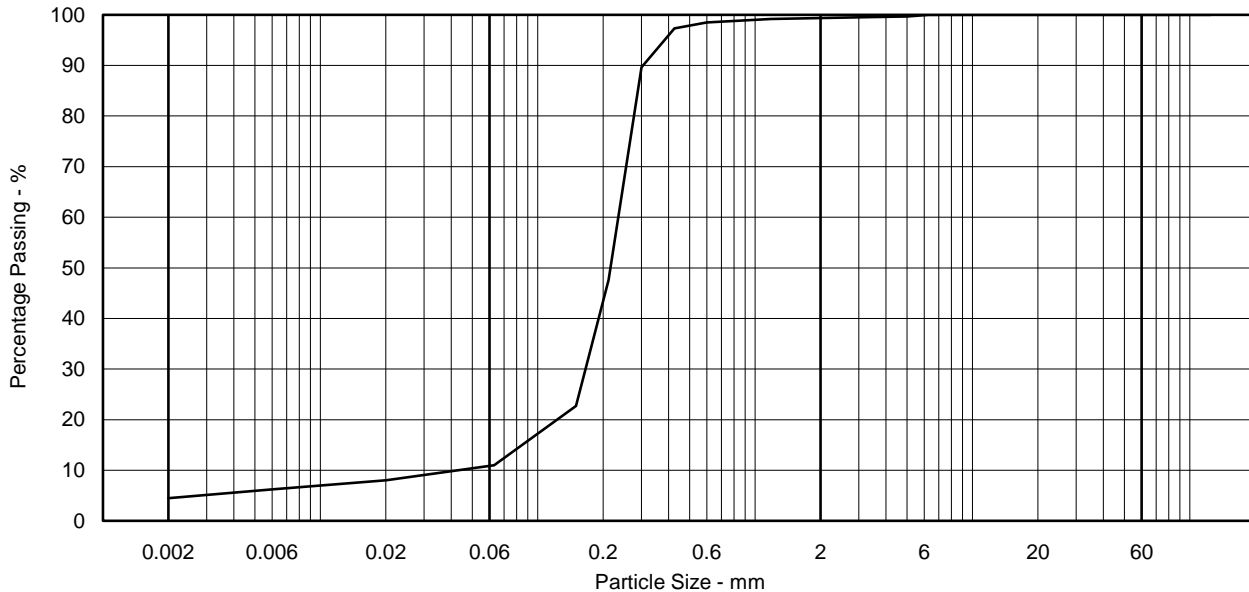
Non Engineering Description
Brown slightly clayey silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.6
Sand	88.6
Silt	6.3
Clay	4.5

Particle Diameter - mm	
D100	6.3
D60	0.23
D10	0.043
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	5.3

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 85

Depth (m) 29.50-30.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	97
425 µm	94
300 µm	81
212 µm	33
150 µm	16
63 µm	8

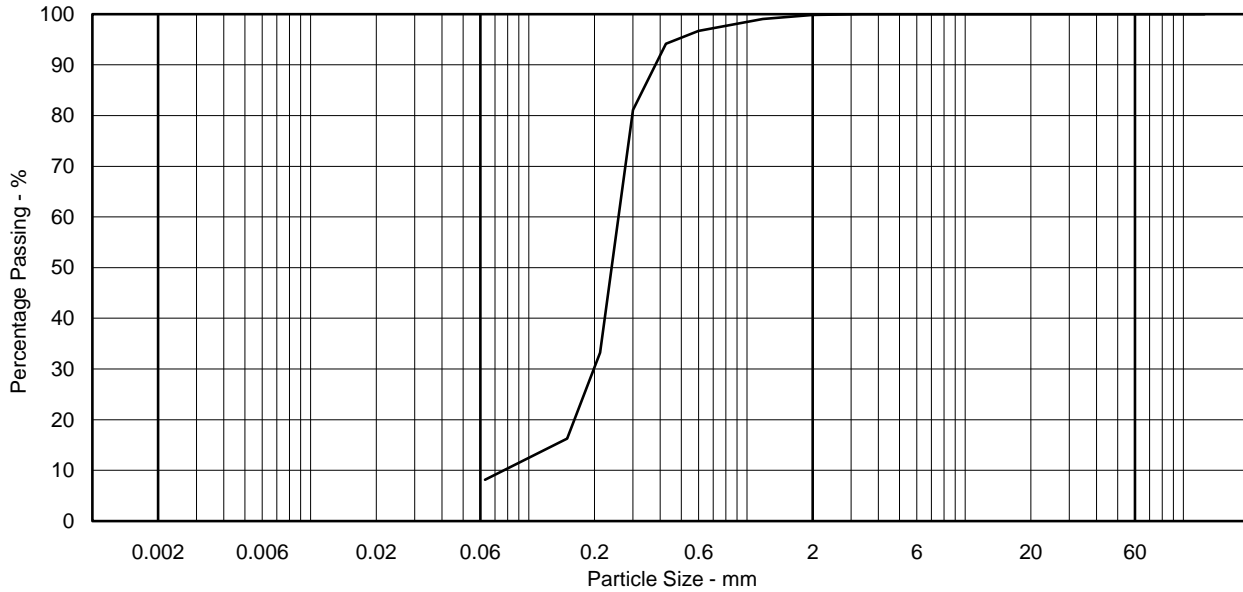
Non Engineering Description
Dark grey mottled brown slightly clayey silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	91.7
Silt & Clay	8.2

Particle Diameter - mm	
D100	3.4
D60	0.26
D10	0.077
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.4

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving







SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 90

Depth (m) 31.50-32.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	94
425 µm	86
300 µm	64
212 µm	31
150 µm	12
63 µm	4

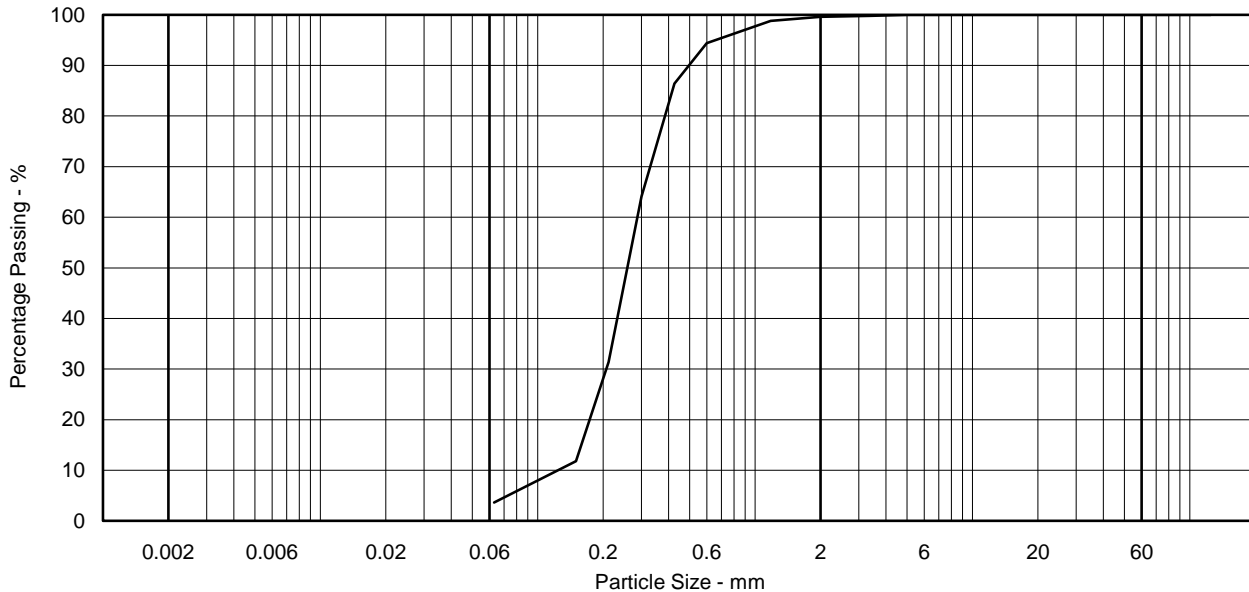
Non Engineering Description
Light brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.4
Sand	96.0
Silt & Clay	3.6

Particle Diameter - mm	
D100	5.0
D60	0.29
D10	0.12
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.4

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB04A  
 Sample Ref 95  
 Depth (m) 33.50-34.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	92
425 µm	81
300 µm	57
212 µm	33
150 µm	20
63 µm	10

**Non Engineering Description**  
 Grey mottled brown slightly clayey silty SAND with rare fine gravel.

**Sample Proportions - %**

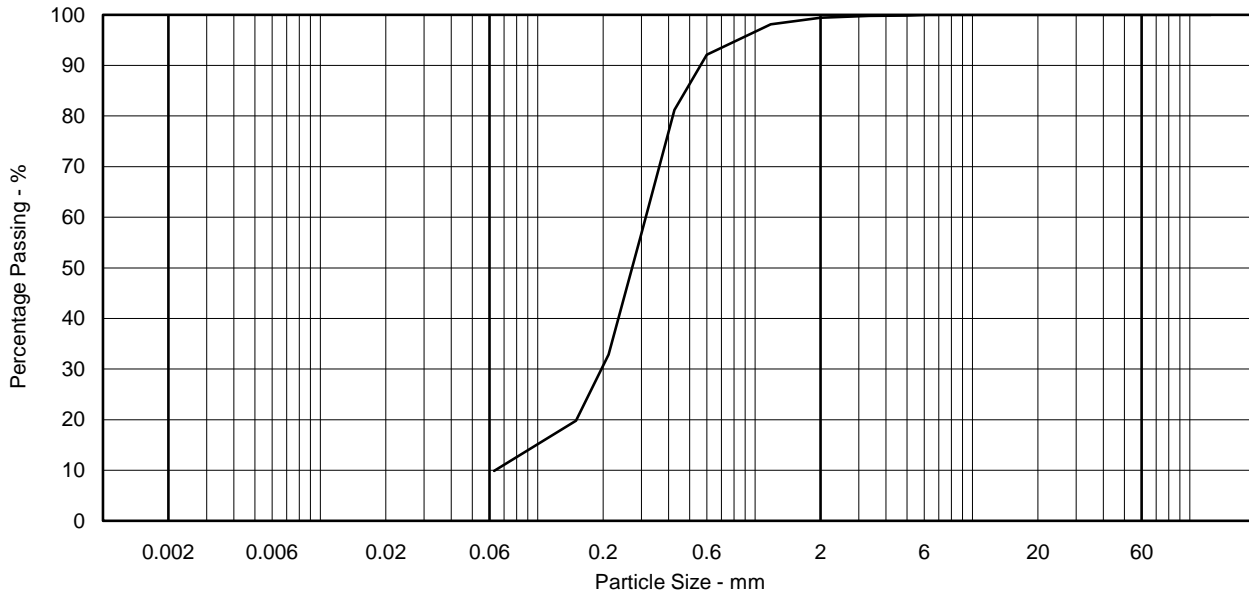
Cobbles	0.0
Gravel	0.6
Sand	89.5
Silt & Clay	9.9

**Particle Diameter - mm**

D100	6.3
D60	0.31
D10	0.064
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	4.8

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
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**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB04A  
 Sample Ref 100  
 Depth (m) 35.50-36.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	96
425 µm	90
300 µm	74
212 µm	41
150 µm	21
63 µm	12
20 µm	9
6 µm	6
2 µm	4

**Non Engineering Description**  
 Dark brown mottled light brown slightly clayey silty SAND.

**Sample Proportions - %**

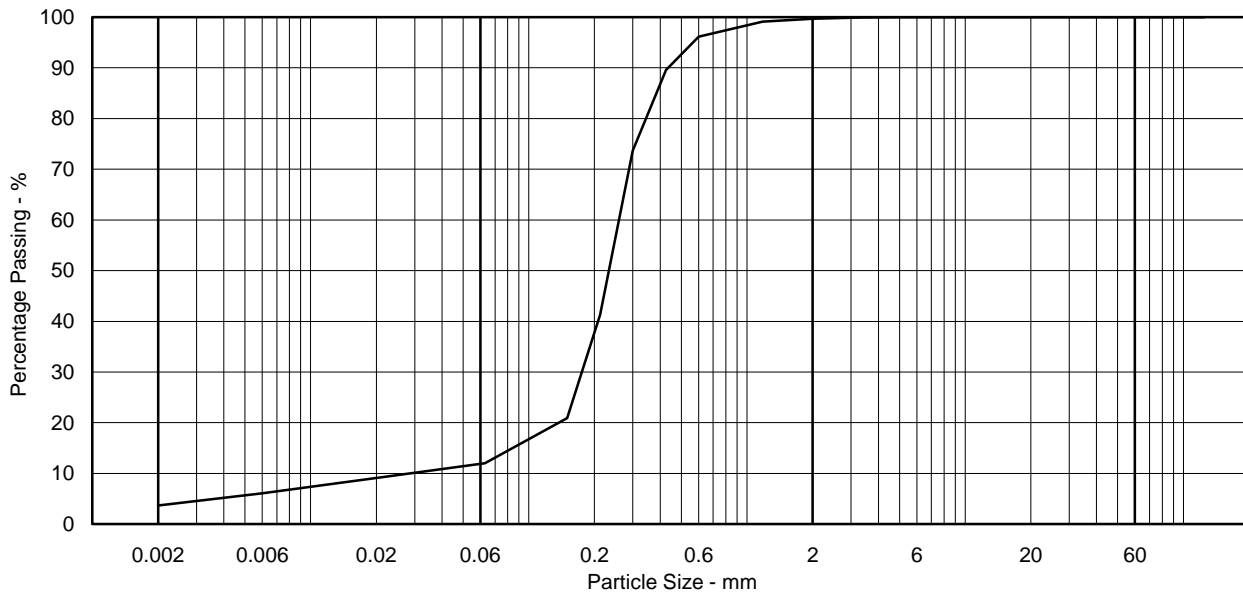
Cobbles	0.0
Gravel	0.3
Sand	87.9
Silt	8.1
Clay	3.7

**Particle Diameter - mm**

D100	5.0
D60	0.26
D10	0.029
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	9.0

**Notes**  
 Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	04/09/2018

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 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A  
 Sample Ref 105  
 Depth (m) 37.50-38.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	97
425 µm	92
300 µm	80
212 µm	55
150 µm	35
63 µm	21
20 µm	16
6 µm	11
2 µm	6

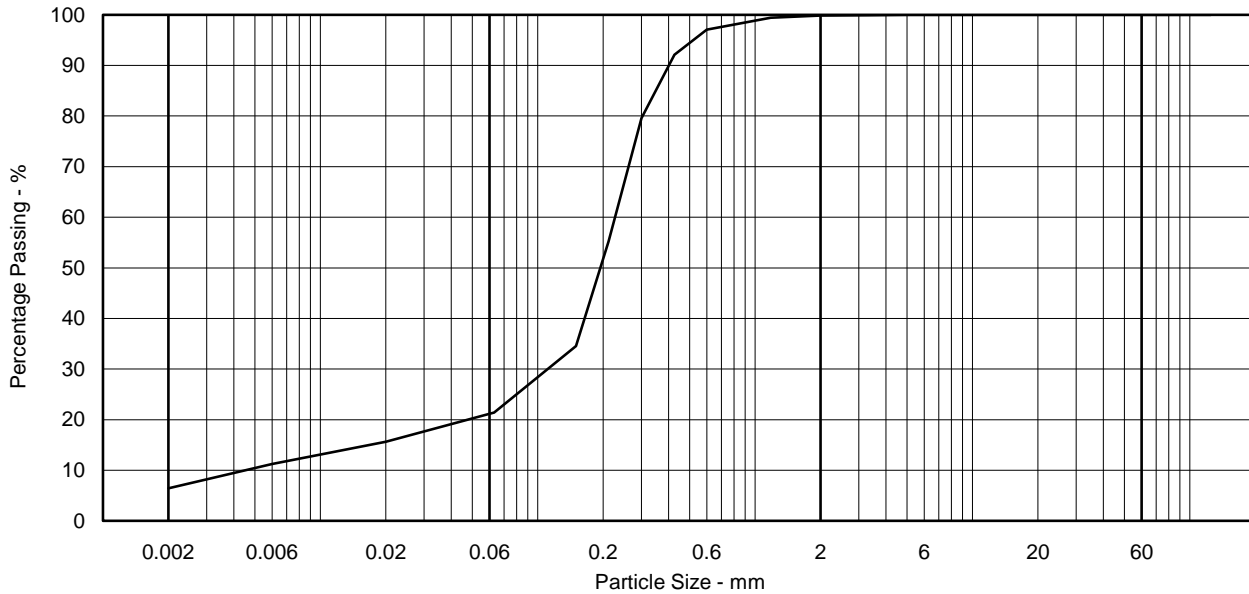
Non Engineering Description
Very dark brown clayey silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	78.8
Silt	14.6
Clay	6.4

Particle Diameter - mm	
D100	5.0
D60	0.23
D10	0.0045
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	51.1

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB04A

Sample Ref 107

Depth (m) 38.50-39.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	98
300 µm	97
212 µm	95
150 µm	94
63 µm	93
20 µm	82
6 µm	56
2 µm	29

**Non Engineering Description**

Very dark grey mottled brown slightly sandy CLAY with rare fine gravel.

**Sample Proportions - %**

Cobbles	0.0
Gravel	0.4
Sand	7.6
Silt	63.4
Clay	28.5

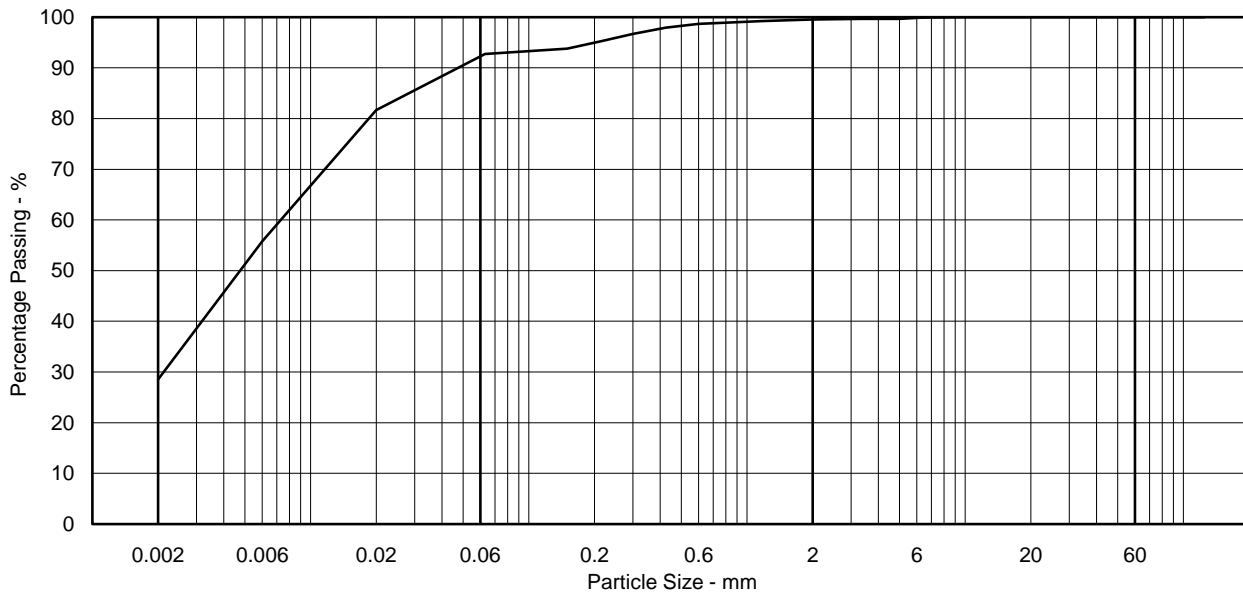
**Particle Diameter - mm**

D100	10
D60	0.0073
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
LCG	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2018071030-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 2  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 3-Aug-18

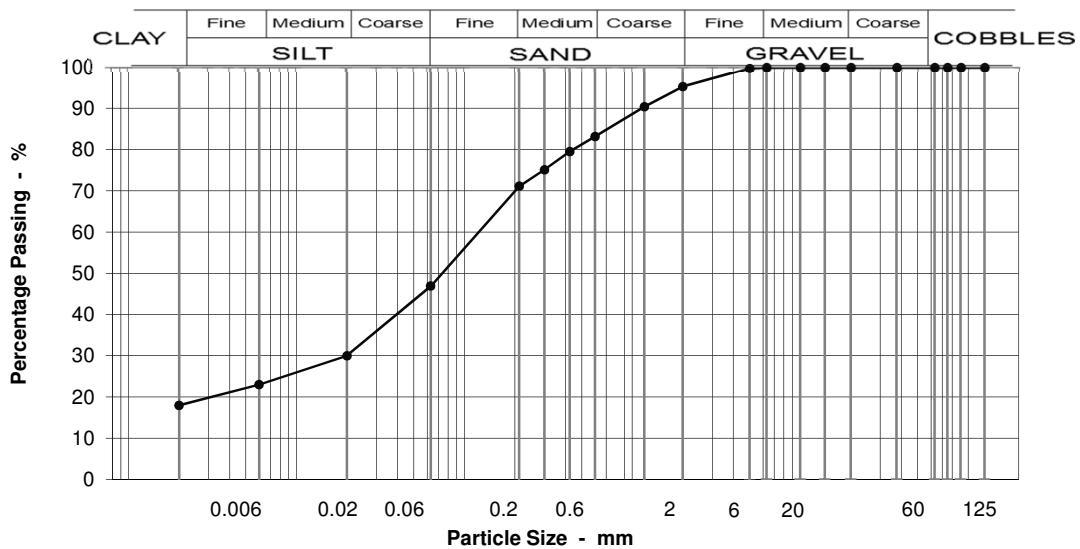
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** MB05 @ 0m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100		BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	0
37.5	100		Fine GRAVEL	5
20	100		Coarse SAND	12
14	100		Medium SAND	12
10	100		Fine SAND	24
6.3	100		Silt & Clay	47
5	100			
2	95			
1.18	90			
0.600	83			
0.425	79			
0.300	75			
0.212	71			
0.063	47			
0.020	30			
0.006	23			
0.002	18			
		<b>Moisture content %</b>		86

Grading Analysis	
D100	5
D60	0.14
D10	0.00
Uniformity Coefficient	>10*

Description	
Very soft dark greysih orange very sandy clayey SILT.	

\* Uniformity coefficient extrapolated

Test Code = 610



Simon Holden (Project Technician)





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB05

Sample Ref 6

Depth (m) 1.50-2.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	96
425 µm	85
300 µm	42
212 µm	22
150 µm	9
63 µm	3

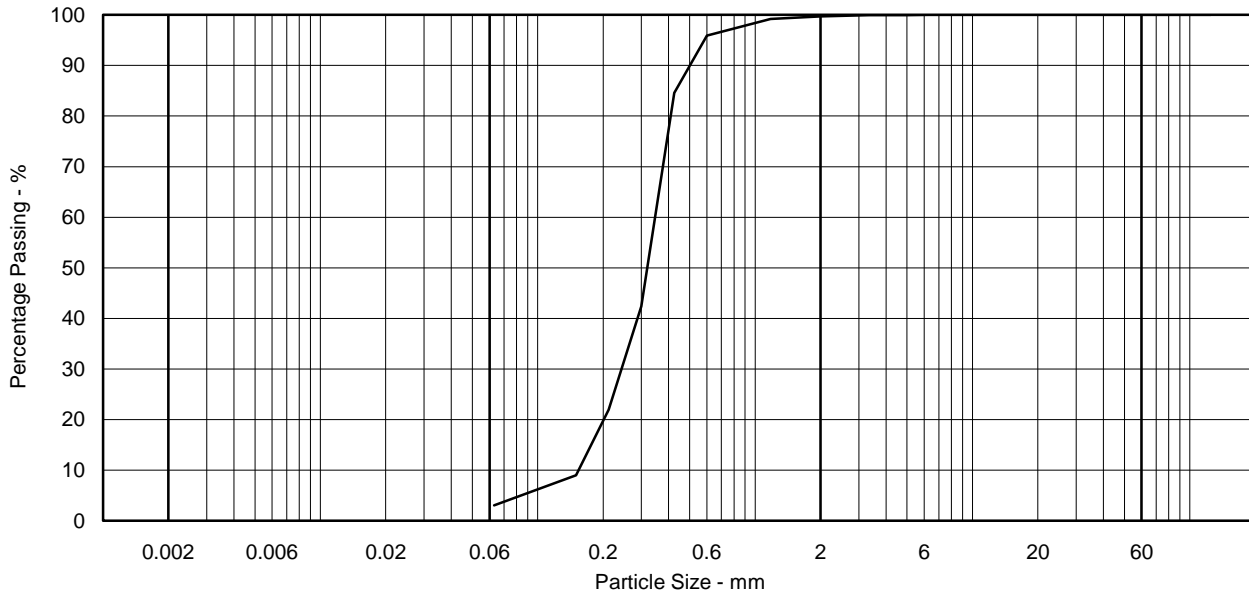
Non Engineering Description
Light brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	96.7
Silt & Clay	3.1

Particle Diameter - mm	
D100	6.3
D60	0.35
D10	0.15
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.3

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving







SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB05  
 Sample Ref 10  
 Depth (m) 2.50-3.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	99
2.00 mm	97
1.18 mm	96
600 µm	91
425 µm	71
300 µm	32
212 µm	14
150 µm	7
63 µm	3

**Non Engineering Description**

Dark brown slightly gravelly slightly silty SAND. Gravel is fine to medium.

**Sample Proportions - %**

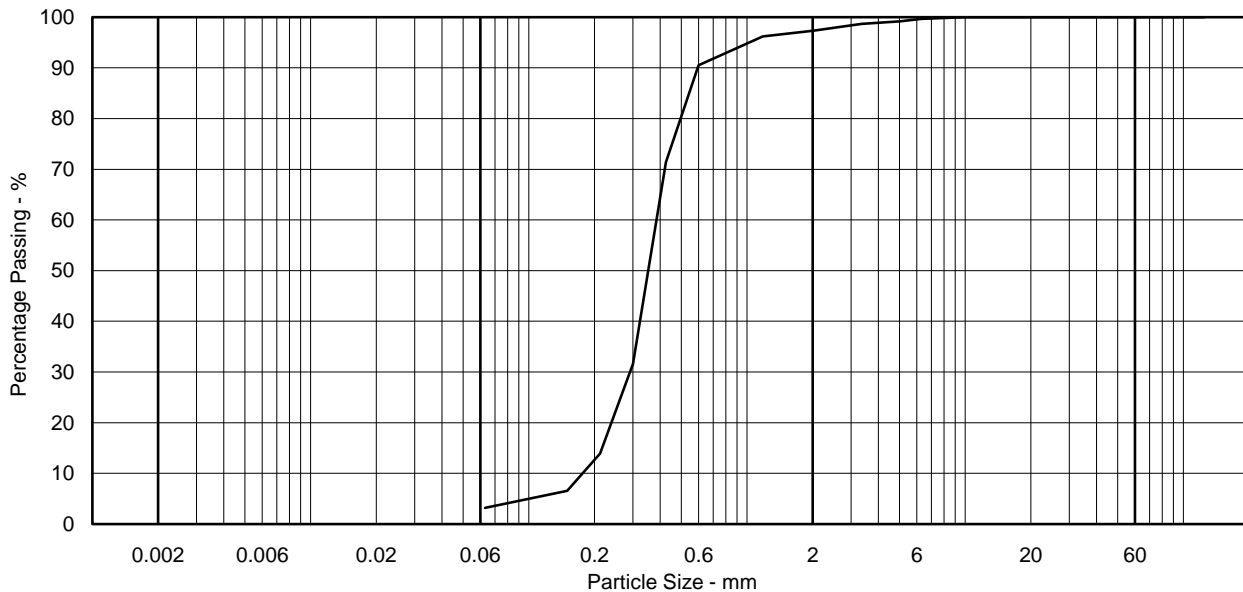
Cobbles	0.0
Gravel	2.7
Sand	94.1
Silt & Clay	3.2

**Particle Diameter - mm**

D100	10
D60	0.38
D10	0.18
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.1

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	05/09/2018

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SITE INVESTIGATION AND LABORATORY SERVICES

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Hole MB05

Sample Ref 14

Depth (m) 3.50-4.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	99
2.00 mm	99
1.18 mm	99
600 µm	95
425 µm	80
300 µm	44
212 µm	23
150 µm	8
63 µm	2

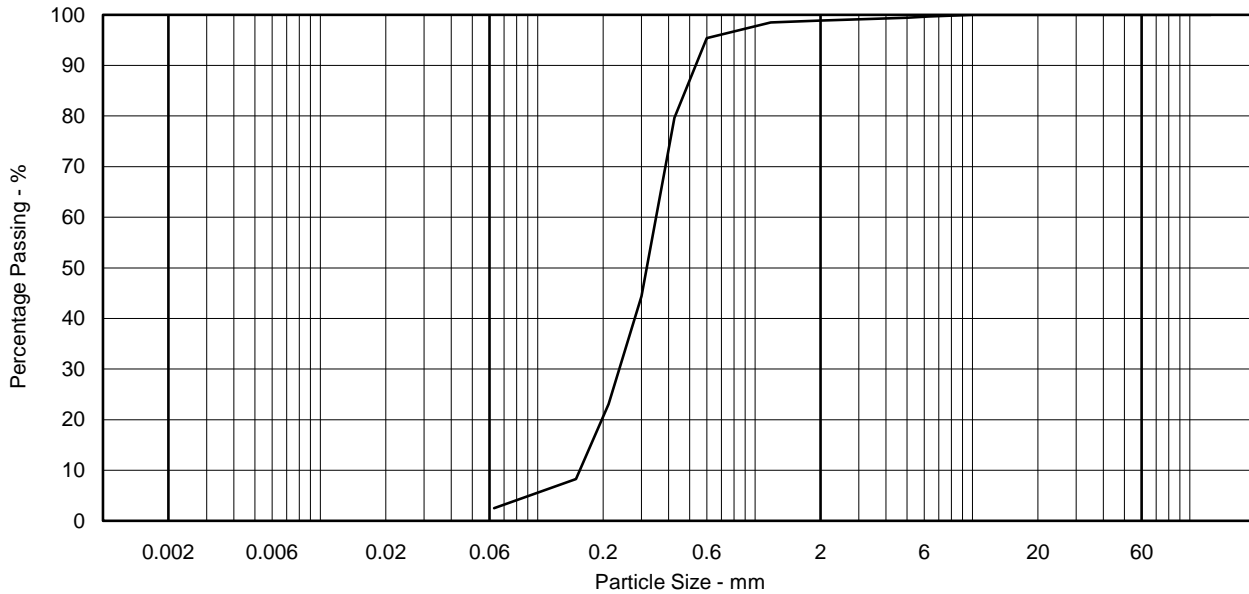
Non Engineering Description
Orange brown slightly gravelly slightly silty SAND.


Sample Proportions - %	
Cobbles	0.0
Gravel	1.1
Sand	96.4
Silt & Clay	2.5

Particle Diameter - mm	
D100	10
D60	0.35
D10	0.16
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.2

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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**PARTICLE SIZE DISTRIBUTION**  
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SITE INVESTIGATION AND LABORATORY SERVICES

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Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB05

Sample Ref 18

Depth (m) 4.50-5.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	98
5.00 mm	98
3.35 mm	97
2.00 mm	96
1.18 mm	95
600 µm	92
425 µm	80
300 µm	55
212 µm	31
150 µm	15
63 µm	9

**Non Engineering Description**

Orange brown slightly clayey slightly gravelly silty SAND.  
Gravel is fine to medium.

**Sample Proportions - %**

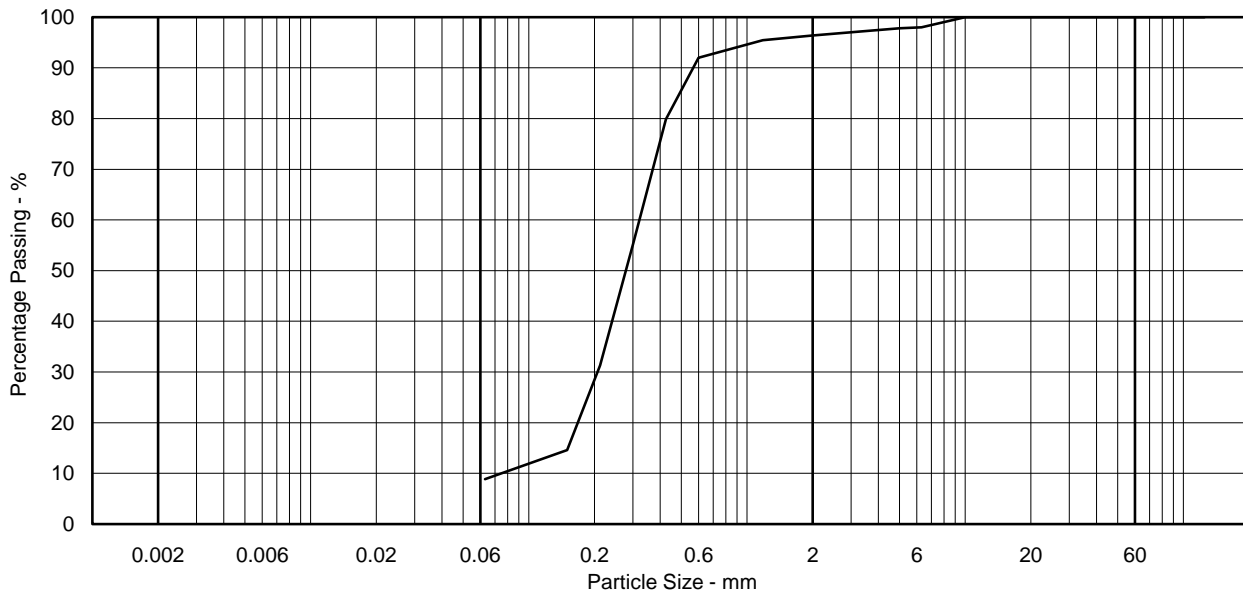
Cobbles	0.0
Gravel	3.6
Sand	87.5
Silt & Clay	8.9

**Particle Diameter - mm**

D100	10
D60	0.32
D10	0.075
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	4.3

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB05

Sample Ref 22

Depth (m) 5.50-6.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	96
425 µm	88
300 µm	72
212 µm	48
150 µm	16
63 µm	3

**Non Engineering Description**

Orangey brown slightly silty SAND with rare fine shell fragments.

**Sample Proportions - %**

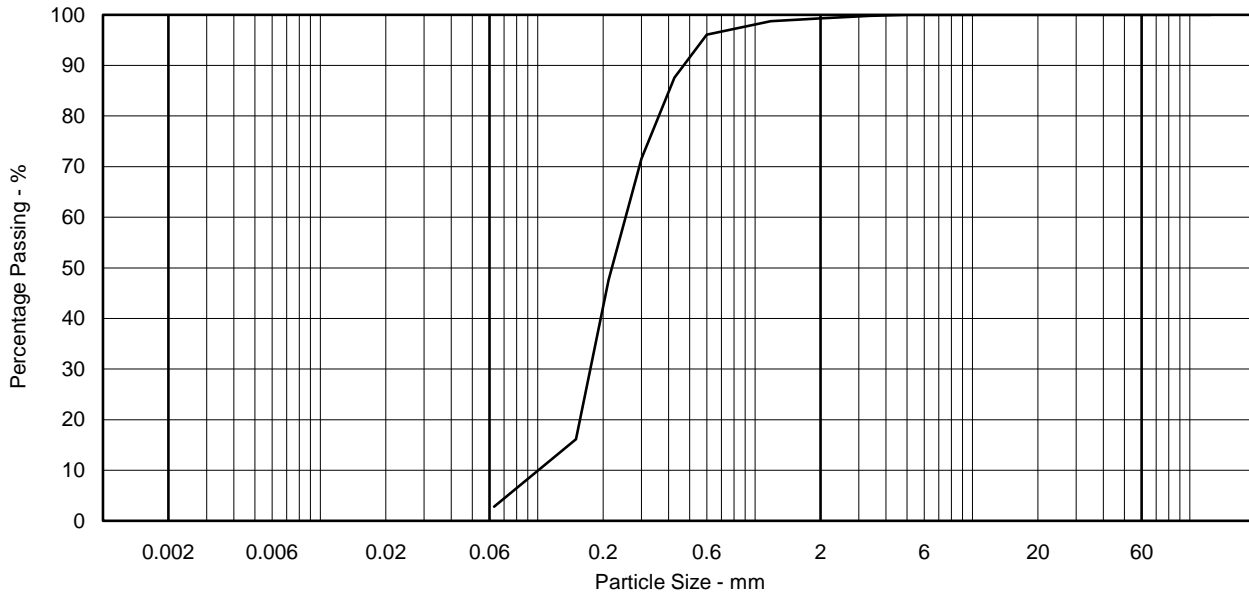
Cobbles	0.0
Gravel	0.7
Sand	96.5
Silt & Clay	2.8

**Particle Diameter - mm**

D100	5.0
D60	0.25
D10	0.10
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB05

Sample Ref 25

Depth (m) 6.50-7.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	96
300 µm	84
212 µm	52
150 µm	19
63 µm	3

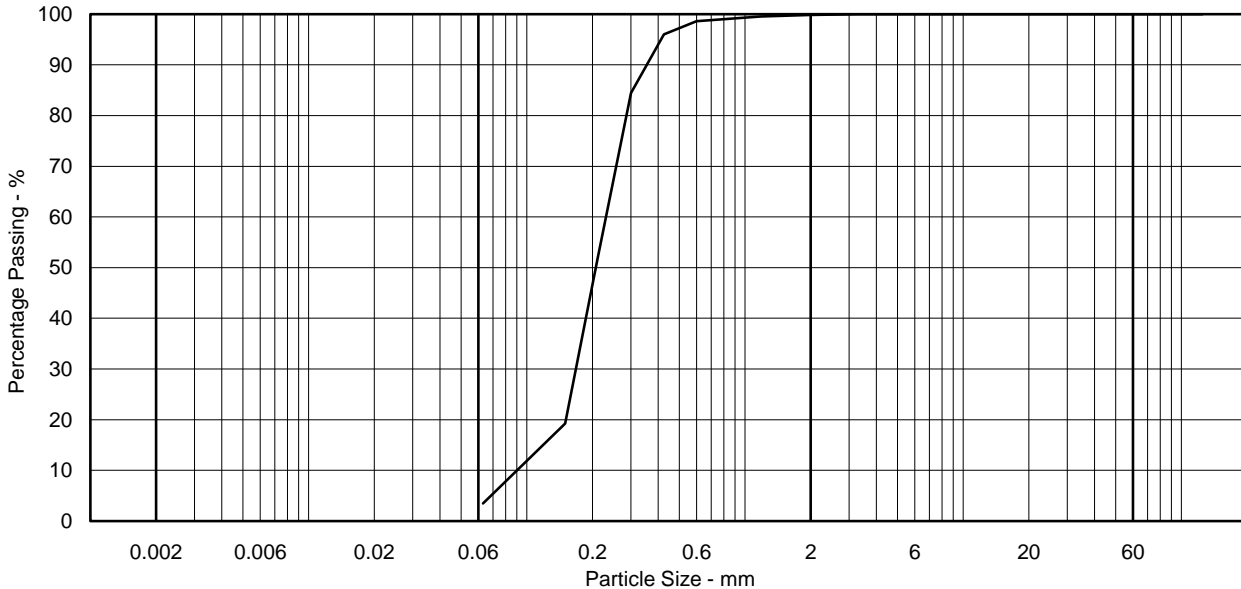
Non Engineering Description
Orange brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.1
Sand	96.4
Silt & Clay	3.5

Particle Diameter - mm	
D100	3.4
D60	0.23
D10	0.090
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.6

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB05

Sample Ref 30

Depth (m) 8.50-9.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	99
300 µm	95
212 µm	72
150 µm	24
63 µm	5

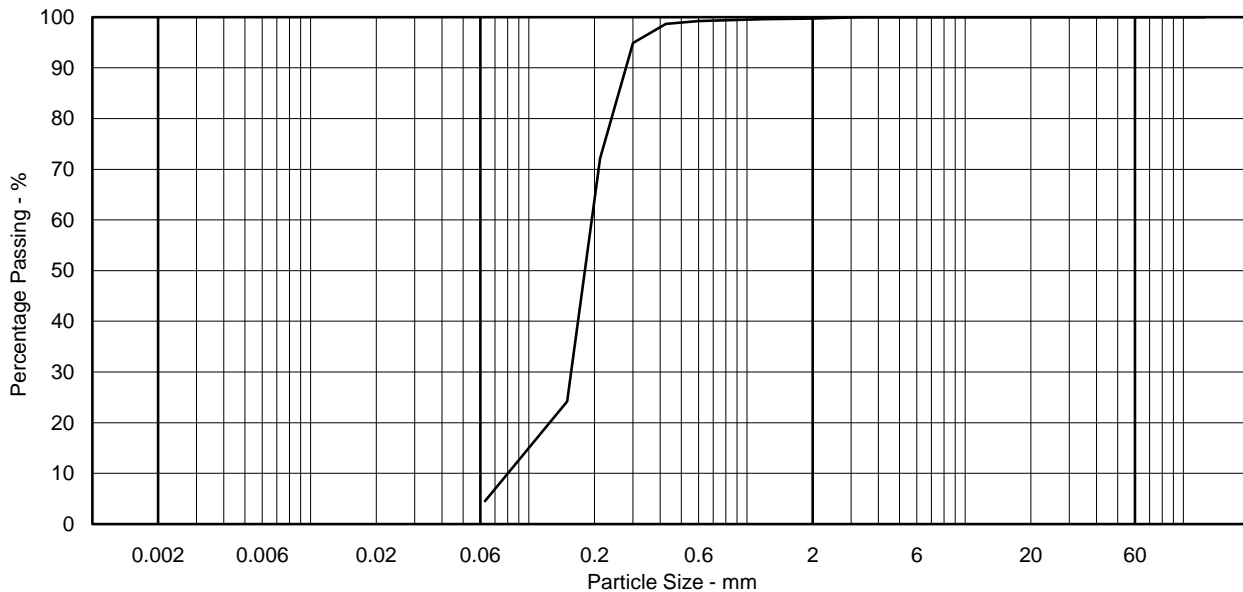
Non Engineering Description
Light brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	95.2
Silt & Clay	4.5

Particle Diameter - mm	
D100	3.4
D60	0.19
D10	0.080
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.4

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB05  
 Sample Ref 43  
 Depth (m) 12.50-13.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	100
300 µm	97
212 µm	77
150 µm	25
63 µm	3

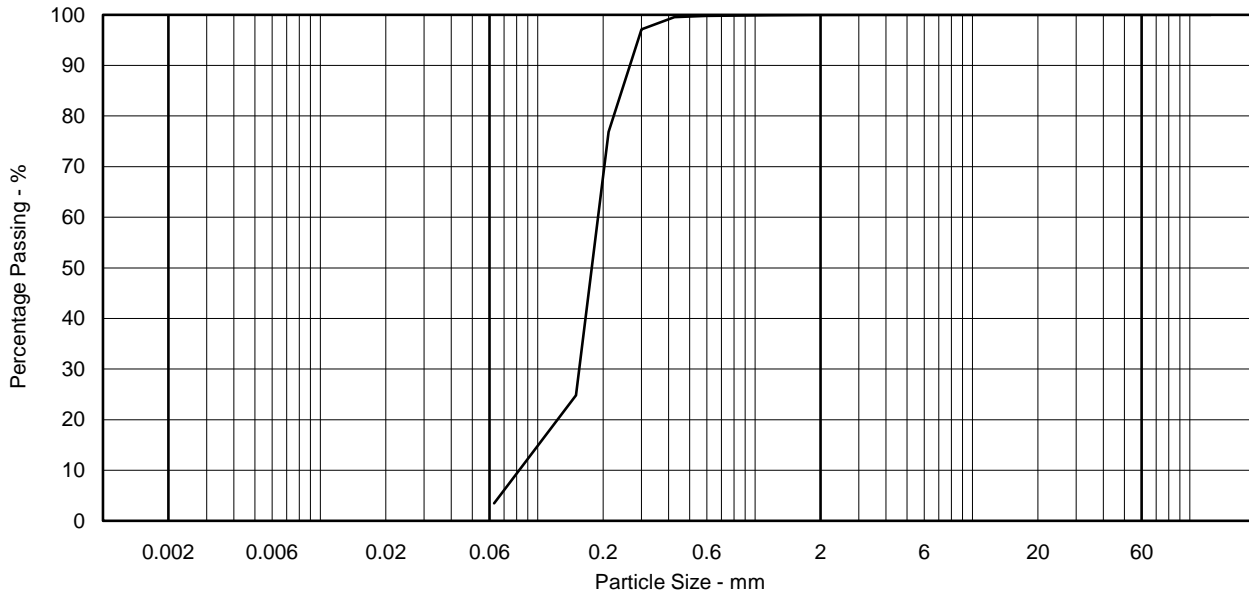
Non Engineering Description
Orange brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.0
Sand	96.5
Silt & Clay	3.5

Particle Diameter - mm	
D100	3.4
D60	0.19
D10	0.082
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.3

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB05  
 Sample Ref 46  
 Depth (m) 13.50-14.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	99
2.00 mm	98
1.18 mm	96
600 µm	92
425 µm	87
300 µm	80
212 µm	59
150 µm	21
63 µm	6

**Non Engineering Description**

Orange brown slightly gravelly silty SAND with occasional fine shell fragments. Gravel is fine to medium.

**Sample Proportions - %**

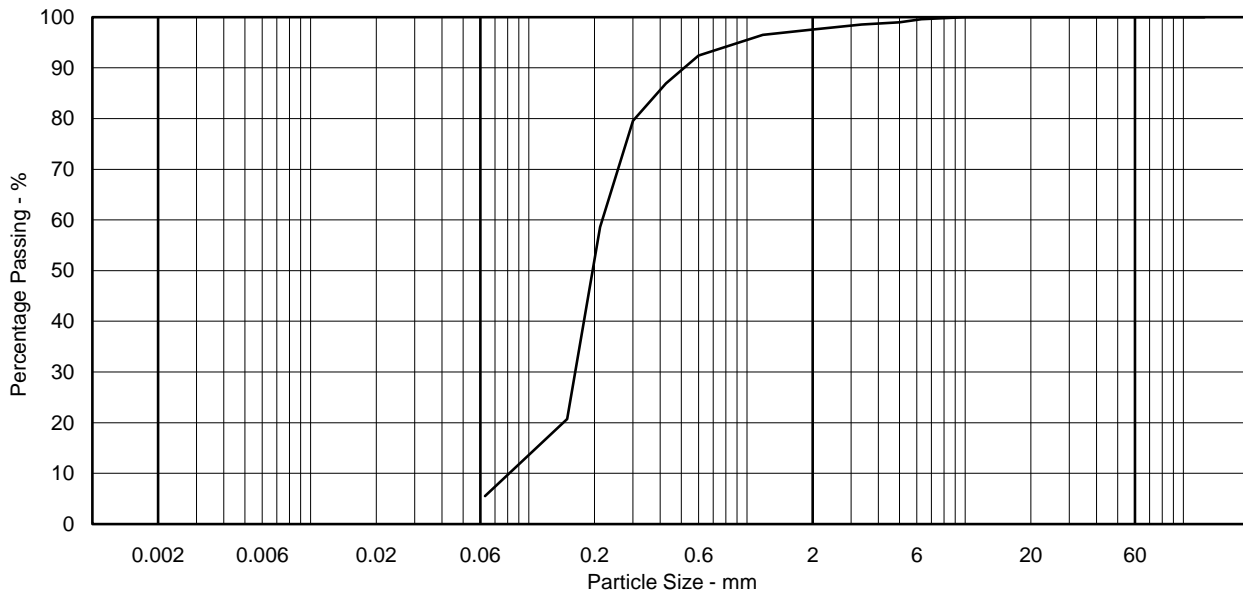
Cobbles	0.0
Gravel	2.5
Sand	92.0
Silt & Clay	5.5

**Particle Diameter - mm**

D100	10
D60	0.22
D10	0.081
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.7

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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Hole MB05  
 Sample Ref 52  
 Depth (m) 15.50-16.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	95
425 µm	90
300 µm	82
212 µm	72
150 µm	49
63 µm	32
20 µm	24
6 µm	19
2 µm	14

**Non Engineering Description**

Orange brown slightly gravelly very sandy CLAY with some fine shell fragments. Gravel is fine.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.0
Sand	67.7
Silt	17.2
Clay	14.0

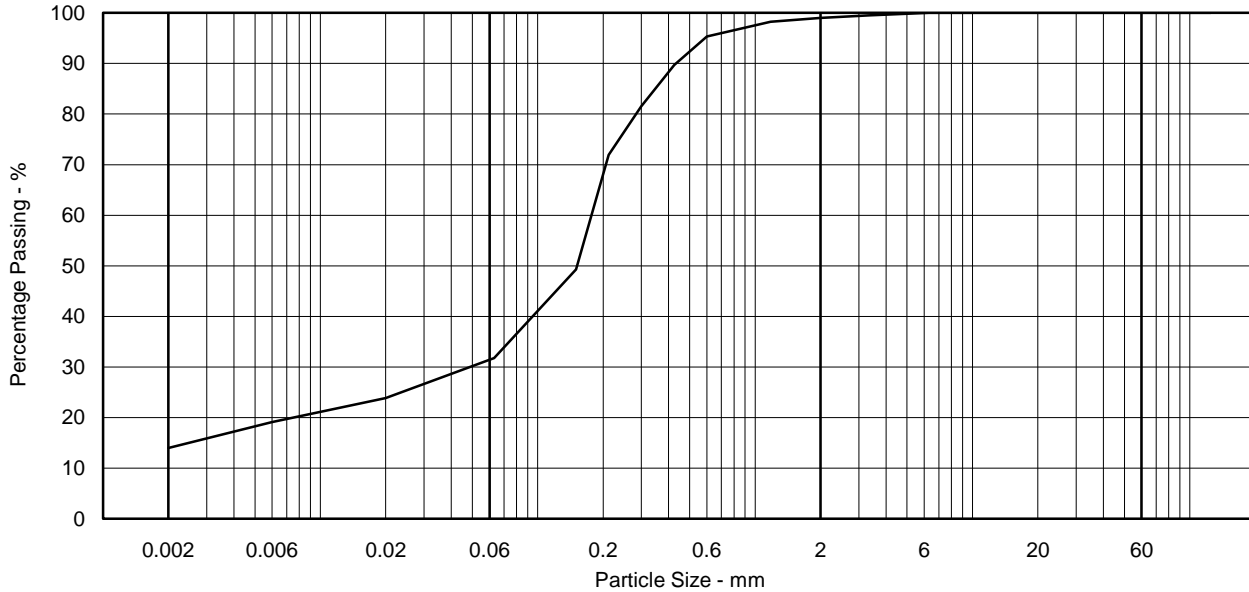
**Particle Diameter - mm**

D100	6.3
D60	0.18
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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Hole MB05

Sample Ref 55

Depth (m) 16.50-17.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	95
425 µm	88
300 µm	72
212 µm	52
150 µm	33
63 µm	13
20 µm	10
6 µm	8
2 µm	5

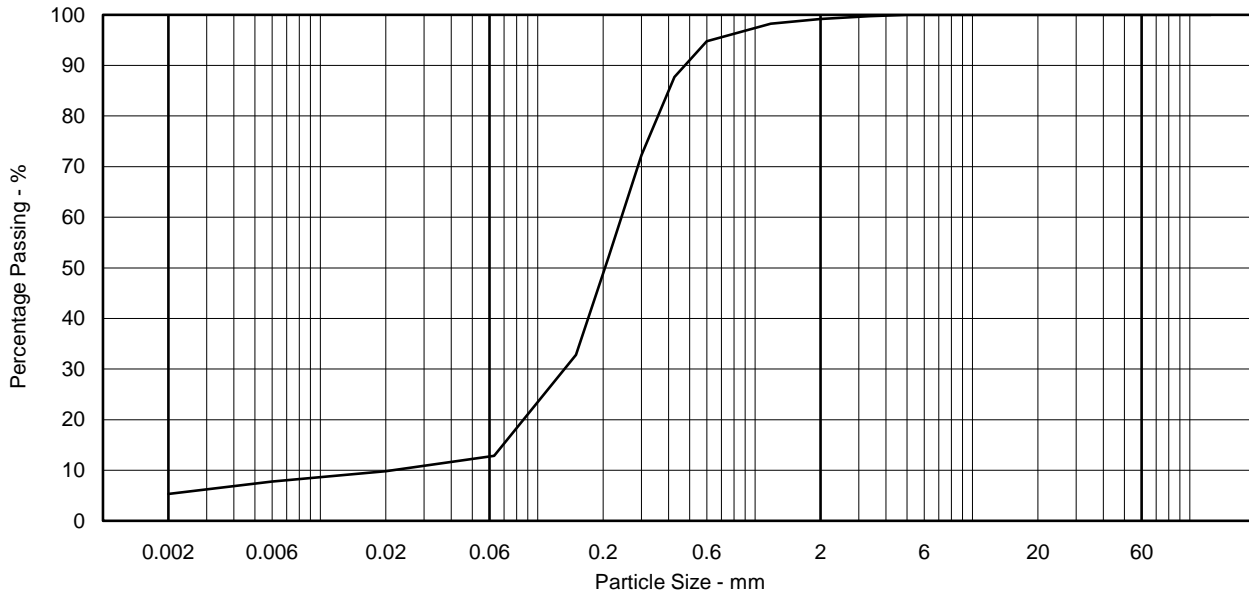
Non Engineering Description	
Dark brown clayey silty SAND.	

Sample Proportions - %	
Cobbles	0.0
Gravel	0.8
Sand	86.6
Silt	7.3
Clay	5.3

Particle Diameter - mm	
D100	5.0
D60	0.24
D10	0.022
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	10.9

Notes	
Sedimentation sample not pre-treated	

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB05

Sample Ref 61

Depth (m) 18.50-19.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	97
300 µm	86
212 µm	62
150 µm	36
63 µm	13
20 µm	10
6 µm	8
2 µm	6

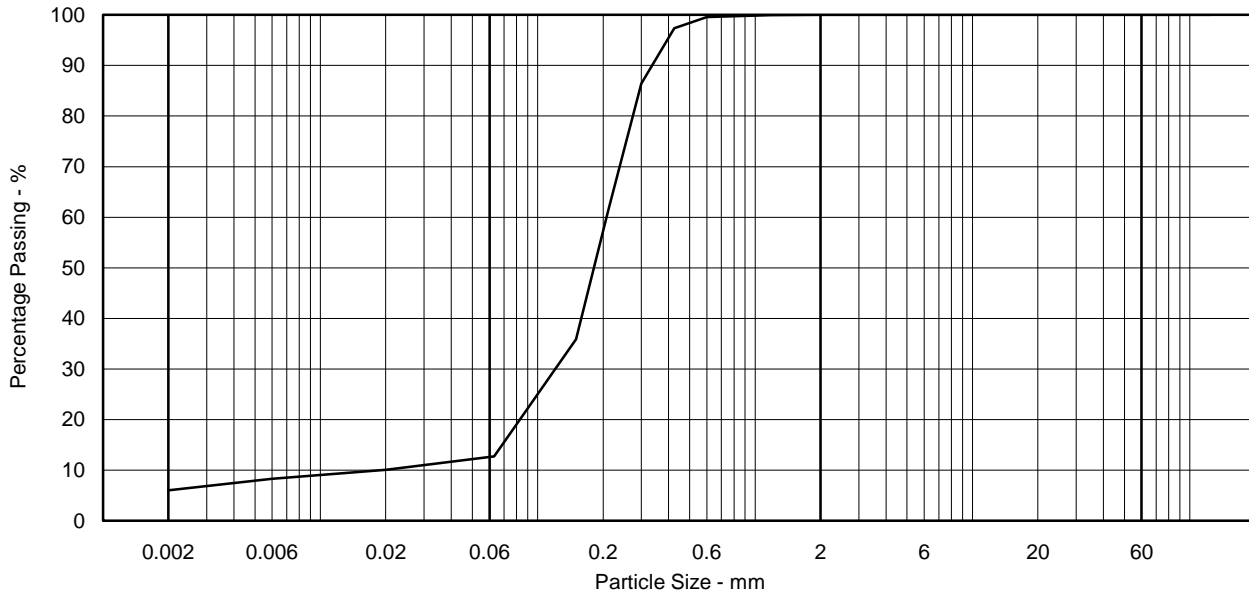
Non Engineering Description
Dark brown clayey silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.0
Sand	87.4
Silt	6.5
Clay	6.0

Particle Diameter - mm	
D100	3.4
D60	0.21
D10	0.019
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	11.1

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB05  
 Sample Ref 64  
 Depth (m) 19.50-20.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	97
425 µm	90
300 µm	58
212 µm	33
150 µm	17
63 µm	4

**Non Engineering Description**

Light brown slightly silty SAND with rare fine gravel.

**Sample Proportions - %**

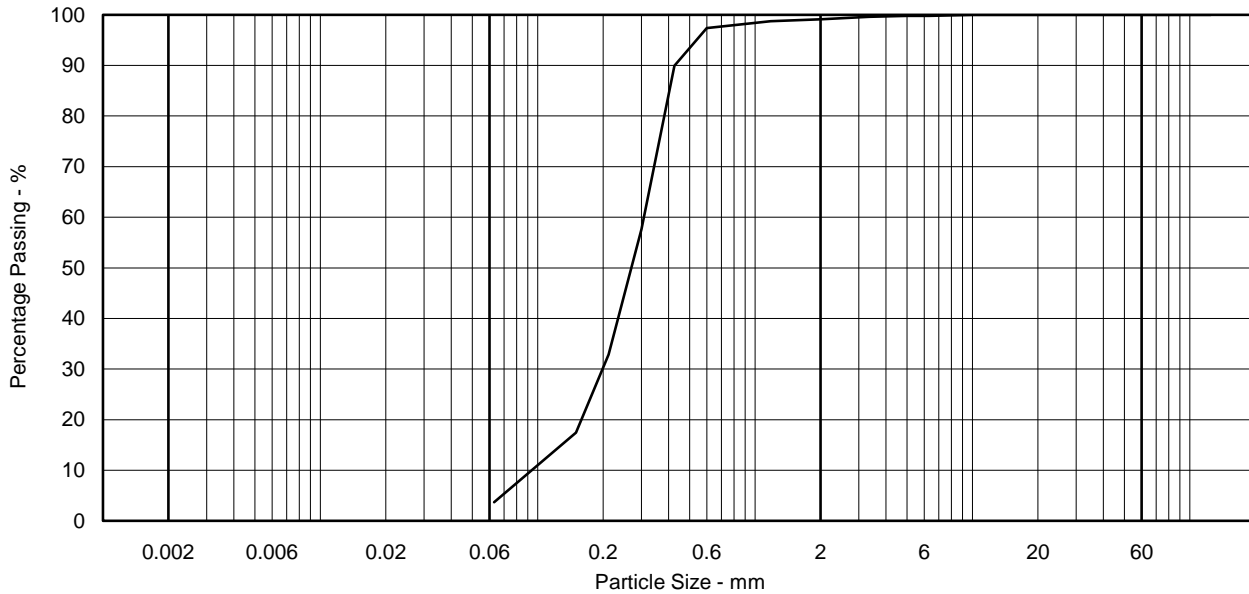
Cobbles	0.0
Gravel	0.9
Sand	95.5
Silt & Clay	3.7

**Particle Diameter - mm**

D100	10
D60	0.31
D10	0.094
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.3

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB05  
 Sample Ref 69  
 Depth (m) 21.50-22.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	97
425 µm	91
300 µm	66
212 µm	47
150 µm	31
63 µm	19
20 µm	16
6 µm	12
2 µm	8

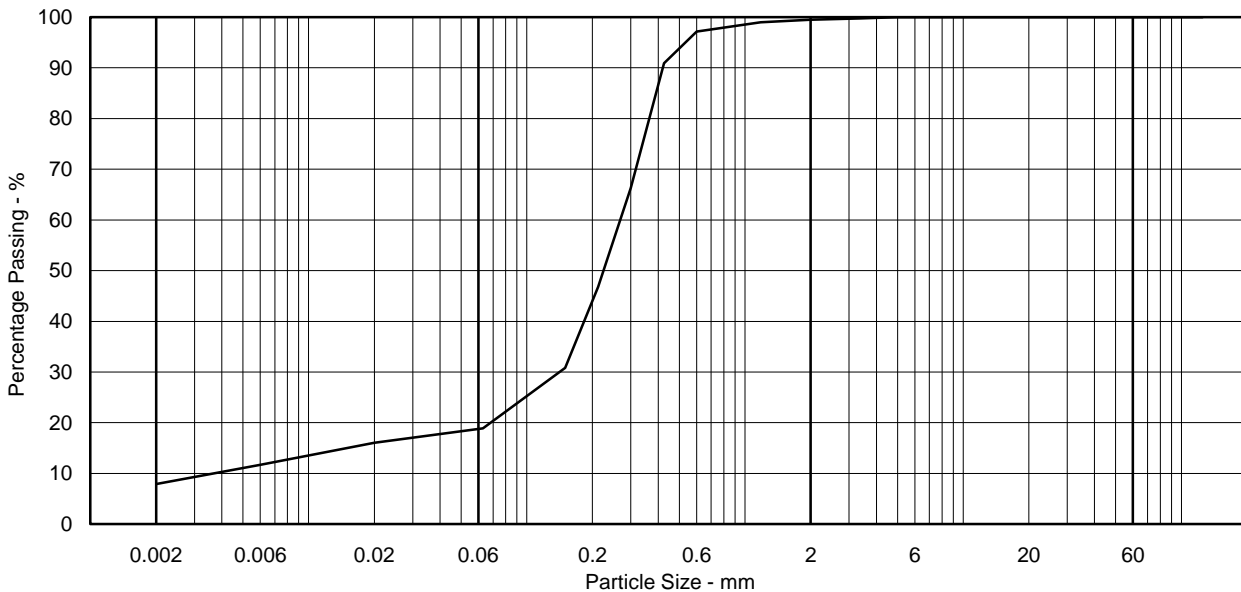
Non Engineering Description
Dark grey clayey silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.5
Sand	80.8
Silt	10.8
Clay	7.9

Particle Diameter - mm	
D100	5.0
D60	0.27
D10	0.0037
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	73.0

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB05  
 Sample Ref 72  
 Depth (m) 22.50-23.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	99
5.00 mm	99
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	97
425 µm	95
300 µm	88
212 µm	79
150 µm	70
63 µm	62
20 µm	51
6 µm	34
2 µm	19

**Non Engineering Description**

Grey mottled light brown slightly gravelly sandy CLAY.  
 Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.3
Sand	37.9
Silt	41.5
Clay	19.4

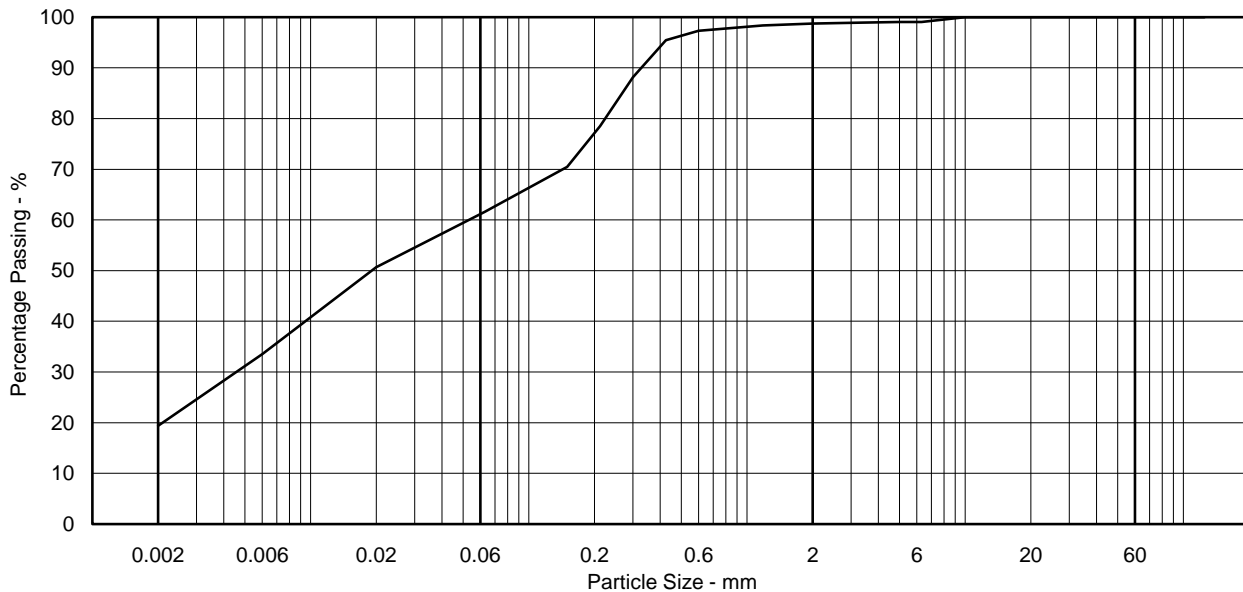
**Particle Diameter - mm**

D100	10
D60	0.053
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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Hole MB05

Sample Ref 75

Depth (m) 23.50-24.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	98
300 µm	97
212 µm	95
150 µm	93
63 µm	91
20 µm	77
6 µm	56
2 µm	31

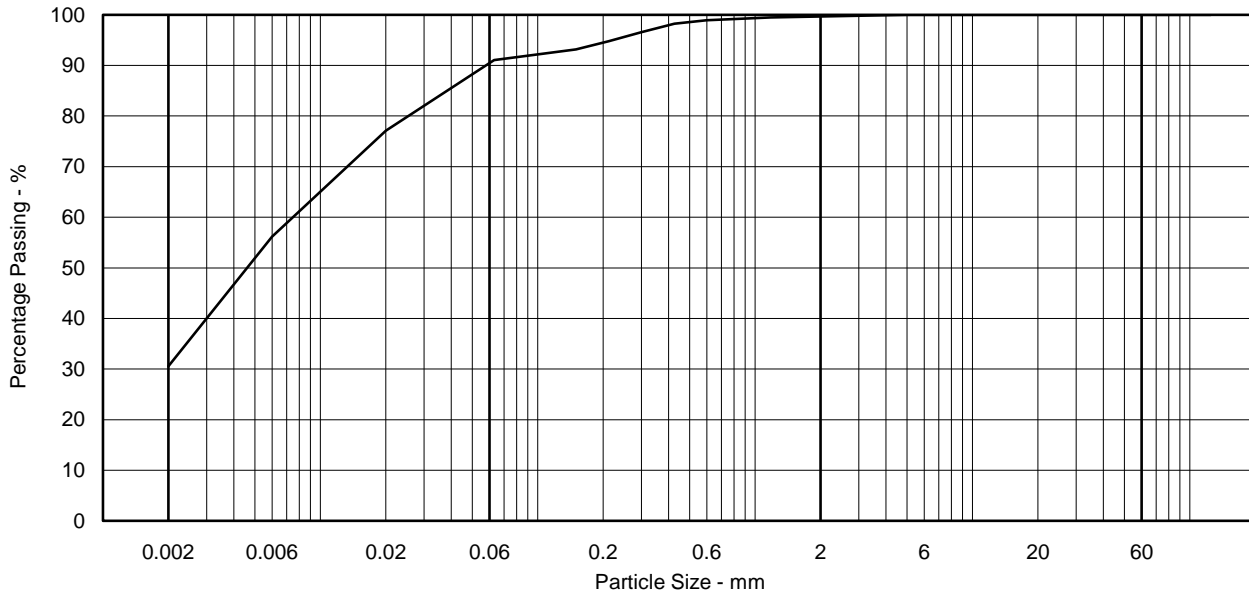
Non Engineering Description
Olive mottled light brown slightly sandy CLAY.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	9.6
Silt	59.6
Clay	30.6

Particle Diameter - mm	
D100	5.0
D60	0.0075
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
PD	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB05

Sample Ref 78

Depth (m) 24.50-25.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	96
425 µm	91
300 µm	68
212 µm	48
150 µm	37
63 µm	26
20 µm	18
6 µm	12
2 µm	7

**Non Engineering Description**

Greyish brown slightly gravelly clayey silty SAND. Gravel is fine.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.0
Sand	73.6
Silt	18.1
Clay	7.2

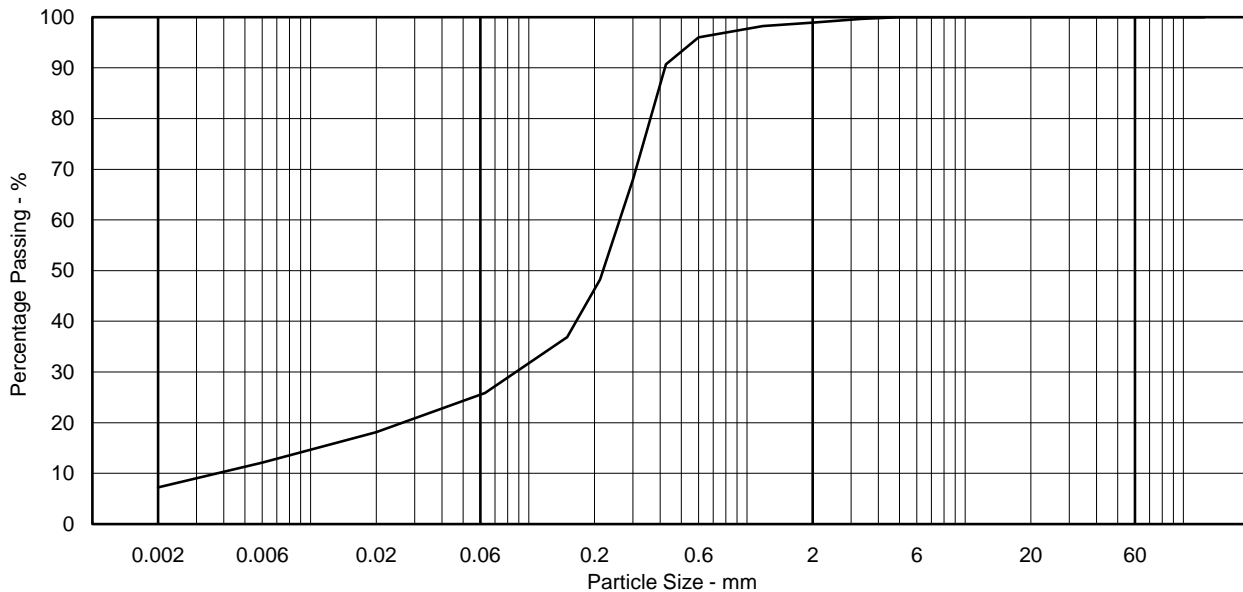
**Particle Diameter - mm**

D100	5.0
D60	0.26
D10	0.0037
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	70.3

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB06  
 Sample Ref 2  
 Depth (m) 0.00-0.50  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	98
5.00 mm	98
3.35 mm	98
2.00 mm	97
1.18 mm	95
600 µm	86
425 µm	69
300 µm	39
212 µm	17
150 µm	6
63 µm	3
20 µm	2
6 µm	1
2 µm	1

**Non Engineering Description**  
 Dark grey slightly silty SAND with occasional fine to medium shell fragments and a slight odour of hydrocarbons.

**Sample Proportions - %**

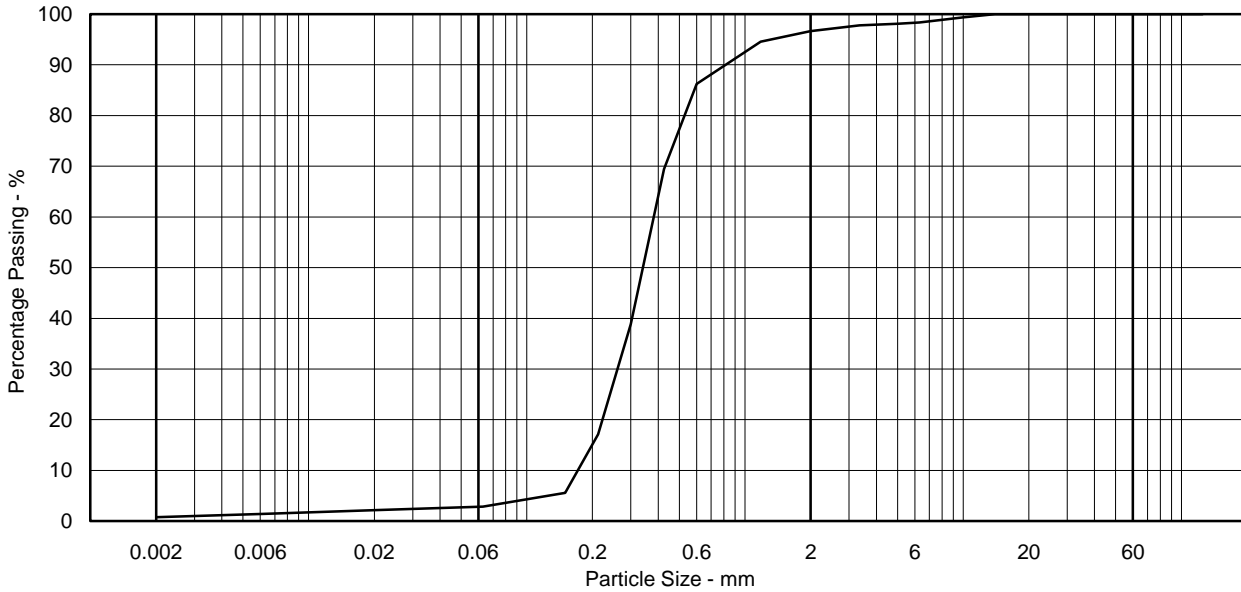
Cobbles	0.0
Gravel	3.3
Sand	93.9
Silt	2.1
Clay	0.7

**Particle Diameter - mm**

D100	14
D60	0.38
D10	0.17
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.2

**Notes**  
 Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB06

Sample Ref 6

Depth (m) 1.50-2.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	99
5.00 mm	99
3.35 mm	99
2.00 mm	98
1.18 mm	97
600 µm	89
425 µm	68
300 µm	33
212 µm	15
150 µm	7
63 µm	4

**Non Engineering Description**

Brown slightly silty SAND with occasional fine to medium shell fragments.

**Sample Proportions - %**

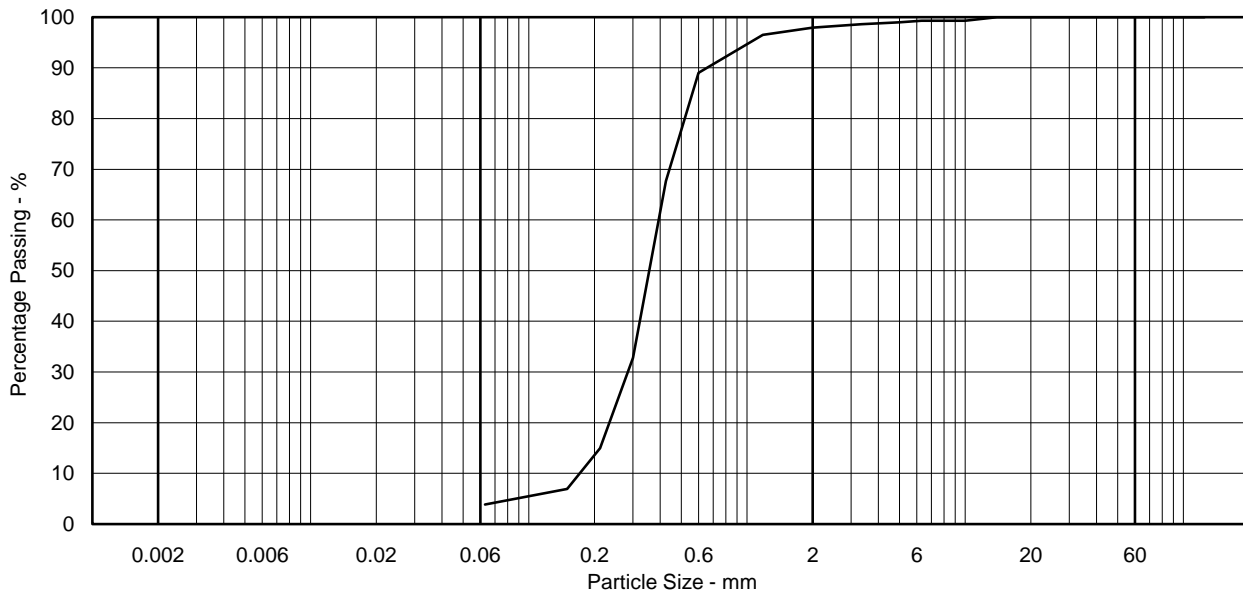
Cobbles	0.0
Gravel	2.0
Sand	94.1
Silt & Clay	3.9

**Particle Diameter - mm**

D100	14
D60	0.39
D10	0.17
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.3

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB06

Sample Ref 10

Depth (m) 2.50-3.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	98
6.30 mm	97
5.00 mm	97
3.35 mm	96
2.00 mm	96
1.18 mm	94
600 µm	91
425 µm	84
300 µm	71
212 µm	58
150 µm	41
63 µm	30
20 µm	25
6 µm	20
2 µm	16

**Non Engineering Description**

Grey slightly gravelly very sandy CLAY with an odour of hydrocarbons. Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	4.5
Sand	65.5
Silt	14.3
Clay	15.7

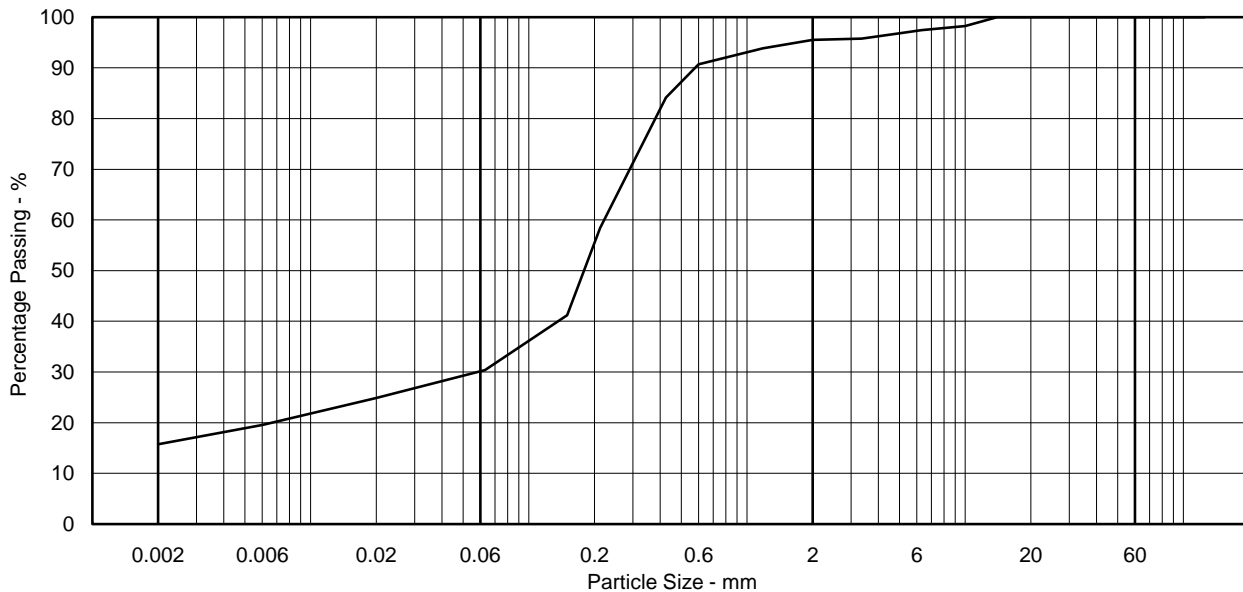
**Particle Diameter - mm**

D100	14
D60	0.22
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB06

Sample Ref 14

Depth (m) 3.50-4.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	97
600 µm	95
425 µm	91
300 µm	81
212 µm	56
150 µm	32
63 µm	21
20 µm	17
6 µm	13
2 µm	11

**Non Engineering Description**

Greyish brown slightly gravelly silty clayey SAND with an odour of hydrocarbons. Gravel is fine.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.3
Sand	78.4
Silt	9.5
Clay	10.8

**Particle Diameter - mm**

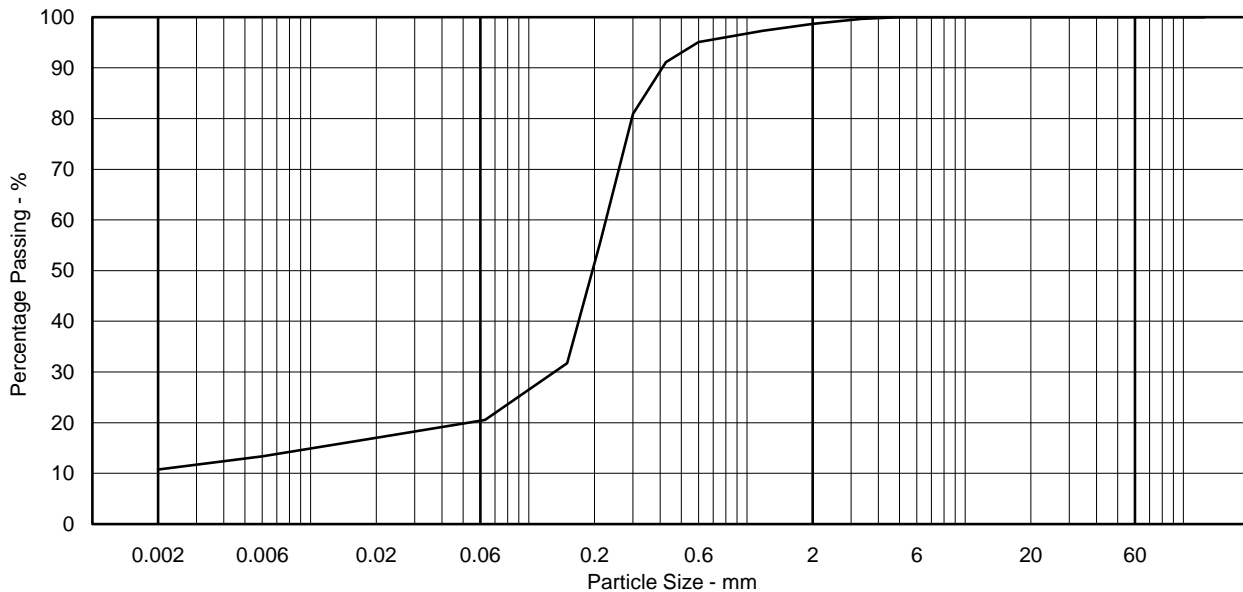
D100	5.0
D60	0.23
D10	
Uniformity Coefficient	N/A

(SHW series 600, Table 6/1, footnote 5)

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB06  
 Sample Ref 18  
 Depth (m) 4.50-5.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	96
425 µm	93
300 µm	84
212 µm	62
150 µm	26
63 µm	8

**Non Engineering Description**

Greyish brown slightly gravelly silty SAND with an odour of hydrocarbons. Gravel is fine.

**Sample Proportions - %**

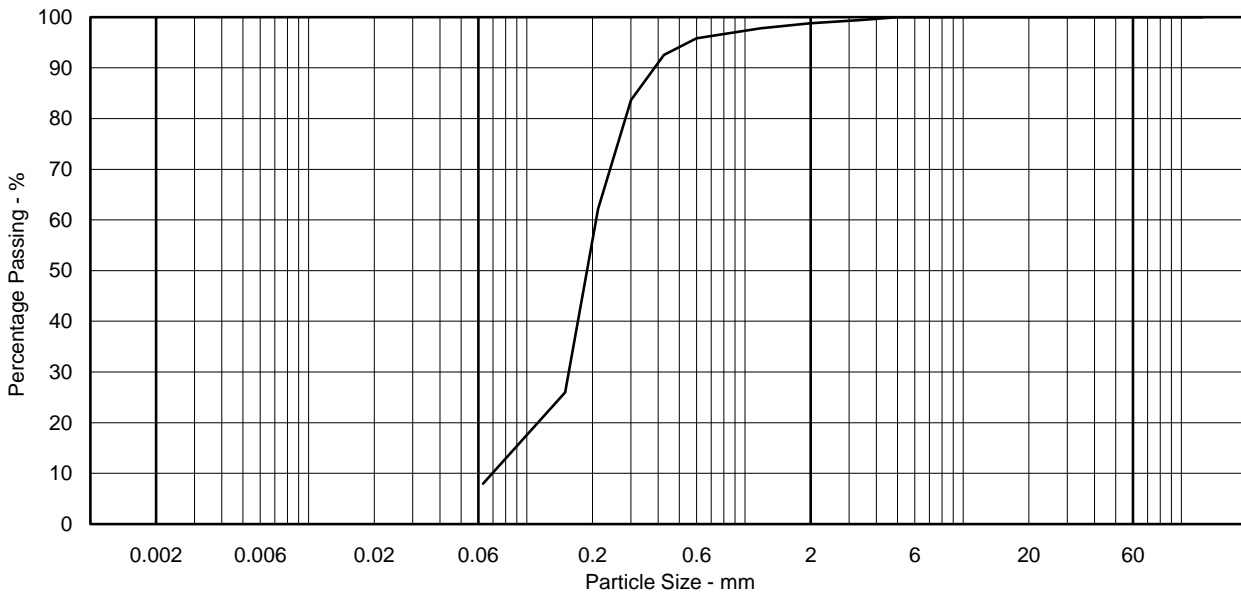
Cobbles	0.0
Gravel	1.2
Sand	90.8
Silt & Clay	8.0

**Particle Diameter - mm**

D100	5.0
D60	0.21
D10	0.069
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.0

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB06

Sample Ref 28

Depth (m) 7.50-8.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	98
300 µm	96
212 µm	54
150 µm	20
63 µm	9

**Non Engineering Description**

Yellowish brown silty SAND with a strong odour of hydrocarbons.

**Sample Proportions - %**

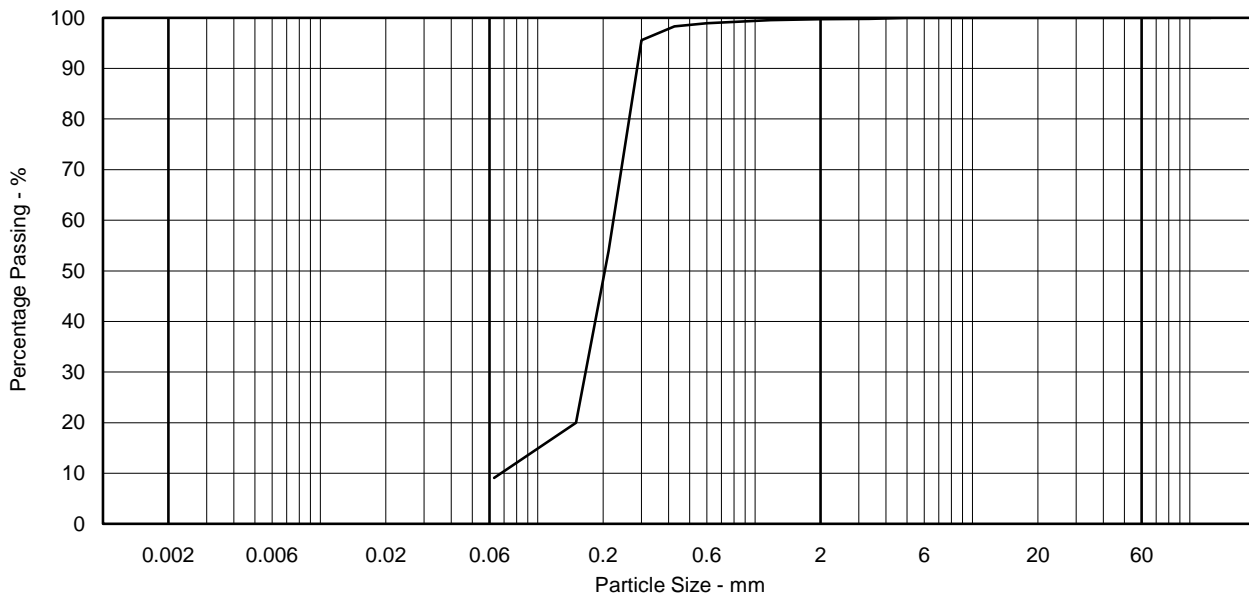
Cobbles	0.0
Gravel	0.3
Sand	90.6
Silt & Clay	9.1

**Particle Diameter - mm**

D100	5.0
D60	0.22
D10	0.068
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.2

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
EH	24/08/2018

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Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB06  
 Sample Ref 38  
 Depth (m) 10.50-11.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	97
425 µm	90
300 µm	66
212 µm	45
150 µm	20
63 µm	7

**Non Engineering Description**

Greyish brown silty SAND and strong smell of hydrocarbons.

**Sample Proportions - %**

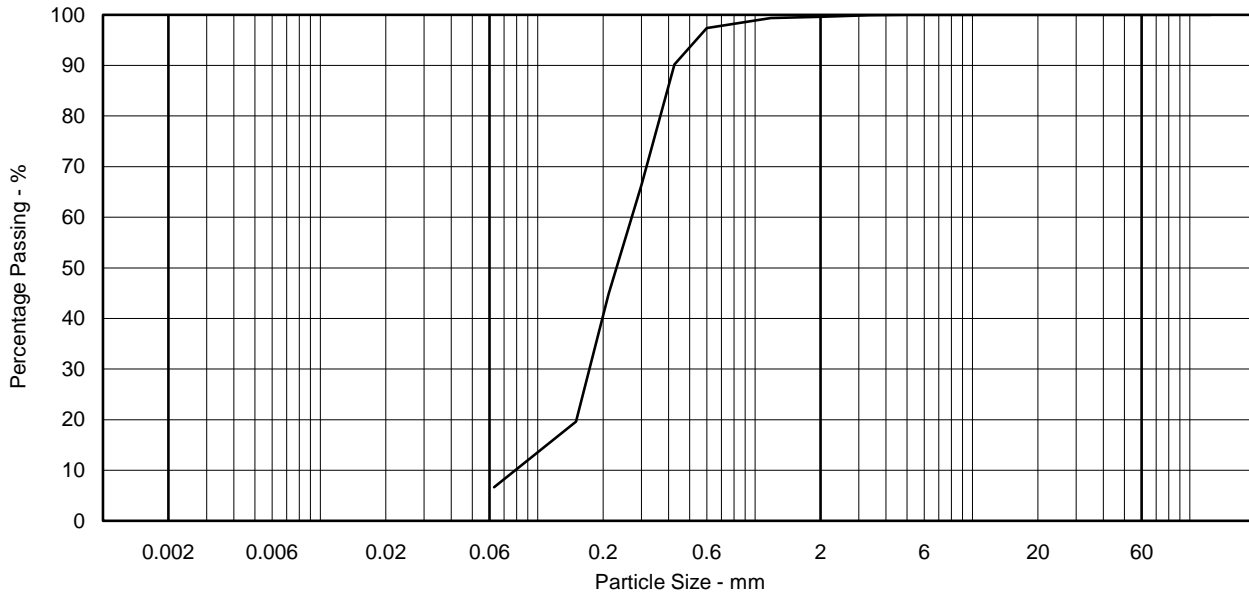
Cobbles	0.0
Gravel	0.4
Sand	93.0
Silt & Clay	6.6

**Particle Diameter - mm**

D100	5.0
D60	0.27
D10	0.079
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.4

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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SITE INVESTIGATION AND LABORATORY SERVICES

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Contract No PZ1522D1

Client Norfolk County Council

Hole MB06  
 Sample Ref 47  
 Depth (m) 13.50-14.00  
 Sample Type B

Engineer Norfolk Partnership Laboratory

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	98
5.00 mm	97
3.35 mm	96
2.00 mm	94
1.18 mm	94
600 µm	91
425 µm	83
300 µm	56
212 µm	38
150 µm	24
63 µm	10
20 µm	9
6 µm	7
2 µm	5

**Non Engineering Description**

Greyish brown clayey silty SAND. With occasional fine to medium shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	5.5
Sand	84.4
Silt	5.1
Clay	5.0

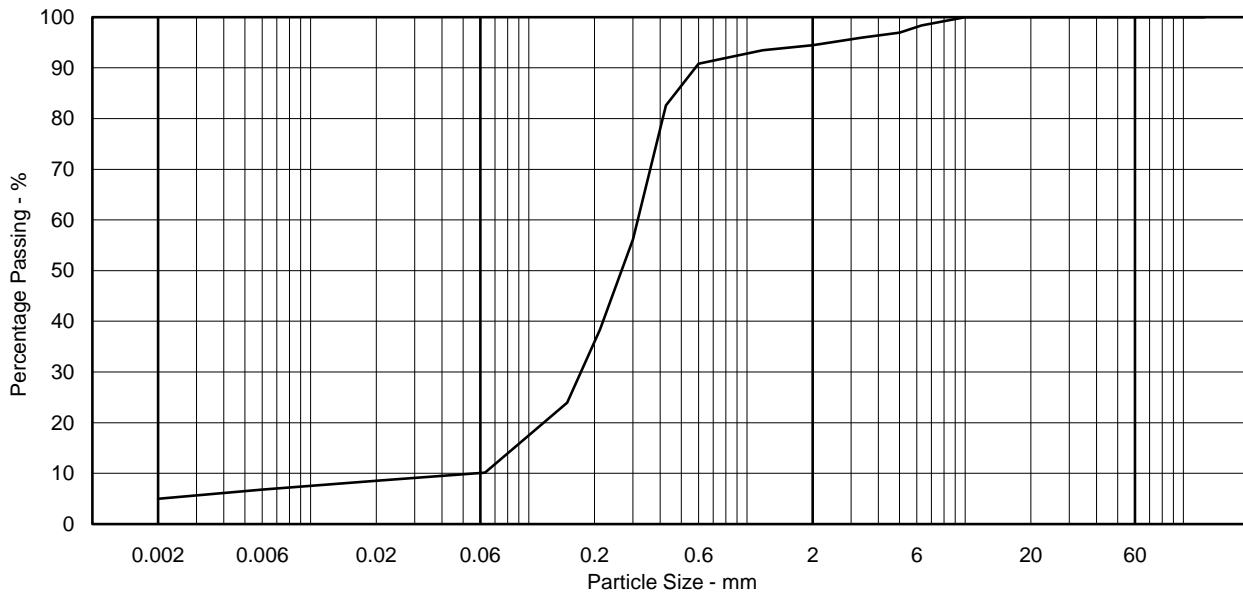
**Particle Diameter - mm**

D100	10
D60	0.32
D10	0.056
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	5.7

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB06  
 Sample Ref 50  
 Depth (m) 14.50-15.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	97
425 µm	88
300 µm	59
212 µm	35
150 µm	17
63 µm	5

**Non Engineering Description**

Light greyish brown silty SAND with occasional shell fragments.

**Sample Proportions - %**

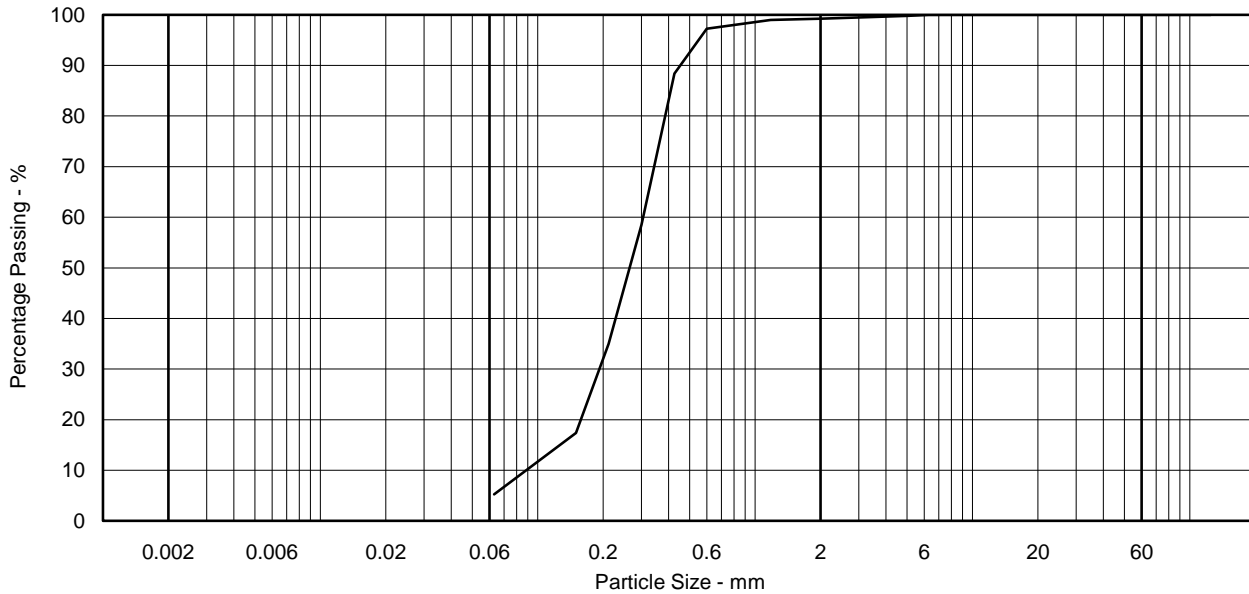
Cobbles	0.0
Gravel	0.7
Sand	94.0
Silt & Clay	5.2

**Particle Diameter - mm**

D100	6.3
D60	0.31
D10	0.089
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.5

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB06  
 Sample Ref 59  
 Depth (m) 17.50-18.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	96
300 µm	78
212 µm	45
150 µm	22
63 µm	5

**Non Engineering Description**

Light greyish brown slightly silty SAND with rare shell fragments.

**Sample Proportions - %**

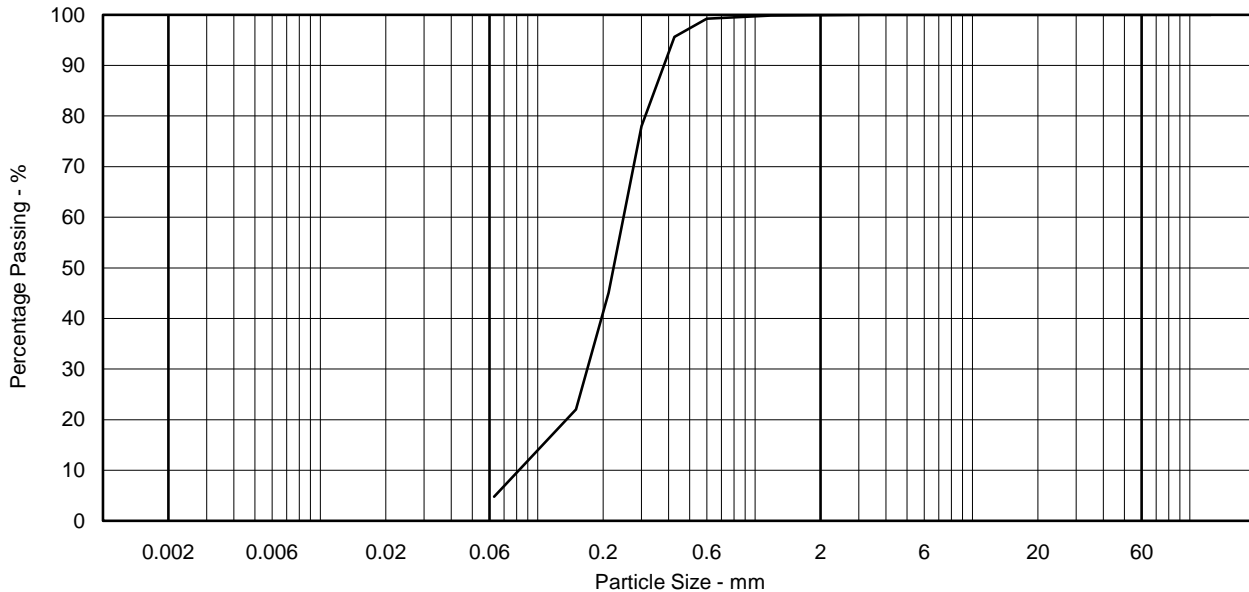
Cobbles	0.0
Gravel	0.1
Sand	95.2
Silt & Clay	4.8

**Particle Diameter - mm**

D100	3.4
D60	0.25
D10	0.082
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.0

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Hole MB06  
 Sample Ref 65  
 Depth (m) 19.50-20.00  
 Sample Type B

Engineer Norfolk Partnership Laboratory

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	94
300 µm	76
212 µm	48
150 µm	31
63 µm	14
20 µm	11
6 µm	8
2 µm	5

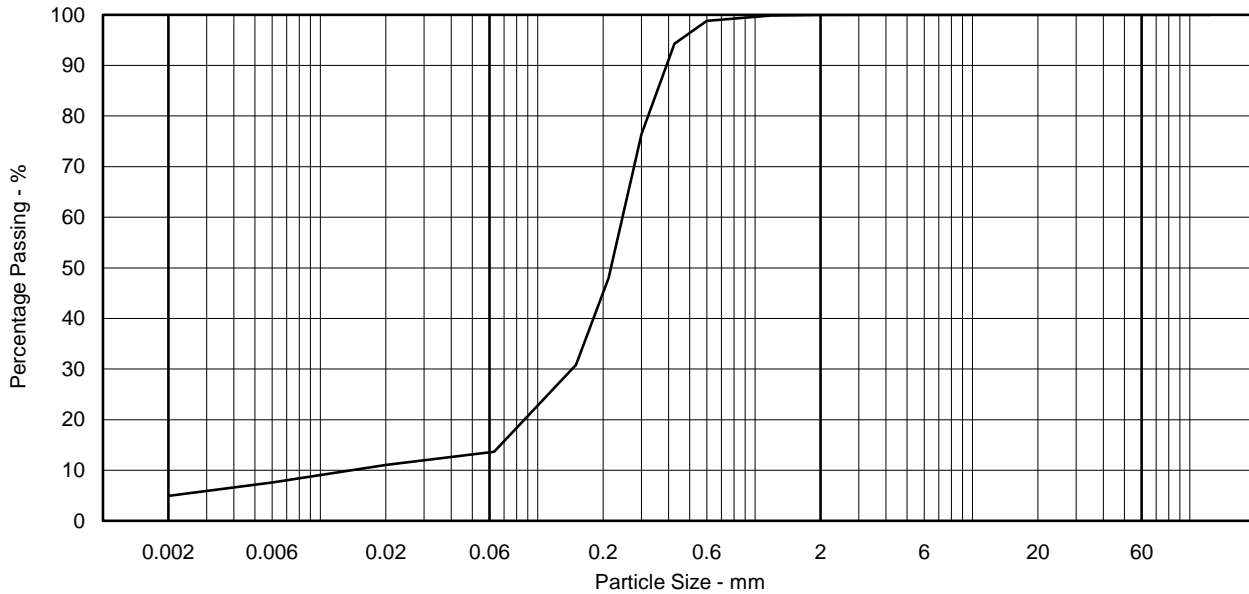
Non Engineering Description
Light greyish brown slightly clayey silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.0
Sand	86.5
Silt	8.6
Clay	4.9

Particle Diameter - mm	
D100	3.4
D60	0.25
D10	0.014
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	17.9

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

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Hole MB06  
 Sample Ref 70  
 Depth (m) 21.50-22.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	99
300 µm	97
212 µm	93
150 µm	89
63 µm	83
20 µm	69
6 µm	47
2 µm	28

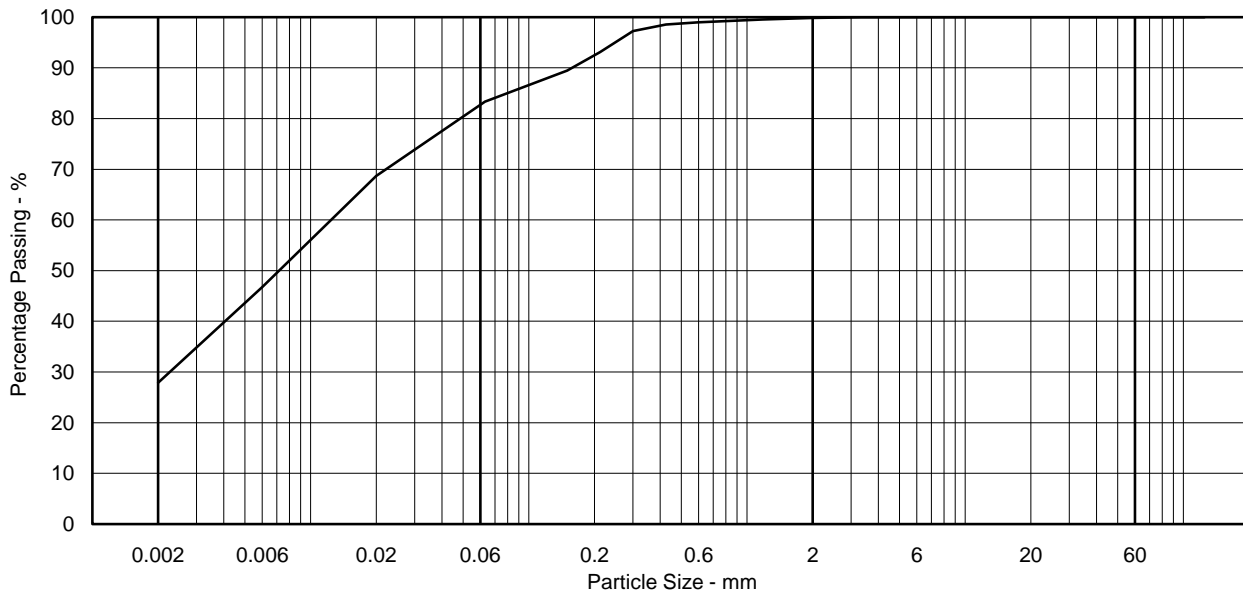
Non Engineering Description
Light grey slightly sandy SILT/CLAY.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	17.5
Silt	54.5
Clay	27.9

Particle Diameter - mm	
D100	3.4
D60	0.012
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
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Site GREAT YARMOUTH 3RD RIVER CROSSING

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Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB06

Sample Ref 77

Depth (m) 23.60

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	97
425 µm	96
300 µm	95
212 µm	93
150 µm	91
63 µm	72
20 µm	35
6 µm	22
2 µm	13

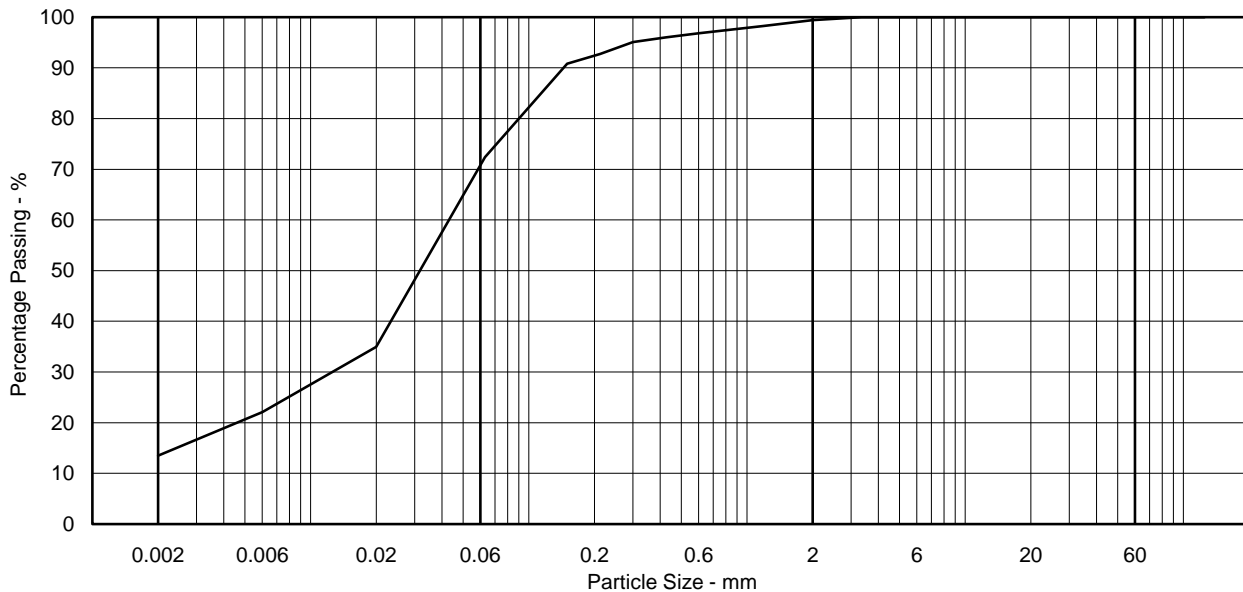
Non Engineering Description	
Grey slightly sandy SILT.	

Sample Proportions - %	
Cobbles	0.0
Gravel	0.6
Sand	29.6
Silt	56.3
Clay	13.5

Particle Diameter - mm	
D100	3.4
D60	0.043
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes	
Sedimentation sample not pre-treated	

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	04/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2018071031-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 2  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 3-Aug-18

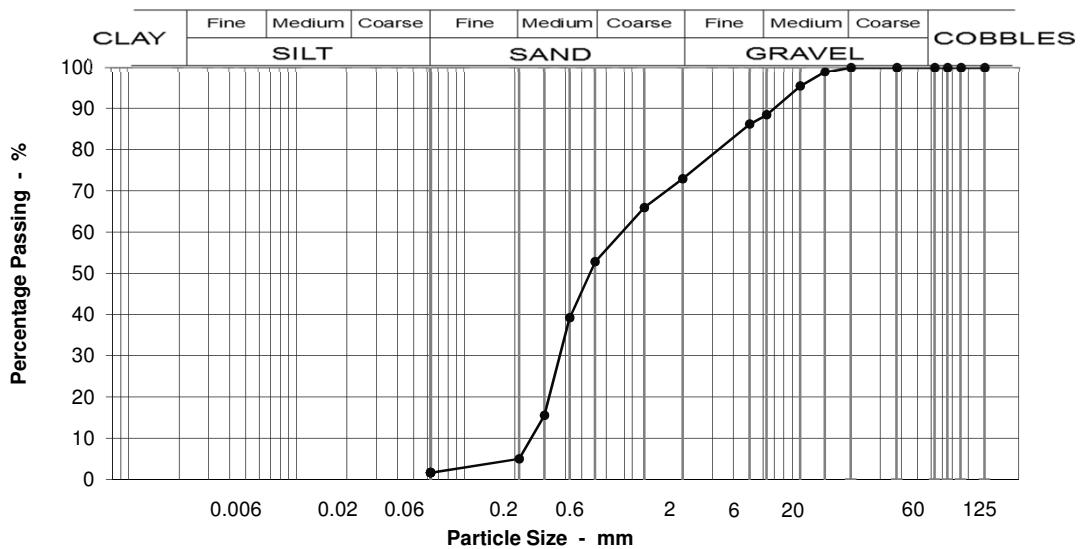
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** MB07 @ 0m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	95
6.3	88
5	86
2	73
1.18	66
0.600	53
0.425	39
0.300	16
0.212	5
0.063	2

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	12
Fine GRAVEL	15
Coarse SAND	20
Medium SAND	48
Fine SAND	3
Silt & Clay	2

Grading Analysis	
D100	14
D60	0.92
D10	0.25
Uniformity Coefficient	4

**Description**  
Greyish brown very gravelly medium to coarse SAND. Gravel is fine and medium angular to subrounded flint, concrete and occasional shell fragments.

**Moisture content %** 16

Test Code = 610



Simon Holden (Project Technician)





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 3

Depth (m) 0.50-1.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	96
6.30 mm	94
5.00 mm	92
3.35 mm	88
2.00 mm	82
1.18 mm	75
600 µm	63
425 µm	51
300 µm	29
212 µm	17
150 µm	11
63 µm	8

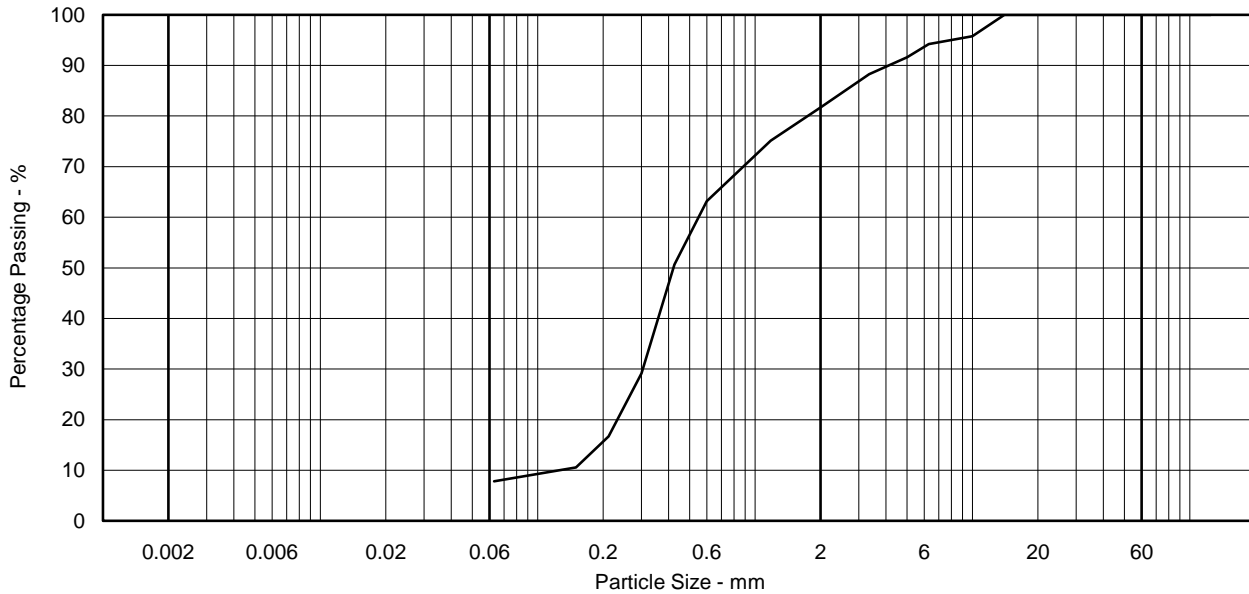
Non Engineering Description
Brown silty gravelly SAND. Gravel is fine to medium.

Sample Proportions - %	
Cobbles	0.0
Gravel	18.3
Sand	73.9
Silt & Clay	7.8

Particle Diameter - mm	
D100	14
D60	0.55
D10	0.13
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	4.2

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving



Sheet 1 of 1



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 6

Depth (m) 1.30

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	98
425 µm	89
300 µm	48
212 µm	25
150 µm	11
63 µm	4

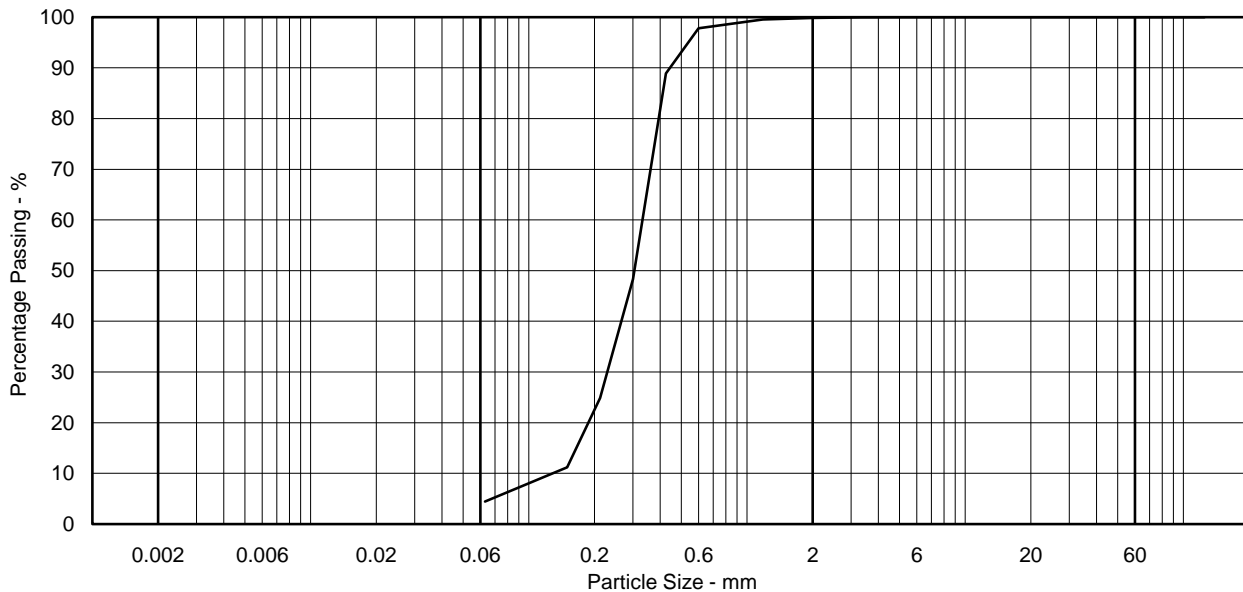
Non Engineering Description
Orange brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	95.4
Silt & Clay	4.5

Particle Diameter - mm	
D100	5.0
D60	0.33
D10	0.13
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB07  
 Sample Ref 10  
 Depth (m) 2.30  
 Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	94
300 µm	72
212 µm	39
150 µm	11
63 µm	5

**Non Engineering Description**  
 Orange brown slightly silty SAND.

**Sample Proportions - %**

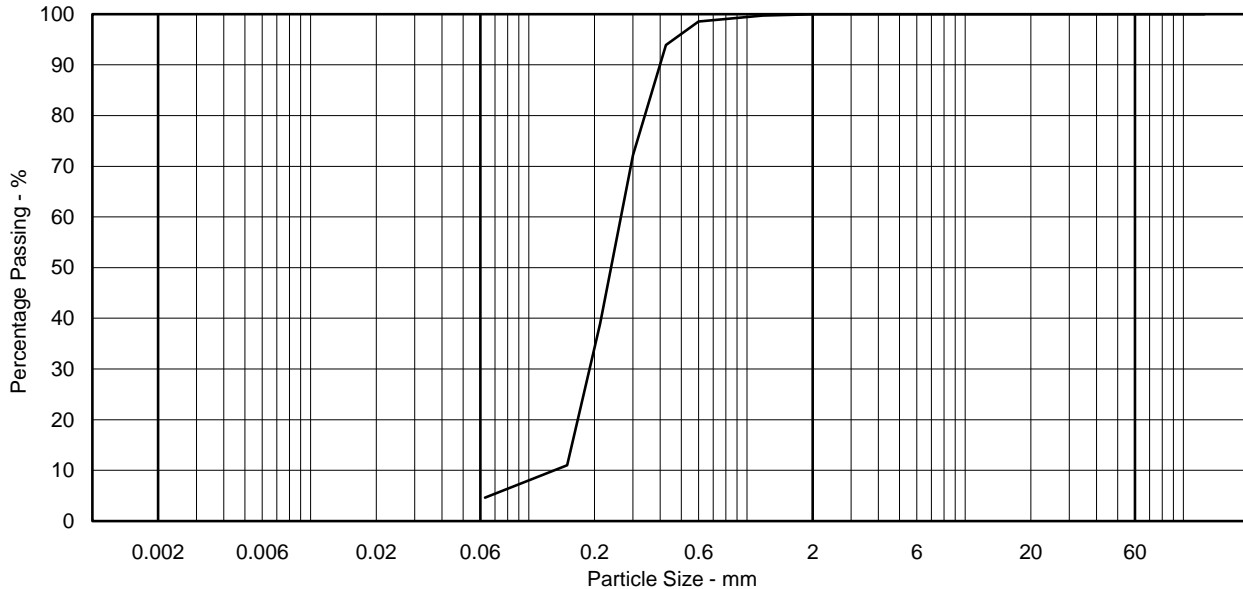
Cobbles	0.0
Gravel	0.0
Sand	95.3
Silt & Clay	4.6

**Particle Diameter - mm**

D100	3.4
D60	0.26
D10	0.13
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.0

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 15

Depth (m) 3.40-4.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	99
5.00 mm	98
3.35 mm	98
2.00 mm	97
1.18 mm	96
600 µm	95
425 µm	93
300 µm	83
212 µm	52
150 µm	18
63 µm	10

**Non Engineering Description**

Orange brown slightly gravelly slightly clayey silty SAND.  
Gravel is fine to medium.

**Sample Proportions - %**

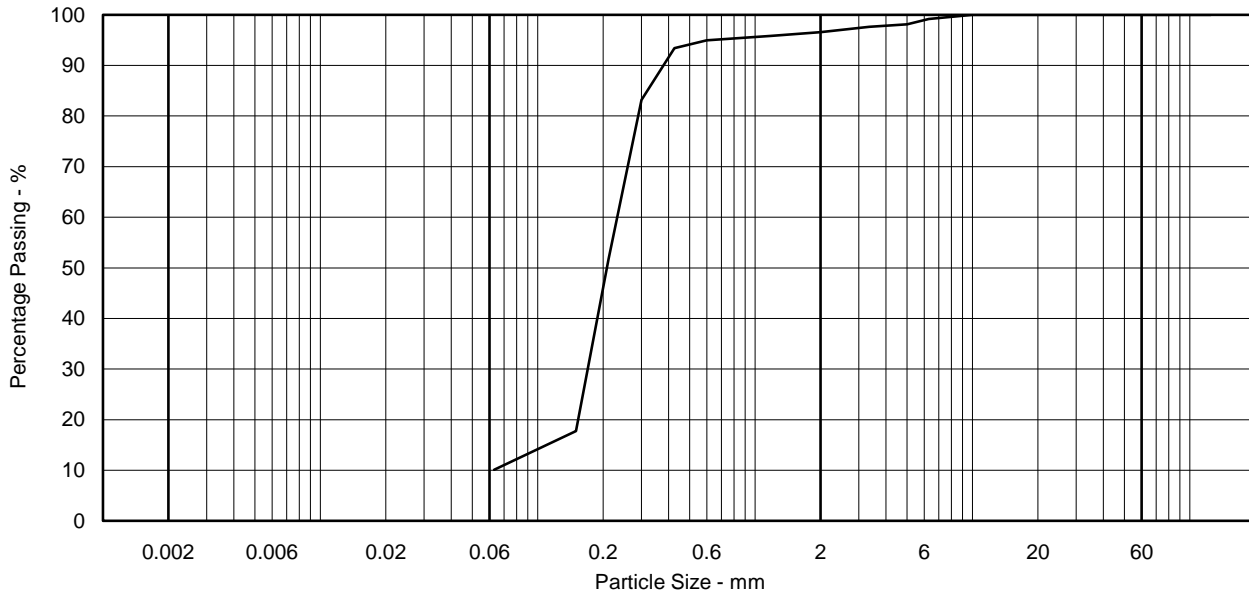
Cobbles	0.0
Gravel	3.4
Sand	86.5
Silt & Clay	10.1

**Particle Diameter - mm**

D100	10
D60	0.23
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	06/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 22

Depth (m) 5.30

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	99
300 µm	98
212 µm	75
150 µm	36
63 µm	22
20 µm	10
6 µm	8
2 µm	7

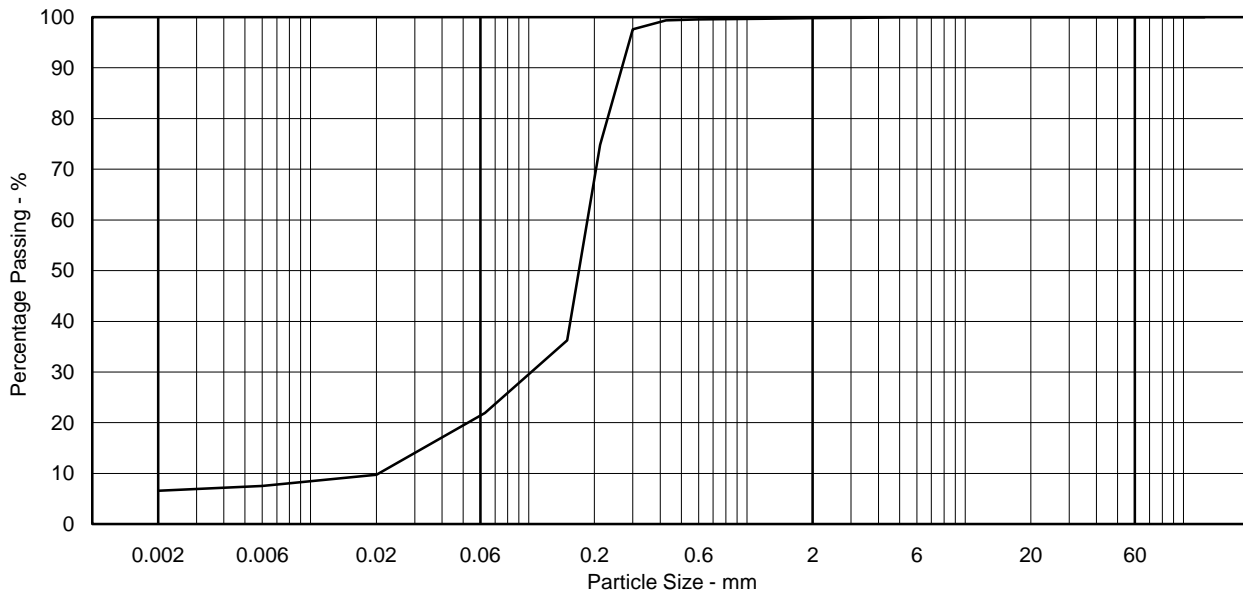
Non Engineering Description
Light brown clayey silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	78.7
Silt	14.5
Clay	6.6

Particle Diameter - mm	
D100	5.0
D60	0.19
D10	0.020
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	9.5

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	11/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 26

Depth (m) 6.50-7.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	98
425 µm	98
300 µm	95
212 µm	67
150 µm	22
63 µm	4

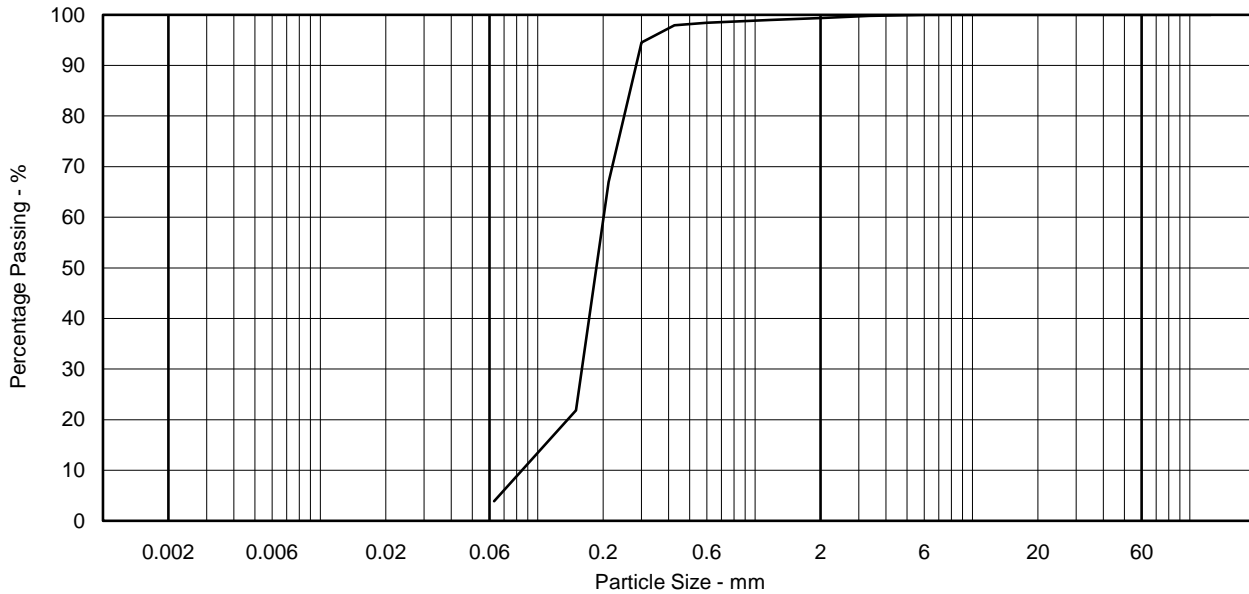
Non Engineering Description
Light brown slightly silty SAND with rare fine gravel.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.7
Sand	95.5
Silt & Clay	3.9

Particle Diameter - mm	
D100	6.3
D60	0.20
D10	0.085
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.4

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 32

Depth (m) 8.50-9.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	99
425 µm	99
300 µm	97
212 µm	68
150 µm	20
63 µm	4

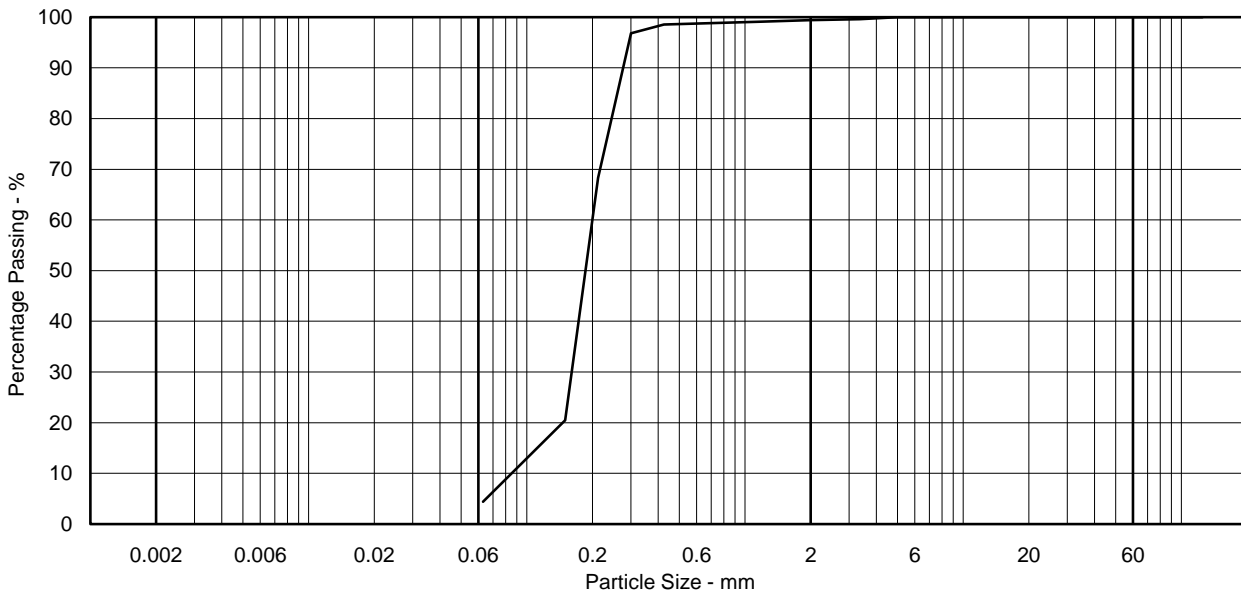
Non Engineering Description
Brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.6
Sand	95.0
Silt & Clay	4.4

Particle Diameter - mm	
D100	5.0
D60	0.20
D10	0.085
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.4

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07  
 Sample Ref 39  
 Depth (m) 10.50-11.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	99
300 µm	92
212 µm	71
150 µm	27
63 µm	5

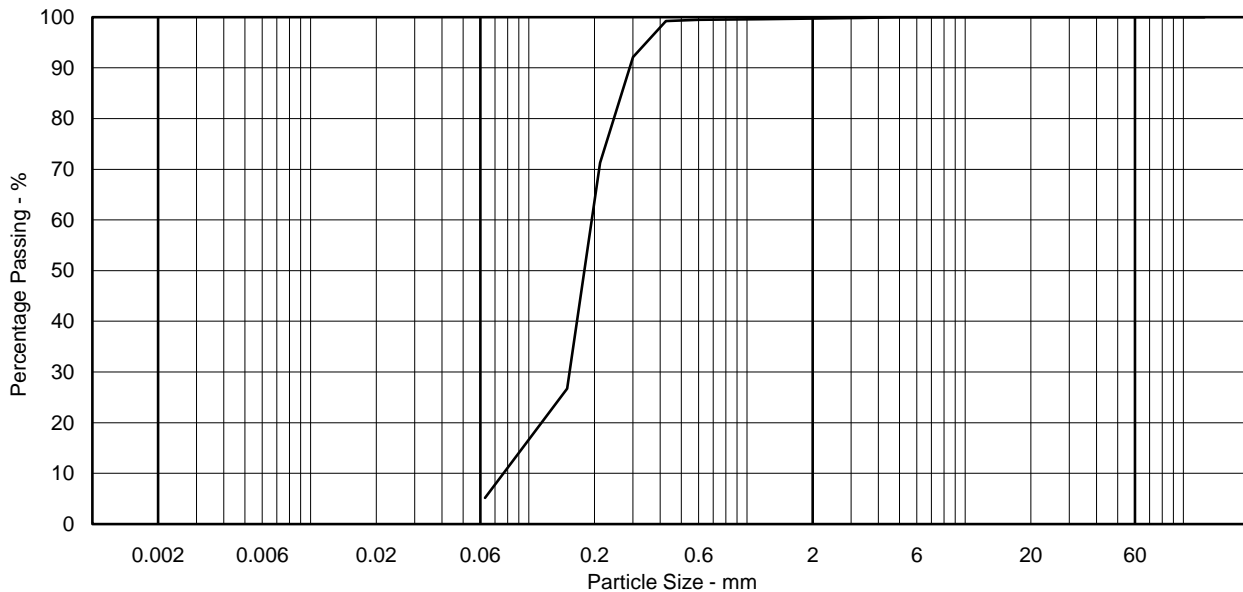
Non Engineering Description
Light orange brown silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	94.6
Silt & Clay	5.2

Particle Diameter - mm	
D100	5.0
D60	0.19
D10	0.077
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 41

Depth (m) 11.30

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	98
6.30 mm	98
5.00 mm	97
3.35 mm	97
2.00 mm	97
1.18 mm	97
600 µm	96
425 µm	96
300 µm	85
212 µm	57
150 µm	23
63 µm	5

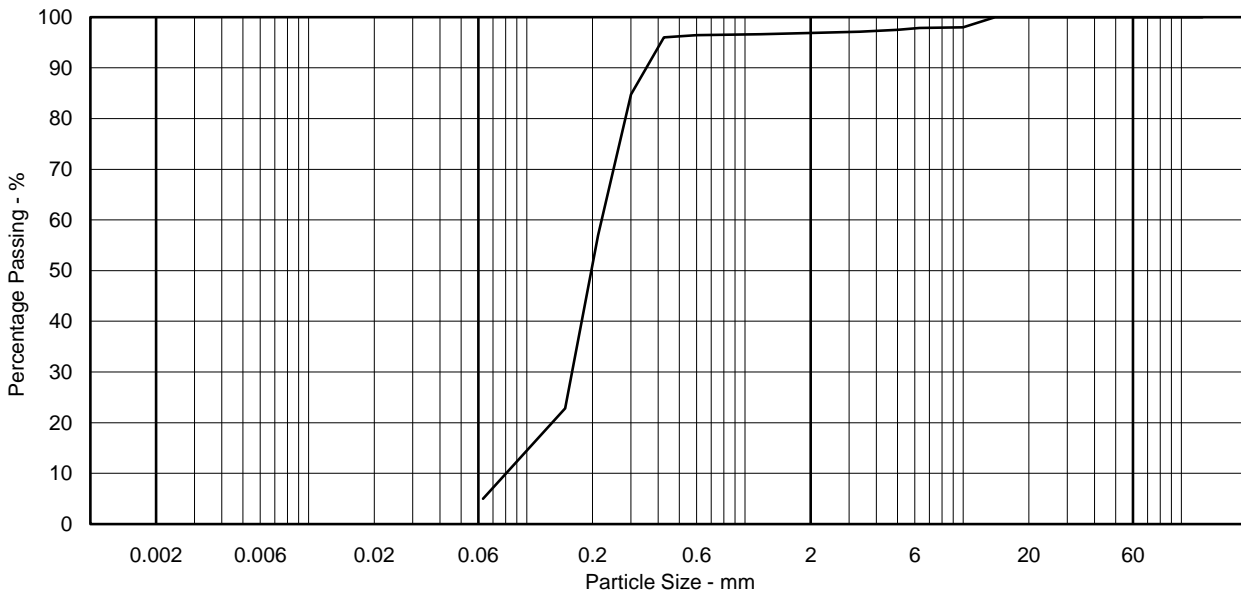
Non Engineering Description
Brown slightly gravelly silty SAND. Gravel is fine to medium.


Sample Proportions - %	
Cobbles	0.0
Gravel	3.1
Sand	91.9
Silt & Clay	5.0

Particle Diameter - mm	
D100	14
D60	0.22
D10	0.080
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.8

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	 05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole MB07  
 Sample Ref 42  
 Depth (m) 11.50-12.00  
 Sample Type B

Engineer Norfolk Partnership Laboratory

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	98
425 µm	95
300 µm	84
212 µm	61
150 µm	24
63 µm	3

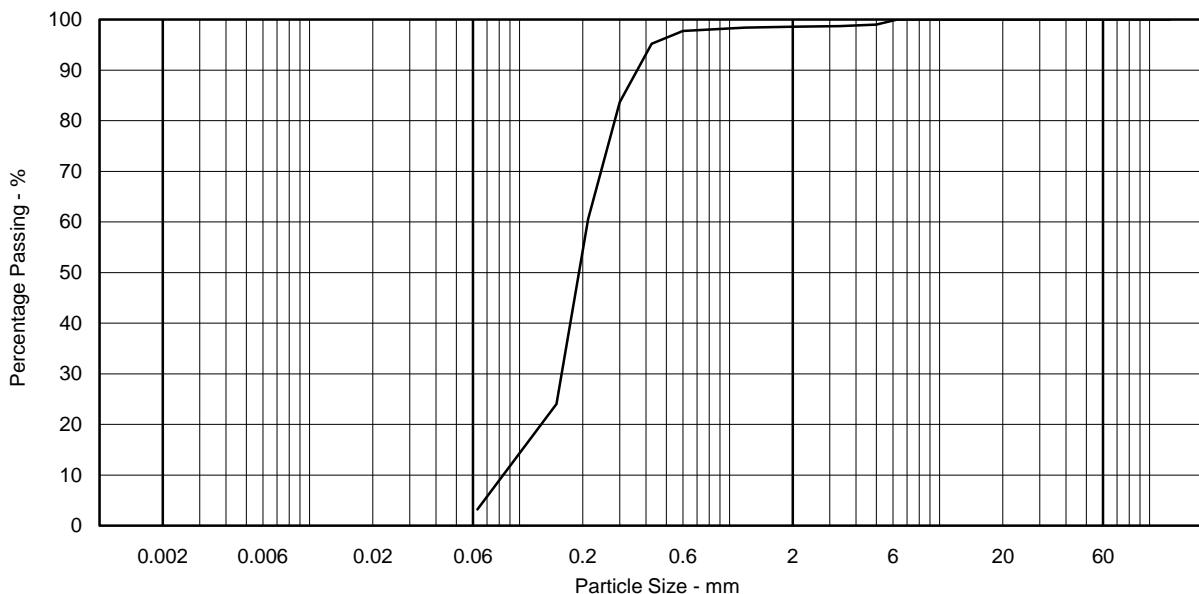
Non Engineering Description
Light brown slightly silty SAND with organic odour and rare fine gravel.

Sample Proportions - %	
Cobbles	0.0
Gravel	1.4
Sand	95.4
Silt & Clay	3.2

Particle Diameter - mm	
D100	6.3
D60	0.21
D10	0.084
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	10/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07  
 Sample Ref 48  
 Depth (m) 13.50-14.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	97
425 µm	91
300 µm	69
212 µm	44
150 µm	22
63 µm	4

**Non Engineering Description**

Light brown slightly silty SAND with rare fine shell fragments.

**Sample Proportions - %**

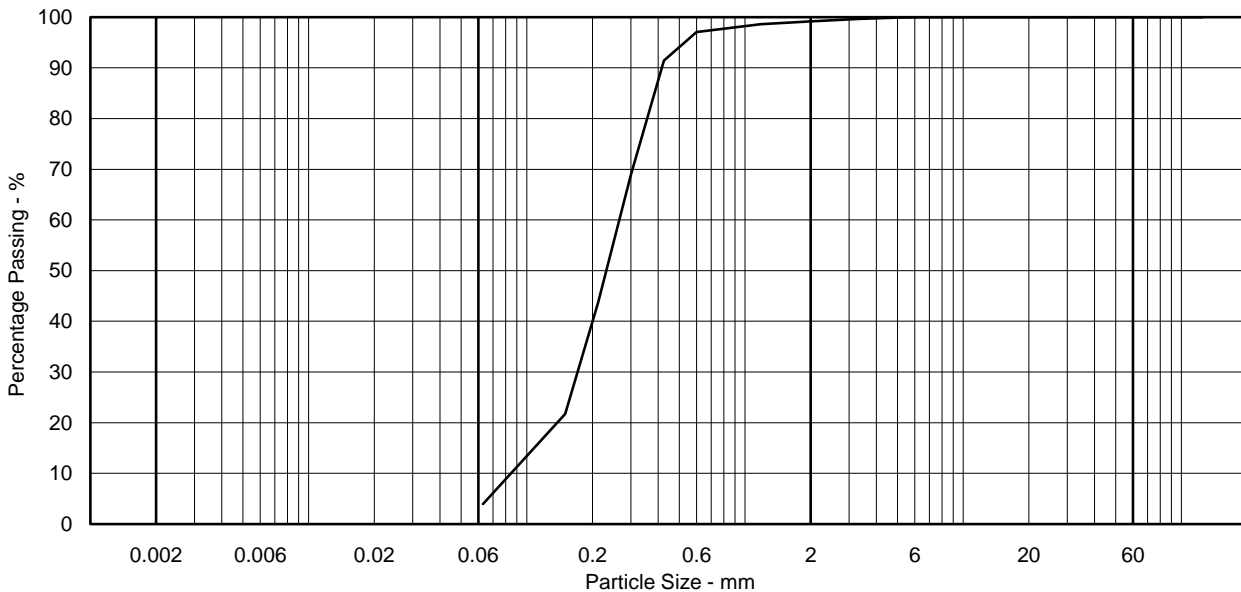
Cobbles	0.0
Gravel	0.8
Sand	95.2
Silt & Clay	4.0

**Particle Diameter - mm**

D100	6.3
D60	0.27
D10	0.085
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.2

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 54

Depth (m) 15.50-16.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	96
425 µm	87
300 µm	54
212 µm	26
150 µm	10
63 µm	2

**Non Engineering Description**

Brown slightly silty SAND with rare fine shell fragments.

**Sample Proportions - %**

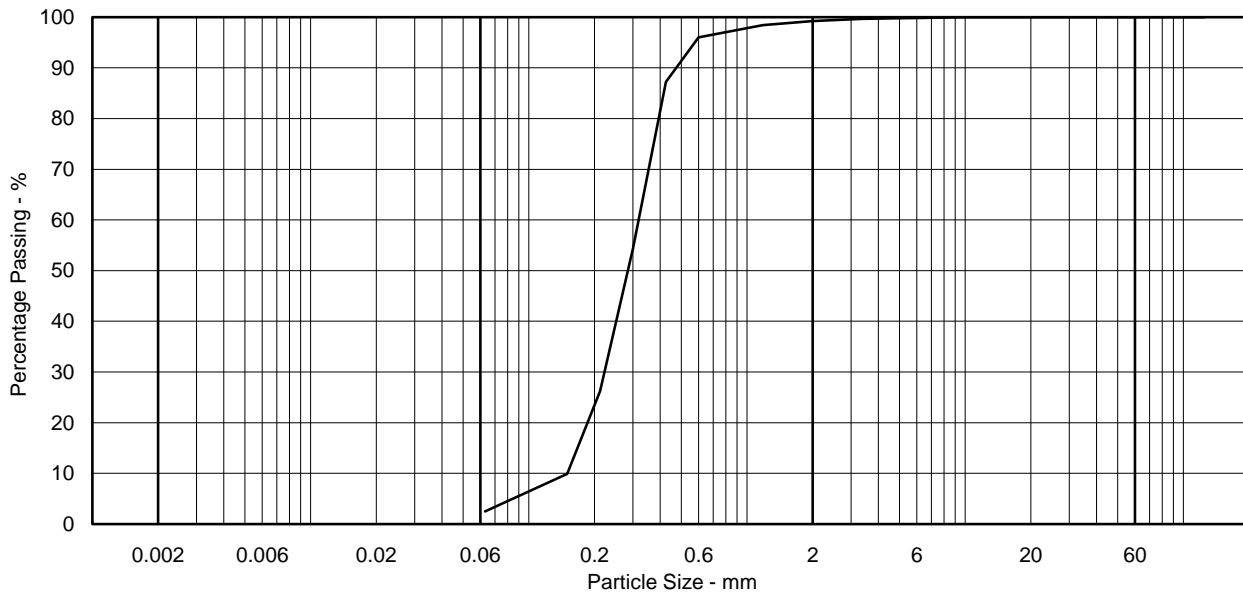
Cobbles	0.0
Gravel	0.8
Sand	96.7
Silt & Clay	2.5

**Particle Diameter - mm**

D100	10
D60	0.32
D10	0.15
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.1

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving







Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB07  
 Sample Ref 63  
 Depth (m) 18.50-19.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	97
425 µm	92
300 µm	72
212 µm	48
150 µm	27
63 µm	11
20 µm	9
6 µm	7
2 µm	5

**Non Engineering Description**  
 Brown slightly clayey silty SAND with rare fine gravel.

**Sample Proportions - %**

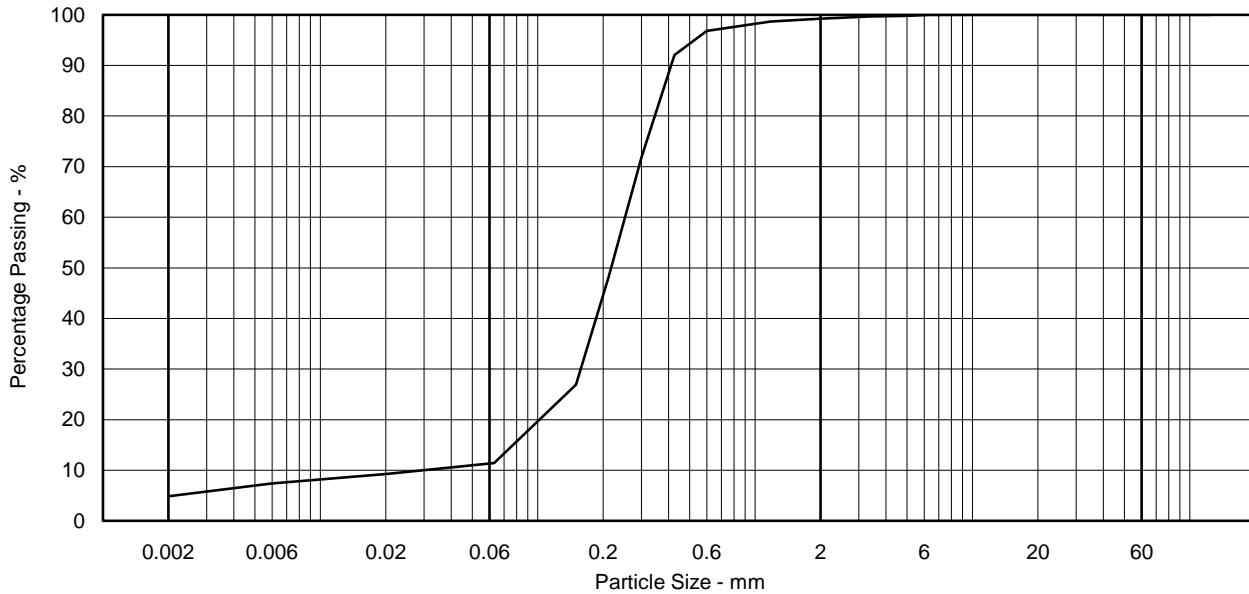
Cobbles	0.0
Gravel	0.8
Sand	88.0
Silt	6.4
Clay	4.9

**Particle Diameter - mm**

D100	6.3
D60	0.25
D10	0.030
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	8.3

**Notes**  
 Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
PD	11/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07  
 Sample Ref 66  
 Depth (m) 19.50-20.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	97
425 µm	92
300 µm	81
212 µm	66
150 µm	55
63 µm	45
20 µm	37
6 µm	26
2 µm	15

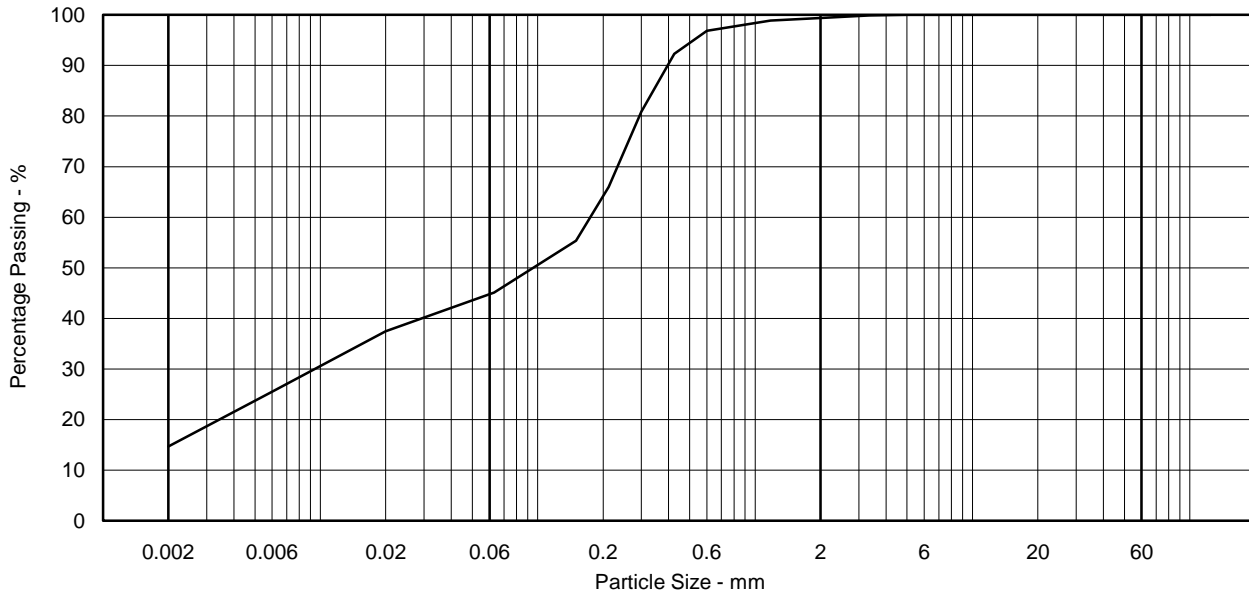
Non Engineering Description
Dark grey sandy CLAY.


Sample Proportions - %	
Cobbles	0.0
Gravel	0.6
Sand	54.8
Silt	29.9
Clay	14.7

Particle Diameter - mm	
D100	5.0
D60	0.17
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	 05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB07

Engineer Norfolk Partnership Laboratory

Sample Ref 69

Depth (m) 20.60

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	99
425 µm	98
300 µm	95
212 µm	88
150 µm	80
63 µm	71
20 µm	54
6 µm	36
2 µm	19

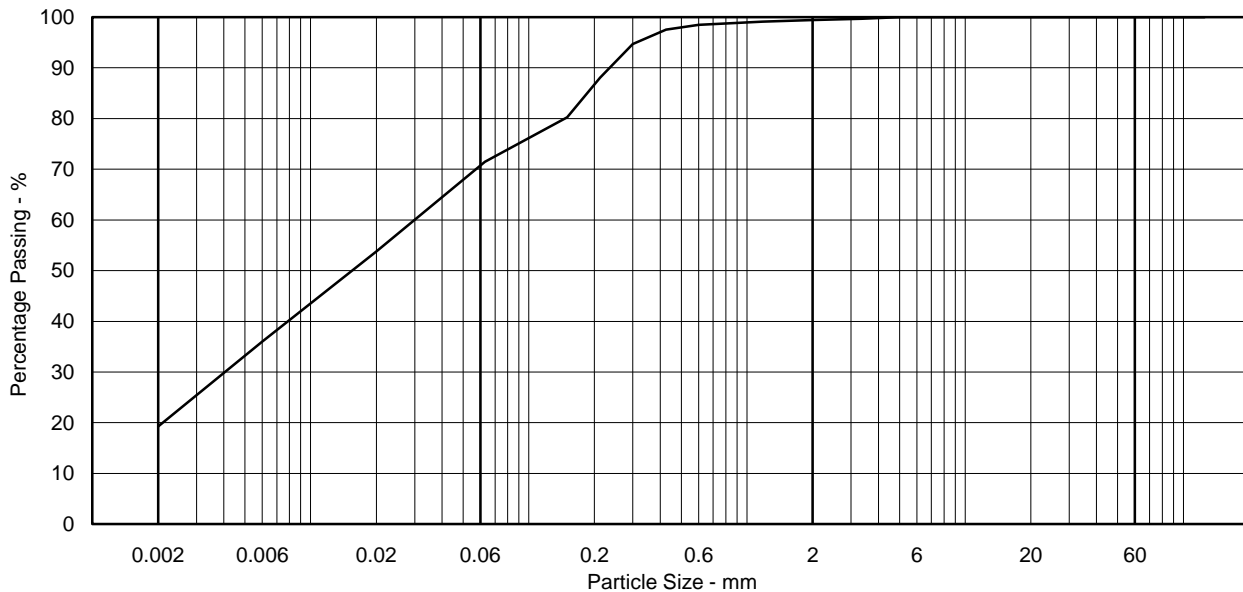
Non Engineering Description	
Grey slightly sandy SILT/CLAY.	

Sample Proportions - %	
Cobbles	0.0
Gravel	0.6
Sand	29.2
Silt	50.9
Clay	19.3

Particle Diameter - mm	
D100	5.0
D60	0.030
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes	
Sedimentation sample not pre-treated	

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	06/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 80

Depth (m) 24.50-25.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	94
425 µm	90
300 µm	78
212 µm	37
150 µm	22
63 µm	16
20 µm	13
6 µm	10
2 µm	6

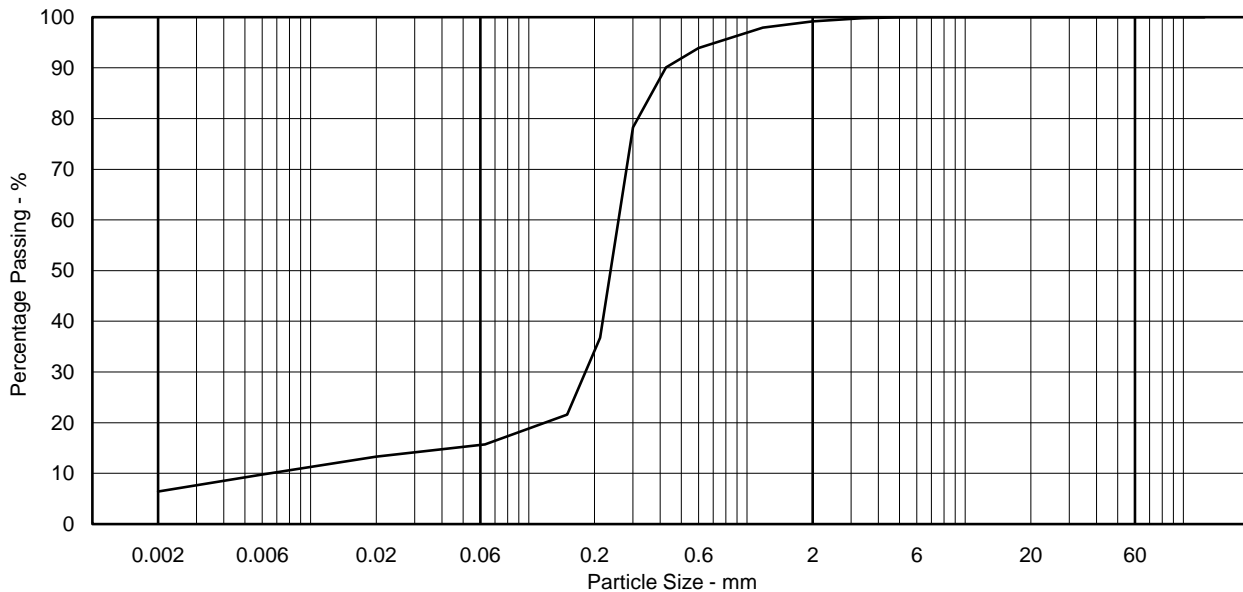
Non Engineering Description
Dark grey clayey silty SAND with rare shell fragments.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.8
Sand	83.6
Silt	9.1
Clay	6.4

Particle Diameter - mm	
D100	6.3
D60	0.26
D10	0.0065
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	40.0

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
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 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole MB07  
 Sample Ref 82  
 Depth (m) 25.50-26.00  
 Sample Type B

Engineer Norfolk Partnership Laboratory

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	96
425 µm	94
300 µm	84
212 µm	43
150 µm	24
63 µm	14
20 µm	11
6 µm	8
2 µm	5

**Non Engineering Description**

Grey mottled light brown clayey silty SAND with rare fine shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	0.8
Sand	85.7
Silt	8.3
Clay	5.2

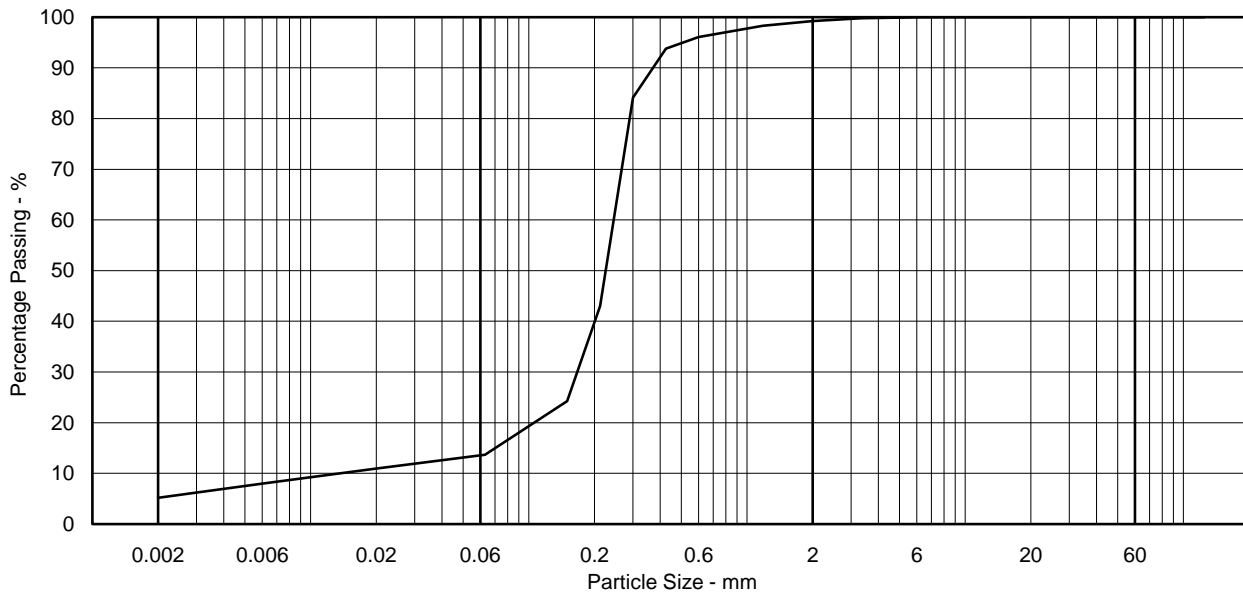
**Particle Diameter - mm**

D100	6.3
D60	0.24
D10	0.014
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	17.1

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 87

Depth (m) 27.50-28.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	98
1.18 mm	98
600 µm	97
425 µm	96
300 µm	92
212 µm	49
150 µm	24
63 µm	10

**Non Engineering Description**

Dark grey slightly clayey slightly gravelly silty SAND. Gravel is fine.

**Sample Proportions - %**

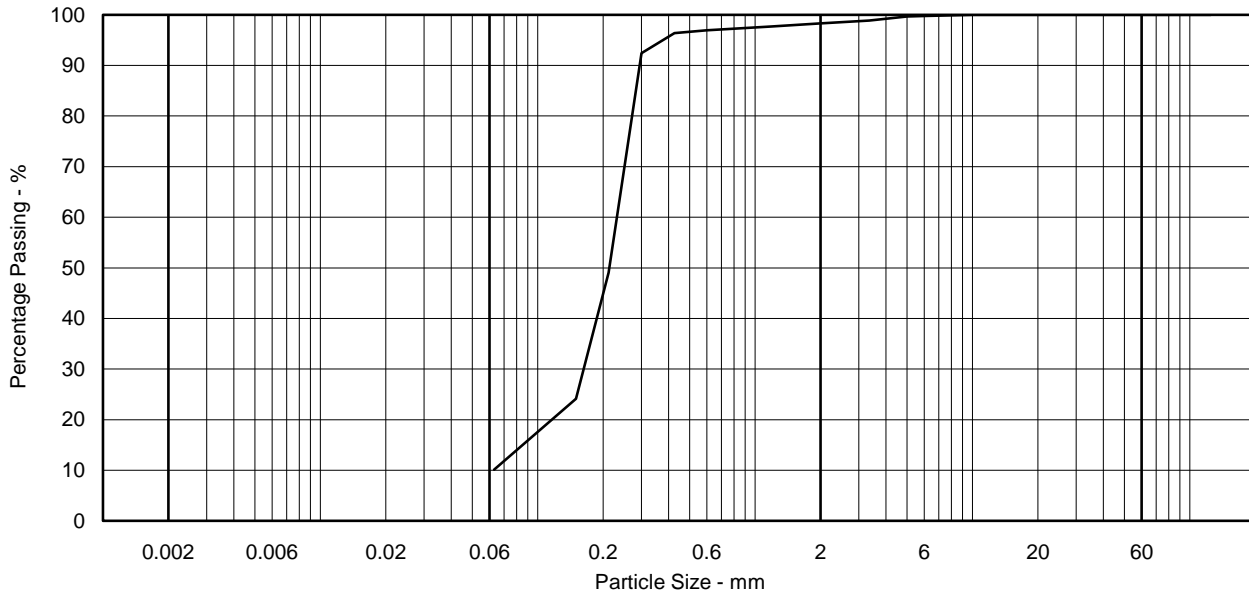
Cobbles	0.0
Gravel	1.7
Sand	88.2
Silt & Clay	10.1


**Particle Diameter - mm**

D100	10
D60	0.23
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	 06/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07  
 Sample Ref 90  
 Depth (m) 28.50-29.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	99
600 µm	97
425 µm	96
300 µm	90
212 µm	57
150 µm	25
63 µm	9

**Non Engineering Description**

Light grey silty SAND with rare fine gravel.

**Sample Proportions - %**

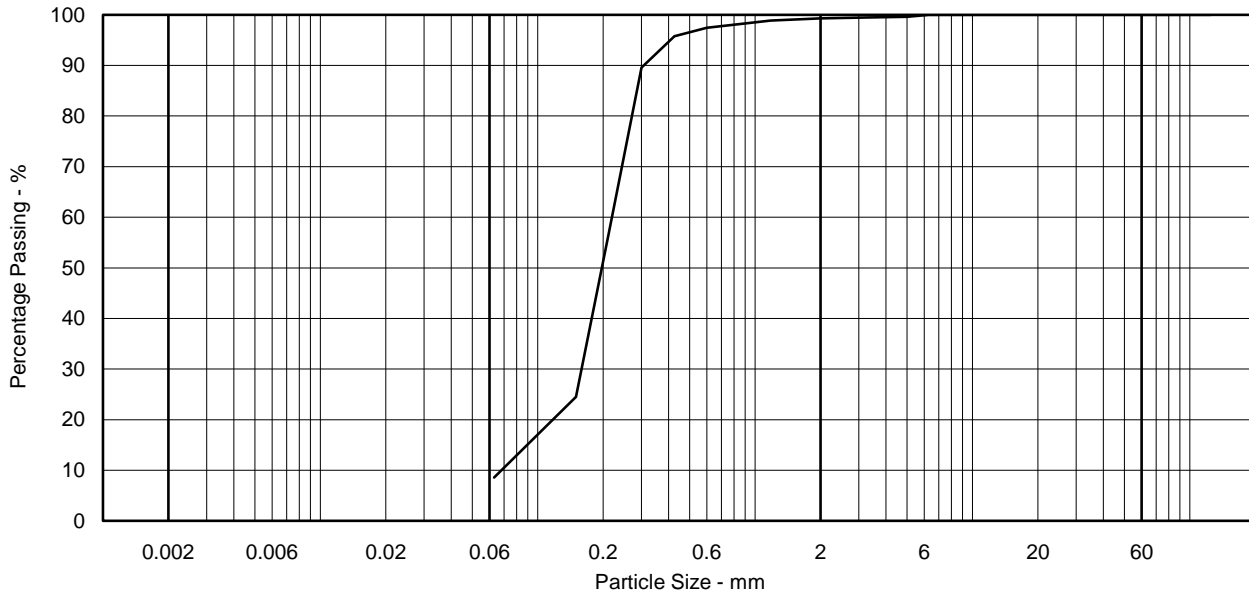
Cobbles	0.0
Gravel	0.7
Sand	90.7
Silt & Clay	8.6

**Particle Diameter - mm**

D100	6.3
D60	0.22
D10	0.068
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.2

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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PD	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving







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Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07  
 Sample Ref 95  
 Depth (m) 30.50-31.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	98
425 µm	95
300 µm	78
212 µm	40
150 µm	19
63 µm	6

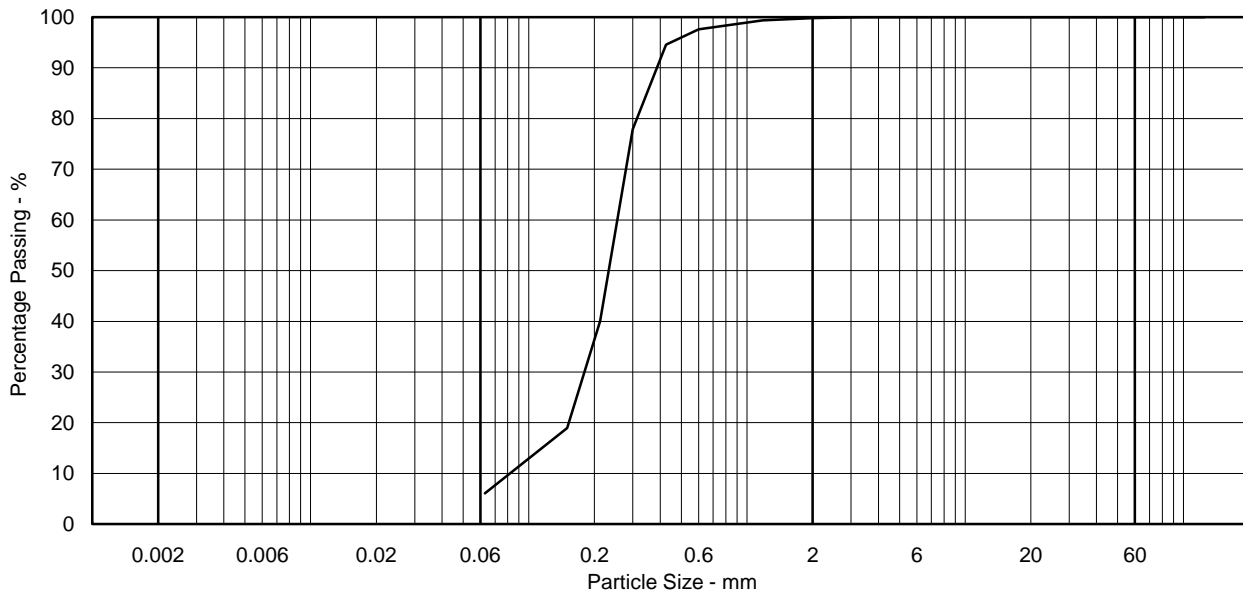
Non Engineering Description
Light brown silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	93.7
Silt & Clay	6.1

Particle Diameter - mm	
D100	3.4
D60	0.25
D10	0.082
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.0

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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LA	05/09/2018

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 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07  
 Sample Ref 102  
 Depth (m) 33.50-34.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	95
425 µm	84
300 µm	56
212 µm	30
150 µm	16
63 µm	6

**Non Engineering Description**

Dark brown slightly clayey slightly silty SAND.

**Sample Proportions - %**

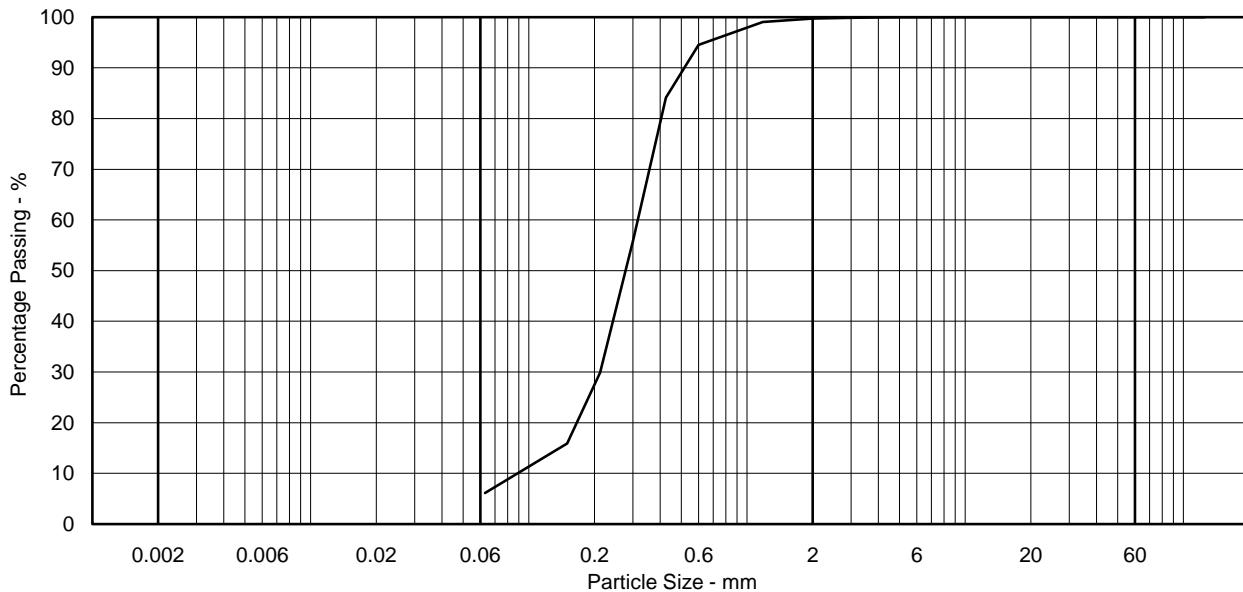
Cobbles	0.0
Gravel	0.3
Sand	93.6
Silt & Clay	6.1

**Particle Diameter - mm**

D100	5.0
D60	0.32
D10	0.089
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.6

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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LA	2018

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 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07  
 Sample Ref 105  
 Depth (m) 34.50-35.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	94
425 µm	84
300 µm	54
212 µm	26
150 µm	13
63 µm	3

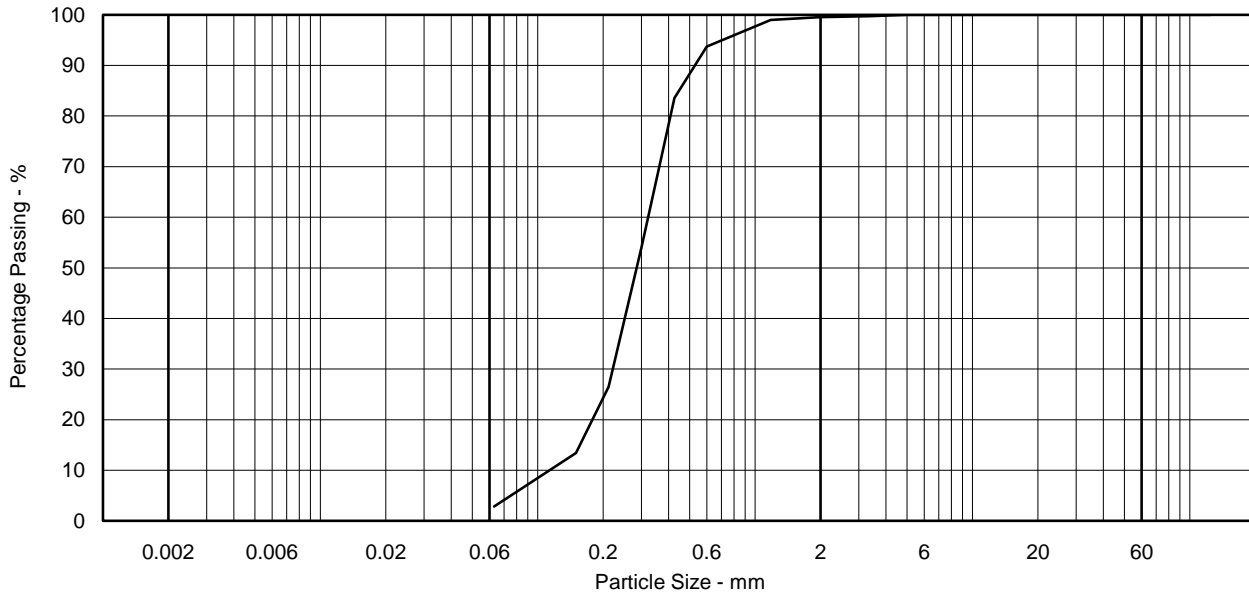
Non Engineering Description
Light brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.5
Sand	96.7
Silt & Clay	2.8

Particle Diameter - mm	
D100	5.0
D60	0.32
D10	0.11
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.9

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07  
 Sample Ref 110  
 Depth (m) 36.50-37.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	96
425 µm	88
300 µm	66
212 µm	39
150 µm	16
63 µm	5

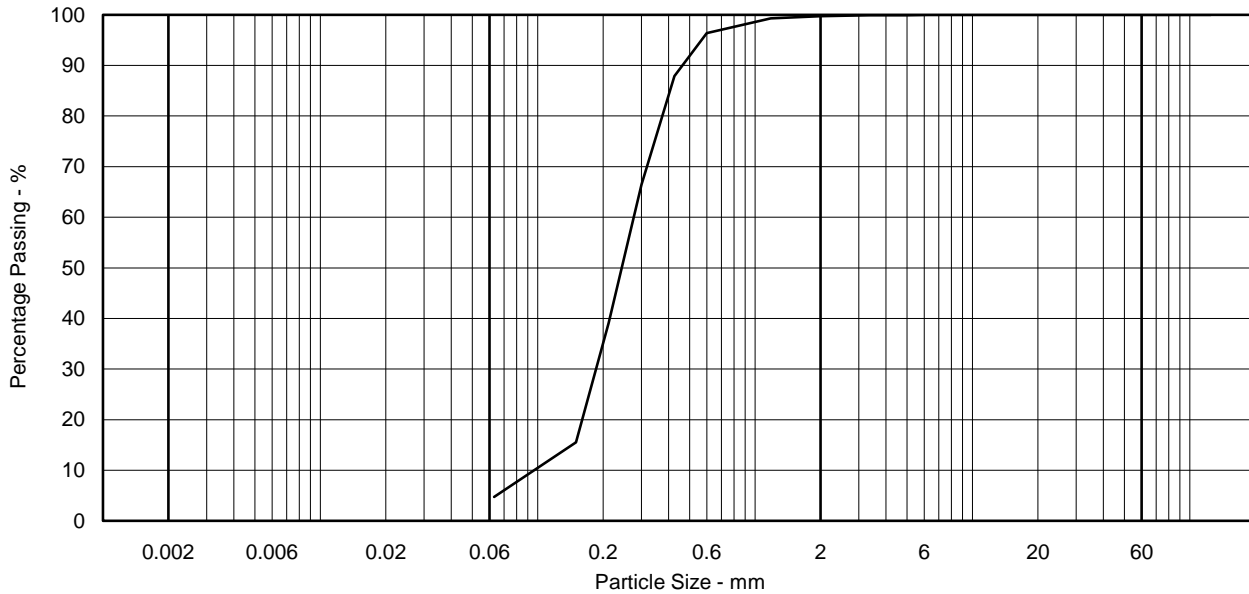
Non Engineering Description
Grey mottled brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	95.0
Silt & Clay	4.7

Particle Diameter - mm	
D100	6.3
D60	0.28
D10	0.096
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.9

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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PD	/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 112

Depth (m) 37.50-38.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	96
10.0 mm	96
6.30 mm	96
5.00 mm	95
3.35 mm	95
2.00 mm	94
1.18 mm	93
600 µm	92
425 µm	92
300 µm	90
212 µm	88
150 µm	85
63 µm	76
20 µm	60
6 µm	42
2 µm	24

**Non Engineering Description**

Olive mottled dark brown slightly gravelly slightly sandy CLAY. Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	5.8
Sand	19.0
Silt	51.2
Clay	24.0

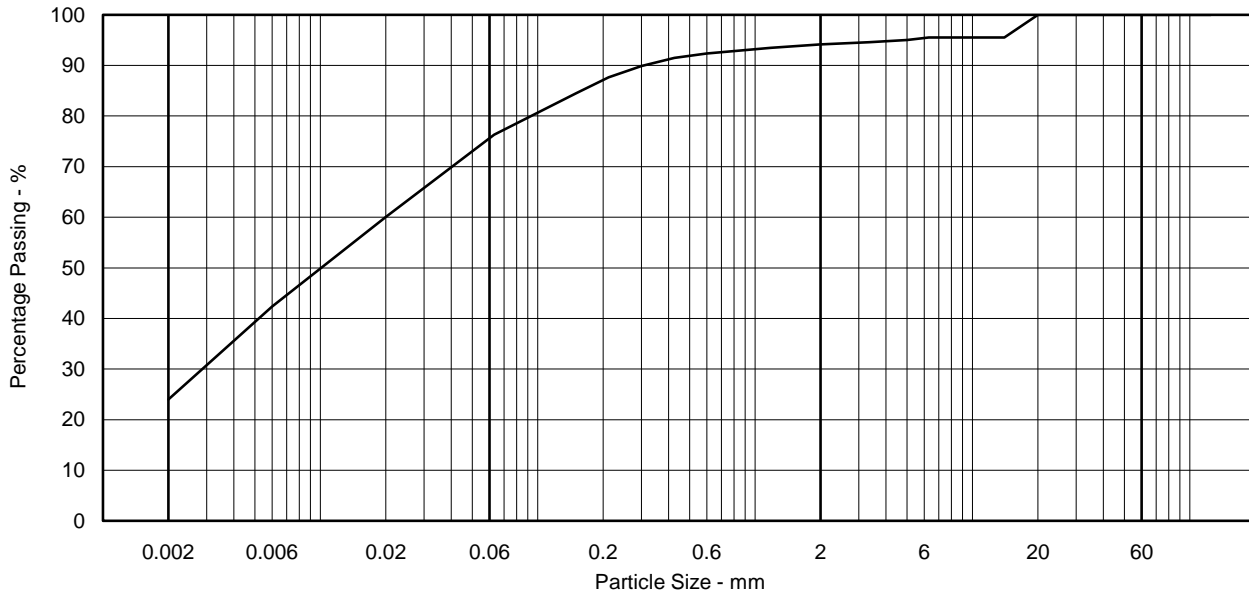
**Particle Diameter - mm**

D100	20
D60	0.020
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref 114

Depth (m) 38.60

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	98
1.18 mm	96
600 µm	93
425 µm	92
300 µm	90
212 µm	89
150 µm	87
63 µm	81
20 µm	65
6 µm	44
2 µm	24

**Non Engineering Description**

Greyish brown slightly gravelly slightly sandy CLAY. Gravel is fine.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.6
Sand	18.3
Silt	56.6
Clay	23.6

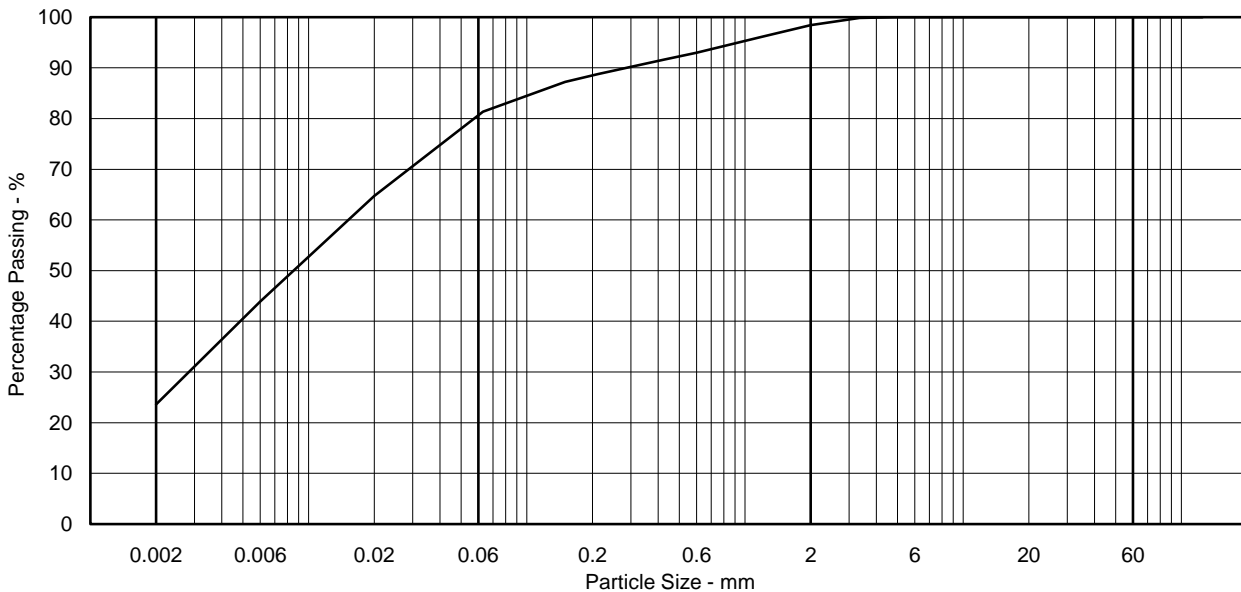
**Particle Diameter - mm**

D100	5.0
D60	0.015
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
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Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2018071032-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 2  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 3-Aug-18

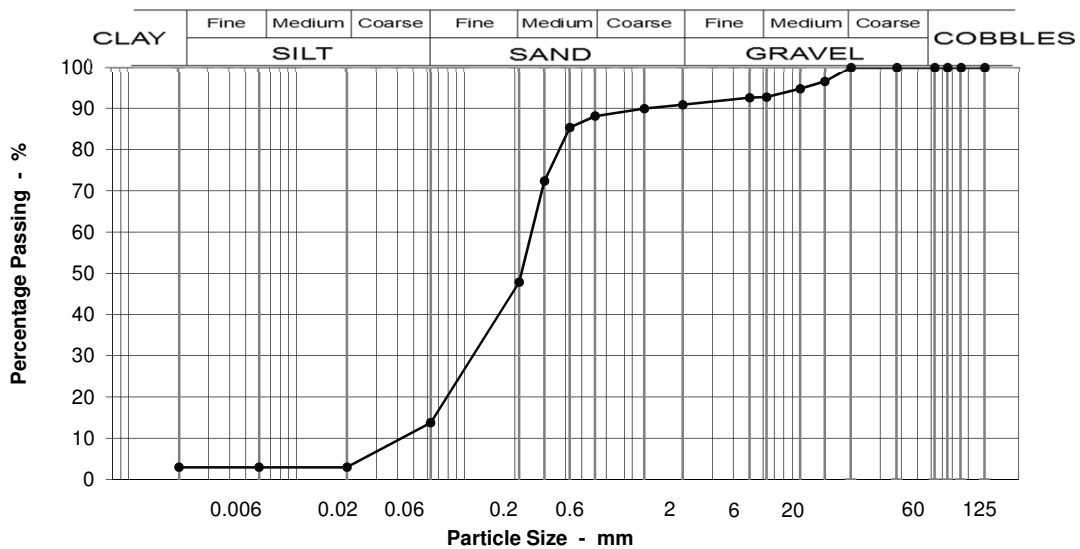
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** MB08 @ 0m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample

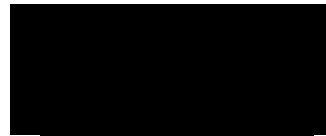


Sieving		Specification for Highway Works Classification Table 6/2	Sample Proportions	
Particle Size mm	% Passing			
125	100	<b>This material complies with the following material classes 1B, 6E/6R.</b>	BOULDERS	0
90	100		COBBLES	0
75	100		Coarse GRAVEL	0
63	100		Medium GRAVEL	7
37.5	100		Fine GRAVEL	2
20	100		Coarse SAND	3
14	97		Medium SAND	40
10	95		Fine SAND	34
6.3	93		Silt & Clay	14
5	93		<b>Grading Analysis</b>	
2	91		D100	14
1.18	90		D60	0.26
0.600	88		D10	0.09
0.425	85		Uniformity Coefficient	3
0.300	72		<b>Description</b>	
0.212	48	Grey and brown slightly gravelly silty fine and medium SAND. Gravel is medium angular to subangular flint.		
0.063	14			
0.020	3			
0.006	3			
0.002	3			
<b>Moisture content %</b>		47		

Test Code = 610



Simon Holden (Project Technician)







Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB08

Engineer Norfolk Partnership Laboratory

Sample Ref 3

Depth (m) 0.50-1.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	99
2.00 mm	98
1.18 mm	97
600 µm	92
425 µm	81
300 µm	58
212 µm	43
150 µm	34
63 µm	25
20 µm	22
6 µm	17
2 µm	12

**Non Engineering Description**

Dark brown mottled very dark grey slightly gravelly clayey silty SAND. Gravel is fine.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.6
Sand	73.3
Silt	13.0
Clay	12.2

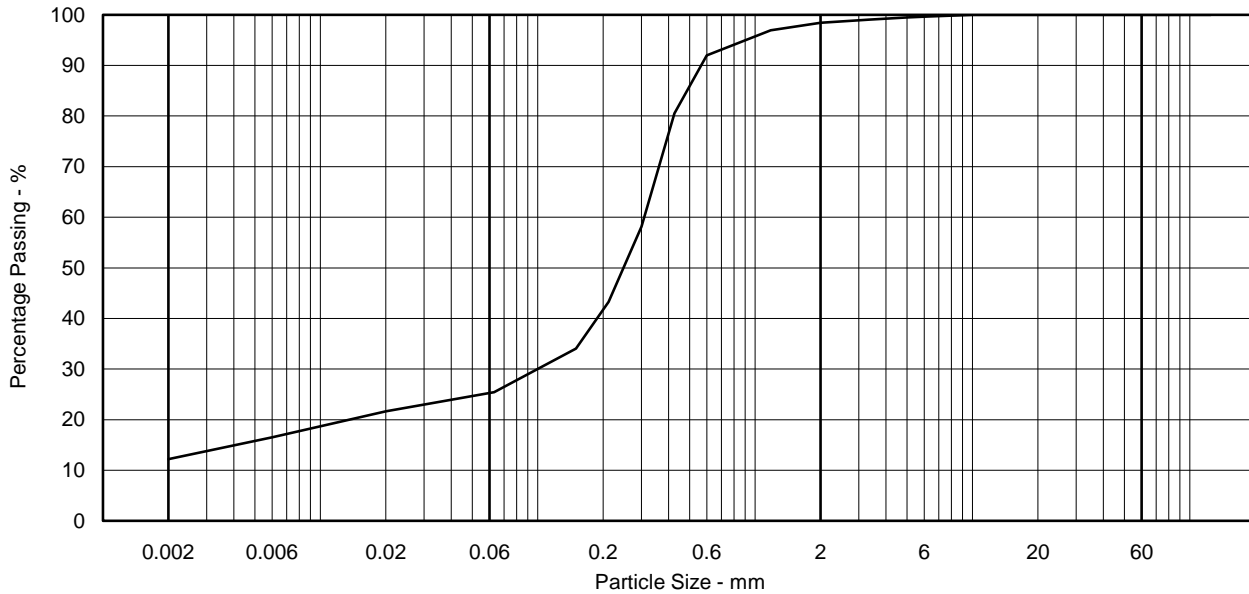
**Particle Diameter - mm**

D100	10
D60	0.31
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
PD	018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB08

Sample Ref 7

Depth (m) 1.50-2.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	98
5.00 mm	96
3.35 mm	95
2.00 mm	94
1.18 mm	92
600 µm	87
425 µm	73
300 µm	44
212 µm	24
150 µm	15
63 µm	9

**Non Engineering Description**

Orange brown slightly clayey silty gravelly SAND. Gravel is fine to medium.

**Sample Proportions - %**

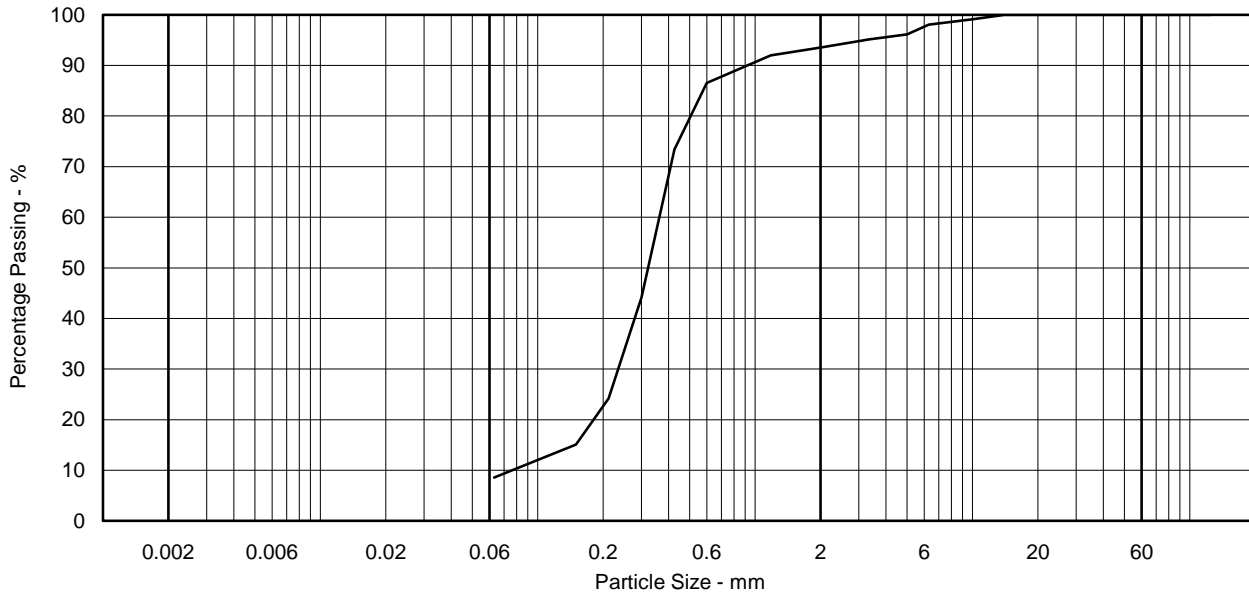
Cobbles	0.0
Gravel	6.5
Sand	85.0
Silt & Clay	8.6

**Particle Diameter - mm**

D100	14
D60	0.36
D10	0.076
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	4.7

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB08

Sample Ref 19

Depth (m) 4.50-5.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	95
425 µm	85
300 µm	52
212 µm	27
150 µm	12
63 µm	6

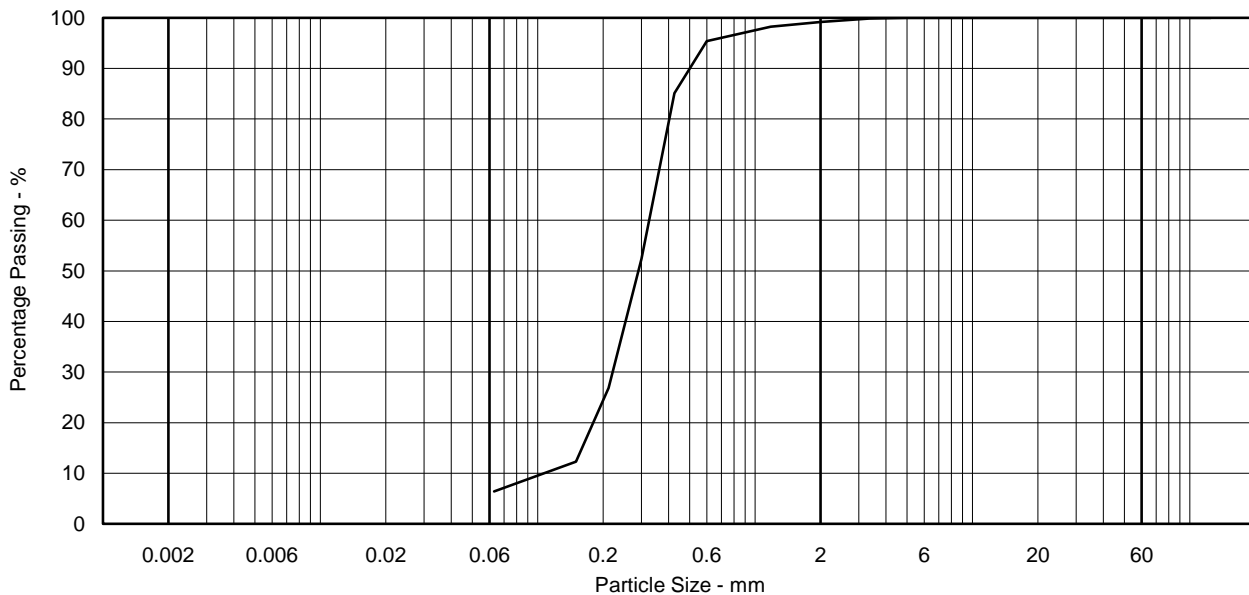
Non Engineering Description
Orange brown SAND with pockets of dark grey silty sand.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.8
Sand	92.8
Silt & Clay	6.4

Particle Diameter - mm	
D100	5.0
D60	0.33
D10	0.11
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.0

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB08

Sample Ref 29

Depth (m) 7.50-8.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	99
300 µm	95
212 µm	74
150 µm	23
63 µm	3

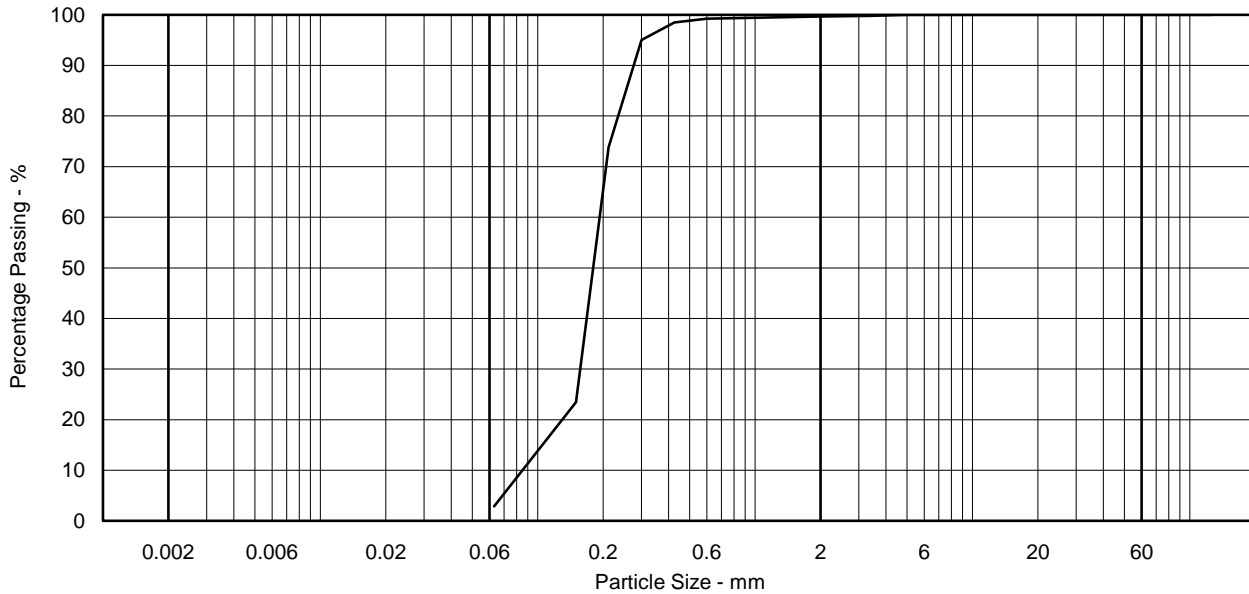
Non Engineering Description
Orange brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	96.8
Silt & Clay	2.9

Particle Diameter - mm	
D100	5.0
D60	0.19
D10	0.085
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.2

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB08

Sample Ref 35

Depth (m) 9.50-10.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	99
425 µm	98
300 µm	95
212 µm	68
150 µm	20
63 µm	4

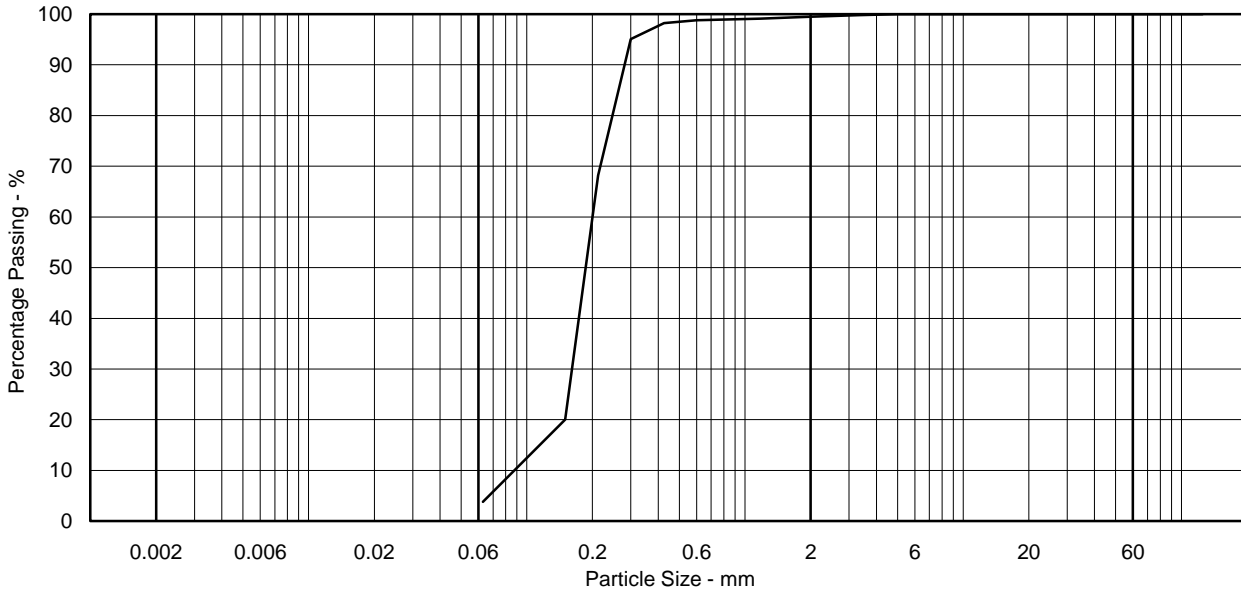
Non Engineering Description
Orange brown slightly silty SAND

Sample Proportions - %	
Cobbles	0.0
Gravel	0.5
Sand	95.7
Silt & Clay	3.8

Particle Diameter - mm	
D100	5.0
D60	0.20
D10	0.088
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.3

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB08

Sample Ref 41

Depth (m) 11.50-12.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	96
300 µm	80
212 µm	59
150 µm	23
63 µm	4

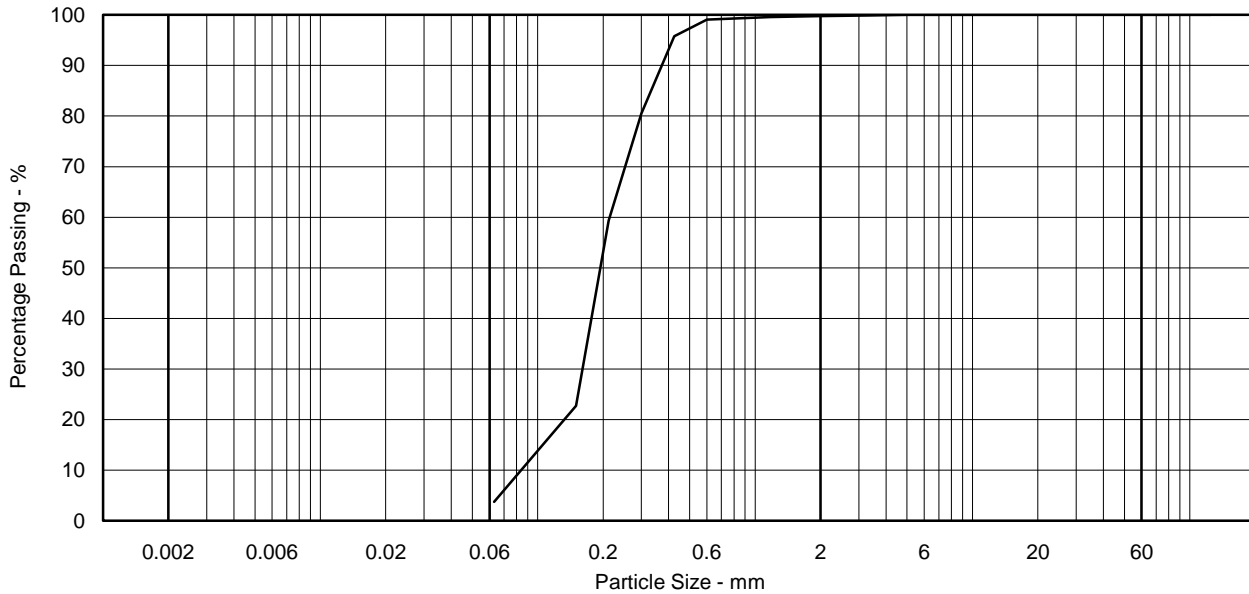
Non Engineering Description
Orange brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	96.0
Silt & Clay	3.8

Particle Diameter - mm	
D100	5.0
D60	0.21
D10	0.084
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB08

Sample Ref 44

Depth (m) 12.50-13.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	98
6.30 mm	98
5.00 mm	98
3.35 mm	98
2.00 mm	98
1.18 mm	98
600 µm	96
425 µm	93
300 µm	80
212 µm	60
150 µm	26
63 µm	4

**Non Engineering Description**

Orange brown slightly gravelly slightly silty SAND. Gravel is fine to medium.

**Sample Proportions - %**

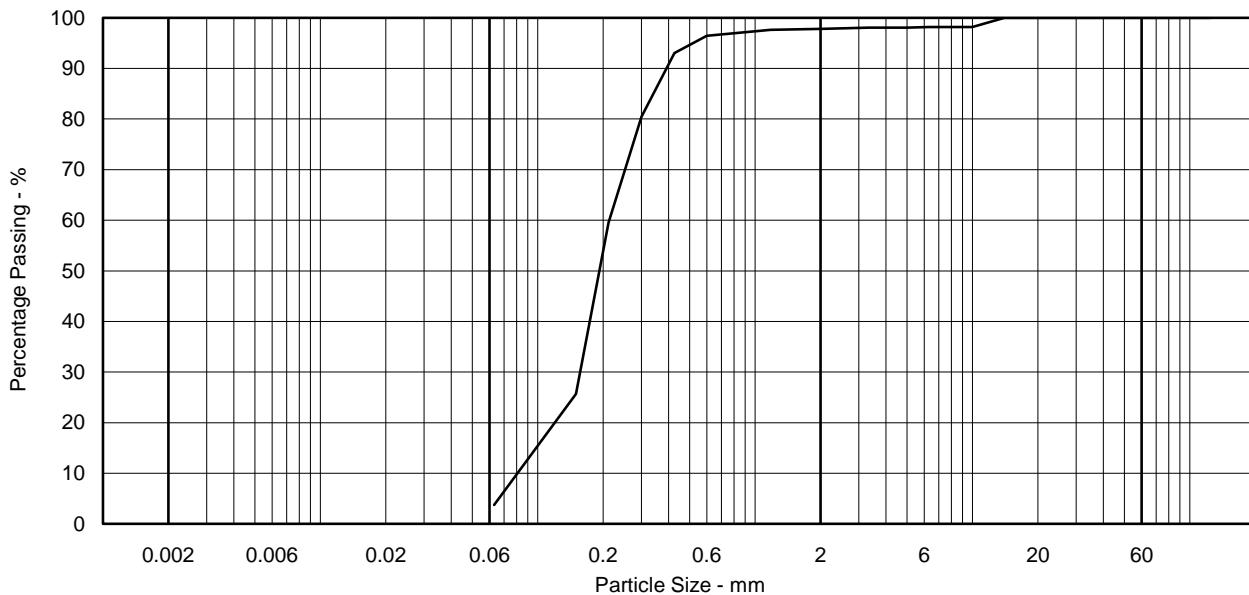
Cobbles	0.0
Gravel	2.2
Sand	94.1
Silt & Clay	3.7

**Particle Diameter - mm**

D100	14
D60	0.21
D10	0.081
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.6

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	9/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving







SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB08

Sample Ref 48

Depth (m) 13.50-14.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	97
10.0 mm	96
6.30 mm	96
5.00 mm	95
3.35 mm	94
2.00 mm	93
1.18 mm	92
600 µm	87
425 µm	75
300 µm	53
212 µm	39
150 µm	19
63 µm	4

**Non Engineering Description**

Orange brown slightly silty gravelly SAND. Gravel is fine to medium.

**Sample Proportions - %**

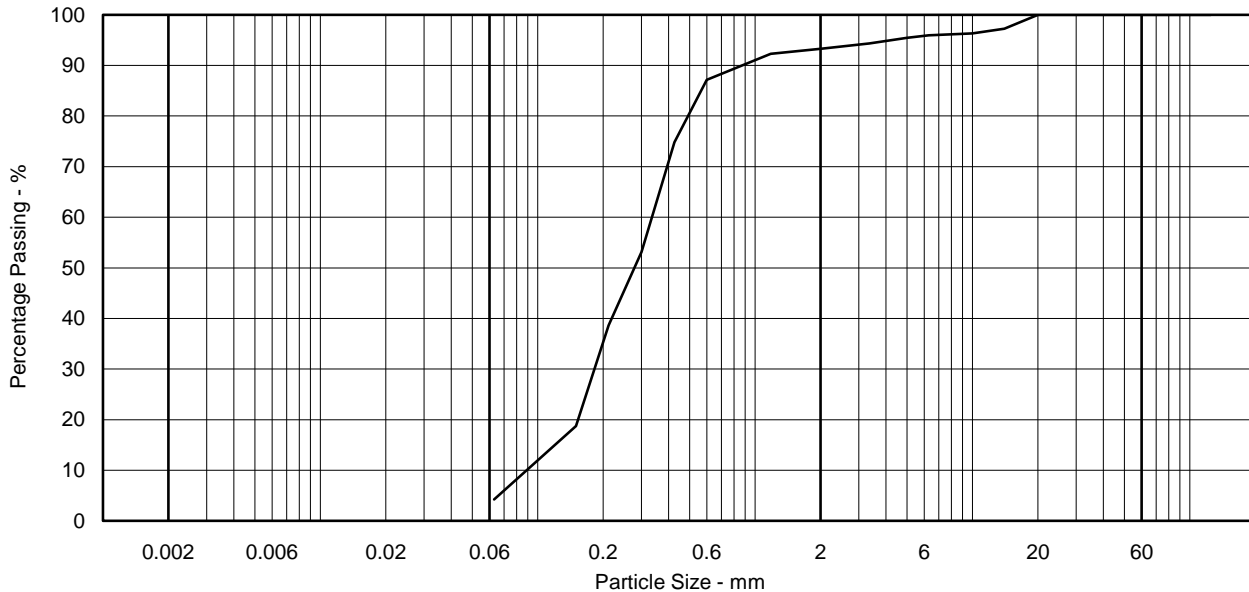
Cobbles	0.0
Gravel	6.7
Sand	89.1
Silt & Clay	4.2

**Particle Diameter - mm**

D100	20
D60	0.34
D10	0.089
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.8

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
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**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB08

Sample Ref 53

Depth (m) 15.50-16.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	99
600 µm	96
425 µm	82
300 µm	47
212 µm	28
150 µm	16
63 µm	5

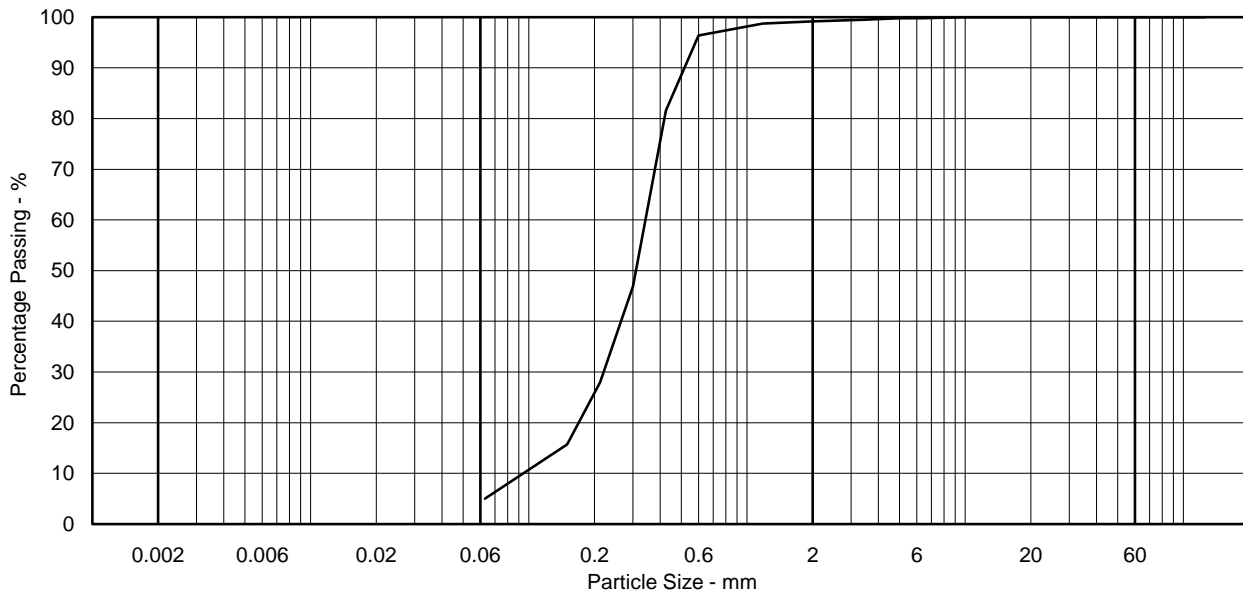
Non Engineering Description
Brown silty SAND with rare fine gravel.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.8
Sand	94.1
Silt & Clay	5.0

Particle Diameter - mm	
D100	10
D60	0.34
D10	0.094
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.6

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB08  
 Sample Ref 58  
 Depth (m) 17.50-18.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	98
425 µm	86
300 µm	34
212 µm	12
150 µm	6
63 µm	2

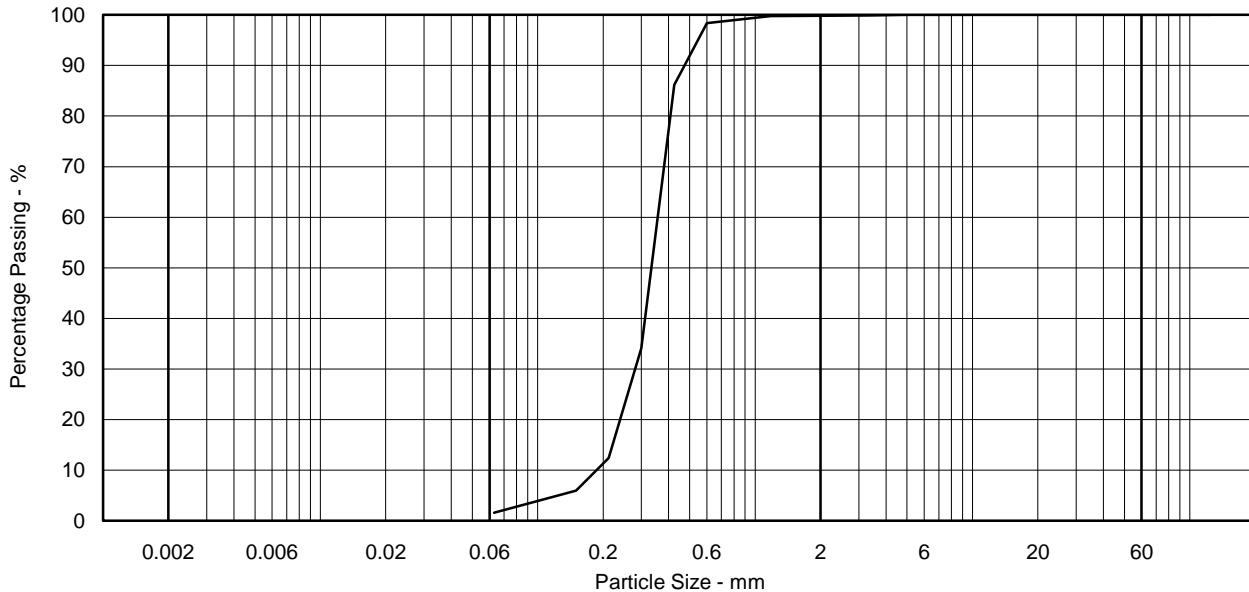
Non Engineering Description
Light brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	98.2
Silt & Clay	1.6

Particle Diameter - mm	
D100	5.0
D60	0.36
D10	0.19
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	1.9

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB08

Sample Ref 63

Depth (m) 19.30-19.70

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	98
425 µm	91
300 µm	71
212 µm	48
150 µm	36
63 µm	22
20 µm	17
6 µm	11
2 µm	6

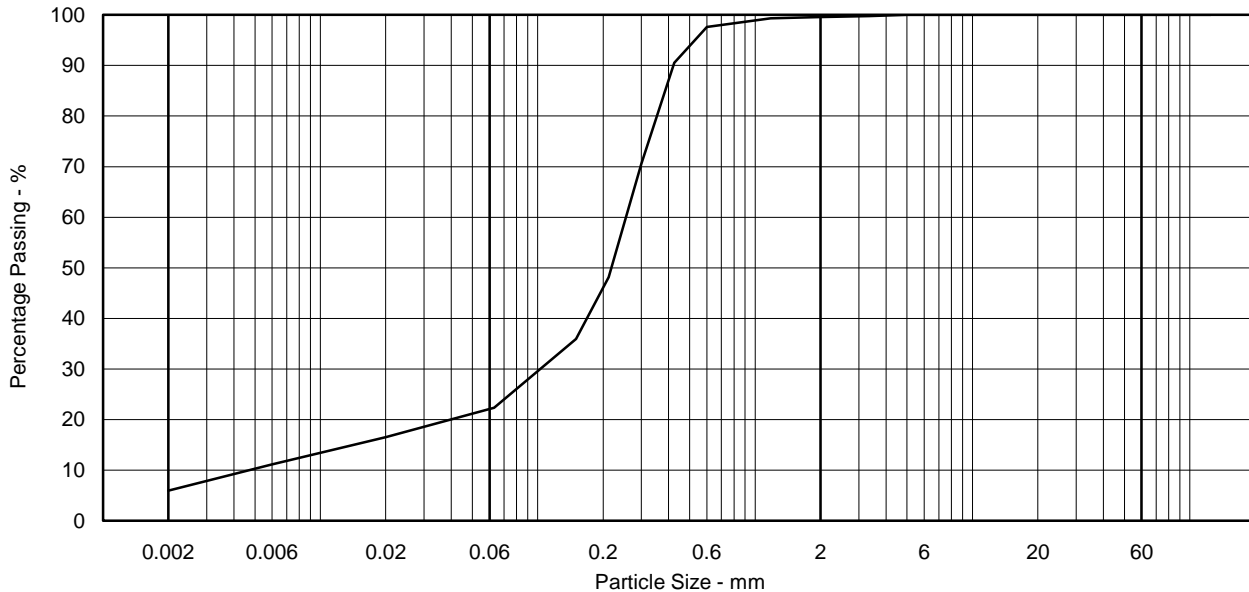
Non Engineering Description	
Grey clayey silty SAND.	

Sample Proportions - %	
Cobbles	0.0
Gravel	0.4
Sand	77.6
Silt	16.0
Clay	6.0

Particle Diameter - mm	
D100	5.0
D60	0.25
D10	0.0047
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	53.2

Notes	
Sedimentation sample not pre-treated	

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MH	[Signature] 9/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB08

Sample Ref 71

Depth (m) 22.00-22.60

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	98
300 µm	97
212 µm	94
150 µm	92
63 µm	88
20 µm	64
6 µm	45
2 µm	29

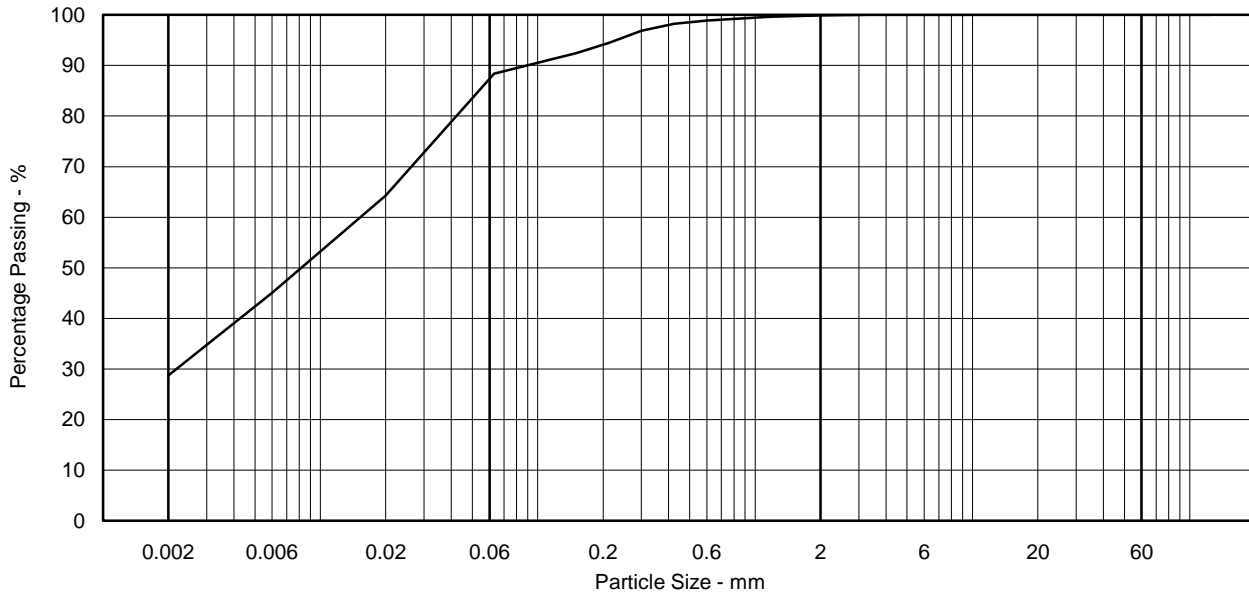
Non Engineering Description
Greyish brown slightly sandy CLAY.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.1
Sand	13.2
Silt	57.9
Clay	28.8

Particle Diameter - mm	
D100	3.4
D60	0.015
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB08

Sample Ref 75

Depth (m) 24.00-24.50

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	97
425 µm	96
300 µm	81
212 µm	42
150 µm	30
63 µm	22
20 µm	17
6 µm	12
2 µm	7

**Non Engineering Description**

Brown slightly gravelly clayey silty SAND. Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.3
Sand	76.9
Silt	14.5
Clay	7.3

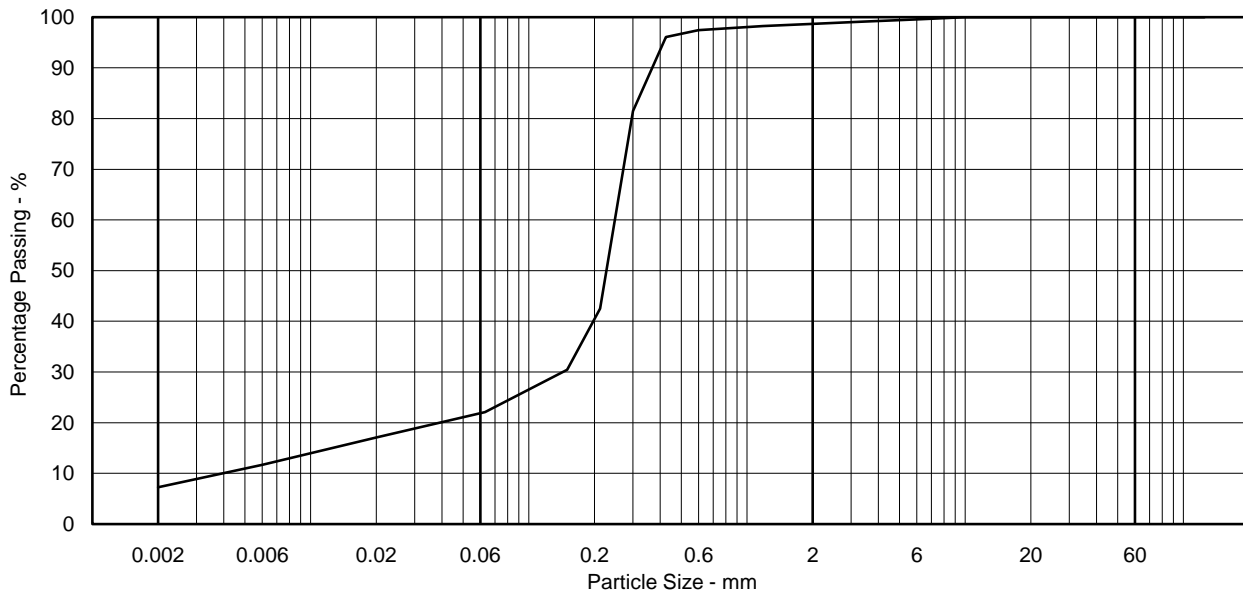
**Particle Diameter - mm**

D100	10
D60	0.25
D10	0.0039
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	64.1

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
LA	/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB08

Sample Ref 74

Depth (m) 25.00-25.44

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	99
600 µm	99
425 µm	98
300 µm	93
212 µm	31
150 µm	14
63 µm	8

**Non Engineering Description**

Greyish brown silty SAND with rare fine to medium gravel.

**Sample Proportions - %**

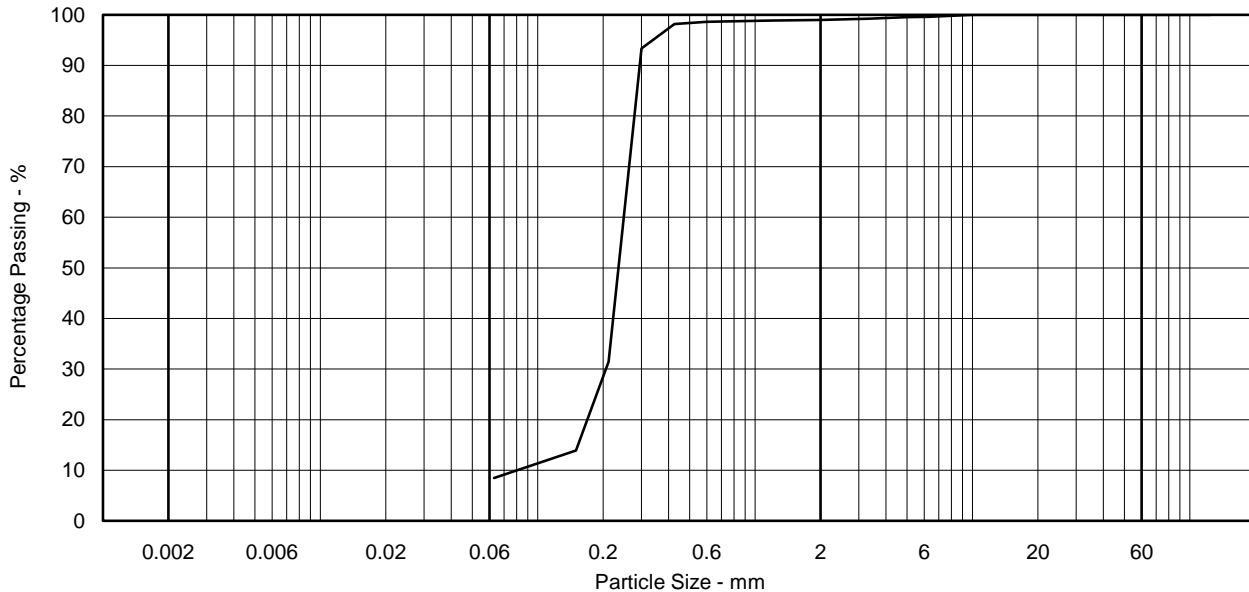
Cobbles	0.0
Gravel	1.0
Sand	90.5
Silt & Clay	8.5

**Particle Diameter - mm**

D100	10
D60	0.25
D10	0.080
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.1

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MH	018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2018071033-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 2  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 3-Aug-18

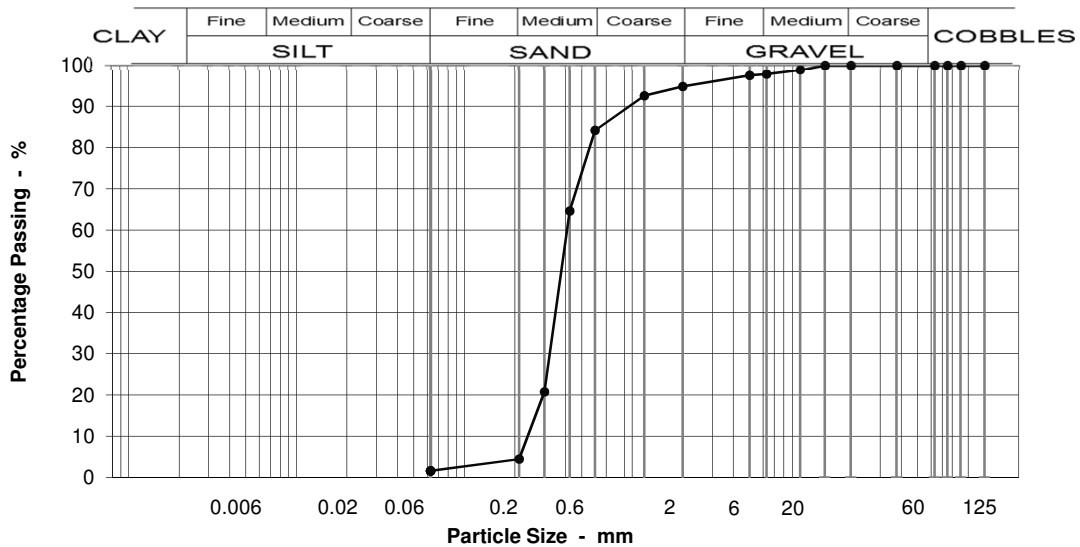
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** MB09 @ 0m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	98
5	98
2	95
1.18	93
0.600	84
0.425	65
0.300	21
0.212	4
0.063	2

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 17

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	3
Coarse SAND	11
Medium SAND	80
Fine SAND	3
Silt & Clay	2

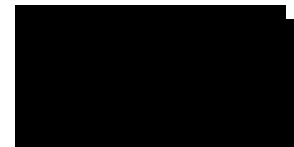
Grading Analysis	
D100	10
D60	0.41
D10	0.24
Uniformity Coefficient	2

Description	
Brown medium SAND.	

Test Code = 610



Simon Holden (Project Technician)





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 3

Depth (m) 0.50-1.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	99
5.00 mm	98
3.35 mm	98
2.00 mm	96
1.18 mm	93
600 µm	84
425 µm	65
300 µm	25
212 µm	11
150 µm	8
63 µm	7

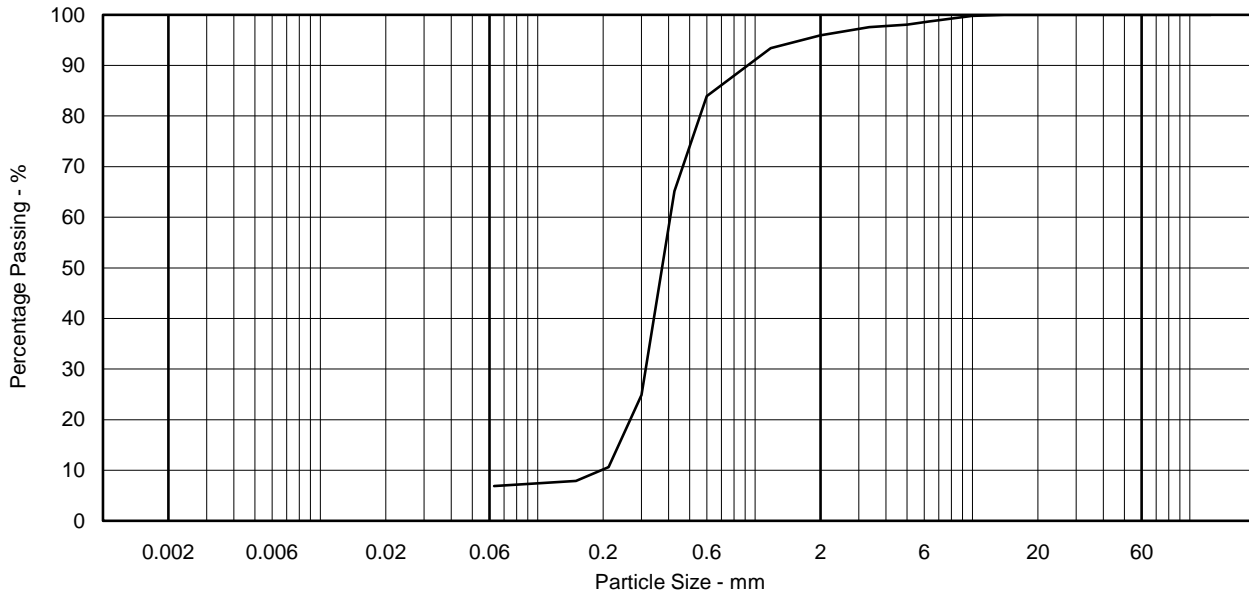
Non Engineering Description
Light brown silty SAND with occasional fine to medium shell fragments.

Sample Proportions - %	
Cobbles	0.0
Gravel	4.1
Sand	89.1
Silt & Clay	6.9

Particle Diameter - mm	
D100	14
D60	0.41
D10	0.20
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.1

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 6

Depth (m) 1.50-2.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	98
5.00 mm	98
3.35 mm	96
2.00 mm	94
1.18 mm	91
600 µm	77
425 µm	55
300 µm	18
212 µm	6
150 µm	4
63 µm	3

**Non Engineering Description**

Brown slightly silty slightly gravelly SAND with some fine shell fragments. Gravel is fine to medium.

**Sample Proportions - %**

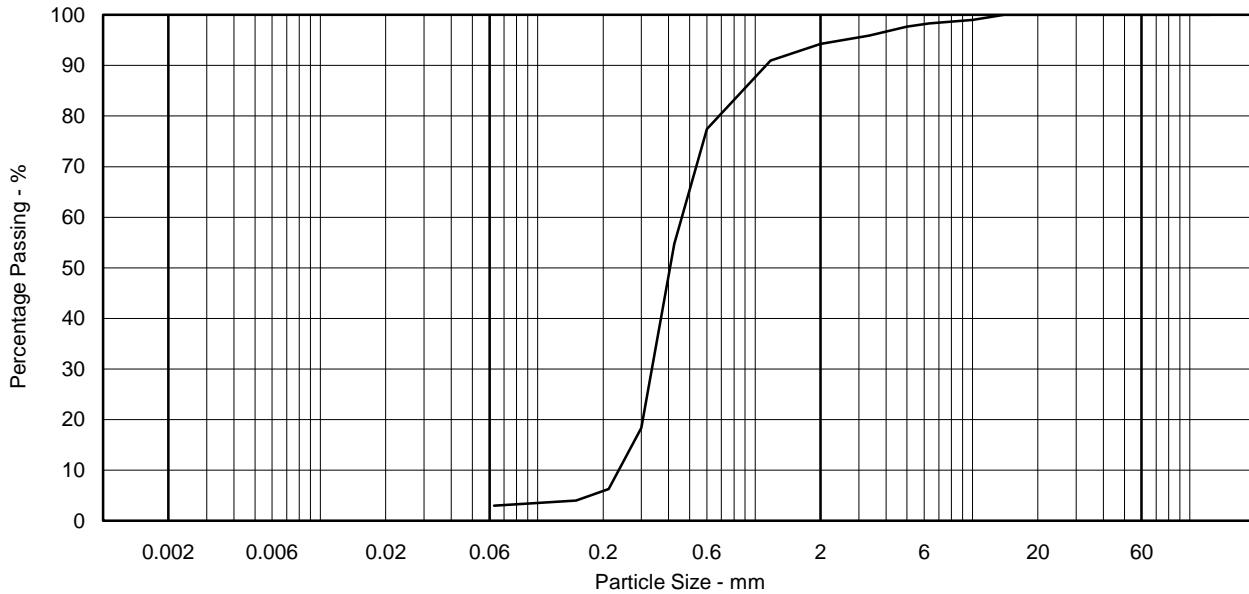
Cobbles	0.0
Gravel	5.8
Sand	91.2
Silt & Clay	3.0

**Particle Diameter - mm**

D100	14
D60	0.46
D10	0.24
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	1.9

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	[Redacted] 018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole MB09  
Sample Ref 22  
Depth (m) 5.30-6.00  
Sample Type B

Engineer Norfolk Partnership Laboratory

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	98
2.00 mm	97
1.18 mm	96
600 µm	93
425 µm	88
300 µm	75
212 µm	56
150 µm	22
63 µm	6

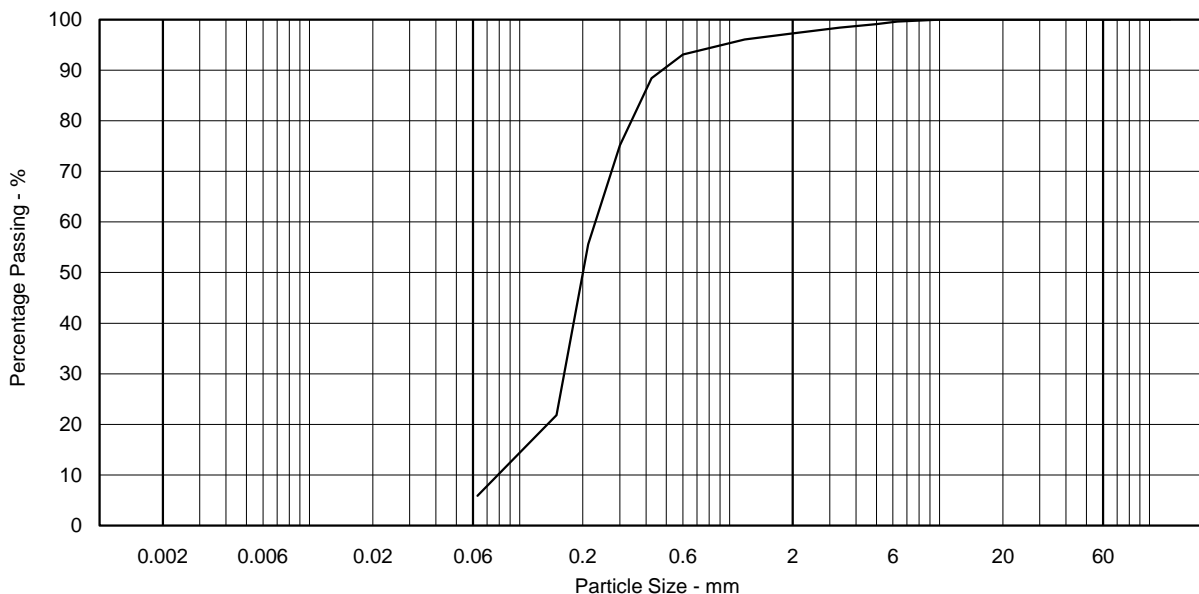
Non Engineering Description
Greyish brown silty SAND with occasional fine to medium shell fragments.

Sample Proportions - %	
Cobbles	0.0
Gravel	2.8
Sand	91.3
Silt & Clay	5.9

Particle Diameter - mm	
D100	10
D60	0.23
D10	0.079
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.9

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB09

Engineer Norfolk Partnership Laboratory

Sample Ref 10

Depth (m) 2.50-3.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	96
5.00 mm	95
3.35 mm	92
2.00 mm	89
1.18 mm	85
600 µm	78
425 µm	67
300 µm	46
212 µm	31
150 µm	20
63 µm	15
20 µm	12
6 µm	9
2 µm	6

**Non Engineering Description**

Very dark grey mottled brown clayey silty gravelly SAND.  
Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	11.2
Sand	73.8
Silt	8.5
Clay	6.5

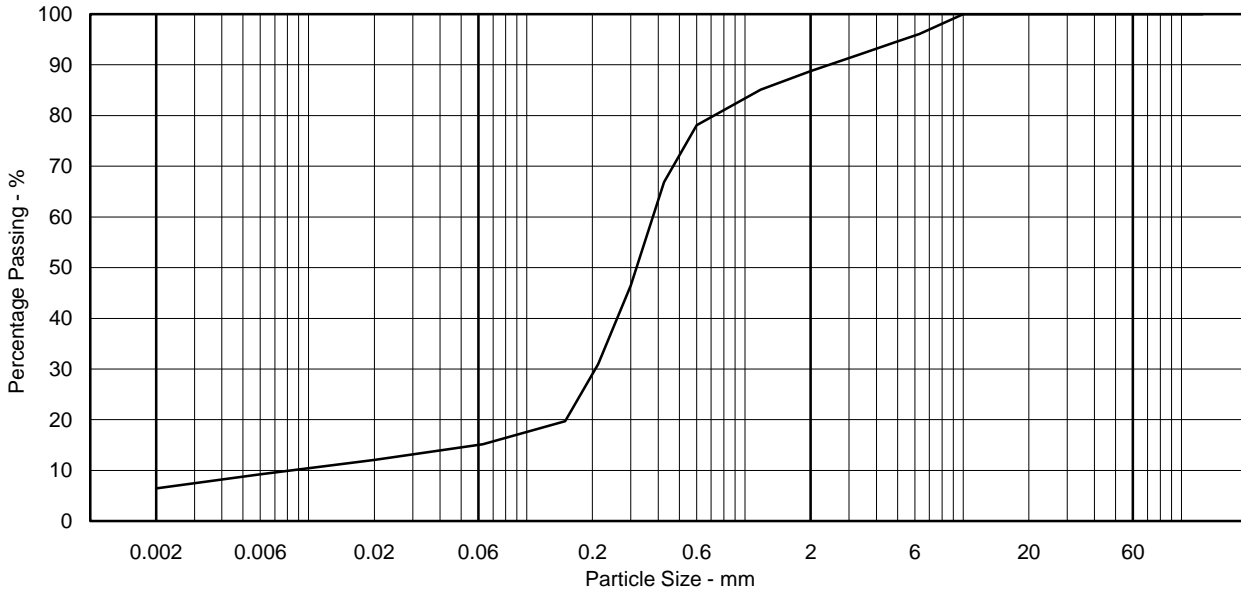
**Particle Diameter - mm**

D100	10
D60	0.38
D10	0.0084
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	45.2

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
LA	2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB09

Engineer Norfolk Partnership Laboratory

Sample Ref 14

Depth (m) 3.50-4.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	98
5.00 mm	97
3.35 mm	95
2.00 mm	93
1.18 mm	90
600 µm	84
425 µm	71
300 µm	39
212 µm	21
150 µm	11
63 µm	7

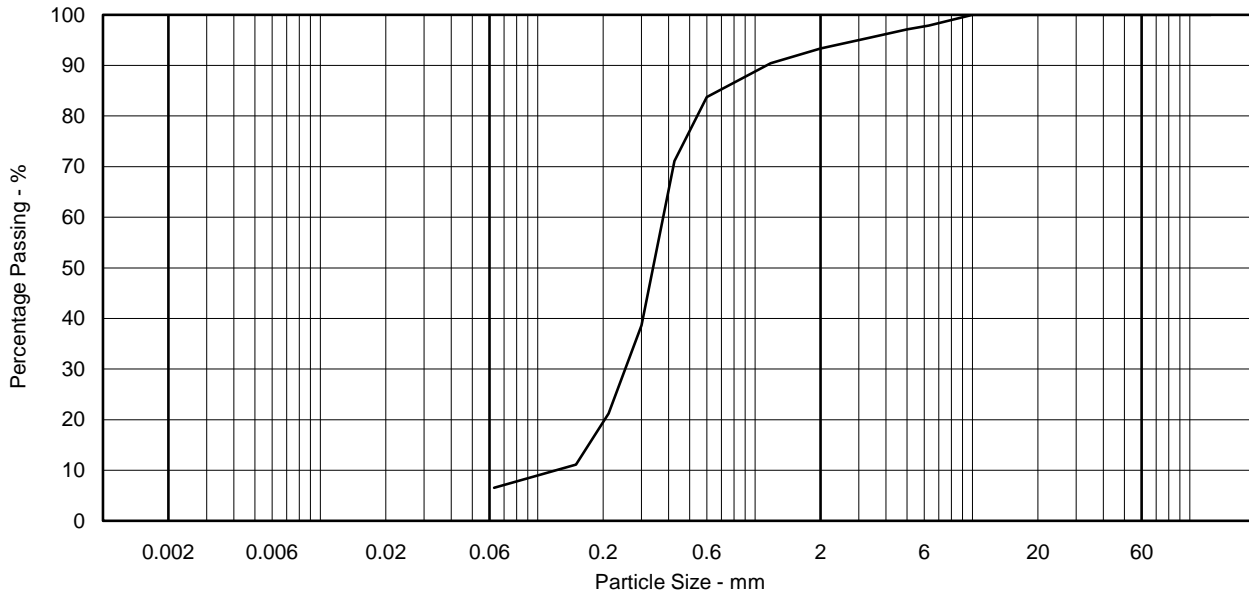
Non Engineering Description
Greyish brown silty gravelly SAND. Gravel is fine to medium.

Sample Proportions - %	
Cobbles	0.0
Gravel	6.6
Sand	86.8
Silt & Clay	6.5

Particle Diameter - mm	
D100	10
D60	0.38
D10	0.12
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.2

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
PD	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB09  
 Sample Ref 112  
 Depth (m) 40.00-40.45  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	97
6.30 mm	94
5.00 mm	93
3.35 mm	92
2.00 mm	91
1.18 mm	91
600 µm	90
425 µm	88
300 µm	87
212 µm	84
150 µm	80
63 µm	74
20 µm	63
6 µm	40
2 µm	18

**Non Engineering Description**  
 Dark brown mottled brown slightly gravelly slightly sandy CLAY. Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	8.8
Sand	18.3
Silt	55.0
Clay	18.0

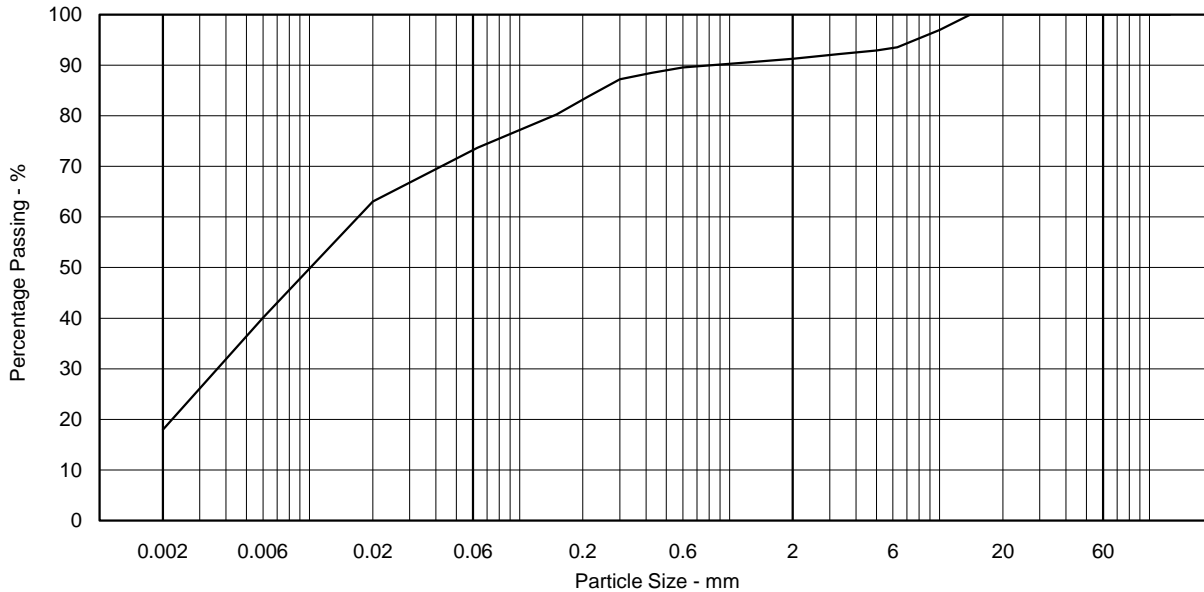
**Particle Diameter - mm**

D100	14
D60	0.017
D10	
Uniformity Coefficient	N/A

(SHW series 600, Table 6/1, footnote 5)

**Notes**  
 Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MH	10/09/2018

**PARTICLE SIZE DISTRIBUTION**  
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 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette







SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 17

Depth (m) 4.50-5.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	97
1.18 mm	95
600 µm	91
425 µm	85
300 µm	67
212 µm	46
150 µm	25
63 µm	14
20 µm	11
6 µm	8
2 µm	6

**Non Engineering Description**

Orange brown clayey silty SAND with occasional fine shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	2.6
Sand	83.8
Silt	7.5
Clay	6.1

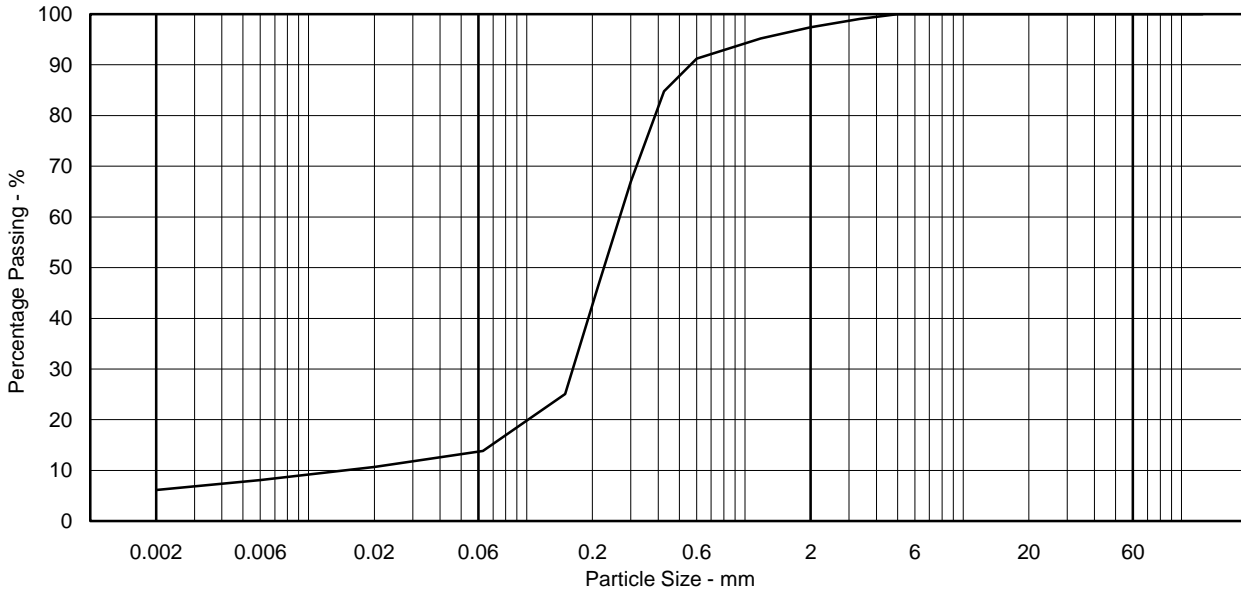
**Particle Diameter - mm**

D100	5.0
D60	0.27
D10	0.015
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	18.0

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	06/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB09  
 Sample Ref 25  
 Depth (m) 6.50-7.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	98
1.18 mm	97
600 µm	94
425 µm	93
300 µm	78
212 µm	54
150 µm	22
63 µm	4

**Non Engineering Description**  
 Orange brown slightly gravelly slightly silty SAND. Gravel is fine.

**Sample Proportions - %**

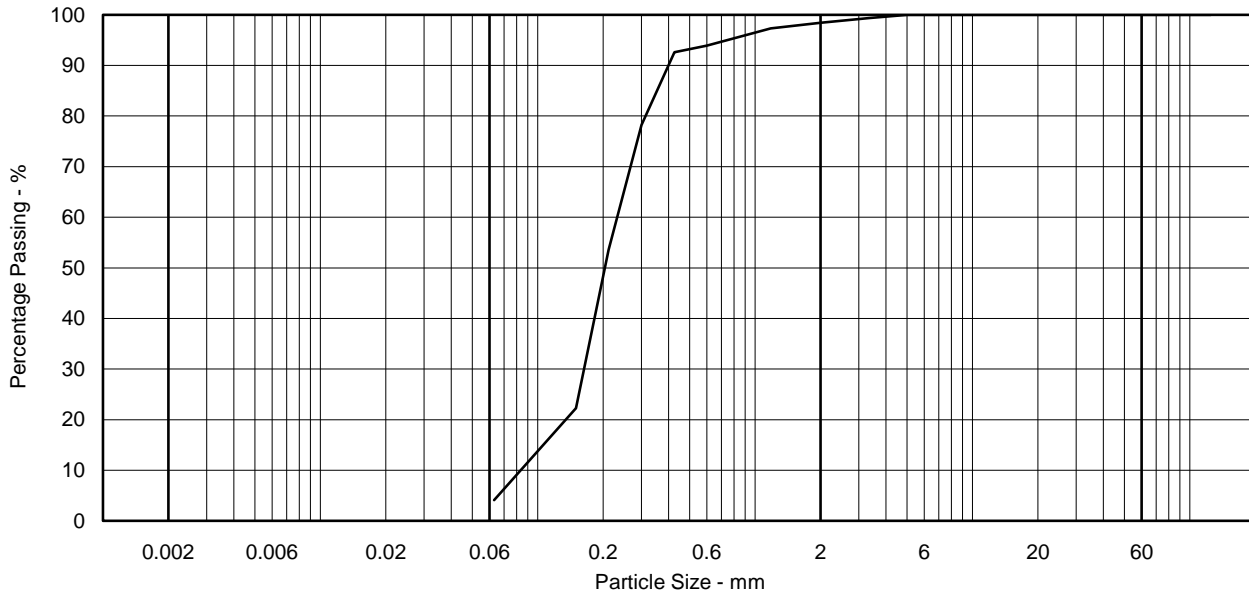
Cobbles	0.0
Gravel	1.6
Sand	94.3
Silt & Clay	4.1

**Particle Diameter - mm**

D100	5.0
D60	0.23
D10	0.084
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.7

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	[Redacted] 05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 38

Depth (m) 10.50-11.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	95
425 µm	88
300 µm	72
212 µm	53
150 µm	19
63 µm	6

**Non Engineering Description**

Orange brown slightly gravelly silty SAND. Gravel is fine.

**Sample Proportions - %**

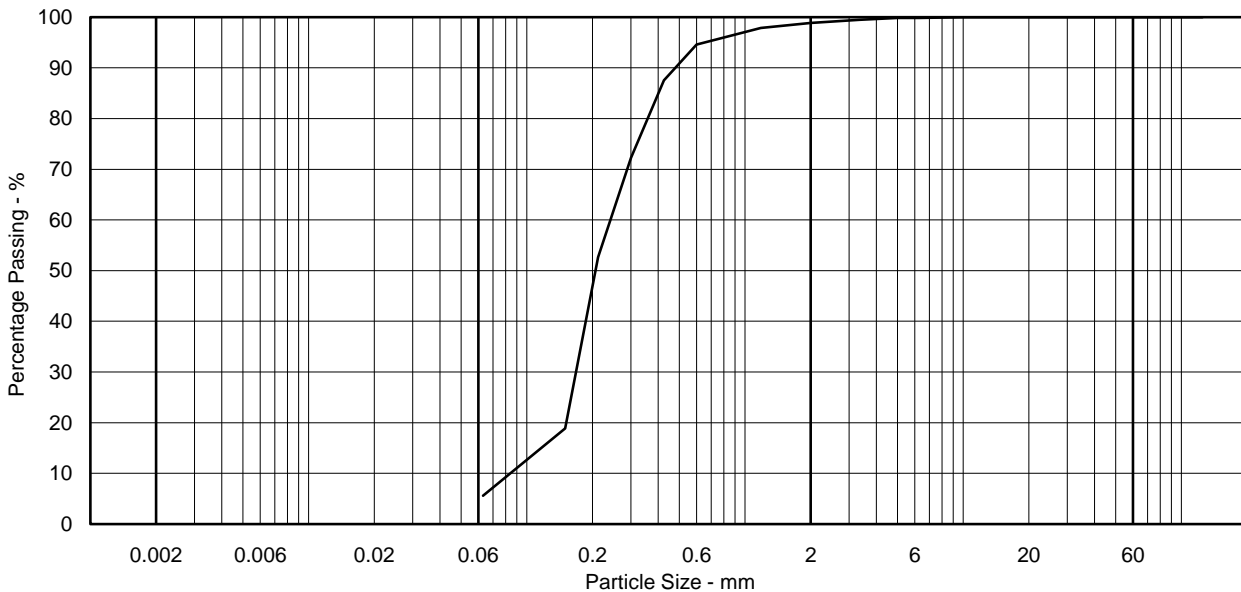
Cobbles	0.0
Gravel	1.1
Sand	93.3
Silt & Clay	5.6

**Particle Diameter - mm**

D100	10
D60	0.24
D10	0.084
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.9

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 44

Depth (m) 12.50-13.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	95
425 µm	90
300 µm	74
212 µm	54
150 µm	25
63 µm	8

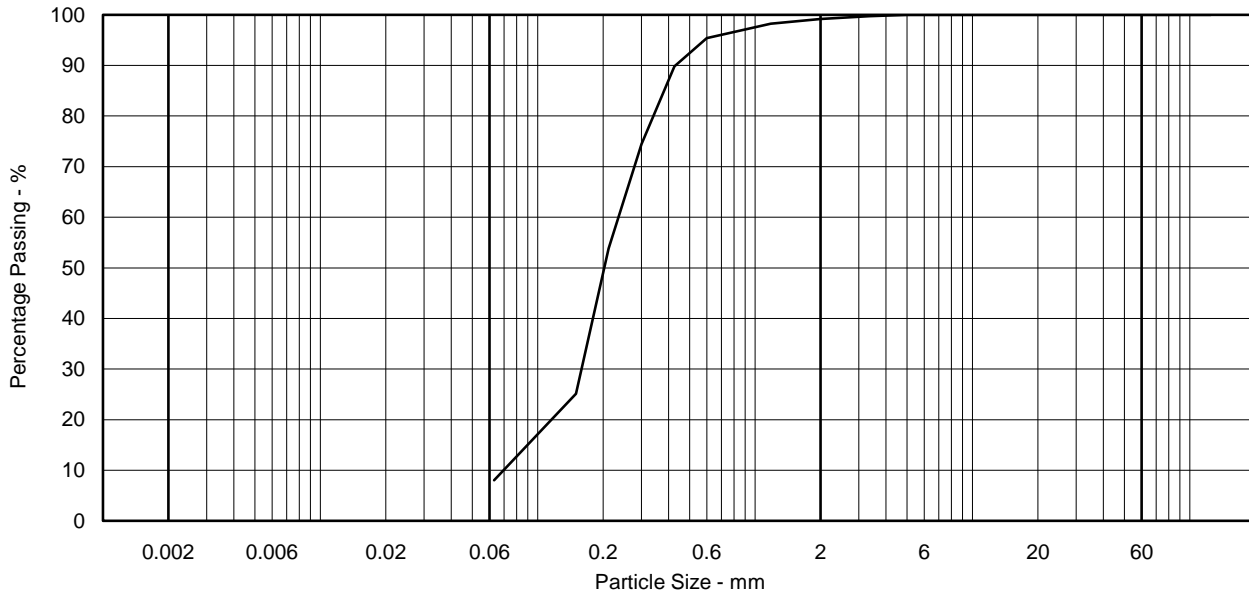
Non Engineering Description
Dark brown mottled orange brown silty SAND with rare fine gravel.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.8
Sand	91.2
Silt & Clay	8.0

Particle Diameter - mm	
D100	5.0
D60	0.24
D10	0.070
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.4

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 46

Depth (m) 13.30

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	98
1.18 mm	97
600 µm	90
425 µm	76
300 µm	52
212 µm	36
150 µm	21
63 µm	6

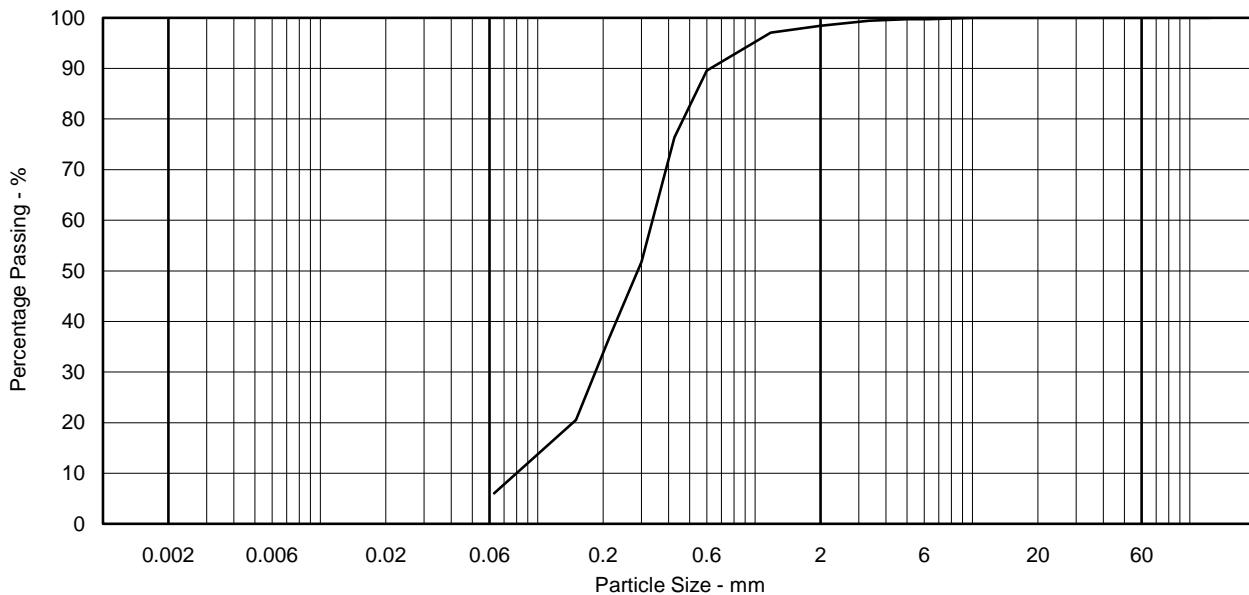
Non Engineering Description
Orange brown silty SAND with occasional fine gravel.

Sample Proportions - %	
Cobbles	0.0
Gravel	1.5
Sand	92.4
Silt & Clay	6.0

Particle Diameter - mm	
D100	10
D60	0.34
D10	0.080
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	4.3

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 50

Depth (m) 14.50-15.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	95
425 µm	85
300 µm	61
212 µm	41
150 µm	24
63 µm	5

**Non Engineering Description**

Orange brown mottled dark grey slightly silty SAND.

**Sample Proportions - %**

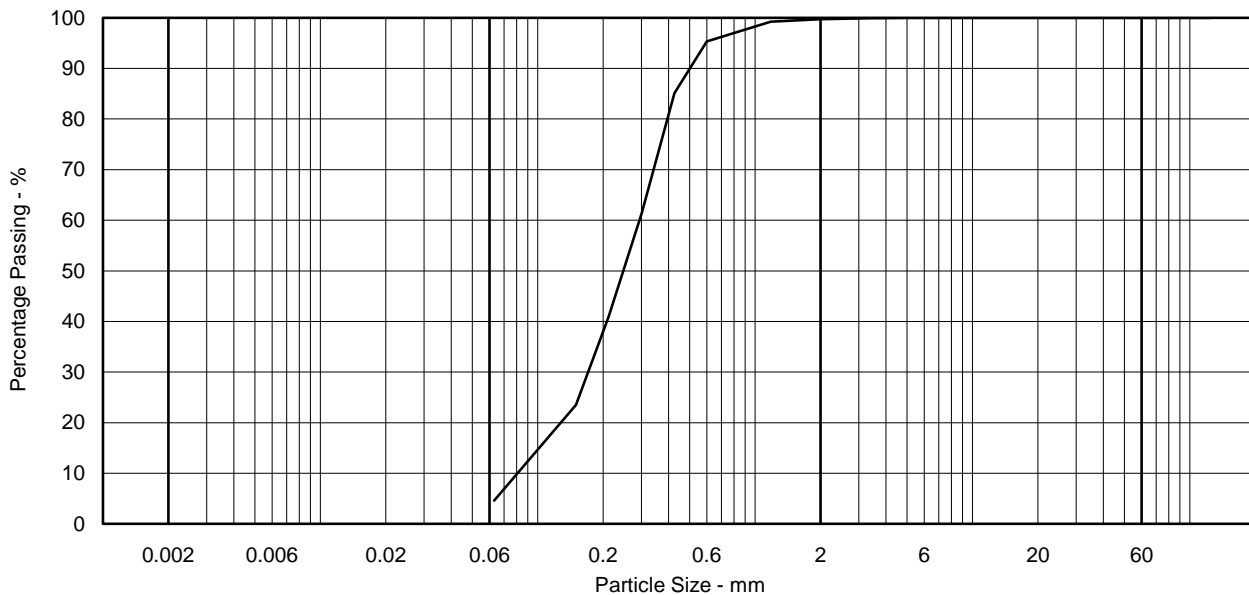
Cobbles	0.0
Gravel	0.3
Sand	95.2
Silt & Clay	4.6

**Particle Diameter - mm**

D100	5.0
D60	0.29
D10	0.081
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.6

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 59

Depth (m) 17.50-18.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	97
425 µm	91
300 µm	67
212 µm	42
150 µm	21
63 µm	4

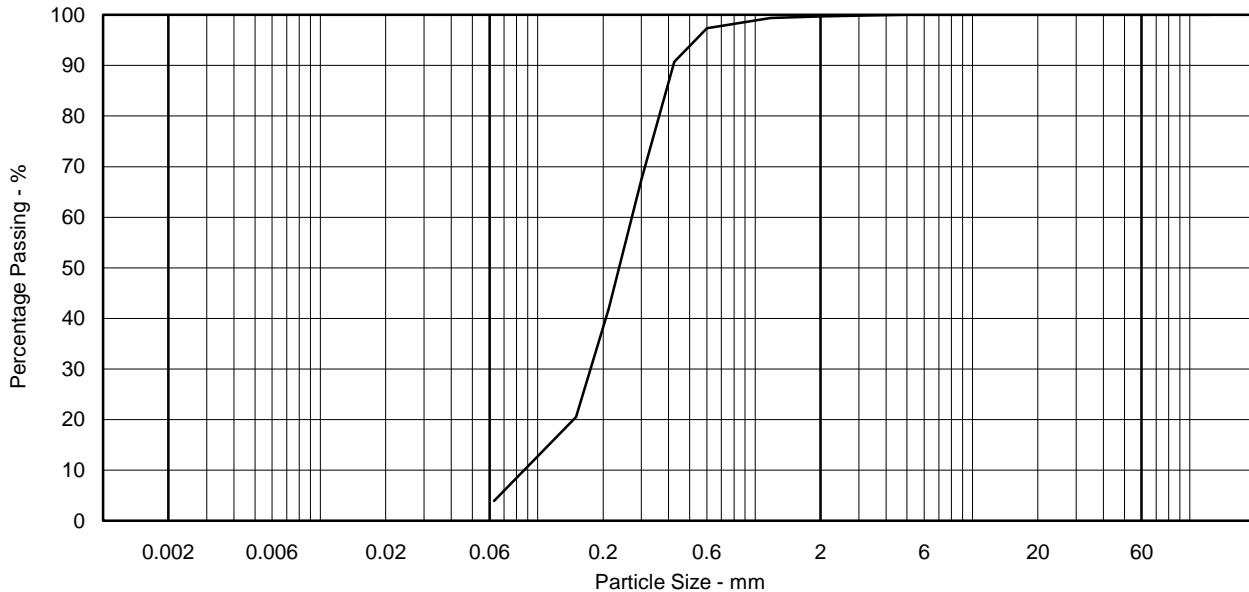
Non Engineering Description
Orange brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	95.8
Silt & Clay	4.0

Particle Diameter - mm	
D100	5.0
D60	0.27
D10	0.086
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.1

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole MB09  
 Sample Ref 62  
 Depth (m) 18.50-19.00  
 Sample Type B

Engineer Norfolk Partnership Laboratory

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	85
300 µm	38
212 µm	19
150 µm	9
63 µm	2

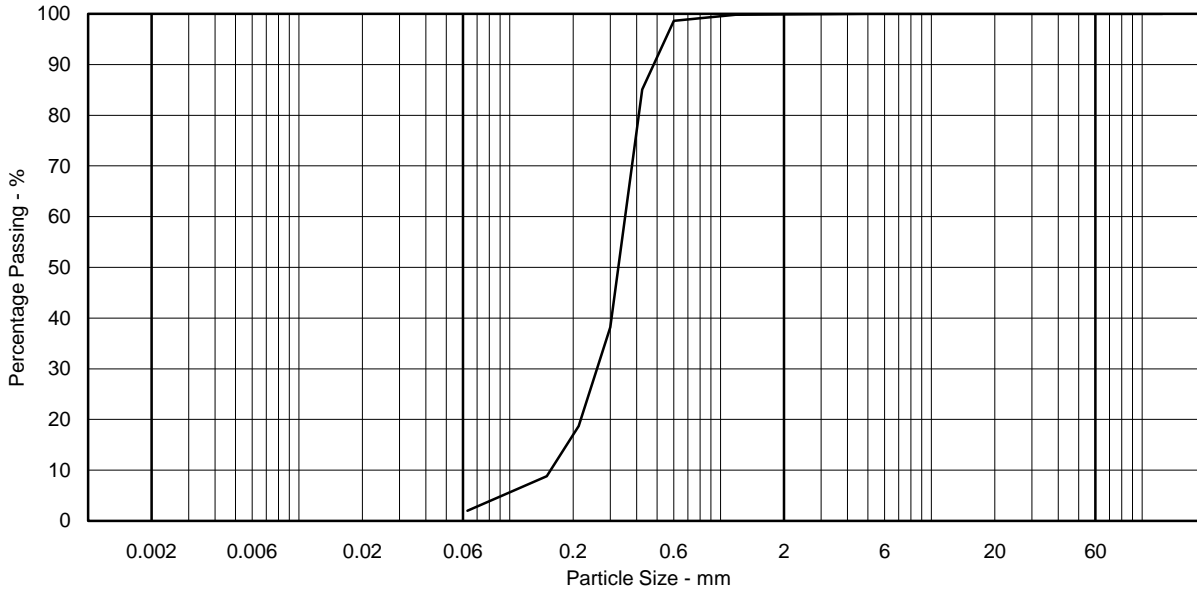
Non Engineering Description
Light brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.1
Sand	97.9
Silt & Clay	2.0

Particle Diameter - mm	
D100	5.0
D60	0.35
D10	0.16
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.2

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	10/09/2018

**PARTICLE SIZE DISTRIBUTION**  
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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 64

Depth (m) 19.50-20.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	99
5.00 mm	99
3.35 mm	98
2.00 mm	98
1.18 mm	97
600 µm	95
425 µm	87
300 µm	57
212 µm	40
150 µm	30
63 µm	22
20 µm	12
6 µm	7
2 µm	4

**Non Engineering Description**

Dark grey mottled brown slightly clayey silty SAND with occasional fine to medium shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	2.4
Sand	76.5
Silt	17.5
Clay	3.6

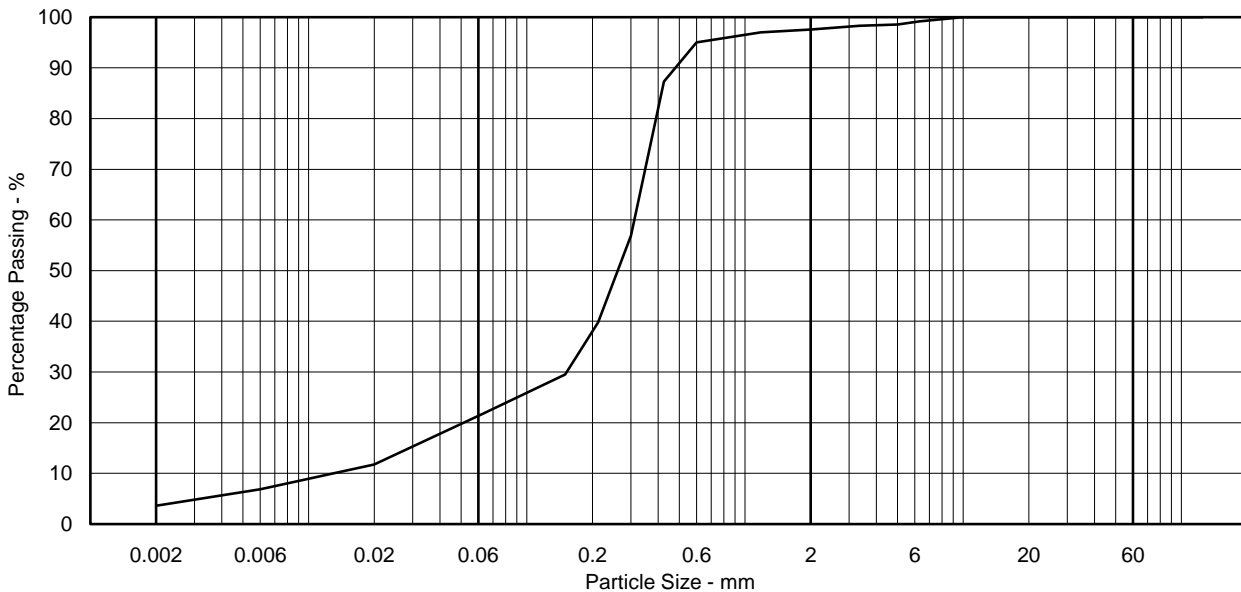
**Particle Diameter - mm**

D100	10
D60	0.31
D10	0.013
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	23.8

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
LA	[Redacted Signature]
	06/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1



Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB09  
 Sample Ref 69  
 Depth (m) 21.50-22.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	98
425 µm	97
300 µm	93
212 µm	84
150 µm	72
63 µm	59
20 µm	50
6 µm	41
2 µm	26

**Non Engineering Description**  
 Dark brown sandy CLAY.

**Sample Proportions - %**

Cobbles	0.0
Gravel	0.6
Sand	41.3
Silt	31.8
Clay	26.4

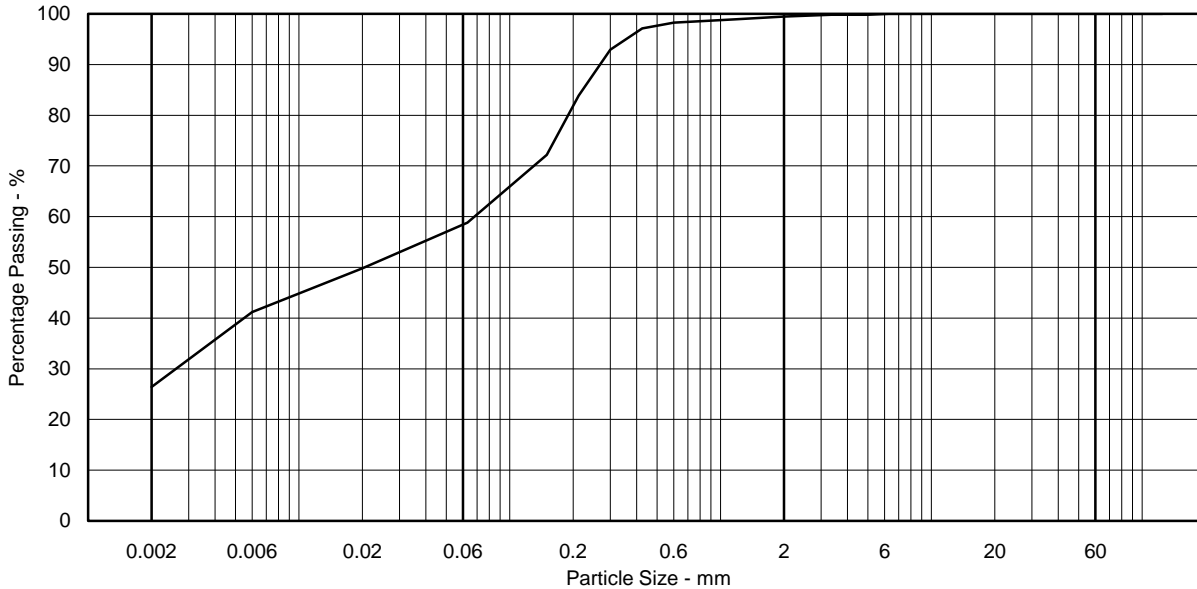
**Particle Diameter - mm**

D100	6.3
D60	0.068
D10	
Uniformity Coefficient	N/A

(SHW series 600, Table 6/1, footnote 5)

**Notes**  
 Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB09

Engineer Norfolk Partnership Laboratory

Sample Ref 72

Depth (m) 23.50-24.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	97
425 µm	96
300 µm	90
212 µm	81
150 µm	78
63 µm	73
20 µm	52
6 µm	36
2 µm	20

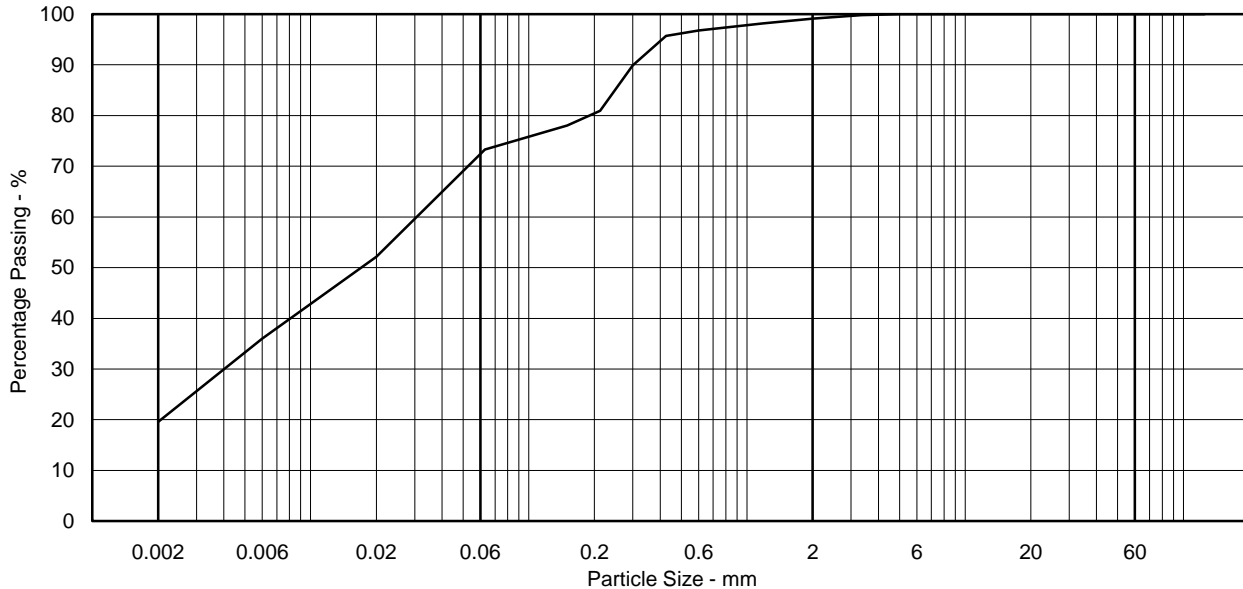
Non Engineering Description
Dark grey mottled dark brown slightly sandy SILT/CLAY with rare fine gravel.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.9
Sand	27.3
Silt	52.2
Clay	19.6

Particle Diameter - mm	
D100	5.0
D60	0.031
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	06/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 75

Depth (m) 24.50-25.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	99
5.00 mm	98
3.35 mm	98
2.00 mm	97
1.18 mm	97
600 µm	96
425 µm	95
300 µm	86
212 µm	43
150 µm	30
63 µm	24
20 µm	21
6 µm	15
2 µm	9

**Non Engineering Description**

Grey slightly gravelly clayey silty SAND. Gravel is fine to medium.

**Sample Proportions - %**

Cobbles	0.0
Gravel	2.9
Sand	73.7
Silt	14.5
Clay	8.8

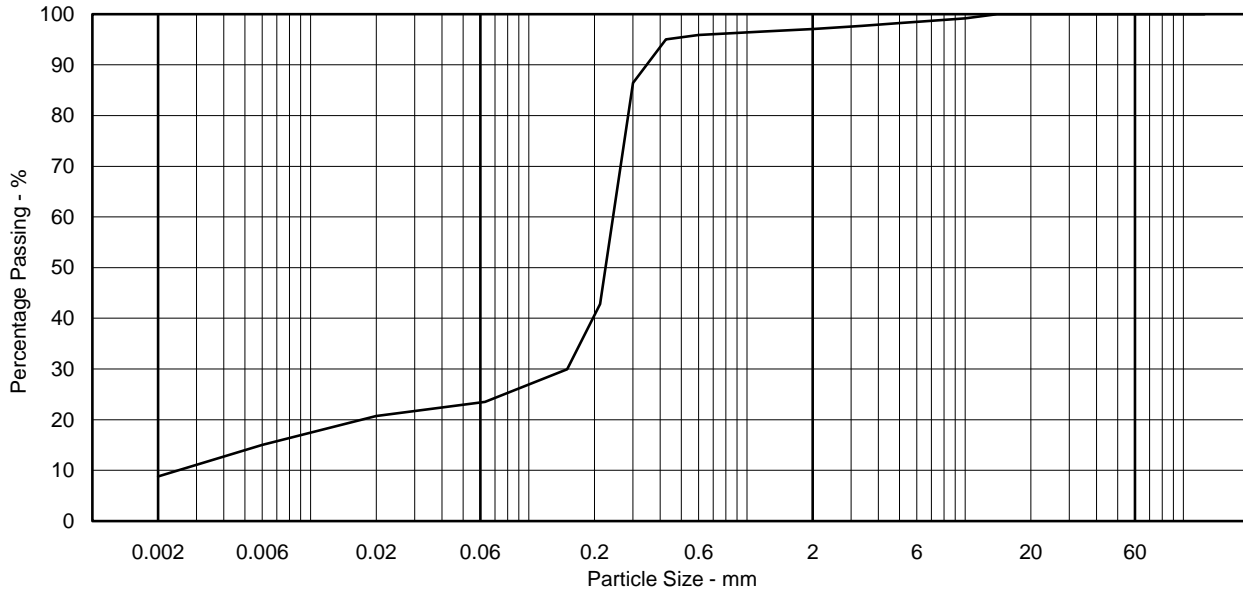
**Particle Diameter - mm**

D100	14
D60	0.24
D10	0.0025
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	96.0

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



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LA	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB09

Engineer Norfolk Partnership Laboratory

Sample Ref 82

Depth (m) 27.50-28.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	99
2.00 mm	98
1.18 mm	97
600 µm	95
425 µm	94
300 µm	83
212 µm	42
150 µm	25
63 µm	15
20 µm	12
6 µm	9
2 µm	5

**Non Engineering Description**

Dark grey clayey silty SAND with some fine shell fragments.

**Sample Proportions - %**

Cobbles	0.0
Gravel	1.9
Sand	83.2
Silt	9.6
Clay	5.3

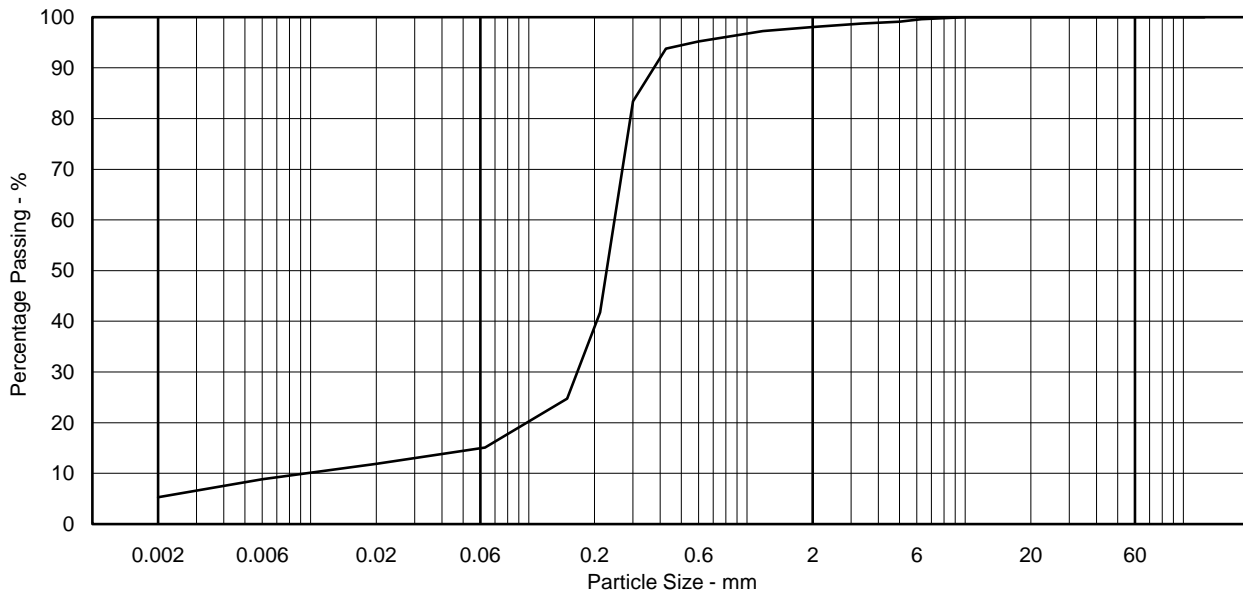
**Particle Diameter - mm**

D100	10
D60	0.25
D10	0.0096
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	26.0

**Notes**

Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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LA	2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 85

Depth (m) 28.50-29.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	98
300 µm	93
212 µm	48
150 µm	28
63 µm	14
20 µm	10
6 µm	7
2 µm	4

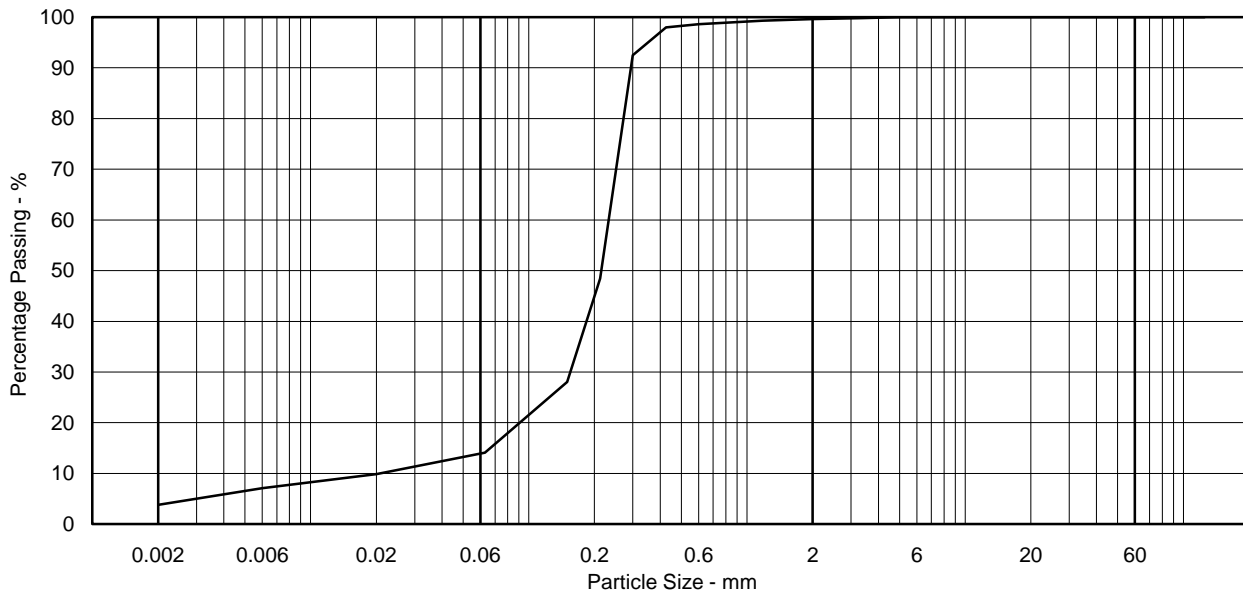
Non Engineering Description
Greyish brown slightly clayey silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.4
Sand	85.8
Silt	10.0
Clay	3.8

Particle Diameter - mm	
D100	5.0
D60	0.23
D10	0.021
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	11.0

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



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LA	06/09/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 92

Depth (m) 31.50-32.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	95
425 µm	89
300 µm	74
212 µm	36
150 µm	16
63 µm	7

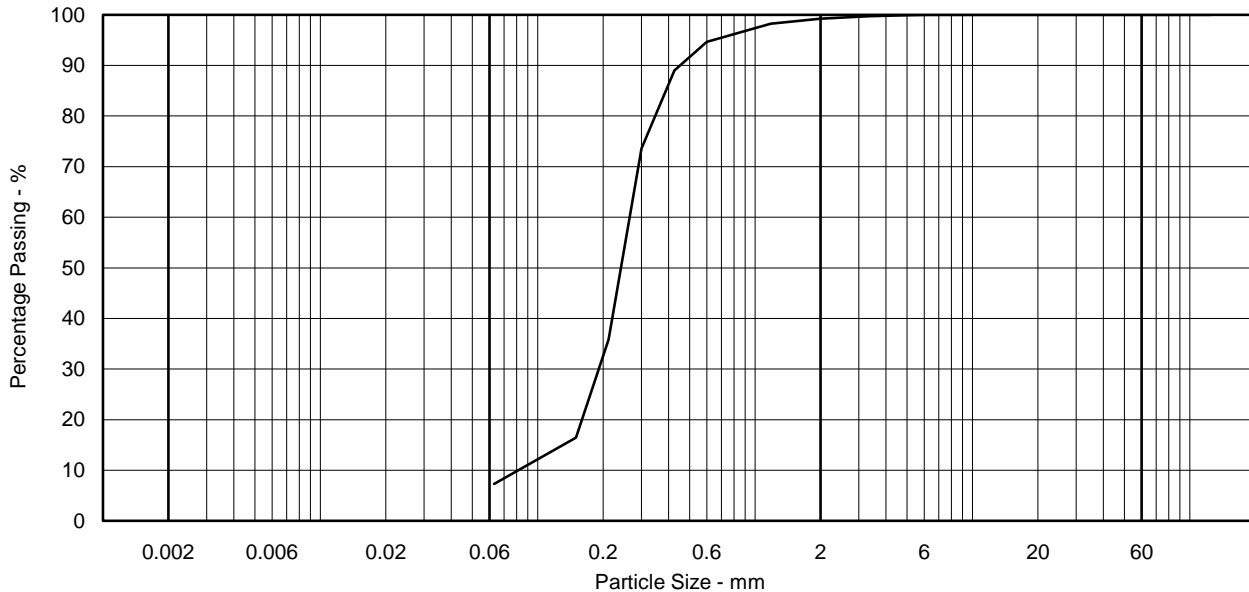
Non Engineering Description
Dark grey silty SAND with rare fine shell fragments.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.7
Sand	92.0
Silt & Clay	7.3

Particle Diameter - mm	
D100	6.3
D60	0.26
D10	0.081
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.2

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 97

Depth (m) 33.50-34.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	89
425 µm	73
300 µm	53
212 µm	27
150 µm	13
63 µm	5

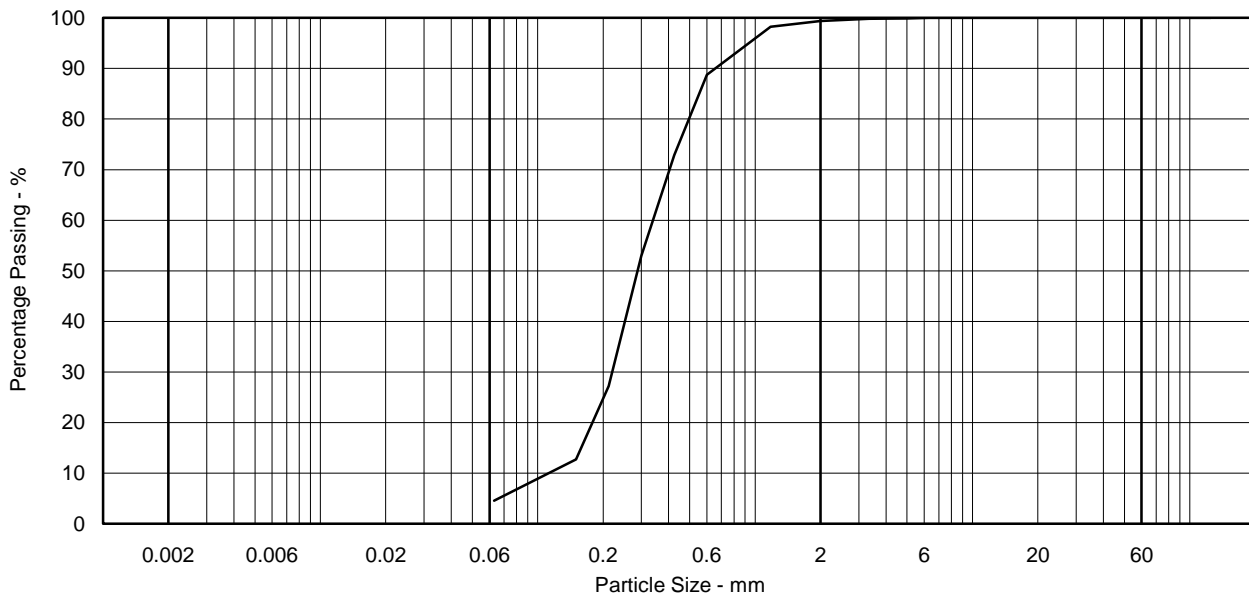
Non Engineering Description
Grey slightly silty SAND.


Sample Proportions - %	
Cobbles	0.0
Gravel	0.6
Sand	94.8
Silt & Clay	4.6

Particle Diameter - mm	
D100	6.3
D60	0.34
D10	0.11
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.1

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	 05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving



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SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 105

Depth (m) 36.50-37.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	91
425 µm	73
300 µm	48
212 µm	25
150 µm	14
63 µm	6

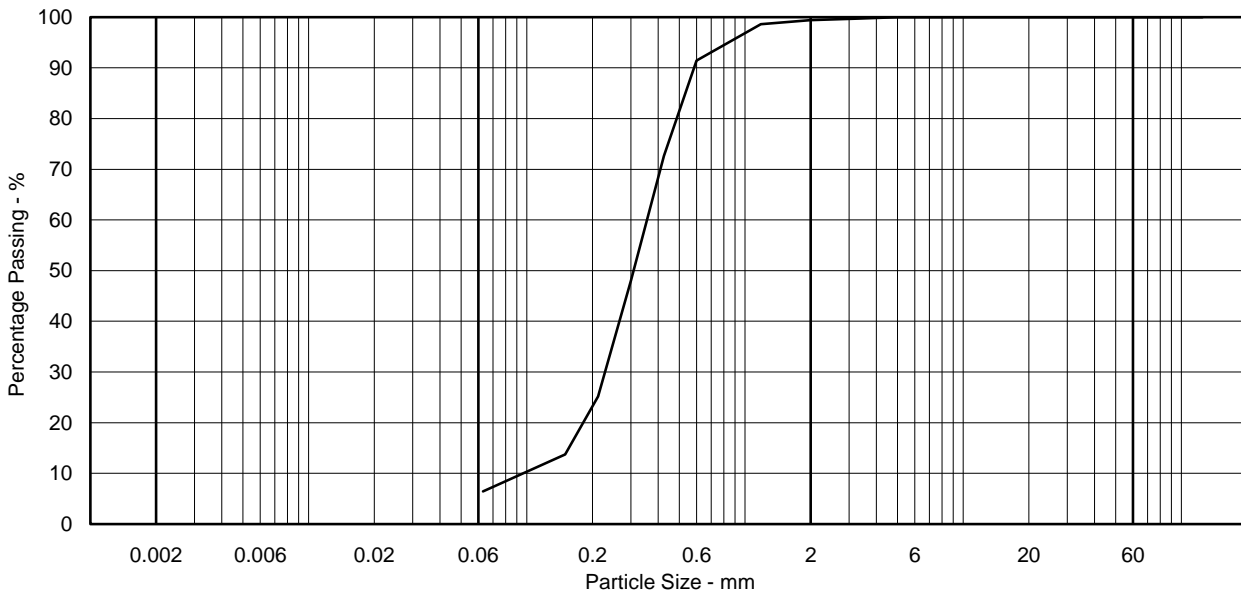
Non Engineering Description
Grey silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.6
Sand	93.0
Silt & Clay	6.5

Particle Diameter - mm	
D100	5.0
D60	0.36
D10	0.096
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.8

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB09

Sample Ref 107

Depth (m) 37.40

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	98
300 µm	98
212 µm	94
150 µm	84
63 µm	74
20 µm	50
6 µm	35
2 µm	18

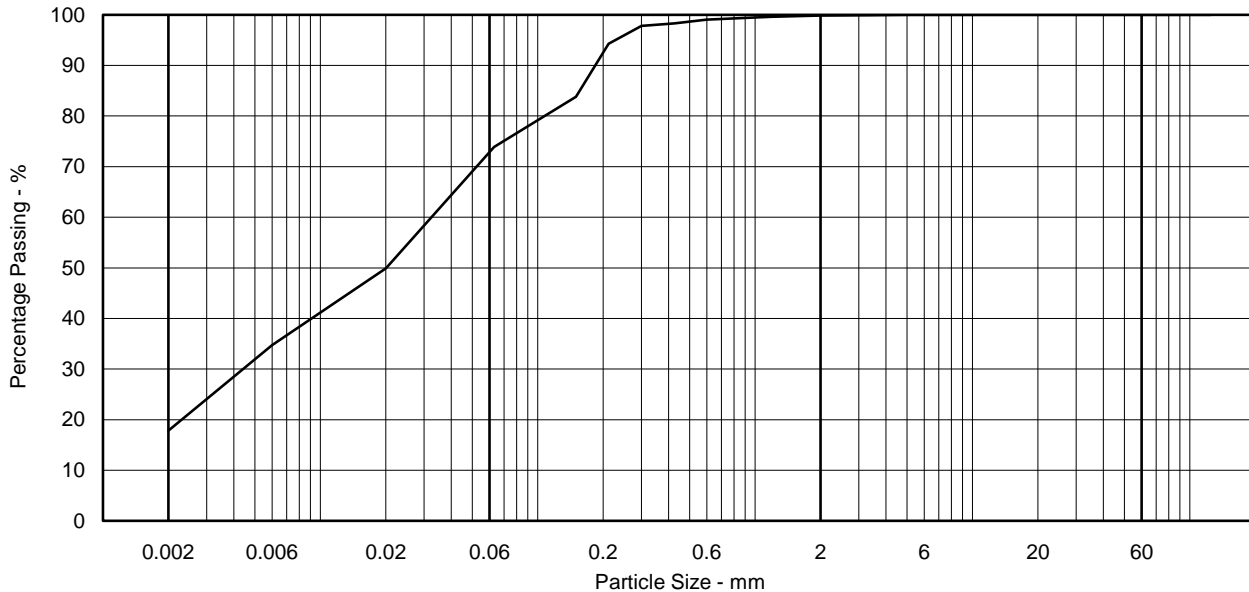
Non Engineering Description	
Dark brown slightly sandy CLAY.	

Sample Proportions - %	
Cobbles	0.0
Gravel	0.1
Sand	27.7
Silt	54.4
Clay	17.8

Particle Diameter - mm	
D100	5.0
D60	0.032
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes	
Sedimentation sample not pre-treated	

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MH	2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1

Community & Environmental Services  
County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2DH

**Our reference No.** NCCL2018071034-610  
**Our Project No** PZ1522D1  
**Your Sample Ref** 1  
**Your Project or Order No.** PZ1522  
**Date Tested**  
**Date Report Issued** 3-Aug-18

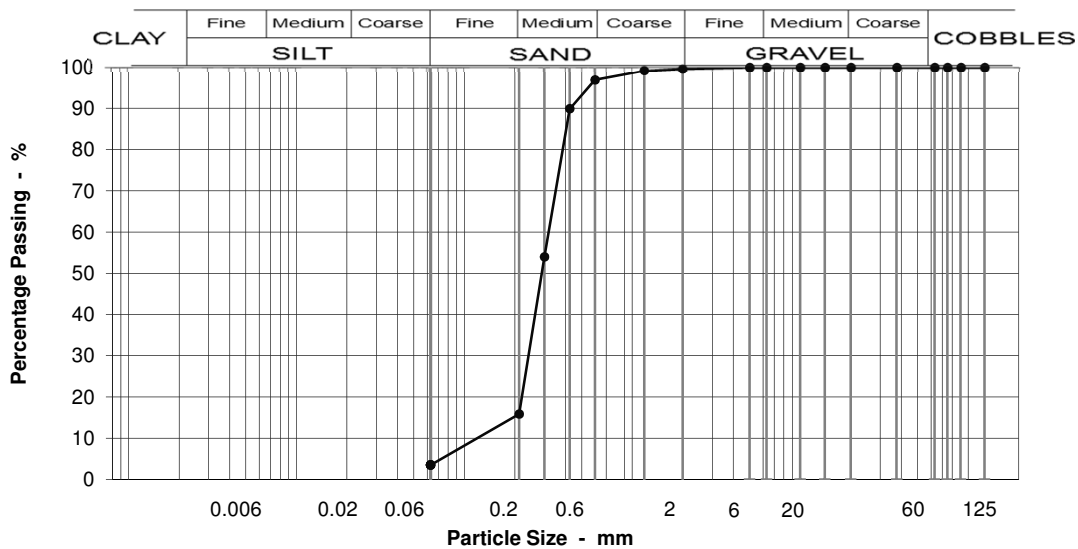
**Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9**

**Scheme:** Gt Yarmouth 3rd River Crossing

**Location:** MB10 @ 0m **Specimen:** 1

Location and orientation within sample not applicable

Bulk disturbed sample



Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	97
0.425	90
0.300	54
0.212	16
0.063	4

**Specification for Highway Works Classification**  
Table 6/2

**This material complies with the following material classes 1B, 6E/6R, 6M.**

**Moisture content %** 27

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	3
Medium SAND	81
Fine SAND	12
Silt & Clay	4

Grading Analysis	
D100	2
D60	0.32
D10	0.14
Uniformity Coefficient	2

Description	
Dark grey and black medium SAND.	

Test Code = 610



Simon Holden (Project Technician)



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 5

Depth (m) 2.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	98
2.00 mm	98
1.18 mm	98
600 µm	96
425 µm	91
300 µm	58
212 µm	20
150 µm	8
63 µm	5

**Non Engineering Description**

Dark brown slightly gravelly silty SAND with pockets of organic material. Gravel is fine to medium.

**Sample Proportions - %**

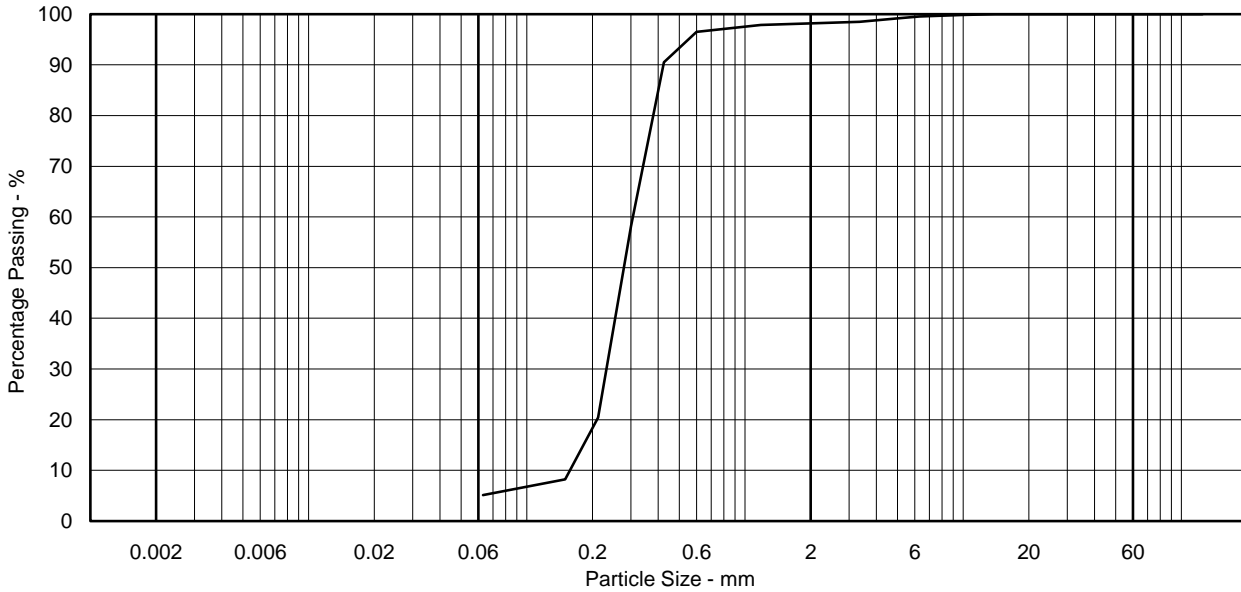
Cobbles	0.0
Gravel	1.8
Sand	93.1
Silt & Clay	5.1

**Particle Diameter - mm**

D100	14
D60	0.31
D10	0.16
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	1.9

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 13

Depth (m) 4.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	94
425 µm	82
300 µm	46
212 µm	16
150 µm	7
63 µm	3

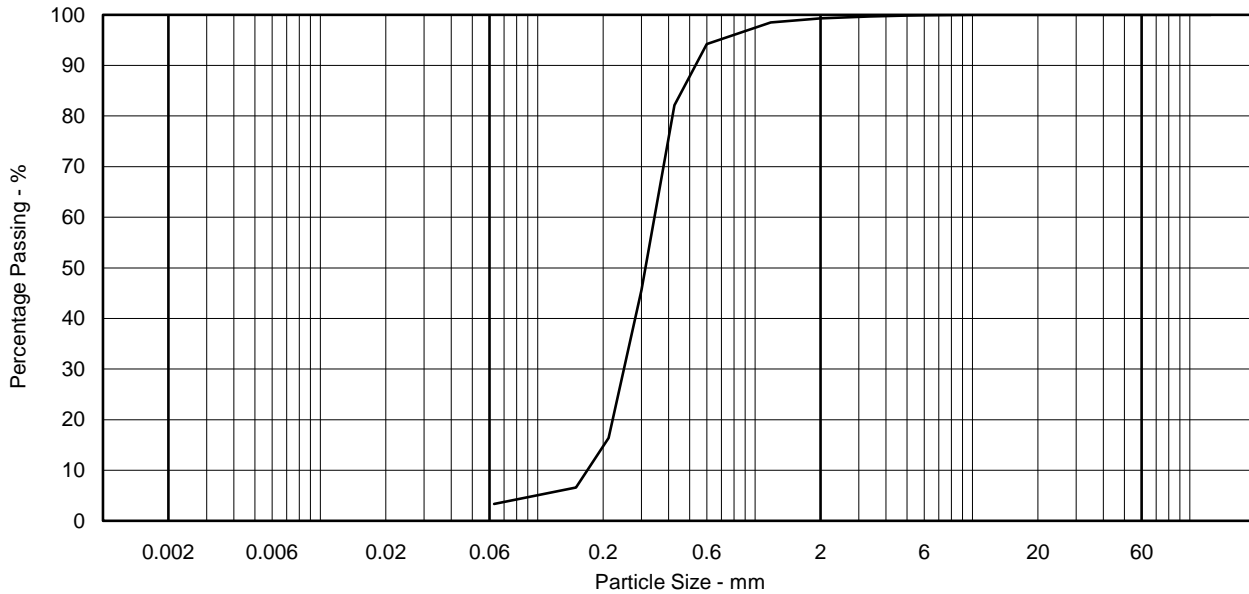
Non Engineering Description
Dark grey mottled brown slightly silty SAND.


Sample Proportions - %	
Cobbles	0.0
Gravel	0.7
Sand	95.9
Silt & Clay	3.3

Particle Diameter - mm	
D100	10
D60	0.34
D10	0.17
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.0

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	 05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving







SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 17

Depth (m) 5.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	97
6.30 mm	93
5.00 mm	90
3.35 mm	89
2.00 mm	87
1.18 mm	86
600 µm	82
425 µm	74
300 µm	59
212 µm	34
150 µm	12
63 µm	6

**Non Engineering Description**

Brown mottled dark grey silty gravelly SAND. Gravel is fine to medium.

**Sample Proportions - %**

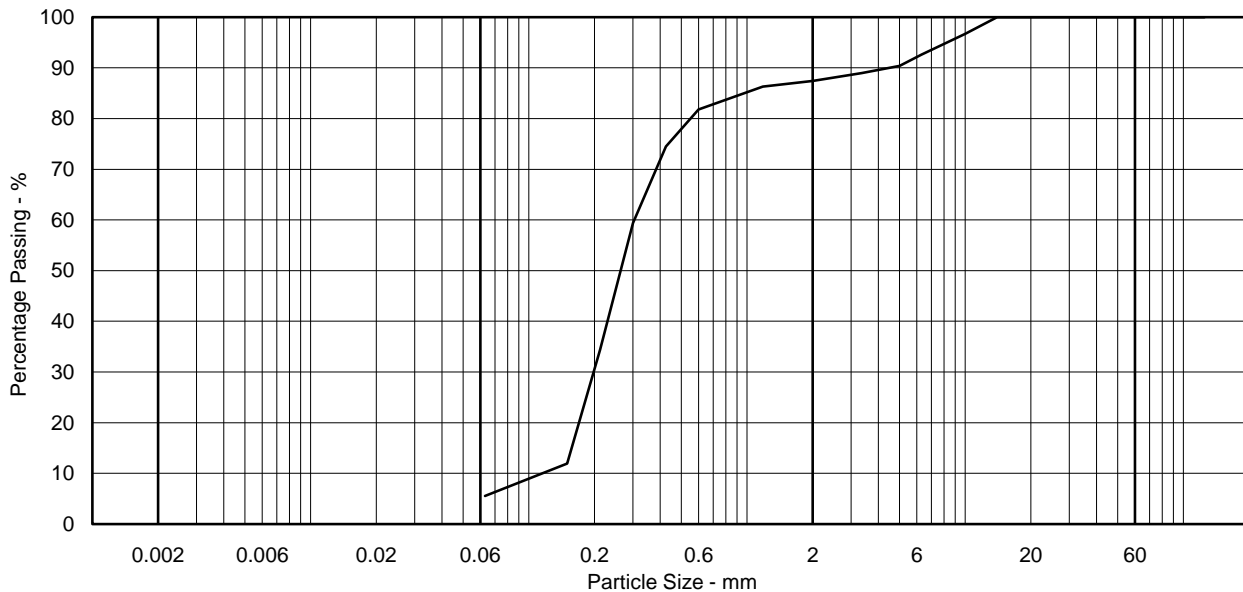
Cobbles	0.0
Gravel	12.6
Sand	81.9
Silt & Clay	5.5

**Particle Diameter - mm**

D100	14
D60	0.30
D10	0.12
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	[Redacted] 18

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 24

Depth (m) 7.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	98
600 µm	97
425 µm	94
300 µm	87
212 µm	56
150 µm	16
63 µm	3

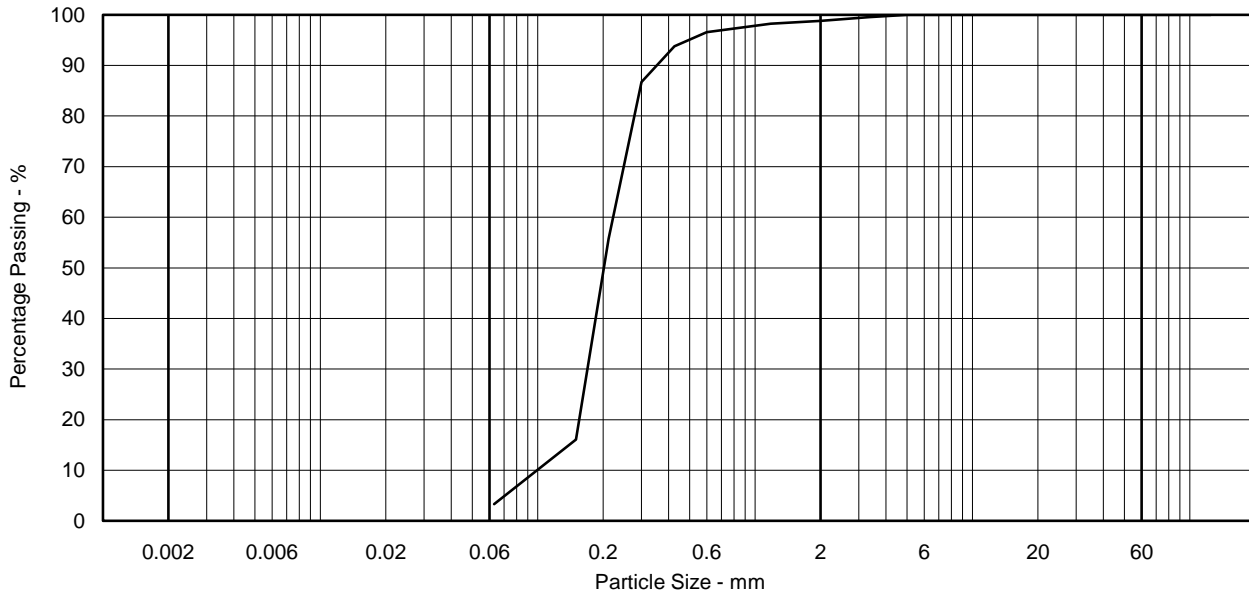
Non Engineering Description
Light brown slightly silty SAND with rare fine gravel.

Sample Proportions - %	
Cobbles	0.0
Gravel	1.2
Sand	95.5
Silt & Clay	3.3

Particle Diameter - mm	
D100	5.0
D60	0.22
D10	0.099
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.2

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 33

Depth (m) 10.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	98
300 µm	95
212 µm	72
150 µm	22
63 µm	4

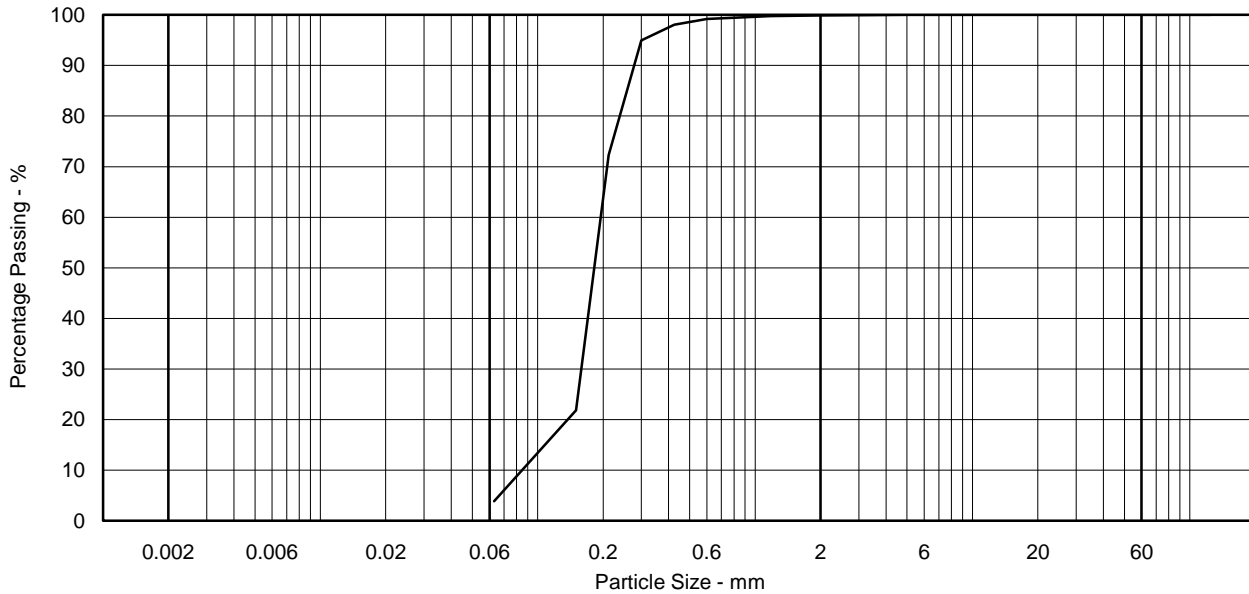
Non Engineering Description
Orange brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.1
Sand	96.0
Silt & Clay	3.9

Particle Diameter - mm	
D100	5.0
D60	0.19
D10	0.085
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.2

Notes
S.I.P (89.31)

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING  
 Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**  
 Hole MB10  
 Sample Ref 40  
 Depth (m) 12.00  
 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	99
300 µm	98
212 µm	74
150 µm	22
63 µm	3

**Non Engineering Description**

Orange brown slightly silty SAND.

**Sample Proportions - %**

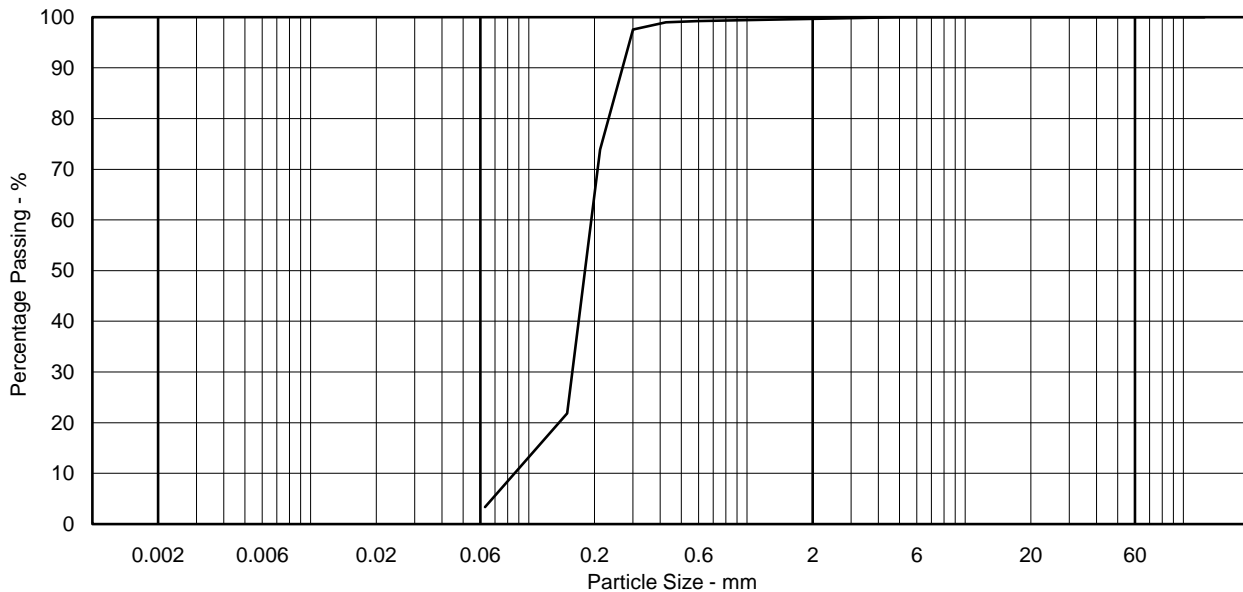
Cobbles	0.0
Gravel	0.4
Sand	96.3
Silt & Clay	3.4

**Particle Diameter - mm**

D100	5.0
D60	0.19
D10	0.086
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.2

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	3/2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 47

Depth (m) 14.00

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	94
425 µm	83
300 µm	63
212 µm	47
150 µm	22
63 µm	5

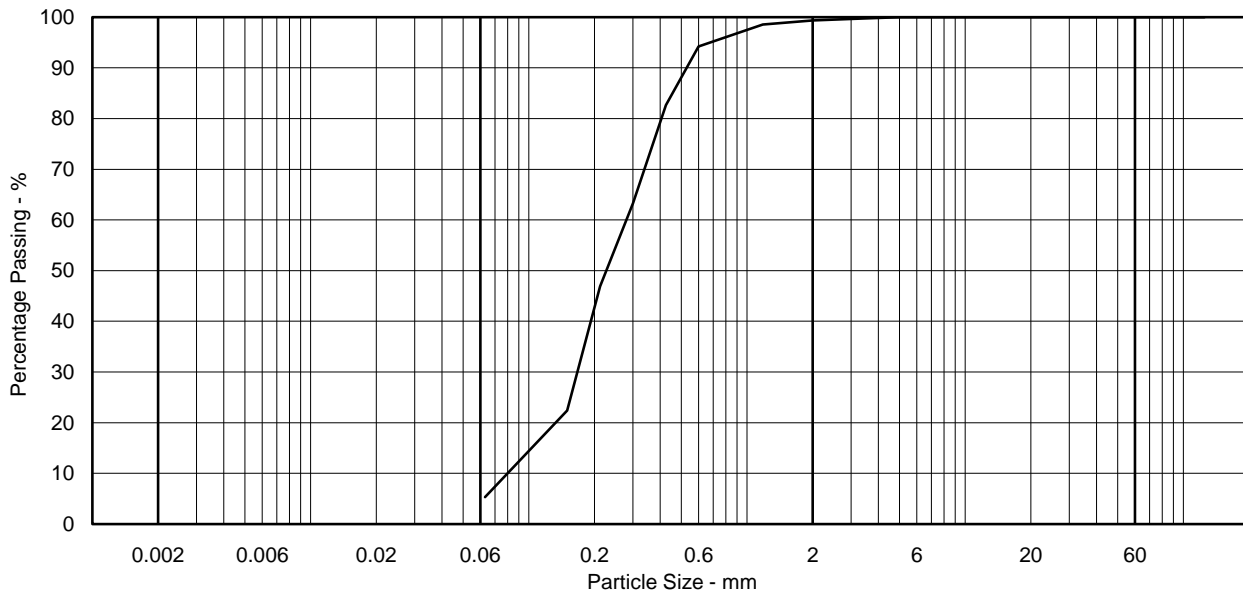
Non Engineering Description
Orange brown silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.7
Sand	94.0
Silt & Clay	5.3

Particle Diameter - mm	
D100	5.0
D60	0.28
D10	0.080
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.5

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 49

Depth (m) 14.50

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	96
28.0 mm	96
20.0 mm	96
14.0 mm	96
10.0 mm	96
6.30 mm	95
5.00 mm	95
3.35 mm	94
2.00 mm	94
1.18 mm	93
600 µm	87
425 µm	72
300 µm	45
212 µm	26
150 µm	14
63 µm	3

**Non Engineering Description**

Orange brown slightly silty gravelly SAND. Gravel is fine to coarse.

**Sample Proportions - %**

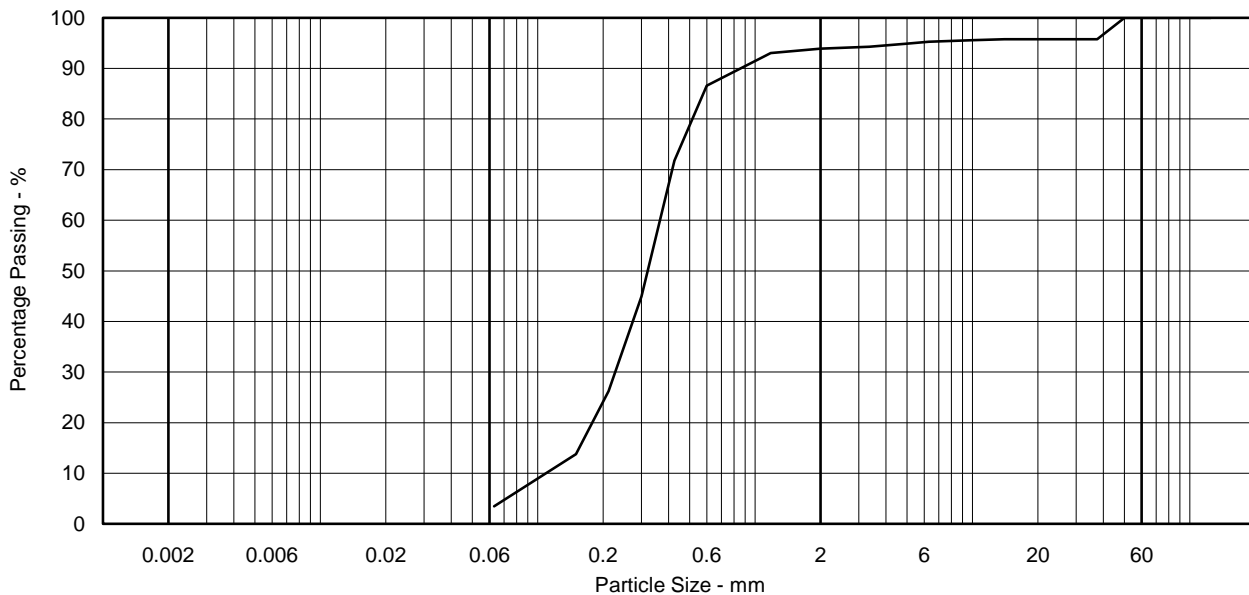
Cobbles	0.0
Gravel	6.1
Sand	90.4
Silt & Clay	3.5

**Particle Diameter - mm**

D100	50
D60	0.36
D10	0.11
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.3

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MH	2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 51

Depth (m) 15.50

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	99
5.00 mm	99
3.35 mm	99
2.00 mm	98
1.18 mm	97
600 µm	93
425 µm	80
300 µm	49
212 µm	25
150 µm	14
63 µm	4

**Non Engineering Description**

Orange brown slightly gravelly slightly silty SAND. Gravel is fine to medium.

**Sample Proportions - %**

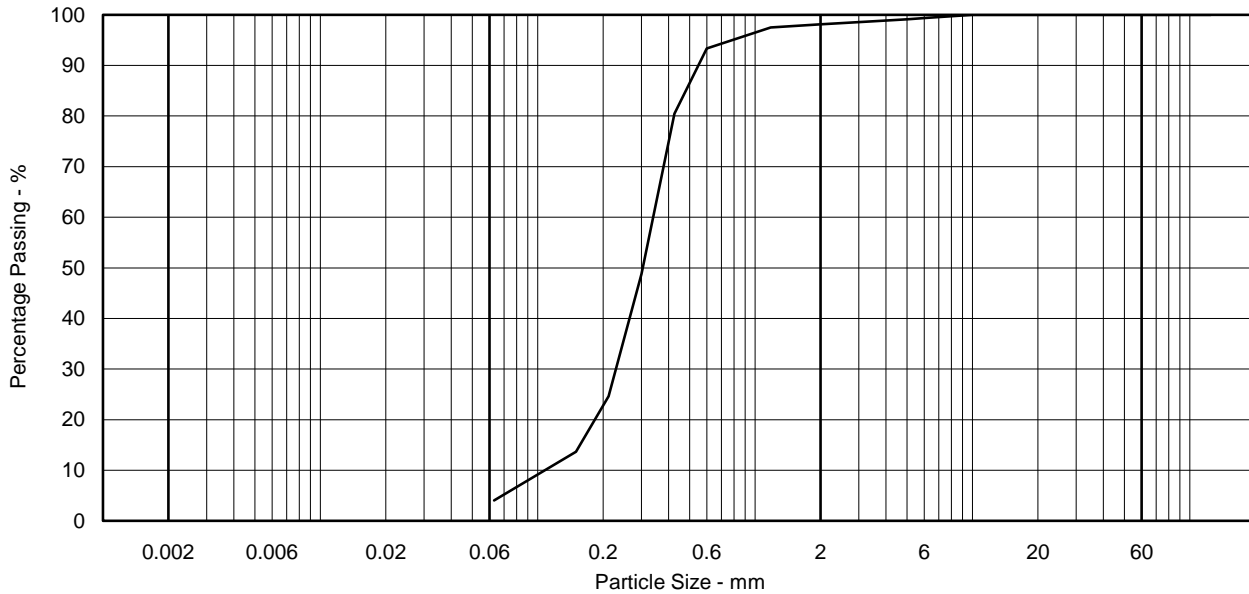
Cobbles	0.0
Gravel	1.9
Sand	94.1
Silt & Clay	4.0

**Particle Diameter - mm**

D100	10
D60	0.34
D10	0.11
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	3.1

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
MAB	05/09/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving







SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 55

Depth (m) 17.50

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	96
425 µm	76
300 µm	34
212 µm	18
150 µm	10
63 µm	3

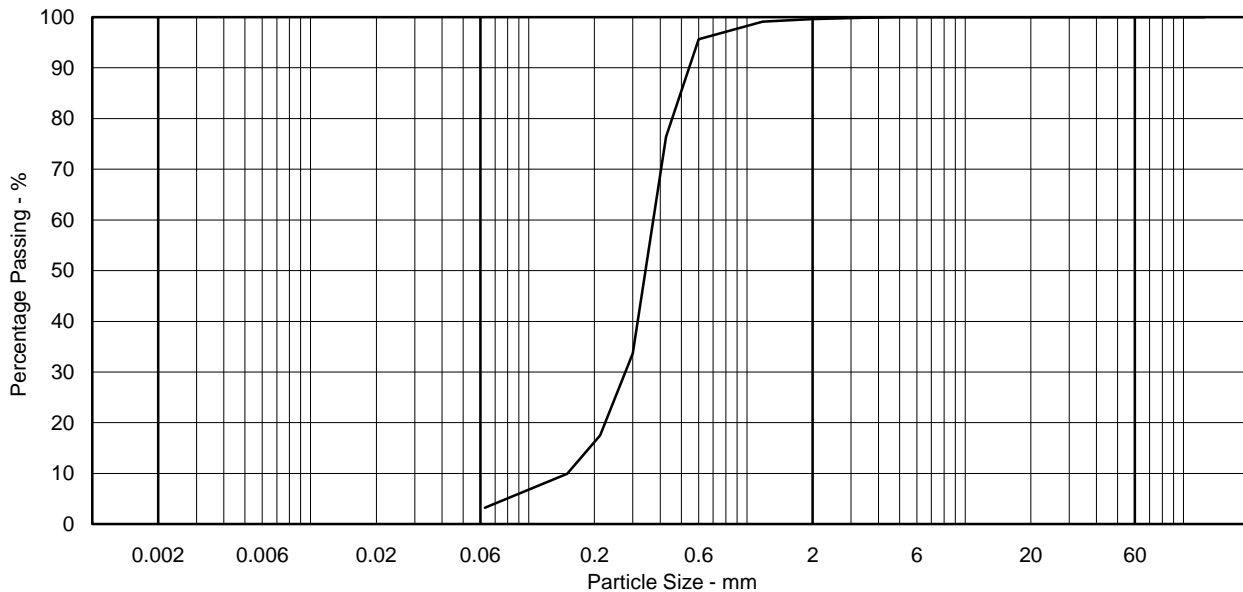
Non Engineering Description
Light brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.4
Sand	96.4
Silt & Clay	3.3

Particle Diameter - mm	
D100	5.0
D60	0.37
D10	0.15
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.5

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 60

Depth (m) 19.30

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	95
425 µm	82
300 µm	46
212 µm	20
150 µm	8
63 µm	3

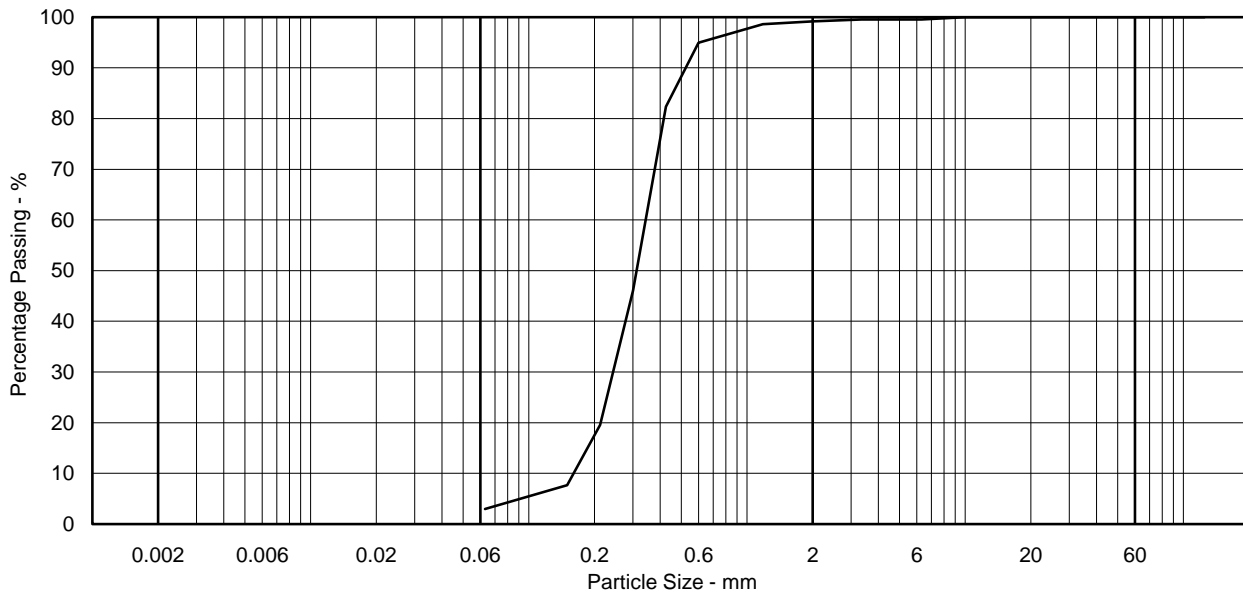
Non Engineering Description
Brown slightly silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.8
Sand	96.2
Silt & Clay	3.0

Particle Diameter - mm	
D100	10
D60	0.34
D10	0.16
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	2.1

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	/2018

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving





SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 63

Depth (m) 20.50

Sample Type D

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	100
300 µm	96
212 µm	77
150 µm	54
63 µm	32
20 µm	21
6 µm	14
2 µm	9

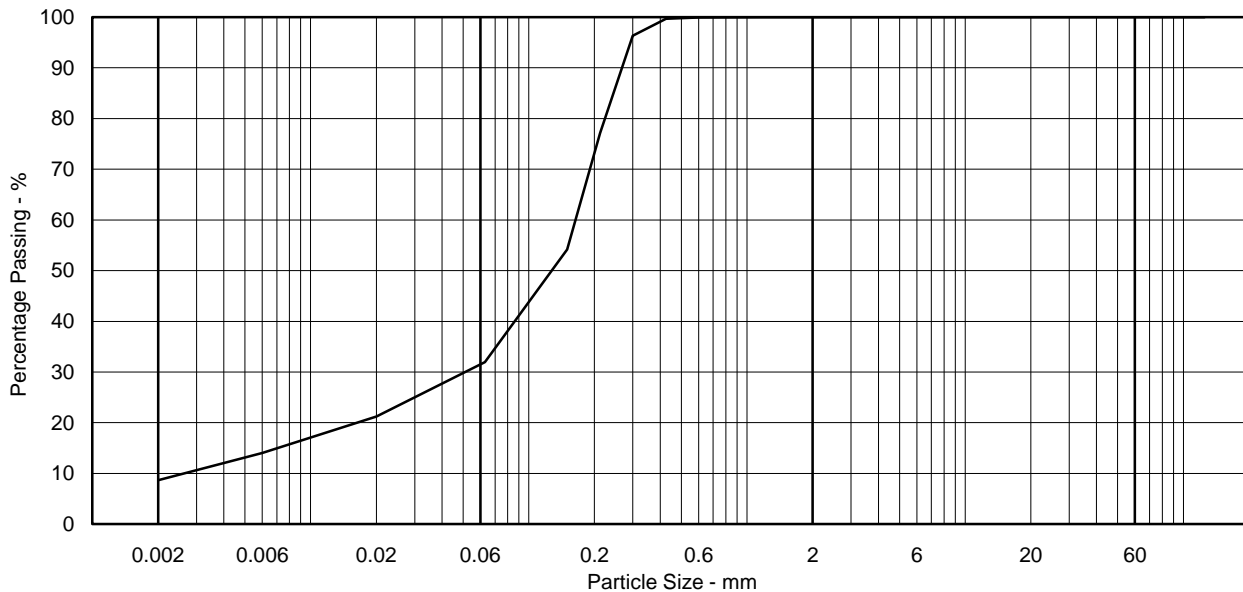
Non Engineering Description
Grey very sandy SILT/CLAY.


Sample Proportions - %	
Cobbles	0.0
Gravel	0.0
Sand	68.8
Silt	22.6
Clay	8.7

Particle Diameter - mm	
D100	2.0
D60	0.16
D10	0.0026
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	61.5

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	 /2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Sheet 1 of 1



SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB10

Sample Ref 68

Depth (m) 22.50

Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	98
425 µm	97
300 µm	95
212 µm	90
150 µm	85
63 µm	78
20 µm	64
6 µm	47
2 µm	31

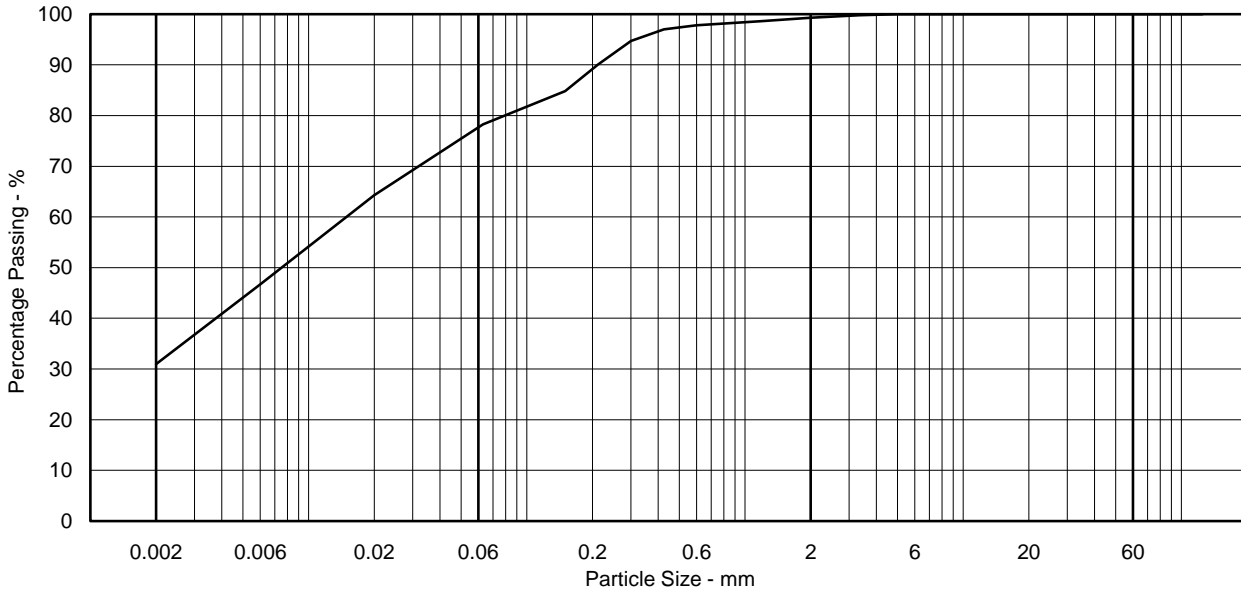
Non Engineering Description
Greyih brown slightly sandy CLAY with rare fine gravel.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.7
Sand	22.0
Silt	46.3
Clay	31.0

Particle Diameter - mm	
D100	5.0
D60	0.015
D10	
Uniformity Coefficient <small>(SHW series 600, Table 6/1, footnote 5)</small>	N/A

Notes
Sedimentation sample not pre-treated

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
LA	2018

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Sheet 1 of 1

**Norfolk Partnership Laboratory**

County Hall  
Martineau Lane  
Norwich  
Norfolk  
NR1 2SG

For the attention of Mr. Simon Holden

Report No: C6474-3

Issue No 01

### LABORATORY TEST REPORT

Project Name		<b>GREAT YARMOUTH 3RD RIVER CROSSING</b>	
Project Number	<b>C6474-3</b>	Date samples received	17/08/2018
Your Ref	PZ1522D1	Date written instructions received	17/08/2018
Purchase Order		Date testing commenced	07/09/2018
<b>Please find enclosed the results as summarised below</b>			
Item No	Test Quantity	Description	ISO 17025 Accredited
7.33	33	Single stage UU Triaxial	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 14/09/2018	
Approved Signatories :		Key to symbols used in this report S/C : Testing was sub-contracted	
G Wilson (JMD/Laboratories Director), M D Brown (Quality Manager), L Anaz (Supervisor), Julie Hopkins (Administrator), A Davison (Supervisor)			
<p>Unless we are notified to the contrary, samples will be disposed after a period of one month from this date. The results reported relate to samples received in the laboratory only. All results contained in this report are provisional unless signed by an approved signatory This report should not be reproduced except in full without the written approval of the laboratory. Under multisite accreditation the testing contained in this report may have been performed at another Terra Tek laboratory. The enclosed results remain the property of Terra Tek Limited and we reserve the right to withdraw our report if we have not received cleared funds in accordance with our standard terms and conditions</p> <p><b>Only those results indicated in this report are UKAS accredited and any opinions or interpretations expressed are outside the scope of UKAS accreditation.</b></p> <p>Feedback on the this report may be left via our website <a href="http://www.terratek.co.uk/contact-us">www.terratek.co.uk/contact-us</a></p>			



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[www.terratek.co.uk](http://www.terratek.co.uk)

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Head Office : 62 Rochsolloch Road, Airdrie, ML6 9BG



SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB01A
Sample Ref	U72
Depth (m)	21.00-21.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	176.6		
Diameter	mm	103.3		
Moisture Content	%	28		
Bulk Density	Mg/m <sup>3</sup>	1.99		
Dry Density	Mg/m <sup>3</sup>	1.55		

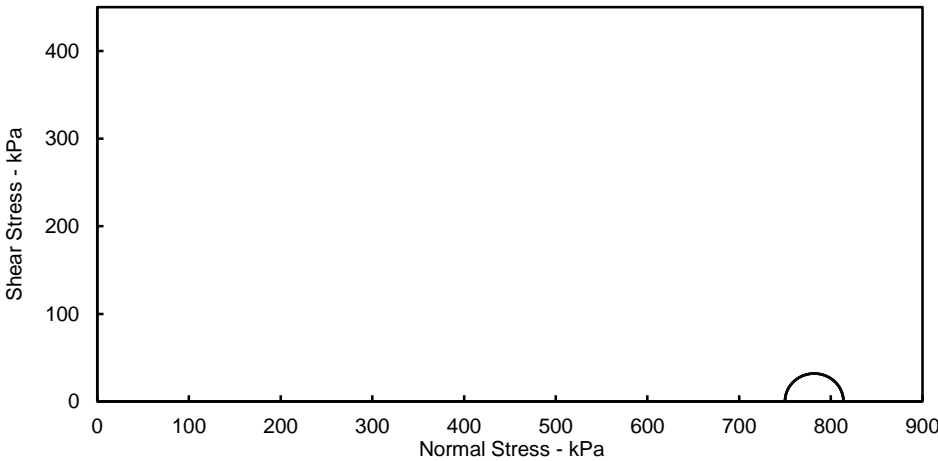
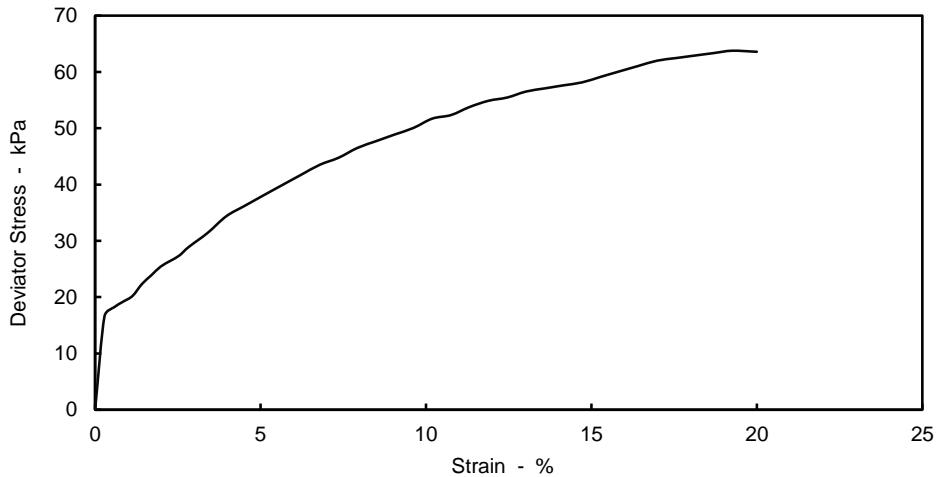
**Comments**  
 Undisturbed specimen taken  
 220mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.08		
Rate of Axial Displacement	%/min	2.30		
Cell Pressure	kPa	750		
Strain at Failure	%	19.2		
Maximum Deviator Stress	kPa	64		
Shear Strength	kPa	32		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Soft layered grey sandy CLAY.



Originator	Checked & Approved
MAB	[Signature] 18

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB01A

Sample Ref U72

Depth (m) 21.00-21.45

Sample Type U



Originator

Checked & Approved

MAB

018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.







Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No. PZ1522D1

Client Norfolk County Council  
 Engineer Norfolk Partnership Laboratory

Hole MB01A  
 Sample Ref U72  
 Depth (m) 21.00-21.45  
 Sample Type U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	176.8		
Diameter	mm	103.5		
Moisture Content	%	25		
Bulk Density	Mg/m <sup>3</sup>	2.00		
Dry Density	Mg/m <sup>3</sup>	1.61		

**Comments**

Undisturbed specimen taken 20mm below top of tube

**Test Details**

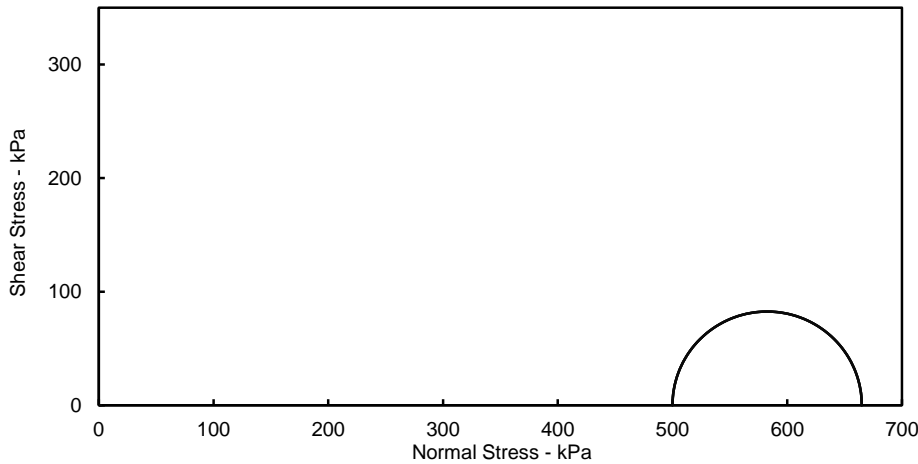
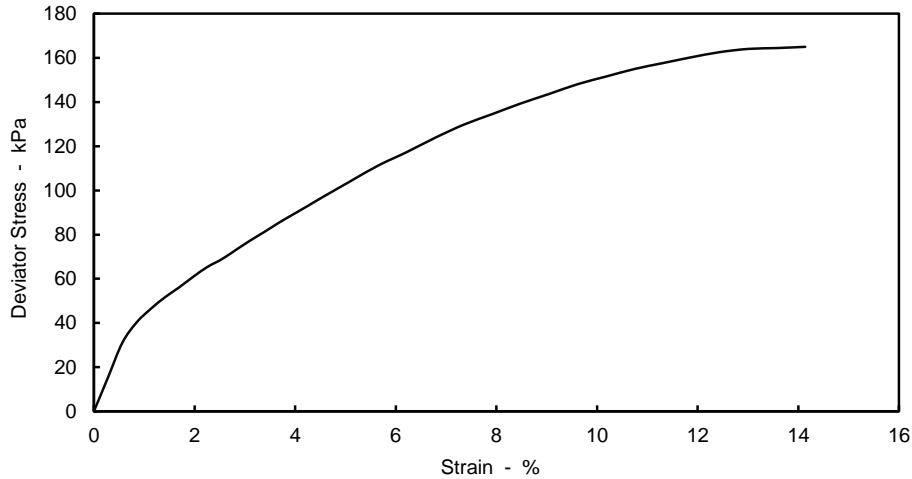
Membrane Thickness	mm	0.20		
Membrane Correction	kPa	0.57		
Rate of Axial Displacement	%/min	2.30		
Cell Pressure	kPa	500		
Strain at Failure	%	14.1		
Maximum Deviator Stress	kPa	165		
Shear Strength	kPa	82		
Mode of Failure			Compound	

**Shear Strength Parameters**

C	n/a	kPa
Phi	n/a	°

Non Engineering Description

Stiff laminated yellowish grey sandy CLAY.



Originator

Checked & Approved

MAB



18

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**

BS 1377 : Part 7 : 1990 Clause 8





Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No PZ1522D1

Client Norfolk County Council

Hole MB01A

Engineer Norfolk Partnership Laboratory

Sample Ref U72

Depth (m) 21.00-21.45

Sample Type U



Originator

Checked & Approved

MAB



Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB01A
Sample Ref	U78
Depth (m)	23.00-23.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	177.9		
Diameter	mm	103.9		
Moisture Content	%	25		
Bulk Density	Mg/m <sup>3</sup>	1.99		
Dry Density	Mg/m <sup>3</sup>	1.60		

**Comments**

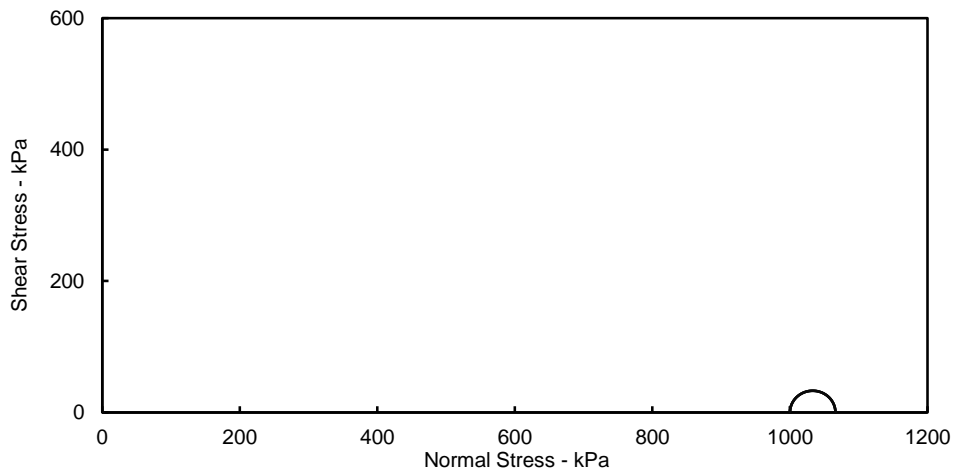
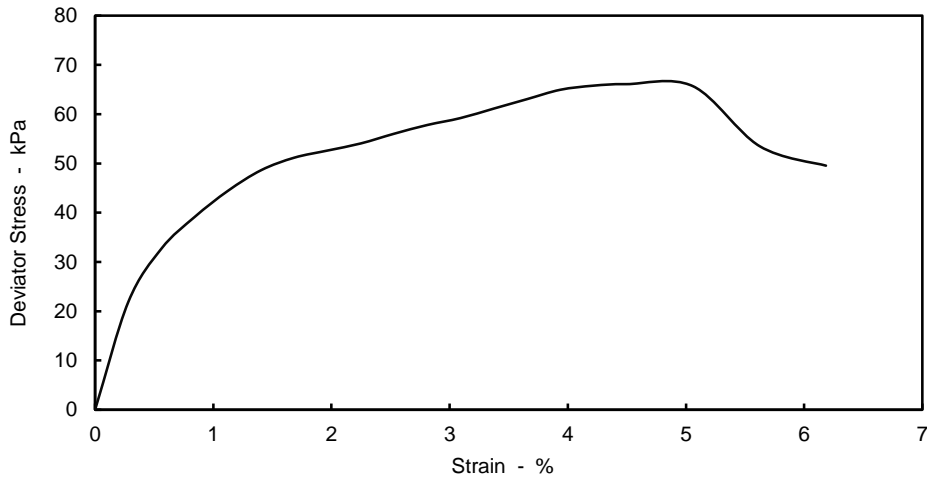
Undisturbed specimen taken 235mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.34		
Rate of Axial Displacement	%/min	0.85		
Cell Pressure	kPa	1000		
Strain at Failure	%	4.5		
Maximum Deviator Stress	kPa	66		
Shear Strength	kPa	33		
Mode of Failure			Plastic	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description	Soft layered grey very sandy CLAY.
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Originator	Checked & Approved
MAB	18

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB01A

Sample Ref U78

Depth (m) 23.00-23.45

Sample Type U



Originator

Checked & Approved


MAB



18

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.

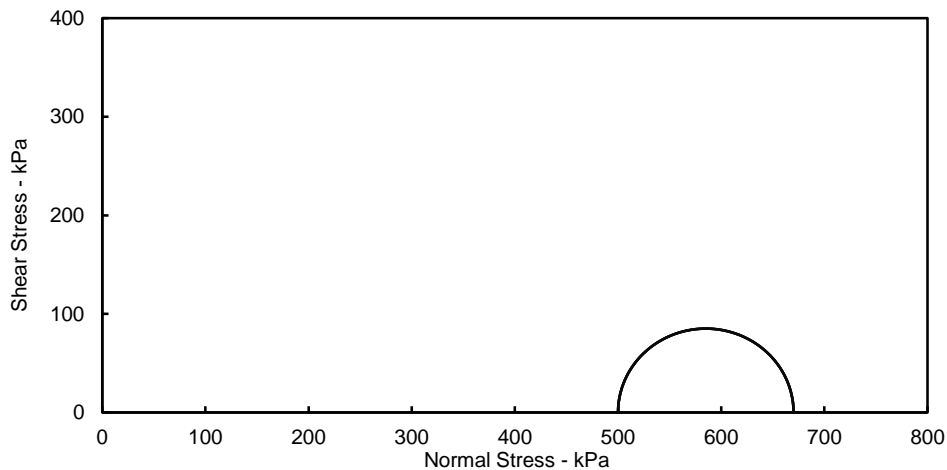
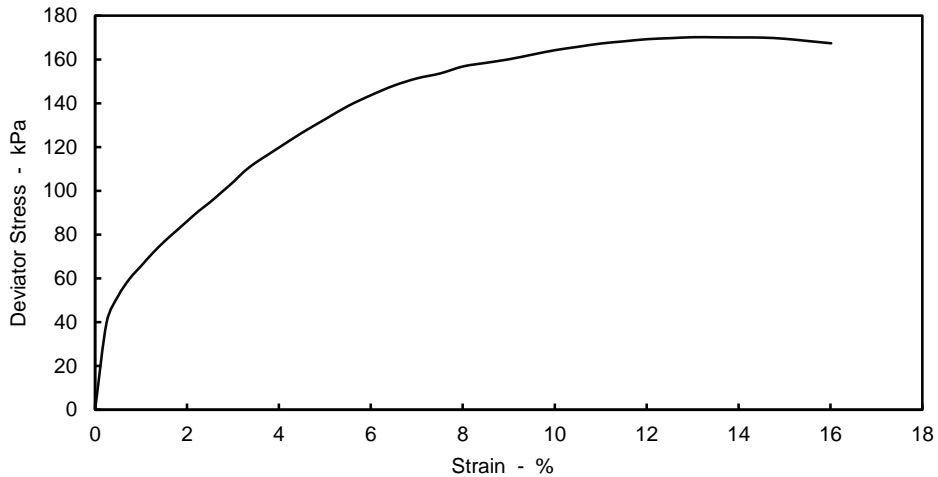




 SITE INVESTIGATION AND LABORATORY SERVICES	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No.	<b>PZ1522D1</b>
	Client	Norfolk County Council	Hole	MB02
	Engineer	Norfolk Partnership Laboratory	Sample Ref	U69
			Depth (m)	21.00-21.45
			Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	199.8		
Diameter	mm	103.4		
Moisture Content	%	27		
Bulk Density	Mg/m <sup>3</sup>	2.01		
Dry Density	Mg/m <sup>3</sup>	1.58		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.80		
Rate of Axial Displacement	%/min	0.76		
Cell Pressure	kPa	500		
Strain at Failure	%	13.0		
Maximum Deviator Stress	kPa	170		
Shear Strength	kPa	85		
Mode of Failure			Compound	
Non Engineering Description		Stiff fissured grey slightly sandy CLAY.		

**Comments**  
 Undisturbed specimen taken  
 230mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved	<b>UNCONSOLIDATED UNDRAINED SINGLE                  STAGE TRIAXIAL COMPRESSION</b> BS 1377 : Part 7 : 1990 Clause 8	
MAB	 18		



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole MB02

Sample Ref U69

Depth (m) 21.00-21.45

Engineer Norfolk Partnership Laboratory

Sample Type U



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Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.

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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB02
Sample Ref	U69
Depth (m)	21.00-21.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	187.1		
Diameter	mm	103.6		
Moisture Content	%	25		
Bulk Density	Mg/m <sup>3</sup>	2.01		
Dry Density	Mg/m <sup>3</sup>	1.61		

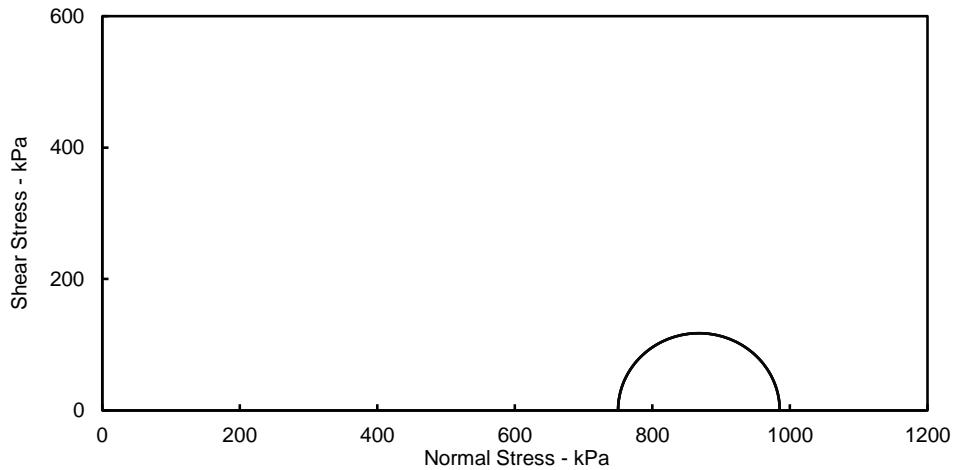
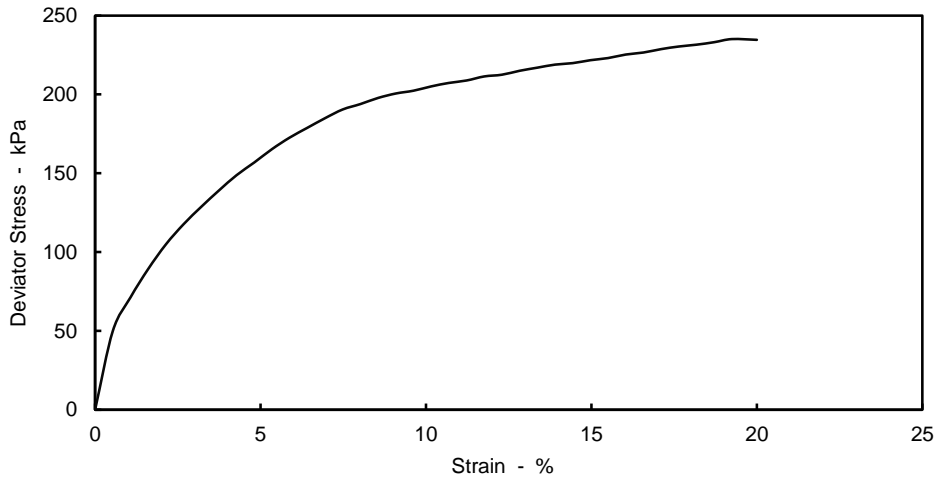
**Comments**  
 Undisturbed specimen taken  
 40mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.07		
Rate of Axial Displacement	%/min	0.81		
Cell Pressure	kPa	750		
Strain at Failure	%	19.2		
Maximum Deviator Stress	kPa	235		
Shear Strength	kPa	118		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description	Stiff layered grey sandy CLAY.
-----------------------------	--------------------------------



Originator	Checked & Approved
MAB	

**UNCONSOLIDATED UNDRAINED SINGLE  
 STAGE TRIAXIAL COMPRESSION**  
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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole MB02

Sample Ref U69

Depth (m) 21.00-21.45

Engineer Norfolk Partnership Laboratory

Sample Type U



Originator

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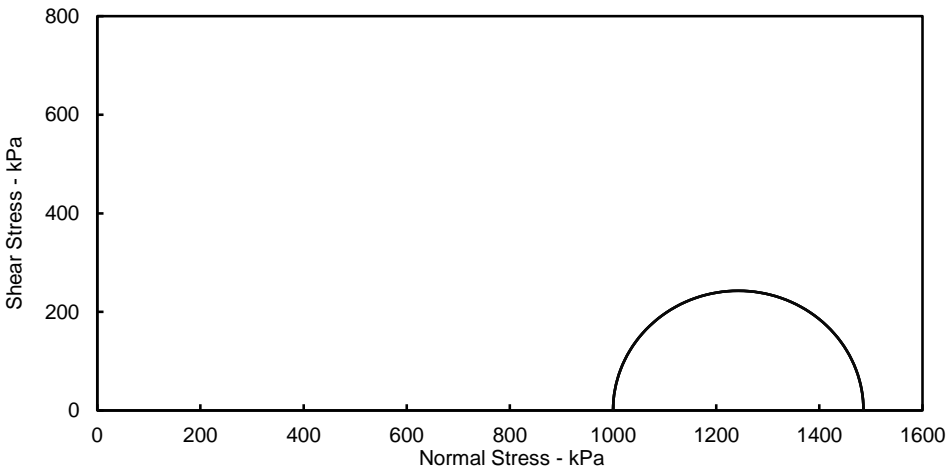
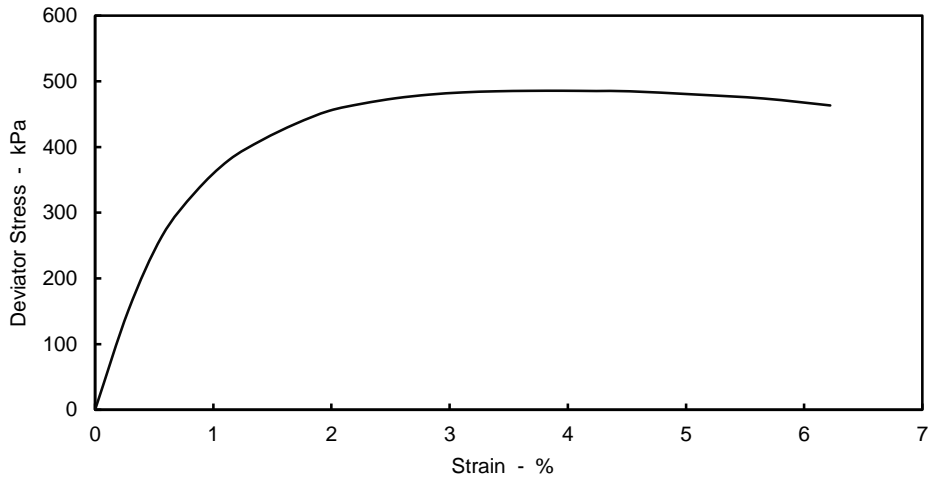
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB02
Sample Ref	U103
Depth (m)	36.10-36.55
Sample Type	U

Sample Details		Undisturbed		
Sample Condition		Undisturbed		
Height	mm	176.8		
Diameter	mm	103.5		
Moisture Content	%	29		
Bulk Density	Mg/m <sup>3</sup>	1.97		
Dry Density	Mg/m <sup>3</sup>	1.52		
Test Details				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.31		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	1000		
Strain at Failure	%	4.0		
Maximum Deviator Stress	kPa	486		
Shear Strength	kPa	243		
Mode of Failure			Brittle	
Non Engineering Description		Very stiff intact dark grey slightly sandy CLAY.		

**Comments**  
 Undisturbed specimen taken 20mm below top of tube

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



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MAB	14/09/2018

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Sheet 1 of 2

# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB02

Sample Ref U103

Depth (m) 36.10-36.55

Sample Type U



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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB02
Sample Ref	U103
Depth (m)	36.10-36.55
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	177.6		
Diameter	mm	103.5		
Moisture Content	%	31		
Bulk Density	Mg/m <sup>3</sup>	1.96		
Dry Density	Mg/m <sup>3</sup>	1.50		

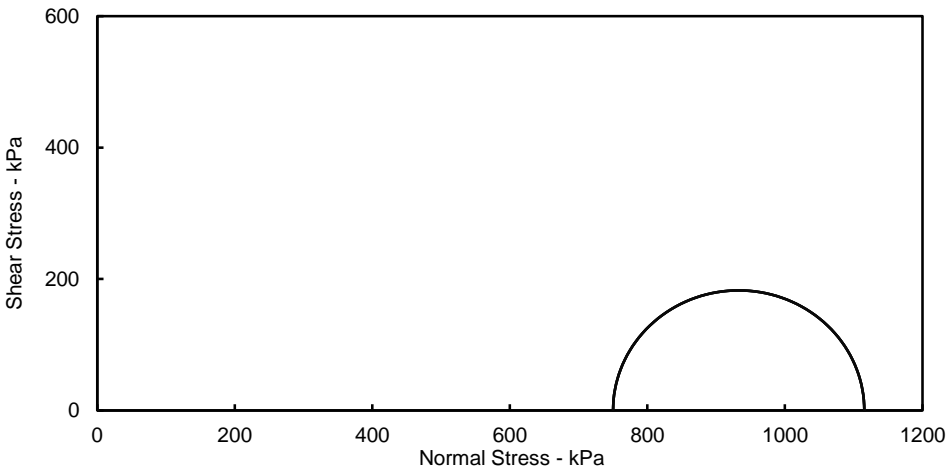
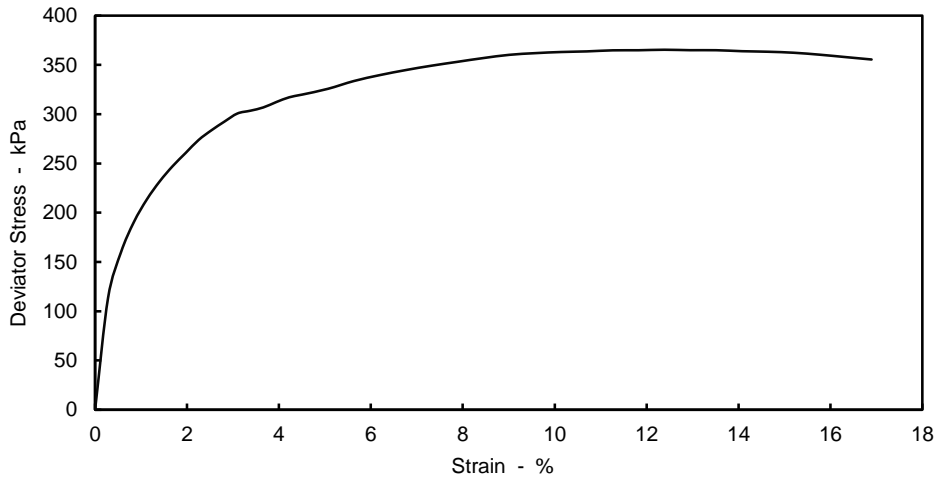
**Comments**  
 Undisturbed specimen taken  
 230mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.77		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	750		
Strain at Failure	%	12.4		
Maximum Deviator Stress	kPa	365		
Shear Strength	kPa	183		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Very stiff fissured grey slightly sandy CLAY.



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MAB	

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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB02

Sample Ref U103

Depth (m) 36.10-36.55

Sample Type U



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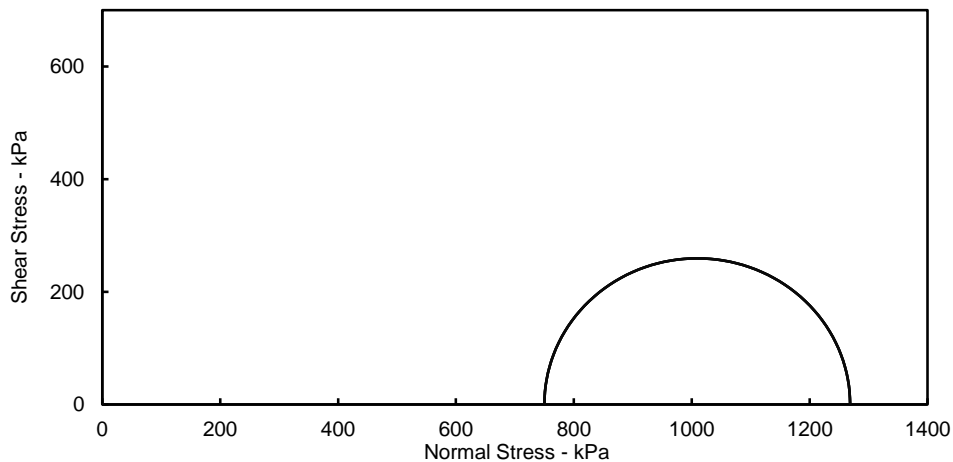
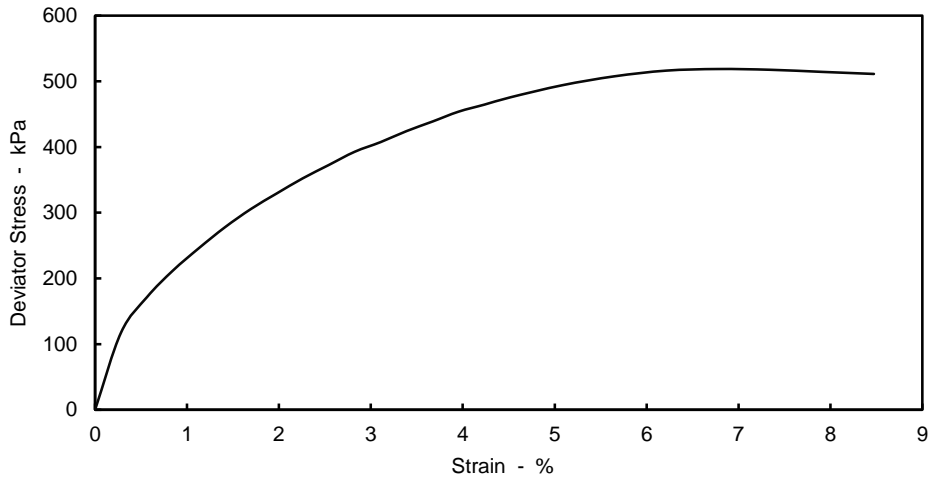



 SITE INVESTIGATION AND LABORATORY SERVICES	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No.	<b>PZ1522D1</b>
	Client	Norfolk County Council	Hole	MB02
	Engineer	Norfolk Partnership Laboratory	Sample Ref	U111
			Depth (m)	40.00-40.45
			Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	177.0		
Diameter	mm	103.6		
Moisture Content	%	31		
Bulk Density	Mg/m <sup>3</sup>	1.95		
Dry Density	Mg/m <sup>3</sup>	1.49		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.48		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	750		
Strain at Failure	%	6.8		
Maximum Deviator Stress	kPa	519		
Shear Strength	kPa	259		
Mode of Failure			Brittle	
Non Engineering Description	Very stiff fissured slightly sandy dark grey CLAY.			

**Comments**  
Undisturbed specimen taken 40mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



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MAB	[Redacted] 018		

# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole MB02

Sample Ref U111

Depth (m) 40.00-40.45

Engineer Norfolk Partnership Laboratory

Sample Type U



Originator

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SITE INVESTIGATION AND LABORATORY SERVICES

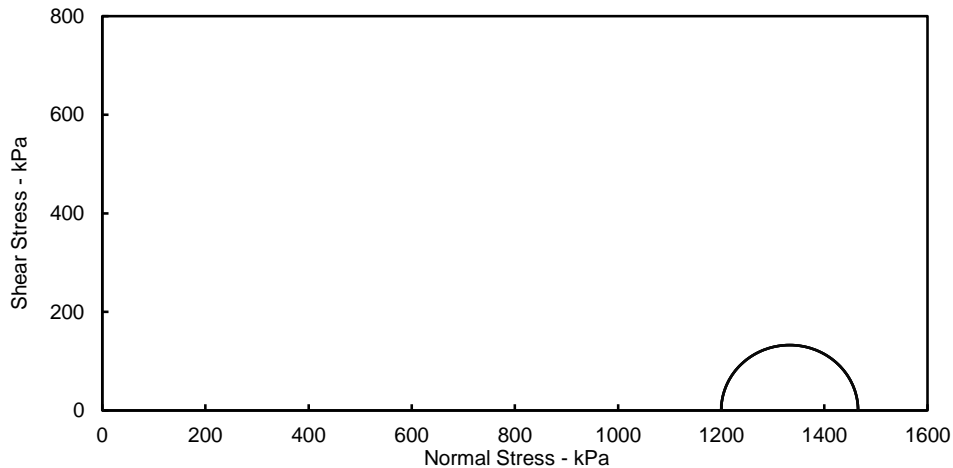
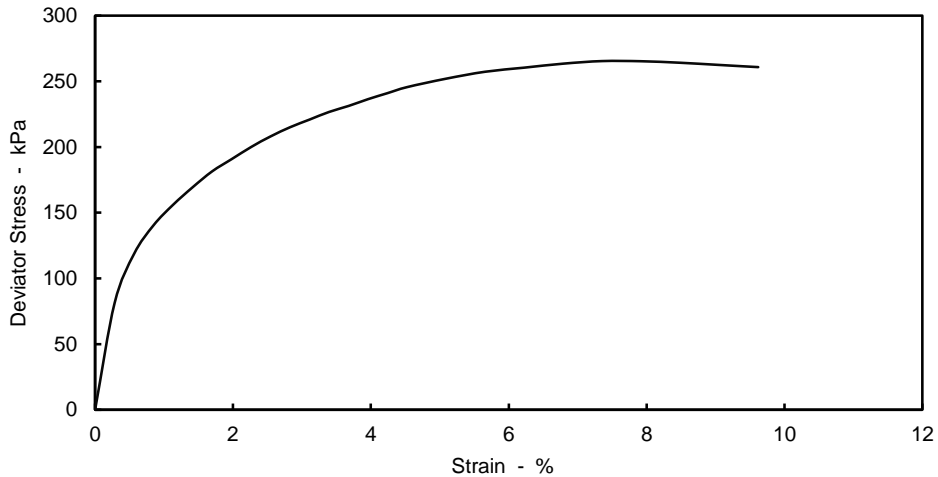
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	MB02
Sample Ref	U111
Depth (m)	40.00-40.45
Sample Type	U

Sample Details		Undisturbed		
Sample Condition		Undisturbed		
Height	mm	176.7		
Diameter	mm	102.9		
Moisture Content	%	33		
Bulk Density	Mg/m <sup>3</sup>	1.94		
Dry Density	Mg/m <sup>3</sup>	1.46		
Test Details				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.52		
Rate of Axial Displacement	%/min	0.86		
Cell Pressure	kPa	1200		
Strain at Failure	%	7.4		
Maximum Deviator Stress	kPa	265		
Shear Strength	kPa	133		
Mode of Failure			Plastic	
Non Engineering Description	Stiff fissured dark grey slightly sandy CLAY.			

**Comments**  
 Undisturbed specimen taken 270mm below top of tube

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



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MAB	 14/09/2018

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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB02

Sample Ref U111

Depth (m) 40.00-40.45

Sample Type U



Originator


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Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.

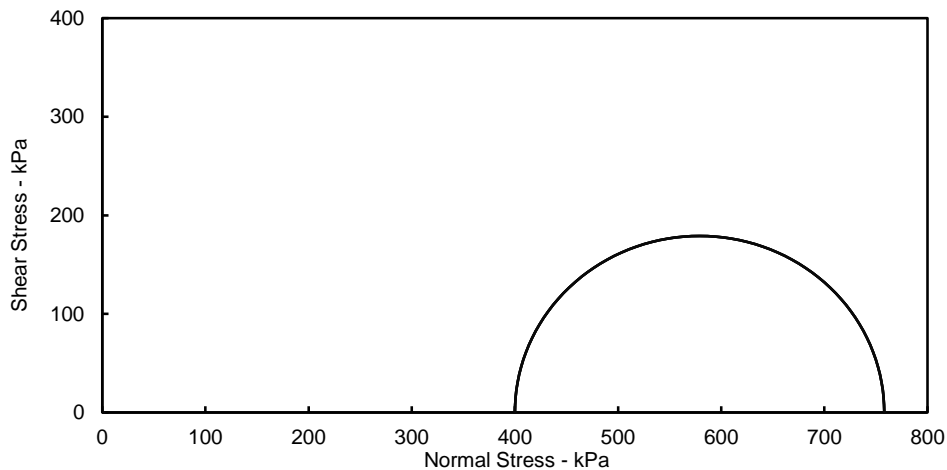
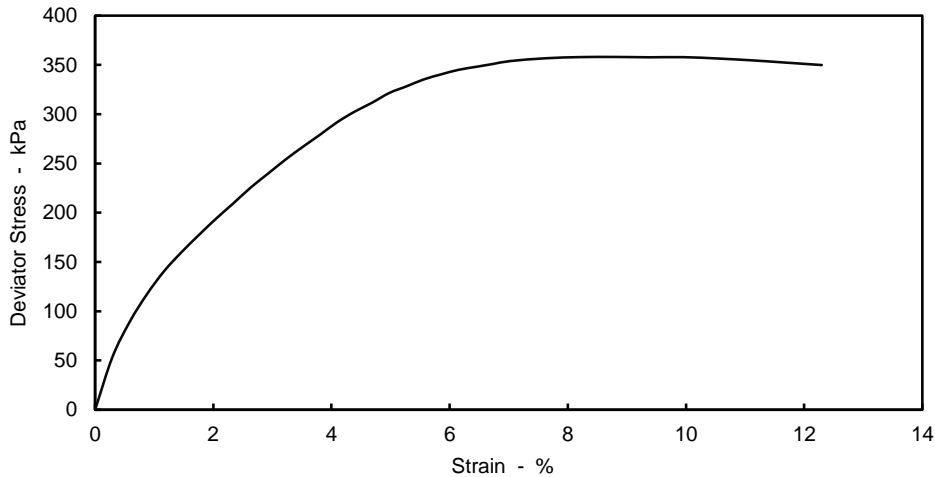




 SITE INVESTIGATION AND LABORATORY SERVICES	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No.	<b>PZ1522D1</b>
	Client	Norfolk County Council	Hole	MB03
	Engineer	Norfolk Partnership Laboratory	Sample Ref	U68
			Depth (m)	20.00-20.45
			Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	170.8		
Diameter	mm	103.6		
Moisture Content	%	24		
Bulk Density	Mg/m <sup>3</sup>	2.01		
Dry Density	Mg/m <sup>3</sup>	1.62		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.59		
Rate of Axial Displacement	%/min	2.38		
Cell Pressure	kPa	400		
Strain at Failure	%	8.8		
Maximum Deviator Stress	kPa	358		
Shear Strength	kPa	179		
Mode of Failure			Plastic	
Non Engineering Description	Very stiff layered grey very sandy CLAY.			

**Comments**  
Undisturbed specimen taken 10mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



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MAB	 2018		

# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole MB03

Sample Ref U68

Depth (m) 20.00-20.45

Engineer Norfolk Partnership Laboratory

Sample Type U



Originator

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Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.

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SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB03
Sample Ref	U68
Depth (m)	20.00-20.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	183.6		
Diameter	mm	102.9		
Moisture Content	%	27		
Bulk Density	Mg/m <sup>3</sup>	1.82		
Dry Density	Mg/m <sup>3</sup>	1.43		

**Comments**

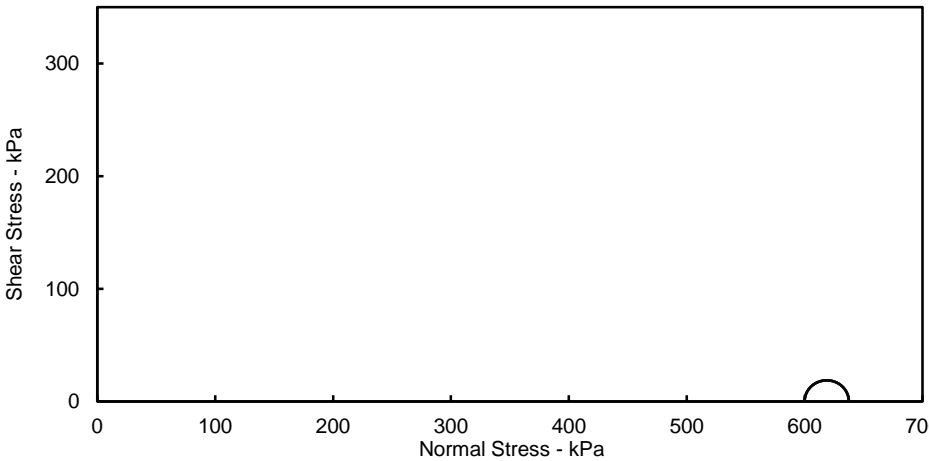
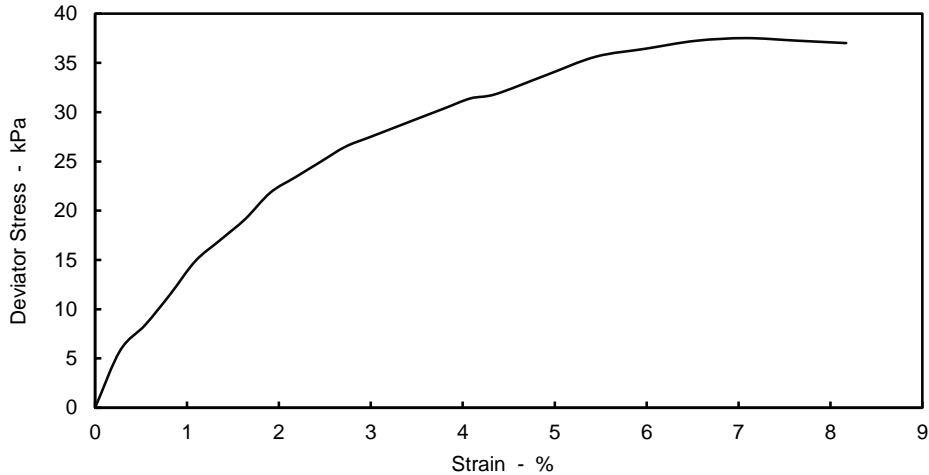
Undisturbed specimen taken 220mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.50		
Rate of Axial Displacement	%/min	0.83		
Cell Pressure	kPa	600		
Strain at Failure	%	7.1		
Maximum Deviator Stress	kPa	38		
Shear Strength	kPa	19		
Mode of Failure			Compound	

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description	Very soft layered very sandy CLAY.
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Originator	Checked & Approved
MAB	[Signature]
	9/2018

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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB03

Sample Ref U68

Depth (m) 20.00-20.45

Sample Type U



Originator

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14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB04A
Sample Ref	U63
Depth (m)	20.50-20.95
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	193.7		
Diameter	mm	103.4		
Moisture Content	%	27		
Bulk Density	Mg/m <sup>3</sup>	2.00		
Dry Density	Mg/m <sup>3</sup>	1.58		

**Comments**

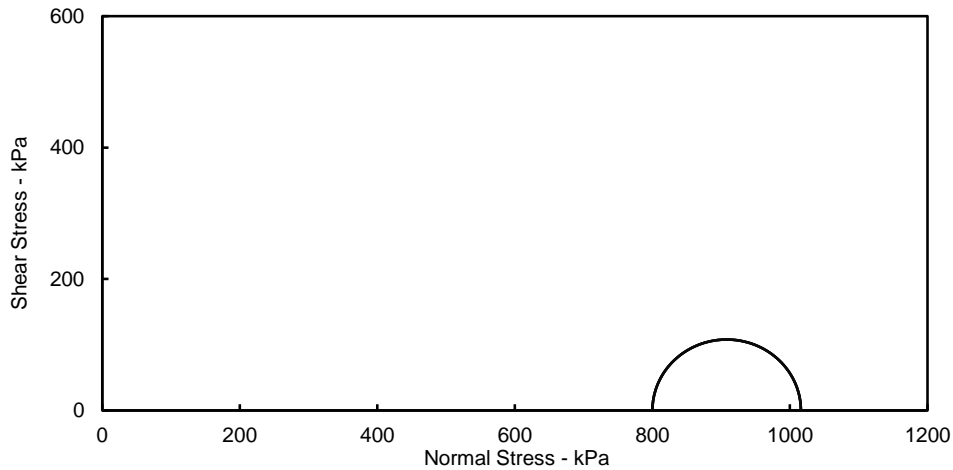
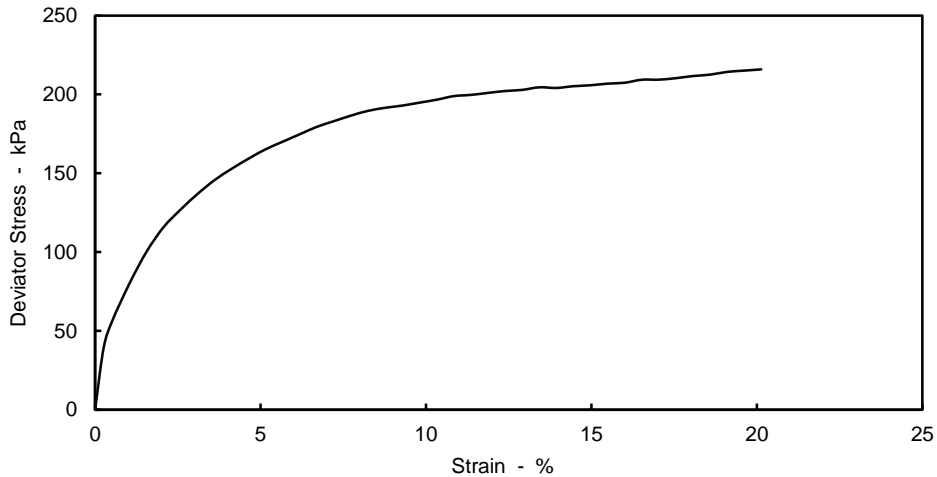
Undisturbed specimen taken 20mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.11		
Rate of Axial Displacement	%/min	2.10		
Cell Pressure	kPa	800		
Strain at Failure	%	20.1		
Maximum Deviator Stress	kPa	216		
Shear Strength	kPa	108		
Mode of Failure			Compound	

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description	Stiff layered grey sandy CLAY.
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Originator	Checked & Approved
MAB	/2018

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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB04A

Sample Ref U63

Depth (m) 20.50-20.95

Sample Type U



Originator

Checked & Approved

MAB

14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB04A
Sample Ref	U63
Depth (m)	20.50-20.95
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	171.3		
Diameter	mm	103.4		
Moisture Content	%	26		
Bulk Density	Mg/m <sup>3</sup>	2.00		
Dry Density	Mg/m <sup>3</sup>	1.59		

**Comments**

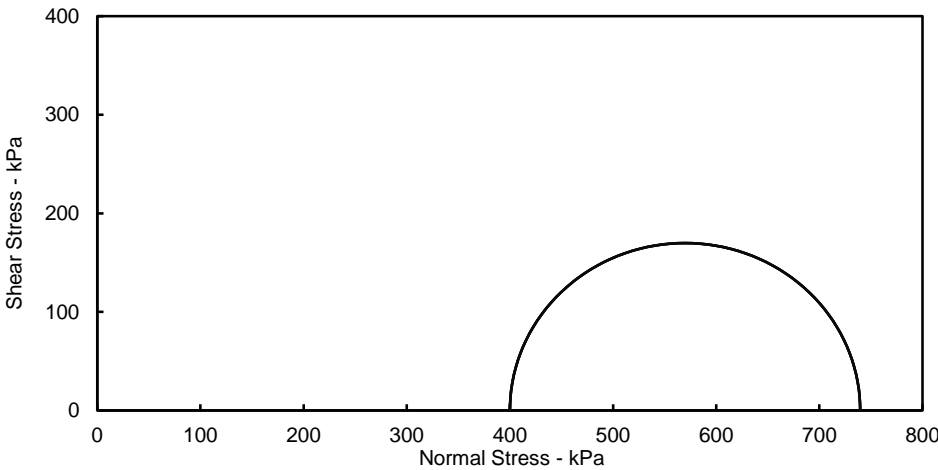
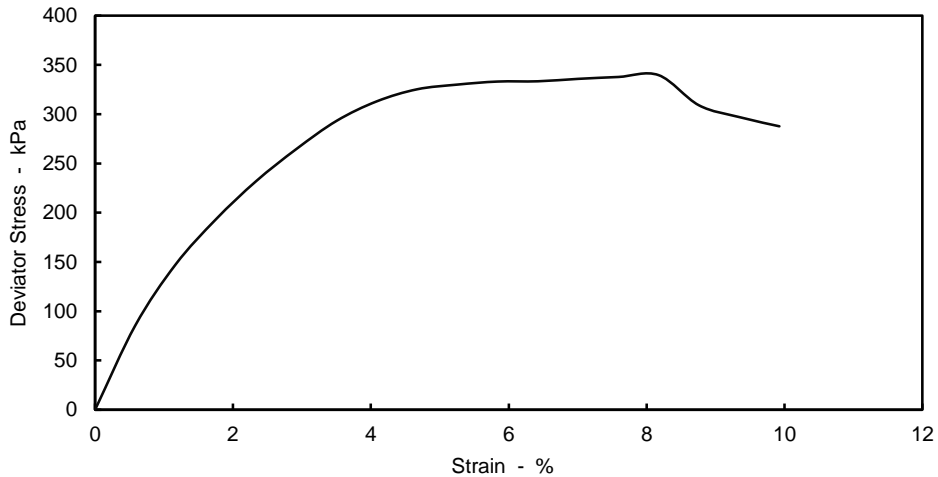
Undisturbed specimen taken 220mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.56		
Rate of Axial Displacement	%/min	2.37		
Cell Pressure	kPa	400		
Strain at Failure	%	8.2		
Maximum Deviator Stress	kPa	340		
Shear Strength	kPa	170		
Mode of Failure			Brittle	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description	Very stiff layered grey sandy CLAY.
-----------------------------	-------------------------------------



Originator	Checked & Approved
VB	[Redacted] 14/09/2018

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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Hole MB04A

Sample Ref U63


Depth (m) 20.50-20.95

Sample Type U

Client Norfolk County Council


Engineer Norfolk Partnership Laboratory



Originator	Checked & Approved
VB	
	14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.

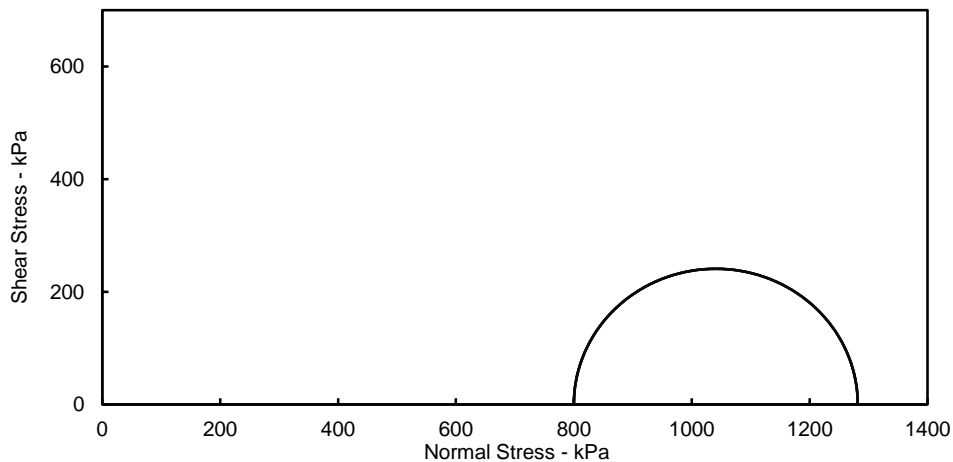
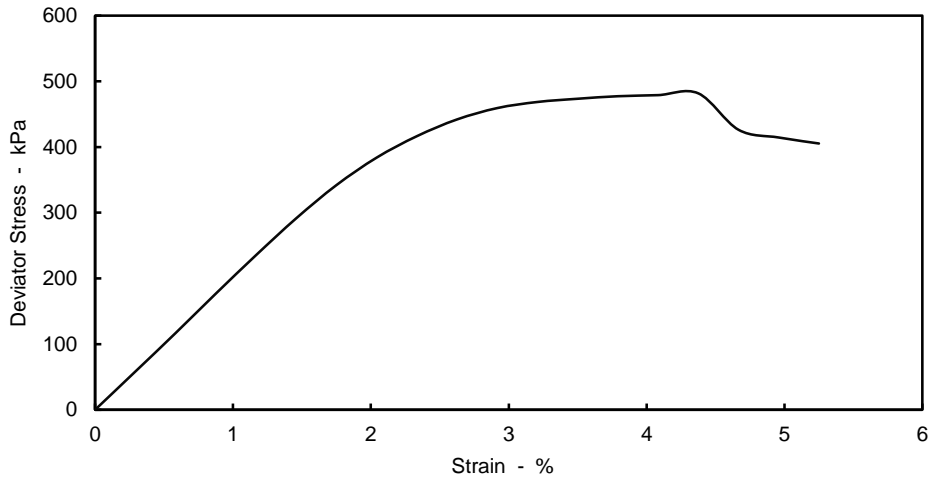



 SITE INVESTIGATION AND LABORATORY SERVICES	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No.	<b>PZ1522D1</b>
	Client	Norfolk County Council	Hole	MB04A
	Engineer	Norfolk Partnership Laboratory	Sample Ref	U108
			Depth (m)	39.00-39.45
			Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	171.4		
Diameter	mm	103.3		
Moisture Content	%	32		
Bulk Density	Mg/m <sup>3</sup>	1.95		
Dry Density	Mg/m <sup>3</sup>	1.47		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.33		
Rate of Axial Displacement	%/min	0.89		
Cell Pressure	kPa	800		
Strain at Failure	%	4.4		
Maximum Deviator Stress	kPa	482		
Shear Strength	kPa	241		
Mode of Failure			Brittle	
Non Engineering Description	Very stiff laminated dark grey slightly sandy CLAY.			

**Comments**  
Undisturbed specimen taken 270mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
MAB	 14/09/2018

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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB04A

Sample Ref U108

Depth (m) 39.00-39.45

Sample Type U



Originator

Checked & Approved

MAB

14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB04A
Sample Ref	U111
Depth (m)	41.00-41.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	172.5		
Diameter	mm	103.2		
Moisture Content	%	36		
Bulk Density	Mg/m <sup>3</sup>	1.95		
Dry Density	Mg/m <sup>3</sup>	1.44		

**Comments**

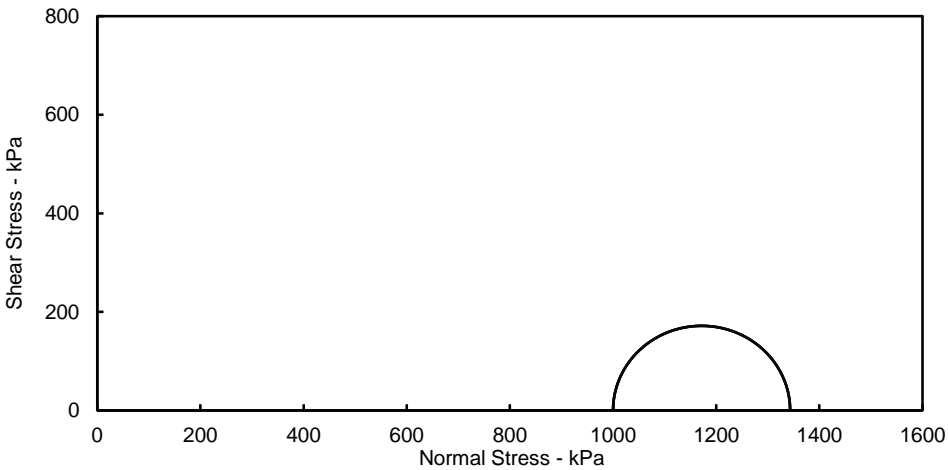
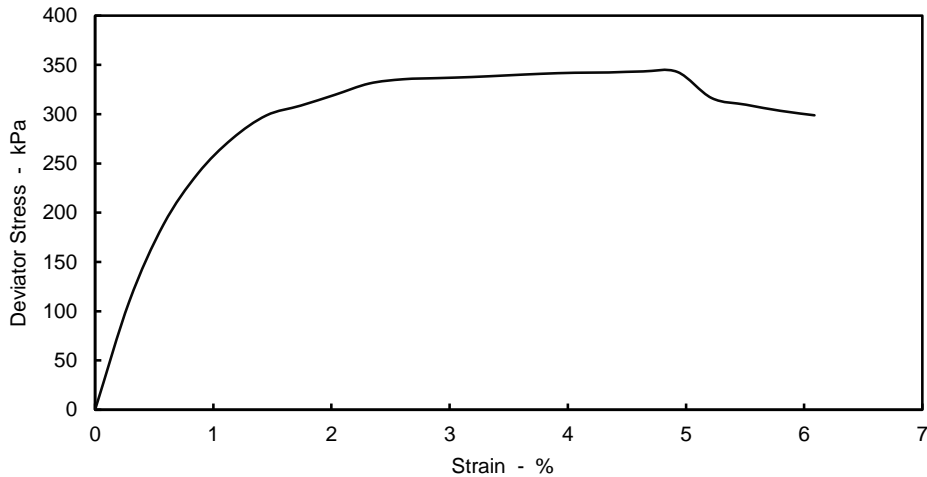
Undisturbed specimen taken 250mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.35		
Rate of Axial Displacement	%/min	0.88		
Cell Pressure	kPa	1000		
Strain at Failure	%	4.6		
Maximum Deviator Stress	kPa	343		
Shear Strength	kPa	172		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description	Very stiff laminated greenish grey slightly sandy CLAY.
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Originator	Checked & Approved
VB	14/09/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
BS 1377 : Part 7 : 1990 Clause 8





# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB04A

Sample Ref U111

Depth (m) 41.00-41.45

Sample Type U



Originator

Checked & Approved

VB

14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.







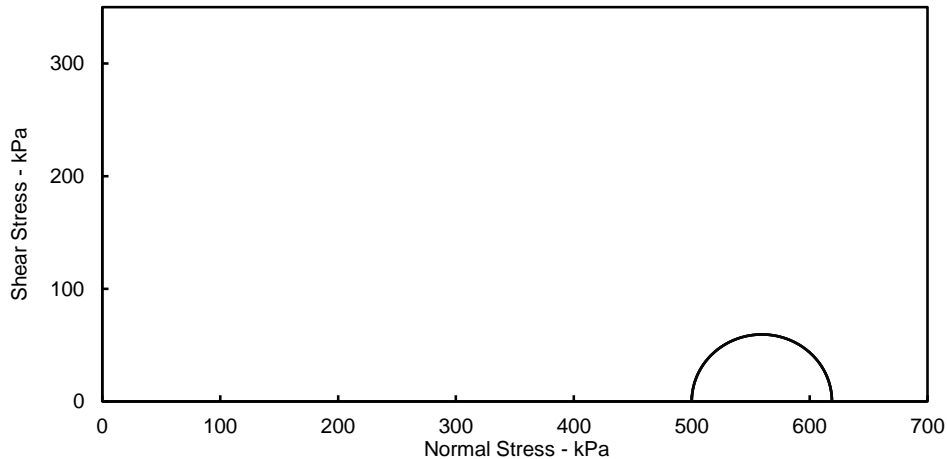
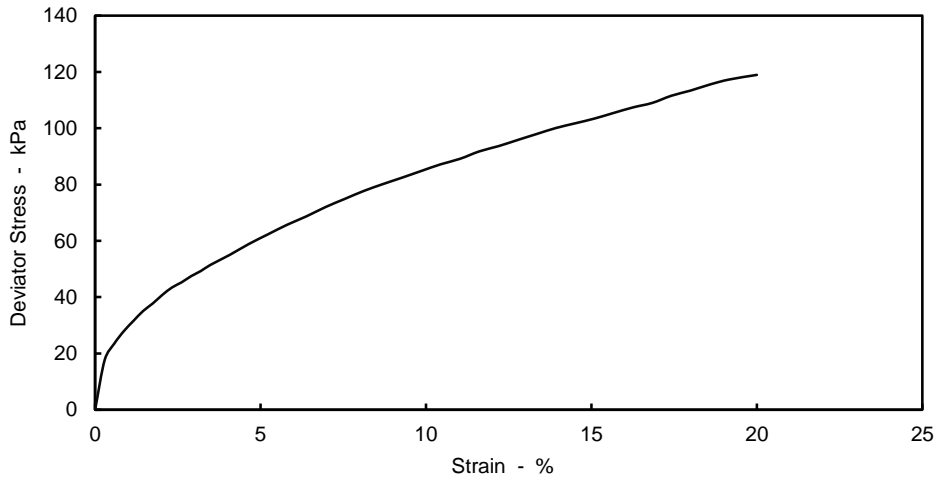
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	MB05
Sample Ref	U73
Depth (m)	23.00-23.45
Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	172.3		
Diameter	mm	103.7		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	2.00		
Dry Density	Mg/m <sup>3</sup>	1.54		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.10		
Rate of Axial Displacement	%/min	0.88		
Cell Pressure	kPa	500		
Strain at Failure	%	20.0		
Maximum Deviator Stress	kPa	119		
Shear Strength	kPa	59		
Mode of Failure			Compound	
Non Engineering Description		Firm laminated light grey CLAY.		

**Comments**  
Undisturbed specimen taken 200mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
MAB	 14/09/2018

**UNCONSOLIDATED UNDRAINED SINGLE  
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BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**



Hole MB05

Sample Ref U73

Depth (m) 23.00-23.45

Sample Type U



Originator	Checked & Approved	Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.	 <p>Sheet 2 of 2</p>
MAB	 14/09/2018		



SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB05
Sample Ref	U73
Depth (m)	23.00-23.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	175.5		
Diameter	mm	103.6		
Moisture Content	%	25		
Bulk Density	Mg/m <sup>3</sup>	1.98		
Dry Density	Mg/m <sup>3</sup>	1.59		

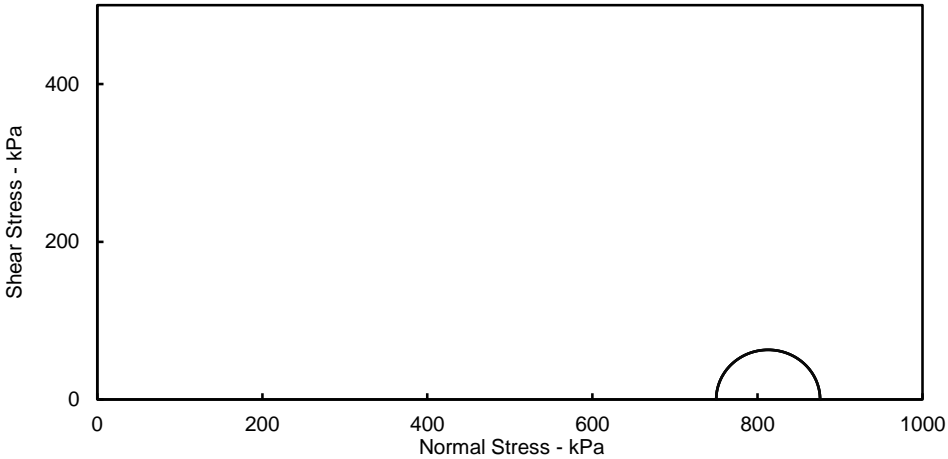
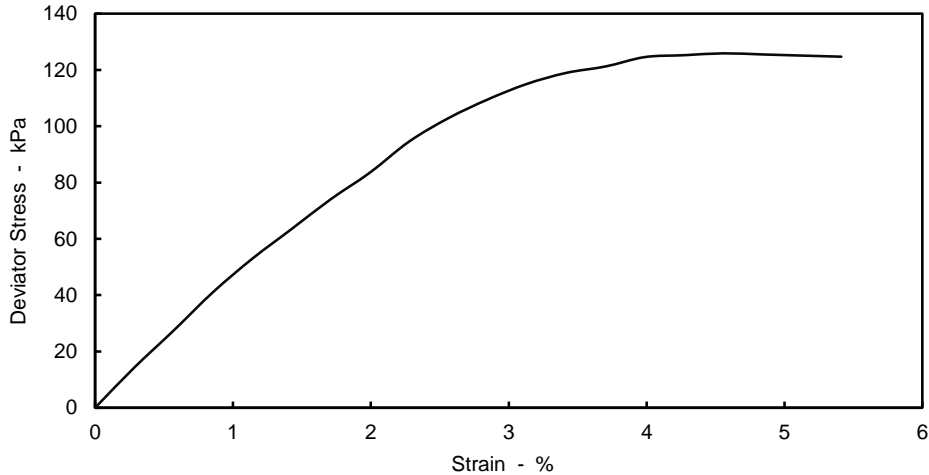
<b>Comments</b>
Undisturbed specimen taken 20mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.35		
Rate of Axial Displacement	%/min	2.31		
Cell Pressure	kPa	750		
Strain at Failure	%	4.6		
Maximum Deviator Stress	kPa	126		
Shear Strength	kPa	63		
Mode of Failure			Plastic	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description	Firm layered light grey slightly sandy CLAY.
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Originator	Checked & Approved
MAB	14/09/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB05

Sample Ref U73

Depth (m) 23.00-23.45

Sample Type U



Originator

Checked & Approved

MAB

14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





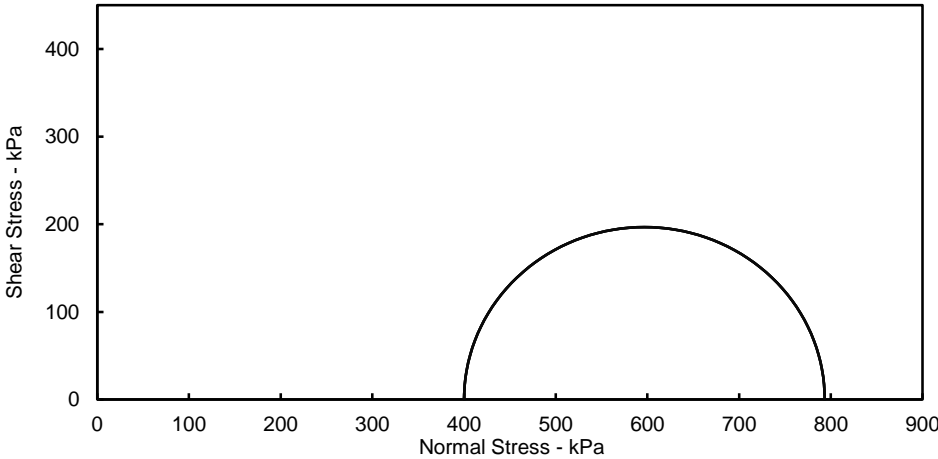
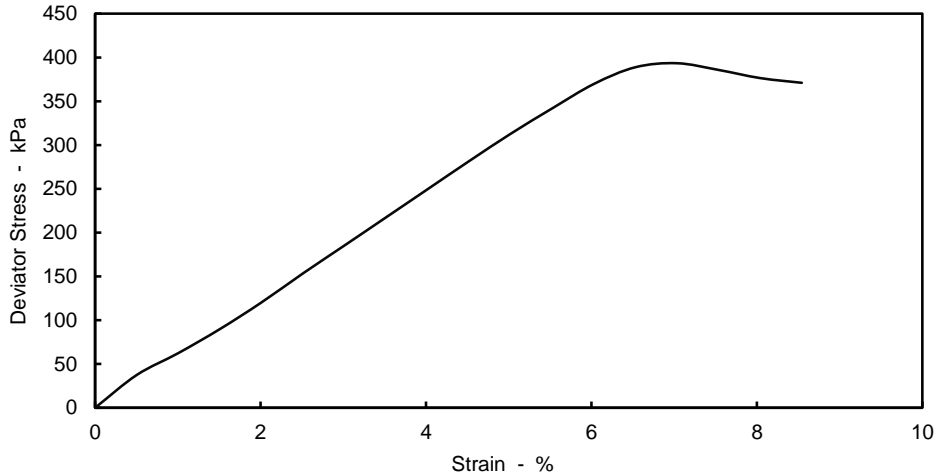
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB06
Sample Ref	U69
Depth (m)	21.00-21.45
Sample Type	U

Sample Details		
Sample Condition		Undisturbed
Height	mm	199.0
Diameter	mm	103.9
Moisture Content	%	23
Bulk Density	Mg/m <sup>3</sup>	2.02
Dry Density	Mg/m <sup>3</sup>	1.64
Test Details		
Membrane Thickness	mm	0.30
Membrane Correction	kPa	0.50
Rate of Axial Displacement	%/min	2.04
Cell Pressure	kPa	400
Strain at Failure	%	7.0
Maximum Deviator Stress	kPa	393
Shear Strength	kPa	197
Mode of Failure		Plastic
Non Engineering Description	Very stiff intact light grey sandy CLAY.	

**Comments**  
 Undisturbed specimen taken 250mm below top of tube

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



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MAB	14/09/2018

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Sheet 1 of 2



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**


Hole MB06

Sample Ref U69

Depth (m) 21.00-21.45

Sample Type U



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Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB06
Sample Ref	U69
Depth (m)	21.00-21.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	183.9		
Diameter	mm	103.7		
Moisture Content	%	26		
Bulk Density	Mg/m <sup>3</sup>	2.01		
Dry Density	Mg/m <sup>3</sup>	1.59		

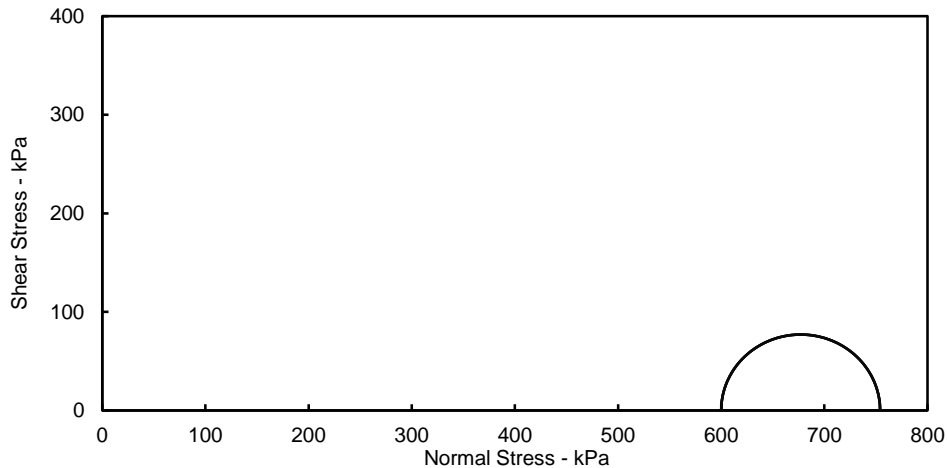
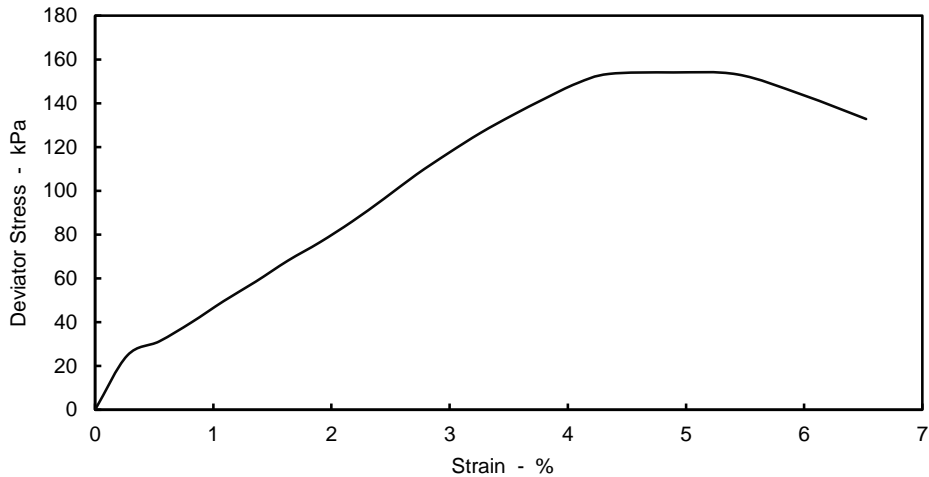
**Comments**  
Undisturbed specimen taken 90mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.37		
Rate of Axial Displacement	%/min	2.21		
Cell Pressure	kPa	600		
Strain at Failure	%	4.9		
Maximum Deviator Stress	kPa	154		
Shear Strength	kPa	77		
Mode of Failure			Plastic	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Stiff layered light grey sandy CLAY.



Originator	Checked & Approved
MAB	14/09/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole MB06

Sample Ref U69

Depth (m) 21.00-21.45

Engineer Norfolk Partnership Laboratory

Sample Type U



Originator


Checked & Approved

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.

MAB

14/09/2018

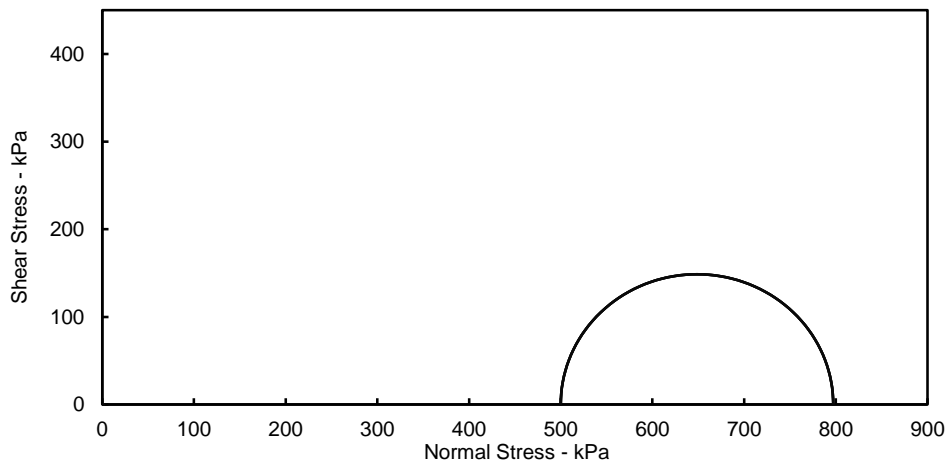
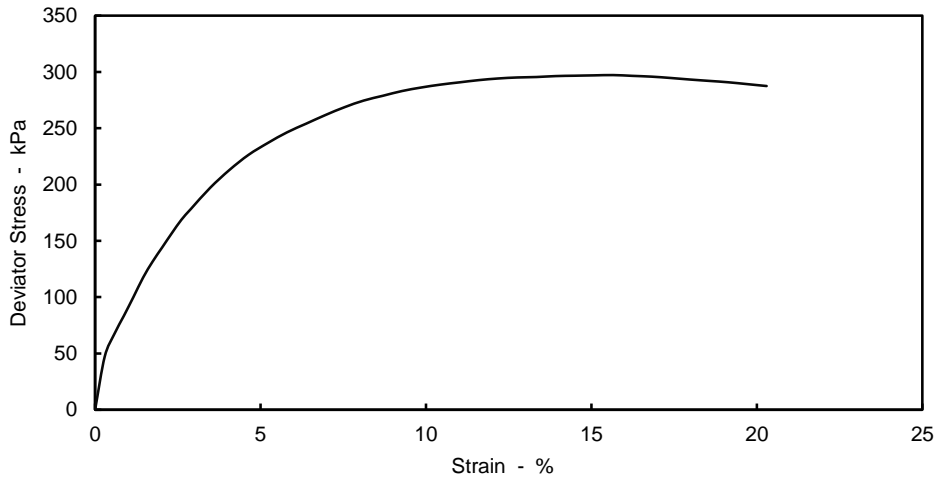



 SITE INVESTIGATION AND LABORATORY SERVICES	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No.	<b>PZ1522D1</b>
	Client	Norfolk County Council	Hole	MB06
	Engineer	Norfolk Partnership Laboratory	Sample Ref	U75
			Depth (m)	23.00-23.45
			Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	172.5		
Diameter	mm	103.3		
Moisture Content	%	23		
Bulk Density	Mg/m <sup>3</sup>	2.09		
Dry Density	Mg/m <sup>3</sup>	1.70		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.92		
Rate of Axial Displacement	%/min	2.35		
Cell Pressure	kPa	500		
Strain at Failure	%	15.7		
Maximum Deviator Stress	kPa	297		
Shear Strength	kPa	149		
Mode of Failure			Plastic	
Non Engineering Description	Stiff fissured light grey sandy CLAY.			

**Comments**  
 Undisturbed specimen taken  
 200mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



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MAB	14/09/2018		

# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB06

Sample Ref U75

Depth (m) 23.00-23.45

Sample Type U



Originator

Checked & Approved

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14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





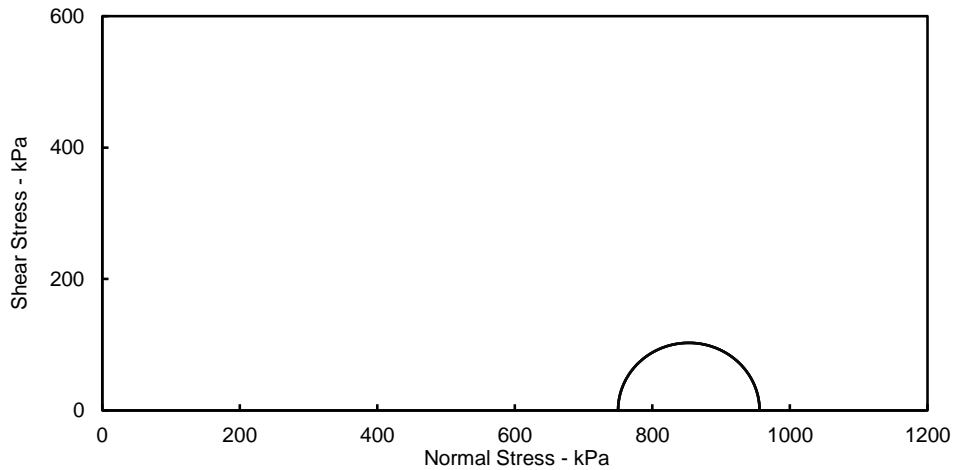
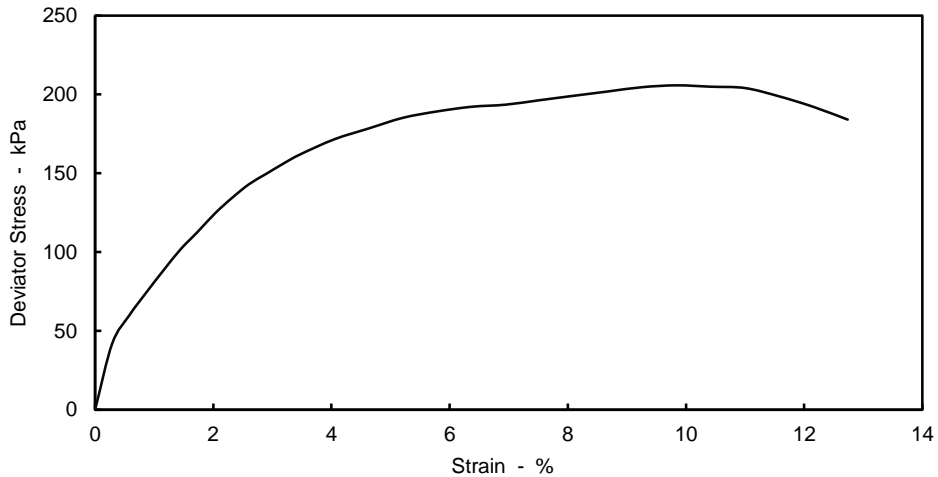
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB06
Sample Ref	U81
Depth (m)	25.00-25.45
Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	172.7		
Diameter	mm	103.4		
Moisture Content	%	27		
Bulk Density	Mg/m <sup>3</sup>	2.02		
Dry Density	Mg/m <sup>3</sup>	1.59		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.65		
Rate of Axial Displacement	%/min	0.88		
Cell Pressure	kPa	750		
Strain at Failure	%	9.8		
Maximum Deviator Stress	kPa	206		
Shear Strength	kPa	103		
Mode of Failure			Compound	
Non Engineering Description		Stiff layered light grey sandy CLAY.		

**Comments**  
 Undisturbed specimen taken 200mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
MAB	14/09/2018

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Sheet 1 of 2

# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB06

Sample Ref U81

Depth (m) 25.00-25.45

Sample Type U



Originator

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14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





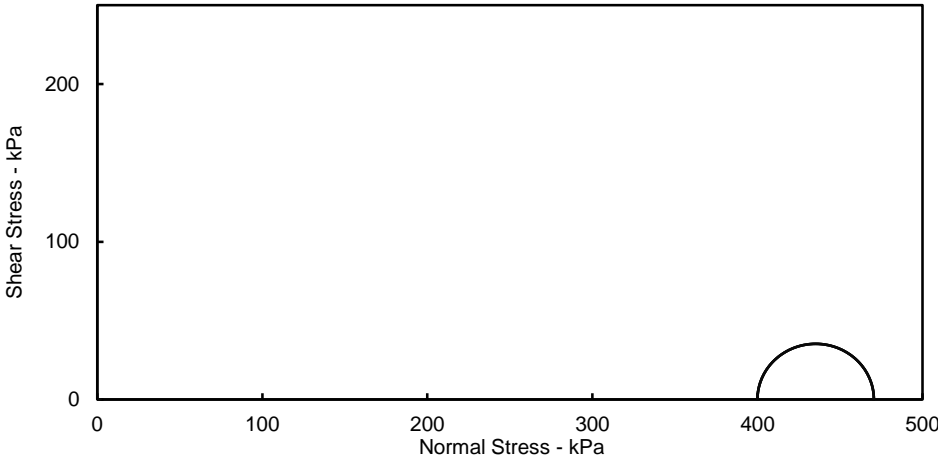
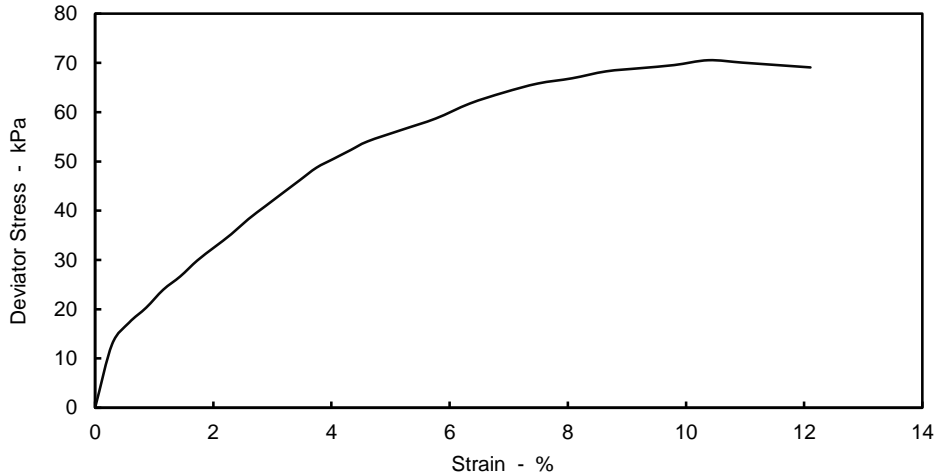
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	MB07
Sample Ref	U67
Depth (m)	20.00-20.45
Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	173.5		
Diameter	mm	103.5		
Moisture Content	%	26		
Bulk Density	Mg/m <sup>3</sup>	1.96		
Dry Density	Mg/m <sup>3</sup>	1.55		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.67		
Rate of Axial Displacement	%/min	2.34		
Cell Pressure	kPa	400		
Strain at Failure	%	10.4		
Maximum Deviator Stress	kPa	71		
Shear Strength	kPa	35		
Mode of Failure			Plastic	
Non Engineering Description		Soft layered light grey very sandy CLAY.		

**Comments**  
 Undisturbed specimen taken  
 230mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
MAB	 2018

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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB07

Sample Ref U67

Depth (m) 20.00-20.45

Sample Type U



Originator

Checked & Approved

MAB




2018

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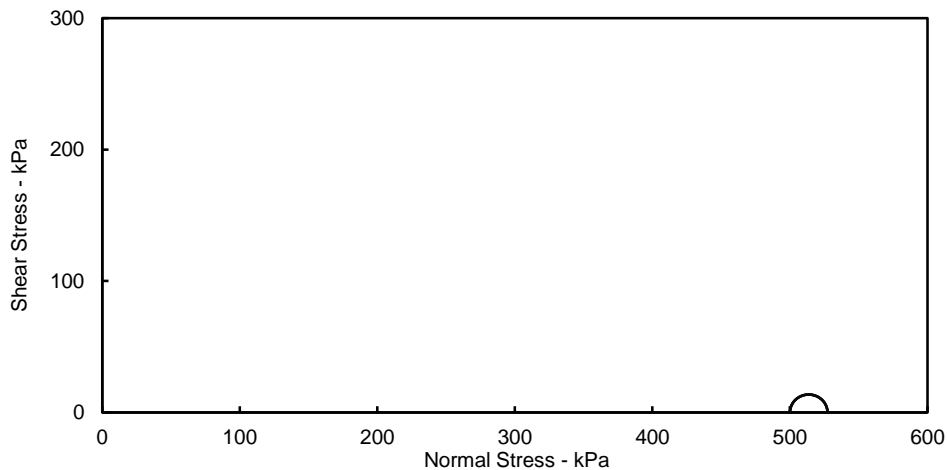
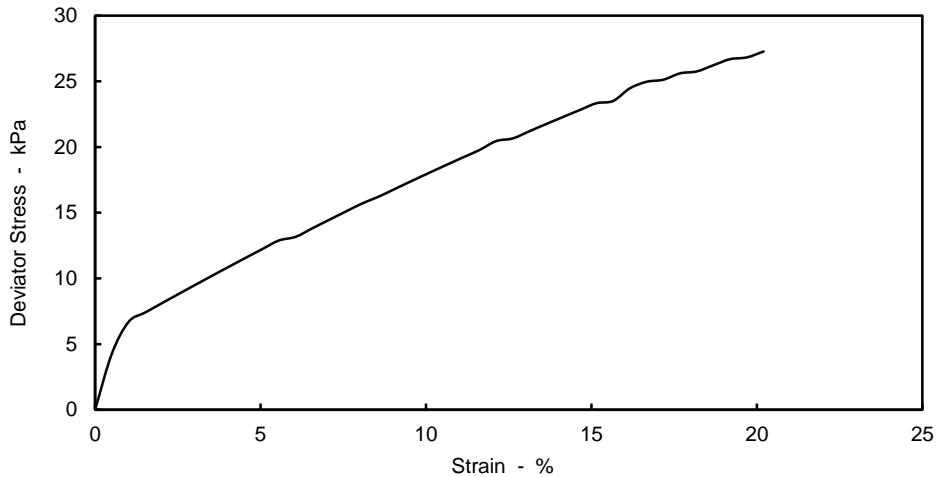


 SITE INVESTIGATION AND LABORATORY SERVICES	Site	GREAT YARMOUTH 3RD RIVER CROSSING	Contract No.	<b>PZ1522D1</b>
	Client	Norfolk County Council	Hole	MB07
	Engineer	Norfolk Partnership Laboratory	Sample Ref	U73
			Depth (m)	22.00-22.45
			Sample Type	U

Sample Details		Undisturbed		
Sample Condition		Undisturbed		
Height	mm	198.0		
Diameter	mm	103.9		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	1.98		
Dry Density	Mg/m <sup>3</sup>	1.52		
Test Details				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.10		
Rate of Axial Displacement	%/min	2.05		
Cell Pressure	kPa	500		
Strain at Failure	%	20.2		
Maximum Deviator Stress	kPa	27		
Shear Strength	kPa	14		
Mode of Failure			Plastic	
Non Engineering Description		Very soft intact light grey very sandy CLAY.		

**Comments**  
Undisturbed specimen taken 10mm below top of tube

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved	<b>UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION</b> BS 1377 : Part 7 : 1990 Clause 8
MAB	 018	



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB07

Sample Ref U73

Depth (m) 22.00-22.45

Sample Type U



Originator

Checked & Approved

MAB

14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB07
Sample Ref	U73
Depth (m)	22.00-22.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	173.3		
Diameter	mm	103.3		
Moisture Content	%	29		
Bulk Density	Mg/m <sup>3</sup>	1.95		
Dry Density	Mg/m <sup>3</sup>	1.52		

**Comments**

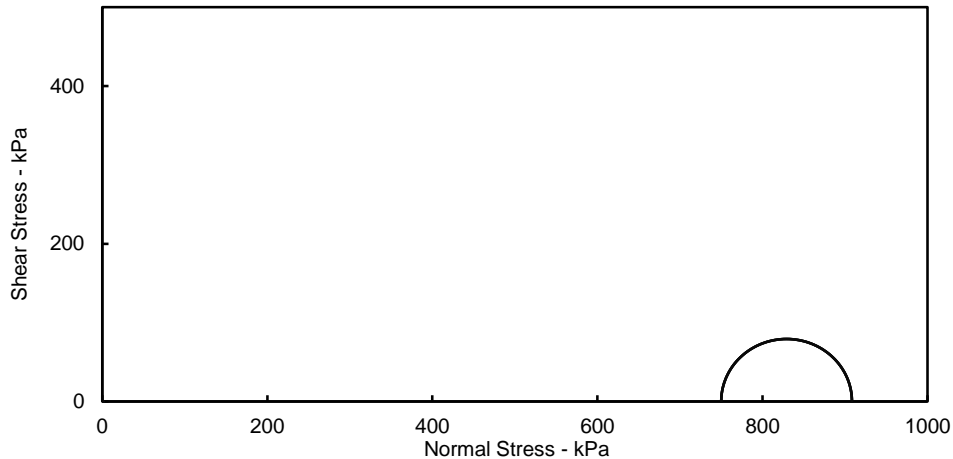
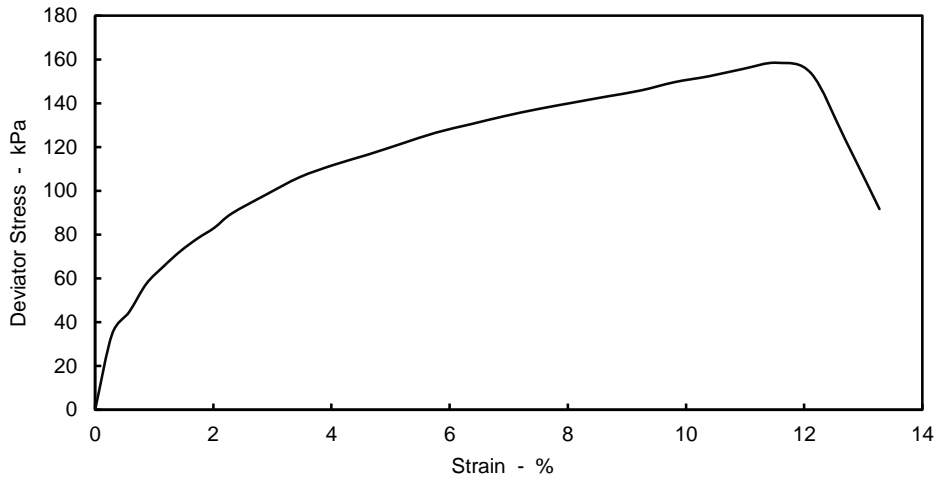
Undisturbed specimen taken 200mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.73		
Rate of Axial Displacement	%/min	2.34		
Cell Pressure	kPa	750		
Strain at Failure	%	11.5		
Maximum Deviator Stress	kPa	158		
Shear Strength	kPa	79		
Mode of Failure			Compound	

Non Engineering Description	Stiff intact light grey very sandy CLAY.
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Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
MAB	[Signature] 14/09/2018

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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**



Hole MB07

Sample Ref U73

Depth (m) 22.00-22.45

Sample Type U



Originator	Checked & Approved	Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.	 <p style="text-align: right;">Sheet 2 of 2</p>
MAB	 14/09/2018		



SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB07
Sample Ref	U113
Depth (m)	38.00-38.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	171.3		
Diameter	mm	103.6		
Moisture Content	%	26		
Bulk Density	Mg/m <sup>3</sup>	1.98		
Dry Density	Mg/m <sup>3</sup>	1.57		

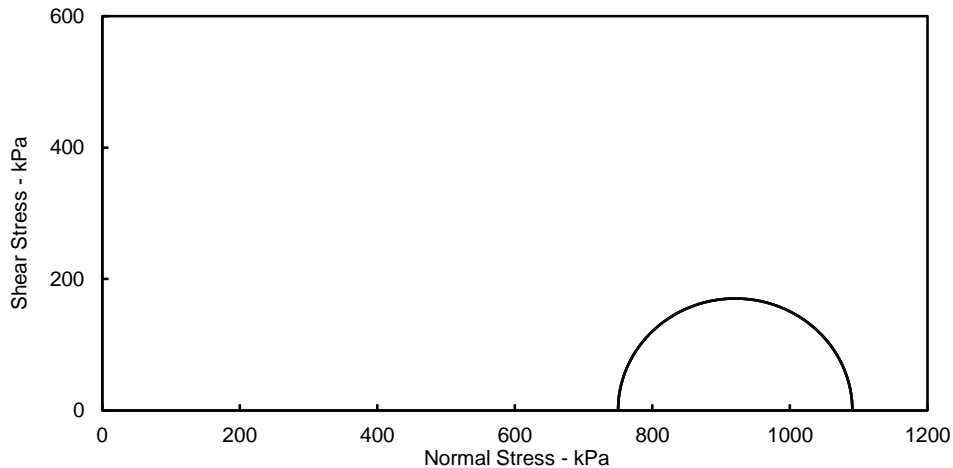
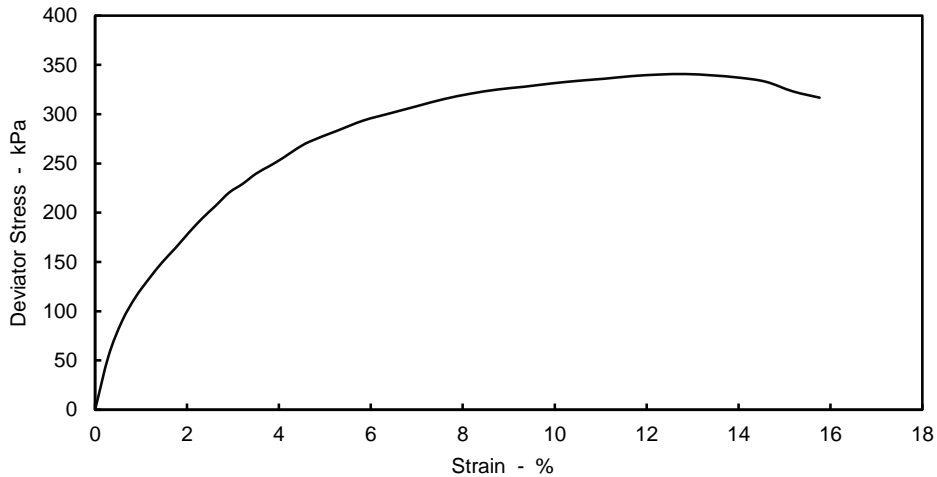
**Comments**  
Undisturbed specimen taken 190mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.79		
Rate of Axial Displacement	%/min	2.37		
Cell Pressure	kPa	750		
Strain at Failure	%	12.8		
Maximum Deviator Stress	kPa	341		
Shear Strength	kPa	170		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Very stiff layered grey sandy CLAY.



Originator	Checked & Approved
MAB	[Signature] 14/09/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
BS 1377 : Part 7 : 1990 Clause 8





# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No PZ1522D1

Hole MB07

Sample Ref U113

Depth (m) 38.00-38.45

Sample Type U



Originator

Checked & Approved

MAB

14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

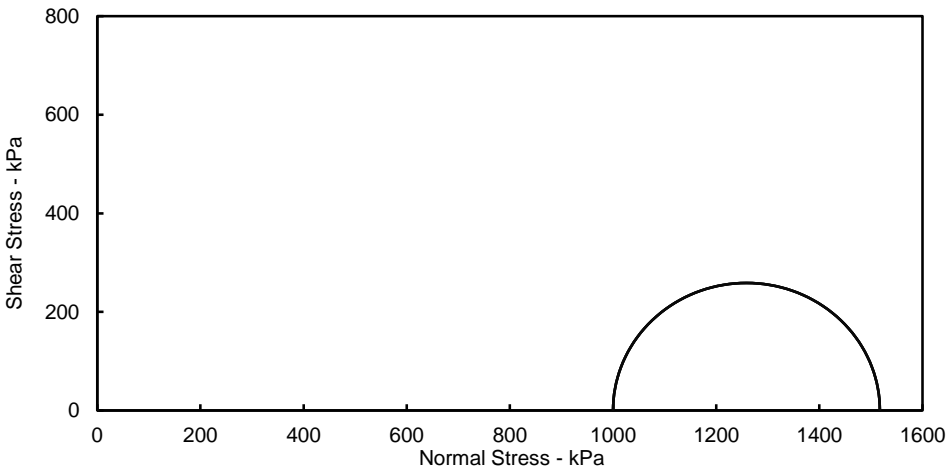
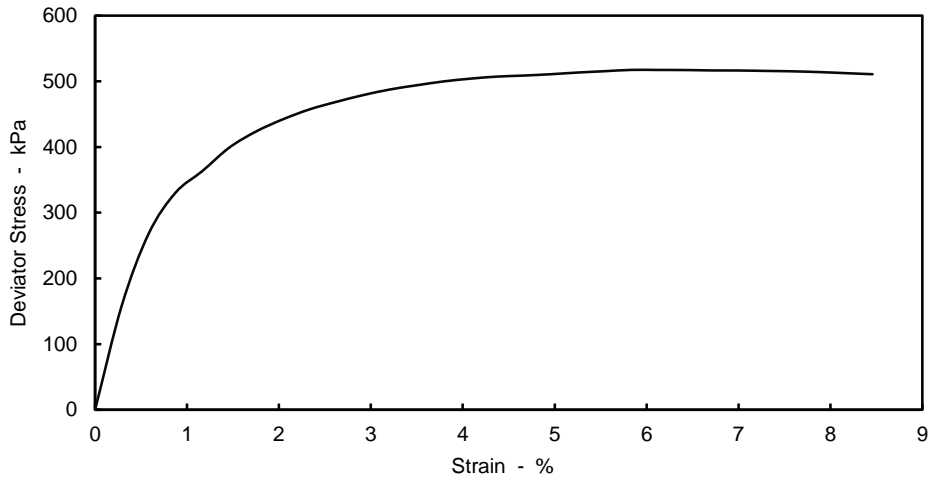
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB07
Sample Ref	U119
Depth (m)	40.00-40.45
Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	171.4		
Diameter	mm	103.6		
Moisture Content	%	30		
Bulk Density	Mg/m <sup>3</sup>	1.97		
Dry Density	Mg/m <sup>3</sup>	1.52		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.43		
Rate of Axial Displacement	%/min	0.89		
Cell Pressure	kPa	1000		
Strain at Failure	%	5.8		
Maximum Deviator Stress	kPa	517		
Shear Strength	kPa	259		
Mode of Failure			Compound	
Non Engineering Description	Very stiff fissured brownish grey slightly sandy CLAY.			

**Comments**  
Undisturbed specimen taken 200mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
RC	2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
BS 1377 : Part 7 : 1990 Clause 8





# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Contract No **PZ1522D1**

Client Norfolk County Council

Hole MB07



Sample Ref U119

Depth (m) 40.00-40.45

Engineer Norfolk Partnership Laboratory

Sample Type U



Originator	Checked & Approved	Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.	 <p style="text-align: right;">Sheet 2 of 2</p>
RC	 14/09/2018		



SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB08
Sample Ref	U69
Depth (m)	22.00-22.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	172.3		
Diameter	mm	103.2		
Moisture Content	%	26		
Bulk Density	Mg/m <sup>3</sup>	2.00		
Dry Density	Mg/m <sup>3</sup>	1.59		

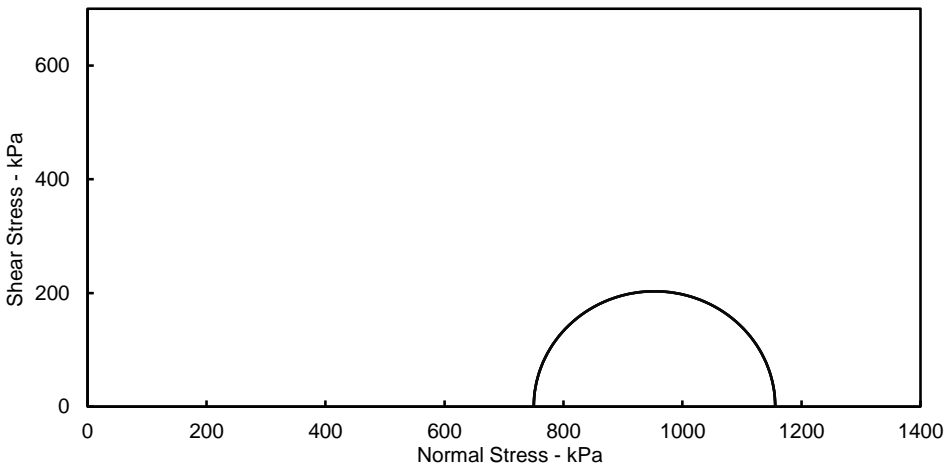
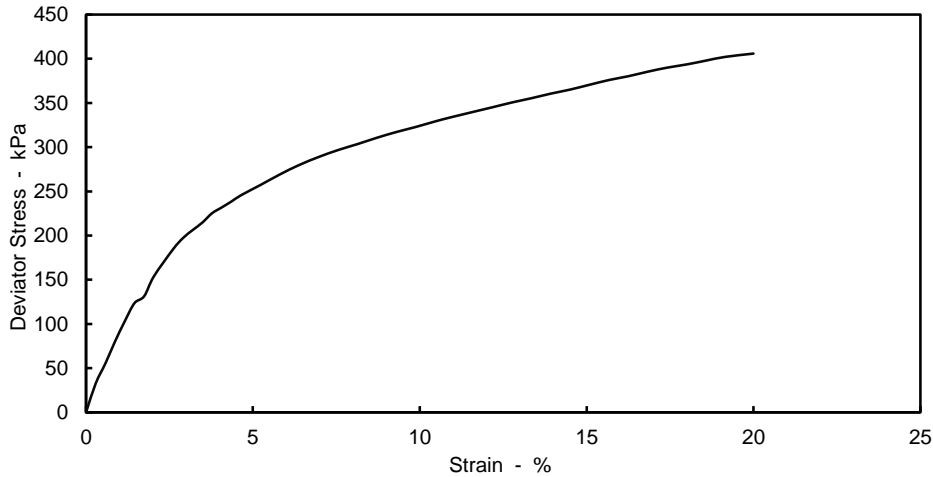
**Comments**  
 Undisturbed specimen taken 200mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	1.10		
Rate of Axial Displacement	%/min	0.91		
Cell Pressure	kPa	750		
Strain at Failure	%	20.0		
Maximum Deviator Stress	kPa	406		
Shear Strength	kPa	203		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Very stiff fissured dark greenish grey slightly sandy CLAY.



Originator	Checked & Approved
RC	018

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 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB08

Sample Ref U69

Depth (m) 22.00-22.45

Sample Type U



Originator

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RC

14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB09
Sample Ref	U70
Depth (m)	23.00-23.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	172.2		
Diameter	mm	102.1		
Moisture Content	%	25		
Bulk Density	Mg/m <sup>3</sup>	2.17		
Dry Density	Mg/m <sup>3</sup>	1.74		

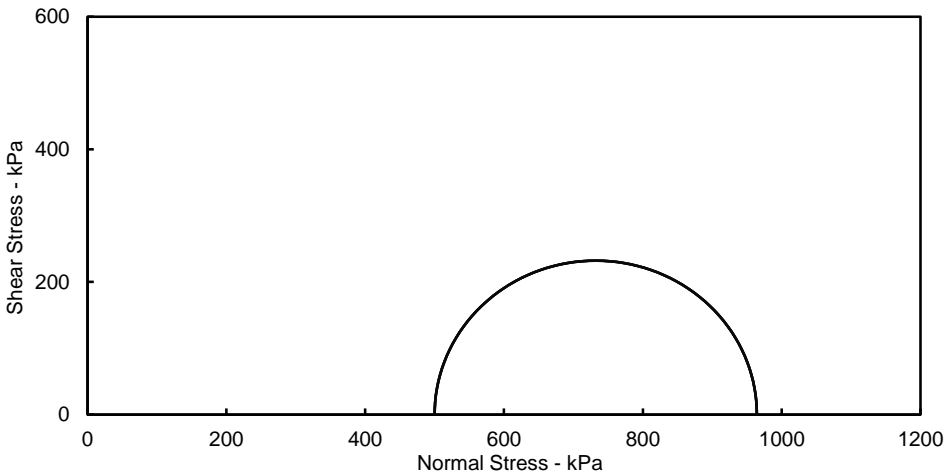
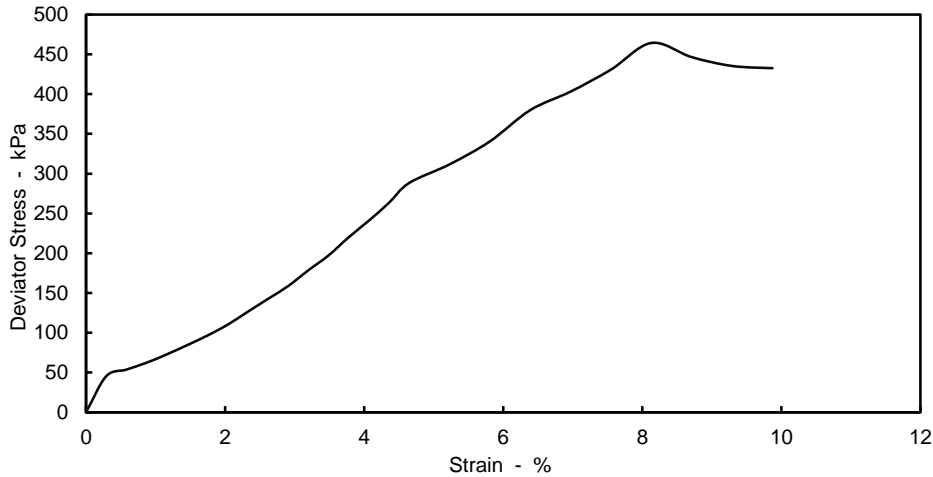
<b>Comments</b>
Undisturbed specimen taken 210mm below top of tube

**Test Details**

Membrane Thickness	mm	0.20		
Membrane Correction	kPa	0.38		
Rate of Axial Displacement	%/min	2.36		
Cell Pressure	kPa	500		
Strain at Failure	%	8.1		
Maximum Deviator Stress	kPa	464		
Shear Strength	kPa	232		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description	Very stiff intact dark grey very sandy CLAY.
-----------------------------	--



Originator	Checked & Approved
MAB	2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB09

Sample Ref U70

Depth (m) 23.00-23.45

Sample Type U



Originator

Checked & Approved

MAB

14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





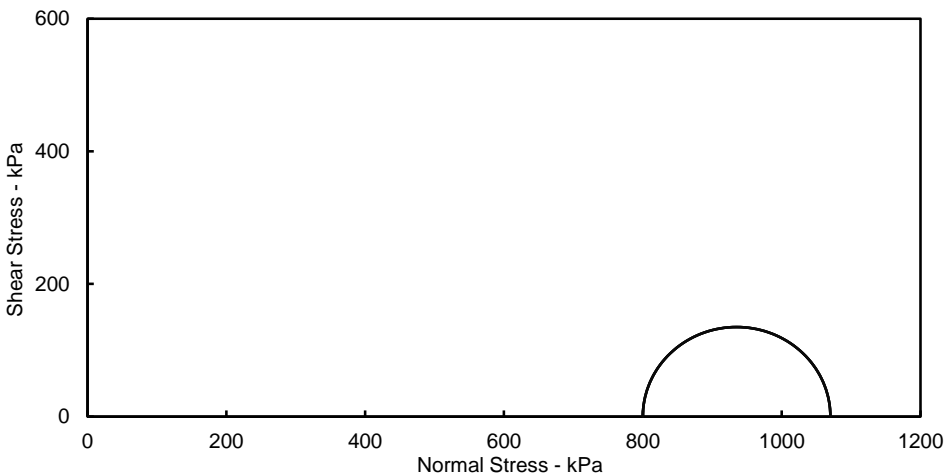
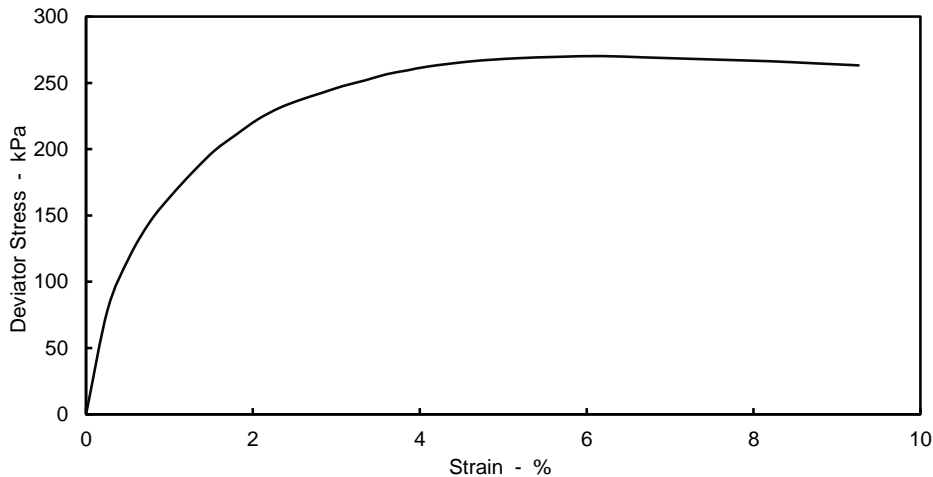
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory


Contract No.	<b>PZ1522D1</b>
Hole	MB09
Sample Ref	U110
Depth (m)	38.10-38.55
Sample Type	U

Sample Details		Undisturbed		
Sample Condition		Undisturbed		
Height	mm	194.4		
Diameter	mm	103.3		
Moisture Content	%	33		
Bulk Density	Mg/m <sup>3</sup>	1.93		
Dry Density	Mg/m <sup>3</sup>	1.45		
Test Details				
Membrane Thickness	mm	0.20		
Membrane Correction	kPa	0.30		
Rate of Axial Displacement	%/min	0.80		
Cell Pressure	kPa	800		
Strain at Failure	%	6.2		
Maximum Deviator Stress	kPa	270		
Shear Strength	kPa	135		
Mode of Failure			Compound	
Non Engineering Description		Stiff fissured dark greenish grey slightly sandy CLAY.		

**Comments**  
 Undisturbed specimen taken 20mm below top of tube

Shear Strength Parameters		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
MAB	 14/09/2018

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 BS 1377 : Part 7 : 1990 Clause 8



Sheet 1 of 2

# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB09

Sample Ref U110

Depth (m) 38.10-38.55

Sample Type U



Originator

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MAB

14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.







SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB09
Sample Ref	U110
Depth (m)	38.10-38.55
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	171.6		
Diameter	mm	108.1		
Moisture Content	%	19		
Bulk Density	Mg/m <sup>3</sup>	1.73		
Dry Density	Mg/m <sup>3</sup>	1.46		

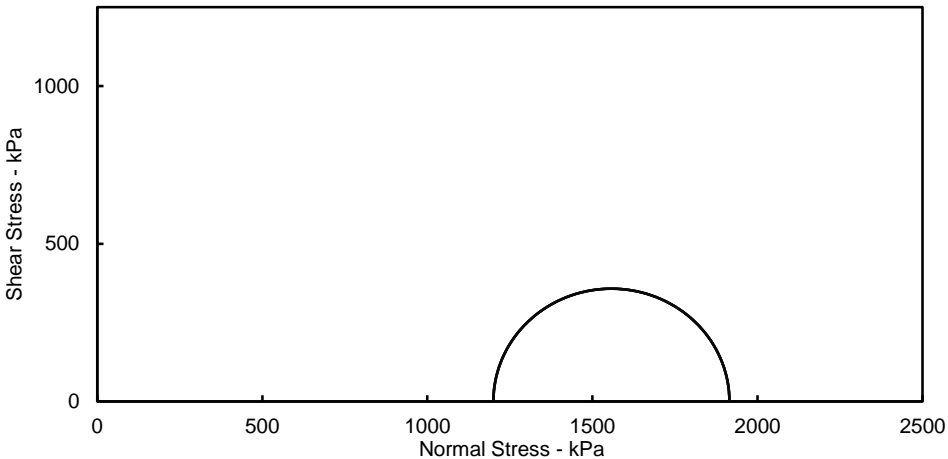
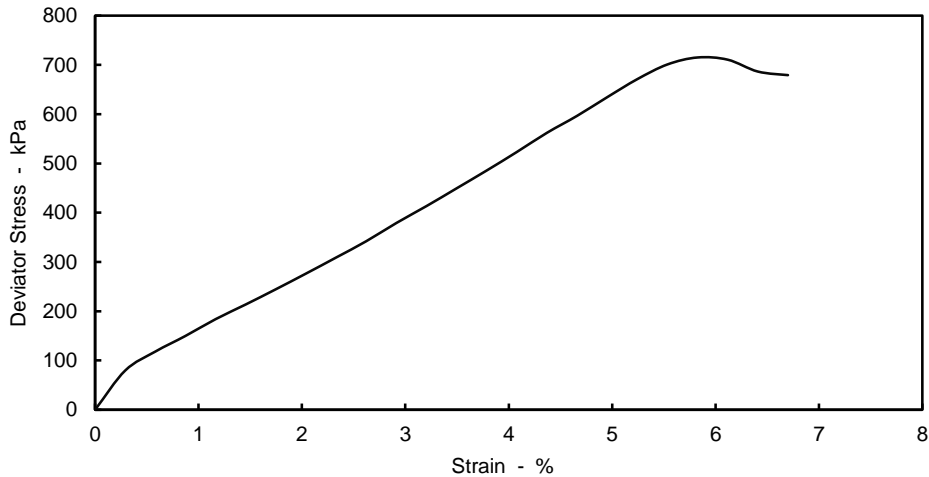
**Comments**  
 Undisturbed specimen taken 250mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.41		
Rate of Axial Displacement	%/min	0.89		
Cell Pressure	kPa	1200		
Strain at Failure	%	5.8		
Maximum Deviator Stress	kPa	715		
Shear Strength	kPa	358		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Grey clayey SAND with occasional shell fragments.



Originator	Checked & Approved
RC	14/09/2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB09

Sample Ref U110

Depth (m) 38.10-38.55

Sample Type U



Originator

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RC

14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

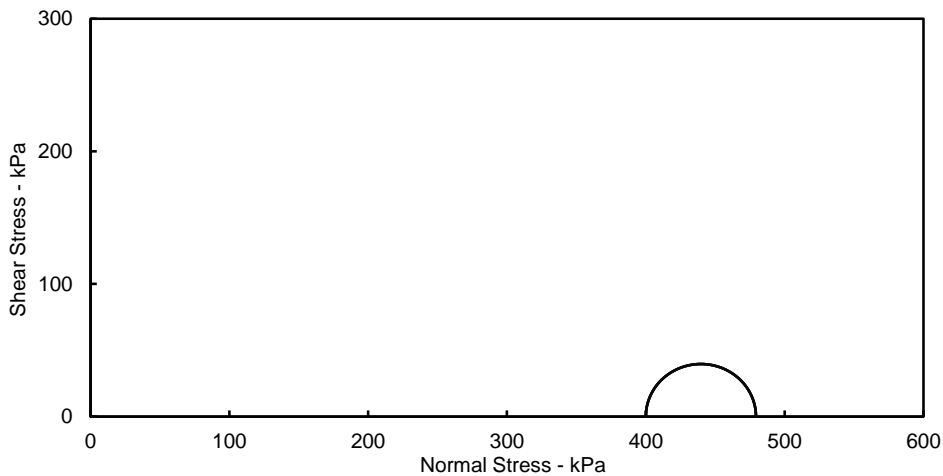
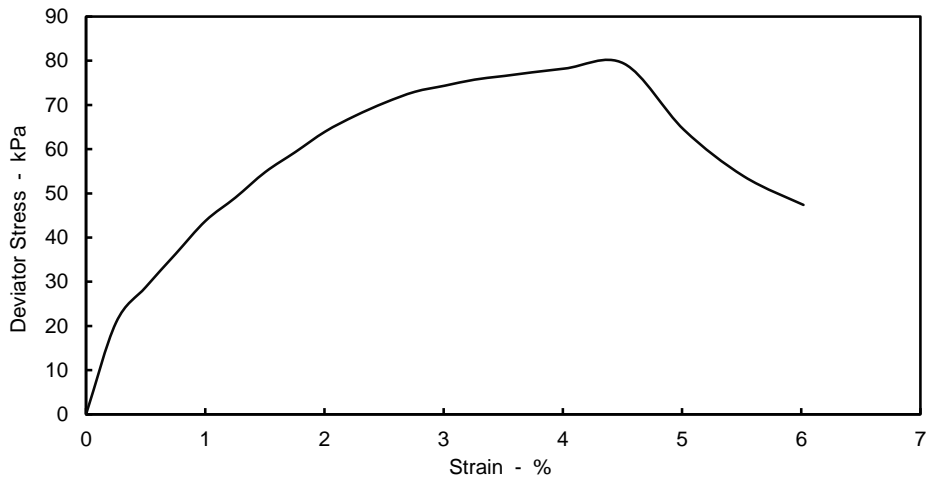
Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB10
Sample Ref	U62
Depth (m)	20.00-20.45
Sample Type	U

<b>Sample Details</b>		Undisturbed		
Sample Condition				
Height	mm	199.4		
Diameter	mm	104.1		
Moisture Content	%	20		
Bulk Density	Mg/m <sup>3</sup>	2.04		
Dry Density	Mg/m <sup>3</sup>	1.70		
<b>Test Details</b>				
Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.34		
Rate of Axial Displacement	%/min	2.27		
Cell Pressure	kPa	400		
Strain at Failure	%	4.5		
Maximum Deviator Stress	kPa	79		
Shear Strength	kPa	40		
Mode of Failure			Plastic	
Non Engineering Description	Firm intact light grey very sandy CLAY.			

**Comments**  
 Undisturbed specimen taken  
 240mm below top of tube

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°



Originator	Checked & Approved
MAB	18

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
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# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB10

Sample Ref U62

Depth (m) 20.00-20.45

Sample Type U



Originator

Checked & Approved

MAB

14/09/2018

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.





SITE INVESTIGATION AND LABORATORY SERVICES

Site	GREAT YARMOUTH 3RD RIVER CROSSING
Client	Norfolk County Council
Engineer	Norfolk Partnership Laboratory

Contract No.	<b>PZ1522D1</b>
Hole	MB10
Sample Ref	U62
Depth (m)	20.00-20.45
Sample Type	U

**Sample Details**

Sample Condition		Undisturbed		
Height	mm	176.1		
Diameter	mm	103.6		
Moisture Content	%	26		
Bulk Density	Mg/m <sup>3</sup>	2.11		
Dry Density	Mg/m <sup>3</sup>	1.67		

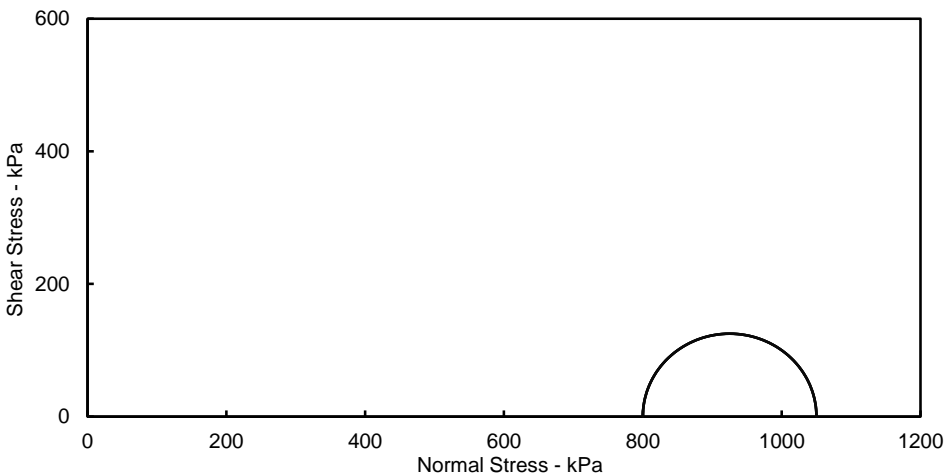
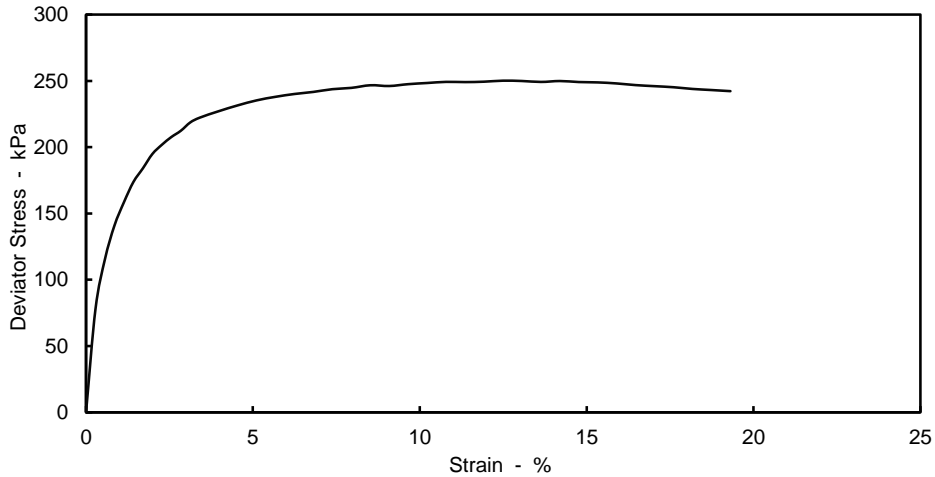
**Comments**  
 Undisturbed specimen taken 10mm below top of tube

**Test Details**

Membrane Thickness	mm	0.30		
Membrane Correction	kPa	0.78		
Rate of Axial Displacement	%/min	2.31		
Cell Pressure	kPa	800		
Strain at Failure	%	12.5		
Maximum Deviator Stress	kPa	250		
Shear Strength	kPa	125		
Mode of Failure			Compound	

<b>Shear Strength Parameters</b>		
C	n/a	kPa
Phi	n/a	°

Non Engineering Description: Stiff fissured light grey very sandy CLAY.



Originator	Checked & Approved
MAB	2018

**UNCONSOLIDATED UNDRAINED SINGLE STAGE TRIAXIAL COMPRESSION**  
 BS 1377 : Part 7 : 1990 Clause 8





# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site GREAT YARMOUTH 3RD RIVER CROSSING

Client Norfolk County Council

Engineer Norfolk Partnership Laboratory

Contract No **PZ1522D1**

Hole MB10

Sample Ref U62

Depth (m) 20.00-20.45

Sample Type U



Originator

Checked & Approved

MAB



8

Please note that these photographs are intended to show the failure mode, and do not necessarily show accurately the colouration of the soil.



# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

<b>Testing Restriction</b>						Date		
						12 September 2018		
To	Norfolk Partnership Laboratory					Tel No	01603 224176	
FAO	Mr. Simon Holden					Fax No		
From	Linda Anaz					Our Ref	<b>C6474-3</b>	
Please notify Terra Tek immediately if you receive this message in error or if any of the pages are missing or incomplete. Records and results transmitted by fax may differ from those contained in the final report The contents of this document are confidential and intended only for the person named above								
Your Ref		<b>PZ1522D1</b>						
Site		GREAT YARMOUTH 3RD RIVER CROSSING						
<b>The following tests have been scheduled on the samples below which cannot be carried out for the reason stated. Please give alternative instructions.</b>								
Lab ID	Hole ID	Depth Top	Depth Base	Samp Ref	Samp Type	Test	Reason	Instruction
338823	MB01A	23.00	23.45	U78	U	Triaxial at 500kPa	Only 250mm of material in tube. Insufficient material for	
338829	MB04A	24.00	24.45	U71	U	Triaxial 750kPa	Couldn't extrude intact sample from tube	
338829#1	MB04A	24.00	24.45	U71	U	Triaxial 500kPa	Couldn't extrude intact sample from tube	
338830#1	MB04A	39.00	39.45	U108	U	Triaxial 1000kPa	Only 300mm of usable sample in tube. Contained a cobble.	
338831#1	MB04A	41.00	41.45	U111	U	Triaxial 800kPa	Only 300mm of usable sample in tube.	
338834#1	MB06	23.00	23.45	U75	U	Triaxial 750kPa	Only 320mm of material in tube.	
338835#1	MB06	25.00	25.45	U81	U	Triaxial 500kPa	Only 300mm of usable sample in tube.	

**TERRA TEK LIMITED**

Unit 2 Springfield Road, Chesham, Bucks, HP51PW  
Telephone 01494 810 136



# TERRA TEK

■■■■ SITE INVESTIGATION AND LABORATORY SERVICES

<b>Testing Restriction</b>						Date		
						14 September 2018		
To	Norfolk Partnership Laboratory					Tel No	01603 224176	
FAO	Mr. Simon Holden					Fax No		
From	Linda Anaz					Our Ref	<b>C6474-3</b>	
Please notify Terra Tek immediately if you receive this message in error or if any of the pages are missing or incomplete. Records and results transmitted by fax may differ from those contained in the final report The contents of this document are confidential and intended only for the person named above								
Your Ref		<b>PZ1522D1</b>						
Site		GREAT YARMOUTH 3RD RIVER CROSSING						
<b>The following tests have been scheduled on the samples below which cannot be carried out for the reason stated. Please give alternative instructions.</b>								
Lab ID	Hole ID	Depth Top	Depth Base	Samp Ref	Samp Type	Test	Reason	Instruction
338836#1	MB07	20.00	20.45	U67	U	Triaxial 600kPa	Sample fell apart	
338838	MB07	38.00	38.45	U113	U	Triaxial 1000kPa	Only 285mm of sample in tube	
338839#1	MB07	40.00	40.45	U119	U	Triaxial 800kPa	Only 250mm of useable sample in tube.	
338840#1	MB08	20.00	20.45	U64	U	Triaxial 600kPa	Only 270mm of sample in tube	
338841	MB08	22.00	22.45	U69	U	Triaxial 500kPa	Only 230mm of sample in tube	
338842#1	MB09	23.00	23.45	U70	U	Triaxial 750kPa	Only 300mm of sample in tube.	

**TERRA TEK LIMITED**

Unit 2 Springfield Road, Chesham, Bucks, HP51PW  
Telephone 01494 810 136

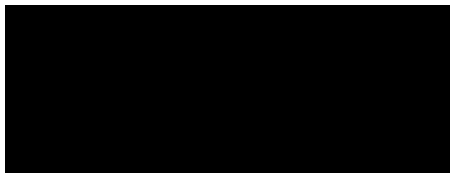
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05199  
**Issue Number:** 1  
**Date:** 11 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

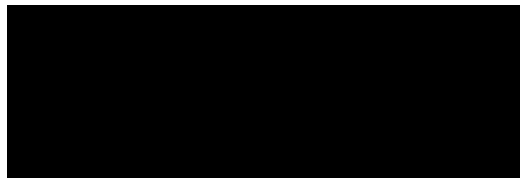
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 597526  
**Date Samples Received:** 29/06/18  
**Date Instructions Received:** 29/06/18  
**Date Analysis Completed:** 11/07/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/05199

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05199/1	18/05199/2	18/05199/3	18/05199/4	18/05199/5	18/05199/6	18/05199/7	18/05199/8	Units	Method ref
Client Sample No	6	8	13	16	38	52	69	84		
Client Sample ID	MB01a	MB01a	MB01a	MB01a	MB01a	MB01a	MB01a	MB01a		
Depth to Top	2.00	2.30	3.50	4.30	10.00	14.30	20.00	25.00		
Depth To Bottom	2.45		4.00		10.45		20.45	25.45		
Date Sampled	19-Jun-18	19-Jun-18	19-Jun-18	19-Jun-18	19-Jun-18	19-Jun-18	19-Jun-18	19-Jun-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	5	1	1	5	5		
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub> <sup>M#</sup>	8.49	-	-	8.49	8.37	8.29	8.26	8.16	pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	2.35	-	-	1.97	<1.00	<1.00	<1.00	1.03	mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1140	-	-	1500	1820	1760	1720	1460	mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	168	-	-	184	202	203	245	210	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.04	-	-	0.04	0.04	0.05	0.07	0.06	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.02	-	-	0.02	0.01	0.05	0.23	0.24	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	44	-	-	82	135	138	97	69	mg/l	A-T-SOLMET5
Organic matter <sub>D</sub> <sup>M#</sup>	-	<0.1	0.1	-	-	-	-	-	% w/w	A-T-032 OM

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

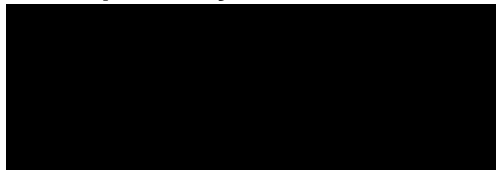
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05126  
**Issue Number:** 1 **Date:** 10 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

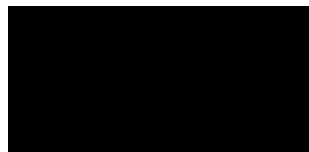
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 597345  
**Date Samples Received:** 27/06/18  
**Date Instructions Received:** 28/06/18  
**Date Analysis Completed:** 10/07/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/05126

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05126/1	18/05126/2	18/05126/3	18/05126/4	18/05126/5	18/05126/6	18/05126/7	18/05126/8	Units	Method ref
Client Sample No	8	18	44	58	68	83	95	107		
Client Sample ID	MB02	MB02	MB02	MB02	MB02	MB02	MB02	MB02		
Depth to Top	2.00	5.0	12.0	17.0	20.80	28.0	33.0	37.30		
Depth To Bottom		5.45	12.45		21.30					
Date Sampled	13-Jun-18	13-Jun-18	13-Jun-18	13-Jun-18	13-Jun-18	13-Jun-18	13-Jun-18	13-Jun-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	1	5A	5	6	5	5	6		
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub> <sup>M#</sup>	8.71	8.51	8.29	8.38	8.06	8.66	8.48	8.14	pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	1.06	1.06	1.19	<1.00	3.77	<1.00	<1.00	6.42	mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1750	1860	2510	1820	1850	1680	1700	1910	mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	210	190	334	358	321	245	246	370	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.05	0.04	0.08	0.10	0.12	0.11	0.10	0.24	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.02	0.02	0.08	0.25	0.47	0.23	0.15	0.52	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	123	123	212	151	71	78.8662	146	157	mg/l	A-T-SOLMETS

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

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For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

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Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

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Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

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Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

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A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

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Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



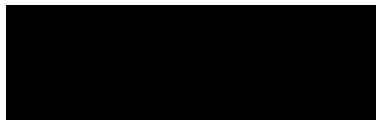
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05059  
**Issue Number:** 1  
**Date:** 16 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

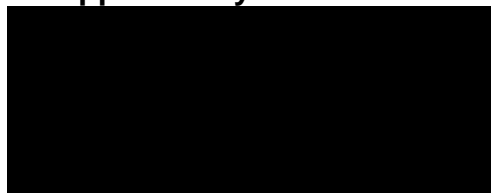
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 597154  
**Date Samples Received:** 20/06/18  
**Date Instructions Received:** 26/06/18  
**Date Analysis Completed:** 16/07/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	% w/w		
pH <sub>D</sub> <sup>M#</sup>	7.84	8.13	7.81	8.23	8.44	-	-	pH	A-T-031s	
pH BRE <sub>D</sub> <sup>M#</sup>	-	-	-	-	-	8.58	8.59	pH	A-T-031s	
Ammoniacal nitrogen <sub>D</sub>	6.3	1.5	1.9	1.3	<0.2	-	-	mg/kg	A-T-033s	
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	-	-	-	-	-	<1.00	<1.00	mg/l	A-T-033s	
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	-	-	1540	2370	mg/l	A-T-026s	
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	-	-	-	-	-	<0.4	<0.4	mg/l	A-T-026s	
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	0.79	0.51	0.20	0.26	0.19	-	-	g/l	A-T-026s	
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	-	-	174	245	mg/l	A-T-026s	
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	3000	1500	550	920	440	-	-	mg/kg	A-T-026s	
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	-	-	-	0.04	0.05	% w/w	A-T-028s	
Sulphur BRE (total) <sub>D</sub>	-	-	-	-	-	0.02	0.02	% w/w	A-T-024s	
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	-	-	-	115	179	mg/l	A-T-SOLMETS	
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	-	-	mg/kg	A-T-042sTCN	
Phenols - Total by HPLC <sub>A</sub>	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	mg/kg	A-T-050s	
Sulphide <sub>A</sub>	210	<5	<5	<5	<5	-	-	mg/kg	A-T-S2-s	
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	1700	170	18	30	<5	-	-	mg/kg	A-T-029s	
Organic matter <sub>D</sub> <sup>M#</sup>	2.2	0.3	<0.1	0.1	<0.1	-	-	% w/w	A-T-032 OM	
Arsenic <sub>D</sub> <sup>M#</sup>	13	26	10	35	8	-	-	mg/kg	A-T-024s	
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	10.2	6.0	2.3	3.0	1.5	-	-	mg/kg	A-T-027s	
Cadmium <sub>D</sub> <sup>M#</sup>	0.5	0.9	<0.5	0.7	<0.5	-	-	mg/kg	A-T-024s	
Copper <sub>D</sub> <sup>M#</sup>	27	4	<1	<1	<1	-	-	mg/kg	A-T-024s	
Chromium <sub>D</sub> <sup>M#</sup>	40	15	9	15	3	-	-	mg/kg	A-T-024s	
Chromium (hexavalent) <sub>D</sub>	<1	<1	<1	<1	<1	-	-	mg/kg	A-T-040s	
Lead <sub>D</sub> <sup>M#</sup>	39	8	4	8	2	-	-	mg/kg	A-T-024s	
Mercury <sub>D</sub>	0.30	<0.17	<0.17	<0.17	<0.17	-	-	mg/kg	A-T-024s	
Nickel <sub>D</sub> <sup>M#</sup>	25	16	6	12	2	-	-	mg/kg	A-T-024s	
Selenium <sub>D</sub> <sup>M#</sup>	<1	1	<1	<1	<1	-	-	mg/kg	A-T-024s	
Zinc <sub>D</sub> <sup>M#</sup>	99	43	20	39	25	-	-	mg/kg	A-T-024s	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Leachate Prep NRA (10:1) <sub>A</sub>	*	-	-	-	-	-	-			
pH (leachable) <sub>A</sub> <sup>#</sup>	7.80	-	-	-	-	-	-	pH	A-T-031w	
Ammoniacal nitrogen (leachable) <sub>A</sub>	0.16	-	-	-	-	-	-	mg/l	A-T-033w	
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	125.55	-	-	-	-	-	-	mg/l	A-T-026w	
Cyanide (total) (leachable) <sub>A</sub>	<0.005	-	-	-	-	-	-	mg/l	A-T-042wTCN	
Phenols (total by HPLC) (leachable) <sub>A</sub>	<0.01	-	-	-	-	-	-	mg/l	A-T-050w	
Sulphide (leachable) <sub>A</sub>	<0.1	-	-	-	-	-	-	mg/l	A-T-S2-w	
DOC (leachable) <sub>A</sub> <sup>#</sup>	5.2	-	-	-	-	-	-	mg/l	A-T-032w	
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	3	-	-	-	-	-	-	µg/l	A-T-025w	
Boron (leachable) <sub>A</sub> <sup>#</sup>	371	-	-	-	-	-	-	µg/l	A-T-025w	
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-	-	-	-	µg/l	A-T-025w	
Copper (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-	-	-	-	µg/l	A-T-025w	
Chromium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-	-	-	-	µg/l	A-T-025w	
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05	-	-	-	-	-	-	mg/l	A-T-040w	
Lead (leachable) <sub>A</sub> <sup>#</sup>	1	-	-	-	-	-	-	µg/l	A-T-025w	
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1	-	-	-	-	-	-	µg/l	A-T-025w	
Nickel (leachable) <sub>A</sub> <sup>#</sup>	2	-	-	-	-	-	-	µg/l	A-T-025w	
Selenium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-	-	-	-	µg/l	A-T-025w	
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1	-	-	-	-	-	-	mg/l	A-T-029w	
Zinc (leachable) <sub>A</sub> <sup>#</sup>	10	-	-	-	-	-	-	µg/l	A-T-025w	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD	NAD	NAD	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	-	-	-	-			

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-019s	
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-019s	
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	mg/kg	A-T-019s	
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	mg/kg	A-T-019s	
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	mg/kg	A-T-019s	
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	mg/kg	A-T-019s	
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	mg/kg	A-T-019s	
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07	<0.07	<0.07	-	-	mg/kg	A-T-019s	
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	<0.06	<0.06	<0.06	<0.06	-	-	mg/kg	A-T-019s	
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	mg/kg	A-T-019s	
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	mg/kg	A-T-019s	
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-019s	
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	mg/kg	A-T-019s	
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	mg/kg	A-T-019s	
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	mg/kg	A-T-019s	
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07	<0.07	<0.07	-	-	mg/kg	A-T-019s	
Total PAH-16MS <sub>A</sub> <sup>M#</sup>	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	mg/kg	A-T-019s	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
PAH 16MS (leachable)										
Acenaphthene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Acenaphthylene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Anthracene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Benzo(a)anthracene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Benzo(a)pyrene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Benzo(b)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Benzo(ghi)perylene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Benzo(k)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Chrysene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Fluorene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Naphthalene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Phenanthrene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Pyrene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Total PAH 16MS (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	<0.002	-	<0.002	<0.002	-	-	-		mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	<0.002	-	<0.002	<0.002	-	-	-		mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	<0.004	-	<0.004	<0.004	-	-	-		mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007	<0.007	<0.007	<0.007	-	-		mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	<0.006	-	<0.006	<0.006	-	-	-		mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	<0.004	-	<0.004	<0.004	-	-	-		mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	<0.004	-	<0.004	<0.004	-	-	-		mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	<0.007	-	<0.007	<0.007	-	-	-		mg/kg	A-T-004s



Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Speciated PCB-WHO12										
PCB BZ 81 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 105 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 114 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 123 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 126 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 156 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 157 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 167 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 169 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 189 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 77 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
Total Speciated PCB-WHO12 <sub>A</sub>	-	<0.007	-	-	<0.007	-	-	mg/kg	A-T-004s	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
SVOC excluding PAH-16 (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,4-Dichlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,4-Dimethylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,4-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,6-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2-Chloronaphthalene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2-Chlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2-Methylnaphthalene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2-Methylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2-Nitrophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
4-Methylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
4-Nitrophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	<4	-	-	-	-	-	-	µg/l	A-T-052w	
Butylbenzyl phthalate (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Carbazole (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Dibenzofuran (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Diethyl phthalate (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Dimethyl phthalate (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
n-Dibutylphthalate (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
n-Dioctylphthalate (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-052w	
Hexachlorobenzene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Hexachlorobutadiene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-			
Hexachloroethane (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500	<500	<500	-	-		µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500	<500	<500	-	-		µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<300	<200	<100	<100	<100	-	-		µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100	<100	<100	-	-			
Perylene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
VOC										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	-	-	µg/kg	A-T-006s	
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Carbon Disulphide <sub>A</sub> <sup>#</sup>	8	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	-	-	µg/kg	A-T-006s	
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	-	-	µg/kg	A-T-006s	
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	-	-	µg/kg	A-T-006s	
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	-	-	µg/kg	A-T-006s	
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	-	-	µg/kg	A-T-006s	
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg		
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	-	-	µg/kg	A-T-006s	
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2	<2	<2	-	-	µg/kg	A-T-006s	
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	-	-	µg/kg	A-T-006s	
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	-	-	µg/kg	A-T-006s	



Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Total Aliphatics <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Total Aromatics <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
TPH (Ali & Aro) <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
Ali >C6-C8 (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
Ali >C10-C12 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Ali >C12-C16 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Ali >C16-C21 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Ali >C21-C35 (leachable) <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	
Ali >C35-C44 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Total Aliphatics (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Total Aliphatics >C5-C44 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Aro >C5-C7 (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
Aro >C7-C8 (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
Aro >C8-C10 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Aro >C10-C12 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Aro >C12-C16 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Aro >C16-C21 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Aro >C35-C44 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Total Aromatics (leachable) <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	
Total Aromatics >C5-C44 (leachable) GCxGC <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	
TPH (Ali & Aro >C5-C35) (leachable) <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	
TPH (Ali & Aro >C5-C44) (leachable) <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	
Ali >C8-C10 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
BTEX - Benzene (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
BTEX - Toluene (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
BTEX - o Xylene (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
BTEX - m & p Xylene (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
MTBE (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
Aro >C21-C35 (leachable) <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

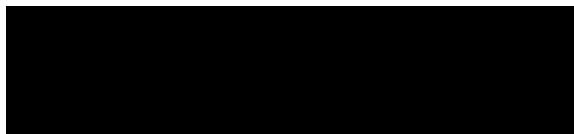
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05237  
**Issue Number:** 1 **Date:** 10 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

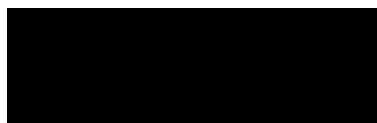
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 597752  
**Date Samples Received:** 02/07/18  
**Date Instructions Received:** 02/07/18  
**Date Analysis Completed:** 10/07/18

**Prepared by:**



Danielle Brierley  
Client Manager

**Approved by:**



John Gustafson  
Managing Director

Envirolab Job Number: 18/05237

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05237/1	18/05237/2	18/05237/3						Units	Method ref
Client Sample No	5	9	44							
Client Sample ID	MB03	MB03	MB03							
Depth to Top	1.50	2.50	12.00							
Depth To Bottom	2.00	3.00	12.45							
Date Sampled	17-Jun-18	17-Jun-18	18-Jun-18							
Sample Type	Soil - B	Soil - B	Soil - D							
Sample Matrix Code	6A	4A	4A							
% Stones >10mm <sub>A</sub>	<0.1	2.0	<0.1							
pH BRE <sub>D</sub> <sup>M#</sup>	8.05	-	8.76						pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	2.32	-	<1.00						mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	3040	-	1580						mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	-	<0.4						mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	411	-	186						mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.12	-	0.05						% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.07	-	0.02						% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	182	-	118						mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	-	0.3	-						% w/w	A-T-032 OM

## **REPORT NOTES**

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### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

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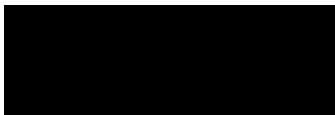
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05294  
**Issue Number:** 1  
**Date:** 13 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

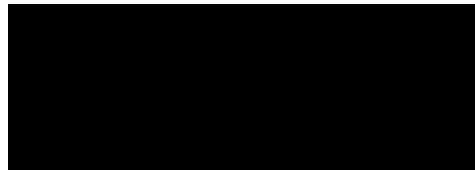
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 597948  
**Date Samples Received:** 03/07/18  
**Date Instructions Received:** 04/07/18  
**Date Analysis Completed:** 13/07/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Richard Wong  
Client Manager



Envirolab Job Number: 18/05294

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05294/1	18/05294/2							Units	Method ref
Client Sample No	60	69								
Client Sample ID	MB03	MB03								
Depth to Top	17.30	20.70								
Depth To Bottom										
Date Sampled	18-Jun-18	18-Jun-18								
Sample Type	Soil - D	Soil - D								
Sample Matrix Code	1	1								
% Stones >10mm <sub>A</sub>	<0.1	<0.1						% w/w		
pH BRE <sub>D</sub> <sup>M#</sup>	7.63	7.44						pH	A-T-031s	
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	<1.00	1.48						mg/l	A-T-033s	
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1880	2830						mg/l	A-T-026s	
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4						mg/l	A-T-026s	
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	236	418						mg/l	A-T-026s	
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.06	0.13						% w/w	A-T-028s	
Sulphur BRE (total) <sub>D</sub>	0.08	0.38						% w/w	A-T-024s	
Magnesium BRE (water sol 2:1) <sub>D</sub>	146	147						mg/l	A-T-SOLMETs	

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### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

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US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

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Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

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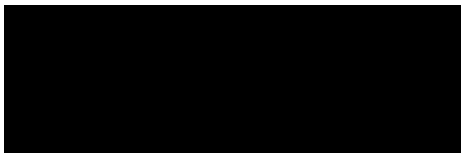
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05349  
**Issue Number:** 1 **Date:** 13 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

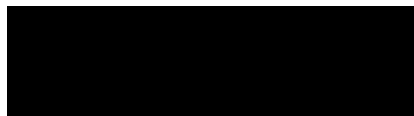
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598202  
**Date Samples Received:** 05/07/18  
**Date Instructions Received:** 05/07/18  
**Date Analysis Completed:** 13/07/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



John Gustafson  
Managing Director

Envirolab Job Number: 18/05349

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05349/1	18/05349/2	18/05349/3	18/05349/4	18/05349/5	18/05349/6			Units	Method ref
Client Sample No	3	8	20	41	54	71				
Client Sample ID	MB05	MB05	MB05	MB05	MB05	MB05				
Depth to Top	1.00	2.00	5.00	12.00	16.30	22.30				
Depth To Bottom	1.45									
Date Sampled	20-Jun-18	20-Jun-18	20-Jun-18	20-Jun-18	20-Jun-18	20-Jun-18				
Sample Type	Soil - D	Soil - ES	Soil - ES	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	4	1	1	1	5	5				
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
pH BRE <sub>D</sub> <sup>M#</sup>	-	7.86	8.39	7.49	7.36	8.13			pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	-	<1.00	<1.00	<1.00	1.77	1.48			mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	1540	1740	3000	3170	2900			mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	-	<0.4	<0.4	<0.4	<0.4	<0.4			mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	159	181	293	477	410			mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	0.06	0.05	0.06	0.17	0.14			% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	-	0.03	0.02	0.02	0.17	0.54			% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	121	137	217	272	160			mg/l	A-T-SOLMETs
Organic matter <sub>D</sub> <sup>M#</sup>	1.0	-	-	-	-	-			% w/w	A-T-032 OM

## **REPORT NOTES**

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### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

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### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

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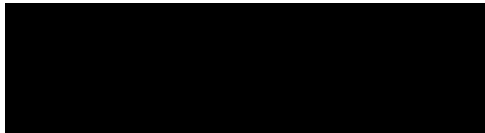
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05419  
**Issue Number:** 1  
**Date:** 16 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598399  
**Date Samples Received:** 06/07/18  
**Date Instructions Received:** 06/07/18  
**Date Analysis Completed:** 16/07/18

**Prepared by:**



Kate Keningale  
Sales Executive

**Approved by:**



Danielle Brierley  
Client Manager

Envirolab Job Number: 18/05419

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05419/1	18/05419/2	18/05419/3	18/05419/4	18/05419/5	18/05419/6	18/05419/7	18/05419/8	Units	Method ref
Client Sample No	4	5	3	9	20	36	56	67		
Client Sample ID	MB06	MB06	MB06	MB06	MB06	MB06	MB06	MB06		
Depth to Top	1.00	1.30	1.45	2.30	5.00	10.00	16.50	20.30		
Depth To Bottom							17.00			
Date Sampled	24-Jun-18	24-Jun-18	24-Jun-18	24-Jun-18	24-Jun-18	24-Jun-18	24-Jun-18	24-Jun-18		
Sample Type	Soil - ES	Soil - D	Soil - D	Soil - D	Soil - ES	Soil - ES	Soil - B	Soil - D		
Sample Matrix Code	4	4	4	4A	5	1	5	1		
% Stones >10mm <sub>A</sub>	0.2	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub> <sup>M#</sup>	7.04	-	-	-	8.36	8.48	7.78	7.89	pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	<1.00	-	-	-	16.8	1.35	<1.00	<1.00	mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1420	-	-	-	1040	1790	1630	2430	mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	-	-	-	0.6	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	165	-	-	-	130	175	253	273	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.06	-	-	-	0.05	0.04	0.07	0.08	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.06	-	-	-	0.03	0.01	0.31	0.15	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	105	-	-	-	31	133	119	186	mg/l	A-T-SOLMETs
Organic matter <sub>D</sub> <sup>M#</sup>	-	1.5	0.3	0.6	-	-	-	-	% w/w	A-T-032 OM



Envirolab Job Number: 18/05419/9

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05419/9								Units	Method ref
Client Sample No	79									
Client Sample ID	MB06									
Depth to Top	24.30									
Depth To Bottom										
Date Sampled	25-Jun-18									
Sample Type	Soil - D									
Sample Matrix Code	5									
% Stones >10mm <sub>A</sub>	<0.1								% w/w	A-T-044
pH BRE <sub>D</sub> <sup>MF</sup>	7.65								pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	2.19								mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>MF</sup>	3100								mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	0.9								mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>MF</sup>	455								mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>MF</sup>	0.13								% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.21								% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	106								mg/l	A-T-SOLMETS

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### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

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For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

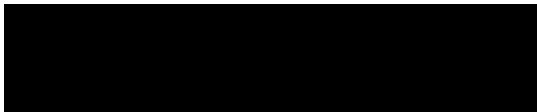
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05529  
**Issue Number:** 1 **Date:** 20 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598787  
**Date Samples Received:** 06/07/18  
**Date Instructions Received:** 11/07/18  
**Date Analysis Completed:** 20/07/18

**Prepared by:**



Danielle Brierley  
Client Manager

**Approved by:**



John Gustafson  
Managing Director

Envirolab Job Number: 18/05529

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05529/1	18/05529/2	18/05529/3	18/05529/4	18/05529/5	18/05529/6	18/05529/7		Units	Method ref
Client Sample No	9	37	56	71	91	108	114			
Client Sample ID	MB07	MB07	MB07	MB07	MB07	MB07	MB07			
Depth to Top	2.00	10.00	16.30	21.30	29.30	36.00	38.60			
Depth To Bottom						36.45				
Date Sampled	25-Jun-18	25-Jun-18	25-Jun-18	26-Jun-18	26-Jun-18	26-Jun-18	26-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D			
Sample Matrix Code	1	1	1A	1	1	1	3			
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	% w/w		
pH BRE <sub>D</sub> <sup>M#</sup>	8.50	8.59	8.45	8.50	7.84	8.33	8.37	pH	A-T-031s	
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	5.55	<1.00	1.13	1.23	<1.00	<1.00	5.97	mg/l	A-T-033s	
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1400	1750	1800	2040	1690	1870	2140	mg/l	A-T-026s	
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s	
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	176	185	230	244	239	385	845	mg/l	A-T-026s	
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.05	0.04	0.09	0.08	0.09	0.18	0.35	% w/w	A-T-028s	
Sulphur BRE (total) <sub>D</sub>	0.02	0.01	0.10	0.15	0.14	0.31	1.61	% w/w	A-T-024s	
Magnesium BRE (water sol 2:1) <sub>D</sub>	104	132	130	105	117	142	107	mg/l	A-T-SOLMETS	

## **REPORT NOTES**

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A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

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Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

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E = contains roots/twigs.

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US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

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Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

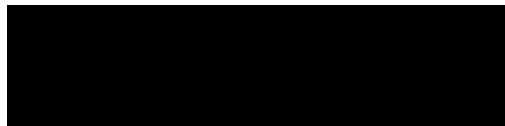
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05525  
**Issue Number:** 1  
**Date:** 20 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598804  
**Date Samples Received:** 26/06/18  
**Date Instructions Received:** 11/07/18  
**Date Analysis Completed:** 20/07/18

**Prepared by:**



Kate Keningale  
Sales Executive

**Approved by:**



John Gustafson  
Managing Director

Envirolab Job Number: 18/05525

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05525/1	18/05525/2	18/05525/3	18/05525/4	18/05525/5	18/05525/6			Units	Method ref
Client Sample No	9	14	46	59	65	70				
Client Sample ID	MB08	MB08	MB08	MB08	MB08	MB08				
Depth to Top	2.00	3.30	10.00	18.00	20.60	22.60				
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	25-Jun-18	22-Jun-18	22-Jun-18	22-Jun-18				
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	1A	1A	1	1	4	4				
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
pH BRE <sub>D</sub> <sup>M#</sup>	8.77	-	8.69	8.61	8.26	8.06			pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	2.06	-	<1.00	<1.00	<1.00	2.23			mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1690	-	2220	1860	2400	1570			mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	1.6	-	1.9	1.5	1.2	1.0			mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	203	-	236	218	572	362			mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.04	-	0.04	0.05	0.14	0.12			% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.03	-	0.02	0.07	0.46	0.45			% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	107	-	161	134	146	67			mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	-	0.2	-	-	-	-			% w/w	A-T-032 OM



## **REPORT NOTES**

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### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

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Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

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Please contact us if you need any further information.

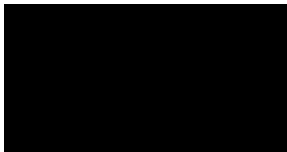
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05561  
**Issue Number:** 1  
**Date:** 20 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

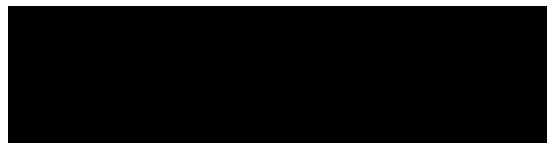
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598960  
**Date Samples Received:** 05/07/18  
**Date Instructions Received:** 12/07/18  
**Date Analysis Completed:** 20/07/18

**Prepared by:**



Georgia King  
Admin & Client Services Supervisor

**Approved by:**



Danielle Brierley  
Client Manager

Envirolab Job Number: 18/05561

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05561/1	18/05561/2	18/05561/3	18/05561/4	18/05561/5	18/05561/6	18/05561/7	18/05561/8	Units	Method ref		
Client Sample No	4	9	16	20	36	49	58	72				
Client Sample ID	MB09	MB09	MB09	MB09	MB09	MB09	MB09	MB09				
Depth to Top	1.00	2.30	4.30	5.00	10.00	14.30	17.30	23.50				
Depth To Bottom								24.00				
Date Sampled	02-Jul-18	02-Jul-18	02-Jul-18	02-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	04-Jul-18				
Sample Type	Soil - ES	Soil - D	Soil - D	Soil - ES	Soil - ES	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	4A	4	1	1A	1	1	1	3				
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			% w/w	A-T-044
pH BRE <sub>D</sub> <sup>M#</sup>	8.44	-	-	8.47	8.59	8.36	8.25	7.61	pH	A-T-031s		
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	1.61	-	-	2.55	<1.00	<1.00	<1.00	1.87	mg/l	A-T-033s		
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1460	-	-	1450	2010	1500	1460	3350	mg/l	A-T-026s		
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s		
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	198	-	-	198	243	226	186	576	mg/l	A-T-026s		
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.09	-	-	0.07	0.06	0.07	0.05	0.16	% w/w	A-T-028s		
Sulphur BRE (total) <sub>D</sub>	0.04	-	-	0.04	0.02	0.05	0.05	0.28	% w/w	A-T-024s		
Magnesium BRE (water sol 2:1) <sub>D</sub>	107	-	-	96	171	127	122	186	mg/l	A-T-SOLMETs		
Organic matter <sub>D</sub> <sup>M#</sup>	-	0.4	0.3	-	-	-	-	-	% w/w	A-T-032 OM		

Envirolab Job Number: 18/05561

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05561/9	18/05561/10	18/05561/11						Units	Method ref
Client Sample No	86	106	112							
Client Sample ID	MB09	MB09	MB09							
Depth to Top	29.30	37.30	38.50							
Depth To Bottom			40.00							
Date Sampled	04-Jul-18	04-Jul-18	04-Jul-18							
Sample Type	Soil - D	Soil - D	Soil - B							
Sample Matrix Code	1	1	3							
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1							
pH BRE <sub>D</sub> <sup>M#</sup>	8.03	8.09	8.44						pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	<1.00	<1.00	5.00						mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1550	1640	1140						mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4	<0.4						mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	283	255	286						mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.11	0.18	0.25						% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.32	0.37	0.42						% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	107	128	71						mg/l	A-T-SOLMETs

## **REPORT NOTES**

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### **Soil chemical analysis:**

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For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

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A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

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US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

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Subscript "A" indicates analysis performed on the sample as received.

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Please contact us if you need any further information.

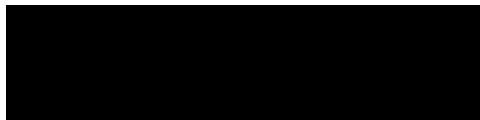
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05528  
**Issue Number:** 1  
**Date:** 20 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

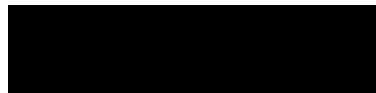
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598805  
**Date Samples Received:** 25/06/18  
**Date Instructions Received:** 11/07/18  
**Date Analysis Completed:** 20/07/18

**Prepared by:**



Kate Keningale  
Sales Executive

**Approved by:**



John Gustafson  
Managing Director

Envirolab Job Number: 18/05528

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05528/1	18/05528/2	18/05528/3	18/05528/4	18/05528/5	18/05528/6	18/05528/7		Units	Method ref
Client Sample No	45	4	7	8	23	59	67			
Client Sample ID	MB10	MB10	MB10	MB10	MB10	MB10	MB10			
Depth to Top	0.00	1.30	2.00	2.30	6.30	18.80	22.00			
Depth To Bottom										
Date Sampled	26-Jun-18	22-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	23-Jun-18			
Sample Type	Soil - ES	Soil - D	Soil - D	Soil - D	Soil - D	Soil - ES	Soil - ES			
Sample Matrix Code	5	1	4	4AE	1	1	5			
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
pH BRE <sub>D</sub> <sup>M#</sup>	8.21	-	8.43	-	8.80	8.52	7.83		pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	1.29	-	<1.00	-	<1.00	<1.00	1.29		mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	2380	-	1610	-	2040	1670	2730		mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	1.2	-	1.4	-	1.7	1.4	0.4		mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	328	-	219	-	209	176	508		mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.16	-	0.12	-	0.05	0.06	0.22		% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.09	-	0.05	-	0.01	0.05	0.65		% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	174	-	136	-	151	138	150		mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	-	0.2	-	0.4	-	-	-		% w/w	A-T-032 OM



## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



# Appendix G

**CONTAMINATED LAND TEST**

**RESULTS**



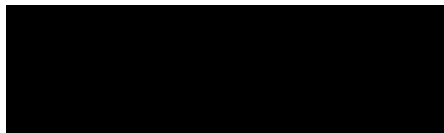
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 18/04837/1

**Envirolab Job Number:** 18/04837  
**Issue Number:** 2  
**Date:** 10 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

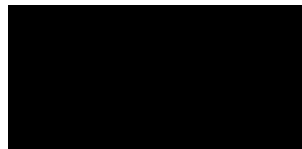
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 596135  
**Date Samples Received:** 14/06/18  
**Date Instructions Received:** 19/06/18  
**Date Analysis Completed:** 10/07/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor



Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4					Units	Method ref
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
Chromium (leachable) <sub>A</sub> <sup>#</sup>	6	-	-	-					µg/l	A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05	-	-	-					mg/l	A-T-040w
Lead (leachable) <sub>A</sub> <sup>#</sup>	38	-	-	-					µg/l	A-T-025w
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1	-	-	-					µg/l	A-T-025w
Nickel (leachable) <sub>A</sub> <sup>#</sup>	61	-	-	-					µg/l	A-T-025w
Selenium (leachable) <sub>A</sub> <sup>#</sup>	20	-	-	-					µg/l	A-T-025w
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1	-	-	-					mg/l	A-T-029w
Zinc (leachable) <sub>A</sub> <sup>#</sup>	123	-	-	-					µg/l	A-T-025w

Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4					Units	Method ref		
Client Sample No	1	1	2	3								
Client Sample ID	MB02	MB01	MB01	MB02								
Depth to Top	0.00	0.80	2.00	3.00								
Depth To Bottom												
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18								
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES								
Sample Matrix Code	6	7	1	1								
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	NAD	NAD	-	-						A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	-	-								



Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4					Units	Method ref
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
<b>PAH-16MS</b>										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	<0.02	<0.02	<0.02					mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	<0.05	<0.05					mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	<0.05	<0.05					mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07	<0.07					mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	<0.06	<0.06	<0.06					mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	<0.08	<0.08	<0.08					mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07	<0.07					mg/kg	A-T-019s
Total PAH-16MS <sub>A</sub> <sup>M#</sup>	<0.08	<0.08	<0.08	<0.08					mg/kg	A-T-019s

Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4					Units	Method ref
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
<b>PAH 16MS (leachable)</b>										
Acenaphthene (leachable) <sub>A</sub>	0.03	-	-	-					µg/l	A-T-019w
Acenaphthylene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Anthracene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Benzo(a)anthracene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Benzo(a)pyrene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Benzo(b)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Benzo(ghi)perylene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Benzo(k)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Chrysene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Fluoranthene (leachable) <sub>A</sub>	0.10	-	-	-					µg/l	A-T-019w
Fluorene (leachable) <sub>A</sub>	0.03	-	-	-					µg/l	A-T-019w
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	<0.02	-	-	-					µg/l	A-T-019w
Naphthalene (leachable) <sub>A</sub>	0.07	-	-	-					µg/l	A-T-019w
Phenanthrene (leachable) <sub>A</sub>	0.11	-	-	-					µg/l	A-T-019w
Pyrene (leachable) <sub>A</sub>	0.08	-	-	-					µg/l	A-T-019w
<b>Total PAH 16MS (leachable)<sub>A</sub></b>	<b>0.42</b>	<b>-</b>	<b>-</b>	<b>-</b>					<b>µg/l</b>	<b>A-T-019w</b>

Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4					Units	Method ref
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	<0.002	<0.002	-	-					mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	<0.002	<0.002	-	-					mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	<0.004	<0.004	-	-					mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007	<0.007	<0.007					mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	<0.006	<0.006	-	-					mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	<0.004	<0.004	-	-					mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	<0.004	<0.004	-	-					mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007	-	-					mg/kg	A-T-004s

Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4					Units	Method ref
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
<b>Speciated PCB-WHO12</b>										
PCB BZ 81 <sub>A</sub>	-	<0.005	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 105 <sub>A</sub>	-	<0.005	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 114 <sub>A</sub>	-	<0.005	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 123 <sub>A</sub>	-	<0.005	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 126 <sub>A</sub>	-	<0.005	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 156 <sub>A</sub>	-	<0.005	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 157 <sub>A</sub>	-	<0.005	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 167 <sub>A</sub>	-	<0.005	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 169 <sub>A</sub>	-	<0.005	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 189 <sub>A</sub>	-	<0.005	<0.005	<0.005					mg/kg	A-T-004s
PCB BZ 77 <sub>A</sub>	-	<0.005	<0.005	<0.005					mg/kg	A-T-004s
Total Speciated PCB-WHO12 <sub>A</sub>	-	<0.005	<0.007	<0.007					mg/kg	A-T-004s



Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4					Units	Method ref
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<20	-	-	-						
Hexachloroethane (leachable) <sub>A</sub>	<20	-	-	-					µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	<20	-	-	-					µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	<20	-	-	-					µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<20	-	-	-					µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	<20	-	-	-					µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	<20	-	-	-					µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	<20	-	-	-					µg/l	A-T-052w

Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4						
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500	<500					µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<200	<200	<200	<200					µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500	<500					µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s



Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4					Units	Method ref
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s
Perylene <sub>A</sub>	<100	<100	<100	<100					µg/kg	A-T-052s

Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4						
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
VOC										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1					µg/kg	A-T-006s
Chloromethane <sub>A</sub>	<10	<10	<10	<10					µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	2	<1	<1					µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5	<5	<5					µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5					µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10					µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3					µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s

Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4					Units	Method ref
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1					µg/kg	A-T-006s
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
m & p Xylene <sub>A</sub> <sup>#</sup>	4	<1	<1	<1					µg/kg	A-T-006s
o-Xylene <sub>A</sub> <sup>#</sup>	2	<1	<1	<1					µg/kg	A-T-006s
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2					µg/kg	A-T-006s
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	1	<1	<1	<1					µg/kg	A-T-006s
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1	<1					µg/kg	A-T-006s
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2	<2					µg/kg	A-T-006s
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3					µg/kg	A-T-006s
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1					µg/kg	A-T-006s
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3					µg/kg	A-T-006s

Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4						
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aliphatics <sub>A</sub>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	0.03	<0.01	<0.01					mg/kg	A-T-022s
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aromatics <sub>A</sub>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
TPH (Ali & Aro) <sub>A</sub>	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	0.02	<0.01	<0.01					mg/kg	A-T-022s
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

Envirolab Job Number: 18/04837

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04837/1	18/04837/2	18/04837/3	18/04837/4						
Client Sample No	1	1	2	3						
Client Sample ID	MB02	MB01	MB01	MB02						
Depth to Top	0.00	0.80	2.00	3.00						
Depth To Bottom										
Date Sampled	12-Jun-18	11-Jun-18	11-Jun-18	12-Jun-18						
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES						
Sample Matrix Code	6	7	1	1						
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Ali >C6-C8 (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Ali >C10-C12 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-055w
Ali >C12-C16 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-055w
Ali >C16-C21 (leachable) <sub>A</sub>	24	-	-	-					µg/l	A-T-055w
Ali >C21-C35 (leachable) <sub>A</sub>	48	-	-	-					µg/l	A-T-055w
Ali >C35-C44 (leachable) <sub>A</sub>	36	-	-	-					µg/l	A-T-055w
Total Aliphatics (leachable) <sub>A</sub>	72	-	-	-					µg/l	A-T-055w
Total Aliphatics >C5-C44 (leachable) <sub>A</sub>	107	-	-	-					µg/l	A-T-055w
Aro >C5-C7 (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Aro >C7-C8 (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Aro >C8-C10 (leachable) <sub>A</sub>	21	-	-	-					µg/l	A-T-055w
Aro >C10-C12 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-055w
Aro >C12-C16 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-055w
Aro >C16-C21 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-055w
Aro >C35-C44 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-055w
Total Aromatics (leachable) <sub>A</sub>	41	-	-	-					µg/l	A-T-055w
Total Aromatics >C5-C44 (leachable) GCxGC <sub>A</sub>	51	-	-	-					µg/l	A-T-055w
TPH (Ali & Aro >C5-C35) (leachable) <sub>A</sub>	113	-	-	-					µg/l	A-T-055w
TPH (Ali & Aro >C5-C44) (leachable) <sub>A</sub>	158	-	-	-					µg/l	A-T-055w
Ali >C8-C10 (leachable) <sub>A</sub>	<10	-	-	-					µg/l	A-T-055w
BTEX - Benzene (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
BTEX - Toluene (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
BTEX - o Xylene (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
BTEX - m & p Xylene (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
MTBE (leachable) <sub>A</sub>	<1	-	-	-					µg/l	A-T-022w
Aro >C21-C35 (leachable) <sub>A</sub>	<20	-	-	-					µg/l	A-T-055w

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

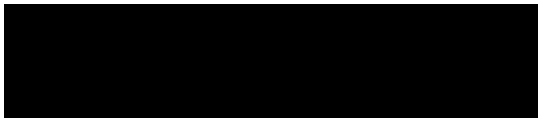
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/04935  
**Issue Number:** 1  
**Date:** 02 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gr Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 596636  
**Date Samples Received:** 19/06/18  
**Date Instructions Received:** 22/06/18  
**Date Analysis Completed:** 02/07/18

**Prepared by:**



Danielle Brierley  
Client Manager

**Approved by:**



Iain Haslock  
Analytical Consultant





Envirolab Job Number: 18/04935

Client Project Name: Gr Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04935/1	18/04935/2							Units	Method ref
Client Sample No	1	1								
Client Sample ID	MB04	MB04a								
Depth to Top	1.00	2.00								
Depth To Bottom										
Date Sampled	15-Jun-18	15-Jun-18								
Sample Type	Solid	Soil - ES								
Sample Matrix Code	7	1								
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD	-								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	-								

Envirolab Job Number: 18/04935

Client Project Name: Gr Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04935/1	18/04935/2								
Client Sample No	1	1								
Client Sample ID	MB04	MB04a								
Depth to Top	1.00	2.00								
Depth To Bottom										
Date Sampled	15-Jun-18	15-Jun-18								
Sample Type	Solid	Soil - ES								
Sample Matrix Code	7	1								
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01							mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	<0.02							mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04							mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04							mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05							mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05							mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07							mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	<0.06							mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	<0.08							mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03							mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03							mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07							mg/kg	A-T-019s
Total PAH-16MS <sub>A</sub> <sup>M#</sup>	<0.08	<0.08							mg/kg	A-T-019s



Envirolab Job Number: 18/04935

Client Project Name: Gr Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04935/1	18/04935/2							Units	Method ref
Client Sample No	1	1								
Client Sample ID	MB04	MB04a								
Depth to Top	1.00	2.00								
Depth To Bottom										
Date Sampled	15-Jun-18	15-Jun-18								
Sample Type	Solid	Soil - ES								
Sample Matrix Code	7	1								
Speciated PCB-EC7										
Total Speciated PCB-EC7 <sup>M#</sup> <sub>A</sub>	<0.007	-							mg/kg	A-T-004s



Envirolab Job Number: 18/04935

Client Project Name: Gr Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/04935/1	18/04935/2							Units	Method ref
Client Sample No	1	1								
Client Sample ID	MB04	MB04a								
Depth to Top	1.00	2.00								
Depth To Bottom										
Date Sampled	15-Jun-18	15-Jun-18								
Sample Type	Solid	Soil - ES								
Sample Matrix Code	7	1								
Hexachlorocyclopentadiene <sub>A</sub>	<400	<400						µg/kg		
Perylene <sub>A</sub>	<100	<100						µg/kg	A-T-052s	









## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05059  
**Issue Number:** 1  
**Date:** 16 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 597154  
**Date Samples Received:** 20/06/18  
**Date Instructions Received:** 26/06/18  
**Date Analysis Completed:** 16/07/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	% w/w		
pH <sub>D</sub> <sup>M#</sup>	7.84	8.13	7.81	8.23	8.44	-	-	pH	A-T-031s	
pH BRE <sub>D</sub> <sup>M#</sup>	-	-	-	-	-	8.58	8.59	pH	A-T-031s	
Ammoniacal nitrogen <sub>D</sub>	6.3	1.5	1.9	1.3	<0.2	-	-	mg/kg	A-T-033s	
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	-	-	-	-	-	<1.00	<1.00	mg/l	A-T-033s	
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	-	-	1540	2370	mg/l	A-T-026s	
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	-	-	-	-	-	<0.4	<0.4	mg/l	A-T-026s	
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	0.79	0.51	0.20	0.26	0.19	-	-	g/l	A-T-026s	
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	-	-	-	-	174	245	mg/l	A-T-026s	
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	3000	1500	550	920	440	-	-	mg/kg	A-T-026s	
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	-	-	-	-	0.04	0.05	% w/w	A-T-028s	
Sulphur BRE (total) <sub>D</sub>	-	-	-	-	-	0.02	0.02	% w/w	A-T-024s	
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	-	-	-	-	115	179	mg/l	A-T-SOLMETs	
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	-	-	mg/kg	A-T-042sTCN	
Phenols - Total by HPLC <sub>A</sub>	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	mg/kg	A-T-050s	
Sulphide <sub>A</sub>	210	<5	<5	<5	<5	-	-	mg/kg	A-T-S2-s	
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	1700	170	18	30	<5	-	-	mg/kg	A-T-029s	
Organic matter <sub>D</sub> <sup>M#</sup>	2.2	0.3	<0.1	0.1	<0.1	-	-	% w/w	A-T-032 OM	
Arsenic <sub>D</sub> <sup>M#</sup>	13	26	10	35	8	-	-	mg/kg	A-T-024s	
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	10.2	6.0	2.3	3.0	1.5	-	-	mg/kg	A-T-027s	
Cadmium <sub>D</sub> <sup>M#</sup>	0.5	0.9	<0.5	0.7	<0.5	-	-	mg/kg	A-T-024s	
Copper <sub>D</sub> <sup>M#</sup>	27	4	<1	<1	<1	-	-	mg/kg	A-T-024s	
Chromium <sub>D</sub> <sup>M#</sup>	40	15	9	15	3	-	-	mg/kg	A-T-024s	
Chromium (hexavalent) <sub>D</sub>	<1	<1	<1	<1	<1	-	-	mg/kg	A-T-040s	
Lead <sub>D</sub> <sup>M#</sup>	39	8	4	8	2	-	-	mg/kg	A-T-024s	
Mercury <sub>D</sub>	0.30	<0.17	<0.17	<0.17	<0.17	-	-	mg/kg	A-T-024s	
Nickel <sub>D</sub> <sup>M#</sup>	25	16	6	12	2	-	-	mg/kg	A-T-024s	
Selenium <sub>D</sub> <sup>M#</sup>	<1	1	<1	<1	<1	-	-	mg/kg	A-T-024s	
Zinc <sub>D</sub> <sup>M#</sup>	99	43	20	39	25	-	-	mg/kg	A-T-024s	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Leachate Prep NRA (10:1) <sub>A</sub>	*	-	-	-	-	-	-			
pH (leachable) <sub>A</sub> <sup>#</sup>	7.80	-	-	-	-	-	-	pH	A-T-031w	
Ammoniacal nitrogen (leachable) <sub>A</sub>	0.16	-	-	-	-	-	-	mg/l	A-T-033w	
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	125.55	-	-	-	-	-	-	mg/l	A-T-026w	
Cyanide (total) (leachable) <sub>A</sub>	<0.005	-	-	-	-	-	-	mg/l	A-T-042wTCN	
Phenols (total by HPLC) (leachable) <sub>A</sub>	<0.01	-	-	-	-	-	-	mg/l	A-T-050w	
Sulphide (leachable) <sub>A</sub>	<0.1	-	-	-	-	-	-	mg/l	A-T-S2-w	
DOC (leachable) <sub>A</sub> <sup>#</sup>	5.2	-	-	-	-	-	-	mg/l	A-T-032w	
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	3	-	-	-	-	-	-	µg/l	A-T-025w	
Boron (leachable) <sub>A</sub> <sup>#</sup>	371	-	-	-	-	-	-	µg/l	A-T-025w	
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-	-	-	-	µg/l	A-T-025w	
Copper (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-	-	-	-	µg/l	A-T-025w	
Chromium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-	-	-	-	µg/l	A-T-025w	
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05	-	-	-	-	-	-	mg/l	A-T-040w	
Lead (leachable) <sub>A</sub> <sup>#</sup>	1	-	-	-	-	-	-	µg/l	A-T-025w	
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1	-	-	-	-	-	-	µg/l	A-T-025w	
Nickel (leachable) <sub>A</sub> <sup>#</sup>	2	-	-	-	-	-	-	µg/l	A-T-025w	
Selenium (leachable) <sub>A</sub> <sup>#</sup>	<1	-	-	-	-	-	-	µg/l	A-T-025w	
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1	-	-	-	-	-	-	mg/l	A-T-029w	
Zinc (leachable) <sub>A</sub> <sup>#</sup>	10	-	-	-	-	-	-	µg/l	A-T-025w	



Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sup>#</sup>	NAD	NAD	NAD	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	-	-	-	-			

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-019s	
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-019s	
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	mg/kg	A-T-019s	
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	mg/kg	A-T-019s	
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	mg/kg	A-T-019s	
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	mg/kg	A-T-019s	
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	mg/kg	A-T-019s	
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07	<0.07	<0.07	-	-	mg/kg	A-T-019s	
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	<0.06	<0.06	<0.06	<0.06	-	-	mg/kg	A-T-019s	
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	mg/kg	A-T-019s	
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	mg/kg	A-T-019s	
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-019s	
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	mg/kg	A-T-019s	
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	mg/kg	A-T-019s	
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	mg/kg	A-T-019s	
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07	<0.07	<0.07	-	-	mg/kg	A-T-019s	
Total PAH-16MS <sub>A</sub> <sup>M#</sup>	<0.08	<0.08	<0.08	<0.08	<0.08	-	-	mg/kg	A-T-019s	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
PAH 16MS (leachable)										
Acenaphthene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Acenaphthylene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Anthracene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Benzo(a)anthracene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Benzo(a)pyrene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Benzo(b)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Benzo(ghi)perylene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Benzo(k)fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Chrysene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Fluoranthene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Fluorene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Naphthalene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Phenanthrene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Pyrene (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	
Total PAH 16MS (leachable) <sub>A</sub>	<0.02	-	-	-	-	-	-	µg/l	A-T-019w	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	<0.002	-	<0.002	<0.002	-	-	-		mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	<0.002	-	<0.002	<0.002	-	-	-		mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	<0.004	-	<0.004	<0.004	-	-	-		mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007	<0.007	<0.007	<0.007	-	-		mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	<0.006	-	<0.006	<0.006	-	-	-		mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	<0.004	-	<0.004	<0.004	-	-	-		mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	<0.004	-	<0.004	<0.004	-	-	-		mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	<0.007	-	<0.007	<0.007	-	-	-		mg/kg	A-T-004s

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Speciated PCB-WHO12										
PCB BZ 81 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 105 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 114 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 123 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 126 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 156 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 157 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 167 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 169 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 189 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
PCB BZ 77 <sub>A</sub>	-	<0.005	-	-	<0.005	-	-	mg/kg	A-T-004s	
Total Speciated PCB-WHO12 <sub>A</sub>	-	<0.007	-	-	<0.007	-	-	mg/kg	A-T-004s	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
SVOC excluding PAH-16 (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,4-Dichlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,4-Dimethylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,4-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2,6-Dinitrotoluene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2-Chloronaphthalene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2-Chlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2-Methylnaphthalene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2-Methylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
2-Nitrophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
4-Methylphenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
4-Nitrophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	<4	-	-	-	-	-	-	µg/l	A-T-052w	
Butylbenzyl phthalate (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Carbazole (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Dibenzofuran (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Diethyl phthalate (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Dimethyl phthalate (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
n-Dibutylphthalate (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
n-Dioctylphthalate (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-052w	
Hexachlorobenzene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	
Hexachlorobutadiene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-	µg/l	A-T-052w	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-			
Hexachloroethane (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
Isophorone (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
Nitrobenzene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
Pentachlorophenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
Perylene (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w
Phenol (leachable) <sub>A</sub>	<2	-	-	-	-	-	-		µg/l	A-T-052w



Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500	<500	<500	-	-		µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500	<500	<500	-	-		µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<300	<200	<100	<100	<100	-	-		µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100	<100	<100	-	-			
Perylene <sub>A</sub>	<100	<100	<100	<100	<100	-	-		µg/kg	A-T-052s

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
VOC										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	-	-	µg/kg	A-T-006s	
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Carbon Disulphide <sub>A</sub> <sup>#</sup>	8	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	-	-	µg/kg	A-T-006s	
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	-	-	µg/kg	A-T-006s	
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	-	-	µg/kg	A-T-006s	
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	-	-	µg/kg	A-T-006s	
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	-	-	µg/kg	A-T-006s	
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg		
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,1,2,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	-	-	µg/kg	A-T-006s	
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2	<2	<2	-	-	µg/kg	A-T-006s	
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	-	-	µg/kg	A-T-006s	
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	-	-	µg/kg	A-T-006s	
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	-	-	µg/kg	A-T-006s	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Ali >C8-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Ali >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Ali >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Ali >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Ali >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Ali >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Total Aliphatics <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Aro >C8-C9 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Aro >C9-C10 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
Aro >C10-C12 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Aro >C12-C16 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Aro >C16-C21 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Aro >C21-C35 <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Aro >C35-C44 <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
Total Aromatics <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
TPH (Ali & Aro) <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	mg/kg	A-T-023s	
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	mg/kg	A-T-022s	

Envirolab Job Number: 18/05059

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05059/1	18/05059/2	18/05059/3	18/05059/4	18/05059/5	18/05059/13	18/05059/17		Units	Method ref
Client Sample No	1	3	3	7	14	20				
Client Sample ID	MB05	MB03	MB01a	MB03	MB05	MB3	MB3			
Depth to Top	0.00	1.00	1.00	2.00	4.00	5.00	9.00			
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	21-Jun-18	17-Jun-18	18-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	5	5	5	1	1	1	1			
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
Ali >C6-C8 (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
Ali >C10-C12 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Ali >C12-C16 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Ali >C16-C21 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Ali >C21-C35 (leachable) <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	
Ali >C35-C44 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Total Aliphatics (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Total Aliphatics >C5-C44 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Aro >C5-C7 (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
Aro >C7-C8 (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
Aro >C8-C10 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Aro >C10-C12 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Aro >C12-C16 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Aro >C16-C21 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Aro >C35-C44 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
Total Aromatics (leachable) <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	
Total Aromatics >C5-C44 (leachable) GCxGC <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	
TPH (Ali & Aro >C5-C35) (leachable) <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	
TPH (Ali & Aro >C5-C44) (leachable) <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	
Ali >C8-C10 (leachable) <sub>A</sub>	<10	-	-	-	-	-	-	µg/l	A-T-055w	
BTEX - Benzene (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
BTEX - Toluene (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
BTEX - o Xylene (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
BTEX - m & p Xylene (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
MTBE (leachable) <sub>A</sub>	<1	-	-	-	-	-	-	µg/l	A-T-022w	
Aro >C21-C35 (leachable) <sub>A</sub>	<20	-	-	-	-	-	-	µg/l	A-T-055w	

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



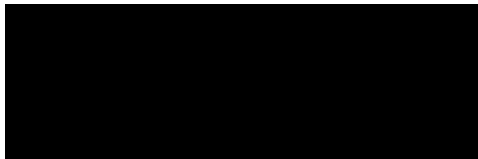
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05126  
**Issue Number:** 1 **Date:** 10 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

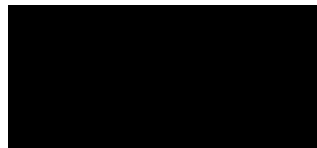
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 597345  
**Date Samples Received:** 27/06/18  
**Date Instructions Received:** 28/06/18  
**Date Analysis Completed:** 10/07/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Georgia King  
Admin & Client Services Supervisor

Envirolab Job Number: 18/05126

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05126/1	18/05126/2	18/05126/3	18/05126/4	18/05126/5	18/05126/6	18/05126/7	18/05126/8	Units	Method ref
Client Sample No	8	18	44	58	68	83	95	107		
Client Sample ID	MB02	MB02	MB02	MB02	MB02	MB02	MB02	MB02		
Depth to Top	2.00	5.0	12.0	17.0	20.80	28.0	33.0	37.30		
Depth To Bottom		5.45	12.45		21.30					
Date Sampled	13-Jun-18	13-Jun-18	13-Jun-18	13-Jun-18	13-Jun-18	13-Jun-18	13-Jun-18	13-Jun-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	1	1	5A	5	6	5	5	6		
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub> <sup>M#</sup>	8.71	8.51	8.29	8.38	8.06	8.66	8.48	8.14	pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	1.06	1.06	1.19	<1.00	3.77	<1.00	<1.00	6.42	mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1750	1860	2510	1820	1850	1680	1700	1910	mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	210	190	334	358	321	245	246	370	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.05	0.04	0.08	0.10	0.12	0.11	0.10	0.24	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.02	0.02	0.08	0.25	0.47	0.23	0.15	0.52	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	123	123	212	151	71	78.8662	146	157	mg/l	A-T-SOLMETS

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

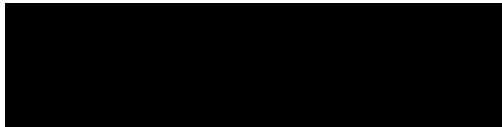
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05167  
**Issue Number:** 1  
**Date:** 10 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

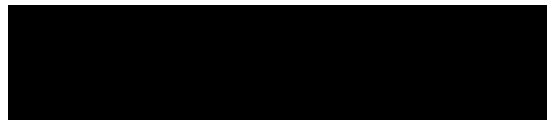
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 597574  
**Date Samples Received:** 25/06/18  
**Date Instructions Received:** 29/06/18  
**Date Analysis Completed:** 10/07/18

**Prepared by:**



Kate Keningale  
Sales Executive

**Approved by:**



Danielle Brierley  
Client Manager

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref
Client Sample No										
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07			
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00			
Depth To Bottom										
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	1	4A	5	5	1	4	1			
% Stones >10mm <sub>A</sub>	<0.1	6.0	<0.1	<0.1	<0.1	<0.1	<0.1			
pH <sub>D</sub> <sup>M#</sup>	7.90	8.34	8.26	8.73	8.36	8.32	8.40		pH	A-T-031s
Ammoniacal nitrogen <sub>D</sub>	1.2	<0.2	24.8	0.9	<0.2	0.9	3.8		mg/kg	A-T-033s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	0.20	0.18	0.36	0.27	0.18	0.20	0.17		g/l	A-T-026s
Sulphate (acid soluble) <sub>D</sub> <sup>M#</sup>	610	830	1600	1000	620	650	520		mg/kg	A-T-028s
Cyanide (total) <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	<1	<1		mg/kg	A-T-042sTCN
Phenols - Total by HPLC <sub>A</sub>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		mg/kg	A-T-050s
Sulphide <sub>A</sub>	120	32	54	41	8	100	<5		mg/kg	A-T-S2-s
Sulphur (elemental) <sub>D</sub> <sup>M#</sup>	34	25	430	88	59	88	13		mg/kg	A-T-029s
Organic matter <sub>D</sub> <sup>M#</sup>	0.4	0.7	2.1	0.5	0.2	1.7	<0.1		% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	3	4	10	10	3	3	9		mg/kg	A-T-024s
Boron (water soluble) <sub>D</sub> <sup>M#</sup>	1.6	2.1	7.4	2.2	1.5	1.7	1.2		mg/kg	A-T-027s
Cadmium <sub>D</sub> <sup>M#</sup>	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	9	44	18	27	5	9	<1		mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	4	8	21	13	4	4	4		mg/kg	A-T-024s
Chromium (hexavalent) <sub>D</sub>	<1	<1	<1	<1	<1	<1	<1		mg/kg	A-T-040s
Lead <sub>D</sub> <sup>M#</sup>	10	151	26	51	9	36	3		mg/kg	A-T-024s
Mercury <sub>D</sub>	<0.17	<0.17	0.21	<0.17	<0.17	<0.17	<0.17		mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	3	8	17	15	3	3	2		mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>M#</sup>	<1	<1	1	<1	<1	<1	<1		mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	33	201	71	69	26	35	14		mg/kg	A-T-024s
Leachate Prep NRA (10:1) <sub>A</sub>	*	*	*	-	-	-	-			A-T-001
pH (leachable) <sub>A</sub> <sup>#</sup>	7.42	7.78	7.99	-	-	-	-		pH	A-T-031w
Ammoniacal nitrogen (leachable) <sub>A</sub>	0.20	<0.02	2.08	-	-	-	-		mg/l	A-T-033w
Sulphate (leachable) <sub>A</sub> <sup>#</sup>	50.92	47.97	59.87	-	-	-	-		mg/l	A-T-026w
Cyanide (total) (leachable) <sub>A</sub>	<0.005	<0.005	<0.005	-	-	-	-		mg/l	A-T-042wTCN
Phenols (total by HPLC) (leachable) <sub>A</sub>	<0.01	<0.01	<0.01	-	-	-	-		mg/l	A-T-050w
Sulphide (leachable) <sub>A</sub>	<0.1	<0.1	<0.1	-	-	-	-		mg/l	A-T-S2-w
DOC (leachable) <sub>A</sub> <sup>#</sup>	1.7	1.9	17.5	-	-	-	-		mg/l	A-T-032w
Arsenic (leachable) <sub>A</sub> <sup>#</sup>	4	6	10	-	-	-	-		µg/l	A-T-025w
Boron (leachable) <sub>A</sub> <sup>#</sup>	125	150	369	-	-	-	-		µg/l	A-T-025w
Cadmium (leachable) <sub>A</sub> <sup>#</sup>	<1	<1	<1	-	-	-	-		µg/l	A-T-025w
Copper (leachable) <sub>A</sub> <sup>#</sup>	<1	9	10	-	-	-	-		µg/l	A-T-025w

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref		
Client Sample No												
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07					
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00					
Depth To Bottom												
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	1	4A	5	5	1	4	1					
Chromium (leachable) <sub>A</sub> <sup>#</sup>	<1	<1	2	-	-	-	-				µg/l	A-T-025w
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05	<0.05	<0.05	-	-	-	-		mg/l	A-T-040w		
Lead (leachable) <sub>A</sub> <sup>#</sup>	<1	38	17	-	-	-	-		µg/l	A-T-025w		
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	-	-	-	-		µg/l	A-T-025w		
Nickel (leachable) <sub>A</sub> <sup>#</sup>	1	1	5	-	-	-	-		µg/l	A-T-025w		
Selenium (leachable) <sub>A</sub> <sup>#</sup>	<1	<1	3	-	-	-	-		µg/l	A-T-025w		
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1	<0.1	<0.1	-	-	-	-		mg/l	A-T-029w		
Zinc (leachable) <sub>A</sub> <sup>#</sup>	43	49	24	-	-	-	-		µg/l	A-T-025w		

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref		
Client Sample No												
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07					
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00					
Depth To Bottom												
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	1	4A	5	5	1	4	1					
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	NAD	NAD	NAD	-	-	-	-			A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	-	-	-	-					



Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref
Client Sample No										
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07			
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00			
Depth To Bottom										
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	1	4A	5	5	1	4	1			
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	0.08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	0.29	<0.04	<0.04	<0.04	<0.04	0.09	<0.04		mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	0.14	<0.04	<0.04	<0.04	<0.04	0.07	<0.04		mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	0.17	<0.05	<0.05	<0.05	<0.05	0.09	<0.05		mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07		mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	0.23	<0.06	<0.06	<0.06	<0.06	0.10	<0.06		mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	0.66	<0.08	<0.08	<0.08	<0.08	0.20	<0.08		mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	0.07	<0.03	<0.03	<0.03	<0.03	0.05	<0.03		mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	0.28	<0.03	<0.03	<0.03	<0.03	0.15	<0.03		mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	0.44	<0.07	<0.07	<0.07	<0.07	0.16	<0.07		mg/kg	A-T-019s
Total PAH-16MS <sub>A</sub> <sup>M#</sup>	2.40	<0.08	<0.08	<0.08	<0.08	0.91	<0.08		mg/kg	A-T-019s

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref
Client Sample No										
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07			
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00			
Depth To Bottom										
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	1	4A	5	5	1	4	1			
PAH 16MS (leachable)										
Acenaphthene (leachable) <sub>A</sub>	<0.02	0.02	0.04	-	-	-	-	µg/l	A-T-019w	
Acenaphthylene (leachable) <sub>A</sub>	<0.02	<0.02	<0.02	-	-	-	-	µg/l	A-T-019w	
Anthracene (leachable) <sub>A</sub>	<0.02	0.02	<0.02	-	-	-	-	µg/l	A-T-019w	
Benzo(a)anthracene (leachable) <sub>A</sub>	<0.02	<0.02	<0.02	-	-	-	-	µg/l	A-T-019w	
Benzo(a)pyrene (leachable) <sub>A</sub>	<0.02	<0.02	<0.02	-	-	-	-	µg/l	A-T-019w	
Benzo(b)fluoranthene (leachable) <sub>A</sub>	<0.02	<0.02	<0.02	-	-	-	-	µg/l	A-T-019w	
Benzo(ghi)perylene (leachable) <sub>A</sub>	<0.02	<0.02	<0.02	-	-	-	-	µg/l	A-T-019w	
Benzo(k)fluoranthene (leachable) <sub>A</sub>	<0.02	<0.02	<0.02	-	-	-	-	µg/l	A-T-019w	
Chrysene (leachable) <sub>A</sub>	<0.02	<0.02	0.02	-	-	-	-	µg/l	A-T-019w	
Dibenzo(ah)anthracene (leachable) <sub>A</sub>	<0.02	<0.02	<0.02	-	-	-	-	µg/l	A-T-019w	
Fluoranthene (leachable) <sub>A</sub>	<0.02	0.06	0.06	-	-	-	-	µg/l	A-T-019w	
Fluorene (leachable) <sub>A</sub>	<0.02	0.03	0.04	-	-	-	-	µg/l	A-T-019w	
Indeno(123-cd)pyrene (leachable) <sub>A</sub>	<0.02	<0.02	<0.02	-	-	-	-	µg/l	A-T-019w	
Naphthalene (leachable) <sub>A</sub>	0.06	0.06	0.08	-	-	-	-	µg/l	A-T-019w	
Phenanthrene (leachable) <sub>A</sub>	<0.02	0.12	0.11	-	-	-	-	µg/l	A-T-019w	
Pyrene (leachable) <sub>A</sub>	<0.02	0.05	0.05	-	-	-	-	µg/l	A-T-019w	
Total PAH 16MS (leachable) <sub>A</sub>	0.06	0.36	0.40	-	-	-	-	µg/l	A-T-019w	

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref		
Client Sample No												
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07					
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00					
Depth To Bottom												
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	1	4A	5	5	1	4	1					
Speciated PCB-EC7												
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	-	-	-	-	-	<0.002		mg/kg	A-T-004s		
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	-	-	-	-	-	<0.002		mg/kg	A-T-004s		
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	-	-	-	-	-	<0.004		mg/kg	A-T-004s		
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007		mg/kg	A-T-004s		
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	-	-	-	-	-	<0.006		mg/kg	A-T-004s		
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	-	-	-	-	-	<0.004		mg/kg	A-T-004s		
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	-	-	-	-	-	<0.004		mg/kg	A-T-004s		
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	-	-	-	-	-	-	<0.007		mg/kg	A-T-004s		

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref		
Client Sample No												
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07					
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00					
Depth To Bottom												
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	1	4A	5	5	1	4	1					
Speciated PCB-WHO12												
PCB BZ 81 <sub>A</sub>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		mg/kg	A-T-004s		
PCB BZ 105 <sub>A</sub>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		mg/kg	A-T-004s		
PCB BZ 114 <sub>A</sub>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		mg/kg	A-T-004s		
PCB BZ 123 <sub>A</sub>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		mg/kg	A-T-004s		
PCB BZ 126 <sub>A</sub>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		mg/kg	A-T-004s		
PCB BZ 156 <sub>A</sub>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		mg/kg	A-T-004s		
PCB BZ 157 <sub>A</sub>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		mg/kg	A-T-004s		
PCB BZ 167 <sub>A</sub>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		mg/kg	A-T-004s		
PCB BZ 169 <sub>A</sub>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		mg/kg	A-T-004s		
PCB BZ 189 <sub>A</sub>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		mg/kg	A-T-004s		
PCB BZ 77 <sub>A</sub>	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		mg/kg	A-T-004s		
Total Speciated PCB-WHO12 <sub>A</sub>	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	-		mg/kg	A-T-004s		

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref
Client Sample No										
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07			
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00			
Depth To Bottom										
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	1	4A	5	5	1	4	1			
SVOC excluding PAH-16 (leachable)										
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
2,4-Dichlorophenol (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
2,4-Dimethylphenol (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
2,4-Dinitrotoluene (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
2,6-Dinitrotoluene (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
2-Chloronaphthalene (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
2-Chlorophenol (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
2-Methylnaphthalene (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
2-Methylphenol (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
2-Nitrophenol (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
4-Methylphenol (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
4-Nitrophenol (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	<4	<8	<16	-	-	-	-	µg/l	A-T-052w	
Butylbenzyl phthalate (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
Carbazole (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
Dibenzofuran (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
Diethyl phthalate (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
Dimethyl phthalate (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
n-Dibutylphthalate (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
n-Dioctylphthalate (leachable) <sub>A</sub>	<10	<20	<30	-	-	-	-	µg/l	A-T-052w	
Hexachlorobenzene (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	
Hexachlorobutadiene (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-	µg/l	A-T-052w	

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref		
Client Sample No												
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07					
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00					
Depth To Bottom												
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	1	4A	5	5	1	4	1					
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-				µg/l	A-T-052w
Hexachloroethane (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-		µg/l	A-T-052w		
Isophorone (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-		µg/l	A-T-052w		
Nitrobenzene (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-		µg/l	A-T-052w		
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-		µg/l	A-T-052w		
Pentachlorophenol (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-		µg/l	A-T-052w		
Perylene (leachable) <sub>A</sub>	<2	<4	<6	-	-	-	-		µg/l	A-T-052w		
Phenol (leachable) <sub>A</sub>	<2	<4	11	-	-	-	-		µg/l	A-T-052w		

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref
Client Sample No										
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07			
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00			
Depth To Bottom										
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	1	4A	5	5	1	4	1			
SVOC										
Hexachlorobenzene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Diethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Dimethyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Dibenzofuran <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Carbazole <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Butylbenzyl phthalate <sub>A</sub>	<100	<100	<100	<100	<100	169	<100		µg/kg	A-T-052s
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500	<500	<500	<500	<500	<500		µg/kg	A-T-052s
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
4-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
4-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
2-Nitrophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
2-Methylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
2-Chlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
2,6-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
2,4-Dinitrotoluene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
2,4-Dimethylphenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
2,4-Dichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
2-Chloronaphthalene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
2-Methylnaphthalene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Phenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Pentachlorophenol <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
n-Diethylphthalate <sub>A</sub>	<500	<500	<500	<500	<500	<500	<500		µg/kg	A-T-052s
n-Dibutylphthalate <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Nitrobenzene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Isophorone <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s
Hexachloroethane <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100		µg/kg	A-T-052s



Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref		
Client Sample No												
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07					
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00					
Depth To Bottom												
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	1	4A	5	5	1	4	1					
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100	<100	<100	<100	<100	<100				µg/kg	A-T-052s
Perylene <sub>A</sub>	<100	<100	<100	<100	<100	150	<100		µg/kg	A-T-052s		

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref
Client Sample No										
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07			
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00			
Depth To Bottom										
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	1	4A	5	5	1	4	1			
VOC										
Dichlorodifluoromethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Chloromethane <sub>A</sub>	<10	<10	<10	<10	<10	<10	<10		µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	2	<1		µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5	<5	<5	<5	<5	<5		µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5		µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2		µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10	<10	<10	<10	<10	<10		µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3	<3	<3	<3	<3	<3		µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref		
Client Sample No												
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07					
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00					
Depth To Bottom												
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	1	4A	5	5	1	4	1					
Chlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1				µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
Ethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
m & p Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
o-Xylene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
Styrene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
Bromoform <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
Isopropylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
1,1,1,2-Tetrachloroethane <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
1,2,3-Trichloropropane <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
Bromobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
n-Propylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
2-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
1,3,5-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
4-Chlorotoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
tert-Butylbenzene <sub>A</sub> <sup>#</sup>	<2	<2	<2	<2	<2	<2	<2		µg/kg	A-T-006s		
1,2,4-Trimethylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
sec-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
4-Isopropyltoluene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
1,3-Dichlorobenzene <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
1,4-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
n-Butylbenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
1,2-Dichlorobenzene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
1,2-Dibromo-3-chloropropane <sub>A</sub>	<2	<2	<2	<2	<2	<2	<2		µg/kg	A-T-006s		
1,2,4-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	<3	<3		µg/kg	A-T-006s		
Hexachlorobutadiene <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1	<1	<1		µg/kg	A-T-006s		
1,2,3-Trichlorobenzene <sub>A</sub>	<3	<3	<3	<3	<3	<3	<3		µg/kg	A-T-006s		

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref
Client Sample No										
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07			
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00			
Depth To Bottom										
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	1	4A	5	5	1	4	1			
TPH UKCWG (leachable)										
Ali >C5-C6 (leachable) <sub>A</sub>	<1	<1	-	-	-	-	-	µg/l	A-T-022w	
Ali >C6-C8 (leachable) <sub>A</sub>	<1	<1	<1	-	-	-	-	µg/l	A-T-022w	
Ali >C10-C12 (leachable) <sub>A</sub>	<10	<10	<10	-	-	-	-	µg/l	A-T-055w	
Ali >C12-C16 (leachable) <sub>A</sub>	<10	<10	15	-	-	-	-	µg/l	A-T-055w	
Ali >C16-C21 (leachable) <sub>A</sub>	<10	<10	24	-	-	-	-	µg/l	A-T-055w	
Ali >C21-C35 (leachable) <sub>A</sub>	<20	<20	54	-	-	-	-	µg/l	A-T-055w	
Ali >C35-C44 (leachable) <sub>A</sub>	<10	<10	<10	-	-	-	-	µg/l	A-T-055w	
Total Aliphatics (leachable) <sub>A</sub>	<10	<10	92	-	-	-	-	µg/l	A-T-055w	
Total Aliphatics >C5-C44 (leachable) <sub>A</sub>	<10	<10	94	-	-	-	-	µg/l	A-T-055w	
Aro >C5-C7 (leachable) <sub>A</sub>	<1	<1	<1	-	-	-	-	µg/l	A-T-022w	
Aro >C7-C8 (leachable) <sub>A</sub>	<1	<1	<1	-	-	-	-	µg/l	A-T-022w	
Aro >C8-C10 (leachable) <sub>A</sub>	<10	<10	18	-	-	-	-	µg/l	A-T-055w	
Aro >C10-C12 (leachable) <sub>A</sub>	<10	<10	<10	-	-	-	-	µg/l	A-T-055w	
Aro >C12-C16 (leachable) <sub>A</sub>	<10	<10	<10	-	-	-	-	µg/l	A-T-055w	
Aro >C16-C21 (leachable) <sub>A</sub>	<10	<10	<10	-	-	-	-	µg/l	A-T-055w	
Aro >C35-C44 (leachable) <sub>A</sub>	<10	<10	16	-	-	-	-	µg/l	A-T-055w	
Total Aromatics (leachable) <sub>A</sub>	<20	<20	<20	-	-	-	-	µg/l	A-T-055w	
Total Aromatics >C5-C44 (leachable) GCxGC <sub>A</sub>	<20	<20	34	-	-	-	-	µg/l	A-T-055w	
TPH (Ali & Aro >C5-C35) (leachable) <sub>A</sub>	<20	<20	111	-	-	-	-	µg/l	A-T-055w	
TPH (Ali & Aro >C5-C44) (leachable) <sub>A</sub>	<20	<20	129	-	-	-	-	µg/l	A-T-055w	
Ali >C8-C10 (leachable) <sub>A</sub>	<10	<10	<10	-	-	-	-	µg/l	A-T-055w	
BTEX - Benzene (leachable) <sub>A</sub>	<1	<1	<1	-	-	-	-	µg/l	A-T-022w	
BTEX - Toluene (leachable) <sub>A</sub>	<1	<1	<1	-	-	-	-	µg/l	A-T-022w	
BTEX - Ethyl Benzene (leachable) <sub>A</sub>	<1	<1	<1	-	-	-	-	µg/l	A-T-022w	
BTEX - o Xylene (leachable) <sub>A</sub>	<1	<1	<1	-	-	-	-	µg/l	A-T-022w	
BTEX - m & p Xylene (leachable) <sub>A</sub>	<1	<1	<1	-	-	-	-	µg/l	A-T-022w	
MTBE (leachable) <sub>A</sub>	<1	<1	<1	-	-	-	-	µg/l	A-T-022w	
Aro >C21-C35 (leachable) <sub>A</sub>	<20	<20	<20	-	-	-	-	µg/l	A-T-055w	

Envirolab Job Number: 18/05167

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05167/1	18/05167/2	18/05167/3	18/05167/4	18/05167/5	18/05167/6	18/05167/7		Units	Method ref
Client Sample No										
Client Sample ID	MB06	MB07	MB08	MB08	MB10	MB10	MB07			
Depth to Top	0.00	0.00	0.00	1.00	1.00	2.00	2.00			
Depth To Bottom										
Date Sampled	24-Jun-18	24-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	24-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	1	4A	5	5	1	4	1			
TPH UKCWG										
Ali >C5-C6 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s	
Ali >C6-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s	
Ali >C8-C10 <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-055s	
Ali >C10-C12 <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-055s	
Ali >C12-C16 <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-055s	
Ali >C16-C21 <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-055s	
Ali >C21-C35 <sub>A</sub> <sup>M#</sup>	<1	<1	<1	1	1	1	<1	mg/kg	A-T-055s	
Ali >C35-C44 <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-055s	
Total Aliphatics >C5-C35 <sub>A</sub> <sup>#</sup>	<1	<1	<1	1	1	2	<1	mg/kg	A-T-055s	
Total Aliphatics >C5-C44 <sub>A</sub>	<1	<1	<1	1	1	2	<1	mg/kg	A-T-055s	
Aro >C5-C7 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s	
Aro >C7-C8 <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s	
Aro >C8-C10 <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	4	<1	mg/kg	A-T-055s	
Aro >C10-C12 <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-055s	
Aro >C12-C16 <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	2	<1	mg/kg	A-T-055s	
Aro >C16-C21 <sub>A</sub> <sup>M#</sup>	<1	<1	<1	<1	<1	4	<1	mg/kg	A-T-055s	
Aro >C21-C35 <sub>A</sub> <sup>M#</sup>	1	2	3	2	4	16	<1	mg/kg	A-T-055s	
Aro >C35-C44 <sub>A</sub>	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-055s	
Total Aromatics >C5-C35 <sub>A</sub> <sup>#</sup>	1	2	3	2	4	26	<1	mg/kg	A-T-055s	
Total Aromatics >C5-C44 <sub>A</sub>	1	2	3	2	4	26	<1	mg/kg	A-T-055s	
TPH (Ali & Aro >C5-C35) <sub>A</sub> <sup>#</sup>	2	2	4	4	5	28	<1	mg/kg	A-T-055s	
TPH (Ali & Aro >C5-C44) <sub>A</sub>	2	2	4	4	5	28	<1	mg/kg	A-T-055s	
BTEX - Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s	
BTEX - Toluene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s	
BTEX - Ethyl Benzene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s	
BTEX - m & p Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s	
BTEX - o Xylene <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s	
MTBE <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s	

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If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

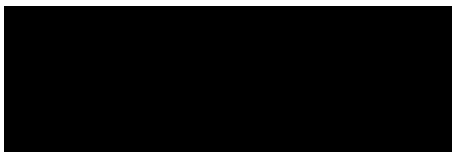
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05199  
**Issue Number:** 1  
**Date:** 11 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

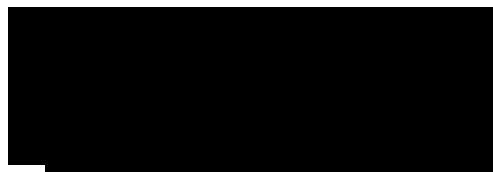
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 597526  
**Date Samples Received:** 29/06/18  
**Date Instructions Received:** 29/06/18  
**Date Analysis Completed:** 11/07/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



Richard Wong  
Client Manager



Envirolab Job Number: 18/05199

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05199/1	18/05199/2	18/05199/3	18/05199/4	18/05199/5	18/05199/6	18/05199/7	18/05199/8	Units	Method ref
Client Sample No	6	8	13	16	38	52	69	84		
Client Sample ID	MB01a	MB01a	MB01a	MB01a	MB01a	MB01a	MB01a	MB01a		
Depth to Top	2.00	2.30	3.50	4.30	10.00	14.30	20.00	25.00		
Depth To Bottom	2.45		4.00		10.45		20.45	25.45		
Date Sampled	19-Jun-18	19-Jun-18	19-Jun-18	19-Jun-18	19-Jun-18	19-Jun-18	19-Jun-18	19-Jun-18		
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D		
Sample Matrix Code	5	5	5	5	1	1	5	5		
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub> <sup>M#</sup>	8.49	-	-	8.49	8.37	8.29	8.26	8.16	pH	A-T-031s
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	2.35	-	-	1.97	<1.00	<1.00	<1.00	1.03	mg/l	A-T-033s
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1140	-	-	1500	1820	1760	1720	1460	mg/l	A-T-026s
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	168	-	-	184	202	203	245	210	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.04	-	-	0.04	0.04	0.05	0.07	0.06	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.02	-	-	0.02	0.01	0.05	0.23	0.24	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	44	-	-	82	135	138	97	69	mg/l	A-T-SOLMET5
Organic matter <sub>D</sub> <sup>M#</sup>	-	<0.1	0.1	-	-	-	-	-	% w/w	A-T-032 OM

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Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

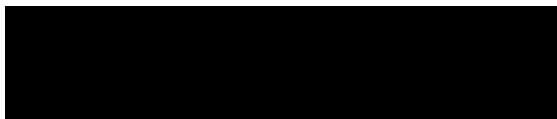
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05237  
**Issue Number:** 1 **Date:** 10 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 597752  
**Date Samples Received:** 02/07/18  
**Date Instructions Received:** 02/07/18  
**Date Analysis Completed:** 10/07/18

**Prepared by:**



Danielle Brierley  
Client Manager

**Approved by:**



John Gustafson  
Managing Director

Envirolab Job Number: 18/05237

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05237/1	18/05237/2	18/05237/3						Units	Method ref		
Client Sample No	5	9	44									
Client Sample ID	MB03	MB03	MB03									
Depth to Top	1.50	2.50	12.00									
Depth To Bottom	2.00	3.00	12.45									
Date Sampled	17-Jun-18	17-Jun-18	18-Jun-18									
Sample Type	Soil - B	Soil - B	Soil - D									
Sample Matrix Code	6A	4A	4A									
% Stones >10mm <sub>A</sub>	<0.1	2.0	<0.1								% w/w	A-T-044
pH BRE <sub>D</sub> <sup>M#</sup>	8.05	-	8.76						pH	A-T-031s		
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	2.32	-	<1.00						mg/l	A-T-033s		
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	3040	-	1580						mg/l	A-T-026s		
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	-	<0.4						mg/l	A-T-026s		
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	411	-	186						mg/l	A-T-026s		
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.12	-	0.05						% w/w	A-T-028s		
Sulphur BRE (total) <sub>D</sub>	0.07	-	0.02						% w/w	A-T-024s		
Magnesium BRE (water sol 2:1) <sub>D</sub>	182	-	118						mg/l	A-T-SOLMETS		
Organic matter <sub>D</sub> <sup>M#</sup>	-	0.3	-						% w/w	A-T-032 OM		

## **REPORT NOTES**

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A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

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Superscript "M" indicates method accredited to MCERTS.

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Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

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## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05294  
**Issue Number:** 1  
**Date:** 13 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

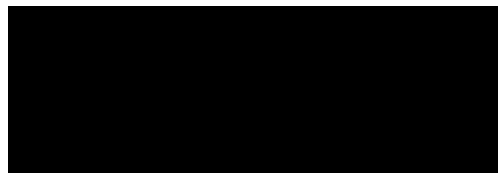
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 597948  
**Date Samples Received:** 03/07/18  
**Date Instructions Received:** 04/07/18  
**Date Analysis Completed:** 13/07/18

**Prepared by:**



Melanie Marshall  
Laboratory Coordinator

**Approved by:**



Richard Wong  
Client Manager

Envirolab Job Number: 18/05294

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05294/1	18/05294/2							Units	Method ref
Client Sample No	60	69								
Client Sample ID	MB03	MB03								
Depth to Top	17.30	20.70								
Depth To Bottom										
Date Sampled	18-Jun-18	18-Jun-18								
Sample Type	Soil - D	Soil - D								
Sample Matrix Code	1	1								
% Stones >10mm <sub>A</sub>	<0.1	<0.1						% w/w		
pH BRE <sub>D</sub> <sup>M#</sup>	7.63	7.44						pH	A-T-031s	
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	<1.00	1.48						mg/l	A-T-033s	
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1880	2830						mg/l	A-T-026s	
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4						mg/l	A-T-026s	
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	236	418						mg/l	A-T-026s	
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.06	0.13						% w/w	A-T-028s	
Sulphur BRE (total) <sub>D</sub>	0.08	0.38						% w/w	A-T-024s	
Magnesium BRE (water sol 2:1) <sub>D</sub>	146	147						mg/l	A-T-SOLMETs	



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### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

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NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

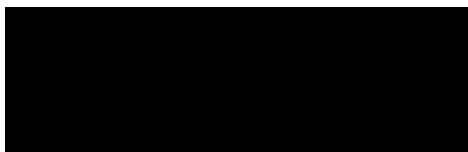
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05349  
**Issue Number:** 1  
**Date:** 13 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

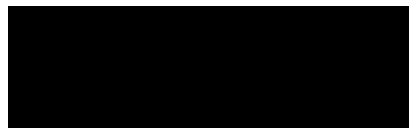
**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598202  
**Date Samples Received:** 05/07/18  
**Date Instructions Received:** 05/07/18  
**Date Analysis Completed:** 13/07/18

**Prepared by:**



Holly Neary-King  
Sales Executive

**Approved by:**



John Gustafson  
Managing Director

Envirolab Job Number: 18/05349

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05349/1	18/05349/2	18/05349/3	18/05349/4	18/05349/5	18/05349/6			Units	Method ref
Client Sample No	3	8	20	41	54	71				
Client Sample ID	MB05	MB05	MB05	MB05	MB05	MB05				
Depth to Top	1.00	2.00	5.00	12.00	16.30	22.30				
Depth To Bottom	1.45									
Date Sampled	20-Jun-18	20-Jun-18	20-Jun-18	20-Jun-18	20-Jun-18	20-Jun-18				
Sample Type	Soil - D	Soil - ES	Soil - ES	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	4	1	1	1	5	5				
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
pH BRE <sub>D</sub> <sup>M#</sup>	-	7.86	8.39	7.49	7.36	8.13			pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	-	<1.00	<1.00	<1.00	1.77	1.48			mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	1540	1740	3000	3170	2900			mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	-	<0.4	<0.4	<0.4	<0.4	<0.4			mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	159	181	293	477	410			mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	-	0.06	0.05	0.06	0.17	0.14			% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	-	0.03	0.02	0.02	0.17	0.54			% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	-	121	137	217	272	160			mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	1.0	-	-	-	-	-			% w/w	A-T-032 OM

## **REPORT NOTES**

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### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

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### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

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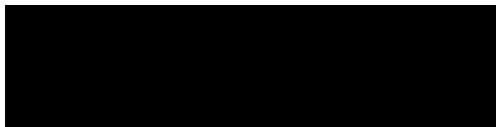
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05419  
**Issue Number:** 1  
**Date:** 16 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598399  
**Date Samples Received:** 06/07/18  
**Date Instructions Received:** 06/07/18  
**Date Analysis Completed:** 16/07/18

**Prepared by:**



Kate Keningale  
Sales Executive

**Approved by:**



Danielle Brierley  
Client Manager

Envirolab Job Number: 18/05419

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05419/1	18/05419/2	18/05419/3	18/05419/4	18/05419/5	18/05419/6	18/05419/7	18/05419/8	Units	Method ref
Client Sample No	4	5	3	9	20	36	56	67		
Client Sample ID	MB06	MB06	MB06	MB06	MB06	MB06	MB06	MB06		
Depth to Top	1.00	1.30	1.45	2.30	5.00	10.00	16.50	20.30		
Depth To Bottom							17.00			
Date Sampled	24-Jun-18	24-Jun-18	24-Jun-18	24-Jun-18	24-Jun-18	24-Jun-18	24-Jun-18	24-Jun-18		
Sample Type	Soil - ES	Soil - D	Soil - D	Soil - D	Soil - ES	Soil - ES	Soil - B	Soil - D		
Sample Matrix Code	4	4	4	4A	5	1	5	1		
% Stones >10mm <sub>A</sub>	0.2	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1		
pH BRE <sub>D</sub> <sup>M#</sup>	7.04	-	-	-	8.36	8.48	7.78	7.89	pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	<1.00	-	-	-	16.8	1.35	<1.00	<1.00	mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1420	-	-	-	1040	1790	1630	2430	mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	-	-	-	0.6	<0.4	<0.4	<0.4	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	165	-	-	-	130	175	253	273	mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.06	-	-	-	0.05	0.04	0.07	0.08	% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.06	-	-	-	0.03	0.01	0.31	0.15	% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	105	-	-	-	31	133	119	186	mg/l	A-T-SOLMETs
Organic matter <sub>D</sub> <sup>M#</sup>	-	1.5	0.3	0.6	-	-	-	-	% w/w	A-T-032 OM

Envirolab Job Number: 18/05419/9

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05419/9								Units	Method ref
Client Sample No	79									
Client Sample ID	MB06									
Depth to Top	24.30									
Depth To Bottom										
Date Sampled	25-Jun-18									
Sample Type	Soil - D									
Sample Matrix Code	5									
% Stones >10mm <sub>A</sub>	<0.1								% w/w	A-T-044
pH BRE <sub>D</sub> <sup>MF</sup>	7.65								pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	2.19								mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>MF</sup>	3100								mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	0.9								mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>MF</sup>	455								mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>MF</sup>	0.13								% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.21								% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	106								mg/l	A-T-SOLMETS



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Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

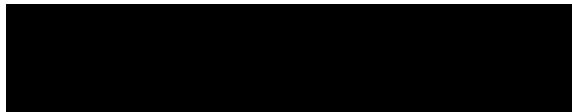
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05501  
**Issue Number:** 1  
**Date:** 20 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

**Project Manager:** Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598647  
**Date Samples Received:** 05/07/18  
**Date Instructions Received:** 10/07/18  
**Date Analysis Completed:** 20/07/18

**Prepared by:**



Danielle Brierley  
Client Manager

**Approved by:**



John Gustafson  
Managing Director



Envirolab Job Number: 18/05501

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05501/1	18/05501/2							Units	Method ref
Client Sample No	1	12								
Client Sample ID	MB09	MB09								
Depth to Top	0.00	3.00								
Depth To Bottom										
Date Sampled	02-Jul-18	02-Jul-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	4A								
Chromium (leachable) <sub>A</sub> <sup>#</sup>	<1	2						µg/l	A-T-025w	
Chromium (hexavalent) (leachable) <sub>A</sub>	<0.05	<0.05						mg/l	A-T-040w	
Lead (leachable) <sub>A</sub> <sup>#</sup>	<1	4						µg/l	A-T-025w	
Mercury (leachable) <sub>A</sub> <sup>#</sup>	<0.1	<0.1						µg/l	A-T-025w	
Nickel (leachable) <sub>A</sub> <sup>#</sup>	<1	1						µg/l	A-T-025w	
Selenium (leachable) <sub>A</sub> <sup>#</sup>	<1	<1						µg/l	A-T-025w	
Sulphur (elemental/free) (leachable) <sub>A</sub>	<0.1	<0.1						mg/l	A-T-029w	
Zinc (leachable) <sub>A</sub> <sup>#</sup>	1	7						µg/l	A-T-025w	

Envirolab Job Number: 18/05501

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05501/1	18/05501/2							Units	Method ref		
Client Sample No	1	12										
Client Sample ID	MB09	MB09										
Depth to Top	0.00	3.00										
Depth To Bottom												
Date Sampled	02-Jul-18	02-Jul-18										
Sample Type	Soil - ES	Soil - ES										
Sample Matrix Code	1A	4A										
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sup>#</sup>	NAD	-								A-T-045		
Asbestos ACM - Suitable for Water Absorption Test?	N/A	-										

Envirolab Job Number: 18/05501

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05501/1	18/05501/2								
Client Sample No	1	12								
Client Sample ID	MB09	MB09								
Depth to Top	0.00	3.00								
Depth To Bottom										
Date Sampled	02-Jul-18	02-Jul-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	4A								
PAH-16MS										
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01							mg/kg	A-T-019s
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	<0.02							mg/kg	A-T-019s
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04							mg/kg	A-T-019s
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04							mg/kg	A-T-019s
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05							mg/kg	A-T-019s
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	<0.05	<0.05							mg/kg	A-T-019s
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07							mg/kg	A-T-019s
Chrysene <sub>A</sub> <sup>M#</sup>	<0.06	<0.06							mg/kg	A-T-019s
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	<0.08							mg/kg	A-T-019s
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	<0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03							mg/kg	A-T-019s
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	0.11							mg/kg	A-T-019s
Pyrene <sub>A</sub> <sup>M#</sup>	<0.07	<0.07							mg/kg	A-T-019s
Total PAH-16MS <sub>A</sub> <sup>M#</sup>	<0.08	0.11							mg/kg	A-T-019s





Envirolab Job Number: 18/05501

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05501/1	18/05501/2							Units	Method ref
Client Sample No	1	12								
Client Sample ID	MB09	MB09								
Depth to Top	0.00	3.00								
Depth To Bottom										
Date Sampled	02-Jul-18	02-Jul-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	4A								
Speciated PCB-EC7										
PCB BZ 28 <sub>A</sub> <sup>M#</sup>	-	<0.002							mg/kg	A-T-004s
PCB BZ 52 <sub>A</sub> <sup>M#</sup>	-	<0.002							mg/kg	A-T-004s
PCB BZ 101 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
PCB BZ 118 <sub>A</sub> <sup>M#</sup>	<0.007	<0.007							mg/kg	A-T-004s
PCB BZ 138 <sub>A</sub> <sup>M#</sup>	-	<0.006							mg/kg	A-T-004s
PCB BZ 153 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
PCB BZ 180 <sub>A</sub> <sup>M#</sup>	-	<0.004							mg/kg	A-T-004s
Total Speciated PCB-EC7 <sub>A</sub> <sup>M#</sup>	-	<0.007							mg/kg	A-T-004s

Envirolab Job Number: 18/05501

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05501/1	18/05501/2							Units	Method ref		
Client Sample No	1	12										
Client Sample ID	MB09	MB09										
Depth to Top	0.00	3.00										
Depth To Bottom												
Date Sampled	02-Jul-18	02-Jul-18										
Sample Type	Soil - ES	Soil - ES										
Sample Matrix Code	1A	4A										
<b>Speciated PCB-WHO12</b>												
PCB BZ 81 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s		
PCB BZ 105 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s		
PCB BZ 114 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s		
PCB BZ 123 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s		
PCB BZ 126 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s		
PCB BZ 156 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s		
PCB BZ 157 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s		
PCB BZ 167 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s		
PCB BZ 169 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s		
PCB BZ 189 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s		
PCB BZ 77 <sub>A</sub>	<0.005	-							mg/kg	A-T-004s		
Total Speciated PCB-WHO12 <sub>A</sub>	<0.007	-							mg/kg	A-T-004s		

Envirolab Job Number: 18/05501

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05501/1	18/05501/2								Units	Method ref
Client Sample No	1	12									
Client Sample ID	MB09	MB09									
Depth to Top	0.00	3.00									
Depth To Bottom											
Date Sampled	02-Jul-18	02-Jul-18									
Sample Type	Soil - ES	Soil - ES									
Sample Matrix Code	1A	4A									
SVOC excluding PAH-16 (leachable)											
1,2,4-Trichlorobenzene SVOC (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
1,2-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
1,3-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
1,4-Dichlorobenzene SVOC (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
2,4,5-Trichlorophenol (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
2,4,6-Trichlorophenol (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
2,4-Dichlorophenol (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
2,4-Dimethylphenol (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
2,4-Dinitrotoluene (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
2,6-Dinitrotoluene (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
2-Chloronaphthalene (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
2-Chlorophenol (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
2-Methylnaphthalene (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
2-Methylphenol (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
2-Nitrophenol (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
4-Bromophenyl phenyl ether (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
4-Chloro-3-methylphenol (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
4-Methylphenol (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
4-Nitrophenol (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
Bis(2-chloroethoxy)methane (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
Bis(2-chloroethyl)ether (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
Bis(2-chloroisopropyl)ether (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate (leachable) <sub>A</sub>	<4	<4								µg/l	A-T-052w
Butylbenzyl phthalate (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
Carbazole (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
Dibenzofuran (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
Diethyl phthalate (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
Dimethyl phthalate (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
n-Dibutylphthalate (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
n-Dioctylphthalate (leachable) <sub>A</sub>	<10	<10								µg/l	A-T-052w
Hexachlorobenzene (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w
Hexachlorobutadiene (leachable) <sub>A</sub>	<2	<2								µg/l	A-T-052w

Envirolab Job Number: 18/05501

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05501/1	18/05501/2							Units	Method ref
Client Sample No	1	12								
Client Sample ID	MB09	MB09								
Depth to Top	0.00	3.00								
Depth To Bottom										
Date Sampled	02-Jul-18	02-Jul-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	4A								
Hexachlorocyclopentadiene (leachable) <sub>A</sub>	<2	<2						µg/l		
Hexachloroethane (leachable) <sub>A</sub>	<2	<2						µg/l	A-T-052w	
Isophorone (leachable) <sub>A</sub>	<2	<2						µg/l	A-T-052w	
Nitrobenzene (leachable) <sub>A</sub>	<2	<2						µg/l	A-T-052w	
n-Nitroso-n-dipropylamine (leachable) <sub>A</sub>	<2	<2						µg/l	A-T-052w	
Pentachlorophenol (leachable) <sub>A</sub>	<2	<2						µg/l	A-T-052w	
Perylene (leachable) <sub>A</sub>	<2	<2						µg/l	A-T-052w	
Phenol (leachable) <sub>A</sub>	3	<2						µg/l	A-T-052w	

Envirolab Job Number: 18/05501

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05501/1	18/05501/2							Units	Method ref		
Client Sample No	1	12										
Client Sample ID	MB09	MB09										
Depth to Top	0.00	3.00										
Depth To Bottom												
Date Sampled	02-Jul-18	02-Jul-18										
Sample Type	Soil - ES	Soil - ES										
Sample Matrix Code	1A	4A										
SVOC												
Hexachlorobenzene <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Diethyl phthalate <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Dimethyl phthalate <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Dibenzofuran <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Carbazole <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Butylbenzyl phthalate <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Bis(2-ethylhexyl)phthalate <sub>A</sub>	<500	<500							µg/kg	A-T-052s		
Bis(2-chloroethoxy)methane <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Bis(2-chloroethyl)ether <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
4-Nitrophenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
4-Methylphenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
4-Chloro-3-methylphenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
2-Nitrophenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
2-Methylphenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
2-Chlorophenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
2,6-Dinitrotoluene <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
2,4-Dinitrotoluene <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
2,4-Dimethylphenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
2,4-Dichlorophenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
2,4,6-Trichlorophenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
2,4,5-Trichlorophenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
2-Chloronaphthalene <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
2-Methylnaphthalene <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Bis(2-chloroisopropyl)ether <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Phenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Pentachlorophenol <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
n-Nitroso-n-dipropylamine <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
n-Diethylphthalate <sub>A</sub>	<500	<500							µg/kg	A-T-052s		
n-Dibutylphthalate <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Nitrobenzene <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Isophorone <sub>A</sub>	<100	<100							µg/kg	A-T-052s		
Hexachloroethane <sub>A</sub>	<100	<100							µg/kg	A-T-052s		

Envirolab Job Number: 18/05501

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05501/1	18/05501/2							Units	Method ref
Client Sample No	1	12								
Client Sample ID	MB09	MB09								
Depth to Top	0.00	3.00								
Depth To Bottom										
Date Sampled	02-Jul-18	02-Jul-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	1A	4A								
Hexachlorocyclopentadiene <sub>A</sub>	<100	<100						µg/kg	A-T-052s	
Perylene <sub>A</sub>	<100	<100						µg/kg	A-T-052s	

Envirolab Job Number: 18/05501

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05501/1	18/05501/2											Units	Method ref
Client Sample No	1	12												
Client Sample ID	MB09	MB09												
Depth to Top	0.00	3.00												
Depth To Bottom														
Date Sampled	02-Jul-18	02-Jul-18												
Sample Type	Soil - ES	Soil - ES												
Sample Matrix Code	1A	4A												
VOC														
Dichlorodifluoromethane <sub>A</sub>	<1	<1											µg/kg	A-T-006s
Chloromethane <sub>A</sub>	<10	<10											µg/kg	A-T-006s
Vinyl Chloride <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Bromomethane <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Chloroethane <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Trichlorofluoromethane <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
1,1-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Carbon Disulphide <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Dichloromethane <sub>A</sub>	<5	<5											µg/kg	A-T-006s
trans 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
1,1-Dichloroethane <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
cis 1,2-Dichloroethene <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
2,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Bromochloromethane <sub>A</sub> <sup>#</sup>	<5	<5											µg/kg	A-T-006s
Chloroform <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
1,1,1-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
1,1-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Carbon Tetrachloride <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
1,2-Dichloroethane <sub>A</sub> <sup>#</sup>	<2	<2											µg/kg	A-T-006s
Benzene <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Trichloroethene <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
1,2-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Dibromomethane <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Bromodichloromethane <sub>A</sub> <sup>#</sup>	<10	<10											µg/kg	A-T-006s
cis 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Toluene <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
trans 1,3-Dichloropropene <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
1,1,2-Trichloroethane <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
1,3-Dichloropropane <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Tetrachloroethene <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s
Dibromochloromethane <sub>A</sub> <sup>#</sup>	<3	<3											µg/kg	A-T-006s
1,2-Dibromoethane <sub>A</sub> <sup>#</sup>	<1	<1											µg/kg	A-T-006s









## **REPORT NOTES**

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For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

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Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

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Subscript "A" indicates analysis performed on the sample as received.

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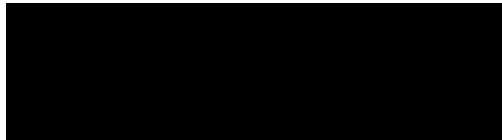
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05525  
**Issue Number:** 1  
**Date:** 20 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

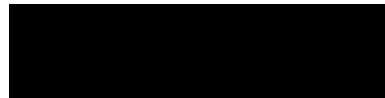
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598804  
**Date Samples Received:** 26/06/18  
**Date Instructions Received:** 11/07/18  
**Date Analysis Completed:** 20/07/18

**Prepared by:**



Kate Keningale  
Sales Executive

**Approved by:**



John Gustafson  
Managing Director

Envirolab Job Number: 18/05525

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05525/1	18/05525/2	18/05525/3	18/05525/4	18/05525/5	18/05525/6			Units	Method ref
Client Sample No	9	14	46	59	65	70				
Client Sample ID	MB08	MB08	MB08	MB08	MB08	MB08				
Depth to Top	2.00	3.30	10.00	18.00	20.60	22.60				
Depth To Bottom										
Date Sampled	21-Jun-18	21-Jun-18	25-Jun-18	22-Jun-18	22-Jun-18	22-Jun-18				
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	1A	1A	1	1	4	4				
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
pH BRE <sub>D</sub> <sup>M#</sup>	8.77	-	8.69	8.61	8.26	8.06			pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	2.06	-	<1.00	<1.00	<1.00	2.23			mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1690	-	2220	1860	2400	1570			mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	1.6	-	1.9	1.5	1.2	1.0			mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	203	-	236	218	572	362			mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.04	-	0.04	0.05	0.14	0.12			% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.03	-	0.02	0.07	0.46	0.45			% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	107	-	161	134	146	67			mg/l	A-T-SOLMETS
Organic matter <sub>D</sub> <sup>M#</sup>	-	0.2	-	-	-	-			% w/w	A-T-032 OM

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For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

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Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

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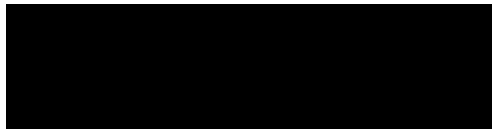
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05528  
**Issue Number:** 1 **Date:** 20 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

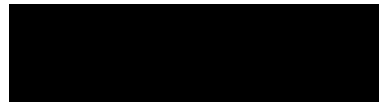
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598805  
**Date Samples Received:** 25/06/18  
**Date Instructions Received:** 11/07/18  
**Date Analysis Completed:** 20/07/18

**Prepared by:**



Kate Keningale  
Sales Executive

**Approved by:**



John Gustafson  
Managing Director

Envirolab Job Number: 18/05528

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05528/1	18/05528/2	18/05528/3	18/05528/4	18/05528/5	18/05528/6	18/05528/7		Units	Method ref
Client Sample No	45	4	7	8	23	59	67			
Client Sample ID	MB10	MB10	MB10	MB10	MB10	MB10	MB10			
Depth to Top	0.00	1.30	2.00	2.30	6.30	18.80	22.00			
Depth To Bottom										
Date Sampled	26-Jun-18	22-Jun-18	22-Jun-18	22-Jun-18	23-Jun-18	23-Jun-18	23-Jun-18			
Sample Type	Soil - ES	Soil - D	Soil - D	Soil - D	Soil - D	Soil - ES	Soil - ES			
Sample Matrix Code	5	1	4	4AE	1	1	5			
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
pH BRE <sub>D</sub> <sup>M#</sup>	8.21	-	8.43	-	8.80	8.52	7.83		pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	1.29	-	<1.00	-	<1.00	<1.00	1.29		mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	2380	-	1610	-	2040	1670	2730		mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	1.2	-	1.4	-	1.7	1.4	0.4		mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	328	-	219	-	209	176	508		mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.16	-	0.12	-	0.05	0.06	0.22		% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.09	-	0.05	-	0.01	0.05	0.65		% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	174	-	136	-	151	138	150		mg/l	A-T-SOLMETs
Organic matter <sub>D</sub> <sup>M#</sup>	-	0.2	-	0.4	-	-	-		% w/w	A-T-032 OM

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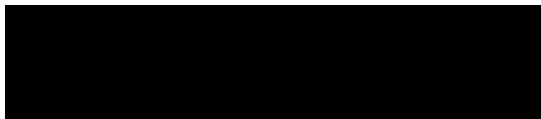
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05529  
**Issue Number:** 1 **Date:** 20 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

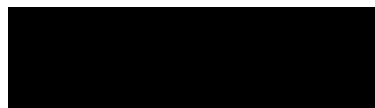
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598787  
**Date Samples Received:** 06/07/18  
**Date Instructions Received:** 11/07/18  
**Date Analysis Completed:** 20/07/18

**Prepared by:**



Danielle Brierley  
Client Manager

**Approved by:**



John Gustafson  
Managing Director

Envirolab Job Number: 18/05529

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05529/1	18/05529/2	18/05529/3	18/05529/4	18/05529/5	18/05529/6	18/05529/7		Units	Method ref
Client Sample No	9	37	56	71	91	108	114			
Client Sample ID	MB07	MB07	MB07	MB07	MB07	MB07	MB07			
Depth to Top	2.00	10.00	16.30	21.30	29.30	36.00	38.60			
Depth To Bottom						36.45				
Date Sampled	25-Jun-18	25-Jun-18	25-Jun-18	26-Jun-18	26-Jun-18	26-Jun-18	26-Jun-18			
Sample Type	Soil - ES	Soil - ES	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D			
Sample Matrix Code	1	1	1A	1	1	1	3			
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
pH BRE <sub>D</sub> <sup>M#</sup>	8.50	8.59	8.45	8.50	7.84	8.33	8.37		pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	5.55	<1.00	1.13	1.23	<1.00	<1.00	5.97		mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1400	1750	1800	2040	1690	1870	2140		mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4		mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	176	185	230	244	239	385	845		mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.05	0.04	0.09	0.08	0.09	0.18	0.35		% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.02	0.01	0.10	0.15	0.14	0.31	1.61		% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	104	132	130	105	117	142	107		mg/l	A-T-SOLMETS

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Please contact us if you need any further information.

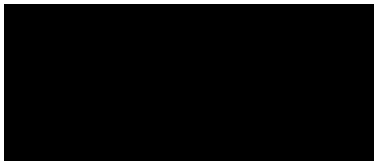
## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 18/05561  
**Issue Number:** 1  
**Date:** 20 July, 2018

**Client:** Norfolk Partnership Laboratory  
Environment, Transport and Development Department  
Norfolk County Council  
County Hall  
Norwich  
Norfolk  
NR1 2SG

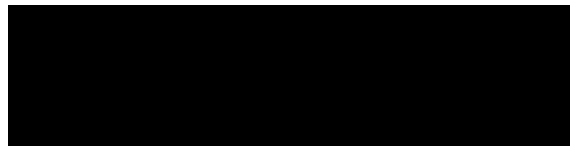
**Project Manager:** Scott Viner/Sharon Woods; Simon Holden  
**Project Name:** Gt Yarmouth 3rd River Crossing  
**Project Ref:** PZ1522D1  
**Order No:** 598960  
**Date Samples Received:** 05/07/18  
**Date Instructions Received:** 12/07/18  
**Date Analysis Completed:** 20/07/18

**Prepared by:**



Georgia King  
Admin & Client Services Supervisor

**Approved by:**



Danielle Brierley  
Client Manager



Envirolab Job Number: 18/05561

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05561/1	18/05561/2	18/05561/3	18/05561/4	18/05561/5	18/05561/6	18/05561/7	18/05561/8	Units	Method ref		
Client Sample No	4	9	16	20	36	49	58	72				
Client Sample ID	MB09	MB09	MB09	MB09	MB09	MB09	MB09	MB09				
Depth to Top	1.00	2.30	4.30	5.00	10.00	14.30	17.30	23.50				
Depth To Bottom								24.00				
Date Sampled	02-Jul-18	02-Jul-18	02-Jul-18	02-Jul-18	03-Jul-18	03-Jul-18	03-Jul-18	04-Jul-18				
Sample Type	Soil - ES	Soil - D	Soil - D	Soil - ES	Soil - ES	Soil - D	Soil - D	Soil - D				
Sample Matrix Code	4A	4	1	1A	1	1	1	3				
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			% w/w	A-T-044
pH BRE <sub>D</sub> <sup>M#</sup>	8.44	-	-	8.47	8.59	8.36	8.25	7.61	pH	A-T-031s		
Ammonium NH <sub>4</sub> BRE (water sol 2:1) <sub>D</sub>	1.61	-	-	2.55	<1.00	<1.00	<1.00	1.87	mg/l	A-T-033s		
Chloride BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1460	-	-	1450	2010	1500	1460	3350	mg/l	A-T-026s		
Nitrate BRE, SO <sub>4</sub> equiv. (water sol 2:1) <sub>D</sub>	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	mg/l	A-T-026s		
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	198	-	-	198	243	226	186	576	mg/l	A-T-026s		
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.09	-	-	0.07	0.06	0.07	0.05	0.16	% w/w	A-T-028s		
Sulphur BRE (total) <sub>D</sub>	0.04	-	-	0.04	0.02	0.05	0.05	0.28	% w/w	A-T-024s		
Magnesium BRE (water sol 2:1) <sub>D</sub>	107	-	-	96	171	127	122	186	mg/l	A-T-SOLMETs		
Organic matter <sub>D</sub> <sup>M#</sup>	-	0.4	0.3	-	-	-	-	-	% w/w	A-T-032 OM		

Envirolab Job Number: 18/05561

Client Project Name: Gt Yarmouth 3rd River Crossing

Client Project Ref: PZ1522D1

Lab Sample ID	18/05561/9	18/05561/10	18/05561/11						Units	Method ref
Client Sample No	86	106	112							
Client Sample ID	MB09	MB09	MB09							
Depth to Top	29.30	37.30	38.50							
Depth To Bottom			40.00							
Date Sampled	04-Jul-18	04-Jul-18	04-Jul-18							
Sample Type	Soil - D	Soil - D	Soil - B							
Sample Matrix Code	1	1	3							
% Stones >10mm <sub>A</sub>	<0.1	<0.1	<0.1							
pH BRE <sub>D</sub> <sup>M#</sup>	8.03	8.09	8.44						pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1) <sub>D</sub>	<1.00	<1.00	5.00						mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1) <sub>D</sub> <sup>M#</sup>	1550	1640	1140						mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) <sub>D</sub>	<0.4	<0.4	<0.4						mg/l	A-T-026s
Sulphate BRE (water sol 2:1) <sub>D</sub> <sup>M#</sup>	283	255	286						mg/l	A-T-026s
Sulphate BRE (acid sol) <sub>D</sub> <sup>M#</sup>	0.11	0.18	0.25						% w/w	A-T-028s
Sulphur BRE (total) <sub>D</sub>	0.32	0.37	0.42						% w/w	A-T-024s
Magnesium BRE (water sol 2:1) <sub>D</sub>	107	128	71						mg/l	A-T-SOLMETs

## **REPORT NOTES**

### **General:**

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **Soil chemical analysis:**

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

### **TPH analysis of water by method A-T-007:**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Electrical Conductivity of water by Method A-T-037:**

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

### **Asbestos:**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

### **Key:**

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



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## Annex D: Human Health Risk Assessment Background Information

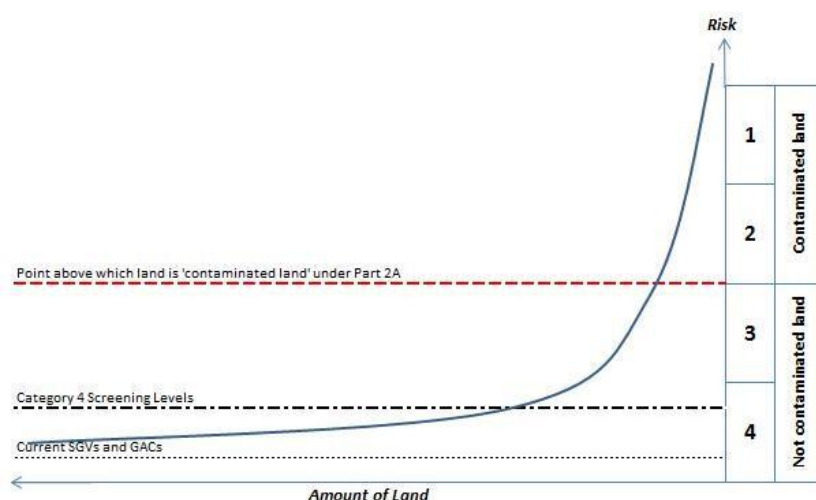
# METHODOLOGY FOR THE DERIVATION OF GENERIC QUANTITATIVE ASSESSMENT CRITERIA TO EVALUATE RISKS TO HUMAN HEALTH FROM SOIL & GROUNDWATER CONTAMINATION

## UK APPROACH

In the UK, the potential risks to human health from contamination in the ground are usually evaluated through a generic quantitative risk assessment (GQRA) approach. This allows generic and conservative exposure assumptions to be readily applied to risk assessments and can be a useful tool for rapidly screening data and to identify those contaminants or scenarios that could benefit from further investigation and/or site-specific detailed quantitative risk assessment (DQRA). Current industry good practice is to use the approach presented in the Environment Agency (EA) publications SR2<sup>1</sup> and SR3<sup>2</sup>. This approach allows the derivation of Generic Assessment Criteria (GACs), primarily for chronic exposure.

In April 2012, the Department of Environment, Food and Rural Affairs (Defra) published updated statutory guidance<sup>3</sup> which introduced a four category approach to determining whether land in England and Wales is contaminated or not on the grounds of significant possibility of significant harm (SPOSH). **Figure 1** presents a graphical representation of the categories.

**Figure 1: Four Categories for Determining if Land Represent a SPOSH**



Cases classified as Category 1 are considered to be SPOSH based on actual evidence or an unacceptably high probability of harm existing. Category 4 cases are those where there is no risk, or a low risk of SPOSH.

<sup>1</sup> Environment Agency 'Human Health Toxicological Assessment of Contaminants in Soil', Report SC050021/SR2. January 2009.

<sup>2</sup> Environment Agency 'Updated Technical Background to the CLEA Model,' Report SC050021/SR3. January 2009.

<sup>3</sup> Defra 'Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance'. April 2012.

GACs represent a minimal risk level, well within Category 4. A 2014 publication by Contaminated Land: Applications in Real Environments (CL:AIRE), SP1010<sup>4</sup> and endorsed by Defra<sup>5</sup> provided an approach to determine Category 4 Screening Levels (C4SLs) which are higher than the GACs whilst being “more pragmatic but still strongly precautionary”. It also provided C4SLs for six contaminants of concern. Although the C4SLs were designed to support Part 2A assessments to determine ‘contaminated land’ they are specifically mentioned, along with reference to the Part 2A statutory guidance, by the Department for Communities and Local Government (DCLG) for use in a planning context<sup>6</sup>.

An updated version the Contaminated Land Exposure Assessment (CLEA) Workbook (v1.071) was released by the EA in September 2015 to take into account the publication of SP1010. The updates comprised: additional toxicity data for the six chemicals for which C4SLs were derived; two new public open space land use scenarios; updated exposure parameters; options to run the model using C4SL exposure assumptions; and increased functionality. There were no changes to algorithms, so it is still possible to replicate the withdrawn SGVs using the input parameters held within v1.071.

It should be noted that the four category approach has not been adopted in Scotland under Part 2A or the planning regime. The Part 2A statutory guidance applicable in Scotland (Paper SE/2006/44 dated May 2006) does not reflect the changes introduced by Defra in April 2012 which allow for the use of C4SLs within Part 2A risk assessments. Additionally, it is considered that the principal of ‘minimal risk’ should still apply under planning in Scotland, based on current guidance.

## WSP APPROACH

Following the withdrawal of the SGVs, and in the absence of an industry-wide, accepted set of GACs it is down to individual practitioners to derive their own soil assessment criteria. WSP has used the approach provided within SR2, SR3, SP1010, CLEA Workbook v1.071 and SR4<sup>7</sup> to produce a set of minimal risk GACs. The chemical-specific data within two key publications were considered during their production: CL:AIRE 2010<sup>8</sup> and LQM 2015<sup>9</sup>. Both documents provide comprehensive sets of GACs for different contaminants of concern.

The LQM Suitable For Use Levels (S4ULs) have selected exposure parameters somewhere between those of the SR3 land uses and the C4SL exposure scenarios. This approach was rejected by WSP as not representing minimal risk, however, the LQM S4UL document was critically reviewed and the approach and chemical input parameters were utilised where considered to be appropriate.

An industry-led C4SL Working Group is in the process of deriving a larger set of C4SLs in the near future, for approximately 20 contaminants. This will include a critical review of the chemical input data for all selected substances, and may therefore lead to further amendments to the chemical input data used in the WSP in-house screening values. It is considered likely that the contaminant list will

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<sup>4</sup> CL:AIRE ‘Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination’ SP1010, Final Project Report (Revision 2). September 2014.

<sup>5</sup> Defra ‘SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document’. December 2014.

<sup>6</sup> DCLG Planning Practice Guidance ‘Land Affected by Contamination’, particularly Paragraphs 001 and 007. Ref IDs: 33-001-20140306 & 33-007-20140612.

<sup>7</sup> Environment Agency ‘CLEA Software (Version 1.05) Handbook (and Software)’, Report SC050021/SR4. September 2009.

<sup>8</sup> CL:AIRE ‘The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment’. ISBN 978-1-05046-20-1. January 2010.

<sup>9</sup> Nathanail et al ‘The LQM/CIEH S4ULs for Human Health Risk Assessment’, Land Quality Press, ISBN 978-0-9931084-0-2. 2015.



crossover with the current CL:AIRE GACs. As such, this document was not critically reviewed by WSP.

WSP's current approach to the assessment of risks to human health is to continue to evaluate minimal risk through the use of in-house derived GACs, and to use the published C4SLs as a secondary tier of assessment until such time as additional C4SLs are published and/or in-house values are derived.

## EXPOSURE MODELS

### LAND USES

WSP has largely adopted the exposure assumptions of the generic land use scenarios included within SR3, with two additional public open space scenarios included from within SP1010:

- à Residential with homegrown produce consumption;
- à Residential without homegrown produce consumption;
- à Allotments;
- à Commercial;
- à Public open space near residential housing (POS<sub>resi</sub>); and
- à Public park (POS<sub>park</sub>).

Exceptions are described in the following Sections.

### SOIL PROPERTIES

SR3 assumes a sandy loam soil with a pH of 7 and a Soil Organic Matter (SOM) content of 6% for its generic land uses, based on the geographical spread of topsoils in the UK. WSP has adopted these default values. In addition, GACs based on an SOM of 1% and 2.5% have been derived, based on common experience of the nature of Made Ground and lack of topsoil on many brownfield sites.

### RECEPTOR CHARACTERISTICS AND BEHAVIOURS

SP1010 provides some updated exposure parameters for long-term inhalation rates<sup>10</sup> and the consumption rates for homegrown produce<sup>11</sup> compared to those provided in SR3. This data was used to derive WSP's GACs.

The changes in inhalation rates do not apply to the allotment generic land use scenario, as these are based on the breathing rates for short-term exposure of light to moderate intensity activity which were derived from a study that was not updated in USEPA 2011, so the SR3 rates were retained.

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<sup>10</sup> USEPA, National Centre for Environmental Assessment 'Exposure Factors Handbook: 2011 Edition' EPA/600/R-09/052F. September 2011.

<sup>11</sup> National Diet and Nutrition Survey 2008/2009 to 2010/2011.

## CHEMICAL DATA

### PHYSICO-CHEMICAL PARAMETERS

Physico-chemical properties for the contaminants for which GACs have been derived have been obtained following critical review of the following hierarchy of data sources:

1. Environment Agency/Defra SGV reports where available.
2. Environment Agency 'Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values', Report SC050021/SR7, November 2008.
3. Published fate and transport reviews within Nathanail et. al 2015 and CL:AIRE 2010.

Where appropriate, and where sufficient data is available, values were adjusted to reflect a UK soil temperature of 10°C (e.g.  $K_{aw}$ ).

### TOXICOLOGICAL DATA

Toxicological data for the derivation of minimal risk Health Criteria Values (HCV) for each contaminant was selected with due regard to the approach presented in SR2. Where appropriate, the following hierarchy of data sources was used:

1. UK toxicity reviews published by authoritative bodies including:
  - < EA;
  - < Public Health England (PHE);
  - < Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT); and
  - < Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC).
2. Authoritative European sources such as European Food Standards Agency (EFSA)
3. International organisations including:
  - < World Health Organisation (WHO); and
  - < Joint FAO/WHO Expert Committee on Food Additives (JECFA).
4. Authoritative country-specific sources including:
  - < United States Environmental Protection Agency (USEPA);
  - < US Agency for Toxic Substances and Disease Registry (ATSDR);
  - < US Integrated Risk Information System (IRIS); and
  - < Netherlands National Institute for Public Health and the Environment (RIVM).

Factors such as the applicability of the data to human health (e.g. epidemiological vs. animal studies), the quality of the data, the level of uncertainty in the results and the age of the data were also taken into account in the final selection. Details for specific substances are available on request.

## MEAN DAILY INTAKES

Estimations of background exposure for each threshold substance have been updated. In line with the SR2 approach, the exposure from non-threshold substances in the soil does not take into account exposure from other sources, and as such GACs were derived without consideration of the Mean Daily Intake (MDI) for those substances.

The data published by the EA in its series of TOX reports between 2002 and 2009 was evaluated to determine whether the values were considered to remain valid today. Values from these current UK published sources were not amended unless they were considered to be significantly different so that the GACs remained as comparable as possible with the revoked SGVs.

## ORAL MEAN DAILY INTAKES

Oral MDI were generally estimated as the sum of exposure via the ingestion of food and drinking water using the default adult physiological parameters presented in Table 3.3 of SR2.

Data on the exposure of substances from food ingestion was generally obtained from UK Total Diet Studies (TDS) published by the Food Standards Agency (FSA) and its predecessor the Ministry of Agriculture, Fisheries and Food (MAFF) and from studies commissioned by COT. Where no UK-specific data was available, MDI were derived from the European Food Safety Authority (EFSA), Health Canada and US sources. This was a rare occurrence, and in these instances, the data was evaluated to determine its applicability to the UK.

Data on the concentrations of substances in tap water was obtained from a variety of sources. UK data was used where available, with preference given to Drinking Water Inspectorate (DWI) 2014 data from water company tap water testing (LOD, 1<sup>st</sup> and 99<sup>th</sup> percentile data is available). Where the substance was not included in tap water testing, other UK sources of information were considered including:

- à DWI data from water company tap water testing from previous years;
- à COT; and
- à FSA.

Where UK data was not available, a number of other data sources were considered, largely WHO International Programme on Chemical Safety (IPCS) Concise International Chemical Assessment Documents (CICADs) and background documents for the development of Guidelines for Drinking Water Quality, using professional judgement on the relevance of the data to the UK. The final decision on the MDI from drinking water was made using professional judgement on the balance of relevance and probability, taking into account the detection limit where not detected, Koc and solubility, reduction in use of the substance, banned substances, tight controls (e.g. on explosives) and with due consideration to the SR2 instruction that “if no data or information in background exposure are available, background exposure should be assumed to be negligible and the MDI set to zero....”.

Data from other countries was generally not used because it was considered that the hydrogeology of these countries along with industrial practices were unlikely to be reflective of the UK.

## INHALATION MEAN DAILY INTAKES

Inhalation MDIs were based on estimates of average daily exposure by the inhalation pathway and calculated using the default adult physiological parameters presented in Table 3.3 of SR2.

The inhalation MDIs were generally estimated using background exposure data from the UK, derived from Defra's UK-AIR: Air Information Resource<sup>12</sup>, which provides ambient air quality data from a number of sites forming a UK-wide monitoring network. The MDIs for heavy metals were based on rolling annual average metal mass concentration data from Defra's UK Heavy Metals Monitoring Network from the period October 2009 to September 2010<sup>13</sup>.

Information for some substances was obtained from UK sources including Environment Agency TOX reports and data from the UK Expert Panel on Air Quality Standards (EPAQS). Where recent UK data was not available, data was sourced from the International Programme on Chemical Safety (IPCS), the World Health Organisation (WHO), the Agency for Toxic Substances and Diseases Registry (ATSDR), Health Canada, and various other peer-reviewed sources summarised by LQM/CIEH<sup>14</sup>.

For other substances, where no data or information on background exposure was available, background exposure was assumed to be negligible and the MDI set at 0.5\*TDI in accordance with guidance in SR2.

## PLANT UPTAKE

Soil to plant concentration factors are available in CLEA v1.071 for arsenic, cadmium, hexavalent chromium, lead, mercury, nickel and selenium. For all remaining inorganic chemicals, concentration factors were obtained using the PRISM model. Substance-specific correction factors have been selected in accordance with the guidance established within SR3. This is consistent to the approach utilised in the derivation of the LQM S4UL values and the EIC/AGS/CL:AIRE GAC.

Where there is a lack of appropriate data to enable the derivation of specific soil to plant concentrations factors for organic chemicals, plant uptake was modelled within CLEA v1.071 using the generic equations recommended within SR3, as follows:

- à Green Vegetables – Ryan et al. (1988);
- à Root Vegetables – Trapp (2002);
- à Tuber Vegetables – Trapp et al. (2007); and
- à Tree Fruit – Trapp et al. (2003).

There are no suitable models available for modelling uptake for herbaceous fruit or shrub fruit. Exposure is considered negligible.

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<sup>12</sup> Crown 2016 copyright Defra via uk-air.defra.gov.uk, licenced under the Open Government Licence (OGL).

<sup>13</sup> Defra, 2013 Spreadsheet of historic data for multiple years for the Metals network. Available online at: <http://uk-air.defra.gov.uk/data/metals-data>. [Accessed 13/03/2016].

<sup>14</sup> LQM/CIEH, 2015. The LQM/CIEH S4ULs for Human Health Risk Assessment.

## SOIL SATURATION LIMITS

GACs are not limited to their theoretical soil saturation within CLEA, although where either the aqueous or the vapour-based saturation is exceeded, this is highlighted within the Workbook (compared with the lower of the two values). This affects pathways which depend on partitioning calculations so in reality this only affects the vapour pathways and is relevant to organic substances and other substances, such as elemental mercury, that have a significant volatile component. However, the Workbook highlights saturation for direct contact pathways to indicate to the user where further qualitative consideration of free phase contamination at surface may be required.

Where the lower of the two saturation limits is exceeded and the vapour pathway is the only exposure route being considered, the chronic risks to human health are likely to be negligible. Further evaluation could be undertaken using an alternative model suitable for evaluating non-aqueous phase liquids (NAPLs), such as the Johnson & Ettinger (J&E) approach described in USEPA 2003. However, WSP considers that if NAPLs are suspected, given the known limitations and over-simplifications of J&E, soil vapour monitoring is a more accurate way of assessing potential risks.

Where the lower saturation limit is exceeded for the vapour pathway and a number of exposure routes are being considered, then the contribution from the NAPL via vapour inhalation to the overall exposure can be evaluated using the procedure provided in SR4. WSP would evaluate this as part of a DQRA process or through soil vapour monitoring on-site to determine site-specific soil vapour concentrations.

## CHEMICAL SPECIFIC ASSUMPTIONS

### CYANIDES

Cyanide has high acute toxicity, and short term exposure is an important consideration when assessing the risks from soils contaminated with cyanide. The primary risk to human receptors from free cyanide in soils is an acute risk.

There is no current UK guidance available for calculating acute risks from free cyanide. Consequently, GAC for acute exposure were derived using the algorithms presented in MADEP 1992<sup>15</sup> and assuming a one-off ingestion of 10g of soil (this conservative value has been taken as an upper bound estimate for a one-off soil ingestion rate amongst children). Receptor body weights have been selected according to the critical receptor for each exposure scenario. The lowest of the chronic and acute GAC for each land use scenario were adopted by WSP. Brinckerhoff.

### LEAD

The SGV for lead was withdrawn by the EA in 2009, and in 2011 the EA withdrew their published TOX report in light of new scientific evidence. The C4SL for lead was derived using the latest scientific evidence from a large human dataset. As such, no chemical-specific margin was applied in the derivation of the C4SL for lead. It may be possible for WSP to derive a GAC for lead using the same dataset and applying a chemical-specific margin, but the value is likely to be lower than UK natural background concentrations. Therefore, WSP has adopted the toxicological data used to derive the C4SLs in deriving the GAC for lead until such time as alternative GACs are published by an authoritative body. The relative bioavailability was set at 100% in line with the approach taken for other GACs, whereas the C4SL assumes 60% for soil and 64% for airborne dust. Thus, the WSP GAC are lower than the C4SLs.

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<sup>15</sup> MADEP 'Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration' 1992. [http://www.mass.gov/dep/toxics/cn\\_soil.htm](http://www.mass.gov/dep/toxics/cn_soil.htm)

## POLYCYCLIC AROMATIC HYDROCARBONS

WSP's approach to the assessment of polycyclic aromatic hydrocarbons (PAHs) uses the surrogate marker approach. BaP was used as a surrogate marker for all genotoxic PAHs in line with the Health Protection Agency 2010<sup>16</sup> recommendations and SP1010. This assumes that the PAH profile of the data is similar to that of the coal tars used in the Culp *et al* oral carcinogenicity study from which the toxicity data for BaP was produced. In reality, this profile has been shown by HPA to be applicable on the majority of contaminated sites based on assessment of sites across the country.

The alternative is the Toxic Equivalency Factor (TEF) approach which uses a reference compound and assigns TEFs for other compounds based on estimates of potency. Key uncertainties with this approach include the assumption that all compounds have the same toxic mechanism of action within the body and that no compounds with a greater potency than the reference compound are present. It is considered by the HPA that the TEF approach is likely to under predict the true carcinogenicity of PAHs and therefore favours the surrogate marker approach.

For these reasons, WSP considers that the adoption of BaP as a surrogate marker for genotoxic PAHs as opposed to the TEF approach is reasonable, even in cases where the PAH profile may differ from that of the Culp *et al* study. In addition, WSP has derived a GAC for naphthalene, which is commonly a risk driver due to its high volatility, relative to other PAH compounds, as an indicator compound for threshold PAHs.

## TRIMETHYLBENZENES

The GAC for trimethylbenzenes can be used for the assessment of any individual isomer (1,2,3-trimethylbenzene, 1,2,4-trimethylbenzene or 1,3,5-trimethylbenzene), or a mixture of the three isomers.

## CHEMICAL GROUPS

For a number of chemical groups, the available toxicity data is for combinations of chemicals. Given that the physico-chemical parameters may differ between the chemicals, the GACs for the chemicals within the groups have been calculated and then the lowest GAC selected to represent the entire group. This was the approach taken by the EA for m-, o- and p-xylenes, and has also been adopted by WSP for:

- à 2-chlorophenol, 2,4-dichlorophenol, 2,4,6-trichlorophenol and 2,3,4,6-tetrachlorophenol;
- à 2-, 3- and 4-methylphenol (total cresols);
- à aldrin and dieldrin; and
- à  $\alpha$ - and  $\beta$ -endosulphan.

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<sup>16</sup> HPA Contaminated Land Information Sheet 'Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs) 2010

## EXPOSURE TO VAPOURS

### INHALATION OF MEASURED VAPOURS

WSP has derived a set of soil vapour GACs ( $GAC_{sv}$ ) that allow for the assessment of measured site soil vapour concentrations, using J&E, in order to establish potential risks via indoor inhalation of vapours. This methodology enables a more robust assessment of exposure via the inhalation of soil vapours indoors than using CLEA-derived soil GAC, as it is based upon measured soil vapour concentrations beneath the site. It also allows for the assessment of vapours from all source terms (i.e. groundwater, soil or NAPL). Outdoor inhalation was not included. WSP considers that the indoor inhalation pathway is the significantly dominant risk-driver.

The generic land use scenarios within CLEA (residential and commercial) that were used to derive the soil GAC were used to define the receptor and building characteristics for the soil vapour GAC. Only residential and commercial generic land use scenarios include the indoor inhalation of vapours pathway.

The  $GAC_{sv}$  were derived for three different soil types; sand, sandy loam and clay, reflecting the importance of this parameter within the J&E model. A depth to contamination of 0.85 m below the base of the building foundation was assumed (i.e. 1 m below ground level). This differs from the depth assumed for the soil GAC (0.5 m bgl), but was selected by WSP as a reasonable worst case scenario.

It is acknowledged that the J&E commonly over-predicts indoor vapour concentrations. In particular, it will significantly over-predict vapour concentrations for suspended floor slabs, which many new builds are constructed with, it does not take into account lateral migration and assumes an infinite source of contamination at steady state conditions. In addition, it is common for soil gas/vapour wells to be installed with at least 1 m of plain riser at the surface and this equates to a total depth of 0.85 m below the building foundation plus a 0.15 m thick foundation, and so is more representative of the depth that samples will be taken from.

The TDSIs and IDs for each substance were converted from  $\mu\text{gkg}^{-1}\text{bwday}^{-1}$  to  $\mu\text{gm}^{-3}$  using the standard conversions quoted in Table 3.3 of SR2, thereby replacing the need to model  $C_{air}$  in the equation:

$$C_{air} = \alpha \cdot C_{vap} \cdot 1,000,000 \text{cm}^3 \text{m}^{-3}$$

Where:

$C_{air}$  is the concentration of vapours within the building,  $\text{mg}^{-3}$

$\alpha$  is the steady state attenuation coefficient between soil and indoor air, dimensionless

$C_{vap}$  is the soil vapour concentration,  $\text{mgcm}^{-3}$

The target concentrations within indoor air for each substance ( $C_{air}$ ) are a function of receptor inhalation rates and occupancy periods, as defined by the site conceptual exposure model (assuming standard CLEA occupancy periods and receptors).

The attenuation factor was calculated using J&E (Equation 10.4 in SR3) and the resulting  $C_{vap}$  is equivalent to the  $GAC_{sv}$  for the modelled exposure scenario.

Where the calculated  $GAC_{sv}$  for a substance exceeds the vapour saturation limit, no  $GAC_{sv}$  has been proposed.



## INHALATION OF GROUNDWATER-DERIVED VAPOURS

The CLEA model does not have the capacity to derive GACs to assess vapours derived from dissolved phase contamination. WSP has derived a set of groundwater GACs ( $GAC_{gw}$ ) to evaluate the potential risks through the indoor inhalation of groundwater-derived vapours by first applying the approach described above for the derivation of the WSP  $GAC_{sv}$  to determine the acceptable concentration in soil vapour directly above the water table.

The depth to groundwater was assumed to be 1 m bgl (i.e. 0.85 m below the base of the building foundation). This depth was considered to be more representative of commonly encountered groundwater conditions than the 0.5 m below the base of the building foundation (i.e. 0.65 m bgl) that is used by CLEA for an unsaturated source present in the overlying soil.

The  $GAC_{gw}$  was then back-calculated from the  $GAC_{sv}$  using the air-water partition coefficient ( $K_{aw}$ ) for each substance.

Where the calculated  $GAC_{gw}$  for a substance exceeds the solubility limit, no  $GAC_{gw}$  has been proposed.

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## Annex E: Risk Chemical Screening

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GYTRC - groundwater - coastal EOS

Table with columns for Lab Sample ID, Depth to Top, Date Sampled, and various chemical concentrations. Rows include parameters like Ammoniacal nitrogen, Sulphate, Cyanide, Arsenic, Boron, Cadmium, Copper, Chromium, Lead, Mercury, Nickel, Selenium, Zinc, and numerous PAHs and VOCs.

Table with columns for Lab Sample ID, Depth to Top, Date Sampled, and various chemical concentrations, serving as a continuation of the data from the first table.











GYTRC - groundwater - coastal EOS

Lab Sample ID	Depth	Client Sample No	Client Sample ID	Sample Matrix Code	Sample Type	Sample Matrix Code	Sample Type	Sample Matrix Code	Sample Type
<b>WSP Groundwater Screen - Coastal EOS</b>									
<b>Source of Screening Value</b>									
<b>Date Sampled</b>									
<b>Sample Type</b>									
<b>Sample Matrix Code</b>									
1,4-Dichlorobenzene	µg/l								
sec-Butylbenzene	µg/l								
tert-Butylbenzene	µg/l								
1,3-Dichlorobenzene	µg/l								
n-Butylbenzene	µg/l								
1,2-Dibromo-3-chloropropane	µg/l								
1,2,4-Trichlorobenzene	µg/l	0.4						WFD 2015	
1,2,3-Trichlorobenzene	µg/l	0.4						WFD 2015	
Hexachlorobutadiene	µg/l	0.6						WFD 2015	
<b>TPH CWB</b>									
Alli <C5-C6 (w)	µg/l								
Alli <C6-C8 (w)	µg/l								
Alli <C8-C10 (w)	µg/l								
Alli <C10-C12 (w)	µg/l								
Alli <C12-C16 (w)	µg/l								
Alli <C16-C21 (w)	µg/l								
Alli <C21-C35 (w)	µg/l								
Total Aliphatics (w)	µg/l								
Aro <C5-C7 (w)	µg/l	8						CLAIRE 2017	
Aro <C7-C8 (w)	µg/l	74						CLAIRE 2017	
Aro <C8-C9 (w)	µg/l	20						CLAIRE 2017	
Aro <C9-C10 (w)	µg/l	20						CLAIRE 2017	
Aro <C10-C12 (w)	µg/l	2						CLAIRE 2017	
Aro <C12-C16 (w)	µg/l	2						CLAIRE 2017	
Aro <C16-C21 (w)	µg/l	0.1						CLAIRE 2017	
Aro <C21-C35 (w)	µg/l	0.00017						CLAIRE 2017	
Total Aromatics (w)	µg/l								
TPH (All & Aro) (w)	µg/l								
BTEX - Benzene (w)	µg/l	8						WFD 2015	
BTEX - Toluene (w)	µg/l	74						WFD 2015	
BTEX - Ethyl Benzene (w)	µg/l	20						P2-115/TR4 2002	
BTEX - m & p Xylene (w)	µg/l	30						CLAIRE 2017	
BTEX - o Xylene (w)	µg/l	30						CLAIRE 2017	
MTBE (w)	µg/l								

18/05033	18/07049	18/08232	18/08736/9	18/09217/3	18/09646/7	18/10170/7
0622-7	0831-8	1005-8	1019-8	1102-8	1115-13	1115-13
BH12B	BH12B	BH12B	BH12B	BH12B	BH12B	BH12B
1.78	1.70	1.76	1.71	1.74	1.73	1.83
Made	Made	Made	Made	Made	Made	Made
ground, alluvium	ground, alluvium	ground, alluvium	ground, alluvium	ground, alluvium	ground, alluvium	ground, alluvium
21-Jun-18	30-Aug-18	04-Oct-18	18/10/2018	01/11/2018	14/11/2018	29/11/2018
Water - N/A	Water - N/A	Water - N/A	Water - EW	Water - EW	Water - EW	Water - EW
<1	<1	<1	<1	<1	<1	<1
<1	<1	<1	<1	<1	<1	<1
<2	<2	<2	<2	<2	<2	<2
<1	<1	<1	<1	<1	<1	<1
<1	<1	<1	<1	<1	<1	<1
<2	<2	<2	<2	<2	<2	<2
<3	<3	<3	<3	<3	<3	<3
<3	<3	<3	<3	<3	<3	<3
<1	<1	<1	<1	<1	<1	<1

18/05033	18/07049	18/08232	18/08736/8	18/09217/9	18/09646/6	18/10170/6
0622-8	0831-6	1005-6	1019-6	1102-6	1115-10	1115-10
BH13	BH13	BH13	BH13	BH13	BH13	BH13
1.75	1.61	1.73	1.66	1.75	1.73	1.87
Breydon and Crag	Breydon and Crag	Breydon and Crag	Breydon and Crag	Breydon and Crag	Breydon and Crag	Breydon and Crag
21-Jun-18	30-Aug-18	04-Oct-18	18/10/2018	01/11/2018	14/11/2018	29/11/2018
Water - N/A	Water - N/A	Water - N/A	Water - EW	Water - EW	Water - EW	Water - EW
<1	<1	1	<1	2	<1	<1
<1	<1	<1	<1	<1	<1	<1
<2	<2	<2	<2	<2	<2	<2
<1	<1	<1	<1	<1	<1	<1
<1	<1	<1	<1	<1	<1	<1
<2	<2	<2	<2	<2	<2	<2
<3	<3	<3	<3	<3	<3	<3
<3	<3	<3	<3	<3	<3	<3
<1	<1	<1	<1	<1	<1	<1

18/08232	18/08736/1	18/09217/1	18/09646/1	18/10170/1
1005-11	1019-11	1102-11	1115-16	1115-16
WS22	WS22	WS22	WS22	WS22
0.95	0.94	0.90	0.93	0.95
Alluvium	Alluvium	Alluvium	Alluvium	Alluvium
04-Oct-18	18/10/2018	01/11/2018	14/11/2018	29/11/2018
Water - N/A	Water - EW	Water - EW	Water - EW	Water - EW
<1	<1	<1	<1	<1
<1	<1	<1	<1	<1
<2	<2	<2	<2	<2
<1	<1	<1	<1	<1
<1	<1	<1	<1	<1
<2	<2	<2	<2	<2
<3	<3	<3	<3	<3
<3	<3	<3	<3	<3
<1	<1	<1	<1	<1

18/08232	18/08736/3	18/09217/2	18/09646/2	18/10170/2
1005-10	1019-10	1102-10	1115-15	1115-15
WS21	WS21	WS21	WS21	WS21
1.19	1.29	1.20	1.1	1.17
Alluvium	Alluvium	Alluvium	Alluvium	Alluvium
04-Oct-18	18/10/2018	01/11/2018	14/11/2018	29/11/2018
Water - N/A	Water - EW	Water - EW	Water - EW	Water - EW
<1	<1	<1	<1	<1
<1	<1	<1	<1	<1
<2	<2	<2	<2	<2
<1	<1	<1	<1	<1
<1	<1	<1	<1	<1
<2	<2	<2	<2	<2
<3	<3	<3	<3	<3
<3	<3	<3	<3	<3
<1	<1	<1	<1	<1

18/08232	18/08736/2	18/09217/4	18/09646/4	18/10170/4
1005-9	1019-9	1102-9	1115-14	1115-14
WS20	WS20	WS20	WS20	WS20
1.22	1.23	1.23	1.26	1.23
Alluvium	Alluvium	Alluvium	Alluvium	Alluvium
04-Oct-18	18/10/2018	01/11/2018	14/11/2018	29/11/2018
Water - N/A	Water - EW	Water - EW	Water - EW	Water - EW
<1	<1	<1	<1	<1
<1	<1	<1	<1	<1
<2	<2	<2	<2	<2
<1	<1	<1	<1	<1
<1	<1	<1	<1	<1
<2	<2	<2	<2	<2
<3	<3	<3	<3	<3
<3	<3	<3	<3	<3
<1	<1	<1	<1	<1

18/04384	18/05033	18/05361	18/05864	18/06265	18/06637
0604-7	0622-9	0703-2	0720-8	0803-4	0817-4
BH15	BH15	BH15	BH15	BH15	BH15
1.35	1.42	1.40	1.44	1.43	2.10
North Denes	North Denes	North Denes	North Denes	North Denes	North Denes
01-Jun-18	21-Jun-18	03-Jul-18	19-Jul-18	02-Aug-18	16-Aug-18
Water - N/A	Water - N/A	Water - N/A	Water - N/A	Water - N/A	Water - N/A
<1	<1	<1	<1	<1	<1
<1	<1	<1	<1	<1	<1
<2	<2	<2	<2	<2	<2
<1	<1	<1	<1	<1	<1
<1	<1	<1	<1	<1	<1
<2	<2	<2	<2	<2	<2
<3	<3	<3	<3	<3	<3
<3	<3	<3	<3	<3	<3
<1	<1	<1	<1	<1	<1









GYTRC - groundwater - coastal EQS

Table with 4 columns: Lab Sample ID, Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom, Date Sampled, Sample Type, Sample Matrix Code, and various chemical parameters (pH, Ammoniacal nitrogen, Sulphate, Cyanide, Arsenic, Boron, Cadmium, Copper, Chromium, Lead, Mercury, Nickel, Selenium, Zinc, PAH 16MS, SVOC, VOC) with units and values.

Table with 7 columns: Visit 5 - 2 August 2018, 7, 4, 3, 5, 6. Contains data for samples 0803-0 through 0803-6.

Table with 2 columns: 0803-4, 0803-6. Contains data for samples 0803-4 and 0803-6.

Table with 7 columns: Visit 6 - 16 August 2018, 1, 7, 3, 2, 4, 6. Contains data for samples 0817-0 through 0817-5.

Table with 2 columns: 0817-4, 0817-5. Contains data for samples 0817-4 and 0817-5.

Table with 8 columns: Visit 7 - 30 August 2018, 1, 9, 4, 2, 7, 8. Contains data for samples 0831-0 through 0831-5.

Table with 3 columns: 0831-8, 0831-4, 0831-6. Contains data for samples 0831-8, 0831-4, and 0831-6.

Table with 6 columns: Visit 8 - 4 October 2018, 5, 11, 7, 6, 10, 12. Contains data for samples 1005-0 through 1005-5.













GYTRC - groundwater - coastal EQS

Lab Sample ID			18/10170/3	18/10170/6
Client Sample No			1115-8	1115-10
Client Sample ID			BH15	BH13
Depth to Top			1.36	1.87
Depth to Bottom				
Date Sampled			29/11/2018	29/11/2018
Sample Type			Water - EW	Water - EW
Sample Matrix Code			N/A	N/A
pH (w)	pH		8.4	8.53
Ammoniacal nitrogen (w)	mg/l		0.21	8.07
Sulphate (w)	mg/l			
Cyanide (free) (w)	mg/l	0.001		
Cyanide (total) (w)	mg/l	0.001		
Arsenic (dissolved)	µg/l	25	69	15
Boron (dissolved)	µg/l		710	680
Cadmium (dissolved)	µg/l	0.2	<0.08	<0.08
Copper (dissolved)	µg/l	3.76	7	7
Chromium (dissolved)	µg/l		<1	<1
Chromium (hexavalent) (w)	mg/l	0.0006	<0.01	<0.01
Chromium (trivalent) (w)	mg/l			
Lead (dissolved)	µg/l	1.3	<1	<1
Mercury (dissolved)	µg/l	0.07	<0.1	0.1
Nickel (dissolved)	µg/l	8.6	<1	2
Selenium (dissolved)	µg/l		<1	<1
Zinc (dissolved)	µg/l	6.8	<1	2
<b>PAH 16MS (w)</b>				
Acenaphthene (w)	µg/l		0.14	0.79
Acenaphthylene (w)	µg/l		0.01	0.07
Anthracene (w)	µg/l	0.1	0.02	0.04
Benzo(a)anthracene (w)	µg/l		0.01	<0.01
Benzo(a)pyrene (w)	µg/l	0.00017	<0.01	<0.01
Benzo(b)fluoranthene (w)	µg/l		<0.01	<0.01
Benzo(ghi)perylene (w)	µg/l		<0.01	<0.01
Benzo(k)fluoranthene (w)	µg/l		<0.01	<0.01
Chrysene (w)	µg/l		0.01	<0.01
Dibenzo(ah)anthracene (w)	µg/l		<0.01	<0.01
Fluoranthene (w)	µg/l	0.0063	0.03	0.01
Fluorene (w)	µg/l		<0.01	0.53
Indeno(1,23-cd)pyrene (w)	µg/l		<0.01	<0.01
Naphthalene (w)	µg/l	2	0.03	<0.01
Phenanthrene (w)	µg/l		0.05	0.22
Pyrene (w)	µg/l		0.04	<0.01
Total PAH 16MS (w)	µg/l		0.34	1.66
<b>SVOC (excluding PAH 16) (w)</b>				
2,4,5-Trichlorophenol	µg/l			
2,4,6-Trichlorophenol	µg/l			
2,4-Dichlorophenol	µg/l	0.42		
2,4-Dimethylphenol	µg/l			
2,4-Dinitrotoluene	µg/l			
2,6-Dinitrotoluene	µg/l			
2-Chloronaphthalene	µg/l			
2-Chlorophenol	µg/l			
2-Methylnaphthalene	µg/l			
2-Methylphenol	µg/l			
2-Nitrophenol	µg/l			
4-Bromophenyl phenyl ether	µg/l			
4-Chloro-3-methylphenol	µg/l			
Bis(2-chloroisopropyl)ether	µg/l			
4-Methylphenol	µg/l			
4-Nitrophenol	µg/l			
Bis(2-chloroethyl)ether	µg/l			
Bis(2-chloroethoxy)methane	µg/l			
Bis(2-ethylhexyl)phthalate	µg/l	1.3		
Butylbenzyl phthalate	µg/l	0.75		
Carbazole	µg/l			
Dibenzofuran	µg/l			
n-Dibutylphthalate	µg/l			
n-Dioctylphthalate	µg/l			
n-Nitroso-n-dipropylamine	µg/l			
Diethyl phthalate	µg/l			
Dimethyl phthalate	µg/l			
Hexachlorobenzene	µg/l	0.05		
Pentachlorophenol	µg/l	0.4		
Phenol	µg/l	7.7		
Hexachloroethane	µg/l			
Nitrobenzene	µg/l			
Isophorone	µg/l			
Hexachlorocyclopentadiene	µg/l			
Perylene	µg/l			
<b>VOC (w)</b>				
Dichlorodifluoromethane	µg/l			
Chloromethane	µg/l			
Vinyl Chloride	µg/l			
Bromomethane	µg/l			
Chloroethane	µg/l			
Trichlorofluoromethane	µg/l			
trans 1,2-Dichloroethene	µg/l			
Dichloromethane	µg/l	20		
Carbon Disulphide	µg/l			
1,1-Dichloroethene	µg/l			
1,1-Dichloroethane	µg/l			
cis 1,2-Dichloroethene	µg/l			
Bromochloromethane	µg/l			
Chloroform	µg/l	2.5		
2,2-Dichloropropane	µg/l			

GYTRC - groundwater - coastal EQS

Lab Sample ID			18/10170/3	18/10170/6
Client Sample No			1115-8	1115-10
Client Sample ID			BH15	BH13
Depth to Top			1.36	1.87
Depth to Bottom				
Date Sampled			29/11/2018	29/11/2018
Sample Type			Water - EW	Water - EW
Sample Matrix Code			N/A	N/A
1,2-Dichloroethane	µg/l	10		
1,1,1-Trichloroethane	µg/l	-		
1,1-Dichloropropene	µg/l	-		
Benzene	µg/l	8		
Carbon Tetrachloride	µg/l	12		
Dibromomethane	µg/l	-		
1,2-Dichloropropane	µg/l	-		
Bromodichloromethane	µg/l	-		
Trichloroethene	µg/l	10		
cis 1,3-Dichloropropene	µg/l	-		
trans 1,3-Dichloropropene	µg/l	-		
1,1,2-Trichloroethane	µg/l	-		
Toluene	µg/l	74		
1,3-Dichloropropane	µg/l	-		
Dibromochloromethane	µg/l	-		
1,2-Dibromoethane	µg/l	-		
Tetrachloroethene	µg/l	10		
1,1,1,2-Tetrachloroethane	µg/l	-		
Chlorobenzene	µg/l	-		
Ethylbenzene	µg/l	20		
m & p Xylene	µg/l	30		
Bromoforn	µg/l	-		
Styrene	µg/l	-		
1,1,2,2-Tetrachloroethane	µg/l	-		
o-Xylene	µg/l	30		
1,2,3-Trichloropropane	µg/l	-		
Isopropylbenzene	µg/l	-		
Bromobenzene	µg/l	-		
2-Chlorotoluene	µg/l	-		
n-propylbenzene	µg/l	-		
4-Chlorotoluene	µg/l	-		
1,2,4-Trimethylbenzene	µg/l	-		
4-Isopropyltoluene	µg/l	-		
1,3,5-Trimethylbenzene	µg/l	-		
1,2-Dichlorobenzene	µg/l	-		
1,4-Dichlorobenzene	µg/l	-		
sec-Butylbenzene	µg/l	-		
tert-Butylbenzene	µg/l	-		
1,3-Dichlorobenzene	µg/l	-		
n-butylbenzene	µg/l	-		
1,2-Dibromo-3-chloropropane	µg/l	-		
1,2,4-Trichlorobenzene	µg/l	0.4		
1,2,3-Trichlorobenzene	µg/l	0.4		
Hexachlorobutadiene	µg/l	0.6		
<b>TPH CWQ</b>				
Alli >C5-C6 (w)	µg/l	-	<1	<1
Alli >C6-C8 (w)	µg/l	-	<1	1
Alli >C8-C10 (w)	µg/l	-	<5	<5
Alli >C10-C12 (w)	µg/l	-	<5	<5
Alli >C12-C16 (w)	µg/l	-	<5	<5
Alli >C16-C21 (w)	µg/l	-	<5	<5
Alli >C21-C35 (w)	µg/l	-	<5	<5
Total Aliphatics (w)	µg/l	-	<5	<5
Aro >C5-C7 (w)	µg/l	8	<1	<1
Aro >C7-C8 (w)	µg/l	74	<1	<1
Aro >C8-C9 (w)	µg/l	20		
Aro >C9-C10 (w)	µg/l	20	<5	31
Aro >C10-C12 (w)	µg/l	2	<5	97
Aro >C12-C16 (w)	µg/l	2	<5	61
Aro >C16-C21 (w)	µg/l	0.1	21	67
Aro >C21-C35 (w)	µg/l	0.00017	<10	23
Total Aromatics (w)	µg/l	-	21	279
TPH (Alli & Aro) (w)	µg/l	-	21	280
BTEX - Benzene (w)	µg/l	8	<1	<1
BTEX - Toluene (w)	µg/l	74	<1	<1
BTEX - Ethyl Benzene (w)	µg/l	20	<1	<1
BTEX - m & p Xylene (w)	µg/l	30	<1	<1
BTEX - o Xylene (w)	µg/l	30	<1	1
MTBE (w)	µg/l	-	<1	<1







GYTRC - Groundwater - DWS

Table with columns for Lab Sample ID, Client Sample No, Client Sample ID, Depth, Strata, Date Sampled, Sample Type, Sample Matrix Code, and various chemical parameters like pH, Ammoniacal nitrogen, Sulfate, Cyanide, Arsenic, Boron, Cadmium, Copper, Chromium, etc.

Table with columns for Date, Client Sample No, Client Sample ID, Depth, Strata, Date Sampled, Sample Type, Sample Matrix Code, and various chemical parameters like pH, Ammoniacal nitrogen, Sulfate, Cyanide, Arsenic, Boron, Cadmium, Copper, Chromium, etc.

Table with columns for Date, Client Sample No, Client Sample ID, Depth, Strata, Date Sampled, Sample Type, Sample Matrix Code, and various chemical parameters like pH, Ammoniacal nitrogen, Sulfate, Cyanide, Arsenic, Boron, Cadmium, Copper, Chromium, etc.



GYTRC - Groundwater - DWS

Table with 3 columns: Lab Sample ID, Client Sample ID, and various chemical parameters (pH, Ammoniacal nitrogen, Sulfate, etc.) with their respective units and UK DWS values.

Table with 6 columns representing different sampling locations (18/05033, 18/07049/6, 18/08232, 18/08736/9, 18/09217/3, 18/09466/7, 18/10170/7) and various chemical parameters.

Table with 6 columns representing different sampling locations (18/05033, 18/07049, 18/08232, 18/08736/8, 18/09217/9, 18/09466/6, 18/10170/6) and various chemical parameters.

Table with 6 columns representing different sampling locations (18/08232, 18/08736/1, 18/09217/1, 18/09466/1, 18/10170/1) and various chemical parameters.

Table with 6 columns representing different sampling locations (18/08232, 18/08736/3, 18/09217/2, 18/09466/2, 18/10170/2) and various chemical parameters.

Table with 6 columns representing different sampling locations (18/08232, 18/08736/2, 18/09217/4, 18/09466/4, 18/10170/4) and various chemical parameters.

Table with 6 columns representing different sampling locations (18/04384, 18/05033, 18/05361, 18/05864, 18/06205) and various chemical parameters.



























GYTRC - Groundwater - DWS

Date 14.03.2019

Concentration of determinand in the groundwater exceeds Drinking Water Standards The Limit of Detection (LoD) is greater than the screening value.

Determinand	Units	Groundwater Screening Value - DWS	Source of Screening Value	BH104 Shallow	BH105 Deep	BH107 Shallow	BH108 Deep	BH110 Shallow	TP104
				Made ground and Breydon	Crag	Made Ground and North Denes	Crag	Made Ground and Breydon	Breydon
Arsenic	µg/l	10	UK DWS	35	20	3	33	35	2
Barium	µg/l	-		370	110	10	430	290	120
Beryllium	µg/l	-		<1	<1	<1	<1	<1	<1
Boron	µg/l	1000	UK DWS	3000	1400	260	2700	840	160
Cadmium	µg/l	5	UK DWS	0.6	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	µg/l	50	UK DWS	16	9	7	14	6	3
Copper	µg/l	2000	UK DWS	1	<1	<1	1	<1	<1
Lead	µg/l	10	UK DWS	<1	<1	<1	<1	<1	1
Nickel	µg/l	20	UK DWS	31	14	2	47	26	8
Selenium	µg/l	10	UK DWS	100	66	5	130	53	2
Vanadium	µg/l	-		4	5	<1	10	6	25
Zinc	µg/l	-		40	14	<3	160	<3	10
Mercury	µg/l	1	UK DWS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate	mg/l	-		<0.3	<0.3	56	<0.3	<0.3	<0.3
Sulphate	mg/l	250	UK DWS	1100	1000	130	1600	1400	330
Sulphide	mg/l	-		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total CN	mg/l	0.005	UK DWS	<0.05	<0.05	<0.05	<0.05	3.5	0.18
Free CN	mg/l	0.005	UK DWS	<0.05	<0.05	<0.05	<0.05	0.94	<0.05
Complex CN	mg/l	-		-	-	-	-	-	0.18
Sulphur	mg/l	-		<0.05	<0.05	<0.05	<0.05	0.13	<0.05
pH	pH units	<6.5 >10	UK DWS	7.91	8	8.07	7.72	7.89	7.64
EPH	µg/l	-		300	120	<10	140	3200	-
Naphthalene	ng/l	-		28	<26	<26	<26	67000	-
Acenaphthalene	ng/l	-		120	<11	<11	<11	1300	-
Acenaphthalene	ng/l	-		100	<15	<15	<15	1900	-
Fluorene	ng/l	-		26	<14	<14	<14	3200	-
Phenanthrene	ng/l	-		60	<22	35	24	13000	-
Anthracene	ng/l	-		17	<15	<15	<15	1300	-
Fluoranthene	ng/l	-		19	<17	<17	<17	3600	-
Pyrene	ng/l	-		18	<15	<15	<15	2100	-
Benzo(a)anthracene	ng/l	-		<17	<17	<17	<17	180	-
Chrysene	ng/l	-		<13	<13	<13	<13	130	-
Benzo(b)fluoranthene	ng/l	-		<23	<23	<23	<23	63	-
Benzo(k)fluoranthene	ng/l	-		<27	<27	<27	<27	<27	-
Benzo(a)pyrene	ng/l	10	UK DWS	<9	<9	<9	<9	34	-
Indeno(123-cd)pyrene	ng/l	-		<14	<14	<14	<14	<14	-
Dibenzo(ah)anthracene	ng/l	-		<16	<16	<16	<16	<16	-
Benzo(ghi)perylene	ng/l	-		<16	<16	<16	<16	<16	-
PAH Total 16	ng/l	-		390	<27	35	<27	93000	-

Concentration of determinand in the groundwater exceeds Coastal Environmental Quality Standards (EQS)  
 The Limit of Detection (LoD) is greater than the screening value.

Determinand	Units	Groundwater Screening Value - Coastal EOS	Soyrce of Screening value	BH104 Shallow	BH105 Deep	BH107 Shallow	BH108 Deep	BH110 Shallow	TP104
				Made ground and Breydon	Crag	Made Ground and North Denes	Crag	Made Ground and Breydon	Breydon
Arsenic	µg/l	25	WFD 2015	35	20	3	33	35	2
Barium	µg/l	-		370	110	10	430	290	120
Beryllium	µg/l	-		<1	<1	<1	<1	<1	<1
Boron	µg/l	-		3000	1400	260	2700	840	160
Cadmium	µg/l	0.2	WFD 2015	0.6	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	µg/l	-		16	9	7	14	6	3
Copper	µg/l	3.76	WFD 2015	1	<1	<1	1	<1	<1
Lead	µg/l	1.3	WFD 2015	<1	<1	<1	<1	<1	1
Nickel	µg/l	8.6	WFD 2015	31	14	2	47	26	8
Selenium	µg/l	-		100	66	5	130	53	2
Vanadium	µg/l	-		4	5	<1	10	6	25
Zinc	µg/l	6.8	WFD 2015	40	14	<3	160	<3	10
Mercury	µg/l	0.07	WFD 2015	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate	mg/l	-		<0.3	<0.3	56	<0.3	<0.3	<0.3
Sulphate	mg/l	-		1100	1000	130	1600	1400	330
Sulphide	mg/l	-		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total CN	mg/l	0.001	WFD 2015	<0.05	<0.05	<0.05	<0.05	3.5	0.18
Free CN	mg/l	0.001	WFD 2015	<0.05	<0.05	<0.05	<0.05	0.94	<0.05
Complex CN	mg/l	-		-	-	-	-	-	0.18
Sulphur	mg/l	-		<0.05	<0.05	<0.05	<0.05	0.13	<0.05
pH	pH units	-		7.91	8	8.07	7.72	7.89	7.64
EPH	µg/l	-		300	120	<10	140	3200	-
Naphthalene	ng/l	2000	WFD 2015	28	<26	<26	<26	61000	-
Acenaphthalene	ng/l	-		120	<11	<11	<11	1300	-
Acenaphthalene	ng/l	-		100	<15	<15	<15	1900	-
Fluorene	ng/l	-		26	<14	<14	<14	3200	-
Phenanthrene	ng/l	-		60	<22	35	24	13000	-
Anthracene	ng/l	100	WFD 2015	17	<15	<15	<15	1300	-
Fluoranthene	ng/l	6.3	WFD 2015	19	<17	<17	<17	3600	-
Pyrene	ng/l	-		18	<15	<15	<15	2100	-
Benzo(a)anthracene	ng/l	-		<17	<17	<17	<17	180	-
Chrysene	ng/l	-		<13	<13	<13	<13	130	-
Benzo(b)fluoranthene	ng/l	-		<23	<23	<23	<23	63	-
Benzo(k)fluoranthene	ng/l	-		<27	<27	<27	<27	<27	-
Benzo(a)pyrene	ng/l	0.17	WFD 2015	<9	<9	<9	<9	34	-
Indeno(1,23-cd)pyrene	ng/l	-		<14	<14	<14	<14	<14	-
Dibenzo(ah)anthracene	ng/l	-		<16	<16	<16	<16	<16	-
Benzo(ghi)perylene	ng/l	-		<16	<16	<16	<16	<16	-
PAH Total 16	ng/l	-		390	<27	35	<27	93000	-

Date	Time	Activity	Status	Performance Metrics											
				M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
2023-10-01	08:00	Activity 1	Completed	95	80	70	60	50	40	30	20	10	15	25	
2023-10-01	09:00	Activity 2	In Progress	85	75	65	55	45	35	25	15	10	20	30	
2023-10-01	10:00	Activity 3	Pending	75	65	55	45	35	25	15	10	5	15	25	
2023-10-01	11:00	Activity 4	Completed	85	75	65	55	45	35	25	15	10	20	30	
2023-10-01	12:00	Activity 5	In Progress	75	65	55	45	35	25	15	10	5	15	25	
2023-10-01	13:00	Activity 6	Pending	65	55	45	35	25	15	10	5	5	10	20	
2023-10-01	14:00	Activity 7	Completed	90	80	70	60	50	40	30	20	10	15	25	
2023-10-01	15:00	Activity 8	In Progress	80	70	60	50	40	30	20	10	5	10	20	
2023-10-01	16:00	Activity 9	Pending	70	60	50	40	30	20	10	5	5	10	20	
2023-10-01	17:00	Activity 10	Completed	85	75	65	55	45	35	25	15	10	20	30	
2023-10-01	18:00	Activity 11	In Progress	75	65	55	45	35	25	15	10	5	10	20	
2023-10-01	19:00	Activity 12	Pending	65	55	45	35	25	15	10	5	5	10	20	
2023-10-01	20:00	Activity 13	Completed	90	80	70	60	50	40	30	20	10	15	25	
2023-10-01	21:00	Activity 14	In Progress	80	70	60	50	40	30	20	10	5	10	20	
2023-10-01	22:00	Activity 15	Pending	70	60	50	40	30	20	10	5	5	10	20	





Parameter	Unit	Background	Maximum	Current	Exceeds Maximum
Asbestos	mg/kg	1	10	1	
Lead	mg/kg	500	5000	1000	
Mercury	mg/kg	0.5	5	1	
Cadmium	mg/kg	0.5	5	1	
Chromium VI	mg/kg	0.5	5	1	
Chromium III	mg/kg	50	500	100	
Copper	mg/kg	50	500	100	
Iron	mg/kg	1000	10000	5000	
Manganese	mg/kg	100	1000	200	
Nickel	mg/kg	50	500	100	
Vanadium	mg/kg	50	500	100	
Zinc	mg/kg	100	1000	200	

Parameter	Unit	Background	Maximum	Current	Exceeds Maximum
Asbestos	mg/kg	1	10	1	
Lead	mg/kg	500	5000	1000	
Mercury	mg/kg	0.5	5	1	
Cadmium	mg/kg	0.5	5	1	
Chromium VI	mg/kg	0.5	5	1	
Chromium III	mg/kg	50	500	100	
Copper	mg/kg	50	500	100	
Iron	mg/kg	1000	10000	5000	
Manganese	mg/kg	100	1000	200	
Nickel	mg/kg	50	500	100	
Vanadium	mg/kg	50	500	100	
Zinc	mg/kg	100	1000	200	

Parameter	Unit	Background	Maximum	Current	Exceeds Maximum
Asbestos	mg/kg	1	10	1	
Lead	mg/kg	500	5000	1000	
Mercury	mg/kg	0.5	5	1	
Cadmium	mg/kg	0.5	5	1	
Chromium VI	mg/kg	0.5	5	1	
Chromium III	mg/kg	50	500	100	
Copper	mg/kg	50	500	100	
Iron	mg/kg	1000	10000	5000	
Manganese	mg/kg	100	1000	200	
Nickel	mg/kg	50	500	100	
Vanadium	mg/kg	50	500	100	
Zinc	mg/kg	100	1000	200	

Parameter	Unit	Background	Maximum	Current	Exceeds Maximum
Asbestos	mg/kg	1	10	1	
Lead	mg/kg	500	5000	1000	
Mercury	mg/kg	0.5	5	1	
Cadmium	mg/kg	0.5	5	1	
Chromium VI	mg/kg	0.5	5	1	
Chromium III	mg/kg	50	500	100	
Copper	mg/kg	50	500	100	
Iron	mg/kg	1000	10000	5000	
Manganese	mg/kg	100	1000	200	
Nickel	mg/kg	50	500	100	
Vanadium	mg/kg	50	500	100	
Zinc	mg/kg	100	1000	200	

Parameter	Unit	Background	Maximum	Current	Exceeds Maximum
Asbestos	mg/kg	1	10	1	
Lead	mg/kg	500	5000	1000	
Mercury	mg/kg	0.5	5	1	
Cadmium	mg/kg	0.5	5	1	
Chromium VI	mg/kg	0.5	5	1	
Chromium III	mg/kg	50	500	100	
Copper	mg/kg	50	500	100	
Iron	mg/kg	1000	10000	5000	
Manganese	mg/kg	100	1000	200	
Nickel	mg/kg	50	500	100	
Vanadium	mg/kg	50	500	100	
Zinc	mg/kg	100	1000	200	

Parameter	Unit	Background	Maximum	Current	Exceeds Maximum
Asbestos	mg/kg	1	10	1	
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Mercury	mg/kg	0.5	5	1	
Cadmium	mg/kg	0.5	5	1	
Chromium VI	mg/kg	0.5	5	1	
Chromium III	mg/kg	50	500	100	
Copper	mg/kg	50	500	100	
Iron	mg/kg	1000	10000	5000	
Manganese	mg/kg	100	1000	200	
Nickel	mg/kg	50	500	100	
Vanadium	mg/kg	50	500	100	
Zinc	mg/kg	100	1000	200	









# **Great Yarmouth Third River Crossing**

## **Application for Development Consent Order**

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### **Document 6.2: Environmental Statement**

### **Volume II: Technical**

### **Appendix 16D: Piling**

### **Works Risk Assessment**

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**Planning Act 2008**

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) (“APFP”)**

APFP regulation Number: 5(2)(a)

Planning Inspectorate Reference Number: TR010043

Author: Norfolk County Council

Document Reference: 6.2 – Technical Appendix 16D

Version Number: 0 – Revision for Submission

Date: 30 April 2019

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# 1 Introduction

## 1.1 Authorisation

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- 1.1.1 This PWRA has been produced to support the design and Development Consent Order (DCO) process for the construction of a third river crossing over the River Yare at Great Yarmouth (“the Scheme”).

## 1.2 Site Information

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- 1.2.1 The Scheme involves the construction, operation and maintenance of a new crossing of the River Yare in Great Yarmouth. The Scheme consists of a new dual carriageway road, including a road bridge across the river, linking the A47 at Harfrey's Roundabout on the western side of the river to the A1243 South Denes Road on the eastern side. The Scheme would feature an opening span double leaf bascule (lifting) bridge across the river, involving the construction of two new 'knuckles' extending the quay wall into the river to support the bridge. The Scheme would include a bridge span over the existing Southtown Road on the western side of the river, and a bridge span on the eastern side of the river to provide an underpass for existing businesses, enabling the new dual carriageway road to rise westwards towards the crest of the new crossing.

- 1.2.2 If constructed, the Scheme would comprise the following principal elements:

- a new dual carriageway road, crossing the River Yare in an east-west orientation, comprising of:
  - A new double-leaf bascule bridge providing an opening span to facilitate vessel movement within the river. This would include structures to support and accommodate the operational requirements of the bridge-opening mechanism, including counterweights below the level of the bridge deck. The bridge would be supported on driven piles;
  - New substructures, supported by driven piles, to support the double leaf bascule bridge within the existing quays either side of the river and within the river itself, requiring new permanent "knuckle" walls, creating cofferdams in the waterway to accommodate their construction;
  - A new five-arm roundabout connecting the new dual carriageway road with Suffolk Road, William Adams Way and the western end of Queen Anne's Road. Sections of the new five arm roundabout

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would be supported on driven piles where deep soft ground is encountered;

- A single-span bridge over Southtown Road, with reinforced earth embankments joining that bridge to the new roundabout at William Adams Way. Southtown Road bridge and the reinforced earth embankments would be supported on driven piles;
  - A single-span bridge to provide an underpass on the eastern side of the river, with reinforced earth embankments joining that single span bridge to South Denes Road. The underpass and reinforced earth embankments would be supported on driven piles; and
  - A new signalised junction connecting the new road with A1243 South Denes Road.
- The closure of Queen Anne's Road, at its junction with Suffolk Road, and the opening of a new junction onto Southtown Road providing vehicular and pedestrian access to residential properties and the MIND Centre and Grounds at the eastern end of Queen Anne's Road;
  - Revised access arrangements for existing businesses onto the local highway network;
  - Dedicated provision for cyclists and pedestrians which ties into existing networks;
  - Implementation of part of a flood defence scheme along Bollard Quay that is proposed to be promoted by the Environment Agency, and works to integrate with the remainder of the flood defence scheme;
  - A control tower structure located immediately south of the crossing on the western side of the river. The control tower would facilitate the 24/7 operation of the opening span of the new double-leaf bascule bridge;
  - A plant room located on the eastern side of the river for the operation of the opening span of the new double-leaf bascule bridge;
  - The demolition of an existing footbridge on William Adams Way;
  - Associated changes, modifications and/or improvements to the existing local highway network;
  - Additional signage, including Variable Message Signs (VMS) at discrete locations, to assist the movement of traffic in response to network conditions and the openings / closings of the double-leaf bascule bridge;
  - The relocation of existing allotments to compensate for an area to be lost as a result of the Scheme and other works, including those at the MIND Centre and Grounds; and
  - New public realm, landscape, ecology and sustainable drainage measures.

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**1.2.3** The Scheme also includes works to facilitate the construction, operation and maintenance of the above elements including:

- Creation of temporary construction sites and accesses from the public highway;
- Provision of new utilities and services and the diversion of existing utilities;
- Provision of drainage infrastructure, lighting and landscaping;
- Demolition of a number of existing residential and commercial / business properties; and
- Provision of vessel waiting facilities to the north and south of the new crossing, either as floating pontoons or additional fendering to the existing berths, including any dredging and quay strengthening works that may be required.

### **1.3 Objectives**

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**1.3.1** The objective of this PWRA is to assess the potential risks to human health and controlled waters associated with piling through the Made Ground into the underlying natural strata and Principal Aquifer. This report also provides a brief summary of the ground and groundwater conditions encountered during the recent ground investigation works, as reported in:

- WSP Interpretative Environmental Ground Investigation Report, Great Yarmouth Third River Crossing prepared by WSP UK Ltd dated March 2019 (Appendix 16C of the Environmental Statement).

### **1.4 Previous Reports**

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**1.4.1** The Principal Application Site has been the subject of a ground investigation (GI) undertaken between September 2017 and July 2018 by Norfolk Partnership Laboratory (NPL) who are the Applicant's appointed Sub-Contractor. Piling will only be occurring within the Principal Application Site. No piling is to be carried out within the Satellite Application Sites.

**1.4.2** The following reports have been produced by WSP UK Ltd in relation to the contaminated land aspects of the Scheme:

- 
- Interpretative Environmental Desk Study Report, ref. 70046035-EGS-0001 dated March 2019 (Appendix 16B of the Environmental Statement)
  - Interpretative Environmental Ground Investigation Report, ref. 70046035-EGS-0002 dated March 2019 (Appendix 16C of the Environmental Statement)

1.4.3 Information provided in Sections 2 and 3 of this report has been reproduced from the above reports.

## 1.5 Assessment

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1.5.1 The Applicants Construction Contractor has tendered a design that has identified that the following piling techniques will be adopted for the Scheme:

- Combi piles comprising driven open toe steel tube and interconnecting driven steel sheet piles to form the bridge abutment cofferdam. These will transfer the bridge load through the made ground and superficial deposits into the underlying Crag Formation.
- Pre-cast concrete driven piles for the highway embankment approaches to the bascule bridge. These will transfer the embankment load through the made ground into the underlying superficial deposits.

1.5.2 The PWRA has been carried out with consideration to the guidance and information provided in the following documents:

- Piling in layered ground: risks to groundwater and archaeology. Environment Agency (October 2006) (Ref 16D.1);
- Piling into contaminated sites. Environment Agency National Groundwater and Contaminated Land Centres (February 2002) (Ref 16D.2); and
- Piling and penetrative ground improvement methods on land affected by contamination: guidance on pollution prevention. Environment Agency (May 2001) (Ref 16D.3).

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## 2 Site Setting

### 2.1 Site History

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2.1.1 Piling is only occurring within the Principal Application Site. For the purposes of this piling report to enhance clarity when discussing the ground conditions and historical uses, the Principal Application Site has been split in two, bisected by the River Yare – referred to as the eastern area and western area.

### 2.2 Eastern Area

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2.2.1 The earliest map provided by GroundSure dated 1883 indicates the eastern area of the Principal Application Site to be densely developed predominantly with commercial / industrial properties including a gasworks, boat building yard and an icehouse. Some residential properties were present but generally the area is dominated by industry. This eastern area of the Principal Application Site has generally remained a commercial / industrial area up to the present day. Various industries have been present including fish canning, oilskin production, chemical factory and unspecified depots, warehouses and factories.

### 2.3 Western Area

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2.3.1 The earliest map provided by GroundSure dated 1883 indicates the western area of the Principal Application Site to be less developed than the eastern area. The majority of the development was present adjacent to the River Yare and comprised a mix of residential properties and commercial / industrial sites such as an iron works, rope walk, gas works and malhouses. Beyond, towards the western boundary of the study area was agricultural land.

2.3.2 By 1906, a railway line running north south was constructed towards the western boundary and by 1926 / 1927, formal gardens and allotments are present towards the centre of the Principal Application Site. A shoe factory is marked adjacent to Queen Anne's Road in 1949 and by 1966 is relabelled as a printing works.

2.3.3 By 1978 the railway line had been dismantled and commercial / industrial units had started to be developed in the far west of the Principal Application Site and beyond. By 1988 the former rail route had started to be redeveloped as a dual carriageway and by 2002 the current major highway routes had been established.

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## 2.4 Surrounding Land Uses

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2.4.1 Immediate neighbouring land uses were as follows at the time of the Environmental Desk Study Report dated March 2019 (Appendix 16B of the Environmental Statement):

- North – Predominantly commercial / industrial with some residential properties on the west side of the river and predominantly residential with a few commercial / industrial properties on the east side of the river.
- East – Predominantly residential properties with occasional commercial properties and a community centre.
- South – Commercial / industrial properties on the east side of the river and residential properties, commercial / industrial properties and a recreation ground on the west side of the river.
- West – Commercial / industrial properties.

## 2.5 Environmental Setting

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### Published Geology

2.5.1 The regional BGS 1:50,000 geological map and information available on the BGS on-line Geology of Britain Viewer ([www.bgs.ac.uk](http://www.bgs.ac.uk)) indicates the Superficial Geology immediately underlying the Principal Application Site within the Order Limits varies as follows:

- South west of the River Yare - peat of the Breydon Formation,
- North west of the River Yare – clay and silt of the Breydon Formation,
- East of the River Yare – sand and gravel of the North Denes Formation.
- Within the River Yare - Clay and silt Tidal River or Creek Deposits.

2.5.2 Bedrock geology is indicated to be the Crag Group (sand and gravel) across the Principal Application Site.

### Hydrogeology

2.5.3 The North Denes Formation superficial deposits underlying the red-line boundary to the east of the River are classified as a Secondary (A) Aquifer with permeable layers. These are defined by the Environment Agency as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

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- 2.5.4 The peat and clay / silt superficial deposits underlying the Principal Application Site to the west of the River Yare are classified as unproductive.
  - 2.5.5 The underlying bedrock is classified as a Principal Aquifer. These are defined by the Environment Agency as layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
  - 2.5.6 The nearest active groundwater abstraction is approximately 71m to the north west of the red-line boundary and is for laundry use.
  - 2.5.7 The Principal Application Site is not within a Source Protection Zone.

### Hydrology

- 2.5.8 The River Yare splits the red-line boundary in two and is recorded as a Primary River. At this point it is estuarine and is not separated from the sea by any locks. No other surface water features are present.
- 2.5.9 No surface water or potable water abstractions are present within 2km of the Order Limits.

## 2.6 Ground Investigation

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- 2.6.1 The ground investigation undertaken in 2017/2018 by Norfolk Partnership Laboratory (NPL) generally confirmed the anticipated geological sequence above and is summarised below. Full details of the ground investigation works undertaken and the ground conditions encountered are presented in the WSP Interpretative Environmental Ground Investigation Report (Appendix 16C of the Environmental Statement).
- 2.6.2 Exploratory hole locations are indicated on the drawing entitled Exploratory Hole Locations Figure 16.1 reference GYTRC-WSP-EGN-XX-DR-EN-0047 presented in Volume 3 of the Environmental Statement.

### Made Ground Eastern Area

- 2.6.3 Made ground was recorded at almost all exploratory hole locations (absent from BH15) and varied in thickness from 0.55m to 4.8m. The thickness of made ground varied across the Principal Application Site with the thicker made ground generally recorded close to the quay wall.
- 2.6.4 The made ground was generally granular and heterogeneous in nature and included detritus comprising brick, wood, concrete, porcelain, asphalt, ceramics and metal. However, BH12A and BH13A both recorded brick / concrete within natural strata at depth (5.9m and 3.5m respectively)



indicating this material may be reworked rather than being in-situ natural strata.

### **Made Ground Western Area**

- 2.6.5 Made ground was recorded at almost all exploratory hole locations (absent from WS8) and varied in thickness from 0.4m to at least 4.2m, although the base of the made ground was not encountered in WS2 at 2m depth and therefore may be deeper.
- 2.6.6 The thickness of made ground varied across the western area and although thick made ground was recorded close to the quay wall, the thickest made ground was not recorded in this area.
- 2.6.7 The made ground was generally granular and heterogeneous in nature and included detritus comprising; concrete, asphalt, tile, brick, ceramic, pottery, wood, ash, leather, metal, glass, plastic, mortar and slag. BH5A at 2.0m recorded brick gravel within the Breydon Formation indicating this layer is likely to be made ground rather than in-situ natural strata.
- 2.6.8 WS4 at 2.3m and WS5 at 1.85m recorded a geogrid structure.

### **Concrete and Underground Structures**

- 2.6.9 Solid concrete was recorded at most locations in the eastern area and was recorded up to 0.65m thick. However, only a few locations in the western area recorded concrete up to 0.5m thick.
- 2.6.10 Tarmac up to 0.2m thick was recorded at a few locations in the western area but was absent from the eastern area.
- 2.6.11 No pipes or underground structures were recorded on the Engineer's logs.

### **Natural Strata**

#### Tidal River or Creek Deposits

- 2.6.12 Tidal River or Creek deposits were generally indistinguishable from the underlying Breydon Formation. The Tidal River or Creek Deposits encountered that can be differentiated are located in the eastern area overlying the sand deposits of the North Denes formation. Here, they generally comprised a dark grey to black, silty, variably organic Clay, and a sandy, clayey Silt interbedded with light brown to black, fine to coarse Sand with occasional flint gravel and pockets of organic material.
- 2.6.13 The deposit was generally encountered underlying Made Ground, to the maximum depth of 5.6m in BH14. The thickness of this deposit varied from 0.5m in BH13 to 3.80m in borehole BH14.

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### North Denes Formation

- 2.6.14 The North Denes Formation was only encountered in the eastern area where it was found underlying made ground. The Formation was typically described as a very loose to dense yellowish brown fine to coarse Sand with some rare gravels and some rare thin silt and clay bands.
- 2.6.15 The Formation was recorded at a maximum depth of 5.6m below ground level (bgl) in BH14 and was not recorded in the four boreholes undertaken along the edge of the eastern quay wall (BH12, BH12A, BH13, BH13A), where Tidal River or Creek Deposits and the Breydon Formation were encountered within the depth range that the sands of the North Denes Formation were found towards the east.

### Breydon Formation

- 2.6.16 The Breydon Formation was encountered in most boreholes in both the western and eastern areas of the Principal Application Site. In the west the Formation was encountered as either granular, cohesive or peat material. The Breydon Peat was encountered predominantly towards the west, but was also found in thinner layers close to the river. The cohesive and granular materials were encountered as interbedded layers of varying thicknesses across the Principal Application Site.
- 2.6.17 The Breydon Formation can be recognised as separate interbedded substrata and these are described below.

### Breydon Peat

- 2.6.18 The Breydon Peat was encountered solely in the western area as soft, dark brown and black, variably fibrous, sometimes clayey amorphous Peat. Occasional wood and reed fragments were observed.
- 2.6.19 The Peat was found to a maximum depth of 11.9m bgl in BH2, with thickness ranging between 0.25m to 3.66m.
- 2.6.20 Towards the west the Peat was encountered in thicker layers often underlying made ground and overlaying the granular and cohesive Breydon Formation strata.

### Breydon Clay and Silt

- 2.6.21 The clay component of the Breydon Formation was generally encountered as very soft to soft, dark grey to brown and variably silty, sandy and organic Clay, containing occasional shell fragments, gravel, pockets of peat and rootlets. The silt component contains occasional traces of gravel, organic debris, rootlets and shell fragments. The thickness of the cohesive bands

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vary from 0.1m to 1.0m in the eastern area and from 0.1m to a maximum of 5.1m in the western area.

- 2.6.22 The silts and clays were encountered between 0.3m and 4.0m bgl in the western area, and between 2.60m and 4.50m bgl in the eastern area.

#### Breydon Sand and Gravel

- 2.6.23 The granular component of the Breydon Formation comprises predominantly loose to very loose, with some locally dense areas, grey and brown-grey silty clayey fine to medium sand, with some angular to rounded gravels of flint and occasional quartz.
- 2.6.24 The thickness of the sand and gravel varies from 0.15m to 2.0m in the eastern area, with the top being encountered between 4m bgl and 4.95m bgl and to a maximum depth of 6.50m bgl
- 2.6.25 The granular material in the western area was encountered in layers ranging between 0.10m and 4.00m thick, the top of which was found at depths of 0.85m bgl to 11.40m bgl. The base of the strata was found up to a maximum depth of 13.00m bgl

#### Breydon Formation (Stratum A)

- 2.6.26 A stratum within the Breydon Formation was encountered as quartz and quartzite gravels within a granular matrix. This material was encountered across both the eastern and western areas and was typically described as a loose to medium dense, grey, slightly silty and gravel, where the gravels are fine to medium, angular to rounded flint and quartz with some rare limestone gravels and shells.
- 2.6.27 It was encountered across both the western and eastern areas at thicknesses ranging between 1.6m to 9.4m. The thickness decreases towards the west away from the river but remains relatively consistent in the eastern area. The top of the strata in the western area was encountered at depths of between 3.00m bgl to 6.00m bgl and in the eastern area at depths of between 3.20m bgl to 11.70m bgl
- 2.6.28 To differentiate it from the other strata within the Breydon Formation, the WSP Geotechnical assessment has labelled this material as Breydon Formation (Stratum A).

#### Happisburgh Glacigenic Formation

- 2.6.29 The Happisburgh Glacigenic Formation was encountered below the Breydon Formation Stratum A in the east. In the western site area, it is partly replaced by the granular and cohesive layers of the Breydon Formation.

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- 2.6.30** The Happisburgh Glaciogenic Formation was typically described as a loose to medium dense, light brown to orange-brown, fine to coarse though predominantly medium, variably silty sand with rare fine gravels. The sand contains variable amounts of angular to rounded, fine to coarse flint gravel. Some cohesive deposits were encountered within the strata as firm to stiff orange-brown laminated sandy silt and clay, with olive grey clay banding.
- 2.6.31** The formation was encountered in the western area at depths ranging between 5.00m bgl to 13.00m bgl and ranged in thickness between 4.30m to 14.70m. On the eastern area the formation was encountered deeper than in the west at depths ranging from 10.00m bgl to 18.00m bgl ranging in thickness between 3.00m and 12.00m.

#### Crag Group

- 2.6.32** The Crag Group was encountered across the entire Principal Application Site underlying the Happisburgh Glacigenic Formation as dense to very dense, grey to dark grey, fine to medium grained silty Sand with frequent white shell fragments, with some fine gravel and occasional soft to firm silty clay layers.
- 2.6.33** This stratum was encountered at depths ranging between 15.85m bgl and 22.80m bgl and with thicknesses ranging from 22.30m to 25.65m. Generally, the top of the strata indicated a relatively uniform horizon in both the west and east of the Principal Application Site.

#### London Clay

- 2.6.34** London Clay was encountered at depth underlying the Crag Formation as a stiff to very stiff, brown grey, sometimes laminated silty clay. Some rare flint gravels and gypsum crystals were encountered.
- 2.6.35** The London Clay was encountered at depths ranging between 44.00m bgl to 46.50m bgl and the base was not confirmed in any boreholes.

#### **Visual and Olfactory Evidence of Contamination**

- 2.6.36** Other than the man-made detritus recorded within the made ground, visual and olfactory evidence of contamination was recorded by NPL at the following locations. Further detail is provided on the Engineer's logs presented in Annex B of the Interpretative Ground Investigation Report (Appendix 16C of the Environmental Statement).

*Table 2.1: Summary of Visual and Olfactory Evidence of Contamination*

	Exploratory Hole reference	Comment	Strata Type (identified on Engineer's logs)	Impacted Strata Depth (m bgl)
<b>Eastern Area</b>	WS21	Hydrocarbon odour	Alluvium	1.4m – 2.0m
	WS21	Hydrocarbon odour	Alluvium	2.5m – 2.95m
	BH14	Diesel odour	Alluvium	2.6m
	BH14	Slight diesel odour	North Denes Formation	7.6m – 8.0m
<b>Western Area</b>	BH6	Slight hydrocarbon odour	Made ground	0.4m – 1.2m
	BH4BU	Hydrogen sulphide odour	Breydon Formation	2.65m – 2.85m

### Marine Sediments

**2.6.37** The Engineer's logs for the marine boreholes presented in Annex C of the Interpretative Environmental Ground Investigation Report (Appendix 16C of the Environmental Statement) indicate that the shallow sediments within the River Yare comprise gravel, sand, silt and clay and are classified as Tidal River or Creek Deposits. These vary in thickness from 0.8m up to 5.3m. Underlying these sediments are the Happisburg Glacigenic Formation and the Crag Formation, both predominantly comprising sand but layers of silt and clay are also present. London Clay was encountered at depth beneath the Crag Formation at a few locations.

## 3 Contamination Assessment

3.1.1 This Section summarises the findings of human health, controlled waters and ground gas risk assessments. Full details are presented in the WSP Interpretative Environmental Ground Investigation Report (ref. 70046035-EGS-0002) dated March 2019 (Appendix 16C of the Environmental Statement).

### 3.2 Human Health Risk Assessment

3.2.1 The chemical test results were screened against both a public open space and a commercial / industrial end use. Whilst both are considered to be conservative these are the two closest standard scenarios for the type of site ie highway with landscaping areas accessible by the general public.

#### Assessment of Results – Public Open Space End Use Scenario

3.2.2 Evidence of hydrocarbons (diesel) was identified at three locations during the ground investigation as detailed in Table 2.1 above. Two of these three locations were targeted for chemical testing and none of the results exceeded the Generic Assessment Criteria (GAC) derived for hydrocarbons using a Public Open Space (POS) scenario. It should be noted that the diesel odour in BH14 was not scheduled for chemical testing by NPL but the area was targeted subsequently at the request of WSP with the three additional window samples WS20, WS21 and WS22. None of the additional samples tested recorded results in excess of the hydrocarbon GAC's.

#### Natural Ground (Eastern Area)

3.2.3 The following Contaminants of Concern (CoC) have been identified from the screening of natural ground in the eastern area:

- Alkaline pH at two locations – BH13A and WS20 – 9.78 and 10.31 respectively compared to a screening value of 9.5.

#### Natural Ground (Western Area)

3.2.4 The following CoC have been identified from the screening of natural ground in the western area:

- Acid pH at one location – TP01 – 5.4 compared to a screening value of 5.5.

#### Made Ground (Eastern Area)

3.2.5 The following CoC have been identified from the screening of made ground in the eastern area:

- Alkaline pH at five locations – BH12A (9.62), BH17 (12.49), BH16 (11.41), BH14 (10.15) and WS21 (11.01) exceeded the GAC of 9.5.

#### Made Ground (Western Area)

3.2.6 The following CoC have been identified from the screening of made ground in the western area:

- Asbestos was recorded by the chemical testing laboratory in four samples:
  - BH6 at 0.5m as chrysotile loose fibres,
  - BH6 at 1.0m as chrysotile loose fibres,
  - CPT3 at 0.5m as chrysotile loose fibres,
  - CPT3 at 1.0m as chrysotile loose fibres,
- Lead at one location – BH5A at 0.5m depth (878mg/kg) compared to a GAC of 808mg/kg.
- Alkaline pH at two locations – BH11A (9.84) and BH10A (11.62) values exceeded the GAC of 9.5.
- Benzo(a)pyrene at two locations – BH7 at 0.8m depth (510mg/kg) and BH4 at 2.0m depth (13.9mg/kg) compared to a GAC of 11mg/kg.

#### **Assessment of Results – Commercial / Industrial End Use Scenario**

3.2.7 Evidence of hydrocarbons (diesel) was identified at three locations during the ground investigation as detailed in Table 2.1 above. Two of these three locations were targeted for chemical testing and none of the results exceeded the GAC derived for hydrocarbons using a Commercial / Industrial end use scenario. It should be noted that the diesel odour in BH14 was not scheduled for chemical testing by NPL but the area was targeted subsequently at the request of WSP with the three additional window samples WS20, WS21 and WS22. None of the additional samples tested recorded results in excess of the hydrocarbon GAC's.

#### Natural Ground (Eastern Area)

3.2.8 The following CoC have been identified from the screening of natural ground in the eastern area:

- Alkaline pH at two locations – BH13A and WS20 – 9.78 and 10.31 respectively compared to a screening value of 9.5.

#### Natural Ground (Western Area)

3.2.9 The following CoC have been identified from the screening of natural ground in the western area:



- Acid pH at one location – WS TP01 – 5.4 compared to a screening value of 5.5.

#### Made Ground (Eastern Area)

3.2.10 The following CoC have been identified from the screening of made ground in the eastern area:

- Alkaline pH at five locations – BH12A (9.62), BH17 (12.49), BH16 (11.41), BH14 (10.15) and WS21 (11.01) exceeded the GAC of 9.5.

#### Made Ground (Western Area)

3.2.11 The following CoC have been identified from the screening of made ground in the western area:

- Asbestos was recorded by the chemical testing laboratory in four samples:
  - BH6 at 0.5m as chrysotile loose fibres,
  - BH6 at 1.0m as chrysotile loose fibres,
  - CPT3 at 0.5m as chrysotile loose fibres,
  - CPT3 at 1.0m as chrysotile loose fibres,
- Alkaline pH at two locations – BH11A (9.84) and BH10A (11.62) values exceeded the GAC of 9.5.
- Benzo(a)pyrene at one location – BH7 (510mg/kg) compared to a GAC of 38mg/kg.

### **Discussion**

3.2.12 Asbestos has been identified at four shallow locations and is therefore likely to be encountered during the earthworks. Most of the other exceedances will be mitigated from a human health perspective through the presence of hard standing or landscaping inert cover. However, the benzo(a)pyrene exceedance of 510mg/kg in BH7 may need further assessment if this material is likely to be disturbed during construction.

## **3.3 Controlled Waters Risk Assessment**

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### **Risks to Aquifer**

#### Soil Leachability Testing

3.3.1 Generic screening of 31 soil leachate test results from the ground investigation was undertaken against Water Quality Standards (WQS). The exceedances are summarised in the table below.

Table 3.1: Summary of Potential Leachate Risks to the Aquifer

Determinand	WQS	Number of Exceedences	Range of Values Recorded
<b>Alkaline pH</b>	>10	1	11.18
<b>Acid pH</b>	<6.5	1	6.22
<b>Ammoniacal Nitrogen</b>	0.389mg/l	11	0.39mg/l to 5.08mg/l
<b>Total Cyanide</b>	0.005mg/l	6	0.006mg/l to 0.021mg/l
<b>Arsenic</b>	10µg/l	6	13µg/l to 37µg/l
<b>Lead</b>	10µg/l	12	14µg/l to 145µg/l
<b>Nickel</b>	20µg/l	1	61µg/
<b>Selenium</b>	10µg/l	1	20µg/l
<b>Benzo(a)pyrene</b>	0.01µg/l	3	0.03µg/l to 0.13µg/l
<b>Sum of four polyaromatic hydrocarbons</b>	0.1µg/l	2	0.23µg/l to 0.34µg/l

3.3.2 It should be noted that the limits of detection for benzo(a)pyrene, bis(2-ethylhexyl) phthalate and hexachlorobutadiene are in excess of the screening values.

#### Groundwater Sampling

3.3.3 Generic screening of groundwater test results from the fourteen monitoring visits identified WQS exceedences for the following determinands but not from every sample on every monitoring visit.

- pH
- Ammoniacal nitrogen
- Sulphate
- Free cyanide
- Total cyanide
- Arsenic
- Boron
- Benzo(a)pyrene

- Sum of four speciated Polyaromatic Hydrocarbons
- Aromatic C10-C12
- Aromatic C12-C16
- Aromatic C16-C21

3.3.4 It should be noted that the limits of detection for bis(2-ethylhexyl) phthalate, vinyl chloride, 1,2-dibromoethane, 1,2-dibromo-3-chloropropane, hexachlorobutadiene are in excess of the screening values.

3.3.5 Most of the exceedances are marginal (less than one order of magnitude) and are unlikely to pose an unacceptable risk to drinking water. However, there are a few exceedances that are one or more orders of magnitude higher than the screening values and these are highlighted below:

- Ammoniacal nitrogen exceeds the WQS in most samples by one order of magnitude although occasional samples from BH13, WS20, WS21 and WS22 recorded concentrations two orders of magnitude higher.
- Sulphate exceeds the WQS by one order of magnitude in a few samples; BH7, BH4D (deep), BH11, BH13 and BH4.
- Arsenic exceedances are no more than one order of magnitude higher than the WQS and are generally recorded in BH7, BH4D (shallow), BH15, but also in BH4D (deep), BH13, BH11, WS20, WS21 and WS22 on occasions.
- Exceedances of benzo(a)pyrene were recorded in BH4D, BH4, WS20, WS21, WS22 and are generally less than one order of magnitude higher than the screening value. However, a maximum concentration of 1.87µg/l was recorded in WS22 during visit eight on 4th October 2018.
- Total PAH exceeded the WQS on only nine occasions and were generally less than one order of magnitude higher than the WQS. However, two samples recorded concentrations greater than one order of magnitude – WS22 – 5.46µg/l on 4th October and WS20 – 1.54µg/l on 29th November.
- Petroleum hydrocarbons are generally below the screening values apart from WS21 and BH13 in the last two monitoring visits where aromatic C12-C16 hydrocarbons were recorded up to 163µg/l. Test results above

the limit of detection were also recorded for aromatic C10-C35 hydrocarbons indicating the possible presence of diesel.

### Risks to River Yare Surface Water

#### Soil Leachability Testing

- 3.3.6 Generic screening of 31 soil leachate test results from the ground investigation was undertaken against Water Quality Standards (WQS). The table below summarises the exceedences.

Table 3.2: Summary of Potential Leachate Risks to Surface Waters

Determinand	WQS	Number of Exceedences	Range of Values Recorded
Cyanide	0.001mg/l	6	0.006mg/l to 0.021mg/l
Arsenic	25µg/l	1	37µg/l
Copper	3.76µg/l	18	4µg/l to 80µg/l
Nickel	8.6µg/l	1	11µg/l
Mercury	0.07µg/l	1	0.1µg/l
Lead	1.3µg/l	23	2µg/l to 145µg/l
Zinc	6.8µg/l	21	7µg/l to 644µg/l
Anthracene	0.1µg/l	1	0.13µg/l
Benzo(a)pyrene	0.00017µg/l	3	0.03µg/l to 0.13µg/l
Fluoranthene	0.0063µg/l	21	0.02µg/l to 0.2µg/l
Naphthalene	2µg/l	1	3.75µg/l
Bis(2-ethylhexyl)phthalate	1.3µg/l	1	4µg/l
Phenol	7.7µg/l	1	11µg/l
Aromatic hydrocarbons C <sub>8</sub> -C <sub>10</sub>	20µg/l	1	21µg/l
Aromatic hydrocarbons C <sub>12</sub> -C <sub>16</sub>	2µg/l	1	11µg/l

- 3.3.7 It should be noted that the limits of detection for cyanide, phenols, cadmium, hexavalent chromium, mercury, benzo(a)pyrene, fluoranthene, 1,2,4-trichlorobenzene, 2,4-dichlorophenol, bis(2-ethylhexyl) phthalate, butylbenzyl phthalate, phenol and aromatic C5-C7, C10-C12, C12-C16, C16-C21 and C21-C35 hydrocarbons are in excess of the screening values.

#### Groundwater Sampling

- 3.3.8 Generic screening of groundwater test results from the 14 monitoring visits identified WQS exceedances for the following determinands but not from every sample on every monitoring visit.

- Free cyanide
- Total cyanide
- Arsenic
- Copper
- Mercury
- Zinc
- Anthracene
- Benzo(a)pyrene
- Fluoranthene
- Phenol
- Trichloroethene
- Aromatic C9-C10
- Aromatic C10-C12
- Aromatic C12-C16
- Aromatic C21-C35

- 3.3.9 Most of the exceedances are marginal (less than one order of magnitude) and are unlikely to pose an unacceptable risk to surface waters. However, there are a few possible patterns that may indicate an impact has previously occurred, as detailed below:

- Trichloroethene and 1,2-dichloroethene are recorded above the limit of detection in BH4 (shallow and deep wells) in most of the monitoring visits. Trichloroethene is recorded above the screening value of 10µg/l in BH4D (deep) during each of the first five monitoring visits. The concentrations recorded range from 14µg/l to 20µg/l. 1,2-dichloroethene concentrations only vary from 1µg/l to 12µg/l (compared to a WQS of 50µg/l). This would suggest an impact has occurred in the past but in the absence of

significantly elevated concentrations of any other VOC's a significant risk is not considered to exist. This location is on the western side of the river.

- Hydrocarbons were not recorded above the limit of detection during the first six visits. However, aromatic hydrocarbons were recorded above the limit of detection in wells on the eastern side of the river from visit seven (30th August 2018), particularly BH13, WS20, WS21 and WS22 until the final two monitoring visits; the concentrations did not exceed 53µg/l. However, the last two monitoring visits recorded an increase in the number of locations recording concentrations above the limit of detection, particularly for aromatic C16 to C21 (up to 97µg/l). WS21 recorded aromatic hydrocarbons up to 163µg/l (C12 to C16).
- Aliphatic hydrocarbons were generally less than the limit of detection except for a few occasions when BH4D, BH10, WS21 and WS22 recorded speciations above the limit of detection up to 80µg/l.
- Hydrocarbon odours were recorded in BH14 and WS21 on the eastern side of the river during the drilling works. Elevated hydrocarbon concentrations within the groundwater have also been recorded in a similar area but only during the final two sampling visits. The elevated concentrations are for the aromatic C9 to C35 fractions and have a maximum concentration of 163µg/l and exceed the WQS for these fractions. An impact appears to have occurred but it is unclear why the last two sampling visits recorded exceedances and the previous visits generally did not.
- Elevated arsenic was recorded in BH15 only up to a maximum concentration of 75µg/l and elevated cyanide was commonly recorded in BH15 and BH4D up to 0.227µg/l.
- Fluoranthene was recorded in most samples during most visits and the results are generally in the range of 0.01µg/l to 0.05µg/l. However, occasional results for WS20, WS21, WS22, BH12B and BH4D (shallow) are recorded an order of magnitude higher, up to 0.48µg/l. WS22 also recorded a maximum concentration of 2.33µg/l. This same sample from WS22 (4th October 2018) also recorded elevated benzo(a)pyrene (1.87µg/l), the highest recorded during the monitoring as well as the only phenol exceedance and one of two anthracene exceedances (the other being WS20).

### Discussion

- 3.3.10 The ground investigation recorded some olfactory evidence of hydrocarbons in WS21, BH14 and BH6.
- 3.3.11 Sampling of groundwater from monitoring well installations (adopting best practice of purging) identified some exceedances of the conservative generic groundwater screening values for metals, inorganics and hydrocarbons.

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Most of these exceedances are less than one order of magnitude greater than the screening values and are therefore not considered to be indicative of significant contamination.

- 3.3.12** However, there is some evidence of organic contamination (polyaromatic hydrocarbons, volatile organic compounds and petroleum hydrocarbons) and to a lesser extent metals and non-metals in the groundwater across the Principal Application Site indicating the groundwater has been impacted previously and has the potential to impact the surface water of the River Yare.
- 3.3.13** The soil leachate WQS exceedances are generally less than one order of magnitude above the screening values and indicate that there is a theoretical potential for an impact to occur. However, the Principal Application Site will be generally hard standing, thus limiting the degree of rainfall percolation through the made ground and hence the concentrations recorded suggest the made ground would not pose a significant risk to Controlled Waters.
- 3.3.14** In view of the above, it is considered that the absence of test results that consistently exceed the screening values at each monitoring visit indicates that there is unlikely to be an unacceptable risk to the identified receptors and hence specific remediation to target existing groundwater exceedances is not considered necessary.
- 3.3.15** The groundwater monitoring test data has also been assessed on a strata by strata basis. This has not identified any significant difference in the exceedances between the different strata or from one side of the river to the other. This would suggest there is hydraulic continuity between the different strata.

## **3.4 Groundwater Levels**

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- 3.4.1** Monitoring of groundwater levels in relation to Ordnance Datum was undertaken on eight occasions following the completion of the intrusive ground investigation works and the data is summarised in Tables 3.3 and 3.4 below.
- 3.4.2** The tables do not include the data for BH4A, BH10 or BH12B; the response zones in these wells cross the made ground / natural ground boundary and therefore the exact source of the ground water cannot be confirmed.



**Table 3.3: Summary of Ground Water Level Monitoring in the Eastern Study Area**

Stratum	Minimum (mOD)	Maximum (mOD)	Observations
<b>Made Ground</b>	-	-	No standalone monitoring wells within the made ground
<b>Natural Ground</b>	-0.18	0.77	-

**Table 3.4: Summary of Ground Water Level Monitoring in the Western Study Area**

Stratum	Minimum (mOD)	Maximum (mOD)	Observations
<b>Made Ground</b>	-1.66	0.09	-
<b>Natural Ground</b>	-0.33	0.19	-

### Hydraulic Gradient

- 3.4.3 The groundwater monitoring data obtained to date appears to indicate the hydraulic gradient is towards the River Yare from both the western area and the eastern area as would be expected. However, it should be noted that the groundwater monitoring data may be subject to tidal fluctuations which could affect the recorded levels.

### Hydraulic Continuity

- 3.4.4 The superficial deposits are likely to be in hydraulic continuity with the Crag Group due to the absence of any continuous low permeable strata separating these aquifers.
- 3.4.5 Similar groundwater quality characteristics across the Principal Application Site and the proximity to the tidally influenced River Yare also indicate that the mixing of groundwater between the superficial deposits and the Crag Group is likely to be occurring.
- 3.4.6 The regional Chalk Group aquifer is essentially protected by the overlying London Clay Formation, which is considered to significantly reduce the potential risks of any groundwater pollution present migrating to the chalk within the study area.

### Assessment of Saline Intrusion

- 3.4.7 The two most recent sets (14th November and 29th November 2018) of groundwater testing included results for electrical conductivity in order to make an assessment of saline intrusion. The results indicate that there is some influence from seawater across the Principal Application Site in both shallow and deep groundwater monitoring wells. It is noted that pile materials should take into account the potential presence of saline water.

### 3.5 Ground Gas Risk Assessment

3.5.1 To date, nine rounds of ground gas monitoring have been undertaken by NPL on the following dates:

- 17th August 2018 – excludes BH7 and window sample locations WS20-WS22,
- 30th August 2018 - excludes BH7 and window sample locations WS20-WS22,
- 4th October 2018 – excludes BH7,
- 18th October 2018 - excludes BH7,
- 1st November 2018 - excludes BH7,
- 14th November 2018 - excludes BH7,
- 29th November 2018 - excludes BH7,
- 11th December 2018 - excludes BH7,
- 20th December 2018 – only BH7 was monitored on this occasion.

3.5.2 A control building and a plant room will be constructed as part of the bridge and therefore this gas assessment will inform the design of those buildings.

3.5.3 Atmospheric pressure varied as summarised in Table 3.5 below during the monitoring period:

*Table 3.5: Summary of Atmospheric Pressure Recorded during Gas Monitoring Visits*

Date	Atmospheric Pressure	Trend
17/8/18	1010	Steady
30/8/18	1020	Steady
4/10/18	1022	Steady
18/10/18	1024	Steady
1/11/18	1001	Steady
14/11/18	1022-1021	Falling
29/11/18	1002	Steady
11/12/18	1026	Steady
20/12/18	1003	Steady

3.5.4 The results of the gas monitoring are presented in Annex B.1 of the Interpretative Environmental Ground Investigation Report (Appendix 16C of the Environmental Statement). The table below presents Gas Screening

Values (GSV) which have been calculated in accordance with C665 for each gas monitoring well.

*Table 3.6: Summary of Ground Gas Monitoring Results*

Exploratory Hole	Max Flow Rate (l/hr)	Max Methane (% v/v)	Max Carbon Dioxide (% v/v)	Methane GSV	Carbon Dioxide GSV	Characteristic Situation
<b>BH4</b>	0.1	0	4.8	0	0.000048	1
<b>BH4A</b>	0	0	5.1	0	0	1
<b>BH4D Shallow</b>	1.1	0	10.6	0	0.1166	2
<b>BH4D Deep</b>	1.0	0	10.1	0	0.101	2
<b>BH6</b>	0.1	0	0.9	0	0.0009	1
<b>BH7</b>	0	0	4.7	0	0	1
<b>BH10</b>	0.1	0	1.5	0	0.0015	1
<b>BH11</b>	1.1	1.1	6.1	0.0121	0.0671	1
<b>BH12B</b>	0.1	0	3.6	0	0.0036	1
<b>BH13</b>	0.1	0.8	0.3	0.0008	0.0003	1
<b>BH15</b>	0	0	0.5	0	0	1
<b>WS20</b>	0	0	0.1	0	0	1
<b>WS21</b>	0	0	0.1	0	0	1
<b>WS22</b>	0	0	0.2	0	0	1

**3.5.5** The above GSV's range between zero and 0.1166 and indicate most monitoring wells are classified as Characteristic Situation 1, with two locations (BH4D deep and BH4D shallow) being Characteristic Situation 2. However, BH4A, BH11 and possibly also BH4, BH7 and BH13 exhibit gas concentrations that could classify these as Characteristic Situation 2 should gas flow increase at these locations.

**3.5.6** No gas protection measures above and beyond standard construction are required for the areas classified as Characteristic Situation 1 whereas areas classified as Characteristic Situation 2 are likely to require gas protection measures. However, the only buildings to be constructed on the Principal Application Site (control room and the plant room) are both located on the bridge abutments above ground level, cantilevered from the sides of the abutments. It is therefore considered that no pathway exists for ground gas to migrate into either of these proposed buildings and hence no gas protection measures are required for the design.

## 4 Conceptual Site Model

### 4.1 Introduction

4.1.1 This Section summarises the Conceptual Site Model (CSM) from the WSP Interpretative Environmental Ground Investigation Report (Appendix 16C of the Environmental Statement). Plausible source-pathway-receptor contaminant linkages have been refined in line with industry good practice (principally CLR11 (Ref 16D.4)).

4.1.2 Table 4.1 provides the potential contaminant linkages that are considered to be plausible for the future use of the Principal Application Site. Where mitigation measures are proposed in the table below, these are detailed in the outline CoCP (document reference 6.16) and secured via a requirement in the DCO.

*Table 4.1: Summary of Plausible Contaminant Linkages*

Potential Contaminants	Potential Pathways	Potential Receptors	Comments
<b>Free asbestos fibres in made ground soil</b>	Inhalation of asbestos fibres.	Future site users Future maintenance workers	Extensive hard standing will restrict exposure following construction but exposure during construction and during maintenance works cannot be discounted. The presence of asbestos elsewhere within the made ground cannot be discounted therefore if made ground materials are placed in landscaping areas, a capping layer will also need to be considered to minimise the risk to site users and adjacent site users

Potential Contaminants	Potential Pathways	Potential Receptors	Comments
			from inhalation of fibres.
<b>Contaminants in soil</b>	Dermal contact, ingestion and inhalation of contaminated made ground, soil particles and fugitive dust.	Future site users Future maintenance workers	Detected potential contaminants limited to benzo-a-pyrene (2 locations), pH (ten locations) and lead (one location).  Extensive hard standing will restrict exposure at most locations except where landscaping is proposed where an inert capping will be required.
<b>Leachable contaminants and contaminants in groundwater</b>	Vertical leaching from impacted soil and lateral migration of impacted groundwater derived from on-site sources.	Superficial Secondary (A) aquifers and bedrock Principal Aquifer.  River Yare surface water	Groundwater appears to have been impacted slightly by inorganic determinands and at a few locations (principally WS22) by hydrocarbons.  There is a theoretical risk to surface waters from leachable contaminants in soil including minor hydrocarbon exceedances.  Extensive hard standing will limit rainfall percolation and leachate potential and the identified exceedances of the

Potential Contaminants	Potential Pathways	Potential Receptors	Comments
			<p>WQS criteria are generally not significantly elevated.</p> <p>Whilst a potential contaminant linkage has been identified, an unacceptable risk to controlled waters is considered unlikely to occur due to the limited contamination identified.</p>

## 5 Piling Risk Assessment

### 5.1 Pile Type and Method

- 5.1.1 Due to the inherently variable nature of the Made Ground, the soft compressible nature of the Superficial deposits including Breydon Peat and Tidal River and Creek Deposits and the high loads required to support the structures, piled foundations are considered the most appropriate technique for the Scheme.
- 5.1.2 The Applicant's construction Contractor's tender design has identified that the following techniques will be adopted at the Scheme:
- Combi piles comprising driven open toe steel tube and interconnecting driven steel sheet piles to form the bridge abutment cofferdam. These will transfer the bridge load through the made ground and superficial deposits into the underlying Crag Formation.
  - Pre-cast concrete driven piles for the highway embankment approaches to the bascule bridge. These will transfer the embankment load through the made ground into the underlying superficial deposits.
- 5.1.3 Driven piles provide the most effective solution for the ground conditions present on the Applicant Site (ie. predominantly granular soils). Bored piles would not be as suited to the ground conditions present due to the risk of 'blowing sands' and disturbance of the sands at the pile toe which could compromise the integrity of the bridge foundations. Driven piles also avoid the need for disposal of pile arisings and the use of drillings fluids such as bentonite hence eliminating the risk of pile arisings and spillages entering the River Yare. Noise and vibration from driven piles present a nuisance risk due to the proximity of residential properties and businesses and will need to be adequately mitigated by selection of appropriate driving heads and vibratory plant.
- 5.1.4 Driven piles can introduce preferential migration pathways due to the smooth surface of the piles (in the case of the proposed precast concrete and steel tubes). However, due to the limited contamination (i.e no significant plumes of hydrocarbons, solvents or other mobile / leachable contaminants) identified at the proposed piling locations (highway embankments and bridge abutments), it is considered that an unacceptable risk to groundwater is unlikely to occur. It is also noted that vertical hydraulic continuity is likely to exist between the superficial deposits and the underlying Crag Group and hence piling will not introduce any new migration pathways.
- 5.1.5 Driven piles can also allow potentially contaminated soils to be dragged along the shaft of the pile or be pushed ahead of the pile toe while driving.



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However, this is not considered to represent an unacceptable risk due to the limited contamination identified at the piling locations.

### Design Responsibility

- 5.1.6 Specific pile design is the responsibility of the specialist contractor who will complete the detailed design of the Scheme based on the available ground information, the loads to be carried, the preferred construction sequence and their own proprietary techniques.
- 5.1.7 As detailed in the outline CoCP (document reference 6.16) and secured via CoCP Requirements, the detailed piling design will follow regulatory guidance and take full cognisance of any contaminated soils and groundwater identified on the Principal Application Site. Appropriate site management and pile installation quality control measures will be in place during pile installation.

## 5.2 Pollution Scenarios and Mitigation Measures

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- 5.2.1 Environment Agency guidance document 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention' (2001) (Ref 16D.3) presents guidance on the potential environmental and human health risks associated with different piling techniques. Six possible pollution scenarios are identified and described, representing situations where there is concern that piling or penetrative ground improvement operations have potential to cause a risk to receptors:

**Scenario 1** - Creation of preferential pathways, through a low permeability layer (an aquitard), to allow potential contamination of an underlying aquifer;

**Scenario 2** - Creation of preferential pathways, through a low permeability surface layer, to allow upward migration of landfill gas, soil gas, or contaminant vapours to the surface;

**Scenario 3** - Direct contact of site workers and others with contaminated soil arisings which have been brought to the surface;

**Scenario 4** - Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of pile materials (where the secondary effects are to increase the potential for contaminant migration);

**Scenario 5** - The driving of solid contaminants down into an aquifer during pile driving; and

**Scenario 6** - Contamination of groundwater and, subsequently, surface water by concrete, cement paste, or grout.

**5.2.2** Where potential contaminant linkages have been identified, mitigation measures have been outlined and these are detailed in the outline CoCP (document reference 6.16) which is secured by a requirement in the DCO. A summary of each pollution scenario is shown in Table 5.1 below. The identification of potential “contaminant linkages” is a key aspect of the evaluation of potentially contaminated land. An approach based on the UK CIRIA report C552 (Ref 16D.5) has been adopted within this table and the matrices used to generate the risk level are presented in Annex A.

**5.2.3** In view of the controlled waters contamination assessment and the absence of any significant soil based contamination summarised in Section 3 above, the potential for contamination of groundwater from the proposed piling activities is considered to be LOW.

#### **Pollution Scenario 1 – Creation of Preferential Pathways through an Aquitard, to Allow Potential Contamination of an Underlying Aquifer**

**5.2.4** It is assumed that piles would penetrate through made ground and be founded in either the superficial deposits (Secondary A aquifer) in the case of the precast driven piles supporting the embankment approaches or in the Crag Group in the case of the combi piles for the bridge support foundations. The soils encountered on site are predominantly granular with no continuous low permeability surface layers being identified and hence are likely to be in hydraulic continuity. Therefore, the proposed piling technique (ie. driven) is not considered to create new preferential pathways for any contamination present. It is also noted that only limited contamination has been identified at the proposed piling locations. Scenario 1 is considered to represent a low risk.

#### **Pollution Scenario 2 – Creation of Preferential Pathways through a Low Permeability Surface Layer, to Allow Upward Migration of Soil, Gas or Contaminant Vapours to the Surface**

**5.2.5** Piles have the potential to create a pathway for any soil gas or contaminant vapours to migrate to the surface. Gas monitoring undertaken and reported in the Interpretative Environmental Ground Investigation report (Appendix 16C of the Environmental Statement) identified that concentrations of methane and carbon dioxide are generally below threshold values (1.0% v/v and 5.0% v/v, respectively) with associated low flow rates once steady state has been reached. Based on the monitoring data, most monitoring locations are classified as Characteristic Situation 1 (Very low risk) with two locations being Characteristic Situation 2 (Low risk). Scenario 2 is considered to represent a low risk for the Principal Application Site due to the proposed end-use (bridge structure/ highway/ landscaping) and the absence of any significant concentrations of ground gas. The only proposed buildings (control room and plant room) are to be founded above ground level and

cantilevered off the side of the bridge abutments and therefore no gas pathway exists.

### **Pollution Scenario 3 – Direct Contact of Site Workers and others with Contaminated Soil Arisings that have been brought to the Surface**

- 5.2.6 WSP's Interpretative Environmental Ground Investigation report (Appendix 16C of the Environmental Statement) has identified only limited contamination present, mainly in the made ground deposits. All made ground was tested for the presence of asbestos and chrysotile fibres were identified in four soil samples (from BH6 and CPT3) located to the west of any proposed bridge supports. It is possible that asbestos fibres could be present in made ground in other areas of the Principal Application Site and hence shallow soils could pose a potential risk to construction workers and third parties.
- 5.2.7 On the basis that appropriate health and safety training, planning and monitoring will be in place for the works the risks are anticipated to be low and contractors will be made aware of the potential issues associated with coming into contact with potentially contaminated material. There will be no pile arisings due to the piling technique adopted by the Contractor.
- 5.2.8 The Contractor should ensure that all construction workers wear appropriate PPE/RPE and the application of mitigation measures such as the dust suppression are implemented in any areas where excavations are undertaken. It is considered that employing appropriate measures, wearing suitable PPE/RPE and the fact that site workers will have limited exposure to excavated soils will prevent Scenario 3 from being a significant concern and the risk is considered to be very low.

### **Pollution Scenario 4 – Direct Contact of the Piles or Engineered Structures with Contaminated Soil or Leachate Causing Degradation of Pile Materials (where the Secondary Effects are to Increase the Potential for Contaminant Migration)**

- 5.2.9 With regard to the potential for contaminated soil or leachate causing degradation of pile materials, appropriate chemical resistant concrete / steel should be employed for the piles in accordance with guidance provided in 'BRE Special Digest 1 Concrete in Aggressive Ground' (Ref 16.D.6) for all strata encountered. This is considered not to be a significant issue and should not pose lasting impact to the Principal Application Site or the wider environment. The pile type adopted by the Contractor (ie. driven steel tubes and precast concrete piles) will be fabricated off-site and result in improved quality control compared with cast in-situ concrete piles.
- 5.2.10 No Non-Aqueous Phase Liquid (NAPL) has been identified and as such the opportunity for degradation of piles is limited. However, consideration of pile material should be given during design and an appropriate material selected

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for use. The potential for degradation of materials under Scenario 4 is therefore considered to be low.

### **Pollution Scenario 5 – The Driving of Solid Contaminants down into an Aquifer during Pile Driving**

- 5.2.11 There is a risk that potentially contaminated soils could be dragged along the shaft of the pile or be pushed ahead of the pile toe during pile driving due to the piling techniques adopted by the Contractor. However, Scenario 5 is considered to represent a low risk due to the limited contamination present.

### **Pollution Scenario 6 – Contamination of Groundwater and Subsequently, Surface Waters by Concrete, Cement, Paste or Grout**

- 5.2.12 The driven piles selected by the Contractor (precast concrete and steel tubes) are fabricated off site and hence the risk of pollution by spillages of concrete or arisings during pile installation does not require further consideration. Good site practices should be employed to prevent escape of concrete, cement paste and grout, particularly with regard to spillages of such materials into the River Yare if any in-situ concreting is undertaken. Scenario 6 is therefore considered to represent a low risk assuming good site management practices.

## **5.3 Existing Infrastructure**

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- 5.3.1 Consideration will be given to the safeguarding of existing buried services, pursuant to the relevant draft protective provisions contained within the DCO (document reference 3.1).

## **5.4 Risk Matrix and Pollution Scenarios**

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- 5.4.1 Table 5.1 presents the risk matrix and pollution scenarios. Reference should be made to Annex A for a description of the methodology and risk descriptors.

*Table 5.1: Piling Works Risk Matrix with Pollution Scenarios*

<b>Risk Scenario</b>	<b>Severity of Risk</b>	<b>Probability of Risk Occurring</b>	<b>Comments</b>	<b>Does the Pile Design Sufficiently Mitigate Risk?</b>	<b>Risk Level CIRIA 552</b>
<b>1. Creation of preferential pathways through an aquitard.</b>	<b>Medium -</b> Pollution of sensitive controlled waters (surface waters or aquifers).	<b>Unlikely</b> – Proposed piles will likely be founded in the Crag Group but new preferential pathways are unlikely to be created as no continuous low permeable strata exist above the Crag Group. Also, it is noted that only limited contamination has been identified at the piling locations.	The shallow groundwater is already likely to be in hydraulic continuity with the Crag Deposits and hence the piles will not create an additional pathway	Yes	<b>Low Risk</b>
<b>2. Creation of preferential pathways through a low permeability surface layer allowing migration of soil gas or</b>	<b>Medium -</b> Chronic (long-term) risk to human health.	<b>Unlikely</b> - Gas monitoring undertaken identified that all levels of methane and carbon dioxide are generally below threshold values (1.0% v/v and 5.0% v/v, respectively) with associated negligible	Limited ground gas identified. No pathway exists as the only buildings proposed are not founded on the ground.	Yes	<b>Low Risk</b>

Risk Scenario	Severity of Risk	Probability of Risk Occurring	Comments	Does the Pile Design Sufficiently Mitigate Risk?	Risk Level CIRIA 552
contaminant vapours to the surface		flow rates once steady state has been reached.			
<b>3. Direct contact of site workers and others with contaminated soil arisings</b>	<b>Minor</b> - Requirement for protective equipment during site works to mitigate health effect.	<b>Unlikely</b> – Limited contamination of near surface soils identified; asbestos identified at 4 locations. There will be no soil arisings from the piling techniques adopted by the Contractor (ie. driven). Based on control measures, any contact with potential contaminated soils will be mitigated.	Appropriate control measures and correct selection of PPE/ RPE and training for staff will mitigate any risks from any contaminated soil encountered including asbestos.	Yes	Very Low Risk
<b>4. Direct contact of the piles or engineered structures with contaminated soil</b>	<b>Medium</b> – degradation of piles and structures.	<b>Unlikely</b> – No NAPL was identified. Appropriate chemical resistant concrete / steel will need to be employed for the piles in	Appropriate pile material selection required. The driven piles adopted by the Contractor will be	Yes	Low Risk

Risk Scenario	Severity of Risk	Probability of Risk Occurring	Comments	Does the Pile Design Sufficiently Mitigate Risk?	Risk Level CIRIA 552
or leachate causing degradation of materials		accordance with BRE Special Digest 1.	fabricated off-site under stringent quality control measures.		
<b>5. The pushing of solid contaminants down into an aquifer during pile driving</b>	<b>Medium</b> - Pollution of sensitive controlled waters (surface waters or aquifers).	<b>Unlikely</b> – Potential risk of any near surface contamination present being dragged along the pile shaft or being pushed ahead of the pile toe while driving. However, pollution is not considered likely due to limited contamination identified at piling locations.	Limited contamination identified at piling locations.	Yes	Low Risk
<b>6. Contamination of groundwater and subsequently, surface waters by wet concrete,</b>	<b>Medium</b> - Pollution of sensitive controlled waters (surface	<b>Unlikely</b> – The driven piles adopted by the Contractor will be fabricated off-site and hence spillages of concrete or arisings into the River Yare	If wet concrete, cement paste or grout is proposed, good site practice should be employed to avoid	Yes	Low Risk



Risk Scenario	Severity of Risk	Probability of Risk Occurring	Comments	Does the Pile Design Sufficiently Mitigate Risk?	Risk Level CIRIA 552
<b>cement paste or grout</b>	waters or aquifers).	during pile construction do not require further consideration.	spillages into the River Yare or impacting the aquifer.		

## 6 Conclusions and Requirements

### 6.1 Conclusions

- 6.1.1** Due to the inherently variable nature of the Made Ground and the soft, compressible, near surface soils, piles founded in the superficial deposits or Crag Group are considered the most appropriate solution for the proposed bascule bridge and the approach embankments. The Contractor has adopted driven piles; combi piles comprising steel tubes with interconnecting sheet piles for the bascule bridge foundations and precast concrete piles for the embankments. Limited contamination has been identified from analysis of soils, leachate and groundwater results (mainly in the near surface soils) but it is noted that the near surface soils are likely to be in hydraulic continuity with the Principal Aquifer (Crag Group) at depth so the use of piles will not create additional pathways for migration of any contamination present.
- 6.1.2** A detailed review of the groundwater levels and also the chemical composition of groundwater (including electrical conductivity) within the Superficial Deposits (Tidal River or Creek Deposits, North Denes Formation, Breydon Formation and Happisburgh Glacigenic Formation) and underlying Principal Aquifer (Crag Formation) identifies that the strata are in hydraulic continuity and that there is saline intrusion in both shallow and deep groundwater samples retrieved from borehole installations. This is as expected due to the lack of any continuous low permeable strata separating the Superficial Deposits and the Crag Formation. It is also considered that the groundwater will be in hydraulic continuity with the River Yare although it is noted that the river is subject to tidal influence at this location.
- 6.1.3** The proposed driven pile solution provides the most effective solution for the ground conditions present on the Site (ie. predominantly granular soils). Driven piles also avoid the need for disposal of pile arisings and the use of drillings fluids such as bentonite hence eliminating the risk of pile arisings and spillages entering the River Yare. Driven piles can introduce preferential migration pathways due to the smooth surface of the piles (in the case of the proposed precast concrete and steel tubes). However, due to the limited contamination identified at the proposed piling locations, it is considered that an unacceptable risk to groundwater is unlikely to occur and no additional pathways will be created as a result of using driven piles as the Superficial Deposits and underlying Crag Deposits are already in hydraulic continuity.
- 6.1.4** Mitigation measures will be required if construction workers come into contact with excavated soils, including (but not limited to) dust suppression and the wearing of appropriate PPE/RPE. This will be the responsibility of the piling contractor and managed accordingly. Details are given in the outline CoCP (document reference 6.16).

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- 6.1.5 The driven piles should be constructed of suitable materials taking into consideration the chemical composition of the soil encountered on the Principal Application Site including the potential presence of saline water.
- 6.1.6 On review of the ground investigation data, the proposed piling works are not considered to represent a significant risk to local controlled waters or human health receptors. A risk assessment adopting the approach in UK CIRIA Report C552 (Ref 16D.5) assesses the risk to be LOW.
- 6.1.7 Specific pile design will remain the responsibility of a specialist contractor who will complete the detailed design of the Scheme based on the available ground information, the loads to be carried, the preferred construction sequence and their own proprietary techniques.
- 6.1.8 The detailed piling design will follow regulatory guidance and take full cognisance of any contaminated soils and groundwater identified on the Principal Application Site. Appropriate site management and pile installation quality control measures will be in place during pile installation.

## 6.2 Requirements

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- 6.2.1 On the basis of this assessment, the following will be detailed in the outline CoCP (document reference 6.16) and secured via full CoCP Requirements.
- Use of appropriate pile materials to be resistant to the chemical composition of soil encountered on the Application Site including the potential presence of saline water.
  - Due to limited soil contamination (predominantly in the near surface soils and groundwater), appropriate dust suppression measures should be undertaken and site workers should wear suitable PPE/ RPE.
  - Quality Assurance and Quality Control (QA/QC) measures should be identified and adopted prior to piling works being undertaken. These are primarily for construction quality and structural performance. However, they are also equally relevant to mitigate environmental risk, for example spillages of oil/hydrocarbons during the construction process (re-fuelling). The relevant measures should ensure that the foundation pile solution techniques are carried out correctly and in an appropriate manner so that the risk assessment and conclusions remain valid. Such QA/QC procedures will normally be agreed between the contractor, client, and relevant regulators.

## Annex A: Risk Descriptors

**A.1.1.1** The identification of potential “pollutant linkages” is a key aspect of the evaluation of potentially contaminated land. An approach based on the UK CIRIA report C552 (Contaminated Land Risk Assessment: A Guide to Good Practice, 2001) has been adopted within this report. For each of the pollutant linkages, an estimate is made of:

- The potential severity of the risk; and
- The likelihood of the risk occurring.

**A1.1.2** Table A-1 presents the classification of the severity of the risk:

**Table A-1: Severity of Risk**

Severe	Acute risks to human health; Major pollution of controlled waters (watercourses or groundwater)
Medium	Chronic (long-term) risk to human health; Pollution of sensitive controlled waters (surface waters or aquifers)
Mild	Pollution of non-sensitive water resources.
Minor	Requirement for protective equipment during site works to mitigate health effects; Damage to non-sensitive ecosystems or species

**A1.1.3** The probability of the risk occurring is classified by criteria given in Table A-2.

**Table A-2: Probability of Risk Occurring**

High Likelihood	Pollutant linkage may be present, and risk is almost certain to occur in the long term, or there is evidence of harm to the receptor.
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term.
Low Likelihood	Pollutant linkage may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Unlikely	Pollutant linkage may be present but the circumstances under which harm would occur are improbable.

**A1.1.4** An overall evaluation of the level of risk is gained from a comparison of the severity and probability as presented in Table A-3.

**Table A-3: Comparison of Severity and Probability**

		Severity			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very high risk	High risk	Moderate risk	Moderate / low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low Likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate / low risk	Low risk	Very low risk	Very low risk

A1.1.5 Table A-4 then provides a description of the typical consequences and potential actions required following each risk definition.

**Table A-4: Qualitative Risk Assessment - Classification of Consequence**

Classification	Definition
Very High Risk	Severe harm to a receptor may already be occurring, or a high likelihood severe harm will arise to a receptor, unless immediate remedial works / mitigation measures are undertaken.
High Risk	Harm is likely to arise to a receptor, and is likely to be severe, unless appropriate remedial actions / mitigation measures are undertaken. Remedial works may be required in the short-term, but likely to be required over the long-term.
Moderate Risk	Possible that harm could arise to a receptor, but low likelihood that such harm would be severe. Harm is likely to be mild. Some remedial works may be required in the long-term.
Moderate / Low Risk	Possible that harm could arise to a receptor, but where a combination of likelihood and consequence results in a risk that is above low, but is not of sufficient concern to be classified as mild.  Limited further investigation may be required to clarify the risk. If necessary, remediation works are likely to be limited in extent.
Low Risk	Possible that harm could arise to a receptor. Such harm, at worst, would normally be mild.

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Very Low Risk

Low likelihood that harm could arise to a receptor. Such harm is unlikely to be any worse than mild.

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## References

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