The Norfolk County Council (Norwich Northern Distributor Road (A1067 to A47(T))) Order

Flood Risk Assessment - Addendum

Planning Act 2008

Infrastructure Planning

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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This document is submitted in relation to the application for a proposed development by Norfolk County Council to the Planning Inspectorate, under the Planning Act 2008.

The application is for the Norfolk County Council (Norwich Northern Distributor Road (A1067 to A47(T))) Order, to grant development consent for the construction of a new highway running west-east between the A1067 Fakenham Road and the A47 Trunk Road at Postwick, including improvements to the existing highway network to the north and north east of Norwich.

This document comprises part of the application documents and relates to Regulation 5(2)(a) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009.

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A. Introduction

A.1.1 This report is an addendum to the Environmental Statement (ES), Volume 1, Chapter 14 Road Drainage and the Water Environment (Document Reference 6.1) and ES Volume 2, Chapter 14 Flood Risk Assessment (Document Reference 6.2) that supports the Development Consent Order (DCO) application for the Norfolk County Council (NCC) (Norwich Northern Distributor Road (NDR) (A1067 to A47(T))) Order (PINS reference No. TR010015). This addendum will make references to and should be read in conjunction with these two reports, hereafter referred to as the 'DCO ES water chapter' and 'DCO Flood Risk Assessment (FRA)' respectively.

A.1.2 Consultation with the Environment Agency has been undertaken throughout the design and planning process, and further consultation was completed post submitting the final DCO application.

A.1.3 This report addresses comments received from the Environment Agency since the DCO application was submitted, relating to the impacts on the water environment and flood risk. The report considers two main concerns:

i. The potential impact of road runoff and accidental spillage on groundwater quality and integrity through the proposed unlined swales; and

ii. The potential for poorly infiltrating lagoons (where the half drain times exceed 7 days) to cause localised flooding.

A.1.4 The landowner of land in and surrounding Rackheath Springs has requested a summary of the likely impacts of the NDR on water quality and flooding.

A.1.5 This Addendum report sets out and addresses the concerns of the Environment Agency (Appendix A) and the landowner of Rackheath Springs, with references to the original ES water chapter and FRA where appropriate and presents further mitigation should significant effects be identified.

B. Consultation

B.1 Groundwater risk assessment

B.1.1 At a meeting with the Environment Agency on 15th January 2014 to discuss the draft Habitats Regulation Assessment (HRA) for the proposed Norwich NDR, the Environment Agency raised concerns regarding the potential risk to groundwater from unlined swales proposed as a first step for the conveyance and treatment of road runoff. The minutes of this meeting are provided in Appendix A.

B.1.2 During consultation with the Environment Agency the need to line the swales was not discussed. However, a formal letter from the Environment Agency dated 23rd January 2014 (see Appendix A) states "*The proposed drainage outlined…refers to the use of unlined swales, which would allow infiltration to occur. Although we are satisfied that the HRA has shown no adverse impact on the Special Area of Conservation (SAC) via groundwater…, our position is that swales used across the NDR should be lined in all but low environmental sensitive location. We have previously highlighted the need for three treatment steps to be employed to protect groundwater (and surface waters) along the route. Allowing infiltration via unlined swales would result in subsequent treatment train components being by-passed, and would make pollution from accidental spills much harder to contain. It should be clearly demonstrated as part of the application that the proposed drainage scheme will appropriately protect both surface and groundwater quality*."

B.1.3 An email to Marcin Kurek from Martin Barrell of the Environment Agency dated 23rd June 2014 and subsequent letter dated 3rd July 2014 raised further questions in response to a draft version of this report (see Appendix A). These have been addressed in the sections stated against their comments below:

- Review the groundwater risk assessment where the receiving groundwater body is classified as a Principal aquifer (Crag or Chalk) of regional or local importance. This has been addressed in Section C.5 and Appendix B.5.
- Request to monitor groundwater levels in the vicinity of Lagoon 4 at the detailed design phase to ensure no higher groundwater levels are present within the sand and gravel layer.

B.2 Poorly infiltrating lagoons

B.2.1 A draft FRA for this scheme dated November 2013 was sent to the Environment Agency for consideration. The Environment Agency responded in a letter dated 28th November 2013 (Appendix A). A letter was sent back in response to this letter dated 2nd December 2013 and formed Appendix F of the DCO FRA.

B.2.2 The Environment Agency have requested further assessment and design information for lagoons with poor half drain down times (exceeding 7 days) compared to the industry required standard of 24 hours. This was true for lagoons 13 (14 days), 13A (29 days), 22 (25 days), 23 (8 days), 24 (66 days) and 25 (125 days). This has been addressed in Section D.

B.2.3 The Environment Agency's letter dated 3rd July 2014 raised further questions in relation to infiltrating lagoons in response to a draft version of this report (see Appendix A). These have been addressed in the sections stated against their comments below:

- Provision of full basin drainage calculations (including the proposed infiltration trenches) to demonstrate the half drain down times have been correctly modelled (including OL29 catchment flows for Lagoon 25). See MicroDrainage results in Appendix C.3 and lagoon spreadsheet in Appendix C.4.
- Final estimated unsaturated zones beneath all lagoons to be presented - see Table 4.3 in Appendix C.6 and paragraph D.3.2.

B.3 Landowner response

B.3.1 The landowner of Rackheath Springs and the surrounding land has requested a more detailed summary of the impacts of the proposed Scheme

B.3.2 A meeting took place on 12th March 2014 with Mr Papworth, a land consultant acting on behalf of the owner of the Trafford Estate, which includes the sensitive Rackheath Springs site. The land owner was concerned that the road runoff from the NDR would adversely affect water quality in the Rackheath Springs lakes and streams. The drainage proposals for this area were discussed in detail. NCC agreed to provide a simplified plan with an explanation of the current proposals. This is provided in Section E of this report.

B.3.3 The letter from the Environment Agency dated 3rd July 2014 requested further clarification on the treatment steps provided at Lagoon 18 that discharges to Dobbs Beck. An additional treatment step would be required if part of the run-off is transported via a central bitumen channel only ahead of the lagoon. This is discussed further in paragraph E.3.8.

C. Groundwater risk assessment

C.1 Introduction

C.1.1 This Addendum report considers the Environment Agency's concerns, assessing the risk of accidental spillage and routine road run-off to groundwater (and surface water where applicable) through infiltration in unlined swales. This report also considers whether there are areas where lining of swales is necessary to prevent any significant adverse effects on groundwater.

C.1.2 This section also reports the latest understanding of groundwater levels along the route.

C.1.3 As explained in paragraph A.1.1, this assessment should be read in conjunction with DCO ES water chapter.

C.2 Overall approach and method

C.2.1 Routine runoff from operational roads contains both dissolved and particulate contaminants, including combustion products such as polycyclic aromatic hydrocarbons (PAHs), fuel and fuel additives, catalytic converter materials, metal from friction and corrosion of vehicle parts, lubricants and materials spread during gritting and de-icing have the potential to contaminate water bodies. There is also a risk that a spillage or vehicle fire may lead to an acute pollution incident, which is largely proportional to the risk of Heavy Goods Vehicle (HGV) road traffic collisions.

C.2.2 Based on the sensitivity of the receiving watercourses or aquifer, the requirements set out by the Environment Agency and suggested best practice in the SuDS Manual (CIRIA 2006), a three tiered treatment system has been applied comprising draining along grassed swales (unlined) to a primary lined lagoon, with discharge via a final infiltration lagoon (unlined). However, at Lagoons 17, 18 and 18A the second or third stage comprises another lined lagoon which discharges to surface water (see paragraph 14.7.10, Volume 1, Chapter 14). The treatment stages proposed at all lagoons locations are presented in Appendix B.1. All catchments, apart from those which drain to kerbs and gullies as the first network system, also benefit from a pre-treatment step as runoff flows over the grass verge prior to discharge to the grass swale.

C.2.3 Within the ES water chapter the risk of routine runoff on groundwater was assessed for the infiltration ponds only (third treatment step) and did not consider the impact of infiltration from runoff through the unlined swales (the initial treatment step). The groundwater risk assessment methodology in the Highways Agency (HA) guidance in the Design Manual for Roads and Bridges (DMRB) Volume 11, section 3, Part 10 (HD 45/09): Road Drainage and the Water Environment (hereafter referred to as HD45/09) (as described in paragraph 14.7.14 to 14.7.18, Volume 1, Chapter 14) has been used subsequently to assess the risk of infiltration from runoff to groundwater and surface waters through the unlined swales. The groundwater risk assessment was carried out for each drainage catchment where unlined swales are proposed. The drainage catchments and reference numbers are shown on Drawing No. MMD-233906-DT-0981-0987 (see Appendix B.3). The location of swales within these drainage catchments are shown on Drawing No. MMD-233906-DT-0815-0826 (see Appendix B.2).

C.2.4 Contaminants within road runoff and from accidental spillage have the potential to adversely affect groundwater and surface water quality, and the aquatic ecology and water users reliant on maintaining current water quality. Risk assessment methodologies withinHD45/09, as described in section 14.3 of the ES water chapter, has been used to assess the potential risks to groundwater and surface waters (where appropriate).

C.2.5 As described in paragraph 14.3.23 of the ES water chapter (Volume 1, Chapter 14), the calculated spillage risk return period must not be greater than 1 in 100 years (<0.01). In addition, the calculated spillage risk return period must not be greater than 1 in 200 years (<0.005) where spillage could affect:

- protected areas for conservation;
- important drinking water supplies; or
- important commercial activities.

C.2.6 These requirements have been reviewed in conjunction with the groundwater risk assessment results for the unlined swales, to determine whether additional measures i.e. the lining of swales, are required to protect groundwater or surface waters.

C.2.7 An assessment of the potentially significant effects of the proposed unlined swales along the NDR on groundwater and groundwater fed surface waters has been undertaken taking into account the risk assessment results, and using a source-pathway-receptor approach. The impact assessment process followed the HD45/09 guidance (as described in paragraphs 14.3.14 to 14.3.28, Volume 1, Chapter 14).

C.2.8 The study area for this assessment remains the same as described in paragraph 14.3.11 of the ES water chapter (Volume 1, Chapter 14). The area extends approximately 500m either side of the centre line of the route corridor, as shown on Drawing No. MMD-233906-DT-0684 (Volume 2, Chapter 14, Section R). The location of environmentally sensitive receptors, such as the River Wensum SAC, has been considered as part of this process addressing the Environment Agency's request that *"swales used across the NDR should be lined in all but low environmental sensitive location"*.

C.3 Revision to estimation of groundwater levels

Changes to Table 4.3 of FRA

C.3.1 Following further review of groundwater levels, Table 4.3 of the FRA has been amended as provided in Appendix C.6.

C.3.2 The maximum groundwater level of borehole BH15P5 has been corrected from 21.0mAOD to 20.38mAOD (error made).

C.3.3 Further investigation of groundwater levels observed in the borehole logs and long-term monitoring of the sand and gravel layer between chainage 2300 and 6000 has been undertaken. Localised perched water tables within the sands and gravels overlying the Corton Till have been observed intermittently along this section, reaching up to 30.9mAOD at BHP6. BHP6 is located 680m west of Lagoon 4 (chainage 3080). Trial pits extending from BHP6 eastwards to borehole BH227/228 (chainage 3975) did not encounter any water strikes at this depth. (Water strikes were encountered at BH227/228 at approximately 28.1mAOD located 800m south-east of Lagoon 4.) Chalk groundwater levels are likely to range between 20 and 23mAOD along this section. As such, the unsaturated zone beneath Lagoons 3, 4, 5, 6 and 6A are therefore likely to be considerably deeper than was previously presented in the FRA. This is discussed in Section D.3.

C.4 Risk assessment results

Risk of accidental spillage

C.4.1 The potential risk of accidental spillage on groundwater and surface water, and the need for pollution control measures, has already been assessed within the ES water chapter (paragraph 14.3.23, Volume 1, Chapter 14) and the results presented in Volume 1, Chapter 14, Section 14.7 and Volume 2, Chapter 14, Section Q. The pollution risk was estimated assuming the drainage system included no measures to mitigate risk i.e. the swales were not lined.

C.4.2 The spillage risk assessment considers the local water body type, Annual Average Daily Traffic (AADT), the percentage of HGVs using the road, the length of road and drainage catchment area, the type of road and presence of junctions, and the expected emergency response times should a spill occur.

C.4.3 For all drainage catchments the risk of spillage to surface water and groundwater is well below the maximum acceptable annual probability (<0.01 and <0.005 where appropriate). Based on this low risk score the guidance suggests no pollution preventions measures are required as part of the Scheme to reduce the potential impact of spillage risk (see paragraph 14.7.10 and 14.7.19).

C.4.4 As indicated above, the Environment Agency's letter dated 23rd January 2014 states *"Allowing infiltration via unlined swales would result in subsequent treatment train components being by-passed, and would make pollution from accidental spills much harder to contain".* However, it is considered that the need to provide pollution control measures (swale lining) should be based on an assessment of the probability of an accidental spill occurring. The results from the spillage risk assessment show an extremely low probability of an accidental spill occurring. As a result, no additional measures are considered necessary in the design i.e. the swales would not be lined.

C.4.5 In this context, it is noted that unlined swales are considered to provide a risk reduction factor for spillage of about 40% (see Table 8.1 in HD 45/09). Therefore the risk to groundwater (or surface water) from accidental spillage is reduced further by the presence of an unlined swale.

Risk to groundwater from routine runoff

C.4.6 The groundwater risk assessment considers eight parameters which influence the pollutant loading carried by routine road runoff, and the extent to which passage through soil to groundwater may modify the polluting potential of the runoff. These include parameters relating to the source (AADT, annual average rainfall and rainfall intensity) and the pathway function (soakaway geometry, the depth of the unsaturated zone, flow type, effective grain size and lithology). Professional judgement is then applied at the impact assessment stage taking into account any additional factors such as the presence of source protection zones (SPZs).

C.4.7 According to Table 3.2 of the Highways Agency HA103/06: Vegetated Drainage Systems for Highway Runoff (DMRB, Volume 4, Section 2, Part 1) grassed swales (similar to 'filter drains' as stated in the table) have the potential to remove certain contaminants before infiltration or the conveyance of the runoff to the next treatment step. As an initial form of treatment, grassed swales can remove up to 7% of metals, 52% of PAHs and 38% of total suspended solids through filtration and adsorption. However, during major rainfall events, infiltration to the unsaturated zone and the treatment capacity of the unlined swale are likely to be limited due to high flows. As a result, a larger proportion of contaminants would be treated in the primary (lined) or final lagoon structures.

C.4.8 The risk assessment was undertaken for each drainage catchment in which infiltration via swales could occur as an initial treatment step, with no pre-treatment in place. The risk assessment tables are presented in Appendix B.4 and the overall risk scores summarised in Appendix B.5.

C.4.9 The risk to groundwater is considered low (score <150) in 11 catchments, with medium risk (score ≥150 <200) in 13 catchments. No drainage catchments showed a high risk score (≥200).

C.4.10 Drainage catchment CA18 was split into two sections for the assessment (CA18A and 18B). This was a result of differences in underlying geology for the two sections. In section 18A the swale is located directly on the Crag which is a Secondary A aquifer[1]. In section 18B, the lower permeability Corton Till is present overlying the Crag aquifer. As a result, the risk to groundwater in section 18A was assessed as medium and the risk to groundwater in section 18B was low.

C.4.11 Similarly, drainage catchment CA13 was split in two sections for the assessment (CA13A and CA13B). The geology underlying catchment CA13A showed Crag at or just beneath the base of the swale. The risk assessment was therefore carried out using the properties of the Crag, which is considered a higher risk category based on the lower clay content and higher recharge rates. In contrast, the geology below catchment CA13B consists of

[1] A Secondary A aquifer has 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.

layers of glacial sand and gravels and Corton Till overlying the Crag and a deeper unsaturated zone.

C.4.12 Drainage catchment CA6 was also split into two sections for the assessment (CA6A and 6B) as discussed under 'Impact assessment and further mitigation' below.

C.5 Impact assessment and further mitigation

C.5.1 The potential for infiltration through the swales to cause a significant adverse effect on groundwater was determined using the impact assessment process (Chapter 5, HD45/09), with the assumption that all swales are unlined. The assessment process considered the groundwater feature, the attributes (e.g. springs and discharge to surface water, water supply), the importance of the feature (based on rarity and quality) and the potential magnitude of impact based on the groundwater and spillage risk assessment scores for each drainage catchment. The overall significance of effect was then based on the assessment of the importance and magnitude of impact.

C.5.2 The importance of the receiving groundwater body (or 'feature') is determined by the uppermost aquifer i.e. a 'very high to medium' importance for a Principal aquifer (level dependent on the resource it supports), and 'medium' importance for a Secondary A aquifer (e.g. within the glacial sands and gravels underlain by Corton Till).

C.5.3 Regardless of whether the groundwater risk assessment results were low or medium risk, all catchments were taken forward to the impact assessment stage, as the presence of highly sensitive receptors might trigger the need for mitigation (i.e. swale lining) regardless of the level of risk identified.

C.5.4 Swale lining is not considered necessary where Corton Till is present beneath the base of the swale and overlying the Principal aquifer below. Corton Till is present intermittently at various depths along the route of the Scheme. Corton Till within the unsaturated zone is considered sufficient to protect the underlying groundwater body. In groundwater studies, recharge through Till is generally taken as about 30 to 50 mm/year. The low recharge, equivalent on average to about 0.0001 m/day, results from a low rate of infiltration through the Till. Hence the infiltration through swales, located above Till, will be low. Any transfer of contaminants to formations below the Till should be insignificant.

C.5.5 The impact assessment table is presented in Appendix B.5.

C.5.6 Eight drainage catchments were identified in which there is the potential for routine runoff to have a significant (moderate) adverse effect on groundwater. These are CA1, CA4, CA5, CA6B, CA13A, CA16, CA17 and CA18A. The sections of grassed swales will therefore be lined to prevent infiltration and potential pollution to groundwater.

C.5.7 Swales within catchments CA1 are to be lined due to the shallow Crag layer overlying the Chalk and the close proximity to the groundwater fed River Wensum SAC. Drainage structures within catchment CA2 consist of impermeable kerbs and gullies serving the northern carriageway and a bitumen channel in the central reserve serving the southern carriageway. It is proposed to incorporate another treatment step to provide the necessary three treatment steps in this location. This is likely to be a lined filter drain located before the primary lagoon and is shown in Appendix C.7 (Drawing R1C093-R1-4951).

C.5.8 With the proposed swale lining in CA1and the additional treatment step serving CA2, for drainage catchments CA1 and CA2, the overall significance of effect on the River Wensum SAC from infiltration of routine runoff to groundwater is considered ‘neutral’. The Environment Agency has agreed with this conclusion as stated in their letter dated 3rd July 2014 (Appendix A) in response to a draft version of this document which states “*we can confirm we are satisfied in principle that an appropriate level of protection will be provided at the discharge point to ensure that there will be no adverse impact on the Wensum SAC via groundwater”.* The Environment Agency will continue to be consulted during the detailed drainage design phase.

C.5.9 Swales within catchments CA4 and CA5 are to be lined due to the shallow unsaturated zone within the Secondary A aquifer, the presence of an SPZ3 and a medium risk score in the groundwater risk assessment.

C.5.10 Groundwater level information was limited within drainage catchments CA6. An assessment was undertaken to estimate groundwater levels using:

- borehole log water strikes with a +/- 1m seasonal variation added (BH227 drilled in November 2007);
- the depth of borehole BHP47 which remained dry during the monitoring period; and
- maximum groundwater levels measured in the period of monitoring (2006 to 2013) in boreholes located in the catchments either side (BH6B and BHP57).

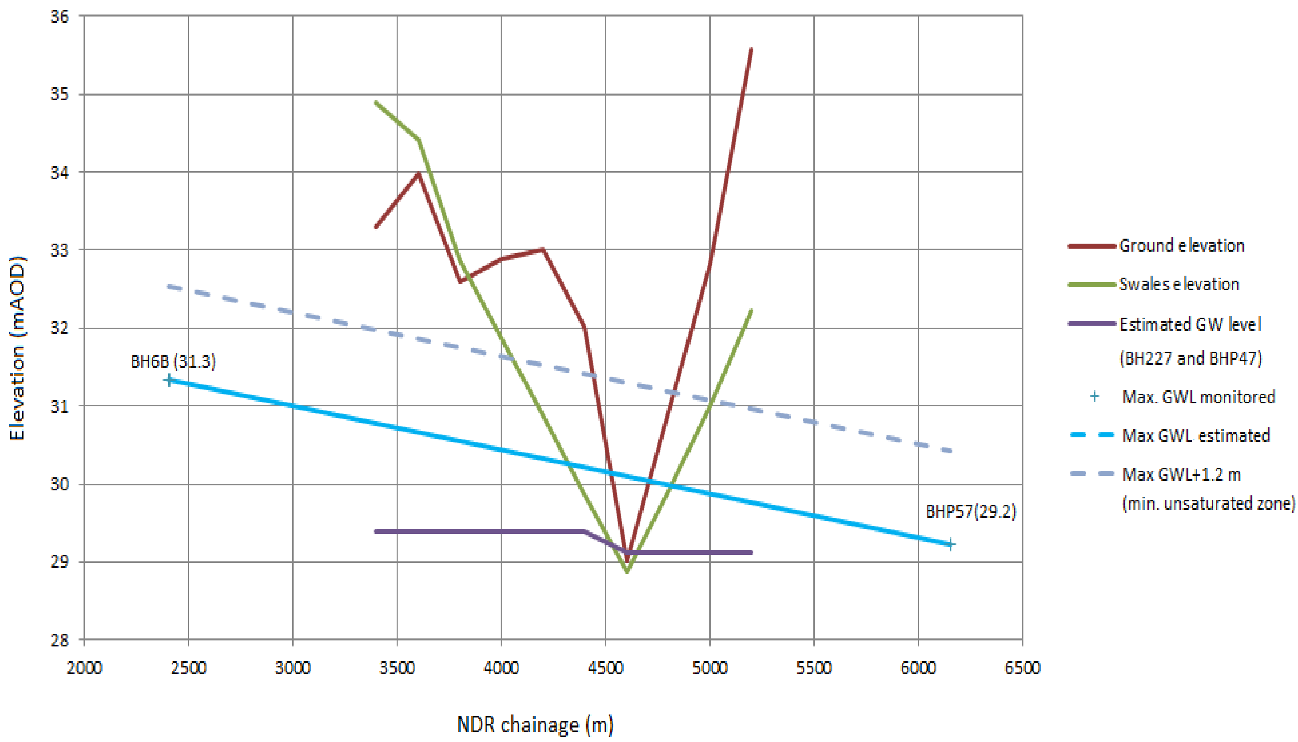
C.5.11 It should be noted that these groundwater levels were used to determine the unsaturated zone beneath the swales as strikes were evident in the location of the proposed swales along the route. However, these levels were not considered when determining the unsaturated zone beneath the lagoons for the reasons expressed in Paragraph C.3.3.

C.5.12 For catchment CA6B, the assessment indicates a moderate adverse impact on groundwater. To ensure the protection of groundwater resources, the Environment Agency advised previously that a minimum 1.2m of unsaturated zone should be present below all infiltration lagoons (letter dated 28 November 2013; reference number AE/2013/116937/01-L01). We have therefore applied this same minimum unsaturated zone beneath any unlined swale.

C.5.1 The maximum groundwater level data plotted in the graph in Figure 1 shows that the minimum 1.2m unsaturated zone may not be maintained between approximate chainages 4000 and 5050 in catchment CA6B. Therefore the swales will be lined throughout CA6B, taking into account the very shallow depth to the water table below the swale over a part of the catchment, and the absence of Till.

C.5.2 The lining of swales in drainage catchments CA13A, CA16, CA17 and CA18A will also be required due to the shallow unsaturated zone, the shallow depth of Till (or absence of Till) and the sensitivity of the groundwater-fed fishing lake 500m to the east of the proposed swales in CA16, CA17 and CA18A.

Figure 1. Cross-section for drainage catchment CA6.



C.6 Conclusions

C.6.1 The risk of accidental spillage along the proposed NDR is considered extremely low (<0.005).

C.6.2 Based on the risk of contaminants in routine runoff entering groundwater via the proposed unlined, infiltrating swales, the sensitivity of nearby receptors and the depth of the unsaturated zone, lining of swales or impermeable primary structures are proposed in eight drainage catchments (see Paragraph C.5.6).

C.6.3 The swales proposed within the NDR drainage design have been sized and modelled as lined structures. Hence there is no need to increase lagoon sizes in catchments where swale lining is proposed. The impact of the NDR on flood risk, identified in the FRA (Volume 2, Chapter 21 (Document Ref 6.2)) and summarised in Chapter 14 of Volume 1, remains unchanged.

D. Improvements to lagoon infiltration

D.1 Introduction

D.1.1 In response to the Environment Agency's letter dated 28th November (Appendix A) further risk assessments and design information associated with lagoons with poor half drain down times (exceeding 7 days) has been undertaken to inform this report section.

D.1.2 As explained in Section B, lagoons 22 (25 days), 24 (66 days) and 25 (125 days) had long half drain down times compared to the industry required standard of 24 hours. Other lagoons with long half drain down times included lagoons 13, 13A and 23. This section considers options to improve infiltration rates in all these lagoons, consequently reducing the half drain down time to less than 7 days.

D.1.3 In addition, since the publication of the original DCO FRA further modelling has been undertaken in order to more holistically assess the drainage network drainage to each lagoon (see Section D.6) and with updated infiltration rates at some lagoon locations. The results of this work have triggered the need to intercept and divert overland flow away from these lagoons and provide ditches or stone filled trenches adjacent to Lagoons 1 and 5 to manage overland flow separately. These are detailed in Section D.6.6.

D.2 Comments from the Environment Agency

D.2.1 Within the letter the Environment Agency raised concerns about the lagoons with half drain down times of more than 7 days. In particular, the risk of these lagoons not functioning correctly with prolonged standing water, causing further soil compaction and further decreasing the soils infiltration rate when considering the lifetime of the development. Although the lagoons have been sized to contain 1 in 100 year storage and a follow-on 1 in 10 year storage volume should the first volume not have drained away, the Environment Agency want further consideration of whether the water will drain away and further assessment of possible management or design measures to increase infiltration rates.

D.2.2 The letter requests that all infiltration lagoons with half drain down times longer than 48 hours should have an additional storage volume provided, not just the ones with a half drain time over 7 days. Based on the improved drain down times presented in this section, the need to provide this additional storage volume has been reassessed, and any locations where this is considered necessary details have been included to demonstrate that sufficient storage volume has been provided in the lagoons.

D.3 Revision to estimation of unsaturated zone

D.3.1 Since the publication of the DCO FRA, both groundwater levels and lagoon invert levels have been further reviewed. Table 4.3 of the FRA has subsequently been amended as provided in Appendix C.6.

D.3.2 A summary of the changes to Table 4.3 in relation to lagoon infiltration is given below:

- Invert levels at Lagoons 1, 4, 8, 9, 13, 13A, 20, 23, 24 and 25 have been updated to mirror recent developments to the detailed design at these locations. The levels represent the lowest level of the relevant infiltration trench. These have resulted in minor changes to the depth of the unsaturated zone calculated at these locations.

- An amendment to the reported maximum groundwater level of borehole BH15P5 has further changed the calculated unsaturated zone depths at Lagoons 8, 8A and 9. These are now 1.42m at Lagoon 8, 4.22m at Lagoon 8A and 1.12m at Lagoon 9.

- The depths of the unsaturated zone beneath Lagoons 3, 4, 5, 6 and 6A are now assessed based on groundwater levels in the Chalk aquifer, due to the presence of a perched water table at borehole BHP6 (see Section C.3.3). This involved the estimation of Chalk groundwater level contours, based on recorded data. The unsaturated zone beneath Lagoons 3, 4, 5, 6 and 6A are therefore likely to be considerably deeper than was previously presented in the FRA, as shown in Appendix C.4.

- Lagoons 29 and 30 have been removed from Table 4.3 in Appendix C.6, as these are under the auspices of the Postwick scheme and, as such, are covered by the Environmental Statement for that scheme.

D.4 Methodology

D.4.1 Infiltration lagoons associated with the proposed Scheme were designed using the drainage modelling package MicroDrainage (MD). Six lagoons are considered in this section: lagoons 13, 13A, 22, 23, 24 and 25. It is calculated that due to poor infiltration rates at these locations it will take more than seven days to fully empty; giving rise to the risk of overtopping during a follow-on storm event. This risk is further mitigated by designing these lagoons to accommodate a 100-year return period storm event with an additional allowance of 30% for anticipated climate change, plus a follow on 1 in 10 year storage volume within the minimum 300mm freeboard). These MicroDrainage files were presented in ES Volume 2 FRA, Appendix C.

D.4.2 The poor infiltration rate is largely a result of Corton Till formation present at the base of these lagoons. The geological cross-section showing the formation present at each location is provided in Appendix B.2 (Drawing numbers MMD-233906-DT-0815-0826).

D.4.3 Several options are available to manage or improve the drain down times at these lagoons. Four options are considered in this assessment:

- Option 1 – Provide a positive outfall to a nearby watercourse;
- Option 2 – Incorporate granular filled trenches in the base or sides of the lagoons by excavating part or the full depth of the poorly infiltrating layer (e.g. Corton till) and replacing with material possessing a higher infiltration rate. The better infiltration rate at the base of the infiltration trenches is assumed to be 0.1m per hour. This assumption is based on the BS 8004:1986, Figure 6 – Permeability and drainage characteristics of soils. According to this figure the rate is applicable to very fine sands, silts and clay-silt laminate, which is similar to Crag soil. It is not possible to carry out BRE compliant tests at these depths. The modelling will be based on an assumed rate (0.1m/hr).
- Option 3 – Install Aquacell infiltration trenches within part of the lagoon base to provide additional storage and promote infiltration in deeper layers where infiltration rates are higher e.g. within the Crag. This reduces the unsaturated zone by providing a void at depth for storage with infiltration promoted at the base (see Drawing ref PTPK1000-01A in Appendix C.1). No filtration occurs within the Aquacell therefore the depth of the available unsaturated zone will determine whether this is a suitable option to provide sufficient protection to groundwater quality.
- Option 4 – Provide a pipe connection between the poorly infiltrating lagoon and a nearby lagoon with a higher infiltration rate that has the capacity for the additional volume.

D.4.4 An assessment of the feasibility and cost of each option is provided in Section D.5.

D.5 Option selection

D.5.1 An overview of which design options were considered feasible at each lagoon is provided in Table D.1 below. Further explanation of how the preferred option was selected is provided in the text following this table.

Table D.1: Alternative design options

<table>
<tr><th>Lagoon no.</th><th>Option 1 – discharge to surface water</th><th>Option 2 – Infiltration trenches</th><th>Option 3 – Aquacell installation</th><th>Option 4 – Connection to nearby lagoon</th><th>Preferred option</th></tr>
<tr><td>13</td><td rowspan="2">No – Nearest watercourse is 1.7km north-east (tributary to Stone Brook)</td><td rowspan="6">Yes – Retains sufficient unsaturated zone (>1.2m) and improves infiltration.</td><td>No – Would allow some standing water</td><td>No – No suitable nearby lagoon.</td><td>Option 2 – Only suitable option</td></tr>
<tr><td>13A</td><td>No – Would allow some standing water.</td><td>No – No suitable nearby lagoon.</td><td>Option 2 - Only suitable option</td></tr>
<tr><td>22</td><td>Yes - Nearest watercourse is 1.2km south-west (Witton Run)</td><td>Yes – Sufficient unsaturated zone (3.65m).</td><td>Yes – Connection to lagoon 21 (good infiltration rate 0.36m/hr) with sufficient attenuation within lagoons 21 and 22 to accommodate flows for a 1 in 100 event.</td><td>Option 4 – Most cost effective</td></tr>
<tr><td>23</td><td>No – Nearest watercourse is 1.5km east (Witton Run)</td><td>Yes – Sufficient unsaturated zone (2.85m) and improved infiltration.</td><td rowspan="3">No – No suitable nearby lagoon.</td><td rowspan="3">Option 2 – Most cost effective</td></tr>
<tr><td>24</td><td>No – Nearest watercourse is 1.85km east (Witton Run)</td><td>Yes – Sufficient unsaturated zone (4.05m) and improved infiltration.</td></tr>
<tr><td>25</td><td>No – Nearest watercourse is 2km north-east (Witton Run)</td><td>Yes – Sufficient unsaturated zone (8.16m) and improved infiltration.</td></tr>
</table>

D.5.2 Lagoon 13 and 13A are located close to Norwich International Airport. Due to the risk of bird strike no standing water is permitted for a period more than 2 weeks to discourage bird use. Option 1 is not suitable for these sites due to the cost of constructing and purchasing land to provide a connecting pipe to the tributary of Stone Brook. Option 3 is also not considered viable on grounds of standing water. Due to the long distance and lack of gradient for flows between these lagoons and other lagoons nearby with higher infiltration rates, Option 4 is not considered viable. Option 2 is therefore the preferred option as the replacement material provided it would allow for the same unsaturated zone and filtration beneath the base of the lagoon (Drawing ref R1C093-R1-4901 in Appendix C.2).

D.5.3 All four assessed options are feasible at Lagoon 22. An estimated cost of constructing each option was compared to determine which option might be most suitable:

- Option 1 (£70k including design and land purchase fees) – Provide a restricted rate outfall from Lagoon 22 to the network of ditches around the field boundaries of Mr Keys land, a culvert under Broad Lane, underground pipes across RG Carter land and eventually out falling into the Witton Run (Drawing ref R1C093-R1-4902 in Appendix C.2).
- Option 2 (£1.1k) – Install 5m deep, 1m wide, 5m long infiltration trench within base of lagoon (Drawing ref R1C093-R1-4903 in Appendix C.2).
- Option 3 (£3.9k) – Installation of 5m deep, 1m wide, 5m long aquacell infiltration trench within base of lagoon.
- Option 4 (£10.4k) – Pipe connection from Lagoon 22 to Lagoon 21 including the construction of an additional headwall at each lagoon and 300mm diameter carrier drain between these headwalls. (Drawing ref R1C093-R1-4904 in Appendix C.2).

D.5.4 At lagoons 23, 24 and 25 the two options considered are Options 2 and 3. Although there is sufficient unsaturated zone beneath the base of the proposed Aquacells (Option 3) the preferred option has been selected based on the cost. The Aquacell trenches are 3.5 times more expensive than granular material filled trenches, saving a total of £35.3k. The preferred option is therefore Option 2 as shown on Drawing ref R1C093-R1-4900B (Lagoons 24 and 25) and R1C093-R1-4953 (Lagoon 23) in Appendix C.2.

D.6 Assessment of impacts

Impact on flood risk

D.6.1 The overall half-drain down times have been reassessed for these lagoons by modelling the lagoons as complex structures within MicroDrainage (MD) and the inclusions of revised infiltration rates where required. The drainage systems have previously been defined in plans R1C093-R1-5063 to 5087 “Outline Drainage Works Plan” with associated MD models to assess pipe and swale capacity and to determine attenuation and infiltration volumes in the lagoons. The MD models represented the highway drainage separately from the lagoons. To provide a more representative model of how the systems will operate hydraulically, the systems have now been combined in MD. The results of this exercise are summarised in an updated “Lagoon Details – combined models” spreadsheet which can be found in Appendix C.4, with the MicroDrainage model output shown in Appendix C.3.

D.6.2 The revised half drain down times with the preferred option to improve infiltration is presented in Table D.2.

Table D.2: Revised half drain down times

Lagoon no.	Method of improvement	Half drain down time (DCO ES and FRA)	Revised half drain down time
13	Option 2	> 7days	8120 minutes(5.6 days)
13A (overland flow only)	Option 2	> 7days	8640 minutes (6 days)
22	Option 4 - connection to Lagoon 21	> 7days (est. 8 days) *(Lagoon 22)*	2785 minutes (1.9 days) *(Lagoons 21 and 22)*
23	Option 2	> 7days	6980 minutes (4.8 days)
24	Option 2	> 7days (est. 25 days)	7200 minutes (5 days)
25	Option 2	> 7days (est. 23 days)	8640 minutes (6 days)

D.6.3 All lagoons now infiltrate in less than 7 days, hence the risk of overtopping and soil compaction has been reduced. The lagoons which still take more than 48 hours to half drain were designed to accommodate a 100-year return period storm event with an additional allowance of 30% for anticipated climate change, plus a follow on 1 in 10 year storage volume.

D.6.4 Further ground investigation will be required to confirm the level of Crag soils into which the base of the infiltration trenches will connect. The depth of the trenches may be adjusted to ensure a layer with a higher infiltration rate is reached whilst retaining an acceptable unsaturated zone.

D.6.5 The granular filled trenches in Option 2 will be regularly maintained to remove sediment accumulated at the surface. This will be achieved by the installation of a geotextile membrane approximately 300mm below the surface of the trench above which the membrane and granular fill will be cleaned and/or replaced to ensure it continues to function effectively.

D.6.6 The revised MD modelling and infiltration rates highlighted the need to revisit the design of overland flow ditches and culverts at Lagoons 1 and 5. The exclusion of natural runoff reduces the volumes of water in the lagoons during storm events and consequently reduces drain down times. The addition of a stone-filled trench and associated culvert, directing overland flow around the lagoons, would result in an acceptable drain down time of 1.8 days at Lagoon 1. At Lagoon 5 it would still remain greater than 7 days, at approximately 14 days. Lagoon 5 does, however, have the volumetric capacity for a 1 in 100 year event plus a follow-on 1 in 10 year event. The revised designs are shown Appendix C.7 (Drawings R1C093-R1-4951 and R1C093-R1-4952). As a result of these developments, Table 4.2 of the FRA is therefore amended as below:

Table D.3: Alternative design options

Catchment Reference	Road Chainage of Catchment Low Point (m)	Catchment Area (km^2)	Receiving Drainage Structure	Culvert Blockage or No Culvert Scenario		Culvert Operational Scenario (1:100 yr+30%CC)	
				Flooded Volume (m^3)	Maximum Flood Level (mAOD)	Flooded Volume (m^3)	Maximum Flood Level (mAOD)
OL01A	600	0.51	Spreader ditch	N/A	N/A	N/A	N/A
OL04	4650	0.23	450mm culvert	5300	30.35	1276	29.92

Impact on groundwater quality

D.6.7 The groundwater risk assessment results presented in Appendix O of the ES Volume 2 Chapter 14 remain correct for these lagoons. However, there is the potential for a change to the risk to groundwater where infiltration trenches are proposed, where the material within the unsaturated zone will change within the first 5m.

D.6.8 This risk is not applicable for Lagoon 13A receiving only overland flow (no routine runoff from the Scheme) or Lagoon 22 where no infiltration trenches are proposed. This is also considered not applicable for Lagoons 24 and 25, where even below the base of the infiltration trench there remains 4 and 8m of unsaturated zone respectively for the pathway of contaminants, providing protection to groundwater quality (see Appendix C.4).

D.6.9 For Option 2, if the trench is also assumed to have an infiltration rate of 0.1m/hr or more then the trench material is likely to consist of fine sands, silt and clay-silt laminate according to Figure 6 of the British Standard BS 8004:1986. This will also ensure a similar capacity to filter contaminants found in routine runoff before it reaches the groundwater. The infiltration trench material therefore can effectively form part of the unsaturated zone beneath a lagoon. As such, for the purposes of groundwater risk assessment, the invert level of the lagoon is used for the calculation of unsaturated zone rather than the base of the infiltration trench within the lagoon.

D.6.10 The revised groundwater risk assessments for Lagoons 13 and 23 are presented in Appendix C.5 and are summarised in Table D.3 below.

Table D.3: Groundwater risk assessment

Lagoon no. (Invert level of lagoon mAOD)	Depth of unsaturated zone (m)	DCO ES Volume 1 Chapter 14	Revised assessment based on Options presented in Table D.2		Number of treatment steps (mitigation)	Significant change in risk
		Groundwater risk assessment score	Formation below lagoon base with new infiltration trench	Groundwater risk assessment score		
13 (20.5)	5.6	142.5	**Informed by borehole BHP89** New granular fill (0-5 m) Crag (5-6.1m) Chalk (6.1m and below)	142.5	3	No
23 (23.4)	8.15	150	**Informed by borehole BH35P5** New granular fill (0-5 m) Crag – silty, fine and medium sand, changing to clayey silt at 6m BGL (5m and below)	150	2-3 (Two steps in sections where kerb and gullies proposed rather than grassed swales)	No

D.6.11 The risk to groundwater does not change based on the sustained unsaturated zone and presumed type of fill material, therefore no significant changes to the impact to groundwater is expected.

D.7 Conclusions

D.7.1 With the implementation of measures to improve infiltration, the half drain down times are now less than 7 days in all but Lagoons 5. This will reduce the risk of overtopping and further reduction in infiltration capacity of the soils at the base of the lagoons through water compaction.

D.7.2 The preferred option (Option 2) at Lagoons 13, 13A and 23 to 25 will not result in an increased risk to groundwater from routine runoff.

D.7.3 The preferred option (Option 4) at Lagoon 22 will not result in an increased risk to groundwater from routine runoff.

D.7.4 The review of groundwater levels in the vicinity of Lagoons 3 to 6A, 8 and 8A now suggest the unsaturated zone will be deeper, improving the protection of groundwater in these areas.

E. Summary of potential impacts on 'The Springs', Rackheath

E.1 Introduction

E.1.1 The route of the proposed Scheme passes within 100m of Ladies Wood, Church Carr and Springs County Wildlife Site (CWS) in Rackheath (hereafter referred to as 'The Springs').

E.1.2 This section summarises the water environment surrounding 'The Springs', identifies how the proposed Scheme design interacts with these water bodies and summarises the potential impacts of the Scheme on the area, as previously identified in the DCO ES water chapter and Flood Risk Assessment (FRA).

E.1.3 The study area for the ES water chapter extended approximately 500m either side of the centre line of the route corridor, with a total width of 1000m. This was extended further north-eastwards to incorporate the sensitive area of 'The Springs' The section of the proposed Scheme considered in this assessment is within 500m of 'The Springs' or drains to this area via the proposed road drainage systems (chainage 12,900 to 16,050m) (hereafter referred to as the 'Rackheath section').

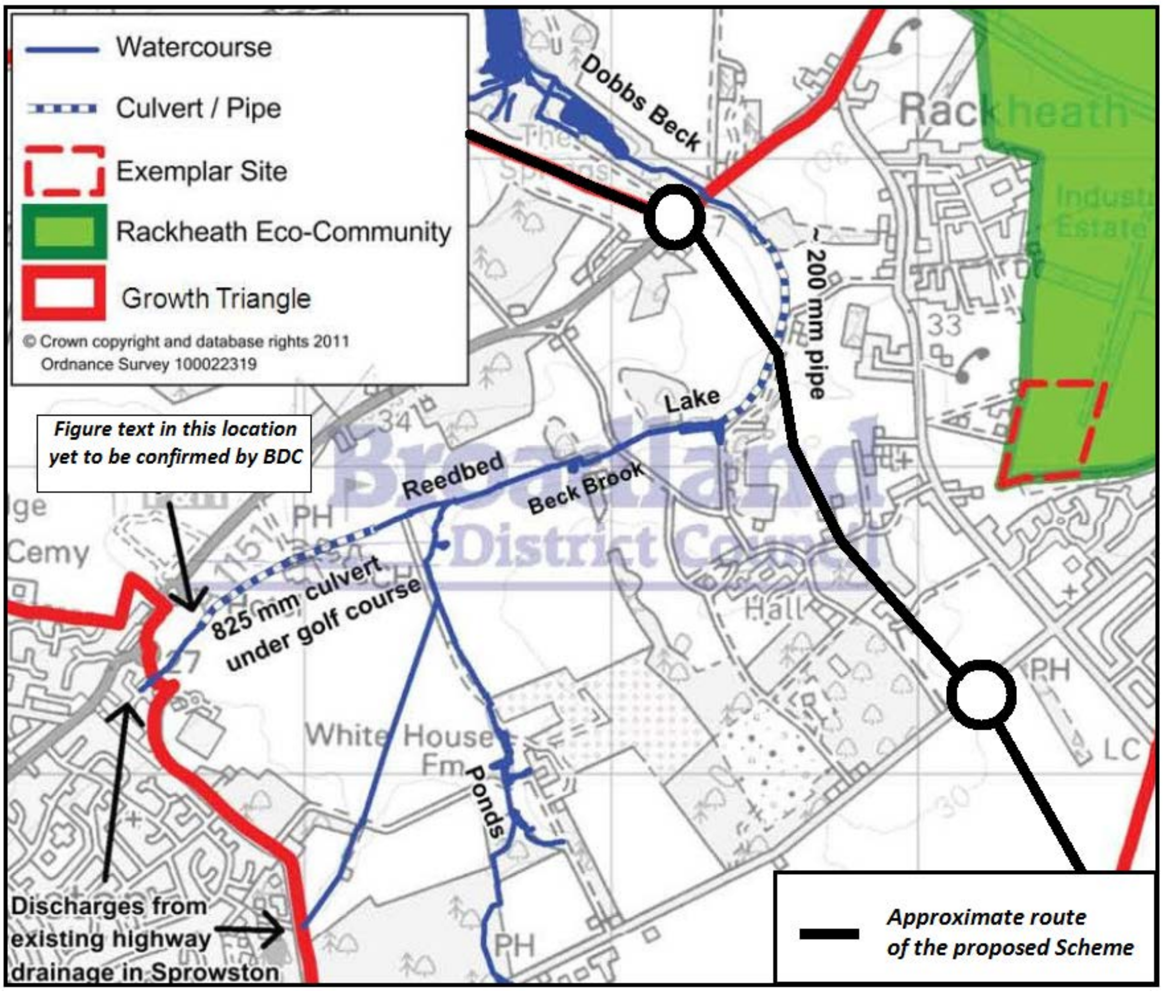
E.2 Baseline conditions

Surface water

E.2.1 The Rackheath section of the Scheme falls within the River Bure catchment. Tributaries in the vicinity of the Scheme that drain to the River Bure include Dobbs Beck, Spixworth Beck and Spixworth Brook. The Scheme crosses the catchment of Beck Brook which continues as Dobbs Beck immediately south of Wroxham Road. Dobbs Beck is a tributary of Spixworth Beck.

E.2.2 The Scheme crosses at the point where Beck Brook flows underground through a 200mm (approx.) diameter pipe connecting the 'Lake' (also known as the 'Dry Lake' on other OS maps) to a ditch comprising the Dobbs Beck just south of Wroxham Road. Water primarily leaves the lake as infiltration to ground. Any overflow is via the underground pipe.

Figure E.1: Dobbs Beck and associated drainage features



Source: Figure 4-6 extracted and adapted from the draft North East Norwich WCS provided by Broadland District Council (BDC) (June 2013)

E.2.3 A drainage survey of this area, undertaken by Birse in November 2012 (see ES Volume 2, Chapter 21: FRA, Section A), identified sections of this 200mm pipe that had collapsed. The pipe structure itself may no longer function to convey surface water between the Lake and Dobbs Beck, however the construction and back fill of the pipe trench with granular material is likely to maintain part, if not all, of this flow path to Dobbs Beck.

E.2.4 Flows in the ditch south of Wroxham Road also pass through a 200 mm (approximate) diameter pipe under Wroxham Road. North of Wroxham Road, Dobbs Beck is fed by a number of springs and surrounding field drains.

E.2.5 Both Dobbs Beck and the second lake to the north between Dobbs Beck and Spixworth Beck are to receiving discharges of road runoff via Lagoons 18 and 17 respectively.

E.2.6 A programme of surface water quality monitoring was implemented and samples taken at 'The Springs' at monthly intervals between September 2006 and June 2013. The purpose of the surveys was to establish the baseline water quality conditions, and to provide data for the assessment of the potential impact of road runoff to these waterbodies.

E.2.7 Samples from 'The Springs' show measurable levels of some Polycyclic Aromatic Hydrocarbon (PAH) compounds, which are typically found in road runoff, with four PAH compounds exceeding the drinking water standards. The source of these PAH compounds has not been specifically identified but is most likely to be runoff from the A1151 Wroxham Road, as runoff from the A1151 discharges into this location without any treatment. There are no other probable sources in this area. This theory is further supported by observed elevated concentrations of dissolved copper and total zinc.

Groundwater

E.2.8 The bedrock underlying the Rackheath section consists of Upper Chalk and Norwich Crag, both of which are classified by the Environment Agency as Principal aquifers. Principal aquifers may support water supply and/or river base flow on a strategic scale. Glacial deposits present on the higher ground consist of Glacial Sand and Gravel, alluvium and Norwich Brickearth which are 'Secondary A' aquifers capable of supporting water supplies at a local rather than strategic scale.

E.2.9 The Rackheath section falls within an area of high groundwater vulnerability due to the high leaching potential of soils, and lies partly within a groundwater Source Protection Zone (SPZ) 3 ('Total catchment area' surrounding a public water supply).

E.2.10 Between chainage 12,900 to 16000 the groundwater divide is south of the road and groundwater flow tends to be northwards away from the Wensum, towards 'The Springs'. Beyond chainage 16000, groundwater again flows southwards towards the River Wensum.

E.2.11 There is one main area of groundwater discharge along the route, at 'The Springs', located between 120 m and 50 m north of the Scheme between chainage 13250 and 14500.

E.2.12 A programme of groundwater monitoring was implemented and water samples collected from site investigation and groundwater level monitoring boreholes installed for the ES. The purpose of the monitoring was to establish an understanding of the seasonal variations in the baseline groundwater chemistry and levels. The monitoring also helped understand the relationship between the lakes at 'The Springs' and the groundwater table. A cross section through the two lakes and the monitoring boreholes suggests the lakes and Dobbs Beck should be receiving groundwater inflow from the Chalk in this area. (Detailed groundwater quality and level results are presented in ES Volume 2, Chapter 14: Road Drainage and the Water Environment, Section C.)

E.2.13 Generally the groundwater is good quality. Few contaminants associated with road runoff were detected in the samples taken.

Flood risk

E.2.14 A flood risk assessment (FRA) was submitted with the DCO application to consider the potential risks of flooding to and from the Scheme.

E.2.15 The FRA shows the Scheme is located in Flood Zone 1 where there is little or no likelihood of fluvial or tidal flooding. However, the road alignment will cross the catchment of Dobb's Beck near Rackheath where available surface water mapping indicates some flood risk from rainfall runoff (over- land flow). The depth, extent and duration of any flooding in this area is currently minimal, and the road will be built above the maximum flood levels and therefore removed from flood risk. In compliance with best practice, the highway drainage for the Scheme has been designed in line with SuDS principles to restrict runoff to greenfield discharge rates. Therefore flood risk due to surface water runoff will be mitigated to acceptable levels.

E.2.16 The proposed Scheme will cross 43 natural surface water catchment drainage areas. Whilst none of the catchments include an open watercourse at the Scheme crossing location, the catchments could pose a potential flood risk to the route as a result of overland flow during a storm event. The Scheme may also have the potential to increase flood risk elsewhere within a catchment if, for example, overland flow gathered upstream of an embankment.

E.2.17 The Environment Agency Flood Maps for Surface Water (FMfSW) indicate that the Scheme will cross an area of "deeper surface water flooding" (more than 0.3m deep) during a 1 in 30 and 1 in 200 rainfall event within the catchment of Dobbs Beck. This is supported by the Environment Agency maps of Areas Susceptible to Surface Water Flooding that shows the Scheme crosses just one area 'more' susceptible to surface water flooding. This vulnerability occurs where the route crosses the catchment of Beck Brook and Dobbs Beck. The overland flow catchment area for Dobbs Beck (OL20) at the intersection with the proposed route of the Scheme is 6.77km² (see Drawing No. MMD-233906-DT-0982-0983 in Appendix B.3).

E.2.18 There are no known records of groundwater or surface water flooding from Norfolk County Council, and no Highways Agency records of any known surface water issues along the proposed route, or within the immediate vicinity of the route. However, the lack of historic evidence may be because such flooding goes unreported.

Existing Road Drainage

E.2.19 Information on existing drainage is generally very poorly recorded for minor roads, including the minor roads crossed by the Scheme. Almost all minor roads in the area have no formal drainage. Road runoff from the edge of the carriageway generally drains into ditches or infiltrates into the soil. In some areas, kerbs exist with some drainage, for example on the Wroxham Road (A1151) which discharges into the watercourse at Rackheath.

E.2.20 Road runoff is not treated on these roads, and in most cases treatment would not be justified as the Annual Average Daily Traffic (AADT) levels are lower than 10,000 (vehicles per day). As there is no formal treatment of runoff along Wroxham Road (A1151) there are also no pollution control measures in the event of a significant accident.

E.3 Mitigation

Mitigation during construction

E.3.1 During construction, best practice for pollution prevention and water management, set out in the following documents, will have to be implemented as part of the overall Construction Environmental Management Plan (CEMP) as appropriate to the specific circumstances of the Scheme and where this is practicable to do so:

- Control of water pollution from construction sites – guide to good practice (CIRIA, 2002);
- Control of water pollution from linear construction projects (CIRIA, 2006); and
- Environment Agency Pollution Prevention Guidelines (PPG).

E.3.2 Monitoring of surface water and groundwater quality, groundwater levels and flows in the streams at ‘The Springs’ will commence six months prior to any pre-construction works. The monitoring will continue during construction at frequencies to be agreed with the Environment Agency.

E.3.3 Emergency response procedures will be developed and implemented to cover any incidents that might lead to release of pollutants to the aquatic environment (including spillages to ground).

Mitigation during operation

Mitigation strategy to protect water quality

E.3.4 There are two water bodies at 'The Springs' receiving runoff from the Scheme: (i) the second lake between Dobbs Beck and Spixworth Beck from Lagoon 17 and (ii) Dobbs Beck from Lagoon 18 and Lagoon 18A.

E.3.5 As agreed with the Environment Agency, the main mitigation measure taken to protect groundwater quality was to establish that 1.2 m or more unsaturated ground would exist between the base of an infiltrating system (swale or infiltration lagoon) and the underlying water table in high groundwater level conditions. The maximum groundwater levels observed during monitoring from 2007 to 2013 were used as a guide to high groundwater level conditions. Based on these levels it was necessary to line Lagoons 17 and 18, and provide a positive outfall to surface water. The need to line the grassed swales within the Rackheath section is discussed earlier in this report (Section C.5).

E.3.6 To minimise risk to surface water quality discharges of routine runoff to 'The Springs' will flow through a three tiered treatment system (Lagoon 17 and 18). For Lagoons 17 and 18, runoff will flow through a lined grassed swale, then discharge to a lined settlement pond, followed by a lined surface flow wetland. Carriageway alignment and safety considerations do not permit grassed swales on the roundabout draining to Lagoon 18A therefore a two tiered treatment train will be provided (kerb and gullies to a lined pond and a positive outfall to Dobbs Beck). Each treatment stage reduces the concentration of contaminants present in the road runoff to different degrees.

E.3.7 The conceptual design at Lagoon 17, 18 and 18A are shown on the drawings R1C093-R1-4907 and R1C093-R1-4908A (Appendix D.1). The drainage design will incorporate permanently wet surface flow wetlands within the second lagoon, with a hydro-brake controlling the outflow rate.

E.3.8 Only two treatment steps are provided at Lagoon 18 where part of the run-off is transported via a central bitumen channel only ahead of the primary lagoon. An additional step has been incorporated prior to the primary settlement lagoon of Lagoon 18 likely to consist of a filter drain between the outfall from the road and the primary lagoon (see drawing R1C093-R1-4908A in Appendix D.1).

E.3.9 All drainage networks will be constructed with measures to contain any accidental spillage of harmful substances. The measures will prevent the spillage reaching the final discharge point by containment within the initial lined settlement pond.

Mitigation strategy to manage flood risk

E.3.10 The Scheme has the potential to increase flood risk from changes to overland flow and increased runoff from impermeable areas. The potential increase in flood risk will be mitigated in the 'The Springs' area in the following ways:

- Drainage lagoons will be installed, capable of storing volumes of road runoff and overland flow for a 1:100 year event plus 30% for climate change;
- Culverts located at natural flow paths points under the road will be installed to control and direct overland flow (i.e. flow originating from outside the Scheme boundary). Spreader ditches are also proposed along the road edge or embankment toe. The ditches will direct flow to the culverts and promote infiltration; and
- The drainage lagoons will regulate discharge rates to surface waters at the existing greenfield runoff rates.

Mitigation strategy for private and public water supplies

E.3.11 As agreed with the Environment Agency, a default 50m radius SPZ1 has been assigned to all private water supplies used for drinking water and all infiltration systems have been excluded from within this zone to protect its integrity. This is applicable for supply a groundwater abstraction within this area located 400m north-east of where Dobbs Beck flows under Wroxham Road (Drawing no. MMD-233906-DT-0979 ref. GWAB-49 in Appendix D.2).

E.3.12 The DMRB groundwater risk assessment takes a source-pathway-receptor approach. This approach considers the pollutants potentially contained within the road runoff, the processes that may modify, contain or convey the pollutants through the soil and subsoil, and whether the pollutants are likely to reach the groundwater. The mitigation proposed to effectively treat runoff and contain accidental spillages is considered adequate to mitigate risks to protect the integrity of the supply. This mitigation has been discussed with and approved by the Environment Agency.

SuDS maintenance and monitoring

E.3.13 The culverts, spreader ditches, swales and attenuation lagoons proposed by the drainage design will be maintained in accordance with policies, standards and practices of NCC's Transport Asset Management Plan and The SuDS Manual (CIRIA, 2007).

E.3.14 NCC have agreed to install erosion protection measures at the discharge points from Lagoons 17 and 18, and at the downstream outfall point of all culverts conveying overland flow beneath the Scheme. Regular monitoring by NCC will be undertaken to ensure these measures are effective.

E.3.15 In order to maintain the efficiency of the SuDS elements of the proposed drainage design, regular maintenance will be required. It is anticipated that swales, filter trenches and detention ponds will require regular inspection, litter and debris removal, and grass cutting, as well as occasional maintenance such as sediment management and vegetation replacement to retain design capacities and functionality. As outlined in the NCC's Transport Asset Management Plan (2013/14-17/18), the routine maintenance of the Scheme and its associated drainage will be the responsibility of Norfolk County Council including the actions outlined in section 5.4.5 and 5.4.6 of the Plan.

E.4 Impacts of NDR construction and operation on Rackheath Springs

Construction

E.4.1 During construction, best practice for pollution prevention and water management will have to be implemented as part of the overall Construction Environmental Management Plan (CEMP) as appropriate to the specific circumstances of the Scheme and where this is practicable to do so.

E.4.2 During a major storm event there is the potential for sediment laden runoff to overwhelm site protective measures at locations protecting nearby watercourses and alter overland flows, however this impact would be temporary and localised. Due to the large overland flow catchment draining to Dobbs Beck, the risk is greatest in this location.

E.4.3 Assessment of potential impacts and significant effects during construction on Rackheath Springs are as follows:

- Change in surface water quality at Dobbs Beck and Spixworth Beck – a minor adverse (short-term) impact resulting in a slight adverse effect as a result of dilution and removal of waste products.
- Change in surface water quality (and flow) at Dobbs Beck - a minor adverse (short-term) impact resulting in a slight adverse effect upon biodiversity.

Operation

Potential impacts on flood risk

E.4.4 As shown on Volume 2, Chapter 14: Road Drainage and the Water Environment, Section R, Drawing No. MMD-233906-DT-0689, the Scheme is in close proximity to the environmentally sensitive area of 'The Springs'. This gives rise to a potential flood risk due to increased surface water runoff, as indicated in the FRA (Volume 2, Chapter 21: FRA). Greenfield runoff rates have therefore been used in the highway drainage design to size settlement and balancing ponds, with a controlled discharge point to 'The Springs' (see section 1.6.2 'Mitigation strategy to prevent flood risk'). The design incorporates SuDS and addresses the potential risk due to increased runoff.

E.4.5 The outfall from Lagoon 17 at 'The Springs' will discharge to the second lake that outfalls to Spixworth Beck. However, no additional flood risk is predicted for the Spixworth Beck due to the restricted greenfield runoff rate for the 1:100 year flood. A similar approach to the design of Lagoon 18A and 18 at 'The Springs' (chainage 14600) will ensure that flood risk is not enhanced by the Scheme.

E.4.6 It is therefore concluded that, in terms of flood risk, the Scheme meets the requirements of NPPF providing the proposed mitigation measures and SuDS design are employed.

Potential impacts on water quality

E.4.7 There was insufficient unsaturated zone available to help protect groundwater (less than 1.2m) due to high groundwater levels at Lagoons 17, 18A and 18 at 'The Springs'. Therefore these lagoons will be lined and discharged to surface water. The drainage design will incorporate permanently wet surface flow wetlands within the second lagoon, with a hydro-brake controlling the outflow rate.

E.4.8 During operation, the potential for pollutants from routine road runoff to have an adverse impact on the two surface water bodies receiving drainage discharges is considered low. Application of the DMRB surface water risk assessment indicates that the quantities of sediment and soluble copper and zinc entering surface waters are acceptable.

E.4.9 The low return periods for spillage risk suggest no additional pollution prevention measures would be required. However, due to the sensitivity of the receiving watercourses and aquifer, the requirements set out by the Environment Agency and suggested best practice in the SuDS Manual (CIRIA 2006), the three (or two) tiered treatment system has been applied as explained in Paragraph E.3.6.These treatment systems can provide a reduction in contaminants before runoff reaches the infiltration pond, reducing the risk to groundwater. For example, the reduction factors associated with the combination of a grass swale and settlement ponds are not taken into account in the assessment. Vegetated systems can produce a reduction of pollutants which exceed 60% in some circumstances.

E.4.10 The risk of a pollution incident arising from spillage at all drainage discharge points has been assessed and shows these are all well below maximum acceptable probability set out in HD45/06 (i.e. the probability of a spillage for any drainage network has been calculated to have an annual probability of less than 1%). This risk will be reduced further with the proposed measures to contain any accidental spillage of harmful substances (containment within the initial lined settlement pond).

E.5 Conclusions

E.5.1 During construction the overall effect of the Scheme during construction on surface water quality is predicted to be slight adverse at worst (not significant). During a major storm event there is the potential for sediment laden runoff to overwhelm site protective measures at locations protecting nearby watercourses and alter overland flows, however this impact would be temporary and localised.

E.5.2 During operation the overall effect on surface water quality is considered to be neutral to slight beneficial. A slight beneficial effect will result from the improvement of treatment to existing runoff from the A1151. Runoff from the A1151 currently discharges into the CWS without any form of treatment.

E.5.3 The overall effect of the Scheme on flood risk is predicted to be neutral to slight beneficial. The Scheme provides a new flow path between the Scheme and Dobbs Beck, along the dry valley, to convey flood flows. With the mitigation measures in place, no increase in flood risk is predicted.

E.5.4 With the appropriate mitigation measures for construction and operation (including maintenance) discussed in this chapter, there are a limited number of slight adverse effects and slight beneficial effects (i.e. not significant effects). As all the other effects are considered neutral, the overall effect of the Scheme on water resources and flood risk is concluded to be not significant.

Appendix A. Consultation

Ms Rebecca Day - Environmental Scientist
Mott MacDonald Group Ltd
Demeter House Station Road
CAMBRIDGE
CB1 2RS

Our ref: AE/2013/116937/01-L01
Your ref: GK/JF/RD/233906/FRA/01

Date: 28 November 2013

Dear Ms Day

DRAFT FRA FOR NORWICH NORTHERN DISTRIBUTOR ROAD (NDR)

Thank you for the opportunity to review the draft Flood Risk Assessment for this scheme, prepared by Mott MacDonald and dated November 2013. We appreciate your tight timescales associated with this project, and as such we have worked to put together the following comments in a short period. Please do come back to us if you have any further questions or require further clarity on any of the points raised.

We have previously requested (in our letter to Norfolk County Council dated 28 June 2013) that the actual half drain times of the basins that are over 7 days long were specified in the FRA, but these have not been provided. We calculate that the half drain times are 8 days for basin 22; 25 days for basin 24; and 23 days for basin 25; which are very long compared to the industry required standard of 24 hours.

The infiltration rate of 4 x 10^-7 m/s in basins 24 and 25 is very poor, typical of clay soils, and is not recommended for the use of infiltration drainage in any technical guidance. Therefore we still have concerns as previously expressed that the basins will not function correctly and will not drain sufficiently. Because of this we previously requested that the FRA provide details of whether it is expected that these basins would actually drain with the weight of water compacting the poor draining soils. The FRA has not provided any comments on whether it is considered that the soils will have sufficient infiltration potential to enable the surface water to drain over the lifetime of the development, with a consideration of the weight of water compacting the soils. The FRA states that the basins have been sized to contain an additional 1 in 10 year storage volume to account for a subsequent rainfall event that occurs before the first has drained away; however this does not address the issue of whether the water will drain away at all or whether it will be a permanent wet pond.

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If the water does not drain adequately then further measures will be required to ensure the basin remains dry and able to accept and accommodate the required rainfall events. The FRA should detail what future measures will be implemented, including possible management measures, should the basins be found to not drain adequately. We have also previously suggested that further measures to increase drainage rates could be investigated.

All basins with a long drain down time should have an additional storage volume provided, not just the ones with a half drain time over 7 days. So any basin with a half drain down time of greater than approximately 48 hours should provide an additional 1 in 10 year storage volume. The additional 1 in 10 year storage volume calculations need to be submitted to demonstrate that sufficient storage volume has been provided in the basins.

Some overland flow routes do not have culverts under the road, so are shown on the plans as flooding the fields adjacent to the road. It will need to be determined whether this increase in flood risk to the third party fields is acceptable, or whether the existing flow routes should be maintained as part of the development.

The calculation of the required culvert sizes is based on an assessment of the Greenfield hydrographs and runoff volumes. The Greenfield flow rates should also be determined using ReFH and used to determine the required culvert size.

Many of the culverted flow routes show areas of flooding in the normal non-blockage scenario. As above, it should be determined whether this is an acceptable increase in flood risk to the third party land. It should also be determined whether the residual flood risk in the event of a culvert blockage, which creates some large flood extents, is acceptable.

The report does not include the results of the infiltration testing. All the infiltration test results should be submitted (the logs showing the fall of water over time as well as the calculations) along with a map showing the test locations. The borehole logs should also be provided detailing the soil types and groundwater levels.

Considering groundwater specifically, to ensure the protection of groundwater resources, we normally require that for all infiltration lagoons the base (invert level) of the lagoon to be at least 1.2 metres above the maximum seasonal groundwater level at that location. In accordance with this, the text in section 3.1.5 states that: “the invert levels of the infiltration basins are to be at least 1.5m above the groundwater table”. However, Table 3.3 suggests that this level of unsaturated zone above the maximum groundwater level is not always available for all lagoons that are proposed to discharge to ground. It is also unclear how the values for the unsaturated zone thickness quoted in the text were calculated – there seem to be discrepancies between the values in Table 3.3 and the text of the draft FRA report. These points should be further clarified to ensure that there will be an adequate unsaturated zone for all infiltration lagoons.

As previously stated, and in line with the SuDS Manual (CIRIA 697), we also require at least three treatment steps for surface water run-off draining to soakaways. We have had discussions on this issue but have yet to see the detailed designs for the proposed scheme.

We trust that this advice is useful.

Yours sincerely

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Record of meeting/discussion

Mott MacDonald

Project title	Norwich Northern Distributor Road (NDR)	**Division**	BNI
Subject	Statement of Common Ground, HRA	**Project no**	233906
Location	Dragonfly House	**Date of meeting**	15/01/2014

Present	Louise Oliver	LO		Natural England
	Martin Barrell	MB		Environment Agency
	Jon Barnard	JB	NDR Team Manager	Norfolk County Council
	Marcin Kurek	MK	Project Engineer	Norfolk County Council
	Laura Henderson	LH	Principal Ecologist	Mott MacDonald
	Jacqueline Fookes	JF	Environmental Scientist	Mott MacDonald
	Simon Allen	SA	Environmental Scientist	Mott MacDonald
	Jonathan Nichols	JN	Environmental Scientist	Mott MacDonald

Recorded by	**Distribution**
JN	All attendees

Item		**Text**	**Action on**
1	JB	NDR project update: DCO application submitted; PINS 28days for validation (non-technical) followed by 6 months examination in public; letters issued to local councils, statutory bodies, interested parties and opposition.	-
2	-	Statement of Common Ground (SoCG)	-
	JB	SoCG will save time and money in examination in public and therefore needs to be concise and not duplicating information already presented elsewhere.	-
	MB	Suggests presenting SoCG using matrices: what is agreed between parties, what is disagreed, what is irrelevant, etc; needs to be as concise as possible containing the least content which can be challenged in public.	-
		Action: circulate example to attendees.	**MB**
	All	Further discussion about SoCG formats: textual list of what parties agree/disagree on; separate SoCGs, one for EA and another for Natural England; agreed will resolve format as process goes forth, and begin by assuming single SoCG will involve both EA and NE together.	-
	JB	Need SoCG to be in place prior to initial examination meeting with inspector during April, therefore need SoCG by mid-March.	-
	JB	Postwick out of SoCG scope assuming there are no legal challenges.	-

Item		Text	Action on
		Action: circulate NSIP programme so can see stages of process.	**JB**
	MK	Question: when will the SPZ boundary at Postwick be defined?	-
	MB	Answer: SPZ boundary at Postwick not yet defined by EA are happy with the current proposals in principle and only the detail has yet to be resolved.	-
	JB	Question: are the planning and licensing sections of Natural England integrated or do they operate in separate silos? Concern about the appearance that NDR interests may appear to be having too much of an influence of licensing which may come up at the public enquiry.	-
	LO	Answer: responsibilities of planning and licensing are separate therefore there can be no accusations of unfair influence.	-
	SA	Question: if planning and licensing are operating independently, how will the SoCG tie-up with licensing/regulation?	-
	LO	Answer: A letter of comfort will be issued.	-
	All	Agreed will populate SoCG as a matrix via email and meet at a future date.	-
3	-	Habitat Regulations Assessment (HRA) review: overall comments	-
	SA	Note: the draft HRA originally submitted for comment has been revised, and appendices appended for submission as part of the NDR DCO application. Copies were given to LO and MB.	-
	LO	Overall comments on HRA: is a very detailed assessment, but needs to be more robust with more description; requires greater expansion as to why certain impacts can be discounted and what the evidence base is that supports the view that there will be no impact; the HRA needs to be as water tight as possible to prevent other interested parties picking holes in it.	-
4	-	Habitat Regulations Assessment (HRA) review: silt ingress	-
	LO	Specific issue regarding sediment ingress to the Wensum: it is recognised there is already significant runoff from agricultural land giving rise to the unfavourable condition of riverine ecosystems. It is difficult to trace the source of sediment between road verges and agricultural ditches. Therefore there is a question over the extent to which the impact of the NDR on silt runoff from minor roads can be discounted, especially because the figures presented are not clear in their support of this conclusion (e.g. adding in overall/aggregate silt figures would be helpful).	

Record of meeting/discussion
Continuation sheet

Mott MacDonald

Project No. 233906 **Date of Meeting** 15/01/2014

Item		Text	Action on
	MB	The text also unfairly suggests that where no direct link can be determined between NDR-related traffic and increased sedimentation the potential cause can be discounted. But there is a possibility of indirect causation and this is not considered in the HRA. This therefore needs to be included or explained.	
	JF	Ecosystem Services Assessment (ESA) produced by Cranfield University shows NDR will overall have a beneficial effect on sedimentation reducing silt ingress by breaking up existing road-drainage catchments through bunding and non-surface drainage systems, etc.	
	JB	On some minor roads outside the NDR yes there is an increase in sediment loading, but on other roads there is a decrease: the aggregate sediment loading is predicted to be the same as that of the existing situation (or do-minimum scenario) overall. Furthermore, other non-NDR schemes to improve peripheral roads e.g. Ringland Hills will combine to reduce silt ingress in the area.	
	LO	In which case there needs to be more detail in the HRA document referring to ESA and Traffic Assessment (TA) and table on page 57 needs to show aggregate figures for all roads. The non-NDR road improvements mentioned by JB also need to be included as mitigation. Furthermore, it should be evident that the precautionary principle has been applied (this being the Habitat Regs). Overall there needs to be more expansion on how the conclusions have been reached using the evidence available, and this evidence from other areas of the DCO document (e.g. TA, ESA) need to be pulled in to support. More details are needed regarding the drive-by survey: questions over the timing and experience of surveyors – need to state/explain to avoid challenges/criticisms over these issues at examination.	
		Action: in HRA need to present evidence of silt ingress from road verge erosion and that the NDR will not exacerbate this, that non-NDR road schemes operated by the council are working together with the NDR to address the issue.	**JF *et al.***
	JB	Question: considering the HRA has already been submitted as part of the DCO application, when would be the appropriate time to add in this extra information now it has been published?	
	LO	Answer: as an addendum and info should definitely be ready ahead of the examination in public [?]	
5	-	Habitat Regulations Assessment (HRA) review: changes in groundwater levels	-
	LO	Section called "evidence to support conclusions" in Stage 1 Outcomes and screening matrix where explains how things are	

Item		Text	Action on
		scored – explanatory text contradicts table, therefore need to add more ticks where appropriate. ZOI could also be better defined and explained e.g. through the provision of a map to help explain how will be impacted. Add description of how key off road routes were IDd and why there might be changes. There also needs to be more detail about how temporary drainage ditches would work during construction.	
	MB	Question: would the CEMP be consulted upon?	
	JF	Answer: the CEMP is a living document based on construction requirements outlined in the ES and any planning conditions brought up in the DCO. The CEMP is partly a demonstration that will undertake mitigation promised in ES and as a means of discharging planning conditions. More detail will come in as PINS processes progresses.	
	LO	Question: are contractor's compounds and borrow pits outside of the scheme?	
	JF	Answer: contractors compounds are part of the scheme within the "red line". There are no borrow pits.	
	MB	Question: what are the other consents required in addition to the HRA and where are they presented?	
	JF	Answer: a DCO document [title] lists those that are known. A number listed in the current version of the HRA were discounted as they are not thought to be required.	
6	-	Habitat Regulations Assessment (HRA) review: groundwater protection	-
	MB	Groundwater protection requires 3-stage treatment in drainage design. Swales therefore may need to be lined, although SUDS guidance on this unclear.	
	MK	Approach to drainage was risk-based e.g. SPZ location swales were lined whereas elsewhere where no SPZ swales were not lined.	
	JB	We need to present this approach in our documents, explaining our precautionary default position and explaining deviations from it.	
7	-	Habitat Regulations Assessment (HRA) review: in-combination effects	-
	LO	The discussion in this section is very short and needs to explain in more detail why these impacts can be ruled out.	

Mr Simon Allen - Environmental Scientist
Mott MacDonald
County Hall Martineau Lane
Norwich
Norfolk
NR1 2US

Our ref: AE/2014/117141/01-L01
Your ref: 233906EN/BSE/NOR/018

Date: 23 January 2014

Dear Simon

DRAFT HRA FOR NORWICH NORTHERN DISTRIBUTOR ROAD (NDR)

Thank you for sending through a copy of the draft Habitats Regulation Assessment for the proposed Norwich Northern Distributor Road (ref: 233906EN/BSE/NOR/018; dated November 2013), and for the meeting on 15 January 2014. The meeting was a useful opportunity to go through Environment Agency and Natural England comments on the draft document. The comments raised, and some further minor points, are outlined below:

In summary, we are broadly in agreement with the findings of the draft Assessment. There are a number of points on which we would suggest that clarification or further information is required, and these are set out below.

We would however, as expressed at the meeting, currently question the conclusions with respect to the impacts of sediment ingress from the local road network (section 4.2.2.5 and Table 4.2). This is also further detailed below.

Section 2.1. At this stage we can not confirm that we would be able to adopt the outcomes of this HRA, in respect of any consents that we may be required to issue in connection with the scheme. This is because at this time we do not have full details of all the activities that may require consent, and so are unable to assess their impacts on the River Wensum SAC.

Section 2.3.3 We would suggest that the zone of influence of the NDR on the European interest features should be more precisely defined. When considering this it should be borne in mind that impacts on water quality elements can extend a considerable distance downstream from the point of entry of any pollutants.

Section 2.4.2 Changes in groundwater levels may also impact on in-channel designated features. Changing groundwater levels may influence the connectivity between surface water and groundwater in the hyporheic zone, which can affect the rooting zone of submerged and floating macrophytes, and the functionality of gravels used for spawning by brook lamprey, bullhead and other fish species. For these reasons we would suggest that the assessment of not applicable given in Tables 3.1 and 5.1 need amending to reflect this, as does the sensitivity of qualifying features to potential effects assessment in Table 2.6.

Section 2.4.2.2 As discussed further below, there is potential for the discharge of sediment to the Wensum via surface water run-off from the local road network even where there is no actual direct link to the Wensum. We have observed such discharges in the Ringland area, and there is potential for worsening of such discharges if the NDR increases traffic volumes and verge erosion on these roads.

Section 4.2.1.1 As highlighted in this section, the NDR scheme will not intercept the water table. We agree that the surface area of the impermeable road surface in relation to the catchment size and the surface area of open ground in the vicinity of the western end of the route is unlikely to be significant. As such, the proposal is considered unlikely to significantly affect the groundwater flow. No change in water level is therefore anticipated.

Section 4.2.2.1 In the description of drainage arrangements for NDR, a section from chainage 390m to chainage 780m on the southern side appears to be missing. Is no surface water run-off anticipated on the southern side of the carriageway in that section?

The proposed drainage outlined in this section also refers to the use of unlined swales, which would allow infiltration to occur. Although we are satisfied that the HRA has shown no adverse impact on the SAC via groundwater (see below), our position is that swales used across the NDR should be lined in all but low environmental sensitivity locations. We have previously highlighted the need for three treatment steps to be employed to protect groundwater (and surface waters) along the route. Allowing infiltration via unlined swales would result in the subsequent treatment train components being by-passed, and would make pollution from accidental spills much harder to contain. It should be clearly demonstrated as part of the application that the proposed drainage scheme will appropriately protect both surface and groundwater quality.

Section 4.2.1.2 It should be clarified how ditches built to accommodate surface water run-off from topsoil and hard surfaces during construction would prevent discharge of silt laden water to the River Wensum. Further details of these temporary drainage arrangements could be provided or referenced (including calculations to demonstrate that they would be sufficient to deal with the quantities of run-off generated by winter/summer storms); or the mechanism to ensure that this issue would be assessed and implemented as part of the scheme could be highlighted in this section.

Section 4.2.2.3 We have not interrogated the HAWRAT model or the input parameter values. However, we note that conservative assumptions have been made during the risk assessment process. Specifically, dilution and attenuation within groundwater have not been modelled as active processes even though they are likely to have a significant impact on any dissolved contaminant concentrations.

Section 4.2.2.5 Whilst some of the roads listed have no direct link to the Wensum, they may be indirectly linked via the surface water drainage network. Alternatively, road run-off could flow down-gradient along the routes to the A1067 and then into the surface water drainage network. Therefore there would appear to be a pathway by which sediment run-off and associated pollutants could adversely impact on the River Wensum. The traffic predictions indicate that volumes will increase on some of these routes (2 routes in 2017 and three routes in 2032). In the absence of mitigation, this is likely to lead to greater verge erosion and so there would appear to be the potential for greater input of silt to the Wensum. Water pollution – agriculture/run-off is listed as one of the reasons for adverse condition of the River Wensum SAC.

Based on the precautionary principle, we cannot therefore currently support the conclusion that the NDR will lead to a reduction in sediment generation from the local road network, as stated in this section and section 4.3.2.2. In order to demonstrate no adverse impact on the integrity of the SAC, further information should be provided in the HRA to clearly demonstrate that overall sediment generation from these routes will not increase as a result of the NDR. If this cannot be shown, it would be advisable for a programme of works to reduce the impacts of diffuse pollution from the local road network to be agreed and implemented in advance of, or in tandem with, the construction of the proposed NDR.

Because of the present uncertainty about these impacts of the scheme it is currently difficult to arrive at a conclusion of no adverse impact on integrity of the Wensum SAC. There would appear to be an opportunity to reduce the risk to the Wensum from local road run-off, and thereby contribute to betterment of the condition of the SAC as part of the environmental mitigation for the proposed NDR, although we note your comments at the meeting regarding the geographical scope of any works that fall within the NDR application.

Please contact me in the first instance if you wish to discuss any aspect of this response in more detail.

Yours sincerely

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Sustainable Places - Planning Specialist

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From: Barrell, Martin [mailto:martin.barrell@environment-agency.gov.uk]
Sent: 23 June 2014 11:11
To: Kurek, Marcin
Cc: Kemp, Mark; Palmer, Sarah; Koryczan, Wojtek
Subject: NDR ES & FRA Addendum

Dear Marcin

We have been reviewing the documents that you sent through and have a few points of clarification that would help us with our response and inform our Written Representation:

D: Improvements to lagoon infiltration

- Option 2 proposes the use of infiltration trenches – are you able to confirm the composition (and infiltration rate) of the fill material?

- For lagoons 13 and 23, could you confirm the depth of the infiltration trenches and the depth of the unsaturated zone beneath the trench?

- Could you forward a drawing for the proposed drainage scheme for lagoon 23?

- D.5.11 details a change to the max GW level under lagoon 9 based on a revised GW level of 20.38 mAOD, making the unsaturated zone 0.82m. However, table 14.7 of the ES (Volume 1, Chapter 14) already uses 20.38mAOD as the maximum GW level for lagoon 9, and states the unsaturated zone as being 1.12m?

- D.5.11 – regarding lagoon 4, this is one previously highlighted by us as having an insufficient unsaturated zone. Is it known whether the localised perched water table referred to is directly below lagoon 4? If so, this would not constitute unsaturated zone.

E: Summary of impacts on 'The Springs', Rackheath

- E.3.6 states that Lagoon 18A will include an infiltration pond, but the submitted drawing shows a discharge to watercourse? E.4.7 states that insufficient unsaturated zone means that lagoon 18A will be lined. We had not previously raised concerns about the unsaturated zone at 18A, but did have concerns over drain down times. Could you confirm if 18A is to be lined and will have a positive outfall?

If possible, could you get back to me mid-week on these points, so that I can address them in our Written Representation?

Many thanks

Martin

____

Martin Barrell
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CUSTOMER SERVICE EXCELLENCE CSE Awarded to Essex, Norfolk and Suffolk Area

Mark Kemp
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Environment, Transport, Development
County Hall Martineau Lane
Norwich
Norfolk
NR1 2SG

Our ref: AE/2014/117786/01-L01
Your ref: .

Date: 03 July 2014

Dear Mr Kemp

NORWICH NORTHERN DISTRIBUTOR ROAD. DRAFT ADDENDUM TO ENVIRONMENTAL STATEMENT AND FLOOD RISK ASSESSMENT

Thank you for forwarding for review the draft document titled ‘Addendum to Environmental Statement: Volume I: Chapter 14 and Volume II: Chapter X Flood Risk Assessment’. We were able to make reference to the draft document in our ‘Written Representation’ response to the Planning Inspectorate, and state where this had satisfactorily addressed our previously raised concerns. Those comments also form part of this response, along with further more detailed comments on other parts of the draft Addendum.

Section C. Groundwater risk assessment

We have previously commented that a swale would provide a single level SuDS treatment train, which would not be acceptable given the environmental sensitivity of the road location unless it was demonstrated via a risk assessment that the potential risks could be adequately mitigated.

The risk assessment method employed for assessing routine run-off is the DMRB Method C (HD 45/09 Road Drainage and the Water Environment). However, we disagree with some of the input parameters, and the interpretation of results:

1. Both the Crag Group and the Chalk Group are designated as Principal Aquifers of regional importance. We would not agree to any risk assessment methodology that would describe these as low or medium importance. Additionally, Table 14.2 in the Environmental Statement attributes a ‘Very

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High’ or ‘High’ value to Principal Aquifer providing a regionally or locally importance resource.

2. Score <150 could result in impacts to groundwater classed as Minor Adverse, while Score 150-250 could result in impacts to groundwater classed as Moderate Adverse (HD 45/09, Table A4.4)

3. According to HD 45/09, Table A4.6 – Qualifying Conditions for Overall Assessment Scores, even potential low risk (score <150) of pollution to a principal aquifer providing a regionally important resource or supporting a river ecosystem is considered to result in significant effects (Moderate Adverse). As a consequence, we have not reviewed the input parameters to Method C matrices in detail.

Based on the above assessment methodology, and given the process indicated the presence of Moderate Adverse effects, it would appear that all swales where the receiving waterbody is groundwater within a Principal Aquifer should be lined.

However, we have previously advised that where swales are placed in clay geology lining may not be required. We would agree to unlined swales where they overlie 5 metres of clay geology / unproductive strata. We have not been provided with complete borehole logs, however, based on cross-sections provided within the original Environmental Statement, it would appear that this may be the case for (whole or parts of) catchments 21, 22, 23, 24 and 25, where the route of the NDR is indicated to overlie the superficial geology of Happisburgh Formation (Corton Formation) silts and clays (designated as Unproductive Strata). The applicant should be mindful of the potential for the trenches in the base of lagoons in these catchments to create preferential pathways to the underlying aquifers and increasing the overall level of risk.

Additional areas along the NDR route may be identified where the above requirement (swales placed in 5 metres of clay geology) would be satisfied.

Paragraph C.4.5 states that swales that serve catchment CA1 will be lined. It also states that surface water run-off from catchment CA2 is drained via kerbs and gullies, and a central bitumen channel, feeding a detention basin and infiltration lagoon. It is proposed that an additional treatment step will be included as part of the CA2 system, to ensure the presence of three SuDS treatment steps. Appendix B.5 also states that swales will be lined in catchment CA2A, although this is not addressed in paragraph C.4.5. Providing these measures are incorporated, we can confirm that we are satisfied in principle that an appropriate level of protection will be provided at the discharge point to ensure that there will be no adverse impact on the Wensum SAC via groundwater. We would still wish to be consulted on the detailed drainage scheme, likely to be via proposed Requirement 25.

The issue of treatment train components for the remainder of the route is not addressed specifically within the text of the draft Addendum document. However, Appendix B.1 does show the proposed treatment steps for each system. This appears to show a number of systems where three treatment steps will not be provided, although it is not clear if that applies to all of the drainage from each system, as some systems are shown to include swales that the document does not highlight as a SuDS component. As previously discussed, a three stage treatment process should be provided, unless it can be demonstrated that fewer steps in specific locations would present an acceptable level of risk.

Section D. Improvements to lagoon infiltration

In order to resolve the issue of poor infiltration rates and long drain down times, alternative options have been presented for lagoons 13, 13A, 22, 23, 24 and 25. These consisted of: 1) Outfall to a watercourse, 2) Construction of granular filled trenches at the base or sides of the basin to provide good infiltration medium which extends down to the crag with good infiltration rates, 3) Installation of Aquacell trenches extending down to the crag with good infiltration rates, and 4) Outfall to another infiltration basin with better infiltration rates.

For lagoon 22, Option 4 was selected, with a positive outfall to lagoon 21 which has very good infiltration rates. Table D.2 states that this approach would reduced the half drain time for lagoon 22 from 8 days to 12 hours. This is a significant betterment and would ensure that the lagoon meets the recommended 24 hour half drain time in the SuDS Manual.

For the remaining lagoons Option 2 was selected; the use of granular filled trenches at the base or sides of the basin to provide a good infiltration medium which extends down to the crag with good infiltration rates. It has been confirmed that the fill material will have an infiltration rate greater than 0.1m/hr, while the infiltration rate at the base of the trenches is assumed to be 0.1m/hr. The use of this option is stated to reduce the half drain times for the basins which were previously between 8 to 125 days, to between six and seven days.

While the half drain times are greater than the industry standard of 24 hours as recommended in the SuDS Manual, the proposals provide greater confidence that the basins will drain. As previously proposed an additional storage volume equating to the 1 in 10 year storm event has been provided in case a subsequent storm occurs while the previous event is draining.

The full basin drainage calculations (including the proposed infiltration trenches) should be submitted to demonstrate that the half drain times have been correctly modelled. For lagoon 25, this modelling will need to include the OL29 catchment flows.

We welcome and support the further work undertaken, and can therefore confirm our view that, subject to a review of the full basin drainage calculations, the approach proposed will appropriately improve the drainage performance of those infiltration lagoons where this was previously inadequate. The amended designs and plans, along with the modelling calculations, will need to form part of the DCO application.

As part of our Written Representation, we also advised that the proposed infiltration trenches share some characteristics of deep bore soakaways. Therefore, these features can act as preferential pathways to the underlying principal aquifers. As such, regard should be given to our Groundwater Protection: Principles and Practice (GP3 v1.1, 2013) document, and in particular position statement G9 (‘Use of deep infiltration systems for surface water and effluent disposal’). It should be ensured that the resultant increased risk is adequately mitigated in line with the requirements of this position statement.

The piped connection of lagoons 21 and 22 is not anticipated to have any water quality implications.

Regarding groundwater levels, paragraph D.5.11 details a change to the maximum groundwater level against borehole BH15P5, from 21.0mAOD to 20.28mAOD. This is stated to amend the unsaturated zone beneath lagoons 8, 8A & 9. The amended unsaturated zone underneath lagoon 9 was quoted as 0.82m, which is significantly less than the minimum we had previously requested. Additionally, table 14.7 of the ES (Volume 1, Chapter 14) already uses 20.38mAOD as the maximum GW level for lagoon 9, giving an unsaturated zone of 1.12m.

We have subsequently been advised that the unsaturated zone beneath lagoon 9 is indeed 1.12m. On that basis, our previous position that the identified unsaturated zone thickness of 1.12m for lagoon 9 may be sufficient, providing groundwater does not rise further, is still applicable. We also note and welcome the increase in unsaturated zone beneath lagoon 8.

Paragraph D.5.11 goes on to outline how locally perched water tables within the sands and gravels have led to a misrepresentation of the unsaturated zone in the ES. Most significantly, this is stated to have affected lagoon 4, which we previously had concerns about due to the inadequate unsaturated zone (0.4m only).

It has subsequently been confirmed that the perched water table is not expected to be present beneath lagoon 4, and therefore the unsaturated zone at this location is considered to be 8.1m. In our Written Representation we advised that, on this basis, we would be satisfied with the design of lagoon 4, but would suggest that this situation is monitored and remains capable of being addressed at the detailed design stage if the higher groundwater levels are subsequently found to be present.

Section E. Summary of potential impacts on ‘The Springs’, Rackheath

While paragraph E.3.6 states that Lagoon 18A will include an infiltration pond, the submitted drawing shows a discharge to watercourse. It has subsequently been confirmed that 18A will be lined with a positive outfall. We had previously raised concerns in respect of the long drain-down times for 18A, but can confirm that we are now satisfied with the drainage performance of this lagoon subject to a review of the full basin drainage calculations. As with the infiltration basins, for all three attenuation lagoons, the full drainage calculations should be submitted to demonstrate the validity of proposals.

We can also confirm that the text at paragraph E.3.6, along with drawings R1C093-R1-4907 and R1C093-R1-4908, have demonstrated satisfactory treatment measures ahead of Lagoon 17 and 18A,

However, some uncertainty remains in respect of lagoon 18. The text at paragraph E.3.6 states that the discharge to lagoon 18 will be via lined swales. However, the associated drawing (R1C093-R1-4908) appears to show an element of the run-off transported via a central bitumen channel only ahead of piped discharge to lagoon 18? If this is the case, a further treatment step should be incorporated for this element of the run-off prior to discharge to lagoon 18.

Please do contact us if you would like to discuss any aspect of this response further. If you would like us to review any additional information prior to submission to the Examining Authority, this will need to be part of an extended charging agreement.

Yours sincerely

MR MARTIN BARRELL
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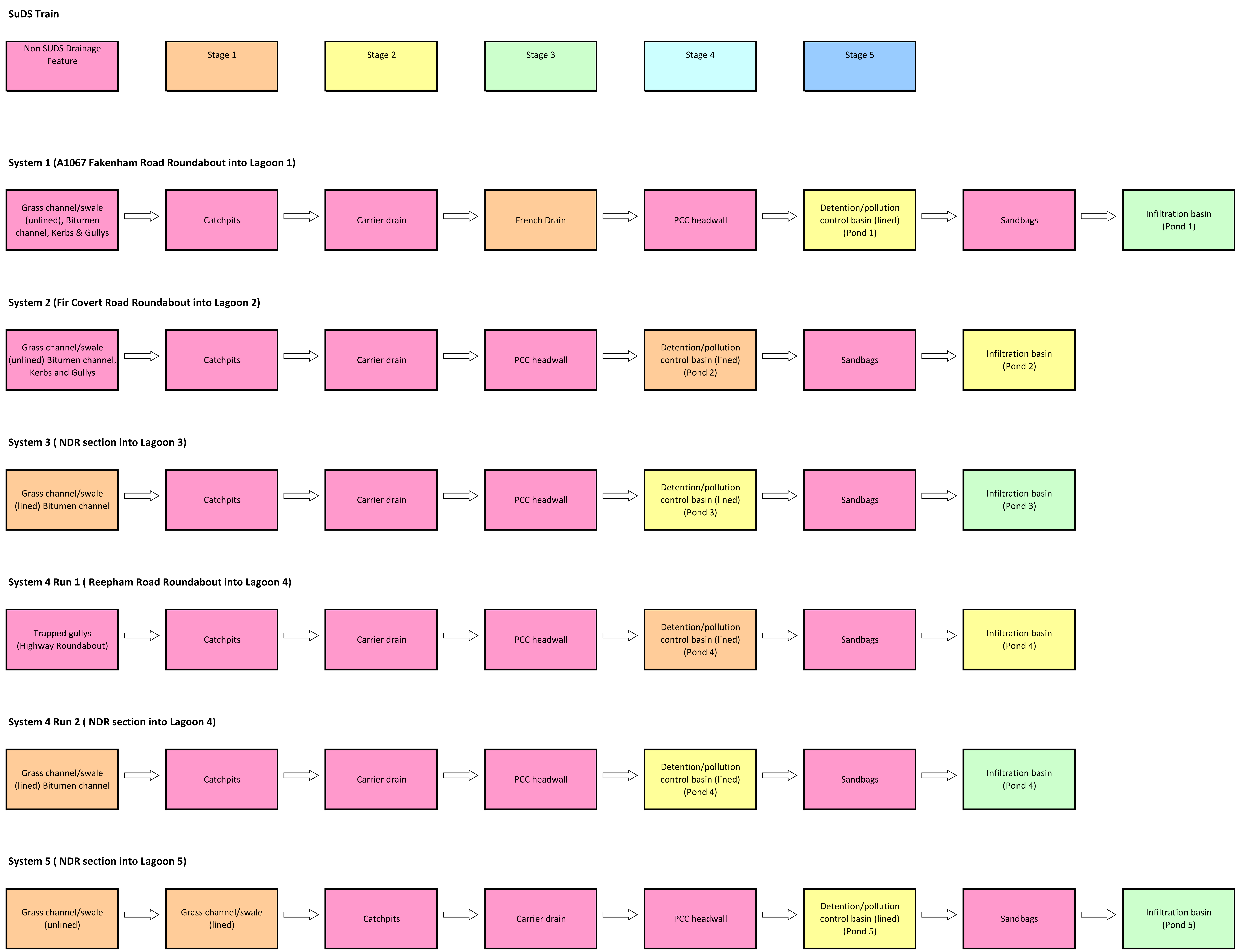
Appendix B. Groundwater Risk Assessment

Appendix B1.	Drainage catchment treatment steps
Appendix B2	A plan showing the location of unlined swales and a geological long section along the NDR route (DWG No. MMD-233906-DT-0815-0826)
Appendix B3	A plan showing road drainage catchments and associated catchment numbering used in the assessment (DWG No. MMD-233906-DT-0981-0987)
Appendix B4	Groundwater risk assessment results – Swales
Appendix B5	Groundwater risk and impact assessment table

Appendix B.1 Drainage design treatment steps


SuDS Train
Non SUDS Drainage Feature
Stage 1
Stage 2
Stage 3
Stage 4
Stage 5
System 1 (A1067 Fakenham Road Roundabout into Lagoon 1)
Grass channel/swale (unlined), Bitumen channel, Kerbs & Gullys
Catchpits
Carrier drain
French Drain
PCC headwall
Detention/pollution control basin (lined) (Pond 1)
Sandbags
Infiltration basin (Pond 1)
System 2 (Fir Covert Road Roundabout into Lagoon 2)
Grass channel/swale (unlined) Bitumen channel, Kerbs and Gullys
Catchpits
Carrier drain
PCC headwall
Detention/pollution control basin (lined) (Pond 2)
Sandbags
Infiltration basin (Pond 2)
System 3 (NDR section into Lagoon 3)
Grass channel/swale (lined) Bitumen channel
Catchpits
Carrier drain
PCC headwall
Detention/pollution control basin (lined) (Pond 3)
Sandbags
Infiltration basin (Pond 3)
System 4 Run 1 (Reepham Road Roundabout into Lagoon 4)
Trapped gullys (Highway Roundabout)
Catchpits
Carrier drain
PCC headwall
Detention/pollution control basin (lined) (Pond 4)
Sandbags
Infiltration basin (Pond 4)
System 4 Run 2 (NDR section into Lagoon 4)
Grass channel/swale (lined) Bitumen channel
Catchpits
Carrier drain
PCC headwall
Detention/pollution control basin (lined) (Pond 4)
Sandbags
Infiltration basin (Pond 4)
System 5 (NDR section into Lagoon 5)
Grass channel/swale (unlined)
Grass channel/swale (lined)
Catchpits
Carrier drain
PCC headwall
Detention/pollution control basin (lined) (Pond 5)
Sandbags
Infiltration basin (Pond 5)

System 6 (NDR/Drayton Lane South into Lagoon 6)

Grass channel/swale (lined short section) Kerbs & Gullys → French Drain → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 6) → Sandbags → Infiltration basin (Pond 6) → Depth below basin to ground water (6 metres)

System 6A (Drayton Lane North/Holt Road Roundabout into Lagoon 6)

Kerbs & Gullys → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 6A) → Sandbags → Infiltration basin (Pond 6) → Depth below basin to ground water (10 metres)

System 8 Run 1 (NDR/A140 Rounadbout and Bridge into Lagoon 8)

Grass channel/swale (unlined). Kerbdrains. Kerbs and Gullys → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 8) → Sandbags → Infiltration basin (Pond 8)

System 8 Run 2 (NDR section/Slip Road into Lagoon 8)

Grass channel/swale (unlined) . Kerbs and Gullys → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 8) → Sandbags → Infiltration basin (Pond 8)

System 9 Run 1 (NDR section/Slip Road into Lagoon 9)

Grass channel/swale (unlined) → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 9) → Sandbags → Infiltration basin (Pond 9)

System 9 Run 1 (Cromer Road Roundabout/A140 Bridge/Cromer Road into Lagoon 9)

Kerbs & Gullys. Kerbdrain → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 9) → Sandbags → Infiltration basin (Pond 9)

System 12 Run 1 (NDR into Lagoon 9)

Grass channel/swale (unlined) Bitumen channel → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 12) → Sandbags → Infiltration basin (Pond 12)

System 12 Run 2 (NDR section/Airport Rounadabout/Airport Access into Lagoon 9)

Grass channel/swale (unlined) Bitumen channel. Kerbs and Gullys → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 12) → Sandbags → Infiltration basin (Pond 12)

System 13 Run 2 (NDR section/Airport Rounadabout/Airport Access into Lagoon 9)

Grass channel/swale (unlined) Bitumen channel → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 13) → Sandbags → Infiltration basin (Pond 13) → Depth below basin to ground water (5.9 metres)

System 14 Run 1 (NDR section into Lagoon 14)

Grass channel/swale (unlined) Bitumen channel → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 14) → Sandbags → Infiltration basin (Pond 14)

System 14 Run 2 (Buxton Road Bridge into Lagoon 14)

Kerbs & Gullys . Kerbdrain → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 14) → Sandbags → Infiltration basin (Pond 14)

System 14A(Buxton Road Bridge into Lagoon 14A)

Kerbs & Gullys . Kerbdrain → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 14A) → Sandbags → Infiltration basin (Pond 13) → Depth below basin to ground water (5.9 metres)

System 16 (NDR/North Walsham Road Roundabout into Lagoon 14A)

Grass channel/swale (unlined) Bitumen channel. Kerbs and Gullys → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 16) → Sandbags → Infiltration basin (Pond 16)

System 17 (NDR into Lagoon 17)

Grass channel/swale (lined) → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 17) → Sandbags → Detention/pollution control basin (lined) (Pond 17). Permanent Wet Area with Reed beds → Controlled outlet (hydrobrake) to wetland

System 18 Run 1 (NDR into Lagoon 18)

Grass channel/swale (lined) Bitumen channel → French Drain → Catchpits → Carrier drain → French Drain → Catchpits → Detention/pollution control basin (lined) (Pond 18) → Sandbags → Infiltration basin (Pond 18). Permanent Wet Area with Reed beds → Controlled outlet (hydrobrake) to wetland

System 18 Run 2 (NDR into Lagoon 18)

Grass channel/swale (unlined) Bitumen channel → French Drain → Catchpits → Carrier drain → French Drain → Catchpits → Detention/pollution control basin (lined) (Pond 18) → Sandbags → Infiltration basin (Pond 18). Permanent Wet Area with Reed beds → Controlled outlet (hydrobrake) to wetland

System 18A (NDR/Wroxham Road Roundabout into Lagoon 18)

Grass channel/swale (unlined) Bitumen channel. Kerbs and Gullys → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 18A) → Sandbags → Infiltration basin (Pond 18A) → Emergency Overflow Weir into ditch

System 19 (NDR/Salhouse Road Roundabout into Lagoon 19)

Kerbs & Gullys → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 19) → Sandbags → Infiltration basin (Pond 19) → Depth below basin to ground water (6.95 metres)

System 20 (NDR into Lagoon 20)

Kerbdrain & Gullys/Grass Channel/Swale (unlined) → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 20) → Sandbags → Infiltration basin (Pond 19) → Depth below basin to ground water (7.75metres)

System 21 (Plumstead Road & Roundabout into Lagoon 21)

Kerbs & Gullys → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 21) → Sandbags → Infiltration basin (Pond 21)

System 22 Run 1 (NDR, Rackheath Bridge into Lagoon 22)

Kerbdrain, Kerbs & Gullys → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 22) → Sandbags → Infiltration basin (Pond 22)

System 22 Run 2 (NDR, Plumstead Road Roundabout into Lagoon 22)

Grass channel/swale (unlined) Bitumen channel. Kerbs and Gullys → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 22) → Sandbags → Infiltration basin (Pond 22)

System 23 Run 1 (Middle Road Bridge into Lagoon 23)

Kerbs & Gullys. Kerbdrain → Ditch → PCC headwall → Culvert → PCC headwall → Detention/pollution control basin (lined) (Pond 23) → Sandbags → Infiltration basin (Pond 23) → Depth below basin to ground water (8.15 metres)

System 23 Run 2 (NDR & Middle Road Bridge into Lagoon 23)

Grass Channel/swale (unlined), Bitumen Channel Kerbs & Gullys . Kerbdrain → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 23) → Sandbags → Infiltration basin (Pond 23) → Depth below basin to ground water (8.15 metres)

System 24 (NDR into Lagoon 24)

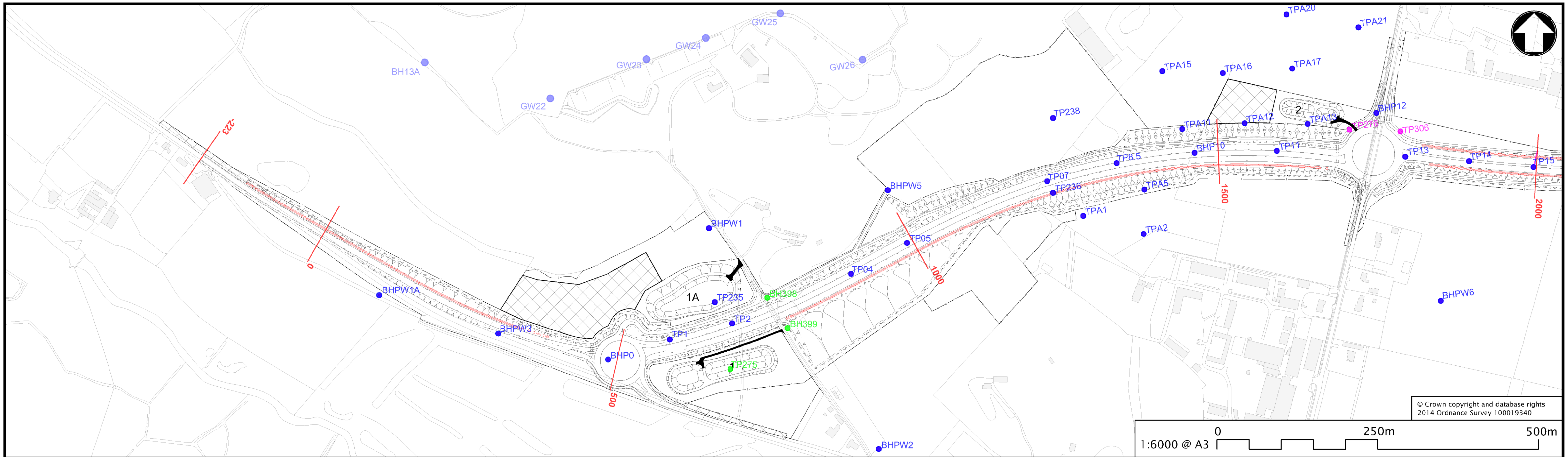
Grass Channel/swale (unlined), Bitumen Channel Kerbs & Gullys . → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 24) → Sandbags → Infiltration basin (Pond 24) → Depth below basin to ground water (6.55 metres)

System 25 (NDR into Lagoon 25)

Grass channel/swale (unlined) Bitumen channel → Catchpits → Carrier drain → PCC headwall → Detention/pollution control basin (lined) (Pond 25) → Sandbags → Infiltration basin (Pond 25) → Depth below basin to ground water (13.66 metres)

Appendix B.2

A plan showing the location of unlined swales and a geological long section along the NDR route (DWG No. MMD-233906-DT-0815-0827)



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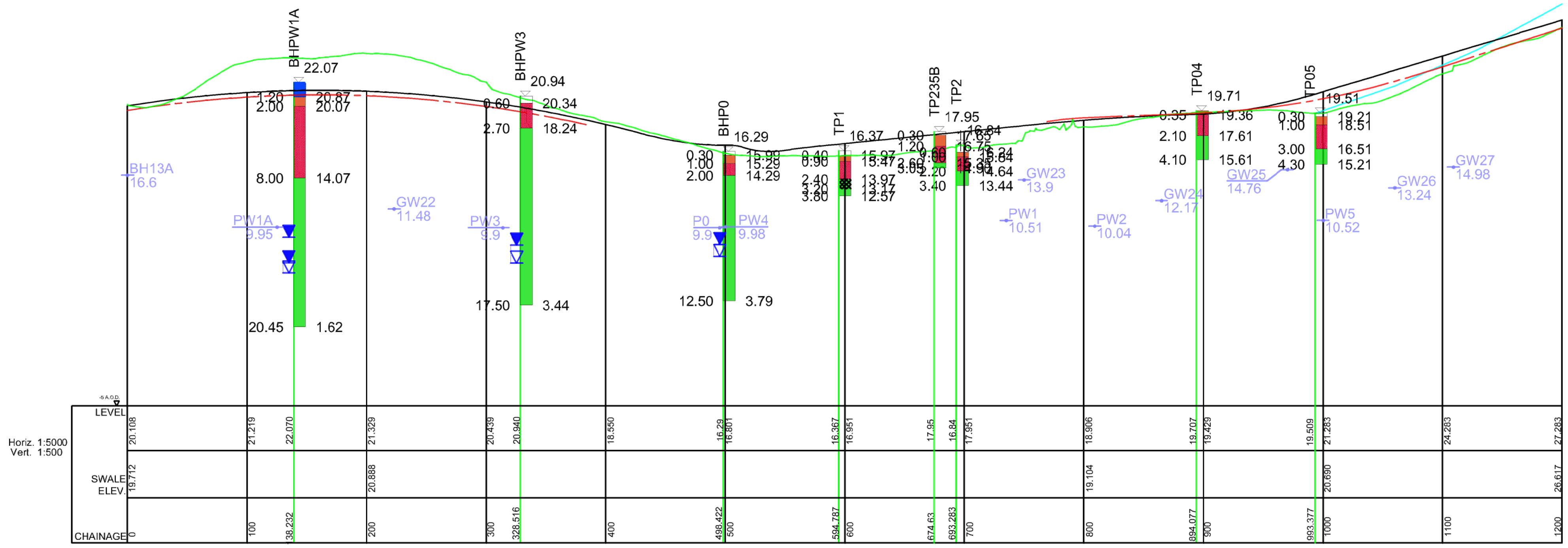
MADE GROUND	SETTLED WATER STRIKE LEVEL AFTER APPROX. 20 MINUTES
HEAD	BOREHOLE MAXIMUM GROUNDWATER LEVEL (mAOD)
COVER SILT	PROPOSED SWALES
ALLUVIUM	
GLACIAL SAND AND GRAVEL	
LOWESTOFT TILL	
CORTON FORMATION SAND	
CORTON TILL	
CRAG	
VARIED CHALK	
UPPER CHALK	



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1 of 12

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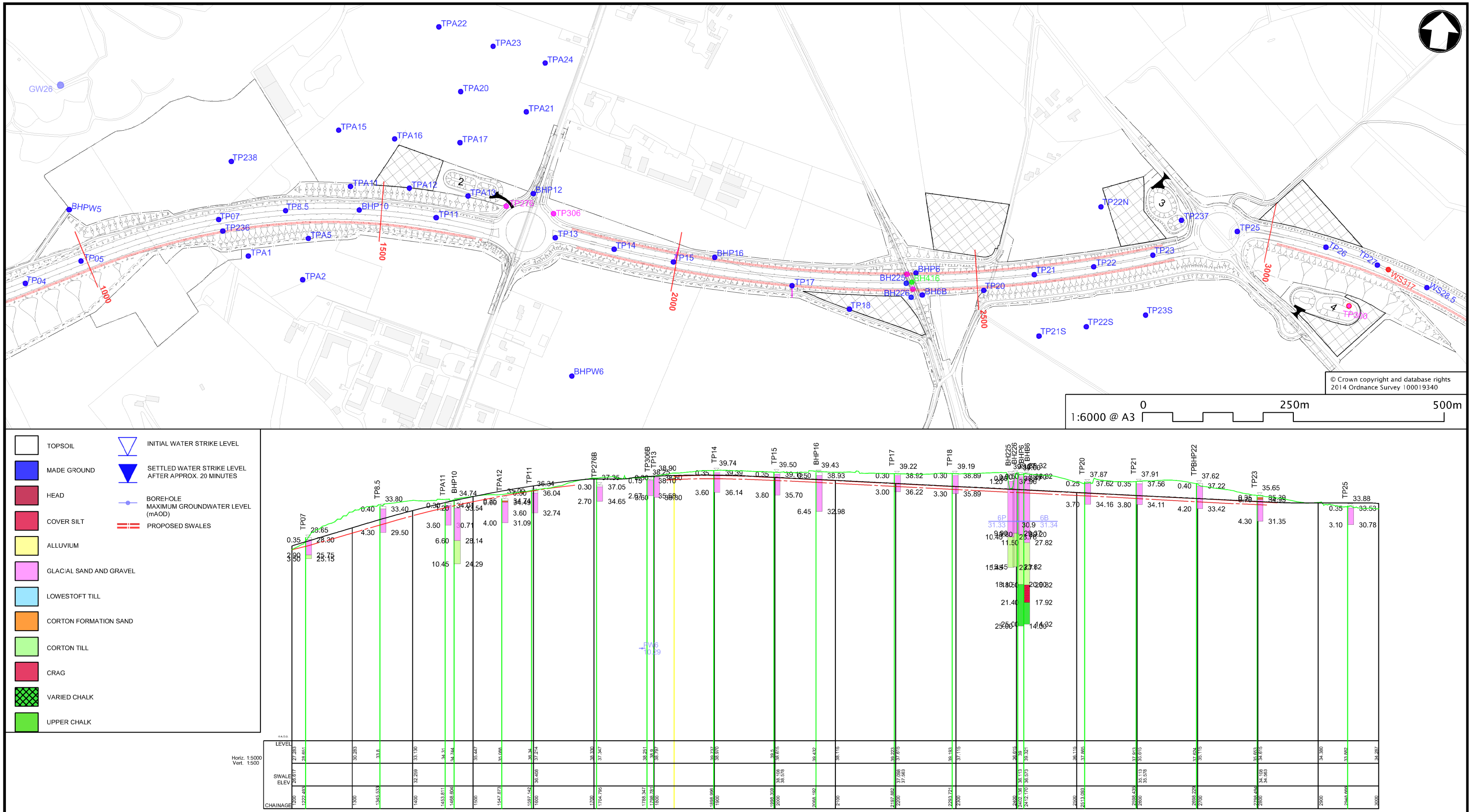

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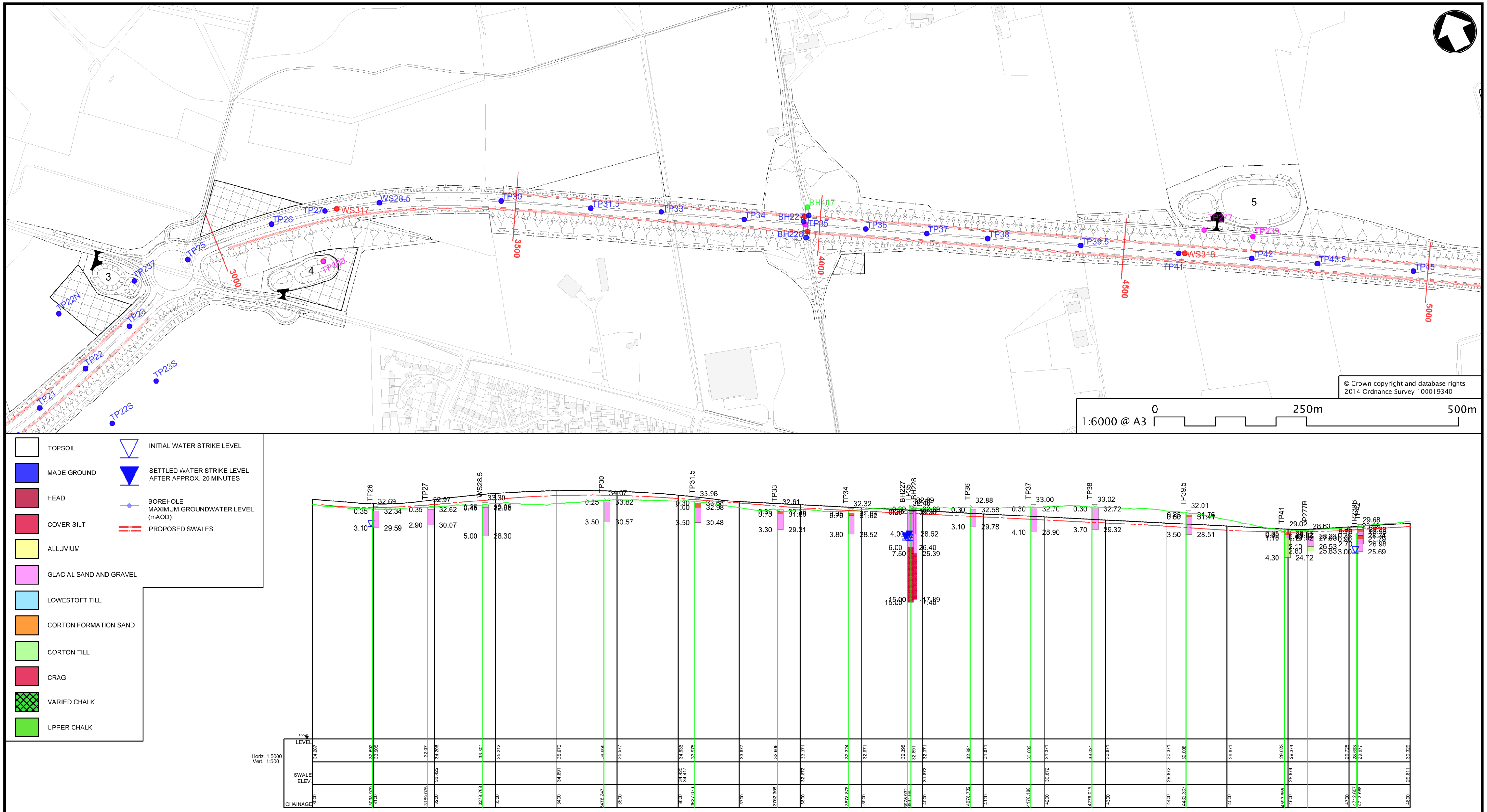

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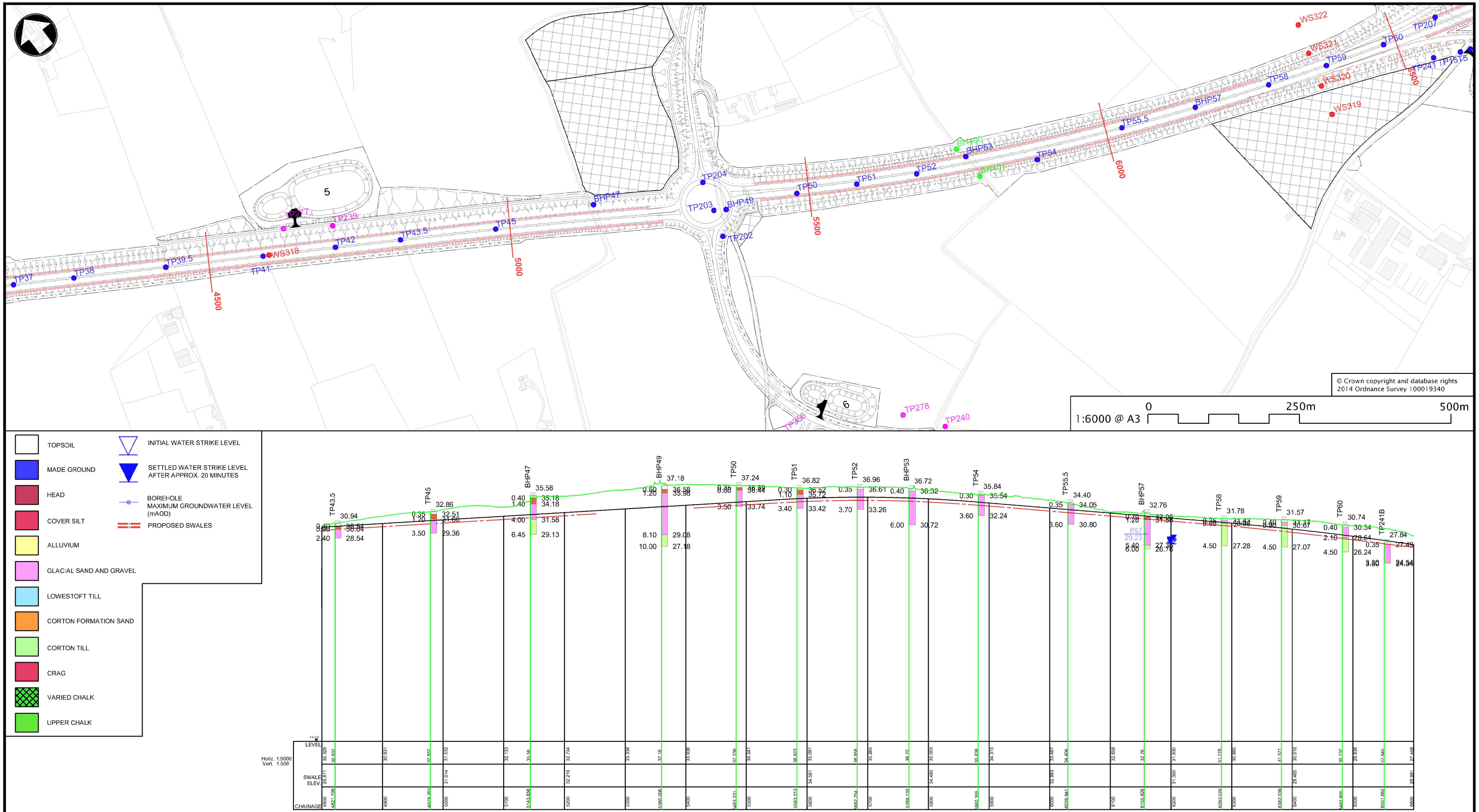

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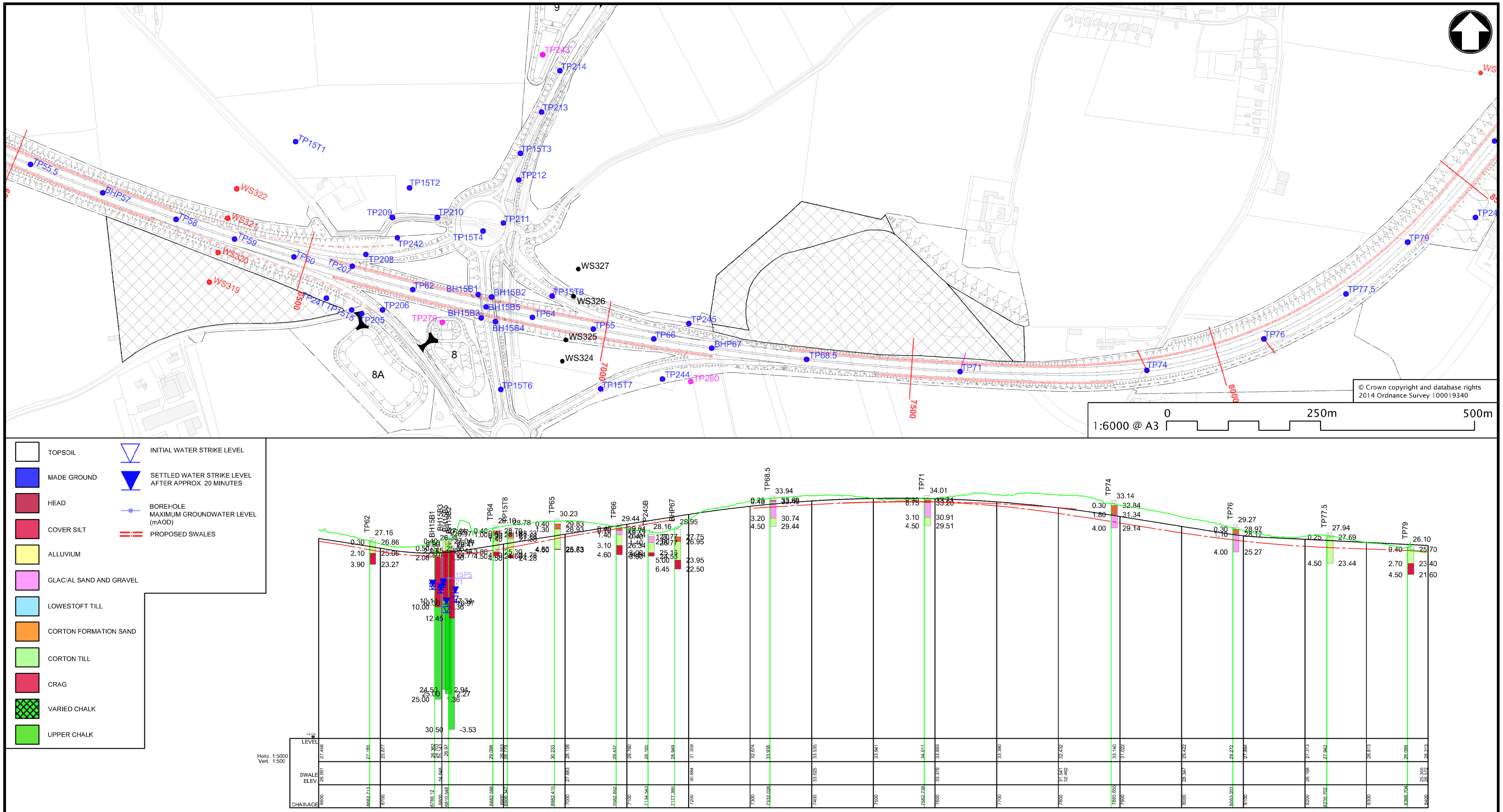

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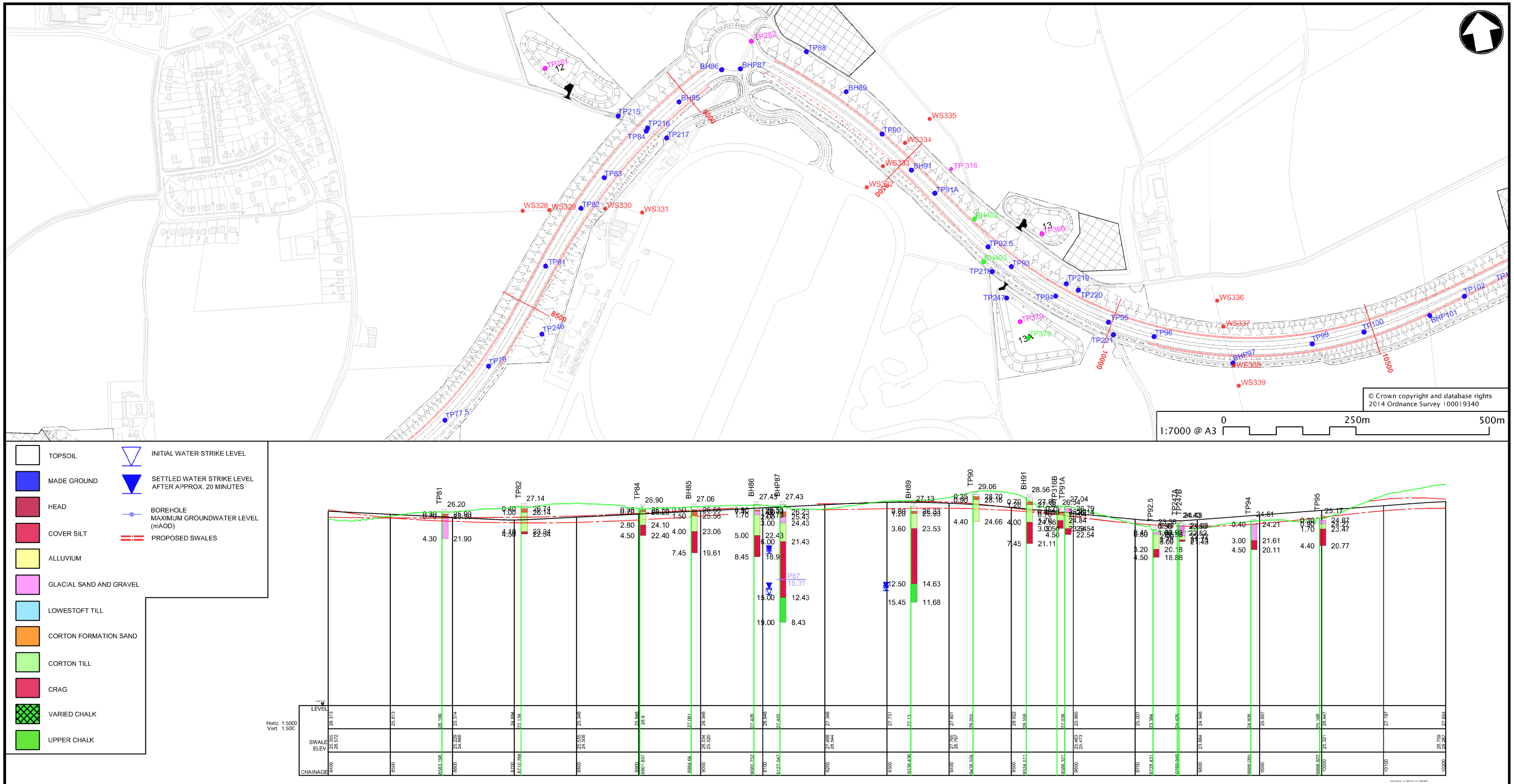

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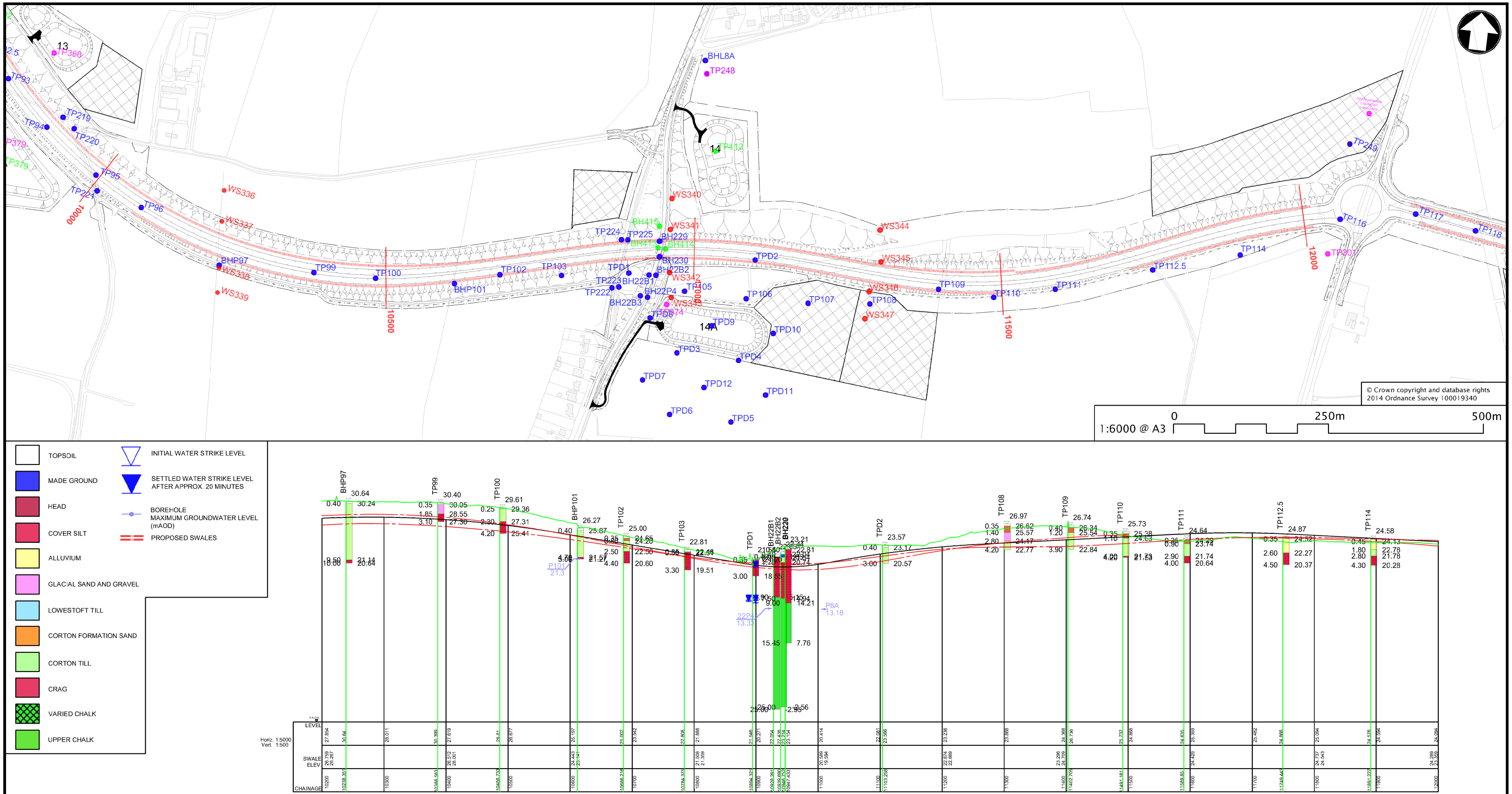

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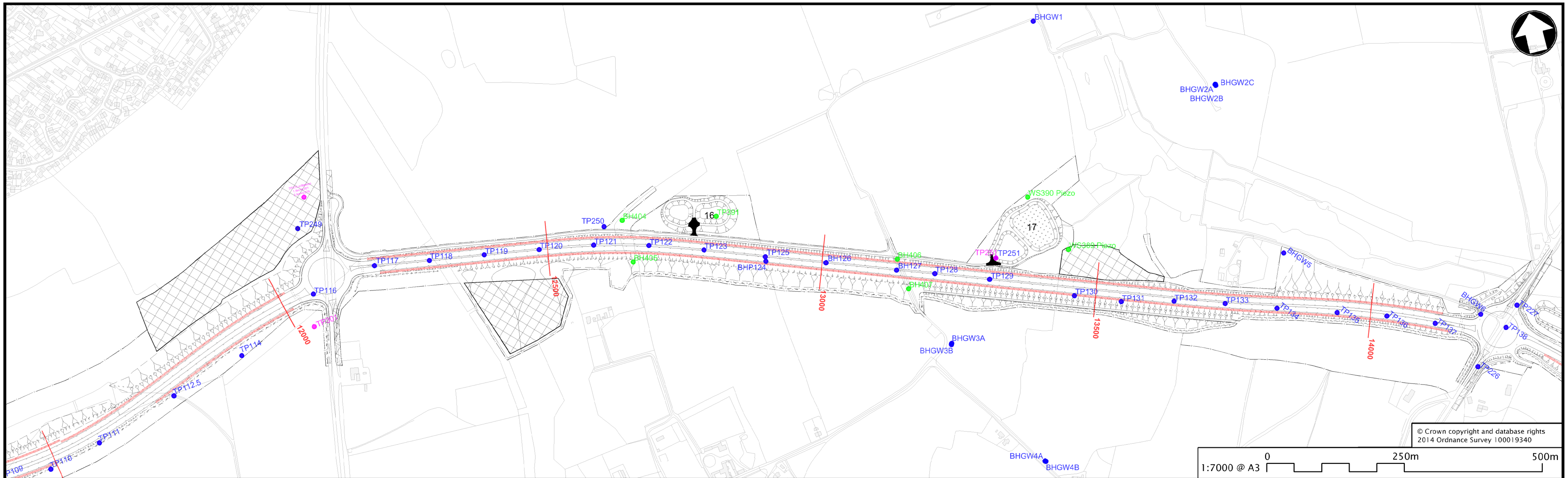

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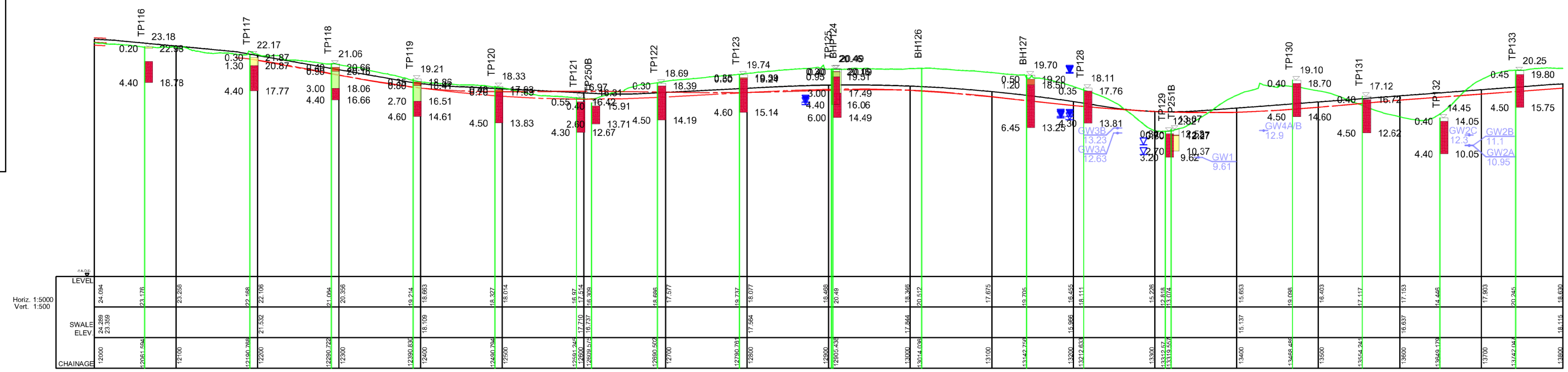
- MADE GROUND
- HEAD
- COVER SILT
- ALLUVIUM
- GLACIAL SAND AND GRAVEL
- LOWESTOFT TILL
- CORTON FORMATION SAND
- CORTON TILL
- CRAG
- VARIED CHALK
- UPPER CHALK
- INITIAL WATER STRIKE LEVEL
- SETTLED WATER STRIKE LEVEL AFTER APPROX. 20 MINUTES
- BOREHOLE MAXIMUM GROUNDWATER LEVEL (mAOD)
- PROPOSED SWALES



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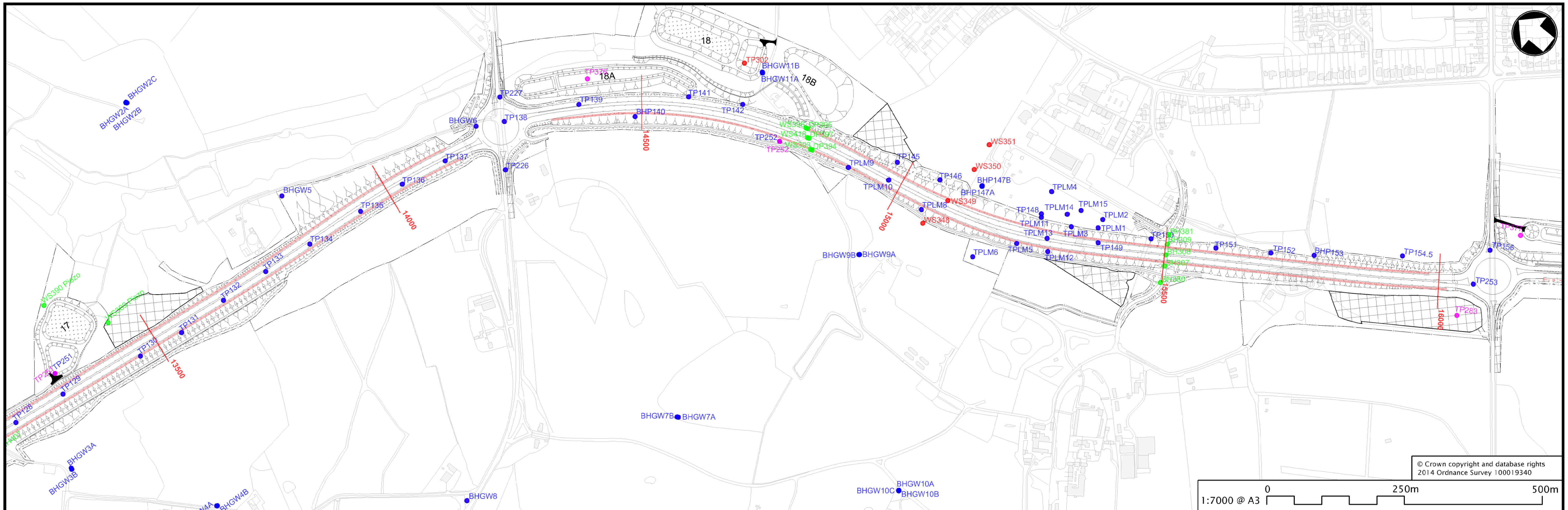

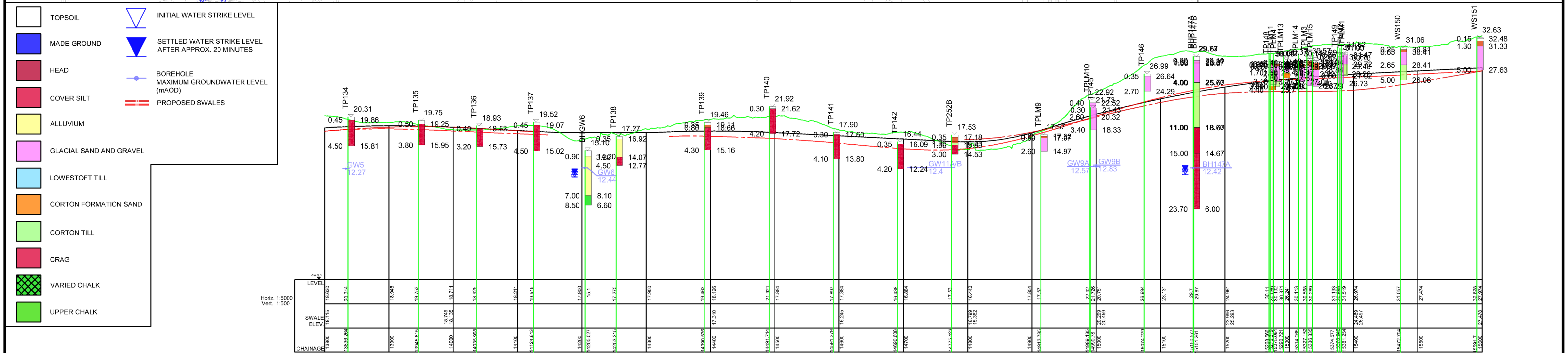

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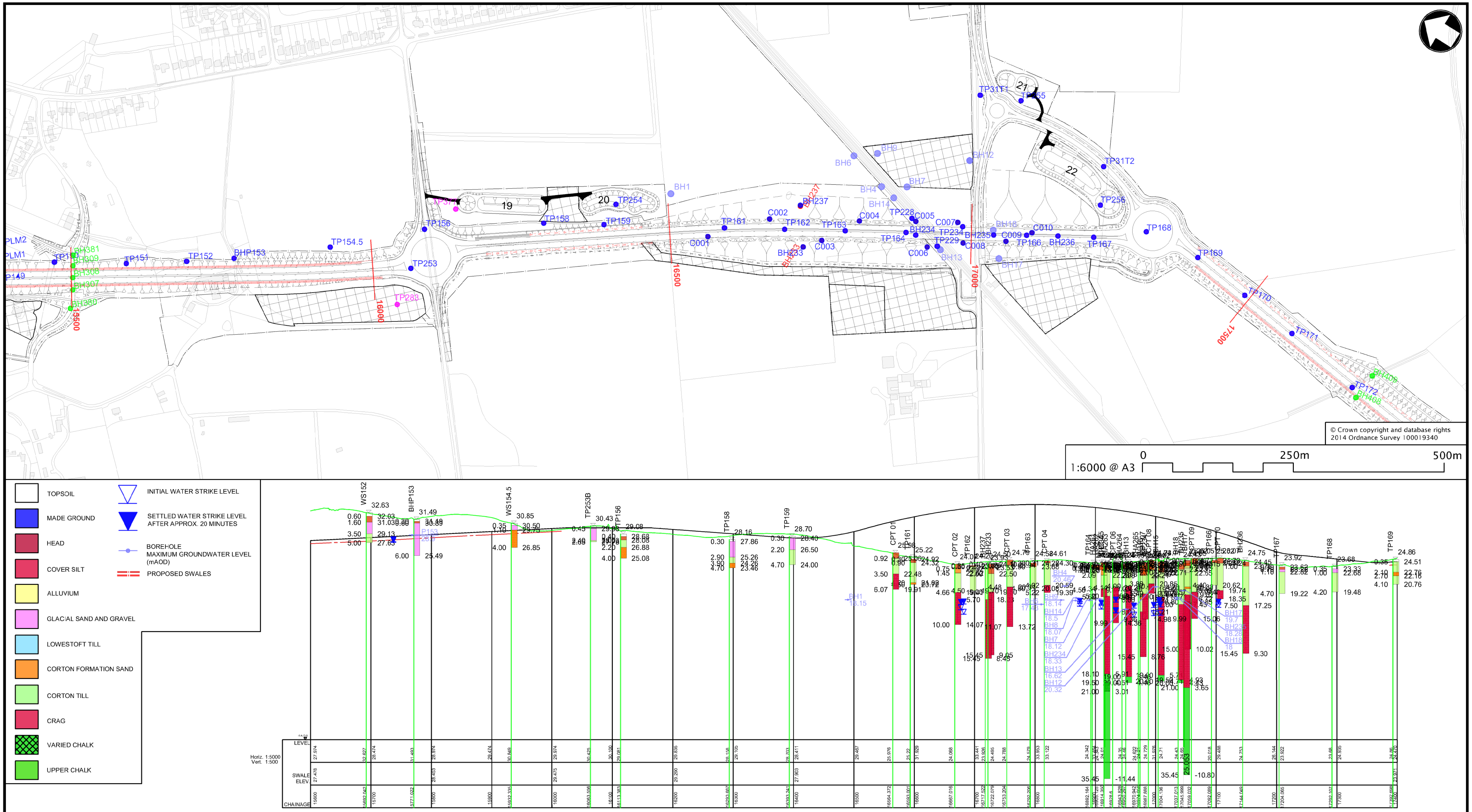

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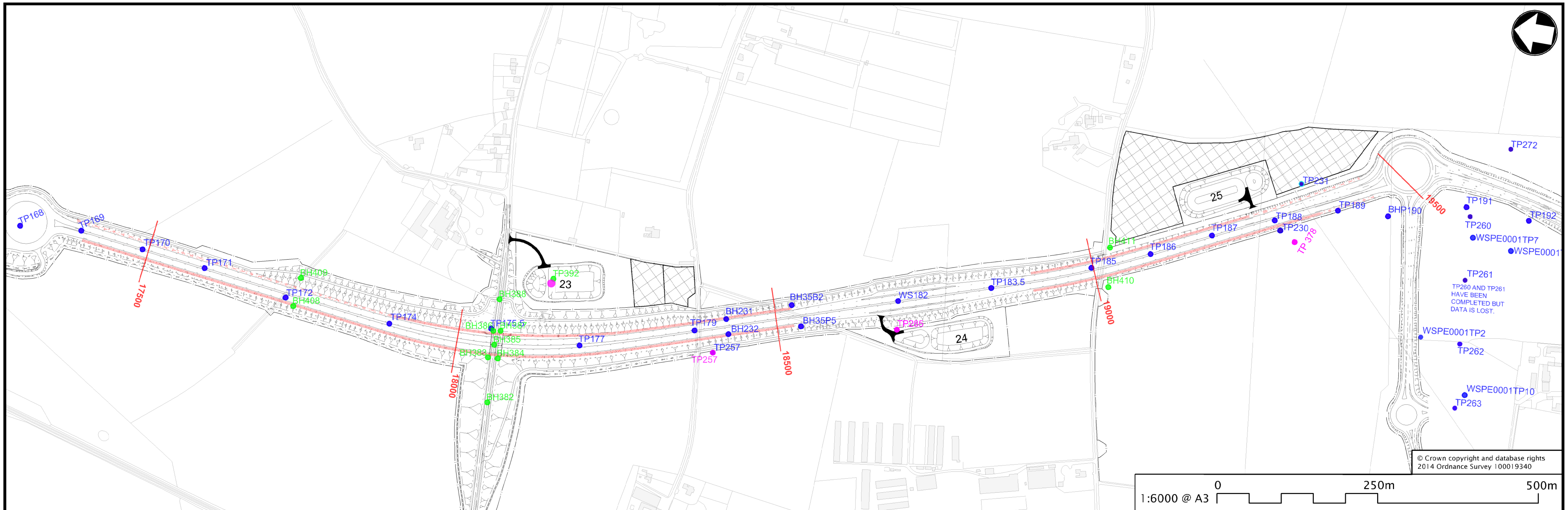

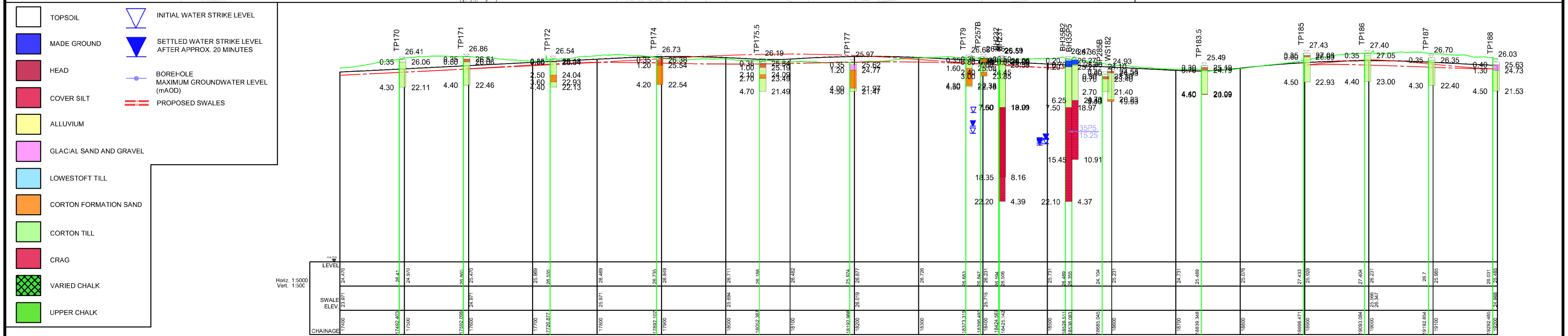

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0	11/13	AW	Revision for Submission	BD	SA
A	02/14	AW	Revision for stakeholder consultation	BD	SA

Title

Norwich Northern Distributor Road
Geological Long Section
Within 50m of NDR

11 of 12

Drawn	AW
Checked	BD
Approved	SA
Scale at A3	As Above

Drawing Number
MMD-233906-DT-0825

Rev	Status
A	INF

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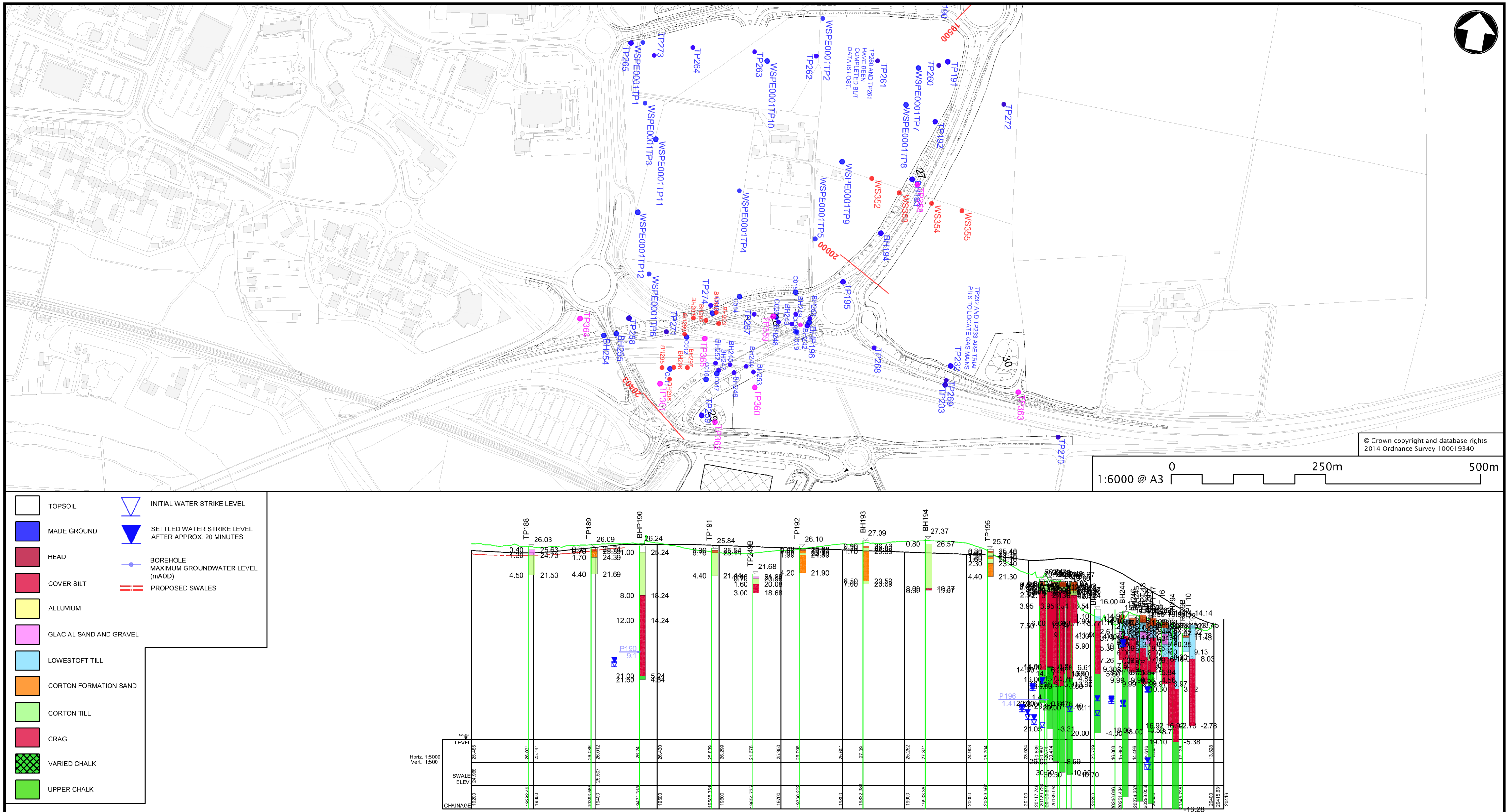

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Title

Norwich Northern Distributor Road
Geological Long Section
Within 50m of NDR

12 of 12

Drawing Number

MMD-233906-DT-0826

Drawn	AW
Checked	BD
Approved	SA
Scale at A3	As Above
Rev	A
Status	INF

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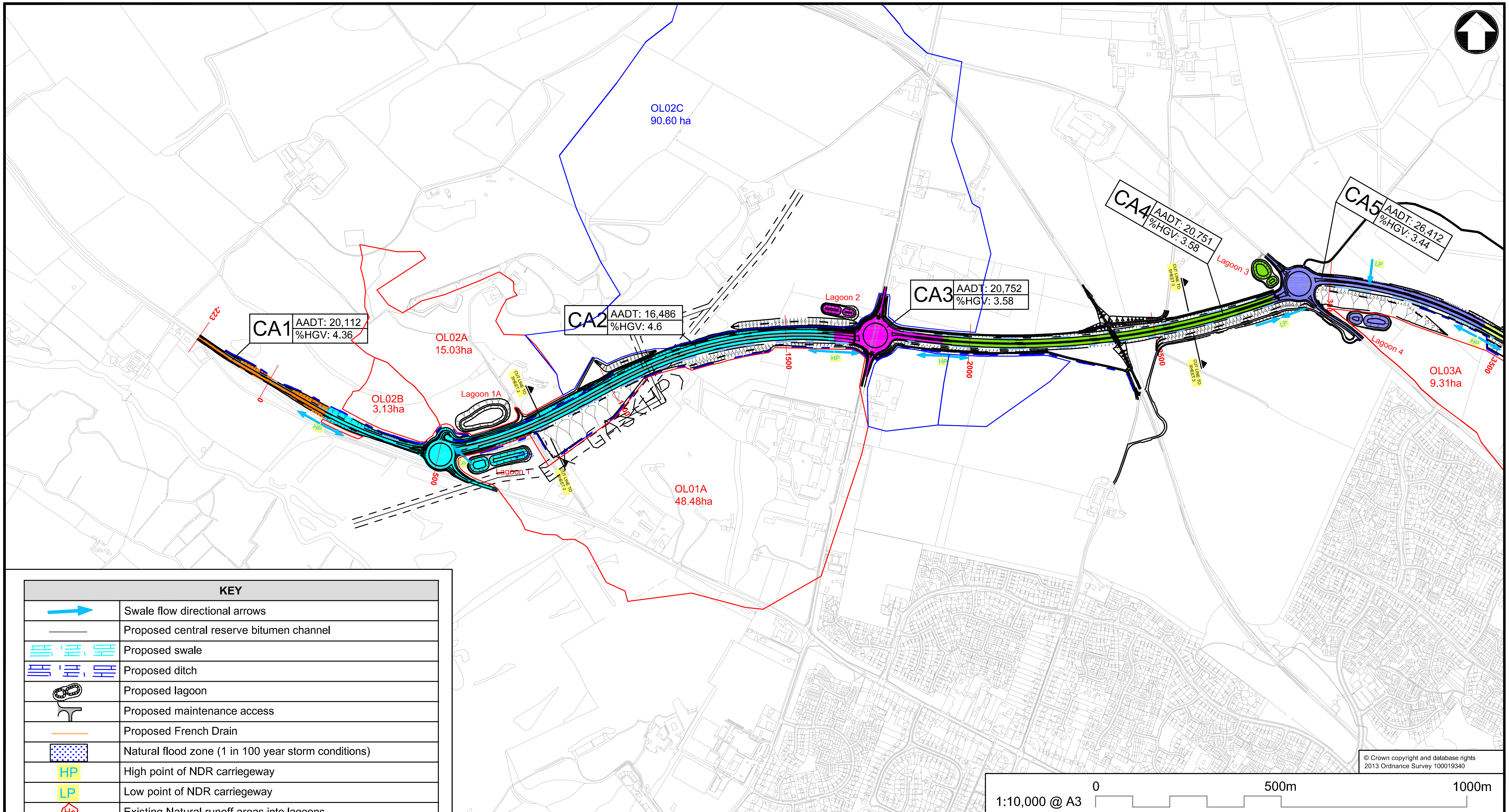
Appendix B.3

A plan showing road drainage catchments and associated catchment numbering used in the assessment (DWG No. MMD-233906-DT-0981-0987)



KEY	
	Swale flow directional arrows
	Proposed central reserve bitumen channel
	Proposed swale
	Proposed ditch
	Proposed lagoon
	Proposed maintenance access
	Proposed French Drain
	Natural flood zone (1 in 100 year storm conditions)
HP	High point of NDR carriageway
LP	Low point of NDR carriageway
Ho	Existing Natural runoff areas into lagoons
Ho	Existing Natural runoff areas not into lagoons
or	Carriageway runoff - Impermeable areas

Drainage Catchment Area (CA)	Annual Average Daily Traffic (AADT)
	% Heavy Goods Vehicle (HGV)

1:10,000 @ A3
0 500m 1000m

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Title
Norwich Northern Distributor Road
Drainage Design
1 of 7

Drawn	EMC
Checked	RD
Approved	PR
Scale at A3	1:10,000

Drawing Number
MMD-233906-DT-0981

Rev	Status
0	INF

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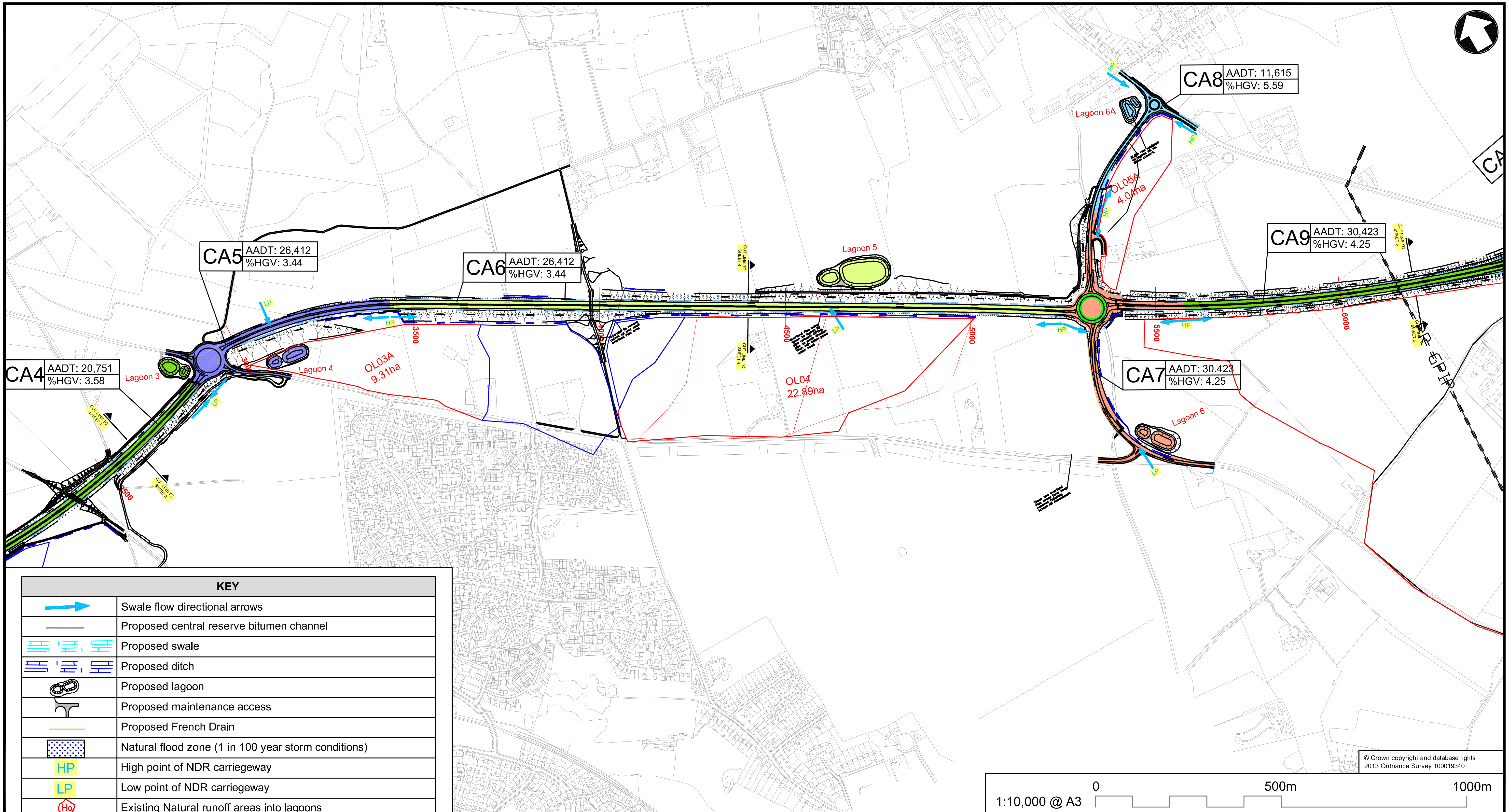

KEY	
	Swale flow directional arrows
	Proposed central reserve bitumen channel
	Proposed swale
	Proposed ditch
	Proposed lagoon
	Proposed maintenance access
	Proposed French Drain
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Drainage Catchment Area (CA)	Annual Average Daily Traffic (AADT)
	% Heavy Goods Vehicle (HGV)

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Title
Norwich Northern Distributor Road
Drainage Design
2 of 7

Drawn	EMC
Checked	RD
Approved	PR
Scale at A3	1:10,000

Drawing Number
MMD-233906-DT-0982

Rev	Status
0	INF

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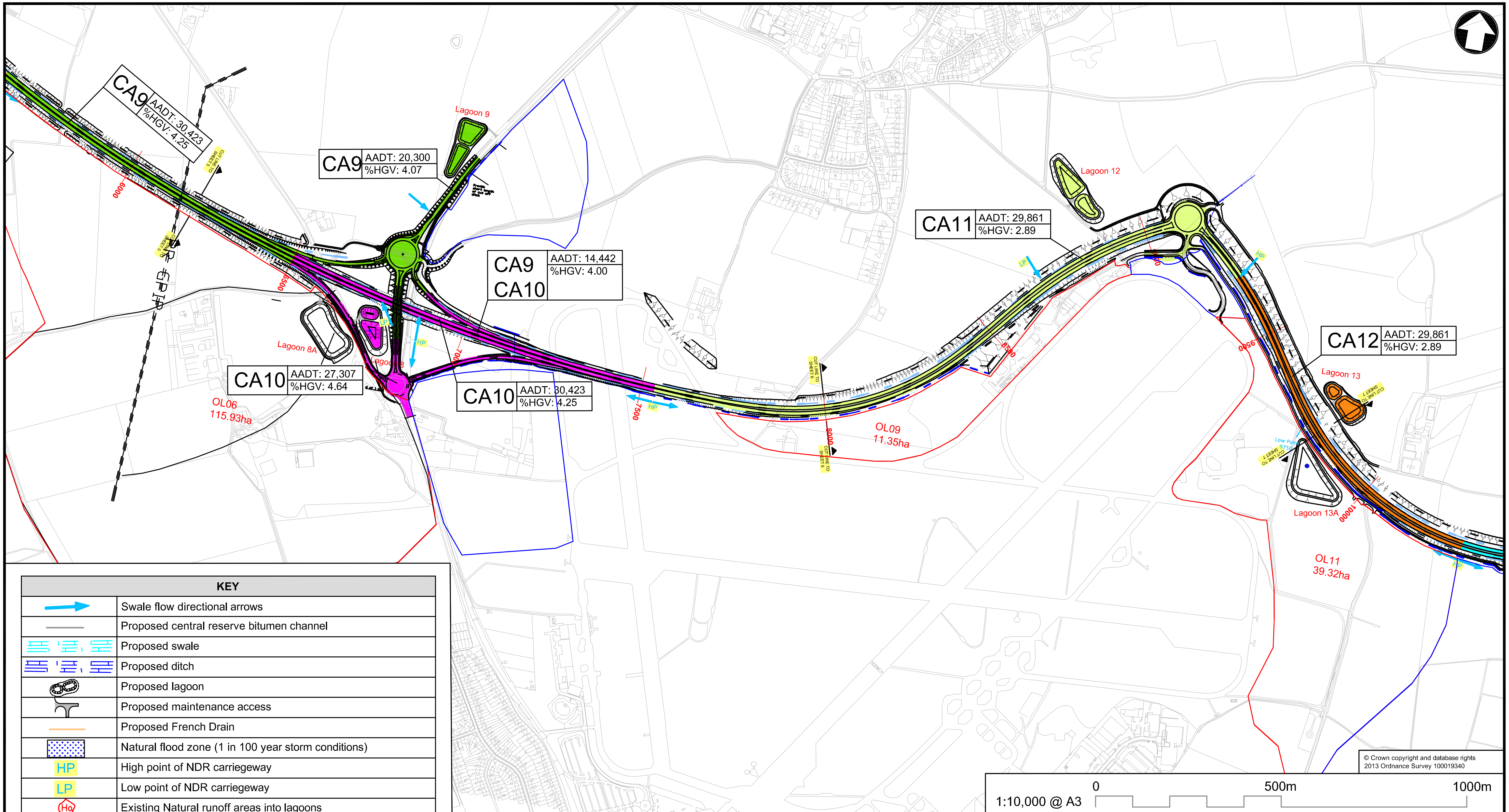

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	Proposed central reserve bitumen channel
	Proposed swale
	Proposed ditch
	Proposed lagoon
	Proposed maintenance access
	Proposed French Drain
	Natural flood zone (1 in 100 year storm conditions)
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Ho	Existing Natural runoff areas not into lagoons
or	Carriegeway runoff - Impermeable areas

Drainage Catchment Area (CA)	Annual Average Daily Traffic (AADT)
	% Heavy Goods Vehicle (HGV)

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Drainage Design

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Drawing Number
MMD-233906-DT-0983

Drawn	EMC
Checked	RD
Approved	PR
Scale at A3	1:10,000
Rev	0
Status	PRE

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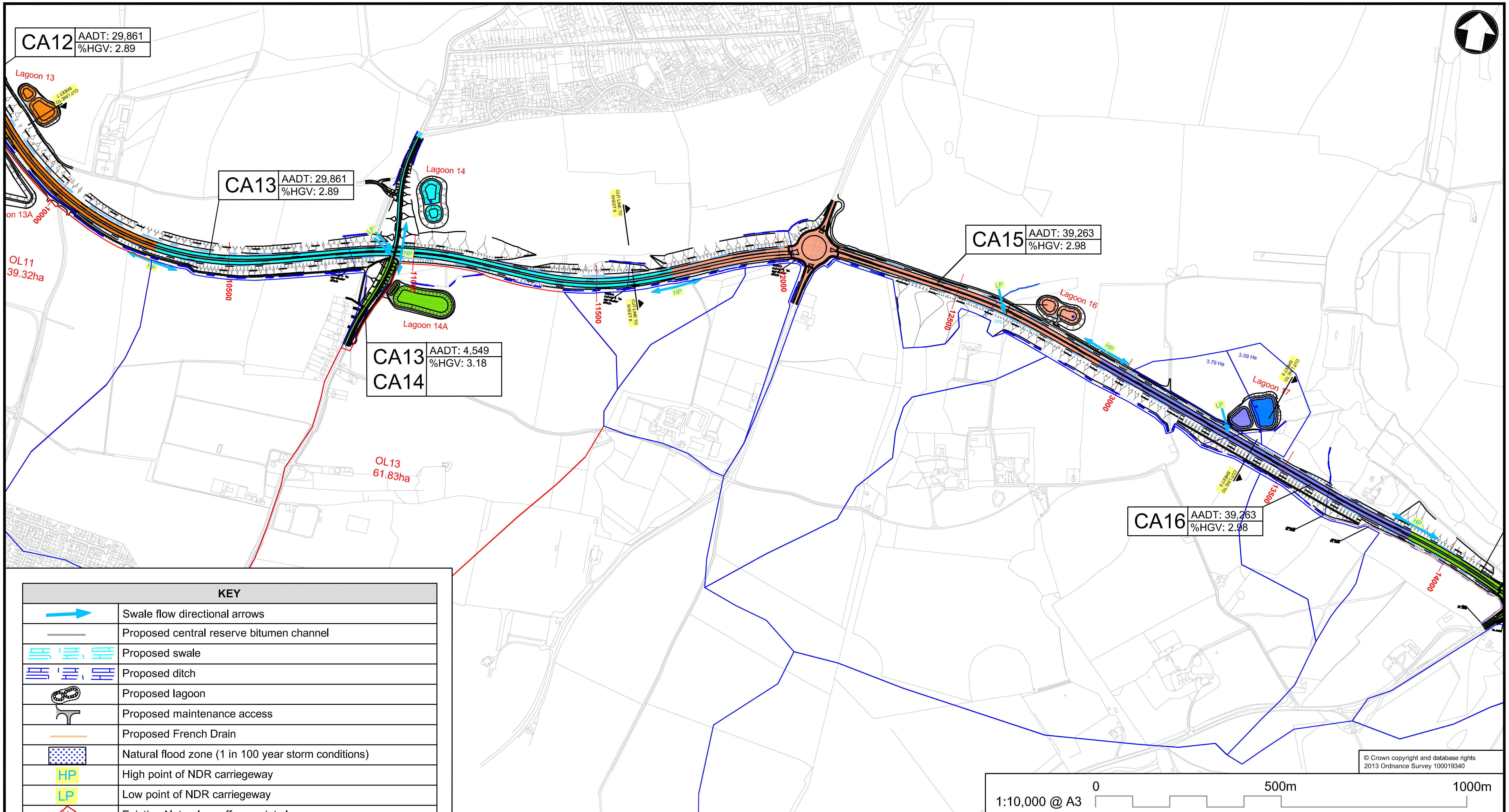

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	Proposed central reserve bitumen channel
	Proposed swale
	Proposed ditch
	Proposed lagoon
	Proposed maintenance access
	Proposed French Drain
	Natural flood zone (1 in 100 year storm conditions)
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Drainage Catchment Area (CA)	Annual Average Daily Traffic (AADT)
	% Heavy Goods Vehicle (HGV)

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Scale at A3	1:10,000

Drawing Number
MMD-233906-DT-0984

Rev	Status
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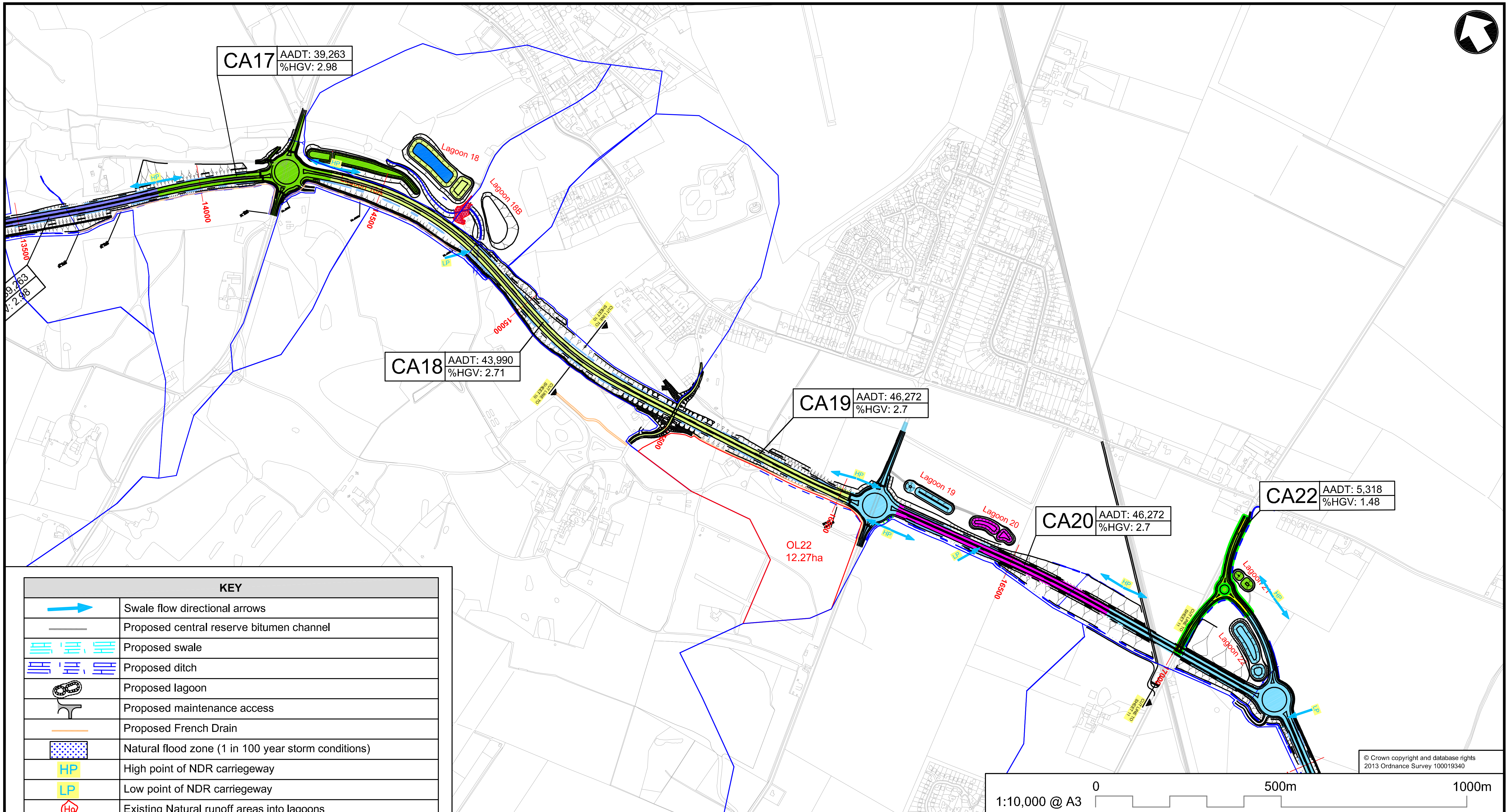

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(arrow)	Swale flow directional arrows
(line)	Proposed central reserve bitumen channel
(symbol)	Proposed swale
(symbol)	Proposed ditch
(symbol)	Proposed lagoon
(symbol)	Proposed maintenance access
(line)	Proposed French Drain
(hatch)	Natural flood zone (1 in 100 year storm conditions)
HP	High point of NDR carriageway
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Drainage Catchment Area (CA)	Annual Average Daily Traffic (AADT)
	% Heavy Goods Vehicle (HGV)

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Drainage Design

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Rev	0
Status	INF

Drawing Number
MMD-233906-DT-0985

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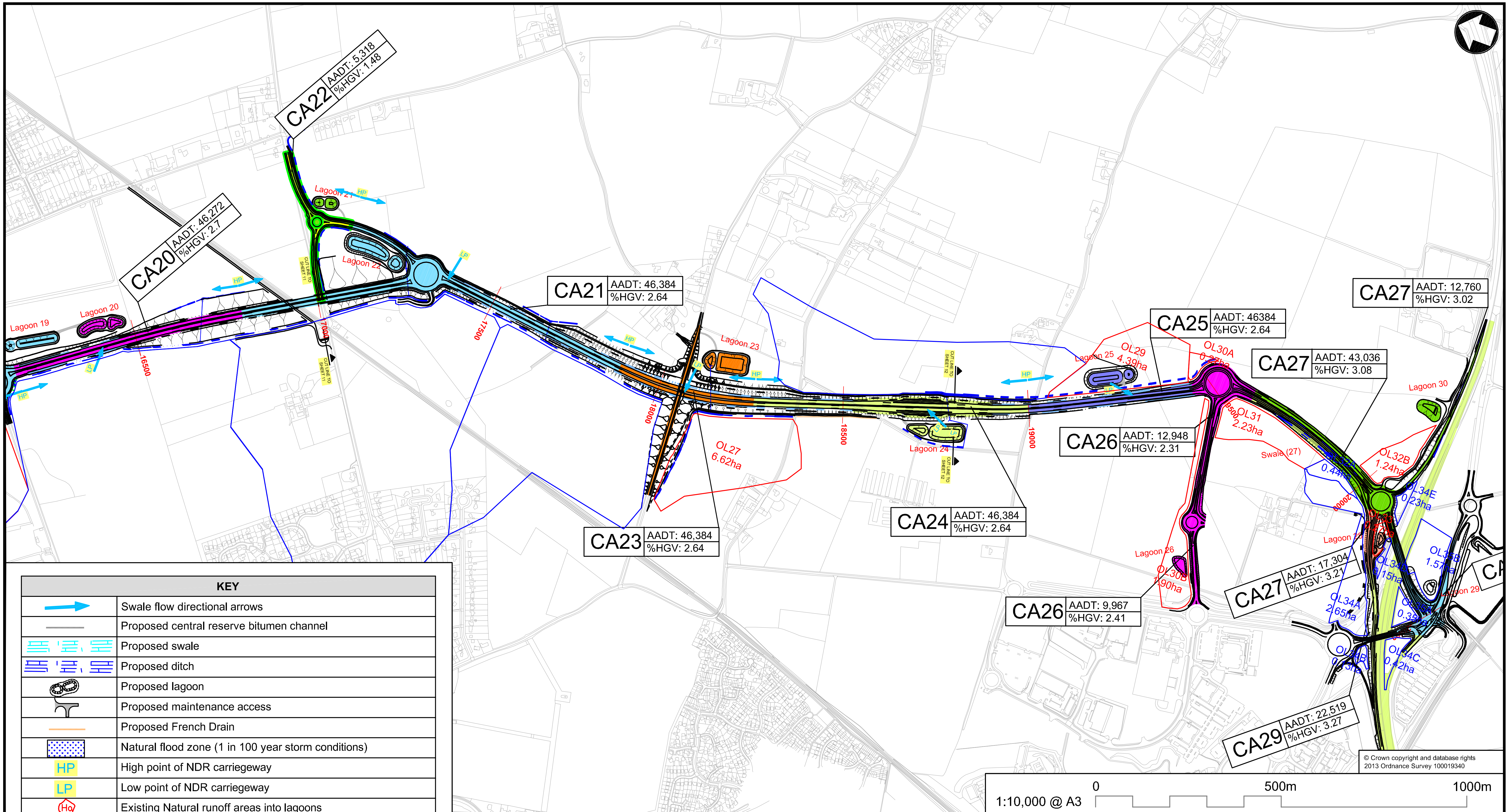

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Drainage Catchment Area (CA)	Annual Average Daily Traffic (AADT)
	% Heavy Goods Vehicle (HGV)

1:10,000 @ A3

0 500m 1000m

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Drainage Design

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Scale at A3	1:10,000
Rev	0
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Drawing Number

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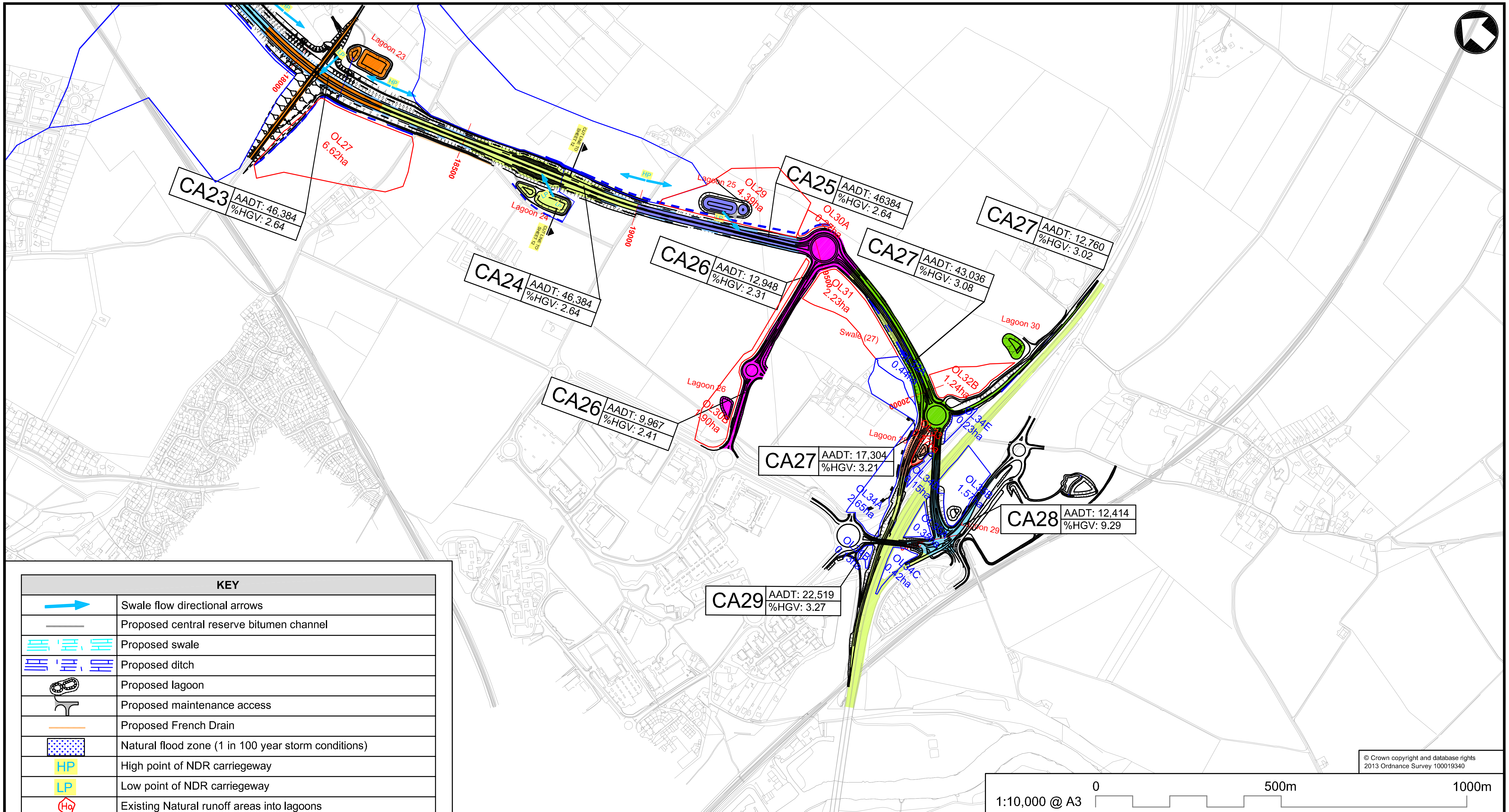

KEY	
	Swale flow directional arrows
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Drainage Catchment Area (CA)	Annual Average Daily Traffic (AADT)
	% Heavy Goods Vehicle (HGV)

1:10,000 @ A3

0 500m 1000m

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Drainage Design
7 of 7

Drawn	EMC
Checked	RD
Approved	PR
Scale at A3	1:10,000

Drawing Number
MMD-233906-DT-0987

Rev	Status
0	INF

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Drainage Design - Standard\MMD-233906-DT-0981-0987.dwg Jan 9, 2014 - 11:46AM eas40619

Appendix B.4 Groundwater risk assessment results – Swales

Drainage Catchment: CA1 (revised) PW1/P0/PW3/BHP10/PW5

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2		15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Single Point, or shallow soakaway (e.g. lagoon) serving low road	2	30
4		20	Unsaturated zone	Depth to water table <15>5m	2	40
5		20	Flow type	Consolidated deposits (i.e. mixed fracture and intergranular flo	2	40
6		7.5	Effective grain size	Fine sand and below	1	7.5
7		7.5	Lithology	<1% clay minerals	3	22.5
					Overall Risk Score	185

Drainage Catchment:CA3 BHP10/BHP16/BHP12/PW6

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2		15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	Unsaturated zone	Depth to water table >15m & non-aquifers	1	20
5		20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	Effective grain size	Fine sand and below	1	7.5
7		7.5	Lithology	<5% - >1% clay minerals	2	15
					Overall Risk Score	122.5

Drainage Catchment:CA4 **P22/BHP16/BH226/BH6B**

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2	Source	15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4	Pathway	20	Unsaturated zone	Depth to water table <5m	3	60
5	Pathway	20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6	Pathway	7.5	Effective grain size	Fine sand and below	1	7.5
7	Pathway	7.5	Lithology	<1% clay minerals	3	22.5
					Overall Risk Score	170

Drainage Catchment: CA5 **BHP16/BH6B/WS28.5**

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2	Source	15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4	Pathway	20	Unsaturated zone	Depth to water table <5m	3	60
5	Pathway	20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6	Pathway	7.5	Effective grain size	Fine sand and below	1	7.5
7	Pathway	7.5	Lithology	<5% - >1% clay minerals	2	15
					Overall Risk Score	162.5

Drainage Catchment: CA6A **BH227 (log water strike only) &BH228/BHP47**

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2	Source	15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4	Pathway	20	Unsaturated zone	Depth to water table <5m	3	60
5	Pathway	20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6	Pathway	7.5	Effective grain size	Fine sand and below	1	7.5
7	Pathway	7.5	Lithology	<5% - >1% clay minerals	2	15
					Overall Risk Score	162.5

Drainage Catchment: CA6B BH227 (log water strike only) &BH228/BHP47

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2		15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	Unsaturated zone	Depth to water table <5m	3	60
5		20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	Effective grain size	Fine sand and below	1	7.5
7		7.5	Lithology	<5% - >1% clay minerals	2	15
					Overall Risk Score	162.5

Drainage Catchment: CA7 BHP49(depth of borehole used as max GW level - remained dry during monitoring)

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2		15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	Unsaturated zone	Depth to water table <15>5m	2	40
5		20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	Effective grain size	Fine sand and below	1	7.5
7		7.5	Lithology	<1% clay minerals	3	22.5
					Overall Risk Score	150

Drainage catchment: CA9 BHP53/BH15B5

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2		15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	Unsaturated zone	Depth to water table <15>5m	2	40
5		20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	Effective grain size	Fine sand and below	1	7.5
7		7.5	Lithology	<5% - >1% clay minerals	2	15
					Overall Risk Score	142.5

Drainage catchment: CA10 BHP59/BH15B5

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	**Traffic density**	<50,000 AADT	1	15
2		15	**Rainfall Volume**	<740mm rainfall	1	15
		15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	**Unsaturated zone**	Depth to water table <5m	3	60
5		20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. dom	1	20
6		7.5	**Effective grain size**	Fine sand and below	1	7.5
7		7.5	**Lithology**	<5% - >1% clay minerals	2	15
				Overall Risk Score		162.5

Drainage catchment: CA11 BHP85, 86 & 87/TP82

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	**Traffic density**	<50,000 AADT	1	15
2		15	**Rainfall Volume**	<740mm rainfall	1	15
		15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	**Unsaturated zone**	Depth to water table <15>5m	2	40
5		20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. dom	1	20
6		7.5	**Effective grain size**	Fine sand and below	1	7.5
7		7.5	**Lithology**	> 15% clay minerals	1	7.5
				Overall Risk Score		135

Drainage catchment: CA12 BHP97/BHP91/BHP87

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	**Traffic density**	<50,000 AADT	1	15
2		15	**Rainfall Volume**	<740mm rainfall	1	15
		15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	**Unsaturated zone**	Depth to water table <15>5m	2	40
5		20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. dom	1	20
6		7.5	**Effective grain size**	Fine sand and below	1	7.5
7		7.5	**Lithology**	> 15% clay minerals	1	7.5
				Overall Risk Score		135

Drainage catchment: CA13A BH22P4/BHP8A/BH22B1

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	**Traffic density**	<50,000 AADT	1	15
2		15	**Rainfall Volume**	<740mm rainfall	1	15
		15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	**Unsaturated zone**	Depth to water table <5m	3	60
5		20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	**Effective grain size**	Fine sand and below	1	7.5
7		7.5	**Lithology**	> 15% clay minerals	1	7.5
				Overall Risk Score		155

Drainage catchment: CA13B BH22P4/BHP8A/BH22B1

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	**Traffic density**	<50,000 AADT	1	15
2		15	**Rainfall Volume**	<740mm rainfall	1	15
		15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	**Unsaturated zone**	Depth to water table <15>5m	2	40
5		20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	**Effective grain size**	Fine sand and below	1	7.5
7		7.5	**Lithology**	> 15% clay minerals	1	7.5
				Overall Risk Score		135

Drainage Catchment: CA14 BHP124 (log only)/BH126/TP120

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	**Traffic density**	<50,000 AADT	1	15
2		15	**Rainfall Volume**	<740mm rainfall	1	15
		15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	**Unsaturated zone**	Depth to water table <5m	3	60
5		20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	**Effective grain size**	Fine sand and below	1	7.5
7		7.5	**Lithology**	<5% - >1% clay minerals	2	15
				Overall Risk Score		162.5

Drainage Catchment: CA15 BHP124 (log only)/BH126/TP120

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2		15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	Unsaturated zone	Depth to water table <5m	3	60
5		20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	Effective grain size	Fine sand and below	1	7.5
7		7.5	Lithology	<5% - >1% clay minerals	2	15
				Overall Risk Score		162.5

Drainage catchment:CA16 BH124/GW3/WS389/WS390

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2		15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	Unsaturated zone	Depth to water table <5m	3	60
5		20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	Effective grain size	Fine sand and below	1	7.5
7		7.5	Lithology	<5% - >1% clay minerals	2	15
				Overall Risk Score		162.5

Drainage catchment: CA17 GW5/GW6

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2		15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	Unsaturated zone	Depth to water table <15>5m	2	40
5		20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	Effective grain size	Fine sand and below	1	7.5
7		7.5	Lithology	<1% clay minerals	3	22.5
				Overall Risk Score		150

Drainage catchment: CA18A BHP124&125/TP152/GW11

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	**Traffic density**	<50,000 AADT	1	15
2		15	**Rainfall Volume**	<740mm rainfall	1	15
		15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	**Unsaturated zone**	Depth to water table <5m	3	60
5		20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	**Effective grain size**	Fine sand and below	1	7.5
7		7.5	**Lithology**	<5% - >1% clay minerals	2	15
				Overall Risk Score		162.5

Drainage catchment: CA18B BHP124&125/TP152/GW11

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	**Traffic density**	<50,000 AADT	1	15
2		15	**Rainfall Volume**	<740mm rainfall	1	15
		15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	**Unsaturated zone**	Depth to water table <15>5m	2	40
5		20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	**Effective grain size**	Fine sand and below	1	7.5
7		7.5	**Lithology**	<5% - >1% clay minerals	2	15
				Overall Risk Score		142.5

Drainage catchment: CA20 BH12&18/BH235/BH236

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	**Traffic density**	<50,000 AADT	1	15
2		15	**Rainfall Volume**	<740mm rainfall	1	15
		15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	**Unsaturated zone**	Depth to water table <15>5m	2	40
5		20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	**Effective grain size**	Fine sand and below	1	7.5
7		7.5	**Lithology**	<5% - >1% clay minerals	2	15
				Overall Risk Score		142.5

Drainage catchment: CA21 BH12&18/BH235/BH236

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2		15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	Unsaturated zone	Depth to water table <15>5m	2	40
5		20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. dom	1	20
6		7.5	Effective grain size	Fine sand and below	1	7.5
7		7.5	Lithology	> 15% clay minerals	1	7.5
					Overall Risk Score	135

Drainage catchment: CA22 BH12&18/BH235/BH236

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2		15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	Unsaturated zone	Depth to water table <15>5m	2	40
5		20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. dom	1	20
6		7.5	Effective grain size	Fine sand and below	1	7.5
7		7.5	Lithology	> 15% clay minerals	1	7.5
					Overall Risk Score	135

Drainage catchment: CA23 TP175.5/TP177/BH35P5

Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	Traffic density	<50,000 AADT	1	15
2		15	Rainfall Volume	<740mm rainfall	1	15
		15	Rainfall Intensity	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	Soakaway geometry	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	Unsaturated zone	Depth to water table <15>5m	2	40
5		20	Flow type	Unconsolidated or non-fractured consolidated deposits (i.e. dom	1	20
6		7.5	Effective grain size	Fine sand and below	1	7.5
7		7.5	Lithology	<5% - >1% clay minerals	2	15
					Overall Risk Score	142.5

Drainage catchment: CA24 TP285/TP177/BH35P5						
Component Number		**Weighting Factor**	**Property or parameter**	**Site data**	**Risk score**	**Component score**
1	**Source**	15	**Traffic density**	<50,000 AADT	1	15
2		15	**Rainfall Volume**	<740mm rainfall	1	15
		15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	**Pathway**	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	**Unsaturated zone**	Depth to water table <15>5m	2	40
5		20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	**Effective grain size**	Fine sand and below	1	7.5
7		7.5	**Lithology**	> 15% clay minerals	1	7.5
					Overall Risk Score	135

Drainage catchment: CA25				BH35P5/P190		
Component Number		**Weighting Factor**	**Property or parameter**	**Site data**	**Risk score**	**Component score**
1	**Source**	15	**Traffic density**	<50,000 AADT	1	15
2		15	**Rainfall Volume**	<740mm rainfall	1	15
		15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	**Pathway**	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4		20	**Unsaturated zone**	Depth to water table <15>5m	2	40
5		20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. don	1	20
6		7.5	**Effective grain size**	Fine sand and below	1	7.5
7		7.5	**Lithology**	> 15% clay minerals	1	7.5
					Overall Risk Score	135

Appendix B.5 Groundwater risk and impact assessment table

	Road chainage (m)								> Impact assessment (potential change in groundwater quality)						
Drainage catchment number	**Start**	**Finish**	**Description of geology at base of swale** (top of crag elevation given where possible)	**Min Swale Invert Level (mAOD)**	**Max GW Level (mAOD)**	**Shallowest depth of unsaturated zone (m)**	**GW Risk score**	**Spillage Risk**	**Feature**	**Attributes**	**Importance**	**Mitigation proposed (Operation)**	**Magnitude (without lining)**	**Significance of Effect (with mitigation but without lining)**	**Swale lining?**
CA1	-223	200	Crag over upper chalk (Highest at 18.24mAOD at PW3)	19.71	9.95	9.76	185	<0.005	Principal aquifer (Chalk/Crag)	River Wensum SAC	Very high (Principal aquifer supporting SAC)	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor adverse/ Negligible	Moderate adverse	**Yes (potential adverse effect)**
CA3	1600	1950	GS&G over corton till over crag and/or chalk	36.41	10.29	26.12	122.5	<0.005	Secondary A aquifer (GSG/Corton Till) (overlying Principal aquifer)	Secondary A aquifer - supporting no known attributes. (Principal aquifer supporting private drinking water and irrigation supplies)	Medium (5 nearby local supplies)	Grassed verge providing pre treatment. No infiltration of road runoff within 50m SPZ1. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor adverse/ Negligible	Neutral	No
CA4	1950	2800	GS&G over corton till over Crag ~21mAOD (Upper chalk ~18mAOD)	35.1	31.34	3.76	170	<0.005	Secondary A aquifer (GSG/Corton Till) (overlying Principal aquifer)	Secondary A aquifer - supporting no known attributes. (Underlying Principal aquifer supporting water supply (public water supply) & SPZ3)	Medium (locally important resource)	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Moderate adverse	Moderate adverse	**Yes (potential adverse effect)**
CA5	2800	3400	GS&G or above existing ground level. (Crag ~21mAOD; Upper chalk ~18mAOD)	33.4	Not determined	<5m*	162.5	<0.005	Secondary A aquifer (GSG/Corton Till) (overlying Principal aquifer)	Secondary A aquifer - supporting no known attributes. (Underlying Principal aquifer - supporting water supply (public water supply) - SPZ3)	Medium	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Moderate adverse	Moderate adverse	**Yes (potential adverse effect and unknown groundwater levels)**
CA6A	3400	4000	GS&G over corton till over crag (~25.5mAOD)	32.87	29.4	3.47	162.5	<0.005	Secondary A aquifer (GSG/Corton Till) (overlying Principal aquifer)	Secondary A aquifer - supporting no known attributes. (Underlying Principal aquifer - supporting local irrigation supply)	Low - medium (locally important resource)	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Moderate adverse	Slight adverse	No
CA6B	4000	5300	GS&G over corton till over crag (~25.5mAOD)	28.87	29.13	-0.26	162.5	<0.005	Secondary A aquifer (GSG/Corton Till) Principal aquifer (Chalk/Crag)	Secondary A aquifer - supporting no known attributes. (Underlying Principal aquifer - supporting local irrigation supply)	Medium (locally important resource)	Grassed verge providing pre treatment. Partial filtering and adsorption of metals/PAH/TSS through swales. Swale provides a 40% spillage risk reduction factor.	Moderate adverse	Slight/moderate adverse	**Yes (shallow unsaturated zone). Small section (approx 100m) where base at or just below max GW level.**
CA7	5300	5600	GS&G over corton till	34.58	27.18	7.4	150	<0.005	Secondary A aquifer (GSG/Corton Till) (overlying Principal aquifer)	Secondary A aquifer - supporting no known attributes. (Underlying Principal aquifer - supporting local irrigation supply)	Low (dry aquifer)	Grassed verge providing pre treatment. No infiltration of road runoff within 50m SPZ1. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor -Moderate adverse	Neutral	No (To be reviewed following further ground investigation to inform groundwater levels in this area)
CA10	6450	7550	Crag at lowest swale depth (ch. 6800); higher swale elevations in Corton till/GS&G over crag (~24mAOD)	24.64	20.99	3.65	162.5	<0.005	Principal aquifer (Chalk/Crag)	Supporting no known attributes within 500m of proposed swales	Low - Medium (no supplies within 500m)	Grassed verge providing pre treatment. Swale provides partial treatment of metals/PAH/TSS and 40% spillage reduction factor. Unsaturated zone >1.5m below base of swale.	Moderate adverse	Slight - moderate adverse	No
CA9	5600	6450	GS&G (and small stretch of Corton till) over Crag (~24mAOD)	29.48	20.99	8.49	142.5	<0.005	Secondary A aquifer (GSG/Corton Till) (overlying Principal aquifer)	Secondary A aquifer - supporting no known attributes. (Underlying Principal aquifer - supporting local irrigation supply)	Medium (locally important resource)	Grassed verge providing pre treatment. No infiltration of road runoff within 50m SPZ1. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor adverse (areas of GSG only)	Slight adverse	No

CA11	7550	9300	GS&G/corton til over crag (~23mAOD)	24.6	15.31	9.29	135	<0.005	Principal aquifer (Crag)	Suppoting one private water supply approx 200m from swales	Medium (locally important resource)	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor adverse/ Negligble	Slight - moderate adverse	No
CA12	9300	10300	Corton till or GS&G over crag (~20mAOD)	23.86	15.31	8.55	135	<0.005	Principal aquifer (Crag)	Suppoting one private water supply approx 150m from swales	Medium (locally important resource)	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor adverse/ Negligble	Slight adverse	No (>2m Corton Till above the Crag.)
CA13A	10300	11100	Crag at lowest swale depth; higher elevations in Corton till over crag (~21.5mAOD)	19.59	13.18	6.41	155	<0.005	Principal aquifer (Crag)	Suppoting two private water supply approx 500m from swales	High (locally important resource)	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Moderate adverse	Moderate adverse	**Yes (potential adverse effect)**
CA13B	11100	11700	Corton till over crag (~21.5mAOD)	19.59	13.18	6.41	135	<0.005	Secondary A aquifer (Corton Till) (overlying Principal aquifer)	Suppoting two private water supply approx 500m from swales	Medium (locally important resource)	Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Negligible	Neutral	No
CA15	11700	12950	Crag (~17.5mAOD) below the overlying corton till. Small lengths of alluvium over crag	22.67	14	8.67	162.5	<0.005	Secondary A auifer (Corton Till) (overlying Principal aquifer)	Supporting no known attributes within 500m of proposed swales	Low - Medium (locally important resource)	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Moderate adverse	Slight adverse	No
CA16	12950	13850	Crag outcrop	15.13	11.68	3.45	162.5	<0.005	Principal aquifer (Crag)	Water supply (public water supply) - SPZ3 & biodiversity (Rackheath Springs)	Medium (locally important resource)	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Moderate adverse	Moderate adverse	**Yes (potential adverse effect)**
CA17	13850	14350	Crag outcrop	18.13	12.44	5.69	150	<0.005	Principal aquifer (Crag)	Water supply (public water supply) - SPZ3 & biodiversity (Rackheath Springs)	Medium (locally important resource)	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor -Moderate adverse	Slight - moderate adverse	**Yes (potential adverse effect)**
CA18A	14350	14900	Crag outcrop at lowest swale depth	15.38	12.39	2.99	162.5	<0.005	Principal aquifer (Crag)	Water supply (public water supply) - SPZ3 & biodiversity (Rackheath Springs)	High (locally important resource)	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Moderate adverse	Moderate adverse	**Yes (potential adverse effect)**
CA18B	14900	16000	GS&G over corton til over crag (~18.7mAOD)	17.57	12.42	5.15	142.5	<0.005	Principal aquifer (Crag)	Water supply (public water supply) - SPZ3 & biodiversity (Rackheath Springs)	Medium (locally important resource)	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor adverse/ Negligble	Slight adverse	No (>2m Cotton Till above/ protecting Crag)
CA20	16200	16450	GS&G over corton til over crag (~24.26mAOD)	27.9	18.15	9.75	142.5	<0.005	Secondary A auifer (GSG/Corton Till) (overlying Principal aquifer)	Secondary A aquifer - supporting no known attributes. (Underlying Principal aquifer - supporting public water supply - SPZ3)	Medium	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor adverse/ Negligble	Slight adverse	~~Yes (Corton Till up to 3m thick (above Crag), but only about 1m at some locations)~~ No (Corton Till overlying Crag)
CA21	17350	17850	Corton till over crag (~18.5mAOD)	23.97	18.28	5.69	135	<0.005	Principal aquifer (Chalk/Crag)	Water supply (public water supply) - SPZ3	Medium	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor adverse/ Negligble	Neutral	No
CA23	17850	18300	Corton formation sand/till over crag (~17.25mAOD)	25.69	15.25	10.44	142.5	<0.005	Principal aquifer (Chalk/Crag)	Water supply (public water supply) - SPZ3	Medium	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor adverse/ Negligble	Neutral	No
CA24	18300	18550	Corton till/Corton formation sand over crag (~19mAOD)	25.71	15.25	10.46	135	<0.005	Principal aquifer (Chalk/Crag)	Water supply (public water supply) - SPZ3	Medium	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor adverse/ Negligble	Neutral	No

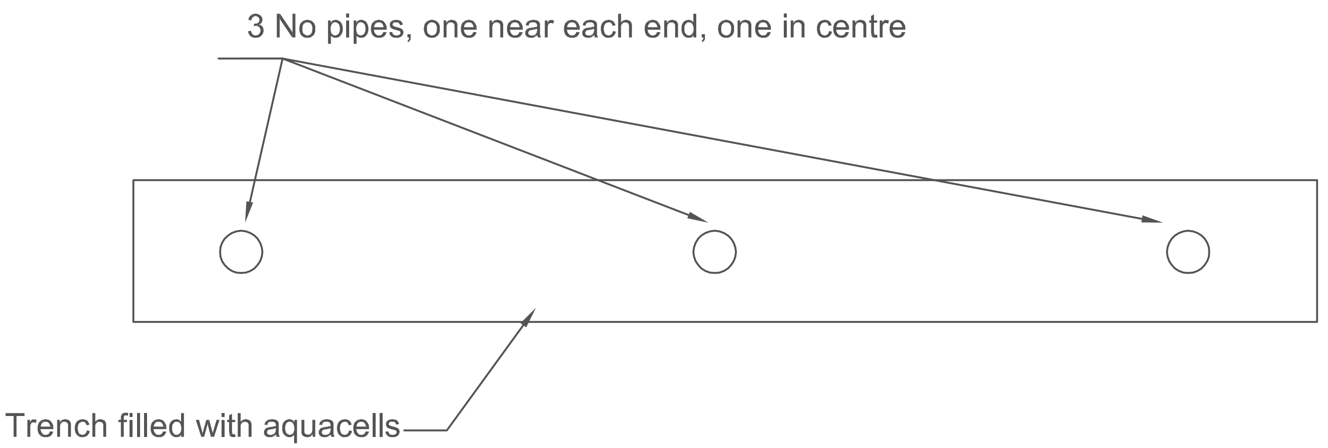
CA25	18850	19450	Corton till/Corton formation sand over crag (~19mAOD)	24.06	9.14	14.92	135	<0.005	Principal aquifer (Chalk/Crag)	Water supply (public water supply) - SPZ3	Medium	Grassed verge providing pre treatment. Unsaturated zone >1.5m below base of swale providing filtering and adsorption of metals/PAH/TSS. Swale provides a 40% spillage risk reduction factor.	Minor adverse/ Negligble	Neutral	No

* includes risk score for unsaturated zone as for CA4.

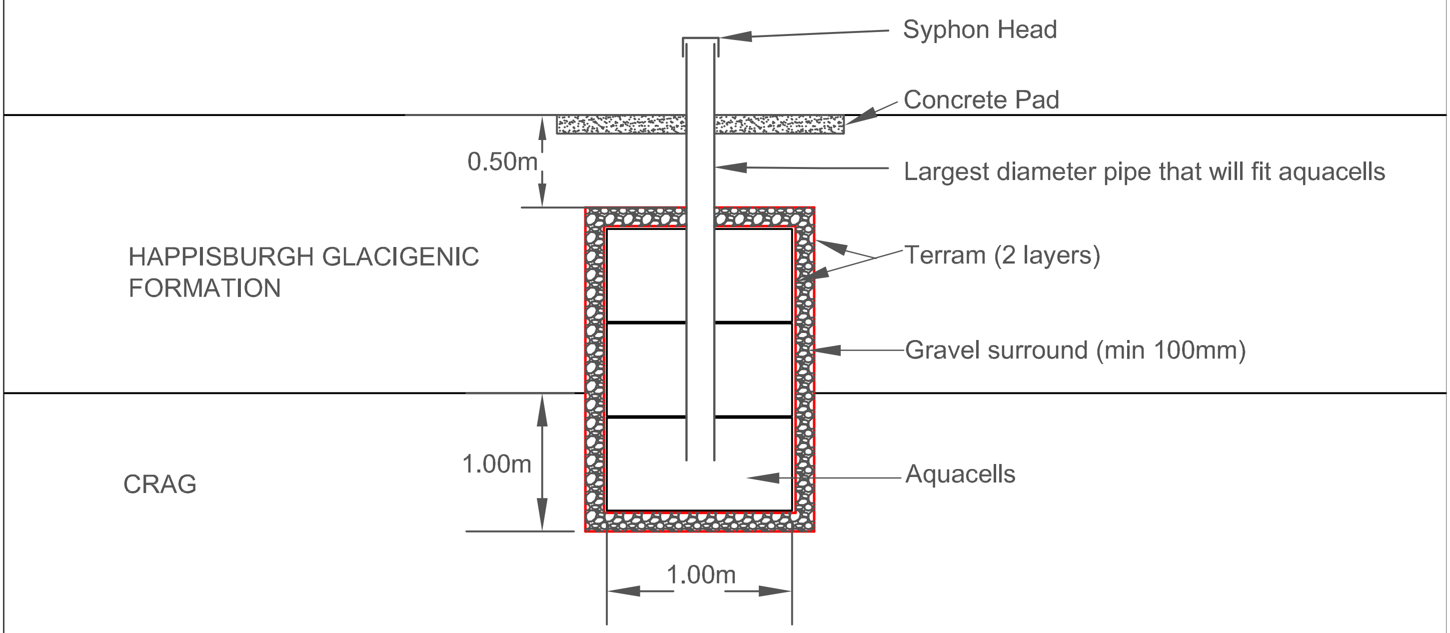
Appendix C. Improved infiltration in lagoons

Appendix C.1.	Schematic of Aquacell infiltration trenches Drawing number PTPK1000-01A.
Appendix C.2	Plans showing the proposed improvement measures at each lagoon site (Drawings R1C093-R1-4900B, Drawings R1C093-R1-4901 to 4904, R1C093-R1-4953)
Appendix C.3	MicroDrainage results
Appendix C.4	Revised lagoon details from combined MicroDrainage model
Appendix C.5	Groundwater risk assessment results - Lagoons 13 and 23
Appendix C.6	Revised Table 4.3 of FRA
Appendix C.7	Changes to overland ditch design at Lagoons 1 and 5

Appendix C.1. Schematic of Aquacell infiltration trenches Drawing number PTPK1000-01A



PLAN



SECTION

Norfolk County Council
working with
MAY GURNEY
Mott MacDonald

DRAWING TITLE
NDR
Schematic for infiltration trench beneath lagoon

Tom McCabe
Interim Director of Environment, Transport and Development
Norfolk County Council
County Hall
Martineau Lane
Norwich NR1 2SG

REV.	DESCRIPTION	CHECKED	DATE
A	Surface detail changed	MLB	04/14

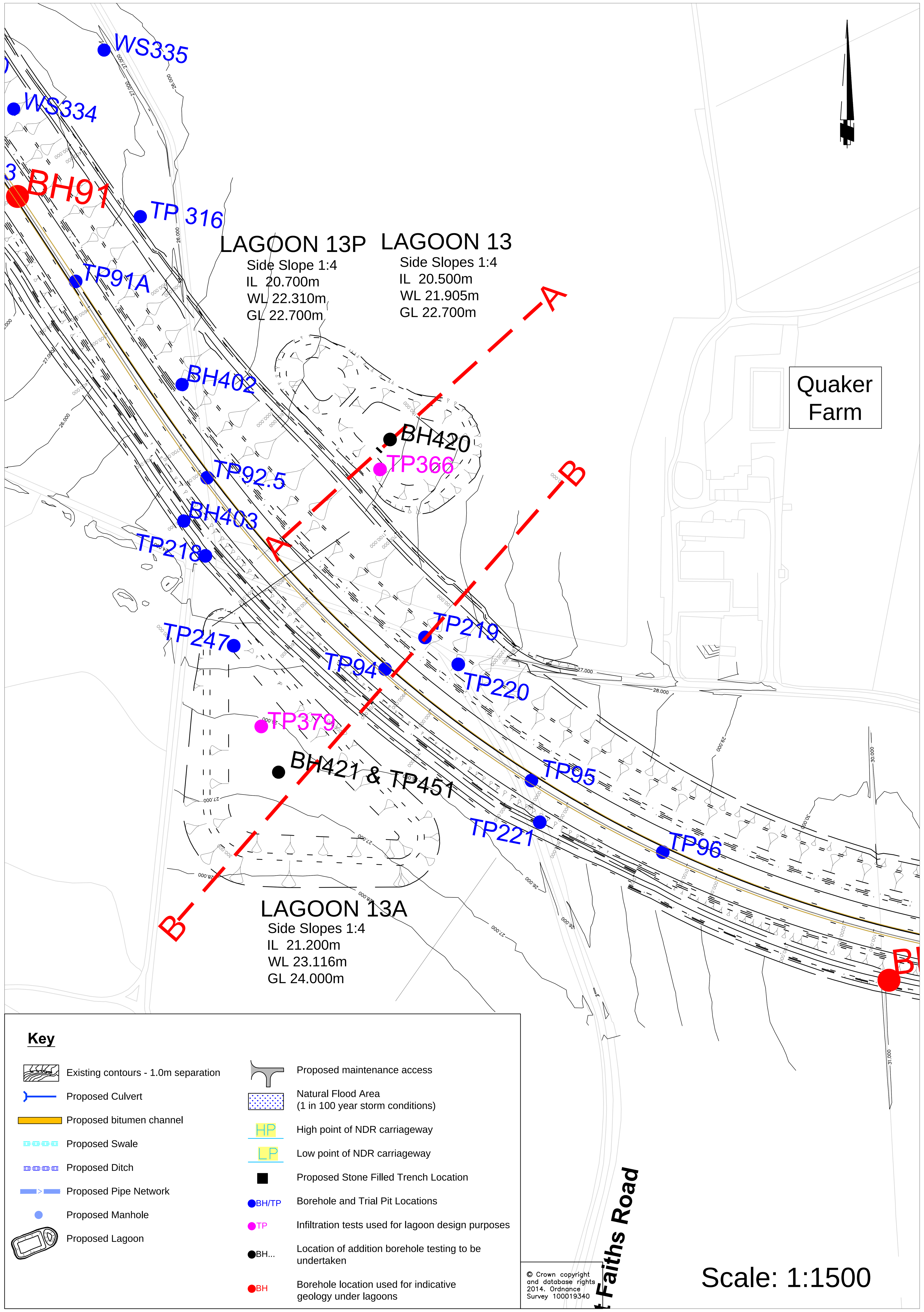
	INIT.	DATE
SURVEYED BY		
DESIGNED BY		
DRAWN BY	SPB	02/14
CHECKED BY	MLB	02/14

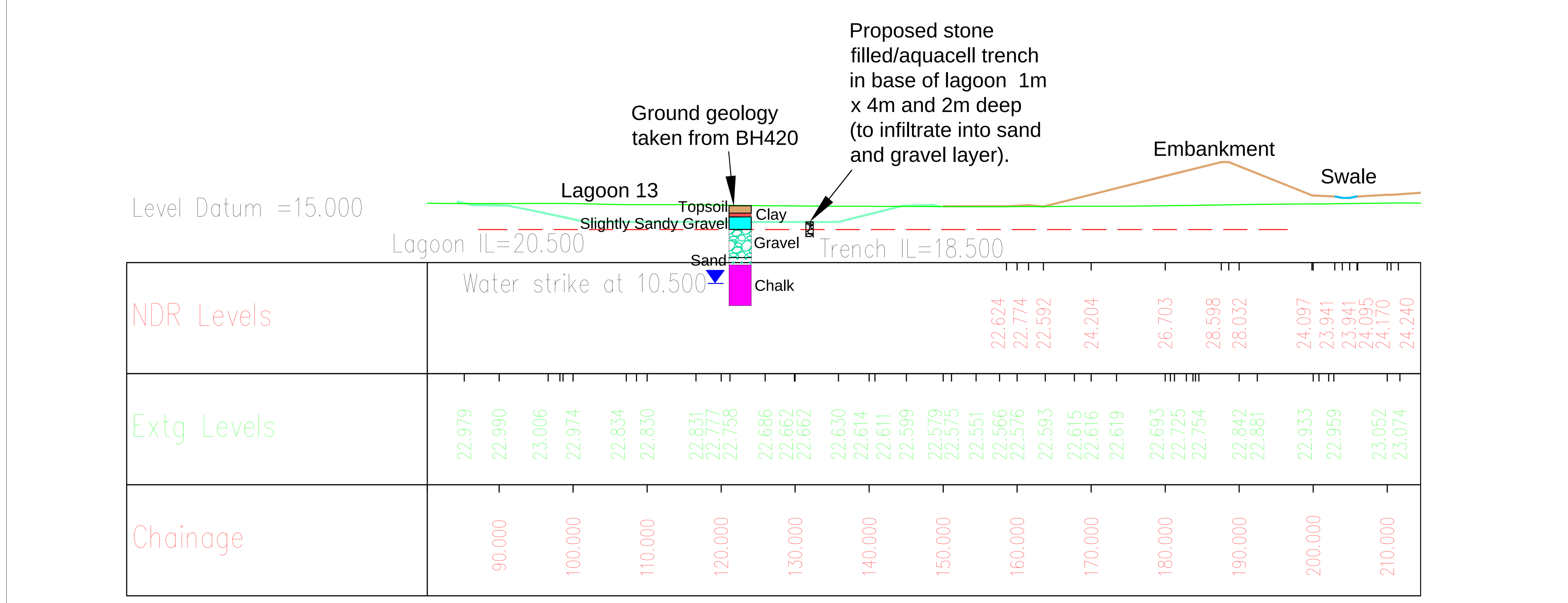
DRAWING No. PTPK1000 - 01A
PROJECT TITLE Norwich Northern Distributor Route
SCALE No Scale
FILE No. PTPK1000

ORIGINAL SIZE: A4

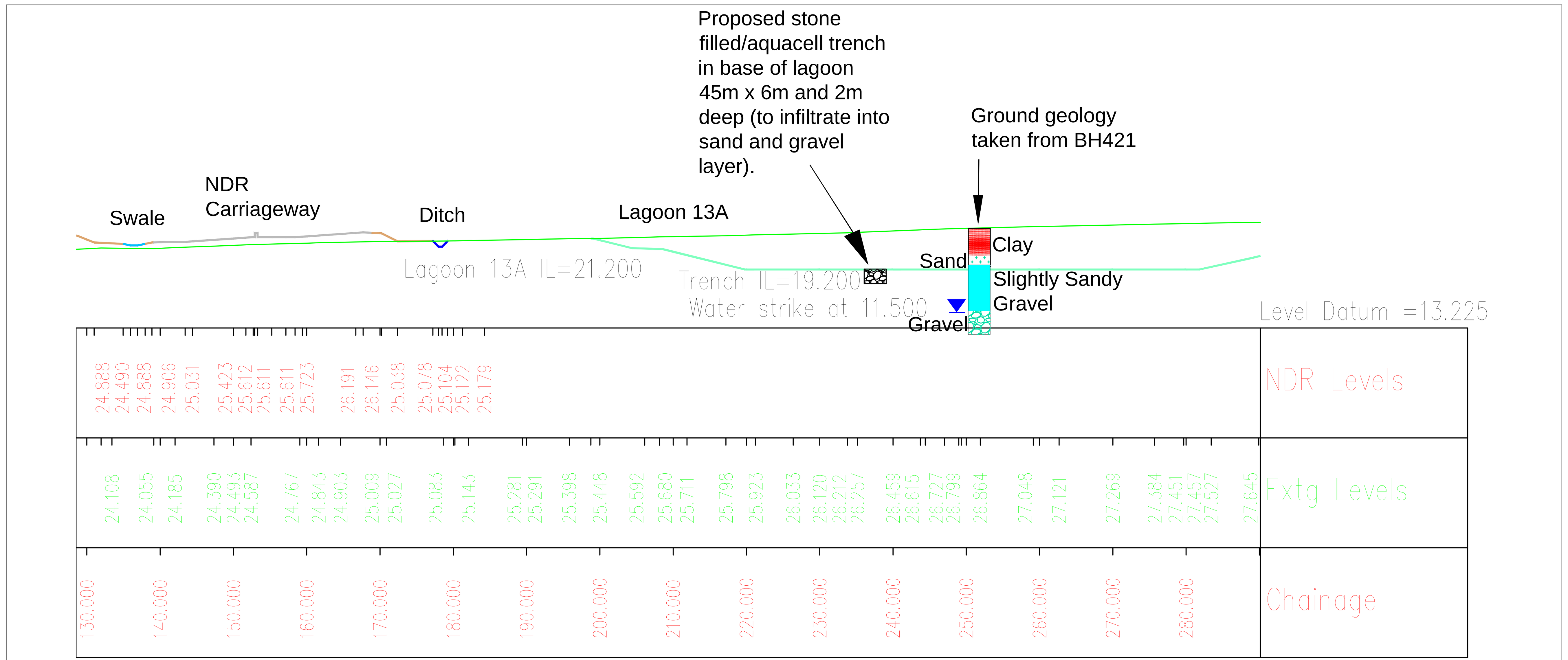
BIL 28/10/13

Appendix C.2 Plans showing the proposed improvement measures at each lagoon site





SECTION AA C/S AT CHAINAGE 9780 ON MALL (H:500/V500)



SECTION BB C/S AT CHAINAGE 9890 ON MALL (H:500/V:500)

Norfolk County Council
Mott MacDonald
Birse Civils

Tom McCabe
Interim Director of Environment, Transport and Development
Norfolk County Council
County Hall, Martineau Lane
Norwich NR1 2SG

DRAWING TITLE
NORWICH: NORTHERN DISTRIBUTOR ROAD
PROPOSED IMPROVEMENTS TO INFILTRATION
FOR LAGOONS 13 AND 13A

REV.	DESCRIPTION	CHECKED	DATE
A	Borehole locations amended		
B	Borehole locations amended		
C	Width amended to trench in lagoon 13a		

	INITIALS	DATE
SURVEYED BY	OS	02/14
DESIGNED BY	JT	02/14
DRAWN BY	JT	02/14
CHECKED BY	MKu	04/14

DRAWING No. R1C093-R1-4901C
PROJECT TITLE Norwich Northern Distributor Road
SCALE As Above
FILE No. R1C093

ORIGINAL SIZE: A1

Norfolk County Council
Mott MacDonald
Birse Civils

Tom McCabe
Interim Director of Environment
Transport and Development
Norfolk County Council
County Hall, Martineau Lane
Norwich NR1 2SG

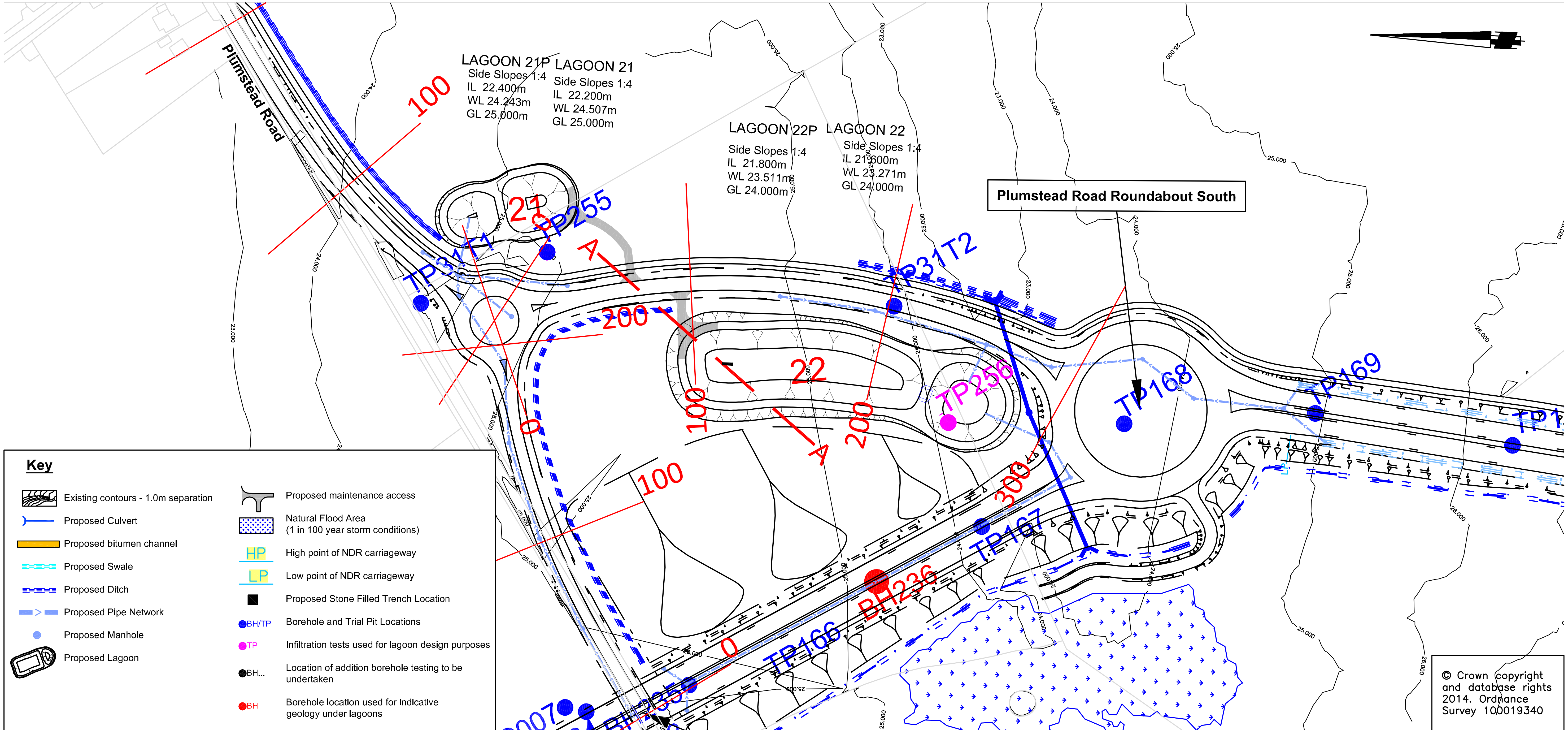
DRAWING TITLE
NORWICH NORTHERN DISTRIBUTOR ROAD - PROPOSED IMPROVEMENTS TO INFILTRATION FOR LAGOON 22
OPTION 1 - OUTFALL TO WITTON RUN

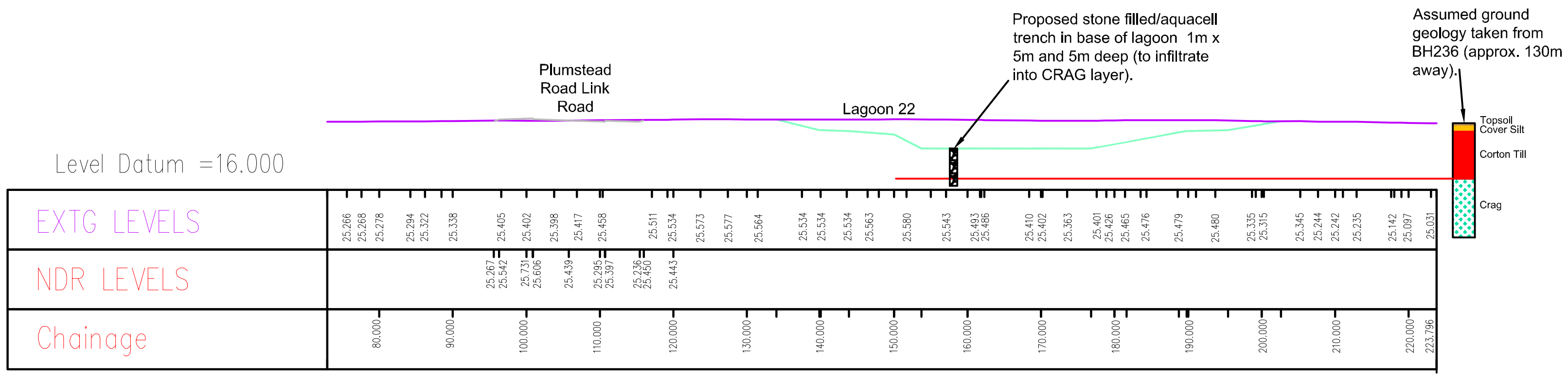
REV.	DESCRIPTION	CHECKED	DATE

	INITIALS	DATE
SURVEYED BY	OS	03/14
DESIGNED BY	JT	03/14
DRAWN BY	JT	03/14
CHECKED BY	MKu	04/14

DRAWING No. R1C093-R1-4902
PROJECT TITLE Norwich Northern Distributor Road
SCALE 1:1500
FILE No. R1C093

ORIGINAL SIZE: A1





SECTION AA (H1000/V:1000)

Norfolk County Council

Mott MacDonald

Birse Civils

Tom McCabe
Interim Director of Environment, Transport and Development
Norfolk County Council
County Hall, Martineau Lane
Norwich NR1 2SG

DRAWING TITLE

NORWICH NORTHERN DISTRIBUTOR ROAD
PROPOSED IMPROVEMENTS TO INFILTRATION FOR LAGOON 22
OPTION 2 - STONE FILLED TRENCH

REV.	DESCRIPTION	CHECKED	DATE

	INITIALS	DATE
SURVEYED BY	OS	03/14
DESIGNED BY	JT	03/14
DRAWN BY	JT	03/14
CHECKED BY	MKu	04/14

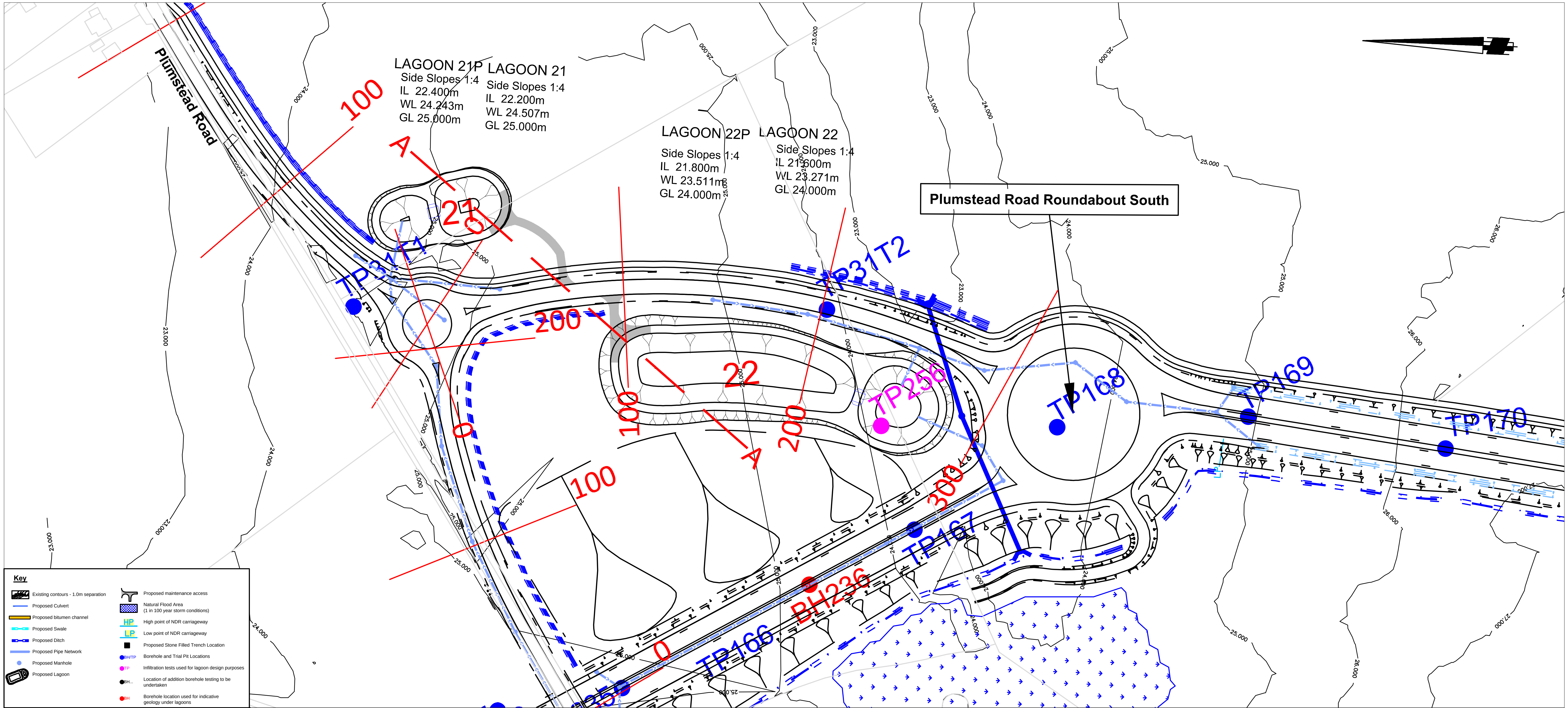
DRAWING No. R1C093-R1-4903

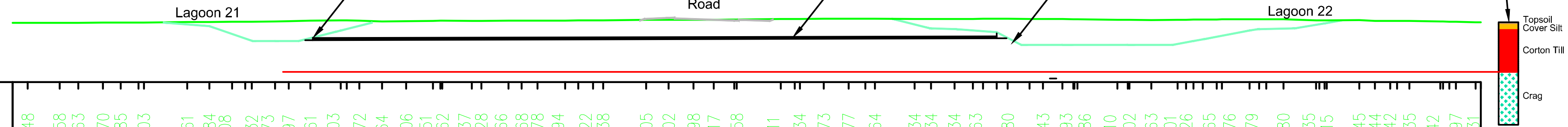
PROJECT TITLE
NORWICH
NORTHERN DISTRIBUTOR ROAD

SCALE 1:1000

FILE No. R1C093

ORIGINAL SIZE: A3





EXTG LEVELS	24.948 24.958 24.963 24.970 24.985 25.003 25.061 25.084 25.108 25.132 25.173 25.197 25.261 25.303 25.272 25.164 25.206 25.251 25.262 25.237 25.228 25.266 25.268 25.278 25.294 25.322 25.338 25.405 25.402 25.398 25.417 25.458 25.511 25.534 25.573 25.577 25.564 25.534 25.534 25.534 25.563 25.580 25.543 25.493 25.486 25.410 25.402 25.363 25.401 25.426 25.465 25.476 25.479 25.480 25.335 25.315 25.345 25.244 25.242 25.235 25.142 25.097 25.031
NDR LEVELS	25.267 25.542 25.731 25.606 25.439 25.295 25.397 25.236 25.450 25.443
Chainage	0.000 10.000 20.000 30.000 40.000 50.000 60.000 70.000 80.000 90.000 100.000 110.000 120.000 130.000 140.000 150.000 160.000 170.000 180.000 190.000 200.000 210.000 220.000 223.796

Norfolk County Council
Mott MacDonald
Birse Civils

Tom McCabe
Interim Director of Environment, Transport and Development
Norfolk County Council
County Hall, Martineau Lane
Norwich NR1 2SG

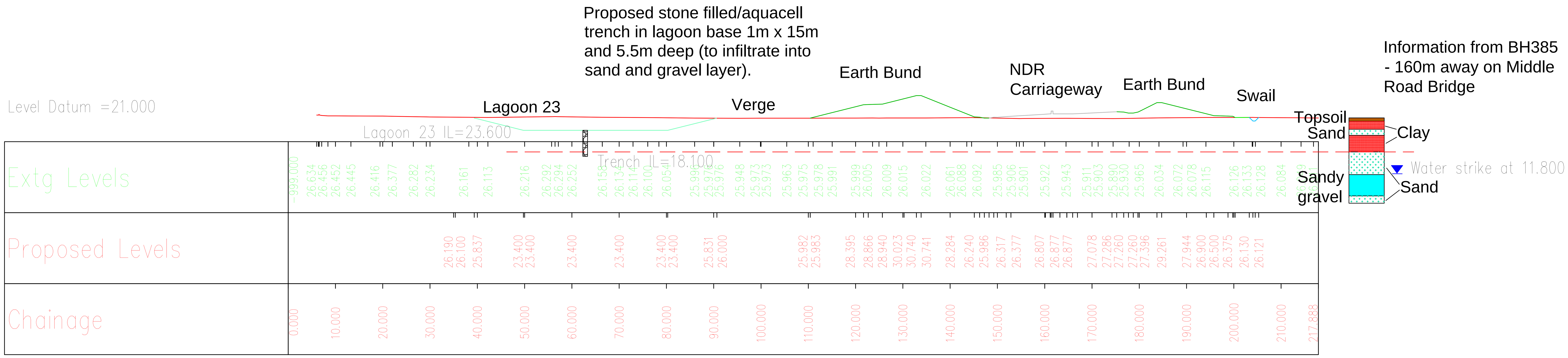
DRAWING TITLE
NORWICH NORTHERN DISTRIBUTOR ROAD
PROPOSED IMPROVEMENTS TO INFILTRATION FOR LAGOON 22
OPTION 4 - CONNECTION TO LAGOON 21

REV.	DESCRIPTION	CHECKED	DATE

	INITIALS	DATE
SURVEYED BY	OS	03/14
DESIGNED BY	JT	03/14
DRAWN BY	JT	03/14
CHECKED BY	MKu	04/14

DRAWING No. R1C093-R1-4904
PROJECT TITLE NORWICH NORTHERN DISTRIBUTOR ROAD
SCALE 1:1000
FILE No. R1C093

ORIGINAL SIZE: A3



SECTION AA C/S AT CHAINAGE 18250.00 ON MALL (H:500/V:500)

Norfolk County Council
Mott MacDonald
Birse Civils

Tom McCabe
Interim Director of Environment, Transport and Development
Norfolk County Council
County Hall, Martineau Lane
Norwich NR1 2SG

DRAWING TITLE
NORWICH NORTHERN DISTRIBUTOR ROAD
PROPOSED IMPROVEMENTS TO INFILTRATION
FOR LAGOON 23

REV.	DESCRIPTION	CHECKED	DATE

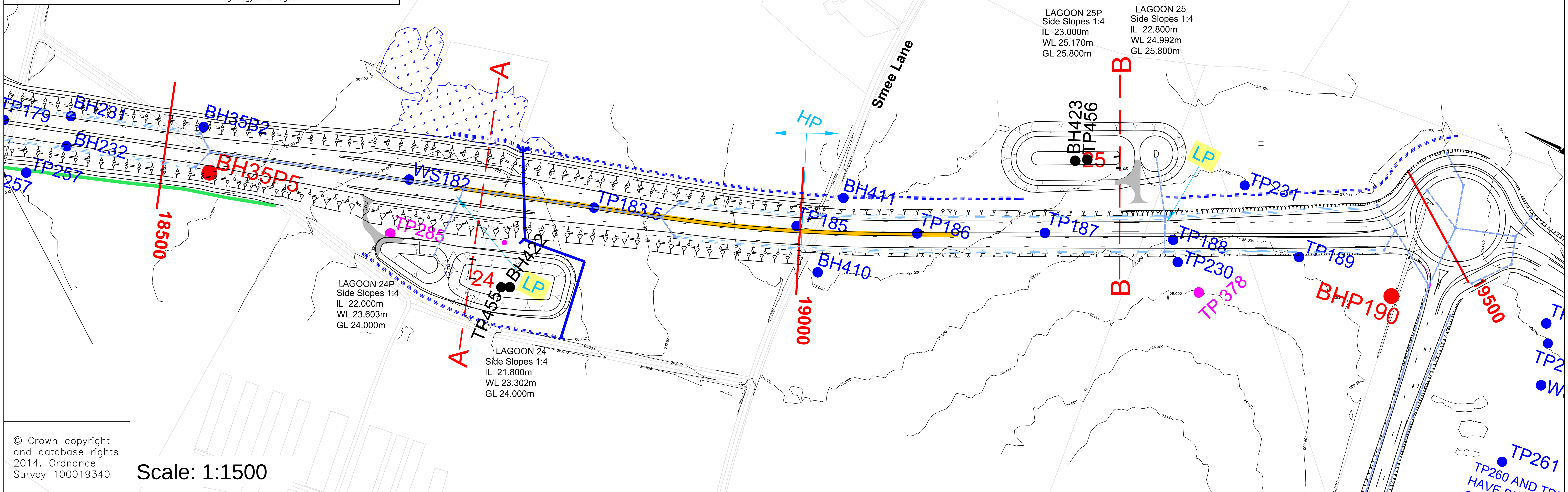
	INITIALS	DATE
SURVEYED BY	OS	2014
DESIGNED BY	JC	06/14
DRAWN BY	JC	06/14
CHECKED BY	Mku	06/14

DRAWING No. R1C093-R1-4953
PROJECT TITLE Norwich Northern Distributor Road
SCALE 1:1500
FILE No. R1C093

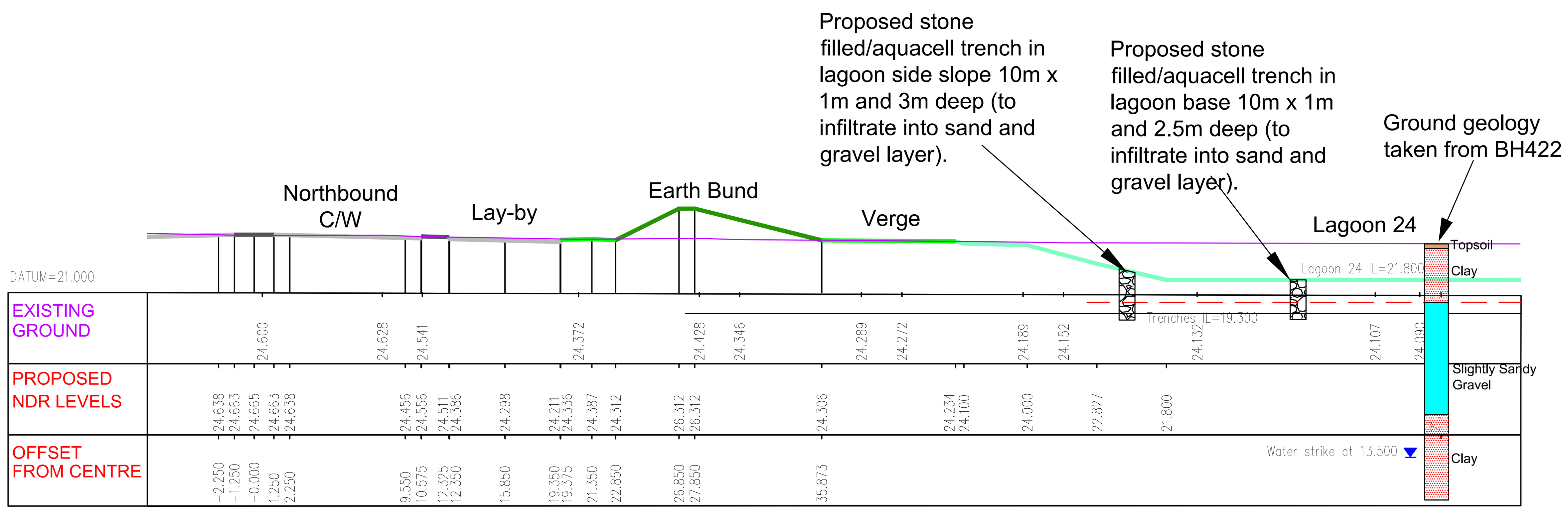
ORIGINAL SIZE: A1

Key

- Existing contours - 1.0m separation
- Proposed Culvert
- Proposed bitumen channel
- Proposed Swale
- Proposed Ditch
- Proposed Pipe Network
- Proposed Manhole
- Proposed Lagoon
- Proposed French Drain
- Proposed maintenance access
- Natural Flood Area (1 in 100 year storm conditions)
- HP — High point of NDR carriageway
- LP — Low point of NDR carriageway
- Proposed Stone Filled Trench Location
- BH/TP — Borehole and Trial Pit Locations
- TP — Infiltration tests used for lagoon design purposes
- BH... — Location of addition borehole testing to be undertaken
- BH — Borehole location used for indicative geology under lagoons



Scale: 1:1500



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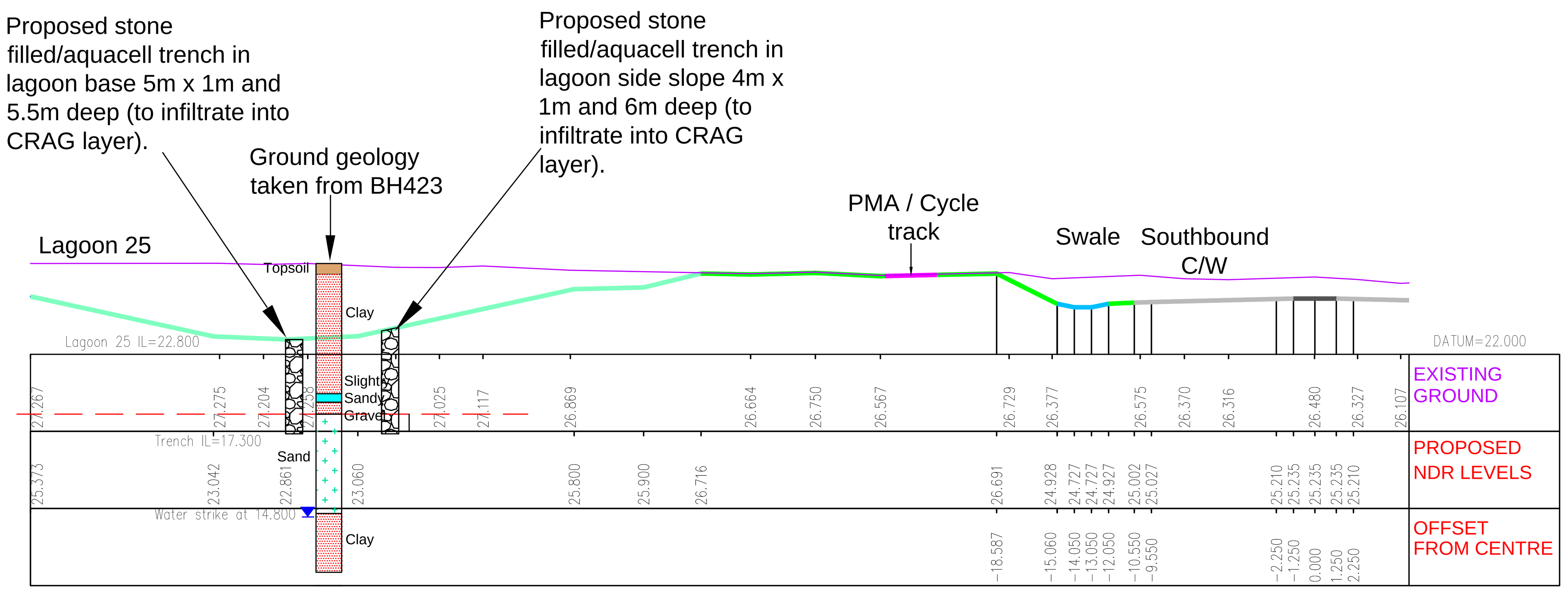

SECTION BB C/S AT CHAINAGE 19250.000 ON MALL (H:250/V:250)

Norfolk County Council | Birse Civils | Mott MacDonald

Tom McCabe
Interim Director of Environment
Transport and Development
Norfolk County Council
County Hall, Martineau Lane
Norwich NR1 2SG

DRAWING TITLE

NORWICH: NORTHERN DISTRIBUTOR ROAD
PROPOSED IMPROVEMENTS TO INFILTRATION
FOR LAGOONS 24 AND 25

REV.	DESCRIPTION	CHECKED	DATE
A	Trench sizes amended		
B	Borehole locations amended		

	INITIALS	DATE
SURVEYED BY	OS	02/14
DESIGNED BY	JT	02/14
DRAWN BY	JT	02/14
CHECKED BY	MKu	02/14

DRAWING No. R1C093-R1-4900B

PROJECT TITLE: Norwich Northern Distributor Road

SCALE: As Above

FILE No. R1C093

ORIGINAL SIZE: A1

Appendix C.3 MicroDrainage results

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.000	1.905	52.5	0.186	5.00	0.0	0.600		o	300
1.001	99.964	2.180	45.9	0.186	0.00	0.0	0.600		o	375
1.002	100.000	2.458	40.7	0.191	0.00	0.0	0.600		o	375
1.003	100.000	2.101	47.6	0.197	0.00	0.0	0.600		o	450
1.004	100.000	2.148	46.6	0.181	0.00	0.0	0.600		o	450
1.005	61.967	1.075	57.6	0.179	0.00	0.0	0.600		o	525
1.006	68.120	1.186	57.4	0.111	0.00	0.0	0.600		o	525
2.000	100.060	1.505	66.5	0.131	5.00	0.0		0.050		-5
2.001	100.000	2.126	47.0	0.137	0.00	0.0		0.050		-5
2.002	100.000	2.509	39.9	0.151	0.00	0.0		0.050		-5
2.003	100.000	2.958	33.8	0.166	0.00	0.0		0.050		-5
2.004	100.000	3.000	33.3	0.155	0.00	0.0		0.050		-5
2.005	100.000	3.164	31.6	0.120	0.00	0.0		0.050		-5
2.006	100.000	2.684	37.3	0.125	0.00	0.0		0.050		-5
2.007	25.158	0.385	65.3	0.000	0.00	0.0	0.600		o	600
1.007	61.770	0.772	80.0	0.112	0.00	0.0	0.600		o	675
1.008	60.000	0.600	100.0	0.184	0.00	0.0	0.600		o	675
1.009	62.520	0.521	120.0	0.163	0.00	0.0	0.600		o	675
3.000	100.000	0.350	285.7	0.031	5.00	0.0		0.050		-5

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	35.124	0.186	0.0	2.17	153.7
1.001	33.219	0.372	0.0	2.68	296.2
1.002	30.564	0.563	0.0	2.85	314.6
1.003	27.131	0.760	0.0	2.95	469.6
1.004	24.031	0.941	0.0	2.99	474.9
1.005	21.083	1.120	0.0	2.95	639.6
1.006	19.483	1.231	0.0	2.96	640.7
2.000	37.589	0.131	0.0	0.68	466.9
2.001	36.084	0.268	0.0	0.81	555.1
2.002	33.958	0.419	0.0	0.88	603.1
2.003	31.449	0.585	0.0	0.95	654.8
2.004	28.491	0.740	0.0	0.96	659.4
2.005	25.491	0.860	0.0	0.99	677.2
2.006	22.327	0.985	0.0	0.91	623.7
2.007	18.318	0.985	0.0	3.02	852.7
1.007	17.933	2.328	0.0	2.93	1049.1
1.008	17.161	2.512	0.0	2.62	938.0
1.009	16.561	2.675	0.0	2.39	855.8
3.000	19.762	0.031	0.0	0.33	225.2

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
3.001	90.720	0.850	106.7	0.029	0.00	0.0		0.050		-5
3.002	21.056	0.263	80.1	0.000	0.00	0.0	0.600		o	375
1.010	96.831	1.076	90.0	0.168	0.00	0.0	0.600		o	675
1.011	97.161	0.987	98.4	0.272	0.00	0.0	0.600		o	675
1.012	15.762	0.105	150.1	0.253	0.00	0.0	0.600		o	750
4.000	100.000	0.756	132.3	0.173	5.00	0.0		0.050		-4
4.001	101.510	2.100	48.3	0.146	0.00	0.0		0.050		-4
4.002	47.292	0.974	48.6	0.032	0.00	0.0	0.600		o	300
4.003	29.543	0.369	80.1	0.033	0.00	0.0	0.600		o	300
4.004	68.708	0.800	85.9	0.051	0.00	0.0	0.600		o	375
5.000	39.368	0.131	300.5	0.291	5.00	0.0	0.600		o	525
4.005	32.087	0.107	299.9	0.000	0.00	0.0	0.600		o	525
6.000	17.841	0.074	241.1	0.179	5.00	0.0	0.600		o	300
6.001	45.077	0.225	200.3	0.157	0.00	0.0	0.600		o	375
1.013	39.454	0.263	150.0	0.027	0.00	0.0	0.600		o	750
1.014	17.000	0.200	85.0	0.000	0.00	0.0	0.600		o	300

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
3.001	19.412	0.060	0.0	0.54	368.5
3.002	17.237	0.060	0.0	2.03	223.8
1.010	16.040	2.903	0.0	2.76	989.0
1.011	14.964	3.175	0.0	2.64	945.4
1.012	13.977	3.428	0.0	2.28	1008.1
4.000	20.935	0.173	0.0	0.49	330.7
4.001	20.179	0.319	0.0	0.80	547.1
4.002	16.854	0.351	0.0	2.26	159.9
4.003	15.880	0.384	0.0	1.76	124.3
4.004	15.511	0.435	0.0	1.96	216.1
5.000	14.425	0.291	0.0	1.29	278.6
4.005	14.294	0.726	0.0	1.29	278.9
6.000	14.380	0.179	0.0	1.01	71.3
6.001	14.306	0.336	0.0	1.28	141.0
1.013	13.872	4.517	0.0	2.28	1008.4
1.014	13.400	4.517	0.0	1.71	120.6

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.015	5.000	-2.990	-1.7	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.015	13.200	4.517	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.015		16.395	16.190	13.400	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 618850 315550 TG 18850 15550
C (1km)	-0.024
D1 (1km)	0.286
D2 (1km)	0.351
D3 (1km)	0.261
E (1km)	0.311
F (1km)	2.482
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: MH23a, DS/PN: 1.014

Invert Level (m) 13.400

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	611.0	1.400	1234.0	2.800	0.0	4.200	0.0
0.200	688.0	1.600	1339.0	3.000	0.0	4.400	0.0
0.400	768.0	1.800	1448.0	3.200	0.0	4.600	0.0
0.600	854.0	2.000	1561.9	3.400	0.0	4.800	0.0
0.800	943.0	2.200	1679.2	3.600	0.0	5.000	0.0
1.000	1036.0	2.400	0.0	3.800	0.0		
1.200	1133.0	2.600	0.0	4.000	0.0		

Infiltration Basin Manhole: MH23b, DS/PN: 1.015

Invert Level (m) 13.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.03960 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.03960

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	663.0	0.800	1285.0	1.600	1972.0	2.400	2723.2
0.200	813.0	1.000	1451.0	1.800	2153.0		
0.400	966.0	1.200	1620.0	2.000	2339.0		
0.600	1124.0	1.400	1794.0	2.200	2529.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer				
1.001	15 Winter	1	0%	100/15 Summer				
1.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
1.003	15 Winter	1	0%	100/15 Summer				
1.004	15 Winter	1	0%	30/15 Summer	100/15 Winter			1
1.005	15 Winter	1	0%	100/15 Summer				
1.006	15 Winter	1	0%	30/15 Summer	100/15 Winter			1
2.000	15 Winter	1	0%					
2.001	15 Winter	1	0%					
2.002	15 Winter	1	0%					
2.003	15 Winter	1	0%					
2.004	15 Winter	1	0%					
2.005	15 Winter	1	0%					
2.006	15 Winter	1	0%					
2.007	15 Winter	1	0%	30/15 Winter	100/15 Summer			4
1.007	15 Winter	1	0%	30/15 Winter	100/15 Summer			4
1.008	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
1.009	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
3.000	15 Winter	1	0%					
3.001	15 Winter	1	0%					
3.002	15 Winter	1	0%	100/15 Summer				
1.010	15 Winter	1	0%	30/15 Summer	100/15 Winter			1
1.011	15 Winter	1	0%	30/15 Summer	100/15 Winter			1
1.012	15 Winter	1	0%	30/15 Summer	100/600 Winter			2
4.000	15 Winter	1	0%					
4.001	15 Winter	1	0%					
4.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			3
4.003	15 Winter	1	0%	30/15 Summer				1
4.004	15 Winter	1	0%	100/15 Summer				
5.000	15 Winter	1	0%	30/15 Summer	100/600 Winter			2
4.005	15 Winter	1	0%	30/15 Summer	100/600 Winter			2
6.000	15 Winter	1	0%	30/15 Summer				6
6.001	15 Winter	1	0%	30/15 Summer				
1.013	15 Winter	1	0%	30/15 Summer				1
1.014	2160 Winter	1	0%	1/15 Winter				
1.015	2160 Winter	1	0%	1/15 Summer				

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	35.210	-0.214	0.000	0.18	0.0	26.1	OK
1.001	MH02	33.323	-0.271	0.000	0.17	0.0	48.6	OK
1.002	BDMH03	30.687	-0.252	0.000	0.23	0.0	70.8	OK
1.003	BDMH04	27.271	-0.310	0.000	0.21	0.0	94.1	OK
1.004	BDMH05	24.185	-0.296	0.000	0.25	0.0	114.1	OK
1.005	BDMH06	21.253	-0.355	0.000	0.23	0.0	132.9	OK
1.006	BDMH07	19.660	-0.348	0.000	0.25	0.0	144.6	OK
2.000	SW01	37.637	-0.227	0.000	0.03	0.0	16.1	FLOOD RISK*
2.001	SW02	36.143	-0.216	0.000	0.05	0.0	28.1	FLOOD RISK*
2.002	SW03	34.026	-0.207	0.000	0.07	0.0	40.0	FLOOD RISK*
2.003	SW04	31.524	-0.200	0.000	0.08	0.0	51.5	FLOOD RISK*
2.004	SW04	28.573	-0.193	0.000	0.09	0.0	60.1	FLOOD RISK*
2.005	SW05	25.575	-0.191	0.000	0.10	0.0	64.5	FLOOD RISK*
2.006	SW06	22.416	-0.186	0.000	0.11	0.0	70.4	FLOOD RISK*
2.007	MH08	18.452	-0.466	0.000	0.11	0.0	70.3	OK
1.007	MH09	18.148	-0.460	0.000	0.22	0.0	205.2	OK
1.008	MH10	17.398	-0.438	0.000	0.27	0.0	220.4	OK
1.009	MH11	16.817	-0.419	0.000	0.31	0.0	231.5	OK
3.000	SW07	19.795	-0.242	0.000	0.02	0.0	4.2	FLOOD RISK*
3.001	SW08	19.444	-0.243	0.000	0.02	0.0	7.0	FLOOD RISK*
3.002	MH12	17.284	-0.328	0.000	0.04	0.0	7.0	OK
1.010	MH13	16.282	-0.433	0.000	0.27	0.0	250.2	OK
1.011	MH14	15.221	-0.418	0.000	0.30	0.0	264.5	OK
1.012	MH15	14.337	-0.390	0.000	0.46	0.0	279.8	OK
4.000	SW09	21.005	-0.205	0.000	0.06	0.0	21.0	FLOOD RISK*
4.001	SW10	20.245	-0.209	0.000	0.07	0.0	37.1	FLOOD RISK*
4.002	MH16	16.959	-0.195	0.000	0.26	0.0	39.6	OK
4.003	MH17	16.007	-0.173	0.000	0.37	0.0	42.1	OK
4.004	MH18	15.632	-0.254	0.000	0.23	0.0	46.2	OK
5.000	MH19	14.578	-0.372	0.000	0.17	0.0	40.7	OK
4.005	MH20	14.495	-0.324	0.000	0.31	0.0	73.7	OK
6.000	MH21	14.517	-0.163	0.000	0.41	0.0	25.3	OK
6.001	MH22	14.459	-0.222	0.000	0.34	0.0	44.1	OK
1.013	MH23	14.231	-0.391	0.000	0.47	0.0	373.8	OK
1.014	MH23a	13.797	0.097	0.000	0.17	0.0	17.8	SURCHARGED
1.015	MH23b	13.791	0.491	0.000	0.00	0.0	0.0	SURCHARGED*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/15 Summer				
1.001	15 Winter	30	+20%	100/15 Summer				
1.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
1.003	15 Winter	30	+20%	100/15 Summer				
1.004	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
1.005	15 Winter	30	+20%	100/15 Summer				
1.006	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
2.000	15 Winter	30	+20%					
2.001	15 Winter	30	+20%					
2.002	15 Winter	30	+20%					
2.003	15 Winter	30	+20%					
2.004	15 Winter	30	+20%					
2.005	15 Winter	30	+20%					
2.006	15 Winter	30	+20%					
2.007	15 Winter	30	+20%	30/15 Winter	100/15 Summer			4
1.007	15 Winter	30	+20%	30/15 Winter	100/15 Summer			4
1.008	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
1.009	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
3.000	15 Winter	30	+20%					
3.001	15 Winter	30	+20%					
3.002	15 Winter	30	+20%	100/15 Summer				
1.010	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
1.011	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
1.012	15 Winter	30	+20%	30/15 Summer	100/600 Winter			2
4.000	15 Winter	30	+20%					
4.001	15 Winter	30	+20%					
4.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			3
4.003	15 Winter	30	+20%	30/15 Summer				1
4.004	15 Winter	30	+20%	100/15 Summer				
5.000	15 Winter	30	+20%	30/15 Summer	100/600 Winter			2
4.005	15 Winter	30	+20%	30/15 Summer	100/600 Winter			2
6.000	15 Winter	30	+20%	30/15 Summer				6
6.001	15 Winter	30	+20%	30/15 Summer				
1.013	15 Winter	30	+20%	30/15 Summer				1
1.014	60 Winter	30	+20%	1/15 Winter				
1.015	2880 Winter	30	+20%	1/15 Summer				

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	35.310	-0.114	0.000	0.67	0.0	100.4	OK
1.001	MH02	33.461	-0.133	0.000	0.72	0.0	205.3	OK
1.002	BDMH03	31.028	0.089	0.000	1.01	0.0	306.2	SURCHARGED
1.003	BDMH04	27.475	-0.106	0.000	0.92	0.0	412.7	OK
1.004	BDMH05	24.956	0.475	0.000	1.11	0.0	499.0	SURCHARGED
1.005	BDMH06	21.575	-0.033	0.000	0.99	0.0	576.6	OK
1.006	BDMH07	20.159	0.151	0.000	1.06	0.0	624.0	SURCHARGED
2.000	SW01	37.694	-0.170	0.000	0.13	0.0	61.9	FLOOD RISK*
2.001	SW02	36.218	-0.141	0.000	0.21	0.0	114.8	FLOOD RISK*
2.002	SW03	34.109	-0.124	0.000	0.27	0.0	164.1	FLOOD RISK*
2.003	SW04	31.612	-0.112	0.000	0.33	0.0	213.6	FLOOD RISK*
2.004	SW04	28.666	-0.100	0.000	0.38	0.0	248.4	FLOOD RISK*
2.005	SW05	25.667	-0.099	0.000	0.39	0.0	265.8	FLOOD RISK*
2.006	SW06	22.513	-0.089	0.000	0.46	0.0	289.5	FLOOD RISK*
2.007	MH08	18.949	0.031	0.000	0.47	0.0	293.1	SURCHARGED
1.007	MH09	18.879	0.271	0.000	0.92	0.0	847.3	SURCHARGED
1.008	MH10	18.352	0.516	0.000	1.00	0.0	821.1	SURCHARGED
1.009	MH11	17.795	0.559	0.000	1.09	0.0	821.6	SURCHARGED
3.000	SW07	19.833	-0.204	0.000	0.07	0.0	14.7	FLOOD RISK*
3.001	SW08	19.485	-0.202	0.000	0.08	0.0	29.2	FLOOD RISK*
3.002	MH12	17.335	-0.277	0.000	0.15	0.0	29.1	OK
1.010	MH13	17.203	0.488	0.000	0.94	0.0	854.3	SURCHARGED
1.011	MH14	16.244	0.605	0.000	1.01	0.0	880.1	SURCHARGED
1.012	MH15	15.261	0.534	0.000	1.50	0.0	909.1	SURCHARGED
4.000	SW09	21.081	-0.129	0.000	0.25	0.0	81.5	FLOOD RISK*
4.001	SW10	20.324	-0.130	0.000	0.28	0.0	153.8	FLOOD RISK*
4.002	MH16	17.678	0.524	0.000	1.05	0.0	158.1	SURCHARGED
4.003	MH17	16.577	0.397	0.000	1.45	0.0	163.7	SURCHARGED*
4.004	MH18	15.778	-0.108	0.000	0.84	0.0	170.9	OK
5.000	MH19	15.146	0.196	0.000	0.61	0.0	147.8	SURCHARGED
4.005	MH20	15.106	0.287	0.000	1.17	0.0	276.5	SURCHARGED
6.000	MH21	15.400	0.720	0.000	1.44	0.0	88.3	SURCHARGED*
6.001	MH22	15.248	0.567	0.000	1.26	0.0	163.3	SURCHARGED*
1.013	MH23	14.961	0.339	0.000	1.55	0.0	1246.7	SURCHARGED*
1.014	MH23a	14.555	0.855	0.000	2.18	0.0	224.4	SURCHARGED
1.015	MH23b	14.528	1.228	0.000	0.00	0.0	0.0	SURCHARGED*

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer				
1.001	15 Winter	100	+30%	100/15 Summer				
1.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
1.003	15 Winter	100	+30%	100/15 Summer				
1.004	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
1.005	15 Winter	100	+30%	100/15 Summer				
1.006	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
2.000	15 Winter	100	+30%					
2.001	15 Winter	100	+30%					
2.002	15 Winter	100	+30%					
2.003	15 Winter	100	+30%					
2.004	15 Winter	100	+30%					
2.005	15 Winter	100	+30%					
2.006	15 Winter	100	+30%					
2.007	15 Winter	100	+30%	30/15 Winter	100/15 Summer			4
1.007	15 Winter	100	+30%	30/15 Winter	100/15 Summer			4
1.008	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
1.009	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
3.000	15 Winter	100	+30%					
3.001	15 Winter	100	+30%					
3.002	15 Winter	100	+30%	100/15 Summer				
1.010	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
1.011	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
1.012	5760 Winter	100	+30%	30/15 Summer	100/600 Winter			2
4.000	15 Winter	100	+30%					
4.001	15 Winter	100	+30%					
4.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			3
4.003	15 Winter	100	+30%	30/15 Summer				1
4.004	15 Winter	100	+30%	100/15 Summer				
5.000	5760 Winter	100	+30%	30/15 Summer	100/600 Winter			2
4.005	5760 Winter	100	+30%	30/15 Summer	100/600 Winter			2
6.000	15 Winter	100	+30%	30/15 Summer				6
6.001	5760 Winter	100	+30%	30/15 Summer				
1.013	5760 Winter	100	+30%	30/15 Summer				1
1.014	5760 Winter	100	+30%	1/15 Winter				
1.015	4320 Winter	100	+30%	1/15 Summer				

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	36.461	1.037	0.000	0.97	0.0	144.9	SURCHARGED
1.001	MH02	34.613	1.019	0.000	0.97	0.0	276.8	SURCHARGED
1.002	BDMH03	32.472	1.533	8.258	1.26	0.0	379.3	FLOOD
1.003	BDMH04	29.113	1.532	0.000	1.11	0.0	497.7	SURCHARGED
1.004	BDMH05	26.533	2.052	1.602	1.32	0.0	594.8	FLOOD
1.005	BDMH06	23.058	1.450	0.000	1.19	0.0	693.3	SURCHARGED
1.006	BDMH07	21.586	1.578	2.639	1.20	0.0	703.1	FLOOD
2.000	SW01	37.727	-0.137	0.000	0.22	0.0	102.0	FLOOD RISK*
2.001	SW02	36.256	-0.103	0.000	0.34	0.0	189.6	FLOOD RISK*
2.002	SW03	34.154	-0.079	0.000	0.45	0.0	271.3	FLOOD RISK*
2.003	SW04	31.662	-0.062	0.000	0.54	0.0	354.2	FLOOD RISK*
2.004	SW04	28.720	-0.046	0.000	0.63	0.0	412.8	FLOOD RISK*
2.005	SW05	25.721	-0.045	0.000	0.65	0.0	441.8	FLOOD RISK*
2.006	SW06	22.571	-0.031	0.000	0.75	0.0	465.0	FLOOD RISK*
2.007	MH08	20.022	1.104	104.518	1.31	0.0	814.0	FLOOD
1.007	MH09	19.949	1.341	77.663	0.96	0.0	890.7	FLOOD
1.008	MH10	19.396	1.560	42.115	1.13	0.0	934.1	FLOOD
1.009	MH11	19.054	1.818	2.356	1.23	0.0	933.2	FLOOD
3.000	SW07	19.856	-0.181	0.000	0.11	0.0	24.1	FLOOD RISK*
3.001	SW08	19.508	-0.179	0.000	0.13	0.0	48.3	FLOOD RISK*
3.002	MH12	18.585	0.973	0.000	0.29	0.0	55.5	FLOOD RISK
1.010	MH13	18.555	1.840	3.727	1.04	0.0	945.0	FLOOD
1.011	MH14	17.554	1.915	2.648	1.18	0.0	1022.6	FLOOD
1.012	MH15	16.660	1.933	1119.822	0.33	0.0	197.1	FLOOD
4.000	SW09	21.124	-0.086	0.000	0.41	0.0	134.5	FLOOD RISK*
4.001	SW10	20.366	-0.088	0.000	0.44	0.0	238.7	FLOOD RISK*
4.002	MH16	18.375	1.221	20.586	1.23	0.0	185.4	FLOOD
4.003	MH17	17.380	1.200	0.000	1.65	0.0	186.3	FLOOD RISK*
4.004	MH18	16.714	0.828	0.000	0.95	0.0	194.0	SURCHARGED*
5.000	MH19	16.276	1.326	259.520	0.52	0.0	126.9	FLOOD
4.005	MH20	16.194	1.375	545.396	0.59	0.0	140.2	FLOOD
6.000	MH21	15.880	1.200	0.000	2.30	0.0	140.9	FLOOD RISK*
6.001	MH22	15.921	1.240	0.000	0.27	0.0	34.8	FLOOD RISK*
1.013	MH23	16.391	1.769	0.000	0.41	0.0	325.4	FLOOD RISK*
1.014	MH23a	15.171	1.471	0.000	1.43	0.0	147.2	SURCHARGED
1.015	MH23b	14.997	1.697	0.000	0.00	0.0	0.0	SURCHARGED*

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 228 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	15.218	0.218	186.9	655.5	O K
30 min Summer	15.406	0.406	203.2	1255.6	O K
60 min Summer	15.499	0.499	209.3	1567.9	O K
120 min Summer	15.962	0.962	239.5	3224.5	O K
180 min Summer	16.113	1.113	251.3	3809.7	O K
240 min Summer	16.294	1.294	262.9	4540.3	O K
360 min Summer	16.491	1.491	275.8	5366.8	O K
480 min Summer	16.601	1.601	284.8	5840.4	O K
600 min Summer	16.693	1.693	292.5	6250.6	O K
720 min Summer	16.754	1.754	297.6	6531.4	Flood Risk
960 min Summer	16.888	1.888	308.9	7156.1	Flood Risk
1440 min Summer	16.986	1.986	317.3	7622.2	Flood Risk
2160 min Summer	16.992	1.992	317.8	7651.2	Flood Risk
2880 min Summer	16.952	1.952	314.4	7461.0	Flood Risk
4320 min Summer	16.666	1.666	290.2	6132.9	O K
5760 min Summer	16.393	1.393	268.0	4951.1	O K
7200 min Summer	16.141	1.141	253.6	3921.7	O K
8640 min Summer	15.928	0.928	236.8	3095.2	O K
10080 min Summer	15.730	0.730	223.1	2371.5	O K
15 min Winter	15.218	0.218	186.9	655.6	O K
30 min Winter	15.407	0.407	203.3	1258.9	O K
60 min Winter	15.487	0.487	208.5	1525.5	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	203.700	538
30 min Summer	114.873	574
60 min Summer	64.781	586
120 min Summer	36.532	680
180 min Summer	26.131	716
240 min Summer	20.602	764
360 min Summer	14.736	842
480 min Summer	11.618	908
600 min Summer	9.661	982
720 min Summer	8.310	1054
960 min Summer	6.695	1196
1440 min Summer	4.936	1466
2160 min Summer	3.640	1844
2880 min Summer	2.932	2216
4320 min Summer	2.067	2960
5760 min Summer	1.613	3704
7200 min Summer	1.331	4424
8640 min Summer	1.137	5144
10080 min Summer	0.995	5864
15 min Winter	203.700	538
30 min Winter	114.873	574
60 min Winter	64.781	584

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
120 min Winter	15.964	0.964	239.6	3231.4	O K
180 min Winter	16.126	1.126	252.3	3859.8	O K
240 min Winter	16.292	1.292	262.8	4532.4	O K
360 min Winter	16.489	1.489	275.6	5354.3	O K
480 min Winter	16.605	1.605	285.1	5860.1	O K
600 min Winter	16.692	1.692	292.4	6248.2	O K
720 min Winter	16.745	1.745	296.9	6490.2	Flood Risk
960 min Winter	16.870	1.870	307.4	7068.0	Flood Risk
1440 min Winter	16.940	1.940	313.4	7402.0	Flood Risk
2160 min Winter	16.875	1.875	307.8	7091.9	Flood Risk
2880 min Winter	16.753	1.753	297.5	6527.1	Flood Risk
4320 min Winter	16.299	1.299	263.2	4562.2	O K
5760 min Winter	15.918	0.918	236.0	3058.7	O K
7200 min Winter	15.584	0.584	215.0	1858.6	O K
8640 min Winter	15.336	0.336	197.2	1026.6	O K
10080 min Winter	15.127	0.127	182.3	378.7	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
120 min Winter	36.532	678
180 min Winter	26.131	718
240 min Winter	20.602	764
360 min Winter	14.736	842
480 min Winter	11.618	912
600 min Winter	9.661	986
720 min Winter	8.310	1058
960 min Winter	6.695	1202
1440 min Winter	4.936	1480
2160 min Winter	3.640	1868
2880 min Winter	2.932	2260
4320 min Winter	2.067	3020
5760 min Winter	1.613	3760
7200 min Winter	1.331	4456
8640 min Winter	1.137	5144
10080 min Winter	0.995	5792

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
Site Location	GB 614650 315250 TG 14650 15250
C (1km)	-0.024
D1 (1km)	0.284
D2 (1km)	0.359
D3 (1km)	0.248
E (1km)	0.311
F (1km)	2.478
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.000

Time (mins)	**Area (ha)**
0-4	0.000

Model Details

Storage is Online Cover Level (m) 17.000

Infiltration Basin Structure

Invert Level (m) 15.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.43200 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.43200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	2950.0	1.400	4176.0	2.800	0.0	4.200	0.0
0.200	3050.0	1.600	4403.0	3.000	0.0	4.400	0.0
0.400	3301.0	1.800	4634.0	3.200	0.0	4.600	0.0
0.600	3480.0	2.000	4869.0	3.400	0.0	4.800	0.0
0.800	3619.0	2.200	0.0	3.600	0.0	5.000	0.0
1.000	3834.0	2.400	0.0	3.800	0.0		
1.200	4053.0	2.600	0.0	4.000	0.0		

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	27.311	0.455	60.0	0.019	5.00	0.0	0.600		o	225
1.001	26.171	0.482	54.3	0.028	0.00	0.0	0.600		o	225
1.002	13.138	0.219	60.0	0.026	0.00	0.0	0.600		o	225
1.003	59.268	1.185	50.0	0.076	0.00	0.0	0.600		o	300
2.000	53.580	0.410	130.7	0.015	5.00	0.0		0.100		-5
2.001	28.111	0.243	115.7	0.000	0.00	0.0	0.600		o	225
2.002	13.800	0.115	120.0	0.065	0.00	0.0	0.600		o	300
3.000	66.690	0.366	182.2	0.086	5.00	0.0		0.100		-4
3.001	20.497	0.137	150.0	0.000	0.00	0.0	0.600		o	300
2.003	59.251	0.395	150.0	0.156	0.00	0.0	0.600		o	375
4.000	53.009	0.586	90.5	0.230	5.00	0.0	0.600		o	375
1.004	40.416	0.556	72.7	0.144	0.00	0.0	0.600		o	450
5.000	33.745	0.169	199.7	0.018	5.00	0.0	0.600		o	300
5.001	27.644	0.138	200.3	0.035	0.00	0.0	0.600		o	300
5.002	34.194	0.171	200.0	0.068	0.00	0.0	0.600		o	300

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	38.965	0.019	0.0	1.69	67.2
1.001	38.510	0.047	0.0	1.78	70.7
1.002	38.028	0.073	0.0	1.69	67.3
1.003	37.809	0.149	0.0	2.23	157.5
2.000	38.937	0.015	0.0	0.24	166.5
2.001	37.377	0.015	0.0	1.21	48.3
2.002	37.134	0.080	0.0	1.43	101.4
3.000	38.472	0.086	0.0	0.21	140.9
3.001	36.881	0.086	0.0	1.28	90.6
2.003	36.744	0.322	0.0	1.48	163.1
4.000	36.935	0.230	0.0	1.91	210.5
1.004	36.349	0.845	0.0	2.39	379.6
5.000	34.436	0.018	0.0	1.11	78.4
5.001	34.267	0.053	0.0	1.11	78.3
5.002	34.129	0.121	0.0	1.11	78.3

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
6.000	13.917	0.139	100.1	0.074	5.00	0.0	0.600		o	225
6.001	27.708	0.225	123.1	0.000	0.00	0.0	0.600		o	225
1.005	47.419	0.593	80.0	0.048	0.00	0.0	0.600		o	450
1.006	20.000	0.200	100.0	0.000	0.00	0.0	0.600		o	300
1.007	5.000	-2.000	-2.5	0.048	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
6.000	36.440	0.074	0.0	1.31	52.0
6.001	36.301	0.074	0.0	1.18	46.8
1.005	33.958	1.088	0.0	2.28	361.8
1.006	33.000	1.088	0.0	1.57	111.1
1.007	32.800	1.136	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007		35.000	34.800	33.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 618850 315550 TG 18850 15550
C (1km)	-0.024
D1 (1km)	0.286
D2 (1km)	0.351
D3 (1km)	0.261

Synthetic Rainfall Details

E (1km)	0.311
F (1km)	2.482
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.006

Invert Level (m) 33.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	32.7	1.400	334.0	2.800	0.0	4.200	0.0
0.200	63.7	1.600	393.3	3.000	0.0	4.400	0.0
0.400	98.7	1.800	456.4	3.200	0.0	4.600	0.0
0.600	137.7	2.000	523.6	3.400	0.0	4.800	0.0
0.800	180.8	2.200	0.0	3.600	0.0	5.000	0.0
1.000	227.1	2.400	0.0	3.800	0.0		
1.200	279.0	2.600	0.0	4.000	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 1.007

Invert Level (m) 32.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.07020 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.07020

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	130.1	1.400	634.4	2.800	0.0	4.200	0.0
0.200	189.4	1.600	722.7	3.000	0.0	4.400	0.0
0.400	253.3	1.800	814.9	3.200	0.0	4.600	0.0
0.600	321.5	2.000	911.3	3.400	0.0	4.800	0.0
0.800	393.7	2.200	1011.6	3.600	0.0	5.000	0.0
1.000	469.9	2.400	0.0	3.800	0.0		
1.200	550.1	2.600	0.0	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%					
1.001	15 Winter	1	0%	100/15 Summer				
1.002	15 Winter	1	0%	100/15 Summer				
1.003	15 Winter	1	0%	100/15 Summer				
2.000	15 Winter	1	0%					
2.001	15 Winter	1	0%	100/15 Summer				
2.002	15 Winter	1	0%	30/15 Winter				
3.000	15 Winter	1	0%					
3.001	15 Winter	1	0%	30/15 Summer	100/15 Winter			1
2.003	15 Winter	1	0%	30/15 Summer				
4.000	15 Winter	1	0%	100/15 Summer	100/15 Winter			1
1.004	15 Winter	1	0%	30/15 Summer				
5.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
5.001	15 Winter	1	0%	30/15 Summer				
5.002	15 Winter	1	0%	30/15 Summer				
6.000	15 Winter	1	0%	100/15 Summer				
6.001	15 Winter	1	0%	100/15 Summer				
1.005	15 Winter	1	0%	30/15 Summer				
1.006	600 Winter	1	0%	1/15 Winter				
1.007	600 Winter	1	0%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	38.995	-0.195	0.000	0.04	0.0	2.7	OK
1.001	MH02	38.556	-0.179	0.000	0.09	0.0	6.0	OK
1.002	MH03	38.088	-0.165	0.000	0.16	0.0	9.1	OK
1.003	MH04	37.879	-0.230	0.000	0.12	0.0	18.2	OK
2.000	SW01	38.962	-0.250	0.000	0.01	0.0	2.1	FLOOD RISK*
2.001	MH05	37.408	-0.194	0.000	0.05	0.0	2.1	OK
2.002	MH06	37.201	-0.233	0.000	0.11	0.0	9.5	OK
3.000	SW02	38.548	-0.199	0.000	0.08	0.0	11.9	FLOOD RISK*
3.001	MH07	36.958	-0.223	0.000	0.15	0.0	11.8	OK
2.003	MH08	36.872	-0.247	0.000	0.25	0.0	37.7	OK
4.000	MH09	37.038	-0.272	0.000	0.16	0.0	31.8	OK
1.004	MH10	36.519	-0.280	0.000	0.30	0.0	101.8	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.000	MH11	34.473	-0.263	0.000	0.03	0.0	2.5	OK
5.001	MH12	34.329	-0.238	0.000	0.09	0.0	6.6	OK
5.002	MH13	34.221	-0.208	0.000	0.20	0.0	14.3	OK
6.000	MH14	36.513	-0.152	0.000	0.23	0.0	10.4	OK
6.001	MH15	36.376	-0.150	0.000	0.24	0.0	10.4	OK
1.005	MH16	34.157	-0.251	0.000	0.41	0.0	132.7	OK
1.006	Pri	33.354	0.054	0.000	0.12	0.0	12.1	SURCHARGED
1.007	Inf	33.351	0.451	0.000	0.00	0.0	0.0	SURCHARGED*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%					
1.001	15 Winter	30	+20%	100/15 Summer				
1.002	15 Winter	30	+20%	100/15 Summer				
1.003	15 Winter	30	+20%	100/15 Summer				
2.000	15 Winter	30	+20%					
2.001	15 Winter	30	+20%	100/15 Summer				
2.002	15 Winter	30	+20%	30/15 Winter				
3.000	15 Winter	30	+20%					
3.001	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
2.003	15 Winter	30	+20%	30/15 Summer				
4.000	15 Winter	30	+20%	100/15 Summer	100/15 Winter			1
1.004	15 Winter	30	+20%	30/15 Summer				
5.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
5.001	15 Winter	30	+20%	30/15 Summer				
5.002	15 Winter	30	+20%	30/15 Summer				
6.000	15 Winter	30	+20%	100/15 Summer				
6.001	15 Winter	30	+20%	100/15 Summer				
1.005	15 Winter	30	+20%	30/15 Summer				
1.006	15 Winter	30	+20%	1/15 Winter				
1.007	600 Winter	30	+20%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	39.027	-0.163	0.000	0.17	0.0	10.4	OK
1.001	MH02	38.611	-0.124	0.000	0.41	0.0	26.7	OK
1.002	MH03	38.171	-0.082	0.000	0.72	0.0	41.9	OK
1.003	MH04	37.973	-0.136	0.000	0.57	0.0	85.2	OK
2.000	SW01	38.992	-0.220	0.000	0.05	0.0	8.2	FLOOD RISK*
2.001	MH05	37.460	-0.142	0.000	0.18	0.0	8.2	OK
2.002	MH06	37.443	0.009	0.000	0.49	0.0	41.1	SURCHARGED
3.000	SW02	38.629	-0.118	0.000	0.33	0.0	47.0	FLOOD RISK*
3.001	MH07	37.462	0.281	0.000	0.60	0.0	47.7	SURCHARGED
2.003	MH08	37.413	0.294	0.000	0.97	0.0	148.2	SURCHARGED
4.000	MH09	37.235	-0.075	0.000	0.63	0.0	122.7	OK
1.004	MH10	37.023	0.224	0.000	1.19	0.0	403.1	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.000	MH11	35.366	0.630	0.000	0.13	0.0	9.4	FLOOD RISK
5.001	MH12	35.357	0.790	0.000	0.52	0.0	36.7	SURCHARGED
5.002	MH13	35.332	0.903	0.000	0.71	0.0	51.2	SURCHARGED
6.000	MH14	36.608	-0.057	0.000	0.90	0.0	40.6	OK
6.001	MH15	36.474	-0.052	0.000	0.94	0.0	40.8	OK
1.005	MH16	35.247	0.839	0.000	1.55	0.0	506.1	SURCHARGED
1.006	Pri	34.080	0.780	0.000	1.97	0.0	190.8	SURCHARGED
1.007	Inf	33.959	1.059	0.000	0.00	0.0	0.0	SURCHARGED*

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%					
1.001	15 Winter	100	+30%	100/15 Summer				
1.002	15 Winter	100	+30%	100/15 Summer				
1.003	15 Winter	100	+30%	100/15 Summer				
2.000	15 Winter	100	+30%					
2.001	15 Winter	100	+30%	100/15 Summer				
2.002	15 Winter	100	+30%	30/15 Winter				
3.000	15 Winter	100	+30%					
3.001	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
2.003	15 Winter	100	+30%	30/15 Summer				
4.000	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
1.004	15 Winter	100	+30%	30/15 Summer				
5.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
5.001	15 Winter	100	+30%	30/15 Summer				
5.002	15 Winter	100	+30%	30/15 Summer				
6.000	15 Winter	100	+30%	100/15 Summer				
6.001	15 Winter	100	+30%	100/15 Summer				
1.005	15 Winter	100	+30%	30/15 Summer				
1.006	30 Winter	100	+30%	1/15 Winter				
1.007	600 Winter	100	+30%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	39.046	-0.144	0.000	0.28	0.0	17.2	OK
1.001	MH02	38.967	0.232	0.000	0.63	0.0	41.2	SURCHARGED
1.002	MH03	38.845	0.592	0.000	1.08	0.0	62.7	SURCHARGED
1.003	MH04	38.668	0.559	0.000	0.78	0.0	116.5	SURCHARGED
2.000	SW01	39.012	-0.200	0.000	0.08	0.0	13.6	FLOOD RISK*
2.001	MH05	38.536	0.934	0.000	0.34	0.0	15.4	FLOOD RISK
2.002	MH06	38.505	1.071	0.000	0.77	0.0	64.6	FLOOD RISK
3.000	SW02	38.676	-0.071	0.000	0.53	0.0	74.0	FLOOD RISK*
3.001	MH07	38.383	1.202	2.534	1.94	0.0	153.7	FLOOD
2.003	MH08	38.437	1.318	0.000	1.37	0.0	209.4	SURCHARGED
4.000	MH09	38.511	1.201	0.574	0.96	0.0	187.9	FLOOD
1.004	MH10	38.005	1.206	0.000	1.71	0.0	578.0	FLOOD RISK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.000	MH11	35.671	0.935	35.021	-1.57	0.0	-112.7	FLOOD
5.001	MH12	36.101	1.534	0.000	1.55	0.0	109.1	FLOOD RISK
5.002	MH13	36.309	1.880	0.000	1.52	0.0	109.2	SURCHARGED
6.000	MH14	37.095	0.430	0.000	1.40	0.0	63.6	SURCHARGED
6.001	MH15	36.831	0.305	0.000	1.44	0.0	62.7	SURCHARGED
1.005	MH16	36.378	1.970	0.000	2.01	0.0	656.7	SURCHARGED
1.006	Pri	34.461	1.161	0.000	2.08	0.0	201.4	SURCHARGED
1.007	Inf	34.270	1.370	0.000	0.00	0.0	0.0	SURCHARGED*

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.000	0.500	200.0	0.270	5.00	0.0	0.600		o	375
1.001	100.000	0.500	200.0	0.124	0.00	0.0	0.600		o	450
1.002	100.000	0.500	200.0	0.125	0.00	0.0	0.600		o	450
1.003	100.000	0.500	200.0	0.125	0.00	0.0	0.600		o	450
2.000	110.700	0.334	331.4	0.125	5.00	0.0		0.100		-5
2.001	100.021	0.550	181.9	0.114	0.00	0.0		0.100		-5
2.002	100.002	0.450	222.2	0.118	0.00	0.0		0.100		-5
2.003	100.007	0.550	181.8	0.122	0.00	0.0		0.100		-5
2.004	100.005	0.500	200.0	0.137	0.00	0.0		0.100		-5
2.005	90.409	0.725	124.7	0.113	0.00	0.0		0.100		-5
2.006	19.049	0.095	200.5	0.000	0.00	0.0	0.600		o	525
1.004	100.000	0.333	300.3	0.123	0.00	0.0	0.600		o	525
1.005	100.000	0.333	300.3	0.122	0.00	0.0	0.600		o	525
1.006	100.000	0.338	295.9	0.122	0.00	0.0	0.600		o	525
3.000	110.111	0.330	333.7	0.031	5.00	0.0		0.100		-4
3.001	100.003	0.500	200.0	0.028	0.00	0.0		0.100		-4
3.002	100.000	0.500	200.0	0.028	0.00	0.0		0.100		-4
3.003	100.178	0.500	200.4	0.027	0.00	0.0		0.100		-4
3.004	101.250	0.500	202.5	0.029	0.00	0.0		0.100		-4

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	36.596	0.270	0.0	1.28	141.1
1.001	36.096	0.394	0.0	1.43	228.1
1.002	35.596	0.519	0.0	1.43	228.1
1.003	35.096	0.644	0.0	1.43	228.1
2.000	38.472	0.125	0.0	0.15	108.2
2.001	38.138	0.239	0.0	0.21	146.0
2.002	37.588	0.357	0.0	0.19	132.1
2.003	37.138	0.479	0.0	0.21	146.0
2.004	36.588	0.616	0.0	0.20	139.2
2.005	36.088	0.729	0.0	0.25	176.3
2.006	33.982	0.729	0.0	1.58	341.6
1.004	33.887	1.496	0.0	1.29	278.7
1.005	33.554	1.618	0.0	1.29	278.7
1.006	33.221	1.740	0.0	1.30	280.8
3.000	38.933	0.031	0.0	0.15	104.1
3.001	38.603	0.059	0.0	0.20	134.5
3.002	38.103	0.087	0.0	0.20	134.5
3.003	37.603	0.114	0.0	0.20	134.4
3.004	37.103	0.143	0.0	0.20	133.6

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
3.005	100.580	0.500	201.2	0.030	0.00	0.0		0.100		-4
3.006	100.593	0.500	201.2	0.047	0.00	0.0		0.100		-4
3.007	102.224	0.500	204.4	0.053	0.00	0.0		0.100		-4
3.008	129.001	0.942	136.9	0.071	0.00	0.0		0.100		-4
3.009	25.653	0.128	200.0	0.000	0.00	0.0	0.600		o	300
1.007	16.491	0.188	87.7	0.120	0.00	0.0	0.600		o	525
4.000	108.201	0.550	196.7	0.125	5.00	0.0		0.100		-5
4.001	101.454	0.500	202.9	0.128	0.00	0.0		0.100		-5
4.002	109.732	0.826	132.8	0.129	0.00	0.0		0.100		-5
1.008	37.898	0.095	398.9	0.000	0.00	0.0	0.600		oo	43
1.009	20.000	0.200	100.0	0.000	0.00	0.0	0.600		o	300
1.010	5.000	-1.800	-2.8	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
3.005	36.603	0.173	0.0	0.20	134.1
3.006	36.103	0.220	0.0	0.20	134.1
3.007	35.603	0.273	0.0	0.20	133.0
3.008	35.103	0.344	0.0	0.24	162.5
3.009	33.236	0.344	0.0	1.11	78.3
1.007	32.883	2.204	0.0	2.39	517.9
4.000	35.638	0.125	0.0	0.20	140.4
4.001	35.088	0.253	0.0	0.20	138.2
4.002	34.588	0.382	0.0	0.24	170.8
1.008	32.695	2.586	0.0	1.01	321.7
1.009	32.600	2.586	0.0	1.57	111.1
1.010	32.400	2.586	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.010		34.400	34.200	32.600	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 617600 316150 TG 17600 16150
C (1km)	-0.024
D1 (1km)	0.290
D2 (1km)	0.350
D3 (1km)	0.249
E (1km)	0.316
F (1km)	2.463
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.009

Invert Level (m) 32.600

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	91.1	1.400	402.0	2.800	0.0	4.200	0.0
0.200	123.4	1.600	462.4	3.000	0.0	4.400	0.0
0.400	159.8	1.800	527.0	3.200	0.0	4.600	0.0
0.600	200.0	2.000	0.0	3.400	0.0	4.800	0.0
0.800	244.6	2.200	0.0	3.600	0.0	5.000	0.0
1.000	293.0	2.400	0.0	3.800	0.0		
1.200	345.5	2.600	0.0	4.000	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 1.010

Invert Level (m) 32.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.05040 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.05040

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	774.2	1.400	1446.7	2.800	0.0	4.200	0.0
0.200	858.0	1.600	1559.0	3.000	0.0	4.400	0.0
0.400	946.0	1.800	1675.0	3.200	0.0	4.600	0.0
0.600	1038.2	2.000	1795.0	3.400	0.0	4.800	0.0
0.800	1134.2	2.200	0.0	3.600	0.0	5.000	0.0
1.000	1234.3	2.400	0.0	3.800	0.0		
1.200	1338.5	2.600	0.0	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
1.001	15 Winter	1	0%	100/15 Summer	100/15 Winter			1
1.002	15 Winter	1	0%	30/15 Winter	100/15 Winter			1
1.003	15 Winter	1	0%	30/15 Summer	100/15 Winter			1
2.000	15 Winter	1	0%					
2.001	15 Winter	1	0%					
2.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			3
2.003	30 Winter	1	0%	100/15 Summer	100/15 Summer			4
2.004	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
2.005	30 Winter	1	0%					
2.006	15 Winter	1	0%	30/15 Summer	100/15 Summer			6
1.004	15 Winter	1	0%	30/15 Summer				
1.005	15 Winter	1	0%	30/15 Summer				
1.006	15 Winter	1	0%	30/15 Summer				
3.000	15 Winter	1	0%					
3.001	15 Winter	1	0%					
3.002	15 Winter	1	0%					
3.003	30 Winter	1	0%					
3.004	30 Winter	1	0%					
3.005	30 Winter	1	0%					
3.006	30 Winter	1	0%					
3.007	30 Winter	1	0%					
3.008	30 Winter	1	0%					
3.009	30 Winter	1	0%	30/15 Summer	100/30 Winter			2
1.007	30 Winter	1	0%	30/15 Summer				
4.000	15 Winter	1	0%					
4.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
4.002	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
1.008	30 Winter	1	0%	30/15 Summer	100/15 Summer			11
1.009	30 Winter	1	0%	1/15 Winter				
1.010	480 Winter	1	0%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	36.732	-0.239	0.000	0.26	0.0	35.0	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.001	MH02	36.241	-0.305	0.000	0.21	0.0	46.4	OK
1.002	MH03	35.756	-0.290	0.000	0.26	0.0	56.8	OK
1.003	MH04	35.269	-0.277	0.000	0.31	0.0	67.9	OK
2.000	SW01	38.579	-0.168	0.000	0.13	0.0	14.0	FLOOD RISK*
2.001	SW02	38.245	-0.168	0.000	0.14	0.0	21.1	FLOOD RISK*
2.002	SW03	37.710	-0.153	0.000	0.19	0.0	25.4	FLOOD RISK*
2.003	SW04	37.259	-0.154	0.000	0.20	0.0	28.7	FLOOD RISK*
2.004	SW05	36.720	-0.143	0.000	0.23	0.0	32.3	FLOOD RISK*
2.005	SW06	36.207	-0.156	0.000	0.20	0.0	34.8	FLOOD RISK*
2.006	MH05	34.138	-0.369	0.000	0.13	0.0	31.7	OK
1.004	MH06	34.115	-0.297	0.000	0.38	0.0	99.3	OK
1.005	MH07	33.784	-0.295	0.000	0.38	0.0	100.9	OK
1.006	MH08	33.448	-0.298	0.000	0.38	0.0	100.8	OK
3.000	SW07	38.982	-0.226	0.000	0.04	0.0	3.8	FLOOD RISK*
3.001	SW08	38.653	-0.225	0.000	0.04	0.0	5.1	FLOOD RISK*
3.002	SW09	38.157	-0.221	0.000	0.04	0.0	6.0	FLOOD RISK*
3.003	SW10	37.659	-0.219	0.000	0.05	0.0	6.8	FLOOD RISK*
3.004	SW11	37.162	-0.216	0.000	0.06	0.0	7.5	FLOOD RISK*
3.005	SW12	36.664	-0.214	0.000	0.06	0.0	8.1	FLOOD RISK*
3.006	SW13	36.169	-0.209	0.000	0.07	0.0	9.1	FLOOD RISK*
3.007	SW14	35.678	-0.200	0.000	0.08	0.0	10.8	FLOOD RISK*
3.008	SW15	35.180	-0.198	0.000	0.09	0.0	14.1	FLOOD RISK*
3.009	MH09	33.327	-0.209	0.000	0.20	0.0	14.0	OK
1.007	MH10	33.096	-0.311	0.000	0.35	0.0	115.9	OK
4.000	SW16	35.732	-0.181	0.000	0.10	0.0	14.1	FLOOD RISK*
4.001	SW17	35.203	-0.160	0.000	0.17	0.0	23.0	FLOOD RISK*
4.002	SW18	34.702	-0.161	0.000	0.18	0.0	30.9	FLOOD RISK*
1.008	MH11	32.965	-0.180	0.000	0.50	0.0	141.9	OK
1.009	Pri	32.932	0.032	0.000	1.11	0.0	107.4	SURCHARGED
1.010	Inf	32.754	0.254	0.000	0.00	0.0	0.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
1.001	15 Winter	30	+20%	100/15 Summer	100/15 Winter			1
1.002	15 Winter	30	+20%	30/15 Winter	100/15 Winter			1
1.003	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
2.000	15 Winter	30	+20%					
2.001	15 Winter	30	+20%					
2.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			3
2.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
2.004	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
2.005	30 Winter	30	+20%					
2.006	15 Winter	30	+20%	30/15 Summer	100/15 Summer			6
1.004	15 Winter	30	+20%	30/15 Summer				
1.005	15 Winter	30	+20%	30/15 Summer				
1.006	30 Winter	30	+20%	30/15 Summer				
3.000	15 Winter	30	+20%					
3.001	15 Winter	30	+20%					
3.002	15 Winter	30	+20%					
3.003	15 Winter	30	+20%					
3.004	30 Winter	30	+20%					
3.005	30 Winter	30	+20%					
3.006	15 Winter	30	+20%					
3.007	15 Winter	30	+20%					
3.008	15 Winter	30	+20%					
3.009	30 Winter	30	+20%	30/15 Summer	100/30 Winter			2
1.007	30 Winter	30	+20%	30/15 Summer				
4.000	15 Winter	30	+20%					
4.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
4.002	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
1.008	30 Winter	30	+20%	30/15 Summer	100/15 Summer			11
1.009	30 Winter	30	+20%	1/15 Winter				
1.010	960 Winter	30	+20%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	37.046	0.075	0.000	1.01	0.0	137.2	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.001	MH02	36.432	-0.114	0.000	0.86	0.0	186.3	OK
1.002	MH03	36.070	0.024	0.000	0.96	0.0	208.0	SURCHARGED
1.003	MH04	35.604	0.058	0.000	1.07	0.0	231.2	SURCHARGED
2.000	SW01	38.692	-0.055	0.000	0.52	0.0	56.6	FLOOD RISK*
2.001	SW02	38.353	-0.060	0.000	0.56	0.0	81.5	FLOOD RISK*
2.002	SW03	37.830	-0.033	0.000	0.73	0.0	96.0	FLOOD RISK*
2.003	SW04	37.377	-0.036	0.000	0.72	0.0	105.7	FLOOD RISK*
2.004	SW05	36.845	-0.018	0.000	0.83	0.0	115.6	FLOOD RISK*
2.005	SW06	36.322	-0.041	0.000	0.72	0.0	127.0	FLOOD RISK*
2.006	MH05	35.206	0.699	0.000	0.50	0.0	124.1	SURCHARGED
1.004	MH06	35.174	0.762	0.000	1.29	0.0	338.7	SURCHARGED
1.005	MH07	34.768	0.689	0.000	1.25	0.0	326.7	SURCHARGED
1.006	MH08	34.408	0.662	0.000	1.14	0.0	301.4	SURCHARGED
3.000	SW07	39.041	-0.167	0.000	0.14	0.0	14.2	FLOOD RISK*
3.001	SW08	38.715	-0.163	0.000	0.16	0.0	21.8	FLOOD RISK*
3.002	SW09	38.224	-0.154	0.000	0.19	0.0	26.0	FLOOD RISK*
3.003	SW10	37.728	-0.150	0.000	0.21	0.0	28.2	FLOOD RISK*
3.004	SW11	37.231	-0.147	0.000	0.22	0.0	29.9	FLOOD RISK*
3.005	SW12	36.735	-0.143	0.000	0.24	0.0	32.0	FLOOD RISK*
3.006	SW13	36.248	-0.130	0.000	0.27	0.0	35.6	FLOOD RISK*
3.007	SW14	35.763	-0.115	0.000	0.33	0.0	43.2	FLOOD RISK*
3.008	SW15	35.267	-0.111	0.000	0.37	0.0	60.2	FLOOD RISK*
3.009	MH09	34.108	0.572	0.000	0.76	0.0	53.4	SURCHARGED
1.007	MH10	34.050	0.643	0.000	1.09	0.0	361.5	SURCHARGED
4.000	SW16	35.831	-0.082	0.000	0.41	0.0	57.1	FLOOD RISK*
4.001	SW17	35.325	-0.038	0.000	0.66	0.0	91.4	FLOOD RISK*
4.002	SW18	34.819	-0.044	0.000	0.70	0.0	119.9	FLOOD RISK*
1.008	MH11	33.904	0.759	0.000	1.59	0.0	453.7	FLOOD RISK
1.009	Pri	33.831	0.931	0.000	2.37	0.0	229.5	SURCHARGED
1.010	Inf	33.427	0.927	0.000	0.00	0.0	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
1.001	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
1.002	15 Winter	100	+30%	30/15 Winter	100/15 Winter			1
1.003	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
2.000	15 Winter	100	+30%					
2.001	15 Winter	100	+30%					
2.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
2.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
2.004	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
2.005	15 Winter	100	+30%					
2.006	30 Winter	100	+30%	30/15 Summer	100/15 Summer			6
1.004	60 Summer	100	+30%	30/15 Summer				
1.005	15 Winter	100	+30%	30/15 Summer				
1.006	30 Winter	100	+30%	30/15 Summer				
3.000	15 Winter	100	+30%					
3.001	15 Winter	100	+30%					
3.002	15 Winter	100	+30%					
3.003	15 Winter	100	+30%					
3.004	15 Winter	100	+30%					
3.005	30 Winter	100	+30%					
3.006	15 Winter	100	+30%					
3.007	15 Winter	100	+30%					
3.008	15 Winter	100	+30%					
3.009	60 Winter	100	+30%	30/15 Summer	100/30 Winter			2
1.007	60 Winter	100	+30%	30/15 Summer				
4.000	15 Winter	100	+30%					
4.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
4.002	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
1.008	60 Winter	100	+30%	30/15 Summer	100/15 Summer			11
1.009	60 Winter	100	+30%	1/15 Winter				
1.010	1440 Winter	100	+30%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	38.105	1.134	9.292	1.36	0.0	184.9	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.001	MH02	37.598	1.052	2.136	1.04	0.0	225.7	FLOOD
1.002	MH03	37.103	1.057	7.373	1.18	0.0	255.6	FLOOD
1.003	MH04	36.596	1.050	0.298	1.35	0.0	292.7	FLOOD
2.000	SW01	38.744	-0.003	0.000	0.86	0.0	93.4	FLOOD RISK*
2.001	SW02	38.409	-0.004	0.000	0.89	0.0	129.6	FLOOD RISK*
2.002	SW03	37.876	0.013	12.862	1.00	0.0	132.1	FLOOD
2.003	SW04	37.421	0.008	8.361	0.99	0.0	143.9	FLOOD
2.004	SW05	36.889	0.026	26.379	1.04	0.0	144.3	FLOOD
2.005	SW06	36.362	-0.001	0.000	0.98	0.0	172.0	FLOOD RISK*
2.006	MH05	35.716	1.209	77.530	1.10	0.0	274.2	FLOOD
1.004	MH06	35.765	1.353	0.000	1.22	0.0	319.1	SURCHARGED
1.005	MH07	35.401	1.322	0.000	1.36	0.0	356.0	FLOOD RISK
1.006	MH08	34.895	1.149	0.000	1.39	0.0	367.3	FLOOD RISK
3.000	SW07	39.075	-0.133	0.000	0.23	0.0	23.5	FLOOD RISK*
3.001	SW08	38.746	-0.132	0.000	0.25	0.0	33.6	FLOOD RISK*
3.002	SW09	38.257	-0.121	0.000	0.30	0.0	40.7	FLOOD RISK*
3.003	SW10	37.762	-0.116	0.000	0.33	0.0	44.9	FLOOD RISK*
3.004	SW11	37.267	-0.111	0.000	0.36	0.0	47.8	FLOOD RISK*
3.005	SW12	36.770	-0.108	0.000	0.38	0.0	50.9	FLOOD RISK*
3.006	SW13	36.291	-0.087	0.000	0.44	0.0	58.7	FLOOD RISK*
3.007	SW14	35.812	-0.066	0.000	0.54	0.0	72.5	FLOOD RISK*
3.008	SW15	35.317	-0.061	0.000	0.61	0.0	98.4	FLOOD RISK*
3.009	MH09	34.446	0.910	9.571	1.07	0.0	75.3	FLOOD
1.007	MH10	34.385	0.977	0.000	1.26	0.0	419.5	FLOOD RISK
4.000	SW16	35.889	-0.024	0.000	0.68	0.0	94.9	FLOOD RISK*
4.001	SW17	35.372	0.009	8.736	0.98	0.0	135.3	FLOOD
4.002	SW18	34.867	0.004	4.133	1.01	0.0	172.6	FLOOD
1.008	MH11	34.218	1.073	180.609	1.79	0.0	509.1	FLOOD
1.009	Pri	34.154	1.254	0.000	2.46	0.0	237.7	FLOOD RISK
1.010	Inf	33.831	1.331	0.000	0.00	0.0	0.0	SURCHARGED

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	65.200	0.466	139.9	0.151	5.00	0.0	0.600		o	300
1.001	64.900	0.683	95.0	0.098	0.00	0.0	0.600		o	375
1.002	100.000	0.909	110.0	0.097	0.00	0.0	0.600		o	375
2.000	60.000	0.272	220.6	0.079	5.00	0.0	0.600		o	375
1.003	16.800	0.305	55.1	0.229	0.00	0.0	0.600		o	375
3.000	100.000	0.370	270.3	0.123	5.00	0.0		0.100		-5
3.001	100.000	0.813	123.0	0.125	0.00	0.0		0.100		-5
3.002	125.000	1.182	105.8	0.198	0.00	0.0		0.100		-5
4.000	91.000	0.741	122.8	0.177	5.00	0.0		0.100		-5
1.004	73.355	0.262	280.0	0.000	0.00	0.0	0.600		oo	42
5.000	55.800	0.359	155.4	0.119	5.00	0.0	0.600		o	300
6.000	46.500	0.230	202.2	0.242	5.00	0.0	0.600		o	375
7.000	49.900	0.250	199.6	0.234	5.00	0.0	0.600		o	375

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	34.252	0.151	0.0	1.33	93.8
1.001	33.711	0.249	0.0	1.86	205.3
1.002	33.028	0.346	0.0	1.73	190.7
2.000	32.316	0.079	0.0	1.22	134.3
1.003	32.044	0.654	0.0	2.45	270.1
3.000	34.908	0.123	0.0	0.17	115.8
3.001	34.538	0.248	0.0	0.25	171.6
3.002	33.725	0.446	0.0	0.27	185.1
4.000	33.284	0.177	0.0	0.25	171.8
1.004	31.739	1.277	0.0	1.08	238.3
5.000	32.996	0.119	0.0	1.26	89.0
6.000	32.792	0.242	0.0	1.27	140.3
7.000	32.812	0.234	0.0	1.28	141.2

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
5.001	40.500	0.135	300.0	0.000	0.00	0.0	0.600		o	450
5.002	100.000	0.500	200.0	0.210	0.00	0.0	0.600		o	525
5.003	34.971	0.175	200.0	0.172	0.00	0.0	0.600		o	525
1.005	25.000	0.200	125.0	0.000	0.00	0.0	0.600		o	300
1.006	5.000	-2.400	-2.1	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
5.001	32.562	0.595	0.0	1.17	185.8
5.002	32.352	0.805	0.0	1.58	342.1
5.003	31.852	0.977	0.0	1.58	342.1
1.005	31.300	2.254	0.0	1.40	99.3
1.006	31.100	2.254	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.006		34.000	33.500	31.600	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	1	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 617600 316150 TG 17600 16150
C (1km)	-0.024
D1 (1km)	0.290
D2 (1km)	0.350
D3 (1km)	0.249

Synthetic Rainfall Details

E (1km)	0.316
F (1km)	2.463
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.005

Invert Level (m) 31.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	143.0	1.400	503.0	2.800	0.0	4.200	0.0
0.200	183.0	1.600	571.0	3.000	0.0	4.400	0.0
0.400	226.0	1.800	642.0	3.200	0.0	4.600	0.0
0.600	273.0	2.000	718.0	3.400	0.0	4.800	0.0
0.800	325.0	2.200	797.0	3.600	0.0	5.000	0.0
1.000	380.0	2.400	880.0	3.800	0.0		
1.200	440.0	2.600	0.0	4.000	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 1.006

Invert Level (m) 31.100 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.16200 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.16200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	538.0	1.400	1242.0	2.800	0.0	4.200	0.0
0.200	626.0	1.600	1359.0	3.000	0.0	4.400	0.0
0.400	719.0	1.800	1480.0	3.200	0.0	4.600	0.0
0.600	815.0	2.000	1605.0	3.400	0.0	4.800	0.0
0.800	916.0	2.200	1734.0	3.600	0.0	5.000	0.0
1.000	1021.0	2.400	1867.0	3.800	0.0		
1.200	1129.0	2.600	2004.0	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	1	0%	100/15 Summer				
1.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
2.000	15 Winter	1	0%	30/15 Summer				
1.003	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	1	0%					
3.001	15 Winter	1	0%					
3.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
4.000	15 Winter	1	0%					
1.004	15 Winter	1	0%	30/15 Summer	30/15 Winter			26
5.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
6.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			3
7.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			3
5.001	15 Winter	1	0%	30/15 Summer				
5.002	15 Winter	1	0%	30/15 Summer				
5.003	15 Winter	1	0%	30/15 Summer				
1.005	15 Winter	1	0%	1/15 Summer				
1.006	480 Winter	1	0%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	34.351	-0.201	0.000	0.24	0.0	21.5	OK
1.001	MH2	33.814	-0.272	0.000	0.17	0.0	32.1	OK
1.002	MH3	33.152	-0.251	0.000	0.23	0.0	41.7	OK
2.000	MH4	32.391	-0.300	0.000	0.09	0.0	10.8	OK
1.003	MH5	32.199	-0.220	0.000	0.36	0.0	76.8	OK
3.000	SW1	35.009	-0.174	0.000	0.12	0.0	14.2	FLOOD RISK*
3.001	SW2	34.641	-0.172	0.000	0.14	0.0	23.3	FLOOD RISK*
3.002	SW3	33.846	-0.154	0.000	0.20	0.0	37.9	FLOOD RISK*
4.000	SW4	33.384	-0.175	0.000	0.14	0.0	24.3	FLOOD RISK*
1.004	MH6	31.942	-0.172	0.000	0.55	0.0	124.0	OK
5.000	MH1	33.087	-0.209	0.000	0.19	0.0	16.3	OK
6.000	MH2	32.923	-0.244	0.000	0.26	0.0	33.4	OK
7.000	MH3	32.940	-0.247	0.000	0.25	0.0	32.2	OK
5.001	MH4	32.782	-0.230	0.000	0.47	0.0	78.3	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.002	MH5	32.553	-0.324	0.000	0.30	0.0	96.8	OK
5.003	MH6	32.077	-0.300	0.000	0.38	0.0	112.0	OK
1.005	Pri	31.687	0.087	0.000	1.23	0.0	108.9	SURCHARGED
1.006	Inf	31.489	0.289	0.000	0.00	0.0	0.0	SURCHARGED

Input Hydrograph Manhole Inf, DS/PN 1.006 (Storm)
480 minute 1 year Winter I+0%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 617600 316150 TG 17600 16150
C	-0.02402
D1	0.28961
D2	0.34858
D3	0.24977
E	0.31570
F	2.46320
Area (Ha)	9.730
SAAR (mm)	628
CWI	92.040
Urban (1990)	0.0000
SPR	20.330
DPSBAR	9.700
DPLBAR	0.262
PROPWET	0.310
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.753
FARL	1.000

Output Variables

TP(0) (mins) 143 Q (l/s) 84.9 PR (%) 12.090
T (mins) 16 TB (mins) 381
TPt (mins) 151 Base Flow (l/s) 0.8

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
8	0.8	48	0.9	88	1.3	128	1.9	168	2.9	208	4.4
16	0.8	56	1.0	96	1.4	136	2.0	176	3.1	216	4.8
24	0.8	64	1.0	104	1.5	144	2.2	184	3.4	224	5.2
32	0.8	72	1.1	112	1.6	152	2.4	192	3.7	232	5.6
40	0.9	80	1.2	120	1.7	160	2.6	200	4.0	240	6.1

Input Hydrograph Manhole Inf, DS/PN 1.006 (Storm)
480 minute 1 year Winter I+0%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
248	6.6	352	13.6	456	13.0	560	6.9	664	2.3	768	1.0
256	7.2	360	13.9	464	12.6	568	6.4	672	2.1	776	0.9
264	7.7	368	14.2	472	12.2	576	6.0	680	2.0	784	0.9
272	8.3	376	14.4	480	11.8	584	5.5	688	1.8	792	0.9
280	8.9	384	14.5	488	11.3	592	5.1	696	1.7	800	0.8
288	9.5	392	14.5	496	10.8	600	4.7	704	1.6	808	0.8
296	10.1	400	14.5	504	10.4	608	4.3	712	1.5	816	0.8
304	10.7	408	14.5	512	9.9	616	3.9	720	1.4	824	0.8
312	11.3	416	14.3	520	9.4	624	3.6	728	1.3	832	0.8
320	11.8	424	14.1	528	8.9	632	3.3	736	1.2	840	0.8
328	12.3	432	13.9	536	8.4	640	3.0	744	1.1	848	0.8
336	12.8	440	13.6	544	7.9	648	2.7	752	1.1		
344	13.3	448	13.3	552	7.4	656	2.5	760	1.0		

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	30	+20%	100/15 Summer				
1.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
2.000	15 Winter	30	+20%	30/15 Summer				
1.003	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	30	+20%					
3.001	15 Winter	30	+20%					
3.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
4.000	15 Winter	30	+20%					
1.004	15 Winter	30	+20%	30/15 Summer	30/15 Winter			26
5.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
6.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			3
7.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			3
5.001	15 Winter	30	+20%	30/15 Summer				
5.002	15 Winter	30	+20%	30/15 Summer				
5.003	30 Winter	30	+20%	30/15 Summer				
1.005	30 Winter	30	+20%	1/15 Summer				
1.006	960 Winter	30	+20%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	34.482	-0.070	0.000	0.90	0.0	80.6	OK
1.001	MH2	33.945	-0.141	0.000	0.68	0.0	132.2	OK
1.002	MH3	33.713	0.310	0.000	0.80	0.0	146.3	SURCHARGED
2.000	MH4	33.180	0.489	0.000	0.26	0.0	33.0	SURCHARGED
1.003	MH5	33.151	0.732	0.000	1.16	0.0	250.4	SURCHARGED
3.000	SW1	35.117	-0.066	0.000	0.50	0.0	57.3	FLOOD RISK*
3.001	SW2	34.750	-0.063	0.000	0.54	0.0	92.4	FLOOD RISK*
3.002	SW3	33.983	-0.017	0.000	0.78	0.0	144.7	FLOOD RISK*
4.000	SW4	33.490	-0.069	0.000	0.54	0.0	92.4	FLOOD RISK*
1.004	MH6	32.823	0.709	4.761	1.69	0.0	381.7	FLOOD
5.000	MH1	33.599	0.303	0.000	0.67	0.0	56.9	SURCHARGED
6.000	MH2	33.629	0.462	0.000	0.91	0.0	118.1	SURCHARGED
7.000	MH3	33.628	0.441	0.000	0.87	0.0	113.9	SURCHARGED
5.001	MH4	33.465	0.453	0.000	1.67	0.0	277.1	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.002	MH5	33.090	0.213	0.000	1.05	0.0	338.6	SURCHARGED
5.003	MH6	32.543	0.166	0.000	1.00	0.0	292.5	SURCHARGED
1.005	Pri	32.523	0.923	0.000	2.36	0.0	209.6	SURCHARGED
1.006	Inf	32.432	1.232	0.000	0.00	0.0	0.0	SURCHARGED

Input Hydrograph Manhole Inf, DS/PN 1.006 (Storm)
960 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 617600 316150 TG 17600 16150
C	-0.02402
D1	0.28961
D2	0.34858
D3	0.24977
E	0.31570
F	2.46320
Area (Ha)	9.730
SAAR (mm)	628
CWI	92.040
Urban (1990)	0.0000
SPR	20.330
DPSBAR	9.700
DPLBAR	0.262
PROPWET	0.310
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.753
FARL	1.000

Output Variables

TP(0) (mins) 143 Q (l/s) 84.9 PR (%) 17.438
T (mins) 16 TB (mins) 381
TPt (mins) 151 Base Flow (l/s) 0.8

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
16	0.8	96	1.8	176	4.7	256	8.2	336	12.0	416	18.7
32	0.8	112	2.2	192	5.5	272	8.9	352	13.0	432	20.6
48	1.0	128	2.7	208	6.2	288	9.6	368	14.2	448	22.7
64	1.1	144	3.3	224	6.9	304	10.3	384	15.5	464	25.0
80	1.4	160	4.0	240	7.5	320	11.1	400	17.0	480	27.5

Input Hydrograph Manhole Inf, DS/PN 1.006 (Storm)
960 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
496	30.1	640	46.4	784	32.6	928	14.7	1072	6.8	1216	1.7
512	32.7	656	46.3	800	30.1	944	13.6	1088	6.0	1232	1.4
528	35.3	672	45.8	816	27.6	960	12.6	1104	5.2	1248	1.2
544	37.8	688	44.8	832	25.2	976	11.7	1120	4.5	1264	1.0
560	40.1	704	43.4	848	23.0	992	10.8	1136	3.9	1280	0.9
576	42.1	720	41.7	864	20.9	1008	10.0	1152	3.3	1296	0.8
592	43.8	736	39.7	880	19.1	1024	9.2	1168	2.8	1312	0.8
608	45.2	752	37.4	896	17.4	1040	8.4	1184	2.4	1328	0.8
624	46.0	768	35.0	912	16.0	1056	7.6	1200	2.0		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	100	+30%	100/15 Summer				
1.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
2.000	15 Winter	100	+30%	30/15 Summer				
1.003	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	100	+30%					
3.001	15 Winter	100	+30%					
3.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
4.000	15 Winter	100	+30%					
1.004	960 Winter	100	+30%	30/15 Summer	30/15 Winter			26
5.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
6.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			3
7.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			3
5.001	15 Winter	100	+30%	30/15 Summer				
5.002	15 Winter	100	+30%	30/15 Summer				
5.003	960 Winter	100	+30%	30/15 Summer				
1.005	960 Winter	100	+30%	1/15 Summer				
1.006	960 Winter	100	+30%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	35.455	0.903	3.215	1.22	0.0	109.5	FLOOD
1.001	MH2	34.976	0.890	0.000	0.89	0.0	172.6	FLOOD RISK
1.002	MH3	34.321	0.918	12.535	0.95	0.0	173.7	FLOOD
2.000	MH4	33.591	0.900	0.000	0.52	0.0	65.7	FLOOD RISK
1.003	MH5	33.509	1.090	15.814	1.55	0.0	334.8	FLOOD
3.000	SW1	35.178	-0.005	0.000	0.82	0.0	95.4	FLOOD RISK*
3.001	SW2	34.809	-0.004	0.000	0.86	0.0	148.4	FLOOD RISK*
3.002	SW3	34.022	0.022	22.386	0.97	0.0	178.8	FLOOD
4.000	SW4	33.553	-0.006	0.000	0.84	0.0	144.4	FLOOD RISK*
1.004	MH6	32.986	0.872	168.106	0.22	0.0	49.1	FLOOD
5.000	MH1	34.501	1.205	4.561	0.99	0.0	83.1	FLOOD
6.000	MH2	34.386	1.219	18.665	1.18	0.0	152.0	FLOOD
7.000	MH3	34.404	1.217	16.646	1.09	0.0	142.2	FLOOD
5.001	MH4	34.290	1.278	0.000	2.08	0.0	344.9	FLOOD RISK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.002	MH5	33.952	1.075	0.000	1.40	0.0	450.0	FLOOD RISK
5.003	MH6	32.984	0.607	0.000	0.12	0.0	36.4	SURCHARGED
1.005	Pri	32.983	1.383	0.000	0.64	0.0	56.9	SURCHARGED
1.006	Inf	32.969	1.769	0.000	0.00	0.0	0.0	SURCHARGED

Input Hydrograph Manhole Inf, DS/PN 1.006 (Storm)
960 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 617600 316150 TG 17600 16150
C	-0.02402
D1	0.28961
D2	0.34858
D3	0.24977
E	0.31570
F	2.46320
Area (Ha)	9.730
SAAR (mm)	628
CWI	92.040
Urban (1990)	0.0000
SPR	20.330
DPSBAR	9.700
DPLBAR	0.262
PROPWET	0.310
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.753
FARL	1.000

Output Variables

TP(0) (mins)	143	Q (l/s)	84.9	PR (%)	20.808
T (mins)	16	TB (mins)	381		
TPt (mins)	151	Base Flow (l/s)	0.8		

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
16	0.8	96	2.5	176	7.7	256	13.8	336	20.4	416	32.2
32	0.9	112	3.3	192	9.0	272	14.9	352	22.2	432	35.5
48	1.1	128	4.2	208	10.2	288	16.1	368	24.2	448	39.2
64	1.4	144	5.2	224	11.4	304	17.4	384	26.5	464	43.2
80	1.9	160	6.4	240	12.6	320	18.8	400	29.2	480	47.5

Input Hydrograph Manhole Inf, DS/PN 1.006 (Storm)
960 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
496	52.0	640	80.7	784	56.4	928	25.2	1072	11.3	1216	2.3
512	56.6	656	80.5	800	52.0	944	23.3	1088	9.9	1232	1.8
528	61.2	672	79.5	816	47.7	960	21.5	1104	8.5	1248	1.4
544	65.5	688	77.8	832	43.5	976	19.9	1120	7.3	1264	1.2
560	69.6	704	75.4	848	39.6	992	18.4	1136	6.2	1280	1.0
576	73.1	720	72.4	864	36.0	1008	17.0	1152	5.2	1296	0.8
592	76.1	736	68.8	880	32.8	1024	15.5	1168	4.4	1312	0.8
608	78.4	752	64.9	896	29.9	1040	14.1	1184	3.6	1328	0.8
624	80.0	768	60.7	912	27.4	1056	12.7	1200	2.9		

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	6.300	0.047	134.0	0.000	5.00	0.0	0.600		o	375
2.000	100.000	0.601	166.4	0.137	5.00	0.0		0.050		-5
2.001	100.000	0.602	166.1	0.133	0.00	0.0		0.050		-5
2.002	100.000	0.601	166.4	0.132	0.00	0.0		0.050		-5
2.003	100.000	0.601	166.4	0.130	0.00	0.0		0.050		-5
2.004	100.000	0.601	166.4	0.126	0.00	0.0		0.050		-5
2.005	100.000	0.601	166.4	0.123	0.00	0.0		0.050		-5
2.006	30.600	0.357	85.7	0.037	0.00	0.0		0.050		-5
3.000	100.000	0.107	934.6	0.161	5.00	0.0		0.050		-5
3.001	100.000	0.852	117.4	0.157	0.00	0.0		0.050		-5
3.002	100.000	0.866	115.5	0.156	0.00	0.0		0.050		-5
3.003	100.000	0.500	200.0	0.155	0.00	0.0		0.050		-5
3.004	100.000	0.500	200.0	0.155	0.00	0.0		0.050		-5
3.005	100.000	0.500	200.0	0.157	0.00	0.0		0.050		-5
3.006	100.000	0.500	200.0	0.146	0.00	0.0		0.050		-5
3.007	100.000	0.500	200.0	0.136	0.00	0.0		0.050		-5
3.008	100.000	0.500	200.0	0.137	0.00	0.0		0.050		-5
3.009	100.000	0.500	200.0	0.136	0.00	0.0		0.050		-5
3.010	100.000	0.500	200.0	0.130	0.00	0.0		0.050		-5
3.011	78.500	0.619	126.8	0.095	0.00	0.0		0.050		-5

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	27.600	0.000	0.0	1.56	172.7
2.000	32.517	0.137	0.0	0.43	295.1
2.001	31.916	0.270	0.0	0.43	295.4
2.002	31.314	0.402	0.0	0.43	295.1
2.003	30.713	0.532	0.0	0.43	295.1
2.004	30.112	0.658	0.0	0.43	295.1
2.005	29.511	0.781	0.0	0.43	295.1
2.006	28.910	0.818	0.0	0.60	411.2
3.000	34.997	0.161	0.0	0.18	124.5
3.001	34.890	0.318	0.0	0.51	351.4
3.002	34.038	0.474	0.0	0.52	354.3
3.003	33.172	0.629	0.0	0.39	269.2
3.004	32.672	0.784	0.0	0.39	269.2
3.005	32.172	0.941	0.0	0.39	269.2
3.006	31.672	1.087	0.0	0.39	269.2
3.007	31.172	1.223	0.0	0.39	269.2
3.008	30.672	1.360	0.0	0.39	269.2
3.009	30.172	1.496	0.0	0.39	269.2
3.010	29.672	1.626	0.0	0.39	269.2
3.011	29.172	1.721	0.0	0.49	338.1

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.001	27.000	0.090	300.0	0.000	0.00	0.0	0.600		o	450
4.000	100.000	0.588	170.1	0.180	5.00	0.0		0.050		-4
4.001	100.000	0.601	166.4	0.158	0.00	0.0		0.050		-4
4.002	100.000	0.601	166.4	0.159	0.00	0.0		0.050		-4
4.003	100.000	0.601	166.4	0.158	0.00	0.0		0.050		-4
4.004	100.000	0.602	166.1	0.157	0.00	0.0		0.050		-4
4.005	100.000	0.574	174.2	0.157	0.00	0.0		0.050		-4
4.006	14.600	0.293	49.8	0.023	0.00	0.0		0.050		-4
5.000	100.000	0.772	129.5	0.172	5.00	0.0		0.050		-4
5.001	100.000	1.058	94.5	0.125	0.00	0.0		0.050		-4
5.002	100.000	0.585	170.9	0.125	0.00	0.0		0.050		-4
5.003	100.000	0.500	200.0	0.125	0.00	0.0		0.050		-4
5.004	100.000	0.500	200.0	0.123	0.00	0.0		0.050		-4
5.005	100.000	0.500	200.0	0.148	0.00	0.0		0.050		-4
5.006	100.000	0.500	200.0	0.155	0.00	0.0		0.050		-4
5.007	100.000	0.500	200.0	0.153	0.00	0.0		0.050		-4
5.008	100.000	0.500	200.0	0.153	0.00	0.0		0.050		-4
5.009	100.000	0.500	200.0	0.155	0.00	0.0		0.050		-4
5.010	100.000	0.500	200.0	0.158	0.00	0.0		0.050		-4

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.001	27.328	2.539	0.0	1.40	791.0
4.000	32.413	0.180	0.0	0.43	291.7
4.001	31.825	0.338	0.0	0.43	294.9
4.002	31.224	0.497	0.0	0.43	294.9
4.003	30.623	0.655	0.0	0.43	294.9
4.004	30.022	0.812	0.0	0.43	295.1
4.005	29.420	0.969	0.0	0.42	288.2
4.006	28.846	0.992	0.0	0.79	538.8
5.000	35.387	0.172	0.0	0.49	334.2
5.001	34.615	0.297	0.0	0.57	391.2
5.002	33.557	0.422	0.0	0.43	290.9
5.003	32.972	0.547	0.0	0.39	269.0
5.004	32.472	0.670	0.0	0.39	269.0
5.005	31.972	0.818	0.0	0.39	269.0
5.006	31.472	0.973	0.0	0.39	269.0
5.007	30.972	1.126	0.0	0.39	269.0
5.008	30.472	1.279	0.0	0.39	269.0
5.009	29.972	1.434	0.0	0.39	269.0
5.010	29.472	1.592	0.0	0.39	269.0

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
5.011	38.500	0.419	91.9	0.060	0.00	0.0		0.050		-4
1.002	52.200	0.238	219.3	0.000	0.00	0.0	0.600		oo	45
1.003	20.000	0.200	100.0	0.000	0.00	0.0	0.600		o	300
1.004	5.000	-1.800	-2.8	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
5.011	28.972	1.652	0.0	0.58	396.8
1.002	27.238	5.183	0.0	1.64	926.3
1.003	27.000	5.183	0.0	1.57	111.1
1.004	26.800	5.183	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004		29.000	28.600	27.200	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 618850 315550 TG 18850 15550
C (1km)	-0.024
D1 (1km)	0.286
D2 (1km)	0.351
D3 (1km)	0.261
E (1km)	0.311
F (1km)	2.482

Synthetic Rainfall Details

Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.003

Invert Level (m) 27.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	873.0	1.400	1592.0	2.800	0.0	4.200	0.0
0.200	963.4	1.600	1711.0	3.000	0.0	4.400	0.0
0.400	1058.0	1.800	1834.0	3.200	0.0	4.600	0.0
0.600	1156.6	2.000	0.0	3.400	0.0	4.800	0.0
0.800	1259.3	2.200	0.0	3.600	0.0	5.000	0.0
1.000	1366.1	2.400	0.0	3.800	0.0		
1.200	1477.0	2.600	0.0	4.000	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 1.004

Invert Level (m) 26.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00270 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00270

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	5778.0	1.400	7528.0	2.800	0.0	4.200	0.0
0.200	6016.0	1.600	7794.0	3.000	0.0	4.400	0.0
0.400	6258.0	1.800	8064.0	3.200	0.0	4.600	0.0
0.600	6504.0	2.000	8338.0	3.400	0.0	4.800	0.0
0.800	6754.0	2.200	0.0	3.600	0.0	5.000	0.0
1.000	7008.0	2.400	0.0	3.800	0.0		
1.200	7266.0	2.600	0.0	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	360 Winter	1	0%	30/30 Winter	100/60 Winter			1
2.000	15 Winter	1	0%					
2.001	15 Winter	1	0%					
2.002	15 Winter	1	0%					
2.003	15 Winter	1	0%					
2.004	15 Winter	1	0%					
2.005	30 Winter	1	0%					
2.006	30 Winter	1	0%					
3.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
3.001	15 Winter	1	0%					
3.002	15 Winter	1	0%					
3.003	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
3.004	30 Winter	1	0%	100/15 Summer	100/15 Summer			4
3.005	30 Winter	1	0%	100/15 Summer	100/15 Summer			4
3.006	30 Winter	1	0%	100/15 Summer	100/15 Summer			5
3.007	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
3.008	30 Winter	1	0%	100/15 Winter	100/15 Winter			5
3.009	60 Winter	1	0%	100/15 Winter	100/15 Winter			5
3.010	60 Winter	1	0%	100/15 Winter	100/15 Winter			6
3.011	60 Winter	1	0%					
1.001	30 Winter	1	0%	30/30 Winter				
4.000	15 Winter	1	0%					
4.001	15 Winter	1	0%					
4.002	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
4.003	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
4.004	15 Winter	1	0%	100/15 Summer	100/15 Summer			3
4.005	30 Winter	1	0%	100/15 Summer	100/15 Summer			4
4.006	30 Winter	1	0%					
5.000	15 Winter	1	0%					
5.001	15 Winter	1	0%					
5.002	15 Winter	1	0%					
5.003	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
5.004	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
5.005	30 Winter	1	0%	100/15 Winter	100/15 Winter			2
5.006	30 Winter	1	0%	100/15 Winter	100/15 Winter			2
5.007	30 Winter	1	0%	100/15 Summer	100/15 Summer			5
5.008	30 Winter	1	0%	100/15 Summer	100/15 Summer			6

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
5.009	60 Winter	1	0%	100/15 Summer	100/15 Summer			6
5.010	60 Winter	1	0%	100/15 Summer	100/15 Summer			6
5.011	60 Winter	1	0%					
1.002	30 Winter	1	0%	30/15 Winter				
1.003	120 Winter	1	0%	30/15 Summer				
1.004	5760 Winter	1	0%	1/180 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	27.600	-0.375	0.000	0.00	0.0	0.0	OK
2.000	SW1	32.582	-0.210	0.000	0.06	0.0	16.7	FLOOD RISK*
2.001	SW2	32.002	-0.189	0.000	0.09	0.0	27.4	FLOOD RISK*
2.002	SW3	31.410	-0.179	0.000	0.12	0.0	35.3	FLOOD RISK*
2.003	SW4	30.815	-0.173	0.000	0.14	0.0	40.9	FLOOD RISK*
2.004	SW5	30.217	-0.170	0.000	0.15	0.0	43.9	FLOOD RISK*
2.005	SW6	29.618	-0.168	0.000	0.16	0.0	47.2	FLOOD RISK*
2.006	SW7	29.000	-0.185	0.000	0.12	0.0	48.3	FLOOD RISK*
3.000	SW8	35.111	-0.161	0.000	0.15	0.0	19.1	FLOOD RISK*
3.001	SW9	34.969	-0.196	0.000	0.08	0.0	28.2	FLOOD RISK*
3.002	SW10	34.126	-0.187	0.000	0.10	0.0	35.5	FLOOD RISK*
3.003	SW11	33.279	-0.168	0.000	0.15	0.0	41.7	FLOOD RISK*
3.004	SW12	32.785	-0.162	0.000	0.18	0.0	47.4	FLOOD RISK*
3.005	SW13	32.290	-0.157	0.000	0.19	0.0	52.0	FLOOD RISK*
3.006	SW14	31.794	-0.153	0.000	0.20	0.0	55.1	FLOOD RISK*
3.007	SW15	31.296	-0.151	0.000	0.21	0.0	57.1	FLOOD RISK*
3.008	SW16	30.797	-0.150	0.000	0.22	0.0	58.2	FLOOD RISK*
3.009	SW17	30.299	-0.148	0.000	0.22	0.0	60.0	FLOOD RISK*
3.010	SW18	29.801	-0.146	0.000	0.23	0.0	61.6	FLOOD RISK*
3.011	SW19	29.286	-0.161	0.000	0.19	0.0	62.9	FLOOD RISK*
1.001	MH2	27.500	-0.428	0.000	0.16	0.0	101.4	OK
4.000	SW20	32.491	-0.197	0.000	0.07	0.0	21.7	FLOOD RISK*
4.001	SW21	31.921	-0.179	0.000	0.12	0.0	34.2	FLOOD RISK*
4.002	SW22	31.330	-0.169	0.000	0.15	0.0	43.6	FLOOD RISK*
4.003	SW23	30.736	-0.162	0.000	0.17	0.0	49.7	FLOOD RISK*
4.004	SW24	30.137	-0.160	0.000	0.18	0.0	52.9	FLOOD RISK*
4.005	SW25	29.540	-0.155	0.000	0.20	0.0	57.5	FLOOD RISK*
4.006	SW26	28.933	-0.188	0.000	0.11	0.0	58.0	FLOOD RISK*
5.000	SW27	35.457	-0.205	0.000	0.06	0.0	20.9	FLOOD RISK*
5.001	SW28	34.692	-0.198	0.000	0.08	0.0	30.5	FLOOD RISK*
5.002	SW29	33.657	-0.175	0.000	0.13	0.0	37.7	FLOOD RISK*
5.003	SW30	33.081	-0.166	0.000	0.16	0.0	42.7	FLOOD RISK*
5.004	SW31	32.583	-0.164	0.000	0.17	0.0	44.8	FLOOD RISK*
5.005	SW32	32.086	-0.161	0.000	0.18	0.0	48.8	FLOOD RISK*
5.006	SW33	31.590	-0.157	0.000	0.19	0.0	52.3	FLOOD RISK*
5.007	SW34	31.093	-0.154	0.000	0.20	0.0	54.9	FLOOD RISK*
5.008	SW35	30.595	-0.152	0.000	0.21	0.0	56.8	FLOOD RISK*
5.009	SW36	30.099	-0.148	0.000	0.22	0.0	59.3	FLOOD RISK*
5.010	SW37	29.602	-0.145	0.000	0.23	0.0	62.1	FLOOD RISK*

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.011	SW38	29.077	-0.170	0.000	0.16	0.0	63.0	FLOOD RISK*
1.002	MH3	27.442	-0.396	0.000	0.27	0.0	216.5	OK
1.003	Pri	27.290	-0.010	0.000	1.00	0.0	96.8	OK
1.004	Inf	27.043	0.143	0.000	0.00	0.0	0.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	60 Winter	30	+20%	30/30 Winter	100/60 Winter			1
2.000	15 Winter	30	+20%					
2.001	15 Winter	30	+20%					
2.002	15 Winter	30	+20%					
2.003	15 Winter	30	+20%					
2.004	15 Winter	30	+20%					
2.005	15 Winter	30	+20%					
2.006	15 Winter	30	+20%					
3.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
3.001	15 Winter	30	+20%					
3.002	15 Winter	30	+20%					
3.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
3.004	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
3.005	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
3.006	30 Winter	30	+20%	100/15 Summer	100/15 Summer			5
3.007	30 Winter	30	+20%	100/15 Summer	100/15 Summer			6
3.008	30 Winter	30	+20%	100/15 Winter	100/15 Winter			5
3.009	30 Winter	30	+20%	100/15 Winter	100/15 Winter			5
3.010	30 Winter	30	+20%	100/15 Winter	100/15 Winter			6
3.011	60 Winter	30	+20%					
1.001	60 Winter	30	+20%	30/30 Winter				
4.000	15 Winter	30	+20%					
4.001	15 Winter	30	+20%					
4.002	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
4.003	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
4.004	15 Winter	30	+20%	100/15 Summer	100/15 Summer			3
4.005	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
4.006	15 Winter	30	+20%					
5.000	15 Winter	30	+20%					
5.001	15 Winter	30	+20%					
5.002	15 Winter	30	+20%					
5.003	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
5.004	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
5.005	15 Winter	30	+20%	100/15 Winter	100/15 Winter			2
5.006	30 Winter	30	+20%	100/15 Winter	100/15 Winter			2
5.007	30 Winter	30	+20%	100/15 Summer	100/15 Summer			5
5.008	30 Winter	30	+20%	100/15 Summer	100/15 Summer			6

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
5.009	30 Winter	30	+20%	100/15 Summer	100/15 Summer			6
5.010	30 Winter	30	+20%	100/15 Summer	100/15 Summer			6
5.011	30 Winter	30	+20%					
1.002	60 Winter	30	+20%	30/15 Winter				
1.003	60 Winter	30	+20%	30/15 Summer				
1.004	7200 Winter	30	+20%	1/180 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	28.064	0.089	0.000	-0.01	0.0	-0.6	SURCHARGED
2.000	SW1	32.656	-0.136	0.000	0.22	0.0	64.7	FLOOD RISK*
2.001	SW2	32.095	-0.096	0.000	0.37	0.0	110.5	FLOOD RISK*
2.002	SW3	31.515	-0.074	0.000	0.48	0.0	141.0	FLOOD RISK*
2.003	SW4	30.923	-0.065	0.000	0.54	0.0	160.7	FLOOD RISK*
2.004	SW5	30.325	-0.062	0.000	0.58	0.0	171.2	FLOOD RISK*
2.005	SW6	29.725	-0.061	0.000	0.60	0.0	177.0	FLOOD RISK*
2.006	SW7	29.088	-0.097	0.000	0.43	0.0	177.7	FLOOD RISK*
3.000	SW8	35.231	-0.041	0.000	0.61	0.0	75.5	FLOOD RISK*
3.001	SW9	35.053	-0.112	0.000	0.32	0.0	112.4	FLOOD RISK*
3.002	SW10	34.219	-0.094	0.000	0.40	0.0	141.1	FLOOD RISK*
3.003	SW11	33.401	-0.046	0.000	0.63	0.0	170.5	FLOOD RISK*
3.004	SW12	32.910	-0.037	0.000	0.70	0.0	189.3	FLOOD RISK*
3.005	SW13	32.413	-0.034	0.000	0.74	0.0	198.7	FLOOD RISK*
3.006	SW14	31.915	-0.032	0.000	0.76	0.0	205.4	FLOOD RISK*
3.007	SW15	31.419	-0.028	0.000	0.79	0.0	212.1	FLOOD RISK*
3.008	SW16	30.922	-0.025	0.000	0.80	0.0	215.8	FLOOD RISK*
3.009	SW17	30.422	-0.025	0.000	0.81	0.0	216.8	FLOOD RISK*
3.010	SW18	29.921	-0.026	0.000	0.80	0.0	215.9	FLOOD RISK*
3.011	SW19	29.391	-0.056	0.000	0.65	0.0	218.2	FLOOD RISK*
1.001	MH2	28.064	0.136	0.000	0.54	0.0	342.4	SURCHARGED
4.000	SW20	32.572	-0.116	0.000	0.29	0.0	84.9	FLOOD RISK*
4.001	SW21	32.026	-0.074	0.000	0.47	0.0	137.2	FLOOD RISK*
4.002	SW22	31.444	-0.055	0.000	0.58	0.0	172.2	FLOOD RISK*
4.003	SW23	30.853	-0.045	0.000	0.66	0.0	193.3	FLOOD RISK*
4.004	SW24	30.256	-0.041	0.000	0.70	0.0	205.8	FLOOD RISK*
4.005	SW25	29.660	-0.035	0.000	0.74	0.0	212.3	FLOOD RISK*
4.006	SW26	29.015	-0.106	0.000	0.39	0.0	212.4	FLOOD RISK*
5.000	SW27	35.532	-0.130	0.000	0.24	0.0	81.2	FLOOD RISK*
5.001	SW28	34.777	-0.113	0.000	0.31	0.0	121.2	FLOOD RISK*
5.002	SW29	33.765	-0.067	0.000	0.51	0.0	148.8	FLOOD RISK*
5.003	SW30	33.195	-0.052	0.000	0.62	0.0	165.7	FLOOD RISK*
5.004	SW31	32.696	-0.051	0.000	0.64	0.0	173.2	FLOOD RISK*
5.005	SW32	32.197	-0.050	0.000	0.66	0.0	177.9	FLOOD RISK*
5.006	SW33	31.703	-0.044	0.000	0.70	0.0	188.3	FLOOD RISK*
5.007	SW34	31.209	-0.038	0.000	0.74	0.0	198.3	FLOOD RISK*
5.008	SW35	30.715	-0.032	0.000	0.77	0.0	206.5	FLOOD RISK*
5.009	SW36	30.219	-0.028	0.000	0.79	0.0	212.9	FLOOD RISK*
5.010	SW37	29.722	-0.025	0.000	0.81	0.0	217.9	FLOOD RISK*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.011	SW38	29.174	-0.073	0.000	0.55	0.0	219.3	FLOOD RISK*
1.002	MH3	28.050	0.212	0.000	0.88	0.0	720.4	SURCHARGED
1.003	Pri	28.019	0.719	0.000	2.16	0.0	209.2	SURCHARGED
1.004	Inf	27.417	0.517	0.000	0.00	0.0	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	60 Winter	100	+30%	30/30 Winter	100/60 Winter			1
2.000	15 Winter	100	+30%					
2.001	15 Winter	100	+30%					
2.002	15 Winter	100	+30%					
2.003	15 Winter	100	+30%					
2.004	15 Winter	100	+30%					
2.005	15 Winter	100	+30%					
2.006	15 Winter	100	+30%					
3.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
3.001	15 Winter	100	+30%					
3.002	15 Winter	100	+30%					
3.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
3.004	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
3.005	30 Winter	100	+30%	100/15 Summer	100/15 Summer			4
3.006	30 Winter	100	+30%	100/15 Summer	100/15 Summer			5
3.007	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
3.008	60 Winter	100	+30%	100/15 Winter	100/15 Winter			5
3.009	60 Winter	100	+30%	100/15 Winter	100/15 Winter			5
3.010	60 Winter	100	+30%	100/15 Winter	100/15 Winter			6
3.011	60 Winter	100	+30%					
1.001	60 Winter	100	+30%	30/30 Winter				
4.000	15 Winter	100	+30%					
4.001	15 Winter	100	+30%					
4.002	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
4.003	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
4.004	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
4.005	30 Winter	100	+30%	100/15 Summer	100/15 Summer			4
4.006	30 Winter	100	+30%					
5.000	15 Winter	100	+30%					
5.001	15 Winter	100	+30%					
5.002	15 Winter	100	+30%					
5.003	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
5.004	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
5.005	30 Winter	100	+30%	100/15 Winter	100/15 Winter			2
5.006	30 Winter	100	+30%	100/15 Winter	100/15 Winter			2
5.007	30 Winter	100	+30%	100/15 Summer	100/15 Summer			5
5.008	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
5.009	60 Winter	100	+30%	100/15 Summer	100/15 Summer			6
5.010	60 Winter	100	+30%	100/15 Summer	100/15 Summer			6
5.011	60 Winter	100	+30%					
1.002	60 Winter	100	+30%	30/15 Winter				
1.003	60 Winter	100	+30%	30/15 Summer				
1.004	8640 Winter	100	+30%	1/180 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	28.615	0.640	15.206	0.40	0.0	42.6	FLOOD
2.000	SW1	32.694	-0.098	0.000	0.36	0.0	106.7	FLOOD RISK*
2.001	SW2	32.149	-0.042	0.000	0.62	0.0	183.0	FLOOD RISK*
2.002	SW3	31.573	-0.016	0.000	0.78	0.0	231.0	FLOOD RISK*
2.003	SW4	30.983	-0.005	0.000	0.88	0.0	260.6	FLOOD RISK*
2.004	SW5	30.384	-0.003	0.000	0.94	0.0	278.3	FLOOD RISK*
2.005	SW6	29.783	-0.003	0.000	0.96	0.0	284.6	FLOOD RISK*
2.006	SW7	29.138	-0.047	0.000	0.69	0.0	284.3	FLOOD RISK*
3.000	SW8	35.273	0.001	1.150	0.96	0.0	119.9	FLOOD
3.001	SW9	35.100	-0.065	0.000	0.53	0.0	186.3	FLOOD RISK*
3.002	SW10	34.275	-0.038	0.000	0.66	0.0	235.5	FLOOD RISK*
3.003	SW11	33.456	0.009	9.338	0.98	0.0	265.1	FLOOD
3.004	SW12	32.962	0.015	15.171	1.00	0.0	268.7	FLOOD
3.005	SW13	32.466	0.019	19.115	1.00	0.0	269.4	FLOOD
3.006	SW14	31.965	0.018	18.488	1.00	0.0	269.8	FLOOD
3.007	SW15	31.463	0.016	16.056	1.00	0.0	269.7	FLOOD
3.008	SW16	30.967	0.020	20.119	1.00	0.0	269.4	FLOOD
3.009	SW17	30.467	0.020	20.075	1.01	0.0	271.1	FLOOD
3.010	SW18	29.960	0.013	13.408	1.02	0.0	275.9	FLOOD
3.011	SW19	29.427	-0.020	0.000	0.85	0.0	287.6	FLOOD RISK*
1.001	MH2	28.635	0.707	0.000	0.81	0.0	511.7	FLOOD RISK
4.000	SW20	32.618	-0.070	0.000	0.48	0.0	140.1	FLOOD RISK*
4.001	SW21	32.086	-0.014	0.000	0.76	0.0	225.1	FLOOD RISK*
4.002	SW22	31.500	0.001	1.351	0.95	0.0	279.0	FLOOD
4.003	SW23	30.908	0.010	10.312	0.99	0.0	291.9	FLOOD
4.004	SW24	30.309	0.012	12.191	1.00	0.0	294.1	FLOOD
4.005	SW25	29.713	0.018	17.978	1.03	0.0	295.6	FLOOD
4.006	SW26	29.048	-0.073	0.000	0.55	0.0	297.2	FLOOD RISK*
5.000	SW27	35.574	-0.088	0.000	0.40	0.0	133.9	FLOOD RISK*
5.001	SW28	34.826	-0.064	0.000	0.51	0.0	201.2	FLOOD RISK*
5.002	SW29	33.827	-0.005	0.000	0.85	0.0	246.7	FLOOD RISK*
5.003	SW30	33.253	0.006	5.708	0.98	0.0	263.9	FLOOD
5.004	SW31	32.752	0.005	4.711	0.99	0.0	266.6	FLOOD
5.005	SW32	32.254	0.007	6.736	0.99	0.0	266.8	FLOOD
5.006	SW33	31.762	0.015	14.961	1.00	0.0	268.2	FLOOD
5.007	SW34	31.265	0.018	17.540	1.00	0.0	268.7	FLOOD
5.008	SW35	30.766	0.019	18.528	1.00	0.0	268.9	FLOOD
5.009	SW36	30.271	0.024	23.853	1.01	0.0	270.4	FLOOD
5.010	SW37	29.765	0.018	18.309	1.03	0.0	277.4	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.011	SW38	29.204	-0.043	0.000	0.72	0.0	284.3	FLOOD RISK*
1.002	MH3	28.608	0.770	0.000	1.31	0.0	1071.5	FLOOD RISK
1.003	Pri	28.551	1.251	0.000	2.71	0.0	262.0	FLOOD RISK
1.004	Inf	27.653	0.753	0.000	0.00	0.0	0.0	SURCHARGED

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	51.234	0.732	70.0	0.131	5.00	0.0	0.600		o	300
1.001	50.129	1.432	35.0	0.072	0.00	0.0	0.600		o	300
1.002	50.000	0.833	60.0	0.127	0.00	0.0	0.600		o	375
1.003	16.853	0.056	300.9	0.000	0.00	0.0	0.600		o	450
1.004	77.045	0.730	105.5	0.094	0.00	0.0	0.600		o	450
2.000	108.020	0.625	172.8	0.168	5.00	0.0		0.100		-4
2.001	101.850	0.879	115.9	0.172	0.00	0.0		0.100		-4
2.002	31.953	0.107	298.6	0.000	0.00	0.0	0.600		o	525
3.000	101.480	0.565	179.6	0.159	5.00	0.0		0.100		-5
3.001	101.690	0.890	114.3	0.172	0.00	0.0		0.100		-5
3.002	32.052	0.231	138.8	0.000	0.00	0.0	0.600		o	450
2.003	59.679	0.436	136.9	0.270	0.00	0.0	0.600		o	525
4.000	59.850	0.460	130.1	0.143	5.00	0.0	0.600		o	375
1.005	20.163	0.101	199.6	0.190	0.00	0.0	0.600		o	600
1.006	27.186	0.090	302.1	0.000	0.00	0.0	0.600		o	600
1.007	50.017	0.167	299.5	0.033	0.00	0.0	0.600		o	600
1.008	50.000	0.500	100.0	0.069	0.00	0.0	0.600		o	600

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	35.217	0.131	0.0	1.88	133.0
1.001	34.485	0.203	0.0	2.67	188.5
1.002	33.053	0.330	0.0	2.34	258.7
1.003	32.220	0.330	0.0	1.17	185.6
1.004	32.164	0.424	0.0	1.98	314.7
2.000	34.731	0.168	0.0	0.21	144.7
2.001	34.106	0.340	0.0	0.26	176.7
2.002	31.977	0.340	0.0	1.29	279.5
3.000	34.731	0.159	0.0	0.21	146.9
3.001	34.166	0.331	0.0	0.26	184.2
3.002	32.101	0.331	0.0	1.72	274.2
2.003	31.870	0.941	0.0	1.91	414.1
4.000	31.894	0.143	0.0	1.59	175.3
1.005	31.434	1.698	0.0	1.72	486.3
1.006	31.333	1.698	0.0	1.40	394.7
1.007	31.243	1.731	0.0	1.40	396.4
1.008	31.076	1.800	0.0	2.44	688.6

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.009	50.000	0.834	60.0	0.054	0.00	0.0	0.600		o	600
1.010	80.883	1.208	67.0	0.095	0.00	0.0	0.600		o	600
1.011	53.519	1.402	38.2	0.091	0.00	0.0	0.600		o	600
1.012	28.943	0.483	59.9	0.000	0.00	0.0	0.600		o	600
5.000	45.752	0.782	58.5	0.017	5.00	0.0	0.600		o	100
5.001	42.718	0.285	149.9	0.046	0.00	0.0	0.600		o	225
5.002	31.935	0.400	79.8	0.039	0.00	0.0	0.600		o	225
6.000	48.040	0.810	59.3	0.032	5.00	0.0	0.600		o	150
6.001	42.411	0.771	55.0	0.043	0.00	0.0	0.600		o	150
6.002	36.140	0.657	55.0	0.033	0.00	0.0	0.600		o	225
6.003	42.609	0.520	81.9	0.060	0.00	0.0	0.600		o	225
1.013	24.456	0.244	100.2	0.000	0.00	0.0	0.600		o	600
1.014	20.000	0.200	100.0	0.000	0.00	0.0	0.600		o	300
1.015	5.000	-2.000	-2.5	0.088	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.009	30.576	1.854	0.0	3.15	890.4
1.010	29.742	1.949	0.0	2.98	842.3
1.011	28.534	2.040	0.0	3.95	1116.8
1.012	27.132	2.040	0.0	3.15	890.6
5.000	28.487	0.017	0.0	1.01	7.9
5.001	27.705	0.063	0.0	1.07	42.4
5.002	27.420	0.102	0.0	1.46	58.2
6.000	29.612	0.032	0.0	1.31	23.1
6.001	28.802	0.075	0.0	1.36	24.0
6.002	28.031	0.108	0.0	1.77	70.3
6.003	27.374	0.168	0.0	1.45	57.5
1.013	26.649	2.310	0.0	2.43	687.8
1.014	26.200	2.310	0.0	1.57	111.1
1.015	26.000	2.398	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.015		28.200	28.000	26.200	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * $10m^3/ha$ Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	1	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 617600 316150 TG 17600 16150
C (1km)	-0.024
D1 (1km)	0.290
D2 (1km)	0.350
D3 (1km)	0.249
E (1km)	0.316
F (1km)	2.463
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.014

Invert Level (m) 26.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	252.4	0.800	472.9	1.600	757.7	2.400	0.0
0.200	301.5	1.000	538.0	1.800	838.9	2.600	0.0
0.400	354.6	1.200	607.0	2.000	924.2	2.800	0.0
0.600	411.7	1.400	680.5	2.200	0.0	3.000	0.0

Infiltration Basin Manhole: Inf, DS/PN: 1.015

Invert Level (m) 26.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.14400 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.14400

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	856.7	0.800	1272.9	1.600	1753.5	2.400	0.0
0.200	954.7	1.000	1387.0	1.800	1883.0	2.600	0.0
0.400	1056.7	1.200	1505.0	2.000	2018.0	2.800	0.0
0.600	1162.8	1.400	1627.3	2.200	2156.0	3.000	0.0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer				
1.001	15 Winter	1	0%	100/15 Summer				
1.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.003	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
1.004	15 Winter	1	0%	30/15 Summer				
2.000	15 Winter	1	0%					
2.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			3
2.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	1	0%					
3.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
3.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
2.003	15 Winter	1	0%	30/15 Summer				
4.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
1.005	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
1.006	15 Winter	1	0%	30/15 Summer				
1.007	15 Winter	1	0%	30/15 Summer				
1.008	15 Winter	1	0%	100/15 Summer				
1.009	15 Winter	1	0%					
1.010	15 Winter	1	0%					
1.011	15 Winter	1	0%					
1.012	15 Winter	1	0%	30/15 Winter				
5.000	15 Winter	1	0%	30/15 Summer	100/15 Winter			1
5.001	15 Winter	1	0%	100/15 Summer				
5.002	15 Winter	1	0%	100/15 Summer				
6.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
6.001	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
6.002	15 Winter	1	0%	30/15 Summer				
6.003	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
1.013	15 Winter	1	0%	30/15 Summer				
1.014	30 Winter	1	0%	1/30 Winter				
1.015	180 Winter	1	0%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	35.295	-0.222	0.000	0.15	0.0	18.5	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.001	MH02	34.564	-0.221	0.000	0.15	0.0	27.4	OK
1.002	MH03	33.160	-0.268	0.000	0.18	0.0	42.6	OK
1.003	MH04	32.386	-0.284	0.000	0.29	0.0	42.0	OK
1.004	MH05	32.293	-0.321	0.000	0.18	0.0	52.3	OK
2.000	SW01	34.838	-0.168	0.000	0.13	0.0	19.3	FLOOD RISK*
2.001	SW02	34.225	-0.156	0.000	0.20	0.0	35.3	FLOOD RISK*
2.002	MH06	32.122	-0.380	0.000	0.15	0.0	35.3	OK
3.000	SW03	34.836	-0.170	0.000	0.13	0.0	18.7	FLOOD RISK*
3.001	SW04	34.283	-0.158	0.000	0.19	0.0	34.9	FLOOD RISK*
3.002	MH07	32.215	-0.336	0.000	0.15	0.0	34.8	OK
2.003	MH08	32.042	-0.353	0.000	0.23	0.0	86.9	OK
4.000	MH09	31.982	-0.287	0.000	0.12	0.0	20.2	OK
1.005	MH10	31.719	-0.315	0.000	0.46	0.0	158.7	OK
1.006	MH11	31.633	-0.300	0.000	0.50	0.0	157.3	OK
1.007	MH12	31.529	-0.314	0.000	0.46	0.0	158.3	OK
1.008	MH13	31.288	-0.388	0.000	0.27	0.0	162.3	OK
1.009	MH14	30.762	-0.414	0.000	0.21	0.0	164.8	OK
1.010	MH15	29.932	-0.410	0.000	0.22	0.0	168.1	OK
1.011	MH16	28.702	-0.432	0.000	0.17	0.0	171.9	OK
1.012	MH17	27.334	-0.398	0.000	0.25	0.0	171.8	OK
5.000	MH18	28.526	-0.061	0.000	0.31	0.0	2.4	OK
5.001	MH19	27.773	-0.157	0.000	0.19	0.0	7.8	OK
5.002	MH20	27.493	-0.152	0.000	0.23	0.0	12.4	OK
6.000	MH21	29.658	-0.104	0.000	0.20	0.0	4.5	OK
6.001	MH22	28.870	-0.082	0.000	0.42	0.0	9.7	OK
6.002	MH23	28.100	-0.156	0.000	0.20	0.0	13.5	OK
6.003	MH24	27.470	-0.129	0.000	0.37	0.0	20.5	OK
1.013	MH25	26.905	-0.344	0.000	0.38	0.0	189.4	OK
1.014	Pri	26.504	0.004	0.000	1.05	0.0	101.2	SURCHARGED
1.015	Inf	26.220	0.120	0.000	0.00	0.0	0.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/15 Summer				
1.001	15 Winter	30	+20%	100/15 Summer				
1.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.003	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
1.004	15 Winter	30	+20%	30/15 Summer				
2.000	15 Winter	30	+20%					
2.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			3
2.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	30	+20%					
3.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
3.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
2.003	15 Winter	30	+20%	30/15 Summer				
4.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
1.005	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
1.006	15 Winter	30	+20%	30/15 Summer				
1.007	15 Winter	30	+20%	30/15 Summer				
1.008	15 Winter	30	+20%	100/15 Summer				
1.009	15 Winter	30	+20%					
1.010	15 Winter	30	+20%					
1.011	15 Winter	30	+20%					
1.012	15 Winter	30	+20%	30/15 Winter				
5.000	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
5.001	15 Winter	30	+20%	100/15 Summer				
5.002	15 Winter	30	+20%	100/15 Summer				
6.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
6.001	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
6.002	15 Winter	30	+20%	30/15 Summer				
6.003	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
1.013	15 Winter	30	+20%	30/15 Summer				
1.014	30 Winter	30	+20%	1/30 Winter				
1.015	1440 Winter	30	+20%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	35.382	-0.135	0.000	0.57	0.0	71.0	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.001	MH02	34.661	-0.124	0.000	0.62	0.0	110.6	OK
1.002	MH03	33.324	-0.104	0.000	0.76	0.0	180.9	OK
1.003	MH04	33.067	0.397	0.000	1.16	0.0	168.0	SURCHARGED
1.004	MH05	33.019	0.405	0.000	0.66	0.0	195.5	SURCHARGED
2.000	SW01	34.951	-0.055	0.000	0.53	0.0	76.6	FLOOD RISK*
2.001	SW02	34.357	-0.024	0.000	0.82	0.0	145.0	FLOOD RISK*
2.002	MH06	33.180	0.678	0.000	0.61	0.0	145.1	SURCHARGED
3.000	SW03	34.944	-0.062	0.000	0.50	0.0	73.9	FLOOD RISK*
3.001	SW04	34.411	-0.030	0.000	0.78	0.0	143.2	FLOOD RISK*
3.002	MH07	33.217	0.666	0.000	0.60	0.0	143.2	SURCHARGED
2.003	MH08	33.136	0.741	0.000	0.89	0.0	335.1	SURCHARGED
4.000	MH09	32.838	0.569	0.000	0.40	0.0	66.3	SURCHARGED
1.005	MH10	32.788	0.754	0.000	1.67	0.0	579.1	FLOOD RISK
1.006	MH11	32.453	0.520	0.000	1.82	0.0	574.8	SURCHARGED
1.007	MH12	32.120	0.277	0.000	1.67	0.0	578.2	SURCHARGED
1.008	MH13	31.549	-0.127	0.000	0.97	0.0	586.5	OK
1.009	MH14	30.970	-0.206	0.000	0.76	0.0	593.8	OK
1.010	MH15	30.143	-0.199	0.000	0.78	0.0	600.0	OK
1.011	MH16	28.878	-0.256	0.000	0.62	0.0	610.2	OK
1.012	MH17	27.793	0.061	0.000	0.88	0.0	609.8	SURCHARGED
5.000	MH18	28.751	0.164	0.000	1.06	0.0	8.3	SURCHARGED
5.001	MH19	27.867	-0.063	0.000	0.83	0.0	33.5	OK
5.002	MH20	27.621	-0.024	0.000	1.00	0.0	54.4	OK
6.000	MH21	30.065	0.303	0.000	0.65	0.0	14.6	SURCHARGED
6.001	MH22	29.772	0.820	0.000	1.33	0.0	31.1	SURCHARGED
6.002	MH23	28.377	0.121	0.000	0.67	0.0	44.2	SURCHARGED
6.003	MH24	28.084	0.485	0.000	1.29	0.0	70.4	SURCHARGED
1.013	MH25	27.424	0.175	0.000	1.36	0.0	672.2	SURCHARGED
1.014	Pri	27.248	0.748	0.000	2.19	0.0	212.3	SURCHARGED
1.015	Inf	27.033	0.933	0.000	0.00	0.0	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer				
1.001	15 Winter	100	+30%	100/15 Summer				
1.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.003	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
1.004	15 Winter	100	+30%	30/15 Summer				
2.000	15 Winter	100	+30%					
2.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
2.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	100	+30%					
3.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
3.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
2.003	15 Winter	100	+30%	30/15 Summer				
4.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
1.005	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
1.006	15 Winter	100	+30%	30/15 Summer				
1.007	15 Winter	100	+30%	30/15 Summer				
1.008	15 Winter	100	+30%	100/15 Summer				
1.009	15 Winter	100	+30%					
1.010	15 Winter	100	+30%					
1.011	15 Winter	100	+30%					
1.012	30 Winter	100	+30%	30/15 Winter				
5.000	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
5.001	15 Winter	100	+30%	100/15 Summer				
5.002	15 Winter	100	+30%	100/15 Summer				
6.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
6.001	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
6.002	15 Winter	100	+30%	30/15 Summer				
6.003	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
1.013	30 Winter	100	+30%	30/15 Summer				
1.014	30 Winter	100	+30%	1/30 Winter				
1.015	1440 Winter	100	+30%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	36.014	0.497	0.000	0.85	0.0	106.4	SURCHARGED*

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.001	MH02	35.518	0.733	0.000	0.86	0.0	152.5	SURCHARGED
1.002	MH03	34.409	0.981	1.620	0.97	0.0	231.0	FLOOD
1.003	MH04	33.638	0.968	14.183	1.40	0.0	203.8	FLOOD
1.004	MH05	33.572	0.958	0.000	0.80	0.0	236.4	FLOOD RISK
2.000	SW01	35.004	-0.002	0.000	0.87	0.0	125.1	FLOOD RISK*
2.001	SW02	34.397	0.016	16.409	0.99	0.0	175.2	FLOOD
2.002	MH06	33.520	1.018	17.531	1.12	0.0	265.1	FLOOD
3.000	SW03	35.001	-0.005	0.000	0.83	0.0	122.3	FLOOD RISK*
3.001	SW04	34.454	0.013	13.102	0.99	0.0	182.2	FLOOD
3.002	MH07	33.564	1.013	13.477	0.91	0.0	215.9	FLOOD
2.003	MH08	33.519	1.124	0.000	1.22	0.0	456.4	SURCHARGED
4.000	MH09	33.271	1.002	2.140	0.64	0.0	105.0	FLOOD
1.005	MH10	33.109	1.075	49.595	1.87	0.0	648.6	FLOOD
1.006	MH11	32.734	0.801	0.000	2.02	0.0	639.7	SURCHARGED
1.007	MH12	32.378	0.535	0.000	1.85	0.0	641.0	SURCHARGED
1.008	MH13	31.812	0.136	0.000	1.12	0.0	675.5	SURCHARGED
1.009	MH14	31.025	-0.151	0.000	0.90	0.0	703.9	OK
1.010	MH15	30.218	-0.124	0.000	0.96	0.0	745.7	OK
1.011	MH16	29.129	-0.005	0.000	0.77	0.0	756.8	OK
1.012	MH17	28.460	0.728	0.000	1.04	0.0	726.0	SURCHARGED
5.000	MH18	29.787	1.200	0.170	1.37	0.0	10.7	FLOOD
5.001	MH19	28.629	0.699	0.000	1.07	0.0	43.0	FLOOD RISK
5.002	MH20	28.303	0.658	0.000	1.34	0.0	73.0	SURCHARGED
6.000	MH21	31.062	1.300	0.412	1.00	0.0	22.4	FLOOD
6.001	MH22	30.258	1.306	5.944	1.47	0.0	34.4	FLOOD
6.002	MH23	29.127	0.871	0.000	0.88	0.0	58.7	FLOOD RISK
6.003	MH24	28.578	0.979	4.970	1.52	0.0	83.3	FLOOD
1.013	MH25	28.042	0.793	0.000	1.69	0.0	836.1	SURCHARGED
1.014	Pri	27.742	1.242	0.000	2.65	0.0	256.2	SURCHARGED
1.015	Inf	27.668	1.568	0.000	0.00	0.0	0.0	SURCHARGED

Parsons Brinckerhoff		Page 1
Manchester Technology... Oxford Road Manchester M1 7ED		
Date 19/06/2014 15:03 File System 6A.mdx	Designed by Chris.Uzzell Checked by	
Micro Drainage	Network W.12.6	

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	50.000	0.263	190.1	0.006	5.00	0.0	0.600	o	225
1.001	50.000	0.385	129.9	0.058	0.00	0.0	0.600	o	225
1.002	50.000	0.743	67.3	0.055	0.00	0.0	0.600	o	225
1.003	91.330	1.337	68.3	0.081	0.00	0.0	0.600	o	300
1.004	59.360	0.989	60.0	0.039	0.00	0.0	0.600	o	300
1.005	18.464	0.169	109.3	0.064	0.00	0.0	0.600	o	300
2.000	49.989	0.573	87.2	0.004	5.00	0.0	0.600	o	225
2.001	53.003	0.753	70.4	0.039	0.00	0.0	0.600	o	225
2.002	24.565	0.339	72.5	0.076	0.00	0.0	0.600	o	225
2.003	19.755	0.100	197.6	0.057	0.00	0.0	0.600	o	300
3.000	34.431	0.174	197.9	0.019	5.00	0.0	0.600	o	225
3.001	37.525	0.250	150.1	0.024	0.00	0.0	0.600	o	225
3.002	16.427	0.170	96.6	0.037	0.00	0.0	0.600	o	300
1.006	25.367	0.274	92.6	0.000	0.00	0.0	0.600	o	450
1.007	18.000	0.200	90.0	0.000	0.00	0.0	0.600	o	300
1.008	5.000	-1.600	-3.1	0.097	0.00	0.0	0.600	o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	35.735	0.006	0.0	0.94	37.6
1.001	35.472	0.064	0.0	1.15	45.6
1.002	35.087	0.119	0.0	1.60	63.5
1.003	34.344	0.200	0.0	1.90	134.7
1.004	33.007	0.239	0.0	2.03	143.7
1.005	32.018	0.303	0.0	1.50	106.3
2.000	33.439	0.004	0.0	1.40	55.7
2.001	32.866	0.043	0.0	1.56	62.1
2.002	32.113	0.119	0.0	1.54	61.2
2.003	31.774	0.176	0.0	1.12	78.8
3.000	32.443	0.019	0.0	0.93	36.8
3.001	32.269	0.043	0.0	1.06	42.3
3.002	32.019	0.080	0.0	1.60	113.1
1.006	31.674	0.559	0.0	2.11	336.1
1.007	31.100	0.559	0.0	1.66	117.2
1.008	30.900	0.656	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008		33.000	32.500	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	1	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 620650 315200 TG 20650 15200
C (1km)	-0.023
D1 (1km)	0.282
D2 (1km)	0.344
D3 (1km)	0.249
E (1km)	0.310
F (1km)	2.485
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.007

Invert Level (m) 31.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	17.0	1.400	314.6	2.800	0.0	4.200	0.0
0.200	47.0	1.600	373.2	3.000	0.0	4.400	0.0
0.400	81.9	1.800	0.0	3.200	0.0	4.600	0.0
0.600	120.4	2.000	0.0	3.400	0.0	4.800	0.0
0.800	162.9	2.200	0.0	3.600	0.0	5.000	0.0
1.000	209.5	2.400	0.0	3.800	0.0		
1.200	260.0	2.600	0.0	4.000	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 1.008

Invert Level (m) 30.900 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.09000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.09000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	358.3	1.400	962.7	2.800	0.0	4.200	0.0
0.200	431.8	1.600	1065.4	3.000	0.0	4.400	0.0
0.400	510.0	1.800	1172.1	3.200	0.0	4.600	0.0
0.600	592.5	2.000	0.0	3.400	0.0	4.800	0.0
0.800	678.9	2.200	0.0	3.600	0.0	5.000	0.0
1.000	769.5	2.400	0.0	3.800	0.0		
1.200	864.0	2.600	0.0	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer				
1.001	15 Winter	1	0%	100/15 Summer				
1.002	15 Winter	1	0%	30/15 Summer	100/15 Winter			1
1.003	15 Winter	1	0%	100/15 Summer				
1.004	15 Winter	1	0%	30/15 Summer				
1.005	15 Winter	1	0%	30/15 Summer				
2.000	15 Winter	1	0%	100/15 Winter				
2.001	15 Winter	1	0%	100/15 Summer				
2.002	15 Winter	1	0%	30/15 Summer				
2.003	15 Winter	1	0%	30/15 Summer				
3.000	15 Winter	1	0%					
3.001	15 Winter	1	0%	100/15 Summer				
3.002	15 Winter	1	0%	100/15 Summer				
1.006	15 Winter	1	0%	100/15 Summer				
1.007	15 Winter	1	0%	30/15 Summer				
1.008	720 Winter	1	0%	1/15 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	35.759	-0.201	0.000	0.02	0.0	0.8	OK
1.001	MH2	35.537	-0.160	0.000	0.18	0.0	7.8	OK
1.002	MH3	35.161	-0.151	0.000	0.23	0.0	14.2	OK
1.003	MH4	34.431	-0.213	0.000	0.18	0.0	23.4	OK
1.004	MH5	33.099	-0.208	0.000	0.20	0.0	27.7	OK
1.005	MH6	32.146	-0.172	0.000	0.38	0.0	34.7	OK
2.000	MH7	33.451	-0.213	0.000	0.01	0.0	0.6	OK
2.001	MH8	32.912	-0.179	0.000	0.09	0.0	5.3	OK
2.002	MH9	32.191	-0.147	0.000	0.26	0.0	14.6	OK
2.003	MH10	31.889	-0.185	0.000	0.31	0.0	21.5	OK
3.000	MH11	32.485	-0.183	0.000	0.08	0.0	2.7	OK
3.001	MH12	32.325	-0.169	0.000	0.14	0.0	5.5	OK
3.002	MH13	32.084	-0.235	0.000	0.10	0.0	10.0	OK
1.006	MH14	31.821	-0.303	0.000	0.23	0.0	65.7	OK
1.007	Pri	31.273	-0.127	0.000	0.63	0.0	63.2	OK
1.008	Inf	31.083	0.083	0.000	0.00	0.0	0.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/15 Summer				
1.001	15 Winter	30	+20%	100/15 Summer				
1.002	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
1.003	15 Winter	30	+20%	100/15 Summer				
1.004	15 Winter	30	+20%	30/15 Summer				
1.005	15 Winter	30	+20%	30/15 Summer				
2.000	15 Winter	30	+20%	100/15 Winter				
2.001	15 Winter	30	+20%	100/15 Summer				
2.002	15 Winter	30	+20%	30/15 Summer				
2.003	15 Winter	30	+20%	30/15 Summer				
3.000	15 Winter	30	+20%					
3.001	15 Winter	30	+20%	100/15 Summer				
3.002	15 Winter	30	+20%	100/15 Summer				
1.006	15 Winter	30	+20%	100/15 Summer				
1.007	1440 Winter	30	+20%	30/15 Summer				
1.008	1440 Winter	30	+20%	1/15 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	35.781	-0.179	0.000	0.09	0.0	3.2	OK
1.001	MH2	35.633	-0.064	0.000	0.82	0.0	35.9	OK
1.002	MH3	35.359	0.047	0.000	1.03	0.0	62.5	SURCHARGED
1.003	MH4	34.555	-0.089	0.000	0.80	0.0	104.4	OK
1.004	MH5	33.350	0.043	0.000	0.88	0.0	119.8	SURCHARGED
1.005	MH6	32.585	0.267	0.000	1.61	0.0	148.0	SURCHARGED
2.000	MH7	33.469	-0.195	0.000	0.04	0.0	2.2	OK
2.001	MH8	32.968	-0.123	0.000	0.42	0.0	24.8	OK
2.002	MH9	32.638	0.300	0.000	1.11	0.0	62.6	SURCHARGED
2.003	MH10	32.220	0.146	0.000	1.33	0.0	91.5	SURCHARGED
3.000	MH11	32.528	-0.140	0.000	0.30	0.0	10.3	OK
3.001	MH12	32.396	-0.098	0.000	0.59	0.0	23.6	OK
3.002	MH13	32.164	-0.155	0.000	0.46	0.0	43.8	OK
1.006	MH14	32.042	-0.082	0.000	0.99	0.0	280.4	OK
1.007	Pri	31.798	0.398	0.000	0.20	0.0	20.3	SURCHARGED
1.008	Inf	31.789	0.789	0.000	0.00	0.0	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer				
1.001	15 Winter	100	+30%	100/15 Summer				
1.002	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
1.003	15 Winter	100	+30%	100/15 Summer				
1.004	15 Winter	100	+30%	30/15 Summer				
1.005	15 Winter	100	+30%	30/15 Summer				
2.000	15 Winter	100	+30%	100/15 Winter				
2.001	15 Winter	100	+30%	100/15 Summer				
2.002	15 Winter	100	+30%	30/15 Summer				
2.003	15 Winter	100	+30%	30/15 Summer				
3.000	15 Winter	100	+30%					
3.001	15 Winter	100	+30%	100/15 Summer				
3.002	15 Winter	100	+30%	100/15 Summer				
1.006	15 Winter	100	+30%	100/15 Summer				
1.007	1440 Winter	100	+30%	30/15 Summer				
1.008	1440 Winter	100	+30%	1/15 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	36.935	0.975	0.000	0.23	0.0	8.3	FLOOD RISK
1.001	MH2	36.933	1.236	0.000	0.91	0.0	39.9	FLOOD RISK
1.002	MH3	36.612	1.300	0.051	1.24	0.0	75.3	FLOOD
1.003	MH4	35.502	0.858	0.000	0.99	0.0	128.5	SURCHARGED
1.004	MH5	34.170	0.863	0.000	1.08	0.0	147.9	SURCHARGED
1.005	MH6	33.028	0.710	0.000	2.02	0.0	185.2	FLOOD RISK
2.000	MH7	33.758	0.094	0.000	0.09	0.0	4.7	SURCHARGED
2.001	MH8	33.753	0.662	0.000	0.61	0.0	36.7	SURCHARGED
2.002	MH9	33.548	1.210	0.000	1.53	0.0	86.3	FLOOD RISK
2.003	MH10	32.710	0.636	0.000	1.96	0.0	134.2	SURCHARGED
3.000	MH11	32.613	-0.055	0.000	0.48	0.0	16.5	OK
3.001	MH12	32.570	0.076	0.000	0.83	0.0	33.1	SURCHARGED
3.002	MH13	32.397	0.078	0.000	0.64	0.0	61.8	SURCHARGED
1.006	MH14	32.326	0.202	0.000	1.33	0.0	375.7	SURCHARGED
1.007	Pri	32.248	0.848	0.000	0.30	0.0	30.4	SURCHARGED
1.008	Inf	32.235	1.235	0.000	0.00	0.0	0.0	SURCHARGED

Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \/ open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m^2)
-4		4501	275			0.590	0.681
-5		4650	275			0.595	0.701
-10		4650	275			0.595	0.701

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * $10m^3$/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 625800 314350 TG 25800 14350
C (1km)	-0.024
D1 (1km)	0.278
D2 (1km)	0.361
D3 (1km)	0.254
E (1km)	0.312
F (1km)	2.487
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.011

Invert Level (m) 22.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	30.2	1.400	474.0	2.800	1116.0	4.200	0.0
0.200	81.6	1.600	554.0	3.000	1224.0	4.400	0.0
0.400	137.1	1.800	637.0	3.200	1335.0	4.600	0.0
0.600	196.5	2.000	725.0	3.400	1451.0	4.800	0.0
0.800	260.0	2.200	817.0	3.600	1571.0	5.000	0.0
1.000	327.0	2.400	912.0	3.800	0.0		
1.200	399.0	2.600	1012.0	4.000	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 1.012

Invert Level (m) 21.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.02840 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.02840

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	310.0	1.000	779.0	2.000	1406.0	3.000	2139.0
0.200	387.0	1.200	895.0	2.200	1544.0	3.200	2297.0
0.400	472.0	1.400	1016.0	2.400	1687.0	3.400	2460.0
0.600	556.0	1.600	1141.0	2.600	1833.0	3.600	2647.0
0.800	668.0	1.800	1271.0	2.800	1984.0	3.800	2797.0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%					
1.001	15 Winter	1	0%					
1.002	15 Winter	1	0%					
1.003	15 Winter	1	0%					
1.004	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
2.000	15 Winter	1	0%					
1.005	15 Winter	1	0%	30/15 Summer				
1.006	15 Winter	1	0%					
1.007	15 Winter	1	0%	100/15 Summer				
1.008	15 Winter	1	0%	30/15 Summer	100/15 Summer			6
3.000	15 Winter	1	0%					
3.001	15 Winter	1	0%					
3.002	15 Winter	1	0%					
1.009	15 Winter	1	0%	10/15 Summer	30/15 Summer			17
4.000	15 Winter	1	0%					
4.001	15 Winter	1	0%					
4.002	15 Winter	1	0%					
4.003	15 Winter	1	0%	100/15 Summer	100/15 Winter			1
4.004	15 Winter	1	0%	100/15 Summer				
5.000	15 Winter	1	0%	30/15 Summer				2
5.001	15 Winter	1	0%	30/15 Summer				
4.005	15 Winter	1	0%	100/15 Summer				
4.006	15 Winter	1	0%	100/15 Summer	100/15 Winter			1
4.007	15 Winter	1	0%	100/15 Summer	100/15 Winter			1
4.008	15 Winter	1	0%	100/15 Summer				
4.009	15 Winter	1	0%	30/15 Winter	100/15 Summer			4
4.010	15 Winter	1	0%	30/15 Summer	100/15 Summer			6
6.000	15 Winter	1	0%					
6.001	15 Winter	1	0%					
6.002	15 Winter	1	0%					
1.010	2880 Winter	1	0%	10/15 Summer	100/15 Summer			13
7.000	15 Winter	1	0%	100/15 Summer				
7.001	15 Winter	1	0%	30/15 Summer				
7.002	15 Winter	1	0%	100/15 Summer				
8.000	15 Winter	1	0%					
9.000	15 Winter	1	0%	30/15 Summer				
9.001	15 Winter	1	0%	30/15 Summer				

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
7.003	15 Winter	1	0%	30/15 Summer				
7.004	15 Winter	1	0%	100/15 Summer				
7.005	15 Winter	1	0%	100/15 Summer				
7.006	15 Winter	1	0%	30/15 Summer				1
7.007	15 Winter	1	0%	30/15 Summer				
10.000	15 Winter	1	0%					
10.001	15 Winter	1	0%					
10.002	15 Winter	1	0%	30/15 Winter				
10.003	15 Winter	1	0%	30/15 Summer				
7.008	15 Winter	1	0%	30/15 Summer				
1.011	2880 Winter	1	0%					
1.012	2880 Winter	1	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	33.572	-0.172	0.000	0.13	0.0	14.8	FLOOD RISK*
1.001	SW02	33.327	-0.179	0.000	0.12	0.0	23.2	FLOOD RISK*
1.002	SW03	32.636	-0.178	0.000	0.12	0.0	31.9	FLOOD RISK*
1.003	SW04	31.008	-0.177	0.000	0.13	0.0	39.4	FLOOD RISK*
1.004	SW05	29.314	-0.166	0.000	0.17	0.0	54.1	FLOOD RISK*
2.000	SW06	28.943	-0.210	0.000	0.07	0.0	18.8	FLOOD RISK*
1.005	MH01	26.603	-0.252	0.000	0.40	0.0	67.6	OK
1.006	MH02	26.442	-0.406	0.000	0.12	0.0	67.3	OK
1.007	MH03	24.999	-0.396	0.000	0.13	0.0	76.0	OK
1.008	MH04	23.548	-0.441	0.000	0.16	0.0	84.7	OK
3.000	SW07	27.918	-0.197	0.000	0.08	0.0	22.6	FLOOD RISK*
3.001	SW08	27.009	-0.183	0.000	0.11	0.0	32.5	FLOOD RISK*
3.002	SW09	25.518	-0.174	0.000	0.15	0.0	41.9	FLOOD RISK*
1.009	MH05	23.187	-0.386	0.000	0.28	0.0	130.5	OK
4.000	SW10	33.598	-0.176	0.000	0.12	0.0	14.7	FLOOD RISK*
4.001	SW11	33.328	-0.178	0.000	0.12	0.0	24.6	FLOOD RISK*
4.002	SW12	32.577	-0.177	0.000	0.13	0.0	42.2	FLOOD RISK*
4.003	MH06	29.624	-0.308	0.000	0.22	0.0	41.9	OK
4.004	MH07	29.476	-0.328	0.000	0.16	0.0	41.8	OK
5.000	MH08	30.475	-0.197	0.000	0.24	0.0	23.8	OK
5.001	MH09	29.813	-0.166	0.000	0.41	0.0	33.1	OK
4.005	BDMH10	29.082	-0.314	0.000	0.20	0.0	70.8	OK
4.006	MH11	28.673	-0.316	0.000	0.19	0.0	70.2	OK
4.007	MH12	27.679	-0.311	0.000	0.21	0.0	75.7	OK
4.008	MH13	26.716	-0.310	0.000	0.21	0.0	82.1	OK
4.009	MH14	25.203	-0.301	0.000	0.24	0.0	91.5	OK
4.010	MH15	23.827	-0.330	0.000	0.30	0.0	101.5	OK
6.000	SW13	27.681	-0.228	0.000	0.03	0.0	10.2	FLOOD RISK*
6.001	SW14	26.916	-0.202	0.000	0.07	0.0	21.6	FLOOD RISK*
6.002	SW15	25.505	-0.187	0.000	0.11	0.0	31.6	FLOOD RISK*
1.010	MH16	23.171	-0.181	0.000	0.03	0.0	15.7	OK
7.000	MH01	32.378	-0.173	0.000	0.12	0.0	6.2	OK
7.001	MH02	32.029	-0.147	0.000	0.26	0.0	11.3	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
7.002	MH03	31.874	-0.219	0.000	0.16	0.0	14.9	OK
8.000	MH04	31.834	-0.241	0.000	0.09	0.0	8.8	OK
9.000	MH05	30.958	-0.179	0.000	0.33	0.0	25.9	OK
9.001	MH06	30.856	-0.240	0.000	0.28	0.0	33.2	OK
7.003	MH07	30.770	-0.290	0.000	0.27	0.0	61.2	OK
7.004	MH08	30.558	-0.325	0.000	0.17	0.0	68.7	OK
7.005	MH09	29.235	-0.318	0.000	0.19	0.0	82.7	OK
7.006	MH10	27.246	-0.307	0.000	0.22	0.0	89.0	OK
7.007	MH11	26.329	-0.261	0.000	0.36	0.0	95.4	OK
10.000	SW01	28.422	-0.186	0.000	0.10	0.0	23.2	FLOOD RISK*
10.001	13	27.431	-0.207	0.000	0.07	0.0	31.3	FLOOD RISK*
10.002	MH12	25.261	-0.327	0.000	0.16	0.0	30.7	OK
10.003	MH13	25.061	-0.305	0.000	0.23	0.0	42.6	OK
7.008	MH14	25.000	-0.328	0.000	0.30	0.0	136.2	OK
1.011	Pri	23.170	0.495	0.000	0.11	0.0	17.8	SURCHARGED
1.012	Inf	23.168	0.968	0.000	0.00	0.0	0.0	SURCHARGED

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	10	0%					
1.001	15 Winter	10	0%					
1.002	15 Winter	10	0%					
1.003	15 Winter	10	0%					
1.004	15 Winter	10	0%	100/15 Summer	100/15 Summer			2
2.000	15 Winter	10	0%					
1.005	15 Winter	10	0%	30/15 Summer				
1.006	15 Winter	10	0%					
1.007	15 Winter	10	0%	100/15 Summer				
1.008	15 Winter	10	0%	30/15 Summer	100/15 Summer			6
3.000	15 Winter	10	0%					
3.001	15 Winter	10	0%					
3.002	15 Winter	10	0%					
1.009	15 Winter	10	0%	10/15 Summer	30/15 Summer			17
4.000	15 Winter	10	0%					
4.001	15 Winter	10	0%					
4.002	15 Winter	10	0%					
4.003	15 Winter	10	0%	100/15 Summer	100/15 Winter			1
4.004	15 Winter	10	0%	100/15 Summer				
5.000	15 Winter	10	0%	30/15 Summer				2
5.001	15 Winter	10	0%	30/15 Summer				
4.005	15 Winter	10	0%	100/15 Summer				
4.006	15 Winter	10	0%	100/15 Summer	100/15 Winter			1
4.007	15 Winter	10	0%	100/15 Summer	100/15 Winter			1
4.008	15 Winter	10	0%	100/15 Summer				
4.009	15 Winter	10	0%	30/15 Winter	100/15 Summer			4
4.010	15 Winter	10	0%	30/15 Summer	100/15 Summer			6
6.000	15 Winter	10	0%					
6.001	15 Winter	10	0%					
6.002	15 Winter	10	0%					
1.010	15 Winter	10	0%	10/15 Summer	100/15 Summer			13
7.000	15 Winter	10	0%	100/15 Summer				
7.001	15 Winter	10	0%	30/15 Summer				
7.002	15 Winter	10	0%	100/15 Summer				
8.000	15 Winter	10	0%					
9.000	15 Winter	10	0%	30/15 Summer				
9.001	15 Winter	10	0%	30/15 Summer				

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
7.003	15 Winter	10	0%	30/15 Summer				
7.004	15 Winter	10	0%	100/15 Summer				
7.005	15 Winter	10	0%	100/15 Summer				
7.006	15 Winter	10	0%	30/15 Summer				1
7.007	15 Winter	10	0%	30/15 Summer				
10.000	15 Winter	10	0%					
10.001	15 Winter	10	0%					
10.002	15 Winter	10	0%	30/15 Winter				
10.003	15 Winter	10	0%	30/15 Summer				
7.008	15 Winter	10	0%	30/15 Summer				
1.011	2880 Winter	10	0%					
1.012	2880 Winter	10	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	33.625	-0.119	0.000	0.28	0.0	32.4	FLOOD RISK*
1.001	SW02	33.373	-0.133	0.000	0.24	0.0	48.4	FLOOD RISK*
1.002	SW03	32.688	-0.126	0.000	0.25	0.0	67.5	FLOOD RISK*
1.003	SW04	31.064	-0.121	0.000	0.28	0.0	87.4	FLOOD RISK*
1.004	SW05	29.382	-0.098	0.000	0.42	0.0	133.7	FLOOD RISK*
2.000	SW06	28.978	-0.175	0.000	0.14	0.0	40.6	FLOOD RISK*
1.005	MH01	26.855	0.000	0.000	1.02	0.0	172.1	OK
1.006	MH02	26.520	-0.328	0.000	0.30	0.0	172.1	OK
1.007	MH03	25.078	-0.317	0.000	0.32	0.0	183.0	OK
1.008	MH04	23.795	-0.194	0.000	0.35	0.0	187.6	OK
3.000	SW07	27.957	-0.158	0.000	0.17	0.0	49.0	FLOOD RISK*
3.001	SW08	27.060	-0.132	0.000	0.24	0.0	73.3	FLOOD RISK*
3.002	SW09	25.572	-0.120	0.000	0.33	0.0	93.7	FLOOD RISK*
1.009	MH05	23.755	0.182	0.000	0.54	0.0	256.6	SURCHARGED
4.000	SW10	33.649	-0.125	0.000	0.25	0.0	32.2	FLOOD RISK*
4.001	SW11	33.374	-0.132	0.000	0.24	0.0	52.0	FLOOD RISK*
4.002	SW12	32.632	-0.122	0.000	0.31	0.0	98.1	FLOOD RISK*
4.003	MH06	29.710	-0.222	0.000	0.51	0.0	98.2	OK
4.004	MH07	29.547	-0.256	0.000	0.38	0.0	96.6	OK
5.000	MH08	30.532	-0.140	0.000	0.52	0.0	51.5	OK
5.001	MH09	29.908	-0.071	0.000	0.92	0.0	73.9	OK
4.005	BDMH10	29.163	-0.234	0.000	0.46	0.0	165.3	OK
4.006	MH11	28.752	-0.237	0.000	0.45	0.0	164.5	OK
4.007	MH12	27.759	-0.231	0.000	0.48	0.0	173.0	OK
4.008	MH13	26.795	-0.231	0.000	0.47	0.0	184.3	OK
4.009	MH14	25.291	-0.213	0.000	0.53	0.0	205.9	OK
4.010	MH15	23.952	-0.205	0.000	0.68	0.0	231.6	OK
6.000	SW13	27.709	-0.200	0.000	0.07	0.0	22.1	FLOOD RISK*
6.001	SW14	26.961	-0.157	0.000	0.16	0.0	51.1	FLOOD RISK*
6.002	SW15	25.558	-0.134	0.000	0.26	0.0	76.5	FLOOD RISK*
1.010	MH16	23.704	0.352	0.000	0.89	0.0	516.3	SURCHARGED
7.000	MH01	32.405	-0.146	0.000	0.26	0.0	13.5	OK
7.001	MH02	32.081	-0.095	0.000	0.61	0.0	26.6	OK

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
7.002	MH03	31.926	-0.167	0.000	0.40	0.0	36.0	OK
8.000	MH04	31.862	-0.213	0.000	0.18	0.0	19.1	OK
9.000	MH05	31.029	-0.108	0.000	0.72	0.0	56.0	OK
9.001	MH06	30.943	-0.153	0.000	0.62	0.0	74.2	OK
7.003	MH07	30.873	-0.187	0.000	0.64	0.0	141.9	OK
7.004	MH08	30.632	-0.251	0.000	0.40	0.0	162.1	OK
7.005	MH09	29.316	-0.237	0.000	0.44	0.0	195.5	OK
7.006	MH10	27.335	-0.218	0.000	0.52	0.0	209.6	OK
7.007	MH11	26.469	-0.121	0.000	0.87	0.0	228.0	OK
10.000	SW01	28.468	-0.140	0.000	0.22	0.0	50.6	FLOOD RISK*
10.001	13	27.469	-0.169	0.000	0.15	0.0	69.4	FLOOD RISK*
10.002	MH12	25.328	-0.260	0.000	0.36	0.0	68.1	OK
10.003	MH13	25.168	-0.198	0.000	0.49	0.0	93.2	OK
7.008	MH14	25.128	-0.200	0.000	0.70	0.0	315.0	OK
1.011	Pri	23.674	0.999	0.000	0.17	0.0	27.4	SURCHARGED
1.012	Inf	23.670	1.470	0.000	0.00	0.0	0.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%					
1.001	15 Winter	30	+20%					
1.002	15 Winter	30	+20%					
1.003	15 Winter	30	+20%					
1.004	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
2.000	15 Winter	30	+20%					
1.005	15 Winter	30	+20%	30/15 Summer				
1.006	15 Winter	30	+20%					
1.007	15 Winter	30	+20%	100/15 Summer				
1.008	15 Winter	30	+20%	30/15 Summer	100/15 Summer			6
3.000	15 Winter	30	+20%					
3.001	15 Winter	30	+20%					
3.002	15 Winter	30	+20%					
1.009	15 Winter	30	+20%	10/15 Summer	30/15 Summer			17
4.000	15 Winter	30	+20%					
4.001	15 Winter	30	+20%					
4.002	15 Winter	30	+20%					
4.003	15 Winter	30	+20%	100/15 Summer	100/15 Winter			1
4.004	15 Winter	30	+20%	100/15 Summer				
5.000	15 Winter	30	+20%	30/15 Summer				2
5.001	15 Winter	30	+20%	30/15 Summer				
4.005	15 Winter	30	+20%	100/15 Summer				
4.006	15 Winter	30	+20%	100/15 Summer	100/15 Winter			1
4.007	15 Winter	30	+20%	100/15 Summer	100/15 Winter			1
4.008	15 Winter	30	+20%	100/15 Summer				
4.009	15 Winter	30	+20%	30/15 Winter	100/15 Summer			4
4.010	15 Winter	30	+20%	30/15 Summer	100/15 Summer			6
6.000	15 Winter	30	+20%					
6.001	15 Winter	30	+20%					
6.002	15 Winter	30	+20%					
1.010	15 Winter	30	+20%	10/15 Summer	100/15 Summer			13
7.000	15 Winter	30	+20%	100/15 Summer				
7.001	15 Winter	30	+20%	30/15 Summer				
7.002	15 Winter	30	+20%	100/15 Summer				
8.000	15 Winter	30	+20%					
9.000	15 Winter	30	+20%	30/15 Summer				
9.001	15 Winter	30	+20%	30/15 Summer				

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
7.003	15 Winter	30	+20%	30/15 Summer				
7.004	15 Winter	30	+20%	100/15 Summer				
7.005	15 Winter	30	+20%	100/15 Summer				
7.006	15 Winter	30	+20%	30/15 Summer				1
7.007	15 Winter	30	+20%	30/15 Summer				
10.000	15 Winter	30	+20%					
10.001	15 Winter	30	+20%					
10.002	15 Winter	30	+20%	30/15 Winter				
10.003	15 Winter	30	+20%	30/15 Summer				
7.008	15 Winter	30	+20%	30/15 Summer				
1.011	2880 Winter	30	+20%					
1.012	2880 Winter	30	+20%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	33.679	-0.065	0.000	0.50	0.0	57.9	FLOOD RISK*
1.001	SW02	33.425	-0.081	0.000	0.45	0.0	88.1	FLOOD RISK*
1.002	SW03	32.739	-0.075	0.000	0.45	0.0	121.6	FLOOD RISK*
1.003	SW04	31.118	-0.067	0.000	0.51	0.0	157.2	FLOOD RISK*
1.004	SW05	29.447	-0.033	0.000	0.75	0.0	239.2	FLOOD RISK*
2.000	SW06	29.015	-0.138	0.000	0.25	0.0	72.0	FLOOD RISK*
1.005	MH01	27.059	0.204	0.000	1.83	0.0	309.0	SURCHARGED
1.006	MH02	26.598	-0.250	0.000	0.54	0.0	307.5	OK
1.007	MH03	25.187	-0.208	0.000	0.58	0.0	325.1	OK
1.008	MH04	24.725	0.736	0.000	0.62	0.0	336.7	FLOOD RISK
3.000	SW07	27.998	-0.117	0.000	0.31	0.0	86.5	FLOOD RISK*
3.001	SW08	27.110	-0.082	0.000	0.43	0.0	130.5	FLOOD RISK*
3.002	SW09	25.627	-0.065	0.000	0.58	0.0	167.0	FLOOD RISK*
1.009	MH05	24.604	1.031	27.609	0.87	0.0	408.0	FLOOD
4.000	SW10	33.700	-0.074	0.000	0.45	0.0	57.5	FLOOD RISK*
4.001	SW11	33.426	-0.080	0.000	0.44	0.0	95.0	FLOOD RISK*
4.002	SW12	32.685	-0.069	0.000	0.56	0.0	175.4	FLOOD RISK*
4.003	MH06	29.818	-0.114	0.000	0.91	0.0	175.3	OK
4.004	MH07	29.630	-0.174	0.000	0.68	0.0	173.1	OK
5.000	MH08	30.856	0.184	0.000	0.86	0.0	84.4	SURCHARGED*
5.001	MH09	30.320	0.341	0.000	1.43	0.0	114.5	SURCHARGED*
4.005	BDMH10	29.263	-0.134	0.000	0.83	0.0	299.7	OK
4.006	MH11	28.852	-0.138	0.000	0.82	0.0	298.6	OK
4.007	MH12	27.860	-0.130	0.000	0.85	0.0	307.8	OK
4.008	MH13	26.885	-0.141	0.000	0.80	0.0	317.7	OK
4.009	MH14	25.772	0.268	0.000	0.87	0.0	338.0	SURCHARGED
4.010	MH15	24.805	0.649	0.000	1.04	0.0	356.9	FLOOD RISK
6.000	SW13	27.735	-0.174	0.000	0.13	0.0	39.3	FLOOD RISK*
6.001	SW14	27.003	-0.115	0.000	0.29	0.0	90.4	FLOOD RISK*
6.002	SW15	25.605	-0.087	0.000	0.46	0.0	133.5	FLOOD RISK*
1.010	MH16	24.522	1.170	0.000	1.43	0.0	831.7	FLOOD RISK
7.000	MH01	32.435	-0.116	0.000	0.46	0.0	23.9	OK
7.001	MH02	32.195	0.019	0.000	1.07	0.0	46.4	SURCHARGED*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
7.002	MH03	31.978	-0.115	0.000	0.68	0.0	61.9	OK
8.000	MH04	31.894	-0.181	0.000	0.33	0.0	33.7	OK
9.000	MH05	31.380	0.243	0.000	1.24	0.0	96.0	SURCHARGED*
9.001	MH06	31.196	0.100	0.000	1.05	0.0	126.1	SURCHARGED*
7.003	MH07	31.070	0.010	0.000	1.08	0.0	240.4	SURCHARGED*
7.004	MH08	30.706	-0.177	0.000	0.68	0.0	274.2	OK
7.005	MH09	29.401	-0.152	0.000	0.75	0.0	332.7	OK
7.006	MH10	27.614	0.061	0.000	0.86	0.0	351.0	SURCHARGED*
7.007	MH11	26.897	0.307	0.000	1.43	0.0	373.2	SURCHARGED*
10.000	SW01	28.512	-0.096	0.000	0.38	0.0	89.5	FLOOD RISK*
10.001	13	27.508	-0.130	0.000	0.28	0.0	123.9	FLOOD RISK*
10.002	MH12	25.704	0.116	0.000	0.64	0.0	120.0	SURCHARGED
10.003	MH13	25.608	0.242	0.000	0.90	0.0	170.9	SURCHARGED*
7.008	MH14	25.539	0.211	0.000	1.16	0.0	523.3	SURCHARGED*
1.011	Pri	24.211	1.536	0.000	0.24	0.0	40.3	SURCHARGED
1.012	Inf	24.207	2.007	0.000	0.00	0.0	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%					
1.001	15 Winter	100	+30%					
1.002	15 Winter	100	+30%					
1.003	15 Winter	100	+30%					
1.004	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
2.000	15 Winter	100	+30%					
1.005	15 Winter	100	+30%	30/15 Summer				
1.006	15 Winter	100	+30%					
1.007	15 Winter	100	+30%	100/15 Summer				
1.008	15 Winter	100	+30%	30/15 Summer	100/15 Summer			6
3.000	15 Winter	100	+30%					
3.001	15 Winter	100	+30%					
3.002	15 Winter	100	+30%					
1.009	30 Winter	100	+30%	10/15 Summer	30/15 Summer			17
4.000	15 Winter	100	+30%					
4.001	15 Winter	100	+30%					
4.002	15 Winter	100	+30%					
4.003	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
4.004	15 Winter	100	+30%	100/15 Summer				
5.000	15 Winter	100	+30%	30/15 Summer				2
5.001	15 Winter	100	+30%	30/15 Summer				
4.005	15 Winter	100	+30%	100/15 Summer				
4.006	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
4.007	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
4.008	15 Winter	100	+30%	100/15 Summer				
4.009	15 Winter	100	+30%	30/15 Winter	100/15 Summer			4
4.010	30 Winter	100	+30%	30/15 Summer	100/15 Summer			6
6.000	15 Winter	100	+30%					
6.001	15 Winter	100	+30%					
6.002	15 Winter	100	+30%					
1.010	30 Winter	100	+30%	10/15 Summer	100/15 Summer			13
7.000	15 Winter	100	+30%	100/15 Summer				
7.001	15 Winter	100	+30%	30/15 Summer				
7.002	15 Winter	100	+30%	100/15 Summer				
8.000	15 Winter	100	+30%					
9.000	15 Winter	100	+30%	30/15 Summer				
9.001	15 Winter	100	+30%	30/15 Summer				

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
7.003	15 Winter	100	+30%	30/15 Summer				
7.004	15 Winter	100	+30%	100/15 Summer				
7.005	15 Winter	100	+30%	100/15 Summer				
7.006	15 Winter	100	+30%	30/15 Summer				1
7.007	15 Winter	100	+30%	30/15 Summer				
10.000	15 Winter	100	+30%					
10.001	15 Winter	100	+30%					
10.002	15 Winter	100	+30%	30/15 Winter				
10.003	15 Winter	100	+30%	30/15 Summer				
7.008	15 Winter	100	+30%	30/15 Summer				
1.011	2880 Winter	100	+30%					
1.012	2880 Winter	100	+30%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	33.739	-0.005	0.000	0.82	0.0	95.4	FLOOD RISK*
1.001	SW02	33.476	-0.030	0.000	0.71	0.0	140.9	FLOOD RISK*
1.002	SW03	32.797	-0.017	0.000	0.73	0.0	197.0	FLOOD RISK*
1.003	SW04	31.178	-0.007	0.000	0.82	0.0	255.9	FLOOD RISK*
1.004	SW05	29.496	0.016	15.746	1.01	0.0	321.5	FLOOD
2.000	SW06	29.053	-0.100	0.000	0.41	0.0	118.8	FLOOD RISK*
1.005	MH01	27.366	0.511	0.000	2.60	0.0	438.9	SURCHARGED
1.006	MH02	26.670	-0.178	0.000	0.76	0.0	434.6	OK
1.007	MH03	25.775	0.380	0.000	0.83	0.0	466.2	SURCHARGED
1.008	MH04	24.842	0.853	67.658	0.71	0.0	382.5	FLOOD
3.000	SW07	28.044	-0.071	0.000	0.50	0.0	142.5	FLOOD RISK*
3.001	SW08	27.168	-0.024	0.000	0.71	0.0	215.6	FLOOD RISK*
3.002	SW09	25.687	-0.005	0.000	0.91	0.0	262.0	FLOOD RISK*
1.009	MH05	24.759	1.186	182.463	0.82	0.0	385.0	FLOOD
4.000	SW10	33.759	-0.015	0.000	0.74	0.0	94.6	FLOOD RISK*
4.001	SW11	33.478	-0.028	0.000	0.71	0.0	151.2	FLOOD RISK*
4.002	SW12	32.744	-0.010	0.000	0.89	0.0	278.0	FLOOD RISK*
4.003	MH06	30.832	0.900	0.099	1.33	0.0	255.2	FLOOD
4.004	MH07	30.641	0.837	0.000	1.00	0.0	254.9	FLOOD RISK*
5.000	MH08	31.572	0.900	0.000	1.28	0.0	125.7	FLOOD RISK*
5.001	MH09	30.879	0.900	0.000	2.18	0.0	174.5	FLOOD RISK*
4.005	BDMH10	30.335	0.938	0.000	1.12	0.0	403.2	FLOOD RISK*
4.006	MH11	29.847	0.858	0.318	1.07	0.0	388.8	FLOOD
4.007	MH12	28.728	0.738	2.723	1.04	0.0	379.3	FLOOD
4.008	MH13	27.716	0.690	0.000	0.98	0.0	385.6	FLOOD RISK
4.009	MH14	26.259	0.754	18.759	0.97	0.0	376.8	FLOOD
4.010	MH15	24.957	0.801	65.102	1.10	0.0	375.7	FLOOD
6.000	SW13	27.766	-0.143	0.000	0.22	0.0	64.7	FLOOD RISK*
6.001	SW14	27.049	-0.069	0.000	0.48	0.0	149.1	FLOOD RISK*
6.002	SW15	25.661	-0.031	0.000	0.72	0.0	211.6	FLOOD RISK*
1.010	MH16	24.716	1.364	139.231	1.45	0.0	847.9	FLOOD
7.000	MH01	32.736	0.185	0.000	0.71	0.0	37.2	SURCHARGED*
7.001	MH02	32.543	0.367	0.000	1.64	0.0	71.2	SURCHARGED*

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
7.002	MH03	32.114	0.021	0.000	1.04	0.0	94.6	SURCHARGED*
8.000	MH04	31.933	-0.142	0.000	0.54	0.0	55.4	OK
9.000	MH05	32.337	1.200	0.000	1.89	0.0	146.9	FLOOD RISK*
9.001	MH06	32.093	0.997	0.000	1.60	0.0	192.4	FLOOD RISK*
7.003	MH07	31.855	0.795	0.000	1.63	0.0	362.5	SURCHARGED*
7.004	MH08	31.466	0.583	0.000	0.97	0.0	394.9	SURCHARGED*
7.005	MH09	30.821	1.268	0.000	1.02	0.0	452.1	SURCHARGED*
7.006	MH10	28.688	1.135	0.000	1.16	0.0	471.4	FLOOD
7.007	MH11	27.500	0.910	0.000	1.91	0.0	500.7	FLOOD RISK*
10.000	SW01	28.565	-0.043	0.000	0.63	0.0	146.9	FLOOD RISK*
10.001	13	27.549	-0.089	0.000	0.45	0.0	201.8	FLOOD RISK*
10.002	MH12	26.743	1.155	0.000	0.99	0.0	184.4	FLOOD RISK
10.003	MH13	26.537	1.171	0.000	1.33	0.0	251.1	SURCHARGED*
7.008	MH14	26.355	1.027	0.000	1.62	0.0	730.4	SURCHARGED*
1.011	Pri	24.662	1.987	0.000	0.34	0.0	55.9	SURCHARGED
1.012	Inf	24.657	2.457	0.000	0.00	0.0	0.0	SURCHARGED

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.000	0.207	483.1	0.144	5.00	0.0		0.090		-5
1.001	100.000	0.718	139.3	0.136	0.00	0.0		0.090		-5
1.002	100.000	0.819	122.1	0.143	0.00	0.0		0.090		-5
1.003	100.000	0.832	120.2	0.142	0.00	0.0		0.090		-5
1.004	100.000	0.784	127.6	0.136	0.00	0.0		0.090		-5
1.005	100.000	0.869	115.1	0.137	0.00	0.0		0.090		-5
1.006	100.000	0.999	100.1	0.161	0.00	0.0		0.090		-5
1.007	100.000	1.551	64.5	0.209	0.00	0.0		0.090		-5
1.008	34.100	0.114	299.1	0.000	0.00	0.0	0.600		o	375
1.009	56.400	1.044	54.0	0.000	0.00	0.0	0.600		o	375
2.000	100.000	0.179	558.7	0.136	5.00	0.0		0.090		-4
2.001	100.000	0.701	142.7	0.141	0.00	0.0		0.090		-4
2.002	100.000	0.860	116.3	0.142	0.00	0.0		0.090		-4
2.003	100.000	0.832	120.2	0.139	0.00	0.0		0.090		-4
2.004	100.000	0.826	121.1	0.136	0.00	0.0		0.090		-4
2.005	100.000	0.826	121.1	0.137	0.00	0.0		0.090		-4
2.006	100.000	0.944	105.9	0.144	0.00	0.0		0.090		-4
2.007	166.300	2.761	60.2	0.292	0.00	0.0		0.090		-4
3.000	85.200	2.419	35.2	0.214	5.00	0.0		0.090		-4

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	34.870	0.144	0.0	0.14	96.2
1.001	34.663	0.280	0.0	0.26	179.2
1.002	33.945	0.423	0.0	0.28	191.4
1.003	33.126	0.565	0.0	0.28	192.9
1.004	32.294	0.701	0.0	0.27	187.3
1.005	31.510	0.838	0.0	0.29	197.2
1.006	30.641	0.999	0.0	0.31	211.4
1.007	29.642	1.208	0.0	0.38	263.4
1.008	26.791	1.208	0.0	1.04	115.1
1.009	26.677	1.208	0.0	2.47	272.8
2.000	34.866	0.136	0.0	0.13	89.4
2.001	34.687	0.277	0.0	0.26	176.9
2.002	33.986	0.419	0.0	0.29	196.0
2.003	33.126	0.558	0.0	0.28	192.7
2.004	32.294	0.694	0.0	0.28	192.0
2.005	31.468	0.831	0.0	0.28	192.0
2.006	30.642	0.975	0.0	0.30	205.3
2.007	29.698	1.267	0.0	0.40	272.3
3.000	29.356	0.214	0.0	0.52	356.1

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.010	100.000	0.333	300.3	0.000	0.00	0.0	0.600		o	600
1.011	79.590	0.333	239.0	0.000	0.00	0.0	0.600		o	600
1.012	25.860	0.086	300.7	0.000	0.00	0.0	0.600		o	600
1.013	75.000	0.441	170.1	0.000	0.00	0.0	0.600		o	600
1.014	100.000	1.266	79.0	0.000	0.00	0.0	0.600		o	600
1.015	76.403	1.163	65.7	0.000	0.00	0.0	0.600		o	600
4.000	41.400	0.414	100.0	0.070	5.00	0.0	0.600		o	375
4.001	35.500	0.355	100.0	0.000	0.00	0.0	0.600		o	375
4.002	50.000	0.500	100.0	0.325	0.00	0.0	0.600		o	375
5.000	49.800	0.611	81.5	0.095	5.00	0.0	0.600		o	300
6.000	46.500	0.930	50.0	0.100	5.00	0.0	0.600		o	300
4.003	45.200	0.904	50.0	0.000	0.00	0.0	0.600		o	375
4.004	32.100	0.642	50.0	0.321	0.00	0.0	0.600		o	450
4.005	100.000	1.818	55.0	0.208	0.00	0.0	0.600		o	450
4.006	100.000	1.818	55.0	0.141	0.00	0.0	0.600		o	450
4.007	26.463	0.465	56.9	0.090	0.00	0.0	0.600		o	450
1.016	31.000	0.100	310.0	0.000	0.00	0.0	0.600		o	300

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.010	25.633	2.689	0.0	1.40	395.8
1.011	25.300	2.689	0.0	1.57	444.1
1.012	24.967	2.689	0.0	1.40	395.6
1.013	24.881	2.689	0.0	1.86	527.2
1.014	24.440	2.689	0.0	2.74	775.2
1.015	23.174	2.689	0.0	3.01	850.4
4.000	29.061	0.070	0.0	1.81	200.1
4.001	28.647	0.070	0.0	1.81	200.1
4.002	28.292	0.395	0.0	1.81	200.1
5.000	29.183	0.095	0.0	1.74	123.2
6.000	29.503	0.100	0.0	2.23	157.5
4.003	27.792	0.590	0.0	2.57	283.6
4.004	26.813	0.911	0.0	2.88	458.1
4.005	26.171	1.119	0.0	2.75	436.7
4.006	24.353	1.260	0.0	2.75	436.7
4.007	22.535	1.350	0.0	2.70	429.3
1.016	21.600	4.039	0.0	0.89	62.7

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.017	5.000	-1.299	-3.8	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.017	21.500	4.039	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.017		23.000	22.799	21.800	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 620700 314750 TG 20700 14750
C (1km)	-0.023
D1 (1km)	0.268
D2 (1km)	0.355
D3 (1km)	0.261
E (1km)	0.310
F (1km)	2.482
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.016

Invert Level (m) 21.600

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1351.4	1.400	2519.2	2.800	0.0	4.200	0.0
0.200	1506.2	1.600	0.0	3.000	0.0	4.400	0.0
0.400	1664.9	1.800	0.0	3.200	0.0	4.600	0.0
0.600	1827.8	2.000	0.0	3.400	0.0	4.800	0.0
0.800	1994.6	2.200	0.0	3.600	0.0	5.000	0.0
1.000	2165.4	2.400	0.0	3.800	0.0		
1.200	2340.3	2.600	0.0	4.000	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 1.017

Invert Level (m) 21.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.02050 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.02050

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1975.6	1.400	3058.3	2.800	0.0	4.200	0.0
0.200	2118.1	1.600	3229.2	3.000	0.0	4.400	0.0
0.400	2264.6	1.800	3404.1	3.200	0.0	4.600	0.0
0.600	2415.2	2.000	0.0	3.400	0.0	4.800	0.0
0.800	2569.9	2.200	0.0	3.600	0.0	5.000	0.0
1.000	2728.7	2.400	0.0	3.800	0.0		
1.200	2891.4	2.600	0.0	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	1	0%					
1.002	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
1.003	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
1.004	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
1.005	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
1.006	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
1.007	30 Winter	1	0%	100/15 Summer	100/15 Summer			5
1.008	30 Winter	1	0%	30/15 Summer	100/15 Summer			6
1.009	30 Winter	1	0%	30/15 Summer				
2.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
2.001	15 Winter	1	0%					
2.002	15 Winter	1	0%					
2.003	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
2.004	30 Winter	1	0%	100/15 Summer	100/15 Summer			4
2.005	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
2.006	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
2.007	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
3.000	15 Winter	1	0%					
1.010	30 Winter	1	0%	30/15 Summer	100/15 Winter			1
1.011	30 Winter	1	0%	30/15 Summer				
1.012	30 Winter	1	0%	30/15 Summer				
1.013	30 Winter	1	0%	100/15 Summer				
1.014	30 Winter	1	0%					
1.015	30 Winter	1	0%					
4.000	15 Winter	1	0%	30/15 Winter				4
4.001	15 Winter	1	0%	30/15 Summer				
4.002	15 Winter	1	0%	30/15 Summer				4
5.000	15 Winter	1	0%	100/15 Summer				
6.000	15 Winter	1	0%	100/15 Summer				
4.003	15 Winter	1	0%	30/15 Summer				4
4.004	15 Winter	1	0%	30/15 Summer				2
4.005	15 Winter	1	0%	30/15 Summer				
4.006	15 Winter	1	0%	30/15 Summer				2
4.007	15 Winter	1	0%	30/15 Summer				
1.016	180 Winter	1	0%	30/15 Summer				
1.017	2160 Winter	1	0%	1/120 Summer				

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	34.994	-0.151	0.000	0.18	0.0	17.3	FLOOD RISK*
1.001	SW2	34.768	-0.170	0.000	0.14	0.0	25.9	FLOOD RISK*
1.002	SW3	34.058	-0.162	0.000	0.17	0.0	32.7	FLOOD RISK*
1.003	SW4	33.247	-0.154	0.000	0.19	0.0	37.4	FLOOD RISK*
1.004	SW5	32.423	-0.146	0.000	0.22	0.0	41.8	FLOOD RISK*
1.005	SW6	31.640	-0.145	0.000	0.23	0.0	45.4	FLOOD RISK*
1.006	SW7	30.772	-0.144	0.000	0.23	0.0	49.1	FLOOD RISK*
1.007	SW8	29.765	-0.152	0.000	0.21	0.0	55.4	FLOOD RISK*
1.008	MH1	26.987	-0.179	0.000	0.54	0.0	55.3	OK
1.009	MH2	26.795	-0.257	0.000	0.22	0.0	55.3	OK
2.000	SW9	34.991	-0.150	0.000	0.18	0.0	16.3	FLOOD RISK*
2.001	SW10	34.791	-0.171	0.000	0.14	0.0	25.0	FLOOD RISK*
2.002	SW11	34.096	-0.165	0.000	0.16	0.0	31.6	FLOOD RISK*
2.003	SW12	33.245	-0.156	0.000	0.19	0.0	36.4	FLOOD RISK*
2.004	SW13	32.420	-0.149	0.000	0.21	0.0	41.0	FLOOD RISK*
2.005	SW14	31.599	-0.144	0.000	0.23	0.0	44.7	FLOOD RISK*
2.006	SW15	30.773	-0.144	0.000	0.23	0.0	48.0	FLOOD RISK*
2.007	SW16	29.823	-0.150	0.000	0.22	0.0	59.2	FLOOD RISK*
3.000	SW17	29.434	-0.197	0.000	0.09	0.0	31.0	FLOOD RISK*
1.010	MH3	25.872	-0.361	0.000	0.33	0.0	122.4	OK
1.011	MH4	25.524	-0.376	0.000	0.30	0.0	121.7	OK
1.012	MH5	25.225	-0.342	0.000	0.39	0.0	121.5	OK
1.013	MH6	25.085	-0.396	0.000	0.25	0.0	121.2	OK
1.014	MH7	24.604	-0.436	0.000	0.17	0.0	121.0	OK
1.015	MH8	23.331	-0.443	0.000	0.16	0.0	121.1	OK
4.000	MH1	29.119	-0.317	0.000	0.06	0.0	10.2	OK
4.001	MH2	28.705	-0.317	0.000	0.06	0.0	10.3	OK
4.002	MH3	28.426	-0.241	0.000	0.27	0.0	50.5	OK
5.000	MH4	29.253	-0.230	0.000	0.12	0.0	13.9	OK
6.000	MH5	29.567	-0.236	0.000	0.10	0.0	14.6	OK
4.003	MH6	27.933	-0.234	0.000	0.30	0.0	79.0	OK
4.004	MH7	26.981	-0.282	0.000	0.30	0.0	118.5	OK
4.005	MH8	26.354	-0.267	0.000	0.34	0.0	140.9	OK
4.006	MH9	24.546	-0.257	0.000	0.38	0.0	156.4	OK
4.007	MH10	22.749	-0.236	0.000	0.46	0.0	166.0	OK
1.016	Pri	21.820	-0.080	0.000	0.89	0.0	50.9	OK
1.017	Inf	21.735	0.135	0.000	0.00	0.0	0.0	SURCHARGED*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	30	+20%					
1.002	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
1.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
1.004	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
1.005	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
1.006	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
1.007	15 Winter	30	+20%	100/15 Summer	100/15 Summer			5
1.008	15 Winter	30	+20%	30/15 Summer	100/15 Summer			6
1.009	15 Winter	30	+20%	30/15 Summer				
2.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
2.001	15 Winter	30	+20%					
2.002	15 Winter	30	+20%					
2.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
2.004	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
2.005	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
2.006	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
2.007	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
3.000	15 Winter	30	+20%					
1.010	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
1.011	15 Winter	30	+20%	30/15 Summer				
1.012	15 Winter	30	+20%	30/15 Summer				
1.013	15 Winter	30	+20%	100/15 Summer				
1.014	15 Winter	30	+20%					
1.015	15 Winter	30	+20%					
4.000	15 Winter	30	+20%	30/15 Winter				4
4.001	15 Winter	30	+20%	30/15 Summer				
4.002	15 Winter	30	+20%	30/15 Summer				4
5.000	15 Winter	30	+20%	100/15 Summer				
6.000	15 Winter	30	+20%	100/15 Summer				
4.003	15 Winter	30	+20%	30/15 Summer				4
4.004	15 Winter	30	+20%	30/15 Summer				2
4.005	15 Winter	30	+20%	30/15 Summer				
4.006	15 Winter	30	+20%	30/15 Summer				2
4.007	15 Winter	30	+20%	30/15 Summer				
1.016	120 Winter	30	+20%	30/15 Summer				
1.017	2880 Winter	30	+20%	1/120 Summer				

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	35.125	-0.020	0.000	0.71	0.0	68.5	FLOOD RISK*
1.001	SW2	34.874	-0.064	0.000	0.54	0.0	96.5	FLOOD RISK*
1.002	SW3	34.171	-0.049	0.000	0.63	0.0	120.6	FLOOD RISK*
1.003	SW4	33.376	-0.025	0.000	0.74	0.0	143.4	FLOOD RISK*
1.004	SW5	32.557	-0.012	0.000	0.85	0.0	159.2	FLOOD RISK*
1.005	SW6	31.771	-0.014	0.000	0.86	0.0	169.5	FLOOD RISK*
1.006	SW7	30.902	-0.014	0.000	0.85	0.0	180.2	FLOOD RISK*
1.007	SW8	29.899	-0.018	0.000	0.85	0.0	225.0	FLOOD RISK*
1.008	MH1	27.907	0.741	0.000	2.14	0.0	220.3	SURCHARGED
1.009	MH2	27.403	0.351	0.000	0.86	0.0	218.5	SURCHARGED*
2.000	SW9	35.123	-0.018	0.000	0.72	0.0	64.7	FLOOD RISK*
2.001	SW10	34.894	-0.068	0.000	0.52	0.0	92.5	FLOOD RISK*
2.002	SW11	34.205	-0.056	0.000	0.60	0.0	116.7	FLOOD RISK*
2.003	SW12	33.373	-0.028	0.000	0.73	0.0	140.6	FLOOD RISK*
2.004	SW13	32.553	-0.016	0.000	0.82	0.0	157.4	FLOOD RISK*
2.005	SW14	31.732	-0.011	0.000	0.88	0.0	168.7	FLOOD RISK*
2.006	SW15	30.902	-0.015	0.000	0.86	0.0	176.9	FLOOD RISK*
2.007	SW16	29.968	-0.005	0.000	0.96	0.0	260.2	FLOOD RISK*
3.000	SW17	29.514	-0.117	0.000	0.34	0.0	121.6	FLOOD RISK*
1.010	MH3	26.676	0.443	0.000	1.41	0.0	519.5	SURCHARGED
1.011	MH4	26.137	0.237	0.000	1.17	0.0	477.3	SURCHARGED
1.012	MH5	25.677	0.110	0.000	1.51	0.0	474.2	SURCHARGED
1.013	MH6	25.358	-0.123	0.000	0.98	0.0	470.4	OK
1.014	MH7	24.794	-0.246	0.000	0.65	0.0	467.7	OK
1.015	MH8	23.511	-0.263	0.000	0.60	0.0	468.5	OK
4.000	MH1	29.640	0.204	0.000	0.21	0.0	38.7	SURCHARGED*
4.001	MH2	29.615	0.593	0.000	0.37	0.0	66.4	SURCHARGED*
4.002	MH3	29.593	0.926	0.000	0.99	0.0	182.4	SURCHARGED*
5.000	MH4	29.349	-0.134	0.000	0.46	0.0	52.8	OK
6.000	MH5	29.632	-0.171	0.000	0.38	0.0	55.9	OK
4.003	MH6	29.261	1.094	0.000	0.98	0.0	254.7	SURCHARGED*
4.004	MH7	28.637	1.374	0.000	0.92	0.0	363.7	SURCHARGED*
4.005	MH8	28.107	1.486	0.000	1.09	0.0	452.9	SURCHARGED*
4.006	MH9	25.982	1.179	0.000	1.18	0.0	488.2	SURCHARGED*
4.007	MH10	23.439	0.454	0.000	1.42	0.0	514.0	SURCHARGED*
1.016	Pri	22.267	0.367	0.000	2.20	0.0	125.6	SURCHARGED
1.017	Inf	22.149	0.549	0.000	0.00	0.0	0.0	SURCHARGED*

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	100	+30%					
1.002	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
1.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
1.004	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
1.005	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
1.006	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
1.007	15 Winter	100	+30%	100/15 Summer	100/15 Summer			5
1.008	30 Winter	100	+30%	30/15 Summer	100/15 Summer			6
1.009	15 Winter	100	+30%	30/15 Summer				
2.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
2.001	15 Winter	100	+30%					
2.002	15 Winter	100	+30%					
2.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
2.004	30 Winter	100	+30%	100/15 Summer	100/15 Summer			4
2.005	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
2.006	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
2.007	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
3.000	15 Winter	100	+30%					
1.010	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
1.011	15 Winter	100	+30%	30/15 Summer				
1.012	15 Winter	100	+30%	30/15 Summer				
1.013	15 Winter	100	+30%	100/15 Summer				
1.014	15 Winter	100	+30%					
1.015	15 Winter	100	+30%					
4.000	30 Winter	100	+30%	30/15 Winter				4
4.001	30 Winter	100	+30%	30/15 Summer				
4.002	30 Winter	100	+30%	30/15 Summer				4
5.000	30 Winter	100	+30%	100/15 Summer				
6.000	30 Winter	100	+30%	100/15 Summer				
4.003	30 Winter	100	+30%	30/15 Summer				4
4.004	15 Winter	100	+30%	30/15 Summer				2
4.005	15 Winter	100	+30%	30/15 Summer				
4.006	15 Winter	100	+30%	30/15 Summer				2
4.007	15 Winter	100	+30%	30/15 Summer				
1.016	120 Winter	100	+30%	30/15 Summer				
1.017	2880 Winter	100	+30%	1/120 Summer				

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	35.152	0.007	6.571	1.00	0.0	96.5	FLOOD
1.001	SW2	34.921	-0.017	0.000	0.80	0.0	143.8	FLOOD RISK*
1.002	SW3	34.222	0.002	2.398	0.97	0.0	185.6	FLOOD
1.003	SW4	33.419	0.018	17.911	0.99	0.0	191.7	FLOOD
1.004	SW5	32.597	0.028	28.284	1.01	0.0	188.3	FLOOD
1.005	SW6	31.804	0.019	18.620	1.00	0.0	197.4	FLOOD
1.006	SW7	30.936	0.020	19.743	1.01	0.0	213.8	FLOOD
1.007	SW8	29.935	0.018	17.600	1.01	0.0	265.6	FLOOD
1.008	MH1	28.400	1.234	34.393	2.48	0.0	255.5	FLOOD
1.009	MH2	27.914	0.862	0.000	1.00	0.0	255.4	SURCHARGED*
2.000	SW9	35.148	0.007	6.514	1.01	0.0	90.5	FLOOD
2.001	SW10	34.942	-0.020	0.000	0.79	0.0	139.1	FLOOD RISK*
2.002	SW11	34.260	-0.001	0.000	0.94	0.0	184.0	FLOOD RISK*
2.003	SW12	33.418	0.017	16.960	0.99	0.0	191.6	FLOOD
2.004	SW13	32.592	0.023	23.551	1.00	0.0	191.7	FLOOD
2.005	SW14	31.769	0.026	26.019	1.01	0.0	193.5	FLOOD
2.006	SW15	30.935	0.018	17.947	1.01	0.0	208.0	FLOOD
2.007	SW16	30.007	0.034	33.766	1.01	0.0	274.3	FLOOD
3.000	SW17	29.560	-0.071	0.000	0.56	0.0	197.6	FLOOD RISK*
1.010	MH3	27.213	0.980	0.621	1.64	0.0	606.5	FLOOD
1.011	MH4	26.511	0.611	0.000	1.38	0.0	562.4	SURCHARGED
1.012	MH5	25.910	0.343	0.000	1.76	0.0	554.1	SURCHARGED
1.013	MH6	25.603	0.122	0.000	1.14	0.0	549.9	SURCHARGED
1.014	MH7	24.833	-0.207	0.000	0.76	0.0	547.9	OK
1.015	MH8	23.547	-0.227	0.000	0.71	0.0	547.6	OK
4.000	MH1	30.336	0.900	0.000	0.22	0.0	40.4	FLOOD RISK*
4.001	MH2	31.008	1.986	0.000	0.40	0.0	71.5	FLOOD RISK*
4.002	MH3	31.278	2.611	0.000	0.97	0.0	179.5	FLOOD
5.000	MH4	30.733	1.250	0.000	0.46	0.0	53.7	FLOOD RISK*
6.000	MH5	31.053	1.250	0.000	0.41	0.0	60.7	FLOOD RISK*
4.003	MH6	30.798	2.631	0.000	1.05	0.0	272.1	FLOOD
4.004	MH7	30.336	3.073	0.000	1.17	0.0	464.4	FLOOD RISK*
4.005	MH8	29.837	3.216	0.000	1.39	0.0	577.6	FLOOD RISK*
4.006	MH9	27.814	3.011	0.000	1.58	0.0	655.7	FLOOD RISK*
4.007	MH10	24.264	1.279	0.000	1.94	0.0	703.2	SURCHARGED*
1.016	Pri	22.597	0.697	0.000	2.85	0.0	163.0	SURCHARGED
1.017	Inf	22.430	0.830	0.000	0.00	0.0	0.0	SURCHARGED*

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.000	0.309	323.6	0.125	5.00	0.0		0.060		-5
1.001	100.000	0.814	122.9	0.130	0.00	0.0		0.060		-5
1.002	91.690	1.942	47.2	0.027	0.00	0.0		0.060		-5
1.003	17.122	0.380	45.1	0.000	0.00	0.0	0.600		o	300
1.004	100.000	1.600	62.5	0.133	0.00	0.0	0.600		o	300
1.005	100.000	1.679	59.6	0.171	0.00	0.0	0.600		o	450
1.006	100.000	1.201	83.3	0.171	0.00	0.0	0.600		o	450
1.007	100.000	0.667	149.9	0.150	0.00	0.0	0.600		o	525
1.008	100.000	0.500	200.0	0.152	0.00	0.0	0.600		o	525
1.009	58.539	0.293	199.8	0.151	0.00	0.0	0.600		o	525
2.000	29.854	0.149	200.4	0.000	5.00	0.0	0.600		o	450
1.010	100.000	0.333	300.3	0.089	0.00	0.0	0.600		o	525
1.011	100.000	0.333	300.3	0.157	0.00	0.0	0.600		o	525
1.012	103.227	0.344	300.1	0.000	0.00	0.0	0.600		o	525
3.000	119.340	1.369	87.2	0.034	5.00	0.0		0.060		-5
3.001	99.570	0.736	135.3	0.175	0.00	0.0		0.060		-5
3.002	101.750	0.859	118.5	0.183	0.00	0.0		0.060		-5
3.003	18.076	0.163	110.9	0.000	0.00	0.0	0.600		o	675

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	34.090	0.125	0.0	0.26	182.4
1.001	33.781	0.255	0.0	0.42	296.1
1.002	32.967	0.282	0.0	0.68	477.6
1.003	31.000	0.282	0.0	2.35	166.0
1.004	30.620	0.415	0.0	1.99	140.8
1.005	29.020	0.586	0.0	2.64	419.6
1.006	27.341	0.757	0.0	2.23	354.6
1.007	26.140	0.907	0.0	1.83	395.5
1.008	25.473	1.059	0.0	1.58	342.1
1.009	24.973	1.210	0.0	1.58	342.3
2.000	24.010	0.000	0.0	1.43	227.8
1.010	23.861	1.299	0.0	1.29	278.7
1.011	23.528	1.456	0.0	1.29	278.7
1.012	23.195	1.456	0.0	1.29	278.8
3.000	26.792	0.034	0.0	0.50	351.5
3.001	25.423	0.209	0.0	0.40	282.1
3.002	24.687	0.392	0.0	0.43	301.5
3.003	22.503	0.392	0.0	2.49	890.5

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
4.000	96.500	0.475	203.2	0.147	5.00	0.0		0.060		-5
4.001	100.290	0.789	127.1	0.145	0.00	0.0		0.060		-5
4.002	18.536	0.093	199.3	0.000	0.00	0.0	0.600		o	300
5.000	100.069	0.834	120.0	0.193	5.00	0.0	0.600		o	300
1.013	16.088	0.080	201.1	0.179	0.00	0.0	0.600		o	675
6.000	100.000	0.309	323.6	0.125	5.00	0.0		0.060		-6
6.001	100.000	0.880	113.6	0.128	0.00	0.0		0.060		-6
6.002	89.120	1.587	56.2	0.117	0.00	0.0		0.060		-6
6.003	104.810	1.812	57.8	0.158	0.00	0.0		0.060		-6
6.004	95.900	1.599	60.0	0.165	0.00	0.0		0.060		-6
6.005	99.890	1.201	83.2	0.170	0.00	0.0		0.060		-6
6.006	96.710	0.500	193.4	0.166	0.00	0.0		0.060		-6
6.007	98.180	0.500	196.4	0.165	0.00	0.0		0.060		-6
6.008	56.720	0.262	216.5	0.092	0.00	0.0		0.060		-6
6.009	99.130	0.156	635.4	0.148	0.00	0.0		0.060		-6
6.010	99.281	0.064	1551.3	0.180	0.00	0.0		0.060		-6
6.011	103.502	0.412	251.2	0.054	0.00	0.0		0.060		-6
1.014	105.542	0.704	149.9	0.000	0.00	0.0	0.600		o	675

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
4.000	25.092	0.147	0.0	0.33	230.2
4.001	24.617	0.292	0.0	0.42	291.1
4.002	22.903	0.292	0.0	1.11	78.5
5.000	24.132	0.193	0.0	1.43	101.4
1.013	22.340	2.512	0.0	1.84	660.1
6.000	33.971	0.125	0.0	0.27	474.3
6.001	33.662	0.253	0.0	0.46	800.5
6.002	32.782	0.370	0.0	0.66	1138.7
6.003	31.195	0.528	0.0	0.65	1122.0
6.004	29.383	0.693	0.0	0.64	1101.9
6.005	27.784	0.863	0.0	0.54	935.7
6.006	26.583	1.029	0.0	0.35	613.6
6.007	26.083	1.194	0.0	0.35	609.0
6.008	25.583	1.286	0.0	0.33	580.0
6.009	25.321	1.434	0.0	0.20	338.5
6.010	25.165	1.614	0.0	0.13	216.7
6.011	25.101	1.668	0.0	0.31	538.4
1.014	22.260	4.180	0.0	2.14	765.2

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.015	86.910	0.579	150.1	0.000	0.00	0.0	0.600		o	675
1.016	27.008	0.180	150.0	0.000	0.00	0.0	0.600		o	675
1.017	60.672	0.404	150.2	0.000	0.00	0.0	0.600		o	675
1.018	25.941	0.324	80.1	0.000	0.00	0.0	0.600		o	675
7.000	135.887	0.716	189.8	0.071	5.00	0.0		0.100		-8
7.001	28.137	0.306	92.0	0.184	0.00	0.0	0.600		o	300
8.000	136.830	1.341	102.0	0.177	5.00	0.0		0.100		-9
8.001	22.544	0.451	50.0	0.000	0.00	0.0	0.600		o	450
7.002	52.061	0.578	90.0	0.201	0.00	0.0	0.600		o	525
7.003	52.009	0.433	120.1	0.144	0.00	0.0	0.600		o	525
9.000	71.053	0.592	120.0	0.057	5.00	0.0	0.600		o	300
9.001	32.405	0.267	121.4	0.083	0.00	0.0	0.600		o	300
9.002	35.356	0.592	59.7	0.047	0.00	0.0	0.600		o	300
9.003	25.386	0.317	80.1	0.073	0.00	0.0	0.600		o	300
9.004	24.128	0.240	100.5	0.196	0.00	0.0	0.600		o	375
7.004	45.982	0.153	300.5	0.029	0.00	0.0	0.600		o	525
7.005	53.841	0.179	300.8	0.087	0.00	0.0	0.600		o	525

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.015	21.556	4.180	0.0	2.14	764.7
1.016	20.977	4.180	0.0	2.14	764.9
1.017	20.797	4.180	0.0	2.14	764.5
1.018	20.393	4.180	0.0	2.93	1048.8
7.000	27.940	0.071	0.0	0.20	138.0
7.001	25.999	0.255	0.0	1.64	115.9
8.000	27.610	0.177	0.0	0.28	194.9
8.001	25.194	0.177	0.0	2.88	458.1
7.002	24.743	0.633	0.0	2.36	511.3
7.003	24.165	0.777	0.0	2.04	442.2
9.000	26.693	0.057	0.0	1.43	101.4
9.001	26.101	0.140	0.0	1.43	100.8
9.002	25.834	0.187	0.0	2.04	144.1
9.003	25.242	0.260	0.0	1.76	124.3
9.004	24.925	0.456	0.0	1.81	199.6
7.004	23.732	1.262	0.0	1.29	278.6
7.005	23.579	1.349	0.0	1.29	278.4

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
7.006	62.425	0.355	175.8	0.108	0.00	0.0	0.600		o	525
10.000	72.000	0.361	199.4	0.106	5.00	0.0		0.100		-9
10.001	61.057	0.682	89.5	0.082	0.00	0.0		0.100		-9
10.002	17.679	0.220	80.4	0.000	0.00	0.0	0.600		o	525
7.007	17.575	0.251	70.0	0.112	0.00	0.0	0.600		o	525
11.000	81.160	0.672	120.8	0.061	5.00	0.0		0.100		-8
11.001	64.220	0.325	197.6	0.034	0.00	0.0		0.100		-8
7.008	83.620	1.467	57.0	0.000	0.00	0.0	0.600		o	525
1.019	25.000	0.200	125.0	0.000	0.00	0.0	0.600		o	300
1.020	5.000	-2.400	-2.1	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
7.006	23.400	1.457	0.0	1.69	365.0
10.000	25.828	0.106	0.0	0.20	139.4
10.001	25.467	0.188	0.0	0.30	208.1
10.002	23.265	0.188	0.0	2.50	541.3
7.007	23.045	1.757	0.0	2.68	580.0
11.000	26.794	0.061	0.0	0.25	173.0
11.001	26.122	0.095	0.0	0.20	135.3
7.008	22.000	1.852	0.0	2.97	643.2
1.019	19.600	6.032	0.0	1.40	99.3
1.020	19.400	6.032	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.020		22.000	21.800	19.600	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	1	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 617600 316150 TG 17600 16150
C (1km)	-0.024
D1 (1km)	0.290
D2 (1km)	0.350
D3 (1km)	0.249
E (1km)	0.316
F (1km)	2.463
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.019

Invert Level (m) 19.600

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	913.6	1.400	1779.0	2.800	0.0	4.200	0.0
0.200	1025.1	1.600	1918.8	3.000	0.0	4.400	0.0
0.400	1140.6	1.800	2063.0	3.200	0.0	4.600	0.0
0.600	1260.2	2.000	2211.4	3.400	0.0	4.800	0.0
0.800	1383.8	2.200	2363.0	3.600	0.0	5.000	0.0
1.000	1511.5	2.400	2519.4	3.800	0.0		
1.200	1643.2	2.600	0.0	4.000	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 1.020

Invert Level (m) 19.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.11880 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.11880

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1523.1	1.400	2771.0	2.800	0.0	4.200	0.0
0.200	1683.3	1.600	2969.0	3.000	0.0	4.400	0.0
0.400	1850.6	1.800	3171.0	3.200	0.0	4.600	0.0
0.600	2024.9	2.000	3377.0	3.400	0.0	4.800	0.0
0.800	2204.9	2.200	3587.5	3.600	0.0	5.000	0.0
1.000	2389.0	2.400	3802.0	3.800	0.0		
1.200	2578.0	2.600	4020.7	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%					
1.001	15 Winter	1	0%					
1.002	15 Winter	1	0%					
1.003	15 Winter	1	0%	100/15 Summer				
1.004	15 Winter	1	0%	100/15 Summer				
1.005	15 Winter	1	0%	100/15 Summer				
1.006	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.007	15 Winter	1	0%	30/15 Winter	100/15 Summer			2
1.008	15 Winter	1	0%	30/15 Summer				
1.009	15 Winter	1	0%	30/15 Summer				
2.000	360 Summer	1	0%	30/15 Summer	30/15 Summer			11
1.010	15 Winter	1	0%	30/15 Summer				
1.011	15 Winter	1	0%	30/15 Summer				
1.012	15 Winter	1	0%	30/15 Summer				
3.000	15 Winter	1	0%					
3.001	15 Winter	1	0%					
3.002	15 Winter	1	0%					
3.003	15 Winter	1	0%	30/15 Summer				
4.000	15 Winter	1	0%					
4.001	15 Winter	1	0%					
4.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			3
5.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
1.013	15 Winter	1	0%	30/15 Summer				
6.000	15 Winter	1	0%					
6.001	15 Winter	1	0%					
6.002	15 Winter	1	0%					
6.003	15 Winter	1	0%					
6.004	15 Winter	1	0%					
6.005	15 Winter	1	0%					
6.006	15 Winter	1	0%					
6.007	30 Winter	1	0%					
6.008	30 Winter	1	0%					
6.009	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
6.010	30 Winter	1	0%	100/15 Summer	100/15 Summer			8
6.011	60 Winter	1	0%					
1.014	15 Winter	1	0%	100/15 Summer				
1.015	15 Winter	1	0%	30/15 Winter				

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.016	15 Winter	1	0%	30/15 Summer				
1.017	15 Winter	1	0%	100/15 Summer				
1.018	15 Winter	1	0%	100/15 Summer				
7.000	15 Winter	1	0%					
7.001	15 Winter	1	0%	30/15 Summer				
8.000	15 Winter	1	0%					
8.001	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
7.002	15 Winter	1	0%	30/15 Summer				
7.003	15 Winter	1	0%	30/15 Summer				
9.000	15 Winter	1	0%	100/15 Summer				2
9.001	15 Winter	1	0%	30/15 Winter				2
9.002	15 Winter	1	0%	30/15 Summer				
9.003	15 Winter	1	0%	30/15 Summer				4
9.004	15 Winter	1	0%	30/15 Summer				4
7.004	15 Winter	1	0%	30/15 Summer				
7.005	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
7.006	15 Winter	1	0%	30/15 Summer				
10.000	15 Winter	1	0%					
10.001	15 Winter	1	0%					
10.002	15 Winter	1	0%	30/15 Summer				
7.007	15 Winter	1	0%	30/15 Summer				
11.000	15 Winter	1	0%					
11.001	15 Winter	1	0%					
7.008	15 Winter	1	0%	30/15 Summer				
1.019	120 Winter	1	0%	1/60 Summer				
1.020	360 Winter	1	0%	1/60 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	34.175	-0.190	0.000	0.08	0.0	15.3	FLOOD RISK*
1.001	SW02	33.865	-0.191	0.000	0.09	0.0	25.7	FLOOD RISK*
1.002	SW03	33.028	-0.214	0.000	0.05	0.0	26.1	FLOOD RISK*
1.003	MH01	31.086	-0.214	0.000	0.18	0.0	26.0	OK
1.004	MH02	30.723	-0.197	0.000	0.25	0.0	34.0	OK
1.005	MH03	29.124	-0.346	0.000	0.12	0.0	46.6	OK
1.006	MH04	27.470	-0.321	0.000	0.18	0.0	60.5	OK
1.007	MH05	26.301	-0.364	0.000	0.20	0.0	74.4	OK
1.008	MH06	25.662	-0.336	0.000	0.27	0.0	87.3	OK
1.009	MH07	25.178	-0.320	0.000	0.32	0.0	100.0	OK
2.000	MH08	24.098	-0.362	0.000	0.09	0.0	16.7	OK
1.010	MH09	24.097	-0.289	0.000	0.40	0.0	105.4	OK
1.011	MH10	23.769	-0.284	0.000	0.42	0.0	110.4	OK
1.012	MH11	23.431	-0.289	0.000	0.42	0.0	109.7	OK
3.000	SW04	26.820	-0.247	0.000	0.01	0.0	4.1	FLOOD RISK*
3.001	SW05	25.502	-0.196	0.000	0.08	0.0	21.7	FLOOD RISK*
3.002	SW06	24.785	-0.177	0.000	0.13	0.0	40.4	FLOOD RISK*
3.003	MH12	22.660	-0.518	0.000	0.08	0.0	40.5	OK
4.000	SW07	25.174	-0.193	0.000	0.08	0.0	18.2	FLOOD RISK*

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
4.001	SW08	24.708	-0.184	0.000	0.12	0.0	34.1	FLOOD RISK*
4.002	MH13	23.054	-0.149	0.000	0.50	0.0	34.0	OK
5.000	MH14	24.242	-0.190	0.000	0.29	0.0	28.1	OK
1.013	MH15	22.637	-0.378	0.000	0.40	0.0	182.9	OK
6.000	SW09	34.052	-0.313	0.000	0.03	0.0	15.7	OK
6.001	SW10	33.741	-0.315	0.000	0.03	0.0	26.2	OK
6.002	SW11	32.855	-0.321	0.000	0.03	0.0	33.8	OK
6.003	SW12	31.279	-0.310	0.000	0.04	0.0	42.4	OK
6.004	SW13	29.476	-0.301	0.000	0.05	0.0	50.2	OK
6.005	SW14	27.895	-0.283	0.000	0.06	0.0	57.1	FLOOD RISK*
6.006	SW15	26.725	-0.252	0.000	0.10	0.0	61.9	FLOOD RISK*
6.007	SW16	26.229	-0.248	0.000	0.11	0.0	67.0	FLOOD RISK*
6.008	SW17	25.733	-0.244	0.000	0.12	0.0	68.6	FLOOD RISK*
6.009	SW18	25.524	-0.191	0.000	0.20	0.0	69.3	FLOOD RISK*
6.010	SW19	25.380	-0.179	0.000	0.23	0.0	62.4	FLOOD RISK*
6.011	SW20	25.248	-0.247	0.000	0.11	0.0	61.4	FLOOD RISK*
1.014	MH16	22.499	-0.436	0.000	0.27	0.0	192.4	OK
1.015	MH17	21.796	-0.435	0.000	0.27	0.0	191.5	OK
1.016	MH18	21.254	-0.398	0.000	0.36	0.0	191.2	OK
1.017	MH19	21.041	-0.431	0.000	0.28	0.0	190.9	OK
1.018	MH20	20.628	-0.440	0.000	0.26	0.0	190.6	OK
7.000	SW01	28.010	-0.205	0.000	0.07	0.0	10.2	FLOOD RISK*
7.001	MH01	26.108	-0.191	0.000	0.28	0.0	29.4	OK
8.000	SW02	27.707	-0.178	0.000	0.13	0.0	25.4	FLOOD RISK*
8.001	MH02	25.271	-0.373	0.000	0.07	0.0	25.5	OK
7.002	MH03	24.884	-0.384	0.000	0.16	0.0	72.8	OK
7.003	MH04	24.331	-0.359	0.000	0.22	0.0	86.5	OK
9.000	MH05	26.753	-0.240	0.000	0.08	0.0	8.1	OK
9.001	MH06	26.192	-0.209	0.000	0.20	0.0	18.2	OK
9.002	MH07	25.920	-0.214	0.000	0.18	0.0	23.8	OK
9.003	MH08	25.353	-0.189	0.000	0.29	0.0	32.4	OK
9.004	MH09	25.073	-0.227	0.000	0.33	0.0	56.2	OK
7.004	MH10	24.018	-0.239	0.000	0.57	0.0	140.8	OK
7.005	MH11	23.870	-0.233	0.000	0.59	0.0	146.5	OK
7.006	MH12	23.652	-0.273	0.000	0.46	0.0	153.5	OK
10.000	SW03	25.917	-0.186	0.000	0.10	0.0	13.8	FLOOD RISK*
10.001	SW04	25.555	-0.187	0.000	0.11	0.0	22.5	FLOOD RISK*
10.002	MH13	23.351	-0.439	0.000	0.06	0.0	22.5	OK
7.007	MH14	23.299	-0.270	0.000	0.47	0.0	182.5	OK
11.000	SW05	26.850	-0.219	0.000	0.05	0.0	7.9	FLOOD RISK*
11.001	SW06	26.198	-0.199	0.000	0.08	0.0	11.5	FLOOD RISK*
7.008	21	22.204	-0.321	0.000	0.32	0.0	192.3	OK
1.019	Pri	19.948	0.048	0.000	1.15	0.0	101.6	SURCHARGED
1.020	Inf	19.728	0.228	0.000	0.00	0.0	0.0	SURCHARGED

Input Hydrograph Manhole MH08, DS/PN 2.000 (Storm)

360 minute 1 year Summer I+0%

Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 617600 316150 TG 17600 16150
C	-0.02348
D1	0.27439
D2	0.35421
D3	0.26042
E	0.31136
F	2.47949
Area (Ha)	11.390
SAAR (mm)	617
CWI	90.060
Urban (1990)	0.0200
SPR	21.360
DPSBAR	12.200
DPLBAR	0.495
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.753
FARL	1.000

Output Variables

TP(0) (mins) 186 Q (l/s) 77.2 PR (%) 13.331
T (mins) 18 TB (mins) 491
TPt (mins) 195 Base Flow (l/s) 0.8

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
6	0.8	114	1.8	222	7.4	330	15.4	438	14.6	546	8.4
12	0.8	120	1.9	228	7.9	336	15.8	444	14.4	552	8.0
18	0.9	126	2.0	234	8.4	342	16.0	450	14.1	558	7.7
24	0.9	132	2.2	240	8.8	348	16.3	456	13.7	564	7.3
30	0.9	138	2.3	246	9.3	354	16.5	462	13.4	570	6.9
36	0.9	144	2.5	252	9.8	360	16.6	468	13.1	576	6.6
42	1.0	150	2.7	258	10.3	366	16.7	474	12.8	582	6.2
48	1.0	156	2.9	264	10.7	372	16.7	480	12.4	588	5.8
54	1.0	162	3.2	270	11.2	378	16.6	486	12.1	594	5.5
60	1.1	168	3.5	276	11.7	384	16.6	492	11.7	600	5.2
66	1.1	174	3.9	282	12.1	390	16.5	498	11.4	606	4.8
72	1.2	180	4.3	288	12.6	396	16.3	504	11.0	612	4.5
78	1.3	186	4.7	294	13.0	402	16.1	510	10.7	618	4.2
84	1.3	192	5.1	300	13.5	408	15.9	516	10.3	624	3.9
90	1.4	198	5.5	306	13.9	414	15.7	522	9.9	630	3.6
96	1.5	204	6.0	312	14.3	420	15.4	528	9.5	636	3.3
102	1.6	210	6.4	318	14.7	426	15.2	534	9.2	642	3.0
108	1.7	216	6.9	324	15.1	432	14.9	540	8.8	648	2.8

Input Hydrograph Manhole MH08, DS/PN 2.000 (Storm)
360 minute 1 year Summer I+0%
Input Hydrograph Type: FEH Dynamic

Time (mins)	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**
654	2.6	666	2.2	678	1.9	690	1.7	702	1.5	714	1.4
660	2.4	672	2.0	684	1.8	696	1.6	708	1.4	720	1.4

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%					
1.001	15 Winter	30	+20%					
1.002	15 Winter	30	+20%					
1.003	15 Winter	30	+20%	100/15 Summer				
1.004	15 Winter	30	+20%	100/15 Summer				
1.005	15 Winter	30	+20%	100/15 Summer				
1.006	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.007	15 Winter	30	+20%	30/15 Winter	100/15 Summer			2
1.008	15 Winter	30	+20%	30/15 Summer				
1.009	15 Winter	30	+20%	30/15 Summer				
2.000	15 Winter	30	+20%	30/15 Summer	30/15 Summer			11
1.010	15 Winter	30	+20%	30/15 Summer				
1.011	15 Winter	30	+20%	30/15 Summer				
1.012	15 Winter	30	+20%	30/15 Summer				
3.000	15 Winter	30	+20%					
3.001	15 Winter	30	+20%					
3.002	15 Winter	30	+20%					
3.003	15 Winter	30	+20%	30/15 Summer				
4.000	15 Winter	30	+20%					
4.001	15 Winter	30	+20%					
4.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			3
5.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
1.013	15 Winter	30	+20%	30/15 Summer				
6.000	15 Winter	30	+20%					
6.001	15 Winter	30	+20%					
6.002	15 Winter	30	+20%					
6.003	15 Winter	30	+20%					
6.004	15 Winter	30	+20%					
6.005	15 Winter	30	+20%					
6.006	15 Winter	30	+20%					
6.007	15 Winter	30	+20%					
6.008	15 Winter	30	+20%					
6.009	30 Winter	30	+20%	100/15 Summer	100/15 Summer			6
6.010	30 Winter	30	+20%	100/15 Summer	100/15 Summer			8
6.011	30 Winter	30	+20%					
1.014	15 Winter	30	+20%	100/15 Summer				
1.015	15 Winter	30	+20%	30/15 Winter				

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.016	15 Winter	30	+20%	30/15 Summer				
1.017	15 Winter	30	+20%	100/15 Summer				
1.018	15 Winter	30	+20%	100/15 Summer				
7.000	15 Winter	30	+20%					
7.001	15 Winter	30	+20%	30/15 Summer				
8.000	15 Winter	30	+20%					
8.001	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
7.002	15 Winter	30	+20%	30/15 Summer				
7.003	15 Winter	30	+20%	30/15 Summer				
9.000	15 Winter	30	+20%	100/15 Summer				2
9.001	15 Winter	30	+20%	30/15 Winter				2
9.002	15 Winter	30	+20%	30/15 Summer				
9.003	15 Winter	30	+20%	30/15 Summer				4
9.004	15 Winter	30	+20%	30/15 Summer				4
7.004	15 Winter	30	+20%	30/15 Summer				
7.005	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
7.006	15 Winter	30	+20%	30/15 Summer				
10.000	15 Winter	30	+20%					
10.001	15 Winter	30	+20%					
10.002	15 Winter	30	+20%	30/15 Summer				
7.007	15 Winter	30	+20%	30/15 Summer				
11.000	15 Winter	30	+20%					
11.001	15 Winter	30	+20%					
7.008	15 Winter	30	+20%	30/15 Summer				
1.019	120 Winter	30	+20%	1/60 Summer				
1.020	960 Winter	30	+20%	1/60 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	34.260	-0.105	0.000	0.33	0.0	60.1	FLOOD RISK*
1.001	SW02	33.954	-0.102	0.000	0.34	0.0	101.7	FLOOD RISK*
1.002	SW03	33.097	-0.145	0.000	0.21	0.0	99.6	FLOOD RISK*
1.003	MH01	31.187	-0.113	0.000	0.70	0.0	99.7	OK
1.004	MH02	30.855	-0.065	0.000	0.91	0.0	124.5	OK
1.005	MH03	29.260	-0.210	0.000	0.53	0.0	211.6	OK
1.006	MH04	27.680	-0.111	0.000	0.87	0.0	293.4	OK
1.007	MH05	26.713	0.048	0.000	0.90	0.0	335.2	SURCHARGED
1.008	MH06	26.216	0.218	0.000	1.09	0.0	350.0	SURCHARGED
1.009	MH07	25.610	0.112	0.000	1.21	0.0	374.1	SURCHARGED
2.000	MH08	24.832	0.372	22.532	0.66	0.0	128.3	FLOOD
1.010	MH09	24.888	0.502	0.000	1.27	0.0	333.0	SURCHARGED
1.011	MH10	24.423	0.370	0.000	1.32	0.0	346.2	SURCHARGED
1.012	MH11	23.902	0.182	0.000	1.24	0.0	326.5	SURCHARGED
3.000	SW04	26.851	-0.216	0.000	0.04	0.0	15.7	FLOOD RISK*
3.001	SW05	25.599	-0.099	0.000	0.35	0.0	97.5	FLOOD RISK*
3.002	SW06	24.903	-0.059	0.000	0.61	0.0	184.9	FLOOD RISK*
3.003	MH12	23.224	0.046	0.000	0.36	0.0	184.2	SURCHARGED
4.000	SW07	25.256	-0.111	0.000	0.31	0.0	71.3	FLOOD RISK*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
4.001	SW08	24.809	-0.083	0.000	0.48	0.0	140.7	FLOOD RISK*
4.002	MH13	23.605	0.402	0.000	2.08	0.0	140.7	SURCHARGED
5.000	MH14	24.537	0.105	0.000	1.07	0.0	105.0	SURCHARGED
1.013	MH15	23.197	0.182	0.000	1.50	0.0	682.7	SURCHARGED
6.000	SW09	34.141	-0.224	0.000	0.13	0.0	60.3	FLOOD RISK*
6.001	SW10	33.832	-0.224	0.000	0.13	0.0	102.7	FLOOD RISK*
6.002	SW11	32.939	-0.237	0.000	0.11	0.0	130.8	FLOOD RISK*
6.003	SW12	31.380	-0.209	0.000	0.15	0.0	167.1	FLOOD RISK*
6.004	SW13	29.587	-0.190	0.000	0.18	0.0	203.3	FLOOD RISK*
6.005	SW14	28.022	-0.156	0.000	0.25	0.0	232.4	FLOOD RISK*
6.006	SW15	26.879	-0.098	0.000	0.41	0.0	251.8	FLOOD RISK*
6.007	SW16	26.379	-0.098	0.000	0.43	0.0	260.5	FLOOD RISK*
6.008	SW17	25.880	-0.097	0.000	0.45	0.0	259.3	FLOOD RISK*
6.009	SW18	25.683	-0.032	0.000	0.75	0.0	254.9	FLOOD RISK*
6.010	SW19	25.541	-0.018	0.000	0.86	0.0	231.8	FLOOD RISK*
6.011	SW20	25.390	-0.105	0.000	0.42	0.0	224.0	FLOOD RISK*
1.014	MH16	22.924	-0.011	0.000	0.99	0.0	704.4	OK
1.015	MH17	22.243	0.012	0.000	0.96	0.0	667.2	SURCHARGED
1.016	MH18	21.714	0.062	0.000	1.24	0.0	664.6	SURCHARGED
1.017	MH19	21.331	-0.141	0.000	0.98	0.0	662.2	OK
1.018	MH20	20.900	-0.168	0.000	0.92	0.0	662.8	OK
7.000	SW01	28.087	-0.128	0.000	0.29	0.0	40.3	FLOOD RISK*
7.001	MH01	26.608	0.309	0.000	1.22	0.0	128.0	SURCHARGED
8.000	SW02	27.807	-0.078	0.000	0.46	0.0	90.4	FLOOD RISK*
8.001	MH02	26.376	0.732	0.000	0.27	0.0	100.1	FLOOD RISK
7.002	MH03	26.344	1.076	0.000	0.54	0.0	248.9	SURCHARGED
7.003	MH04	26.185	1.495	0.000	0.72	0.0	284.8	SURCHARGED*
9.000	MH05	26.813	-0.180	0.000	0.32	0.0	31.3	OK
9.001	MH06	26.531	0.130	0.000	0.83	0.0	76.2	SURCHARGED*
9.002	MH07	26.473	0.339	0.000	0.66	0.0	87.6	SURCHARGED*
9.003	MH08	26.342	0.800	0.000	1.06	0.0	118.3	SURCHARGED*
9.004	MH09	26.152	0.852	0.000	1.32	0.0	226.9	SURCHARGED*
7.004	MH10	25.960	1.703	0.000	1.85	0.0	454.5	SURCHARGED*
7.005	MH11	25.459	1.356	0.000	1.90	0.0	474.8	SURCHARGED
7.006	MH12	24.800	0.876	0.000	1.51	0.0	500.3	SURCHARGED
10.000	SW03	26.008	-0.095	0.000	0.39	0.0	54.0	FLOOD RISK*
10.001	SW04	25.649	-0.093	0.000	0.44	0.0	91.5	FLOOD RISK*
10.002	MH13	23.984	0.194	0.000	0.25	0.0	91.6	SURCHARGED
7.007	MH14	23.961	0.391	0.000	1.61	0.0	620.7	SURCHARGED
11.000	SW05	26.914	-0.155	0.000	0.18	0.0	30.6	FLOOD RISK*
11.001	SW06	26.279	-0.118	0.000	0.34	0.0	45.4	FLOOD RISK*
7.008	21	22.852	0.327	0.000	1.11	0.0	665.3	SURCHARGED
1.019	Pri	20.765	0.865	0.000	2.27	0.0	201.3	SURCHARGED
1.020	Inf	20.482	0.982	0.000	0.00	0.0	0.0	SURCHARGED

Input Hydrograph Manhole MH08, DS/PN 2.000 (Storm)
15 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 617600 316150 TG 17600 16150
C	-0.02348
D1	0.27439
D2	0.35421
D3	0.26042
E	0.31136
F	2.47949
Area (Ha)	11.390
SAAR (mm)	617
CWI	90.060
Urban (1990)	0.0200
SPR	21.360
DPSBAR	12.200
DPLBAR	0.495
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.753
FARL	1.000

Output Variables

TP(0) (mins)	186	Q (l/s)	77.0	PR (%)	13.331
T (mins)	19	TB (mins)	492		
TPt (mins)	195	Base Flow (l/s)	0.8		

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
1	3.9	11	4.1	21	5.8	31	7.4	41	9.1	51	10.2
2	3.9	12	4.3	22	5.9	32	7.6	42	9.2	52	10.2
3	3.9	13	4.4	23	6.1	33	7.7	43	9.4	53	10.2
4	3.9	14	4.6	24	6.2	34	7.9	44	9.5	54	10.2
5	3.9	15	4.8	25	6.4	35	8.1	45	9.7	55	10.2
6	3.9	16	4.9	26	6.6	36	8.2	46	9.9	56	10.2
7	3.9	17	5.1	27	6.7	37	8.4	47	10.0	57	10.2
8	3.9	18	5.3	28	6.9	38	8.6	48	10.2	58	13.3
9	3.9	19	5.4	29	7.1	39	8.7	49	10.2	59	13.3
10	3.9	20	5.6	30	7.2	40	8.9	50	10.2	60	13.3

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%					
1.001	15 Winter	100	+30%					
1.002	15 Winter	100	+30%					
1.003	15 Winter	100	+30%	100/15 Summer				
1.004	15 Winter	100	+30%	100/15 Summer				
1.005	15 Winter	100	+30%	100/15 Summer				
1.006	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.007	15 Winter	100	+30%	30/15 Winter	100/15 Summer			2
1.008	15 Winter	100	+30%	30/15 Summer				
1.009	15 Winter	100	+30%	30/15 Summer				
2.000	30 Winter	100	+30%	30/15 Summer	30/15 Summer			11
1.010	15 Winter	100	+30%	30/15 Summer				
1.011	15 Winter	100	+30%	30/15 Summer				
1.012	15 Winter	100	+30%	30/15 Summer				
3.000	15 Winter	100	+30%					
3.001	15 Winter	100	+30%					
3.002	15 Winter	100	+30%					
3.003	15 Winter	100	+30%	30/15 Summer				
4.000	15 Winter	100	+30%					
4.001	15 Winter	100	+30%					
4.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			3
5.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
1.013	15 Winter	100	+30%	30/15 Summer				
6.000	15 Winter	100	+30%					
6.001	15 Winter	100	+30%					
6.002	15 Winter	100	+30%					
6.003	15 Winter	100	+30%					
6.004	15 Winter	100	+30%					
6.005	15 Winter	100	+30%					
6.006	15 Winter	100	+30%					
6.007	15 Winter	100	+30%					
6.008	15 Winter	100	+30%					
6.009	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
6.010	30 Winter	100	+30%	100/15 Summer	100/15 Summer			8
6.011	30 Winter	100	+30%					
1.014	15 Winter	100	+30%	100/15 Summer				
1.015	15 Winter	100	+30%	30/15 Winter				

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.016	60 Winter	100	+30%	30/15 Summer				
1.017	60 Winter	100	+30%	100/15 Summer				
1.018	60 Winter	100	+30%	100/15 Summer				
7.000	15 Winter	100	+30%					
7.001	15 Winter	100	+30%	30/15 Summer				
8.000	15 Winter	100	+30%					
8.001	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
7.002	15 Summer	100	+30%	30/15 Summer				
7.003	15 Summer	100	+30%	30/15 Summer				
9.000	15 Winter	100	+30%	100/15 Summer				2
9.001	15 Winter	100	+30%	30/15 Winter				2
9.002	30 Winter	100	+30%	30/15 Summer				
9.003	30 Winter	100	+30%	30/15 Summer				4
9.004	30 Winter	100	+30%	30/15 Summer				4
7.004	15 Winter	100	+30%	30/15 Summer				
7.005	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
7.006	15 Winter	100	+30%	30/15 Summer				
10.000	15 Winter	100	+30%					
10.001	15 Winter	100	+30%					
10.002	15 Winter	100	+30%	30/15 Summer				
7.007	15 Winter	100	+30%	30/15 Summer				
11.000	15 Winter	100	+30%					
11.001	15 Winter	100	+30%					
7.008	15 Winter	100	+30%	30/15 Summer				
1.019	120 Winter	100	+30%	1/60 Summer				
1.020	1440 Winter	100	+30%	1/60 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	34.311	-0.054	0.000	0.54	0.0	99.3	FLOOD RISK*
1.001	SW02	34.003	-0.053	0.000	0.57	0.0	169.3	FLOOD RISK*
1.002	SW03	33.134	-0.108	0.000	0.35	0.0	165.4	FLOOD RISK*
1.003	MH01	31.848	0.548	0.000	1.08	0.0	152.9	SURCHARGED
1.004	MH02	31.479	0.559	0.000	1.15	0.0	157.4	SURCHARGED
1.005	MH03	29.648	0.178	0.000	0.74	0.0	293.9	SURCHARGED
1.006	MH04	28.835	1.044	5.681	1.04	0.0	350.0	FLOOD
1.007	MH05	27.638	0.973	9.812	1.11	0.0	414.8	FLOOD
1.008	MH06	27.114	1.116	0.000	1.37	0.0	441.4	FLOOD RISK
1.009	MH07	26.065	0.567	0.000	1.67	0.0	516.9	SURCHARGED
2.000	MH08	24.967	0.507	157.662	-1.31	0.0	-256.5	FLOOD
1.010	MH09	25.266	0.880	0.000	1.23	0.0	321.4	SURCHARGED
1.011	MH10	25.027	0.974	0.000	1.49	0.0	391.7	SURCHARGED
1.012	MH11	24.538	0.818	0.000	1.24	0.0	326.3	SURCHARGED
3.000	SW04	26.873	-0.194	0.000	0.07	0.0	25.9	FLOOD RISK*
3.001	SW05	25.651	-0.047	0.000	0.57	0.0	161.8	FLOOD RISK*
3.002	SW06	24.960	-0.002	0.000	0.97	0.0	292.3	FLOOD RISK*
3.003	MH12	24.040	0.862	0.000	0.52	0.0	267.4	FLOOD RISK
4.000	SW07	25.305	-0.062	0.000	0.51	0.0	117.7	FLOOD RISK*

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Micro Drainage	Network W.12.6	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
4.001	SW08	24.863	-0.029	0.000	0.74	0.0	215.2	FLOOD RISK*
4.002	MH13	24.128	0.925	24.942	2.50	0.0	169.3	FLOOD
5.000	MH14	25.336	0.904	4.188	1.45	0.0	142.5	FLOOD
1.013	MH15	24.009	0.994	0.000	1.84	0.0	838.9	SURCHARGED
6.000	SW09	34.194	-0.171	0.000	0.21	0.0	99.4	FLOOD RISK*
6.001	SW10	33.881	-0.175	0.000	0.21	0.0	169.1	FLOOD RISK*
6.002	SW11	32.987	-0.189	0.000	0.19	0.0	215.2	FLOOD RISK*
6.003	SW12	31.437	-0.152	0.000	0.25	0.0	276.6	FLOOD RISK*
6.004	SW13	29.653	-0.124	0.000	0.31	0.0	336.3	FLOOD RISK*
6.005	SW14	28.084	-0.094	0.000	0.41	0.0	381.8	FLOOD RISK*
6.006	SW15	26.939	-0.038	0.000	0.68	0.0	416.7	FLOOD RISK*
6.007	SW16	26.440	-0.037	0.000	0.71	0.0	429.9	FLOOD RISK*
6.008	SW17	25.940	-0.037	0.000	0.73	0.0	424.5	FLOOD RISK*
6.009	SW18	25.763	0.048	47.927	1.02	0.0	344.2	FLOOD
6.010	SW19	25.612	0.053	53.470	1.17	0.0	316.1	FLOOD
6.011	SW20	25.425	-0.070	0.000	0.58	0.0	311.5	FLOOD RISK*
1.014	MH16	23.687	0.752	0.000	1.25	0.0	884.4	SURCHARGED
1.015	MH17	22.800	0.569	0.000	1.18	0.0	819.5	SURCHARGED
1.016	MH18	22.072	0.420	0.000	1.40	0.0	754.3	SURCHARGED
1.017	MH19	21.804	0.332	0.000	1.12	0.0	753.0	SURCHARGED
1.018	MH20	21.445	0.377	0.000	1.02	0.0	737.8	SURCHARGED
7.000	SW01	28.129	-0.086	0.000	0.41	0.0	56.7	FLOOD RISK*
7.001	MH01	27.487	1.188	0.000	1.61	0.0	169.0	FLOOD RISK
8.000	SW02	27.866	-0.019	0.000	0.70	0.0	137.2	FLOOD RISK*
8.001	MH02	26.659	1.015	115.003	1.02	0.0	384.7	FLOOD
7.002	MH03	27.063	1.795	0.000	0.82	0.0	376.1	FLOOD RISK
7.003	MH04	27.111	2.421	0.000	0.94	0.0	372.6	SURCHARGED*
9.000	MH05	27.893	0.900	0.000	0.44	0.0	43.2	FLOOD RISK*
9.001	MH06	28.237	1.836	0.000	0.98	0.0	90.4	FLOOD RISK*
9.002	MH07	27.478	1.344	0.000	0.67	0.0	88.8	FLOOD RISK*
9.003	MH08	26.676	1.134	0.000	1.10	0.0	122.8	FLOOD
9.004	MH09	26.657	1.357	0.000	1.27	0.0	217.3	FLOOD RISK*
7.004	MH10	26.734	2.477	0.000	2.10	0.0	516.2	FLOOD RISK*
7.005	MH11	26.488	2.384	6.164	2.10	0.0	526.1	FLOOD
7.006	MH12	25.987	2.063	0.000	1.80	0.0	599.2	FLOOD RISK
10.000	SW03	26.062	-0.041	0.000	0.64	0.0	89.0	FLOOD RISK*
10.001	SW04	25.699	-0.043	0.000	0.69	0.0	142.7	FLOOD RISK*
10.002	MH13	24.929	1.139	0.000	0.46	0.0	164.4	FLOOD RISK
7.007	MH14	24.890	1.320	0.000	2.01	0.0	772.7	SURCHARGED
11.000	SW05	26.950	-0.119	0.000	0.29	0.0	50.3	FLOOD RISK*
11.001	SW06	26.326	-0.071	0.000	0.56	0.0	75.9	FLOOD RISK*
7.008	21	23.905	1.380	0.000	1.40	0.0	837.0	SURCHARGED
1.019	Pri	21.340	1.440	0.000	2.72	0.0	240.9	SURCHARGED
1.020	Inf	21.014	1.514	0.000	0.00	0.0	0.0	SURCHARGED

Input Hydrograph Manhole MH08, DS/PN 2.000 (Storm)
30 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 617600 316150 TG 17600 16150
C	-0.02348
D1	0.27439
D2	0.35421
D3	0.26042
E	0.31136
F	2.47949
Area (Ha)	11.390
SAAR (mm)	617
CWI	90.060
Urban (1990)	0.0200
SPR	21.360
DPSBAR	12.200
DPLBAR	0.495
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.753
FARL	1.000

Output Variables

TP(0) (mins)	186	Q (l/s)	77.0	PR (%)	16.680
T (mins)	19	TB (mins)	492		
TPt (mins)	195	Base Flow (l/s)	0.8		

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
1	6.5	11	6.8	21	10.6	31	14.5	41	18.3	51	20.9
2	6.5	12	7.2	22	11.0	32	14.8	42	18.7	52	20.9
3	6.5	13	7.6	23	11.4	33	15.2	43	19.0	53	20.9
4	6.5	14	8.0	24	11.8	34	15.6	44	19.4	54	20.9
5	6.5	15	8.4	25	12.2	35	16.0	45	19.8	55	20.9
6	6.5	16	8.7	26	12.6	36	16.4	46	20.2	56	20.9
7	6.5	17	9.1	27	12.9	37	16.7	47	20.6	57	20.9
8	6.5	18	9.5	28	13.3	38	17.1	48	20.9	58	28.2
9	6.5	19	9.9	29	13.7	39	17.5	49	20.9	59	28.2
10	6.5	20	10.3	30	14.1	40	17.9	50	20.9	60	28.2

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.000	0.289	346.0	0.134	5.00	0.0		0.100		-5
1.001	100.000	0.709	141.0	0.137	0.00	0.0		0.100		-5
1.002	138.200	1.088	127.0	0.164	0.00	0.0		0.100		-5
1.003	61.500	0.411	149.6	0.000	0.00	0.0	0.600		o	375
2.000	100.000	0.892	112.1	0.132	5.00	0.0	0.600		o	300
2.001	100.000	0.957	104.5	0.134	0.00	0.0	0.600		o	375
2.002	100.000	0.899	111.2	0.041	0.00	0.0	0.600		o	375
1.004	39.800	0.995	40.0	0.179	0.00	0.0	0.600		o	375
3.000	100.000	0.719	139.1	0.156	5.00	0.0	0.600		o	300
3.001	100.000	0.750	133.3	0.156	0.00	0.0	0.600		o	375
4.000	100.000	0.135	740.7	0.028	5.00	0.0		0.100		-5
4.001	132.500	1.144	115.8	0.028	0.00	0.0		0.100		-5
4.002	75.600	0.901	83.9	0.000	0.00	0.0	0.600		o	150
3.002	100.000	0.750	133.3	0.163	0.00	0.0	0.600		o	375
3.003	100.000	0.788	126.9	0.168	0.00	0.0	0.600		o	450
3.004	40.700	0.969	42.0	0.232	0.00	0.0	0.600		o	450

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	27.010	0.134	0.0	0.15	102.3
1.001	26.721	0.271	0.0	0.23	160.3
1.002	26.012	0.435	0.0	0.25	168.9
1.003	23.624	0.435	0.0	1.48	163.3
2.000	25.961	0.132	0.0	1.48	104.9
2.001	25.069	0.266	0.0	1.77	195.7
2.002	24.112	0.307	0.0	1.72	189.7
1.004	23.213	0.921	0.0	2.87	317.2
3.000	26.371	0.156	0.0	1.33	94.1
3.001	25.652	0.312	0.0	1.57	173.1
4.000	28.382	0.028	0.0	0.10	69.9
4.001	28.247	0.056	0.0	0.26	176.9
4.002	26.028	0.056	0.0	1.10	19.4
3.002	24.902	0.531	0.0	1.57	173.1
3.003	24.077	0.699	0.0	1.80	286.8
3.004	23.289	0.931	0.0	3.14	500.0

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
5.000	100.000	0.262	381.7	0.048	5.00	0.0		0.100		-4
5.001	100.000	1.169	85.5	0.048	0.00	0.0		0.100		-4
5.002	100.000	1.386	72.2	0.145	0.00	0.0		0.100		-4
5.003	136.400	1.717	79.4	0.206	0.00	0.0		0.100		-4
6.000	100.000	0.162	617.3	0.169	5.00	0.0		0.100		-9
6.001	100.000	0.698	143.3	0.170	0.00	0.0		0.100		-9
6.002	100.000	0.750	133.3	0.170	0.00	0.0		0.100		-9
6.003	100.000	0.788	126.9	0.170	0.00	0.0		0.100		-9
6.004	122.500	1.282	95.6	0.219	0.00	0.0		0.100		-9
1.005	77.820	1.206	64.5	0.000	0.00	0.0	0.600		o	575
1.006	25.000	0.700	35.7	0.000	0.00	0.0	0.600		o	300
1.007	5.000	-2.500	-2.0	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
5.000	27.940	0.048	0.0	0.14	97.3
5.001	27.678	0.096	0.0	0.30	205.6
5.002	26.509	0.241	0.0	0.33	223.9
5.003	25.123	0.447	0.0	0.31	213.4
6.000	26.948	0.169	0.0	0.13	251.1
6.001	26.786	0.339	0.0	0.27	521.3
6.002	26.088	0.509	0.0	0.28	540.4
6.003	25.338	0.679	0.0	0.29	553.9
6.004	24.550	0.898	0.0	0.33	638.3
1.005	21.906	3.197	0.0	2.96	767.4
1.006	20.700	3.197	0.0	2.64	186.6
1.007	20.000	3.197	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007		22.700	22.500	20.900	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 623300 314800 TG 23300 14800
C (1km)	-0.024
D1 (1km)	0.275
D2 (1km)	0.354
D3 (1km)	0.261
E (1km)	0.311
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: MH3, DS/PN: 1.006

Invert Level (m) 20.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	476.7	1.400	1027.0	2.800	0.0	4.200	0.0
0.200	543.3	1.600	1122.0	3.000	0.0	4.400	0.0
0.400	613.9	1.800	1221.0	3.200	0.0	4.600	0.0
0.600	688.0	2.000	1324.0	3.400	0.0	4.800	0.0
0.800	767.0	2.200	0.0	3.600	0.0	5.000	0.0
1.000	850.0	2.400	0.0	3.800	0.0		
1.200	936.0	2.600	0.0	4.000	0.0		

Complex Manhole: MH3, DS/PN: 1.007

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	2.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	12.0
Safety Factor	2.0	Slope (1:X)	0.0
Porosity	0.30	Cap Volume Depth (m)	2.000
Invert Level (m)	18.500	Cap Infiltration Depth (m)	0.000

Infiltration Basin

Invert Level (m)	20.500	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00540	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.00540		

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1852.3	1.400	2879.0	2.800	0.0	4.200	0.0
0.200	1987.0	1.600	3041.0	3.000	0.0	4.400	0.0
0.400	2125.0	1.800	3208.0	3.200	0.0	4.600	0.0
0.600	2268.0	2.000	3379.0	3.400	0.0	4.800	0.0
0.800	2414.0	2.200	3554.0	3.600	0.0	5.000	0.0
1.000	2565.0	2.400	0.0	3.800	0.0		
1.200	2720.0	2.600	0.0	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	1	0%					
1.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
1.003	15 Winter	1	0%	30/15 Summer	100/15 Summer			3
2.000	15 Winter	1	0%	100/15 Summer				
2.001	15 Winter	1	0%	100/15 Summer				
2.002	15 Winter	1	0%	100/15 Summer	100/15 Winter			1
1.004	15 Winter	1	0%	30/15 Summer	100/15 Summer			3
3.000	15 Winter	1	0%	30/15 Winter	100/15 Summer			2
3.001	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
4.000	15 Winter	1	0%					
4.001	15 Winter	1	0%					
4.002	15 Winter	1	0%	30/15 Summer				
3.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
3.003	15 Winter	1	0%	100/15 Summer				
3.004	15 Winter	1	0%	100/15 Summer				
5.000	15 Winter	1	0%					
5.001	15 Winter	1	0%					
5.002	15 Winter	1	0%					
5.003	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
6.000	15 Winter	1	0%					
6.001	15 Winter	1	0%					
6.002	15 Winter	1	0%					
6.003	15 Winter	1	0%					
6.004	30 Winter	1	0%					
1.005	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
1.006	30 Winter	1	0%	10/15 Summer				
1.007	2880 Winter	1	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	27.125	-0.160	0.000	0.16	0.0	15.9	FLOOD RISK*
1.001	SW2	26.831	-0.165	0.000	0.16	0.0	25.1	FLOOD RISK*
1.002	SW3	26.135	-0.152	0.000	0.21	0.0	35.9	FLOOD RISK*
1.003	MH1	23.747	-0.252	0.000	0.23	0.0	35.6	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
2.000	MH4	26.050	-0.211	0.000	0.18	0.0	18.2	OK
2.001	MH5	25.177	-0.267	0.000	0.18	0.0	33.3	OK
2.002	MH6	24.228	-0.259	0.000	0.20	0.0	36.7	OK
1.004	MH2	23.342	-0.246	0.000	0.26	0.0	74.4	OK
3.000	MH7	26.473	-0.198	0.000	0.23	0.0	21.2	OK
3.001	MH8	25.777	-0.250	0.000	0.23	0.0	38.4	OK
4.000	SW4	28.442	-0.215	0.000	0.06	0.0	3.9	FLOOD RISK*
4.001	SW5	28.284	-0.238	0.000	0.02	0.0	4.4	FLOOD RISK*
4.002	MH9	26.076	-0.102	0.000	0.23	0.0	4.3	OK
3.002	MH10	25.055	-0.222	0.000	0.34	0.0	55.7	OK
3.003	MH11	24.236	-0.291	0.000	0.26	0.0	71.3	OK
3.004	MH12	23.430	-0.309	0.000	0.21	0.0	94.2	OK
5.000	SW6	28.008	-0.207	0.000	0.06	0.0	6.0	FLOOD RISK*
5.001	SW7	27.733	-0.220	0.000	0.04	0.0	9.1	FLOOD RISK*
5.002	SW8	26.593	-0.191	0.000	0.09	0.0	20.5	FLOOD RISK*
5.003	SW9	25.237	-0.161	0.000	0.18	0.0	39.4	FLOOD RISK*
6.000	SW10	27.100	-0.261	0.000	0.08	0.0	20.5	FLOOD RISK*
6.001	SW11	26.902	-0.297	0.000	0.05	0.0	28.1	FLOOD RISK*
6.002	SW12	26.217	-0.284	0.000	0.07	0.0	35.4	FLOOD RISK*
6.003	SW13	25.475	-0.276	0.000	0.07	0.0	41.4	FLOOD RISK*
6.004	SW14	24.690	-0.273	0.000	0.08	0.0	52.8	FLOOD RISK*
1.005	MH3	22.141	-0.340	0.000	0.35	0.0	245.7	OK
1.006	MH3	20.924	-0.076	0.000	0.75	0.0	125.0	OK
1.007	MH3	20.809	0.709	0.000	0.00	0.0	0.0	SURCHARGED

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	10	0%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	10	0%					
1.002	15 Winter	10	0%	100/15 Summer	100/15 Summer			4
1.003	15 Winter	10	0%	30/15 Summer	100/15 Summer			3
2.000	15 Winter	10	0%	100/15 Summer				
2.001	15 Winter	10	0%	100/15 Summer				
2.002	15 Winter	10	0%	100/15 Summer	100/15 Winter			1
1.004	15 Winter	10	0%	30/15 Summer	100/15 Summer			3
3.000	15 Winter	10	0%	30/15 Winter	100/15 Summer			2
3.001	15 Winter	10	0%	30/15 Summer	100/15 Summer			2
4.000	15 Winter	10	0%					
4.001	15 Winter	10	0%					
4.002	15 Winter	10	0%	30/15 Summer				
3.002	15 Winter	10	0%	30/15 Summer	100/15 Summer			2
3.003	15 Winter	10	0%	100/15 Summer				
3.004	15 Winter	10	0%	100/15 Summer				
5.000	15 Winter	10	0%					
5.001	15 Winter	10	0%					
5.002	15 Winter	10	0%					
5.003	15 Winter	10	0%	100/15 Summer	100/15 Summer			4
6.000	15 Winter	10	0%					
6.001	15 Winter	10	0%					
6.002	15 Winter	10	0%					
6.003	15 Winter	10	0%					
6.004	15 Winter	10	0%					
1.005	15 Winter	10	0%	30/15 Summer	100/15 Summer			4
1.006	30 Winter	10	0%	10/15 Summer				
1.007	2880 Winter	10	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	27.184	-0.101	0.000	0.35	0.0	35.5	FLOOD RISK*
1.001	SW2	26.887	-0.109	0.000	0.33	0.0	53.3	FLOOD RISK*
1.002	SW3	26.199	-0.088	0.000	0.47	0.0	80.0	FLOOD RISK*
1.003	MH1	23.817	-0.182	0.000	0.51	0.0	78.7	OK

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
2.000	MH4	26.096	-0.165	0.000	0.39	0.0	39.6	OK
2.001	MH5	25.244	-0.200	0.000	0.42	0.0	78.5	OK
2.002	MH6	24.299	-0.188	0.000	0.47	0.0	86.3	OK
1.004	MH2	23.421	-0.167	0.000	0.58	0.0	167.1	OK
3.000	MH7	26.530	-0.141	0.000	0.51	0.0	46.1	OK
3.001	MH8	25.858	-0.169	0.000	0.54	0.0	89.2	OK
4.000	SW4	28.476	-0.181	0.000	0.11	0.0	7.7	FLOOD RISK*
4.001	SW5	28.310	-0.212	0.000	0.06	0.0	11.3	FLOOD RISK*
4.002	MH9	26.111	-0.067	0.000	0.59	0.0	11.2	OK
3.002	MH10	25.167	-0.110	0.000	0.80	0.0	132.3	OK
3.003	MH11	24.344	-0.183	0.000	0.62	0.0	170.1	OK
3.004	MH12	23.521	-0.218	0.000	0.51	0.0	227.8	OK
5.000	SW6	28.045	-0.170	0.000	0.13	0.0	12.9	FLOOD RISK*
5.001	SW7	27.771	-0.182	0.000	0.10	0.0	21.0	FLOOD RISK*
5.002	SW8	26.648	-0.136	0.000	0.23	0.0	50.6	FLOOD RISK*
5.003	SW9	25.314	-0.084	0.000	0.49	0.0	104.7	FLOOD RISK*
6.000	SW10	27.178	-0.183	0.000	0.18	0.0	45.0	FLOOD RISK*
6.001	SW11	26.958	-0.241	0.000	0.11	0.0	58.8	FLOOD RISK*
6.002	SW12	26.281	-0.220	0.000	0.14	0.0	74.1	FLOOD RISK*
6.003	SW13	25.550	-0.201	0.000	0.17	0.0	91.5	FLOOD RISK*
6.004	SW14	24.769	-0.194	0.000	0.19	0.0	123.9	FLOOD RISK*
1.005	MH3	22.307	-0.174	0.000	0.82	0.0	576.8	OK
1.006	MH3	21.235	0.235	0.000	0.97	0.0	161.6	SURCHARGED
1.007	MH3	21.035	0.935	0.000	0.00	0.0	0.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	30	+20%					
1.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
1.003	15 Winter	30	+20%	30/15 Summer	100/15 Summer			3
2.000	15 Winter	30	+20%	100/15 Summer				
2.001	15 Winter	30	+20%	100/15 Summer				
2.002	15 Winter	30	+20%	100/15 Summer	100/15 Winter			1
1.004	15 Winter	30	+20%	30/15 Summer	100/15 Summer			3
3.000	15 Winter	30	+20%	30/15 Winter	100/15 Summer			2
3.001	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
4.000	15 Winter	30	+20%					
4.001	15 Winter	30	+20%					
4.002	15 Winter	30	+20%	30/15 Summer				
3.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
3.003	15 Winter	30	+20%	100/15 Summer				
3.004	15 Winter	30	+20%	100/15 Summer				
5.000	15 Winter	30	+20%					
5.001	15 Winter	30	+20%					
5.002	15 Winter	30	+20%					
5.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
6.000	15 Winter	30	+20%					
6.001	15 Winter	30	+20%					
6.002	15 Winter	30	+20%					
6.003	15 Winter	30	+20%					
6.004	15 Winter	30	+20%					
1.005	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
1.006	30 Winter	30	+20%	10/15 Summer				
1.007	2880 Winter	30	+20%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	27.247	-0.038	0.000	0.62	0.0	63.6	FLOOD RISK*
1.001	SW2	26.943	-0.053	0.000	0.60	0.0	95.9	FLOOD RISK*
1.002	SW3	26.265	-0.022	0.000	0.83	0.0	140.1	FLOOD RISK*
1.003	MH1	24.411	0.412	0.000	0.90	0.0	138.2	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
2.000	MH4	26.154	-0.107	0.000	0.69	0.0	70.2	OK
2.001	MH5	25.322	-0.122	0.000	0.74	0.0	139.1	OK
2.002	MH6	24.385	-0.102	0.000	0.84	0.0	152.9	OK
1.004	MH2	24.063	0.475	0.000	0.92	0.0	263.9	SURCHARGED
3.000	MH7	26.705	0.034	0.000	0.87	0.0	79.5	SURCHARGED
3.001	MH8	26.150	0.123	0.000	0.84	0.0	140.4	SURCHARGED
4.000	SW4	28.510	-0.147	0.000	0.19	0.0	13.5	FLOOD RISK*
4.001	SW5	28.341	-0.181	0.000	0.13	0.0	22.4	FLOOD RISK*
4.002	MH9	26.553	0.375	0.000	1.14	0.0	21.7	SURCHARGED
3.002	MH10	25.628	0.351	0.000	1.20	0.0	199.2	SURCHARGED
3.003	MH11	24.437	-0.090	0.000	0.96	0.0	261.7	OK
3.004	MH12	23.648	-0.091	0.000	0.84	0.0	375.7	OK
5.000	SW6	28.083	-0.132	0.000	0.24	0.0	22.9	FLOOD RISK*
5.001	SW7	27.797	-0.156	0.000	0.18	0.0	37.2	FLOOD RISK*
5.002	SW8	26.699	-0.085	0.000	0.40	0.0	90.5	FLOOD RISK*
5.003	SW9	25.383	-0.015	0.000	0.88	0.0	188.2	FLOOD RISK*
6.000	SW10	27.249	-0.112	0.000	0.32	0.0	80.2	FLOOD RISK*
6.001	SW11	27.017	-0.182	0.000	0.20	0.0	103.9	FLOOD RISK*
6.002	SW12	26.342	-0.159	0.000	0.24	0.0	130.6	FLOOD RISK*
6.003	SW13	25.618	-0.133	0.000	0.29	0.0	159.2	FLOOD RISK*
6.004	SW14	24.842	-0.121	0.000	0.34	0.0	216.6	FLOOD RISK*
1.005	MH3	23.292	0.811	0.000	1.30	0.0	914.8	SURCHARGED
1.006	MH3	21.649	0.649	0.000	1.22	0.0	202.4	SURCHARGED
1.007	MH3	21.327	1.227	0.000	0.00	0.0	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	100	+30%					
1.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
1.003	15 Winter	100	+30%	30/15 Summer	100/15 Summer			3
2.000	15 Winter	100	+30%	100/15 Summer				
2.001	15 Winter	100	+30%	100/15 Summer				
2.002	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
1.004	15 Winter	100	+30%	30/15 Summer	100/15 Summer			3
3.000	15 Winter	100	+30%	30/15 Winter	100/15 Summer			2
3.001	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
4.000	15 Winter	100	+30%					
4.001	15 Winter	100	+30%					
4.002	15 Winter	100	+30%	30/15 Summer				
3.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
3.003	15 Winter	100	+30%	100/15 Summer				
3.004	15 Winter	100	+30%	100/15 Summer				
5.000	15 Winter	100	+30%					
5.001	15 Winter	100	+30%					
5.002	15 Winter	100	+30%					
5.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
6.000	15 Winter	100	+30%					
6.001	15 Winter	100	+30%					
6.002	15 Winter	100	+30%					
6.003	15 Winter	100	+30%					
6.004	15 Winter	100	+30%					
1.005	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
1.006	30 Winter	100	+30%	10/15 Summer				
1.007	2880 Winter	100	+30%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	27.287	0.002	1.941	0.95	0.0	97.4	FLOOD
1.001	SW2	26.995	-0.001	0.000	0.93	0.0	148.4	FLOOD RISK*
1.002	SW3	26.304	0.017	17.380	1.01	0.0	169.8	FLOOD
1.003	MH1	25.204	1.205	5.696	1.35	0.0	207.4	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
2.000	MH4	27.032	0.771	0.000	1.02	0.0	104.2	SURCHARGED
2.001	MH5	26.448	1.004	0.000	0.98	0.0	183.6	FLOOD RISK
2.002	MH6	25.687	1.200	0.141	0.95	0.0	172.5	FLOOD
1.004	MH2	24.803	1.215	15.209	1.11	0.0	318.6	FLOOD
3.000	MH7	27.878	1.207	7.247	1.01	0.0	92.5	FLOOD
3.001	MH8	27.235	1.208	7.518	0.99	0.0	165.3	FLOOD
4.000	SW4	28.547	-0.110	0.000	0.32	0.0	22.1	FLOOD RISK*
4.001	SW5	28.364	-0.158	0.000	0.19	0.0	33.0	FLOOD RISK*
4.002	MH9	27.305	1.127	0.000	1.49	0.0	28.5	FLOOD RISK
3.002	MH10	26.493	1.216	15.922	1.44	0.0	239.5	FLOOD
3.003	MH11	25.525	0.998	0.000	1.12	0.0	305.9	FLOOD RISK
3.004	MH12	24.579	0.840	0.000	0.95	0.0	425.2	SURCHARGED
5.000	SW6	28.124	-0.091	0.000	0.39	0.0	37.8	FLOOD RISK*
5.001	SW7	27.832	-0.121	0.000	0.29	0.0	59.6	FLOOD RISK*
5.002	SW8	26.752	-0.032	0.000	0.66	0.0	147.7	FLOOD RISK*
5.003	SW9	25.420	0.022	21.751	1.00	0.0	213.7	FLOOD
6.000	SW10	27.303	-0.058	0.000	0.53	0.0	132.9	FLOOD RISK*
6.001	SW11	27.084	-0.115	0.000	0.33	0.0	170.1	FLOOD RISK*
6.002	SW12	26.402	-0.099	0.000	0.40	0.0	215.7	FLOOD RISK*
6.003	SW13	25.671	-0.080	0.000	0.48	0.0	266.5	FLOOD RISK*
6.004	SW14	24.893	-0.070	0.000	0.52	0.0	332.7	FLOOD RISK*
1.005	MH3	23.763	1.282	82.197	1.42	0.0	999.0	FLOOD
1.006	MH3	22.168	1.168	0.000	1.46	0.0	243.9	SURCHARGED
1.007	MH3	21.640	1.540	0.000	0.00	0.0	0.0	SURCHARGED

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 8688 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	21.594	2.394	9.4	2516.7	O K
30 min Summer	21.677	2.477	9.6	3047.5	O K
60 min Summer	21.773	2.573	9.8	3665.9	O K
120 min Summer	21.882	2.682	10.0	4392.2	O K
180 min Summer	21.939	2.739	10.1	4778.4	O K
240 min Summer	22.004	2.804	10.3	5223.8	O K
360 min Summer	22.085	2.885	10.4	5788.7	O K
480 min Summer	22.142	2.942	10.6	6187.9	O K
600 min Summer	22.190	2.990	10.7	6537.2	O K
720 min Summer	22.227	3.027	10.7	6799.6	O K
960 min Summer	22.323	3.123	10.9	7506.2	O K
1440 min Summer	22.467	3.267	11.2	8588.1	O K
2160 min Summer	22.622	3.422	11.6	9793.7	O K
2880 min Summer	22.731	3.531	11.8	10669.6	O K
4320 min Summer	22.797	3.597	11.9	11204.1	O K
5760 min Summer	22.829	3.629	12.0	11463.9	O K
7200 min Summer	22.841	3.641	12.0	11565.5	O K
8640 min Summer	22.841	3.641	12.0	11566.1	O K
10080 min Summer	22.833	3.633	12.0	11501.8	O K
15 min Winter	21.594	2.394	9.4	2516.7	O K
30 min Winter	21.677	2.477	9.6	3047.5	O K
60 min Winter	21.773	2.573	9.8	3665.6	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	206.464	831
30 min Summer	115.708	835
60 min Summer	64.846	852
120 min Summer	36.341	890
180 min Summer	25.900	924
240 min Summer	20.367	964
360 min Summer	14.515	1048
480 min Summer	11.414	1134
600 min Summer	9.473	1232
720 min Summer	8.134	1328
960 min Summer	6.544	1532
1440 min Summer	4.815	1958
2160 min Summer	3.544	2636
2880 min Summer	2.851	3308
4320 min Summer	2.020	4672
5760 min Summer	1.582	6048
7200 min Summer	1.309	7416
8640 min Summer	1.121	8760
10080 min Summer	0.984	9824
15 min Winter	206.464	831
30 min Winter	115.708	835
60 min Winter	64.846	854

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
120 min Winter	21.882	2.682	10.0	4391.7	O K
180 min Winter	21.944	2.744	10.1	4812.6	O K
240 min Winter	22.006	2.806	10.3	5235.5	O K
360 min Winter	22.085	2.885	10.4	5788.2	O K
480 min Winter	22.144	2.944	10.6	6202.3	O K
600 min Winter	22.191	2.991	10.7	6538.7	O K
720 min Winter	22.229	3.029	10.7	6817.5	O K
960 min Winter	22.326	3.126	10.9	7528.4	O K
1440 min Winter	22.471	3.271	11.3	8618.8	O K
2160 min Winter	22.625	3.425	11.6	9818.9	O K
2880 min Winter	22.736	3.536	11.8	10706.4	O K
4320 min Winter	22.804	3.604	12.0	11263.8	O K
5760 min Winter	22.839	3.639	12.0	11545.9	O K
7200 min Winter	22.854	3.654	12.1	11669.6	O K
8640 min Winter	22.856	3.656	12.1	11691.5	O K
10080 min Winter	22.851	3.651	12.1	11644.7	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
120 min Winter	36.341	890
180 min Winter	25.900	926
240 min Winter	20.367	966
360 min Winter	14.515	1052
480 min Winter	11.414	1140
600 min Winter	9.473	1234
720 min Winter	8.134	1332
960 min Winter	6.544	1534
1440 min Winter	4.815	1956
2160 min Winter	3.544	2612
2880 min Winter	2.851	3272
4320 min Winter	2.020	4604
5760 min Winter	1.582	5944
7200 min Winter	1.309	7280
8640 min Winter	1.121	8600
10080 min Winter	0.984	9888

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
Site Location	GB 623300 314800 TG 23300 14800
C (1km)	-0.024
D1 (1km)	0.275
D2 (1km)	0.354
D3 (1km)	0.261
E (1km)	0.311
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.000

Time (mins)	**Area (ha)**
0-4	0.000

Model Details

Storage is Online Cover Level (m) 24.000

Complex Structure

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	6.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	45.0
Safety Factor	2.0	Slope (1:X)	0.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	19.200	Cap Infiltration Depth (m)	0.000

Infiltration Basin

Invert Level (m)	21.200	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00260	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.00260		

Depth (m)	**Area (m²)**	**Depth (m)**	**Area (m²)**	**Depth (m)**	**Area (m²)**	**Depth (m)**	**Area (m²)**
0.000	5611.9	1.400	7783.1	2.800	10170.4	4.200	0.0
0.200	5905.0	1.600	8112.1	3.000	0.0	4.400	0.0
0.400	6204.0	1.800	8445.0	3.200	0.0	4.600	0.0
0.600	6509.7	2.000	8782.0	3.400	0.0	4.800	0.0
0.800	6820.6	2.200	9123.1	3.600	0.0	5.000	0.0
1.000	7137.3	2.400	9468.1	3.800	0.0		
1.200	7458.2	2.600	9817.2	4.000	0.0		

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.000	0.415	241.0	0.030	5.00	0.0		0.050		-5
1.001	100.000	0.903	110.7	0.051	0.00	0.0		0.050		-5
1.002	100.000	1.923	52.0	0.051	0.00	0.0		0.050		-5
1.003	100.000	2.090	47.8	0.149	0.00	0.0		0.050		-5
1.004	100.000	1.692	59.1	0.163	0.00	0.0		0.050		-5
1.005	134.820	2.439	55.3	0.178	0.00	0.0		0.050		-5
2.000	100.000	0.475	210.5	0.017	5.00	0.0		0.050		-5
2.001	100.000	1.082	92.4	0.026	0.00	0.0		0.050		-5
2.002	100.000	0.988	101.2	0.123	0.00	0.0		0.050		-5
2.003	100.000	1.341	74.6	0.120	0.00	0.0		0.050		-5
2.004	148.371	2.408	61.6	0.207	0.00	0.0		0.050		-5
1.006	15.875	0.053	300.0	0.000	0.00	0.0	0.600		o	900
3.000	100.000	0.964	103.7	0.156	5.00	0.0	0.600		o	375
3.001	100.000	1.414	70.7	0.156	0.00	0.0	0.600		o	375
3.002	100.000	1.655	60.4	0.148	0.00	0.0	0.600		o	375
3.003	100.000	1.654	60.5	0.031	0.00	0.0	0.600		o	375
3.004	100.000	1.681	59.5	0.026	0.00	0.0	0.600		o	375
3.005	50.220	0.436	115.2	0.127	0.00	0.0	0.600		o	375

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	28.382	0.030	0.0	0.36	245.3
1.001	27.967	0.081	0.0	0.53	361.8
1.002	27.064	0.132	0.0	0.77	528.0
1.003	25.141	0.281	0.0	0.80	550.4
1.004	23.051	0.444	0.0	0.72	495.2
1.005	21.359	0.622	0.0	0.75	512.1
2.000	25.214	0.017	0.0	0.38	262.4
2.001	24.739	0.043	0.0	0.58	396.0
2.002	23.657	0.166	0.0	0.55	378.4
2.003	22.669	0.286	0.0	0.64	440.9
2.004	21.328	0.493	0.0	0.71	485.0
1.006	17.395	1.115	0.0	1.80	1147.5
3.000	26.016	0.156	0.0	1.78	196.5
3.001	25.052	0.312	0.0	2.16	238.2
3.002	23.638	0.460	0.0	2.33	257.9
3.003	21.983	0.491	0.0	2.33	257.8
3.004	20.329	0.517	0.0	2.35	259.9
3.005	18.648	0.644	0.0	1.69	186.4

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
4.000	100.000	0.479	208.8	0.166	5.00	0.0	0.600		o	375
4.001	100.000	0.500	200.0	0.157	0.00	0.0	0.600		o	375
4.002	100.000	0.500	200.0	0.159	0.00	0.0	0.600		o	375
4.003	100.000	0.599	166.9	0.152	0.00	0.0	0.600		o	375
4.004	100.000	1.106	90.4	0.045	0.00	0.0	0.600		o	375
4.005	100.000	1.649	60.6	0.133	0.00	0.0	0.600		o	375
4.006	52.950	0.697	76.0	0.137	0.00	0.0	0.600		o	375
1.007	14.220	0.047	300.0	0.137	0.00	0.0	0.600		o	900
5.000	100.000	0.415	241.0	0.174	5.00	0.0		0.050		-4
5.001	100.000	1.026	97.5	0.168	0.00	0.0		0.050		-4
5.002	100.000	1.268	78.9	0.157	0.00	0.0		0.050		-4
5.003	100.000	1.486	67.3	0.148	0.00	0.0		0.050		-4
5.004	100.000	1.469	68.1	0.148	0.00	0.0		0.050		-4
5.005	132.664	1.489	89.1	0.276	0.00	0.0		0.050		-4
6.000	100.000	0.401	249.4	0.137	5.00	0.0		0.050		-4
6.001	80.327	0.388	207.0	0.128	0.00	0.0		0.050		-4
6.002	100.000	0.525	190.5	0.189	0.00	0.0		0.050		-4
6.003	100.000	0.294	340.1	0.153	0.00	0.0		0.050		-4
6.004	100.000	0.322	310.6	0.155	0.00	0.0		0.050		-4

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
4.000	23.817	0.166	0.0	1.25	138.1
4.001	23.338	0.323	0.0	1.28	141.1
4.002	22.838	0.482	0.0	1.28	141.1
4.003	22.338	0.634	0.0	1.40	154.6
4.004	21.739	0.679	0.0	1.91	210.5
4.005	20.633	0.812	0.0	2.33	257.4
4.006	18.984	0.949	0.0	2.08	229.8
1.007	17.342	2.845	0.0	1.80	1147.5
5.000	27.080	0.174	0.0	0.36	245.0
5.001	26.665	0.342	0.0	0.57	385.3
5.002	25.639	0.499	0.0	0.63	428.3
5.003	24.371	0.647	0.0	0.68	463.7
5.004	22.885	0.795	0.0	0.68	461.0
5.005	21.416	1.071	0.0	0.59	403.0
6.000	24.851	0.137	0.0	0.35	240.9
6.001	24.450	0.265	0.0	0.39	264.3
6.002	24.062	0.454	0.0	0.40	275.6
6.003	23.537	0.607	0.0	0.30	206.2
6.004	23.243	0.762	0.0	0.32	215.8

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
6.005	100.000	0.388	257.7	0.043	0.00	0.0		0.050		-4
6.006	165.437	2.606	63.5	0.070	0.00	0.0		0.050		-4
1.008	107.848	0.359	300.0	0.000	0.00	0.0	0.600		o	900
1.009	13.344	0.135	98.8	0.000	0.00	0.0	0.600		o	900
7.000	65.000	1.300	50.0	0.071	5.00	0.0	0.600		o	150
8.000	21.180	0.424	50.0	0.043	5.00	0.0	0.600		o	150
8.001	33.220	0.133	250.0	0.003	0.00	0.0	0.600		o	225
7.001	10.620	0.035	300.0	0.069	0.00	0.0	0.600		o	300
7.002	40.000	0.133	300.0	0.000	0.00	0.0	0.600		o	300
7.003	50.000	1.000	50.0	0.048	0.00	0.0	0.600		o	300
9.000	35.940	0.144	250.0	0.045	5.00	0.0	0.600		o	225
9.001	34.120	0.136	250.0	0.036	0.00	0.0	0.600		o	225
7.004	33.148	0.121	275.0	0.063	0.00	0.0	0.600		o	375
7.005	48.298	0.176	275.0	0.000	0.00	0.0	0.600		o	375
7.006	68.104	0.248	275.0	0.000	0.00	0.0	0.600		o	375
7.007	13.017	0.135	96.4	0.000	0.00	0.0	0.600		o	375

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
6.005	22.921	0.805	0.0	0.35	236.9
6.006	22.533	0.875	0.0	0.70	477.4
1.008	17.295	4.791	0.0	1.80	1147.5
1.009	16.935	4.791	0.0	3.15	2005.2
7.000	24.000	0.071	0.0	1.43	25.2
8.000	21.506	0.043	0.0	1.43	25.2
8.001	21.007	0.046	0.0	0.82	32.7
7.001	20.799	0.186	0.0	0.90	63.8
7.002	20.764	0.186	0.0	0.90	63.8
7.003	20.630	0.234	0.0	2.23	157.5
9.000	18.009	0.045	0.0	0.82	32.7
9.001	17.865	0.081	0.0	0.82	32.7
7.004	17.579	0.378	0.0	1.09	120.1
7.005	17.458	0.378	0.0	1.09	120.1
7.006	17.283	0.378	0.0	1.09	120.1
7.007	17.035	0.378	0.0	1.85	203.8

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.010	21.000	0.200	105.0	0.000	0.00	0.0	0.600		o	300
1.011	5.000	-2.600	-1.9	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.010	16.800	5.169	0.0	1.53	108.4
1.011	16.600	5.169	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.011		19.600	19.200	17.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 624150 314600 TG 24150 14600
C (1km)	-0.024
D1 (1km)	0.285
D2 (1km)	0.344
D3 (1km)	0.264
E (1km)	0.313
F (1km)	2.483
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840

Synthetic Rainfall Details

Storm Duration (mins) 30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.010

Invert Level (m) 16.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	459.1	1.400	993.7	2.800	0.0	4.200	0.0
0.200	523.4	1.600	1086.1	3.000	0.0	4.400	0.0
0.400	591.7	1.800	1182.6	3.200	0.0	4.600	0.0
0.600	664.1	2.000	1283.1	3.400	0.0	4.800	0.0
0.800	740.4	2.200	1387.6	3.600	0.0	5.000	0.0
1.000	820.8	2.400	1496.1	3.800	0.0		
1.200	905.2	2.600	1608.7	4.000	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 1.011

Invert Level (m) 16.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.05890 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.05890

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	958.8	1.400	1746.4	2.800	2752.2	4.200	0.0
0.200	1057.9	1.600	1876.7	3.000	0.0	4.400	0.0
0.400	1161.5	1.800	2011.5	3.200	0.0	4.600	0.0
0.600	1269.6	2.000	2150.7	3.400	0.0	4.800	0.0
0.800	1382.1	2.200	2294.4	3.600	0.0	5.000	0.0
1.000	1499.1	2.400	2442.5	3.800	0.0		
1.200	1620.5	2.600	2595.1	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%					
1.001	15 Winter	1	0%					
1.002	15 Winter	1	0%					
1.003	15 Winter	1	0%					
1.004	15 Winter	1	0%					
1.005	15 Winter	1	0%					
2.000	15 Winter	1	0%					
2.001	15 Winter	1	0%					
2.002	15 Winter	1	0%					
2.003	15 Winter	1	0%					
2.004	15 Winter	1	0%					
1.006	15 Winter	1	0%	30/15 Summer	100/15 Summer			5
3.000	15 Winter	1	0%	100/15 Summer				
3.001	15 Winter	1	0%	100/15 Summer				
3.002	15 Winter	1	0%	100/15 Summer	100/15 Winter			1
3.003	15 Winter	1	0%	30/15 Winter	100/15 Winter			1
3.004	15 Winter	1	0%	30/15 Summer	100/15 Winter			1
3.005	15 Winter	1	0%	30/15 Summer	100/15 Summer			3
4.000	15 Winter	1	0%	30/15 Winter	100/15 Summer			2
4.001	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
4.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
4.003	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
4.004	15 Winter	1	0%	100/15 Summer	100/15 Winter			1
4.005	15 Winter	1	0%	30/15 Winter	100/15 Winter			1
4.006	15 Winter	1	0%	30/15 Summer				
1.007	15 Winter	1	0%	30/15 Summer				
5.000	15 Winter	1	0%					
5.001	15 Winter	1	0%					
5.002	15 Winter	1	0%					
5.003	15 Winter	1	0%					
5.004	15 Winter	1	0%					
5.005	15 Winter	1	0%	100/15 Summer	100/15 Summer			3
6.000	15 Winter	1	0%					
6.001	15 Winter	1	0%					
6.002	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
6.003	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
6.004	30 Winter	1	0%	100/15 Summer	100/15 Summer			6

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
6.005	30 Winter	1	0%					
6.006	30 Winter	1	0%					
1.008	15 Winter	1	0%	30/15 Summer				
1.009	15 Winter	1	0%	30/15 Summer				
7.000	15 Winter	1	0%	30/15 Summer				
8.000	15 Winter	1	0%	30/15 Summer				
8.001	15 Winter	1	0%	30/15 Summer				
7.001	15 Winter	1	0%	30/15 Summer				
7.002	15 Winter	1	0%	30/15 Summer				
7.003	15 Winter	1	0%	100/15 Summer				
9.000	15 Winter	1	0%	30/15 Summer				
9.001	15 Winter	1	0%	30/15 Summer				2
7.004	15 Winter	1	0%	30/15 Summer				
7.005	15 Winter	1	0%	30/15 Summer				1
7.006	15 Winter	1	0%	30/15 Summer				
7.007	60 Winter	1	0%	30/15 Summer				
1.010	60 Winter	1	0%	1/15 Summer				
1.011	960 Winter	1	0%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	28.413	-0.244	0.000	0.02	0.0	3.8	FLOOD RISK*
1.001	SW2	28.005	-0.237	0.000	0.02	0.0	8.4	FLOOD RISK*
1.002	SW3	27.101	-0.238	0.000	0.02	0.0	12.0	FLOOD RISK*
1.003	SW4	25.194	-0.222	0.000	0.04	0.0	24.1	FLOOD RISK*
1.004	SW5	23.124	-0.202	0.000	0.07	0.0	36.4	FLOOD RISK*
1.005	SW6	21.443	-0.191	0.000	0.10	0.0	51.3	FLOOD RISK*
2.000	SW7	25.233	-0.256	0.000	0.01	0.0	2.4	FLOOD RISK*
2.001	SW8	24.764	-0.250	0.000	0.01	0.0	4.5	FLOOD RISK*
2.002	SW9	23.710	-0.222	0.000	0.04	0.0	15.9	FLOOD RISK*
2.003	SW10	22.732	-0.212	0.000	0.06	0.0	25.4	FLOOD RISK*
2.004	SW11	21.408	-0.195	0.000	0.09	0.0	44.5	FLOOD RISK*
1.006	MH1	17.730	-0.565	0.000	0.13	0.0	96.1	OK
3.000	MH2	26.102	-0.289	0.000	0.12	0.0	21.7	OK
3.001	MH3	25.158	-0.269	0.000	0.17	0.0	39.3	OK
3.002	MH4	23.760	-0.253	0.000	0.23	0.0	55.8	OK
3.003	MH5	22.106	-0.252	0.000	0.23	0.0	58.1	OK
3.004	MH6	20.454	-0.250	0.000	0.24	0.0	59.5	OK
3.005	MH7	18.817	-0.206	0.000	0.41	0.0	71.4	OK
4.000	MH8	23.925	-0.267	0.000	0.17	0.0	22.2	OK
4.001	MH9	23.479	-0.234	0.000	0.28	0.0	38.1	OK
4.002	MH10	23.005	-0.208	0.000	0.39	0.0	52.3	OK
4.003	MH11	22.514	-0.199	0.000	0.43	0.0	64.6	OK
4.004	MH12	21.889	-0.225	0.000	0.33	0.0	67.1	OK
4.005	MH13	20.776	-0.232	0.000	0.31	0.0	75.5	OK
4.006	MH14	19.149	-0.210	0.000	0.40	0.0	84.9	OK
1.007	MH15	17.720	-0.522	0.000	0.37	0.0	255.2	OK
5.000	SW12	27.165	-0.190	0.000	0.09	0.0	21.0	FLOOD RISK*

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.001	SW13	26.749	-0.191	0.000	0.09	0.0	34.4	FLOOD RISK*
5.002	SW14	25.728	-0.186	0.000	0.10	0.0	43.7	FLOOD RISK*
5.003	SW15	24.461	-0.185	0.000	0.11	0.0	49.9	FLOOD RISK*
5.004	SW16	22.979	-0.181	0.000	0.12	0.0	54.1	FLOOD RISK*
5.005	SW17	21.525	-0.166	0.000	0.17	0.0	68.3	FLOOD RISK*
6.000	SW18	24.925	-0.201	0.000	0.07	0.0	16.6	FLOOD RISK*
6.001	SW19	24.539	-0.186	0.000	0.10	0.0	27.6	FLOOD RISK*
6.002	SW20	24.168	-0.169	0.000	0.15	0.0	40.2	FLOOD RISK*
6.003	SW21	23.668	-0.144	0.000	0.22	0.0	45.5	FLOOD RISK*
6.004	SW22	23.371	-0.147	0.000	0.22	0.0	47.7	FLOOD RISK*
6.005	SW23	23.041	-0.155	0.000	0.20	0.0	46.9	FLOOD RISK*
6.006	SW24	22.617	-0.191	0.000	0.10	0.0	47.8	FLOOD RISK*
1.008	MH16	17.647	-0.548	0.000	0.32	0.0	330.5	OK
1.009	MH17	17.298	-0.537	0.000	0.34	0.0	328.3	OK
7.000	MH1	24.068	-0.082	0.000	0.42	0.0	10.3	OK
8.000	MH2	21.558	-0.098	0.000	0.26	0.0	6.2	OK
8.001	MH3	21.078	-0.154	0.000	0.21	0.0	6.5	OK
7.001	MH4	20.948	-0.151	0.000	0.50	0.0	25.1	OK
7.002	MH5	20.900	-0.164	0.000	0.41	0.0	24.4	OK
7.003	MH6	20.721	-0.209	0.000	0.20	0.0	29.6	OK
9.000	MH7	18.079	-0.155	0.000	0.21	0.0	6.3	OK
9.001	MH8	17.957	-0.134	0.000	0.34	0.0	10.5	OK
7.004	MH9	17.752	-0.202	0.000	0.43	0.0	46.1	OK
7.005	MH10	17.626	-0.207	0.000	0.41	0.0	45.3	OK
7.006	MH11	17.446	-0.211	0.000	0.38	0.0	43.5	OK
7.007	MH12	17.256	-0.154	0.000	0.17	0.0	24.8	OK
1.010	Pri	17.254	0.154	0.000	1.36	0.0	129.0	SURCHARGED
1.011	Inf	17.113	0.413	0.000	0.00	0.0	0.0	SURCHARGED*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%					
1.001	15 Winter	30	+20%					
1.002	15 Winter	30	+20%					
1.003	15 Winter	30	+20%					
1.004	15 Winter	30	+20%					
1.005	15 Winter	30	+20%					
2.000	15 Winter	30	+20%					
2.001	15 Winter	30	+20%					
2.002	15 Winter	30	+20%					
2.003	15 Winter	30	+20%					
2.004	15 Winter	30	+20%					
1.006	15 Winter	30	+20%	30/15 Summer	100/15 Summer			5
3.000	15 Winter	30	+20%	100/15 Summer				
3.001	15 Winter	30	+20%	100/15 Summer				
3.002	15 Winter	30	+20%	100/15 Summer	100/15 Winter			1
3.003	15 Winter	30	+20%	30/15 Winter	100/15 Winter			1
3.004	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
3.005	15 Winter	30	+20%	30/15 Summer	100/15 Summer			3
4.000	15 Winter	30	+20%	30/15 Winter	100/15 Summer			2
4.001	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
4.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
4.003	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
4.004	15 Winter	30	+20%	100/15 Summer	100/15 Winter			1
4.005	15 Winter	30	+20%	30/15 Winter	100/15 Winter			1
4.006	15 Winter	30	+20%	30/15 Summer				
1.007	15 Winter	30	+20%	30/15 Summer				
5.000	15 Winter	30	+20%					
5.001	15 Winter	30	+20%					
5.002	15 Winter	30	+20%					
5.003	15 Winter	30	+20%					
5.004	15 Winter	30	+20%					
5.005	15 Winter	30	+20%	100/15 Summer	100/15 Summer			3
6.000	15 Winter	30	+20%					
6.001	15 Winter	30	+20%					
6.002	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
6.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
6.004	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
6.005	15 Winter	30	+20%					
6.006	30 Winter	30	+20%					
1.008	15 Winter	30	+20%	30/15 Summer				
1.009	60 Winter	30	+20%	30/15 Summer				
7.000	15 Winter	30	+20%	30/15 Summer				
8.000	15 Winter	30	+20%	30/15 Summer				
8.001	15 Winter	30	+20%	30/15 Summer				
7.001	15 Winter	30	+20%	30/15 Summer				
7.002	15 Winter	30	+20%	30/15 Summer				
7.003	15 Winter	30	+20%	100/15 Summer				
9.000	15 Winter	30	+20%	30/15 Summer				
9.001	15 Winter	30	+20%	30/15 Summer				2
7.004	15 Winter	30	+20%	30/15 Summer				
7.005	60 Winter	30	+20%	30/15 Summer				1
7.006	60 Winter	30	+20%	30/15 Summer				
7.007	60 Winter	30	+20%	30/15 Summer				
1.010	60 Winter	30	+20%	1/15 Summer				
1.011	1440 Winter	30	+20%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	28.449	-0.208	0.000	0.06	0.0	14.4	FLOOD RISK*
1.001	SW2	28.058	-0.184	0.000	0.10	0.0	35.2	FLOOD RISK*
1.002	SW3	27.153	-0.186	0.000	0.10	0.0	51.0	FLOOD RISK*
1.003	SW4	25.272	-0.144	0.000	0.20	0.0	109.1	FLOOD RISK*
1.004	SW5	23.219	-0.107	0.000	0.33	0.0	161.4	FLOOD RISK*
1.005	SW6	21.545	-0.089	0.000	0.46	0.0	236.5	FLOOD RISK*
2.000	SW7	25.260	-0.229	0.000	0.03	0.0	8.2	FLOOD RISK*
2.001	SW8	24.798	-0.216	0.000	0.05	0.0	18.6	FLOOD RISK*
2.002	SW9	23.787	-0.145	0.000	0.19	0.0	73.3	FLOOD RISK*
2.003	SW10	22.818	-0.126	0.000	0.26	0.0	113.4	FLOOD RISK*
2.004	SW11	21.507	-0.096	0.000	0.43	0.0	208.8	FLOOD RISK*
1.006	MH1	18.693	0.398	0.000	0.62	0.0	439.1	SURCHARGED
3.000	MH2	26.197	-0.194	0.000	0.45	0.0	84.2	OK
3.001	MH3	25.300	-0.127	0.000	0.73	0.0	167.0	OK
3.002	MH4	23.947	-0.066	0.000	0.97	0.0	239.5	OK
3.003	MH5	22.495	0.137	0.000	0.95	0.0	236.0	SURCHARGED
3.004	MH6	21.078	0.374	0.000	0.94	0.0	233.6	SURCHARGED
3.005	MH7	19.601	0.578	0.000	1.53	0.0	263.6	SURCHARGED
4.000	MH8	24.376	0.184	0.000	0.63	0.0	84.1	SURCHARGED
4.001	MH9	24.267	0.554	0.000	0.84	0.0	114.0	SURCHARGED
4.002	MH10	23.853	0.640	0.000	1.15	0.0	155.4	SURCHARGED
4.003	MH11	23.139	0.426	0.000	1.29	0.0	191.0	SURCHARGED
4.004	MH12	22.088	-0.026	0.000	0.99	0.0	200.1	OK
4.005	MH13	21.105	0.097	0.000	0.91	0.0	225.8	SURCHARGED
4.006	MH14	19.784	0.425	0.000	1.27	0.0	271.4	SURCHARGED
1.007	MH15	18.663	0.421	0.000	1.38	0.0	953.6	SURCHARGED
5.000	SW12	27.251	-0.104	0.000	0.34	0.0	82.8	FLOOD RISK*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.001	SW13	26.842	-0.098	0.000	0.36	0.0	140.3	FLOOD RISK*
5.002	SW14	25.826	-0.088	0.000	0.41	0.0	175.9	FLOOD RISK*
5.003	SW15	24.560	-0.086	0.000	0.43	0.0	200.0	FLOOD RISK*
5.004	SW16	23.081	-0.079	0.000	0.47	0.0	217.7	FLOOD RISK*
5.005	SW17	21.656	-0.035	0.000	0.74	0.0	297.8	FLOOD RISK*
6.000	SW18	25.004	-0.122	0.000	0.27	0.0	65.2	FLOOD RISK*
6.001	SW19	24.636	-0.089	0.000	0.42	0.0	111.0	FLOOD RISK*
6.002	SW20	24.283	-0.054	0.000	0.59	0.0	161.8	FLOOD RISK*
6.003	SW21	23.805	-0.007	0.000	0.88	0.0	180.8	FLOOD RISK*
6.004	SW22	23.502	-0.016	0.000	0.85	0.0	183.1	FLOOD RISK*
6.005	SW23	23.159	-0.037	0.000	0.73	0.0	173.0	FLOOD RISK*
6.006	SW24	22.695	-0.113	0.000	0.36	0.0	173.3	FLOOD RISK*
1.008	MH16	18.574	0.379	0.000	1.26	0.0	1303.5	SURCHARGED
1.009	MH17	18.287	0.452	0.000	0.85	0.0	816.1	SURCHARGED
7.000	MH1	25.233	1.083	0.000	1.34	0.0	33.2	SURCHARGED*
8.000	MH2	21.809	0.153	0.000	0.94	0.0	22.3	SURCHARGED*
8.001	MH3	21.427	0.195	0.000	0.78	0.0	24.1	SURCHARGED*
7.001	MH4	21.355	0.256	0.000	1.77	0.0	89.1	SURCHARGED*
7.002	MH5	21.222	0.158	0.000	1.47	0.0	87.2	SURCHARGED*
7.003	MH6	20.825	-0.105	0.000	0.73	0.0	108.9	OK
9.000	MH7	18.688	0.454	0.000	0.65	0.0	19.9	SURCHARGED*
9.001	MH8	18.647	0.557	0.000	1.10	0.0	34.0	SURCHARGED*
7.004	MH9	18.535	0.582	0.000	1.57	0.0	168.3	SURCHARGED*
7.005	MH10	18.293	0.460	0.000	0.76	0.0	84.6	SURCHARGED*
7.006	MH11	18.284	0.626	0.000	0.65	0.0	73.6	SURCHARGED*
7.007	MH12	18.275	0.866	0.000	0.47	0.0	67.0	SURCHARGED*
1.010	Pri	18.271	1.171	0.000	2.53	0.0	240.8	SURCHARGED
1.011	Inf	17.936	1.236	0.000	0.00	0.0	0.0	SURCHARGED*

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s): Summer and Winter
Duration(s) (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years): 1, 30, 100
Climate Change (%): 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%					
1.001	15 Winter	100	+30%					
1.002	15 Winter	100	+30%					
1.003	15 Winter	100	+30%					
1.004	15 Winter	100	+30%					
1.005	15 Winter	100	+30%					
2.000	15 Winter	100	+30%					
2.001	15 Winter	100	+30%					
2.002	15 Winter	100	+30%					
2.003	15 Winter	100	+30%					
2.004	15 Winter	100	+30%					
1.006	30 Winter	100	+30%	30/15 Summer	100/15 Summer			5
3.000	15 Winter	100	+30%	100/15 Summer				
3.001	15 Winter	100	+30%	100/15 Summer				
3.002	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
3.003	15 Winter	100	+30%	30/15 Winter	100/15 Winter			1
3.004	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
3.005	15 Winter	100	+30%	30/15 Summer	100/15 Summer			3
4.000	15 Winter	100	+30%	30/15 Winter	100/15 Summer			2
4.001	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
4.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
4.003	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
4.004	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
4.005	15 Winter	100	+30%	30/15 Winter	100/15 Winter			1
4.006	15 Winter	100	+30%	30/15 Summer				
1.007	60 Winter	100	+30%	30/15 Summer				
5.000	15 Winter	100	+30%					
5.001	15 Winter	100	+30%					
5.002	15 Winter	100	+30%					
5.003	15 Winter	100	+30%					
5.004	15 Winter	100	+30%					
5.005	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
6.000	15 Winter	100	+30%					
6.001	15 Winter	100	+30%					
6.002	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
6.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
6.004	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
6.005	30 Winter	100	+30%					
6.006	30 Winter	100	+30%					
1.008	30 Winter	100	+30%	30/15 Summer				
1.009	60 Winter	100	+30%	30/15 Summer				
7.000	15 Winter	100	+30%	30/15 Summer				
8.000	15 Winter	100	+30%	30/15 Summer				
8.001	15 Winter	100	+30%	30/15 Summer				
7.001	15 Winter	100	+30%	30/15 Summer				
7.002	15 Winter	100	+30%	30/15 Summer				
7.003	15 Winter	100	+30%	100/15 Summer				
9.000	30 Winter	100	+30%	30/15 Summer				
9.001	15 Winter	100	+30%	30/15 Summer				2
7.004	15 Winter	100	+30%	30/15 Summer				
7.005	15 Winter	100	+30%	30/15 Summer				1
7.006	60 Winter	100	+30%	30/15 Summer				
7.007	60 Winter	100	+30%	30/15 Summer				
1.010	60 Winter	100	+30%	1/15 Summer				
1.011	1440 Winter	100	+30%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	28.471	-0.186	0.000	0.10	0.0	23.7	FLOOD RISK*
1.001	SW2	28.082	-0.160	0.000	0.16	0.0	58.1	FLOOD RISK*
1.002	SW3	27.178	-0.161	0.000	0.16	0.0	84.9	FLOOD RISK*
1.003	SW4	25.310	-0.106	0.000	0.33	0.0	180.7	FLOOD RISK*
1.004	SW5	23.269	-0.057	0.000	0.54	0.0	268.1	FLOOD RISK*
1.005	SW6	21.604	-0.030	0.000	0.72	0.0	368.9	FLOOD RISK*
2.000	SW7	25.275	-0.214	0.000	0.05	0.0	13.4	FLOOD RISK*
2.001	SW8	24.820	-0.194	0.000	0.08	0.0	30.9	FLOOD RISK*
2.002	SW9	23.825	-0.107	0.000	0.32	0.0	121.1	FLOOD RISK*
2.003	SW10	22.863	-0.081	0.000	0.43	0.0	187.7	FLOOD RISK*
2.004	SW11	21.562	-0.041	0.000	0.66	0.0	321.4	FLOOD RISK*
1.006	MH1	19.280	0.985	86.902	0.65	0.0	464.0	FLOOD
3.000	MH2	26.788	0.397	0.000	0.69	0.0	130.2	SURCHARGED
3.001	MH3	26.438	1.011	0.000	0.90	0.0	206.0	FLOOD RISK
3.002	MH4	25.217	1.204	4.206	1.09	0.0	269.0	FLOOD
3.003	MH5	23.560	1.202	2.261	1.01	0.0	250.6	FLOOD
3.004	MH6	21.905	1.201	1.040	1.00	0.0	249.4	FLOOD
3.005	MH7	20.227	1.204	4.154	1.78	0.0	307.0	FLOOD
4.000	MH8	25.394	1.202	2.023	0.96	0.0	126.7	FLOOD
4.001	MH9	24.938	1.225	25.472	0.99	0.0	134.7	FLOOD
4.002	MH10	24.446	1.233	32.858	1.42	0.0	192.9	FLOOD
4.003	MH11	23.928	1.215	14.873	1.48	0.0	220.1	FLOOD
4.004	MH12	23.315	1.201	0.598	1.04	0.0	209.9	FLOOD
4.005	MH13	22.209	1.201	1.044	1.01	0.0	248.8	FLOOD
4.006	MH14	20.552	1.193	0.000	1.53	0.0	326.3	FLOOD RISK
1.007	MH15	19.307	1.065	0.000	1.22	0.0	838.1	SURCHARGED
5.000	SW12	27.303	-0.052	0.000	0.56	0.0	137.0	FLOOD RISK*

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.001	SW13	26.894	-0.046	0.000	0.60	0.0	233.0	FLOOD RISK*
5.002	SW14	25.882	-0.032	0.000	0.68	0.0	292.5	FLOOD RISK*
5.003	SW15	24.618	-0.028	0.000	0.72	0.0	332.0	FLOOD RISK*
5.004	SW16	23.140	-0.020	0.000	0.78	0.0	360.3	FLOOD RISK*
5.005	SW17	21.712	0.021	21.470	1.01	0.0	407.7	FLOOD
6.000	SW18	25.049	-0.077	0.000	0.45	0.0	107.9	FLOOD RISK*
6.001	SW19	24.689	-0.036	0.000	0.68	0.0	181.0	FLOOD RISK*
6.002	SW20	24.341	0.004	3.539	0.94	0.0	257.7	FLOOD
6.003	SW21	23.854	0.042	42.503	1.04	0.0	214.9	FLOOD
6.004	SW22	23.534	0.016	16.227	1.03	0.0	222.1	FLOOD
6.005	SW23	23.190	-0.006	0.000	0.95	0.0	224.9	FLOOD RISK*
6.006	SW24	22.721	-0.087	0.000	0.48	0.0	230.2	FLOOD RISK*
1.008	MH16	19.253	1.058	0.000	1.49	0.0	1535.2	SURCHARGED
1.009	MH17	18.999	1.164	0.000	1.35	0.0	1292.7	SURCHARGED
7.000	MH1	26.306	2.156	0.000	1.96	0.0	48.4	FLOOD RISK*
8.000	MH2	22.856	1.200	0.000	1.40	0.0	33.4	FLOOD RISK*
8.001	MH3	22.126	0.894	0.000	1.18	0.0	36.3	FLOOD RISK*
7.001	MH4	21.972	0.873	0.000	2.59	0.0	130.9	SURCHARGED*
7.002	MH5	21.697	0.633	0.000	2.15	0.0	127.5	SURCHARGED*
7.003	MH6	21.079	0.148	0.000	1.06	0.0	157.8	SURCHARGED*
9.000	MH7	19.434	1.200	0.000	0.66	0.0	20.3	FLOOD RISK*
9.001	MH8	19.907	1.817	0.000	1.58	0.0	48.5	FLOOD
7.004	MH9	19.937	1.984	0.000	2.24	0.0	239.9	SURCHARGED*
7.005	MH10	19.271	1.438	0.000	2.11	0.0	234.3	FLOOD
7.006	MH11	18.989	1.332	0.000	1.08	0.0	122.5	SURCHARGED*
7.007	MH12	18.982	1.572	0.000	0.85	0.0	121.6	SURCHARGED*
1.010	Pri	18.979	1.879	0.000	3.05	0.0	289.7	SURCHARGED
1.011	Inf	18.427	1.727	0.000	0.00	0.0	0.0	SURCHARGED*

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	43.638	0.970	45.0	0.047	5.00	0.0	0.600	o	150
1.001	49.838	1.260	39.6	0.060	0.00	0.0	0.600	o	225
1.002	58.715	0.673	87.2	0.130	0.00	0.0	0.600	o	375
1.003	13.618	0.045	302.6	0.034	0.00	0.0	0.600	o	375
2.000	34.778	0.700	49.7	0.008	5.00	0.0	0.600	o	225
2.001	45.899	0.692	66.3	0.059	0.00	0.0	0.600	o	225
1.004	50.138	0.201	249.4	0.000	0.00	0.0	0.600	o	375
1.005	36.978	0.485	76.2	0.000	0.00	0.0	0.600	o	375
1.006	22.111	0.142	155.7	0.000	0.00	0.0	0.600	o	375
1.007	12.000	1.600	7.5	0.000	0.00	0.0	0.600	o	300
1.008	5.000	-2.600	-1.9	0.000	0.00	0.0	0.600	o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	25.326	0.047	0.0	1.50	26.6
1.001	24.356	0.107	0.0	2.09	83.0
1.002	22.946	0.237	0.0	1.94	214.4
1.003	22.273	0.271	0.0	1.04	114.5
2.000	23.620	0.008	0.0	1.86	74.0
2.001	22.920	0.067	0.0	1.61	63.9
1.004	22.228	0.338	0.0	1.14	126.2
1.005	22.027	0.338	0.0	2.08	229.4
1.006	21.542	0.338	0.0	1.45	160.1
1.007	21.400	0.338	0.0	5.78	408.2
1.008	19.800	0.338	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008		22.600	22.400	21.500	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	1	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 624050 314050 TG 24050 14050
C (1km)	-0.024
D1 (1km)	0.281
D2 (1km)	0.353
D3 (1km)	0.259
E (1km)	0.311
F (1km)	2.488
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.007

Invert Level (m) 21.400

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	81.6	1.400	0.0	2.800	0.0	4.200	0.0
0.200	137.1	1.600	0.0	3.000	0.0	4.400	0.0
0.400	196.5	1.800	0.0	3.200	0.0	4.600	0.0
0.600	260.0	2.000	0.0	3.400	0.0	4.800	0.0
0.800	327.6	2.200	0.0	3.600	0.0	5.000	0.0
1.000	399.2	2.400	0.0	3.800	0.0		
1.200	474.7	2.600	0.0	4.000	0.0		

Infiltration Basin Manhole: MH09, DS/PN: 1.008

Invert Level (m) 19.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.02590 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.02590

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	4662.1	1.400	6552.6	2.800	8640.3	4.200	0.0
0.200	4920.1	1.600	6838.2	3.000	0.0	4.400	0.0
0.400	5182.1	1.800	7128.9	3.200	0.0	4.600	0.0
0.600	5448.1	2.000	7423.2	3.400	0.0	4.800	0.0
0.800	5718.2	2.200	7721.4	3.600	0.0	5.000	0.0
1.000	5992.3	2.400	8023.7	3.800	0.0		
1.200	6270.4	2.600	8329.9	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer				
1.001	15 Winter	1	0%	100/15 Summer				
1.002	15 Winter	1	0%	100/15 Summer				
1.003	15 Winter	1	0%	30/15 Summer				2
2.000	15 Winter	1	0%	100/15 Winter				
2.001	15 Winter	1	0%	100/15 Summer				
1.004	15 Winter	1	0%	30/15 Summer				
1.005	15 Winter	1	0%	100/15 Summer				
1.006	15 Winter	1	0%	30/15 Summer				
1.007	15 Winter	1	0%					
1.008	1440 Summer	1	0%	1/240 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	25.379	-0.097	0.000	0.26	0.0	6.7	OK
1.001	MH02	24.420	-0.161	0.000	0.18	0.0	14.2	OK
1.002	MH03	23.043	-0.278	0.000	0.15	0.0	29.9	OK
1.003	MH04	22.433	-0.215	0.000	0.37	0.0	33.5	OK
2.000	MH05	23.638	-0.207	0.000	0.02	0.0	1.1	OK
2.001	MH06	22.976	-0.169	0.000	0.14	0.0	8.4	OK
1.004	MH07	22.383	-0.220	0.000	0.35	0.0	40.8	OK
1.005	MH08	22.140	-0.262	0.000	0.20	0.0	40.9	OK
1.006	MH09	21.682	-0.235	0.000	0.30	0.0	40.4	OK
1.007	Pri	21.468	-0.232	0.000	0.12	0.0	36.7	OK
1.008	MH09	19.968	0.068	0.000	0.00	0.0	0.0	SURCHARGED*

Input Hydrograph Manhole MH09, DS/PN 1.008 (Storm)
1440 minute 1 year Summer I+0%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 624050 314050 TG 24050 14050
C	-0.02350
D1	0.27599
D2	0.35912
D3	0.25880
E	0.31100
F	2.48679
Area (Ha)	30.870
SAAR (mm)	614
CWI	89.520
Urban (1990)	0.0769
SPR	22.670
DPSBAR	8.300
DPLBAR	0.780
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.796
FARL	1.000

Output Variables

TP(0) (mins)	199	Q (l/s)	193.5	PR (%)	16.458
T (mins)	24	TB (mins)	531		
TPt (mins)	211	Base Flow (l/s)	2.1		

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	2.1	360	7.9	696	20.1	1032	41.8	1368	11.5	1704	4.5
48	2.3	384	8.4	720	22.9	1056	39.3	1392	10.9	1728	4.0
72	2.5	408	8.8	744	26.0	1080	36.5	1416	10.4	1752	3.6
96	2.7	432	9.2	768	29.4	1104	33.6	1440	10.0	1776	3.3
120	3.0	456	9.6	792	32.9	1128	30.6	1464	9.6	1800	3.0
144	3.4	480	10.1	816	36.4	1152	27.6	1488	9.2	1824	2.7
168	3.9	504	10.5	840	39.6	1176	24.7	1512	8.8	1848	2.5
192	4.4	528	11.0	864	42.4	1200	22.0	1536	8.3	1872	2.3
216	5.0	552	11.6	888	44.7	1224	19.6	1560	7.8	1896	2.2
240	5.5	576	12.4	912	46.2	1248	17.5	1584	7.3	1920	2.1
264	6.0	600	13.3	936	46.9	1272	15.8	1608	6.8	1944	2.1
288	6.5	624	14.5	960	46.6	1296	14.4	1632	6.2	1968	2.1
312	7.0	648	16.0	984	45.6	1320	13.2	1656	5.5		
336	7.5	672	17.9	1008	44.0	1344	12.3	1680	5.0		

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/15 Summer				
1.001	15 Winter	30	+20%	100/15 Summer				
1.002	15 Winter	30	+20%	100/15 Summer				
1.003	15 Winter	30	+20%	30/15 Summer				2
2.000	15 Winter	30	+20%	100/15 Winter				
2.001	15 Winter	30	+20%	100/15 Summer				
1.004	15 Winter	30	+20%	30/15 Summer				
1.005	15 Winter	30	+20%	100/15 Summer				
1.006	15 Winter	30	+20%	30/15 Summer				
1.007	15 Winter	30	+20%					
1.008	2880 Winter	30	+20%	1/240 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	25.475	-0.001	0.000	0.99	0.0	25.7	OK
1.001	MH02	24.505	-0.076	0.000	0.75	0.0	59.6	OK
1.002	MH03	23.209	-0.112	0.000	0.66	0.0	132.2	OK
1.003	MH04	22.959	0.311	0.000	1.55	0.0	138.8	SURCHARGED*
2.000	MH05	23.657	-0.188	0.000	0.06	0.0	4.4	OK
2.001	MH06	23.060	-0.085	0.000	0.64	0.0	38.9	OK
1.004	MH07	22.831	0.228	0.000	1.45	0.0	169.6	SURCHARGED*
1.005	MH08	22.287	-0.115	0.000	0.81	0.0	167.9	OK
1.006	MH09	21.971	0.054	0.000	1.22	0.0	165.8	SURCHARGED
1.007	Pri	21.551	-0.149	0.000	0.50	0.0	159.4	OK
1.008	MH09	20.728	0.828	0.000	0.00	0.0	0.0	SURCHARGED*

Input Hydrograph Manhole MH09, DS/PN 1.008 (Storm)
2880 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 624050 314050 TG 24050 14050
C	-0.02350
D1	0.27599
D2	0.35912
D3	0.25880
E	0.31100
F	2.48679
Area (Ha)	30.870
SAAR (mm)	614
CWI	89.520
Urban (1990)	0.0769
SPR	22.670
DPSBAR	8.300
DPLBAR	0.780
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.796
FARL	1.000

Output Variables

TP(0) (mins)	199	Q (l/s)	193.5	PR (%)	23.921
T (mins)	24	TB (mins)	531		
TPt (mins)	211	Base Flow (l/s)	2.1		

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	2.1	456	17.7	888	26.5	1320	69.9	1752	100.8	2184	49.8
48	2.2	480	18.4	912	27.7	1344	73.1	1776	99.3	2208	47.1
72	2.3	504	19.1	936	29.1	1368	76.4	1800	97.4	2232	44.4
96	2.5	528	19.6	960	30.6	1392	79.6	1824	95.3	2256	41.9
120	2.9	552	20.0	984	32.3	1416	82.8	1848	92.9	2280	39.5
144	3.4	576	20.3	1008	34.1	1440	85.9	1872	90.3	2304	37.3
168	4.1	600	20.6	1032	36.1	1464	88.8	1896	87.5	2328	35.2
192	4.9	624	20.8	1056	38.2	1488	91.6	1920	84.5	2352	33.3
216	5.9	648	21.0	1080	40.5	1512	94.2	1944	81.4	2376	31.6
240	7.1	672	21.2	1104	42.9	1536	96.5	1968	78.2	2400	30.0
264	8.3	696	21.5	1128	45.5	1560	98.5	1992	75.0	2424	28.6
288	9.6	720	21.8	1152	48.2	1584	100.2	2016	71.7	2448	27.3
312	10.9	744	22.1	1176	51.0	1608	101.6	2040	68.4	2472	26.1
336	12.2	768	22.6	1200	54.0	1632	102.5	2064	65.2	2496	25.2
360	13.5	792	23.1	1224	57.0	1656	103.0	2088	62.0	2520	24.3
384	14.7	816	23.8	1248	60.2	1680	103.0	2112	58.8	2544	23.6
408	15.8	840	24.6	1272	63.4	1704	102.7	2136	55.7	2568	23.0
432	16.8	864	25.5	1296	66.6	1728	101.9	2160	52.7	2592	22.5

Input Hydrograph Manhole MH09, DS/PN 1.008 (Storm)
2880 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2616	22.1	2760	20.6	2904	17.4	3048	9.9	3192	4.0	3336	2.1
2640	21.8	2784	20.4	2928	16.4	3072	8.6	3216	3.5	3360	2.1
2664	21.5	2808	20.0	2952	15.2	3096	7.5	3240	3.0	3384	2.1
2688	21.3	2832	19.6	2976	13.9	3120	6.4	3264	2.7	3408	2.1
2712	21.1	2856	19.0	3000	12.6	3144	5.5	3288	2.4		
2736	20.9	2880	18.3	3024	11.3	3168	4.7	3312	2.2		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer				
1.001	15 Winter	100	+30%	100/15 Summer				
1.002	15 Winter	100	+30%	100/15 Summer				
1.003	15 Winter	100	+30%	30/15 Summer				2
2.000	15 Winter	100	+30%	100/15 Winter				
2.001	15 Winter	100	+30%	100/15 Summer				
1.004	15 Winter	100	+30%	30/15 Summer				
1.005	15 Winter	100	+30%	100/15 Summer				
1.006	15 Winter	100	+30%	30/15 Summer				
1.007	15 Winter	100	+30%					
1.008	2880 Winter	100	+30%	1/240 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	26.876	1.400	0.000	1.32	0.0	34.1	FLOOD RISK*
1.001	MH02	25.302	0.721	0.000	0.94	0.0	74.9	SURCHARGED*
1.002	MH03	24.168	0.847	0.000	0.87	0.0	175.3	FLOOD RISK*
1.003	MH04	23.548	0.900	0.000	2.23	0.0	200.2	FLOOD RISK*
2.000	MH05	23.864	0.019	0.000	0.10	0.0	6.9	SURCHARGED*
2.001	MH06	23.853	0.708	0.000	0.80	0.0	48.7	SURCHARGED*
1.004	MH07	23.515	0.912	0.000	2.04	0.0	238.0	FLOOD RISK*
1.005	MH08	22.766	0.364	0.000	1.12	0.0	231.0	SURCHARGED*
1.006	MH09	22.158	0.241	0.000	1.66	0.0	226.7	SURCHARGED
1.007	Pri	21.584	-0.116	0.000	0.69	0.0	218.3	OK
1.008	MH09	21.373	1.473	0.000	0.00	0.0	0.0	SURCHARGED*

Input Hydrograph Manhole MH09, DS/PN 1.008 (Storm)
2880 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 624050 314050 TG 24050 14050
C	-0.02350
D1	0.27599
D2	0.35912
D3	0.25880
E	0.31100
F	2.48679
Area (Ha)	30.870
SAAR (mm)	614
CWI	89.520
Urban (1990)	0.0769
SPR	22.670
DPSBAR	8.300
DPLBAR	0.780
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.796
FARL	1.000

Output Variables

TP(0) (mins)	199	Q (l/s)	193.5	PR (%)	27.262
T (mins)	24	TB (mins)	531		
TPt (mins)	211	Base Flow (l/s)	2.1		

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	2.1	456	27.2	888	41.5	1320	111.4	1752	161.3	2184	79.1
48	2.2	480	28.4	912	43.5	1344	116.7	1776	158.9	2208	74.6
72	2.4	504	29.5	936	45.6	1368	122.0	1800	155.9	2232	70.4
96	2.8	528	30.3	960	48.1	1392	127.2	1824	152.5	2256	66.3
120	3.4	552	31.0	984	50.8	1416	132.3	1848	148.6	2280	62.5
144	4.2	576	31.5	1008	53.7	1440	137.3	1872	144.4	2304	58.9
168	5.3	600	31.9	1032	56.9	1464	142.0	1896	139.8	2328	55.6
192	6.6	624	32.3	1056	60.3	1488	146.5	1920	135.0	2352	52.5
216	8.2	648	32.6	1080	64.1	1512	150.7	1944	130.0	2376	49.7
240	10.1	672	33.0	1104	68.0	1536	154.4	1968	124.9	2400	47.1
264	12.1	696	33.4	1128	72.1	1560	157.7	1992	119.6	2424	44.8
288	14.2	720	33.9	1152	76.5	1584	160.4	2016	114.4	2448	42.7
312	16.3	744	34.4	1176	81.1	1608	162.6	2040	109.1	2472	40.9
336	18.5	768	35.2	1200	85.8	1632	164.0	2064	103.9	2496	39.3
360	20.5	792	36.1	1224	90.7	1656	164.8	2088	98.7	2520	37.9
384	22.4	816	37.1	1248	95.8	1680	164.9	2112	93.6	2544	36.8
408	24.2	840	38.4	1272	100.9	1704	164.4	2136	88.6	2568	35.8
432	25.8	864	39.8	1296	106.1	1728	163.1	2160	83.8	2592	35.0

Input Hydrograph Manhole MH09, DS/PN 1.008 (Storm)
2880 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2616	34.4	2760	32.0	2904	26.8	3048	14.7	3192	5.2	3336	2.2
2640	33.8	2784	31.6	2928	25.1	3072	12.6	3216	4.3	3360	2.1
2664	33.4	2808	31.0	2952	23.2	3096	10.7	3240	3.6	3384	2.1
2688	33.0	2832	30.3	2976	21.2	3120	9.1	3264	3.0	3408	2.1
2712	32.7	2856	29.4	3000	19.1	3144	7.6	3288	2.6		
2736	32.4	2880	28.2	3024	16.9	3168	6.3	3312	2.3		

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.000	0.502	199.2	0.185	5.00	0.0	0.600		o	300
1.001	30.826	0.411	75.0	0.178	0.00	0.0	0.600		o	300
2.000	100.000	0.721	138.7	0.171	5.00	0.0		0.050		-5
2.001	100.080	0.657	152.3	0.121	0.00	0.0		0.050		-5
2.002	103.890	0.797	130.4	0.126	0.00	0.0		0.050		-5
2.003	34.920	0.116	301.0	0.000	0.00	0.0	0.600		o	450
3.000	100.000	0.086	1162.8	0.220	5.00	0.0		0.050		-4
3.001	99.940	0.026	3843.8	0.053	0.00	0.0		0.050		-4
3.002	108.340	0.797	135.9	0.056	0.00	0.0		0.050		-4
3.003	38.416	1.046	36.7	0.000	0.00	0.0	0.600		o	450
1.002	79.138	0.791	100.0	0.200	0.00	0.0	0.600		o	450
4.000	31.453	0.449	70.0	0.032	5.00	0.0	0.600		o	375
4.001	41.690	0.278	150.0	0.045	0.00	0.0	0.600		o	375
4.002	50.230	0.335	150.0	0.145	0.00	0.0	0.600		o	375
1.003	48.285	0.161	300.0	0.261	0.00	0.0	0.600		o	525
5.000	41.154	0.588	70.0	0.034	5.00	0.0	0.600		o	150

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	22.534	0.185	0.0	1.11	78.5
1.001	22.032	0.363	0.0	1.82	128.5
2.000	25.187	0.171	0.0	0.48	334.4
2.001	24.466	0.292	0.0	0.46	319.1
2.002	23.809	0.418	0.0	0.49	344.9
2.003	21.737	0.418	0.0	1.17	185.5
3.000	24.851	0.220	0.0	0.16	111.5
3.001	24.765	0.273	0.0	0.09	61.3
3.002	24.739	0.329	0.0	0.48	326.2
3.003	22.667	0.329	0.0	3.36	534.9
1.002	21.621	1.310	0.0	2.03	323.3
4.000	20.400	0.032	0.0	2.17	239.5
4.001	19.951	0.077	0.0	1.48	163.1
4.002	19.673	0.222	0.0	1.48	163.1
1.003	19.338	1.793	0.0	1.29	278.8
5.000	23.149	0.034	0.0	1.20	21.3

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
5.001	34.501	0.493	70.0	0.028	0.00	0.0	0.600		o	225
5.002	66.542	1.331	50.0	0.181	0.00	0.0	0.600		o	300
1.004	99.997	0.500	200.0	0.079	0.00	0.0	0.600		o	525
1.005	100.000	1.000	100.0	0.000	0.00	0.0	0.600		o	525
1.006	60.000	0.880	68.2	0.000	0.00	0.0	0.600		o	525
1.007	60.581	0.858	70.6	0.000	0.00	0.0	0.600		o	600
6.000	99.080	1.760	56.3	0.122	5.00	0.0		0.050		-4
6.001	100.630	1.750	57.5	0.171	0.00	0.0		0.050		-4
6.002	58.810	0.717	82.0	0.074	0.00	0.0		0.050		-4
6.003	50.200	0.484	103.7	0.051	0.00	0.0		0.050		-4
6.004	17.632	0.118	150.0	0.000	0.00	0.0	0.600		o	675
1.008	79.417	0.265	299.7	0.024	0.00	0.0	0.600		o	675
1.009	72.569	0.871	83.3	0.099	0.00	0.0	0.600		o	675
7.000	78.725	1.400	56.2	0.122	5.00	0.0		0.050		-5
7.001	99.640	1.750	56.9	0.135	0.00	0.0		0.050		-5
7.002	60.300	0.717	84.1	0.090	0.00	0.0		0.050		-5
7.003	60.420	0.336	179.8	0.090	0.00	0.0		0.050		-5
7.004	78.920	0.594	132.9	0.109	0.00	0.0		0.050		-5

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
5.001	22.561	0.062	0.0	1.57	62.2
5.002	22.068	0.243	0.0	2.23	157.6
1.004	19.177	2.115	0.0	1.58	342.1
1.005	18.677	2.115	0.0	2.24	484.9
1.006	17.677	2.115	0.0	2.72	587.8
1.007	16.797	2.115	0.0	2.90	820.2
6.000	22.067	0.122	0.0	0.74	506.9
6.001	20.307	0.293	0.0	0.74	501.6
6.002	18.557	0.367	0.0	0.62	420.0
6.003	17.840	0.418	0.0	0.55	373.5
6.004	16.057	0.418	0.0	2.14	765.0
1.008	15.939	2.557	0.0	1.51	539.9
1.009	15.674	2.656	0.0	2.87	1028.0
7.000	21.707	0.122	0.0	0.75	525.1
7.001	20.307	0.257	0.0	0.74	521.9
7.002	18.557	0.347	0.0	0.61	429.4
7.003	17.840	0.437	0.0	0.42	293.7
7.004	17.504	0.546	0.0	0.49	341.6

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
7.005	70.520	0.590	119.5	0.100	0.00	0.0		0.050		-5
8.000	86.480	0.195	443.5	0.130	5.00	0.0		0.050		-5
8.001	122.530	0.776	157.9	0.170	0.00	0.0		0.050		-5
8.002	76.240	0.691	110.3	0.100	0.00	0.0		0.050		-5
7.006	14.896	0.142	105.0	0.000	0.00	0.0	0.600		o	750
9.000	75.490	0.302	250.0	0.069	5.00	0.0	0.600		o	225
1.010	13.552	0.104	130.0	0.186	0.00	0.0	0.600		o	750
10.000	163.000	0.359	454.0	0.032	5.00	0.0		0.050		-4
11.000	86.900	0.195	445.6	0.117	5.00	0.0		0.050		-4
11.001	66.780	0.312	214.0	0.089	0.00	0.0		0.266		-4
11.002	133.790	0.202	662.3	0.031	0.00	0.0		0.050		-4
1.011	32.637	0.109	300.0	0.000	0.00	0.0	0.600		o	750
1.012	60.558	0.202	300.0	0.000	0.00	0.0	0.600		o	750
1.013	24.722	0.082	301.5	0.000	0.00	0.0	0.600		o	750
1.014	20.000	0.200	100.0	0.000	0.00	0.0	0.600		o	300

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
7.005	16.910	0.646	0.0	0.51	360.2
8.000	17.982	0.130	0.0	0.27	187.0
8.001	17.787	0.300	0.0	0.45	313.4
8.002	17.011	0.400	0.0	0.53	374.9
7.006	14.945	1.046	0.0	2.73	1206.5
9.000	16.246	0.069	0.0	0.82	32.7
1.010	14.803	3.957	0.0	2.45	1083.7
10.000	17.632	0.032	0.0	0.26	178.5
11.000	17.982	0.117	0.0	0.26	180.2
11.001	17.787	0.206	0.0	0.07	48.9
11.002	17.475	0.237	0.0	0.22	147.8
1.011	14.699	4.226	0.0	1.61	711.5
1.012	14.590	4.226	0.0	1.61	711.5
1.013	14.388	4.226	0.0	1.61	709.7
1.014	14.300	4.226	0.0	1.57	111.1

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.015	5.000	-2.000	-2.5	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.015	14.100	4.226	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.015		16.500	16.100	14.300	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 625800 314350 TG 25800 14350
C (1km)	-0.024
D1 (1km)	0.278
D2 (1km)	0.361
D3 (1km)	0.254
E (1km)	0.312
F (1km)	2.487
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.014

Invert Level (m) 14.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	810.4	1.400	1490.1	2.800	0.0	4.200	0.0
0.200	896.0	1.600	1604.1	3.000	0.0	4.400	0.0
0.400	984.7	1.800	1721.0	3.200	0.0	4.600	0.0
0.600	1078.0	2.000	1842.0	3.400	0.0	4.800	0.0
0.800	1175.1	2.200	0.0	3.600	0.0	5.000	0.0
1.000	1276.3	2.400	0.0	3.800	0.0		
1.200	1382.0	2.600	0.0	4.000	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 1.015

Invert Level (m) 14.100 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.03960 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.03960

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	836.0	1.400	1577.5	2.800	0.0	4.200	0.0
0.200	932.0	1.600	1699.1	3.000	0.0	4.400	0.0
0.400	1030.0	1.800	1825.0	3.200	0.0	4.600	0.0
0.600	1131.1	2.000	1954.5	3.400	0.0	4.800	0.0
0.800	1236.7	2.200	2088.2	3.600	0.0	5.000	0.0
1.000	1346.2	2.400	0.0	3.800	0.0		
1.200	1460.0	2.600	0.0	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
1.001	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	1	0%					
2.001	15 Winter	1	0%					
2.002	15 Winter	1	0%					
2.003	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
3.001	15 Winter	1	0%					
3.002	30 Winter	1	0%					
3.003	30 Winter	1	0%	100/15 Summer				
1.002	15 Winter	1	0%	30/15 Summer				
4.000	15 Winter	1	0%	30/15 Summer				
4.001	15 Winter	1	0%	30/15 Summer				
4.002	15 Winter	1	0%	30/15 Summer				
1.003	15 Winter	1	0%	30/15 Summer				
5.000	15 Winter	1	0%	100/15 Summer				2
5.001	15 Winter	1	0%	100/15 Summer				2
5.002	15 Winter	1	0%	100/15 Summer				2
1.004	15 Winter	1	0%	30/15 Summer				2
1.005	15 Winter	1	0%	30/15 Summer				1
1.006	15 Winter	1	0%	30/15 Winter				3
1.007	15 Winter	1	0%	30/15 Summer				
6.000	15 Winter	1	0%					
6.001	15 Winter	1	0%					
6.002	15 Winter	1	0%					
6.003	15 Winter	1	0%					
6.004	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
1.008	15 Winter	1	0%	30/15 Summer	100/960 Summer			
1.009	15 Winter	1	0%	30/15 Summer	100/960 Summer			
7.000	15 Winter	1	0%					
7.001	15 Winter	1	0%					
7.002	15 Winter	1	0%					
7.003	15 Winter	1	0%					
7.004	15 Winter	1	0%					
7.005	15 Winter	1	0%					
8.000	15 Winter	1	0%					
8.001	15 Winter	1	0%					

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
8.002	15 Winter	1	0%					
7.006	15 Winter	1	0%	30/15 Summer	100/15 Summer			8
9.000	15 Winter	1	0%	30/15 Summer				
1.010	15 Winter	1	0%	30/15 Summer	100/960 Summer			1
10.000	15 Winter	1	0%					
11.000	15 Winter	1	0%					
11.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			6
11.002	30 Winter	1	0%					
1.011	15 Winter	1	0%	30/15 Summer	100/960 Summer			
1.012	15 Winter	1	0%	30/15 Summer	100/960 Summer			
1.013	15 Winter	1	0%	30/15 Summer	100/960 Summer			
1.014	2160 Winter	1	0%	30/15 Summer				
1.015	2160 Winter	1	0%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	22.658	-0.176	0.000	0.32	0.0	24.5	OK
1.001	MH02	22.163	-0.169	0.000	0.39	0.0	45.5	OK
2.000	SW01	25.258	-0.204	0.000	0.06	0.0	21.1	FLOOD RISK*
2.001	SW02	24.554	-0.187	0.000	0.09	0.0	30.3	FLOOD RISK*
2.002	SW03	23.902	-0.182	0.000	0.12	0.0	41.4	FLOOD RISK*
2.003	MH03	21.890	-0.297	0.000	0.25	0.0	41.0	OK
3.000	SW04	24.988	-0.138	0.000	0.22	0.0	26.6	FLOOD RISK*
3.001	SW05	24.872	-0.168	0.000	0.14	0.0	17.2	FLOOD RISK*
3.002	SW06	24.794	-0.220	0.000	0.05	0.0	16.7	FLOOD RISK*
3.003	MH04	22.721	-0.396	0.000	0.04	0.0	16.7	OK
1.002	MH05	21.792	-0.279	0.000	0.31	0.0	93.6	OK
4.000	MH06	20.438	-0.337	0.000	0.02	0.0	4.7	OK
4.001	MH07	20.015	-0.310	0.000	0.07	0.0	10.2	OK
4.002	MH08	19.782	-0.266	0.000	0.18	0.0	27.6	OK
1.003	MH09	19.626	-0.237	0.000	0.57	0.0	141.2	OK
5.000	MH10	23.199	-0.100	0.000	0.24	0.0	4.9	OK
5.001	MH11	22.618	-0.168	0.000	0.14	0.0	8.4	OK
5.002	MH12	22.160	-0.208	0.000	0.20	0.0	30.8	OK
1.004	MH13	19.453	-0.249	0.000	0.53	0.0	170.1	OK
1.005	MH14	18.899	-0.303	0.000	0.37	0.0	167.8	OK
1.006	MH15	17.879	-0.323	0.000	0.32	0.0	168.1	OK
1.007	MH16	16.990	-0.407	0.000	0.23	0.0	167.4	OK
6.000	SW07	22.112	-0.230	0.000	0.03	0.0	15.2	FLOOD RISK*
6.001	SW08	20.374	-0.208	0.000	0.06	0.0	30.8	FLOOD RISK*
6.002	SW09	18.636	-0.196	0.000	0.09	0.0	36.5	FLOOD RISK*
6.003	SW10	17.927	-0.188	0.000	0.11	0.0	40.7	FLOOD RISK*
6.004	MH17	16.258	-0.474	0.000	0.09	0.0	40.3	OK
1.008	MH18	16.246	-0.368	0.000	0.42	0.0	204.5	OK
1.009	MH19	15.890	-0.459	0.000	0.22	0.0	206.8	OK
7.000	SW11	21.752	-0.230	0.000	0.03	0.0	15.9	FLOOD RISK*
7.001	SW12	20.370	-0.212	0.000	0.05	0.0	27.9	FLOOD RISK*
7.002	SW13	18.634	-0.198	0.000	0.08	0.0	35.3	FLOOD RISK*

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
7.003	SW14	17.942	-0.173	0.000	0.14	0.0	41.4	FLOOD RISK*
7.004	SW15	17.605	-0.174	0.000	0.14	0.0	46.6	FLOOD RISK*
7.005	SW16	17.011	-0.174	0.000	0.14	0.0	51.7	FLOOD RISK*
8.000	SW17	18.067	-0.190	0.000	0.09	0.0	16.4	FLOOD RISK*
8.001	SW18	17.875	-0.187	0.000	0.09	0.0	28.8	FLOOD RISK*
8.002	SW19	17.095	-0.191	0.000	0.10	0.0	36.4	FLOOD RISK*
7.006	MH20	15.193	-0.502	0.000	0.14	0.0	87.2	OK
9.000	MH21	16.334	-0.137	0.000	0.32	0.0	10.1	OK
1.010	MH22	15.176	-0.377	0.000	0.49	0.0	298.9	OK
10.000	SW20	17.670	-0.237	0.000	0.03	0.0	4.7	FLOOD RISK*
11.000	SW21	18.063	-0.194	0.000	0.08	0.0	14.8	FLOOD RISK*
11.001	SW22	17.921	-0.141	0.000	0.24	0.0	11.7	FLOOD RISK*
11.002	SW23	17.551	-0.199	0.000	0.09	0.0	12.7	FLOOD RISK*
1.011	MH23	15.099	-0.350	0.000	0.56	0.0	311.4	OK
1.012	MH24	14.968	-0.372	0.000	0.50	0.0	308.9	OK
1.013	MH25	14.799	-0.339	0.000	0.58	0.0	306.9	OK
1.014	Pri	14.589	-0.011	0.000	0.21	0.0	20.8	OK
1.015	Inf	14.583	0.383	0.000	0.00	0.0	0.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
1.001	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	30	+20%					
2.001	15 Winter	30	+20%					
2.002	15 Winter	30	+20%					
2.003	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
3.001	15 Winter	30	+20%					
3.002	15 Winter	30	+20%					
3.003	15 Winter	30	+20%	100/15 Summer				
1.002	15 Winter	30	+20%	30/15 Summer				
4.000	15 Winter	30	+20%	30/15 Summer				
4.001	15 Winter	30	+20%	30/15 Summer				
4.002	15 Winter	30	+20%	30/15 Summer				
1.003	15 Winter	30	+20%	30/15 Summer				
5.000	15 Winter	30	+20%	100/15 Summer				2
5.001	15 Winter	30	+20%	100/15 Summer				2
5.002	15 Winter	30	+20%	100/15 Summer				2
1.004	15 Winter	30	+20%	30/15 Summer				2
1.005	15 Winter	30	+20%	30/15 Summer				1
1.006	15 Winter	30	+20%	30/15 Winter				3
1.007	15 Winter	30	+20%	30/15 Summer				
6.000	15 Winter	30	+20%					
6.001	15 Winter	30	+20%					
6.002	15 Winter	30	+20%					
6.003	15 Winter	30	+20%					
6.004	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
1.008	15 Winter	30	+20%	30/15 Summer	100/960 Summer			
1.009	15 Winter	30	+20%	30/15 Summer	100/960 Summer			
7.000	15 Winter	30	+20%					
7.001	15 Winter	30	+20%					
7.002	15 Winter	30	+20%					
7.003	15 Winter	30	+20%					
7.004	15 Winter	30	+20%					
7.005	15 Winter	30	+20%					
8.000	15 Winter	30	+20%					
8.001	15 Winter	30	+20%					

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
8.002	15 Winter	30	+20%					
7.006	15 Winter	30	+20%	30/15 Summer	100/15 Summer			8
9.000	15 Winter	30	+20%	30/15 Summer				
1.010	15 Winter	30	+20%	30/15 Summer	100/960 Summer			1
10.000	15 Winter	30	+20%					
11.000	15 Winter	30	+20%					
11.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
11.002	15 Winter	30	+20%					
1.011	15 Winter	30	+20%	30/15 Summer	100/960 Summer			
1.012	15 Winter	30	+20%	30/15 Summer	100/960 Summer			
1.013	15 Winter	30	+20%	30/15 Summer	100/960 Summer			
1.014	2160 Winter	30	+20%	30/15 Summer				
1.015	2160 Winter	30	+20%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	23.685	0.851	0.000	1.11	0.0	84.8	SURCHARGED
1.001	MH02	23.164	0.832	0.000	1.29	0.0	150.6	SURCHARGED
2.000	SW01	25.335	-0.127	0.000	0.25	0.0	82.3	FLOOD RISK*
2.001	SW02	24.648	-0.093	0.000	0.38	0.0	120.9	FLOOD RISK*
2.002	SW03	24.000	-0.084	0.000	0.48	0.0	166.7	FLOOD RISK*
2.003	MH03	22.784	0.597	0.000	1.02	0.0	165.4	SURCHARGED
3.000	SW04	25.122	-0.004	0.000	0.86	0.0	103.6	FLOOD RISK*
3.001	SW05	24.980	-0.060	0.000	0.58	0.0	69.5	FLOOD RISK*
3.002	SW06	24.858	-0.156	0.000	0.20	0.0	65.4	FLOOD RISK*
3.003	MH04	22.778	-0.339	0.000	0.14	0.0	65.4	OK
1.002	MH05	22.667	0.596	0.000	1.16	0.0	351.0	SURCHARGED*
4.000	MH06	21.483	0.708	0.000	0.06	0.0	13.3	FLOOD RISK*
4.001	MH07	21.722	1.396	0.000	0.26	0.0	38.8	FLOOD RISK*
4.002	MH08	21.700	1.652	0.000	0.58	0.0	87.8	SURCHARGED*
1.003	MH09	21.615	1.752	0.000	1.88	0.0	464.8	SURCHARGED*
5.000	MH10	23.264	-0.035	0.000	0.92	0.0	18.9	OK
5.001	MH11	22.689	-0.097	0.000	0.59	0.0	34.6	OK
5.002	MH12	22.302	-0.066	0.000	0.95	0.0	142.6	OK
1.004	MH13	21.049	1.347	0.000	1.80	0.0	579.9	SURCHARGED*
1.005	MH14	19.668	0.466	0.000	1.20	0.0	547.4	SURCHARGED*
1.006	MH15	18.368	0.166	0.000	0.99	0.0	528.3	SURCHARGED*
1.007	MH16	17.606	0.209	0.000	0.69	0.0	504.9	SURCHARGED
6.000	SW07	22.165	-0.177	0.000	0.12	0.0	58.8	FLOOD RISK*
6.001	SW08	20.457	-0.125	0.000	0.26	0.0	128.3	FLOOD RISK*
6.002	SW09	18.725	-0.107	0.000	0.36	0.0	150.8	FLOOD RISK*
6.003	SW10	18.022	-0.093	0.000	0.44	0.0	166.1	FLOOD RISK*
6.004	MH17	17.233	0.501	0.000	0.35	0.0	165.3	SURCHARGED
1.008	MH18	17.219	0.605	0.000	1.26	0.0	613.3	SURCHARGED
1.009	MH19	16.829	0.480	0.000	0.65	0.0	595.2	SURCHARGED
7.000	SW11	21.804	-0.178	0.000	0.12	0.0	61.2	FLOOD RISK*
7.001	SW12	20.448	-0.134	0.000	0.22	0.0	114.9	FLOOD RISK*
7.002	SW13	18.721	-0.111	0.000	0.34	0.0	144.4	FLOOD RISK*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
7.003	SW14	18.053	-0.062	0.000	0.57	0.0	168.3	FLOOD RISK*
7.004	SW15	17.713	-0.066	0.000	0.55	0.0	186.8	FLOOD RISK*
7.005	SW16	17.115	-0.070	0.000	0.56	0.0	202.4	FLOOD RISK*
8.000	SW17	18.154	-0.103	0.000	0.34	0.0	64.3	FLOOD RISK*
8.001	SW18	17.970	-0.092	0.000	0.37	0.0	115.3	FLOOD RISK*
8.002	SW19	17.178	-0.108	0.000	0.38	0.0	140.6	FLOOD RISK*
7.006	MH20	16.494	0.799	0.000	0.55	0.0	334.5	FLOOD RISK
9.000	MH21	16.601	0.130	0.000	1.20	0.0	38.1	SURCHARGED
1.010	MH22	16.465	0.912	0.000	1.44	0.0	871.8	SURCHARGED
10.000	SW20	17.717	-0.190	0.000	0.10	0.0	18.1	FLOOD RISK*
11.000	SW21	18.146	-0.111	0.000	0.32	0.0	57.9	FLOOD RISK*
11.001	SW22	18.051	-0.011	0.000	0.89	0.0	43.6	FLOOD RISK*
11.002	SW23	17.623	-0.127	0.000	0.30	0.0	44.7	FLOOD RISK*
1.011	MH23	16.156	0.707	0.000	1.64	0.0	920.9	SURCHARGED
1.012	MH24	15.812	0.472	0.000	1.49	0.0	918.6	SURCHARGED
1.013	MH25	15.363	0.225	0.000	1.74	0.0	918.5	SURCHARGED
1.014	Pri	15.295	0.695	0.000	0.37	0.0	35.8	SURCHARGED
1.015	Inf	15.285	1.085	0.000	0.00	0.0	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
1.001	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	100	+30%					
2.001	15 Winter	100	+30%					
2.002	15 Winter	100	+30%					
2.003	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
3.001	15 Winter	100	+30%					
3.002	30 Winter	100	+30%					
3.003	15 Winter	100	+30%	100/15 Summer				
1.002	15 Winter	100	+30%	30/15 Summer				
4.000	30 Winter	100	+30%	30/15 Summer				
4.001	30 Winter	100	+30%	30/15 Summer				
4.002	30 Winter	100	+30%	30/15 Summer				
1.003	30 Winter	100	+30%	30/15 Summer				
5.000	15 Winter	100	+30%	100/15 Summer				2
5.001	15 Winter	100	+30%	100/15 Summer				2
5.002	15 Winter	100	+30%	100/15 Summer				2
1.004	15 Winter	100	+30%	30/15 Summer				2
1.005	15 Winter	100	+30%	30/15 Summer				1
1.006	30 Winter	100	+30%	30/15 Winter				3
1.007	15 Winter	100	+30%	30/15 Summer				
6.000	15 Winter	100	+30%					
6.001	15 Winter	100	+30%					
6.002	15 Winter	100	+30%					
6.003	15 Winter	100	+30%					
6.004	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
1.008	15 Winter	100	+30%	30/15 Summer	100/960 Summer			
1.009	5760 Summer	100	+30%	30/15 Summer	100/960 Summer			
7.000	15 Winter	100	+30%					
7.001	15 Winter	100	+30%					
7.002	15 Winter	100	+30%					
7.003	15 Winter	100	+30%					
7.004	15 Winter	100	+30%					
7.005	15 Winter	100	+30%					
8.000	15 Winter	100	+30%					
8.001	15 Winter	100	+30%					

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
8.002	15 Winter	100	+30%					
7.006	15 Winter	100	+30%	30/15 Summer	100/15 Summer			8
9.000	15 Winter	100	+30%	30/15 Summer				
1.010	5760 Summer	100	+30%	30/15 Summer	100/960 Summer			1
10.000	15 Winter	100	+30%					
11.000	15 Winter	100	+30%					
11.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
11.002	30 Winter	100	+30%					
1.011	7200 Winter	100	+30%	30/15 Summer	100/960 Summer			
1.012	60 Winter	100	+30%	30/15 Summer	100/960 Summer			
1.013	60 Winter	100	+30%	30/15 Summer	100/960 Summer			
1.014	60 Winter	100	+30%	30/15 Summer				
1.015	2880 Winter	100	+30%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	24.543	1.709	18.655	1.12	0.0	85.5	FLOOD
1.001	MH02	24.041	1.709	19.236	1.55	0.0	180.9	FLOOD
2.000	SW01	25.377	-0.085	0.000	0.41	0.0	135.9	FLOOD RISK*
2.001	SW02	24.701	-0.040	0.000	0.63	0.0	200.5	FLOOD RISK*
2.002	SW03	24.055	-0.029	0.000	0.72	0.0	247.8	FLOOD RISK*
2.003	MH03	23.413	1.226	126.268	1.97	0.0	320.4	FLOOD
3.000	SW04	25.144	0.018	17.981	1.05	0.0	126.4	FLOOD
3.001	SW05	25.030	-0.010	0.000	0.88	0.0	105.8	FLOOD RISK*
3.002	SW06	24.892	-0.122	0.000	0.32	0.0	105.7	FLOOD RISK*
3.003	MH04	23.874	0.757	0.000	0.22	0.0	102.3	SURCHARGED
1.002	MH05	23.761	1.690	0.000	1.43	0.0	433.4	FLOOD RISK*
4.000	MH06	21.483	0.708	0.000	0.08	0.0	16.7	FLOOD RISK*
4.001	MH07	21.842	1.516	0.000	0.33	0.0	48.6	FLOOD RISK*
4.002	MH08	22.161	2.113	0.000	0.68	0.0	102.3	FLOOD RISK*
1.003	MH09	22.952	3.089	0.000	2.14	0.0	530.8	FLOOD RISK*
5.000	MH10	24.499	1.200	0.000	1.20	0.0	24.7	FLOOD RISK*
5.001	MH11	24.019	1.233	0.000	0.75	0.0	44.2	FLOOD
5.002	MH12	23.527	1.159	0.000	1.14	0.0	172.1	FLOOD RISK*
1.004	MH13	22.576	2.874	0.000	2.22	0.0	715.3	FLOOD
1.005	MH14	20.902	1.700	0.000	1.49	0.0	681.7	FLOOD
1.006	MH15	19.152	0.950	0.000	1.10	0.0	584.1	FLOOD
1.007	MH16	18.232	0.835	0.000	0.82	0.0	604.3	FLOOD RISK
6.000	SW07	22.195	-0.147	0.000	0.19	0.0	97.1	FLOOD RISK*
6.001	SW08	20.502	-0.080	0.000	0.42	0.0	212.6	FLOOD RISK*
6.002	SW09	18.775	-0.057	0.000	0.60	0.0	250.3	FLOOD RISK*
6.003	SW10	18.078	-0.037	0.000	0.73	0.0	273.8	FLOOD RISK*
6.004	MH17	17.667	0.935	35.059	0.50	0.0	235.2	FLOOD
1.008	MH18	17.675	1.061	0.000	1.38	0.0	675.5	SURCHARGED
1.009	MH19	17.365	1.016	0.000	0.05	0.0	48.8	FLOOD RISK
7.000	SW11	21.834	-0.148	0.000	0.19	0.0	100.9	FLOOD RISK*
7.001	SW12	20.488	-0.094	0.000	0.36	0.0	190.0	FLOOD RISK*
7.002	SW13	18.770	-0.062	0.000	0.56	0.0	239.2	FLOOD RISK*

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
7.003	SW14	18.112	-0.003	0.000	0.95	0.0	278.7	FLOOD RISK*
7.004	SW15	17.773	-0.006	0.000	0.90	0.0	306.0	FLOOD RISK*
7.005	SW16	17.174	-0.011	0.000	0.90	0.0	323.5	FLOOD RISK*
8.000	SW17	18.204	-0.053	0.000	0.57	0.0	106.1	FLOOD RISK*
8.001	SW18	18.021	-0.041	0.000	0.61	0.0	190.9	FLOOD RISK*
8.002	SW19	17.226	-0.060	0.000	0.60	0.0	226.3	FLOOD RISK*
7.006	MH20	16.739	1.044	144.396	0.61	0.0	367.9	FLOOD
9.000	MH21	17.283	0.812	0.000	1.85	0.0	58.8	SURCHARGED
1.010	MH22	17.360	1.807	16.234	0.26	0.0	155.8	FLOOD
10.000	SW20	17.741	-0.166	0.000	0.17	0.0	29.8	FLOOD RISK*
11.000	SW21	18.195	-0.062	0.000	0.53	0.0	95.5	FLOOD RISK*
11.001	SW22	18.085	0.023	22.713	1.05	0.0	51.5	FLOOD
11.002	SW23	17.647	-0.103	0.000	0.41	0.0	60.3	FLOOD RISK*
1.011	MH23	16.459	1.010	0.000	0.29	0.0	163.8	SURCHARGED
1.012	MH24	16.146	0.806	0.000	1.56	0.0	959.2	SURCHARGED
1.013	MH25	15.860	0.722	0.000	1.82	0.0	958.1	SURCHARGED
1.014	Pri	15.732	1.132	0.000	2.40	0.0	232.4	SURCHARGED
1.015	Inf	15.712	1.512	0.000	0.00	0.0	0.0	SURCHARGED

Parsons Brinckerhoff		Page 1
Manchester Technology... Oxford Road Manchester M1 7ED		
Date 19/06/2014 16:38 File System 17.mdx	Designed by Chris.Uzzell Checked by	
Micro Drainage	Network W.12.6	

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	91.400	0.227	402.6	0.140	5.00	0.0		0.080		-5
1.001	100.000	0.774	129.2	0.153	0.00	0.0		0.080		-5
1.002	100.000	1.323	75.6	0.153	0.00	0.0		0.080		-5
1.003	100.000	1.250	80.0	0.154	0.00	0.0		0.080		-5
2.000	165.700	0.818	202.6	0.235	5.00	0.0		0.080		-5
2.001	100.000	0.754	132.6	0.154	0.00	0.0		0.080		-5
2.002	100.000	0.746	134.0	0.154	0.00	0.0		0.080		-5
2.003	100.000	0.750	133.3	0.153	0.00	0.0		0.080		-5
2.004	100.000	0.916	109.2	0.153	0.00	0.0		0.080		-5
1.004	27.200	0.109	249.5	0.000	0.00	0.0	0.600		o	525
3.000	91.600	0.227	403.5	0.161	5.00	0.0		0.080		-4
3.001	100.000	0.774	129.2	0.177	0.00	0.0		0.080		-4
3.002	100.000	1.323	75.6	0.175	0.00	0.0		0.080		-4
3.003	100.000	1.250	80.0	0.147	0.00	0.0		0.080		-4
4.000	164.900	1.073	153.7	0.230	5.00	0.0		0.080		-4
4.001	100.000	0.750	133.3	0.129	0.00	0.0		0.080		-4
4.002	100.000	0.750	133.3	0.126	0.00	0.0		0.080		-4
4.003	100.000	0.750	133.3	0.130	0.00	0.0		0.080		-4

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	17.982	0.140	0.0	0.17	118.6
1.001	17.755	0.293	0.0	0.30	209.3
1.002	16.981	0.446	0.0	0.40	273.7
1.003	15.658	0.600	0.0	0.39	266.0
2.000	18.392	0.235	0.0	0.24	167.2
2.001	17.574	0.389	0.0	0.30	206.6
2.002	16.820	0.543	0.0	0.30	205.5
2.003	16.074	0.696	0.0	0.30	206.1
2.004	15.324	0.849	0.0	0.33	227.7
1.004	12.958	1.449	0.0	1.41	306.0
3.000	17.982	0.161	0.0	0.17	118.3
3.001	17.755	0.338	0.0	0.31	209.1
3.002	16.981	0.513	0.0	0.40	273.4
3.003	15.658	0.660	0.0	0.39	265.8
4.000	18.647	0.230	0.0	0.28	191.8
4.001	17.574	0.359	0.0	0.30	205.9
4.002	16.824	0.485	0.0	0.30	205.9
4.003	16.074	0.615	0.0	0.30	205.9

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
4.004	100.000	0.916	109.2	0.126	0.00	0.0		0.080		-4
1.005	23.000	0.354	65.0	0.000	0.00	0.0	0.600		o	525
1.006	5.000	0.000	0.0	0.000	0.00	0.0	0.600		o	100
1.007	5.000	0.000	0.0	0.000	0.00	0.0	0.600		o	225

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
4.004	15.324	0.741	0.0	0.33	227.5
1.005	12.849	2.850	0.0	2.78	602.3
1.006	12.000	2.850	0.0	0.00	0.0
1.007	12.000	2.850	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007		13.400	12.000	12.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	2	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 626400 314250 TG 26400 14250
C (1km)	-0.024
D1 (1km)	0.278
D2 (1km)	0.361
D3 (1km)	0.254
E (1km)	0.312
F (1km)	2.487

Synthetic Rainfall Details

Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: MH2, DS/PN: 1.006

Invert Level (m) 12.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1702.5	1.400	2677.9	2.800	0.0	4.200	0.0
0.200	1829.8	1.600	0.0	3.000	0.0	4.400	0.0
0.400	1961.0	1.800	0.0	3.200	0.0	4.600	0.0
0.600	2096.0	2.000	0.0	3.400	0.0	4.800	0.0
0.800	2235.6	2.200	0.0	3.600	0.0	5.000	0.0
1.000	2379.0	2.400	0.0	3.800	0.0		
1.200	2526.5	2.600	0.0	4.000	0.0		

Tank or Pond Manhole: MH2, DS/PN: 1.007

Invert Level (m) 12.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3744.0	1.400	5135.5	2.800	0.0	4.200	0.0
0.200	3931.0	1.600	0.0	3.000	0.0	4.400	0.0
0.400	4122.5	1.800	0.0	3.200	0.0	4.600	0.0
0.600	4317.9	2.000	0.0	3.400	0.0	4.800	0.0
0.800	4517.3	2.200	0.0	3.600	0.0	5.000	0.0
1.000	4720.7	2.400	0.0	3.800	0.0		
1.200	4928.0	2.600	0.0	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%					
1.001	15 Winter	1	0%					
1.002	15 Winter	1	0%					
1.003	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
2.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
2.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
2.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
2.003	15 Winter	1	0%	100/15 Summer	100/15 Summer			6
2.004	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
1.004	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
3.001	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
3.002	15 Winter	1	0%					
3.003	15 Winter	1	0%	100/15 Summer	100/15 Summer			3
4.000	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
4.001	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
4.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			3
4.003	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
4.004	30 Winter	1	0%	100/15 Winter	100/15 Winter			2
1.005	15 Winter	1	0%	30/15 Summer				
1.006	1440 Winter	1	0%	1/15 Winter				
1.007	5760 Winter	1	0%	30/480 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	18.091	-0.166	0.000	0.14	0.0	17.2	FLOOD RISK*
1.001	SW2	17.858	-0.172	0.000	0.14	0.0	28.5	FLOOD RISK*
1.002	SW3	17.082	-0.174	0.000	0.14	0.0	37.0	FLOOD RISK*
1.003	SW4	15.769	-0.164	0.000	0.17	0.0	46.4	FLOOD RISK*
2.000	SW5	18.512	-0.155	0.000	0.15	0.0	24.3	FLOOD RISK*
2.001	SW6	17.688	-0.161	0.000	0.17	0.0	34.8	FLOOD RISK*
2.002	SW7	16.945	-0.150	0.000	0.20	0.0	41.8	FLOOD RISK*
2.003	SW8	16.204	-0.145	0.000	0.22	0.0	45.7	FLOOD RISK*
2.004	SW9	15.452	-0.147	0.000	0.23	0.0	51.6	FLOOD RISK*
1.004	MH1	13.181	-0.302	0.000	0.38	0.0	95.0	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
3.000	SW10	18.100	-0.157	0.000	0.17	0.0	19.6	FLOOD RISK*
3.001	SW11	17.864	-0.166	0.000	0.15	0.0	32.3	FLOOD RISK*
3.002	SW12	17.089	-0.167	0.000	0.15	0.0	41.8	FLOOD RISK*
3.003	SW13	15.773	-0.160	0.000	0.19	0.0	49.8	FLOOD RISK*
4.000	SW14	18.757	-0.165	0.000	0.12	0.0	24.0	FLOOD RISK*
4.001	SW15	17.685	-0.164	0.000	0.16	0.0	32.8	FLOOD RISK*
4.002	SW16	16.943	-0.156	0.000	0.19	0.0	38.3	FLOOD RISK*
4.003	SW17	16.197	-0.152	0.000	0.20	0.0	41.3	FLOOD RISK*
4.004	SW18	15.444	-0.155	0.000	0.20	0.0	45.8	FLOOD RISK*
1.005	MH2	13.083	-0.291	0.000	0.41	0.0	187.7	OK
1.006	MH2	12.268	0.168	0.000	2.94	0.0	9.8	SURCHARGED
1.007	MH2	12.170	-0.055	0.000	0.19	0.0	4.5	OK

Input Hydrograph Manhole MH2, DS/PN 1.006 (Storm)
1440 minute 1 year Winter I+0%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 626400 314250 TG 26400 14250
C	-0.02400
D1	0.27612
D2	0.36719
D3	0.25358
E	0.31161
F	2.48446
Area (Ha)	3.982
SAAR (mm)	611
CWI	88.980
Urban (1990)	0.0000
SPR	16.410
DPSBAR	19.400
DPLBAR	0.196
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.851
FARL	1.000

Output Variables

TP(0) (mins)	107	TPt (mins)	119	TB (mins)	301	PR (%)	7.405
T (mins)	24	Q (l/s)	44.1	Base Flow (l/s)	0.3		

Input Hydrograph Manhole MH2, DS/PN 1.006 (Storm)
1440 minute 1 year Winter I+0%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	0.3	312	0.7	600	1.5	888	2.7	1176	1.1	1464	0.6
48	0.3	336	0.7	624	1.6	912	2.6	1200	1.0	1488	0.6
72	0.3	360	0.7	648	1.8	936	2.5	1224	0.9	1512	0.5
96	0.3	384	0.8	672	1.9	960	2.4	1248	0.9	1536	0.5
120	0.4	408	0.8	696	2.1	984	2.2	1272	0.8	1560	0.4
144	0.4	432	0.8	720	2.3	1008	2.1	1296	0.8	1584	0.4
168	0.5	456	0.9	744	2.4	1032	1.9	1320	0.8	1608	0.3
192	0.5	480	0.9	768	2.5	1056	1.7	1344	0.7	1632	0.3
216	0.6	504	1.0	792	2.6	1080	1.6	1368	0.7	1656	0.3
240	0.6	528	1.1	816	2.7	1104	1.4	1392	0.7	1680	0.3
264	0.7	552	1.2	840	2.7	1128	1.3	1416	0.7	1704	0.3
288	0.7	576	1.4	864	2.7	1152	1.2	1440	0.7	1728	0.3

Input Hydrograph Manhole MH2, DS/PN 1.007 (Storm)
5760 minute 1 year Winter I+0%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 626400 314250 TG 26400 14250
C	-0.02400
D1	0.27612
D2	0.36719
D3	0.25358
E	0.31161
F	2.48446
Area (Ha)	3.631
SAAR (mm)	611
CWI	88.980
Urban (1990)	0.0000
SPR	16.410
DPSBAR	19.400
DPLBAR	1.416
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.851
FARL	1.000

Output Variables

TP(0) (mins) 312 TPt (mins) 324 TB (mins) 817 PR (%) 9.205
T (mins) 24 Q (l/s) 14.8 Base Flow (l/s) 0.2

Input Hydrograph Manhole MH2, DS/PN 1.007 (Storm)
5760 minute 1 year Winter I+0%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	0.2	1128	0.4	2232	0.7	3336	1.3	4440	0.6	5544	0.4
48	0.2	1152	0.4	2256	0.8	3360	1.3	4464	0.6	5568	0.4
72	0.2	1176	0.4	2280	0.8	3384	1.3	4488	0.6	5592	0.4
96	0.2	1200	0.4	2304	0.8	3408	1.3	4512	0.6	5616	0.4
120	0.2	1224	0.4	2328	0.8	3432	1.3	4536	0.6	5640	0.4
144	0.2	1248	0.4	2352	0.8	3456	1.3	4560	0.6	5664	0.4
168	0.2	1272	0.4	2376	0.8	3480	1.3	4584	0.6	5688	0.4
192	0.2	1296	0.4	2400	0.9	3504	1.3	4608	0.6	5712	0.4
216	0.2	1320	0.4	2424	0.9	3528	1.3	4632	0.6	5736	0.4
240	0.2	1344	0.4	2448	0.9	3552	1.3	4656	0.5	5760	0.4
264	0.3	1368	0.4	2472	0.9	3576	1.2	4680	0.5	5784	0.4
288	0.3	1392	0.4	2496	0.9	3600	1.2	4704	0.5	5808	0.4
312	0.3	1416	0.5	2520	1.0	3624	1.2	4728	0.5	5832	0.4
336	0.3	1440	0.5	2544	1.0	3648	1.2	4752	0.5	5856	0.4
360	0.3	1464	0.5	2568	1.0	3672	1.2	4776	0.5	5880	0.4
384	0.3	1488	0.5	2592	1.0	3696	1.2	4800	0.5	5904	0.4
408	0.3	1512	0.5	2616	1.0	3720	1.1	4824	0.5	5928	0.3
432	0.3	1536	0.5	2640	1.0	3744	1.1	4848	0.5	5952	0.3
456	0.3	1560	0.5	2664	1.1	3768	1.1	4872	0.5	5976	0.3
480	0.3	1584	0.5	2688	1.1	3792	1.1	4896	0.5	6000	0.3
504	0.3	1608	0.5	2712	1.1	3816	1.1	4920	0.5	6024	0.3
528	0.3	1632	0.5	2736	1.1	3840	1.1	4944	0.5	6048	0.3
552	0.3	1656	0.5	2760	1.1	3864	1.0	4968	0.5	6072	0.3
576	0.3	1680	0.5	2784	1.1	3888	1.0	4992	0.5	6096	0.3
600	0.4	1704	0.5	2808	1.2	3912	1.0	5016	0.5	6120	0.3
624	0.4	1728	0.5	2832	1.2	3936	1.0	5040	0.5	6144	0.3
648	0.4	1752	0.5	2856	1.2	3960	1.0	5064	0.5	6168	0.3
672	0.4	1776	0.5	2880	1.2	3984	0.9	5088	0.5	6192	0.3
696	0.4	1800	0.5	2904	1.2	4008	0.9	5112	0.4	6216	0.3
720	0.4	1824	0.5	2928	1.2	4032	0.9	5136	0.4	6240	0.3
744	0.4	1848	0.5	2952	1.3	4056	0.9	5160	0.4	6264	0.3
768	0.4	1872	0.6	2976	1.3	4080	0.9	5184	0.4	6288	0.2
792	0.4	1896	0.6	3000	1.3	4104	0.9	5208	0.4	6312	0.2
816	0.4	1920	0.6	3024	1.3	4128	0.8	5232	0.4	6336	0.2
840	0.4	1944	0.6	3048	1.3	4152	0.8	5256	0.4	6360	0.2
864	0.4	1968	0.6	3072	1.3	4176	0.8	5280	0.4	6384	0.2
888	0.4	1992	0.6	3096	1.3	4200	0.8	5304	0.4	6408	0.2
912	0.4	2016	0.6	3120	1.3	4224	0.8	5328	0.4	6432	0.2
936	0.4	2040	0.6	3144	1.3	4248	0.8	5352	0.4	6456	0.2
960	0.4	2064	0.6	3168	1.3	4272	0.7	5376	0.4	6480	0.2
984	0.4	2088	0.7	3192	1.3	4296	0.7	5400	0.4	6504	0.2
1008	0.4	2112	0.7	3216	1.3	4320	0.7	5424	0.4	6528	0.2
1032	0.4	2136	0.7	3240	1.3	4344	0.7	5448	0.4	6552	0.2
1056	0.4	2160	0.7	3264	1.3	4368	0.7	5472	0.4	6576	0.2
1080	0.4	2184	0.7	3288	1.3	4392	0.7	5496	0.4		
1104	0.4	2208	0.7	3312	1.3	4416	0.7	5520	0.4		

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%					
1.001	15 Winter	30	+20%					
1.002	15 Winter	30	+20%					
1.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
2.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
2.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
2.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
2.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
2.004	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
1.004	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
3.001	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
3.002	15 Winter	30	+20%					
3.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			3
4.000	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
4.001	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
4.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			3
4.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
4.004	15 Winter	30	+20%	100/15 Winter	100/15 Winter			2
1.005	15 Winter	30	+20%	30/15 Summer				
1.006	2160 Winter	30	+20%	1/15 Winter				
1.007	5760 Winter	30	+20%	30/480 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	18.207	-0.050	0.000	0.58	0.0	68.2	FLOOD RISK*
1.001	SW2	17.965	-0.065	0.000	0.53	0.0	110.8	FLOOD RISK*
1.002	SW3	17.188	-0.068	0.000	0.52	0.0	141.5	FLOOD RISK*
1.003	SW4	15.890	-0.043	0.000	0.71	0.0	187.9	FLOOD RISK*
2.000	SW5	18.640	-0.027	0.000	0.58	0.0	96.4	FLOOD RISK*
2.001	SW6	17.809	-0.040	0.000	0.65	0.0	135.1	FLOOD RISK*
2.002	SW7	17.075	-0.020	0.000	0.78	0.0	159.8	FLOOD RISK*
2.003	SW8	16.337	-0.012	0.000	0.86	0.0	177.0	FLOOD RISK*
2.004	SW9	15.581	-0.018	0.000	0.86	0.0	196.2	FLOOD RISK*
1.004	MH1	14.168	0.685	0.000	1.50	0.0	378.3	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
3.000	SW10	18.225	-0.032	0.000	0.66	0.0	78.4	FLOOD RISK*
3.001	SW11	17.978	-0.052	0.000	0.60	0.0	125.0	FLOOD RISK*
3.002	SW12	17.201	-0.055	0.000	0.58	0.0	159.7	FLOOD RISK*
3.003	SW13	15.897	-0.036	0.000	0.75	0.0	198.2	FLOOD RISK*
4.000	SW14	18.874	-0.048	0.000	0.49	0.0	94.4	FLOOD RISK*
4.001	SW15	17.801	-0.048	0.000	0.62	0.0	127.7	FLOOD RISK*
4.002	SW16	17.065	-0.034	0.000	0.71	0.0	145.9	FLOOD RISK*
4.003	SW17	16.322	-0.027	0.000	0.77	0.0	158.0	FLOOD RISK*
4.004	SW18	15.561	-0.038	0.000	0.74	0.0	169.3	FLOOD RISK*
1.005	MH2	13.924	0.550	0.000	1.62	0.0	741.0	SURCHARGED
1.006	MH2	12.790	0.690	0.000	5.26	0.0	17.4	SURCHARGED
1.007	MH2	12.493	0.268	0.000	0.25	0.0	5.9	SURCHARGED

Input Hydrograph Manhole MH2, DS/PN 1.006 (Storm)
2160 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 626400 314250 TG 26400 14250
C	-0.02400
D1	0.27612
D2	0.36719
D3	0.25358
E	0.31161
F	2.48446
Area (Ha)	3.982
SAAR (mm)	611
CWI	88.980
Urban (1990)	0.0000
SPR	16.410
DPSBAR	19.400
DPLBAR	0.196
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.851
FARL	1.000

Output Variables

TP(0) (mins)	107	Q (l/s)	44.1	PR (%)	14.539
T (mins)	24	TB (mins)	301		
TPt (mins)	119	Base Flow (l/s)	0.3		

Input Hydrograph Manhole MH2, DS/PN 1.006 (Storm)
2160 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	0.3	432	2.1	840	5.1	1248	10.1	1656	3.9	2064	2.0
48	0.3	456	2.1	864	5.4	1272	10.0	1680	3.6	2088	2.0
72	0.3	480	2.1	888	5.9	1296	9.7	1704	3.3	2112	1.9
96	0.4	504	2.2	912	6.3	1320	9.4	1728	3.1	2136	1.8
120	0.6	528	2.2	936	6.7	1344	9.1	1752	2.9	2160	1.7
144	0.8	552	2.3	960	7.2	1368	8.7	1776	2.7	2184	1.5
168	1.0	576	2.4	984	7.6	1392	8.3	1800	2.6	2208	1.3
192	1.2	600	2.5	1008	8.0	1416	7.9	1824	2.4	2232	1.1
216	1.4	624	2.6	1032	8.4	1440	7.4	1848	2.3	2256	0.9
240	1.5	648	2.8	1056	8.8	1464	7.0	1872	2.3	2280	0.7
264	1.7	672	3.0	1080	9.2	1488	6.6	1896	2.2	2304	0.5
288	1.8	696	3.2	1104	9.5	1512	6.1	1920	2.2	2328	0.4
312	1.9	720	3.4	1128	9.8	1536	5.7	1944	2.1	2352	0.3
336	2.0	744	3.7	1152	10.0	1560	5.3	1968	2.1	2376	0.3
360	2.0	768	4.0	1176	10.2	1584	4.9	1992	2.1	2400	0.3
384	2.1	792	4.3	1200	10.3	1608	4.6	2016	2.1	2424	0.3
408	2.1	816	4.7	1224	10.2	1632	4.2	2040	2.1	2448	0.3

Input Hydrograph Manhole MH2, DS/PN 1.007 (Storm)
5760 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 626400 314250 TG 26400 14250
C	-0.02400
D1	0.27612
D2	0.36719
D3	0.25358
E	0.31161
F	2.48446
Area (Ha)	3.631
SAAR (mm)	611
CWI	88.980
Urban (1990)	0.0000
SPR	16.410
DPSBAR	19.400
DPLBAR	1.416
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.851
FARL	1.000

Input Hydrograph Manhole MH2, DS/PN 1.007 (Storm)
5760 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Output Variables

TP(0) (mins) 312 Q (l/s) 14.8 PR (%) 16.416
T (mins) 24 TB (mins) 817
TPt (mins) 324 Base Flow (l/s) 0.2

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	0.2	1032	1.1	2040	1.9	3048	4.8	4056	3.0	5064	1.2
48	0.2	1056	1.1	2064	2.0	3072	4.8	4080	2.9	5088	1.1
72	0.2	1080	1.1	2088	2.0	3096	4.8	4104	2.9	5112	1.1
96	0.2	1104	1.1	2112	2.1	3120	4.9	4128	2.8	5136	1.1
120	0.2	1128	1.1	2136	2.1	3144	4.9	4152	2.7	5160	1.1
144	0.2	1152	1.1	2160	2.2	3168	4.9	4176	2.7	5184	1.1
168	0.3	1176	1.1	2184	2.3	3192	4.9	4200	2.6	5208	1.1
192	0.3	1200	1.1	2208	2.3	3216	4.9	4224	2.5	5232	1.1
216	0.3	1224	1.1	2232	2.4	3240	4.9	4248	2.4	5256	1.1
240	0.3	1248	1.1	2256	2.5	3264	4.9	4272	2.4	5280	1.1
264	0.3	1272	1.1	2280	2.5	3288	4.9	4296	2.3	5304	1.1
288	0.3	1296	1.1	2304	2.6	3312	4.9	4320	2.3	5328	1.1
312	0.4	1320	1.1	2328	2.7	3336	4.9	4344	2.2	5352	1.1
336	0.4	1344	1.1	2352	2.7	3360	4.9	4368	2.1	5376	1.1
360	0.4	1368	1.1	2376	2.8	3384	4.9	4392	2.1	5400	1.1
384	0.4	1392	1.1	2400	2.9	3408	4.8	4416	2.0	5424	1.1
408	0.5	1416	1.1	2424	3.0	3432	4.8	4440	2.0	5448	1.1
432	0.5	1440	1.2	2448	3.0	3456	4.7	4464	1.9	5472	1.1
456	0.5	1464	1.2	2472	3.1	3480	4.7	4488	1.9	5496	1.1
480	0.6	1488	1.2	2496	3.2	3504	4.6	4512	1.8	5520	1.1
504	0.6	1512	1.2	2520	3.3	3528	4.6	4536	1.8	5544	1.1
528	0.6	1536	1.2	2544	3.3	3552	4.5	4560	1.7	5568	1.1
552	0.7	1560	1.2	2568	3.4	3576	4.5	4584	1.7	5592	1.0
576	0.7	1584	1.2	2592	3.5	3600	4.4	4608	1.6	5616	1.0
600	0.7	1608	1.3	2616	3.6	3624	4.4	4632	1.6	5640	1.0
624	0.8	1632	1.3	2640	3.7	3648	4.3	4656	1.5	5664	1.0
648	0.8	1656	1.3	2664	3.7	3672	4.2	4680	1.5	5688	1.0
672	0.8	1680	1.3	2688	3.8	3696	4.1	4704	1.5	5712	1.0
696	0.9	1704	1.4	2712	3.9	3720	4.1	4728	1.4	5736	0.9
720	0.9	1728	1.4	2736	4.0	3744	4.0	4752	1.4	5760	0.9
744	0.9	1752	1.4	2760	4.0	3768	3.9	4776	1.4	5784	0.9
768	0.9	1776	1.4	2784	4.1	3792	3.9	4800	1.3	5808	0.9
792	1.0	1800	1.5	2808	4.2	3816	3.8	4824	1.3	5832	0.8
816	1.0	1824	1.5	2832	4.2	3840	3.7	4848	1.3	5856	0.8
840	1.0	1848	1.6	2856	4.3	3864	3.6	4872	1.3	5880	0.8
864	1.0	1872	1.6	2880	4.4	3888	3.6	4896	1.3	5904	0.7
888	1.0	1896	1.6	2904	4.4	3912	3.5	4920	1.2	5928	0.7
912	1.0	1920	1.7	2928	4.5	3936	3.4	4944	1.2	5952	0.7
936	1.1	1944	1.7	2952	4.6	3960	3.3	4968	1.2	5976	0.6
960	1.1	1968	1.8	2976	4.6	3984	3.2	4992	1.2	6000	0.6
984	1.1	1992	1.8	3000	4.7	4008	3.2	5016	1.2	6024	0.5
1008	1.1	2016	1.9	3024	4.7	4032	3.1	5040	1.2	6048	0.5

Input Hydrograph Manhole MH2, DS/PN 1.007 (Storm)
5760 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Time (mins)	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**
6072	0.5	6168	0.4	6264	0.3	6360	0.3	6456	0.2	6552	0.2
6096	0.4	6192	0.3	6288	0.3	6384	0.2	6480	0.2	6576	0.2
6120	0.4	6216	0.3	6312	0.3	6408	0.2	6504	0.2		
6144	0.4	6240	0.3	6336	0.3	6432	0.2	6528	0.2		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%					
1.001	15 Winter	100	+30%					
1.002	15 Winter	100	+30%					
1.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
2.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
2.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
2.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
2.003	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
2.004	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
1.004	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
3.001	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
3.002	15 Winter	100	+30%					
3.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
4.000	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
4.001	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
4.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
4.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
4.004	15 Winter	100	+30%	100/15 Winter	100/15 Winter			2
1.005	15 Winter	100	+30%	30/15 Summer				
1.006	2160 Winter	100	+30%	1/15 Winter				
1.007	5760 Winter	100	+30%	30/480 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	18.256	-0.001	0.000	0.93	0.0	109.9	FLOOD RISK*
1.001	SW2	18.021	-0.009	0.000	0.83	0.0	174.3	FLOOD RISK*
1.002	SW3	17.247	-0.009	0.000	0.83	0.0	226.2	FLOOD RISK*
1.003	SW4	15.941	0.008	8.092	1.00	0.0	266.6	FLOOD
2.000	SW5	18.676	0.009	9.161	0.90	0.0	149.7	FLOOD
2.001	SW6	17.855	0.006	6.304	0.97	0.0	200.3	FLOOD
2.002	SW7	17.117	0.022	21.917	0.99	0.0	204.5	FLOOD
2.003	SW8	16.376	0.027	26.565	1.01	0.0	207.8	FLOOD
2.004	SW9	15.613	0.014	14.047	1.01	0.0	230.0	FLOOD
1.004	MH1	14.713	1.230	29.655	2.07	0.0	521.4	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
3.000	SW10	18.262	0.005	5.125	0.98	0.0	116.0	FLOOD
3.001	SW11	18.030	0.000	0.403	0.93	0.0	194.5	FLOOD
3.002	SW12	17.256	0.000	0.000	0.93	0.0	255.3	FLOOD RISK*
3.003	SW13	15.947	0.014	14.214	1.01	0.0	268.7	FLOOD
4.000	SW14	18.924	0.002	1.735	0.82	0.0	156.5	FLOOD
4.001	SW15	17.854	0.005	5.056	0.97	0.0	199.1	FLOOD
4.002	SW16	17.112	0.013	13.341	0.99	0.0	204.5	FLOOD
4.003	SW17	16.364	0.015	14.775	1.01	0.0	208.0	FLOOD
4.004	SW18	15.605	0.006	5.537	1.01	0.0	229.9	FLOOD
1.005	MH2	14.414	1.040	0.000	2.00	0.0	913.8	FLOOD RISK
1.006	MH2	13.185	1.085	0.000	6.47	0.0	21.4	FLOOD RISK
1.007	MH2	12.765	0.540	0.000	0.25	0.0	6.1	SURCHARGED

Input Hydrograph Manhole MH2, DS/PN 1.006 (Storm)
2160 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 626400 314250 TG 26400 14250
C	-0.02400
D1	0.27612
D2	0.36719
D3	0.25358
E	0.31161
F	2.48446
Area (Ha)	3.982
SAAR (mm)	611
CWI	88.980
Urban (1990)	0.0000
SPR	16.410
DPSBAR	19.400
DPLBAR	0.196
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.851
FARL	1.000

Output Variables

TP(0) (mins)	107	Q (l/s)	44.1	PR (%)	17.975
T (mins)	24	TB (mins)	301		
TPt (mins)	119	Base Flow (l/s)	0.3		

Input Hydrograph Manhole MH2, DS/PN 1.006 (Storm)
2160 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	0.3	432	3.5	840	8.7	1248	17.7	1656	6.7	2064	3.4
48	0.3	456	3.5	864	9.4	1272	17.4	1680	6.2	2088	3.3
72	0.4	480	3.5	888	10.1	1296	16.9	1704	5.7	2112	3.2
96	0.6	504	3.6	912	10.9	1320	16.4	1728	5.3	2136	3.0
120	0.8	528	3.7	936	11.6	1344	15.8	1752	4.9	2160	2.7
144	1.1	552	3.8	960	12.4	1368	15.1	1776	4.6	2184	2.4
168	1.5	576	4.0	984	13.2	1392	14.4	1800	4.3	2208	2.0
192	1.8	600	4.2	1008	13.9	1416	13.7	1824	4.1	2232	1.7
216	2.2	624	4.4	1032	14.7	1440	12.9	1848	3.9	2256	1.3
240	2.5	648	4.7	1056	15.4	1464	12.2	1872	3.8	2280	1.0
264	2.8	672	5.0	1080	16.0	1488	11.4	1896	3.7	2304	0.7
288	3.0	696	5.4	1104	16.6	1512	10.6	1920	3.6	2328	0.5
312	3.2	720	5.8	1128	17.1	1536	9.9	1944	3.5	2352	0.4
336	3.3	744	6.3	1152	17.5	1560	9.2	1968	3.5	2376	0.3
360	3.4	768	6.8	1176	17.8	1584	8.5	1992	3.5	2400	0.3
384	3.4	792	7.4	1200	17.9	1608	7.9	2016	3.5	2424	0.3
408	3.5	816	8.1	1224	17.8	1632	7.2	2040	3.4	2448	0.3

Input Hydrograph Manhole MH2, DS/PN 1.007 (Storm)
5760 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 626400 314250 TG 26400 14250
C	-0.02400
D1	0.27612
D2	0.36719
D3	0.25358
E	0.31161
F	2.48446
Area (Ha)	3.631
SAAR (mm)	611
CWI	88.980
Urban (1990)	0.0000
SPR	16.410
DPSBAR	19.400
DPLBAR	1.416
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.851
FARL	1.000

Input Hydrograph Manhole MH2, DS/PN 1.007 (Storm)
5760 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Output Variables

TP(0) (mins) 312 Q (l/s) 14.8 PR (%) 19.916
T (mins) 24 TB (mins) 817
TPt (mins) 324 Base Flow (l/s) 0.2

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	0.2	1032	1.7	2040	3.1	3048	7.8	4056	4.9	5064	1.8
48	0.2	1056	1.7	2064	3.2	3072	7.9	4080	4.8	5088	1.8
72	0.2	1080	1.7	2088	3.3	3096	8.0	4104	4.7	5112	1.8
96	0.2	1104	1.7	2112	3.3	3120	8.0	4128	4.5	5136	1.7
120	0.2	1128	1.7	2136	3.4	3144	8.1	4152	4.4	5160	1.7
144	0.3	1152	1.7	2160	3.6	3168	8.1	4176	4.3	5184	1.7
168	0.3	1176	1.7	2184	3.7	3192	8.1	4200	4.2	5208	1.7
192	0.3	1200	1.7	2208	3.8	3216	8.1	4224	4.1	5232	1.7
216	0.3	1224	1.7	2232	3.9	3240	8.1	4248	3.9	5256	1.7
240	0.3	1248	1.7	2256	4.0	3264	8.1	4272	3.8	5280	1.7
264	0.4	1272	1.7	2280	4.1	3288	8.1	4296	3.7	5304	1.7
288	0.4	1296	1.7	2304	4.2	3312	8.1	4320	3.6	5328	1.7
312	0.4	1320	1.7	2328	4.3	3336	8.1	4344	3.5	5352	1.7
336	0.5	1344	1.7	2352	4.5	3360	8.0	4368	3.4	5376	1.7
360	0.5	1368	1.7	2376	4.6	3384	8.0	4392	3.3	5400	1.7
384	0.6	1392	1.8	2400	4.7	3408	7.9	4416	3.2	5424	1.7
408	0.6	1416	1.8	2424	4.8	3432	7.9	4440	3.1	5448	1.7
432	0.7	1440	1.8	2448	5.0	3456	7.8	4464	3.0	5472	1.7
456	0.7	1464	1.8	2472	5.1	3480	7.7	4488	3.0	5496	1.6
480	0.8	1488	1.8	2496	5.2	3504	7.6	4512	2.9	5520	1.6
504	0.9	1512	1.8	2520	5.3	3528	7.6	4536	2.8	5544	1.6
528	0.9	1536	1.9	2544	5.5	3552	7.5	4560	2.7	5568	1.6
552	1.0	1560	1.9	2568	5.6	3576	7.4	4584	2.6	5592	1.6
576	1.0	1584	1.9	2592	5.7	3600	7.3	4608	2.6	5616	1.6
600	1.1	1608	2.0	2616	5.9	3624	7.2	4632	2.5	5640	1.6
624	1.2	1632	2.0	2640	6.0	3648	7.0	4656	2.4	5664	1.5
648	1.2	1656	2.0	2664	6.1	3672	6.9	4680	2.4	5688	1.5
672	1.3	1680	2.1	2688	6.2	3696	6.8	4704	2.3	5712	1.5
696	1.3	1704	2.1	2712	6.4	3720	6.7	4728	2.3	5736	1.4
720	1.4	1728	2.2	2736	6.5	3744	6.6	4752	2.2	5760	1.4
744	1.4	1752	2.2	2760	6.6	3768	6.4	4776	2.2	5784	1.3
768	1.4	1776	2.3	2784	6.7	3792	6.3	4800	2.1	5808	1.3
792	1.5	1800	2.3	2808	6.9	3816	6.2	4824	2.1	5832	1.2
816	1.5	1824	2.4	2832	7.0	3840	6.1	4848	2.0	5856	1.2
840	1.5	1848	2.5	2856	7.1	3864	5.9	4872	2.0	5880	1.1
864	1.6	1872	2.5	2880	7.2	3888	5.8	4896	2.0	5904	1.1
888	1.6	1896	2.6	2904	7.3	3912	5.7	4920	1.9	5928	1.0
912	1.6	1920	2.7	2928	7.4	3936	5.6	4944	1.9	5952	0.9
936	1.6	1944	2.7	2952	7.5	3960	5.4	4968	1.9	5976	0.9
960	1.6	1968	2.8	2976	7.6	3984	5.3	4992	1.8	6000	0.8
984	1.6	1992	2.9	3000	7.7	4008	5.2	5016	1.8	6024	0.8
1008	1.6	2016	3.0	3024	7.8	4032	5.0	5040	1.8	6048	0.7

Input Hydrograph Manhole MH2, DS/PN 1.007 (Storm)
5760 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
6072	0.6	6168	0.5	6264	0.3	6360	0.3	6456	0.2	6552	0.2
6096	0.6	6192	0.4	6288	0.3	6384	0.3	6480	0.2	6576	0.2
6120	0.5	6216	0.4	6312	0.3	6408	0.3	6504	0.2		
6144	0.5	6240	0.4	6336	0.3	6432	0.2	6528	0.2		

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	115.270	0.575	200.5	0.149	5.00	0.0		0.060		-5
1.001	100.000	0.500	200.0	0.142	0.00	0.0		0.060		-5
1.002	100.000	0.500	200.0	0.147	0.00	0.0		0.060		-5
1.003	100.000	0.500	200.0	0.161	0.00	0.0		0.060		-5
1.004	102.950	0.500	205.9	0.154	0.00	0.0		0.060		-5
1.005	101.950	0.474	215.1	0.167	0.00	0.0		0.060		-5
1.006	92.800	0.306	303.3	0.049	0.00	0.0		0.050		-5
1.007	13.626	0.184	74.1	0.000	0.00	0.0	0.600		o	375
1.008	94.188	1.192	79.0	0.121	0.00	0.0	0.600		o	375
1.009	87.535	1.487	58.9	0.138	0.00	0.0	0.600		o	375
1.010	97.512	2.257	43.2	0.132	0.00	0.0	0.600		o	375
1.011	100.000	2.807	35.6	0.149	0.00	0.0	0.600		o	375
1.012	82.818	1.830	45.3	0.000	0.00	0.0	0.600		o	375
2.000	95.180	0.986	96.5	0.043	5.00	0.0		0.060		-5
2.001	89.550	1.487	60.2	0.041	0.00	0.0		0.060		-5
2.002	100.620	2.845	35.4	0.057	0.00	0.0		0.060		-5
2.003	98.420	3.151	31.2	0.027	0.00	0.0		0.060		-5
2.004	82.290	2.106	39.1	0.016	0.00	0.0		0.060		-5
2.005	15.742	0.053	295.0	0.000	0.00	0.0	0.600		o	600
1.013	21.910	0.073	300.1	0.078	0.00	0.0	0.600		o	600

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	29.528	0.149	0.0	0.33	231.8
1.001	28.953	0.291	0.0	0.33	232.0
1.002	28.453	0.438	0.0	0.33	232.0
1.003	27.953	0.599	0.0	0.33	232.0
1.004	27.453	0.753	0.0	0.33	228.7
1.005	26.953	0.920	0.0	0.32	223.8
1.006	26.479	0.969	0.0	0.32	226.1
1.007	25.073	0.969	0.0	2.11	232.8
1.008	24.889	1.090	0.0	2.04	225.3
1.009	23.697	1.228	0.0	2.37	261.3
1.010	22.210	1.360	0.0	2.76	305.2
1.011	19.953	1.509	0.0	3.04	336.2
1.012	17.146	1.509	0.0	2.70	298.2
2.000	26.434	0.043	0.0	0.48	334.0
2.001	25.448	0.084	0.0	0.60	422.9
2.002	23.961	0.141	0.0	0.79	551.8
2.003	21.116	0.168	0.0	0.84	587.2
2.004	17.965	0.184	0.0	0.75	525.0
2.005	14.634	0.184	0.0	1.41	399.4
1.013	14.581	1.771	0.0	1.40	396.0

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
3.000	100.670	0.522	192.9	0.129	5.00	0.0		0.060		-4
3.001	99.440	0.500	198.9	0.141	0.00	0.0		0.060		-4
3.002	99.980	0.500	200.0	0.146	0.00	0.0		0.060		-4
3.003	99.920	0.500	199.8	0.157	0.00	0.0		0.060		-4
3.004	102.950	0.500	205.9	0.154	0.00	0.0		0.060		-4
3.005	101.890	0.549	185.6	0.168	0.00	0.0		0.060		-4
3.006	89.470	0.969	92.3	0.134	0.00	0.0		0.060		-8
3.007	92.940	1.289	72.1	0.152	0.00	0.0		0.060		-8
3.008	85.880	1.487	57.8	0.157	0.00	0.0		0.060		-8
3.009	111.850	2.314	48.3	0.196	0.00	0.0		0.060		-8
3.010	84.190	2.229	37.8	0.142	0.00	0.0		0.060		-8
3.011	98.750	1.589	62.1	0.029	0.00	0.0		0.060		-8
1.014	55.710	0.531	104.9	0.000	0.00	0.0	0.600		o	600
1.015	48.869	0.181	270.0	0.000	0.00	0.0	0.600		o	600
1.016	52.512	0.175	300.1	0.000	0.00	0.0	0.600		o	600
1.017	33.451	0.031	1081.8	0.000	0.00	0.0	0.600		o	600
4.000	99.261	0.410	242.1	0.168	5.00	0.0	0.600		o	300
4.001	99.572	0.500	199.1	0.168	0.00	0.0	0.600		o	300
4.002	66.281	0.325	203.9	0.150	0.00	0.0	0.600		o	375

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
3.000	29.475	0.129	0.0	0.34	228.2
3.001	28.953	0.270	0.0	0.33	224.8
3.002	28.453	0.416	0.0	0.33	224.1
3.003	27.953	0.573	0.0	0.33	224.2
3.004	27.453	0.727	0.0	0.32	220.9
3.005	26.953	0.895	0.0	0.34	232.7
3.006	26.294	1.029	0.0	0.54	773.9
3.007	25.325	1.181	0.0	0.61	875.7
3.008	24.036	1.338	0.0	0.69	978.5
3.009	22.549	1.534	0.0	0.75	1069.6
3.010	20.235	1.676	0.0	0.85	1210.0
3.011	18.006	1.705	0.0	0.66	943.3
1.014	14.508	3.476	0.0	2.38	672.2
1.015	13.977	3.476	0.0	1.48	417.7
1.016	13.796	3.476	0.0	1.40	396.0
1.017	13.621	3.476	0.0	0.73	206.9
4.000	16.729	0.168	0.0	1.01	71.1
4.001	16.319	0.336	0.0	1.11	78.5
4.002	15.744	0.486	0.0	1.27	139.7

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
4.003	58.819	0.267	220.0	0.112	0.00	0.0	0.600		o	375
5.000	100.530	0.361	278.5	0.160	5.00	0.0		0.100		-11
5.001	104.250	0.493	211.5	0.181	0.00	0.0		0.100		-11
5.002	112.180	0.600	187.0	0.190	0.00	0.0		0.100		-11
5.003	102.680	0.910	112.8	0.162	0.00	0.0		0.100		-11
6.000	48.390	0.748	64.7	0.053	5.00	0.0		0.100		-11
5.004	16.752	0.116	145.0	0.000	0.00	0.0	0.600		o	525
4.004	16.319	0.054	300.0	0.160	0.00	0.0	0.600		o	525
7.000	37.240	0.301	123.7	0.012	5.00	0.0		0.100		-9
4.005	26.768	0.089	300.0	0.000	0.00	0.0	0.600		o	525
4.006	57.674	0.192	300.0	0.000	0.00	0.0	0.600		o	525
4.007	24.708	0.082	300.0	0.000	0.00	0.0	0.600		o	525
4.008	33.686	0.102	330.0	0.000	0.00	0.0	0.600		o	525
1.018	33.451	0.200	167.3	0.000	0.00	0.0	0.600		o	300
1.019	33.451	0.000	0.0	0.000	0.00	0.0	0.600		o	225

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
4.003	15.419	0.598	0.0	1.22	134.5
5.000	17.421	0.160	0.0	0.15	182.4
5.001	17.060	0.341	0.0	0.17	209.3
5.002	16.567	0.531	0.0	0.18	222.6
5.003	15.967	0.693	0.0	0.24	286.5
6.000	15.805	0.053	0.0	0.31	378.3
5.004	14.036	0.746	0.0	1.86	402.2
4.004	13.920	1.504	0.0	1.29	278.8
7.000	16.802	0.012	0.0	0.25	171.0
4.005	13.866	1.516	0.0	1.29	278.8
4.006	13.777	1.516	0.0	1.29	278.8
4.007	13.585	1.516	0.0	1.29	278.8
4.008	13.502	1.516	0.0	1.23	265.7
1.018	13.400	4.992	0.0	1.21	85.7
1.019	13.200	4.992	0.0	0.00	0.0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * $10m^3$/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 617600 316150 TG 17600 16150
C (1km)	-0.024
D1 (1km)	0.290
D2 (1km)	0.350
D3 (1km)	0.249
E (1km)	0.316
F (1km)	2.463
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Online Controls for Storm

Hydro-Brake® Manhole: Tank, DS/PN: 1.019, Volume (m^3): 6.3

Design Head (m) 2.500 Hydro-Brake® Type Md6 SW Only Invert Level (m) 13.200
Design Flow (l/s) 10.0 Diameter (mm) 105

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	1.200	6.9	3.000	10.9	7.000	16.6
0.200	5.3	1.400	7.4	3.500	11.8	7.500	17.2
0.300	5.3	1.600	8.0	4.000	12.6	8.000	17.8
0.400	5.0	1.800	8.4	4.500	13.3	8.500	18.3
0.500	5.0	2.000	8.9	5.000	14.1	9.000	18.9
0.600	5.1	2.200	9.3	5.500	14.8	9.500	19.4
0.800	5.7	2.400	9.7	6.000	15.4		
1.000	6.3	2.600	10.1	6.500	16.0		

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.018

Invert Level (m) 13.400

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	698.0	1.400	1423.5	2.800	0.0	4.200	0.0
0.200	789.6	1.600	1543.2	3.000	0.0	4.400	0.0
0.400	885.2	1.800	1667.0	3.200	0.0	4.600	0.0
0.600	984.8	2.000	1794.8	3.400	0.0	4.800	0.0
0.800	1088.4	2.200	1926.7	3.600	0.0	5.000	0.0
1.000	1196.1	2.400	2062.5	3.800	0.0		
1.200	1307.8	2.600	2202.4	4.000	0.0		

Tank or Pond Manhole: Tank, DS/PN: 1.019

Invert Level (m) 13.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	4009.6	1.400	5851.8	2.800	7891.0	4.200	0.0
0.200	4260.7	1.600	6131.1	3.000	0.0	4.400	0.0
0.400	4515.8	1.800	6414.3	3.200	0.0	4.600	0.0
0.600	4775.0	2.000	6701.6	3.400	0.0	4.800	0.0
0.800	5038.2	2.200	6993.0	3.600	0.0	5.000	0.0
1.000	5305.4	2.400	7288.3	3.800	0.0		
1.200	5576.6	2.600	7587.7	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%					
1.001	15 Winter	1	0%					
1.002	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
1.003	15 Winter	1	0%	100/15 Summer	100/15 Summer			3
1.004	30 Winter	1	0%	100/15 Summer	100/15 Summer			4
1.005	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
1.006	30 Winter	1	0%	100/30 Summer	100/30 Summer			3
1.007	30 Winter	1	0%	30/15 Winter				
1.008	30 Winter	1	0%	100/15 Summer				
1.009	30 Winter	1	0%	100/15 Summer				
1.010	30 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.011	30 Winter	1	0%	30/15 Winter	100/15 Summer			3
1.012	30 Winter	1	0%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	1	0%					
2.001	15 Winter	1	0%					
2.002	15 Winter	1	0%					
2.003	15 Winter	1	0%					
2.004	15 Winter	1	0%					
2.005	15 Winter	1	0%	30/15 Summer	100/15 Summer			8
1.013	15 Winter	1	0%	30/15 Summer				
3.000	15 Winter	1	0%					
3.001	15 Winter	1	0%					
3.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
3.003	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
3.004	30 Winter	1	0%	100/15 Summer	100/15 Summer			4
3.005	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
3.006	30 Winter	1	0%					
3.007	30 Winter	1	0%					
3.008	30 Winter	1	0%					
3.009	30 Winter	1	0%					
3.010	60 Winter	1	0%					
3.011	60 Winter	1	0%					
1.014	30 Winter	1	0%	30/15 Summer				
1.015	30 Winter	1	0%	30/15 Summer				
1.016	30 Winter	1	0%	30/15 Summer	100/15 Summer			8
1.017	30 Winter	1	0%	30/15 Summer				
4.000	15 Winter	1	0%	30/15 Summer	30/15 Summer			6

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
4.001	15 Winter	1	0%	30/15 Summer	30/15 Summer			7
4.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
4.003	15 Winter	1	0%	30/15 Summer				
5.000	15 Winter	1	0%					
5.001	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
5.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			3
5.003	30 Winter	1	0%					
6.000	15 Winter	1	0%					
5.004	15 Winter	1	0%	30/15 Summer	100/15 Summer			6
4.004	15 Winter	1	0%	30/15 Summer				
7.000	15 Winter	1	0%					
4.005	15 Winter	1	0%	30/15 Summer				
4.006	15 Winter	1	0%	30/15 Summer				
4.007	15 Winter	1	0%	30/15 Summer				
4.008	15 Winter	1	0%	30/15 Summer				3
1.018	60 Winter	1	0%	1/30 Winter				
1.019	2880 Winter	1	0%	1/1440 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	29.610	-0.193	0.000	0.08	0.0	17.5	FLOOD RISK*
1.001	SW02	29.053	-0.175	0.000	0.12	0.0	28.9	FLOOD RISK*
1.002	SW03	28.565	-0.163	0.000	0.16	0.0	37.4	FLOOD RISK*
1.003	SW04	28.073	-0.155	0.000	0.19	0.0	43.3	FLOOD RISK*
1.004	SW05	27.577	-0.151	0.000	0.21	0.0	47.0	FLOOD RISK*
1.005	SW06	27.084	-0.144	0.000	0.23	0.0	51.0	FLOOD RISK*
1.006	SW07	26.609	-0.145	0.000	0.23	0.0	51.6	FLOOD RISK*
1.007	MH01	25.215	-0.233	0.000	0.31	0.0	51.6	OK
1.008	MH02	25.015	-0.249	0.000	0.24	0.0	52.8	OK
1.009	MH03	23.816	-0.256	0.000	0.22	0.0	54.5	OK
1.010	MH04	22.324	-0.261	0.000	0.20	0.0	58.1	OK
1.011	MH05	20.070	-0.258	0.000	0.21	0.0	67.7	OK
1.012	MH06	17.270	-0.251	0.000	0.24	0.0	67.7	OK
2.000	SW08	26.467	-0.242	0.000	0.02	0.0	5.5	FLOOD RISK*
2.001	SW09	25.485	-0.238	0.000	0.02	0.0	9.2	FLOOD RISK*
2.002	SW10	24.001	-0.235	0.000	0.03	0.0	13.8	FLOOD RISK*
2.003	SW11	21.156	-0.235	0.000	0.03	0.0	15.1	FLOOD RISK*
2.004	SW12	18.007	-0.233	0.000	0.03	0.0	16.2	FLOOD RISK*
2.005	MH07	14.803	-0.431	0.000	0.06	0.0	16.3	OK
1.013	MH08	14.799	-0.382	0.000	0.28	0.0	86.5	OK
3.000	SW13	29.549	-0.201	0.000	0.07	0.0	15.8	FLOOD RISK*
3.001	SW14	29.051	-0.177	0.000	0.12	0.0	27.5	FLOOD RISK*
3.002	SW15	28.564	-0.164	0.000	0.16	0.0	36.4	FLOOD RISK*
3.003	SW16	28.072	-0.156	0.000	0.19	0.0	42.3	FLOOD RISK*
3.004	SW17	27.577	-0.151	0.000	0.21	0.0	46.0	FLOOD RISK*
3.005	SW18	27.079	-0.149	0.000	0.22	0.0	51.3	FLOOD RISK*
3.006	SW19	26.402	-0.277	0.000	0.07	0.0	54.3	FLOOD RISK*
3.007	SW20	25.429	-0.281	0.000	0.07	0.0	57.4	FLOOD RISK*

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
3.008	SW21	24.136	-0.285	0.000	0.06	0.0	60.8	FLOOD RISK*
3.009	SW22	22.649	-0.285	0.000	0.06	0.0	65.5	FLOOD RISK*
3.010	SW23	20.331	-0.289	0.000	0.06	0.0	69.6	FLOOD RISK*
3.011	SW24	18.118	-0.273	0.000	0.07	0.0	70.4	FLOOD RISK*
1.014	MH09	14.711	-0.397	0.000	0.25	0.0	149.5	OK
1.015	MH10	14.255	-0.322	0.000	0.41	0.0	148.3	OK
1.016	MH11	14.150	-0.246	0.000	0.42	0.0	145.0	OK
1.017	MH12	14.096	-0.125	0.000	0.99	0.0	144.2	OK
4.000	MH01	16.854	-0.175	0.000	0.32	0.0	22.0	OK
4.001	MH02	16.478	-0.141	0.000	0.51	0.0	39.0	OK
4.002	MH03	15.913	-0.206	0.000	0.41	0.0	53.3	OK
4.003	MH04	15.609	-0.185	0.000	0.51	0.0	64.2	OK
5.000	SW01	17.541	-0.209	0.000	0.11	0.0	19.2	FLOOD RISK*
5.001	SW02	17.194	-0.195	0.000	0.14	0.0	30.3	FLOOD RISK*
5.002	SW03	16.712	-0.184	0.000	0.17	0.0	37.7	FLOOD RISK*
5.003	SW04	16.098	-0.198	0.000	0.15	0.0	43.4	FLOOD RISK*
6.000	SW05	15.848	-0.286	0.000	0.02	0.0	7.7	FLOOD RISK*
5.004	MH05	14.219	-0.342	0.000	0.17	0.0	43.9	OK
4.004	MH06	14.201	-0.245	0.000	0.55	0.0	115.6	OK
7.000	SW06	16.823	-0.254	0.000	0.01	0.0	1.8	FLOOD RISK*
4.005	MH07	14.132	-0.260	0.000	0.51	0.0	116.3	OK
4.006	MH08	14.026	-0.275	0.000	0.45	0.0	114.7	OK
4.007	MH09	13.848	-0.261	0.000	0.50	0.0	113.6	OK
4.008	MH10	13.765	-0.262	0.000	0.50	0.0	112.8	OK
1.018	Pri	13.751	0.051	0.000	1.15	0.0	90.6	SURCHARGED
1.019	Tank	13.460	0.035	0.000	0.43	0.0	5.3	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%					
1.001	15 Winter	30	+20%					
1.002	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
1.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			3
1.004	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
1.005	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
1.006	30 Winter	30	+20%	100/30 Summer	100/30 Summer			3
1.007	30 Winter	30	+20%	30/15 Winter				
1.008	30 Winter	30	+20%	100/15 Summer				
1.009	30 Winter	30	+20%	100/15 Summer				
1.010	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.011	15 Winter	30	+20%	30/15 Winter	100/15 Summer			3
1.012	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	30	+20%					
2.001	15 Winter	30	+20%					
2.002	15 Winter	30	+20%					
2.003	15 Winter	30	+20%					
2.004	15 Winter	30	+20%					
2.005	15 Winter	30	+20%	30/15 Summer	100/15 Summer			8
1.013	15 Winter	30	+20%	30/15 Summer				
3.000	15 Winter	30	+20%					
3.001	15 Winter	30	+20%					
3.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
3.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
3.004	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
3.005	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
3.006	30 Winter	30	+20%					
3.007	15 Winter	30	+20%					
3.008	15 Winter	30	+20%					
3.009	15 Winter	30	+20%					
3.010	15 Winter	30	+20%					
3.011	15 Winter	30	+20%					
1.014	15 Winter	30	+20%	30/15 Summer				
1.015	15 Winter	30	+20%	30/15 Summer				
1.016	15 Winter	30	+20%	30/15 Summer	100/15 Summer			8
1.017	60 Winter	30	+20%	30/15 Summer				
4.000	15 Winter	30	+20%	30/15 Summer	30/15 Summer			6

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
4.001	15 Winter	30	+20%	30/15 Summer	30/15 Summer			7
4.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
4.003	15 Winter	30	+20%	30/15 Summer				
5.000	15 Winter	30	+20%					
5.001	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
5.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			3
5.003	15 Winter	30	+20%					
6.000	15 Winter	30	+20%					
5.004	15 Winter	30	+20%	30/15 Summer	100/15 Summer			6
4.004	15 Winter	30	+20%	30/15 Summer				
7.000	15 Winter	30	+20%					
4.005	15 Winter	30	+20%	30/15 Summer				
4.006	15 Winter	30	+20%	30/15 Summer				
4.007	60 Winter	30	+20%	30/15 Summer				
4.008	60 Winter	30	+20%	30/15 Summer				3
1.018	60 Winter	30	+20%	1/30 Winter				
1.019	4320 Winter	30	+20%	1/1440 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	29.693	-0.110	0.000	0.30	0.0	69.1	FLOOD RISK*
1.001	SW02	29.162	-0.066	0.000	0.50	0.0	115.7	FLOOD RISK*
1.002	SW03	28.681	-0.047	0.000	0.63	0.0	146.1	FLOOD RISK*
1.003	SW04	28.195	-0.033	0.000	0.72	0.0	167.5	FLOOD RISK*
1.004	SW05	27.703	-0.025	0.000	0.78	0.0	178.4	FLOOD RISK*
1.005	SW06	27.209	-0.019	0.000	0.83	0.0	185.6	FLOOD RISK*
1.006	SW07	26.731	-0.023	0.000	0.83	0.0	188.2	FLOOD RISK*
1.007	MH01	25.477	0.029	0.000	1.12	0.0	188.2	SURCHARGED
1.008	MH02	25.168	-0.096	0.000	0.90	0.0	194.4	OK
1.009	MH03	23.955	-0.117	0.000	0.81	0.0	201.9	OK
1.010	MH04	22.484	-0.101	0.000	0.85	0.0	249.1	OK
1.011	MH05	20.369	0.041	0.000	0.97	0.0	311.9	SURCHARGED
1.012	MH06	17.816	0.295	0.000	1.08	0.0	306.7	SURCHARGED
2.000	SW08	26.504	-0.205	0.000	0.06	0.0	21.0	FLOOD RISK*
2.001	SW09	25.534	-0.189	0.000	0.09	0.0	37.2	FLOOD RISK*
2.002	SW10	24.054	-0.182	0.000	0.10	0.0	56.2	FLOOD RISK*
2.003	SW11	21.207	-0.184	0.000	0.10	0.0	60.5	FLOOD RISK*
2.004	SW12	18.058	-0.182	0.000	0.12	0.0	63.2	FLOOD RISK*
2.005	MH07	15.930	0.696	0.000	0.22	0.0	63.8	FLOOD RISK
1.013	MH08	15.919	0.738	0.000	1.23	0.0	374.3	SURCHARGED
3.000	SW13	29.628	-0.122	0.000	0.27	0.0	61.8	FLOOD RISK*
3.001	SW14	29.160	-0.068	0.000	0.50	0.0	111.3	FLOOD RISK*
3.002	SW15	28.683	-0.045	0.000	0.64	0.0	142.9	FLOOD RISK*
3.003	SW16	28.196	-0.032	0.000	0.73	0.0	164.4	FLOOD RISK*
3.004	SW17	27.705	-0.023	0.000	0.80	0.0	175.7	FLOOD RISK*
3.005	SW18	27.202	-0.026	0.000	0.79	0.0	184.0	FLOOD RISK*
3.006	SW19	26.502	-0.177	0.000	0.25	0.0	193.2	FLOOD RISK*
3.007	SW20	25.534	-0.176	0.000	0.23	0.0	203.1	FLOOD RISK*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
3.008	SW21	24.243	-0.178	0.000	0.23	0.0	225.7	FLOOD RISK*
3.009	SW22	22.763	-0.171	0.000	0.24	0.0	251.6	FLOOD RISK*
3.010	SW23	20.436	-0.184	0.000	0.22	0.0	268.1	FLOOD RISK*
3.011	SW24	18.229	-0.162	0.000	0.29	0.0	271.3	FLOOD RISK*
1.014	MH09	15.850	0.742	0.000	0.96	0.0	573.0	SURCHARGED
1.015	MH10	15.200	0.623	0.000	1.55	0.0	566.2	FLOOD RISK*
1.016	MH11	14.948	0.552	0.000	1.61	0.0	561.9	SURCHARGED
1.017	MH12	14.608	0.387	0.000	3.43	0.0	501.4	SURCHARGED
4.000	MH01	18.030	1.001	0.846	1.03	0.0	70.9	FLOOD
4.001	MH02	17.552	0.933	5.111	1.50	0.0	113.8	FLOOD
4.002	MH03	16.607	0.488	0.000	1.17	0.0	154.4	SURCHARGED
4.003	MH04	16.139	0.345	0.000	1.51	0.0	190.3	SURCHARGED
5.000	SW01	17.673	-0.077	0.000	0.42	0.0	76.1	FLOOD RISK*
5.001	SW02	17.336	-0.053	0.000	0.55	0.0	115.2	FLOOD RISK*
5.002	SW03	16.856	-0.040	0.000	0.63	0.0	140.2	FLOOD RISK*
5.003	SW04	16.230	-0.066	0.000	0.54	0.0	155.7	FLOOD RISK*
6.000	SW05	15.900	-0.234	0.000	0.08	0.0	30.0	FLOOD RISK*
5.004	MH05	15.240	0.679	0.000	0.69	0.0	180.4	FLOOD RISK
4.004	MH06	15.198	0.753	0.000	1.75	0.0	365.5	SURCHARGED
7.000	SW06	16.850	-0.227	0.000	0.04	0.0	6.9	FLOOD RISK*
4.005	MH07	14.983	0.592	0.000	1.60	0.0	366.6	SURCHARGED
4.006	MH08	14.764	0.462	0.000	1.42	0.0	358.9	SURCHARGED*
4.007	MH09	14.562	0.452	0.000	1.20	0.0	271.8	SURCHARGED*
4.008	MH10	14.556	0.529	0.000	1.20	0.0	270.3	SURCHARGED*
1.018	Pri	14.552	0.852	0.000	2.31	0.0	181.5	SURCHARGED
1.019	Tank	13.866	0.441	0.000	0.43	0.0	5.4	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%					
1.001	15 Winter	100	+30%					
1.002	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
1.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
1.004	30 Winter	100	+30%	100/15 Summer	100/15 Summer			4
1.005	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
1.006	30 Winter	100	+30%	100/30 Summer	100/30 Summer			3
1.007	30 Winter	100	+30%	30/15 Winter				
1.008	15 Winter	100	+30%	100/15 Summer				
1.009	15 Winter	100	+30%	100/15 Summer				
1.010	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.011	15 Winter	100	+30%	30/15 Winter	100/15 Summer			3
1.012	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	100	+30%					
2.001	15 Winter	100	+30%					
2.002	15 Winter	100	+30%					
2.003	15 Winter	100	+30%					
2.004	15 Winter	100	+30%					
2.005	30 Winter	100	+30%	30/15 Summer	100/15 Summer			8
1.013	30 Winter	100	+30%	30/15 Summer				
3.000	15 Winter	100	+30%					
3.001	15 Winter	100	+30%					
3.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
3.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
3.004	30 Winter	100	+30%	100/15 Summer	100/15 Summer			4
3.005	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
3.006	15 Winter	100	+30%					
3.007	15 Winter	100	+30%					
3.008	15 Winter	100	+30%					
3.009	15 Winter	100	+30%					
3.010	15 Winter	100	+30%					
3.011	15 Winter	100	+30%					
1.014	30 Winter	100	+30%	30/15 Summer				
1.015	180 Winter	100	+30%	30/15 Summer				
1.016	60 Winter	100	+30%	30/15 Summer	100/15 Summer			8
1.017	60 Winter	100	+30%	30/15 Summer				
4.000	15 Winter	100	+30%	30/15 Summer	30/15 Summer			6

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
4.001	15 Winter	100	+30%	30/15 Summer	30/15 Summer			7
4.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
4.003	15 Winter	100	+30%	30/15 Summer				
5.000	15 Winter	100	+30%					
5.001	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
5.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
5.003	15 Winter	100	+30%					
6.000	15 Winter	100	+30%					
5.004	30 Winter	100	+30%	30/15 Summer	100/15 Summer			6
4.004	30 Winter	100	+30%	30/15 Summer				
7.000	15 Winter	100	+30%					
4.005	60 Winter	100	+30%	30/15 Summer				
4.006	60 Winter	100	+30%	30/15 Summer				
4.007	60 Winter	100	+30%	30/15 Summer				
4.008	60 Winter	100	+30%	30/15 Summer				3
1.018	120 Winter	100	+30%	1/30 Winter				
1.019	4320 Winter	100	+30%	1/1440 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	29.741	-0.062	0.000	0.49	0.0	114.4	FLOOD RISK*
1.001	SW02	29.221	-0.007	0.000	0.81	0.0	187.7	FLOOD RISK*
1.002	SW03	28.734	0.006	6.526	0.97	0.0	225.5	FLOOD
1.003	SW04	28.245	0.017	17.190	0.99	0.0	230.4	FLOOD
1.004	SW05	27.751	0.023	22.996	1.00	0.0	227.6	FLOOD
1.005	SW06	27.256	0.028	28.058	1.03	0.0	229.9	FLOOD
1.006	SW07	26.756	0.002	1.645	1.02	0.0	231.6	FLOOD
1.007	MH01	26.351	0.903	0.000	1.53	0.0	257.1	FLOOD RISK
1.008	MH02	26.098	0.834	0.000	1.16	0.0	249.5	FLOOD RISK
1.009	MH03	25.064	0.992	0.000	1.05	0.0	261.0	FLOOD RISK
1.010	MH04	23.588	1.003	3.470	1.00	0.0	292.2	FLOOD
1.011	MH05	21.340	1.012	12.150	1.06	0.0	343.8	FLOOD
1.012	MH06	18.524	1.003	3.421	1.16	0.0	328.9	FLOOD
2.000	SW08	26.527	-0.182	0.000	0.10	0.0	34.5	FLOOD RISK*
2.001	SW09	25.558	-0.165	0.000	0.15	0.0	61.7	FLOOD RISK*
2.002	SW10	24.081	-0.155	0.000	0.17	0.0	93.4	FLOOD RISK*
2.003	SW11	21.234	-0.157	0.000	0.17	0.0	100.5	FLOOD RISK*
2.004	SW12	18.087	-0.153	0.000	0.19	0.0	102.3	FLOOD RISK*
2.005	MH07	16.302	1.068	167.852	0.77	0.0	219.9	FLOOD
1.013	MH08	16.312	1.131	0.000	1.24	0.0	377.3	SURCHARGED
3.000	SW13	29.674	-0.076	0.000	0.45	0.0	102.1	FLOOD RISK*
3.001	SW14	29.219	-0.009	0.000	0.80	0.0	180.5	FLOOD RISK*
3.002	SW15	28.735	0.007	7.333	0.97	0.0	218.0	FLOOD
3.003	SW16	28.246	0.018	17.690	0.99	0.0	222.6	FLOOD
3.004	SW17	27.751	0.023	22.956	1.01	0.0	222.2	FLOOD
3.005	SW18	27.243	0.015	15.275	1.03	0.0	238.5	FLOOD
3.006	SW19	26.556	-0.123	0.000	0.34	0.0	266.0	FLOOD RISK*
3.007	SW20	25.595	-0.115	0.000	0.36	0.0	316.9	FLOOD RISK*

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
3.008	SW21	24.306	-0.115	0.000	0.37	0.0	361.9	FLOOD RISK*
3.009	SW22	22.828	-0.106	0.000	0.38	0.0	409.3	FLOOD RISK*
3.010	SW23	20.497	-0.123	0.000	0.36	0.0	438.9	FLOOD RISK*
3.011	SW24	18.292	-0.099	0.000	0.47	0.0	444.8	FLOOD RISK*
1.014	MH09	16.268	1.160	0.000	1.05	0.0	623.9	SURCHARGED
1.015	MH10	15.200	0.623	0.000	1.28	0.0	468.0	FLOOD RISK*
1.016	MH11	15.385	0.989	114.054	1.74	0.0	608.0	FLOOD
1.017	MH12	15.184	0.963	0.000	4.15	0.0	606.3	FLOOD RISK
4.000	MH01	18.048	1.019	18.571	1.06	0.0	73.0	FLOOD
4.001	MH02	17.589	0.970	41.832	1.69	0.0	128.6	FLOOD
4.002	MH03	17.057	0.938	10.133	1.45	0.0	191.4	FLOOD
4.003	MH04	16.666	0.872	0.000	2.02	0.0	253.7	FLOOD RISK
5.000	SW01	17.730	-0.020	0.000	0.69	0.0	126.2	FLOOD RISK*
5.001	SW02	17.392	0.003	3.144	0.92	0.0	193.4	FLOOD
5.002	SW03	16.906	0.010	10.446	1.00	0.0	222.6	FLOOD
5.003	SW04	16.287	-0.009	0.000	0.86	0.0	246.2	FLOOD RISK*
6.000	SW05	15.927	-0.207	0.000	0.13	0.0	48.1	FLOOD RISK*
5.004	MH05	15.456	0.895	69.633	0.94	0.0	244.1	FLOOD
4.004	MH06	15.412	0.967	0.000	1.82	0.0	379.5	SURCHARGED
7.000	SW06	16.867	-0.210	0.000	0.07	0.0	11.3	FLOOD RISK*
4.005	MH07	15.268	0.877	0.000	1.56	0.0	358.0	SURCHARGED
4.006	MH08	15.170	0.869	0.000	1.42	0.0	357.3	SURCHARGED*
4.007	MH09	15.000	0.890	0.000	1.57	0.0	355.6	FLOOD RISK*
4.008	MH10	15.000	0.973	0.000	1.56	0.0	352.5	FLOOD
1.018	Pri	15.098	1.398	0.000	2.84	0.0	223.2	SURCHARGED
1.019	Tank	14.122	0.697	0.000	0.48	0.0	6.0	SURCHARGED

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.000	0.498	200.8	0.139	5.00	0.0	0.600		o	300
1.001	69.987	0.914	76.6	0.141	0.00	0.0	0.600		o	375
2.000	59.140	0.067	882.7	0.071	5.00	0.0		0.100		-5
2.001	100.000	0.440	227.3	0.121	0.00	0.0		0.100		-5
2.002	100.000	0.771	129.7	0.125	0.00	0.0		0.100		-5
2.003	17.110	0.086	199.0	0.000	0.00	0.0	0.600		o	450
3.000	44.100	0.259	170.3	0.019	5.00	0.0		0.100		-4
3.001	100.010	0.367	272.5	0.044	0.00	0.0		0.100		-4
3.002	100.000	0.775	129.0	0.044	0.00	0.0		0.100		-4
3.003	33.526	0.335	100.0	0.000	0.00	0.0	0.600		o	300
1.002	53.018	0.353	150.0	0.266	0.00	0.0	0.600		o	450
1.003	45.071	0.451	99.9	0.147	0.00	0.0	0.600		o	450
1.004	27.087	0.452	59.9	0.131	0.00	0.0	0.600		o	525
4.000	54.299	1.324	41.0	0.131	5.00	0.0	0.600		o	300
4.001	40.666	0.878	46.3	0.061	0.00	0.0	0.600		o	300
4.002	33.257	0.600	55.4	0.000	0.00	0.0	0.600		o	300
5.000	26.700	0.322	82.9	0.046	5.00	0.0		0.100		-5

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	17.265	0.139	0.0	1.11	78.2
1.001	16.767	0.280	0.0	2.07	228.9
2.000	18.392	0.071	0.0	0.09	66.3
2.001	18.325	0.192	0.0	0.19	130.6
2.002	17.885	0.317	0.0	0.25	172.9
2.003	15.939	0.317	0.0	1.44	228.7
3.000	19.225	0.019	0.0	0.21	145.7
3.001	18.966	0.063	0.0	0.17	115.2
3.002	18.599	0.107	0.0	0.25	167.4
3.003	16.899	0.107	0.0	1.57	111.1
1.002	15.853	0.970	0.0	1.66	263.6
1.003	15.500	1.117	0.0	2.03	323.5
1.004	15.049	1.248	0.0	2.90	627.2
4.000	19.445	0.131	0.0	2.46	174.1
4.001	18.121	0.192	0.0	2.32	163.7
4.002	17.243	0.192	0.0	2.12	149.6
5.000	17.476	0.046	0.0	0.31	216.2

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
5.001	42.397	0.141	300.0	0.000	0.00	0.0	0.600		o	300
4.003	21.234	0.071	299.1	0.060	0.00	0.0	0.600		o	375
4.004	44.057	0.678	65.0	0.238	0.00	0.0	0.600		o	450
6.000	59.411	0.299	198.7	0.195	5.00	0.0	0.600		o	450
7.000	21.643	0.417	51.9	0.075	5.00	0.0	0.600		o	375
6.001	20.054	0.134	149.7	0.023	0.00	0.0	0.600		o	450
1.005	29.297	0.167	175.4	0.000	0.00	0.0	0.600		o	525
1.006	4.500	0.000	0.0	0.000	0.00	0.0	0.600		o	300
1.007	5.000	0.000	0.0	0.025	0.00	0.0	0.600		o	225

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
5.001	16.329	0.046	0.0	0.90	63.8
4.003	16.188	0.298	0.0	1.04	115.1
4.004	16.117	0.536	0.0	2.53	401.6
6.000	14.700	0.195	0.0	1.44	228.8
7.000	14.818	0.075	0.0	2.52	278.3
6.001	14.401	0.293	0.0	1.66	264.0
1.005	14.267	2.077	0.0	1.69	365.4
1.006	14.000	2.077	0.0	0.00	0.0
1.007	14.000	2.102	0.0	0.00	0.0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 625800 314350 TG 25800 14350
C (1km)	-0.024
D1 (1km)	0.278
D2 (1km)	0.361
D3 (1km)	0.254
E (1km)	0.312
F (1km)	2.487
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Online Controls for Storm

Hydro-Brake® Manhole: Tank, DS/PN: 1.007, Volume (m^3): 1.7

Design Head (m) 1.000 Hydro-Brake® Type Md6 SW Only Invert Level (m) 14.000
Design Flow (l/s) 5.6 Diameter (mm) 99

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.0	1.200	6.1	3.000	9.7	7.000	14.8
0.200	4.6	1.400	6.6	3.500	10.5	7.500	15.3
0.300	4.5	1.600	7.1	4.000	11.2	8.000	15.8
0.400	4.3	1.800	7.5	4.500	11.9	8.500	16.3
0.500	4.3	2.000	7.9	5.000	12.5	9.000	16.8
0.600	4.5	2.200	8.3	5.500	13.1	9.500	17.2
0.800	5.0	2.400	8.7	6.000	13.7		
1.000	5.6	2.600	9.0	6.500	14.3		

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.006

Invert Level (m) 14.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	980.4	1.400	0.0	2.800	0.0	4.200	0.0
0.200	1095.8	1.600	0.0	3.000	0.0	4.400	0.0
0.400	1215.7	1.800	0.0	3.200	0.0	4.600	0.0
0.600	1340.2	2.000	0.0	3.400	0.0	4.800	0.0
0.800	1469.2	2.200	0.0	3.600	0.0	5.000	0.0
1.000	1602.9	2.400	0.0	3.800	0.0		
1.200	0.0	2.600	0.0	4.000	0.0		

Tank or Pond Manhole: Tank, DS/PN: 1.007

Invert Level (m) 14.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3304.0	1.400	0.0	2.800	0.0	4.200	0.0
0.200	3720.0	1.600	0.0	3.000	0.0	4.400	0.0
0.400	4140.0	1.800	0.0	3.200	0.0	4.600	0.0
0.600	4564.0	2.000	0.0	3.400	0.0	4.800	0.0
0.800	4994.0	2.200	0.0	3.600	0.0	5.000	0.0
1.000	5427.0	2.400	0.0	3.800	0.0		
1.200	0.0	2.600	0.0	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s): Summer and Winter
Duration(s) (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years): 1, 30, 100
Climate Change (%): 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	1	0%	30/15 Winter	100/15 Summer			2
2.000	15 Winter	1	0%					
2.001	15 Winter	1	0%					
2.002	15 Winter	1	0%					
2.003	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	1	0%					
3.001	15 Winter	1	0%					
3.002	15 Winter	1	0%					
3.003	15 Winter	1	0%	100/15 Summer				
1.002	15 Winter	1	0%	30/15 Summer				
1.003	15 Winter	1	0%	30/15 Summer				
1.004	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
4.000	15 Winter	1	0%					
4.001	15 Winter	1	0%	100/15 Summer				
4.002	15 Winter	1	0%	100/15 Summer				
5.000	15 Winter	1	0%					
5.001	15 Winter	1	0%	30/15 Summer				
4.003	15 Winter	1	0%	30/15 Summer				
4.004	15 Winter	1	0%	100/15 Summer				
6.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
7.000	15 Winter	1	0%	30/15 Summer				
6.001	15 Winter	1	0%	30/15 Summer				
1.005	15 Winter	1	0%	30/15 Summer				
1.006	180 Winter	1	0%	30/15 Summer				
1.007	2880 Winter	1	0%	30/480 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	17.370	-0.195	0.000	0.24	0.0	18.0	OK
1.001	MH02	16.868	-0.274	0.000	0.16	0.0	34.2	OK
2.000	SW01	18.496	-0.171	0.000	0.14	0.0	9.2	FLOOD RISK*
2.001	SW02	18.417	-0.183	0.000	0.11	0.0	13.9	FLOOD RISK*
2.002	SW03	17.979	-0.181	0.000	0.12	0.0	21.5	FLOOD RISK*
2.003	MH03	16.057	-0.332	0.000	0.13	0.0	21.5	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
3.000	SW04	19.257	-0.243	0.000	0.02	0.0	2.6	FLOOD RISK*
3.001	SW05	19.028	-0.213	0.000	0.05	0.0	6.3	FLOOD RISK*
3.002	SW06	18.659	-0.215	0.000	0.06	0.0	9.7	FLOOD RISK*
3.003	MH04	16.961	-0.238	0.000	0.10	0.0	9.7	OK
1.002	MH05	16.031	-0.272	0.000	0.33	0.0	78.8	OK
1.003	MH06	15.675	-0.275	0.000	0.32	0.0	92.7	OK
1.004	MH07	15.210	-0.364	0.000	0.20	0.0	105.3	OK
4.000	MH08	19.513	-0.232	0.000	0.11	0.0	18.6	OK
4.001	MH09	18.205	-0.216	0.000	0.17	0.0	26.0	OK
4.002	MH10	17.331	-0.212	0.000	0.19	0.0	26.2	OK
5.000	SW07	17.518	-0.233	0.000	0.03	0.0	6.6	FLOOD RISK*
5.001	MH11	16.401	-0.228	0.000	0.11	0.0	6.4	OK
4.003	MH12	16.353	-0.210	0.000	0.40	0.0	38.9	OK
4.004	MH13	16.247	-0.320	0.000	0.18	0.0	65.6	OK
6.000	MH14	14.809	-0.341	0.000	0.13	0.0	27.3	OK
7.000	MH15	14.870	-0.323	0.000	0.05	0.0	10.8	OK
6.001	MH16	14.597	-0.254	0.000	0.18	0.0	37.2	OK
1.005	MH17	14.584	-0.208	0.000	0.67	0.0	204.6	OK
1.006	Pri	14.167	-0.133	0.000	0.59	0.0	28.2	OK
1.007	Tank	14.117	-0.108	0.000	0.11	0.0	2.7	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	30	+20%	30/15 Winter	100/15 Summer			2
2.000	15 Winter	30	+20%					
2.001	15 Winter	30	+20%					
2.002	15 Winter	30	+20%					
2.003	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	30	+20%					
3.001	15 Winter	30	+20%					
3.002	15 Winter	30	+20%					
3.003	15 Winter	30	+20%	100/15 Summer				
1.002	15 Winter	30	+20%	30/15 Summer				
1.003	15 Winter	30	+20%	30/15 Summer				
1.004	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
4.000	15 Winter	30	+20%					
4.001	15 Winter	30	+20%	100/15 Summer				
4.002	15 Winter	30	+20%	100/15 Summer				
5.000	15 Winter	30	+20%					
5.001	15 Winter	30	+20%	30/15 Summer				
4.003	15 Winter	30	+20%	30/15 Summer				
4.004	15 Winter	30	+20%	100/15 Summer				
6.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
7.000	15 Winter	30	+20%	30/15 Summer				
6.001	15 Winter	30	+20%	30/15 Summer				
1.005	15 Winter	30	+20%	30/15 Summer				
1.006	60 Winter	30	+20%	30/15 Summer				
1.007	2880 Winter	30	+20%	30/480 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	17.547	-0.018	0.000	0.91	0.0	69.2	OK
1.001	MH02	17.205	0.063	0.000	0.63	0.0	135.3	SURCHARGED
2.000	SW01	18.604	-0.063	0.000	0.54	0.0	35.9	FLOOD RISK*
2.001	SW02	18.525	-0.075	0.000	0.47	0.0	61.1	FLOOD RISK*
2.002	SW03	18.087	-0.073	0.000	0.54	0.0	93.9	FLOOD RISK*
2.003	MH03	17.049	0.660	0.000	0.57	0.0	96.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
3.000	SW04	19.294	-0.206	0.000	0.07	0.0	10.1	FLOOD RISK*
3.001	SW05	19.105	-0.136	0.000	0.23	0.0	26.4	FLOOD RISK*
3.002	SW06	18.730	-0.144	0.000	0.24	0.0	39.4	FLOOD RISK*
3.003	MH04	17.062	-0.137	0.000	0.39	0.0	39.3	OK
1.002	MH05	17.019	0.716	0.000	1.30	0.0	312.7	SURCHARGED
1.003	MH06	16.514	0.564	0.000	1.18	0.0	343.6	SURCHARGED
1.004	MH07	15.939	0.365	0.000	0.77	0.0	395.1	SURCHARGED
4.000	MH08	19.585	-0.160	0.000	0.44	0.0	71.8	OK
4.001	MH09	18.310	-0.111	0.000	0.69	0.0	105.8	OK
4.002	MH10	17.445	-0.098	0.000	0.78	0.0	106.9	OK
5.000	SW07	17.568	-0.183	0.000	0.12	0.0	25.4	FLOOD RISK*
5.001	MH11	16.712	0.083	0.000	0.42	0.0	24.8	SURCHARGED
4.003	MH12	16.676	0.113	0.000	1.66	0.0	161.7	SURCHARGED
4.004	MH13	16.431	-0.136	0.000	0.80	0.0	288.8	OK
6.000	MH14	15.791	0.641	0.000	0.42	0.0	89.3	FLOOD RISK
7.000	MH15	15.756	0.563	0.000	0.15	0.0	34.7	SURCHARGED
6.001	MH16	15.734	0.883	0.000	0.64	0.0	132.0	SURCHARGED
1.005	MH17	15.683	0.891	0.000	2.54	0.0	773.3	SURCHARGED
1.006	Pri	14.469	0.169	0.000	2.26	0.0	107.3	SURCHARGED
1.007	Tank	14.285	0.060	0.000	0.19	0.0	4.6	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	100	+30%	30/15 Winter	100/15 Summer			2
2.000	15 Winter	100	+30%					
2.001	15 Winter	100	+30%					
2.002	15 Winter	100	+30%					
2.003	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
3.000	15 Winter	100	+30%					
3.001	15 Winter	100	+30%					
3.002	15 Winter	100	+30%					
3.003	15 Winter	100	+30%	100/15 Summer				
1.002	15 Winter	100	+30%	30/15 Summer				
1.003	15 Summer	100	+30%	30/15 Summer				
1.004	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
4.000	15 Winter	100	+30%					
4.001	15 Winter	100	+30%	100/15 Summer				
4.002	15 Winter	100	+30%	100/15 Summer				
5.000	15 Winter	100	+30%					
5.001	15 Winter	100	+30%	30/15 Summer				
4.003	15 Winter	100	+30%	30/15 Summer				
4.004	15 Winter	100	+30%	100/15 Summer				
6.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
7.000	15 Summer	100	+30%	30/15 Summer				
6.001	15 Summer	100	+30%	30/15 Summer				
1.005	15 Summer	100	+30%	30/15 Summer				
1.006	60 Winter	100	+30%	30/15 Summer				
1.007	2880 Winter	100	+30%	30/480 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	18.771	1.206	6.182	1.29	0.0	98.1	FLOOD
1.001	MH02	18.268	1.126	1.290	0.89	0.0	191.5	FLOOD
2.000	SW01	18.662	-0.005	0.000	0.89	0.0	59.2	FLOOD RISK*
2.001	SW02	18.585	-0.015	0.000	0.78	0.0	102.2	FLOOD RISK*
2.002	SW03	18.145	-0.015	0.000	0.82	0.0	141.0	FLOOD RISK*
2.003	MH03	17.455	1.066	66.385	1.94	0.0	327.4	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
3.000	SW04	19.316	-0.184	0.000	0.11	0.0	16.7	FLOOD RISK*
3.001	SW05	19.147	-0.094	0.000	0.38	0.0	44.1	FLOOD RISK*
3.002	SW06	18.770	-0.104	0.000	0.40	0.0	66.4	FLOOD RISK*
3.003	MH04	17.634	0.435	0.000	0.65	0.0	66.7	SURCHARGED
1.002	MH05	17.581	1.278	0.000	1.57	0.0	377.7	SURCHARGED
1.003	MH06	17.270	1.320	0.000	1.30	0.0	378.7	SURCHARGED
1.004	MH07	16.529	0.955	1.496	0.95	0.0	490.5	FLOOD
4.000	MH08	19.637	-0.108	0.000	0.72	0.0	118.4	OK
4.001	MH09	19.003	0.582	0.000	1.02	0.0	155.2	SURCHARGED
4.002	MH10	18.055	0.512	0.000	1.17	0.0	159.7	SURCHARGED
5.000	SW07	17.596	-0.155	0.000	0.19	0.0	41.4	FLOOD RISK*
5.001	MH11	17.358	0.729	0.000	0.91	0.0	54.4	FLOOD RISK
4.003	MH12	17.348	0.785	0.000	2.55	0.0	248.5	SURCHARGED
4.004	MH13	17.063	0.496	0.000	1.14	0.0	411.3	SURCHARGED
6.000	MH14	16.041	0.891	48.415	1.05	0.0	221.3	FLOOD
7.000	MH15	16.212	1.019	0.000	0.28	0.0	66.6	FLOOD RISK
6.001	MH16	16.167	1.316	0.000	1.07	0.0	221.7	FLOOD RISK
1.005	MH17	16.157	1.365	0.000	3.03	0.0	922.9	SURCHARGED
1.006	Pri	14.694	0.394	0.000	3.38	0.0	160.2	SURCHARGED
1.007	Tank	14.416	0.191	0.000	0.19	0.0	4.6	SURCHARGED

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	37.640	0.753	50.0	0.068	5.00	0.0	0.600	o	225
2.000	66.010	0.889	74.3	0.251	5.00	0.0	0.600	o	375
1.001	42.370	1.047	40.5	0.106	0.00	0.0	0.600	o	375
3.000	56.740	1.150	49.3	0.112	5.00	0.0	0.600	o	225
1.002	24.930	0.250	99.7	0.140	0.00	0.0	0.600	o	450
4.000	26.165	0.300	87.2	0.106	5.00	0.0	0.600	o	225
5.000	29.240	0.532	55.0	0.050	5.00	0.0	0.600	o	225
1.003	21.700	0.310	70.0	0.000	0.00	0.0	0.600	o	450
6.000	50.000	0.333	150.2	0.152	5.00	0.0	0.600	o	300
1.004	62.571	0.267	234.3	0.000	0.00	0.0	0.600	o	525
1.005	20.000	0.200	100.0	0.000	0.00	0.0	0.600	o	300
1.006	5.000	-2.400	-2.1	0.000	0.00	0.0	0.600	o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	29.025	0.068	0.0	1.85	73.7
2.000	29.161	0.251	0.0	2.10	232.5
1.001	28.272	0.425	0.0	2.86	315.4
3.000	28.375	0.112	0.0	1.87	74.2
1.002	27.225	0.677	0.0	2.04	323.8
4.000	27.275	0.106	0.0	1.40	55.7
5.000	27.600	0.050	0.0	1.77	70.3
1.003	26.975	0.833	0.0	2.43	386.9
6.000	26.000	0.152	0.0	1.28	90.5
1.004	25.667	0.985	0.0	1.46	315.8
1.005	25.300	0.985	0.0	1.57	111.1
1.006	25.100	0.985	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.006		27.700	27.500	25.300	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	1	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 628550 312150 TG 28550 12150
C (1km)	-0.023
D1 (1km)	0.261
D2 (1km)	0.394
D3 (1km)	0.264
E (1km)	0.308
F (1km)	2.487
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.005

Invert Level (m) 25.300

Depth (m)	**Area (m²)**	**Depth (m)**	**Area (m²)**	**Depth (m)**	**Area (m²)**	**Depth (m)**	**Area (m²)**
0.000	27.7	1.400	236.5	2.800	0.0	4.200	0.0
0.200	45.4	1.600	282.5	3.000	0.0	4.400	0.0
0.400	67.1	1.800	332.5	3.200	0.0	4.600	0.0
0.600	92.9	2.000	386.6	3.400	0.0	4.800	0.0
0.800	122.7	2.200	444.7	3.600	0.0	5.000	0.0
1.000	156.6	2.400	506.9	3.800	0.0		
1.200	194.5	2.600	0.0	4.000	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 1.006

Invert Level (m) 25.100 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.06840 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.06840

Depth (m)	**Area (m²)**	**Depth (m)**	**Area (m²)**	**Depth (m)**	**Area (m²)**	**Depth (m)**	**Area (m²)**
0.000	186.5	1.400	1334.5	2.800	0.0	4.200	0.0
0.200	338.3	1.600	1514.6	3.000	0.0	4.400	0.0
0.400	494.3	1.800	1698.8	3.200	0.0	4.600	0.0
0.600	654.2	2.000	1887.0	3.400	0.0	4.800	0.0
0.800	818.2	2.200	2079.3	3.600	0.0	5.000	0.0
1.000	986.3	2.400	2275.6	3.800	0.0		
1.200	1158.0	2.600	2475.9	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer				
2.000	15 Winter	1	0%	100/15 Summer	100/15 Winter			1
1.001	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
3.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
1.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
4.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
5.000	15 Winter	1	0%	100/15 Summer				
1.003	15 Winter	1	0%	30/15 Summer				
6.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			11
1.004	15 Winter	1	0%	30/15 Summer				
1.005	1440 Winter	1	0%	1/15 Summer				
1.006	1440 Winter	1	0%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	29.082	-0.168	0.000	0.14	0.0	10.1	OK
2.000	MH2	29.266	-0.270	0.000	0.17	0.0	37.0	OK
1.001	MH3	28.389	-0.258	0.000	0.21	0.0	60.8	OK
3.000	MH4	28.449	-0.151	0.000	0.23	0.0	16.5	OK
1.002	MH5	27.410	-0.265	0.000	0.35	0.0	95.4	OK
4.000	MH6	27.361	-0.139	0.000	0.30	0.0	15.7	OK
5.000	MH7	27.651	-0.174	0.000	0.11	0.0	7.5	OK
1.003	MH8	27.166	-0.259	0.000	0.38	0.0	118.6	OK
6.000	MH9	26.106	-0.194	0.000	0.26	0.0	22.3	OK
1.004	MH10	25.926	-0.266	0.000	0.48	0.0	137.5	OK
1.005	Pri	25.751	0.151	0.000	0.06	0.0	6.3	SURCHARGED
1.006	Inf	25.749	0.549	0.000	0.00	0.0	0.0	SURCHARGED

Input Hydrograph Manhole Inf, DS/PN 1.006 (Storm)
1440 minute 1 year Winter I+0%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 628550 312150 TG 28550 12150
C	-0.02300
D1	0.26790
D2	0.38775
D3	0.25029
E	0.30920
F	2.48280
Area (Ha)	12.120
SAAR (mm)	608
CWI	88.440
Urban (1990)	0.0945
SPR	15.310
DPSBAR	7.300
DPLBAR	0.389
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.882
FARL	1.000

Output Variables

TP(0) (mins) 130 TPt (mins) 142 TB (mins) 358 PR (%) 9.880
T (mins) 24 Q (l/s) 112.7 Base Flow (l/s) 0.8

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	0.8	336	2.6	648	6.3	960	9.6	1272	3.3	1584	1.4
48	0.8	360	2.6	672	6.9	984	9.1	1296	3.1	1608	1.2
72	0.8	384	2.7	696	7.5	1008	8.6	1320	2.9	1632	1.1
96	0.9	408	2.8	720	8.1	1032	8.0	1344	2.8	1656	1.0
120	1.1	432	2.9	744	8.7	1056	7.4	1368	2.7	1680	0.9
144	1.2	456	3.1	768	9.3	1080	6.8	1392	2.7	1704	0.8
168	1.4	480	3.3	792	9.7	1104	6.2	1416	2.6	1728	0.8
192	1.6	504	3.6	816	10.1	1128	5.6	1440	2.5	1752	0.8
216	1.9	528	3.9	840	10.4	1152	5.1	1464	2.3	1776	0.8
240	2.0	552	4.3	864	10.5	1176	4.6	1488	2.2		
264	2.2	576	4.7	888	10.4	1200	4.2	1512	2.0		
288	2.3	600	5.2	912	10.3	1224	3.8	1536	1.8		
312	2.5	624	5.7	936	10.0	1248	3.5	1560	1.6		

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/15 Summer				
2.000	15 Winter	30	+20%	100/15 Summer	100/15 Winter			1
1.001	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
3.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
1.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
4.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
5.000	15 Winter	30	+20%	100/15 Summer				
1.003	15 Winter	30	+20%	30/15 Summer				
6.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			11
1.004	15 Winter	30	+20%	30/15 Summer				
1.005	2880 Winter	30	+20%	1/15 Summer				
1.006	2880 Winter	30	+20%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	29.146	-0.104	0.000	0.55	0.0	38.2	OK
2.000	MH2	29.384	-0.152	0.000	0.64	0.0	140.2	OK
1.001	MH3	28.725	0.078	0.000	0.77	0.0	222.6	SURCHARGED
3.000	MH4	28.859	0.259	0.000	0.80	0.0	57.5	SURCHARGED
1.002	MH5	28.093	0.418	0.000	1.27	0.0	345.5	SURCHARGED
4.000	MH6	28.040	0.540	0.000	1.08	0.0	55.7	SURCHARGED
5.000	MH7	27.765	-0.060	0.000	0.42	0.0	27.5	OK
1.003	MH8	27.678	0.253	0.000	1.36	0.0	427.6	SURCHARGED
6.000	MH9	27.128	0.828	0.000	0.83	0.0	71.2	FLOOD RISK
1.004	MH10	26.963	0.771	0.000	1.68	0.0	482.2	SURCHARGED
1.005	Pri	26.730	1.130	0.000	0.09	0.0	8.5	SURCHARGED
1.006	Inf	26.727	1.527	0.000	0.00	0.0	0.0	SURCHARGED

Input Hydrograph Manhole Inf, DS/PN 1.006 (Storm)
2880 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 628550 312150 TG 28550 12150
C	-0.02300
D1	0.26790
D2	0.38775
D3	0.25029
E	0.30920
F	2.48280
Area (Ha)	12.120
SAAR (mm)	608
CWI	88.440
Urban (1990)	0.0945
SPR	15.310
DPSBAR	7.300
DPLBAR	0.389
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.882
FARL	1.000

Output Variables

TP(0) (mins) 130 Q (l/s) 112.7 PR (%) 17.398
T (mins) 24 TB (mins) 358
TPt (mins) 142 Base Flow (l/s) 0.8

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	0.8	456	6.1	888	8.9	1320	23.7	1752	28.0	2184	11.8
48	0.8	480	6.1	912	9.4	1344	24.6	1776	27.2	2208	11.1
72	0.9	504	6.2	936	10.0	1368	25.6	1800	26.3	2232	10.5
96	1.0	528	6.2	960	10.6	1392	26.5	1824	25.4	2256	9.9
120	1.3	552	6.2	984	11.2	1416	27.3	1848	24.5	2280	9.4
144	1.6	576	6.2	1008	11.9	1440	28.1	1872	23.6	2304	8.9
168	2.0	600	6.3	1032	12.6	1464	28.8	1896	22.6	2328	8.4
192	2.5	624	6.3	1056	13.4	1488	29.5	1920	21.6	2352	8.0
216	2.9	648	6.4	1080	14.2	1512	30.0	1944	20.6	2376	7.7
240	3.4	672	6.5	1104	15.1	1536	30.4	1968	19.6	2400	7.4
264	3.9	696	6.6	1128	16.0	1560	30.7	1992	18.7	2424	7.1
288	4.4	720	6.7	1152	16.9	1584	30.9	2016	17.7	2448	6.9
312	4.8	744	6.9	1176	17.8	1608	30.8	2040	16.8	2472	6.7
336	5.1	768	7.1	1200	18.8	1632	30.7	2064	15.9	2496	6.6
360	5.4	792	7.4	1224	19.8	1656	30.4	2088	15.0	2520	6.5
384	5.7	816	7.7	1248	20.7	1680	29.9	2112	14.1	2544	6.4
408	5.8	840	8.1	1272	21.7	1704	29.4	2136	13.3	2568	6.3
432	6.0	864	8.5	1296	22.7	1728	28.7	2160	12.5	2592	6.3

Input Hydrograph Manhole Inf, DS/PN 1.006 (Storm)
2880 minute 30 year Winter I+20%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2616	6.3	2736	6.1	2856	5.1	2976	2.8	3096	1.1	3216	0.8
2640	6.2	2760	6.0	2880	4.8	3000	2.3	3120	0.9		
2664	6.2	2784	5.8	2904	4.3	3024	1.9	3144	0.8		
2688	6.2	2808	5.7	2928	3.8	3048	1.6	3168	0.8		
2712	6.1	2832	5.4	2952	3.3	3072	1.3	3192	0.8		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer				
2.000	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
1.001	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
3.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
1.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
4.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
5.000	15 Winter	100	+30%	100/15 Summer				
1.003	15 Winter	100	+30%	30/15 Summer				
6.000	2880 Winter	100	+30%	30/15 Summer	100/15 Summer			11
1.004	15 Winter	100	+30%	30/15 Summer				
1.005	2880 Winter	100	+30%	1/15 Summer				
1.006	2880 Winter	100	+30%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH1	30.549	1.299	0.000	0.80	0.0	55.9	FLOOD RISK
2.000	MH2	30.900	1.364	0.075	0.96	0.0	209.1	FLOOD
1.001	MH3	30.015	1.368	3.891	1.06	0.0	306.1	FLOOD
3.000	MH4	29.805	1.205	5.147	1.02	0.0	73.1	FLOOD
1.002	MH5	28.832	1.157	6.882	1.61	0.0	435.6	FLOOD
4.000	MH6	28.704	1.204	3.797	1.46	0.0	75.1	FLOOD
5.000	MH7	28.432	0.607	0.000	0.66	0.0	43.3	SURCHARGED
1.003	MH8	28.200	0.775	0.000	1.74	0.0	547.3	SURCHARGED
6.000	MH9	27.268	0.968	67.919	-0.05	0.0	-3.9	FLOOD
1.004	MH10	27.354	1.162	0.000	1.95	0.0	561.7	SURCHARGED
1.005	Pri	27.267	1.667	0.000	0.11	0.0	10.4	SURCHARGED
1.006	Inf	27.264	2.064	0.000	0.00	0.0	0.0	SURCHARGED

Input Hydrograph Manhole Inf, DS/PN 1.006 (Storm)
2880 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Input Variables

Site Location	GB 628550 312150 TG 28550 12150
C	-0.02300
D1	0.26790
D2	0.38775
D3	0.25029
E	0.30920
F	2.48280
Area (Ha)	12.120
SAAR (mm)	608
CWI	88.440
Urban (1990)	0.0945
SPR	15.310
DPSBAR	7.300
DPLBAR	0.389
PROPWET	0.270
LAG (hrs)	0.000
Base Flow (l/s)	(Calculated)
Areal Reduction Factor	1.000
BFIHOST	0.882
FARL	1.000

Output Variables

TP(0) (mins) 130 Q (l/s) 112.7 PR (%) 20.731
T (mins) 24 TB (mins) 358
TPt (mins) 142 Base Flow (l/s) 0.8

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	0.8	456	9.7	888	14.5	1320	39.4	1752	46.7	2184	19.4
48	0.8	480	9.8	912	15.4	1344	41.0	1776	45.4	2208	18.3
72	1.0	504	9.9	936	16.3	1368	42.6	1800	43.9	2232	17.2
96	1.2	528	9.9	960	17.3	1392	44.1	1824	42.4	2256	16.2
120	1.6	552	10.0	984	18.4	1416	45.6	1848	40.8	2280	15.3
144	2.2	576	10.0	1008	19.6	1440	46.9	1872	39.2	2304	14.4
168	2.9	600	10.1	1032	20.8	1464	48.1	1896	37.6	2328	13.7
192	3.6	624	10.1	1056	22.1	1488	49.2	1920	35.9	2352	13.0
216	4.5	648	10.3	1080	23.5	1512	50.1	1944	34.3	2376	12.4
240	5.3	672	10.4	1104	24.9	1536	50.8	1968	32.6	2400	11.9
264	6.1	696	10.6	1128	26.4	1560	51.3	1992	31.0	2424	11.5
288	6.9	720	10.8	1152	28.0	1584	51.5	2016	29.3	2448	11.1
312	7.6	744	11.2	1176	29.5	1608	51.5	2040	27.8	2472	10.8
336	8.2	768	11.5	1200	31.2	1632	51.2	2064	26.2	2496	10.6
360	8.7	792	12.0	1224	32.8	1656	50.7	2088	24.7	2520	10.4
384	9.0	816	12.5	1248	34.5	1680	50.0	2112	23.3	2544	10.3
408	9.3	840	13.1	1272	36.1	1704	49.1	2136	21.9	2568	10.2
432	9.6	864	13.8	1296	37.8	1728	48.0	2160	20.6	2592	10.1

Input Hydrograph Manhole Inf, DS/PN 1.006 (Storm)
2880 minute 100 year Winter I+30%
Input Hydrograph Type: FEH Dynamic

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2616	10.0	2736	9.7	2856	8.1	2976	4.2	3096	1.3	3216	0.8
2640	10.0	2760	9.6	2880	7.5	3000	3.4	3120	1.1		
2664	9.9	2784	9.3	2904	6.8	3024	2.7	3144	0.9		
2688	9.9	2808	9.0	2928	5.9	3048	2.1	3168	0.8		
2712	9.8	2832	8.6	2952	5.1	3072	1.7	3192	0.8		

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.000	0.463	216.0	0.123	5.00	0.0	0.600		o	375
1.001	99.994	1.272	78.6	0.240	0.00	0.0	0.600		o	375
1.002	100.000	2.304	43.4	0.239	0.00	0.0	0.600		o	375
1.003	50.000	1.096	45.6	0.119	0.00	0.0	0.600		o	450
1.004	56.143	0.933	60.2	0.121	0.00	0.0	0.600		o	450
2.000	100.020	0.694	144.1	0.162	5.00	0.0		0.100		-5
2.001	112.810	1.058	106.6	0.141	0.00	0.0		0.100		-5
3.000	62.500	0.724	86.3	0.080	5.00	0.0		0.100		-5
2.002	13.582	0.045	300.0	0.000	0.00	0.0	0.600		o	450
1.005	13.506	0.054	250.1	0.000	0.00	0.0	0.600		o	525
4.000	116.840	0.802	145.7	0.174	5.00	0.0		0.100		-4
4.001	114.170	1.058	107.9	0.152	0.00	0.0		0.100		-4
5.000	45.950	0.539	85.3	0.129	5.00	0.0		0.100		-4
1.006	47.332	0.169	280.1	0.000	0.00	0.0	0.600		o	600
1.007	18.100	0.200	90.5	0.000	0.00	0.0	0.600		o	300

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	32.360	0.123	0.0	1.23	135.7
1.001	31.897	0.363	0.0	2.05	225.9
1.002	30.625	0.602	0.0	2.76	304.5
1.003	28.321	0.721	0.0	3.02	479.7
1.004	27.225	0.842	0.0	2.62	417.4
2.000	29.364	0.162	0.0	0.23	164.0
2.001	28.670	0.303	0.0	0.27	190.7
3.000	28.336	0.080	0.0	0.30	211.9
2.002	26.337	0.383	0.0	1.17	185.8
1.005	26.292	1.225	0.0	1.41	305.6
4.000	29.472	0.174	0.0	0.23	157.6
4.001	28.670	0.326	0.0	0.27	183.1
5.000	28.151	0.129	0.0	0.30	206.0
1.006	26.238	1.680	0.0	1.45	410.0
1.007	25.900	1.680	0.0	1.65	116.9

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.008	5.000	-1.800	-2.8	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.008	25.700	1.680	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008		27.700	27.500	25.900	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 625800 314350 TG 25800 14350
C (1km)	-0.024
D1 (1km)	0.278
D2 (1km)	0.361
D3 (1km)	0.254
E (1km)	0.312
F (1km)	2.487
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.007

Invert Level (m) 25.900

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	296.2	0.800	579.6	1.600	926.3	2.400	0.0
0.200	361.0	1.000	660.5	1.800	1023.3	2.600	0.0
0.400	429.8	1.200	745.6	2.000	0.0	2.800	0.0
0.600	502.7	1.400	833.4	2.200	0.0	3.000	0.0

Infiltration Basin Manhole: Infil, DS/PN: 1.008

Invert Level (m) 25.700 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.06120 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.06120

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	610.7	0.800	1089.5	1.600	1633.4	2.400	0.0
0.200	723.8	1.000	1219.4	1.800	1779.5	2.600	0.0
0.400	841.6	1.200	1353.4	2.000	1929.6	2.800	0.0
0.600	963.5	1.400	1491.4	2.200	0.0	3.000	0.0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer				
1.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
1.003	15 Winter	1	0%	30/15 Summer				
1.004	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	1	0%					
2.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
3.000	15 Winter	1	0%					
2.002	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
1.005	15 Winter	1	0%	30/15 Summer				
4.000	15 Winter	1	0%					
4.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
5.000	15 Winter	1	0%					
1.006	15 Winter	1	0%	30/15 Summer				
1.007	30 Winter	1	0%	30/15 Summer				
1.008	240 Winter	1	0%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	32.454	-0.281	0.000	0.13	0.0	17.0	OK
1.001	MH02	32.015	-0.257	0.000	0.21	0.0	45.7	OK
1.002	MH03	30.754	-0.246	0.000	0.25	0.0	73.7	OK
1.003	MH04	28.458	-0.313	0.000	0.20	0.0	87.4	OK
1.004	MH05	27.382	-0.293	0.000	0.26	0.0	101.0	OK
2.000	SW01	29.466	-0.173	0.000	0.12	0.0	20.1	FLOOD RISK*
2.001	SW02	28.784	-0.161	0.000	0.18	0.0	34.5	FLOOD RISK*
3.000	SW03	28.396	-0.215	0.000	0.06	0.0	11.9	FLOOD RISK*
2.002	MH06	26.610	-0.177	0.000	0.30	0.0	42.4	OK
1.005	MH07	26.597	-0.220	0.000	0.64	0.0	139.3	OK
4.000	SW04	29.579	-0.168	0.000	0.13	0.0	20.6	FLOOD RISK*
4.001	SW05	28.787	-0.158	0.000	0.19	0.0	35.6	FLOOD RISK*
5.000	SW06	28.232	-0.194	0.000	0.09	0.0	18.9	FLOOD RISK*
1.006	MH08	26.548	-0.290	0.000	0.53	0.0	187.7	OK
1.007	Pri	26.116	-0.084	0.000	0.87	0.0	87.0	OK
1.008	Infil	25.941	0.141	0.000	0.00	0.0	0.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/15 Summer				
1.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
1.003	15 Winter	30	+20%	30/15 Summer				
1.004	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	30	+20%					
2.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
3.000	15 Winter	30	+20%					
2.002	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
1.005	15 Winter	30	+20%	30/15 Summer				
4.000	15 Winter	30	+20%					
4.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
5.000	15 Winter	30	+20%					
1.006	15 Winter	30	+20%	30/15 Summer				
1.007	15 Winter	30	+20%	30/15 Summer				
1.008	360 Winter	30	+20%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	32.557	-0.178	0.000	0.49	0.0	64.5	OK
1.001	MH02	32.191	-0.081	0.000	0.89	0.0	193.3	OK
1.002	MH03	31.257	0.257	0.000	1.00	0.0	291.0	SURCHARGED
1.003	MH04	29.103	0.332	0.000	0.77	0.0	335.4	SURCHARGED
1.004	MH05	28.514	0.839	0.000	0.94	0.0	358.1	FLOOD RISK
2.000	SW01	29.570	-0.069	0.000	0.48	0.0	78.1	FLOOD RISK*
2.001	SW02	28.906	-0.039	0.000	0.69	0.0	131.6	FLOOD RISK*
3.000	SW03	28.462	-0.149	0.000	0.21	0.0	44.6	FLOOD RISK*
2.002	MH06	27.762	0.975	0.000	1.31	0.0	183.0	FLOOD RISK
1.005	MH07	27.709	0.892	0.000	2.29	0.0	501.3	SURCHARGED
4.000	SW04	29.689	-0.058	0.000	0.51	0.0	80.4	FLOOD RISK*
4.001	SW05	28.916	-0.029	0.000	0.78	0.0	143.4	FLOOD RISK*
5.000	SW06	28.313	-0.113	0.000	0.36	0.0	73.4	FLOOD RISK*
1.006	MH08	27.286	0.448	0.000	1.94	0.0	692.3	SURCHARGED
1.007	Pri	26.624	0.424	0.000	1.79	0.0	179.6	SURCHARGED
1.008	Infil	26.329	0.529	0.000	0.00	0.0	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer				
1.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
1.003	15 Winter	100	+30%	30/15 Summer				
1.004	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	100	+30%					
2.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
3.000	15 Winter	100	+30%					
2.002	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
1.005	15 Winter	100	+30%	30/15 Summer				
4.000	15 Winter	100	+30%					
4.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
5.000	15 Winter	100	+30%					
1.006	15 Winter	100	+30%	30/15 Summer				
1.007	30 Winter	100	+30%	30/15 Summer				
1.008	480 Winter	100	+30%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	33.813	1.078	0.000	0.74	0.0	96.6	FLOOD RISK*
1.001	MH02	33.482	1.210	9.727	1.00	0.0	216.3	FLOOD
1.002	MH03	32.215	1.215	14.934	1.09	0.0	317.6	FLOOD
1.003	MH04	29.753	0.982	0.000	0.92	0.0	401.1	FLOOD RISK
1.004	MH05	28.818	1.143	18.253	1.07	0.0	410.1	FLOOD
2.000	SW01	29.630	-0.009	0.000	0.78	0.0	128.3	FLOOD RISK*
2.001	SW02	28.953	0.008	8.102	0.97	0.0	184.0	FLOOD
3.000	SW03	28.498	-0.113	0.000	0.34	0.0	71.7	FLOOD RISK*
2.002	MH06	27.924	1.137	36.879	2.57	0.0	358.1	FLOOD
1.005	MH07	27.884	1.067	0.000	2.41	0.0	527.5	SURCHARGED
4.000	SW04	29.744	-0.003	0.000	0.83	0.0	131.5	FLOOD RISK*
4.001	SW05	28.958	0.013	12.574	1.01	0.0	185.3	FLOOD
5.000	SW06	28.360	-0.066	0.000	0.59	0.0	120.5	FLOOD RISK*
1.006	MH08	27.460	0.622	0.000	2.18	0.0	779.4	SURCHARGED
1.007	Pri	26.992	0.792	0.000	2.24	0.0	224.7	SURCHARGED
1.008	Infil	26.567	0.767	0.000	0.00	0.0	0.0	SURCHARGED

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.000	0.656	152.4	0.133	5.00	0.0		0.100		-5
1.001	100.000	0.500	200.0	0.134	0.00	0.0		0.100		-5
1.002	100.000	0.500	200.0	0.134	0.00	0.0		0.100		-5
1.003	100.000	0.500	200.0	0.134	0.00	0.0		0.100		-5
1.004	86.110	0.697	123.5	0.115	0.00	0.0		0.100		-5
1.005	27.246	0.199	136.9	0.000	0.00	0.0	0.600		o	450
2.000	100.000	0.333	300.3	0.161	5.00	0.0		0.100		-4
2.001	100.000	0.500	200.0	0.150	0.00	0.0		0.100		-4
2.002	100.000	0.500	200.0	0.128	0.00	0.0		0.100		-4
2.003	100.000	0.500	200.0	0.132	0.00	0.0		0.100		-4
2.004	102.610	0.782	131.2	0.132	0.00	0.0		0.100		-4
2.005	15.135	0.050	302.7	0.000	0.00	0.0	0.600		o	525
1.006	45.169	0.151	299.1	0.142	0.00	0.0	0.600		o	525
1.007	32.060	0.107	299.6	0.083	0.00	0.0	0.600		o	525
1.008	45.639	0.152	300.3	0.210	0.00	0.0	0.600		o	525
1.009	34.201	0.114	300.0	0.040	0.00	0.0	0.600		o	525
3.000	47.879	0.691	69.3	0.081	5.00	0.0	0.600		o	225
3.001	58.087	0.484	120.0	0.101	0.00	0.0	0.600		o	300

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	26.527	0.133	0.0	0.23	159.5
1.001	25.871	0.267	0.0	0.20	139.2
1.002	25.371	0.401	0.0	0.20	139.2
1.003	24.871	0.535	0.0	0.20	139.2
1.004	24.371	0.650	0.0	0.25	177.1
1.005	22.599	0.650	0.0	1.74	276.1
2.000	26.204	0.161	0.0	0.16	109.7
2.001	25.871	0.311	0.0	0.20	134.5
2.002	25.371	0.439	0.0	0.20	134.5
2.003	24.871	0.571	0.0	0.20	134.5
2.004	24.371	0.703	0.0	0.24	166.0
2.005	22.450	0.703	0.0	1.28	277.6
1.006	22.400	1.495	0.0	1.29	279.2
1.007	22.249	1.578	0.0	1.29	279.0
1.008	22.142	1.788	0.0	1.29	278.7
1.009	21.990	1.828	0.0	1.29	278.8
3.000	23.599	0.081	0.0	1.57	62.6
3.001	22.908	0.182	0.0	1.43	101.4

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.010	20.603	0.015	1408.7	0.110	0.00	0.0	0.600		o	525
4.000	100.188	0.689	145.4	0.120	5.00	0.0	0.600		o	300
4.001	105.043	1.813	57.9	0.112	0.00	0.0	0.600		o	300
4.002	13.334	0.139	95.9	0.000	0.00	0.0	0.600		o	375
5.000	99.271	0.689	144.1	0.117	5.00	0.0	0.600		o	300
5.001	105.478	1.813	58.2	0.113	0.00	0.0	0.600		o	300
5.002	13.860	0.139	99.7	0.000	0.00	0.0	0.600		o	375
4.003	100.000	2.632	38.0	0.123	0.00	0.0	0.600		o	375
4.004	50.994	1.350	37.8	0.121	0.00	0.0	0.600		o	375
4.005	66.149	1.378	48.0	0.206	0.00	0.0	0.600		o	450
4.006	20.301	0.423	48.0	0.083	0.00	0.0	0.600		o	450
4.007	35.020	0.724	48.4	0.111	0.00	0.0	0.600		o	450
1.011	23.500	0.200	117.5	0.000	0.00	0.0	0.600		o	300
6.000	50.000	0.191	261.8	0.102	5.00	0.0	0.600		o	300
6.001	50.000	0.167	299.4	0.041	0.00	0.0	0.600		o	300
6.002	50.000	0.166	301.2	0.041	0.00	0.0	0.600		o	300
6.003	40.200	0.134	300.0	0.044	0.00	0.0	0.600		o	300

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.010	21.876	2.120	0.0	0.59	127.3
4.000	33.402	0.120	0.0	1.30	92.0
4.001	32.712	0.232	0.0	2.07	146.3
4.002	29.675	0.232	0.0	1.85	204.4
5.000	33.402	0.117	0.0	1.31	92.4
5.001	32.712	0.230	0.0	2.07	146.0
5.002	29.675	0.230	0.0	1.81	200.4
4.003	28.725	0.585	0.0	2.95	325.5
4.004	26.093	0.706	0.0	2.96	326.5
4.005	24.743	0.912	0.0	2.94	467.6
4.006	23.365	0.995	0.0	2.94	467.7
4.007	22.942	1.106	0.0	2.93	465.8
1.011	21.800	3.226	0.0	1.45	102.5
6.000	23.399	0.102	0.0	0.97	68.4
6.001	23.208	0.143	0.0	0.90	63.9
6.002	23.041	0.184	0.0	0.90	63.7
6.003	22.875	0.228	0.0	0.90	63.8

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
6.004	40.150	0.134	299.6	0.061	0.00	0.0	0.600		o	300
6.005	10.660	0.036	296.1	0.014	0.00	0.0	0.600		o	375
7.000	33.730	0.690	48.9	0.055	5.00	0.0	0.600		o	150
8.000	55.000	0.611	90.0	0.107	5.00	0.0	0.600		o	225
9.000	20.430	0.082	249.1	0.049	5.00	0.0	0.600		o	225
6.006	28.870	0.096	300.7	0.000	0.00	0.0	0.600		o	375
6.007	25.000	0.400	62.5	0.000	0.00	0.0	0.600		o	300
6.008	100.000	0.400	250.0	0.000	0.00	0.0	0.600		o	300
1.012	5.100	-2.200	-2.3	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
6.004	22.741	0.289	0.0	0.90	63.8
6.005	22.532	0.303	0.0	1.05	115.7
7.000	23.980	0.055	0.0	1.44	25.5
8.000	23.802	0.107	0.0	1.38	54.8
9.000	23.214	0.049	0.0	0.82	32.8
6.006	22.496	0.514	0.0	1.04	114.8
6.007	22.400	0.514	0.0	1.99	140.8
6.008	22.000	0.514	0.0	0.99	70.0
1.012	21.600	3.740	0.0	0.00	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.012		24.000	23.800	21.800	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 625800 314350 TG 25800 14350
C (1km)	-0.024
D1 (1km)	0.278
D2 (1km)	0.361
D3 (1km)	0.254
E (1km)	0.312
F (1km)	2.487
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri 22, DS/PN: 1.011

Invert Level (m) 21.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	375.1	1.000	703.9	2.000	1133.5	3.000	0.0
0.200	432.8	1.200	781.7	2.200	1231.5	3.200	0.0
0.400	494.5	1.400	863.6	2.400	0.0		
0.600	560.3	1.600	949.5	2.600	0.0		
0.800	630.1	1.800	1039.5	2.800	0.0		

Tank or Pond Manhole: Pri, DS/PN: 6.007

Invert Level (m) 22.400

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	6.0	1.200	139.1	2.400	419.7	3.600	0.0
0.200	17.7	1.400	175.7	2.600	480.7	3.800	0.0
0.400	33.6	1.600	216.4	2.800	0.0	4.000	0.0
0.600	53.8	1.800	261.1	3.000	0.0		
0.800	78.1	2.000	310.0	3.200	0.0		
1.000	106.6	2.200	362.8	3.400	0.0		

Infiltration Basin Manhole: Inf, DS/PN: 6.008

Invert Level (m) 22.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.36000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.36000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	54.2	1.200	274.0	2.400	641.7	3.600	0.0
0.200	79.7	1.400	325.2	2.600	717.0	3.800	0.0
0.400	109.8	1.600	380.4	2.800	796.3	4.000	0.0
0.600	144.4	1.800	439.7	3.000	0.0		
0.800	183.6	2.000	503.0	3.200	0.0		
1.000	226.8	2.200	570.3	3.400	0.0		

Infiltration Basin Manhole: Inf 22, DS/PN: 1.012

Invert Level (m) 21.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00680 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00680

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1472.0	0.600	2012.0	1.200	2589.0	1.800	3202.0
0.200	1648.0	0.800	2200.0	1.400	2789.0	2.000	3415.0
0.400	1828.0	1.000	2393.0	1.600	2994.0	2.200	3631.0

Infiltration Basin Manhole: Inf 22, DS/PN: 1.012

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
2.400	3852.0	2.600	0.0	2.800	0.0	3.000	0.0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%					
1.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
1.003	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
1.004	30 Winter	1	0%					
1.005	30 Winter	1	0%	30/15 Summer	100/15 Winter			5
2.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
2.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
2.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
2.003	30 Winter	1	0%	100/15 Summer	100/15 Summer			6
2.004	30 Winter	1	0%	100/15 Summer	100/15 Summer			4
2.005	30 Winter	1	0%	30/15 Summer	100/15 Summer			8
1.006	30 Winter	1	0%	30/15 Summer				
1.007	30 Winter	1	0%	30/15 Summer				
1.008	30 Winter	1	0%	30/15 Summer				
1.009	30 Winter	1	0%	30/15 Summer				
3.000	15 Winter	1	0%	100/15 Summer	100/15 Winter			1
3.001	15 Winter	1	0%	30/15 Summer				
1.010	60 Winter	1	0%	30/15 Summer				
4.000	15 Winter	1	0%					2
4.001	15 Winter	1	0%	100/15 Summer				2
4.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
5.000	15 Winter	1	0%					2
5.001	15 Winter	1	0%	100/15 Summer				2
5.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
4.003	15 Winter	1	0%	30/15 Winter				
4.004	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
4.005	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
4.006	15 Winter	1	0%	30/15 Summer				
4.007	15 Winter	1	0%	30/15 Summer				
1.011	60 Winter	1	0%	30/15 Summer				
6.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
6.001	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
6.002	15 Winter	1	0%	30/15 Summer				
6.003	15 Winter	1	0%	30/15 Summer				
6.004	15 Winter	1	0%	30/15 Summer				
6.005	15 Winter	1	0%	30/15 Summer				

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
7.000	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
8.000	15 Winter	1	0%	30/15 Summer	100/15 Winter			1
9.000	15 Winter	1	0%	100/15 Summer				
6.006	15 Winter	1	0%	30/15 Summer				
6.007	15 Winter	1	0%	30/15 Summer				
6.008	15 Winter	1	0%	30/15 Summer				
1.012	2880 Winter	1	0%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	26.620	-0.182	0.000	0.10	0.0	16.2	FLOOD RISK*
1.001	SW02	25.993	-0.153	0.000	0.19	0.0	26.1	FLOOD RISK*
1.002	SW03	25.505	-0.141	0.000	0.23	0.0	31.5	FLOOD RISK*
1.003	SW04	25.009	-0.137	0.000	0.25	0.0	34.3	FLOOD RISK*
1.004	SW05	24.495	-0.151	0.000	0.21	0.0	37.5	FLOOD RISK*
1.005	MH01	22.719	-0.330	0.000	0.16	0.0	37.5	OK
2.000	SW06	26.327	-0.152	0.000	0.18	0.0	19.3	FLOOD RISK*
2.001	SW07	25.997	-0.149	0.000	0.20	0.0	27.4	FLOOD RISK*
2.002	SW08	25.505	-0.141	0.000	0.23	0.0	31.2	FLOOD RISK*
2.003	SW09	25.010	-0.136	0.000	0.26	0.0	34.4	FLOOD RISK*
2.004	SW10	24.499	-0.147	0.000	0.23	0.0	37.7	FLOOD RISK*
2.005	MH02	22.634	-0.341	0.000	0.19	0.0	37.7	OK
1.006	MH03	22.610	-0.315	0.000	0.32	0.0	77.9	OK
1.007	MH04	22.508	-0.266	0.000	0.34	0.0	79.3	OK
1.008	MH05	22.457	-0.210	0.000	0.34	0.0	83.1	OK
1.009	MH06	22.428	-0.087	0.000	0.35	0.0	83.7	OK
3.000	MH07	23.667	-0.157	0.000	0.20	0.0	11.8	OK
3.001	MH08	23.011	-0.197	0.000	0.25	0.0	24.5	OK
1.010	MH09	22.401	0.000	0.000	1.17	0.0	89.3	OK
4.000	BB01	33.491	-0.211	0.000	0.18	0.0	16.2	FLOOD RISK*
4.001	BB02	32.804	-0.208	0.000	0.20	0.0	29.5	FLOOD RISK*
4.002	MH01	29.789	-0.261	0.000	0.20	0.0	29.3	OK
5.000	BB03	33.489	-0.213	0.000	0.17	0.0	15.9	FLOOD RISK*
5.001	BB04	32.803	-0.209	0.000	0.20	0.0	29.3	FLOOD RISK*
5.002	MH02	29.789	-0.261	0.000	0.20	0.0	29.1	OK
4.003	MH03	28.847	-0.253	0.000	0.23	0.0	71.1	OK
4.004	MH04	26.228	-0.240	0.000	0.28	0.0	83.5	OK
4.005	MH05	24.894	-0.299	0.000	0.24	0.0	104.6	OK
4.006	MH06	23.537	-0.278	0.000	0.31	0.0	113.2	OK
4.007	Mh07	23.113	-0.279	0.000	0.31	0.0	124.5	OK
1.011	Pri 22	22.088	-0.012	0.000	1.00	0.0	90.9	OK
6.000	MH1	23.498	-0.201	0.000	0.23	0.0	14.5	OK
6.001	MH2	23.325	-0.183	0.000	0.31	0.0	18.7	OK
6.002	MH3	23.170	-0.171	0.000	0.37	0.0	22.3	OK
6.003	MH4	23.015	-0.160	0.000	0.44	0.0	25.9	OK
6.004	MH5	22.895	-0.146	0.000	0.51	0.0	30.5	OK
6.005	MH6	22.710	-0.197	0.000	0.37	0.0	32.1	OK
7.000	MH7	24.040	-0.090	0.000	0.33	0.0	8.0	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
8.000	MH8	23.887	-0.140	0.000	0.30	0.0	15.9	OK
9.000	MH9	23.290	-0.149	0.000	0.24	0.0	7.2	OK
6.006	MH10	22.692	-0.179	0.000	0.53	0.0	53.9	OK
6.007	Pri	22.537	-0.163	0.000	0.43	0.0	53.8	OK
6.008	Inf	22.162	-0.138	0.000	0.57	0.0	38.6	OK
1.012	Inf 22	22.064	0.364	0.000	0.00	0.0	0.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%					
1.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
1.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
1.004	30 Winter	30	+20%					
1.005	30 Winter	30	+20%	30/15 Summer	100/15 Winter			5
2.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
2.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
2.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
2.003	15 Winter	30	+20%	100/15 Summer	100/15 Summer			6
2.004	30 Winter	30	+20%	100/15 Summer	100/15 Summer			4
2.005	30 Winter	30	+20%	30/15 Summer	100/15 Summer			8
1.006	30 Winter	30	+20%	30/15 Summer				
1.007	30 Winter	30	+20%	30/15 Summer				
1.008	30 Winter	30	+20%	30/15 Summer				
1.009	30 Winter	30	+20%	30/15 Summer				
3.000	15 Winter	30	+20%	100/15 Summer	100/15 Winter			1
3.001	15 Winter	30	+20%	30/15 Summer				
1.010	60 Winter	30	+20%	30/15 Summer				
4.000	15 Winter	30	+20%					2
4.001	15 Winter	30	+20%	100/15 Summer				2
4.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
5.000	15 Winter	30	+20%					2
5.001	15 Winter	30	+20%	100/15 Summer				2
5.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
4.003	15 Winter	30	+20%	30/15 Winter				
4.004	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
4.005	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
4.006	15 Winter	30	+20%	30/15 Summer				
4.007	15 Winter	30	+20%	30/15 Summer				
1.011	60 Winter	30	+20%	30/15 Summer				
6.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
6.001	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
6.002	15 Winter	30	+20%	30/15 Summer				
6.003	15 Winter	30	+20%	30/15 Summer				
6.004	15 Winter	30	+20%	30/15 Summer				
6.005	15 Winter	30	+20%	30/15 Summer				

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
7.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
8.000	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
9.000	15 Winter	30	+20%	100/15 Summer				
6.006	15 Winter	30	+20%	30/15 Summer				
6.007	15 Winter	30	+20%	30/15 Summer				
6.008	2880 Winter	30	+20%	30/15 Summer				
1.012	2880 Winter	30	+20%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	26.715	-0.087	0.000	0.40	0.0	63.4	FLOOD RISK*
1.001	SW02	26.124	-0.022	0.000	0.74	0.0	102.5	FLOOD RISK*
1.002	SW03	25.638	-0.008	0.000	0.87	0.0	121.3	FLOOD RISK*
1.003	SW04	25.141	-0.005	0.000	0.93	0.0	129.6	FLOOD RISK*
1.004	SW05	24.611	-0.035	0.000	0.75	0.0	133.6	FLOOD RISK*
1.005	MH01	23.666	0.617	0.000	0.56	0.0	131.9	FLOOD RISK
2.000	SW06	26.456	-0.023	0.000	0.69	0.0	76.2	FLOOD RISK*
2.001	SW07	26.126	-0.020	0.000	0.78	0.0	104.3	FLOOD RISK*
2.002	SW08	25.634	-0.012	0.000	0.87	0.0	116.6	FLOOD RISK*
2.003	SW09	25.138	-0.008	0.000	0.91	0.0	123.0	FLOOD RISK*
2.004	SW10	24.618	-0.028	0.000	0.80	0.0	132.5	FLOOD RISK*
2.005	MH02	23.636	0.661	0.000	0.65	0.0	131.6	FLOOD RISK
1.006	MH03	23.604	0.679	0.000	1.10	0.0	272.2	SURCHARGED
1.007	MH04	23.423	0.649	0.000	1.18	0.0	277.7	SURCHARGED
1.008	MH05	23.277	0.610	0.000	1.21	0.0	297.6	SURCHARGED
1.009	MH06	23.072	0.557	0.000	1.27	0.0	302.2	SURCHARGED
3.000	MH07	23.748	-0.076	0.000	0.75	0.0	44.7	OK
3.001	MH08	23.250	0.042	0.000	1.03	0.0	99.2	SURCHARGED
1.010	MH09	22.923	0.522	0.000	4.14	0.0	316.6	SURCHARGED
4.000	BB01	33.595	-0.107	0.000	0.67	0.0	61.9	FLOOD RISK*
4.001	BB02	32.925	-0.087	0.000	0.83	0.0	121.1	FLOOD RISK*
4.002	MH01	29.939	-0.111	0.000	0.83	0.0	121.1	OK
5.000	BB03	33.591	-0.111	0.000	0.66	0.0	60.8	FLOOD RISK*
5.001	BB04	32.925	-0.087	0.000	0.83	0.0	120.7	FLOOD RISK*
5.002	MH02	29.940	-0.110	0.000	0.83	0.0	120.7	OK
4.003	MH03	29.289	0.189	0.000	0.93	0.0	290.5	SURCHARGED
4.004	MH04	27.041	0.573	0.000	1.09	0.0	330.8	SURCHARGED
4.005	MH05	25.422	0.229	0.000	0.93	0.0	401.9	SURCHARGED
4.006	MH06	24.227	0.412	0.000	1.19	0.0	434.8	SURCHARGED
4.007	Mh07	23.647	0.255	0.000	1.17	0.0	476.3	SURCHARGED
1.011	Pri 22	22.863	0.763	0.000	2.19	0.0	199.0	SURCHARGED
6.000	MH1	24.269	0.570	0.000	0.73	0.0	47.1	FLOOD RISK
6.001	MH2	24.198	0.690	0.000	0.90	0.0	54.2	SURCHARGED
6.002	MH3	24.061	0.720	0.000	1.09	0.0	65.1	SURCHARGED
6.003	MH4	23.852	0.677	0.000	1.28	0.0	76.1	SURCHARGED
6.004	MH5	23.617	0.576	0.000	1.56	0.0	92.4	SURCHARGED
6.005	MH6	23.267	0.360	0.000	1.11	0.0	96.0	SURCHARGED
7.000	MH7	24.383	0.253	0.000	1.16	0.0	28.5	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
8.000	MH8	24.154	0.127	0.000	1.09	0.0	57.7	SURCHARGED
9.000	MH9	23.386	-0.053	0.000	0.92	0.0	27.2	OK
6.006	MH10	23.222	0.351	0.000	1.97	0.0	199.1	SURCHARGED
6.007	Pri	22.955	0.255	0.000	1.20	0.0	151.0	SURCHARGED
6.008	Inf	22.545	0.245	0.000	-0.10	0.0	-6.9	SURCHARGED
1.012	Inf 22	22.574	0.874	0.000	0.00	0.0	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%					
1.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
1.003	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
1.004	15 Winter	100	+30%					
1.005	60 Winter	100	+30%	30/15 Summer	100/15 Winter			5
2.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
2.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
2.002	30 Winter	100	+30%	100/15 Summer	100/15 Summer			4
2.003	30 Winter	100	+30%	100/15 Summer	100/15 Summer			6
2.004	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
2.005	60 Winter	100	+30%	30/15 Summer	100/15 Summer			8
1.006	120 Summer	100	+30%	30/15 Summer				
1.007	15 Winter	100	+30%	30/15 Summer				
1.008	15 Winter	100	+30%	30/15 Summer				
1.009	60 Winter	100	+30%	30/15 Summer				
3.000	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
3.001	15 Winter	100	+30%	30/15 Summer				
1.010	60 Winter	100	+30%	30/15 Summer				
4.000	15 Winter	100	+30%					2
4.001	15 Winter	100	+30%	100/15 Summer				2
4.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
5.000	15 Winter	100	+30%					2
5.001	15 Winter	100	+30%	100/15 Summer				2
5.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
4.003	15 Winter	100	+30%	30/15 Winter				
4.004	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
4.005	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
4.006	15 Winter	100	+30%	30/15 Summer				
4.007	15 Winter	100	+30%	30/15 Summer				
1.011	120 Winter	100	+30%	30/15 Summer				
6.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
6.001	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
6.002	15 Winter	100	+30%	30/15 Summer				
6.003	15 Winter	100	+30%	30/15 Summer				
6.004	15 Winter	100	+30%	30/15 Summer				
6.005	15 Winter	100	+30%	30/15 Summer				

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
7.000	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
8.000	15 Winter	100	+30%	30/15 Summer	100/15 Winter			1
9.000	15 Winter	100	+30%	100/15 Summer				
6.006	15 Winter	100	+30%	30/15 Summer				
6.007	15 Winter	100	+30%	30/15 Summer				
6.008	2880 Winter	100	+30%	30/15 Summer				
1.012	2880 Winter	100	+30%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	26.771	-0.031	0.000	0.65	0.0	104.2	FLOOD RISK*
1.001	SW02	26.161	0.015	14.656	0.98	0.0	136.3	FLOOD
1.002	SW03	25.668	0.022	22.154	1.00	0.0	139.1	FLOOD
1.003	SW04	25.170	0.024	24.245	1.03	0.0	143.8	FLOOD
1.004	SW05	24.646	0.000	0.000	0.97	0.0	171.9	FLOOD RISK*
1.005	MH01	23.982	0.933	33.256	0.61	0.0	141.7	FLOOD
2.000	SW06	26.486	0.007	7.264	0.97	0.0	106.0	FLOOD
2.001	SW07	26.163	0.017	16.630	0.99	0.0	132.9	FLOOD
2.002	SW08	25.665	0.019	19.498	1.00	0.0	133.9	FLOOD
2.003	SW09	25.171	0.025	24.593	1.03	0.0	138.5	FLOOD
2.004	SW10	24.653	0.007	7.203	0.98	0.0	161.9	FLOOD
2.005	MH02	23.952	0.977	87.840	0.78	0.0	158.4	FLOOD
1.006	MH03	24.035	1.110	0.000	0.99	0.0	244.0	SURCHARGED
1.007	MH04	23.864	1.090	0.000	1.25	0.0	294.2	SURCHARGED
1.008	MH05	23.779	1.112	0.000	1.60	0.0	394.5	SURCHARGED
1.009	MH06	23.510	0.995	0.000	1.46	0.0	348.1	SURCHARGED
3.000	MH07	24.924	1.100	0.076	1.08	0.0	64.8	FLOOD
3.001	MH08	24.138	0.930	0.000	1.45	0.0	139.5	FLOOD RISK
1.010	MH09	23.384	0.983	0.000	5.72	0.0	437.0	SURCHARGED
4.000	BB01	33.702	0.000	0.000	0.96	0.0	88.3	FLOOD RISK*
4.001	BB02	33.013	0.001	0.000	1.06	0.0	155.3	FLOOD RISK*
4.002	MH01	31.208	1.158	7.613	1.07	0.0	156.7	FLOOD
5.000	BB03	33.702	0.000	0.000	0.94	0.0	86.9	FLOOD RISK*
5.001	BB04	33.013	0.001	0.000	1.06	0.0	155.1	FLOOD RISK*
5.002	MH02	31.208	1.158	7.607	1.07	0.0	156.6	FLOOD
4.003	MH03	31.159	2.059	0.000	1.06	0.0	332.1	FLOOD RISK
4.004	MH04	28.408	1.940	7.558	1.32	0.0	398.9	FLOOD
4.005	MH05	26.558	1.365	7.611	1.12	0.0	484.2	FLOOD
4.006	MH06	25.119	1.304	0.000	1.41	0.0	518.5	FLOOD RISK
4.007	Mh07	24.277	0.885	0.000	1.48	0.0	602.9	SURCHARGED
1.011	Pri 22	23.298	1.198	0.000	2.41	0.0	219.0	SURCHARGED
6.000	MH1	24.531	0.832	32.292	1.21	0.0	78.1	FLOOD
6.001	MH2	24.839	1.331	1.242	1.30	0.0	78.2	FLOOD
6.002	MH3	24.970	1.629	0.000	1.29	0.0	77.6	SURCHARGED
6.003	MH4	24.913	1.738	0.000	1.60	0.0	94.9	SURCHARGED
6.004	MH5	24.675	1.634	0.000	2.25	0.0	133.3	SURCHARGED
6.005	MH6	23.999	1.092	0.000	1.64	0.0	142.1	SURCHARGED
7.000	MH7	25.331	1.201	1.023	1.57	0.0	38.6	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
8.000	MH8	25.227	1.200	0.492	1.58	0.0	83.5	FLOOD
9.000	MH9	23.994	0.555	0.000	1.41	0.0	41.9	SURCHARGED
6.006	MH10	23.883	1.012	0.000	2.81	0.0	284.0	SURCHARGED
6.007	Pri	23.298	0.598	0.000	1.41	0.0	177.8	SURCHARGED
6.008	Inf	22.833	0.533	0.000	-0.15	0.0	-9.8	SURCHARGED
1.012	Inf 22	22.875	1.175	0.000	0.00	0.0	0.0	SURCHARGED

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.000	0.627	159.5	0.027	5.00	0.0		0.100		-5
2.000	100.000	0.624	160.3	0.027	5.00	0.0		0.100		-5
1.001	15.210	0.051	298.2	0.000	0.00	0.0	0.600		o	225
1.002	17.850	0.060	297.5	0.434	0.00	0.0	0.600		o	375
3.000	100.000	0.351	284.9	0.152	5.00	0.0		0.100		-4
3.001	100.000	0.777	128.7	0.163	0.00	0.0		0.100		-4
4.000	76.000	0.238	319.3	0.116	5.00	0.0		0.100		-4
4.001	100.000	0.924	108.2	0.160	0.00	0.0		0.100		-4
1.003	74.010	0.296	250.0	0.000	0.00	0.0	0.600		o	525
5.000	50.000	1.000	50.0	0.126	5.00	0.0	0.600		o	225
5.001	50.000	2.000	25.0	0.059	0.00	0.0	0.600		o	225
6.000	28.500	0.095	300.0	0.075	5.00	0.0	0.600		o	225
5.002	74.650	0.249	299.8	0.088	0.00	0.0	0.600		o	375

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	27.139	0.027	0.0	0.22	150.7
2.000	27.136	0.027	0.0	0.22	150.4
1.001	25.337	0.054	0.0	0.75	29.9
1.002	24.141	0.488	0.0	1.05	115.4
3.000	26.209	0.152	0.0	0.17	112.7
3.001	25.858	0.315	0.0	0.25	167.6
4.000	26.243	0.116	0.0	0.16	106.4
4.001	26.005	0.276	0.0	0.27	182.8
1.003	24.006	1.079	0.0	1.41	305.7
5.000	27.909	0.126	0.0	1.85	73.7
5.001	26.909	0.185	0.0	2.63	104.5
6.000	24.683	0.075	0.0	0.75	29.8
5.002	24.588	0.348	0.0	1.04	115.0

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.004	13.225	0.066	200.4	0.000	0.00	0.0	0.600		o	525
1.005	20.200	0.044	459.1	0.000	0.00	0.0	0.600		o	300
1.006	5.000	-2.000	-2.5	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.004	23.710	1.427	0.0	1.58	341.8
1.005	23.644	1.427	0.0	0.73	51.4
1.006	23.600	1.427	0.0	0.00	0.0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	1	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 628250 310100 TG 28250 10100
C (1km)	-0.024
D1 (1km)	0.263
D2 (1km)	0.401
D3 (1km)	0.263
E (1km)	0.309
F (1km)	2.483
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.005

Invert Level (m) 23.644

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	176.9	1.400	600.7	2.800	0.0	4.200	0.0
0.200	224.8	1.600	677.5	3.000	0.0	4.400	0.0
0.400	277.2	1.800	758.4	3.200	0.0	4.600	0.0
0.600	333.8	2.000	843.0	3.400	0.0	4.800	0.0
0.800	394.5	2.200	932.0	3.600	0.0	5.000	0.0
1.000	459.2	2.400	1025.0	3.800	0.0		
1.200	527.9	2.600	0.0	4.000	0.0		

Complex Manhole: Inf, DS/PN: 1.006

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	15.0
Safety Factor	2.0	Slope (1:X)	0.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	18.100	Cap Infiltration Depth (m)	0.000

Infiltration Basin

Invert Level (m)	23.600	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00180	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.00180		

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1793.0	0.800	2402.0	1.600	3084.8	2.400	3832.0
0.200	1938.0	1.000	2566.6	1.800	3265.0	2.600	4029.0
0.400	2088.0	1.200	2735.0	2.000	3450.0		
0.600	2243.0	1.400	2907.9	2.200	3639.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%					
2.000	15 Winter	1	0%					
1.001	15 Winter	1	0%	30/15 Summer				
1.002	15 Winter	1	0%	10/15 Summer	100/15 Summer			2
3.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
3.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
4.000	15 Winter	1	0%					
4.001	15 Winter	1	0%	100/15 Winter	100/15 Winter			1
1.003	15 Winter	1	0%	10/15 Winter	100/15 Summer			4
5.000	15 Winter	1	0%	30/15 Winter				
5.001	15 Winter	1	0%	30/15 Summer	100/15 Summer			2
6.000	15 Winter	1	0%	10/15 Summer	100/15 Summer			4
5.002	15 Winter	1	0%	30/15 Summer				
1.004	15 Winter	1	0%	10/15 Summer				
1.005	30 Winter	1	0%	1/15 Winter				
1.006	2880 Winter	1	0%	1/180 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	27.178	-0.236	0.000	0.03	0.0	4.0	FLOOD RISK*
2.000	SW2	27.175	-0.236	0.000	0.03	0.0	4.0	FLOOD RISK*
1.001	MH1	25.422	-0.140	0.000	0.31	0.0	8.1	OK
1.002	MH2	24.359	-0.157	0.000	0.63	0.0	60.1	OK
3.000	SW3	26.327	-0.157	0.000	0.16	0.0	18.4	FLOOD RISK*
3.001	SW4	25.975	-0.158	0.000	0.19	0.0	32.6	FLOOD RISK*
4.000	SW5	26.349	-0.169	0.000	0.14	0.0	15.1	FLOOD RISK*
4.001	SW6	26.113	-0.167	0.000	0.17	0.0	30.7	FLOOD RISK*
1.003	MH3	24.233	-0.298	0.000	0.38	0.0	107.1	OK
5.000	MH4	27.988	-0.146	0.000	0.26	0.0	18.4	OK
5.001	MH5	26.987	-0.147	0.000	0.26	0.0	26.1	OK
6.000	MH6	24.794	-0.114	0.000	0.39	0.0	10.8	OK
5.002	MH7	24.761	-0.202	0.000	0.44	0.0	47.8	OK
1.004	MH8	24.006	-0.229	0.000	0.61	0.0	148.1	OK
1.005	Pri	23.957	0.013	0.000	1.36	0.0	57.3	SURCHARGED
1.006	Inf	23.776	0.076	0.000	0.00	0.0	0.0	SURCHARGED*

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	10	0%					
2.000	15 Winter	10	0%					
1.001	15 Winter	10	0%	30/15 Summer				
1.002	15 Winter	10	0%	10/15 Summer	100/15 Summer			2
3.000	15 Winter	10	0%	100/15 Summer	100/15 Summer			2
3.001	15 Winter	10	0%	100/15 Summer	100/15 Summer			2
4.000	15 Winter	10	0%					
4.001	15 Winter	10	0%	100/15 Winter	100/15 Winter			1
1.003	15 Winter	10	0%	10/15 Winter	100/15 Summer			4
5.000	15 Winter	10	0%	30/15 Winter				
5.001	15 Winter	10	0%	30/15 Summer	100/15 Summer			2
6.000	15 Winter	10	0%	10/15 Summer	100/15 Summer			4
5.002	15 Winter	10	0%	30/15 Summer				
1.004	15 Winter	10	0%	10/15 Summer				
1.005	30 Winter	10	0%	1/15 Winter				
1.006	2880 Winter	10	0%	1/180 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	27.199	-0.215	0.000	0.06	0.0	8.6	FLOOD RISK*
2.000	SW2	27.196	-0.215	0.000	0.06	0.0	8.6	FLOOD RISK*
1.001	MH1	25.472	-0.090	0.000	0.66	0.0	17.4	OK
1.002	MH2	24.611	0.095	0.000	1.66	0.0	158.2	SURCHARGED
3.000	SW3	26.387	-0.097	0.000	0.36	0.0	40.9	FLOOD RISK*
3.001	SW4	26.039	-0.094	0.000	0.45	0.0	74.9	FLOOD RISK*
4.000	SW5	26.403	-0.115	0.000	0.31	0.0	33.1	FLOOD RISK*
4.001	SW6	26.170	-0.110	0.000	0.38	0.0	68.9	FLOOD RISK*
1.003	MH3	24.533	0.002	0.000	0.81	0.0	227.7	SURCHARGED
5.000	MH4	28.032	-0.102	0.000	0.56	0.0	39.8	OK
5.001	MH5	27.036	-0.098	0.000	0.59	0.0	59.0	OK
6.000	MH6	24.982	0.074	0.000	0.84	0.0	23.4	SURCHARGED
5.002	MH7	24.929	-0.034	0.000	1.00	0.0	109.0	OK
1.004	MH8	24.332	0.097	0.000	1.37	0.0	333.1	SURCHARGED
1.005	Pri	24.178	0.234	0.000	2.75	0.0	115.7	SURCHARGED
1.006	Inf	24.018	0.318	0.000	0.00	0.0	0.0	SURCHARGED*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%					
2.000	15 Winter	30	+20%					
1.001	15 Winter	30	+20%	30/15 Summer				
1.002	15 Winter	30	+20%	10/15 Summer	100/15 Summer			2
3.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
3.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
4.000	15 Winter	30	+20%					
4.001	15 Winter	30	+20%	100/15 Winter	100/15 Winter			1
1.003	15 Winter	30	+20%	10/15 Winter	100/15 Summer			4
5.000	15 Winter	30	+20%	30/15 Winter				
5.001	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
6.000	15 Winter	30	+20%	10/15 Summer	100/15 Summer			4
5.002	15 Winter	30	+20%	30/15 Summer				
1.004	15 Winter	30	+20%	10/15 Summer				
1.005	30 Winter	30	+20%	1/15 Winter				
1.006	4320 Winter	30	+20%	1/180 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	27.224	-0.190	0.000	0.10	0.0	15.3	FLOOD RISK*
2.000	SW2	27.221	-0.190	0.000	0.10	0.0	15.3	FLOOD RISK*
1.001	MH1	25.590	0.028	0.000	1.16	0.0	30.6	SURCHARGED
1.002	MH2	25.539	1.023	0.000	2.60	0.0	247.4	SURCHARGED
3.000	SW3	26.452	-0.032	0.000	0.65	0.0	73.2	FLOOD RISK*
3.001	SW4	26.100	-0.033	0.000	0.72	0.0	120.8	FLOOD RISK*
4.000	SW5	26.459	-0.059	0.000	0.55	0.0	58.8	FLOOD RISK*
4.001	SW6	26.227	-0.053	0.000	0.62	0.0	113.9	FLOOD RISK*
1.003	MH3	25.241	0.710	0.000	1.38	0.0	388.8	FLOOD RISK
5.000	MH4	28.223	0.089	0.000	0.97	0.0	68.7	SURCHARGED
5.001	MH5	27.294	0.160	0.000	0.97	0.0	97.6	SURCHARGED
6.000	MH6	25.597	0.689	0.000	1.44	0.0	40.0	FLOOD RISK
5.002	MH7	25.401	0.438	0.000	1.63	0.0	177.2	SURCHARGED
1.004	MH8	24.716	0.481	0.000	2.24	0.0	545.1	SURCHARGED
1.005	Pri	24.488	0.544	0.000	3.95	0.0	166.1	SURCHARGED
1.006	Inf	24.372	0.672	0.000	0.00	0.0	0.0	SURCHARGED*

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%					
2.000	15 Winter	100	+30%					
1.001	15 Winter	100	+30%	30/15 Summer				
1.002	15 Winter	100	+30%	10/15 Summer	100/15 Summer			2
3.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
3.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
4.000	15 Winter	100	+30%					
4.001	15 Winter	100	+30%	100/15 Winter	100/15 Winter			1
1.003	15 Winter	100	+30%	10/15 Winter	100/15 Summer			4
5.000	15 Winter	100	+30%	30/15 Winter				
5.001	15 Winter	100	+30%	30/15 Summer	100/15 Summer			2
6.000	15 Winter	100	+30%	10/15 Summer	100/15 Summer			4
5.002	15 Winter	100	+30%	30/15 Summer				
1.004	30 Winter	100	+30%	10/15 Summer				
1.005	30 Winter	100	+30%	1/15 Winter				
1.006	4320 Winter	100	+30%	1/180 Winter				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW1	27.248	-0.166	0.000	0.16	0.0	23.9	FLOOD RISK*
2.000	SW2	27.245	-0.166	0.000	0.16	0.0	23.9	FLOOD RISK*
1.001	MH1	26.549	0.987	0.000	2.34	0.0	61.6	FLOOD RISK
1.002	MH2	26.415	1.899	4.201	4.27	0.0	406.7	FLOOD
3.000	SW3	26.489	0.005	4.920	0.96	0.0	108.0	FLOOD
3.001	SW4	26.144	0.011	10.634	0.95	0.0	159.7	FLOOD
4.000	SW5	26.514	-0.004	0.000	0.91	0.0	96.7	FLOOD RISK*
4.001	SW6	26.283	0.003	2.682	0.93	0.0	170.0	FLOOD
1.003	MH3	25.434	0.903	78.259	1.42	0.0	401.7	FLOOD
5.000	MH4	30.456	2.322	0.000	1.51	0.0	107.0	SURCHARGED
5.001	MH5	28.042	0.908	8.352	1.11	0.0	111.3	FLOOD
6.000	MH6	25.816	0.908	8.250	1.84	0.0	51.0	FLOOD
5.002	MH7	25.739	0.776	0.000	1.95	0.0	213.1	SURCHARGED
1.004	MH8	25.015	0.780	0.000	2.27	0.0	551.2	SURCHARGED
1.005	Pri	24.863	0.919	0.000	5.03	0.0	211.5	SURCHARGED
1.006	Inf	24.801	1.101	0.000	0.00	0.0	0.0	SURCHARGED*

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	100.010	0.321	311.6	0.159	5.00	0.0		0.100		-4
1.001	100.000	0.500	200.0	0.136	0.00	0.0		0.100		-4
1.002	64.410	0.597	107.9	0.087	0.00	0.0		0.100		-4
1.003	16.903	0.338	50.0	0.000	0.00	0.0	0.600		o	525
2.000	100.000	0.648	154.3	0.133	5.00	0.0		0.100		-5
2.001	100.000	0.575	173.9	0.134	0.00	0.0		0.100		-5
2.002	66.040	0.522	126.5	0.087	0.00	0.0		0.100		-5
2.003	16.750	0.338	49.6	0.000	0.00	0.0	0.600		o	525
1.004	100.000	0.862	116.0	0.145	0.00	0.0	0.600		o	525
1.005	100.000	0.400	250.0	0.332	0.00	0.0	0.600		o	525
3.000	97.840	0.506	193.4	0.118	5.00	0.0		0.100		-4
3.001	18.962	0.095	200.0	0.000	0.00	0.0	0.600		o	450
4.000	99.910	0.790	126.5	0.028	5.00	0.0		0.100		-5
4.001	18.439	0.184	100.0	0.000	0.00	0.0	0.600		o	300
3.002	75.000	0.300	250.0	0.259	0.00	0.0	0.600		o	450
3.003	80.578	1.297	62.1	0.302	0.00	0.0	0.600		o	450

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	26.236	0.159	0.0	0.16	107.7
1.001	25.915	0.295	0.0	0.20	134.5
1.002	25.415	0.382	0.0	0.27	183.1
1.003	23.743	0.382	0.0	3.17	686.9
2.000	26.563	0.133	0.0	0.23	158.5
2.001	25.915	0.267	0.0	0.21	149.3
2.002	25.340	0.354	0.0	0.25	175.1
2.003	23.743	0.354	0.0	3.19	690.0
1.004	23.405	0.881	0.0	2.08	450.0
1.005	22.543	1.213	0.0	1.41	305.7
3.000	25.566	0.118	0.0	0.20	136.8
3.001	23.835	0.118	0.0	1.43	228.1
4.000	26.347	0.028	0.0	0.25	175.1
4.001	24.074	0.028	0.0	1.57	111.1
3.002	23.740	0.405	0.0	1.28	203.8
3.003	23.440	0.707	0.0	2.58	410.8

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.006	58.229	0.142	410.1	0.398	0.00	0.0	0.600		o	525
1.007	25.000	0.201	124.4	0.000	0.00	0.0	0.600		o	300
1.008	5.000	-2.000	-2.5	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.006	22.143	2.318	0.0	1.10	238.1
1.007	22.001	2.318	0.0	1.41	99.6
1.008	21.800	2.318	0.0	0.00	0.0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	21600
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
Site Location	GB 625800 314350 TG 25800 14350
C (1km)	-0.024
D1 (1km)	0.278
D2 (1km)	0.361
D3 (1km)	0.254
E (1km)	0.312
F (1km)	2.487
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	5760

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.007

Invert Level (m) 22.001

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	241.3	0.800	530.6	1.600	898.8	2.400	0.0
0.200	303.7	1.000	616.6	1.800	1000.9	2.600	0.0
0.400	372.7	1.200	706.6	2.000	1107.0	2.800	0.0
0.600	448.7	1.400	800.7	2.200	0.0	3.000	0.0

Complex Manhole: Infil, DS/PN: 1.008

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	20.0
Safety Factor	2.0	Slope (1:X)	0.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	19.300	Cap Infiltration Depth (m)	0.000

Infiltration Basin

Invert Level (m)	21.800	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00160	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.00160		

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1488.1	1.400	2573.7	2.800	0.0	4.200	0.0
0.200	1631.1	1.600	2744.9	3.000	0.0	4.400	0.0
0.400	1778.1	1.800	2920.1	3.200	0.0	4.600	0.0
0.600	1929.2	2.000	3099.0	3.400	0.0	4.800	0.0
0.800	2084.3	2.200	3282.0	3.600	0.0	5.000	0.0
1.000	2243.4	2.400	0.0	3.800	0.0		
1.200	2406.5	2.600	0.0	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
1.002	15 Winter	1	0%					
1.003	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	1	0%					
2.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
2.002	15 Winter	1	0%					
2.003	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
1.004	15 Winter	1	0%	30/15 Summer				
1.005	15 Winter	1	0%	10/15 Summer				2
3.000	15 Winter	1	0%					
3.001	15 Winter	1	0%	30/15 Summer	100/15 Summer			4
4.000	15 Winter	1	0%					
4.001	15 Winter	1	0%	30/15 Summer				
3.002	15 Winter	1	0%	30/15 Summer				
3.003	15 Winter	1	0%	30/15 Summer				4
1.006	15 Winter	1	0%	10/15 Summer	100/15 Summer			4
1.007	30 Winter	1	0%	10/15 Summer				
1.008	2880 Winter	1	0%	1/60 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	26.359	-0.152	0.000	0.18	0.0	19.1	FLOOD RISK*
1.001	SW02	26.038	-0.152	0.000	0.20	0.0	26.2	FLOOD RISK*
1.002	SW03	25.523	-0.167	0.000	0.17	0.0	30.7	FLOOD RISK*
1.003	MH01	23.833	-0.435	0.000	0.07	0.0	30.6	OK
2.000	SW04	26.657	-0.181	0.000	0.10	0.0	16.3	FLOOD RISK*
2.001	SW05	26.034	-0.156	0.000	0.18	0.0	26.5	FLOOD RISK*
2.002	SW06	25.455	-0.160	0.000	0.18	0.0	31.8	FLOOD RISK*
2.003	MH02	23.835	-0.433	0.000	0.07	0.0	31.9	OK
1.004	MH03	23.547	-0.383	0.000	0.16	0.0	67.8	OK
1.005	MH04	22.746	-0.322	0.000	0.30	0.0	87.4	OK
3.000	SW07	25.660	-0.181	0.000	0.13	0.0	17.2	FLOOD RISK*
3.001	MH05	23.938	-0.347	0.000	0.10	0.0	17.2	OK
4.000	SW08	26.384	-0.238	0.000	0.02	0.0	4.1	FLOOD RISK*

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
4.001	MH06	24.114	-0.260	0.000	0.04	0.0	4.1	OK
3.002	MH07	23.895	-0.295	0.000	0.25	0.0	47.5	OK
3.003	MH08	23.579	-0.311	0.000	0.20	0.0	78.8	OK
1.006	MH09	22.530	-0.138	0.000	0.88	0.0	190.4	OK
1.007	Pri	22.296	-0.005	0.000	1.00	0.0	88.9	OK
1.008	Infil	22.082	0.182	0.000	0.00	0.0	0.0	SURCHARGED

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	10	0%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	10	0%	100/15 Summer	100/15 Summer			4
1.002	15 Winter	10	0%					
1.003	15 Winter	10	0%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	10	0%					
2.001	15 Winter	10	0%	100/15 Summer	100/15 Summer			2
2.002	15 Winter	10	0%					
2.003	15 Winter	10	0%	30/15 Summer	100/15 Summer			4
1.004	15 Winter	10	0%	30/15 Summer				
1.005	15 Winter	10	0%	10/15 Summer				2
3.000	15 Winter	10	0%					
3.001	15 Winter	10	0%	30/15 Summer	100/15 Summer			4
4.000	15 Winter	10	0%					
4.001	15 Winter	10	0%	30/15 Summer				
3.002	15 Winter	10	0%	30/15 Summer				
3.003	15 Winter	10	0%	30/15 Summer				4
1.006	15 Winter	10	0%	10/15 Summer	100/15 Summer			4
1.007	30 Winter	10	0%	10/15 Summer				
1.008	2880 Winter	10	0%	1/60 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	26.422	-0.089	0.000	0.39	0.0	42.5	FLOOD RISK*
1.001	SW02	26.103	-0.087	0.000	0.43	0.0	57.7	FLOOD RISK*
1.002	SW03	25.575	-0.115	0.000	0.35	0.0	64.3	FLOOD RISK*
1.003	MH01	23.875	-0.393	0.000	0.14	0.0	64.2	OK
2.000	SW04	26.705	-0.133	0.000	0.23	0.0	35.9	FLOOD RISK*
2.001	SW05	26.101	-0.089	0.000	0.40	0.0	59.0	FLOOD RISK*
2.002	SW06	25.512	-0.103	0.000	0.40	0.0	70.1	FLOOD RISK*
2.003	MH02	23.881	-0.387	0.000	0.16	0.0	70.1	OK
1.004	MH03	23.617	-0.313	0.000	0.34	0.0	142.2	OK
1.005	MH04	23.240	0.172	0.000	0.68	0.0	196.3	SURCHARGED*
3.000	SW07	25.709	-0.132	0.000	0.27	0.0	37.1	FLOOD RISK*
3.001	MH05	24.016	-0.269	0.000	0.22	0.0	37.7	OK
4.000	SW08	26.404	-0.218	0.000	0.05	0.0	8.9	FLOOD RISK*

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
4.001	MH06	24.136	-0.238	0.000	0.09	0.0	8.9	OK
3.002	MH07	23.998	-0.192	0.000	0.58	0.0	109.9	OK
3.003	MH08	23.673	-0.217	0.000	0.51	0.0	198.0	OK
1.006	MH09	23.086	0.418	0.000	1.95	0.0	420.1	SURCHARGED
1.007	Pri	22.589	0.288	0.000	1.58	0.0	140.8	SURCHARGED
1.008	Infil	22.299	0.399	0.000	0.00	0.0	0.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
1.002	15 Winter	30	+20%					
1.003	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	30	+20%					
2.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
2.002	15 Winter	30	+20%					
2.003	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
1.004	15 Winter	30	+20%	30/15 Summer				
1.005	15 Winter	30	+20%	10/15 Summer				2
3.000	15 Winter	30	+20%					
3.001	15 Winter	30	+20%	30/15 Summer	100/15 Summer			4
4.000	15 Winter	30	+20%					
4.001	15 Winter	30	+20%	30/15 Summer				
3.002	15 Winter	30	+20%	30/15 Summer				
3.003	15 Winter	30	+20%	30/15 Summer				4
1.006	15 Winter	30	+20%	10/15 Summer	100/15 Summer			4
1.007	30 Winter	30	+20%	10/15 Summer				
1.008	2880 Winter	30	+20%	1/60 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	26.490	-0.021	0.000	0.71	0.0	76.0	FLOOD RISK*
1.001	SW02	26.163	-0.027	0.000	0.74	0.0	99.2	FLOOD RISK*
1.002	SW03	25.626	-0.064	0.000	0.60	0.0	110.4	FLOOD RISK*
1.003	MH01	24.761	0.493	0.000	0.25	0.0	112.9	SURCHARGED
2.000	SW04	26.753	-0.085	0.000	0.40	0.0	64.0	FLOOD RISK*
2.001	SW05	26.162	-0.028	0.000	0.70	0.0	104.5	FLOOD RISK*
2.002	SW06	25.569	-0.046	0.000	0.69	0.0	121.0	FLOOD RISK*
2.003	MH02	24.762	0.494	0.000	0.28	0.0	123.2	SURCHARGED
1.004	MH03	24.741	0.811	0.000	0.61	0.0	257.2	SURCHARGED*
1.005	MH04	24.477	1.409	0.000	1.08	0.0	311.0	SURCHARGED*
3.000	SW07	25.757	-0.084	0.000	0.48	0.0	66.0	FLOOD RISK*
3.001	MH05	24.901	0.616	0.000	0.40	0.0	69.3	SURCHARGED
4.000	SW08	26.428	-0.194	0.000	0.09	0.0	15.7	FLOOD RISK*

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
4.001	MH06	24.891	0.517	0.000	0.20	0.0	19.3	SURCHARGED
3.002	MH07	24.876	0.686	0.000	0.89	0.0	169.8	SURCHARGED*
3.003	MH08	24.628	0.738	0.000	0.71	0.0	275.7	SURCHARGED*
1.006	MH09	23.978	1.310	0.000	3.11	0.0	671.1	SURCHARGED
1.007	Pri	22.961	0.660	0.000	2.09	0.0	185.6	SURCHARGED
1.008	Infil	22.574	0.674	0.000	0.00	0.0	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
1.002	15 Winter	100	+30%					
1.003	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
2.000	15 Winter	100	+30%					
2.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
2.002	15 Winter	100	+30%					
2.003	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
1.004	60 Winter	100	+30%	30/15 Summer				
1.005	15 Winter	100	+30%	10/15 Summer				2
3.000	15 Winter	100	+30%					
3.001	15 Winter	100	+30%	30/15 Summer	100/15 Summer			4
4.000	15 Winter	100	+30%					
4.001	15 Summer	100	+30%	30/15 Summer				
3.002	15 Winter	100	+30%	30/15 Summer				
3.003	15 Winter	100	+30%	30/15 Summer				4
1.006	15 Winter	100	+30%	10/15 Summer	100/15 Summer			4
1.007	30 Winter	100	+30%	10/15 Summer				
1.008	2880 Winter	100	+30%	1/60 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	26.519	0.008	7.662	0.97	0.0	104.9	FLOOD
1.001	SW02	26.202	0.012	11.527	1.01	0.0	135.8	FLOOD
1.002	SW03	25.673	-0.017	0.000	0.85	0.0	154.9	FLOOD RISK*
1.003	MH01	25.131	0.863	38.611	0.46	0.0	207.3	FLOOD
2.000	SW04	26.810	-0.028	0.000	0.66	0.0	105.4	FLOOD RISK*
2.001	SW05	26.202	0.012	11.731	0.99	0.0	147.8	FLOOD
2.002	SW06	25.613	-0.002	0.000	0.96	0.0	167.4	FLOOD RISK*
2.003	MH02	25.135	0.867	42.353	0.40	0.0	176.9	FLOOD
1.004	MH03	25.230	1.300	0.000	0.65	0.0	275.3	FLOOD RISK*
1.005	MH04	25.072	2.004	0.000	1.27	0.0	364.8	FLOOD RISK*
3.000	SW07	25.816	-0.025	0.000	0.71	0.0	97.5	FLOOD RISK*
3.001	MH05	25.386	1.101	51.598	-1.81	0.0	-313.7	FLOOD
4.000	SW08	26.451	-0.171	0.000	0.14	0.0	24.3	FLOOD RISK*

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
4.001	MH06	25.685	1.311	0.000	0.56	0.0	54.1	FLOOD RISK
3.002	MH07	25.673	1.483	0.000	1.28	0.0	244.6	FLOOD RISK*
3.003	MH08	25.206	1.316	0.000	0.89	0.0	342.1	FLOOD
1.006	MH09	24.652	1.984	20.977	3.83	0.0	826.0	FLOOD
1.007	Pri	23.377	1.076	0.000	2.54	0.0	225.4	SURCHARGED
1.008	Infil	22.861	0.961	0.000	0.00	0.0	0.0	SURCHARGED

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)
1.000	85.216	0.641	132.9	0.107	5.00	0.0		0.100		-5
1.001	98.497	0.678	145.3	0.127	0.00	0.0		0.100		-5
1.002	100.006	0.732	136.6	0.127	0.00	0.0		0.100		-5
2.000	153.602	1.460	105.2	0.146	5.00	0.0		0.100		-5
1.003	26.826	0.150	178.8	0.000	0.00	0.0	0.600		o	375
3.000	84.066	0.075	1120.9	0.113	5.00	0.0		0.100		-4
3.001	99.979	0.423	236.4	0.132	0.00	0.0		0.100		-4
3.002	99.422	0.748	132.9	0.132	0.00	0.0		0.100		-4
4.000	151.032	1.490	101.4	0.276	5.00	0.0		0.100		-4
1.004	47.798	0.186	257.0	0.000	0.00	0.0	0.600		o	525
1.005	25.000	0.200	125.0	0.000	0.00	0.0	0.600		o	300
1.006	5.000	-2.700	-1.9	0.000	0.00	0.0	0.600		o	100

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	26.387	0.107	0.0	0.24	165.1
1.001	25.746	0.234	0.0	0.23	157.9
1.002	25.068	0.361	0.0	0.24	162.9
2.000	25.796	0.146	0.0	0.27	185.6
1.003	23.336	0.507	0.0	1.35	149.3
3.000	25.566	0.113	0.0	0.08	56.8
3.001	25.491	0.245	0.0	0.18	123.7
3.002	25.068	0.377	0.0	0.24	165.0
4.000	25.810	0.276	0.0	0.28	188.9
1.004	23.186	1.160	0.0	1.39	301.5
1.005	23.000	1.160	0.0	1.40	99.3
1.006	22.800	1.160	0.0	0.00	0.0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	1	Number of Storage Structures	2
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
Site Location	GB 629000 308850 TG 29000 08850
C (1km)	-0.024
D1 (1km)	0.264
D2 (1km)	0.418
D3 (1km)	0.250
E (1km)	0.309
F (1km)	2.479
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Storage Structures for Storm

Tank or Pond Manhole: Pri, DS/PN: 1.005

Invert Level (m) 23.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	16.0	1.000	127.3	2.000	339.0	3.000	0.0
0.200	30.1	1.200	161.6	2.200	393.6	3.200	0.0
0.400	48.4	1.400	200.0	2.400	452.1	3.400	0.0
0.600	70.7	1.600	242.3	2.600	514.6	3.600	0.0
0.800	96.9	1.800	288.7	2.800	581.1	3.800	0.0

Complex Manhole: Inf, DS/PN: 1.006

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.10000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.10000	Trench Length (m)	9.0
Safety Factor	2.0	Slope (1:X)	0.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	17.300	Cap Infiltration Depth (m)	0.000

Infiltration Basin

Invert Level (m)	22.800	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00140	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.00140		

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	700.8	1.400	1647.9	2.800	2792.1	4.200	0.0
0.200	824.3	1.600	1799.3	3.000	2971.6	4.400	0.0
0.400	951.3	1.800	1954.7	3.200	0.0	4.600	0.0
0.600	1082.6	2.000	2114.2	3.400	0.0	4.800	0.0
0.800	1217.9	2.200	2277.6	3.600	0.0	5.000	0.0
1.000	1357.2	2.400	2445.1	3.800	0.0		
1.200	1500.6	2.600	2616.6	4.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	1	0%					
1.001	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.002	15 Winter	1	0%	100/15 Summer	100/15 Summer			4
2.000	15 Winter	1	0%					
1.003	15 Winter	1	0%	10/15 Summer	100/15 Summer			5
3.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			3
3.001	15 Winter	1	0%					
3.002	15 Winter	1	0%					
4.000	15 Winter	1	0%	100/15 Summer	100/15 Summer			2
1.004	15 Winter	1	0%	10/15 Winter				
1.005	15 Winter	1	0%	10/15 Summer				
1.006	2880 Winter	1	0%	1/60 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	26.469	-0.193	0.000	0.08	0.0	13.7	FLOOD RISK*
1.001	SW02	25.856	-0.165	0.000	0.15	0.0	24.3	FLOOD RISK*
1.002	SW03	25.190	-0.153	0.000	0.21	0.0	34.0	FLOOD RISK*
2.000	SW04	25.886	-0.185	0.000	0.12	0.0	21.4	FLOOD RISK*
1.003	MH01	23.501	-0.210	0.000	0.40	0.0	52.2	OK
3.000	SW05	25.706	-0.135	0.000	0.23	0.0	13.9	FLOOD RISK*
3.001	SW06	25.592	-0.174	0.000	0.13	0.0	16.5	FLOOD RISK*
3.002	SW07	25.167	-0.176	0.000	0.14	0.0	22.8	FLOOD RISK*
4.000	SW08	25.933	-0.152	0.000	0.21	0.0	39.7	FLOOD RISK*
1.004	MH02	23.421	-0.290	0.000	0.41	0.0	109.4	OK
1.005	Pri	23.291	-0.009	0.000	1.00	0.0	88.7	OK
1.006	Inf	23.154	0.254	0.000	0.00	0.0	0.0	SURCHARGED

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	10	0%					
1.001	15 Winter	10	0%	100/15 Summer	100/15 Summer			2
1.002	15 Winter	10	0%	100/15 Summer	100/15 Summer			4
2.000	15 Winter	10	0%					
1.003	15 Winter	10	0%	10/15 Summer	100/15 Summer			5
3.000	15 Winter	10	0%	100/15 Summer	100/15 Summer			3
3.001	15 Winter	10	0%					
3.002	15 Winter	10	0%					
4.000	15 Winter	10	0%	100/15 Summer	100/15 Summer			2
1.004	15 Winter	10	0%	10/15 Winter				
1.005	15 Winter	10	0%	10/15 Summer				
1.006	2880 Winter	10	0%	1/60 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	26.509	-0.153	0.000	0.18	0.0	30.0	FLOOD RISK*
1.001	SW02	25.919	-0.102	0.000	0.35	0.0	54.8	FLOOD RISK*
1.002	SW03	25.257	-0.086	0.000	0.48	0.0	77.9	FLOOD RISK*
2.000	SW04	25.933	-0.138	0.000	0.25	0.0	46.4	FLOOD RISK*
1.003	MH01	23.857	0.146	0.000	0.93	0.0	121.5	SURCHARGED
3.000	SW05	25.777	-0.064	0.000	0.52	0.0	31.2	FLOOD RISK*
3.001	SW06	25.642	-0.124	0.000	0.29	0.0	35.6	FLOOD RISK*
3.002	SW07	25.219	-0.124	0.000	0.31	0.0	50.9	FLOOD RISK*
4.000	SW08	25.995	-0.090	0.000	0.46	0.0	87.4	FLOOD RISK*
1.004	MH02	23.782	0.071	0.000	0.94	0.0	250.8	SURCHARGED
1.005	Pri	23.720	0.420	0.000	1.78	0.0	157.9	SURCHARGED
1.006	Inf	23.522	0.622	0.000	0.00	0.0	0.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%					
1.001	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.002	15 Winter	30	+20%	100/15 Summer	100/15 Summer			4
2.000	15 Winter	30	+20%					
1.003	15 Winter	30	+20%	10/15 Summer	100/15 Summer			5
3.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			3
3.001	15 Winter	30	+20%					
3.002	15 Winter	30	+20%					
4.000	15 Winter	30	+20%	100/15 Summer	100/15 Summer			2
1.004	15 Winter	30	+20%	10/15 Winter				
1.005	15 Winter	30	+20%	10/15 Summer				
1.006	4320 Winter	30	+20%	1/60 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	26.551	-0.111	0.000	0.32	0.0	53.2	FLOOD RISK*
1.001	SW02	25.978	-0.043	0.000	0.62	0.0	97.5	FLOOD RISK*
1.002	SW03	25.321	-0.022	0.000	0.82	0.0	133.4	FLOOD RISK*
2.000	SW04	25.978	-0.093	0.000	0.42	0.0	78.8	FLOOD RISK*
1.003	MH01	24.538	0.827	0.000	1.40	0.0	182.0	FLOOD RISK
3.000	SW05	25.837	-0.004	0.000	0.90	0.0	54.4	FLOOD RISK*
3.001	SW06	25.701	-0.065	0.000	0.55	0.0	67.8	FLOOD RISK*
3.002	SW07	25.275	-0.068	0.000	0.57	0.0	94.8	FLOOD RISK*
4.000	SW08	26.063	-0.022	0.000	0.82	0.0	155.0	FLOOD RISK*
1.004	MH02	24.347	0.636	0.000	1.53	0.0	408.6	FLOOD RISK
1.005	Pri	24.205	0.905	0.000	2.37	0.0	209.8	SURCHARGED
1.006	Inf	23.991	1.091	0.000	0.00	0.0	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 10, 30, 100
Climate Change (%) 0, 0, 20, 30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%					
1.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.002	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
2.000	15 Winter	100	+30%					
1.003	15 Winter	100	+30%	10/15 Summer	100/15 Summer			5
3.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			3
3.001	15 Winter	100	+30%					
3.002	15 Winter	100	+30%					
4.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
1.004	15 Winter	100	+30%	10/15 Winter				
1.005	4320 Winter	100	+30%	10/15 Summer				
1.006	4320 Winter	100	+30%	1/60 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	26.600	-0.062	0.000	0.53	0.0	87.5	FLOOD RISK*
1.001	SW02	26.026	0.005	5.330	0.95	0.0	150.3	FLOOD
1.002	SW03	25.358	0.015	15.510	1.01	0.0	164.3	FLOOD
2.000	SW04	26.033	-0.038	0.000	0.67	0.0	125.3	FLOOD RISK*
1.003	MH01	24.672	0.961	61.161	1.39	0.0	181.6	FLOOD
3.000	SW05	25.851	0.010	9.739	1.05	0.0	62.9	FLOOD
3.001	SW06	25.749	-0.017	0.000	0.81	0.0	100.7	FLOOD RISK*
3.002	SW07	25.333	-0.010	0.000	0.89	0.0	146.9	FLOOD RISK*
4.000	SW08	26.097	0.012	12.485	1.01	0.0	190.3	FLOOD
1.004	MH02	24.578	0.867	0.000	1.71	0.0	458.0	FLOOD RISK
1.005	Pri	24.483	1.183	0.000	0.28	0.0	25.0	SURCHARGED
1.006	Inf	24.480	1.580	0.000	0.00	0.0	0.0	SURCHARGED

Appendix C.4 Revised lagoon details from combined MicroDrainage model

Lagoon Details - combined models

NCC Lagoon No	Chainage	Outfall Type	Trial Pit Number	Minimum Infiltration Rate at relevent depth (m/hr)	Max. Ground Water Level ex MM 110614	Lagoon Invert level	Unsaturated zone (m)	Approx min Ground Level	Lagoon total Depth (m)	Max. Water Level (m) 1:100+30%	Max. Water Depth (m)	Max Water Volume 1:100+30% (cu m)	Critical Design Storm	Control Outlet Size/Type (mm)	Control Outlet Invert Level	Wier Crest Level	Wier Width (m)	Half Drawdown Time (min) (days)	Overland Detail	Max Water Volume (Primary + Infiltration) (m^3)	Total Volume Available (m^3)	Total Volume Available (Primary + Infiltration) (m^3)	Spare Volume Available (Primary + Infiltration) (m^3)	Max Water Volume for 1 in 10 yrs (m^3)	Max Water Volume for 1 in 10 (Primary + Infiltration) (m^3)	Total flooded volume for 1 in 10 follow on storm event (m^3)
1 Primary	600	Pipe	n/a	n/a	9.910	13.400	3.490	15.600	2.20	15.171	1.771	1782.0	5760W	300 Pipe	13.400	15.200	8.0	n/a		4266.0	2429	6375	2109.0	499	1794	0.0
1 Infiltration	650	Infiltration	TP448	0.0396	9.910	13.200	3.290	15.600	2.40	14.997	1.797	2484.0	4320W	none	none	none	none	2592 (1.8d)			3946			1295		
1a Infiltration (OL Only)	600	Infiltration	TP235	0.4320	9.910	15.000	5.090	17.000	2.00	16.687	1.687	6050.6	1440S	none	none	none	none	228	OL02 = 90.60ha OL02A = 15.03ha OL02B = 3.13ha, Sum = **91**	n/a	7515	7515	1465.0	n/a	n/a	
2 Primary	1675	Pipe	n/a	n/a	10.290	33.000	22.710	35.000	2.00	34.461	1.461	264.0	30W	300 Pipe	33.000	34.600	5.000	n/a		825.0	489	1654	829.0	n/a	n/a	
2 Infiltration	1625	Infiltration	TP276	0.0720	10.290	32.800	22.510	35.000	2.20	34.270	1.470	561.0	600W	none	none	none	none	1090			1165			n/a	n/a	
3 Primary	2840	Pipe	n/a	n/a	21.000	32.600	11.600	34.400	1.80	34.154	1.554	401.0	60W	300 Pipe	32.600	33.800	6.0	n/a		1981.0	507	3009	1028.0	n/a	n/a	
3 Infiltration	2820	Infiltration	TP449	0.0864	21.000	32.400	11.400	34.400	2.00	33.831	1.431	1580.0	1440W	none	none	none	none	1670 (1.1d)			2502			n/a	n/a	
4 Primary	3065	Pipe	n/a	n/a	21.000	31.300	10.300	33.700	2.40	32.983	1.683	611.0	960W	300 Pipe	31.300	33.300	5.0	n/a		2488.0	1113	4268	1780.0	n/a	n/a	
4 Infiltration	3125	Infiltration	TP300	0.1620	21.000	31.100	10.100	33.700	2.60	32.969	1.869	1877.0	960W	none	none	none	none	793	OL03A = 9.31ha		3155			n/a	n/a	
5 Primary	4120	Pipe	n/a	n/a	23.000	27.000	4.000	28.800	1.80	28.551	1.551	1982.0	60W	300 Pipe	27.000	28.3	7.0	n/a		7356.0	2386	16435	9079.0	623	3039	0.0
5 Infiltration	4200	Infiltration	TP239	0.0027	23.000	26.800	3.800	28.800	2.00	27.653	0.853	5374.0	8640W	none	none	none	none	>7 days			14049			2416		
6 Primary	1000 Offline	Pipe	n/a	n/a	20.000	26.200	6.200	28.200	2.00	27.742	1.542	739.0	30W	300 Pipe	26.200	27.800	8.0	n/a	14.4	2918.0	1110	4334	1416.0	n/a	n/a	
6 Infiltration	1075 Offline	Infiltration	TP450	0.1440	20.000	26.000	6.000	28.200	2.20	27.668	1.668	2179.0	1440W	none	none	none	none	756			3224			n/a	n/a	
6a Primary	10 Offline	Pipe	n/a	n/a	20.000	31.100	11.100	32.700	1.60	32.248	1.148	144.0	1440W	300 Pipe	31.100	32.300	5.0	n/a		987.0	277	1604	617.0	n/a	n/a	
6a Infiltration	50 Offline	Infiltration	TP357	0.0900	20.000	30.900	10.900	32.700	1.80	32.235	1.335	843.0	1440W	none	none	none	none	864	OL05A = 4.04ha		1327			n/a	n/a	
8 Primary	320 Offline	Pipe	n/a	n/a	20.380	22.300	1.920	25.900	3.60	24.662	2.362	1000.0	2880W	300 Pipe	22.300	25.500	10.00	n/a		4080.0	2489	7836	3756.0	330	1766	0.0
8 Infiltration	385 Offline	Infiltration	TP279	0.0284	20.380	21.800	1.420	25.900	4.10	24.657	2.857	3080.0	2880W	none	none	none	none	5180 (3.5d)			5347			1436		
8A Infiltration (OL only)	340 Offline	Infiltration	n/a	0.0284	n/a	24.600		27.400	2.80	27.182	2.582	19151.0	4320W	none	none	none	none	4881 (3.3d)	OL06 = 115.93ha (assumed only **90** ha will flow into lagoon 8A)	19151.0	21218	21218	2067	3899	3899	1832.0
9 Primary	5 Offline	Pipe	n/a	n/a	20.380	21.600	1.220	23.000	1.40	22.597	0.997	1752.0	120W	300 Pipe	21.600	22.600	6.0	n/a		3911.0	2489	7833	3922.0	622	1482	0.0
9 Infiltration	0 Offline	Infiltration	TP243	0.0205	20.380	21.500	1.120	23.000	1.50	22.430	0.930	2159.0	2880W	none	none	none	none	4176 (2.9d)			5344			860		
12 Primary	8900	Pipe	n/a	n/a	15.310	19.600	4.290	22.000	2.40	21.340	1.740	2526.0	120W	300 Pipe	19.600	21.600	10.0	n/a	OL09 = 11.35ha	6121.0	4002	11036	4915.0	772	1880	0.0
12 Infiltration	8900	Infiltration	TP281	0.1188	15.310	19.400	4.090	22.000	2.60	21.014	1.614	3595.0	1440W	none	none	none	none	1131			7034			1108		
13 Primary	9750	Pipe	n/a	n/a	14.930	20.700	5.770	22.700	2.00	22.168	1.468	1122.0	30W	300 Pipe	20.700	22.300	6.0	n/a		3708.0	1733	7590	3882.0	309	1416	0.0
13 Infiltration	9800	Infiltration basin + trench	TP366	0.0054 + 0.1	14.930	18.500	3.570	22.700	4.20	21.640	3.140	2586.0	2880W	none	none	none	none	8120 (5.6d)			5857			1107		
13a Infiltration (OL only)	9900	Infiltration	TP451	0.0026 + 0.1	14.930	19.200	4.270	24.000	4.80	22.856	3.656	11691.0	8640	none	none	none	none	6 days	OL11 = **39.32**ha	11691.0	21889	21889	10198	4934	4934	0.0
14 Primary	250 Offline	Pipe	n/a	n/a	13.180	16.800	3.620	19.400	2.60	18.979	2.179	1925.0	60W	300 Pipe	16.800	18.600	8.0	n/a		4606.0	2540	7531	2925.0	548	1598.0	0.0
14 Infiltration	180 Offline	Infiltration	TP248	0.0589	13.180	16.600	3.420	19.400	2.80	18.427	1.827	2681.0	1440W	none	none	none	none	2232 (1.5d)			4991			1050		
14a Primary	420 Offline	Pipe	n/a	n/a	13.330	21.400	8.070	22.600	1.20	21.584	0.184	20.0	15W	300 Pipe	21.400	22.200	6.0	n/a		9004.0	318	18756	9752.0	11	2216	0.0
14a Infiltration	430 Offline	Infiltration	TP374	0.0259	13.330	19.800	6.470	22.600	2.80	21.373	1.573	8984.0	2880W	none	none	none	none	3168 (2.2d)	OL13 = 61.83ha (assumed only **30.89** ha will flow into lagoon 14A)		18438			2205		
16 Primary	12750	Pipe	n/a	n/a	12.630	14.300	1.670	16.300	2.00	15.732	1.432	1648.0	60W	300 Pipe	14.300	15.700	8.0	n/a		3669.0	2586	5716	2047.0	571	1388	0.0
16 Infiltration	12800	Infiltration	TP391	0.0396	12.630	14.100	1.470	16.300	2.20	15.712	1.612	2021.0	2880W	none	none	none	none	3616 (2.5d)			3130			817		
17 Primary	13330	Pipe	n/a	n/a	11.680	12.000	0.320	13.400	1.40	13.185	1.185	2491.0	2160w	100 Pipe	12.000	13.000	8.0	n/a	OL16A = 3.79ha	5633.0	3043	9237	3604.0	877	1964	0.0
17 Tank	13400	Hydro-Brake	TP251	n/a	11.680	12.000	0.320	13.400	1.40	12.765	0.765	3142.0	5760W	94 Hbrake	12.000	13.100	10.000	6582 (4.5d)	OL16B = 3.59ha		6194			1087		
18 Primary	14670	Pipe	n/a	n/a	12.390	13.400	1.010	16.000	2.60	15.098	1.698	1934.0	120W	300 Pipe	13.400	15.400	6.0	n/a		6178.0	3622	20098	13920.0	613	2471	0.0
18 Tank	14600	Hydro-Brake	TP141	n/a	12.390	13.200	0.810	16.000	2.80	14.122	0.922	4244.0	4320W	105 Hbrake	13.200	15.900	10.0	8177 (5.6)			16476			1858		
18a Primary	14325	Pipe	n/a	n/a	12.440	14.000	1.560	15.000	1.00	14.694	0.694	829.7	60W	300 Pipe	14.000	14.600	12.0	n/a		2385.7	1282	5636	3250.3	527	1552	0.0
18a Tank	14450	Hydro-Brake	TP376	n/a	12.440	14.000	1.560	15.000	1.00	14.416	0.416	1556.0	2880W	105 Hbrake	14.000	none	none	3528 (2.5)			4354			1025		
19 Primary	16140	Pipe	n/a		18.150	25.300	7.150	27.700	2.40	27.267	1.967	350.0	2880W	300 Pipe	25.300	27.300	5.0	n/a		2684.0	525	3835	1151.0	109	342	0.0
19 Infiltration	16200	Infiltration	TP377	0.0684	18.150	25.100	6.950	27.700	2.60	27.264	2.164	2334.0	2880W	none	none	none	none	936 (0.6d)	OL22 = 12.27ha		3310			233		
20 Primary	16450	Pipe	n/a	n/a	18.150	25.900	7.750	27.700	1.80	26.992	1.092	547.0	30W	300 Pipe	25.900	27.300	5.0	n/a		1299.7	1138	3578	2278.3	145	330	0.0
20 Infiltration	16400	Infiltration	TP452	0.0612	18.150	25.700	7.550	27.700	2.00	26.567	0.867	752.7	480W	none	none	none	none	1084			2440			185		
21 Primary	100 Offline	Pipe	n/a	n/a	20.320	22.400	2.080	25.000	2.60	23.298	0.898	42.0	15W	300 Pipe	22.400	24.600	5.0	n/a		142.0	482	1485	1343.0	5	n/a	
21 Infiltration	140 Offline	Infiltration connection to Net 22 infil	TP453	0.3600	20.320	22.200	1.880	25.000	2.80	22.833	0.633	100.0	2880W	none	none	none	none	1488 (1d)			1003			25		
22 Primary	250 Offline	Pipe	n/a	n/a	17.950	21.800	3.850	24.000	2.20	23.298	1.498	943.0	120W	300 Pipe	21.800	23.400	8.0	n/a		3573.0	1677	7948	4375.0	295	1520	0.0
22 Infiltration	160 Offline	Infiltration connection from Net 21 infil	TP454	0.0068	17.950	21.600	3.650	24.000	2.40	22.875	1.275	2630.0	2880W	none	none	none	none	2785 (1.9d)			6271			1225		
23 Primary	18000	Pipe	n/a	n/a	15.250	23.600	8.350	26.000	2.40	24.863	1.263	422.0	30W	300 Pipe	23.600	25.600	6.0	n/a	OL27 = 6.62ha	3164.0	1325	8736	5572.0	132	981	0.0
23 Infiltration	18160	Infiltration; basin + trench	TP392	0.0018 0.1 trench	15.250	18.100	2.850	26.000	7.90	24.801	6.701	2742.0	4320W	none	none	none	none	6980 (4.8d)			7411			849		
24 Primary	18700	Pipe	n/a	n/a	15.250	22.000	6.750	24.000	2.00	23.377	1.377	695.0	30W	300 Pipe	22.000	23.600	5.0	n/a		2720.0	1269.3	6427.3	3707.3	211	1068	0.0
24 Infiltration	18760	Infiltration; basin + trench	TP455	0.0016 + 0.1	15.250	19.300	4.050	24.000	4.70	22.861	3.561	2025.0	2880W	none	none	none	none	7200 (5d)			5158			857		
25 Primary	19270	Pipe	n/a	n/a	9.140	23.000	13.860	25.800	2.80	24.483	1.483	157.0	4320W	300 Pipe	23.000	25.400	7.0	n/a	OL29 = 4.39ha	2298.0	651.8	5933.6	3635.6	45	741	0.0
25 Infiltration	19350	Infiltration; basin + trench	TP456	0.0014 + 0.1	9.140	17.300	8.160	25.800	8.50	24.480	7.180	2141.0	4320W	none	none	none	none	8640 (6d)			5281.8			696		
26 Infiltration	120 Offline	Infiltration	WSPETP1	0.1040		17.500		19.100	1.60	18.459	0.959	1020.7	180W	none	none	none	none	372		1020.7	2003	2003	982.3	n/a	n/a	0.0

Appendix C.5 Groundwater risk assessment results - Lagoons 13 and 23

Table C.1 Groundwater risk assessment – Lagoons 13

Lagoon Number 13	TP247/BHP97/BHP91/BH89					
Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	**Traffic density**	<50,000 AADT	1	15
2	Source	15	**Rainfall Volume**	<740mm rainfall	1	15
2	Source	15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	**Soakaway geometry**	Continuous linear (e.g. ditch, grassed channel)	1	15
4	Pathway	20	**Unsaturated zone**	Depth to water table <15>5m	2	40
5	Pathway	20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. dom	1	20
6	Pathway	7.5	**Effective grain size**	Fine sand and below	1	7.5
7	Pathway	7.5	**Lithology**	<5% - >1% clay minerals	2	15
				Overall Risk Score		142.5

Table C.2 Groundwater risk assessment – Lagoons 23

Lagoon Number 23	TP175.5/TP177/BH35P5					
Component Number		Weighting Factor	Property or parameter	Site data	Risk score	Component score
1	Source	15	**Traffic density**	<50,000 AADT	1	15
2	Source	15	**Rainfall Volume**	<740mm rainfall	1	15
2	Source	15	**Rainfall Intensity**	Uneven (35-47mm FEH 1 hour rainfall)	2	30
3	Pathway	15	**Soakaway geometry**	Single Point, or shallow soakaway (e.g. lagoon) serving low road	2	30
4	Pathway	20	**Unsaturated zone**	Depth to water table <15>5m	2	40
5	Pathway	20	**Flow type**	Unconsolidated or non-fractured consolidated deposits (i.e. dom	1	20
6	Pathway	7.5	**Effective grain size**	Fine sand and below	1	7.5
7	Pathway	7.5	**Lithology**	> 15% clay minerals	1	7.5
				Overall Risk Score		150

Appendix C.6 Revised Table 4.3 of FRA

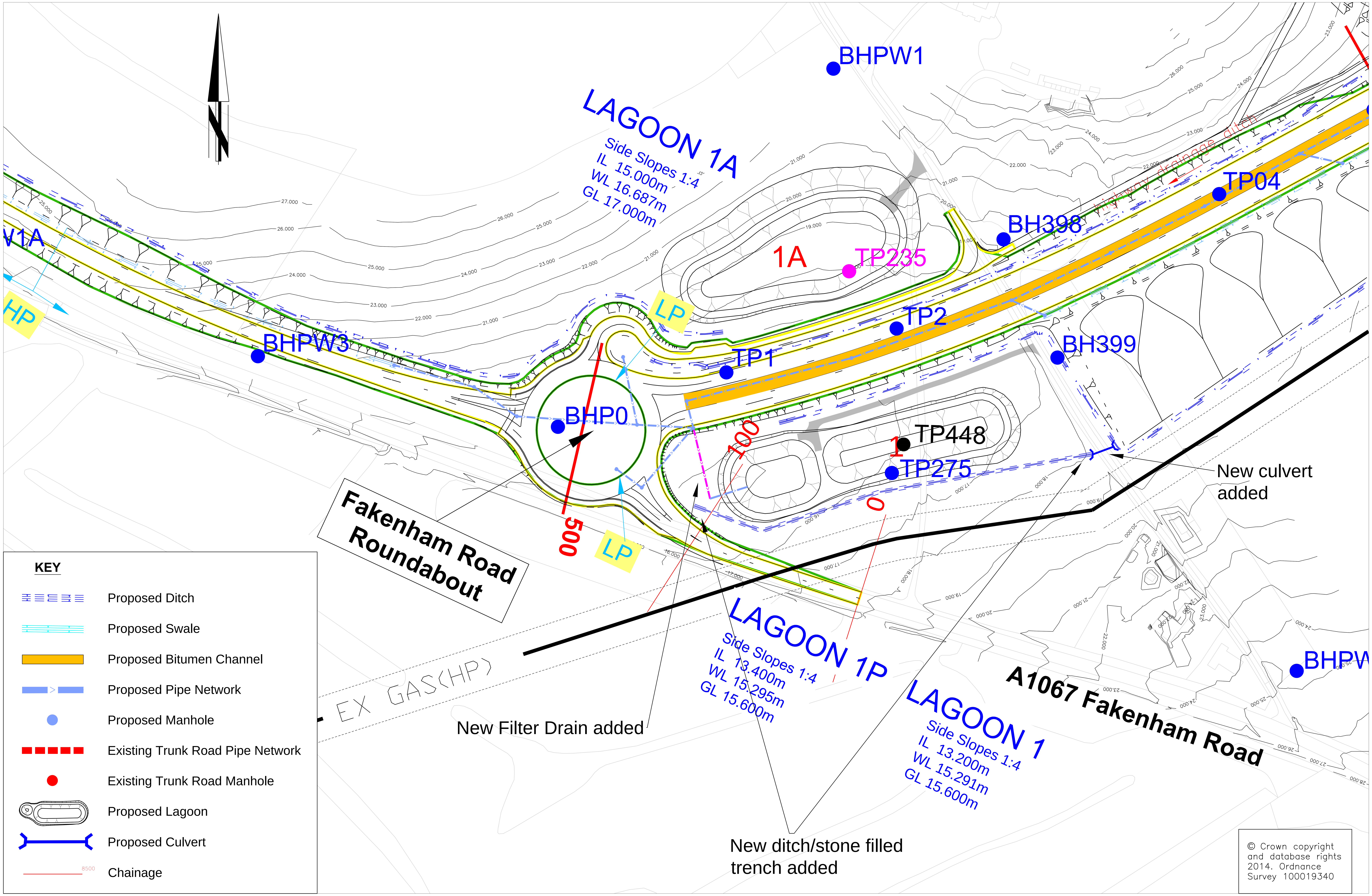
Piezometer Reference	Road Chainage	Preliminary Road Level	Borehole Cover Level	Maximum Groundwater Level		Average Groundwater Level		Invert Level of Nearest Lagoon (mAOD)	Unsaturated Zone Thickness (m)
	(m)	(mAOD)	(mAOD)	mBGL	mAOD	mBGL	mAOD		
PW1A (UC)	137	20.94	22.35	13.5	10	12.9	9.4		
PW3 (UC)	328	20.49	21.25	13	9.9	11.9	9.3		
P0 (UC)	497	16.5	16.51	7.7	9.9	7.1	9.4	13.2 (Lagoon 1) 15.0 (Lagoon 1A)	3.3 (Lagoon 1) 5.1 (Lagoon 1A)
P12 (GSG)	1,739	38.65	37.51	DRY	DRY	DRY	DRY		
P16 (GSG)	2064	38.37	39.73	DRY	DRY	DRY	DRY		
6P (GSG) (aka BHP6)	2,402	36.62	39.54	10.6	30.9	8.8	29.1		
6B (UC)	2,412	36.62	39.54	9.4	31.3	8.7	30.8		
Predicted GW chalk levels[2]	3000	34.29	N/A	N/A	N/A	N/A	21.0 (min)	32.4 (Lagoon 3) 31.1 (Lagoon 4)	11.4 (Lagoon 3) 10.1 (Lagoon 4)
	4700	29.73	N/A	N/A	N/A	N/A	23.0 (min)	26.8 (Lagoon 5)	3.8 (Lagoon 5)
	5500	33.94	N/A	N/A	N/A	N/A	19.0 (min)	26.0 (Lagoon 6) 30.9 (Lagoon 6A)	7.0 (Lagoon 6) 11.9 (Lagoon 6A)
PW6 (UC)					10.29		9.7	32.8 (Lagoon 2)	22.51 (Lagoon 2)
P47 (CT)	5,143	32.38	35.88	DRY	DRY	DRY	DRY		
P49 (CT)	5,359	33.68	37.49	DRY	DRY	DRY	DRY		
P57 (GSG)	6,155	31.83	33.07	5.7	29.2	4.7	28.4		
15P5 (CG/UC)	6,804	24.7	28.57	8.38	20.38	8.2	20.2	21.8 (Lagoon 8) 24.6 (Lagoon 8A)	1.42 (Lagoon 8) 4.22 (Lagoon 8A)

[2] Chalk groundwater levels estimated using contours presented on the 1:125,000 regional hydrogeological map (BGS, 1976) (considered minimum levels as levels measured during dry period of years). Further ground investigations will be required to inform the presence of localised perched water tables through drilling boreholes in the location of infiltrating lagoons 3, 4, 5, 6 and 6A.

Piezometer Reference	Road Chainage (m)	Preliminary Road Level (mAOD)	Borehole Cover Level (mAOD)	Maximum Groundwater Level		Average Groundwater Level		Invert Level of Nearest Lagoon (mAOD)	Unsaturated Zone Thickness (m)
				mBGL	mAOD	mBGL	mAOD		
								21.5 (Lagoon 9)	1.12 (Lagoon 9)
P87 (UC)	9,126	26.85	27.34	13	15.3	12.6	14.7	19.4 (Lagoon 12)	4.1 (Lagoon 12)
BH89 (UC)					14.93*			18.5 (Lagoon 13) 19.2 (Lagoon 13A)	3.57 (Lagoon 13) 4.27 (Lagoon 13A)
P97 (CT)	10,237	28	30.93	DRY	DRY	DRY	DRY		
P101 (CT)	10,611	25.2	26.59	5.3	21.3	5.3	21.3		
22P4 (UC)	10,923	20	22.47	9.8	13.3	9.5	13	19.8 (Lagoon 14A)	6.5 (Lagoon 14A)
P8A (UC)	11,010	18.87	18.39	9.6	13.2	5.8	12.6	16.6 (Lagoon 14)	3.4 (Lagoon 14)
P124 (CG)	12,904	18.47	20.77	DRY	DRY	DRY	DRY		
GW3A (UC)	13254	15.69	14.8	2.9	12.6	2.5	12.3	14.1 (Lagoon 16)	1.5 (Lagoon 16)
WS389	13350	15.22	14.0	2.32	11.68	2.62	11.38	12.0 (Lagoon 17)	(Lagoon 17 – lined)
GW6 (UC)	14,204	17.9	15.28	3.4	12.44	3. 1	12.2	14.0 (Lagoon 18A)	1.56 (Lagoon 18A - lined)
GW11A (UC)	14,711	16.43	14.44	2.6	12.39	2.3	12.2	13.2 (Lagoon 18)	0.8 (Lagoon 18 - lined)
BH147A (CG)	15,150	24.96	29.95	18.1	12.4	17.5	12.2		
BH147B (CG)	15,150	25.09	29.91	DRY	DRY	DRY	DRY		
P153(GSG)	15,769	28.98	31.31	DRY	DRY	DRY	DRY	-	
BH1 (GSG / CTCG)	16,490	24.24	25.86	8.5	18.2	7.6	17.1	25.1 (Lagoon 19) 25.7 (Lagoon 20)	6.9 (Lagoon 19) 7.5 (Lagoon 20)
BH12					20.32			22.2 (Lagoon 21)	1.88 (Lagoon 21)
BH14 (CT/CG)	16,868	33.95	24.22	8.3	18.5	6. 8	17.7		
BH234(CG)	16,917	33	24.32	8.7	18.3	6.8	16.4		
BH13 (CG/UC)	16,948	33.46	24.46	7.4	19.7	6.8	17.7		

Piezometer Reference	Road Chainage (m)	Preliminary Road Level (mAOD)	Borehole Cover Level (mAOD)	Maximum Groundwater Level		Average Groundwater Level		Invert Level of Nearest Lagoon (mAOD)	Unsaturated Zone Thickness (m)
				mBGL	mAOD	mBGL	mAOD		
BH235 (CG)	17,035	31	24.98	7.5	18.3	7	18		
BH18 (CG/UC)	17,035	30.85	24.43	13.9	18	8.2	17.3	21.6 (Lagoon 22)	3.6 (Lagoon 22)
BH35P5					15.25			18.1 (Lagoon 23) 19.3 (Lagoon 24)	2.85 (Lagoon 23) 4.05 (Lagoon 24)
BH17 (CT/CG)	17,045	30.85	25.02	7.8	18.6	7.3	17.8		
P190 (CG)	19,469	26.43	26.54	18.2	9.1	17.9	8.8	17.3 (Lagoon 25)	8.2 (Lagoon 25)
P196 (UC)	20,127	24.22	21.08	20.3	1.4	20	1.1		

* (including 1m variation observed at BHP87)



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DRAWING TITLE
NORWICH NORTHERN DISTRIBUTOR ROAD
AMENDMENTS TO OVERLAND FLOWS
DITCHES AND CULVERTS

REV.	DESCRIPTION	CHECKED	DATE

	INITIALS	DATE
SURVEYED BY	OS	2014
DESIGNED BY	JC	06/14
DRAWN BY	JC	06/14
CHECKED BY	MKu	06/14

DRAWING No. R1C093-R1-4951
PROJECT TITLE Norwich Northern Distributor Road
SCALE 1:1500
FILE No. R1C093

ORIGINAL SIZE: A3
BIL 29/10/13

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NORWICH NORTHERN DISTRIBUTOR ROAD
AMENDMENTS TO OVERLAND FLOW
DITCHES AND CULVERTS

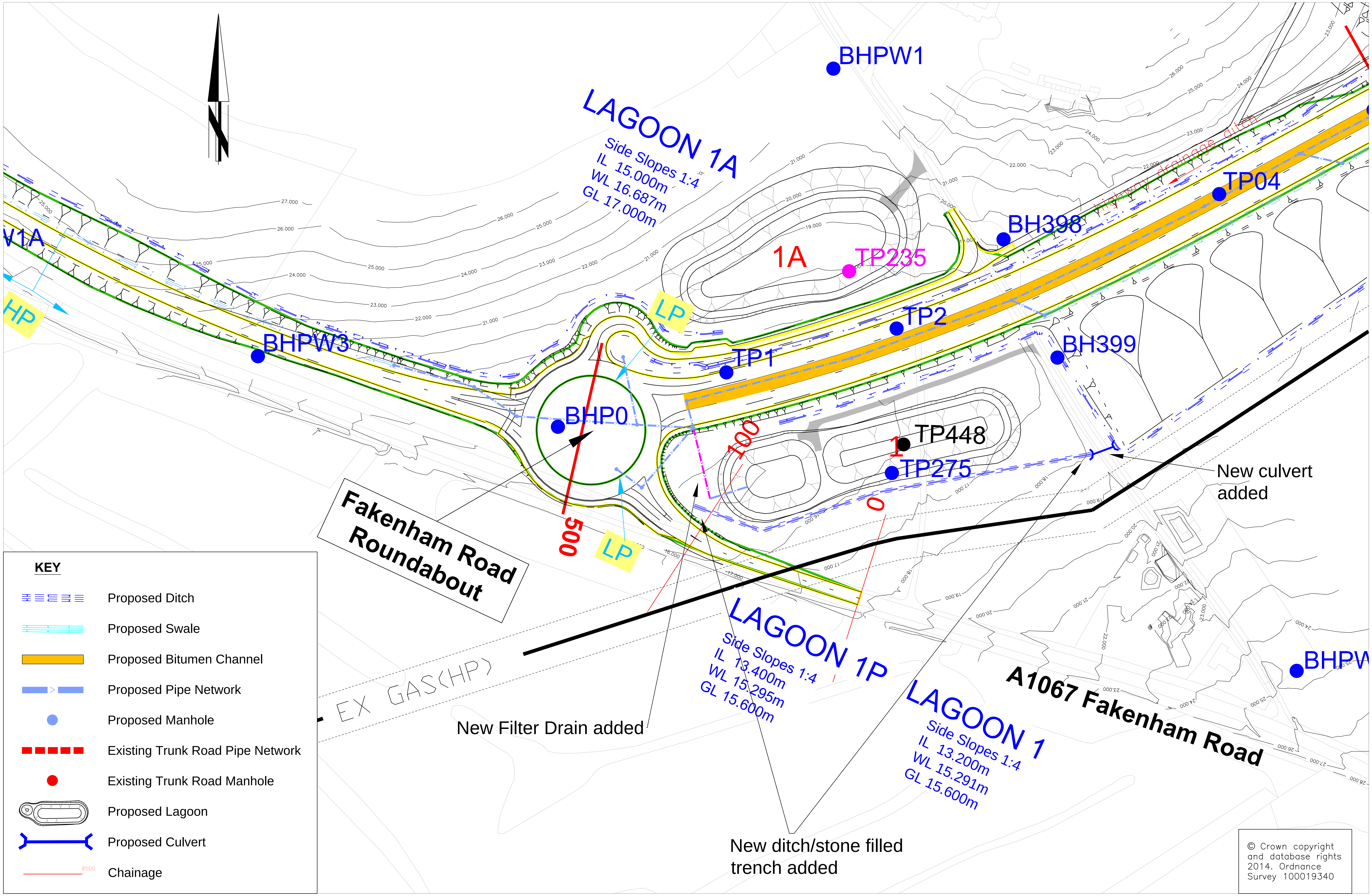
REV.	DESCRIPTION	CHECKED	DATE

	INITIALS	DATE
SURVEYED BY	OS	2014
DESIGNED BY	JC	06/14
DRAWN BY	JC	06/14
CHECKED BY	MKu	06/14

DRAWING No. R1C093-R1-4952
PROJECT TITLE Norwich Northern Distributor Road
SCALE 1:1500
FILE No. R1C093

ORIGINAL SIZE: A3

Appendix C7. Changes to Overland Ditches



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DRAWING TITLE

NORWICH NORTHERN DISTRIBUTOR ROAD
AMENDMENTS TO OVERLAND FLOWS
DITCHES AND CULVERTS

REV.	DESCRIPTION	CHECKED	DATE

	INITIALS	DATE
SURVEYED BY	OS	2014
DESIGNED BY	JC	06/14
DRAWN BY	JC	06/14
CHECKED BY	MKu	06/14

DRAWING No. R1C093-R1-4951

PROJECT TITLE Norwich Northern Distributor Road

SCALE 1:1500

FILE No. R1C093

ORIGINAL SIZE: A3

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AMENDMENTS TO OVERLAND FLOW
DITCHES AND CULVERTS

REV.	DESCRIPTION	CHECKED	DATE

	INITIALS	DATE
SURVEYED BY	OS	2014
DESIGNED BY	JC	06/14
DRAWN BY	JC	06/14
CHECKED BY	MKu	06/14

DRAWING No. R1C093-R1-4952
PROJECT TITLE Norwich Northern Distributor Road
SCALE 1:1500
FILE No. R1C093

ORIGINAL SIZE: A3

Appendix D. Information on 'The Springs', Rackheath

Appendix D.1	Conceptual design plans for Lagoon 17, 18A and 18
Appendix D.2	Groundwater and surface water abstractions

Appendix D.1 Conceptual design plans for Lagoon 17, 18A and 18

Note:
Shown with Revision F Carriageway alignment.

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DRAWING TITLE
NORWICH: NORTHERN DISTRIBUTOR ROAD
DRAINAGE MEASURES FOR LAGOON 17
WETLAND SYSTEM

REV.	DESCRIPTION	CHECKED	DATE

	INITIALS	DATE
SURVEYED BY	OS	2014
DESIGNED BY	NCC	03/14
DRAWN BY	JT	03/14
CHECKED BY	MKu	04/14

DRAWING No. R1C093-R1-4907
PROJECT TITLE Norwich Northern Distributor Road
SCALE 1:1000
FILE No. R1C093

ORIGINAL SIZE: A1

Note:
Shown with Revision F Carriageway alignment.

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DRAWING TITLE
NORWICH: NORTHERN DISTRIBUTOR ROAD
DRAINAGE MEASURES FOR LAGOONS 18 AND 18A
INTO WETLAND SYSTEM

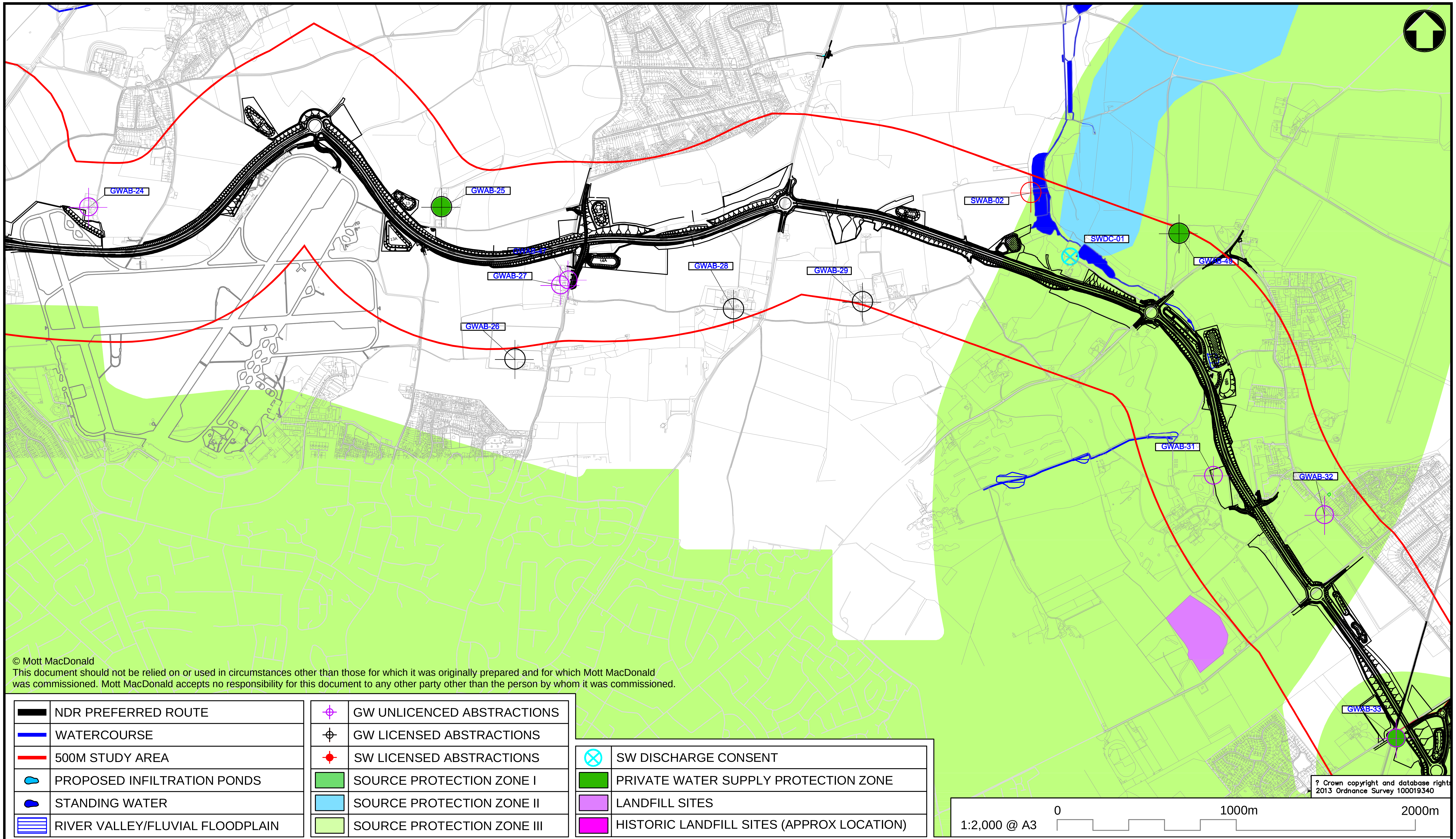
REV.	DESCRIPTION	CHECKED	DATE
A	New Filter Drain Added	MKu	07/14

	INITIALS	DATE
SURVEYED BY	OS	2010
DESIGNED BY	JT	01/14
DRAWN BY	JT	01/14
CHECKED BY	MKu	04/14

DRAWING No.
R1C093-R1-4908A
PROJECT TITLE
Norwich
Northern Distributor Road
SCALE
1:1000
FILE No.
R1C093

ORIGINAL SIZE: A1

Appendix D.2 Groundwater and surface water abstractions



NDR PREFERRED ROUTE	GW UNLICENCED ABSTRACTIONS	SW DISCHARGE CONSENT	
WATERCOURSE	GW LICENSED ABSTRACTIONS	PRIVATE WATER SUPPLY PROTECTION ZONE	
500M STUDY AREA	SW LICENSED ABSTRACTIONS	LANDFILL SITES	
PROPOSED INFILTRATION PONDS	SOURCE PROTECTION ZONE I	HISTORIC LANDFILL SITES (APPROX LOCATION)	
STANDING WATER	SOURCE PROTECTION ZONE II		
RIVER VALLEY/FLUVIAL FLOODPLAIN	SOURCE PROTECTION ZONE III		

1:2,000 @ A3 — 0, 1000m, 2000m

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Norfolk County Council

Rev	Date	Drawn	Description	Ch'k'd	App'd
0	11/13	EMC	Revision for Submission	RD	PR

Title
Norwich Northern Distributor Road
Water Users
2 of 3

Drawn	EMC
Checked	RD
Approved	PR
Scale at A3	1:2000

Drawing Number: MMD-233906-DT-0979
Rev: 0
Status: INF

\\UKCAMBVMADC03\Projects\Cambridge\Demeter - Daedalus\WEM\Projects\223779 Norwich NDR\11. Drawings & Figures\11.1 ES Water