



Norfolk County Council

Flood Investigation Report

Report Title:

North Norfolk

Rose Farm Barn and Market Street

Tunstead

Report Reference: 000336

December 2013

Report Status: Approved Report

	Name	Date
Prepared by:	Julian Bilics	18 / 12 / 2013
Checked by:	Mark Henderson	18/ 12/ 2013
Approved by:	Graham Brown	18/ 12 / 2013

Prepared by the Flood Risk Officers on behalf of the Flood and Water Management Team

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Flood Investigation Report

Market Street, Tunstead, North Norfolk

1. Reason for Investigation

It was deemed necessary to complete a formal investigation into the flood incident at Rose Farm Barn (a residential property) and Market Street that occurred on 9 March 2013 as;

- a) The property flooded to a depth of approx 30-45 cm of water
- b) Market Street, primarily outside of Rose Farm Barn flooded, and this is a primary gritting route.
- c) The foul sewer was overloaded due to the amount of surface water entering the sewer.

This met Norfolk County Council's threshold for triggering the undertaking of a formal flood investigation.

2. Location of flooding incident

- 1.1 Tunstead is located approximately 10 miles north of Norwich. With Market Street being the main road through Tunstead. The area of reported flooding is along Market street and into Rose Farm Barn and the surrounding area.

3. Flood Incident as reported

- 3.1 The flooding that occurred on 9 March 2013 was first reported to Norfolk County Council Flood and Water Management Team by North Norfolk District Council on 17 June 2013. This report was supported by appropriate evidence of the event.

4 Desk Study

- 4.1 The location of the flooding:

- The area is sited within an area of geology likely to have low rates of infiltration. From east to west there is a decreasing suitability for ground infiltration at Rose Farm Barn
- The flood site on Market Street lies within an area shown to be vulnerable to surface water flooding and has flooded on a number of occasions in the past during extreme events.
- Rose Farm Barn is below the height of the surrounding field
- The site is not within 2.5km of a registered rain gauge and no known flow data exists for the local drainage system.
- Anglian Water records show that foul water sewers at the

flood site are independent of the land drainage surface water drainage system.

5 Summary of site investigation and information received

- 5.1 Site visits were undertaken by Norfolk County Council at Rose Farm Barn and the private road and properties adjacent to Rose Farm Barn on 24 June 2013, 8 July 2013 and 28 August 2013.
- 5.2 Please see annotated Map attached to this report summarising the information received by third parties and through on-site investigations.

6 Summary of impacts

- 6.1 Information relating to the impacts experienced at the flood location are detailed below; *(Please see Annex 6 within the PFRA Annexes to the final guidance for the classification of property types to be used in filling in the section below).*

Risk to life: No

Internal Flooding: Yes

External Flooding: Yes

Critical services: Yes

Priority Gritting Routes: Yes

Obstruction of Access: Yes

7 Investigation findings

7.1 What caused the flooding?

- 7.1.1 The flooding of the highway, Rose Farm Barn and the surrounding area was experienced due to a number of factors;
- Heavy rainfall was experienced across Norfolk causing many low capacity systems to be exceeded.
 - Snow melt and a frozen saturated landscape exacerbated the event.
 - Market Street is located in a low point within Tunstead and the surrounding catchment. In addition it is located on the overland flowpath of this catchment and is a natural receptor of this water in extreme flood events.
 - A large area of surface water run-off flooded the field (see A on the attached map). This water then flowed onto the

highway and exacerbated an already flooded highway and adjacent private road and riparian owned ditch system. A cut through in the verge bank released the flood from the field.

- There limited capacity in the ditch and culvert within the private road (i.e. pipe diameter) .
- There is a culvert that links the private ditch (see B on the map) to a manhole cover in the front of Rose Farm Barn and it is not clear whether it is linked to the wider drainage system or if it is functioning. NCC Highways have indicated that the maintenance of this structure is the responsibility of the riparian owners.
- There is a gully on the Highway near to the entrance to Rose Farm Barn but it is not clear whether this is linked to the wider drainage system.
- It has been reported that a pipe in the curtilage of Rose Barn Farm exists but it is not currently connected to the main ditch system on Market Street. This may alleviate surface water drainage within Rose Barn Farm.

7.2 Who has responsibilities to manage the cause(s) of the flood?

7.2.1 With reference to the above factors, responsibility to manage the causes of the flood are listed below;

- Property owners
- Norfolk County Council (NCC) Highways
- Adjacent landowners

7.3 What was their response in relation to the cause of the flood?

7.3.1 The responses of the organisations to the cause of the flooding are listed below;

- Anglian Water tankered out approximately 20,000 gallons of surface water from Rose Barn Farm. This was not the responsibility of Anglian Water and this was carried out as a gesture of goodwill.
- Norfolk County Council's Flood Risk Officer was made aware of a 'cut through' to relieve the flooding in the field being made into the bank adjacent to Market Street to the highway and reported this to NCC Highways
- Owners of the properties on the private road experienced flooding to the whole of the private road (see B on the attached map), and it is unlikely that any additional maintenance would have enabled the existing ditch to cope with such an extreme event.
- Norfolk County Council's Flood Risk Officer contacted relevant residents to make them aware of their riparian responsibilities and the appropriate measures that they could take to protect their property without prejudicing the rights and responsibilities of adjoining property holders

- Norfolk County Council's Flood Risk Officer has made the owner of Rose Barn Farm aware of the need to take appropriate measures to protect his property
- NCC Highways have already put in place, prior to the flooding in March, caution signs denoting that the road is liable to flooding

8 Recommendations

- 8.1 The recommendations highlighted below are referenced against the factors detailed above and should not be considered in isolation.
- 8.2 The riparian owners responsible for the main open ditch and culverts on Market Street (marked blue on the attached map) need to maintain their watercourse and structures.
- 8.3 Norfolk County Council Highways could investigate and assess the current adequacy and integrity of the gullies that discharge into the ditch (marked D on the annotated map) and whether there is a need for maintenance.
- 8.4 In light of recent changes and the impact of the flooding at this location NCC Highways could review their existing risk based approach in relation to their response to flooding incidents where there are implications for highways systems.
- 8.5 Norfolk County Council's Flood and Water Management Team will investigate the ownership of the culvert that is under the highway and adjacent to Rose Farm Barn to enable an investigation into its adequacy and integrity.
- 8.6 The property owner at Rose Farm Barn should take appropriate measures to protect his property. NCC Flood and Water Management Team will provide some information to support the resident.
- 8.7 It is recommended that the owner of Rose Farm Barn contact the adjacent landowner to investigate the potential for works to be undertaken to alleviate the flood risk at the property.
- 8.8 Norfolk County Council will work with the Environment Agency to identify the possibility of securing funding to mitigate flood risk in this community where it is necessary beyond the individual property level protection. This recommendation will be subject to priorities and availability of resources
- 8.9 Where structure or features are associated with significant flood risk these will be included on a public register. This will provide transparency for residents as to ownership and condition.

9 Disclaimer

Although every effort has been taken to ensure the accuracy of the information contained within the pages of the report, we cannot guarantee that the contents will always be current, accurate or complete.

This report has been prepared as part of Norfolk County Council's responsibilities under the Flood and Water Management Act 2010. It is intended to provide context and information to support the delivery of the local flood risk management strategy and should not be used for any other purpose.

The findings of the report are based on a subjective assessment of the information available by those undertaking the investigation and therefore may not include all relevant information. As such it should not be considered as a definitive assessment of all factors that may have triggered or contributed to the flood event.

The opinions, conclusions and any recommendations in this Report are based on assumptions made by Norfolk County Council when preparing this report, including, but not limited to those key assumptions noted in the Report, including reliance on information provided by third parties.

Norfolk County Council expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the time of preparation and Norfolk County Council expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with those opinions, conclusions and any recommendations.

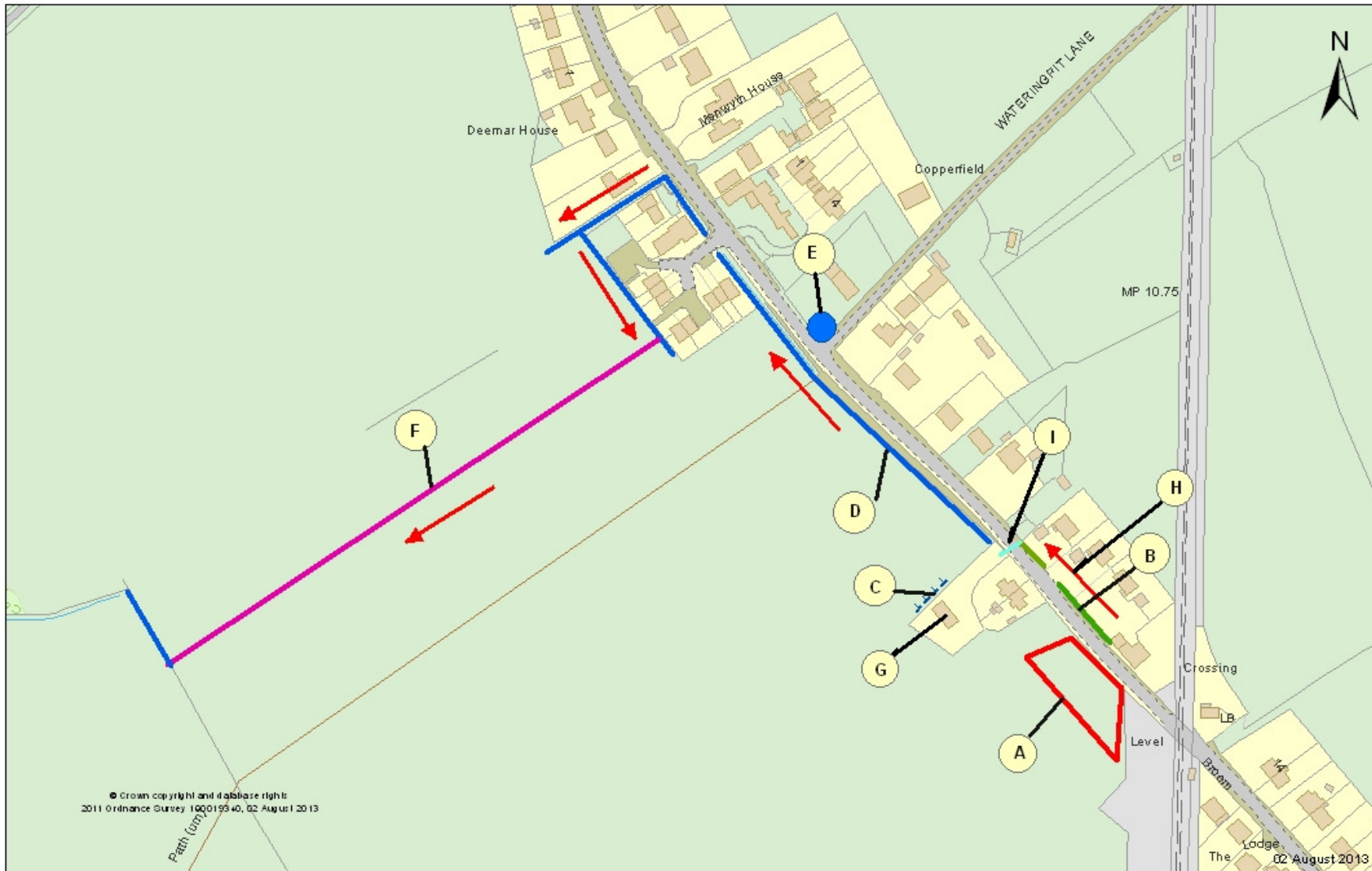
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Annotated Map

Flood Investigation Report: Tunstead

It should be noted that the order in which these are listed does not reflect the significance of the issue and may require more detailed analysis or surveying to ascertain their level of influence over the incidents experienced at this location.

- | | |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | A large area of surface water run-off flooded the field. This water then flowed onto the highway and exacerbated an already flooded highway and adjacent private road and riparian owned ditch system. |
| B | Water from the highway (via a series of gullies) and the adjacent field flowed into the ditch within the private road. This ditch has limited capacity and is the responsibility of the riparian owners. The ditch then flows into a culvert under the highway (marked I on the map) that links the private ditch to a manhole cover in the front of Rose Farm Barn (marked G on the map). It is not clear as to the ownership of the culvert and whether it is linked to the wider drainage system downstream or if it is functioning. |
| C | It has been reported that a pipe in the curtilage of Rose Barn Farm exists but it is not currently connected to the main ditch system on Market Street. |
| D | This is the current extent of the open ditch system (marked blue) on Market Street and surface water flows to a land drain (see D). There is a gully on the Highway near to the entrance to Rose Farm Barn but is not clear whether this is linked to the wider drainage system. |
| E | This pond is in one of the lowest points of Market Street and attenuates a large amount of surface water from the highway. |
| F | This land drain (in Pink) connects to an open drain on the other side of the field which in turn outfalls to the River Bure. |
| G | Rose Farm Barn |
| H | Red arrow also denote private road (as well as flow path) |
| I | Culvert which connects (ditch B) to an inspection chamber within the boundary of Rose Farm Barn (G) |



Tunstead flow map
Tunstead

Norfolk County Council

Scale 1: 2393 Centred on 629733 321553



Legend

- Parish Boundaries
- District Boundaries