FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT AT WINDMILL GARAGE, WISBECH ROAD, LONG SUTTON, LINCS.

FINAL REPORT

GEOFF BEEL CONSULTANCY

APRIL 2017

GCB/MERCHANT

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G R Merchant Ltd drg. no. GRH:3

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1.0 INTRODUCTION

1.1 An outline planning application is to be submitted by G R Merchant Ltd on behalf of Mr & Mrs G Hartwell for proposed residential development at Windmill Garage, Wisbech Road, Long Sutton, Lincs.

1.2 A Flood Risk Assessment is required to accompany the planning application and meet the requirements and general principles of the Planning Practice Guidance to the National Planning Policy Framework (NPPF) and for approval by the Environment Agency.

The site, as situated, is located within Flood Zone 3, of the Environment Agency's Flood Zone Maps. The latest Agency Flood Maps have been created as a tool to raise awareness of flood risk with the public and our partner organisations, such as Local Authorities, Emergency Services and Drainage Authorities. The Maps do not take into account any flood defences.

The site is also shown on the edge of a Low Probability Zone of Flooding in the South Holland District Council's Strategic Flood Risk Assessment Map. (2010)

The site is also located in the South Holland IDB drainage district.

1.3 Geoff Beel Consultancy was appointed on 12th April 2017 to undertake a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is located at Windmill Garage, Wisbech Road, Long Sutton. The National Grid Reference of the central point of the development is TF 44102215.

2.2 The position and extent of the site is shown on Fig 1 – Location & Site Plans and Fig 2 – Location and Site Plans at the end of the document.

2.3 The site, located within the South Holland Internal Drainage Board district is shown within Flood Zone 3 as detailed on the Environment Agency Flood Zone Maps and on the edge of the Low Probability Zone of Flooding of the Council's Strategic Flood Risk Assessment Map (2010).

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently existing commercial premises.

3.2 The area of development is approximately 0.22 hectare.

3.3 The proposed site layout consists the construction of 2 two storey dwellings after demolition of the existing commercial premises.

3.4 The Sequential Test and Exception Test will require to be applied by the Local Planning Authority but the development may be permitted as the site is protected against both the 1 in 200 year return period tidal event and the 1 in 100 year return period fluvial event with no increase of risk of flooding.

Flood mitigation measures have been incorporated into the design and construction of the development by raising finished floor levels above the existing ground level to safeguard against the risk of flooding as a result of a breach to the tidal defences and to ensure the proposals pass Part 2 of the Exception Test with an adequate water exclusion strategy for the design flood and breach event.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

4.1 The site is within a defended floodplain, as defined in Appendix 1 of the Environment Agency's 'Policy for the Protection of Floodplains' and is considered to be passive until such time as a flood greater than that for which the defences were designed occurs. The likelihood of flooding due to overtopping or failure of a flood defence embankment is considered to be small.

The South Holland Internal Drainage Board is protected by a combination of the River Welland tidal defences downstream of Spalding, the River Welland fluvial embankments as well as the River Nene tidal defences downstream of Foul Anchor.

4.2 The site and the surrounding land drains by gravity to a culverted section of drain on the opposite side of the road to the site frontage and hence to the South Holland Outfall Sluice to discharge into the tidal River Nene upstream of Sutton Bridge.

4.3 The existing standard of drainage for the South Holland Internal Drainage Board is 1 in 50 years return period, compatible with the Department of the Environment, Food and Rural Affairs target level of service for rural drainage and flood defence works. Freeboard of 900mm is provided to the lowest land levels.

4.4 Current maintenance standards within the South Holland Internal Drainage Board and of the Environment Agency defences are generally very good.

During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Boards assets are commensurate with the standard of protection that is sought. However, bank slips, blocked culverts etc may occur from time to time and these matters are usually dealt with promptly.

5.0 POTENTIAL SOURCES OF FLOODING

5.1 Three potential sources of flooding have been identified as a result of this assessment:

a) local blockages to IDB main drain system.
b) storm return period of 1 in 50 years being exceeded
c) overtopping and breaching the tidal River Nene defences

5.2 The probability of flooding from source a) is low due to the maintenance standards already achieved and managed by the IDB.

The probability of flooding from b) is also low due to the South Holland IDB main drain design standard incorporating a minimum 900mm freeboard to the lowest land level which provides adequate storage in events greater than 1 in 50 years.

Previous historic rainfall events of 1968 and 1978, estimated to be greater than 1 in 100 year events, caused no flooding to any residential properties at the time and the Boards policy is to provide a standard of drainage which satisfies NPPF requirements of a 1 in 100 year return period for fluvial protection inclusive of the effects of climate change and developments to the arterial system enables a flexible approach to be adopted and meet the criteria for "sustainable urban drainage".

5.3 The flood embankments to the tidal River Nene provide a 1 in 200 year return period level of protection. Surface water drainage from the site will be to soakaways designed to BRE365 requirement and Building Regulations approval.

5.4 More recent Tidal Hazard Mapping prepared by the Environment Agency as shown in Fig 5 shows the development site as affected by between 0.25-0.50m depth of flooding in year 2115.

6.0 EXTENT OF KNOWN FLOODING

6.1 During the preparation of this assessment, no evidence was discovered of the site being flooded or of any adjoining properties.

7.0 PROBABILITIES AND TRENDS OF FLOODING

7.1 The probability of this development flooding from localised drainage systems is very low.

7.2 The probability of the site flooding with water from any South Holland IDB main drain is less than 1% because of the standards of the existing flood defence systems, storage within existing drainage channels and the location of the site.

7.3 The probability of the site flooding with fluvial waters from any main river system is less than 1% because of the standards of the existing flood defences and the location of the site.

7.4 If under very extreme events, levels of floodwater from the South Holland IDB main drains or arterial systems rose to such an extent that the site was affected, the situation would not be sudden. It is very probable that sufficient time would be available to take precautionary actions to limit the extent and potential impact of flooding.

7.5 The water levels in the drainage channels will tend to rise as a result of the impacts of climate change. However the existing systems and defences together with the proposed floor levels a minimum of 500mm above existing ground level with a further 300mm of flood resilient construction will be appropriate for the design life of the development (i.e. 100 years).

7.6 Safe refuge is available at first floor level of the new dwellings.

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated.

8.2 Floor levels of the development will be a minimum of 500mm above existing ground levels which together with the proposed resilient construction will offer additional protection against impacts arising from any extreme short duration, localised events.

8.3 The general location of the site within the catchment is such that if flooding occurred from any of the South Holland IDB main drain systems, then probably 2 to 3 days warning time would be available.

8.4 No displacement of water from the site will affect any adjoining properties as soakaways drainage will be to BRE365 design requirements and Building Requirements approval.

8.5 Safe and dry access/egress is available to the site from Long Sutton where land is in Flood Zone 1.

9.0 RESIDUAL RISK – EXTREME EVENTS

9.1 The residual risk from extreme events is very low on this site, because of its location, within the South Holland IDB area and its location 3.00kms from the River Nene tidal defences.

9.2 Although within Flood Zone 3 according to NPPF classification, the site actually has a very low risk of flooding due to the current standards of drainage and flood defence and land levels. The site is not located within a Functional Flood Plain of any 'main river' or 'main drain'. The Environment Agency Flood Map for Planning has been produced irrespective of existing flood defences and standards of protection.

9.3 South Holland District Council in conjunction with the Environment Agency and the local IDB's within the Council area have carried out a Strategic Flood Risk Assessment of the whole District by appointed Consulting Engineers.

The Strategic Flood Risk Assessment has produced more definitive Flood Risk Maps than those published by the Environment Agency and at the same time has analysed flood return periods of all tidal and fluvial defences for years 2002 and 2115 to account for the effects of climate change.

Breach scenarios of embankments failing and/or being overtopped have also been carried out to establish Flood Risk Zones. The site is shown as being liable to flooding up to 500mm as a result of a failure of the River Nene tidal defences.

9.4 As a result of the Strategic Flood Risk Assessment; the South Holland Main Drain and associated IDB main drains have been determined as providing protection against a 1 in 100 year return period event both in year 2115.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 As a result of the assessment, the following conclusions have been reached:-

- The proposed development is not in a Functional Floodplain. It is located in the Passive Floodplain protected by the River Nene tidal defences and the South Holland IDB to a 1 in 200 year return period, (0.5%).

- Although the site is in Flood Zone 3, the actual risk of site flooding from any Environment Agency river system is very low (less than 0.5%). The site has been identified as liable of up to 500mm depth of flooding due to the failure of the River Nene tidal defences in the South Holland District Council's Strategic Flood Risk Assessment Map (2010) and the more recent Environment Agency Tidal Hazard Mapping.

- Although the site is located within an Internal Drainage District with a minimum standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. Freeboard to design water level of 900mm to lowest land level is available for events greater than 1 in 50 years providing further storage within the drainage channels.

- On site rainwater from the development will be discharged via soakaway drainage to BRE365 design requirements and hence to IDB main drain system.

Google Maps



Imagery ©2017 Google, Map data ©2017 Google 20 m

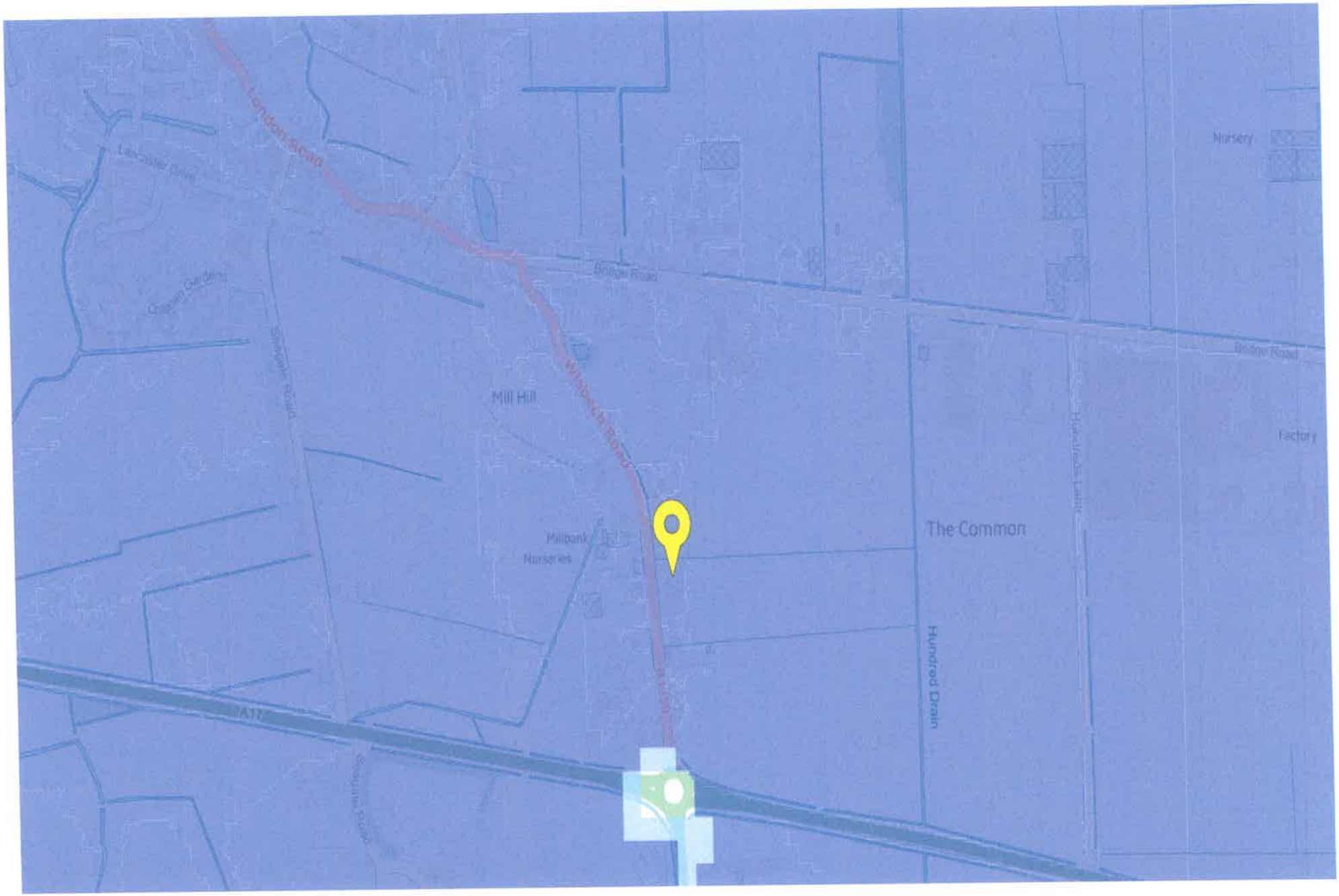
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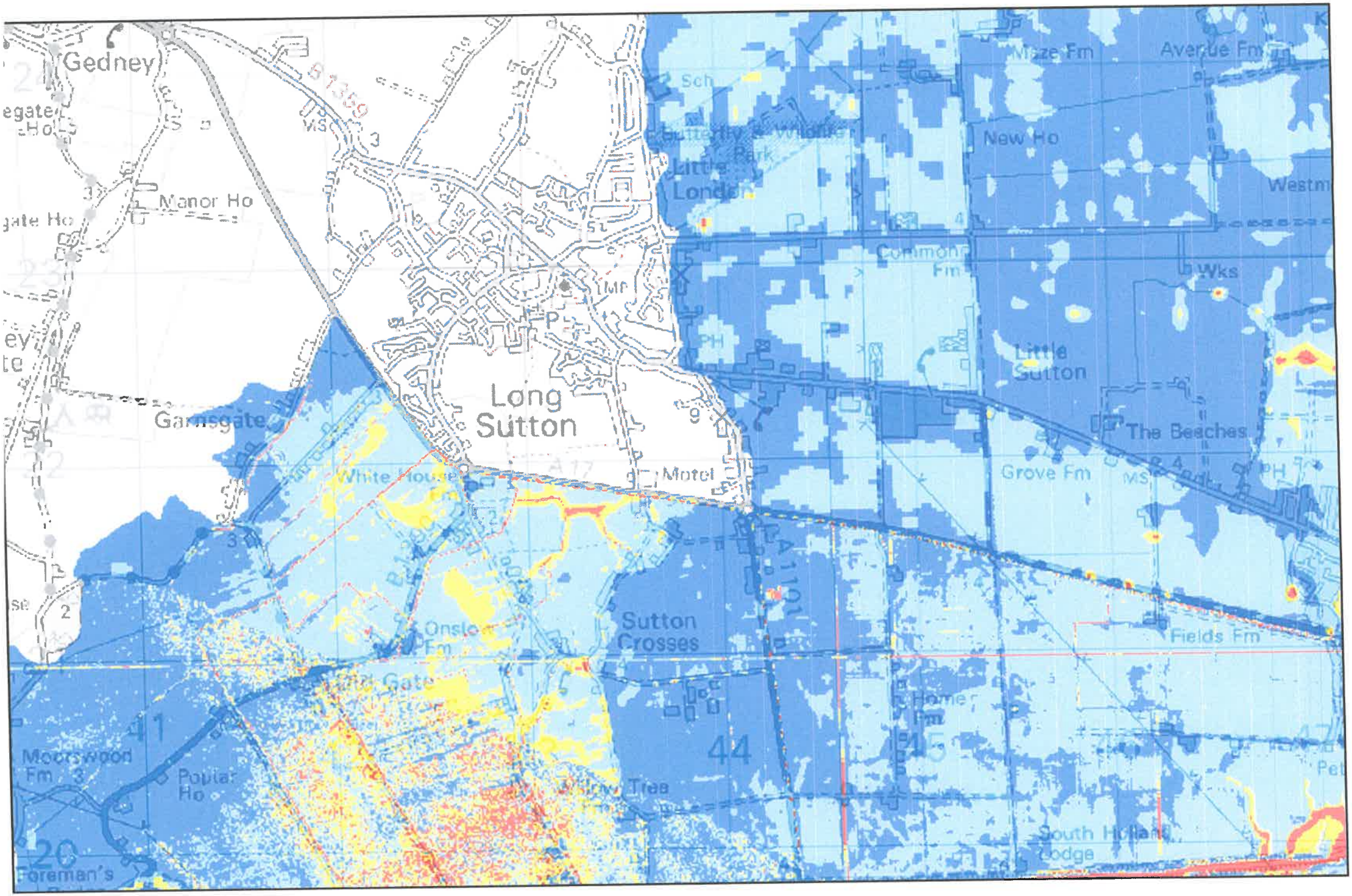


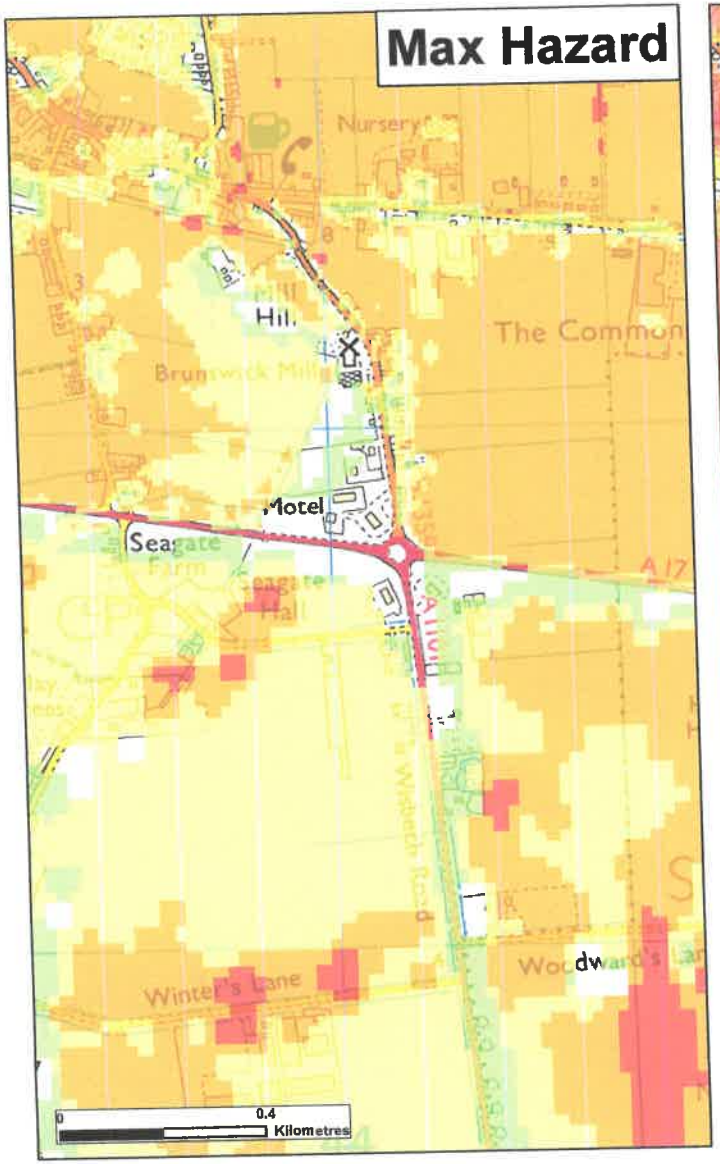
Long Sutton, England

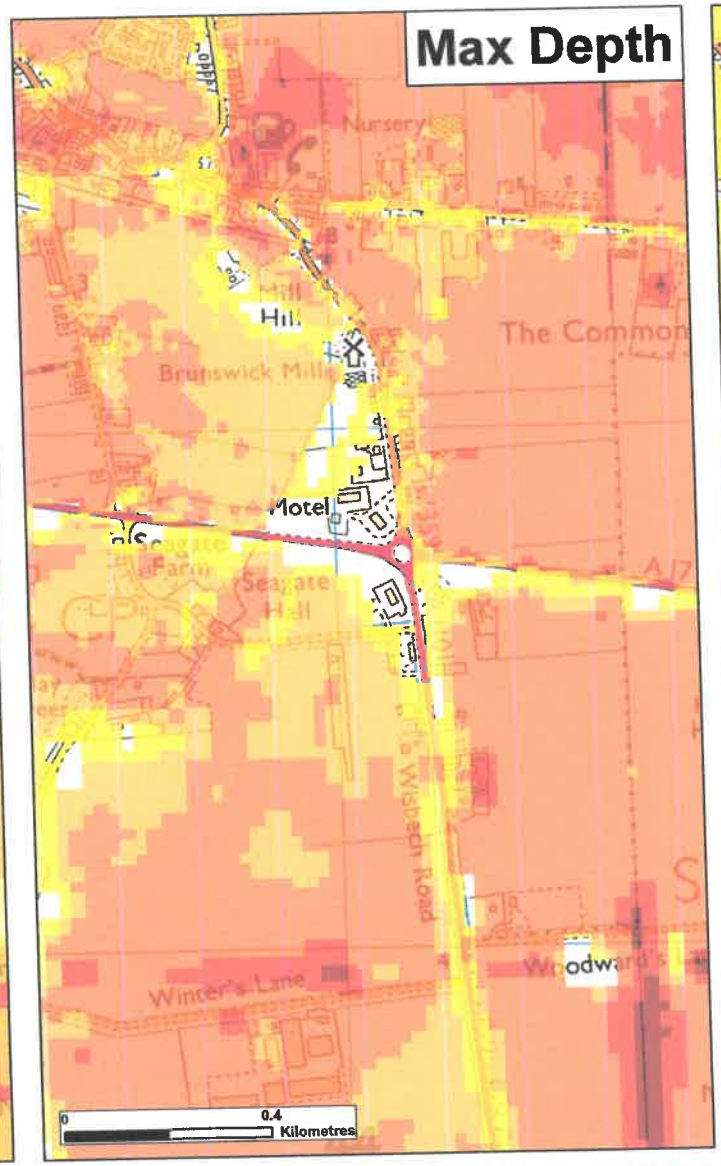
Street View - Jun 2016

Image capture: Jun 2016 © 2017 Google


Bridge Road
Mill Hill
Millbank Nurseries
The Common
Hundred Drain
Nursery
Factory
A17


Gedney
Manor Ho
Garnsgate
Long Sutton
Motel
Onsle Fm
Sutton Crosses
Moorswood Fm
Poplar Ho
Foreman's
Maze Fm
Avenue Fm
New Ho
Little Sutton
The Beeches
Grove Fm
Fields Fm
Homer Fm
South Holland Lodge
A1101
41
44
20







★ **Modelled Breach Locations** - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

Date Printed	October 2016	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2016-25722

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.

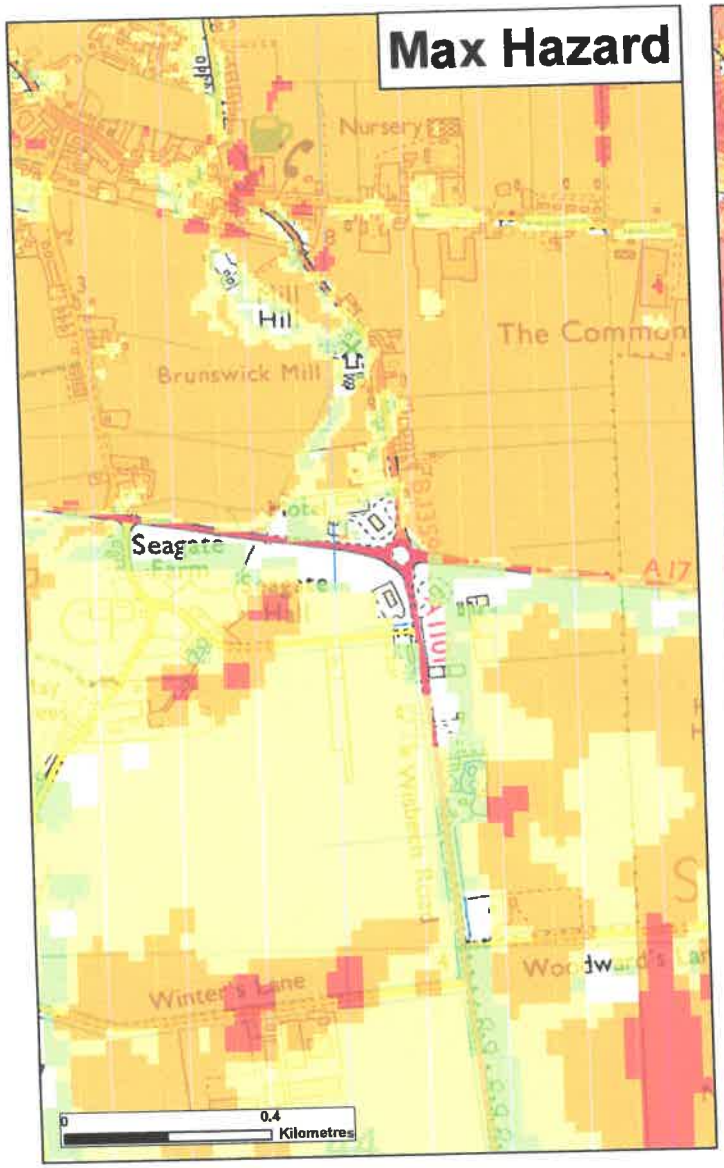
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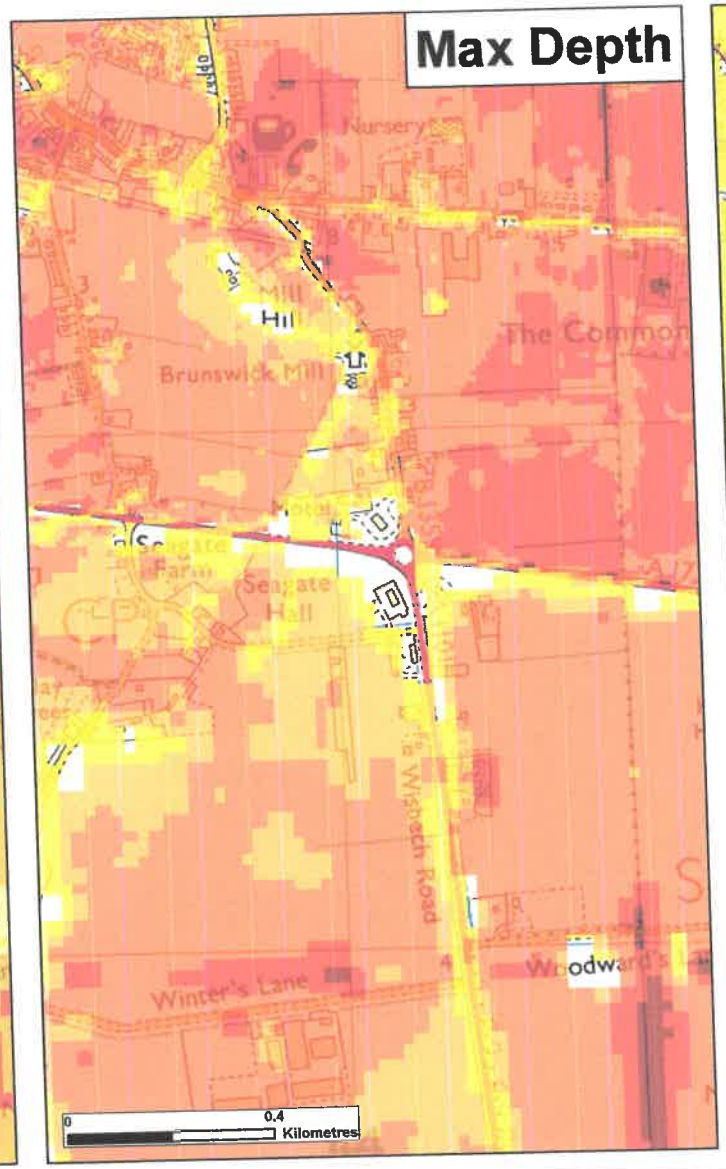
Environment Agency

Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Centred on TF 44052 21700

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Max Hazard (Flood Risk to People : FD2320)	Max Depth (m)	Max Velocity (m/s)
Less than 0.75 (Low Hazard)	0 - 0.25	0 - 0.3
Between 0.75 and 1.25 (Danger for Some)	0.25 - 0.50	0.3 - 1.0
Between 1.25 and 2.0 (Danger for Most)	0.50 - 1.0	1.0 - 1.5
Greater than 2.0 (Danger for All)	1.0 - 1.6	1.5 - 2.5
	1.6 +	2.5 +

Date Printed	October 2016	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2016-25722

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

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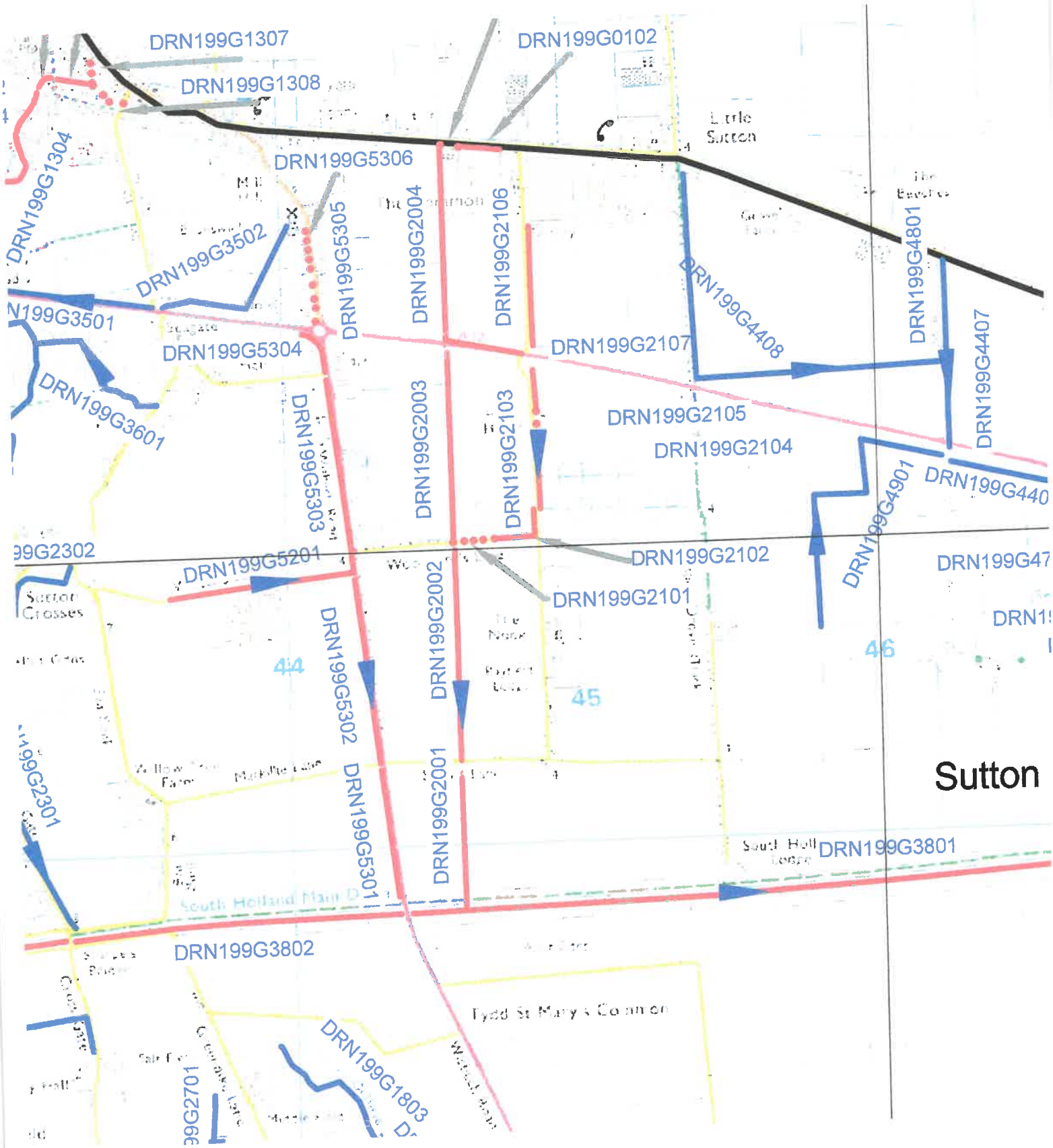
General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

Environment Agency

Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Centred on TF 44052 21700

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Little Sutton
Sutton Crosses
Tydd St Mary's Common
South Holland Main D
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46
Sutton