FLOOD RISK ASSESSMENT FOR RESIDENTIAL DEVELOPMENT OFF DRAW DIKE, SUTTON ST. JAMES, SPALDING, LINCS.

FINAL REPORT

GEOFF BEEL CONSULTANCY

AUGUST 2016

GCB/MERCHANT

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Fig 1 - Indicative Location & Site Layout Plans – G R Merchant drg. no. 2988-16-01

Fig 2 - Environment Agency Flood Zone Map

Fig 3 - South Holland Strategic Flood Risk Assessment Residual Depth Flood Zone Map (2010)

Fig 4 - Environment Agency Tidal Hazard Mapping – 1 in 200 and 1 in 1000 year events (2115) – CCN-2016-18121

Fig 5 - South Holland IDB district plan

1.0 INTRODUCTION

1.1 An outline planning application is to be submitted by G R Merchant Ltd on behalf of Mr & Mrs M Campling for proposed residential development at land off Draw Dike, Sutton St. James, Spalding, Lincs.

1.2 Planning approval requires a Flood Risk Assessment to accompany the planning application to meet the requirements and general principles contained in the Planning Practice Guidance to the National Planning Policy Framework (NPPF) and for approval by the Environment Agency.

The site, as situated, is located in Flood Zone 3 of the Environment Agency's Flood Map. The Agency's latest Flood Zone Maps have been created as a tool to raise awareness of flood risk with the public and 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 in Flood Zone 3 of the South Holland Strategic Flood Risk Assessment Flood Zone Map (2010).

The site is also located in the South Holland Internal Drainage Board district.

1.3 Geoff Beel Consultancy was appointed on 12th July 2016 to prepare a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is located at land north of Draw Dike, Sutton St. James, 6.50kms west of the tidal River Nene. The National Grid Reference of the site is TF 40151850.

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

2.3 The site is located in the South Holland Internal Drainage Board district and is shown within Flood Zone 3 as detailed on both the Environment Agency and South Holland Strategic Flood Risk Assessment Flood Zone Maps (2010).

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently agricultural land.

3.2 The area of development is approximately 0.30 hectare.

3.3 The proposed site layout consists the construction of 5 dwellings off Draw Dike.

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 as well as the 1 in 100 year return period fluvial event meeting the requirements of NPPF.

The Sequential Test is met as the site is shown located in Flood Zone 1 of the Environment Agency Tidal Hazard Mapping for the 1 in 200 year event in 2115.

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 and Practice 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.

4.2 The site is located in the South Holland Drainage Board area, the nearest main drain is situated 500m west of the site. Land levels are generally at 3.00m aOD.

The site drains to the Sutton St. James Pumping Station some 1.50kms north west of the site and hence via the South Holland Main Drain to the Sutton Bridge Outfall Sluice which discharges into the tidal River Nene.

4.3 The existing standard of drainage for the IDB main drain is 1 in 50 years return period, compatible with the Department of Environment, Food and Rural Affairs target level of service for rural urban drainage and flood defence works.

4.4 Tidal flood protection from the River Nene between Wisbech and Sutton Bridge is estimated to be a 1 in 200 years return period. The Environment Agency has recently carried out the River Nene Tidal Strategic Study which covers the tidal River Nene from the Dog in a Doublet Sluice near Peterborough to its outfall in the Wash at Nene Lighthouses, a distance of some 39.5km.

4.5 The Strategic Study has concluded that improvement works are cost effective to meet Department of the Environment, Food and Rural Affairs guidelines in order to sustain the existing tidal defences over the 50 year appraisal period up to a 1 in 200 year standard.

4.6 Current maintenance standards of the Environment Agency for tidal defences; and the South Holland Internal Drainage Board for surface water and land drainage are considered to be very good.

During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board seek 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 Five potential sources of flooding have been identified as a result of this assessment:

a) local blockages to existing IDB main drains
b) storm return period of 1 in 50 years being exceeded
c) failure of the Sutton St. James Pumping Station
d) failure of the Sutton Bridge Outfall Sluice
e) overtopping and breaching of the River Nene tidal 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 source 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.

5.3 Failure of the Sutton St. James Pumping Station may occur due to mechanical breakdown or electricity power failure. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low.

5.4 Failure of the Sutton Bridge Outfall Sluice may occur due to mechanical breakdown or electricity power failure. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low.

5.5 The existing tidal defences between Wisbech and Sutton Bridge consist generally of strengthened and heightened earth embankments with a riverside berm. Crest levels are at 7.00m aOD. The highest recorded tidal surge level reached 5.60m aOD at Wisbech on 11th January 1978 when extensive areas of the town were flooded. The more recent tidal surge event of 5th December 2013 reached a level of 6.10m aOD and the town and surrounding areas were protected by the improved defences.

The site is located approximately 6.50kms west of the River Nene tidal defences which were raised and strengthened after the 1978 surge event.

More recent studies by the Environment Agency have concluded a design water level for the 1 in 200 year tidal event between Sutton Bridge and Wisbech to be below existing tidal defence crest level with sufficient freeboard to take into account sea level rise during the next 100 years.

More recent Tidal Hazard mapping produced by the environment Agency shows the site unaffected by floodwater of the 1 in 200 year event in 2115. However, part of the site is affected by floodwaters of between 0.25-0.50m in the 1 in 1000 year event in 2115.

It is necessary to mitigate against such remote events and finished floor levels should be raised 500mm above Draw Dike carriageway level with 300mm of flood resilient construction above finished floor level.

5.6 The developer should ensure that the eventual occupiers of the dwellings are sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high. Indirect warnings are provided to all flood risk areas, even those at low risk of flooding. The main method is media broadcasts via local radio and also by television.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding contacting 0845 988 1188.

5.7 Surface water drainage from the development site will be to a combination of sustainable systems i.e. soakaways to individual dwellings subject to percolation tests and BRE 365 design requirements with Building Regulations and Lead Local Flood Authority approvals.

6.0 EXTENT OF KNOWN FLOODING

6.1 During the preparation of this assessment, the site did not flood during the tidal surge event of February 1978 and since that date, the defences between Sutton Bridge and Wisbech have been raised to the 1 in 200 year standard. The more recent tidal surge event of 5th December 2013 reached a level of 6.10m aOD at Wisbech Town Bridge and the town and surrounding areas were protected by the improved defences.

7.0 PROBABILITIES AND TRENDS OF FLOODING

7.1 The probability of this development flooding from localised drainage systems is very low. It is also intended to construct floor levels 500mm above Draw Dike carriageway level with 300mm of flood resilient construction above finished floor level.

7.2 The probability of the site flooding with water from the River Nene tidal river system is less than 0.5% because of the standards of the existing flood defences.

7.3 If under very extreme events, levels of floodwater from the North Level IDB arterial system 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.

7.4 The water levels in the drainage channels will tend to rise as a result of the impacts of climate change. However the existing main drains and tidal defences together with the raising of floor levels 500mm above Draw Dike carriageway level with flood resilient construction incorporated up to 300mm above finished flor level will be appropriate for the design life of the development (i.e. 100 years).

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated.

8.2 Floor levels of the development will be raised 500mm above Draw Dike carriageway levels with flood resilient construction incorporated offering 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 the IDB main drain or the River Nene tidal system sufficient warning time would be available.

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

8.5 Safe access and egress is available from the site onto Draw Dike to Sutton St. James which remains 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 internal drainage system, existing levels of tidal defences and proposed floor level compared to surrounding land and road levels.

9.2 The site is within Flood Zone 3 but in Flood Zone 1 of the more recent Tidal Hazard mapping according to NPPF classification, with a very low risk of flooding due to the proposed 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 Zone maps have been produced irrespective of existing flood defences and standards of protection. The risk of flooding to adjoining properties in the vicinity is not increased in terms of probability by the proposed development.

9.3 In the extreme event of a serious pumping station failure occurring to the IDB main drain system, or the overtopping of tidal defences, protection will be afforded by the proposed raising of floor levels above Draw Dike carriageway level.

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 existing River Nene tidal defences to a minimum standard of 1 in 200 years.

- The site is shown in Flood Zone 1 of the Environment Agency Tidal Hazard Mapping for year 2115 of the 1 in 200 year event with the actual risk of site flooding from the tidal River Nene system being very low (less than 0.5%).

- Although the site is located within an Internal Drainage District with a standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. A minimum of 900mm freeboard is provided within the main drain design standard to the lowest land level which provides further storage to cater for events greater than 1 in 50 years.

- On site surface water drainage of individual dwellings to be discharged via soakaways to BRE365 design requirements and Building Regulations approval as part of an overall sustainable drainage strategy agreed with the South Holland IDB and approved by the Lead Local Flood Authority.

- Floor levels will be above 500mm Draw Dike carriageway level with flood resilient construction incorporated up to 300mm above finished floor level.

INDIVIDUAL ACCESSES
TO CHANNEL GATE TO BE INSTALLED TO THE
REQUIREMENTS & SPECIFICATION OF
LINCS C.C. HIGHWAYS DEPARTMENT.

INDICATIVE DWELLING SCHEDULE :-

PLOT 1 - 4 BEDROOM BUNGALOW WITH ATTACHED GARAGE.
PLOT 2 - 3 BEDROOM BUNGALOW WITH ATTACHED DOUBLE GARAGE.
PLOT 3 - 3 BEDROOM BUNGALOW WITH ATTACHED GARAGE.
PLOT 4 - 4 BEDROOM HOUSE WITH ATTACHED DOUBLE GARAGE.
PLOT 5 - 3 BEDROOM BUNGALOW WITH ATTACHED DOUBLE GARAGE.



LOCATION PLAN
1/2500.

SITE LAYOUT PLAN
1/500.

AREA = 0.2Hs Hectares.

DRAW DIKE

FIELD VIEW

SUTTON GATE

Brain

G. R. MERCHANT LTD.
I.ENG AMICE FIWO

ARCHITECTURAL, STRUCTURAL
AND LAND DRAINAGE
CONSULTANTS

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Fax: 01406 425744
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DO NOT SCALE FROM THIS DRAWING

Environment Agency

Enter a postcode or place name:

Sutton St James, Lincolnshire

Go

Other topics for this area...

Flood Map for Planning (Rivers and Sea)

Flood Map for Planning (Rivers and Sea)

Map legend

Click on the map to see what Flood Zone (National Planning Policy Guidance definitions) the proposed development is in.

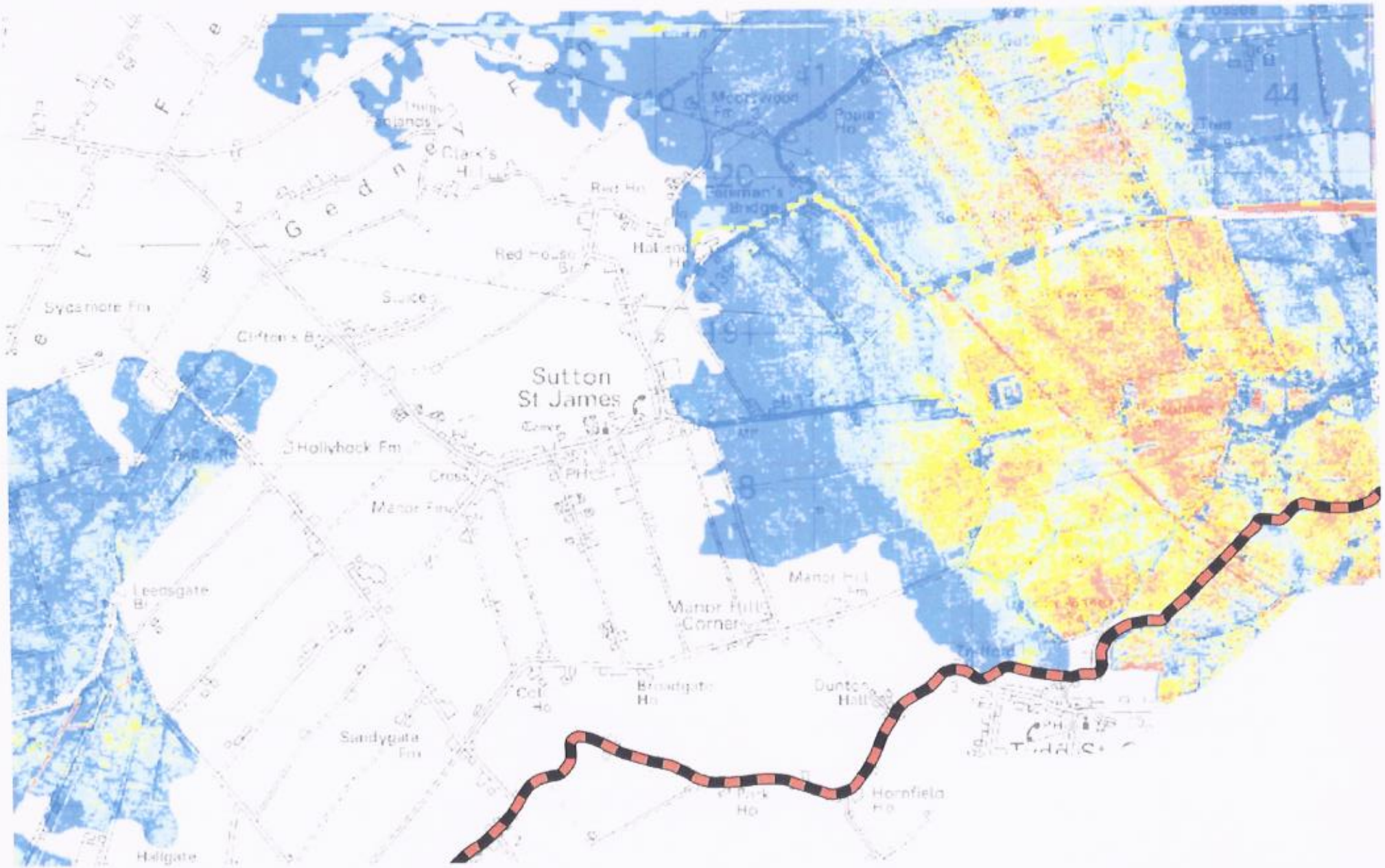
- Flood Map for Planning (Rivers and Sea)
  - Flood Zone 3
  - Flood Zone 2
  - Flood defences (Not all may be shown*)
  - Areas benefiting from flood defences (Not all may be shown*)
- Main River Line
  - Main River Line
- Other national environmental organisations
  - Natural Resources Wales Area of responsibility
  - Scottish Environment Protection Agency Area of responsibility

Sutton St James, Lincolnshire at scale 1:10,000

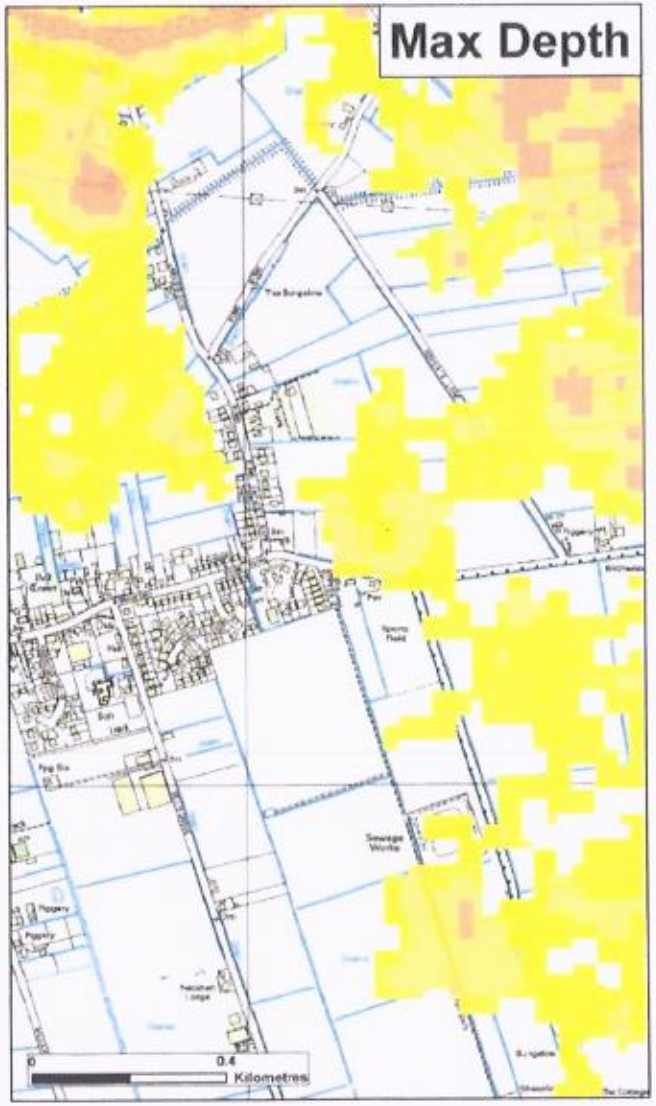
Other maps | Data search | Text only version

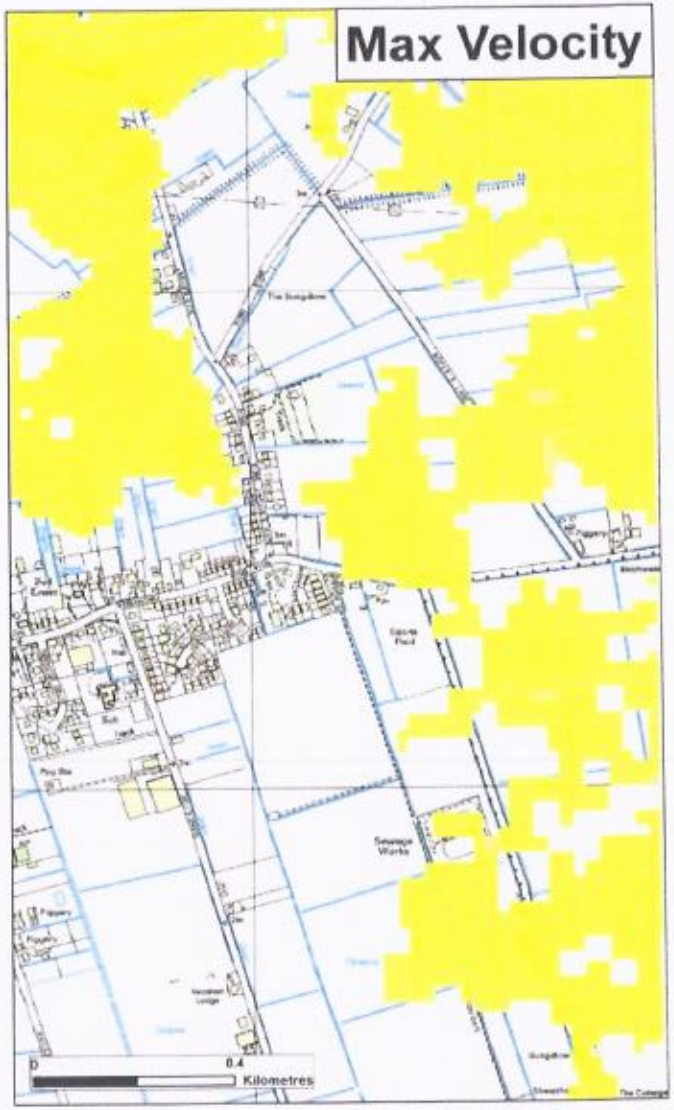


Customers in Wales - From 1 April 2013 Natural Resources Wales (NRW) has taken over the responsibilities of the Environment Agency in Wales.
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Sutton
St James
Hollyhock Fm
Sycamore Fm
Leedsgate
Sandygate
Fm
Holgate
Manor Hill
Corner
Broadgate
Ho
Duntop
Hall
Hornfield
Ho
Red House
Clark's
Hill
Moorwood
Fm
Poplar
Ho
Fisherman's
Bridge
Manor Hill
Fm
Cross
PH
41
44
20
19
8







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

Max Hazard
a) 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 - 2.0
- 2.0 +

Max Velocity (m/s)

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

ed	August 2016	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2016-18121

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.

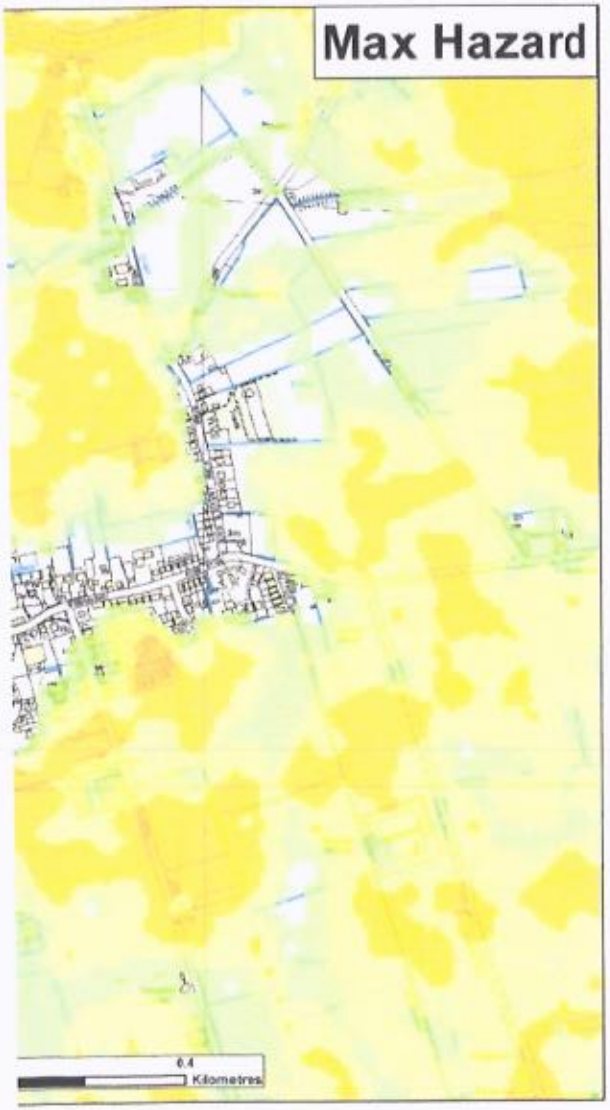
General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 4p per minute from BT Weekend Unlimited, Mobile and other providers' charges may vary.

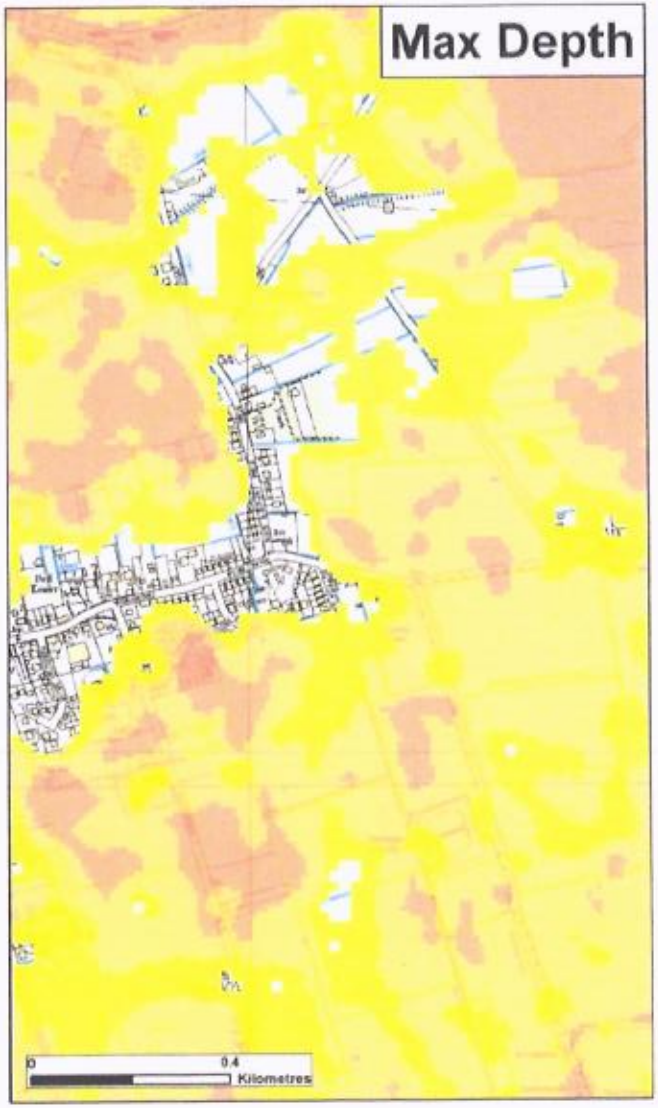
Environment Agency

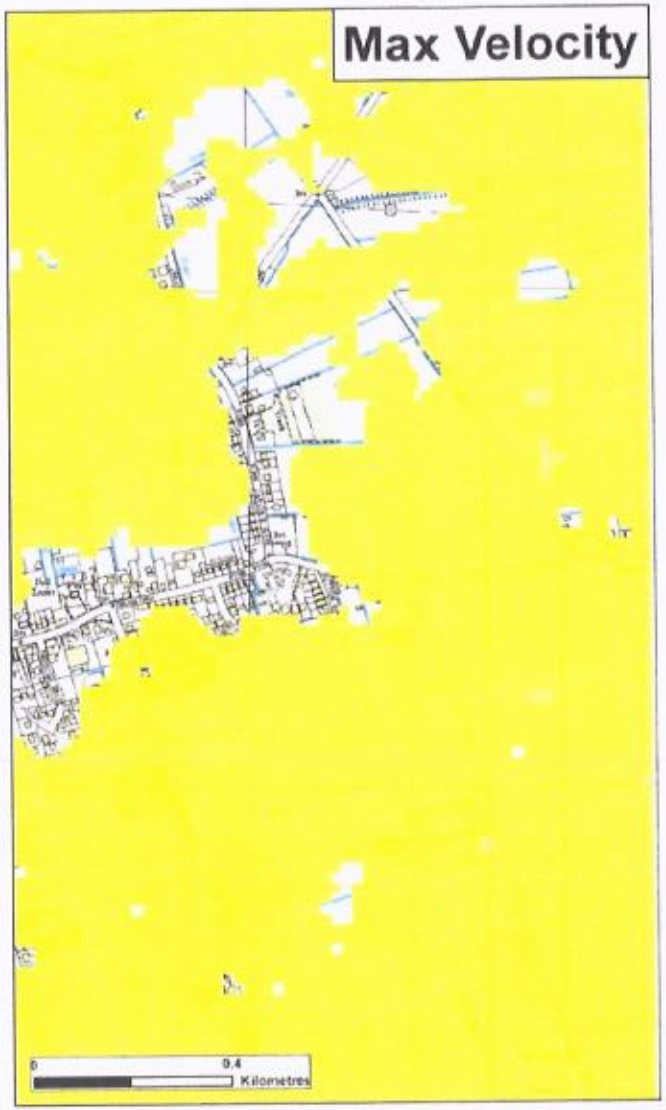
Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Centred on TF4016118466

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- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 2.0
- 2.0 +

Max Velocity (m/s)

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

e ed	August 2016	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2016-1812

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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Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

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