FLOOD RISK ASSESSMENT

PROPOSED ERECTION OF 1 NO. DWELLING & DOUBLE GARAGE

Chapel Lane, Friskney, Boston, Lincolnshire, PE22 8RX

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CONTENTS

APPENDICES

1 INTRODUCTION

1.1 This Flood Risk Assessment (FRA) accompanies a planning application for the construction of 1 no. dwelling off Chapel Lane in Friskney.

1.2 The Government has placed increasing priority on the need to take full account of the risks associated with flooding at all stages of the planning and development process. This course of action seeks to reduce the future damage to property and risk to life resulting from incidents of flooding. National Planning Policy does not prevent all development in flood risk areas and this would be unsustainable and result in economic stagnation, depriving existing communities of much needed homes, services, employment opportunities etc. It is in the essential interests of the vitality of settlements and for the wider economic and social wellbeing of the community, that development opportunities are not unnecessarily constrained. Accordingly, the aims of this site-specific FRA will be as follows:

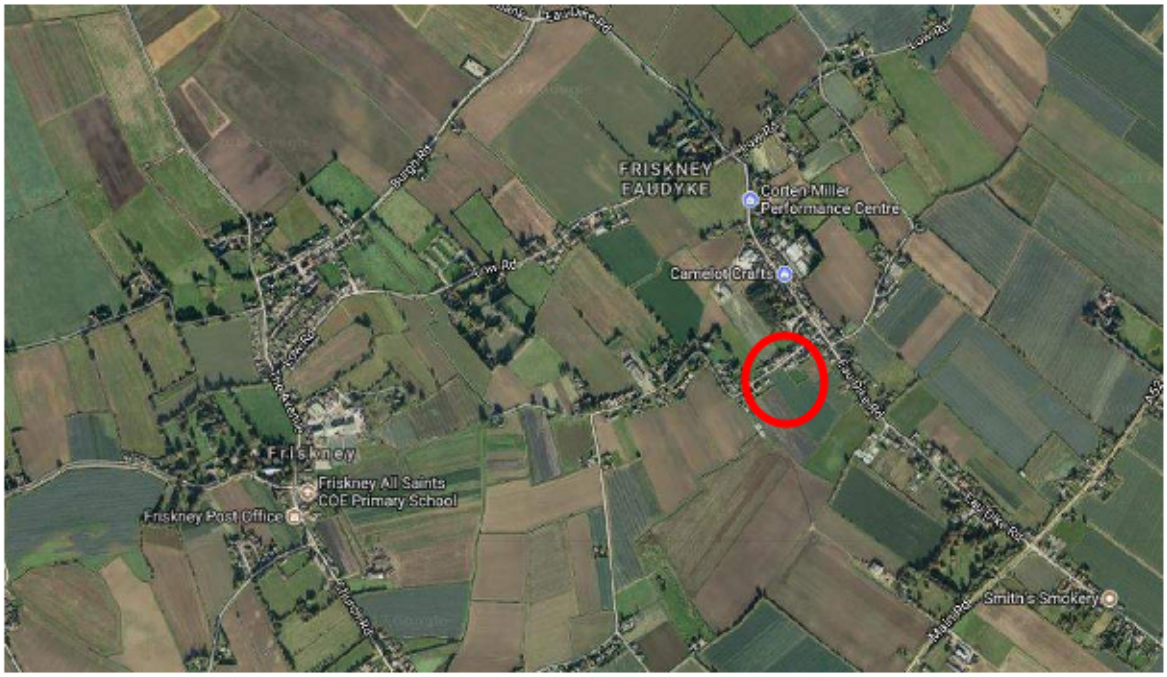
- Identify and address flood risk issues associated with the development.
- Assess if the project is likely to be affected by flooding from all relevant sources both now and in the future.
- Assess whether the project will increase the flood risk elsewhere.
- Demonstrate that the project is safe and where possible, reduces flood risk.
- Propose measures to deal with the identified effects and risks.

1.3 It should be noted that this FRA is an adaptation of the previous one submitted with the extant application S/053/01289/16, which was agreed in principle.

2 SITE LOCATION

2.1 The application site is located on the eastern side of Friskney and on the southern side of Chapel Lane (see Figure 1). The Ordnance Survey Grid reference for the centre of the site is TF 547362 355686.

2.2 The site, which is approximately 0.07 hectares in area, is generally flat and at the same level as the neighbouring properties. The site is located within the settlement boundary for Friskney Eaudyke as defined in the East Lindsey District Council (ELDC) Local Plan; see Figure 2. The area outlined in red in Figure 2, identified with a letter 'A', is land identified for residential development in the Local Plan. This area has already seen some properties built since the Local Plan was produced and includes the application site.



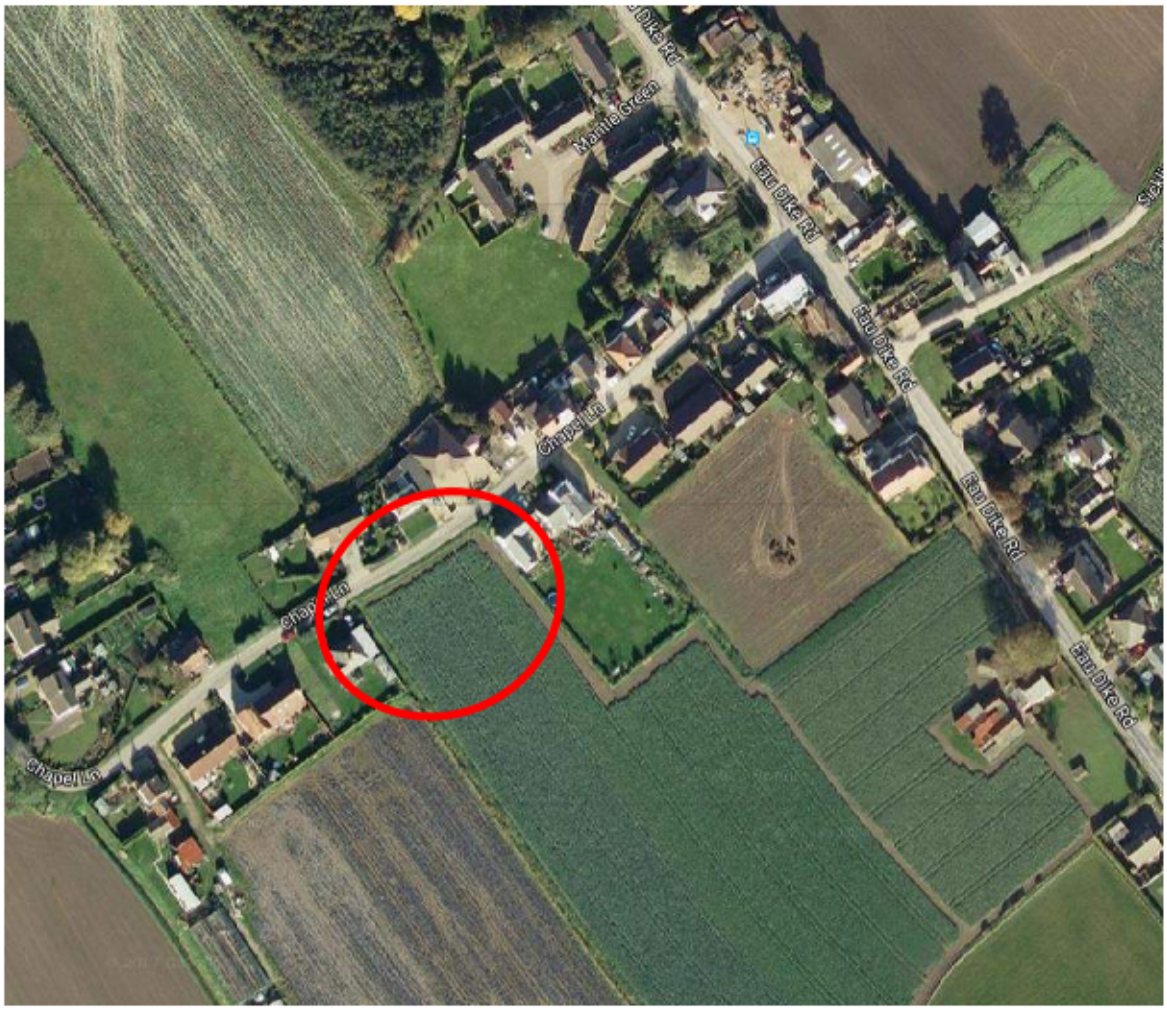


FIGURE 1: Aerial photographs highlighting location of site.

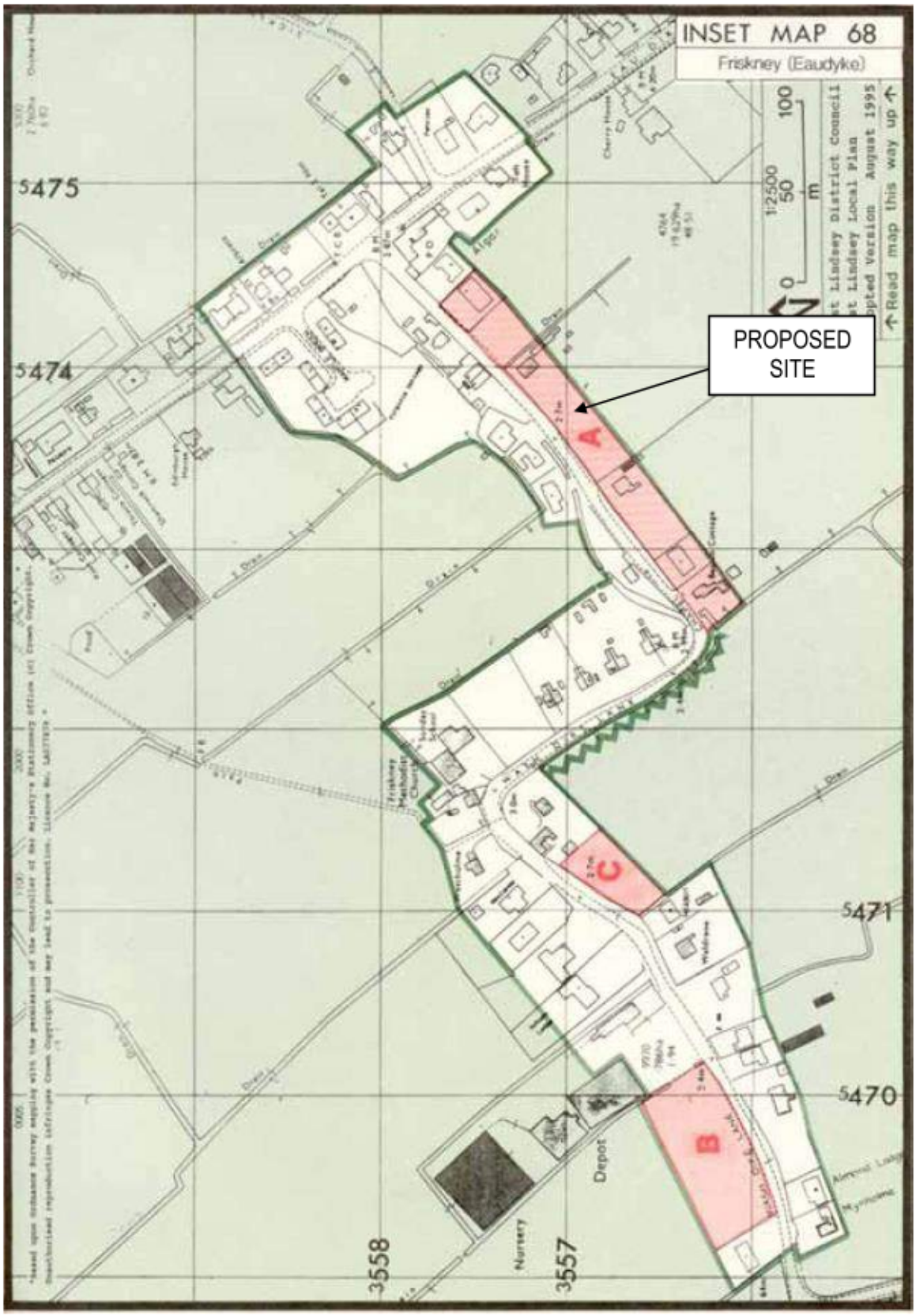


FIGURE 2: ELDC Local Plan Inset Map – Friskney Eaudyke (site highlighted).

2.3 The Flood Map for Planning service (https://flood-map-for-planning.service.gov.uk) shows that the site is in an area designated as Flood Zone 3 (Figure 3). This map indicates the risk of flooding to the site, assuming no flood defences exist, for a flood event with 1 in 200-year chance of occurring from the sea. The more detailed Hazard Maps show the level of risk and depth of water to the site and are discussed later in this report.

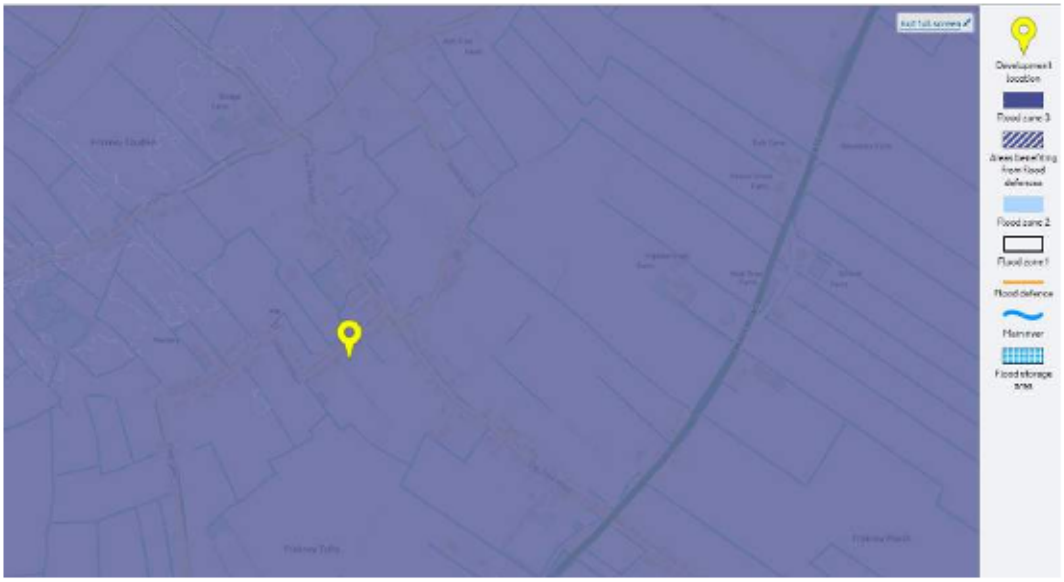


FIGURE 3: Extract from the 'Flood Map for Planning' service (www.gov.uk); proposed site highlighted.

2.4 The gov.uk website provides a map which enables users to check the flood risk throughout the country. This website states that the *'flood risk from rivers or the sea is low'*; demonstrating this on the map shown in Figure 4. In relation to this area the website states that;

'Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. This takes into account the effect of any flood defences in the area. These defences reduce, but do not completely stop the chance of flooding as they can be overtopped, or fail.'

2.5 Essentially, the difference between the two maps is that one considers the presence of defences (Figure 4) whilst the other does not (Figure 3). The significance of the defences will be discussed later in this assessment.

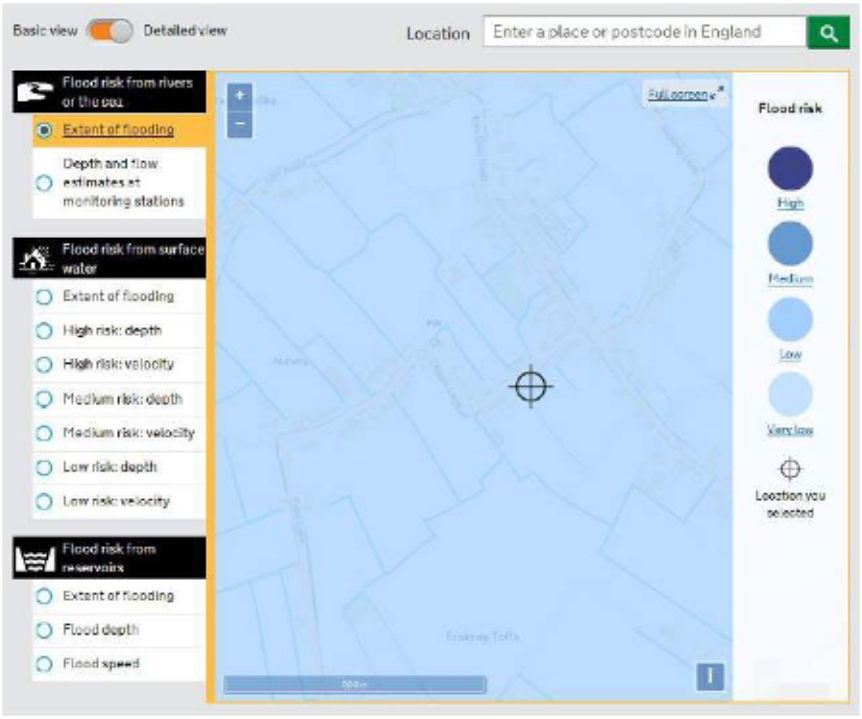


FIGURE 4: Long term detailed flood map for risk from rivers or the sea (source:gov.uk)

2.6 Figure 5 demonstrates that the site is not in an area at risk from surface water flooding.

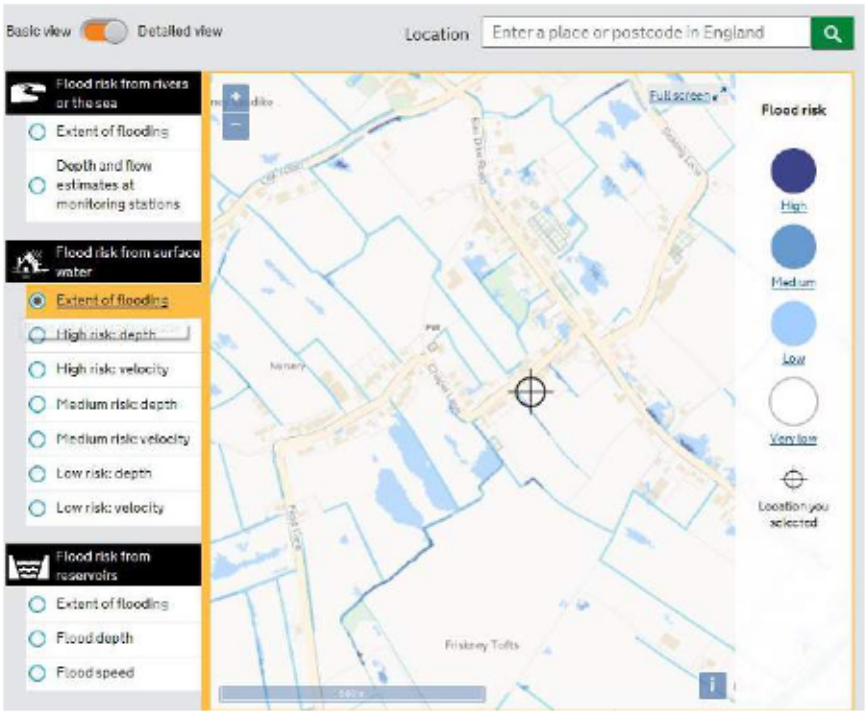


FIGURE 5: Long term detailed flood map for risk from surface water (source:gov.uk)

3 PROPOSED SCHEME

3.1 The proposed scheme involves the erection of 1 no. detached dwelling. The dwelling will be 1½ storeys high and will have a detached double garage. All bedrooms will be located on the first floor. The property will have its own vehicular access off Chapel Lane.

4 INVOLVEMENT

4.1 Flood data has been obtained from the Environment Agency and is enclosed at Appendix A.

5 THE SEQUENTIAL & EXCEPTION TESTS

5.1 The sequential and exception tests have already been completed and agreed with planning under the extant application S/053/01289/16.

5.2 This FRA has been prepared in accordance with the NPPF (and its accompanying Planning Practice Guidance). The dwelling has been specifically designed to mitigate against the risk from flooding and later in this document it will be demonstrated that these measures are appropriate and will make the dwelling safe for at least its lifetime.

6 FLOOD HISTORY

6.1 The Environment Agency has advised that they have no records of flooding around the application site.

7 ASSESSMENT OF POTENTIAL SOURCES OF FLOODING

7.1 Table A summarises the typical sources of flooding and assesses whether they will have any effect on the proposed dwelling. The potential sources of flooding have been identified as tidal (from a breach of the sea defences) and fluvial (local watercourses). The area surrounding the site is not known to suffer from ground water problems and there is no significantly higher ground adjacent to the

development which could promote overland flow of water across the site. There are also no depressed areas which could encourage ponding and no evidence of ponding has been observed.

7.2 Although the site is located over 3.5km from the coast the North Sea is the principal source of flood risk. The Hazard Maps provided by the Environment Agency show the hazard rating, depth and velocity of water for present day and future scenarios for either a breach or overtopping of the sea defences. The Hazard Maps are attached at Appendix A, whilst a comparison between these maps and the proposed development can be seen at Figure 7.

7.3 The Environment Agency have said that the 1 in 200 maps (for 2115) should be used as a basis for developments of at least two-storeys, with the 1 in 1000 maps (2115) used for single storey dwellings. The risks shown by the Hazard Maps for is summarised in Table B.

TABLE A: POSSIBLE FLOODING MECHANISMS

Source	Risk	Comment
Fluvial	Low	Local watercourses and drains.
Tidal/Coastal	Low	If a breach/overtopping of the defences occurred
Pluvial (drainage)	Low	On site run off.
Groundwater	No	Unlikely due to local drainage network
Overland flow	No	No higher ground adjacent to the site
Blockage	No	No culverts or bridges close to the site
Infrastructure failure	No	No major infrastructure has been identified
Rainfall ponding	No	No depressed areas which could encourage ponding.

TABLE B: SUMMARY OF HAZARD MAPS*			
Breach Scenario	**Hazard Rating**	**Max Depth (m)**	**Max Velocity (m/s)**
Plot 1 (2 Storey)			
Year 2006, 1 in 200 (0.5%)	No risk		
Year 2115, 1 in 200 (0.5%)	No risk		
Mitigation required	None required		
Plot 2 (2 Storey)			
Year 2006, 1 in 200 (0.5%)	No risk		
Year 2115, 1 in 200 (0.5%)	'Low Hazard'	0 - 0.25	0 - 0.3
Mitigation required	FFL must be set 300mm above ground level		

* Notes:
- The above ratings/depths are in relation to the position of the dwellings themselves; there are areas within the curtilage which have different ratings/depths
- Both plots are dormer style dwellings and are therefore considered 2 storey; being assessed against the 1 in 200 chance maps (in accordance with the standing advice from the Environment Agency)

7.4 If overtopping occurred the depth and velocity of the flood water would be greater closer to the sea defences as reflected in the Overtopping Hazard Map. The risk of overtopping would also only occur for a small period either side of high tide. Again, during a breach the depth and velocity of water would be at its greatest directly behind the defence, reducing as the land raises further inland.

FIGURE 7: Hazard rating map for a 1 in 200 year breach (scenario year 2115) with red line boundary

7.5 The Breach Hazard Maps are based on computer modelling of simulated breaches at specific locations. Although these maps show a theoretical risk of flooding to the site should a breach occur, they do not consider the likelihood of a breach occurring. The likelihood of a breach occurring will depend on several factors, including the construction and condition of the defences in the area. The Environment Agency has confirmed that the site is protected from tidal flooding by earth embankments which are supplemented by saltmarsh. The defences are said to be in fair condition and provide protection against a flood with a 0.67% chance of occurring in any year (1 in 150-year chance). These defences are inspected regularly by the Environment Agency to ensure that any potential defects are identified early.

7.6 Local drainage of the area is controlled by Witham Fourth District Internal Drainage Board. It is considered that any flooding is likely to be local to the source and would not affect the proposed site. The risk of fluvial flooding is therefore considered to be low due to the distance to the watercourses, the horizontality of the surrounding

landscape character and the matrix of local drains and dykes which can act to the slow and intercept fluvial flood water.

8 POTENTIAL FLOODING IMPACTS

8.1 It is considered that the proposed development is unlikely to suffer from fluvial flooding. If flooding from the local drains and watercourses by overtopping was to occur during an extreme event it would result in very low velocity flooding with shallow depths of water. The volume of water would be displaced over a large area and would be intercepted by the high number of dykes and drains within the area. It is likely that sufficient time would be available to evacuate the site or take precautionary action.

8.2 The likelihood of the site being affected by overtopping of the sea defences is considered low given the height of the sea defences and the distance from the defences to the site. The Hazard Maps show that the site could be affected by a breach of the defences in the future. The likelihood of a breach is considered low given the current condition of the defences and the commitment to maintain and raise the defences in the future. However, whilst the likelihood of a breach in the sea defences is low, a risk of breaching remains. If a breach occurred the most extreme scenario would be that Plot 2 could be flooded to a maximum depth of 0.25m; 100mm above a standard damp proof course.

8.3 Whilst the development is stated to be within the flood plain the likelihood of flooding is low. Subject to appropriate mitigation measures (discussed in Section 9) the threat posed by potential flooding is also considered to be low. Given the current and future level of flood protection, together with the proposed mitigation measures, there is no reason to believe that there would be a risk to life or property at this site.

8.4 The amount of impermeable area within the site will be increased because of the development, affecting surface water runoff. Methods to reduce runoff are discussed further in Section 9. These methods will ensure that the development

has no or very little impact on the potential flood plain and will not increase the risk of flooding elsewhere.

9 MITIGATION MEASURES

9.1 A precautionary approach has been adopted to ensure that the development is safe and not exposed unnecessarily to flooding.

9.2 The ground floor level has been set at 2.890m AOD; protecting against the depth of flood water shown by the hazard maps for a 1 in 200-year chance event in 2115. It is felt that this is a safe and practical limit to which the ground floor can be raised without affecting the neighbouring properties and the character of the area whilst still being able to comply with regulations and standards such as the Building Regulations.

9.3 Additional physical measures which should be considered include:

- Solid ground floor construction.
- Electrical circuits and sockets to be raised as high as reasonably possible i.e. 1m above floor level in accordance with the BRE Publication: Design Guidance on Flood Damage to Buildings (1996). The position of sockets etc should also comply with the Building Regulations.
- Heating boilers to be wall mounted.
- Where possible, all service entries should be sealed (e.g. with expanding foam or similar closed cell material).

9.4 Further advice can be found in the following;

- Improving Flood Performance of New Buildings – Flood Resilient Construction (DCLG 2007)
- BRE Publication: Design Guidance on Flood Damage to Buildings (1996).

9.5 It is recommended that the dwelling is registered with the Environment Agency's 'Warnings Direct' flood warning system. The Agency provides this flood warning service in England and Wales and supports the public acting to prepare and respond when these warnings are issued. The warnings are provided for flooding

from rivers and the sea but not for localised flash flooding that cannot be predicted, for example from blocked or overloaded sewers or local groundwater flooding. The Agency issues warnings through media on TV and radio weather bulletins and on its website (www.environment-agency.gov.uk/floodline). In areas of risk, the Agency can send a warning message direct to people at home or at work by telephone, fax or pager using an Automatic Voice Messaging (AVM) system.

9.6 The amount of impermeable area within the site will be increased because of the development, affecting surface water runoff. Methods which can be used to reduce surface water runoff include;

- Soakaways - large underground pits filled with gravel; only permitted following the satisfaction of a permeability test.
- Permeable paving for paths and drives
- Water butts for external irrigation

9.7 Although the impermeable area of the site is increasing, it is felt that measures such as soakaways and permeable paving would ensure that the development has no harmful impact on the potential flood plain or neighbouring properties.

10 CONCLUSION

10.1 The following conclusions, in relation to the questions posed at the start of this document, are as follows:

10.2 *Identify and address flood risk issues associated with the proposed development:* The potential sources of flood risk have been discussed within this report. It has been established that tidal flooding is the main source of flood risk.

10.3 *Assess if the project is likely to be affected by flooding from all relevant sources both now and in the future:* The Hazard Maps show that the site could be at risk if a breach of the sea defences was to occur in the future scenario year of 2115. However, the likelihood of a breach is considered low given the current condition

of the defences. However, whilst the likelihood of a breach in the sea defences is considered low, a risk of breaching remains.

10.4 *Assess whether the project will increase the flood risk elsewhere:* It is considered that the development will have no harmful effect on the floodplain and will not increase risk elsewhere.

10.5 *Demonstrate the project is safe and where possible reduces flood risk overall and proposes measures to deal with the identified effects and risks:* The ground floors of each dwelling will be raised above the worst-case flood scenario.

10.6 The site has been identified in an area that is at risk from flooding, however national planning policy emphasises the need for a balanced flexible approach which addresses the risks of flooding whilst recognising the benefits of development. Flooding events are generally predicted with a two-hour warning being given on pending events and the road network is adequate to allow escape in the event of an unpredicted flooding event. The mitigation measures detailed further reduce the impact upon human life.

10.7 This report demonstrates the proposed development is compliant with the sequential and exception tests set out in the National Planning Policy Framework. It is therefore considered that planning permission should not be refused on flood risk grounds.

APPENIDX A

Environment Agency Data

Environment Agency

Ruth Rossiter
Lincs Design Consultancy
12 Vickers Lane
Louth, Lincolnshire
LN11 9PJ

Our ref: CCN/2017/61891

Date: 3/10/2017

Dear Ruth,

Provision of Flood Risk Information for land off Chapel Lane, Friskney (TF547362 355687) & Eau Dyke Road, Friskney (TF 547541 355667).

Thank you for your request to use our flood risk information in the development of the Flood Risk Assessment (FRA) for the above site. The information is set out below and attached. It is important you read any contextual notes on the maps provided.

We aim to review our information on a regular basis, so if you are using this data more than twelve months from the date of this letter, please contact us again to check it is still valid.

Flood Map

The attached map includes the current Flood Map for your area. The Flood Map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

In some locations, such as around the fens and the large coastal floodplains, showing the area at risk of flooding assuming no defences may give a slightly misleading picture in that if there were no flood defences, water would spread out across these large floodplains. This flooding could cover large areas of land but to relatively shallow depths and could leave pockets of locally slightly higher land as isolated dry islands. It is important to understand the actual risk of the flooding to these dry islands, particularly in the event of defence failure.

The Flood Map also shows the location of formal raised flood defences and flood storage reservoirs. It represents areas at risk of flooding for present day only and does not take account of climate change.

The Flood Map only indicates the extent and likelihood of flooding from rivers or the sea. It should also be remembered flooding may occur from other sources such as surface water sewers, road drainage, etc.

History of Flooding

With regards to the history of flooding I can advise we do not have any records of flooding in this area. It is possible other flooding may have occurred we do not have records for, and other organisations, such as the Local Authority or Internal Drainage Boards, may have records.

FLOODS DESTROY BE PREPARED

Tidal Flood Risk Information

Tidal Defence Information

The tidal defences protecting this site consist of earth embankments which are supplemented by saltmarsh.

They are in fair condition and reduce the risk of flooding to a 0.67% (1 in 150) chance of occurring in any year. We inspect these defences routinely to ensure potential defects are identified.

Tidal Flood Levels

The attached table shows our current best estimate for extreme tide levels.

Levels for the Humber Estuary have an assessment date of 2014, with others having an assessment date of 2006, which should be used in any consideration of future increases due to climate change.

Modelled Hazard Mapping

For certain locations we have carried out modelling to map the maximum values of flood depth, velocity and hazard rating (danger to people) resulting from overtopping and / or breaching of defences at specific locations for a number of scenarios.

At present this information is available along the full coastal / tidal floodplain, except the tidal Witham Haven in Boston (upstream of Hobhole) where only breaching and not overtopping has been modelled and the tidal River Welland upstream of Fosdyke Bridge where neither breaching nor overtopping are available. Hazard mapping is also available for fluvial flood risk in Northampton, Thrapston, Lincoln, Brigg, Wainfleet and some isolated rural locations.

The number of locations we have this information for is expected to increase in time.

Hazard Mapping – Breaching

The attached maps show the maximum values of flood depth, velocity and hazard rating (danger to people) resulting from breaching of the defences at specific locations for the scenarios below. For some locations the breach mapping also includes flooding from overtopping if this is expected in that scenario. The location of modelled tidal breaches is shown on a separate attached map.

- Year 2115 0.5% (1 in 200) chance
- Year 2115 0.1% (1 in 1000) chance

Your site is not affected by breaching of the defences for the present day (2006) scenarios.

Hazard Mapping – Overtopping

The attached maps show the maximum values of flood depth, velocity and hazard rating (danger to people) resulting from simulated overtopping of defences for the following scenarios:

- Year 2115 0.5% (1 in 200) chance
- Year 2115 0.1% (1 in 1000) chance

Your site is not affected by overtopping of the defences for the present day (2006) scenarios.

FLOODS DESTROY BE PREPARED

Waterside House, Waterside North, Lincoln, LN2 5HA.
Customer services line: 03708 506 506
Email: enquiries@environment-agency.gov.uk
www.gov.uk/environment-agency

Development Planning
If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of our information for Flood Risk Assessments. We recommend that you undertake a formal pre-application enquiry using the form available from the website.

https://www.gov.uk/planning-applications-assessing-flood-risk

https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Climate change will increase flood risk due to overtopping of defences. Please note the climate change data included has an allowance for 20% increase in flow. Updated guidance on how climate change could affect flood risk to new development - 'Flood risk assessments: climate change allowances' was published on GOV.UK in February 2016. The appropriate updated climate change allowance should be applied in a Flood Risk Assessment.

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

Supporting Information
Please see the Standard Notice or licence for details of permitted use. The Standard Notice can be found at the link below.
http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

We respond to requests for recorded information we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

Further information on flood risk can be found on the GOV.UK website at:
https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

Other Flood Risk Management Authorities
The information provided with this letter relates to flood risk from main river or the sea. Additional information may be available from your Lead Local Flood Authority (ie county council or unitary authority) or, where they exist, the Internal Drainage Board.

Waterside House, Waterside North, Lincoln, LN2 5HA.
Customer services line: 03708 506 506
Email: enquiries@environment-agency.gov.uk
www.gov.uk/environment-agency

Further Contact
I hope we have correctly interpreted your request. If you are not satisfied with our response to your request for information, you can contact us within two calendar months to ask for our decision to be reviewed.

If you have any queries or would like to discuss the content of this letter further please contact Simon Doncaster using the details below.

Yours faithfully,

Simon Doncaster

FOR Ian Cappitt
Partnerships and Strategic Overview Team Leader - Witham

Direct dial 02084749428
Direct e-mail PSOLINCS@environment-agency.gov.uk

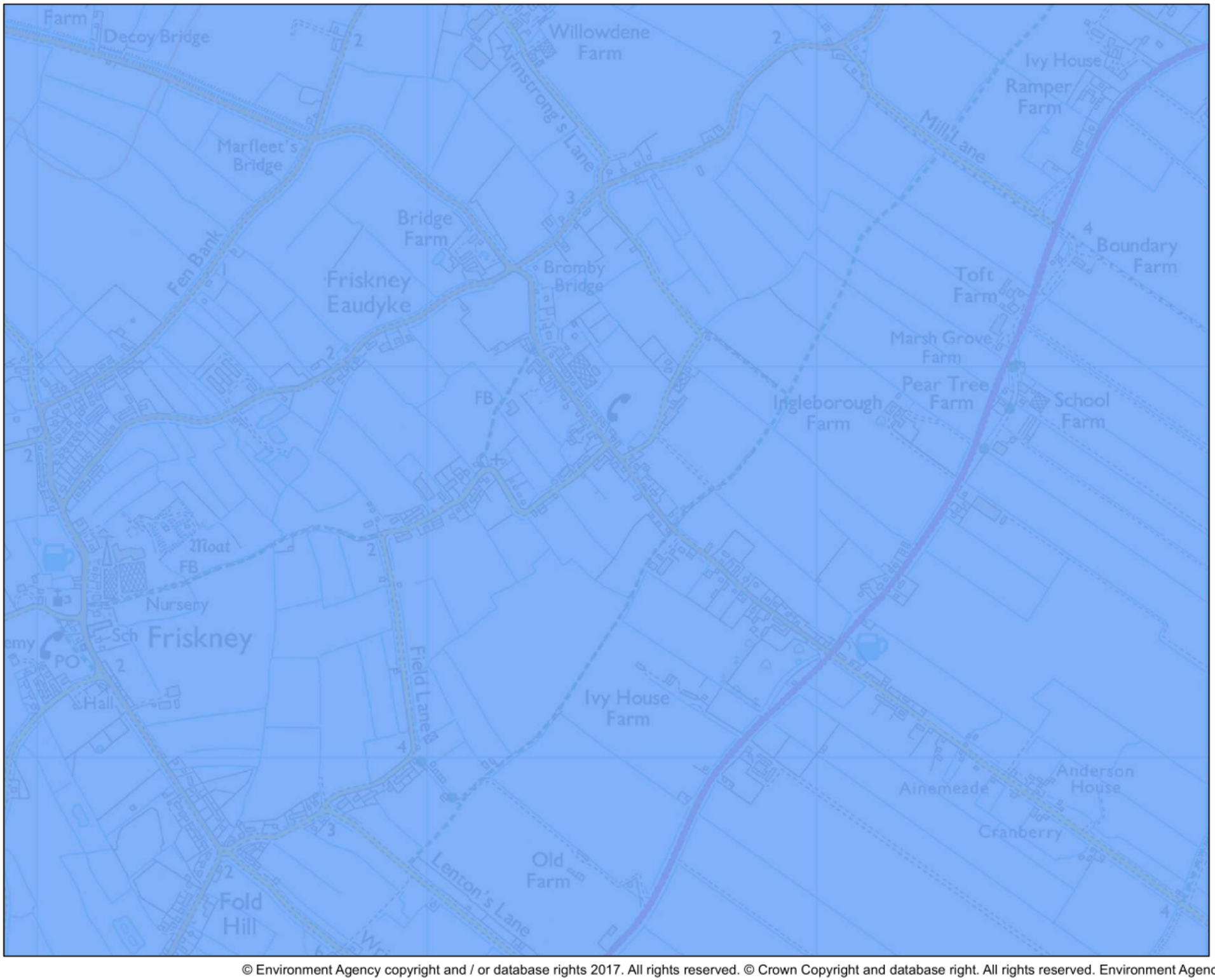
Enc.
Flood Map
Estimated Tide Levels
Tidal Breach Locations Map
Hazard Mapping – Breaching (2 maps)
Hazard Mapping – Overtopping (2 maps)

CUSTOMER SERVICE EXCELLENCE CSE

Awarded to Lincolnshire & Northamptonshire Area

FLOODS DESTROY BE PREPARED

Flood Map centred on TF 47462 55709 - created October 2017 [Ref: CCN-2017- 61891]



Environment Agency

Scale 1:10,000

N W E S

- Main River
- Raised Defences
- Flood Storage Areas
- Area at Risk of Flooding from Rivers or The Sea
- Extreme Flood Outline

Dark blue shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year.

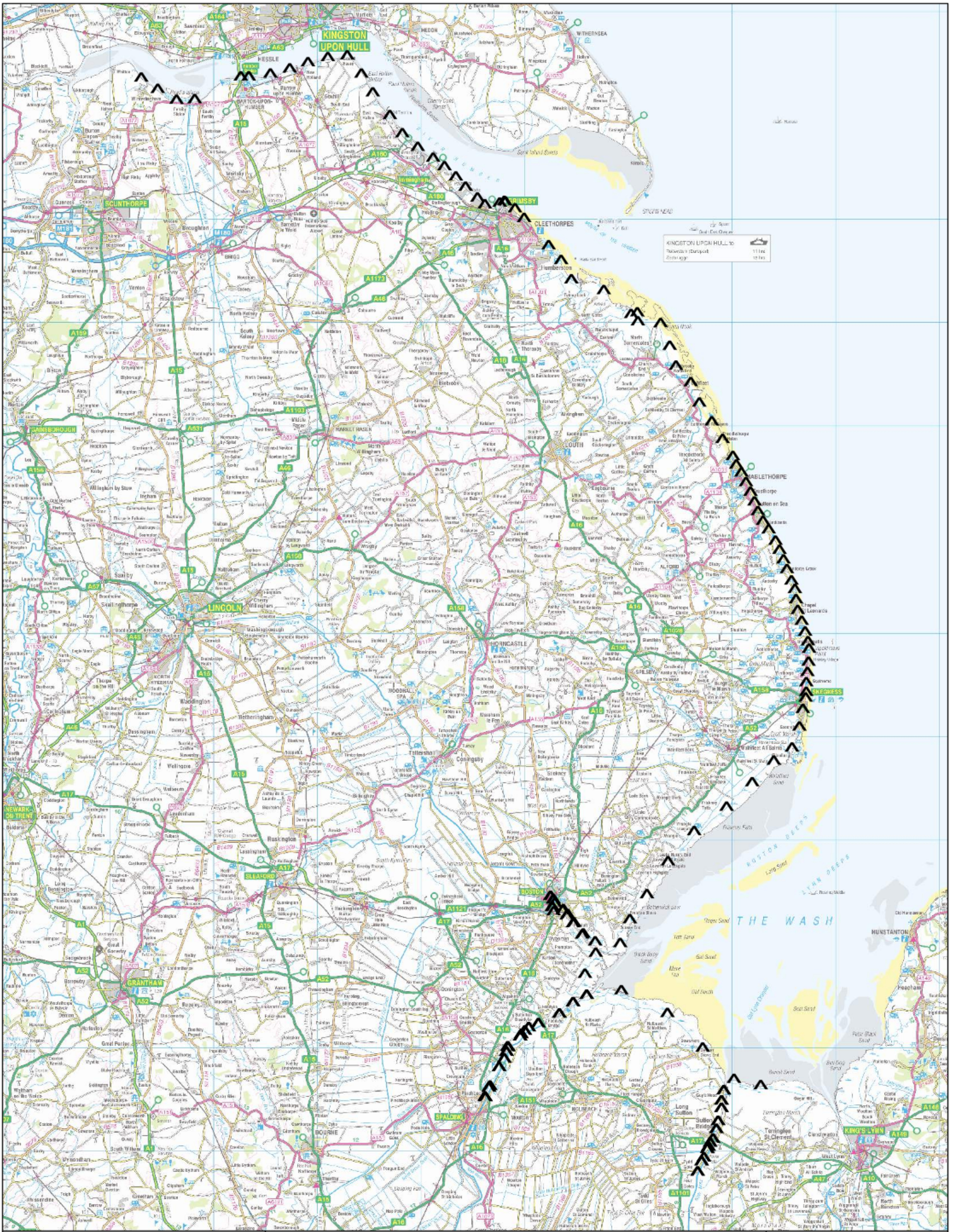
- or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.

Light blue shows the extent of the Extreme Flood Outline, which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Sites outside the two extents, but behind raised defences, may be affected by flooding if the defences are overtopped or fail.

Created by the Partnerships and Strategic Overview Team, Lincoln

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk



^ **Modelled Breach Locations**

0 3.5 7 14 Kilometres

This map indicates the location of where we have modelled the consequence of breaches in the defences along the coastline and tidal rivers. We have mapped the the maximum values of Hazard Rating (Danger to People), Depth and Velocity.

We have not assumed that all breaches occur at the same time, but have modelled each breach individually and overlaid the results to find the maximum values.

Our modelling only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. Our defences generally provide a good standard of flood defence but a risk of breaching remains.

Please contact the Environment Agency for information on how these maps are used in the management of flood risk.

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

Produced by the Partnership and Strategic Overview Team, Lincoln
General Enquiries No: 03708 506 506

Northern Area Tidal Hazard Mapping

Location of Modelled Breaches

Tidal Level Location Map
Lincolnshire & Northamptonshire Area

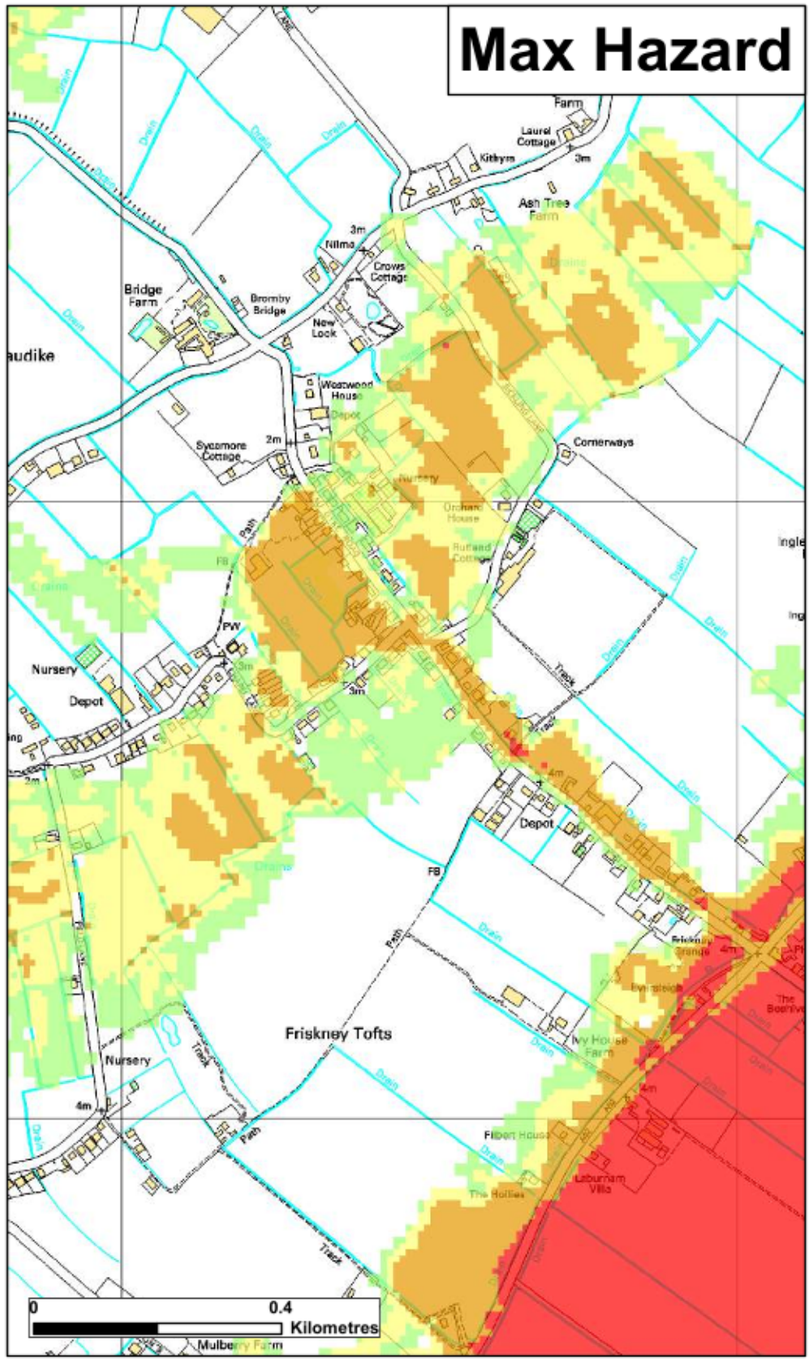
Environment Agency

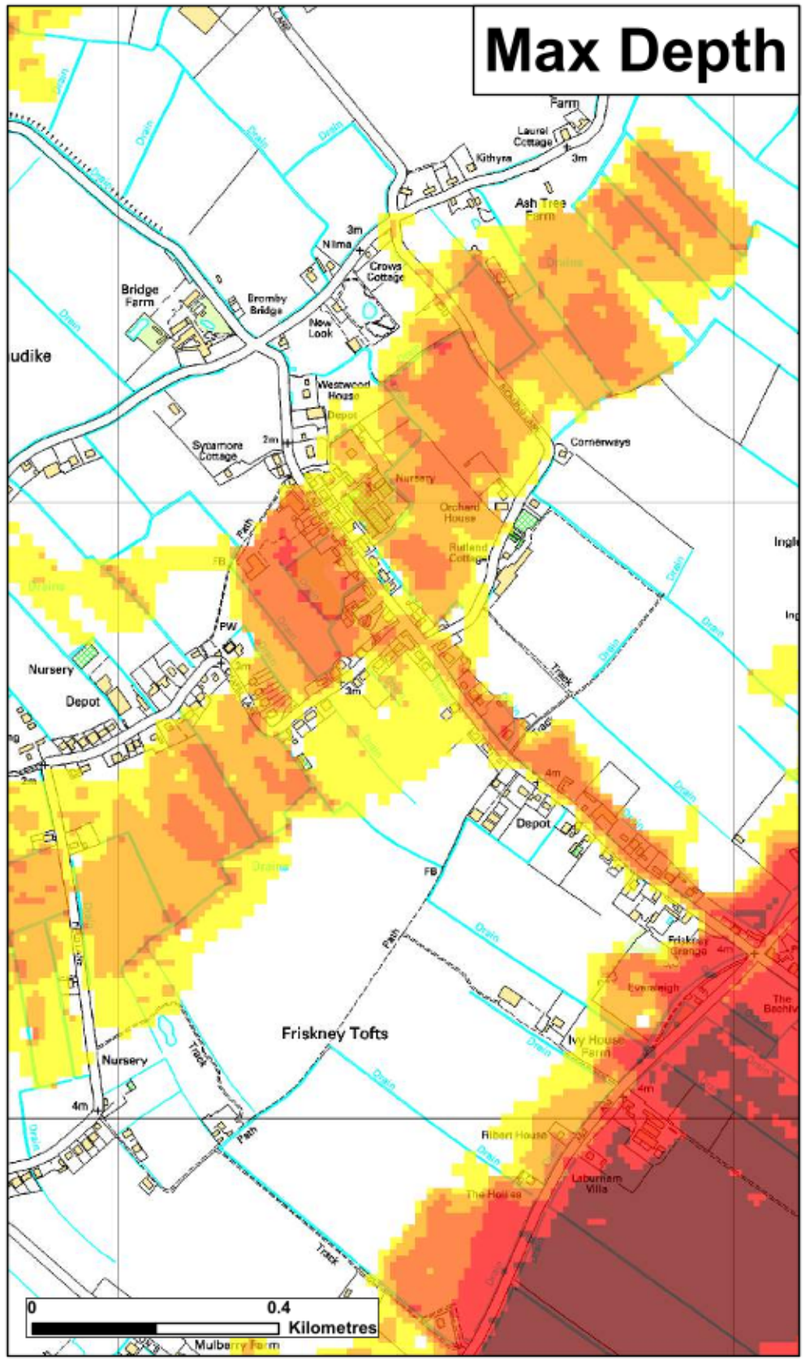
Tidal Water Levels for the South Humber, East Coast and The Wash

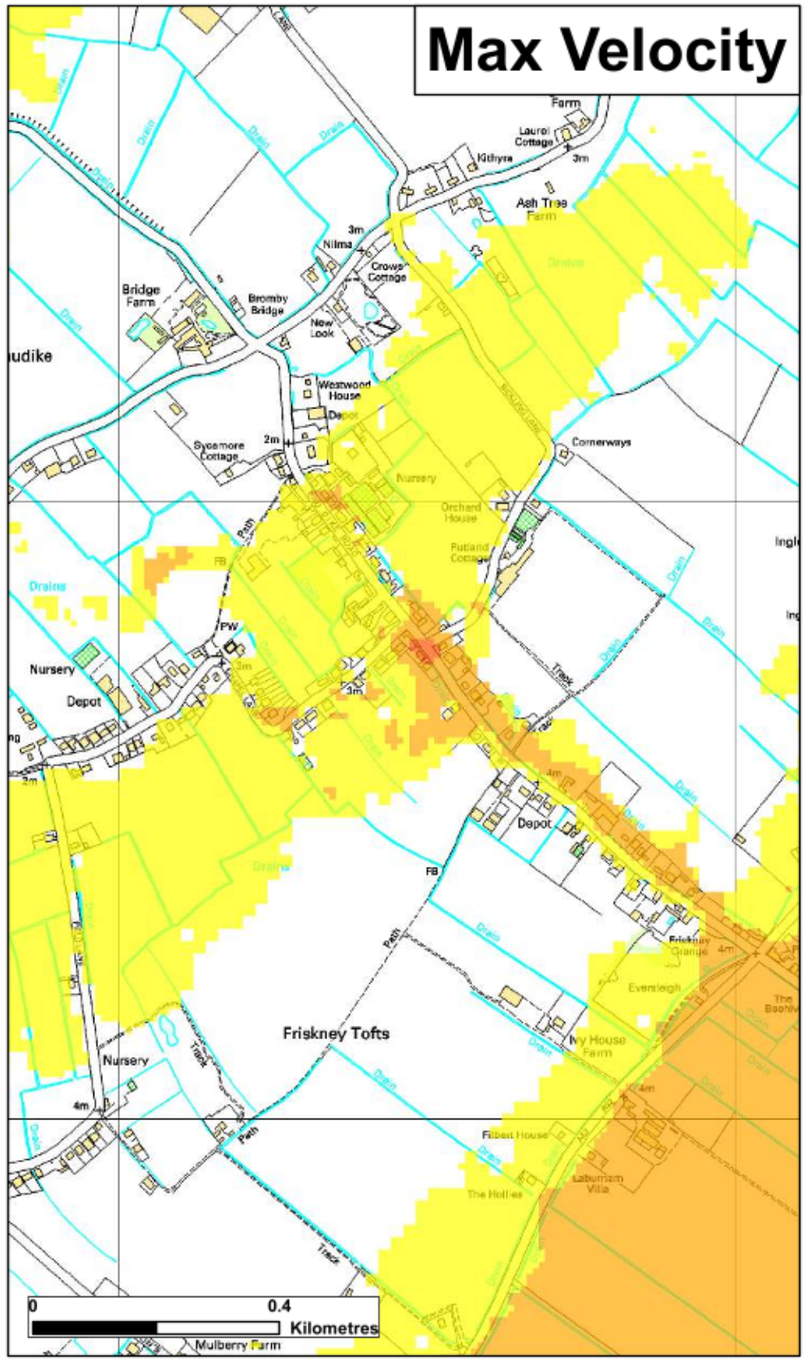
The table below shows still water levels for locations, from the above location map, around the South Humber Estuary, East Coast and The Wash. It is important to note the following:

- The base date for the data is 2014 for the South Humber and 2006 for the East Coast and The Wash.
- The data are still water levels. Depending on the use of the data it may be necessary to consider wave heights and / or joint probability analysis of water level and other variables.
- The water level quoted is the 'Best Estimate' water level. Depending on the use of the data it may be necessary to carry out sensitivity testing. Upper and Lower 95% confidence bandings are available upon request.
- Levels for other annual chance scenarios are available if required.

Ref	Location	Easting	Northing	Annual Chance (1 in x) of Tide Level metres ODN					
				1	10	50	100	200	1000
HUMBER									
H030	Tetney	535420	403180	3.94	4.29	4.56	4.69	4.82	5.15
H050	Buck Beck	532700	406580	4.03	4.36	4.62	4.74	4.87	5.18
H060	Grimsby	527878	411346	4.10	4.43	4.70	4.82	4.95	5.27
H080	Haborough Marsh	520790	415740	4.26	4.61	4.88	5.01	5.14	5.47
H090	Immingham	519141	417449	4.26	4.61	4.88	5.01	5.14	5.47
H100	South Killingholme	518700	417120	4.41	4.77	5.05	5.18	5.32	5.66
H130	North Killingholme	516530	420000	4.51	4.87	5.15	5.28	5.42	5.77
H150	East Halton	514450	422870	4.59	4.96	5.25	5.39	5.53	5.89
H170	Goxhill	511970	425440	4.67	5.04	5.34	5.47	5.61	5.95
H200	New Holland	508020	424330	4.87	5.26	5.55	5.68	5.81	6.12
H210	Barrow Haven	506380	422620	4.92	5.31	5.60	5.73	5.86	6.17
H220	Ferriby	497550	421150	5.04	5.42	5.67	5.77	5.86	6.04
H230	Winterton	493420	422830	5.14	5.51	5.74	5.83	5.90	6.02
H250	Blacktoft	484247	424190	5.25	5.62	5.83	5.90	5.96	6.04
H270	Goole	474857	422960	5.46	5.85	6.07	6.15	6.21	6.29
East Coast									
~	Great Eau	545500	393800	3.80	4.19	4.46	4.57	4.69	4.96
~	Boygrift	553300	379800	3.84	4.24	4.53	4.65	4.77	5.05
~	Burgh Sluice	555190	358620	4.26	4.45	4.76	4.90	5.03	5.34
Wash									
~	Hobhole	536610	339940	4.82	5.30	5.64	5.78	5.93	6.27
~	Lawyers Sluice	540750	334550	4.84	5.32	5.66	5.80	5.95	6.29
~	West Lighthouse	549150	325750	4.88	5.37	5.71	5.86	6.01	6.35
~	Grand Sluice	532400	344500	4.88	5.33	5.65	5.78	5.93	~
~	Fosdyke Bridge	531700	332200	4.91	5.38	5.71	5.85	5.99	~
~	Marsh Road	526000	324000	5.04	5.44	5.73	5.85	5.98	~
~	Wisbech	546100	310000	4.83	5.25	5.53	5.66	5.78	~
~	Dog In Doublet	527300	299300	3.67	4.00	4.22	4.32	4.42	~







★ **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
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Date Printed	October 2017	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2017-61891

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.

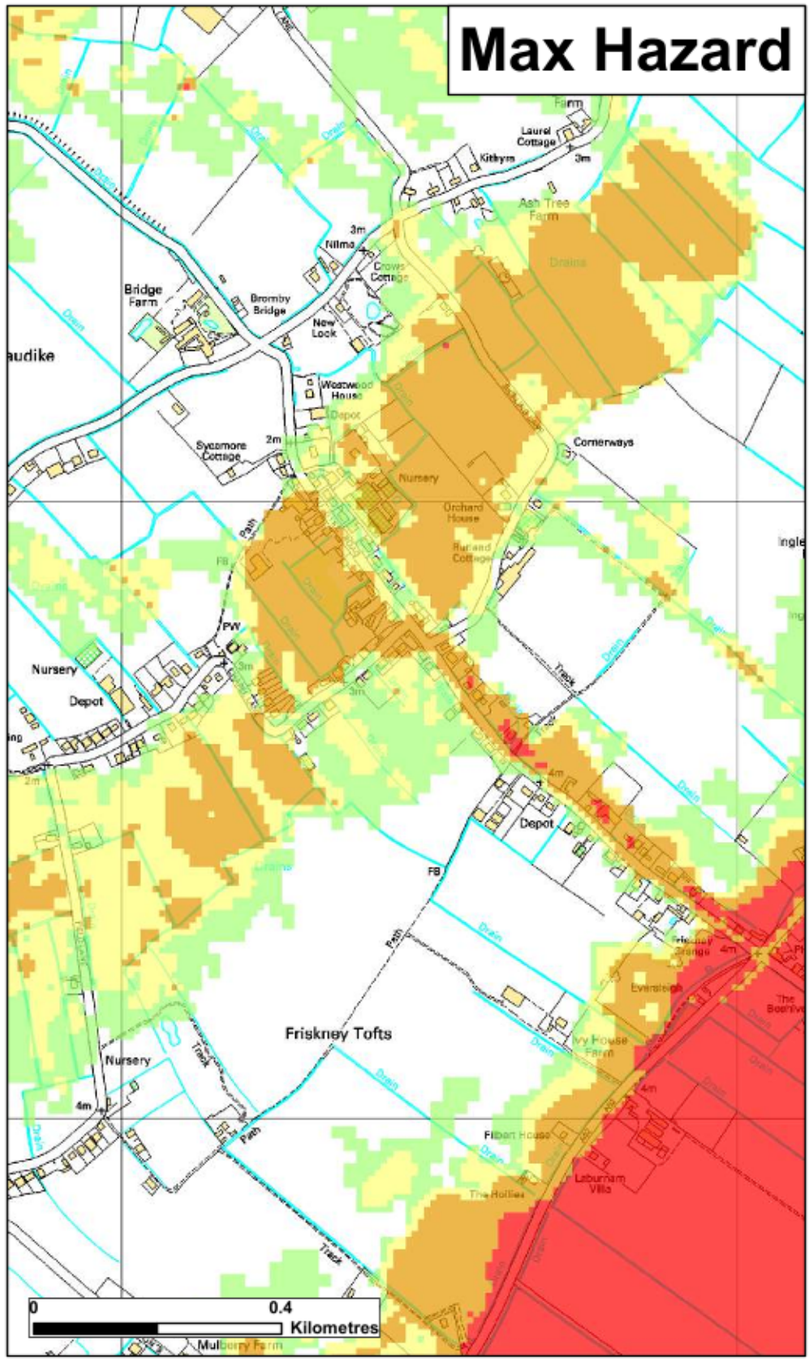
The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

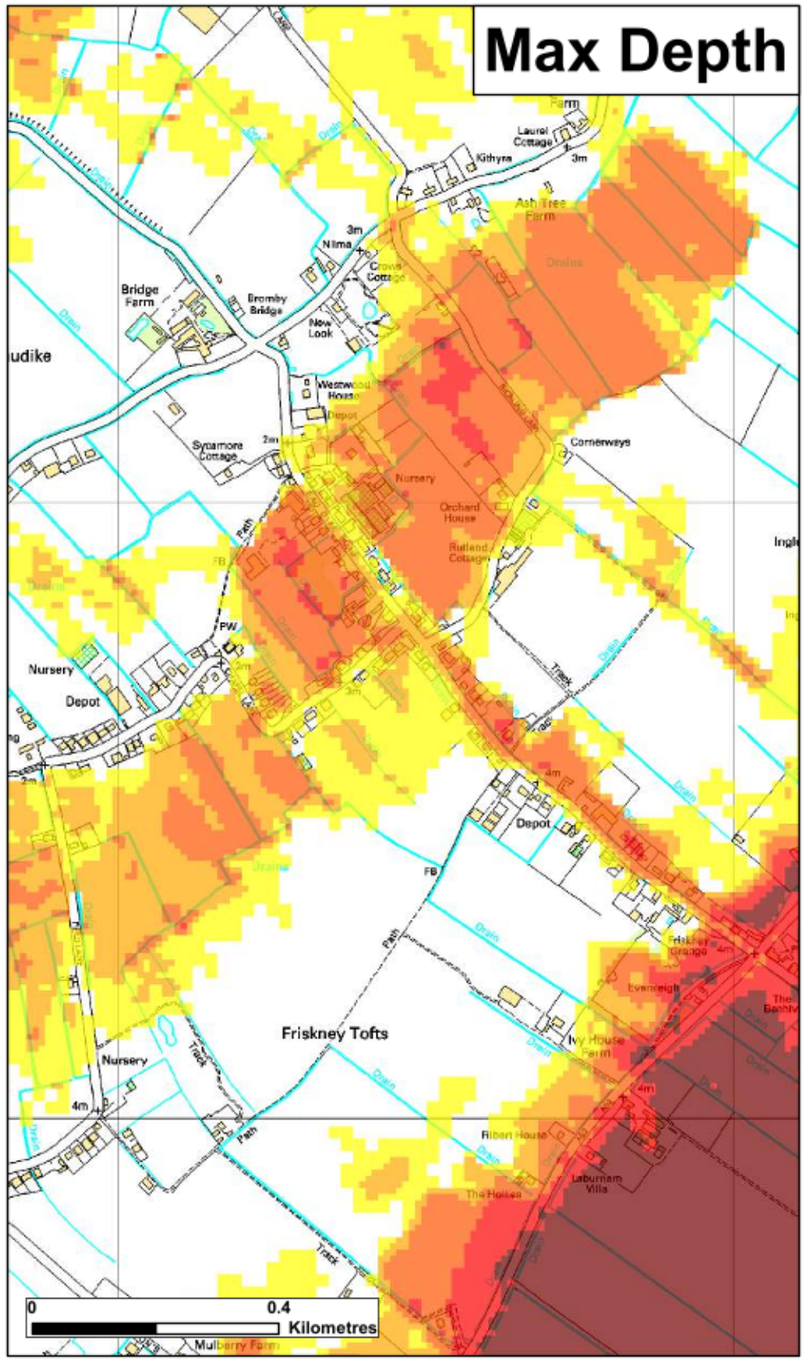
The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely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

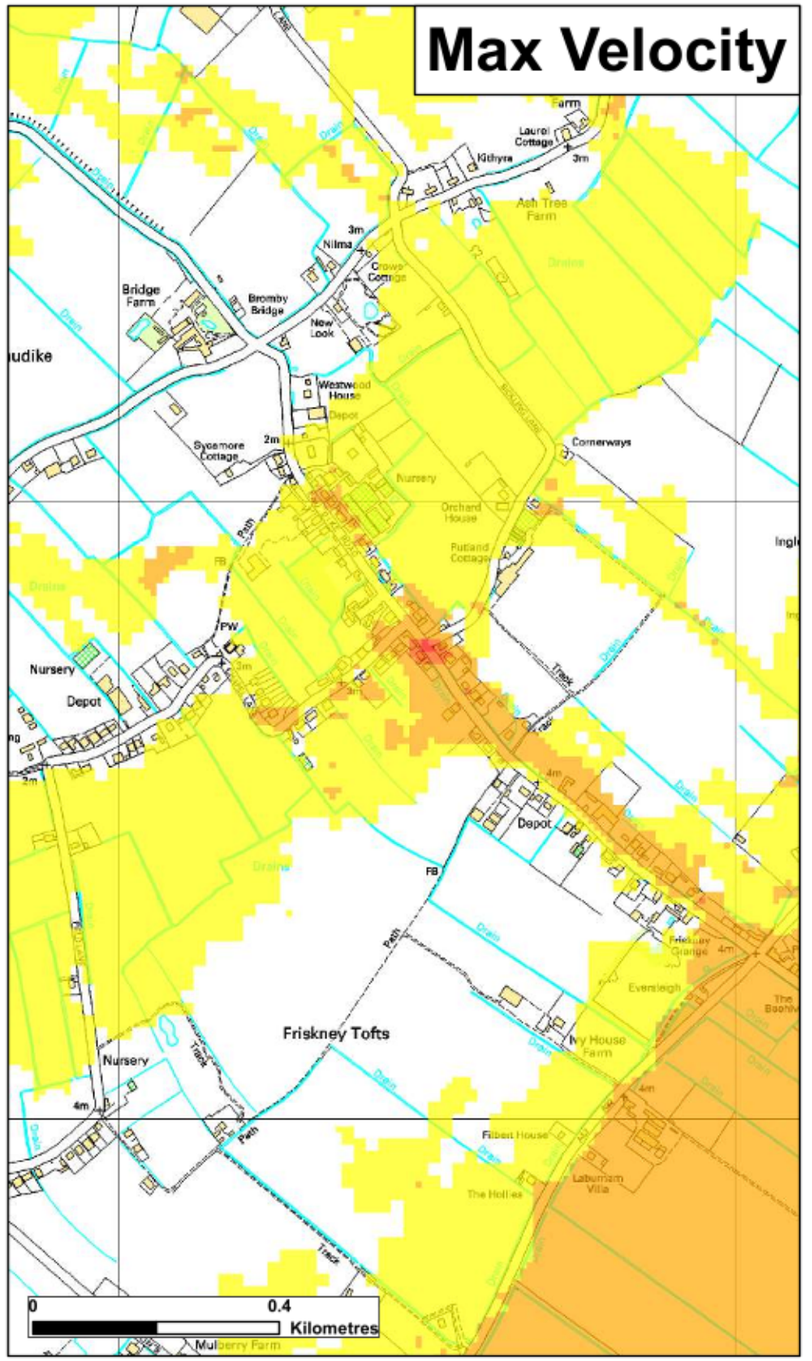
Environment Agency

Lincolnshire and Northamptonshire Breach Hazard mapping

Map Centred on TF 47462 55709







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Date Printed	October 2017	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2017-61891

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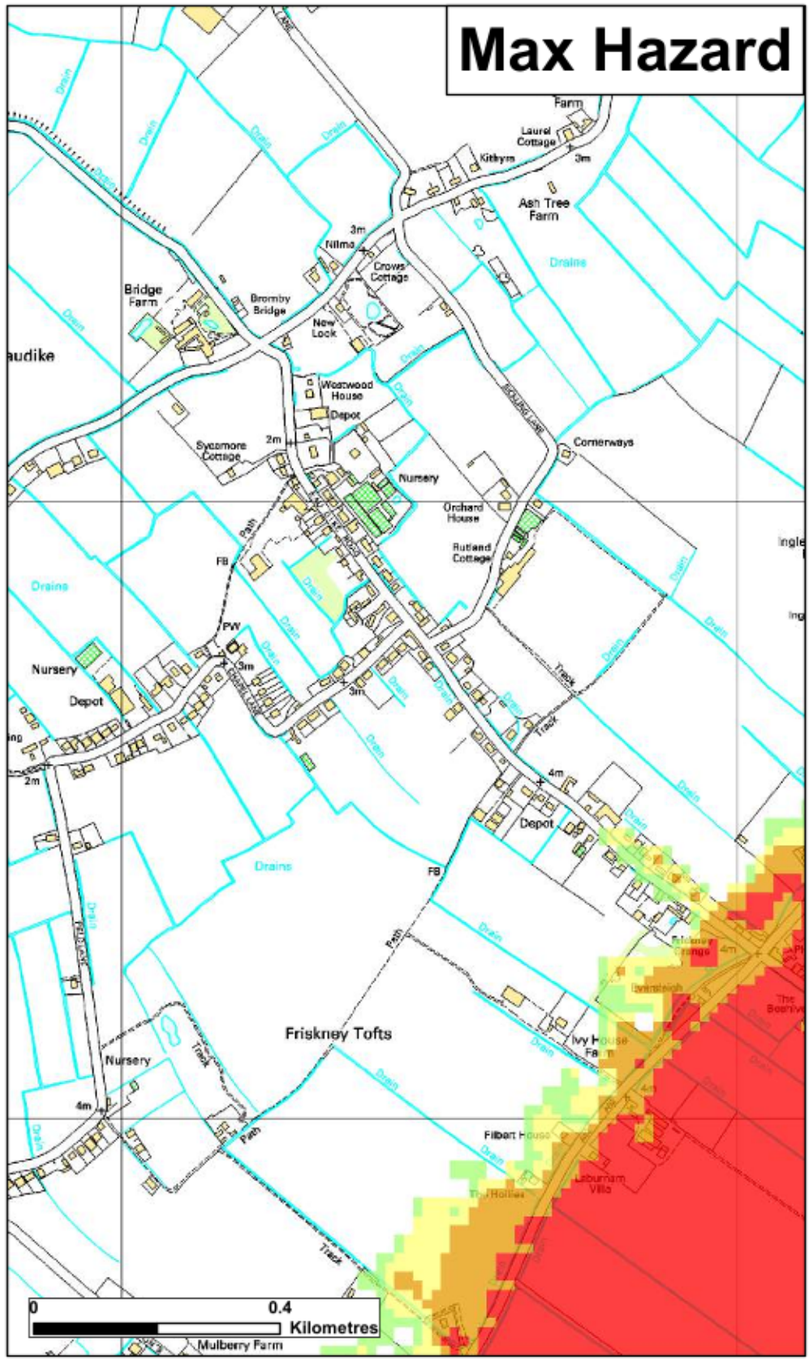
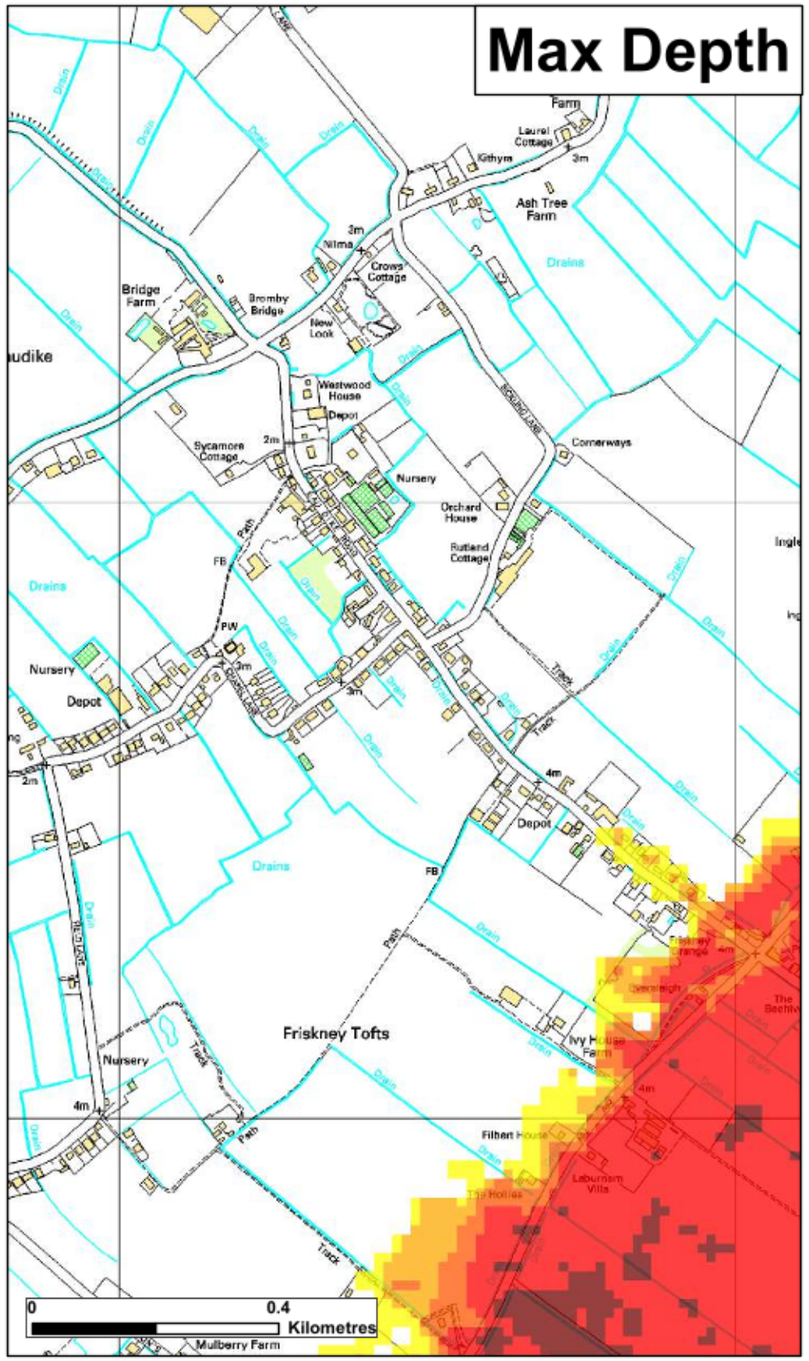
General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

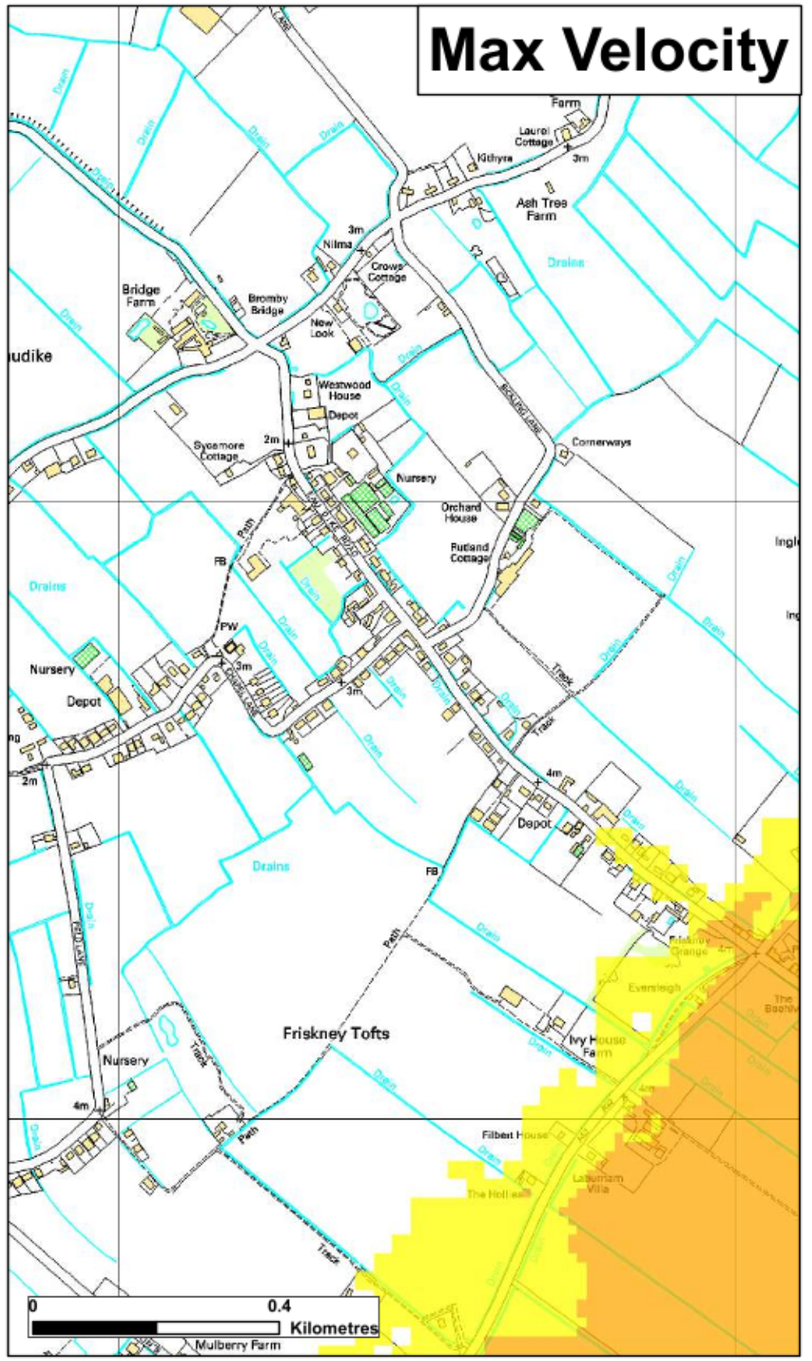
Environment Agency

Lincolnshire and Northamptonshire Breach Hazard mapping

Map Centred on TF 47462 55709







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Date Printed	October 2017	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2017-61891

The map is based on computer modelling of simulated overtopping of the main coastal defences for specific tidal scenarios. It does not include overtopping along the following tidal rivers which are currently being investigated: Witham Haven (upstream of Hobhole), and Welland (upstream of Fosdyke Bridge)

The map only considers the consequences of overtopping of the defences, and does not show the possible consequences of breaches of the tidal defences. Separate maps of the flood extent from just breaching of the defences are available.

For future climate change scenarios it is assumed that defences remain at 2006 heights.

These maps do not replace the flood zone maps used in the National Planning Policy Framework (NPPF)

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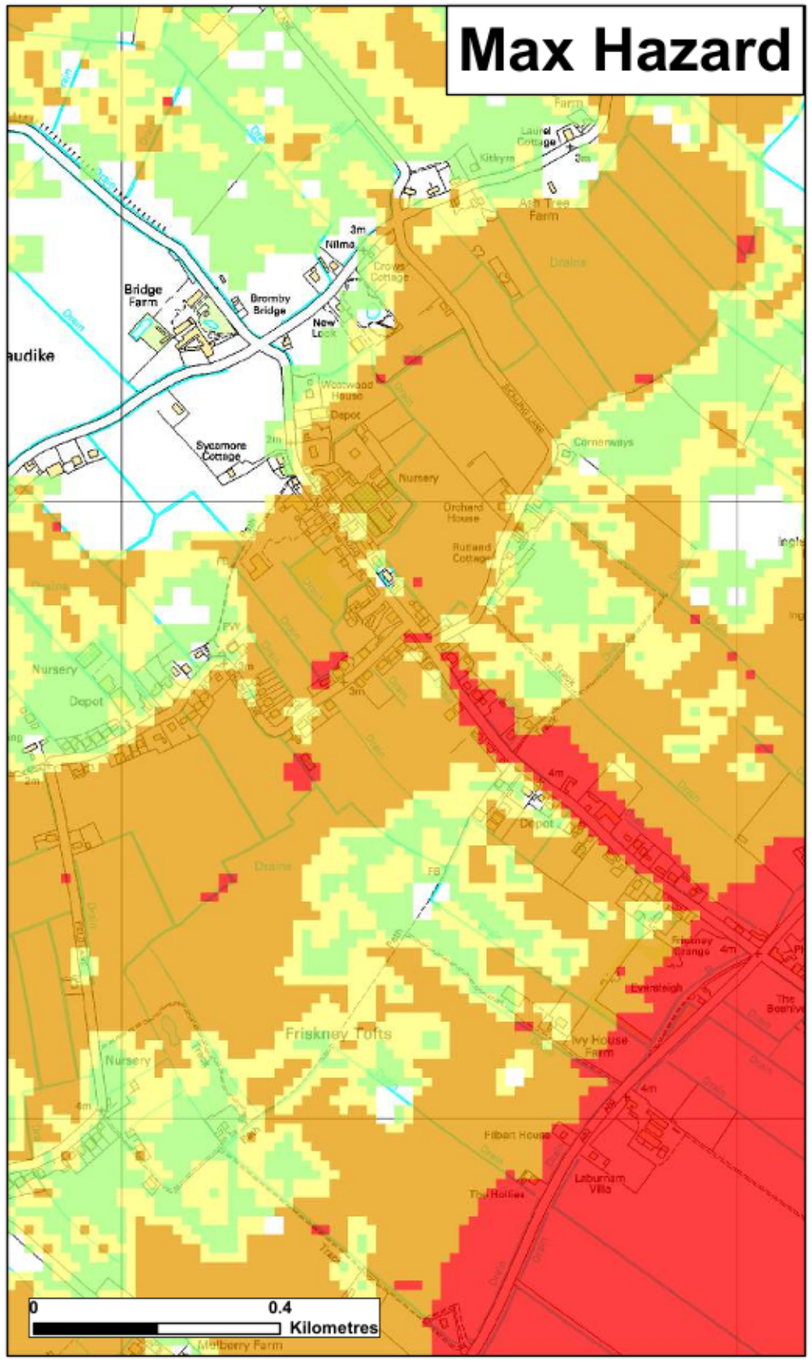
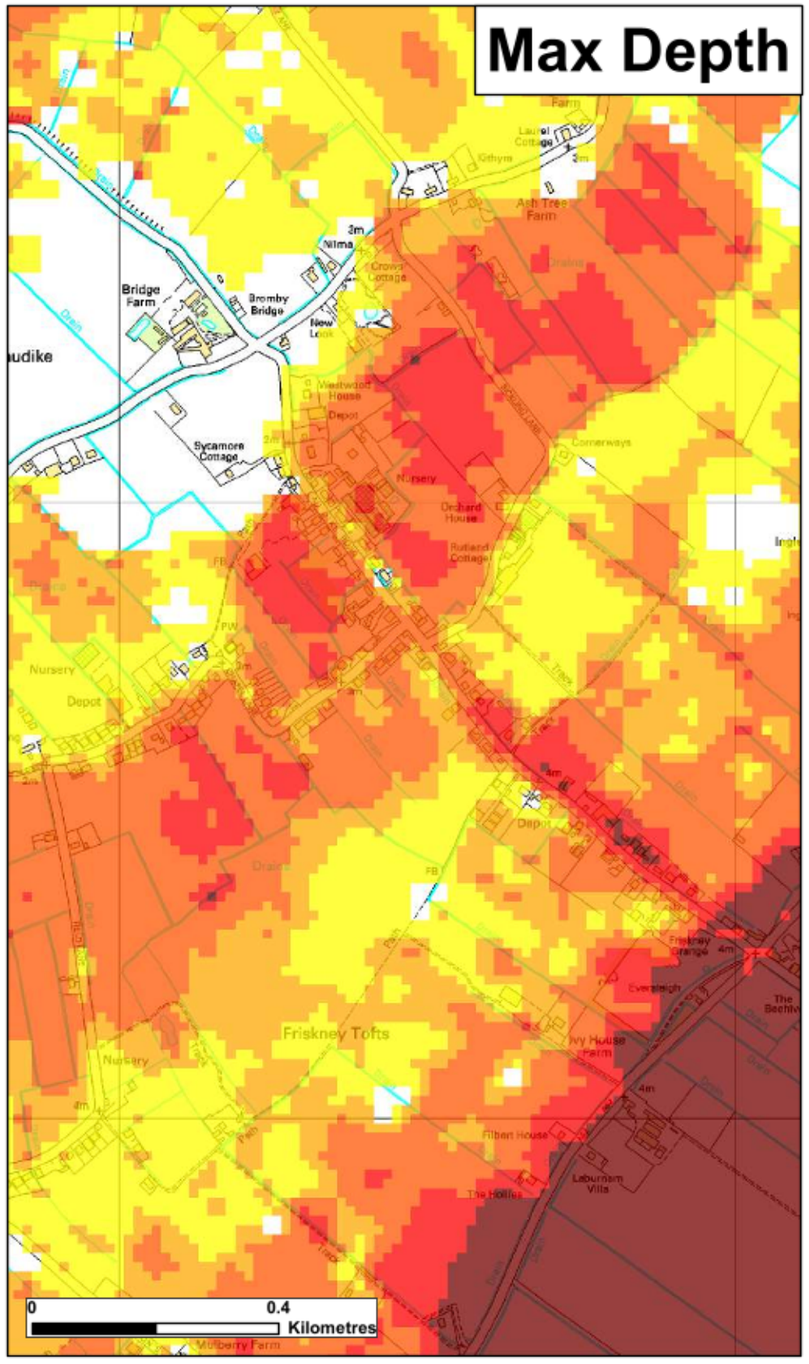
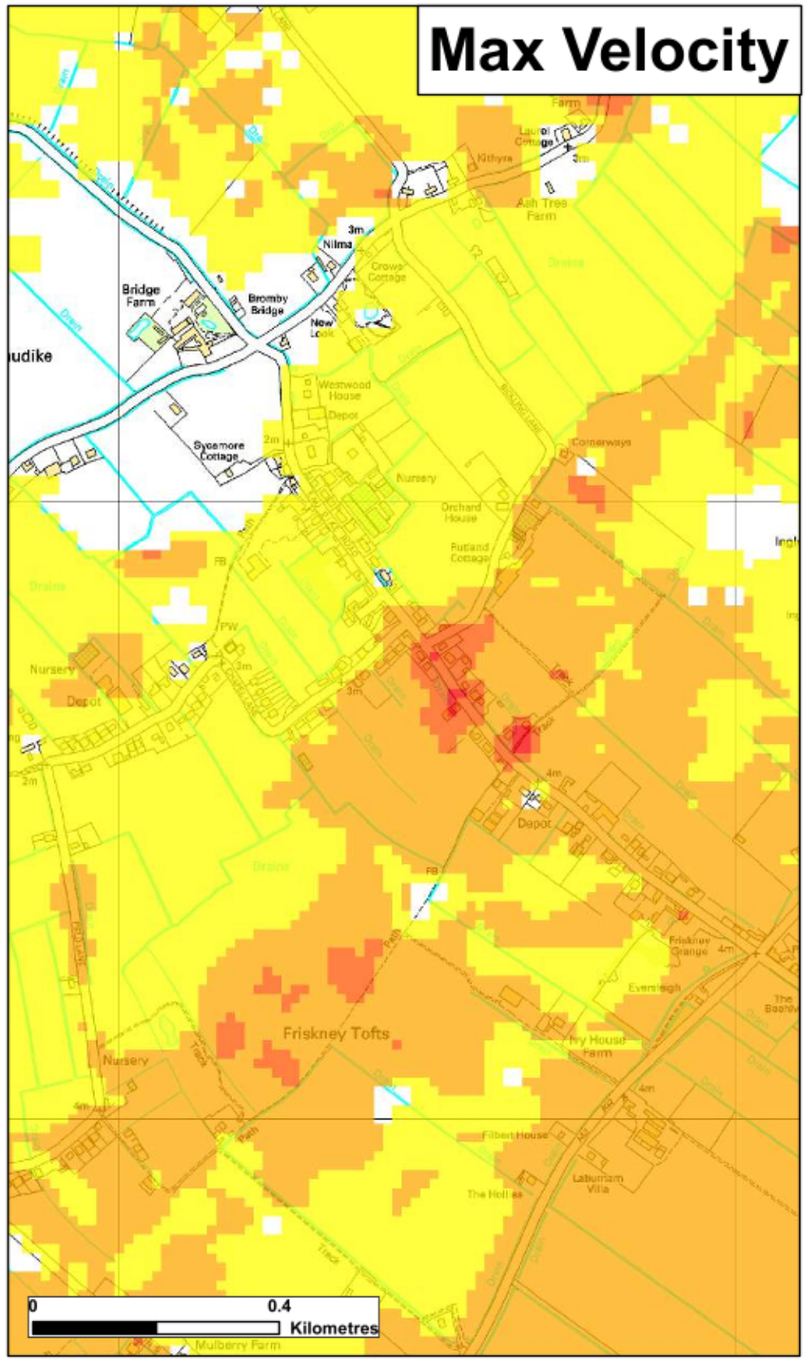
Environment Agency

Lincolnshire and Northamptonshire Overtopping Hazard Mapping

Map Centred on TF 47462 55709







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