

**PROPOSED NEW DWELLING ADJACENT TO CHOICES FOLLY,
MARSH ROAD, GEDNEY DROVE END, SPALDING PE12 9PJ**

FLOOD RISK ASSESSMENT



View from rear garden

S M Hemmings B Sc C Eng MICE MIWEM,
69 Charlotte Way,
Peterborough,
PE3 9ER

This flood risk assessment has been prepared solely to support the planning application for the new dwelling at Marsh Road, Gedney Drove End. The author has made every effort to provide an accurate assessment of the flood risk but accepts no liability should the information be found to be incorrect or incomplete.

Introduction

A Planning application is proposed to be made to South Holland District Council to construct a new dwelling on a site south east of the existing house called Choices Folly at Marsh Road, Gedney Drove End. The area is at present the garden alongside the building.

The site is within Flood Zone 3 as shown on the Environment Agency's Flood Zone map. These maps do not take into account flood defences.

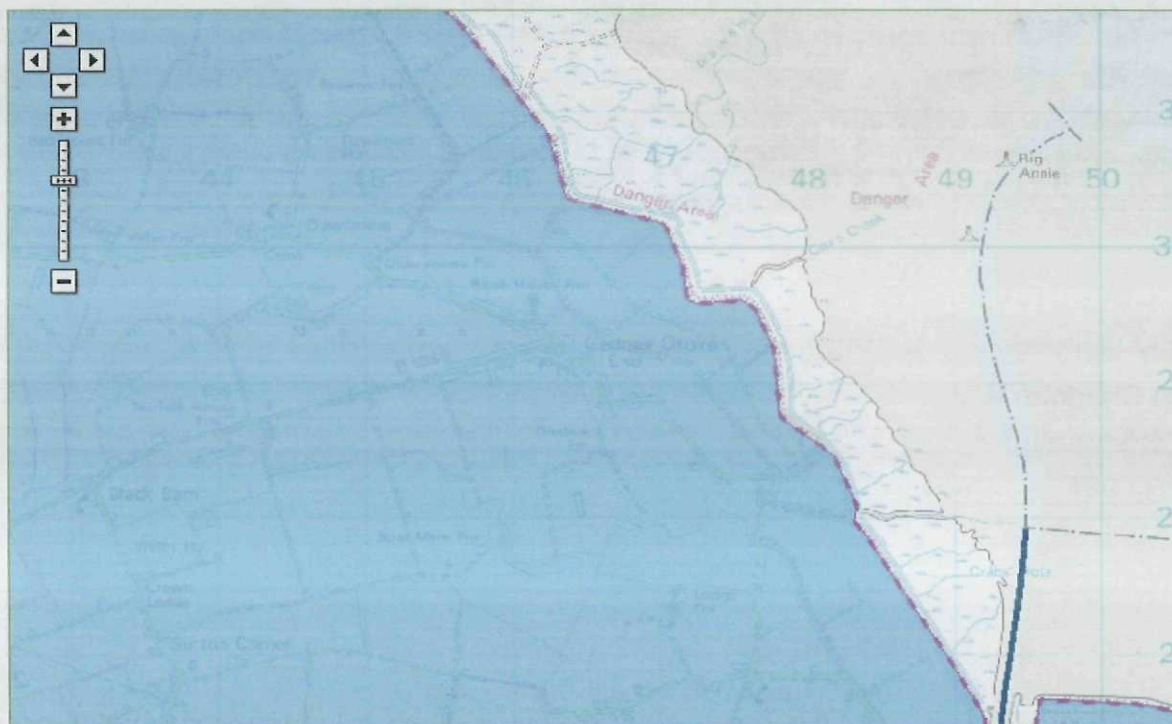
The Planning Application requires a flood risk assessment to be carried out as required in the Technical Guidance to the National Planning Policy Framework Development and Flood Risk. The site is within the defended area as specified on the South Holland District Council's Strategic Flood Risk Assessment (SHDC SFRA) map and is located in the South Holland Internal Drainage Board District.

Environment Agency (EA) Flood Map

The map below is taken from the EA website and shows the whole area to be at risk of flooding from rivers and sea assuming no defences.

Map of PE12 9PJ at scale 1:40,000

[Data search](#)  [Text only version](#) 



Application Site

The site is located 600 metres west of the main defences of the Wash. The National Grid reference of the site is 546382 329305, and the extent of the site is shown on the plan at the end of this document.

The proposed development is within Flood Zone 3(a) "High Probability" as detailed on the Environment Agency's flood zone maps without defences, as defined in Table 1 of the Technical Guidance to the National Planning Policy Framework. Applying the flood risk vulnerability classification in Table 2 of the Guidance the development is classified as "more vulnerable" and the Table 3 states that the development of a dwelling house requires the exception test to be considered.

Exception Test

For the Exception Test to be passed:

- a) It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA;
- b) The development should be on developable previously developed land or, if not, it must be demonstrated there is no such alternative land available; and
- c) A FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere, and, where possible, reducing flood risk overall.

All three parts of this test must be satisfied in order for the development to be considered appropriate in terms of flood risk. There must be robust evidence in support of every part of the test.

Section (a) and (b) will be demonstrated by the planning approval.

This flood risk assessment will demonstrate that Section (c) is passed.

Strategic Flood Risk Assessment

Consultants have produced a Strategic Flood Risk Assessment (SFRA) for the South Holland District Council (SHDC). This document provides details of the flood risk in the Council's area. Reference to the maps in this document give the following information for the flood risk and hazard at the site for the 1% fluvial event and 0.5% tidal event.

Actual Peak Depth	Present day	Zero
	Year 2115	1.0m – 1.5m
Actual Risk Extent	Present day	Low to medium risk, but reliant on defences
	Year 2115	High
Actual Peak Velocity	Present day	No velocity
	Year 2115	>0.25m/sec

Residual Peak Depth	Present day	Marsh Road 0 - 0.5m, site 0.5m – 1.0m
	Year 2115	1.0m – 1.5m
Residual Risk Extent	Present day	Low to medium risk, but reliant on flood defences
	Year 2115	
Residual Peak Velocity	Present day	No velocities shown
	2115	>0.25m/sec

Figure 16 of the general maps show that the site is not within the rapid inundation zone, and will not be in 2115.

Tables in the SFRA show the following details of the Wash defence banks north east of the site, between chainage 18.0km and 20.0km.

	2007	2055	2115
Peak 1 in 200 year extreme tide level	5.97m OD	6.24m OD	7.05m OD
Peak 1 in 1,000 year extreme tide level	6.64m OD	7.45m OD	7.78m OD

With an average defence crest level between 7.60 and 7.70 m OD the freeboards are as follows:

	2007	2055	2115
Peak 1 in 200 year freeboard	1630mm	1360mm	550mm
Peak 1 in 1,000 year freeboard	960mm	150mm	-180mm

Information from Environment Agency

The Environment Agency have provided more up to date information on flood risk and hazard for a number of scenarios that have been modelled. These show that if a large breach were to develop in the sea defences when the sea levels were at their maximum 1 in 200 or 1 in 1000 year levels flood depths of up to 2.0 metres deep with velocities of up to 2.5 metres / second could occur, which would produce a hazard of "danger for all". These are the type of conditions that occurred during the 1953 east coast flooding.

	Hazard	Depth	Velocity
1 in 200 breach in 2006	Danger for All	1.0m – 2.0m	1.5 – 2.5m/sec
1 in 1000 breach in 2006	Danger for All	1.0m – 2.0m	1.5 – 2.5m/sec
1 in 200 breach in 2006	Danger for All	1.0m – 2.0m	1.0 – 1.5m/sec
1 in 1000 breach in 2006	Danger for All	1.0m – 2.0m	1.0 – 1.5m/sec
Overtopping in 2006	Nil	Nil	Nil
Overtopping in 2115	Low	0 – 0.25m	0.3m – 1.0m

The plans supplied by the Environment Agency are shown on pages 11-16 at the end of this report.

Site Levels

Existing Site levels are shown on page 9. The existing house has a ground floor level of 4.14m OD and the level in Marsh Road of 3.76m OD. The site levels range from 3.80 to 4.05m OD, and it is recommended that the ground floor level of the proposed building should be 4.50m OD.

Existing Flood Alleviation Measures

The site is within a defended flood plain, as defined in Appendix 1 of the Environment Agency's "Policy and Practice for the Protection of Flood Plains", which is considered to be passive until such time that a flood greater than the defences can withstand occurs. The likelihood of flooding occurring due to overtopping or failures of the defences is considered to be very low.

The site is located approximately 600 metres from the coastal defences of the Wash, where the tidal defence bank is maintained by the Environment Agency.

The main watercourses in the area are maintained by South Holland IDB.

Potential Sources of Flooding

The potential sources of flooding to the site are:-

1. Failure or overtopping of the tidal defences
2. Overtopping of IDB watercourses
3. Blockages or problems in local surface water systems

1. Failure or overtopping of tidal defences

The predicted levels in the SFRA indicate that the tidal defences have a satisfactory height to withstand a 1 in 200 year storm event in 2115, allowing for a 600mm freeboard. However in a 1 in 1000 year event in 2055 and 2115 there is not the required freeboard.

The Environment Agency regularly review the standards of the defences and you would expect that if climate change projections are realised they would raise and improve the defences to retain an adequate standard of defence.

2. Overtopping of IDB watercourses

South Holland IDB maintain the sluices and the major channels in this area. Normal water levels are usually retained 1.0 metres at least below the lowest land level in the area. After heavy rainfall the levels in the drains will increase but on average the IDB drains would prevent flooding of all land and properties in a 1 in 100 year event. However the lowest land in the area is about 3.0m OD and therefore if overtopping of the IDB drains started to occur it would not affect the proposed property.

South Holland IDB have a very good maintenance regime for all their structures and watercourses, so flooding from this source can be discounted.

3. Blockages or problems in local surface water systems.

The proposed level of the new house is approximately 940mm above the level of Marsh Road. Therefore there is no risk of surface water systems in the road causing flooding to the proposed house, and this source can be discounted.

Extent of known Flooding

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

Probabilities and Trends of Flooding

The probability of this development flooding from the Wash is very low, and less than 0.5% in any year. In an extreme event any effect on this location would not be sudden and there would be time for residents to take precautionary measures to limit the impact of any flooding that may occur.

Residual Flood Risk to the site

The major flood risk at this location is from a very high tide level in the Wash caused by circumstances that lead to the flooding that occurred in 1953.

If a breach occurred in the sea bank with tide levels predicted for a 1 in 200 year event scenarios indicated on the flood maps in the SFRA significant flooding would occur. If the sea bank breached directly east north east of the site the area as far as the IDB drain 150 metres north east of the site could flood to a depth of at least 300mm in 30 minutes, as defined in the rapid inundation zone.



The north eastern bank of the IDB drain is nearly 1.0 metres higher than the opposite side nearest Gedney Drove End. This is probably because there used to be a secondary sea bank along this line, as shown on the picture above.

This raised area will hold back the flood water until it is approximately 1.0 metres in depth and then it will start to overflow into the IDB drain. This will distribute the flood water north and south but will quite quickly then flood onto the land between the IDB drain and Marsh Road, and flood water will then spread across marsh Road and flood the area west of the road.

The predicted flood depths that would occur following a breach in the tidal bank in a 1 in 200 year event in 2115 are set out in the SFRA. This document indicates flood depths of between 1.0 metres and 1.5 metres would occur in this scenario.

Since the SFRA was issued the EA have undertaken further modelling work, extracts of which are shown on pages 11 – 16 of this report. These indicate that following a breach in the tidal bank in a 1 in 200 year event in 2115 flood depths of between 1.0 metres and 2.0 metres and velocities of between 1.0m/sec and 1.5 m/sec could occur. This would be a hazard rating of "danger for all".

Conclusions

All of village of Gedney Drove End is at risk of flooding if a breach occurs in the sea bank during a 1 in 200 year tidal flood event.

With present day weather forecasts and communication methods occupants would receive adequate warning that a very severe tidal event was due to occur at least 24 hours before the event. They would therefore have time to decide whether to evacuate the area during the duration of the tidal event.

During daylight hours residents would be able to keep watch on the situation with the sea defences and if they saw a breach occur they would still have adequate time to evacuate the area.

It should be remembered that the risk of flooding events such as described above would only happen in a once in 200 year event, and the likelihood of this happening would be further reduced if the Environment Agency or another authority or organisation raises and strengthens the sea defences in the next 100 years.

The proposed development is not in a functional flood plain as defined by PPS 25.

In a flood risk area there is always a risk of an event occurring of greater magnitude than has been considered in this flood risk assessment.

Recommendations

If flood risk is considered to be the main planning consideration then the developer should consider designing a building with only storage facilities provided at ground

floor level. All rooms with equipment, such as kitchens, living areas and bedrooms should be located at first floor level. The developer might consider a three story building with kitchen, lounge and dining areas on the first floor and bedrooms on the second floor, and possibly a lounge area at the rear of the ground floor with patio doors for use in the summer period. All finishes on the ground floor should be flood resistant. This type of building would not suffer serious damage if a serious flood occurred.

Alternately one could consider a normal two story type of building on the plot. If a flood occurred the contents of kitchens and other living rooms on the ground floor would need to be replaced. However if this type of flood occurred without warning residents would be safe in their bedrooms during the night time and could use these rooms as a refuge if a flood occurred during the daytime. Flood resistant techniques could be used up to first floor level, and the building could be raised at least 500mm above existing ground level with a level of 4.50m OD.

Occupiers of the property should register with the Environment Agency's Floodline Warnings Direct Service.

Future occupiers of the property should write a flood action plan which would include plans of what valuable items to move to the first floor, locations of where the services should be switched off, and how and when the occupants should evacuate the building if that is required, and what area they will go to.

The developer should consider incorporating flood resistant/resilient techniques in the construction of the new properties to allow it to be refurbished after being flooded to a depth of approximately 2.0m. Consideration should be given to the electrics and heating pipes being distributed at ceiling level rather than at floor level. Materials used for the floor and walls should be able to withstand flooding for a period of at least a week.

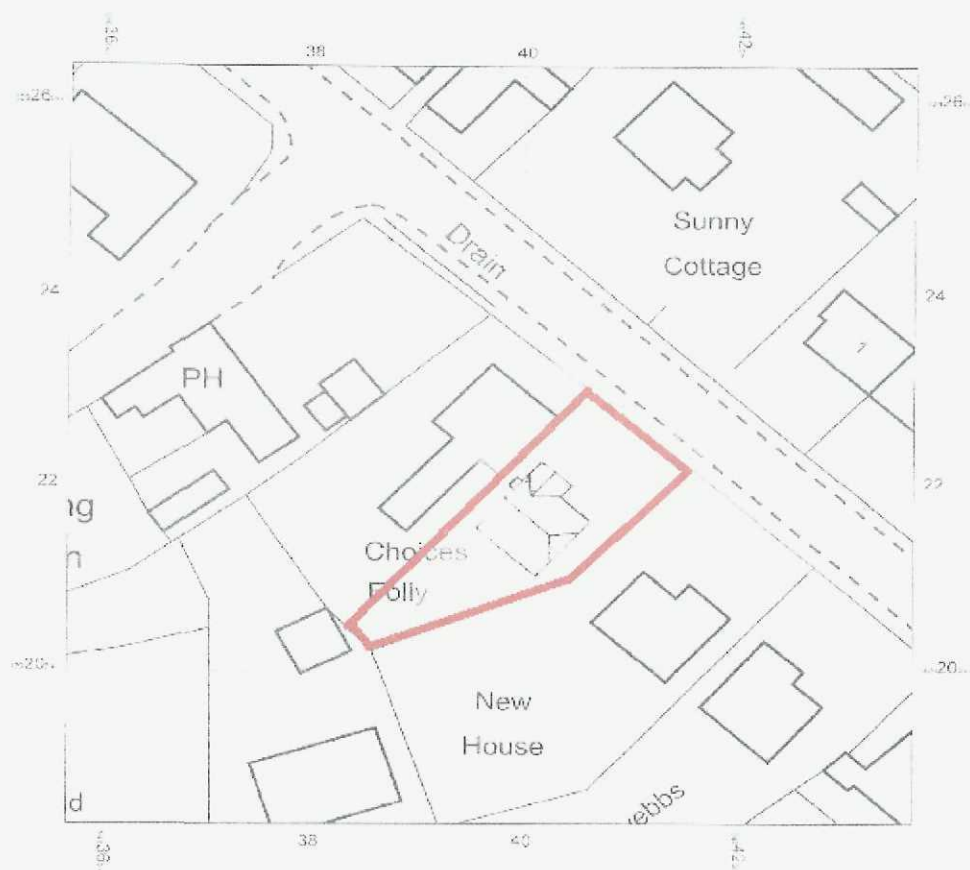
On site surface water drainage should be discharged into soakaways and these should be designed to BRE Digest 365 and approved under Building regulations.

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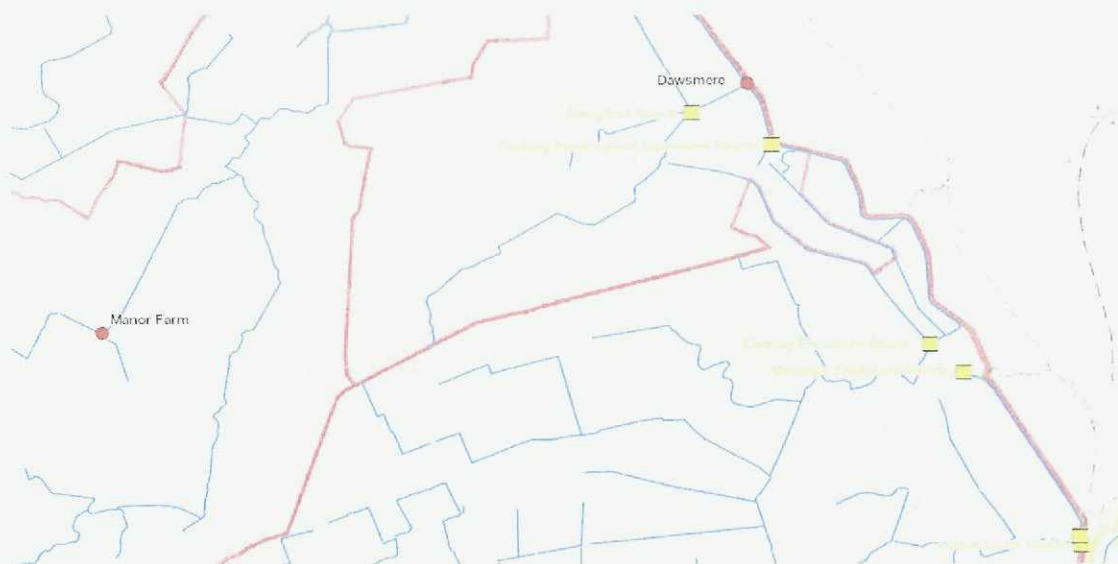
stuart.hemmings@btinternet.com

10th March 2015.

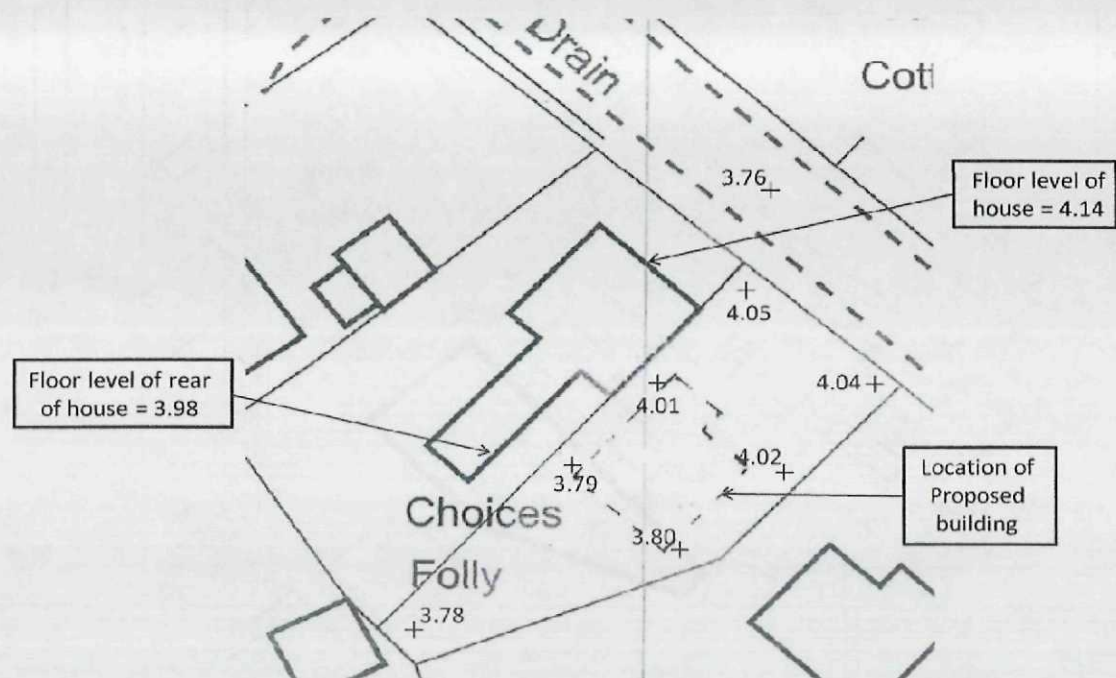
LOCATION PLAN

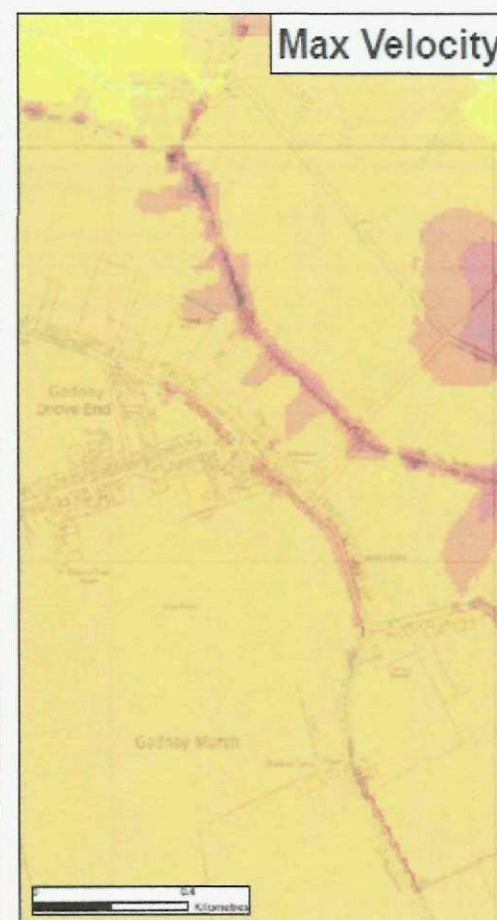


LOCATION PLAN SHOWING IDB WATERCOURSES



SITE LEVELS





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

Max Hazard (Flood Risk to People - 700,000)	Max Depth (m)	Max Velocity (m/s)
Less than 0.75 (Low Hazard)	0 - 0.25	0 - 0.5
Between 0.75 and 1.25 (Danger for Some)	0.25 - 0.50	0.5 - 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 - 2.0	1.5 - 2.5
	2.0 +	2.5 +

Date Printed	December 2014	Scenario year	2006	Scenario Annual Chance	0.5% (1 in 200)
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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 Tel: 01509 556 006 | Weekday daytime calls cost 1p plus up to 1p per minute from BT. Weekend and other providers' charges may vary.

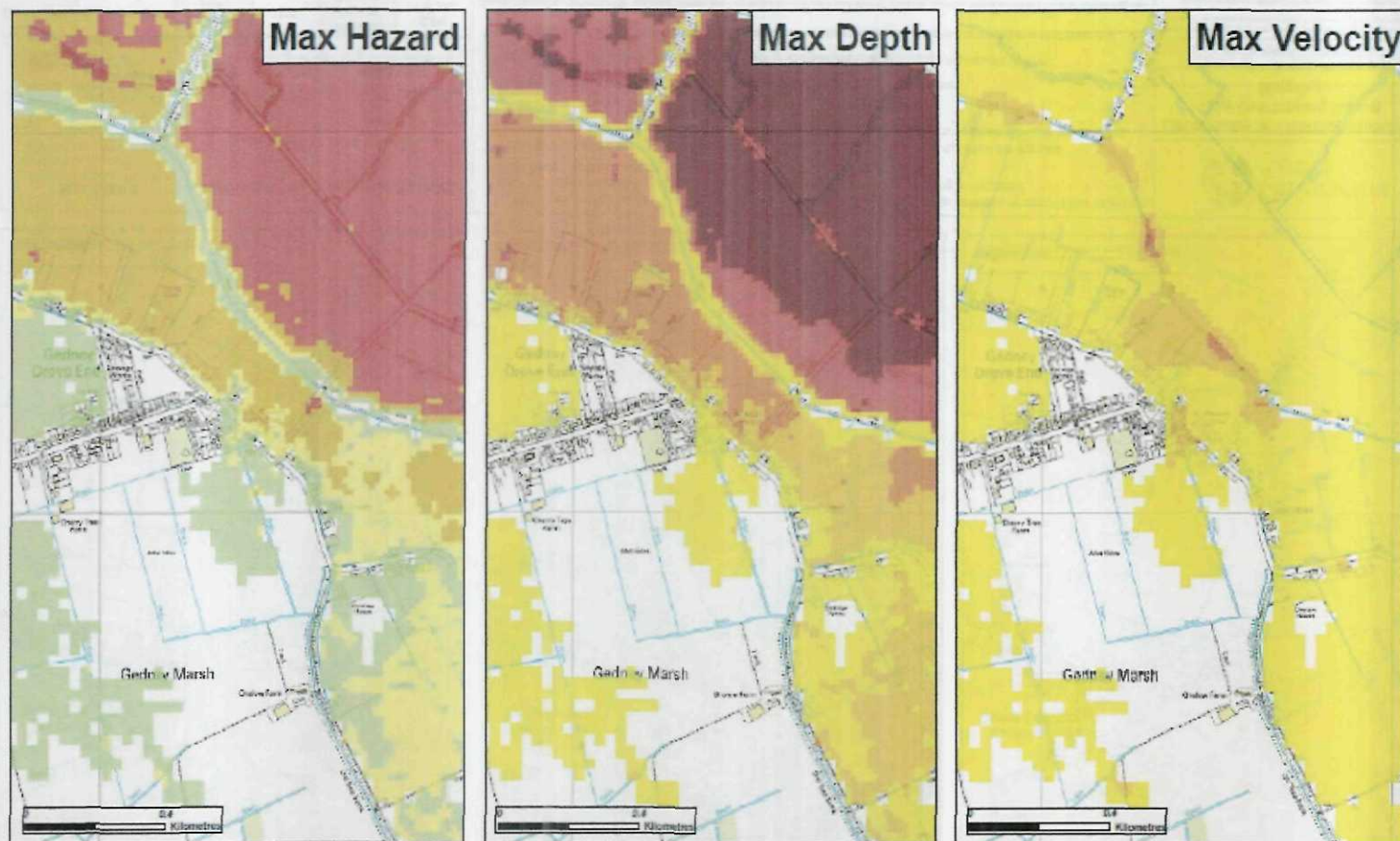


**Environment
Agency**

**Lincolnshire and Northamptonshire
Tidal Breaching Hazard
Mapping**

Map Created on 11/08/2014 15:22:23

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© Crown copyright and may be reproduced under the provisions of the Ordnance Survey Licence.



Max Hazard (Flood Risk to People - F02020) - 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 - 1.8 1.8 - 2.8 2.8 +		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 Holmole), and Welland (upstream of Pooley 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). Please contact the Environment Agency for information on how these maps are used in the management of flood risk. General Enquiries No: 03700 506 506. Weekdays Daytime calls cost 5p plus up to 5p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary.	
Date Printed	December 2014	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)	Lincolnshire and Northamptonshire Tidal Overtopping Hazard Mapping Map Created on 11/05/2015 This map is made available by permission of the Environment Agency on behalf of the Secretary of State. The Environment Agency is not responsible for any errors or omissions. The map is made available for personal use only. It is not to be used for any other purpose without the written permission of the Environment Agency.	