

NATIONAL PLANNING POLICY FRAMEWORK - FLOOD RISK

FLOOD RISK ASSESSMENT



**GASREC LTD ,
BERVOR CLOSE,
WARDENTREE PARK,
PINCHBECK,
SPALDING,
LINCOLNSHIRE
PE11 3ZN**

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NATIONAL PLANNING POLICY FRAMEWORK - FLOOD RISK

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NATIONAL PLANNING POLICY FRAMEWORK - FLOOD RISK FLOOD RISK ASSESSMENT – PART ONE

1.0 Introduction

1.1 "DC Architectural Services Ltd" have been commissioned to prepare a Site-Specific Flood Risk Assessment to accompany a submission to the Planning Authority seeking consent for the construction of GASREC SERVICE STATION, at Bervor Close, Wardentree Park, Pinchbeck, Spalding, Lincolnshire. PE11 3ZN

1.2 Objective

1.2.1 The objective is to comply with National Planning Policy Framework (NPPF), published by National Government. These state that it is a matter for applicants to investigate the potential Flood - associated risks relating to individual development proposals. The purpose of this Flood Risk Assessment is therefore to:

- Demonstrate whether the project is likely to be affected by flooding from any source, either now or in the future.
- Satisfy the Local Planning Authority that the development would be safe and, where possible, reduces the flood risk overall.
- Demonstrate whether the flood risk will be increased elsewhere.
- Demonstrate the measures proposed to deal with the identified flood effects and risks.

2.0 Planning Application

2.1 Planning Application

2.1.1 This document is to support a Full Planning Application for new Bio-LNG and CNG refueling station.

3.0 The Application Site

3.1 Application Site

3.1.1 The site is part of Wardentree park and is located on a grassed area. The site totals an area of hectares. The site is bounded by industrial buildings to all sides (refer Appendix E). The site is level being in open fenland at a height of 3.050m ODN (refer to site plan at Appendix A).

4.0 Existing Planning Permission

4.1.2 The site as a whole has the benefit of planning for industrial/B1/B8 use under application numbers H14/0647/02, H14/0957/22 and H14/0391/21.

5.0 Proposed Development

5.1 Development

- 5.1.1 The development is for a gas service station Appendix B shows an illustrative layout of the proposed development. Appendix C shows the existing site.

6.0 Assessment of the Risk

6.1 Assessment of the Risk

There are four areas to consider in the context of this:

6.1.1 Coastal

The Environment Agency flood maps identify the area to be Zone 3a at risk from flooding, the South Holland District Council SFRA Study area has been consulted and the site flooding probability falls in category 3 (high probability) equal to Environment Agency zone 3 assessed as having an annual probability of flooding of 0.1-0.5% between 1:200 and 1:1000 probability in each year.

6.1.2 Main River

The nearest EA asset is the Vernatt's Drain which has an earth bank protection of 5.8m ODN. The Environment Agency map indicates the possibility of river flooding without taking into account existing defenses as between 1% (1:100) chance of happening in any year. This supports the identification of the site falling in Zone 3 without taking into account of existing flood defences. The South Holland District Council Strategic Flood Risk Assessment takes into account the existing defences as cat 3. Throughout the area, banks are inspected, assessed as in good condition failure is unlikely. Flood is therefore most likely from overtopping resulting in low velocities and shallow depths. The South Holland District Council SFRA identify the surface water risk as Category 3. The SHDC SFRA identifies the Welland to the west to pose a greater risk than the Vernatts Drain but is some way to the east to have a lesser effect. The site remains largely outside the low risk area a less than 0.1% annual probability.

6.1.3 Ordinary Water Course

The nearest significant Welland and Deeping Internal Drainage Board asset is the Blue Gowt Drain, The drainage from the site area drains into the Drain and on into the River Glenn and the Welland.

5.1.4 Land

The site lies on land to the Due North of the town centre on existing commercial premises shown in Appendix E. It lies on a level ground surrounded by commercial property part of the industrial estate.

The land lies in a flat typical fenland. Its position means that it will not be subject to flooding from higher land. There are no reservoir which are close enough to have any risk effect on the proposals.

5.1.5 References

The South Holland District Council Strategic Flood Risk Assessment has been used as a source of information and an extract are found in appendix G.

Environment Agency. Flood information

Welland and Deeping Drainage Board.

Zone	Characteristic	Assigned Annual Probability of Flooding
1	Low Probability	<u>Fluvial & Tidal</u> Less than 0.1% (1 in 1000 or more years)
2	Medium Probability	<u>Fluvial</u> 0.1% to 1% (from 1 in 100 to 1 in 1000 years) <u>Tidal</u> 0.1% to 0.5% (from 1 in 200 to 1 in 1000 years)
3a	High Probability	<u>Fluvial</u> Greater than 1% (1 in 100 or less years) <u>Tidal</u> Greater than 0.5% (1 in 200 or less years)
3b	Functional Floodplain	<u>To be identified by LPA in agreement with Environment Agency</u>

5.1.5 Evaluation of the Risk (including allowance for climate)

Flooding of the Site

Evaluation		Risk					Magnitude				
		1 Low	2	3	4	5 High	1	2	3	4	5
Land			/					/			
Fluvial			/							/	
Tidal			/					/			
Drains			/					/			

Flooding Elsewhere

Evaluation		Risk					Magnitude				
		1	2	3	4	5	1	2	3	4	5
Land		/					/				
Property		/					/				

The risk is evaluated as **Low**

5.1.6 Residual Risk of Flooding

The actual risk to the site taking into account flood defences is low however a residual risk remains in the event of defence failure ie over topping or breach.

ANNUAL CHANCE 0.5% (1:1000)

		2006	2115
Over Topping	Max Hazard	-	low
	Max Depth	-	0 – 0.25
	Max Velocity	-	0 – 0.25
Breach	Max Hazard	Danger for all	Danger for all
	Max Depth (m)	1.0 – 1.5	1.0 – 1.5
	Max Velocity (m/s)	0.0 – 0.1	Excess of 0.25

5.1.6 Risk Conclusions

Having identified the site in relation to the South Holland District Council SFRA and EA predictions, the site is confirmed as Zone 3. From the Environment Agency Flood Risk Matrix commercial premises exceeding 250m² requires sequential and where necessary exception test.

Zone 1 Low Probability

Definition
This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

Appropriate uses
All uses of land are appropriate in this zone.

FRA requirements
For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a FRA. This need only be brief unless the factors above or other local considerations require particular attention. See Annex E for minimum requirements.

Policy aims
In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage techniques.

7.0 Flood Risk Matrix

7.1 Flood Risk Matrix

- 7.1.1 The flood risk matrix in Appendix F identifies the development of greater than 250sq m in Zone 3 as requiring a flood risk assessment. Consultation with the EA is required. A detailed drainage scheme is required before commencement.

8.0 Sequential Test

7.1 Sequential Test

- 8.1.1 This risk-based approach endeavors to place development that is most vulnerable away from areas that are at most risk.

- 8.1.2 This development falls into South Holland District Council SFRA Category 3: probability risk of flooding.
- 8.1.3 When applying the test as figure 4.1, the proposal passes the test being in Zone 3; less vulnerable use category is considered compatible.
- 8.1.4 An exception test would be required only for more vulnerable classification.
- 8.1.4 As the site has been assessed in the South Holland District Councils development plan as being zoned for development there is no requirement for sequential test

Policy 4: Approach to Flood Risk

Development proposed within an area at risk of flooding (Flood Zones 2 and 3 Of the Environment Agency's flood map or at risk during a breach or overtopping scenario as shown on the flood hazard and depths maps in the Strategic Flood Risk Assessment) will be permitted, where:

1. It can be demonstrated that there are no other sites available at a lower risk of flooding (i.e. that the sequential test is passed). The sequential test will be based on a Borough or District wide search area Of alternative sites within the defined settlement boundaries, unless local circumstances relating to the catchment area for the development justify a reduced search area, i.e. there is a specific need for the development in that location. The sequential test is not required for sites allocated in the Local plan, minor development' or change of use (except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site).
2. It can be demonstrated that essential infrastructure in FZ3a & FZ3b, highly vulnerable development in FZ2 and more vulnerable development in FZ3 provide wider sustainability benefits to the community that Outweigh flood risk.
3. The application is supported with a site-specific flood risk assessment, covering risk from all sources Of flooding including the impacts Of climate change and which:
4. demonstrate that the vulnerability of the proposed use is compatible

Justification for this approach to policy 4.1

Promoting Economic Prosperity and Employment Opportunities

South East Lincolnshire is located within the Greater Lincolnshire Local Government Enterprise Partnership (GLLEP) and the Greater Cambridge and Peterborough Local Enterprise partnership which are committed to delivering sustainable economic growth in their areas over the Local Plan period. The GLLEP in particular has set ambitious targets in respect Of key growth sectors; the aspiration is for agri-food, logistics, education, research and development, and the visitor economy to increase their economic value over the Local Plan period. Additionally, the aim is to diversify the local economy and jobs market

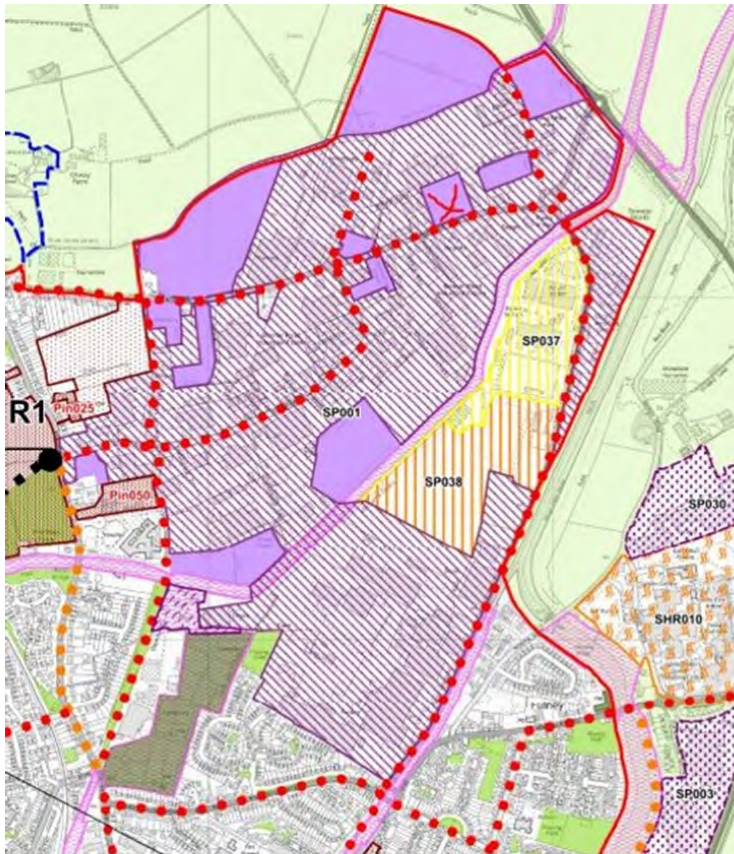
to attract more highly-skilled and High value employment to the area". This Local Plan has a fundamental role to play in the delivery of these aspirations. Appendix 5: 'Allocations — Infrastructure requirements, constraints and mitigation' Of the Local Plan provides an assignment of constraints and infrastructure that may need to be met on the allocated employment sites. Whilst these considerations may change over the plan period they are a useful starting point in preparing development proposals.

Policy 4.2. Improving South East Lincolnshire's Employment Land Portfolio

The Employment Land Technical Paper (ELTP). 20163* identifies that up to 10,300 B-class jobs could be required in the Local Plan period. including for business, transport/storage. manufacturing and agri-food industries. The Spatial Strategy Background Paper, 201630 Indicates that about 17,600 jobs could be required overall, including from the growth sectors Of health. education. IOW carbon industries and leisure. It also identifies that more jobs are expected to be required in South Holland (13,800 jobs) compared to Boston Borough (3,800 jobs)". Of these, about 10,300 B Class jobs could be required" Economic growth Will be focussed in the higher-tier settlements; growth Will therefore take place in the most sustainable locations. ensuring that better access between housing. jobs and services is promoted. Policy 7 directs the of new employment land and therefore jobs, to the Main and Local Employment Areas within the Sub-Regional Centres Of Boston and Spading and the Main Service Centres (Crowland, Holbeach, Kirton. Long Sutton, Sutterton and Sutton Bridge). More land is identified in South Holland to reflect the higher level of job growth expected to be delivered over the Local Plan period.

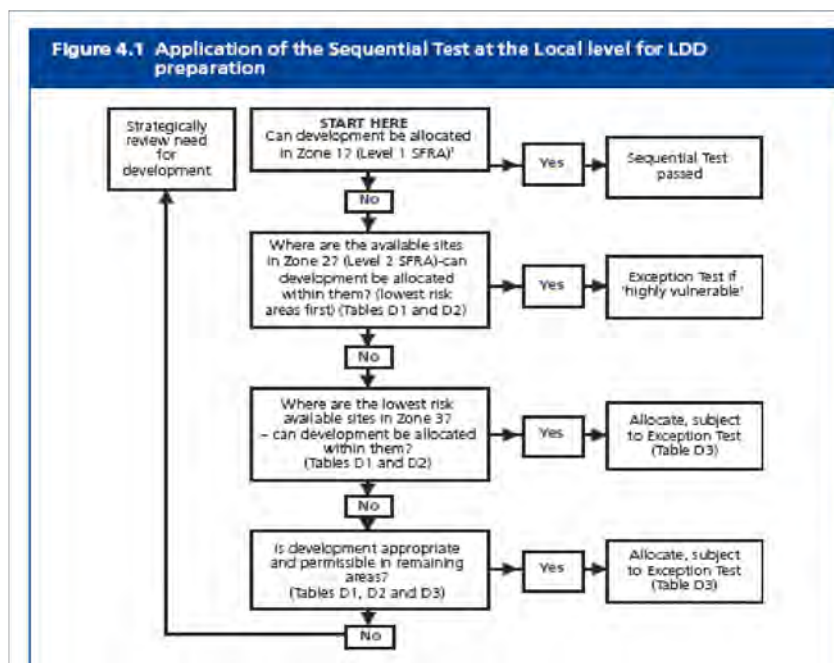
Policy 7: Improving South East Lincolnshire's Employment Land Portfolio

The South East Lincolnshire authorities will, in principle, support proposals which assist in the delivery Of economic prosperity and some 17,600 jobs in the area, 3,800 in Boston Borough and 13,800 in South Holland District. Of these about 10,300 jobs fall into Class B.

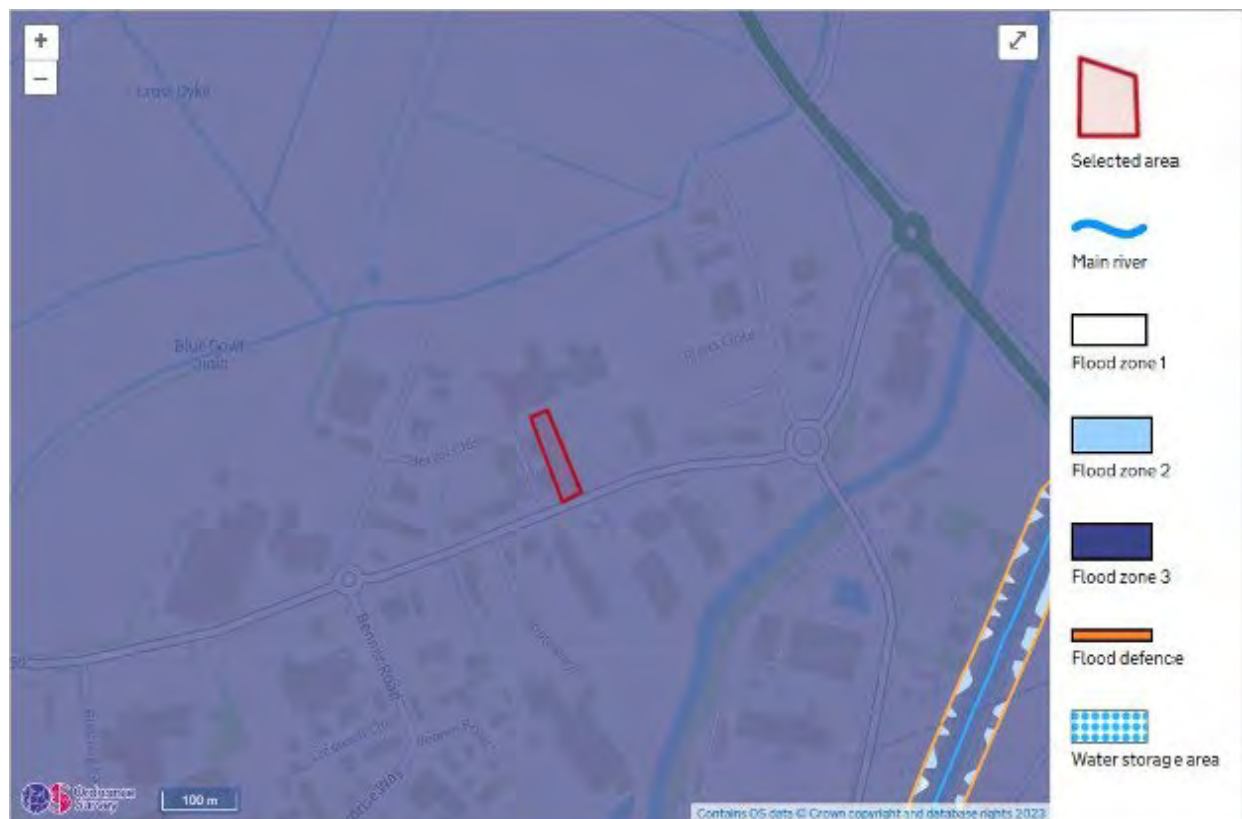


South East Lincolnshire Local Plan 2011-2036

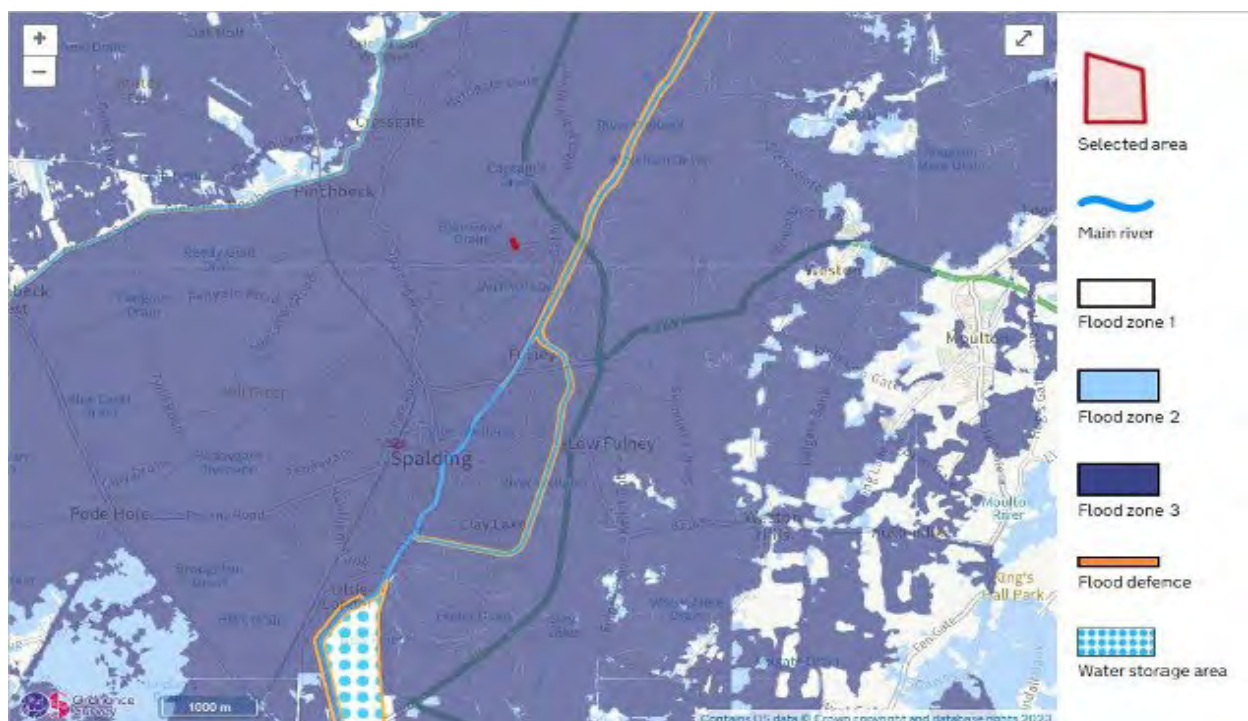
South East Lincs Local plan showing the site zoned for development



The above figure demonstrates the compatibility of the proposal within Flood Zone 3 and passing of the sequential test.



Site showing flood zone 3



Site showing flood zone 3 in the greater area

Table D.2: Flood Risk Vulnerability Classification

Essential Infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk, and strategic utility infrastructure, including electricity generating power stations and grid and primary substations.
Highly Vulnerable	• Police stations, Ambulance stations and Fire stations and Command Centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent.¹⁹
More Vulnerable	• Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste.²⁰ • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	• Buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non-residential institutions not included in 'more vulnerable'; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment plants. • Sewage treatment plants (if adequate pollution control measures are in place).
Water-compatible Development	• Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel workings. • Docks, marinas and wharves. • Navigation facilities. • MOD defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Industrial storage and distribution – less vulnerable

We have made a detailed study of available units in Spalding and have not

found suitable sites in a low flood risk area. The nearest similar units are in Bourne 10 miles away. In conjunction with a local estate agent we have established that there is a demand for this type of unit in Spalding. The proposal will fulfil the demand and provide valuable local employment opportunities.

The location of the proposal is central to the Warden Tree park business area and as such will be adjacent to many business / employment premises reducing multiple vehicle journeys for prospective clients.

9.0 Exemption Test

9.1 Exemption Test

8.1.1 The appropriate designate in table D3 would indicate an exemption test is not required as the site

Table D.3²²: Flood Risk Vulnerability and Flood Zone 'Compatibility'

Flood Risk Vulnerability classification (see Table D2)		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone (see Table D.1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	x	Exception Test required	✓
	Zone 3b 'Functional Floodplain'	Exception Test required	✓	x	x	x

10.0 Existing Drainage

10.1 Existing Drainage

10.1.2 The site for the building is almost entirely covered with permeable surface.. The site drainage for this area has a principle collection point in a yard and a HYDROBRAKE controlled discharge to the IDB drainage system

10.1.3 The land is under layered with silty subsoils. The plan in Appendix H shows the proposed drainage system.

11.0 Effect of the Proposal

11.1 Effect of the Proposal

11.1.1 The existing site of site is made up of grassed areas. This is to be drained by series of pipes of pipes, gullies and channels discharge into the SW drain and eventually IDB drain.

11.1.2 The proposal is to construct gas station over existing permeable area– an indicative layout is shown at Appendix B. As the building will utilize a controlled discharge for area there will be no change in the flow velocities.

11.1.3 The application is for planning permission at this stage, a schematic drainage solution is proposed in Appendix D.

11.1.4 In principle, as the existing site consists of extensive permeable areas drainage with no positive existing positive drainage with no flooding history, it would not be unreasonable to expect the drainage system to remain unchanged as run off from present levels by attenuation to 1.4l/s/h.

- 11.1.5 The NPPF seeks to provide post-development run off at greenfield rates or 25% reduction of run off on previously developed sites. A further 30% should be added to projected run-offs to allow for climate change. However, in this instance the site is not being redeveloped in the traditional sense and the proposal is for it to remain the same.
- 11.1.6 The effect of the proposal will not increase the probability of flooding elsewhere due to the neutral off site run-off rate achieved.

12.0 Effect of the Proposal on People and Property

12.1 Flooding Effect Fluvial

- 12.1.1 The existing site of site is made up of grass areas. This is drained by series of pipes and gullies.
- 12.1.2 The South Holland SFRA considers the risk of overtopping of the Welland to the east to have the highest probability of occurring in any one year the analysis provide an insight into risks and projected depths, the site levels provide some protection and the area remains outside the low risk area and the projected depths 2115 are outside the projected depth area for the building and 0 - 0.5m for the car park. The site remains outside the low risk area. The SFRA also considers a breach in the coronation channel and in this event the effect on the site would be significant with a peak velocity exceeding 0.25m/s maintaining a residual flood hazard as significant and a potential depth of 1.0 – 1.5m, The bank condition however is considered good and the annual probability remains Low.

12.2 Flooding Effect Tidal

- 12.2.1 The flooding effect on the site places the site in a EA zone 3 flood risk area the risk identified by EA has probability of occurring of 0.5% in any given year there is likely to be advance warning as the most likely event scenario would be when heavy rain fall storm and high tide occur simultaneously an event the EA can predict with some accuracy the depth given the distance to travel and the extent of the flat fen area is predicted to be shallow and of low velocity.

12.3 Flooding Effect Tidal

- 12.3.1 The flooding from local drains is less easy to predict as it could occur at any time during heavy rain if a drain has become blocked, the IDB have a regular maintenance program in place, on site drainage should be inspected at least annually which will mitigate this event.

13.0 Assessment of the Actual Risk and Its Implications on the Site

13.1 Assessment of the Actual Risk and Its Implications on the Site

- 13.1.1 It is clear that the site is located in Zone 3 as identified in the South Holland SFRA. The actual risk is identified as medium its implication for the site given the proposed and existing use should not prevent a planning application being approved.

14.0 Climate Change

14.1 Climate Change

- 14.1.1 Currently the assumption is that climate change will impact on global sea levels and impact subsequently on surge tides and an increase in significant storm events. The future risk is

therefore increased. The design of new any drainage system should have a 30% additional allowance for climate change.

15.0 Mitigation Measure

15.1 Mitigation Measures

- 15.1.1 Given the Zone 3 risk of the site there are no specific mitigation measures required apart from provision of an adequate drainage system.
- 15.1.2 It is recommended that the project proposals are drained, with roof water and clean areas being discharged to surface water piped dyke system maintained by the IDB.
- 15.1.3 The development area is small buildings, canopy and forecourt, none contain sleeping accommodation. As there is medium risk of the site being flooded, there are no particular measures proposed in accordance with Environment Agency Standing Advice. Floor level set not lower than existing and flood resilience techniques applied. The premises are advised to register for the EA early warning service for commercial premises in accordance with Lincolnshire.
- 15.1.4 The FRA identifies existing finished floor levels (FFL) in the complex to be generally in the region of 3.050m above ordnance datum (AOD).
- 15.1.5 The proposed floor levels are 3.150m ODN.
- 15.1.6 It is recommended that flood resilient construction techniques be adopted as stated in the guidance document 'Improving the Flood Performance of New Buildings – Flood Resilient Construction' by Communities and Local Government. Based on the documents guidance and projected flood level, it is understood this scheme should adopt a water entry strategy. On this basis, the development would adopt a number of the principles. The measures will include the use of closed cell insulation to composite panel walls with no soft finishes internally. Electric sockets data points and any new mechanical services will be placed at a minimum of 1125mm above FFL where possible and feeds are to drop from high level.

16.0 Pollution

16.1 Existing

The existing site is grass area there are no anticipated significant pollution effects not able to be controlled by good practice.

16.2 Construction

The possibility exists for silt or other pollutants to build up during construction. Flooding during the construction phase will need to be considered as there will be a possibility of the site becoming flooded during excavation works for the construction phase. Risk assessments and method statements should ensure not only that the site remains water free, but any construction work dewatering does not contaminate local receptors. The use of temporary bunding and settlement lagoons should be considered during inclement weather.

16.3 Post Construction

There is little potential for contaminated or dirty water from operational surfaces which

cannot be controlled by interceptor and attenuation.

16.4 Pollution Mitigation

16.4.1 Construction

Construction sequence, temporary bundage and settlement tanks should be considered and implemented during the works. Full reference should be made to PPG 6 Working on Construction and Demolition sites and Environmental Good Practice on Site 3rd Edition 2010.

The selection of a contractor to carry out the works must show consideration of the contractors proposals for pollution control during the works. A detailed spill action plan will be required to be put in place prior to construction.

16.4.2 Post Construction

Roof water and water from clean areas only are allowed to enter the receptor.

16.4.3 Levels and Precautions

The design level will be set at 3.150 m OND ie level with existing to provide a level floor throughout to enable fork truck operation throughout the building at one level and as required by the Disability Access for All Act.

16.4.4 Proposed Drainage

The proposed drainage will be clean water drainage restricted to flows from roofs where there is no possibility of becoming contaminated by accidental spillage or dirty vehicles. There will be a new interceptor to serve the new dock area.

It is proposed to retain the existing drainage system apart from areas disturbed by the works where it will be repaired or replaced.

17.0 Drainage Solution

17.1 Drainage Solution

The proposal is to utilize the existing approved controlled outfall which was designed to accept water from this phase one and two there is therefore spare capacity not presently utilized by the proposed outfall.

The design will discharge roof and yard water (yard water intercepted) into the this system. We will be undertaking a full hydraulic design and attenuating the proposed drainage to ensure the existing system is not inundated.

18.0 Environment Agency

18.1 Environment Agency

18.1 Environment Agency

Hazard mapping - breaching.

> year 2115 0.5% (1 in 200) chance event

> year 2115 0.1% (1 in 100) chance event

The site is not affected by breaching for the present day (2006) scenarios.

Environment Agency predictions of flood depth are predicted to be depth of 0.25 – 0.5 m resulting in flood water levels of 3.9m ODN

Appendix J contains Environment Agency predictions

19.0 Drainage Design

19.1 Drainage

The drainage design shall adopt the principle of no increased run velocities off, no change to drainage system therefore no change to flow velocities off-site flows.

The design will discharge roof and yard water (yard water intercepted) into the attenuation system. We will be undertaking a full hydraulic design and attenuating the proposed drainage to ensure the pump chamber is not inundated.

20.0 Conclusion

20.1 Conclusion

It is our conclusion that the development complies with NPPF and passes, or is not required to pass, the sequential and exemption tests and an adequate drainage system will need to be designed and implemented prior to occupation. It is our opinion that there is no reason that the planning application should not be approved.

PART TWO

Evacuation Plan

21.0 Introduction

21.1.1 Primarily any plan of action should be aimed at serving the safety of employees and visitors , any written plan should allow adaption's to be considered to ensure best response on an incident by incident basis.

21.1.2 The flood incident differs significantly from a fire incident and this cannot be emphasised enough. The warnings and evacuation in the event of fire are intended to remove the occupants off to a safe place as soon as possible ideally in less than 3 minutes. Given the prevailing conditions during a flood event this is very unlikely to be the best action to be taken. Staff and employees are in the first instance to remain in the building.

22.0 Risks

22.1.1 There are other risks involved during a flood event apart from water levels which are not always covered, for example when the flood is likely to occur.

- During heavy rain
- High winds
- Power failure
- Cold weather
- Dark during winter months
- Fast moving water
- Hidden hazards in water (ie missing manhole covers, kerbs etc)

22.1.2 A fire tends to be very localised with only a few minutes warning for a flood to raise the alarm and carry out evacuation by fire drill is wholly inappropriate any may put the occupants at greater risk.

22.1.3 A flood event other than localised surface water from a blocked drain for example is likely to be more regional has greater warning time probabilities and requires a considered evacuation response.

22.1.4 During a flood alarm you should not:-

- Congregate outside
- Leave belongings behind (particularly outdoor clothing and lunch boxes)

- Send employees home to an environment at greater risk.

22.1.5 To emphasis should be on a calm considered response and remaining on site in first instance is likely to be the best response as rapid onset of hypothermia is a real risk in wet cold conditions.

23.0 FLOOD ACTION AND EVACUATION RESPONSE

23.0 Preparation

23.1.1 The site is registered with the Environment Agency Flood Line (0845 988 1188) and will receive automated warnings to the main switchboard together with text alerts to main reception

Monitoring

23.1.2 Available sources of information

Environmental Agency website; www.environment-agency.gov.uk/flood Environmental Agency flood line ; 0845 988 1188

BBC Radio Lincolnshire 94.9FM

Met Office website; www.metoffice.gov.uk

Highways Agency website; [www. highwaysagency.gov.uk](http://www.highwaysagency.gov.uk)

Other sources of information:-

Lincolnshire County Council

Check for flooding - GOV.UK (www.gov.uk)

Sign up for flood warnings - GOV.UK (www.gov.uk)

How to plan ahead for flooding - Check for flooding - GOV.UK ([check-for flooding service.gov.uk](http://check-for-flooding.service.gov.uk))

Action

23.2.3 Refer to sections 18 and 19 and carry out actions now.

24.0 ENVIRONMENT AGENCY FLOOD WARNING ALERTS

24.1.1 The Environment Agency has four code levels relating to levels of risk and suggested actions, it should be noted that these can be issued in any order.

Flood alert - Prepare

- prepare a bag that includes medicines and insurance documents
- check flood warnings
- Flood warning - Act
- turn off gas, water and electricity
- move things upstairs or to safety
- move family, pets and car to safety

Severe flood warning - Survive

- call 999 if in immediate danger
- follow advice from emergency services
- keep yourself and your family safe

24.1.2 Instigate actions outlined in Environment Agency flood alert and alert all members of staff of the condition and brief them on the possibility of escalated action. Monitor situation on Radio and websites and flood line (it is important not to overuse web and phone functions).

understand your flood warning codes

Our warning service has three types of warnings - Flood Alert, Flood Warning and Severe Flood Warning - that will help you prepare for flooding and take necessary actions.

ONLINE FLOOD RISK FORECAST

What it means

Be aware.
Keep an eye on the weather situation.

When it's used

Forecasts of flooding on the Environment Agency website are updated at least once a day.

What to do

- Check weather conditions.
- Check for updated flood forecasts on our website.



FLOOD ALERT

What it means

Flooding is possible.
Be prepared.

When it's used

Two hours to two days in advance of flooding.

What to do

- Be prepared to act on your flood plan.
- Prepare a flood kit of essential items.
- Monitor local water levels and the flood forecast on our website.



FLOOD WARNING

What it means

Flooding is expected.
Immediate action required.

When it's used

Half an hour to one day
in advance of flooding.

What to do

- Move staff, stock and valuables to a safe place.
 - Turn off gas, electricity and water supplies if safe to do so.
 - Put flood protection equipment in place.
-



SEVERE FLOOD WARNING

What it means

Severe flooding.
Danger to life.

When it's used

When flooding poses a
significant risk to life.

What to do

- Stay in a safe place with means of escape.
 - Be ready should you need to evacuate.
 - Co-operate with the emergency services.
 - Call 999 if you are in immediate danger.
-

WARNING NO LONGER IN FORCE

What it means

No further flooding is
currently expected in
you area.

When it's used

When river or sea
conditions begin to
return to normal.

What to do

- Be careful. Flood water may still be around for several days.

PART THREE

Proposed Drainage Principles

21.0 Introduction

The project consists of canopy roof and forecourt all are impermeable areas the roof water will discharge direct to the attenuation lagoon, 'yard' water will pass through silt trap and forecourt separator prior to the lagoon and discharge to IDB main via Hydro-brake. Flows are to be based on **100-year plus 40 % climate change** event with no above-ground flooding, with exceedance flows safely routed within the site. The outfall connects to the existing surface water system at a controlled rate, ensuring **no increase in flood risk on or off site**. A maintenance regime covering gullies, lagoon and flow control will be implemented for the lifetime of the development.

21.1 Design basis

- **Impermeable area:** 4,000 m²
- **Discharge control:** Single Hydro-brake to existing IDB surface water system
- **Restricted rate:** 1.4 l/s (TBA greenfield-equivalent)
- **Design standards:**
 - **1 in 30-year** storm – no surface flooding
 - **1 in 100-year + climate change (40 %)** – no off-site flooding, storage within lagoon

21.2 Indicative storage requirements

Using typical UK design depths (to be confirmed by MicroDrainage/Flow/ICM at detailed design):

- **1 in 30-year event** – assume ~**60 mm** rainfall
- **1 in 100-year + 40 % CC** – assume ~**95 mm** rainfall

Preliminary calculations indicate a required attenuation volume of approximately **210 m³** for the 1 in 30-year event and **350 m³** for the 1 in 100-year + 40 % climate change event, to limit discharge from 4,000 m² of impermeable area to **1.4 l/s**. Final volumes will be confirmed by detailed hydraulic modelling.

21.3. Lagoon arrangement

- **Type:** Open attenuation lagoon (online) receiving all surface water from the 4,000 m² hardstanding and roofs
- **Volume:** Designed to provide at least **350 m³** effective storage between base and 1 in 100-year + CC water level.
- **Geometry:**

- o Side slopes typically **1 in 3** or flatter.
 - o Freeboard $\geq$ **300 mm** above 1 in 100-year + CC water level.
- **Inlets:** Pipe(s) from gullies/catchpits discharging to a stilling area to minimise erosion and re-suspension.

21.4. Hydro-brake and outfall

- **Control:** Hydro-brake (or equivalent vortex flow control) in an outlet manhole at lagoon toe.
- **Design point:**
 - o **Q = 1.4 l/s** at design head (difference between lagoon max water level and outlet invert).
- **Downstream:**
 - o Pipe sized for self-cleansing where practicable.
 - o Outfall to existing surface water sewer/ditch with headwall and erosion protection.

21.5. Exceedance routing

- **1 in 30-year:** No flooding – all water contained within pipe system + lagoon.
- **1 in 100-year + CC:** Water level contained within lagoon with freeboard.
- **>1 in 100-year + CC:**
 - o Overland flow directed across hardstanding and landscaped areas.
 - o Finished levels fall towards the lagoon and internal low spots, away from buildings, plant and boundaries.
 - o No uncontrolled exceedance off-site or onto the public highway.

21.6. Water quality and SuDS treatment

- **Pre-treatment:**
 - o Road gullies and trapped catchpits on hardstanding.
 - o Oil separator or proprietary treatment unit HGV/fuel risk is present.
- **Lagoon:**
 - o Provides additional **settlement and biological treatment** before discharge.

This gives at least **two treatment stages** in SuDS terms.

21.7. Maintenance strategy (lifetime of development)

- **Quarterly / biannual:**
 - o Inspect and de-silt gullies and catchpits.
 - o Check lagoon inlets/outlet for blockage and erosion.
- **Annual:**
 - o Inspect Hydro-brake for obstruction and structural condition.
 - o Inspect lagoon banks, side slopes and freeboard; cut vegetation as required.
- **After major storms:**
 - o Check lagoon for debris, bank erosion and damage to headwalls.

21.8. Summary

Surface water from approximately **4,000 m²** of new impermeable hardstanding will drain to an on-site **open attenuation lagoon** via silt trap and forecourt separator and discharging via a **Hydro-brake** limited to **1.4 l/s**. The lagoon will provide around **210 m³** of storage for the **1 in 30-year** storm and **350 m³** for the **1 in 100-year plus 40 % climate change** event, ensuring no above-ground flooding in these design events and no increase in flood risk on or off site. Exceedance flows will be routed safely within the site, and a maintenance regime will be implemented for the lifetime of the development.

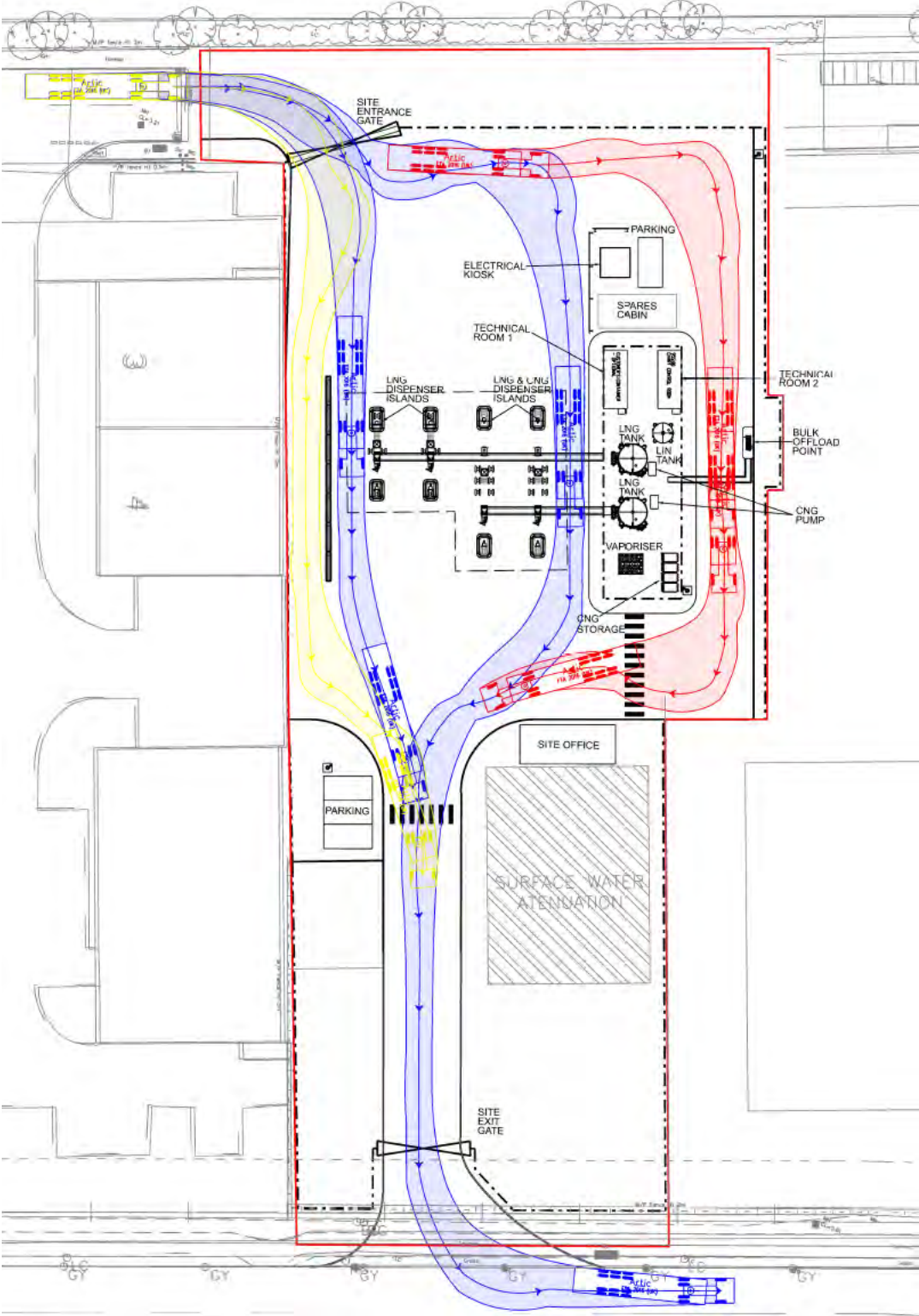
PART FOUR

Appendix A



Site plan with levels full size original with application

Appendix B



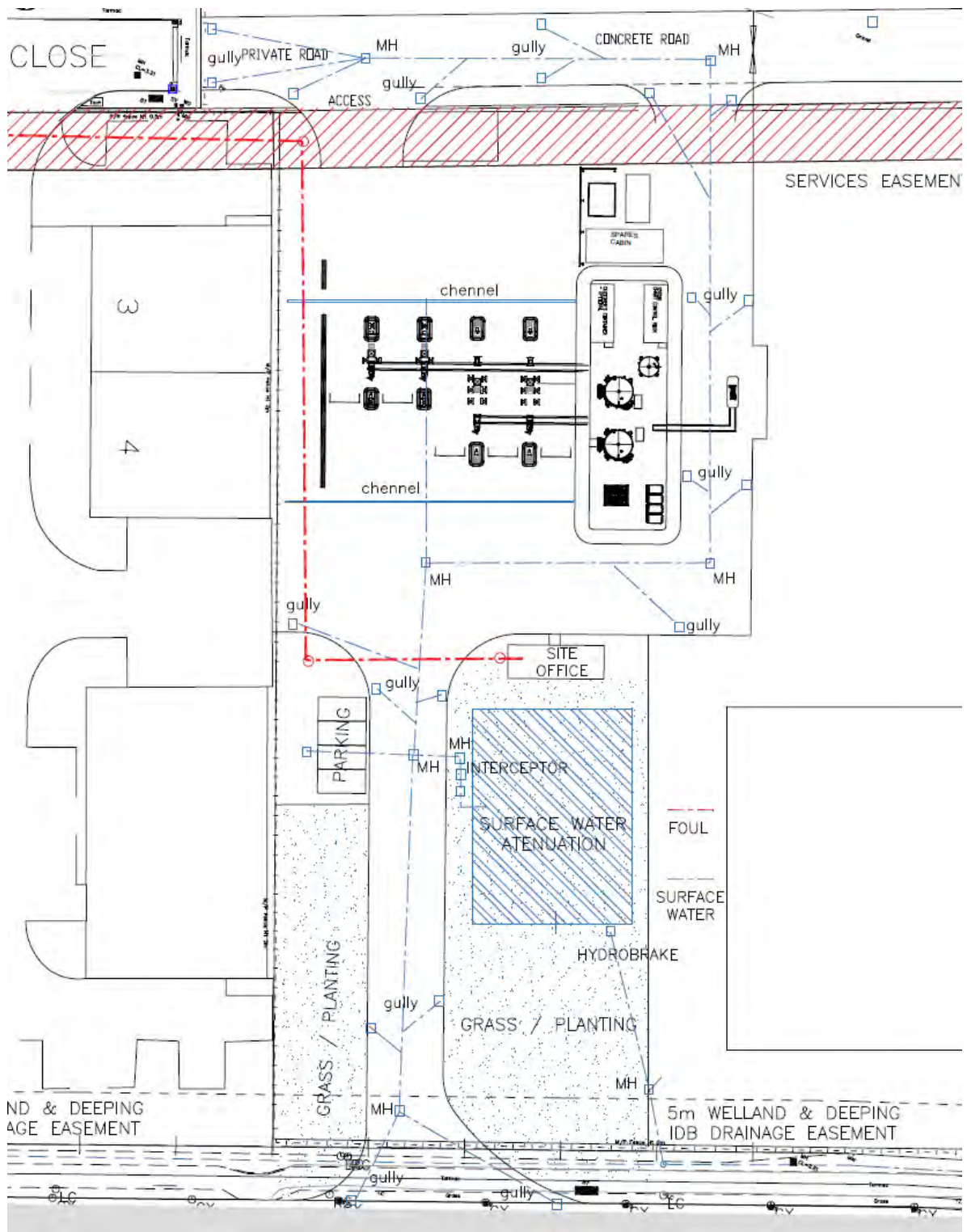
Proposed site layout

Appendix C



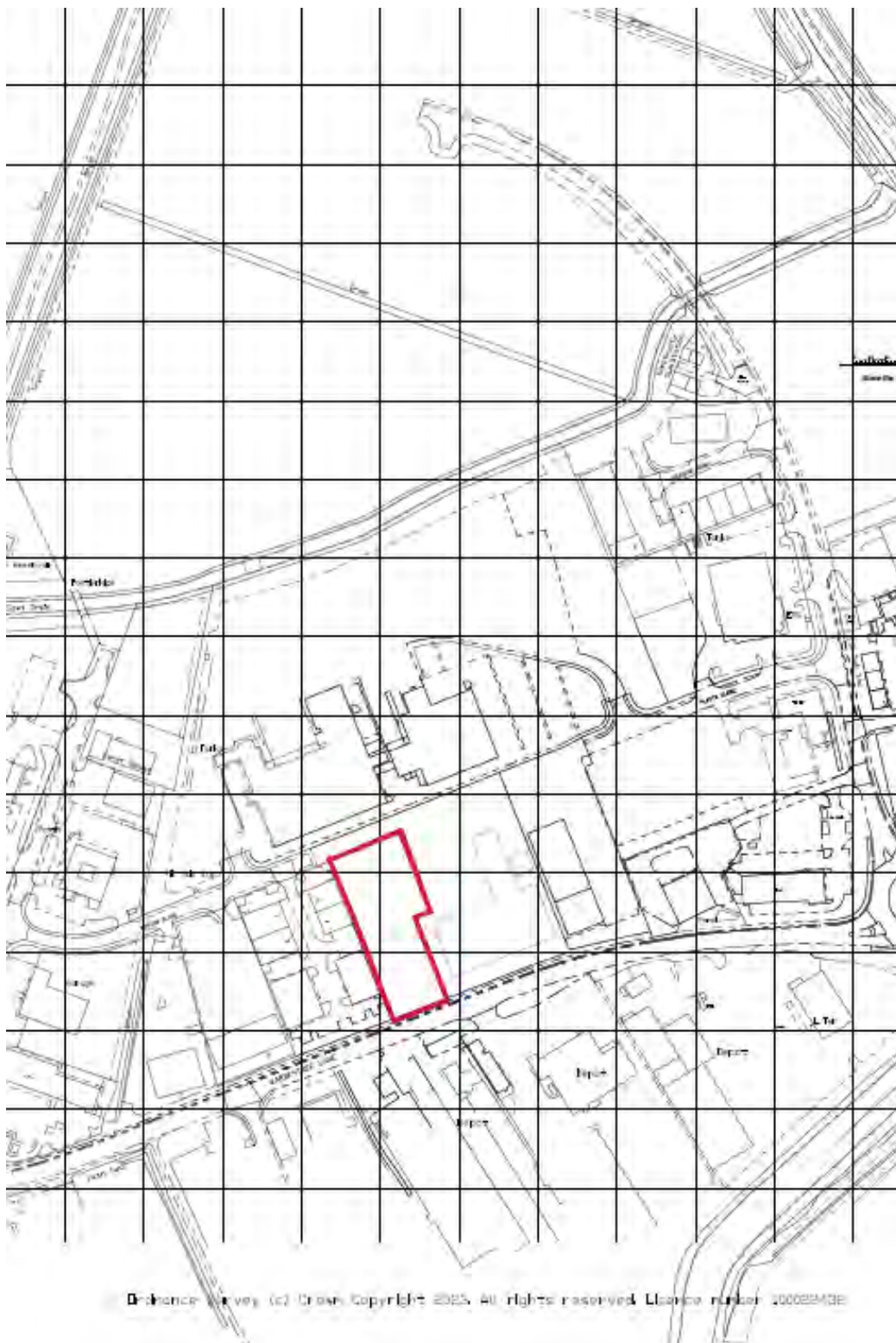
Existing Site Layout

Appendix D



Drainage Plan

Appendix E



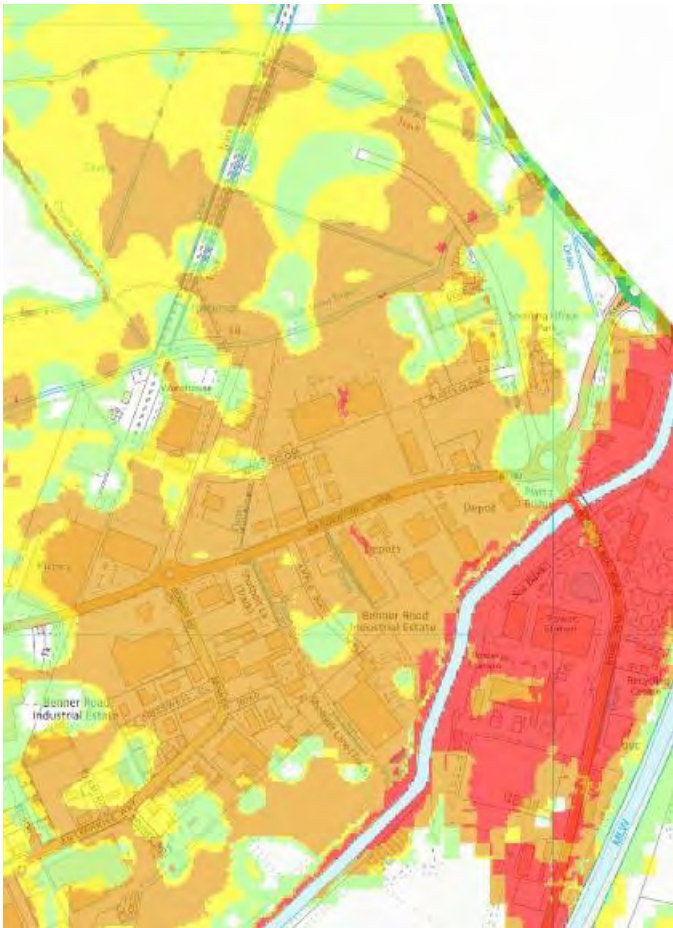
Location Plan

Appendix F

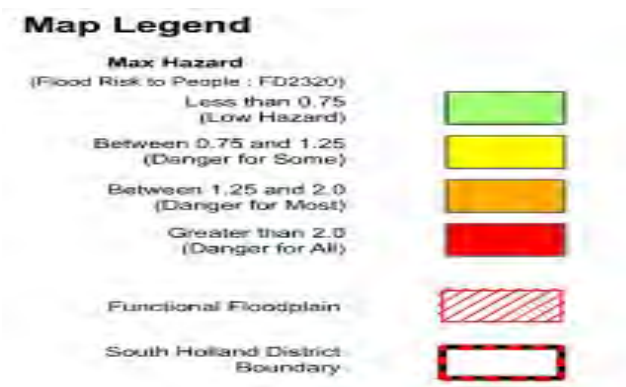
Development and flood risk: when to consult the Environment Agency						March 2007
						
A1 Development category	A2 Development (including boundary walls etc.) within 20 metres of the top of a bank of a Main River	C1 Includes culverting or control of flow of any river or stream	D1 Within Flood Zone 3	E1 Within Flood Zone 2	F1 Within Flood Zone 1	
A2 Householder development and alterations	A3 Consult EA Note	C2 Consult EA with FRA showing design details of any culvert or flow control structure proposed	D2 No consultation - see standard comment Note	E2 No consultation - see standard comment Note	F2 No consultation - No EA Advice	
A3 Non-residential extensions with a footprint of less than 250m ²	A4 Consult EA Note	C3 Consult EA with FRA showing design details of any culvert or flow control structure proposed	D3 No consultation - see standard comment Note	E3 No consultation - see standard comment Note	F3 No consultation - No EA Advice	
A4 Change of use FROM Water Compatible TO 'Less Vulnerable' development	A5 Only consult EA if site also falls within Flood Zone 3. FRA Required	C4 No consultation - no EA advice	D4 Consult EA with FRA	E4 No consultation - no EA advice	F4 No consultation - No EA Advice	
A5 Change of use RESULTING IN 'Highly Vulnerable' or 'More Vulnerable' development	A6 Only consult EA if site also falls within Flood Zone 3 or 2. FRA Required	C5 No consultation - no EA advice	D5 Consult EA with FRA	E5 Consult EA with FRA	F5 No consultation - No EA Advice	
A6 Operational development less than 1 hectare	A7 Consult EA	C6 Consult EA with FRA showing design details of any culvert or flow control structure proposed	D6 Consult EA with FRA and Sequential Test Evidence (and where required confirm Exception Test has been applied)	E6 Consult EA with FRA and Sequential Test Evidence (and where required confirm Exception Test has been applied)	F6 No consultation - No EA Advice	
A7 Operational development of 1 hectare or greater	A8 Consult EA	C7 Consult EA with FRA showing design details of any culvert or flow control structure proposed	D7 Consult EA with FRA and Sequential Test Evidence (and where required confirm Exception Test has been applied)	E7 Consult EA with FRA and Sequential Test Evidence (and where required confirm Exception Test has been applied)	F7 Consult EA with FRA	

Appendix F

South Lincolnshire Strategic Flood Risk



Residual Flood hazard 2115 0.5% tidal / 1.0% fluvial 2115 event probability



Appendix J

Environment Agency Data

creating a better place
for people and wildlife



1. Flood Map for Planning

The attached map includes the current Flood Map for Planning for your area. The map indicates the Area at Risk of Flooding (Flood Zone 3) and the Extreme Flood Outline (Flood Zone 2) **assuming no flood defences exist.**

The Area at Risk of Flooding shows the land that could be impacted from a flood with a 0.5% or greater chance of occurring in any year for flooding from the sea, or a 1% or greater chance of occurring in any year for fluvial (river) flooding.

The Extreme Flood Outline shows the land that could be impacted from a flood which has between a 1% and 0.1% chance of occurring in any year for fluvial (river) flooding, or between a 0.5% and 0.1% annual probability of sea flooding, 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 for Planning 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 for Planning 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.

2. Recorded Flood Outlines

With regards to the history of flooding I can advise we do not have any records of flooding in this area. It is possible recent flooding may have occurred which we are currently investigating, therefore this information may be subject to change. It is possible other flooding may have occurred which other risk management authorities, such as the Lead Local Flood Authority (ie top tier council) or Internal Drainage Board (where they exist) have responsibility.

3. Schemes in the area

There are no ongoing capital projects to reduce or sustain the current flood risk to this area.

4. Fluvial Flood Risk Information

This site is not considered to be at risk of flooding from main rivers.

The site may be at risk from local ordinary watercourses for which other risk management authorities, such as the Lead Local Flood Authority (i.e. top tier council) or Internal Drainage Board (where they exist) have responsibility.

5. Tidal Flood Risk Information

This site is considered to be at risk from tidal flooding.

5.1 Tidal Defence Information

The existing tidal defences protecting this site consist of earth embankments.

They are in fair condition and reduce the risk of flooding (at the defence) to a 1% (1 in 100) chance of occurring in any year. We inspect these defences routinely to ensure potential defects are identified.

Refer to paragraph 3 for details of any ongoing capital projects to reduce the flood risk to this site.

5.2 Tidal Flood Levels

The attached data sheets show our current best estimate for extreme tide levels.

Please read the information notes on the data sheets.

5.3 Tidal 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.

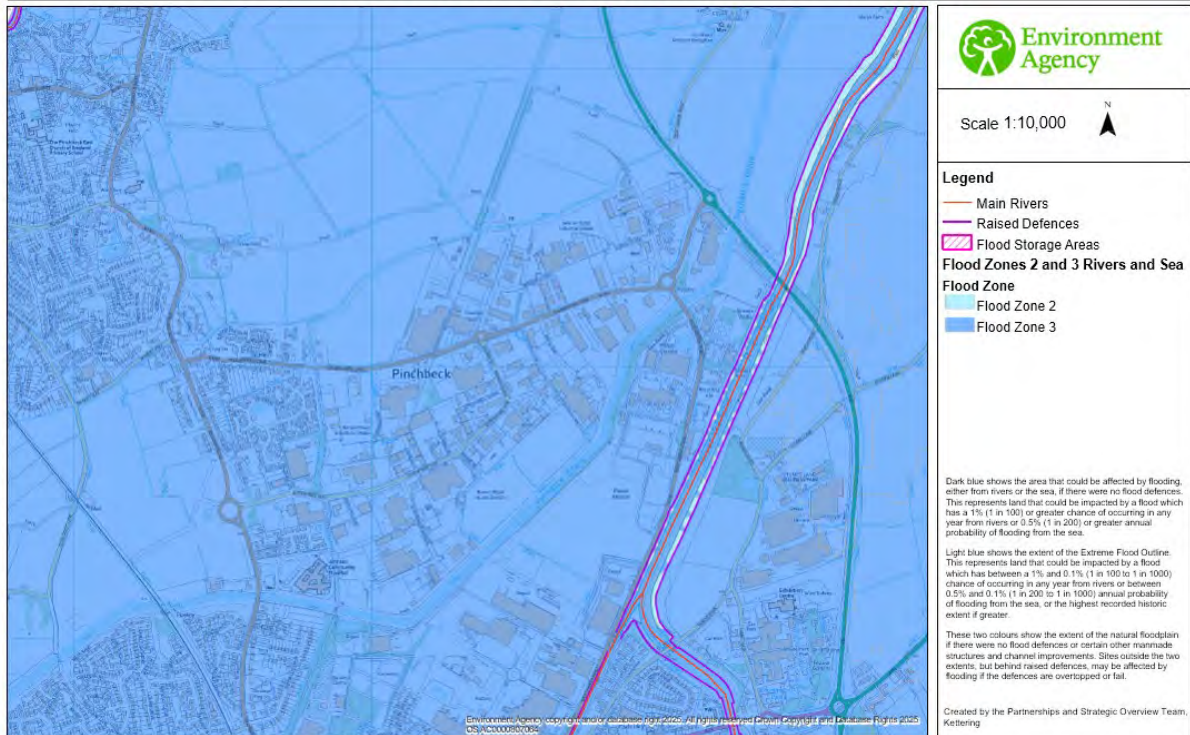
The number of locations we have this information for is expected to increase in time.

At present this site is not covered by any Environment Agency hazard mapping.

Detailed Hazard Mapping is available within the 2017 Update of South Holland Strategic Flood Risk Assessment. This can be downloaded via the following link:

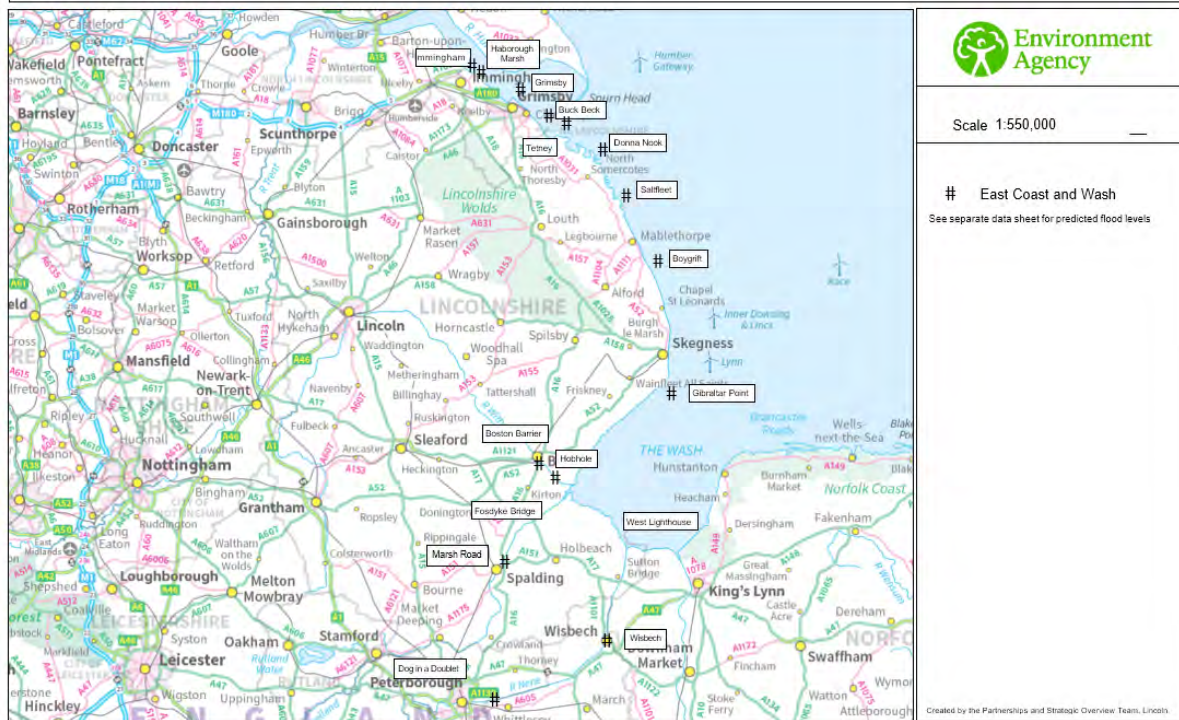
<http://www.southeastlincslocalplan.org/water/>

Flood Map centred on TF 25650 25285 - created March 2026 [Ref: EIR2026/13221]



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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

East Coast and Wash - 2018 Coastal Flood Boundary [CFB] Dataset Key Node Points



East Coast and Wash: Immingham to the West Lighthouse



2018 Coastal Flood Boundary Extreme Sea Levels

CFB REF	LOCATION	EASTING	NORTHING	ANNUAL CHANCE (1 IN X) OF TIDE LEVEL IN METRES ODN																							
				1			10			50			100			200			300			1000					
				Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound					
				2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%			
3888	Immingham	520440	417625	4.16	4.17	4.19	4.50	4.53	4.62	4.73	4.80	5.00	4.83	4.93	5.19	4.93	5.06	5.41	4.98	5.14	5.55	5.15	5.38	6.01			
3890	Haborough Marsh	522100	410512	4.14	4.15	4.17	4.48	4.51	4.60	4.70	4.77	4.97	4.80	4.90	5.16	4.90	5.03	5.38	4.94	5.10	5.51	5.11	5.34	5.97			
3898	Grimsby	529295	413182	3.98	3.99	4.01	4.31	4.34	4.43	4.53	4.60	4.80	4.61	4.71	4.97	4.71	4.84	5.19	4.74	4.90	5.31	4.88	5.11	5.74			
3906	Buck Beck	534709	407389	3.87	3.88	3.90	4.19	4.23	4.31	4.41	4.50	4.68	4.50	4.61	4.86	4.61	4.75	5.10	4.64	4.82	5.22	4.80	5.05	5.66			
3910	Tetney	538035	405537	3.85	3.86	3.89	4.17	4.22	4.30	4.40	4.50	4.67	4.49	4.61	4.88	4.60	4.75	5.10	4.63	4.82	5.21	4.80	5.06	5.66			
3918	Donna Nook	544841	401967	3.82	3.83	3.86	4.14	4.19	4.27	4.38	4.48	4.65	4.47	4.60	4.85	4.58	4.74	5.10	4.63	4.82	5.22	4.81	5.08	5.68			
3928	Saltfleet	549131	393380	3.78	3.79	3.82	4.11	4.16	4.26	4.36	4.46	4.64	4.47	4.59	4.86	4.57	4.74	5.11	4.63	4.83	5.25	4.83	5.11	5.74			
3942	Boygriff	555131	380880	3.72	3.74	3.77	4.06	4.11	4.22	4.33	4.43	4.65	4.43	4.57	4.87	4.56	4.73	5.13	4.62	4.83	5.28	4.85	5.15	5.82			
3968	Gibraltar Point	557652	356181	4.16	4.17	4.20	4.51	4.56	4.67	4.78	4.85	5.08	4.85	4.97	5.27	4.94	5.10	5.49	4.99	5.18	5.63	5.14	5.41	6.09			
3992_14	Hobhole	535990	340116	4.96	4.97	5.01	5.40	5.44	5.66	5.66	5.76	5.98	5.78	5.90	6.20	5.88	6.04	6.44	5.92	6.11	6.57	6.03	6.31	6.99			
	Grand Sluice*	532386	344510	4.93	4.94	4.98	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3			
3992_9	Boston Barrier	532754	342852	4.93	4.94	4.98	5.41	5.45	5.57	5.73	5.83	6.05	5.85	5.97	6.27	5.93	6.09	6.49	5.94	6.13	6.59	5.98	6.26	6.94			
3992_5	Fosdyke Bridge	531886	332234	4.87	4.88	4.92	5.31	5.35	5.47	5.58	5.68	5.90	5.71	5.83	6.13	5.82	5.98	6.38	5.87	6.06	6.52	6.01	6.29	6.97			
4008	West Lighthouse	550094	329971	4.87	4.88	4.91	5.21	5.26	5.37	5.46	5.56	5.78	5.56	5.68	5.98	5.66	5.82	6.21	5.71	5.90	6.35	5.86	6.14	6.81			
-	Marsh Road	525988	324065	-	5.04	-	-	5.44	-	-	5.73	-	-	5.85	-	-	5.98	-	-	-	-	-	-	-			
-	Wisbech	546110	309940	-	4.83	-	-	5.25	-	-	5.53	-	-	5.66	-	-	5.78	-	-	-	-	-	-	-			
-	Dog-in-a-Doublet	527200	299287	-	3.87	-	-	4.00	-	-	4.22	-	-	4.32	-	-	4.42	-	-	-	-	-	-	-			

See next page for notes

East Coast and Wash: Immingham to the West Lighthouse



2018 Coastal Flood Boundary Extreme Sea Levels

NOTES:

The following notes apply to all CFB sites (ie all on table excluding Marsh Road, Wisbech, Dog-in-a-Doublet)

- The base date for the data is 2017.
- The levels 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.
- Levels for other annual chance probabilities are available if required.
- For additional information relating to the 2018 Coastal Flood Boundary Extreme Sea Levels or to access the full dataset for the above sites or intermediate locations refer to the Defra Metadata Catalogue at https://deframetadata.com/geonetwork/srv/eng/catalog_search#/metadata/84a5c7c0-d485-11e4-b0bd-f0def148f590

The following notes apply to all Marsh Road, Wisbech, Dog-in-a-Doublet

- The base date for the data is 2008.
- The levels 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.
- Levels for other annual chance probabilities are available if required.
- These levels will be updated as their respective tidal river models are updated.

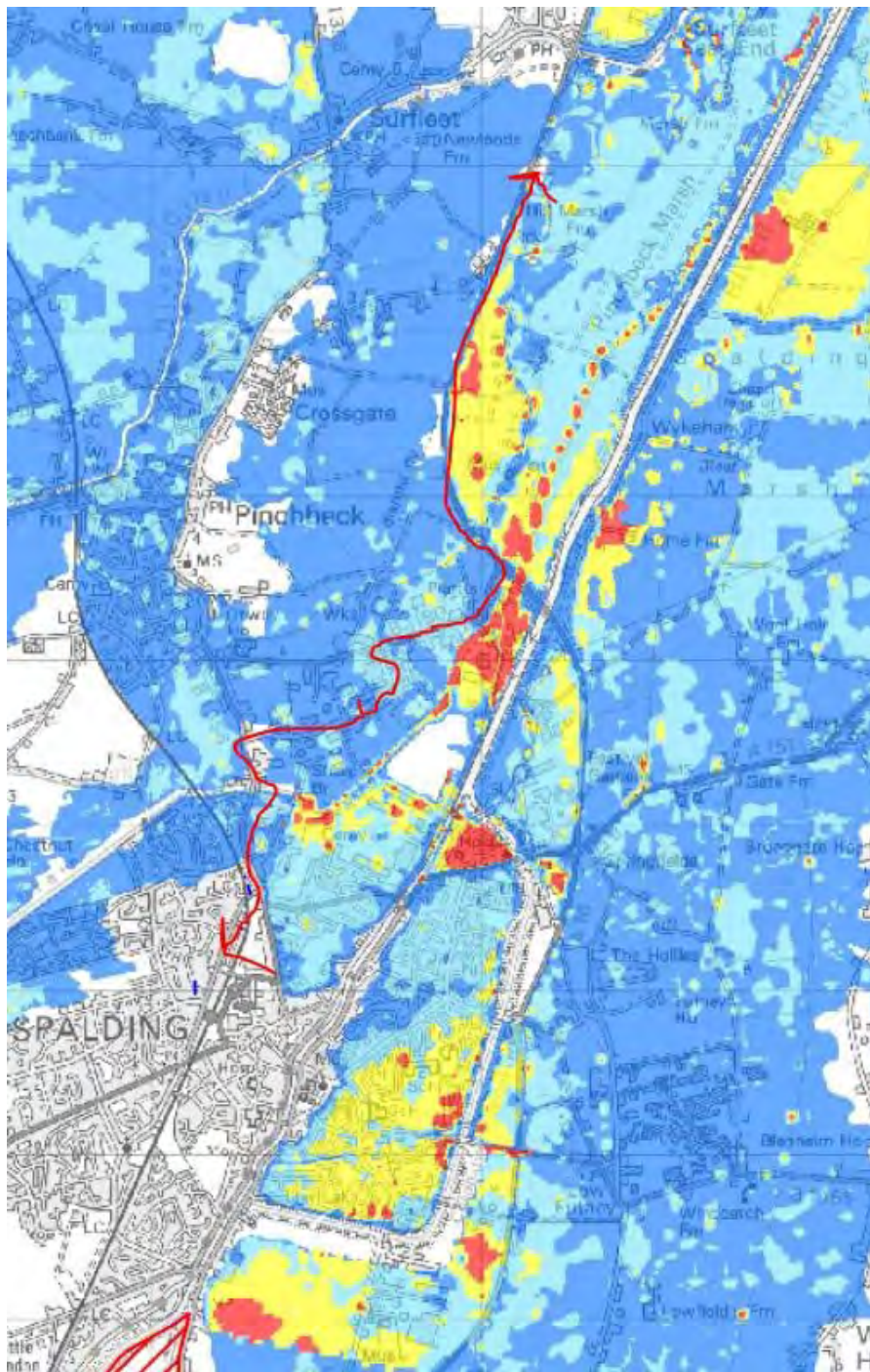
The following notes apply to Grand Sluice

- Grand Sluice remains the tidal limit for the River Witham.
- The data is based on CFB 2018 data for Boston Barrier site, capped at 5.3m AOD to reflect use of the barrier which raises for tides above this level.
- The base date for the data is 2017.
- The levels 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.
- For additional information relating to the 2018 Coastal Flood Boundary Extreme Sea Levels or to access the full dataset for the above sites or intermediate locations refer to the Defra Metadata Catalogue at https://deframetadata.com/geonetwork/srv/eng/catalog_search#/metadata/84a5c7c0-d485-11e4-b0bd-f0def148f590



Assessments Breach Locations

Appendix K



Possible evacuation routes