3.0 THE SITE AND SEQUENTIAL TEST

4.0 EXISTING FLOOD ALLEVIATION MEASURES

FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT OFF BATTLEFIELDS LANE NORTH, HOLBEACH, LINCS.

FINAL REPORT

GEOFF BEEL CONSULTANCY

JUNE 2017

GCB/BLISS

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1.0 INTRODUCTION

1.1 An outline planning application has been submitted by L W Bliss (Design & Build) for proposed residential development at land off Battlefields Lane North,
Holbeach, Spalding, Lincs.

1.2 A Flood Risk Assessment is required to accompany the planning application and meet the requirements and general principles contained in the Planning Practice Guidance to the National Planning Policy Framework (NPPF).

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

The site however is also shown in Flood Zone 1 and outside of any Hazard Zone of the South Holland District Council's Strategic Flood Risk Assessment Maps (2016).

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

1.3 Geoff Beel Consultancy was appointed on 15th May 2017 to undertake a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is located immediately north of Washway Road, off Battlefields Lane North, Holbeach.

2.2 The position and extent of the site is shown on Fig 1 - Location Plan. The National Grid Reference for the site is TF 37052565.

2.3 The site, located within the South Holland Internal Drainage Board district is shown within Flood Zone 3 as detailed on the Environment Agency Flood Map for Planning and in Flood Zone 1 of the Council's Updated Strategic Flood Risk Assessment Maps (2016) as defended by the Agency's tidal defences and the Internal Drainage Board system.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently brownfield land with the existing industrial premises to be demolished prior to development.

3.2 The area of development is approximately 0.42 hectare.

3.3 The proposed site layout consists the construction of 7 two-storey residential dwellings. Existing land level is generally at 3.00m aOD.

3.4 The Sequential Test is met as the site is located in Flood Zone 1 of the Council's Updated Strategic Flood Risk Assessment Maps (2016) and protected against both the 1 in 100 year fluvial event and the 1 in 200 year tidal event.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

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

The development site within the South Holland Internal Drainage Board is protected by the Wash tidal defences to the Holbeach Marsh frontage with embankment levels of a minimum of 7.00m aOD.

4.2 The site and the surrounding land drains by gravity to the nearby IDB main drain on the north western boundary of the site and hence in a northerly direction to the Holbeach River Sluice to discharge into the tidal River Welland.

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

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

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

5.0 POTENTIAL SOURCES OF FLOODING

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

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

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

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

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

5.3 Failure of Holbeach River Sluice may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low.

5.4 The flood embankments to the Wash tidal defences provide a 1 in 200 year return period level of protection. The 1 in 200 year tidal event to the Holbeach Marsh frontage inclusive of climate change to 2115 is estimated to be 7.20m aOD as against existing embankment levels of a minimum of 7.00m aOD.

There is a low risk during such an event for wave and wind action to cause overtopping and/or breaching of the first line defences. However, the site is further protected by second line defences with embankment levels of 6.00m aOD. Any overtopping/breaching could reach the development site.

More recent Tidal Hazard Mapping produced by the Environment Agency shows that the development site could be affected by floodwaters between 0.25 – 0.50m deep as a result of a breach occurring to the Wash Coastal Defences.

It is necessary to mitigate against this remote risk and finished floor levels should be raised 0.50m above ground levels with an additional 300mm of flood resilient construction above finished floor level.

5.5 The Environment Agency has recently published The Wash Shoreline Management Plan 2 from Gibraltar Point to Old Hunstanton. The summary of the plan between Gibraltar Point and Wolferton Creek is as follows:-

The intent of management for this Policy Development Zone (PDZ) is to sustain flood defence for the communities and their hinterland on the low-lying areas around The Wash. This includes an increase of management as needed to sustain the current level of flood risk in the face of climate change.

5.6 Surface water drainage from the development site will be to soakaways designed to BRE365 requirements and Building Regulations approval.

6.0 EXTENT OF KNOWN FLOODING

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

7.0 PROBABILITIES AND TRENDS OF FLOODING

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

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

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

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

7.5 The water levels in the drainage channels will tend to rise as a result of the impacts of climate change. However the existing systems and defences together with the proposed floor levels at 500 mm above surrounding ground level with an additional 300mm of flood resilient construction will be appropriate for the design life of the development (i.e. 100 years). Safe refuge would be available at first floor level of all dwellings with no sleeping accommodation on the ground floor.

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated.

8.2 Floor levels of the development will be 500 mm above surrounding ground levels with an additional 300mm of flood resilient construction which together with the proposed soakaway drainage system will offer additional protection against impacts arising from any extreme short duration, localised events.

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

8.4 No displacement of water from the site will affect any adjoining properties as proposed soakaways to BRE 365 design requirements will be implemented with Building Regulations approval.

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

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding, contact tel no: 0345 988 1188 and the occupiers of the new dwellings should register with the Floodline Direct Warning Service to receive future flood warnings.

9.0 RESIDUAL RISK – EXTREME EVENTS

9.1 The residual risk from extreme events is very low on this site, because of its location, within the South Holland IDB area and its location 8.00kms from The Wash tidal defences with secondary defences between the marsh frontage and the site.

9.2 The site is within Flood Zone 1 according to NPPF classification with a very low risk of flooding due to the current standards of drainage and flood defence and land levels. The site is not located within a Functional Flood Plain of any 'main river' or 'main drain'. The Environment Agency Flood Map for Planning has been produced irrespective of existing flood defences and standards of protection.

9.3 South Holland District Council in conjunction with the Environment Agency and the local IDB's within the Council area have carried out an updated Strategic Flood Risk Assessment (2016) of the whole District by appointed Consulting Engineers.

The Updated Strategic Flood Risk Assessment (2016) has produced definitive Flood Risk Maps similar to those published by the Environment Agency and at the same time has analysed flood return periods of all tidal and fluvial defences to account for the effects of climate change.

Breach scenarios of embankments failing and/or being overtopped have also been carried out to establish Flood Risk Zones. As a result of the Updated Strategic Flood Risk Assessment (2016) the site is outside any Hazard Zone and defended by tidal defences and tidal doors.

10.0 CONCLUSIONS AND RECOMMENDATIONS

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

- The proposed development is in a Defended Floodplain. It is located in the Passive Floodplain of The Wash Coastal Defences and South Holland IDB protected to a 1 in 200 year return period.

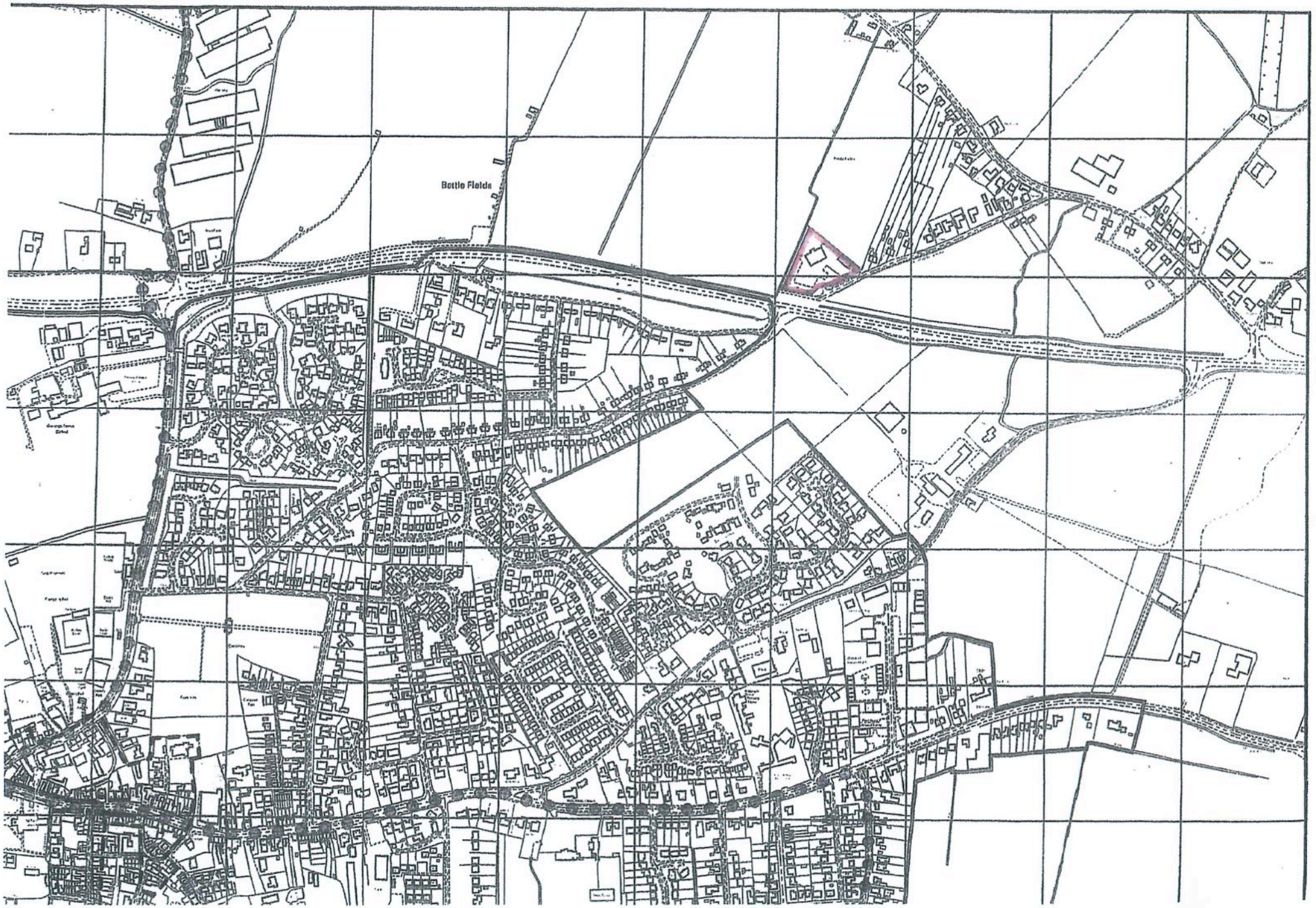
- The site is in Flood Zone 1 with the actual risk of the site flooding from any Environment Agency river system is very low (less than 0.5%).

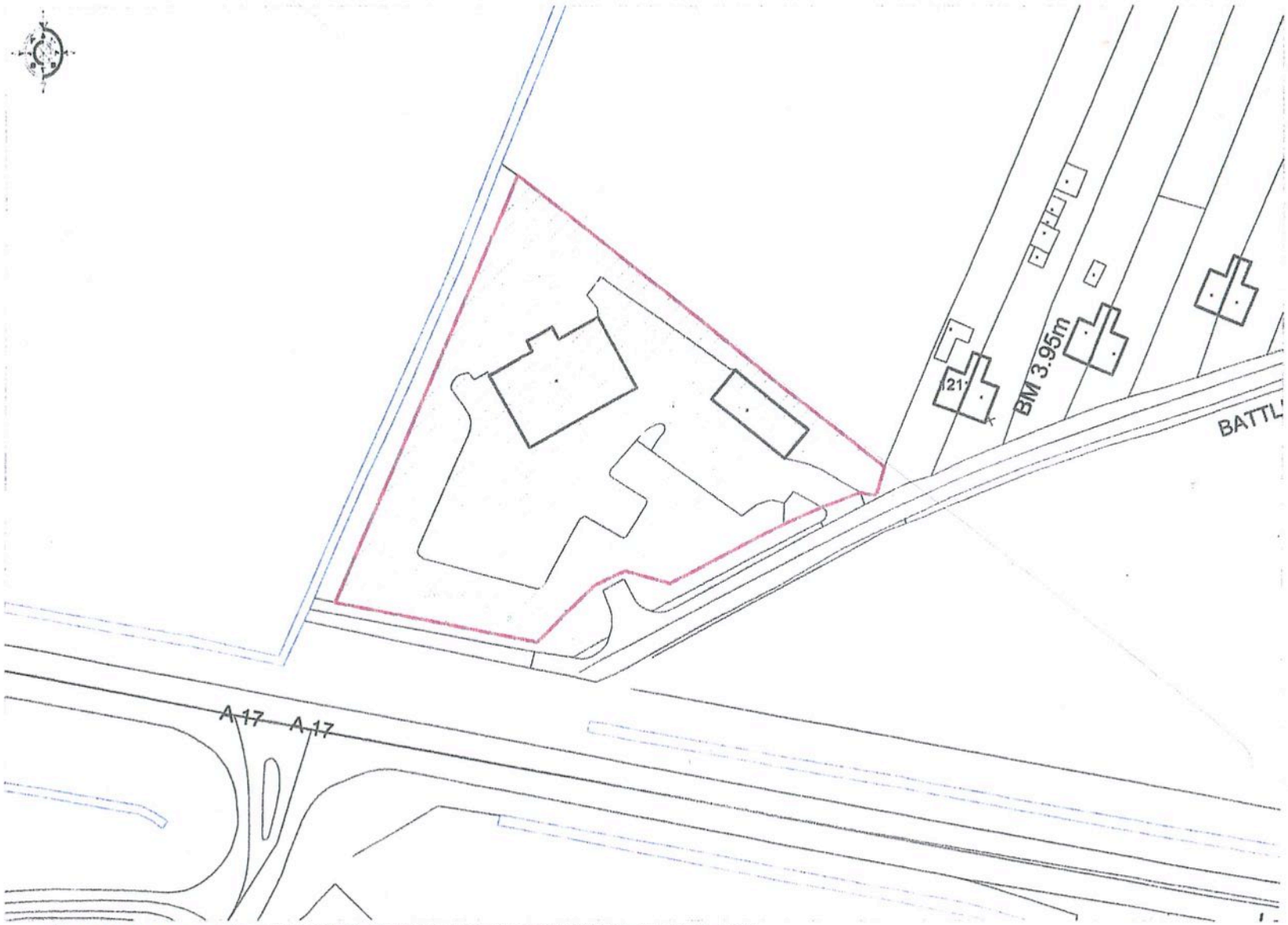
- Although the site is located within an Internal Drainage District with a minimum standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. Freeboard to design water level of 900mm to lowest land level is available for events greater than 1 in 50 years providing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

- On site surface water run-off from the development will be discharged to soakaways to BRE365 design requirements and Building Regulations approval.

- Floor levels of the development will be at 500 mm above ground level with an additional 300mm of flood resilient construction above finished floor level and safe refuge at first floor level with no sleeping accommodation at ground floor level.

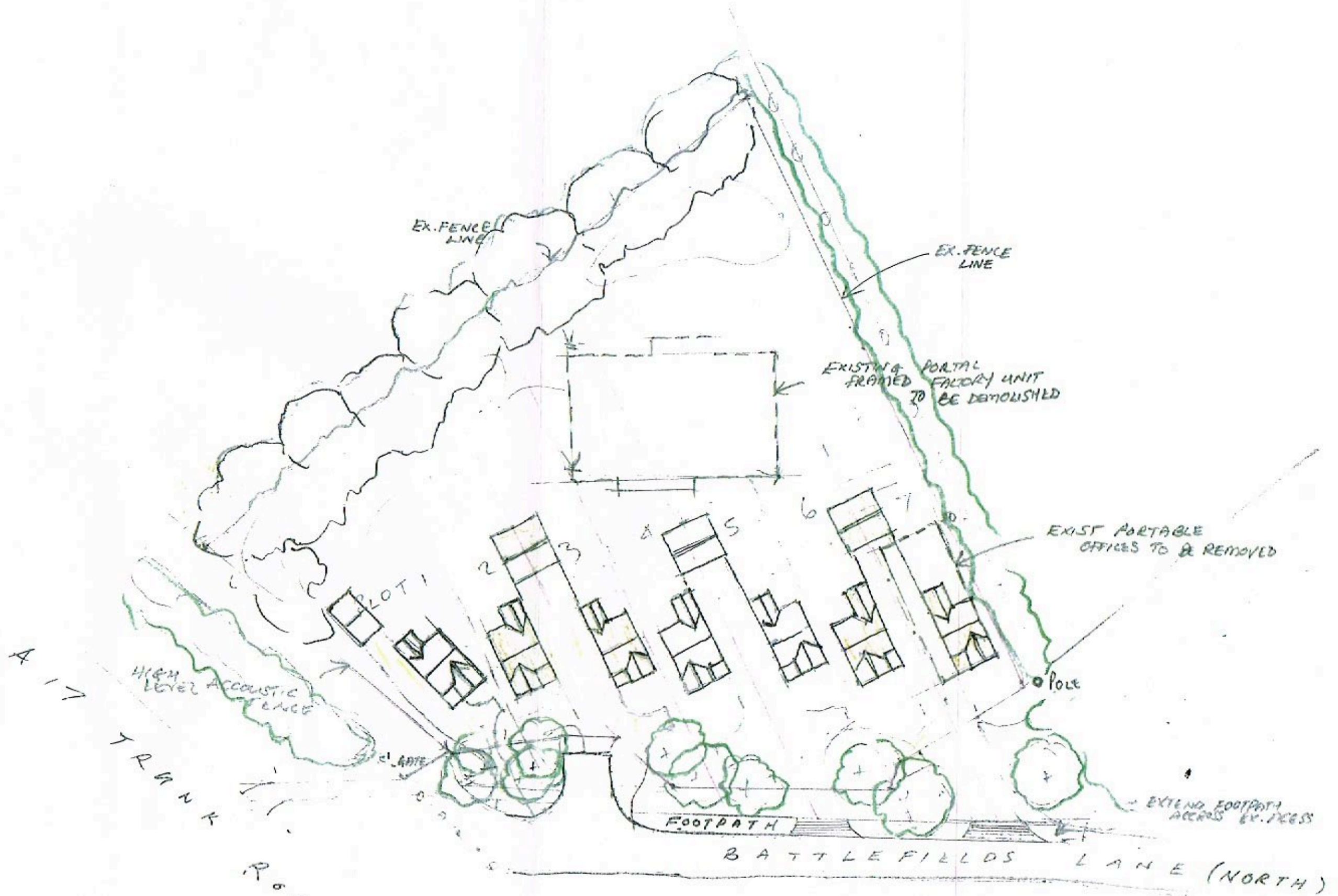
- No development will be permitted within 9.00m of the IDB main drain on the north western boundary without prior Lane Drainage Byelaw Consent from the South Holland IDB.


Battle Fields



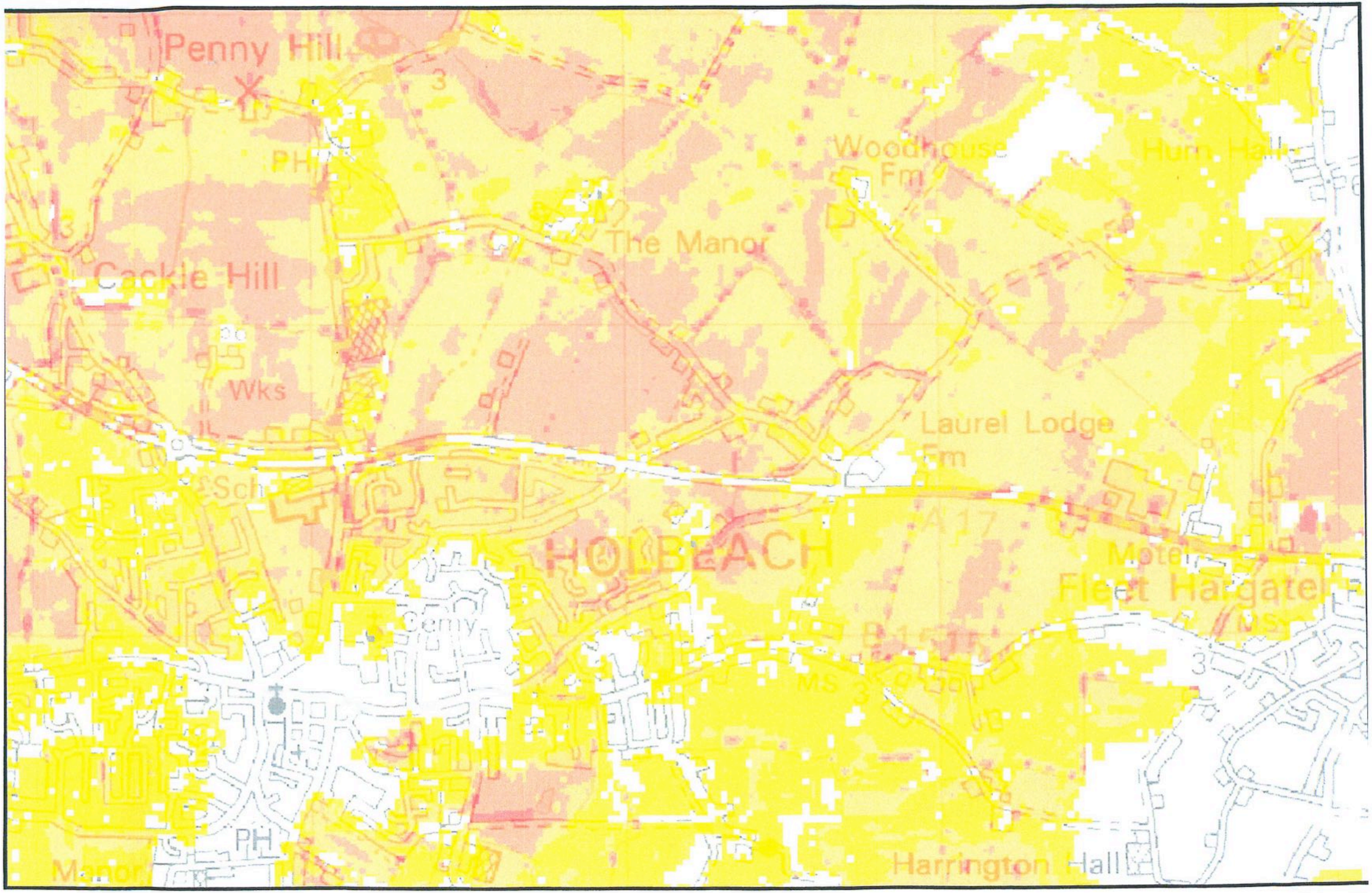
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APPENDIX B

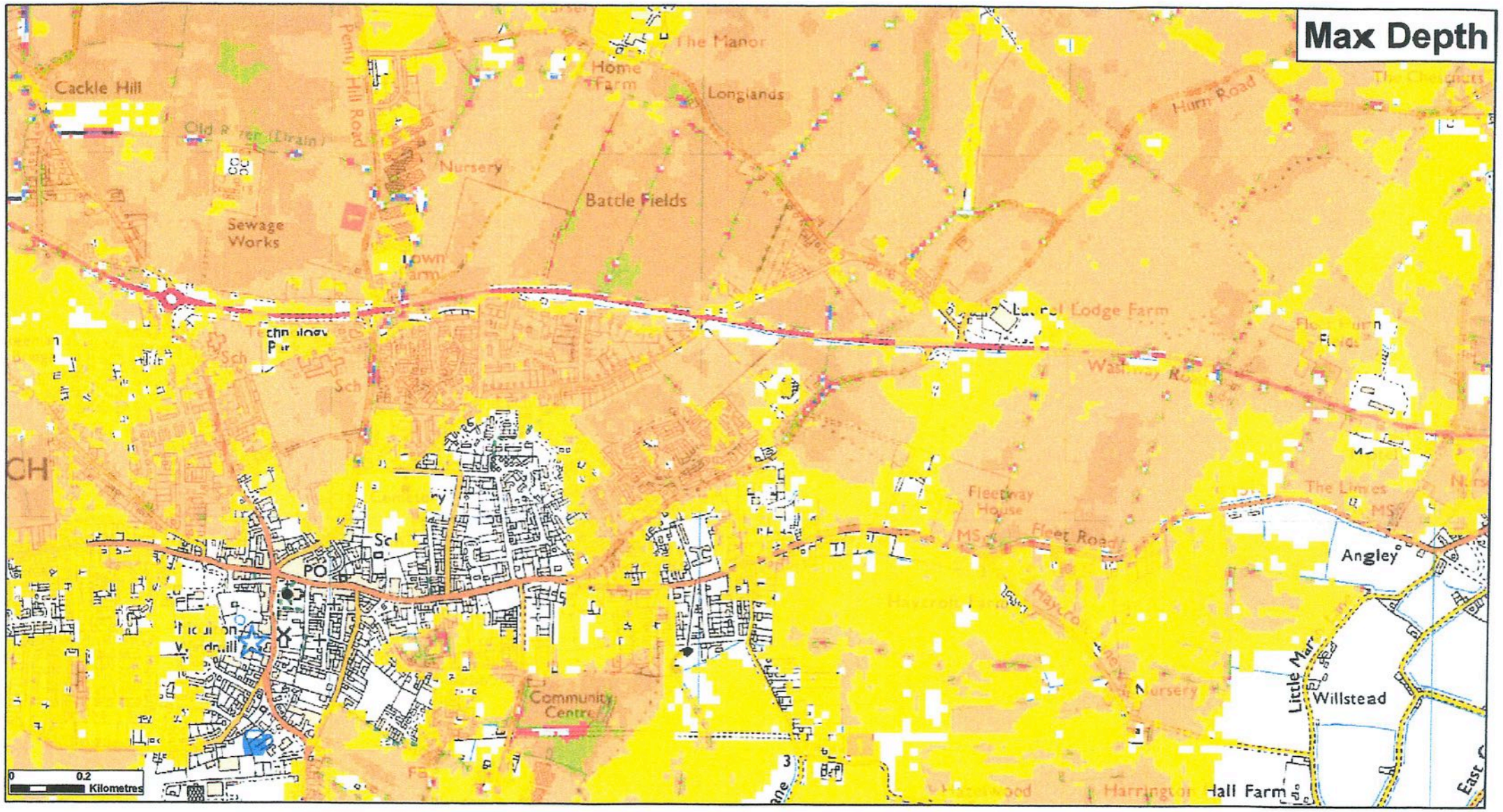

EX. FENCE LINE
EX. FENCE LINE
EXISTING & FRAMED PORTAL FACTORY UNIT TO BE DEMOLISHED
EXIST PORTABLE OFFICES TO BE REMOVED
PLOT 1
2
3
4
5
6
7
HIGH LEVEL ACOUSTIC FENCE
GATE
POLE
FOOTPATH
EXTEND FOOTPATH ACCROS EV. ACCESS
BATTLE FIELDS LANE (NORTH)
A 17 TRENT ROAD

SCALE 1:500


Home Farm
Battle Fields
Town Farm
A12
Nursery
Farm


Penny Hill
PH
Woodhouse Fm
Hurn Hall
The Manor
Cackle Hill
Wks
Laurel Lodge Fm
Sch
A17
HOLBEACH
Motel
Fleet Hargate
Penny
B1
MS
PH
Manor
Harrington Hall

Max Depth



Max Depth (m)

0 - 0.25	0.75 - 1	1.5 - 1.75
0.25 - 0.5	1 - 1.25	1.75 - 2
0.5 - 0.75	1.25 - 1.5	2+

Date Printed	October 2014	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)

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

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

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

General Enquiries No: 03708 506 506. Calls to 03 numbers cost the same as calls to standard geographic numbers (i.e. numbers beginning with 01 or 02.

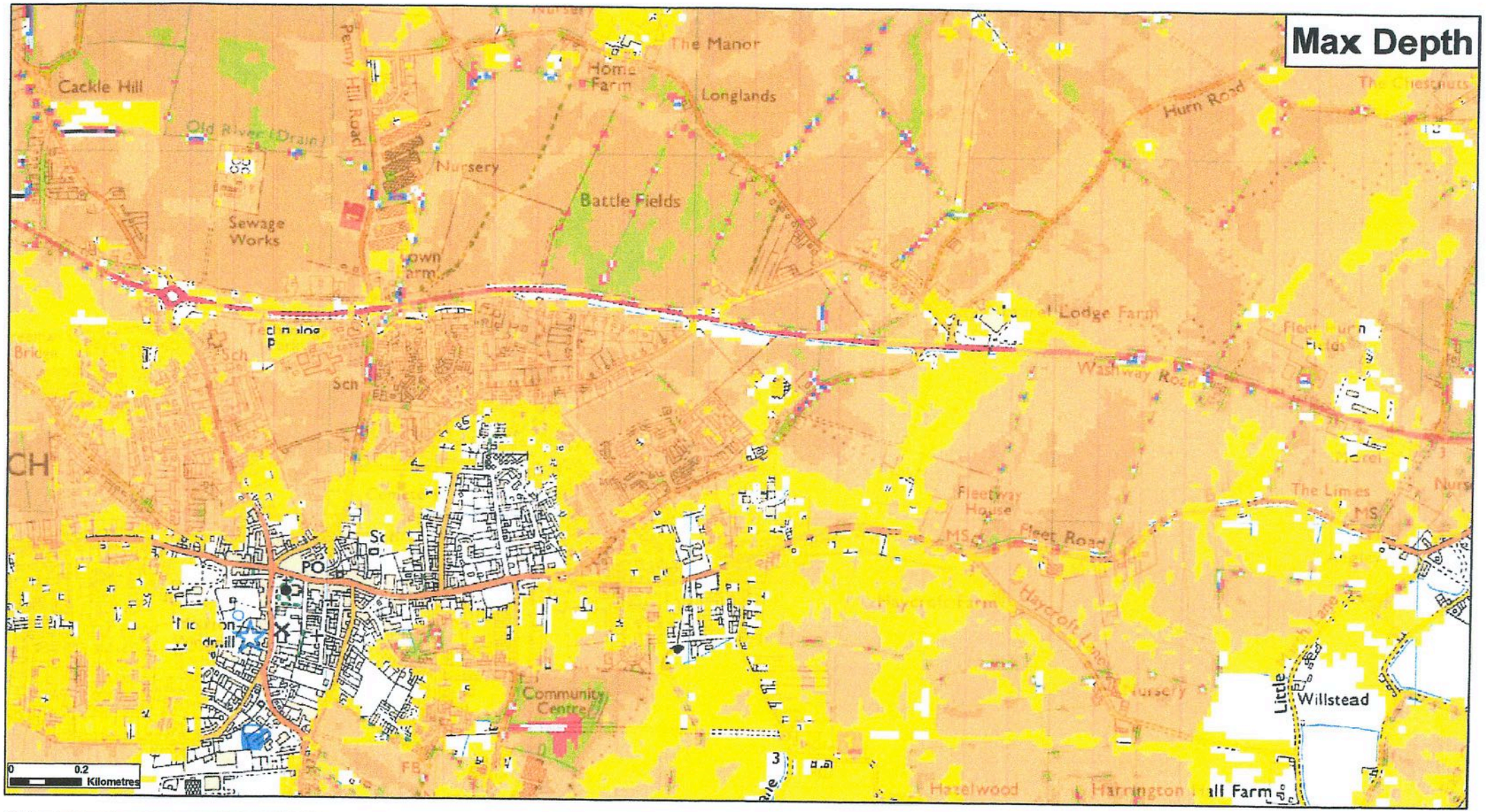
Environment Agency

Produced by the Partnerships & Strategic Overview Team, Lincoln

Northern Area Tidal Breaching Hazard Mapping

Map Centered on TF 37134 25318

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Max Depth (m)

0 - 0.25	0.75 - 1	1.5 - 1.75
0.25 - 0.5	1 - 1.25	1.75 - 2
0.5 - 0.75	1.25 - 1.5	2+

Date Printed	October 2014	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)

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.

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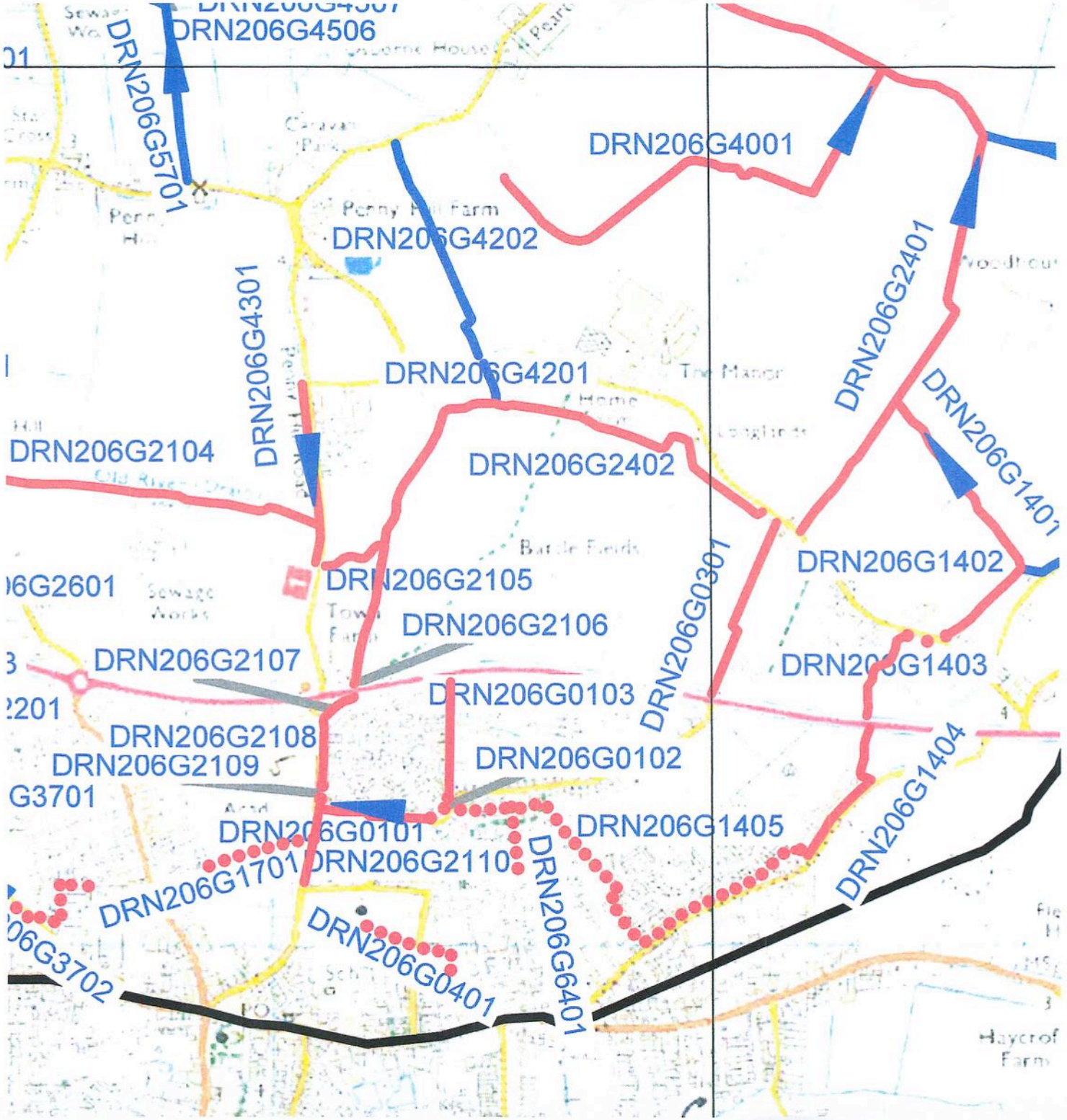
Environment Agency

Produced by the Partnerships & Strategic Overview Team, Lincoln

Northern Area Tidal Breaching Hazard Mapping

Map Centered on TF 371 34 25318

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