Weetwood

Development • Planning • Environment

ROMAN BANK, SPALDING

FLOOD RISK ASSESSMENT

Draft Report v1.1

February 2017

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1 INTRODUCTION

1.1 PURPOSE OF REPORT

Weetwood Services Ltd ('Weetwood') has been instructed by Millhouse Developments Ltd to undertake a Flood Risk Assessment (FRA) for the proposed redevelopment of a site located off Roman Bank, Spalding.

The FRA has been undertaken in accordance with the requirements of the National Planning Policy Framework (NPPF) and supporting Planning Practice Guidance.

1.2 STRUCTURE OF THE REPORT

The report is structured as follows:

Section 1 Introduction and report structure

Section 2 Presents national and local flood risk and drainage planning policy

Section 3 Provides background information relating to the development site, the development proposals, ground conditions and existing site access arrangements

Section 4 Assesses the potential sources of flooding to the development site

Section 5 Presents flood risk mitigation measures based on the findings of the assessment

Section 6 Addresses the effect of the proposed development on surface water runoff

Section 7 Presents a summary of key findings

Section 8 Presents the recommendations

2 PLANNING POLICY AND GUIDANCE

2.1 NATIONAL PLANNING POLICY

The aim of the NPPF is to ensure that flood risk is taken into account at all stages in the planning process and is appropriately addressed.

2.1.1 Sequential Test

Paragraph 100 of the NPPF states that *'inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk but where development is necessary, making it safe without increasing flood risk elsewhere*'.

This policy is implemented through the application of the flood risk Sequential Test which aims to steer new development to areas with the lowest probability of flooding.

2.1.2 Exception Test

If, following application of the Sequential Test, it is not possible for the development to be located in zones with a lower probability of flooding, the Exception Test can be applied, if appropriate.

As detailed in paragraph 102 of the NPPF, for the Exception Test to be passed:

- It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment (SFRA) where one has been prepared; and
- A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

2.2 LOCAL PLANNING POLICY AND GUIDANCE

The South Holland Local Plan was adopted in July 2006. Policy SG9 - Development and Flood Risk states:

'In areas of flood risk planning permission will only be granted where a flood risk assessment has been carried out and submitted to the Council. Proposals shall, where necessary, include details of measures designed to reduce the risk and consequences of flooding.

For permission to be granted the Strategic Flood Risk Assessment and site specific assessment will need to demonstrate how the proposed development will be defended from flooding for its proposed life, taking into account proposed mitigation measures.

Built development that would be at high risk of flooding, or which may be subject to rapid inundation, will not normally be permitted unless exceptionally required for operational reasons'.

Policy SG11 - Sustainable Urban Drainage Systems (SUDS) states:

'Development generating surface water run-off, likely to result in increased flood risk, will be permitted provided that:

1. *The development's surface water management system accords with sustainable development principles and has been designed as part of the development layout; and*

2. *The system will effectively control and adequately mitigate or attenuate any adverse effects from surface water run-off on people, habitats of acknowledged importance and property; and*

3. *Developers can ensure long term maintenance of the drainage systems, where necessary through planning obligations.*

Where this is not possible the developer will be required to implement an alternative method of surface water disposal that is to the Council's satisfaction.'

2.3 CONSENTS

An Environmental Permit for Flood Risk Activities may be required from the Environment Agency (EA) for work:

- in, under, over or near a main river (including where the river is in a culvert)
- on or near a flood defence on a main river
- in the flood plain of a main river
- on or near a sea defence

Further information can be found by visiting the following website:
https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Land drainage consent may be required from the lead local flood authority or internal drainage board for work to an ordinary watercourse. Undertaking activities controlled by local Byelaws (made under the Water Resources Act 1991) also requires the relevant consent.

2.4 RELEVANT DOCUMENTS

The FRA has been informed by the following documents:

- SFRA, South Holland District Council, January 2010
- Preliminary Flood Risk Assessment (PFRA), Lincolnshire County Council, June 2011

3 SITE DETAILS AND PROPOSED DEVELOPMENT

3.1 SITE LOCATION

The site is located adjacent to Roman Bank at Ordnance Survey National Grid Reference TF 257 238, as shown in **Figure 1**. The site is approximately 0.48 hectares (ha) in area.

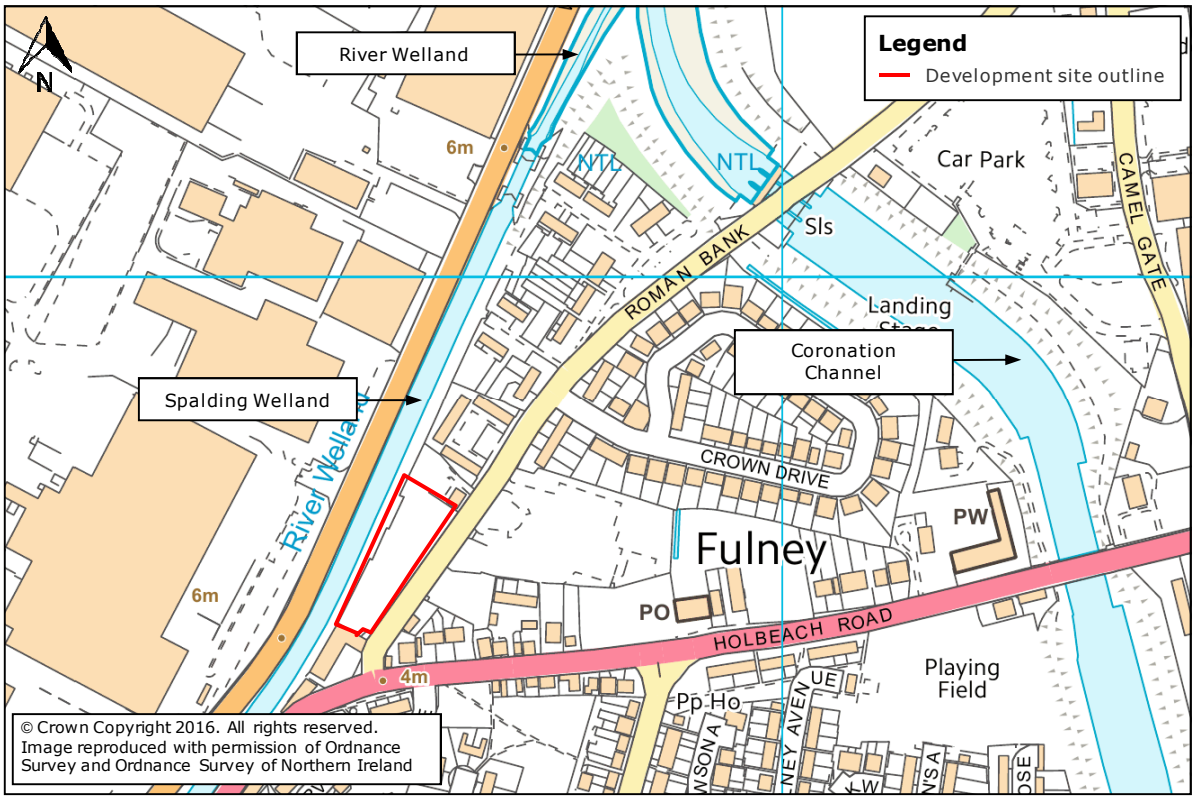


Figure 1: Site Location

3.2 EXISTING AND PROPOSED DEVELOPMENT

The site is a former builders merchants.

Proposals are for the development of a 90 room care facility and 30 retirement apartments (**Appendix A**).

The NPPF Planning Practice Guidance classifies residential development as 'more vulnerable' land use.

3.3 WATERBODIES IN THE VICINITY OF THE SITE

The River Welland is located approximately 270 m northeast of the site, flowing in a north-easterly direction.

Spalding Welland runs adjacent to the western boundary of the site, flowing in north-easterly direction. The Coronation Channel is located approximately 320 m to the northeast of the site, flowing in a north-westerly direction.

The River Welland, Spalding Welland and the Coronation Channel are classified as 'main rivers'.

3.4 GROUND CONDITIONS

According to the British Geological Survey (BGS) maps, the bedrock underlying the site is *'Oxford Clay Formation – Mudstone'*, whilst superficial deposits are likely to be *'Tidal Flat Deposits - Clay and Silt'.*

According to the Soilscapes maps produced by the National Soils Research Institute[1], soil conditions at the site and within the surrounding area are described as 'Loamy and clayey soils of coastal flats with naturally high groundwater'.

3.5 SITE LEVELS

A topographic survey of the site has been undertaken by Khoury Architects and is provided in **Appendix B**.

Site levels are generally shown to be in the region of 3.40 to 4.40 metres Above Ordnance Datum (m AOD), sloping downwards from south to north.

3.6 ACCESS AND EGRESS

Access and egress is provided via Roman Bank.

The existing levels along Roman Bank are in the region of 4.10 to 4.55 m AOD.

[1] Soilscapes www.landis.org.uk/soilscapes/

4 REVIEW OF FLOOD RISK

4.1 FLOOD ZONE DESIGNATION

Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. The NPPF Planning Practice Guidance defines Flood Zones as follows:

- **Flood Zone 1: Low Probability**. Land having a less than 1 in 1,000 annual probability of river or sea flooding.
- **Flood Zone 2: Medium Probability**. Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
- **Flood Zone 3a: High Probability**. Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.
- **Flood Zone 3b: The Functional Floodplain**. This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency.

The Flood Zones are shown on the EA Flood Map for Planning (Rivers and Sea). The Planning Practice Guidance states that the Zones shown on the EA Flood Map do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.

4.1.1 Environment Agency Flood Map for Planning (Rivers and Sea)

According to the EA Flood Map for Planning (Rivers and Sea) (**Figure 2**) the site is located in Flood Zone 3.

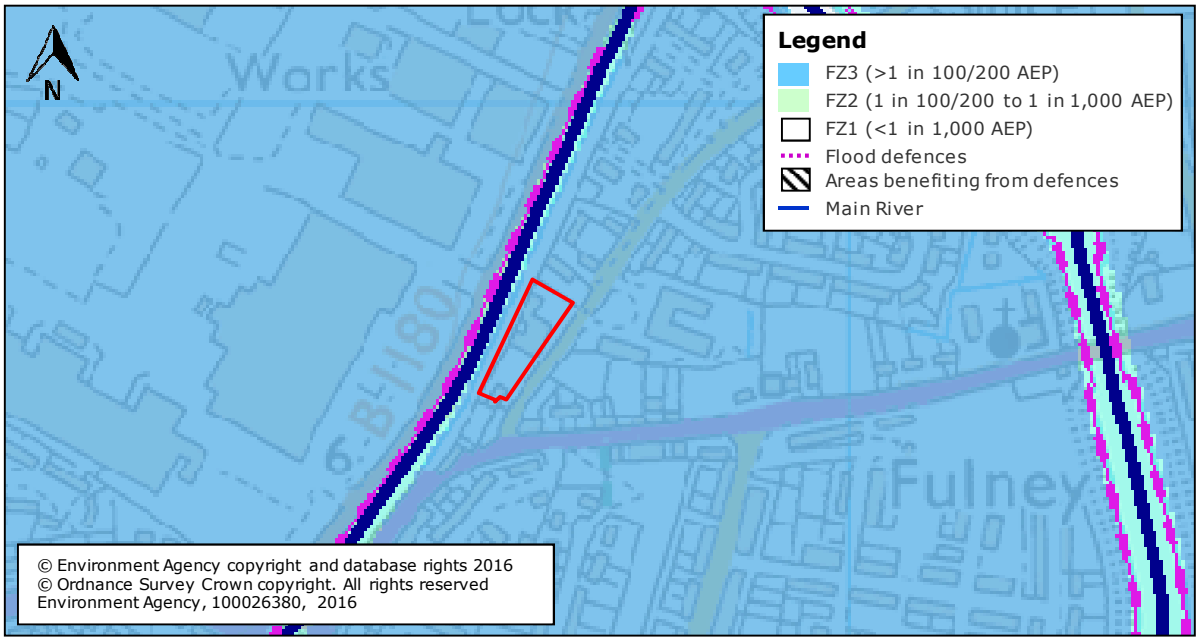


Figure 2: Environment Agency Flood Map for Planning (Rivers & Sea)
(Source: EA website)

4.1.2 Strategic Flood Risk Assessment

Figure 7 of the South Holland District Council SFRA reaffirms the sites Flood Zone 3 designation.

4.2 SEQUENTIAL TEST AND EXCEPTION TEST

The South Holland District Council Local Plan clearly promotes the "support of the growth of Spalding as the District's Main Town" and it "aims to ensure that higher densities of housing are achieved in the most sustainable locations, namely the towns and especially Spalding".

It should be noted that all of Spalding and the vast majority of the surrounding land is located within Flood Zone 3, as illustrated in **Figure 3**. Therefore, there are no sequentially preferable sites within Spalding that are in either Flood Zone 2 or Flood Zone 1. As such, it is considered the requirements of the Sequential Test have been addressed.

If the above is not supported by South Holland District Council, this would effectively preclude any new housing within Spalding contrary to principles set out in the Local Plan.

This report addresses the second part of the Exception Test.

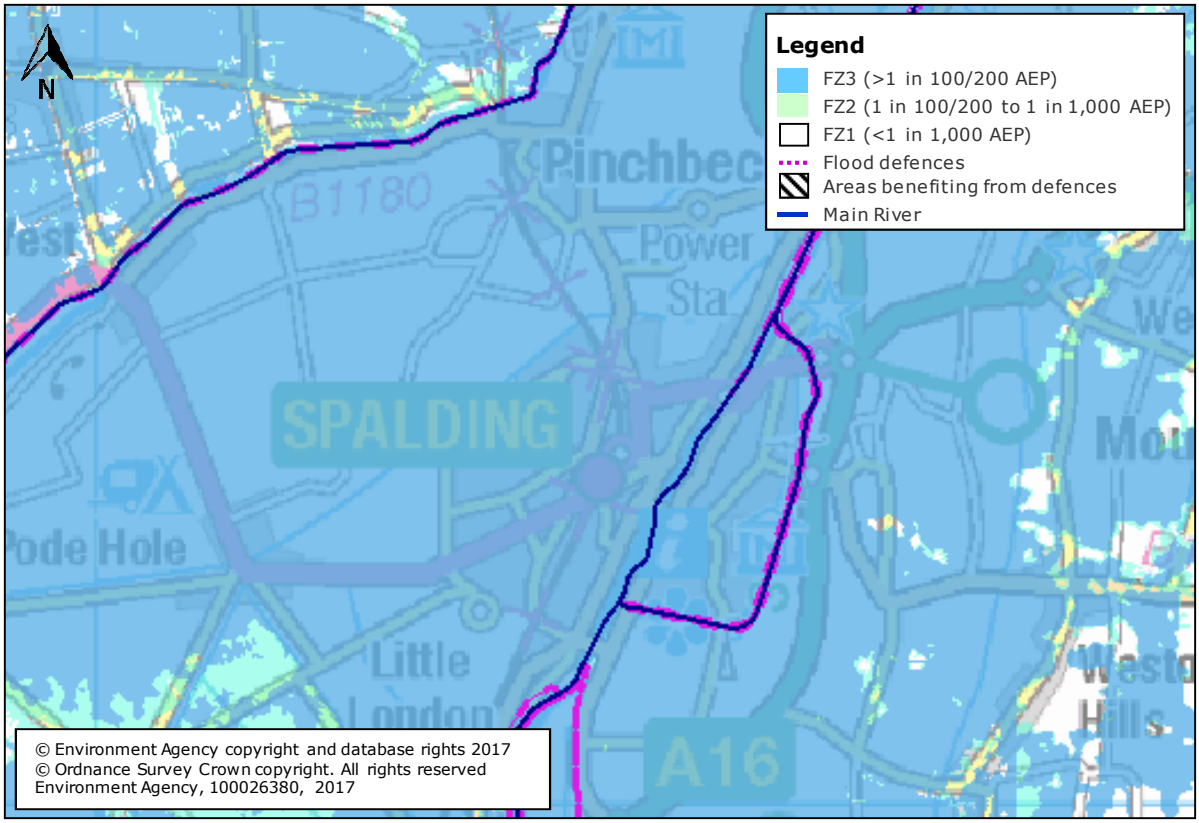


Figure 3: Environment Agency Flood Map of Spalding

(Source: EA website)

4.3 HISTORICAL RECORDS OF FLOODING

SFRA identifies a tidal breach event in January 1978 where flooding occurred in the vicinity of the site. It is not known whether the site was directly affected.

4.4 TIDAL FLOOD RISK – RIVER WELLAND

The River Welland is located approximately 270 m northeast of the site, flowing in a north-easterly direction. The River Welland is tidally dominated in this location.

4.4.1 Flood Defences

Earth embankments form defences along the River Welland.

4.4.2 Tidal Levels

The SFRA has provided the following modelled design peak still tidal levels at Fulney Lock and Marsh Road Sluice (**Figure 3**):

- 1 in 200 annual probability (2007) 5.98 m AOD
- 1 in 1,000 annual probability (2007) 6.27 m AOD

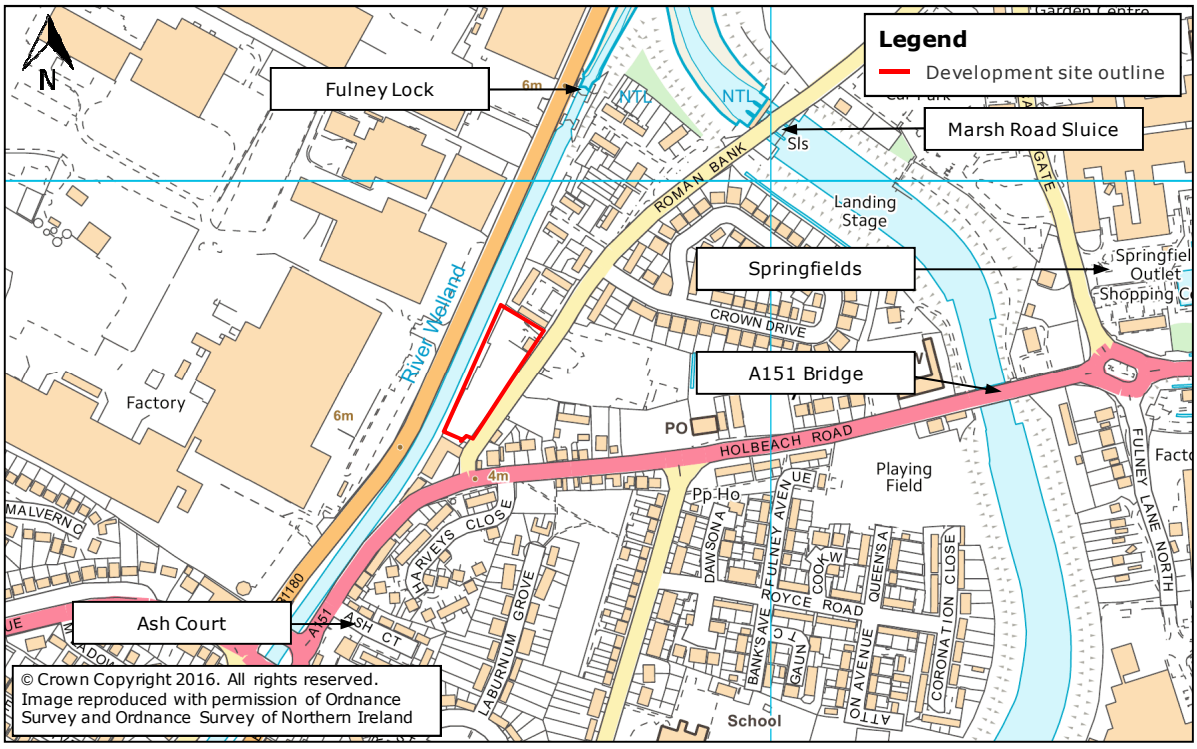


Figure 4: Key SFRA Model Locations

The NPPF requires an allowance for climate change to be made. Using the contingency allowances set out in the EA guidance[2] and a development lifetime of 100 years, this allowance has been calculated as 1,152 mm (**Table 1**). The 1 in 200 annual probability climate change level is therefore taken as 7.13 m AOD.

Table 1: Climate Change Allowance

2 Flood Risk Assessments: climate change allowances (https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances)

Period	Net Sea Level Rise (mm/yr)	No. of years	Total Sea Level Rise (m)
2007 - 2025	4	18	0.072
2026 - 2055	8.5	30	0.255
2056 - 2085	12	30	0.360
2086 - 2115	15	31	0.465
			1.152

The flood level used within the SFRA to assess 'residual flood risk' for a 1 in 200 annual probability climate change event is 7.12 m AOD (refer to Table 4 of the SFRA); therefore, the SFRA Residual Flood Depth Map representing flood depths at the site under breach conditions may be considered in accordance with the updated EA guidance that was released in February 2016.

Extracts of the SFRA Residual Flood Depth Maps are provided in **Figure 5** showing flood depths at the site under breach conditions during 1 in 200, 1 in 1,000 and 1 in 200 climate change annual probability events.

In light of the above, maximum flood depths on site may be expected to be in the region of 0.5 to 1.5 m, with the greatest flood depths expected in the north-east of the site during a 1 in 200 climate change annual probability event. Ground levels in the north-east of the site are in the region of 3.4 m AOD; assuming a flood depth of 1.5 m, the flood level in the vicinity of the site is estimated to be 4.9 m AOD.

The flood risk to the site will be mitigated though the implementation of the measures proposed in **Section 5** of this report.

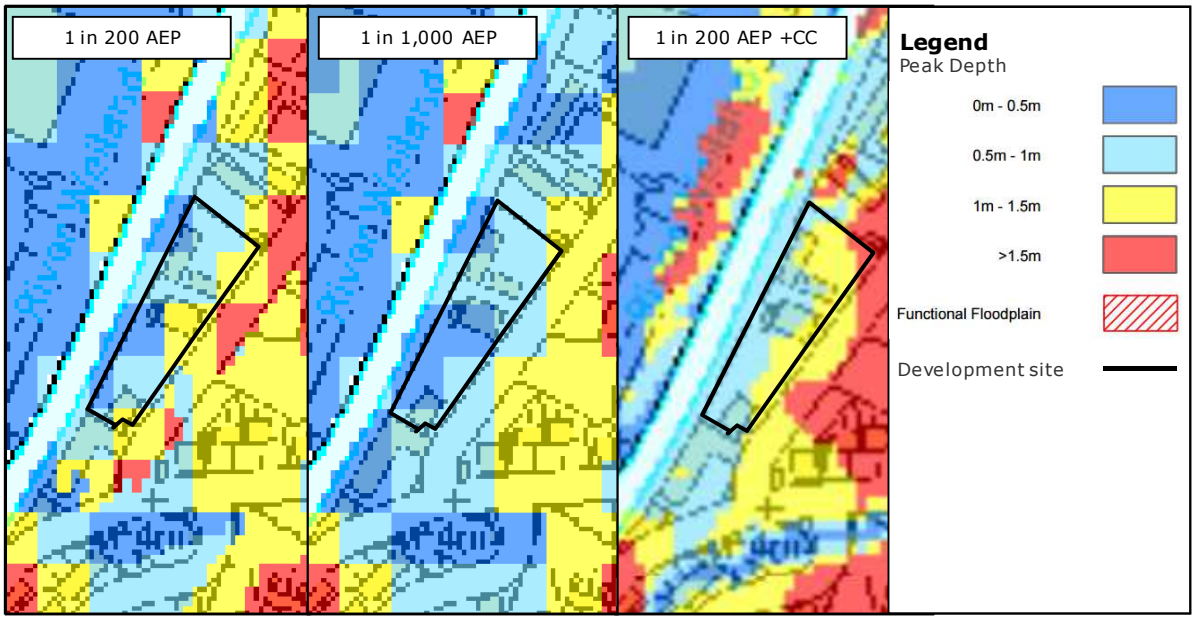


Figure 5: SFRA Residual Flood Depth Map Extracts

4.5 FLUVIAL FLOOD RISK – SPALDING WELLAND AND CORONATION CHANNEL

Spalding Welland flows adjacent to the western boundary of the site in a northeast direction, at a distance of approximately 7 m.

Coronation Channel flows approximately 320 m to the northeast of the site in a north-westerly direction.

4.5.1 Flood Defences

There is an earth embankment defence along the Coronation Channel, with crest levels in the region of 6.01 to 6.96 m AOD.

Although the SFRA and the EA Flood Map for Planning do not identify a formal flood defence adjacent to the site on the right bank of the Spalding Welland, there is an area of raised ground located along the northwest boundary of the site with crest levels in the region of 5.32 m AOD.

4.5.2 Modelled Flood Levels

Modelled flood levels for Spalding Welland and Coronation Channel have been provided in the SFRA for the 1 in 100, 1 in 100 climate change and 1 in 1,000 annual probability events.

The flood levels derived for these events for the modelled nodes illustrated on **Figure 4** in **Section 4.4.2** are provided in **Table 2** and **Table 3** (the *italicised cells* indicate the modelled nodes situated adjacent to the site).

Table 2: Spalding Welland Modelled Flood Levels

Model Node	Annual Probability Flood Level (m AOD)		
	1 in 100	1 in 100 climate change	1 in 1,000
Fulney Lock	4.28	5.26	4.29
+0.1km	4.43	4.68	4.45
+0.2km	4.43	4.68	4.45
+0.3km	*4.43*	*4.68*	*4.45*
+0.4km	4.43	4.68	4.45
Ash Court	4.43	4.68	4.45

Due to the presence of the raised land along the northwest boundary of the site mentioned in **Section 4.5.1**, the site is not expected to flood from the Spalding Welland as the crest level is between 0.64 and 0.89 m higher than the annual provability flood events outlined above.

Table 3: Coronation Channel Modelled Flood Levels

Model Node	Annual Probability Flood Level (m AOD)		
	1 in 100	1 in 100 climate change	1 in 1,000

Marsh Road Sluice	*4.32*	*4.69*	*4.34*
Springfields	4.32	4.69	4.34
A151 Bridge	4.32	4.69	4.34

Due to the presence of the earth embankment mentioned in **Section 4.5.1**, the site is not expected to experience flooding from Coronation Channel as the crest level is between 1.40 and 2.64 m higher than the annual probability flood levels outlined above.

It is acknowledged that revised climate change allowances introduced in February 2016 have not by accounted for in the above levels. However, as there is a freeboard of 0.64 and 1.32 to 2.27 m during the 1 in 100 climate change events for the Spalding Wellend and Coronation Channel respectively, flood levels including the new climate change allowance are not expected to overtop the defences.

Irrespective of the above, tidal flood risk is deemed to be the primary source of flood risk to the site, which will be mitigated accordingly. Any residual fluvial flood risk to the site will therefore also be mitigated though the implementation of the measures proposed in **Section 5** of this report.

4.6 FLOOD RISK FROM RESERVOIRS, CANALS AND OTHER ARTIFICIAL SOURCES

Reservoir or canal flooding may occur as a result of the facility being overwhelmed and/or as a result of dam or bank failure.

There are no canals located within the immediate vicinity of the site.

The EA Risk of Flooding from Reservoirs map (**Figure 6**) indicates that the majority of the site is at risk from reservoir flooding. However as detailed on the EA website, reservoir flooding is extremely unlikely to happen as all large reservoirs are inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the EA ensures that all reservoirs are inspected regularly and essential safety work is carried out.

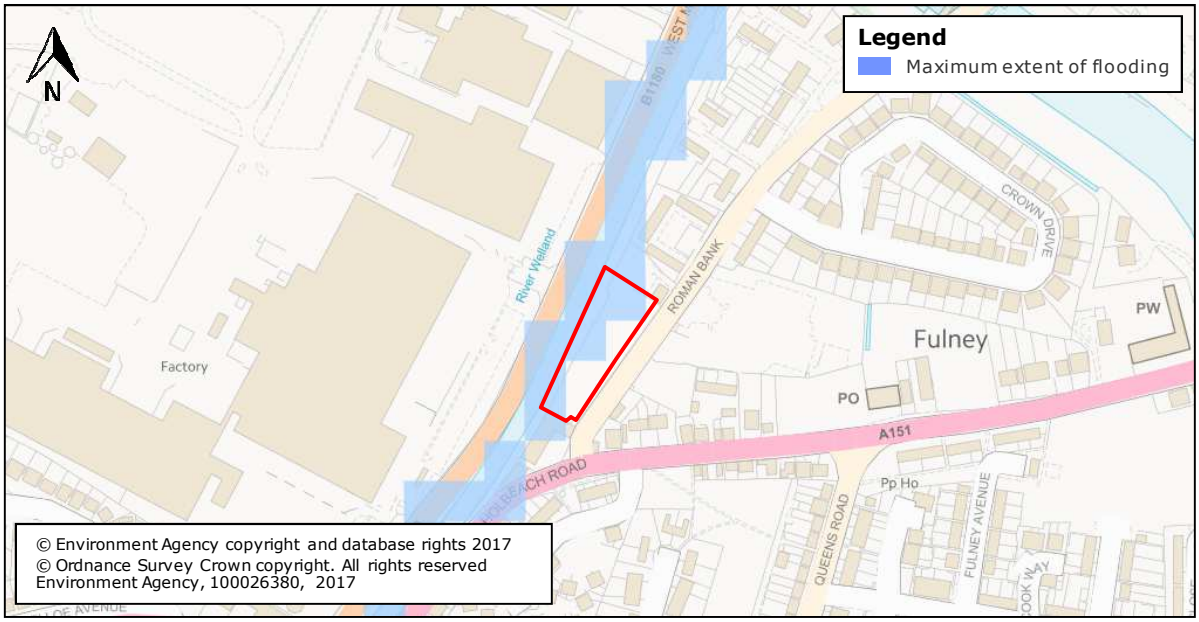


Figure 6: Environment Agency Risk of Flooding from Reservoirs Map
(Source: EA website)

4.7 FLOOD RISK FROM GROUNDWATER

Groundwater flooding generally occurs during intense, long-duration rainfall events, when infiltration of rainwater into the ground raises the level of the water table until it exceeds ground levels. It is most common in low-lying areas overlain by permeable soils and permeable geology, or in areas with a naturally high water table.

As detailed in **Section 3.4** ground conditions at the site and within the surrounding area are described as loamy/clayey. The permeability of the underlying soil conditions and the subsequent propensity for groundwater flooding may therefore be assessed to be low.

The BGS Groundwater Flooding Hazard map (**Figure 7**) does not identify the site as having any susceptibly to groundwater flooding.

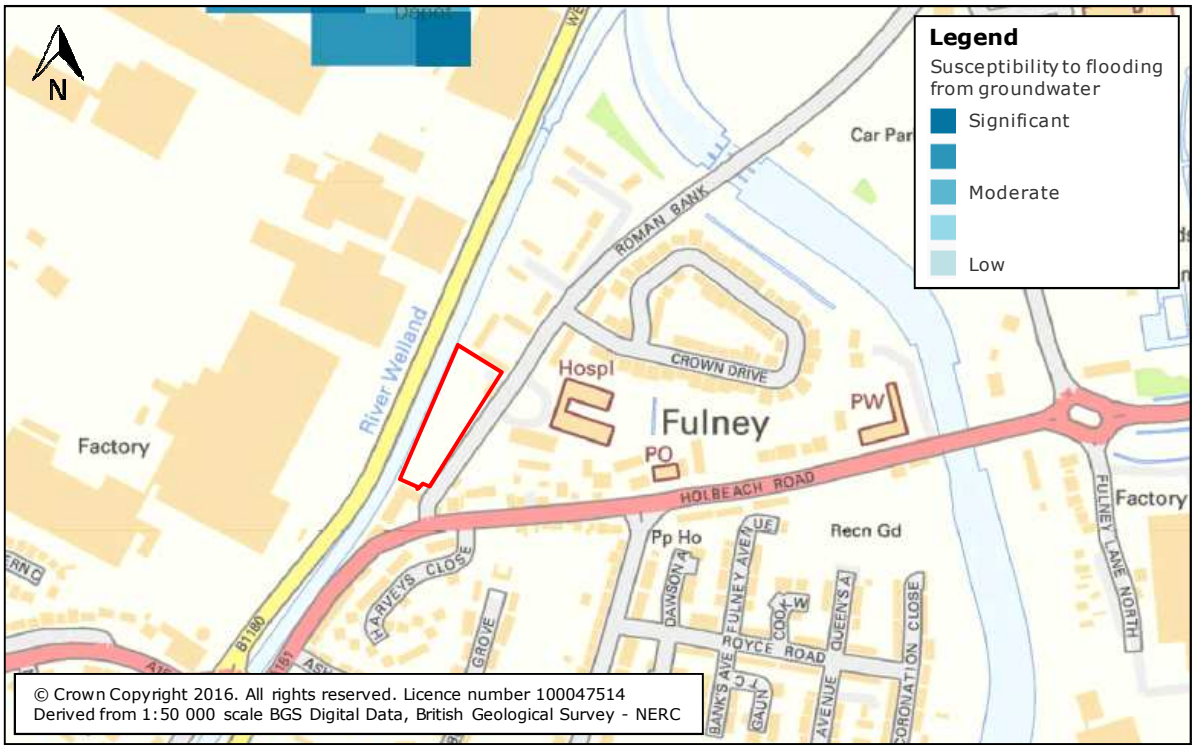


Figure 7: Groundwater Flooding Hazard Map
(Source: Findmaps)

Based on the above, the risk of groundwater flooding is assessed to be low. Any residual risk of flooding from this source will be mitigated through the implementation of the measures proposed in **Section 5** of this report.

4.8 FLOOD RISK FROM SURFACE WATER

Surface water flooding comprises pluvial flooding and flooding from sewers and highway drains and gullies.

4.8.1 Risk of Pluvial Flooding

Pluvial flooding results from rainfall-generated overland flow, before the runoff enters any watercourse or sewer, or where the sewerage/drainage systems and watercourses are overwhelmed and therefore unable to accept surface water.

Pluvial flooding is usually associated with high intensity rainfall events but may also occur with lower intensity rainfall where the ground is saturated, developed or otherwise has low permeability resulting in overland flow and ponding within depressions in the topography.

As detailed in **Section 3.4** ground conditions at the site and within the surrounding area are described as loamy/clayey. There may therefore be the propensity for surface water flooding at the existing site.

The EA Risk of Flooding from Surface Water map (**Figure 8**) indicates that most of the site is at very low risk, with an area of medium to high surface water flooding risk in the north of the site, which accords with localised low spots on the site. According to the EA website, flood depths in this area would be expected to be in the region of 300-900 mm with velocities of less than 0.25 m/s.

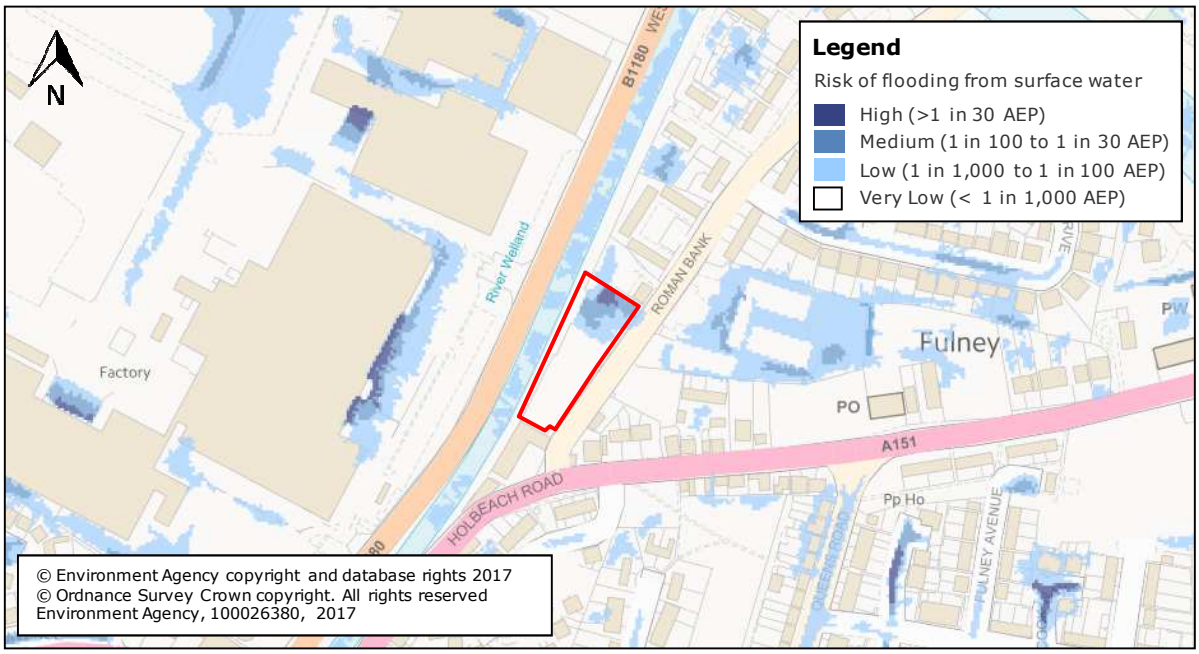


Figure 8: Environment Agency Risk of Flooding from Surface Water
(Source: EA website)

The flood risk to the site will be mitigated though the implementation of the measures proposed in **Section 5** of this report and the surface water drainage strategy in **Section 6**.

4.8.2 Risk of Flooding from Sewers and Highway Drains and Gullies

Flooding of land and/or property can occur when the capacity of the sewer/drainage system is overwhelmed by heavy rainfall, becomes blocked or is of inadequate capacity or where the normal discharge of sewers and drains through outfalls is impeded by high water levels in receiving waters.

Anglian Water has been consulted to ascertain whether it holds any records of sewer flooding at the site. A response was received[3] indicating a single incident of sewer flooding has occurred on Roman Bank since 2011. The site was not affected.

Lincolnshire County Council has been consulted to ascertain whether it holds any records of highways flooding at or within the vicinity of the site. A response was received[4] indicating that incident occurred on Roman bank in August 2013. The description of the flooding has not been confirmed.

[3] Email from Lincolnshire County Council to Weetwood dated 27 July 2016

[4] Telephone call from Anglian Water to Weetwood dated 23 August 2016

5 FLOOD RISK MITIGATION MEASURES

5.1 FLOOD MITIGATION

The flood risk to the site will be mitigated though the implementation of the measures proposed within the following section of this report.

5.1.1 Finished Floor Levels

Finished floor levels should be set at a minimum of 5.2 m AOD. This provides a freeboard of 300 mm above the 1 in 200 annual probability climate change breach event expected at the site.

In order to minimise the impact on the floodplain, it is proposed to use undercroft voids to raise the site accordingly.

In light of the above, the following further mitigation measures should also be included.

5.1.2 Flood Resistant and Resilient Construction

Flood resilient construction techniques should be incorporated into the design of the buildings, in line with government guidance[5]. These include design features and finish materials to minimise the entry of water and/or reduce the damage in the unlikely event of the development being inundated.

5.2 FLOOD RISK ELSEWHERE

As outlined previously, the site is only expected to be at a significant risk of flooding during a breach of the defences during a tidal flood event. Residual risk from a breach scenario should not normally be accounted for when assessing floor risk to third parties. Irrespective, as outlined above, undercroft voids could be used to raise the site. In which case, the impacts to third parties in terms of increased flood risk should be minimised.

5.3 FLOOD PLAN

It is recommended that a Flood Plan is prepared in consultation with Lincolnshire County Council Emergency Planners prior to occupation of the building. This should detail the existing flood risk to the site, the actions that should be taken to prepare for flooding and those necessary in the event of flooding.

The requirement to produce a Flood Plan may be conditioned as part of any planning permission subsequently granted.

The site is included in an EA flood warning area (**Figure 9**).

[5] Improving the Flood Performance of New Buildings: Flood Resilient Construction. Dept for Communities and Local Government. May 2007.

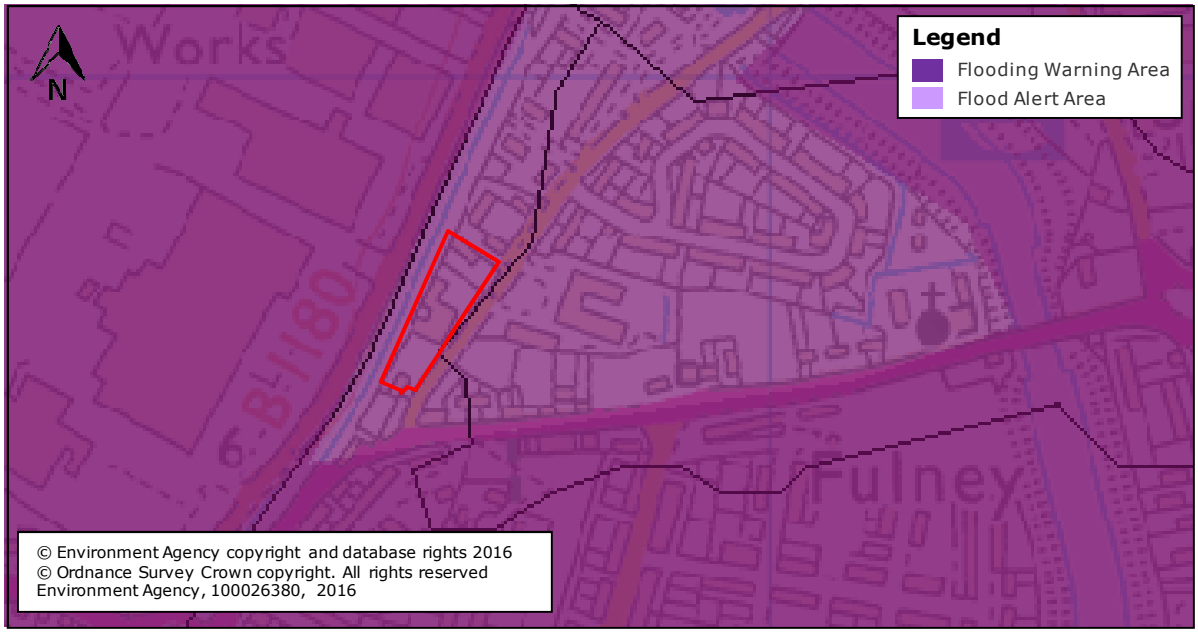


Figure 9: Environment Agency Flood Warning Areas
(Source: EA website)

The EA offers a free flood warning service called Floodline Warnings Direct (FWD). Users of the site may register with the EA to receive flood warnings by telephone, email, text or fax. More information can be found either by visiting the EA website (www.environment-agency.gov.uk) or by calling on 0345 988 1188. The smartphone Flood Alert app can also be used to monitor flood warnings.

5.4 FLOOD DEFENCE CONSENT

An 6 m undeveloped buffer strip has been provided adjacent to the Spalding Wellend for maintenance purposes.

6 SURFACE WATER MANAGEMENT

6.1 REQUIREMENTS FOR SUSTAINABLE DRAINAGE SYSTEMS

Planning applications for major developments[6] are required[7] to provide Sustainable Drainage Systems (SuDS) for the management of surface water runoff, unless demonstrated to be inappropriate[8] or disproportionately expensive.

SuDS aim to mimic natural drainage and can achieve multiple objectives such as removing pollutants from urban runoff at source, controlling surface water runoff from developments, and ensuring that flood risk is not increased downstream. Combining water management with green space can provide amenity and biodiversity enhancement.

In considering a development that includes a sustainable drainage system, the local planning authority will want to be satisfied that the proposed minimum standards of operation are appropriate and that there are clear arrangements in place for ongoing maintenance. Technical standards[9] have been published by Defra in relation to the design, construction and operation of sustainable drainage systems.

6.2 DISPOSAL OF SURFACE WATER

In accordance with the NPPF Planning Practice Guidance[10], surface water runoff should be disposed of according to the following hierarchy:

1. Into the ground (infiltration)
2. To a surface water body
3. To a surface water sewer, highway drain, or another drainage system
4. To a combined sewer

Infiltration testing has not been undertaken at the site. However, as discussed in **Section 3.4**, the site is expected to be underlain by loamy/clayey soils. As such, the disposal of surface water via infiltration is not expected to be feasible. Infiltration testing may be undertaken at the detailed design stage in accordance with BRE365 to confirm this.

As discussed in **Section 3.3**, the Spalding Wellend flows to the north-west of the site. Comparison of the in-channel water levels with site levels indicated that the disposal of surface water into the Spalding Wellend without the use of pumping is unlikely to be feasible.

Sewer records provided by Anglian Water (**Appendix C**) show that there are no public surface water or combined sewers within the vicinity of the site. As such, disposal of surface water into the sewer system is unlikely to be feasible.

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6 Developments of 10 dwellings or more; or equivalent non-residential or mixed development (as set out in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2010)

7 Written Statement (HCWS161) made by the Secretary of State for Communities and Local Government (Mr Eric Pickles) on 18 December 2014

8 Paragraph 082 (Reference ID: 7-082-20150323) of the Planning Practice Guidance outlines how a sustainable drainage system might be judged to be inappropriate

9 Non-Statutory Technical Standards for Sustainable Drainage Systems, Defra, March 2015

10 Paragraph 080, Reference ID: 7-080-20150323

Therefore, the only viable option to dispose surface water from the site may involve a pumped solution into the Spalding Wellend.

6.3 SURFACE WATER DRAINAGE STRATEGY

Given the close proximity of the site to the tidal boundary, to store surface water on site and to restrict the discharge rate is deemed to be inappropriate.

Surface water will therefore be discharged directly into the Spalding Wellend.

As detailed above, a pumped solution is also likely to be required into the Spalding Welland in the absence of a suitable surface water receptor.

Further details regarding the proposed surface water drainage system will be provided once the development has been granted planning permission.

7 SUMMARY

This FRA has been prepared on behalf of Millhouse Developments Ltd and relates to the proposed redevelopment of a site off Roman Bank, Spalding.

According to the EA Flood Map for Planning (Rivers and Sea) the proposed development site is located within the 1 in 100 annual probability / 1 in 200 annual probability annual probability flood outline and is therefore defined by the NPPF as being situated within Flood Zone 3.

All of Spalding town and the majority of the surrounding areas are located within Flood Zone 3. Therefore, there are no sequentially preferable sites for the proposed development in Spalding. As such, it is considered the requirements of the Sequential Test have been addressed. This report addresses the second part of the Exception Test.

The River Welland is located approximately 270 m northeast of the site, flowing in a north-easterly direction, and is tidally dominated in this location. Maximum flood depths on site may be expected to be in the region of 0.5 to 1.5 m, with the greatest flood depths expected in the north-east of the site during a 1 in 200 climate change annual probability event. Ground levels in the north-east of the site are in the region of 3.4 m AOD; assuming a flood depth of 1.5 m, the flood level in the vicinity of the site is estimated to be 4.9 m AOD.

Spalding Welland flows adjacent to the western boundary of the site in a northeast direction, at a distance of approximately 7 m. Due to the presence of a raised defence, the site is not expected to flood from the Spalding Welland in any of the annual provability flood events

Coronation Channel flows approximately 320 m to the northeast of the site in a north-westerly direction. Due to the presence of a raised defence, the site is not expected to flood from the Coronation Channel in any of the annual provability flood events.

The site is at risk form reservoir flooding. However, as detailed on the EA website, reservoir flooding is extremely unlikely to happen as all large reservoirs are inspected and supervised by reservoir panel engineers.

The site is not identified as being susceptible to groundwater flooding. Most of the site is considered to be at very low risk from surface water flooding, with an area of medium to high risk in the north of the site.

Finished floor levels will be set to 5.20 m AOD. This provides a 300 mm freeboard over the 1 in 200 climate change annual probability breach event. Flood resistant construction techniques may be incorporated into the design of the buildings.

Undercroft voids may be included in construction to minimise the impact of the development on the floodplain for flood events which result in flood levels of less than 5.20 m AOD.

The site is included within an EA Flood Warning area. It is recommended that a Flood Plan is prepared prior to occupation of the building.

8 RECOMMENDATIONS

This FRA has demonstrated that the proposed development may be completed without conflicting with the requirements of the NPPF subject to the following:

- Finished floor levels to be set at a minimum of 5.20 m AOD
- Flood resistant construction techniques may be incorporated into the design of the buildings
- Flood Plan to be developed in consultation with Lincolnshire County Council