PROPOSED RESIDENTIAL DEVELOPMENT AT 39 AND 41 ALBERT STREET, SPALDING, PE11 2LD

FLOOD RISK ASSESSMENT



View from west side of site

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Revision A 24th November 2025 Alternative recommendation and block plan added.

Revision B 3rd August 2026 Sequential and Exception Test Rewritten

Revision C 2nd November 2026 Sequential and Exception Removed (separate report) and Block Plan added.

This flood risk assessment has been prepared solely to support the planning application for a development at Albert Street, Spalding. The author has made every effort to provide an accurate assessment of the flood risk but accepts no liability should the information be found to be incorrect or incomplete, or if it is used for any other purposes other than for which it was originally commissioned.

Introduction

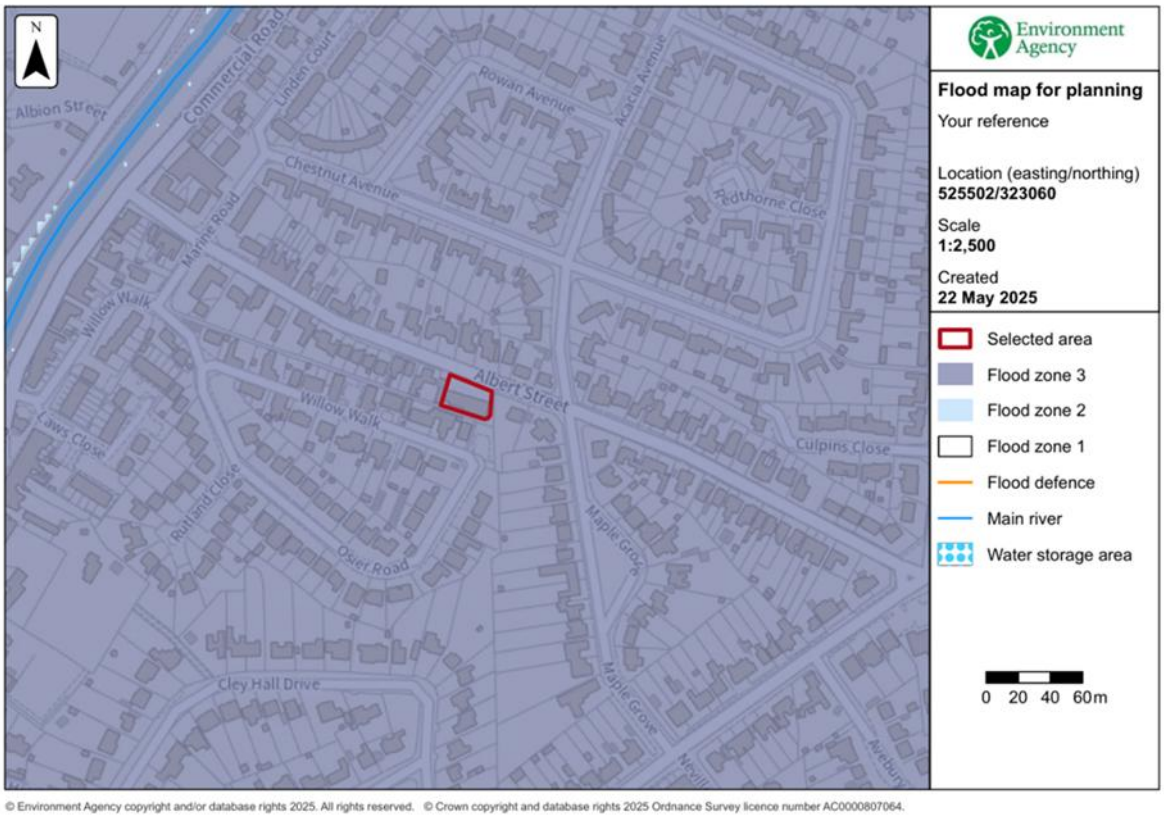
An amended planning application is due to be submitted to South Holland District Council for permission to carry out a residential development at 39 and 41 Albert Street, Spalding, PE11 2LD. The existing industrial buildings on the site will be demolished. A planning application submitted in 2025 (reference H16-1191-25) was refused by the Council.

The site of the proposed development is within Flood Zone 3 as shown on the Environment Agency's Flood Zone map.

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

Environment Agency (EA) Flood Zones

The map below is taken from the Environment agency website and shows the flood zones in this area.



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It can be seen that that all of this area of Spalding is in Flood Zone 3.

Application Site

The National Grid Reference of the site is 525500 323060.

The position and extent of the site is shown on the plan at the end of this document.

As the site is within a defended area the proposed development can be considered to be within flood zone 3(a) as defined in Table 1 of the Technical Guidance.

Applying the flood risk vulnerability classification in Table 2 of the Guidance, a development consisting of dwelling houses is classified as “more vulnerable”.

Table 3 of the Guidance is shown below:

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

From the above table it can be seen that “More Vulnerable” development is only satisfactory within flood zone 3(a) if the sequential and exception test is passed.

A separate report will be submitted with the application to support the sequential and exception tests.

Strategic Flood Risk Assessment

The Strategic Flood Risk Assessment (SFRA) written for the South Holland District Council (SHDC) in 2010 provides details of the actual flood risk in the Council’s area. This information has not been updated and reference to the maps in this document give the following information for the actual flood risk and hazard at the site for the 1% fluvial event and 0.5% tidal event.

For the present day — Depth of flooding … zero
Extent of flooding .. Low or medium flood probability
Peak Velocity ……. Nil

For year 2115 — Depth of flooding … 500mm – 1.0metre
Extent of flooding….High
Peak Velocity …… 0 – 0.1m/sec

The maps showing the residual flood hazard were revised in the 2016 update of the South Holland District Council Strategic Flood Risk Assessment which can be found on the website of the South East Lincolnshire Joint Planning Committee. The hazards are as follows for the 1% fluvial or 0.5% tidal event probability:

For the present day — Depth of flooding …1.0 – 2.0 metres
Extent of flooding .. High

	Hazard rating……	1.25 – 2.0 (Danger for Most)
	Peak Velocity ..	0 – 0.3m/sec
For the year 2115	Depth of flooding …	Greater than 2.0 metres
	Extent of flooding ..	High
	Hazard rating……	Greater than 2.00 (Danger for all)
	Peak velocity …….	0 – 0.3m/sec

The hazards for the 0.1% tidal and fluvial event probability are as follows:

For the year 2115	Depth of flooding …	Greater than 2.0 metres
	Extent of flooding ..	High
	Hazard rating……	Greater than 2.00 (Danger for all)
	Peak velocity …….	0 – 0.3m/sec

Figure 16 of the general maps show that the site is not within the rapid inundation zone for the present day and 2115.

Maximum flood level and bank levels in the River Welland

Tables in the SFRA show the following details of the defence bank on the east side of the tidal section of the River Welland at chainage 22.0km immediately north of Marsh Road Sluice and 1.7km metres north of the development site.

	2007	2055	2115
Peak 1 in 200 year extreme tide level	5.98m OD	6.31m OD	7.12m OD
Peak 1 in 1,000 year extreme tide level	6.32m OD	6.65m OD	7.46m OD

With an average defence crest level between 7.80 and 7.90 m OD the freeboards are as follows:

	2007	2055	2115
Peak 1 in 200 year freeboard	1870mm	1540mm	730mm
Peak 1 in 1,000 year freeboard	1580mm	1250mm	440mm

Tables in the SFRA show the following details for the defence bank on the west side of the Coronation Channel at chainage 1.1 km which is 580 metres east of the site.

	2007	2115
Peak 1 in 100 year flood level	4.34m OD	4.69m OD
Peak 1 in 1,000 year flood level	4.36m OD	4.69m OD

The crest level of the bank at chainage 1.1km is 5.28m OD but most crest levels on this section vary between 5.50m OD and 6.0m OD. Therefore it can be seen there is a minimum freeboard of 600mm to the predicted design maximum levels in 2115.

The Wash banks are at least 20.0 km north of the site. The tidal defences are earth banks with an average level of 7.80m OD. The maximum predicted 1 in 200 year tide level in 2115 in the SFRA is 7.11m OD.

Information on Surface Water Flooding on Environment Agency Website

The map below shows the predicted areas of surface water flooding in a 1 in 1000 year event in this area of Spalding.



It can be seen that between there is no predicted risk of surface water flooding to this site in a 1 in 1000 year event. There is a projected risk of flooding to the areas immediately east and west of the site which are at a lower level than the site.

Existing Flood Alleviation Measures

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

The site is approximately 250 metres south east of the fluvial section of the River Welland, which is the main river and maintained by the Environment Agency.

The site is approximately 1.15km south of the tidal defences of the River Welland and Coronation Channel.

The area between the River Welland and the Coronation Channel is drained by surface water sewers maintained by Anglian Water, which discharge either into the River Welland or into drainage channels maintained by South Holland Internal Drainage Board. The water levels in the IDB channels are controlled by Clay Lake Pumping Station, which is operated by South Holland IDB, and discharges into the Coronation channel.

Existing Ground Levels

A topographical survey has been produced for the site which will be included with the planning application. Most of the levels have been transposed onto the plan which is shown on page 13 of this report.

The levels of the centre line of Albert Street vary between 3.43m and 3.54m OD and the levels of the pavement north of the site are similar and vary between 3.40m and 3.53m OD. The levels of the existing concrete hardstanding north of the buildings vary between 3.60m and 3.68m OD with an average level of 3.65m OD.

The finished floor levels of the existing buildings are 3.85m OD for the western building, 3.67m OD for the centre building and 3.65m OD for the building on the east side.

Potential Sources of Flooding

The following sources of flooding have been identified:

1. Failure or overtopping of the tidal defences.
2. Overtopping of the River Welland.
3. Overtopping or breaching of the Coronation Channel.
4. Failures of Clay Lake Pumping Station (IDB)
5. Flooding from IDB channels and piped drains
6. Blockages in local surface water sewers (highway or Anglian Water)

1. Failure or overtopping of tidal defences.

There is a short length of tidal defences on the Coronation Channel west of Marsh Road Sluice and on the River Welland north of Fulney Lock that defends the area between the River Welland and the Coronation Channel from tidal flooding.

The SFRA states that the defences are adequate to withstand a 1 in 200 year (0.5%) probability event for present day but in the future (2115) some of the banks would be overtopped in a 0.5% probability event. Crest levels of this bank have been surveyed and these are shown on the map below.



These levels range from 7.28m OD near Fulney Lock to above 8.00m OD on the main section of bank. The low level of 6.88m OD mentioned in the SFRA was not found. All the surveyed levels are higher than the 1 in 200 year extreme tide level in 2115 of 7.12m OD stated in the SFRA.

These banks are well maintained and have a top width of at least 4.0 metres, and it is reasonable to assume that during the next one hundred years, considering the assets that are protected by this bank, further maintenance and capital works will be carried out on the tidal banks to ensure a continuing minimum defence standard of 1 in 200 years.

If a breach occurred in the tidal bank during a 1 in 200 year event in the year 2115 flood water would flow southwards and start to flood the whole area between the Coronation Channel and the River Welland. The hazards of this will be considered later in the report.

2. Overtopping of the River Welland.

The crest level of the east bank of the fluvial section of the River Welland varies between 4.90m and 6.10m OD. The levels on this section of the east bank are tabulated in the Strategic Flood Risk Assessment which was produced by Royal Haskoning and issued in January 2010. These levels are reproduced below for the relevant section between chainage 0.6km and 1.4km.

Location					Albert St	Willow Rd			Cley Hall
Chainage	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4
Defence Crest Level	4.90	4.90	4.90	4.90	4.90	5.20	5.84	5.18	5.06

The highest predicted fluvial level for a 1 in 100 year event in the fluvial River Welland in 2115 is 4.69m OD. The lowest level of the east bank of the River Welland between 0.6km and 1.4km can be seen to be 4.90m OD.

There is a risk of flooding on the proposed site from this source if a breach occurred in the east bank of the River Welland in a 1 in 100 year event in 2115. However there is a road located on the top of this bank (High Street, Commercial Road and Holbeach Road) which will reduce the risk of flooding from this source to a very low level, and this risk can almost be discounted.

3. Overtopping or Breaching of the Coronation Channel

The area between the River Welland and the Coronation Channel is protected from flooding by banks on the west side of the channel, which are approximately 2.0m to 3.0m above the land. The average crest level of these banks are at a level of 5.40m OD, which gives a freeboard of at least 700 mm above the 1 in 1,000 year maximum design level in the channel.

If a breach occurred in the channel the maximum water level in the flooded area could reach between 4.0 m and 4.1 m OD for the present day situation and between 4.3m and 4.4 m OD if climate change is allowed for.

Therefore the risk of flooding from this source can be considered to be low, and it is likely that the flood level following a breach would be lower than if the tidal defences were to breach. This source of flooding will be adequately mitigated by providing adequate mitigation against tidal flooding.

4. Failure of Clay Lake Pumping Station

The South Holland IDB estimate that the Clay Lake Pumping Station provides a 1 in 50 year standard with a freeboard, which in effect provides a 1 in 100 year protection against flooding. The pumping station is maintained in good condition and should a failure occur the Drainage Board would quickly deploy temporary pumps to alleviate the situation. It is highly unlikely that any flooding from this source would extend as far as this site, as the flood water would need to rise above 3.60m OD, which is higher than the ground levels around the pumping station itself which would flood first.

Therefore flooding from this source can be considered to be adequately mitigated.

5. Flooding from IDB channels and Piped Drains

There are two main drainage channels in the area between the Coronation Channel and the River Welland. Exeter Drain flows southwards from Albert Street to Clay Lake Pumping Station, and the northern part of the drain is located immediately east of the footpath on the eastern side of the site. The northern section of this drain from Halmer Gate to Albert Street is piped. The upper section of the second drain is piped and flows eastwards from north of the development site as far as the Coronation Channel. The drain then flows southwards as far as Clay Lake Pumping Station as an open channel located behind the bank of the Coronation Channel.

The South Holland IDB has a regular annual maintenance programme and they remove weed growth from channels such as these twice each year. However, any flooding from this channel will not cause any flooding to the development site, as explained in (4) above.

Flooding from this source can be considered to be adequately mitigated.

6. Blockages in local surface water sewers

Both Anglian Water and the Highways Authority maintain surface water drainage systems in this area. There is unlikely to be significant depths of surface water accumulating near the proposed development as the level of Albert Street is lower east of the site.

Flooding from this source can be considered to be adequately mitigated.

Extent of known Flooding

During the preparation of this assessment, no evidence was discovered of the site or any of the adjoining properties having been flooded in the last 50 years.

Probabilities and Trends of Flooding

The probability of this development being flooded from either the River Welland or the Coronation Channel is very low. The highest risk to the development would be from an extremely high tide event leading to a breach in the tidal defences during that event. In such an event lower land south of Halmer Gate where land levels are 3.00m OD and lower would flood to a depth of greater than 1.0 metre before the western end of Albert Street would be affected.

If the breach remained unrepaired and there were subsequent high tides the level of the flood water could rise to approximately 5.00m OD. At this level the flood water would start to flow across Commercial Road and into the River Welland. This would limit any further increase in the level of the flood water in this area.

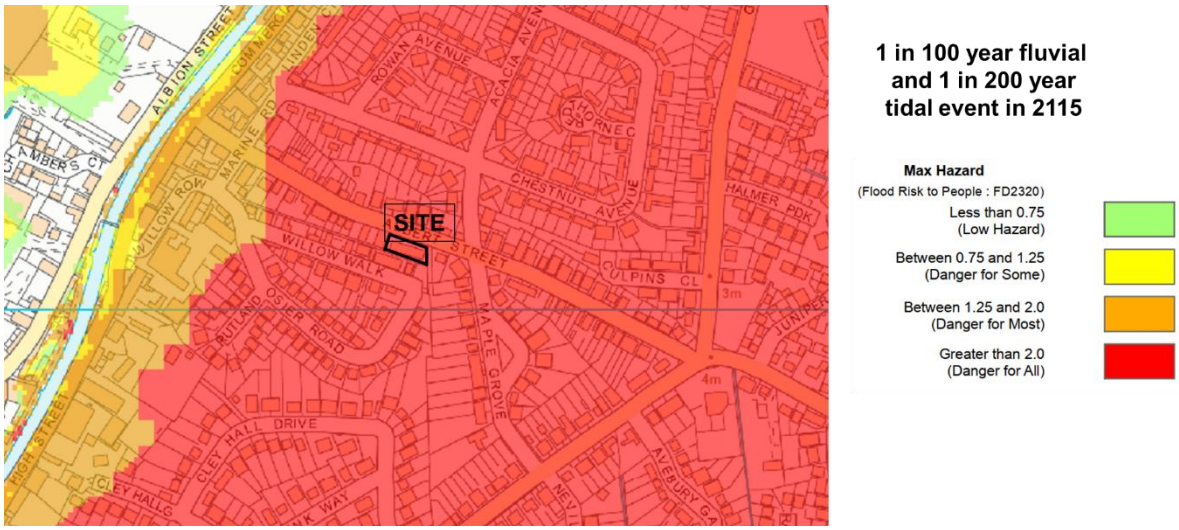
Climate Change

The recommendations for flood depths for this flood risk assessment use information mostly taken from the South Holland DC SFRA which was last updated in 2010. The EA have issued new guidance on recommended contingency allowances for predicted sea rises, fluvial flows and rainfall intensities which from 19th February 2016 needs to be considered in this FRA. The effects of these new recommendations are considered in the Appendix of this report (pages 15 to 18). The hazard maps can be found on the South East Lincolnshire Local Plan website. The modelling and mapping note advises that these new maps do not take into account of the new climate change guidance (February 2016) issued by the Environment Agency. The notes in the Appendix conclude that no extra mitigation measures are necessary to comply with the new guidance on climate change.

South East Lincs Advice Matrix

Advice can be found on the recommended mitigation required by referring to a spreadsheet on the South East Lincolnshire website.

The map below shows that the predicted flood hazard for this site is greater than 2.00 (danger for all), for both the 1 in 200 year and 1 in 1000 year event in 2115.



As the development is in flood zone 3 and the predicted flood hazard is greater than 2.00 (Danger for all) reference should be made to Category C8 which shows the following advice.

The Environment Agency requires direct consultation on proposals in this hazard zone. The NPPF requires that the proposal is accompanied by a Flood Risk Assessment which contains evidence that appropriate mitigation measures / flood resilience techniques have been incorporated into the development.

The applicant is advised to refer to the document "Improving Flood Performance of New Buildings Flood Resilient Construction (DCLG2007).

Finished floor levels (FFL) should be informed by the predicted flood depth maps and set as required below (single storey proposals must use the 0.1% event, 2115 scenario, for setting FFLs).

Flood depths of greater than 1.6 metres:

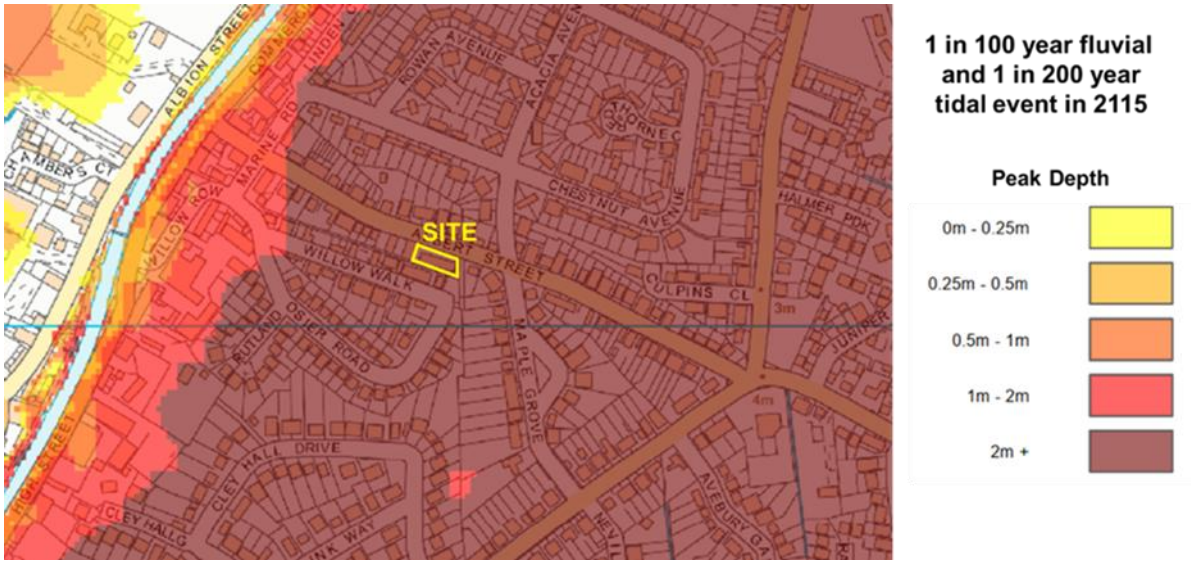
It is unlikely that mitigation measures would prevent flood water from entering the building at ground floor level. Therefore proposals should have a minimum of 2 storeys with no ground floor habitable accommodation. The first floor living accommodation must be above the highest predicted flood depth.

Flood depths of 1.0 – 1.6 metres:

Proposals must have a minimum of 2 storeys, with FFL set a minimum of 1.0 metre above existing ground level, flood resilient construction to a height of 300mm above the predicted flood depth, and demountable defences to 600mm above FFL.

EA Map of Predicted Flood Depths

The Environment Agency plan (shown below) of predicted depths of flooding in a 1 in 200 year fluvial or tidal event in 2115 indicates predicted flood depths of greater than 2.0 metres at this site if a breach were to occur in the tidal bank of the River Welland.



The depths shown in the map will be the result of a breach occurring in the tidal bank in a 1 in 200 year event in 2115.

Summary of Flood Risk

The above map of predicted flood depths indicates that the depth of flooding could be greater than 2.0 metres.

Levels have been taken on the site and the lowest ground levels around the site of the proposed dwellings are approximately 3.65m OD. In the previous paragraph (Probabilities and Trends of Flooding on page 8) it is explained that if a breach occurred in the tidal defences the level of flood water in the area between the River Welland and the Coronation Channel would rise steadily until it reached a level of 4.90m OD when it would start to flow over Commercial Road and into the River Welland. As the flow across the road increased it is estimated that the maximum flood level in the whole area of Albert Street would be 5.10m OD.

Taking a ground level of 3.65m OD around the existing building the maximum depth of flood water around the proposed dwellings would be 1.450 metres. This is a more accurate assessment of the predicted flood depth than the map from the South East Lincolnshire Local Plan website shown on page 11.

By referring to the South East Lincolnshire Advice Matrix the recommended mitigation for flood depths of 1.0 – 1.6 metres is as follows:

Proposals must have a minimum of 2 storeys, with FFL set a minimum of 1.0 metre above existing ground level, flood resilient construction to a height of 300mm above the predicted flood depth, and demountable defences to 600mm above FFL.

However due to other planning requirements the dwellings will be designed with a ground floor level of 3.80m OD. Therefore any rooms on the ground floor will need to be designed with flood resistant or flood resilient materials to enable these rooms to be brought back into use within a short period time.

All sleeping accommodation will be located on the first and second floors.

Recommendations

In any area at risk of flooding it is recommended that all new dwellings should be of two story construction with all bedrooms at first floor level. This is to provide a refuge for residents if the building becomes flooded after a major breach of the tidal bank, and ensure there is no danger to residents when they are asleep.

The proposed dwellings should have the kitchen and utility room on the ground floor designed with flood resistant or flood resilient materials to enable these rooms to be brought back into use within a short period time. All bedrooms should be on the first floor where the level will be at least 6.40m OD with a ground floor level of 3.80m OD. All of the ground floor of the buildings should be constructed to withstand flooding to a depth of 1.5 metres for a number days.

The developer should advise all future owners and occupiers of the properties to register with the Environment Agency’s Floodline Warnings Direct Service.

A flood warning and evacuation plan should be written advising future residents of what action to take if a flood warning is issued by the Environment Agency.

Rainwater from the roof of the building should be discharged if possible into soakaways and these should be designed to BRE Digest 365 and approved under Building Regulations. If infiltration is found to be unsuitable then the surface water should be discharged with suitable attenuation into the IDB watercourse on the south east corner of the site with consent from the South Holland Internal Drainage Board. New hardstandings around the building should be constructed with permeable paving.

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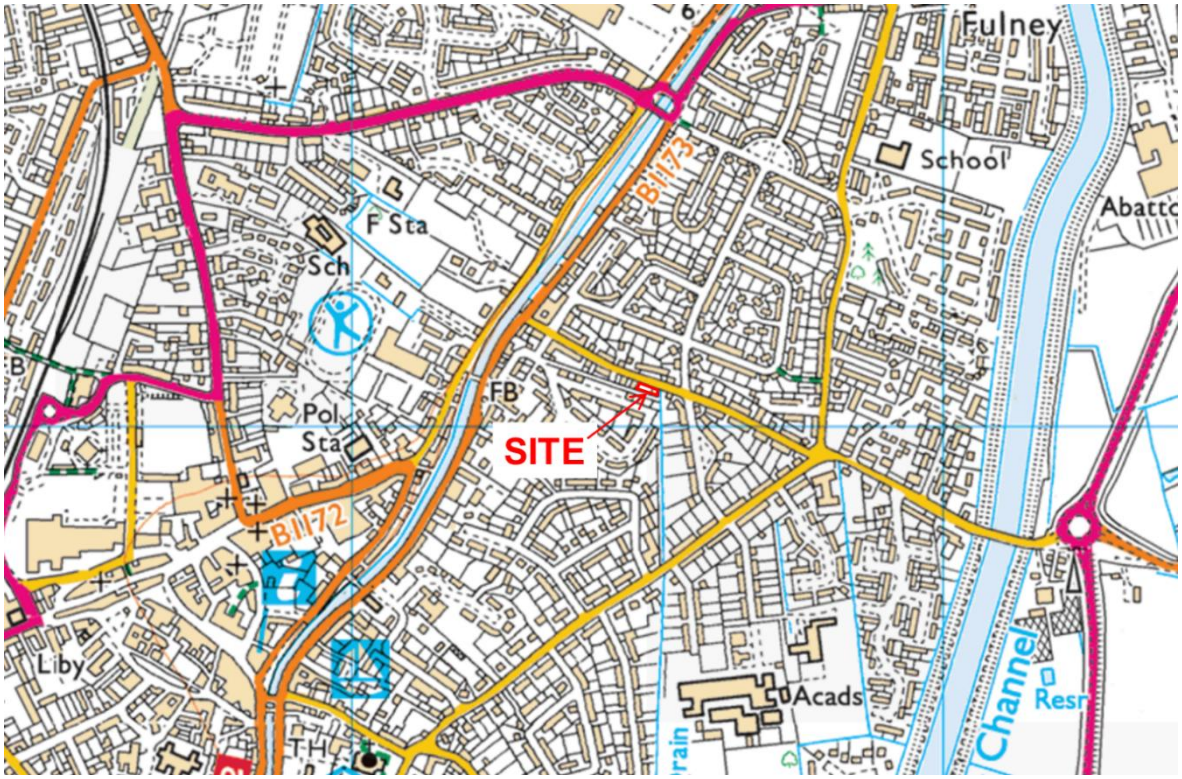
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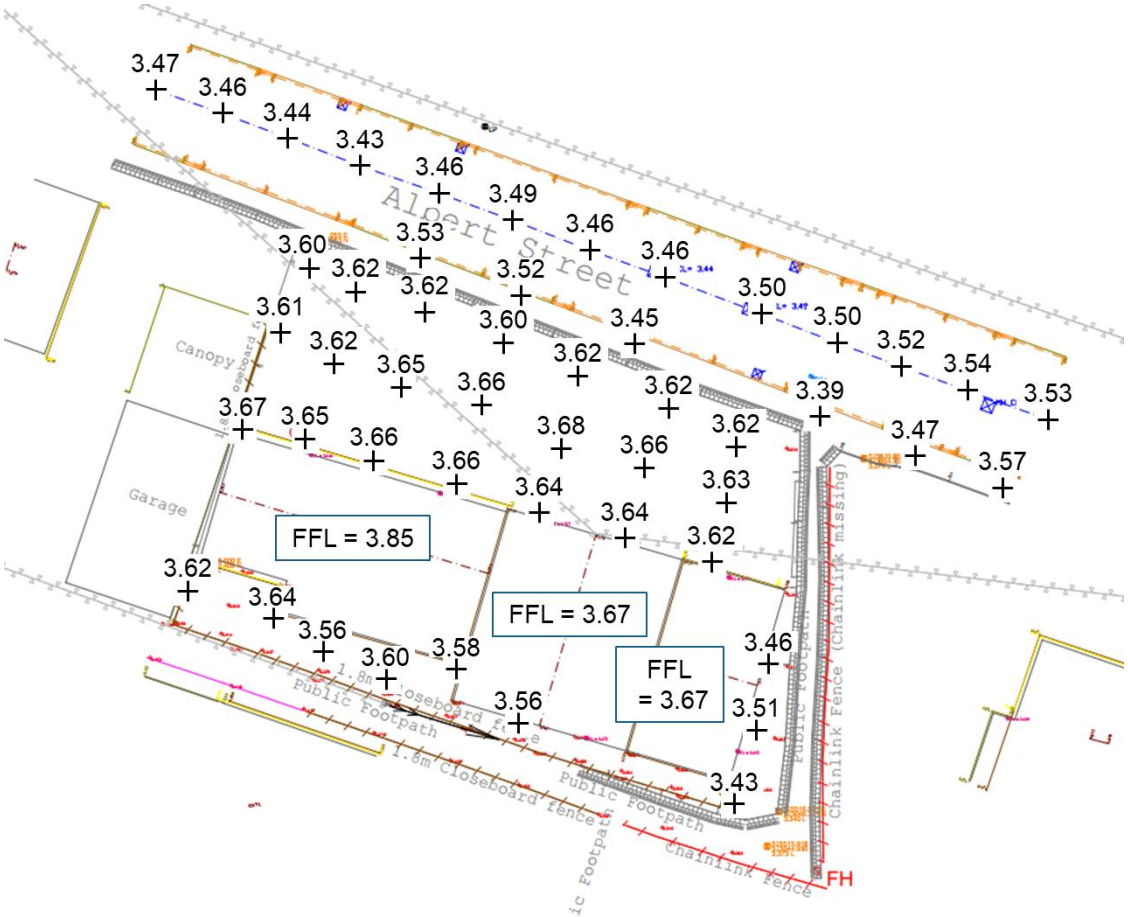
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Revision B 3rd August 2026

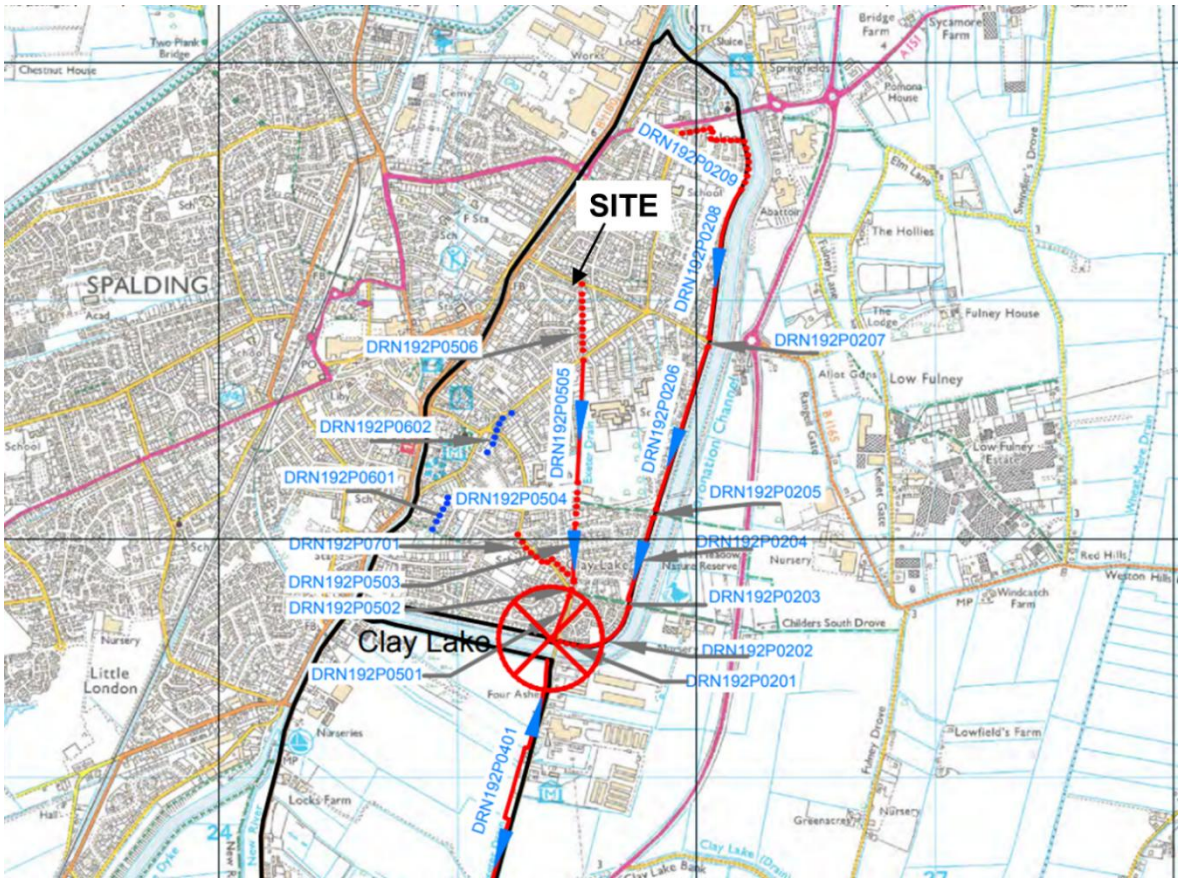
LOCATION PLAN



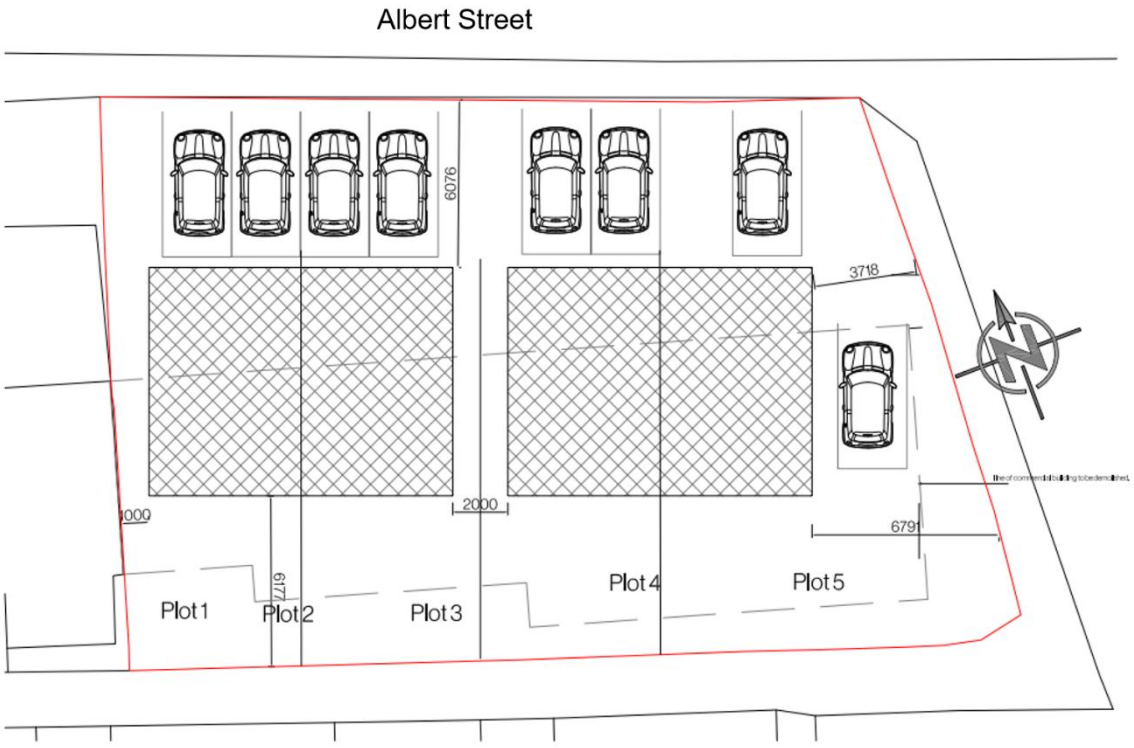
GROUND LEVELS ON THE SITE



PLAN OF IDB DRAINS



BLOCK PLAN



APPENDIX CLIMATE CHANGE

The Environment Agency has issued revised guidance on climate change and have now stated that the new predictions should be considered and incorporated into all flood risk assessments produced after 19th February 2016.

Listed below are the climate change allowances in three documents:

- South Holland SFRA
- EA guidance (2013)
- Revised EA guidance

The recommendations in each document are shown below.

2010 South Holland DC SFRA

The SHDC SFRA states that the the following allowances have been made for climate change:

4.4 Climate Change

Scenarios for the years 2055 and 2115 include for climate change contingency allowances to the amount suggested by PPS25[1]. These allowances are expressed in *Table 2*. Percentage increases are relative to the present-day.

Table 2 – Adopted Climate change contingency allowances

Parameter	Year 2055	Year 2115
Sea level rise (m)	+ 0.33	+ 1.14
Extreme wave height	+ 10%	+ 10%
Peak river flow and volume	+ 20%	+ 20%
Peak rainfall intensity	+ 20%	+30%

Where flows arise from pumping rather than natural run-off, notably in the Vernatt's Drain and for the Fenland subcatchments of the South Forty Foot Drain, peak flow rates for future eras have been taken as equal to current rates since this SFRA assumes all flood risk management measures will remain in their current state.

2013 Guidance to Planners

Guidance to planners was issued by EA in September 2013

Table 1: Recommended contingency allowances for net sea level rises (Net sea level rise (mm per year) relative to 1990)

	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
East of England, east midlands, London, south-east England (south of Flamborough Head)	4.0	8.5	12.0	15.0
South-west England	3.5	8.0	11.5	14.5
North-west England, north-east England (north of Flamborough Head)	2.5	7.0	10.0	13.0

document is out of date'a

Table 2: Recommended national precautionary sensitivity ranges for peak rainfall intensity, peak river flow, offshore wind speed and wave height

Parameter	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	+5%	+10%	+20%	+30%
Peak river flow	+10%	+20%		
Offshore wind speed	+5%		+10%	
Extreme wave height	+5%		+10%	

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Revised 2016 EA Guidance

Table 1 peak river flow allowances by river basin district (use 1961 to 1990 baseline)

River basin district	Allowance category	Total potential change anticipated for '2020s' (2015 to 39)	Total potential change anticipated for '2050s' (2040 to 2069)	Total potential change anticipated for '2080s' (2070 to 2115)
Anglian	Upper end	25%	35%	65%
	Higher central	15%	20%	35%
	Central	10%	15%	25%

For more vulnerable development in flood zone 3(a) the higher central and upper end should be used to assess the range of allowances.

Table 2 peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 baseline)

Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper end	10%	20%	40%
Central	5%	10%	20%

Table 3 sea level allowance for each epoch in millimetres (mm) per year with cumulative sea level rise for each epoch in brackets (use 1990 baseline)

Area of England	1990 to 2025	2026 to 2050	2051 to 2080	2081 to 2115	Cumulative rise 1990 to 2115 / metres (m)
East, east midlands, London, south east	4 (140 mm)	8.5 (212.5 mm)	12 (360 mm)	15 (525 mm)	1.24 m

Table 4 offshore wind speed and extreme wave height allowance (use 1990 baseline)

Applies around all the English coast	1990 to 2050	2051 to 2115
Offshore wind speed allowance	+5%	+10%
Offshore wind speed sensitivity test	+10%	+10%
Extreme wave height allowance	+5%	+10%
Extreme wave height sensitivity test	+10%	+10%

Effects on Predictions of Flood Risk in FRA

The FRA has identified two sources of flooding where the new climate change recommendations could affect the predictions of flood levels in 2115 at the development site:

1) Flooding from the tidal River Welland
2) Flooding from the fluvial section of the River Welland, the Coronation Channel or IDB drainage system

1) Flooding from the tidal River Welland

The contingency allowance in metres for the years 2055 and 2115 using 1990 as a baseline in the SFRA compared with the guidelines is as follows

Year	SFRA	2013 guidance	Revised 2016 guidance
2055	0.33	0.395	0.412
2115	1.14	1.205	1.24

Therefore it can be seen that the revised guidance increases the maximum allowance for sea rise in 2115 by 100mm. This may slightly increase the risk of a breach occurring in the tidal bank north of the site. It may also slightly increase the flow of water into the area between the Coronation Channel and the River Welland. However it will not change the conclusions and recommendations in this report.

Fluvial Flooding.

As the development is in flood zone 3 and is classed as more vulnerable, the advice from the Environment Agency is that the higher central climate change allowance, which is 35%, should be considered. After considering the effects of this increase the upper end allowance, which is 65%, should be considered to assess the effect of this.

Maximum flood levels in the River Welland and the Coronation Channel will not be increased by the increase in flows projected in the new climate change allowances. If flows increase by 65% in these systems it will have the affect of flooding over the long sections of bank between Spalding and Market Deeping and the maximum levels will not increase significantly.

IDB's have been using an allowance of 20% for climate change over the past few years in their assessments and modelling of their systems. Generally IDB's are happy that their systems provide a 1 in 100 year standard to most urban areas at the present time.

South Holland IDB, and all IDB's, are aware that climate change will affect the operations of pumping stations, sluices and drainage channels. Pumping stations and sluices only have a 30 year life and will need to be refurbished or rebuilt within this timespan. It is assumed that South Holland IDB will continue to review the modelling they have already carried out and when the Board consider these refurbishments adequate arrangements will be made to incorporate the latest climate change projections in order that the Board continues to provide the same standard of service as the present day.

Therefore as the major flood risk to this site is from tidal flooding then any increases in flow from fluvial sources do not need to be considered further.

Therefore it is considered that the mitigation proposed for the development, with the recommendation that dwellings should be designed and built with only garages and storage rooms on the ground floor and all habitable rooms should be on the first floor where the level will be at least 6.40m OD if the ground floor level is 3.80m OD, will be satisfactory.