FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT ON LAND ADJACENT TO 37 ST PAULS ROAD, SPALDING, LINCOLNSHIRE

INTRODUCTION

An Outline Planning application (Reference No H16-0722-10) has been submitted to South Holland District Council for the development of a dwelling on land adjacent to 37 St Pauls Road, Spalding.

This Planning application requires a flood risk assessment to accompany the application to meet the requirements of Planning Policy Statement 25 (PPS25) – Development and Flood Risk.

The site is within Flood Zone 3 of the Environment Agency's Flood Zone map. These maps do not take into consideration flood defences.

The site is also shown within a defended area of the South Holland District Council's Strategic Flood Risk Assessment (SHDC SFRA) map and is located in the South Holland Internal Drainage Board District.

APPLICATION SITE

The development site is located on the south side of St Pauls Road, Spalding. The National Grid Reference of the central point of the site is 525510 323610.

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

The proposed development is within Flood Zone 3(a) "High Probablility" as detailed on the Environment Agency's flood zone maps without defences, as defined in Table D1 of Planning Policy Statement 25 (PPS25).

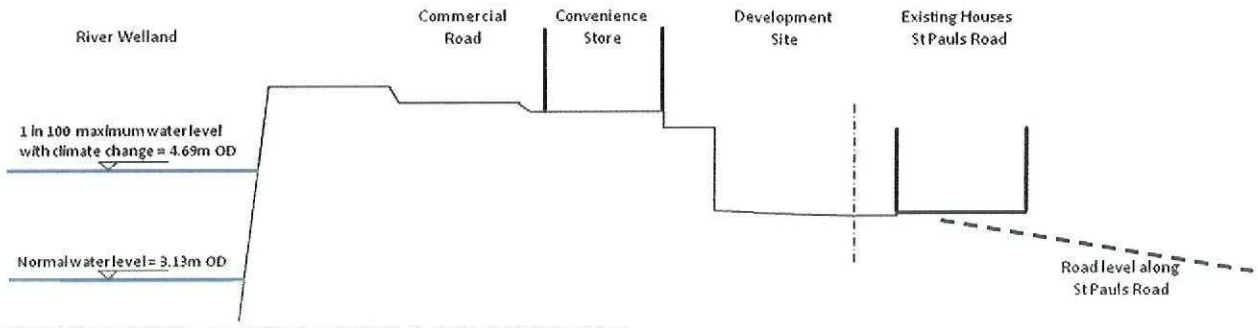
Applying the flood risk vulnerability classification in Table D2 of PPS25, the development is classified as "More vulnerable" with Table D2 of PPS25 stating that the residential uses only permitted after the exception test is followed. However the exception test does not need to be followed for minor developments.

Levels have been taken on and around the site, and these are shown at the end of this report. The site level is approximately 3.9m OD.

A west east cross section below shows the relationship with levels of the River Welland and along St Pauls Road

AMENDED PLAN
Ref. A2

SHDC
Planning & Development
- 2 FEB 2011
Ref: 0722-10



STRATEGIC FLOOD RISK ASSESSMENT

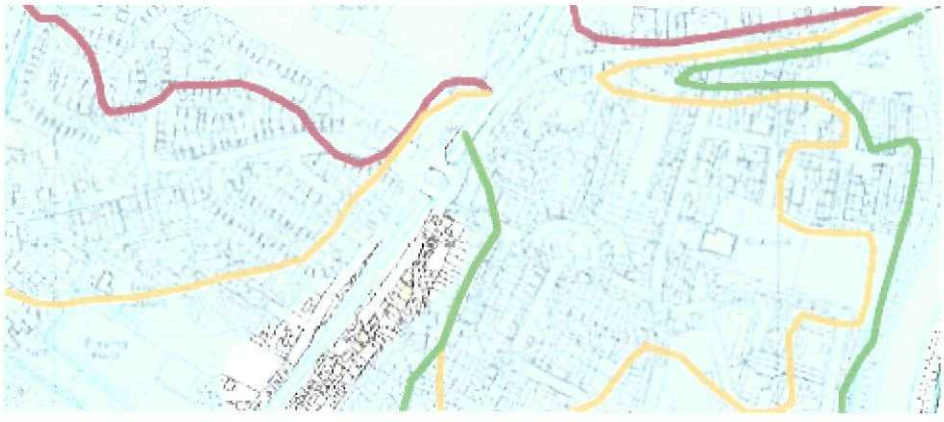
The following information about the area of the development site has been found in the South Holland District Council Strategic Flood Risk Assessment (SHDC SFRA):

1) The Rapid Inundation Zone is specified in Section 4.10 of the SHDC SFRA as an area where flood water could reach a depth of 0.3 metres in 30 minutes or less.

2) Map 12 shows areas of actual risk and the site is classified in one of the areas classed as high risk. However this is because breach failures have been allowed to occur.

3) Map 13 shows large areas in and around Spalding at high risk.

4) Map 14 shows the scenario of a tidal event on the site in 2115, which indicates that flooding could occur east of the development 3 hours from the start of the event. However the site itself is at low risk of flooding.



5) Flood Maps for 2115 show:

Actual Risk:

Depth of flood water would be 0.0m to 0.5m.
Extent of the flood would occur 3 hours from the start of the event.
The hazard is low.
The peak water velocity on the site is between 0 and 0.1m/sec.

Residual Risk: The depth of flood water would be between 1.0m and 1.5m.
Extent flood probability is medium/high.
The peak hazard is significant.
The peak water velocity on the site is between 0 and 0.1m/sec.

6) Fluvial flood levels in the River Welland adjacent to the site stated in the SHDC SFRA are as follows:-

	Present	***Present plus Climate Change***
1 in 100 year	4.32	4.69
1 in 1,000 year	4.34	4.69

The above figures are for chainage 0.6km along the River Welland.

The minimum freeboard for the present plus climate change is 700mm with an average freeboard of approximately 1.0 metres.

The maintenance standards in these main rivers are good and defences are well maintained and regularly inspected for their asset condition.

EXISTING FLOOD ALLEVATION 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 small.

The site is located 50 metres east of the River Welland, as shown on the cross section above. The site is within an area surrounded on all sides by main river with flood banks. The Coronation Channel is on the north, east and south sides of this area. There are raised earth flood banks alongside the Coronation Channel. Both of these watercourses are maintained by the Environment Agency.

POTENTIAL SOURCES OF FLOODING

The following sources of flooding have been identified:-

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

1 *Failure or overtopping of tidal defences*

A high tidal event could overtop the defences and flow south and flood the site. This scenario is shown on Map 14 of the SFRA. There is only a length of approximately 350 metres that if breached or overtopped that could lead to flooding of the development site. The SFRA states that it would be at least 3 hours before this effected the site. If it is assumed that a breach or overtopping would occur around high tide the water level of the tide, and therefore any inflow at a breach would be reducing rapidly as the tide receded. Therefore the likelyhood of the site flooding from this source is very low.

2. *Overtopping of River Welland*

The east bank of the River Welland is at a level of approximately 5.50m aOD. The maximum possible water level in the River is 4.69m OD. The likelyhood of flooding along all the fluvial length, and particularly adjacent to the development site is very low. With freeboards of approximately 800mm, and wide banks with roads on the top, breaching of the banks can almost be discounted.

3. *Overtopping or breaching of the Coronation Channel.*

The maximum predicted water level in the Coronation Channel is 4.69m OD. There are earth banks approximately 2.0 metres high protecting the area west of the Coronation Channel. These banks have a top level of 5.4m OD, which again makes the likelihood of any flooding from this source extremely low, as there is a freeboard of 700mm in a 1 in 1,000 year event.

If a breach occurred in the bank then water would flood the southern part of the area first, and as the area filled up the site would become at risk from flooding. However if any serious flood event developed the level in the Coronation Channel and River Welland would fall at least 300mm and therefore if the proposed development was constructed with a floor level of 4.20m OD it would be highly unlikely that the property would flood.

4. *Failure of Clay Lake Pumping Station*

Clay Lake Pumping Station controls water levels in the open drainage channels south of St Pauls Road. Surface Water Sewers discharge into this drainage system. The South Holland IDB estimate that the Clay Lake Pumping Station provides a 1 in 50 year service with a free board, which in effect provide at least 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. Therefore, the risk of flooding from this source is considered to be low.

5 *Blockages in local surface water sewers*

Both Anglian Water and the Highways Authority maintain surface water drainage systems in the area. The sewer along St Pauls Road is a combined

sewer which receives foul water, roof water and surface water from the highways. If blockages were to occur then surface water would flow along the surface of St Pauls Road, which falls eastwards. Therefore it is unlikely that any flooding from these sewers would effect the development site.

EXTENT OF KNOWN FLOODING

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

PROBABILITIES AND TRENDS OF FLOODING

The probability of this development flooding from Environment Agency main river is low. Under an extreme event the effect of this site would not be sudden and there would be time for residents to take precautionary measures to limit the extent and potential impact of flooding.

RESIDUAL RISK – EXTREME EVENTS

The residual risk from extreme events is very low on this site because of its location within a pumped sub catchment managed by South Holland IDB and its location 500 metres from the Coronation Channel.

Although within Flood Zone 3 according to PPS25 classification, the site actually has a very low risk of flooding due to current standards of drainage and flood defences. The site is not located within a functional flood plain of a main river as defined in PPS25. The Environment Agency Zone Maps have been produced ignoring all flood defences.

INFRASTRUCTURE

It is assumed that the foul water will be discharged into the sewer in St Pauls Road.

The surface water from the existing convenience store west of the site at present has a basic surface water drainage system which discharges rainwater from the roof of this building onto a concrete surface which then flows onto the development site. It is recommended that a new method of disposal method is constructed so that none of this water is disposed of onto the proposed development site.

The surface water from the roof of the new development should be discharged into a new soakaway that should be designed and proved in accordance with BRE Digest 363.

The new access adjacent to 37, St Pauls Road *should* be constructed of porous paving or gravel. *It is recommended that it* should be at least 50mm below the hardstanding level in the next door property to ensure that the new development does not discharge surface water onto the next door site. The site level of the development site should not be raised above 3.90m OD, the present level. *The Environment Agency has recommended that the ground floor of the dwelling should*

be built 600mm above the surrounding ground level at a level of 4.50m OD to reduce the risk of flooding if there is a substantial flood event. However it is recognised that other planning considerations may mean that this cannot be accommodated. It is recommended though that the floor level of the building should be placed at least 300mm above ground level at 4.20m OD.

The development should be a two story building to provide a refuge at first floor level if a substantial flooding event occurs.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions have been reached:-

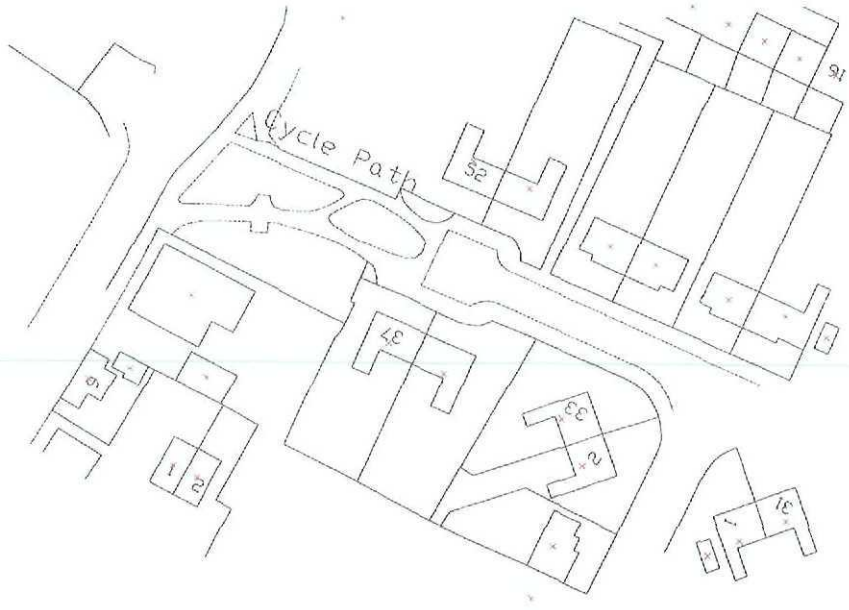
- The proposed development is not in a functional floodplain as defined by PPS25.
- The area is protected with defences which have at least a 1 in 100 year return period standard.
- Drainage Board systems provide a 1 in 100 year standard of protection.
- *If possible a floor level of 4.50m OD* should be provided and the developer should consider incorporating flood resistant/resilient techniques into the design and construction of the proposed dwellings.
- *The development should be a two story building.*
- Future residents should be warned that a breach of the flood defences could lead to flooding of the property, although the risk of this is very low.
- Should an extreme event occur then there is an escape route onto the high bank alongside the River Welland.
- On site surface water drainage will be discharged to soakaways designed to to BRE Digest 363 and Building regulations approval.
- Future occupiers of the properties should register with the Environment Agency's Floodline Warnings direct service.
- In a flood risk area there is always a risk of an event occurring of greater magnitude than has been considered in this flood risk assessment.

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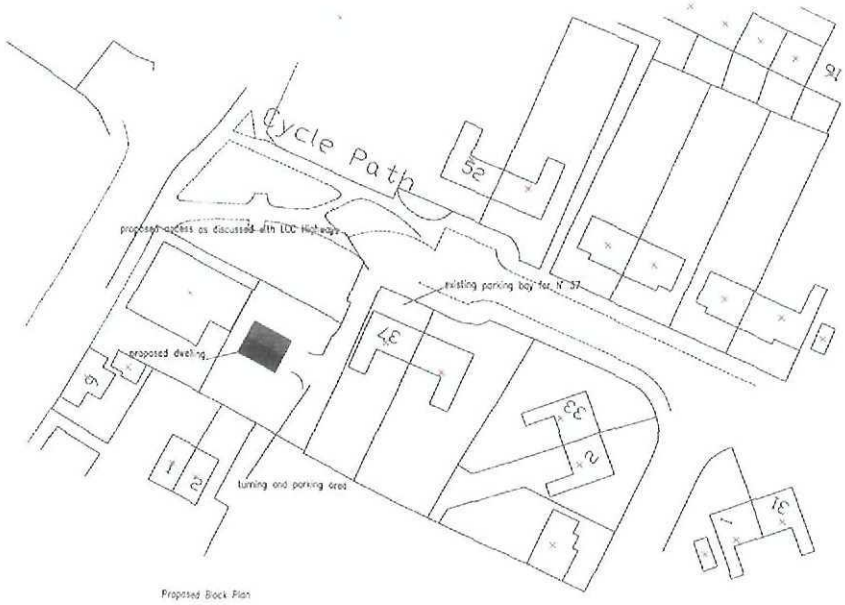
Original November 2010

Revised (revisions in italics) December 2010

SITE PLAN



Existing Block Plan



Proposed Block Plan


B1178
A151
ASH CT
WL 3.13m
TBM 5.85m
4.14m
road level
3.87m
4.37m
Bank level
5.52m
DPC 4.02m
Road level
3.28m
Road level
5.42m
B1173
conc yard
5.00m
plot
3.89m
plot
4.06m
BARGE
FERRY TREE GR
ST
Metres
0 3.5 7 14 21 28