PROPOSED REPLACEMENT DWELLINGS AT
280, HIGH ROAD, WHAPLODE, SPALDING, PE12 6TG.
FLOOD RISK ASSESSMENT



View from road

S M Hemmings B Sc C Eng MICE MIWEM,
69 Charlotte Way,
Peterborough,
PE3 9ER.

This flood risk assessment has been prepared solely to support the planning application for a development at High Road, Whaplode. 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.

Introduction

A Planning application is due to be submitted to South Holland District Council to construct a dwelling and demolish the existing offices at 280, High Road, Whaplode.

The site is in Flood Zone 3 as shown on the Environment Agency's Flood Zone map. The flood zone maps do not take into account existing flood defences.

For the Planning Application to be valid a flood risk assessment needs to be carried out to conform with the requirements of the Technical Guidance to the National Planning Policy Framework Development and Flood Risk. The site is within a defended area as specified in the South Holland District Council's Strategic Flood Risk Assessment and is located in the South Holland Internal Drainage Board District.

Application Site

The site is located in the centre of Whaplode, 6.0 km from the tidal defences of the River Welland north of Spalding, and at least 10km south of the tidal defences of the Wash.

The National Grid Reference of the site is 532355 324335, and the 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 Probability" as detailed on the Environment Agency's flood zone maps without defences, as defined in Table 1 of the Technical Guidance.



Applying the flood risk vulnerability classification in Table 2 of the Guidance, residential development is classified as "more vulnerable". Table 3 of the Guidance states that more vulnerable development in Flood Zone 3(a) is only permitted after the sequential and exception test is followed.

Sequential Test

As the proposed development is located in Flood Zone 3(a) the NPPF requires the sequential test to be applied to determine if there are any reasonably available and suitable alternative sites in a lower flood risk zone for this type of development. This development can be classed as a windfall site within the village of Whaplode. The development complies with the South Holland District Council's policy on these types of sites. The central area of Whaplode is slightly higher than the outskirts of the village and is therefore has a slightly lower flood risk than other parts of Whaplode.

Exception Test

The Sequential Test has demonstrated that it is not possible, consistent with wider sustainability objectives, for the development to be located in zones with a lower probability of flooding. Therefore the Exception Test must be applied and for this to be passed:

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

Both parts of this test must be satisfied in order for the development to be considered appropriate in terms of flood risk. There must be robust evidence in support of every part of the test.

The first section will be demonstrated by the Supporting Planning Statement and compliance with South Holland District Council's planning policies.

This flood risk assessment will demonstrate that the development will be safe for its lifetime and it will not increase flood risk elsewhere.

Strategic Flood Risk Assessment

The following information about the flood risk in the location of this development has been sourced from the maps and reports in the South Holland District Council's Strategic Flood Risk Assessment (SHDC SFRA).

Report Maps

Map 3 shows that site is within flood zone 3.

Map 5 shows that the site is at low or medium risk, but reliant on flood defences for this standard.

Map 6 indicates the peak depth is zero for the present day 1% fluvial and 0.5% tidal event probability.

Map 7 indicates the peak velocity is zero for the present day 1% fluvial and 0.5% tidal event probability.

Map 12 indicates the actual risk is low or medium for the year 2055 1% fluvial and 0.5% tidal event probability.

Map 13 indicates the actual risk is low or medium for the year 2115 1% fluvial and 0.5% tidal event probability.

Map 16 shows that the site is not within a rapid inundation zone.

Flood Maps Table D1

The actual flood hazard for the present day and 2115 is as follows:

Depth of flooding..... zero

Extent of flooding..... low or medium, reliant on flood defences

Velocity ..... nil

The residual flood hazard for the present day and 2115 is as follows:

Depth of flooding..... zero

Extent of flooding..... low or medium, reliant on flood defences

Velocity ..... nil

Maximum flood level and bank levels in the River Welland

The maximum levels in this tidal section of the River Welland 6 km west of the site are as follows:

	2007	2115
Peak 1 in 200 year level	5.98	7.12
Peak 1 in 1000 year level	6.27	7.41

The lowest levels of the east bank of the River Welland around chainage 18km are 7.50m OD, with average levels between 7.60m and 7.70m OD.

Environment Agency Tidal Breach Hazard Mapping

The Environment Agency has published mapping which predicts the depths, velocities and hazard following a breach in the tidal defences for a 1 in 200 and 1 in 1000 year event in 2115. The maps have been produced by modelling breaches along the whole length of the tidal defences and combining these into one map.

The maps show that the predicted flood depths for the area of the site is between 0 and 250mm. When interpolating this equates to a maximum flood level in a 1 in 200 year event in 2115 of between 3.60m and 3.70m OD.

Therefore a proposed floor level of 3.75m OD is recommended for the proposed development.

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", which is considered to be passive until such time that a flood greater than the defences can withstand occurs. The likelihood of flooding occurring due to overtopping or failures of the defences is considered to be very low.

The site is located approximately 6.0 km from the tidal section of the River Welland and 10.0km from the Wash defences at the nearest point. The tidal defence banks to all of these are maintained by the Environment Agency.

The major watercourses in the area are maintained by South Holland IDB, which has carried out improvement schemes so that IDB watercourses generally provide a standard of 1 in 100 years with a freeboard of 300mm in urban areas.

Existing Ground Levels and Proposed Levels of Buildings

The level of the existing car park where the proposed dwelling is to be located is between 3.40m and 3.50m OD. The ground level of the existing offices is approximately 3.50m OD. The land levels are lower north of the existing building and are probably below 3.30m OD. The level of Main Road is between 3.50m and 3.55m OD. The approximate ground floor level of the bungalow on the eastern side of the site is 3.50m OD. A plan showing all the levels is shown on sheet 10 of this report.

It is recommended that the new dwelling should have a level of 3.75m OD, approximately 300mm above the level of the car parking area.

Potential Sources of Flooding

The potential sources of flooding to the site are:-

1. Failure or overtopping of tidal defences of the River Welland or the Wash.
2. Failure or Overtopping of the Coronation Channel
3. High water levels in IDB drainage channels.
4. Localised flooding in the area.

1. Failure or overtopping of tidal defences of the River Nene or the Wash

As shown above, the east bank of the River Welland, which is approximately 6.0 km from the site, provides at a 1 in 200 year standard of protection in 2115. The latest EA maps indicate that if there is a breach in the tidal defences there could be up to 250mm of flood water affecting parts of the site. The maps only predict that the flooding will follow a failure of the tidal defences, but it is assumed that the site in Whaplode is at greater risk from a breach in the bank of the tidal Welland than a breach in the defences to the Wash.

The risk of this happening is very low, less than an annual risk of 0.1%. However the proposed ground floor level of 3.75m OD is higher than the predicted 1 in 200 year flood level predicted by the EA.

2. **Failure or Overtopping of the Coronation Channel**

The SFRA states that the maximum design level in the Coronation Channel is 4.69m OD. The minimum crest level of the east bank of the Channel is 5.14m OD, which gives a minimum freeboard of 450mm. However, generally there is a freeboard of 600 mm along this bank of the Channel.

If the Channel were to breach water would flow eastwards towards the site. However, it would be retained for a short time by the A16 which is higher than the surrounding land. The SFRA indicates that with a serious breach water would not reach the site in a 1 in 100 year event.

With the site being at least 6.0 km from the Coronation Channel the risk from this source is so low it can almost be discounted.

3. **High Water Levels in IDB drains**

Although the whole of this area is below high tide level and levels in the rivers, the retained water levels in the drainage channels ensure that the risk of flooding is extremely low. South Holland IDB maintains a system of sluices, pumping stations, and drainage channels which convey surface water into the River Welland, the Wash and the River Nene and control water levels throughout the South Holland IDB area.

The development site is located on the north side of main Road which is the boundary between the Holbeach River catchment to the north and the Little Holland catchment to the south. Surface water from the site will flow to a watercourse approximately 350 metres north of the site which is maintained by South Holland IDB. This flows north eastwards and then via a drain called Whaplode River under the A17 By Pass and then via the Holbeach River to Holbeach River Sluice located on the south east bank of the tidal River Welland.

The channels maintained by South Holland IDB in urban areas are classified as high priority watercourses and as such receive a higher maintenance priority.

There are possibilities of failure of outfall sluices, but these are mitigated by the high level of maintenance given to these structures by the IDB. If a failure did occur the IDB would immediately be warned of the problem by their telemetry system and take action to repair the fault or to bring in temporary pumps to reduce the risk of any flooding in the area. Similarly any failures of culverts or other blockages would be dealt with immediately.

IDB systems are designed to provide a freeboard of between 600mm and 1000mm to all land in a 1 in 10 year return period rainfall event. South Holland IDB watercourses generally state that their watercourses provide a standard of 1 in 100

years with a freeboard of 300mm in urban areas. In an extreme event water levels will rise but this will be a slow process and it would be at least 24 hours before levels were high enough to begin to flood low land in the area, and after this the level of the flood water would need to rise another 1.0 metre before the development site would be affected.

Therefore the risk of flooding from IDB drainage channels can be considered to be extremely low.

4. **Localised Flooding in the area**

There is a possibility that surface water from High Road could accumulate is this area. However any large accumulations of surface water would find its way into the local dykes and then into IDB drains to the north and as the proposed floor level is 3.75m OD compared with the road level of 3.55m OD it is extremely unlikely that any flooding will occur to the proposed dwelling from this source.

Extent of known Flooding

During the preparation of this assessment, no evidence was discovered of the existing house or garden or any of the adjoining properties having been flooded in the past.

Probabilities and Trends of Flooding

The probability of this development flooding from Environment Agency main river is very low. In an extreme event any effect on this location would not be sudden and there would be time for residents to take precautionary measures to limit the impact of any flooding that may occur.

Residual Risk – Extreme Events

The residual risk from extreme events is very low on this site. The major risk to the site is from a breach or overtopping of the tidal defences

The risk of this happening in this case is low and the hazard from any flooding is also low.

Conclusions

The EA state that there is risk of flooding from the tidal section of the River Welland or the Wash in a 1 in 200 year event in 2115. The EA have modelled breaches in banks of all of the tidal rivers and along the frontage of the Wash. The banks are high enough at the present time to prevent overtopping. If a large breach occurred in the bank the maps of the 1 in 200 year Residual Flood Depth in 2115 in the SFRA indicate that the flood water would extend to within 100 metres of the site. However subsequent flood maps published by the EA for the same scenario indicate there could be flooding with a maximum depth of 250mm.

It is likely that during the next one hundred years the banks of the Tidal Welland and the Wash will be raised by the EA to further decrease the risk of breaches and flooding.

The risk of flooding to the building from IDB drains can be considered low, especially as the floor level is at least 2.0 metres higher than the normal water level in the Holbeach River. In this area discharge of water into the Tidal Welland is controlled by sluices which operate automatically. It is also possible to operate these by hand in an emergency.

The IDB have adequate arrangements to bring in contractors and use their own staff if a failure of any part of the sluices occurred. If drains become full any flooding that occurs would happen very slowly and affect land at levels between 2.50m OD and 3.0m OD before the development site. It would be very unlikely to reach a level of 3.75m OD and enter the proposed building.

The proposed development is not in a functional flood plain as defined by PPS 25.

Although the site is in flood zone 3, and the actual risk of the site flooding from any Environment Agency or IDB watercourse is very low. The site is only likely to flood if a breach occurs in the east bank of the River Welland or the Wash during a 1 in 200 year high tide in 2115. The proposed ground floor level of the building is above the predicted flood level in this event. No flooding would be likely to occur if a breach did not occur.

If any flooding were occur it would happen very slowly and residents would have adequate time to prepare themselves for the event.

Recommendations

In any area at risk of flooding it is preferable that 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 ground floor level of the proposed replacement building should be approximately 300mm above existing ground level at a level of 3.75m OD and all bedrooms should be at first floor level.

Occupiers of the property should register with the Environment Agency's Floodline Warnings Direct Service.

On site surface water drainage should be discharged into soakaways and these should be designed to BRE Digest 365 and approved under Building regulations.

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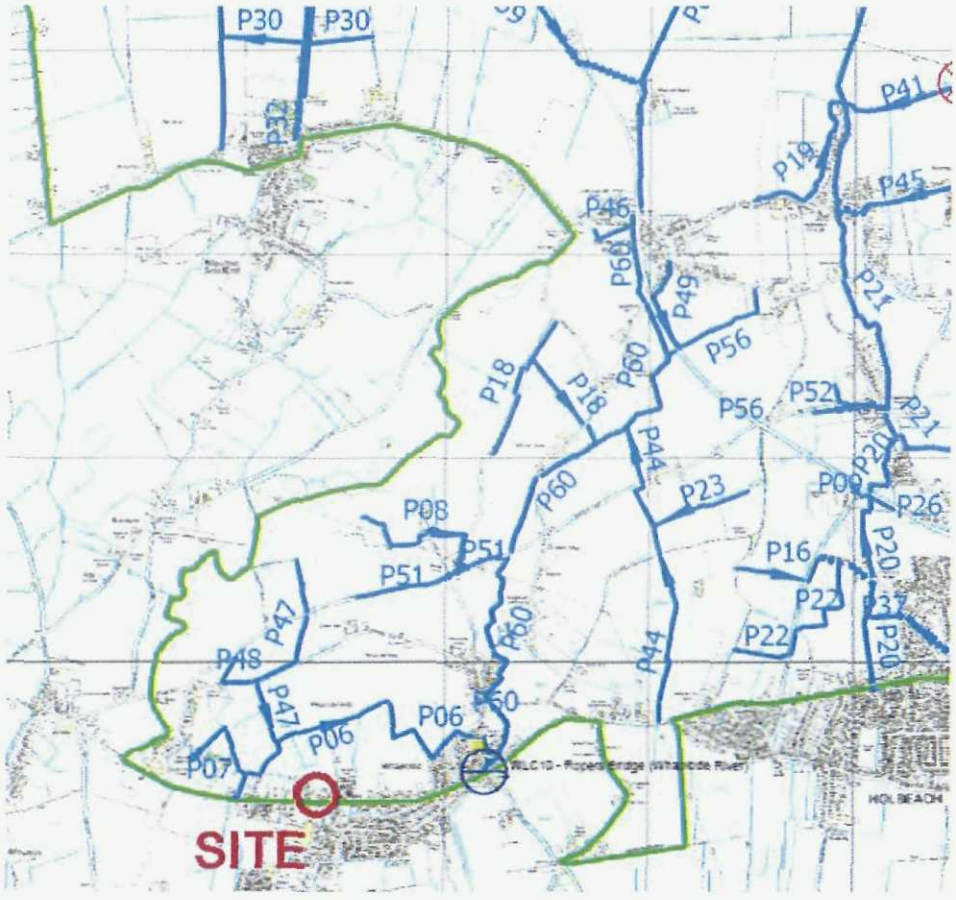
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31st August 2015

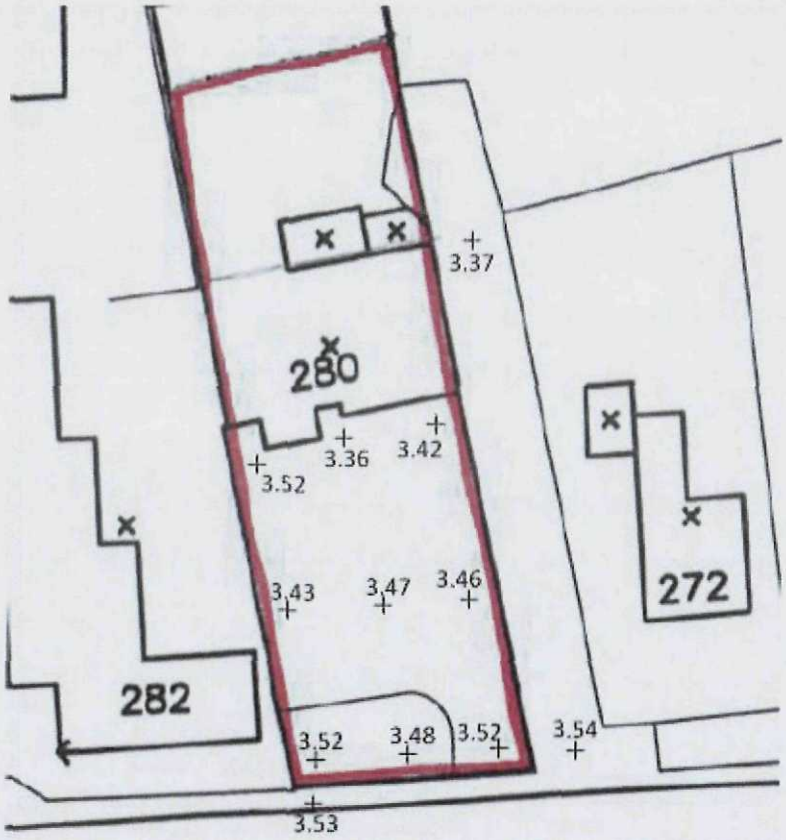
LOCATION PLAN



PLAN OF AREA SHOWING IDB WATERCOURSES



PLAN OF SITE SHOWING LEVELS



MAP FROM SFRA SHOWING PREDICTED RESIDUAL FLOOD DEPTHS IN 1 in 200 YEAR EVENT IN 2115

