PROPOSED DEMOLITION OF EXISTING COMMERCIAL BUILDINGS AND CONSTRUCTION OF A RESIDENTIAL DEVELOPMENT AT 36 & 38 HOLBEACH ROAD, SPALDING, PE11 2HQ

ADDITIONAL INFORMATION FOR FLOOD RISK ASSESSMENT

Introduction

This report is written to clarify the methodology of the investigation work on site and how the recommendations in the Flood Risk Assessment dated 17th October 2016 have been reached.

Site Investigation

On 30th September 2016 I visited the site and met with Richard Diggle who opened the gate and the door to the existing building on the site of the proposed development. From the google map it can be seen that the old buildings cover the whole site, and I concluded that it would be difficult to ascertain levels of the land outside the buildings.



Therefore one level only was taken in the building as the floor of the whole of the building was at the same level. The reference point to calculate the levels to Ordnance Datum was a known level shown on the OS map near the junction with Acacia Avenue.

Levels were taken on the footpath (shown as TBM A), the bank on the opposite side of Holbeach Road and of the water level in the River Welland.

The water level in the River Welland was checked against the gauge board reading and the levels adjusted to take account of this. The levels recorded are shown on the next page, with the adjusted levels shown in red.

Date 30th September 2016 Levels taken for Spalding.

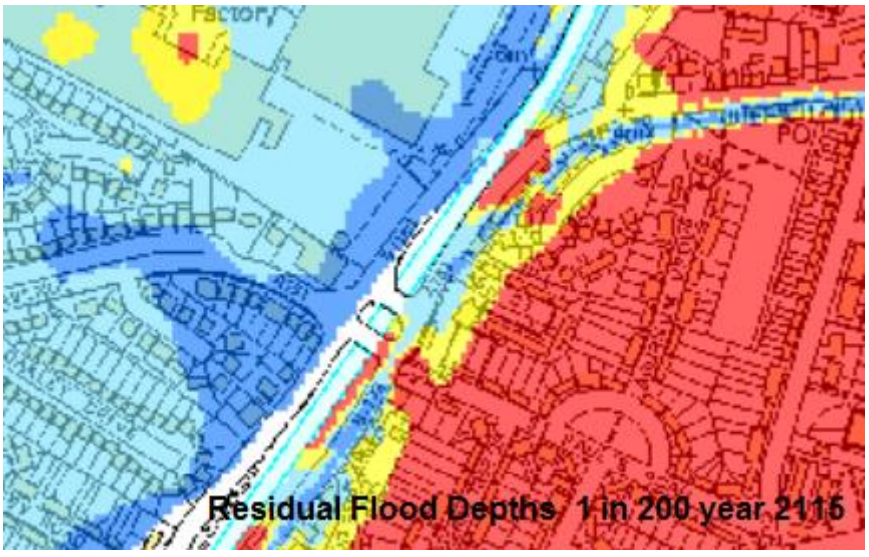
From 36 & 38 Holbeach Road To

BACK SIGHT	INTER-MEDIATE	FORE SIGHT	COLLIMATION OR H.P.C.	REDUCED LEVEL	DISTANCE	REMARKS
1.314			6.214	4.900	5.050	Level Road
1.551		1.311	6.454	4.903	5.053	TBM A
	1.780		~~6.315~~	4.674	4.824	Level Floor.
1.616			6.520	4.904		TBM A
	3.600			2.920	3.070	Level River
						3.65 ish to bottom.
1.370			6.275	4.905	5.055	TBM A.
	1.200			5.075	5.225	Bank.
		1.375		4.900	5.050	Level Road.

Reference to the South Holland DC SFRA

The relevant part of the map in the SFRA showing the residual peak depths for Spalding in 2115 in a 1% fluvial and 0.5% tidal event probability is shown below.

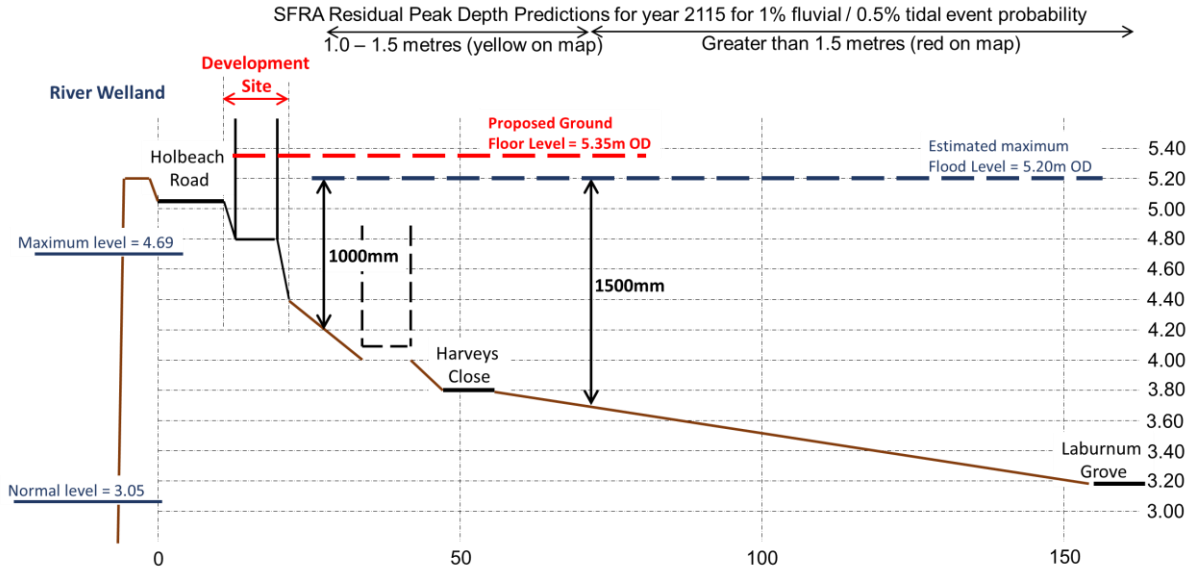
This shows the boundary between the red (greater than 1.5 metre depth) and the yellow (between 1.0 and 1.5 metre depth) areas and between the yellow (between 1.0 and 1.5 metre depth) and the light blue (between 500mm and 1.0 metre depth) areas. There are two red areas near to the River Welland which do not seem to be correct. Also no dark blue (between 0 and 500mm depth) areas are shown. One would expect Holbeach Road to be coloured dark blue.



I conclude that the predicted flood depths along Holbeach Road itself are shown to be light blue, yellow and red, giving a range of levels between 500mm and greater than 1.5metres. It can clearly be seen on site that the level of the road does not change to that extent. Therefore the levels in this area can be considered unreliable.

Estimation of Maximum Flood Level

As the flood depths around Holbeach Road are unreliable, the boundaries between the red and yellow, where the flood depth will be 1.5 metres, and the yellow and light blue, where the flood depth will be 1.0 metres will be used on the cross section below from Holbeach Road to Laburnum Grove to estimate the predicted maximum flood level.



Therefore from the cross section above it is possible to estimate that the maximum flood level from the information in the SFRA to be 5.20m OD. The new climate change allowances recommend that the maximum high tide level in 2115 will be 100mm above the allowance used in the SFRA. This will produce a smaller increase in predicted flood level than 100mm. Therefore using these predictions a ground floor level of 5.35m will provide adequate mitigation against flooding to the building in this event.

Reference to the Sequence of Events after a Breach

If a breach occurred in the tidal bank between Fulney Lock and West Marsh Sluice then the whole area between the Coronation Channel and the River Welland would start to fill with flood water. A major emergency would be called by the Authorities as there would be hundreds of houses at risk. When the water level reached 5.00m OD the water would start to flow into the River Welland, and the maximum level that the flood water would rise to would be 5.30m OD, which would limit the further increase in level of flood water. At the same time the level of the tide would be falling and the flood water would stop flowing in and would flow out of the breach for around 6 hours until the next tide.

It is possible to make some calculations to estimate how long after the breach forms the maximum level will be reached in the area between the Coronation Channel and the River Welland.

The area between the Coronation Channel and the River Welland = 1,596,000 sq m.

If the average depth of water is taken to be 2.3 metres, Volume = 3,670,000 cu m.

The maximum depth of the breach will be taken to be 2.5 metres.

Width of breach = 40 metres

Assume the breach is a broad crested Weir

Maximum Volume through Breach = $1.7 \times b \times H^{3/2}$

$= 1.7 \times 40 \times 2.5^{3/2}$

$= 269$ cumecs

Therefore the time it will take for the breach to fill the area with water to a level of approximately 5.3m OD

= 3,670,000/269/60/60 = 3.79 hours

The tables in the SFRA show that there is approximately 700 metres of the bank of the fluvial River Welland where the bank is at a level of 4.90m OD.

Therefore if the flood level in the area reached 5.30m OD it is reasonable to assume a broad crested weir 700 metres long will have 300mm (minimum) of water flowing over it into the River Welland.

This volume will be $1.7 \times b \times H^{3/2} = 1.7 \times 700 \times 0.3^{3/2}$

$= 196$ cumecs

Therefore it can be concluded that the above calculations demonstrate that the flood level is very unlikely to increase above 5.35m OD in this area.

Conclusion

The predicted flood level has been calculated in two different ways and both indicate that the maximum flood level in this area of Boston would not exceed 5.30 m OD. It is therefore considered that the mitigation proposed with a proposed floor level of 5.35m OD would be adequate for a 1 in 200 year tidal event in 2115.

Stuart Hemmings

20th March 2017