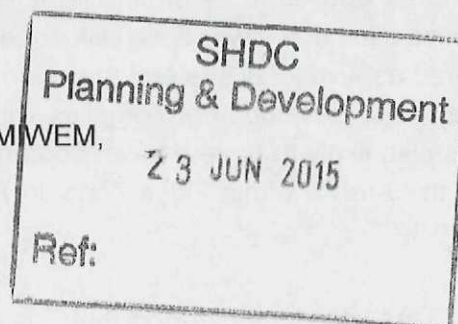


PROPOSED DEVELOPMENT AT SITE EAST OF
57 AND 59 ROTTEN ROW, PINCHBECK, SPALDING PE11 3RQ
FLOOD RISK ASSESSMENT



View of plot from The Chase

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



This flood risk assessment has been prepared solely to support the planning application for a proposed development at Rotten Row, Pinchbeck, 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.

Introduction

An application is due to be made to South Holland District Council for Planning Permission to construct a bungalow on a plot of land west of 57 and 59 Rotten Row, Pinchbeck which is at present part of the rear gardens of these properties.

The Planning Application requires a Flood Risk Assessment to be carried out as required in the Technical Guidance to the National Planning Policy Framework.

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

Application Site

The development is located on the southern side of the River Glen. The National Grid Reference of the site is 523660 325690.

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 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, the development is classified as "more vulnerable" in Table 3 of the Guidance, and the statement states that residential use 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 can be considered as a windfall site and there are few others like this available in the Pinchbeck area. The development complies with South Holland District Council's policies and it is also likely to have a lower flood risk than many others in Pinchbeck, as the whole of this area is within Flood Zone 3(a).

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 at the location of the proposed development has been gained from the maps produced for the South Holland District Council Strategic Flood Risk Assessment:

1. Report Maps

- Map 5 indicates the site to be low to medium probability and protected by flood defences.
- Map 6 indicates the peak depth is zero for the present day 1% / 0.5% tidal event probability.
- Map 7 indicates the peak velocity is zero for the present day 1% fluvial / 0.5% tidal event probability.
- Map 8 indicates the risk extent is low to medium probability for the present day 1% fluvial / 0.5% tidal event probability.
- Map 10 indicates the actual risk extent for the 0.1% event probability is high, reliant upon protection by flood defences, and flooding starts to occur between ½ hour and 1 hour after a breach.
- Map 12 indicates the actual risk extent for the year 2055 for the 1% fluvial / 0.5% tidal event probability is high.
- Map 13 indicates the site is within the high probability band for the year 2115 for the 1% fluvial / 0.5% tidal event probability.
- Map 14 indicates the actual risk extent for the year 2115 for the 0.1% event probability is medium or high, and indicates that this flooding would probably develop less than ½ hour after any breach occurs.
- Map 16 indicates the site is not within the present day or the year 2115 rapid inundation zone.

2. Flood Maps Table D1

- The maps illustrate the actual flood hazard which is as follows:

For the present day	Depth of flooding ... zero
	Extent of flooding ..low to medium
	Hazard zero
	Velocity ... zero
For year 2115	Depth of flooding ...0 - 0.5m
	Extent of flooding ...High probability,
	Hazard ... Moderate
	Velocity .. 0 to 0.1m / sec

- The maps also illustrate the residual flood hazard which is as follows:-

For the present day	Depth of flooding ...0 - 0.5m
	Extent of flooding .. High probability
	Hazard ... Low
	Velocity .. 0 to 0.1m / sec
For the year 2115	Depth of flooding ...0 - 0.5m
	Extent of flooding .. High probability
	Hazard ... Moderate
	Velocity .. 0.0 to 0.1m / sec

3. Maximum flood levels:

Maximum flood levels in the River Glen are shown in the reports as follows:

	Present	Present + Climate Change
1 in 100 year	4.32	4.91
1 in 1,000 year	4.47	4.98

The bank level at this location is 4.39m OD, but there is a flood wall 900mm high along this length of the River which raises the defence height to 5.29m OD.

Maximum flood levels in the Vernatt's Drain are shown in the reports as follows:

	Present	Present + Climate Change
1 in 100 year	3.79	3.79
1 in 1,000 year	3.79	3.79

The bank level at this location is 4.25m OD

4. Extreme tide levels

The extreme tide levels in the River Welland between are shown in the report as follows:

	2007	2055	2115
1 in 100 year	5.98	6.31	7.12
1 in 1,000 year	6.32	6.65	7.46

The lowest bank level on the left bank of the tidal River Welland is 7.57m OD.

Information from Environment Agency

The Environment Agency have advised that with predicted flood depths of 0 – 500mm in the SFRA then finished floor levels of new single story properties should be raised at least 500mm above the ground level. In addition to this flood resilient construction should be incorporated to a maximum height of 300mm above the maximum flood level.

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 400 metres south of the River Glen, which is main river and maintained by the Environment Agency.

The site is approximately 2.2km from Vernatt's Drain (IDB) and 2.6 km from the tidal defences of the River Welland.

The area is drained by watercourses maintained by the Welland and Deepings IDB.

Proposed Levels of Buildings

The ground levels on the site vary between 3.70m and 3.90m OD. The level of the ground floor of Nos 57 and 59 Rotten Row is 3.98m OD and the ground floor level of the bungalow on the west side of the plot is 3.78m OD. The road level of the Chase in front of the plot is 3.70m OD and the road level at the junction with Rotten Row is 3.52m OD. The proposed level of the new bungalow should be at least 4.10m OD. A plan of the levels on the site is shown on page 10 of this report.

Potential Sources of Flooding

The following sources of flooding have been identified:

1. Failure or overtopping of the tidal defences of the River Welland
2. Flooding due to high water levels in Vernatt's Drain

3. Overtopping or breaching of the River Glen.
4. Failures of Pinchbeck Pumping Station (IDB).
5. Flooding from the IDB drainage system.
6. Blockages in local surface water and foul sewers (highway or Anglian Water).

1. Failure or overtopping of the tidal defences of the River Welland.

The tidal River Welland is 2.6km east of the site. The predicted levels in this watercourse show that the defences will not be overtopped in a 1 in 1000 year event in 2115. However there is still the risk that the earth bank could breach when the water levels are high. If a breach occurred in the west bank of the tidal Welland water would flow westwards and would flow into Vernatt's Drain. This will hold up the flow until the water level reaches 4.25m OD then water would flow out of Vernatt's Drain and start to flow westwards towards the development site.

Therefore it is very unlikely that flood water from this source would reach and cross Church Street and cause flooding to Pinchbeck and the risk of flooding from this source is extremely low.

2. Flooding due to high water levels in Vernatt's Drain

The SFRA states that the maximum water level in Vernatt's Drain is 3.79m OD. This is 450mm below the bank levels on the east side of 4.25m OD. These flood levels are lower than the proposed floor level of the building and therefore this source of flooding can be discounted.

3. Overtopping or breaching of the River Glen.

The predicted maximum 1 in 100 year water level at the present time is 4.32m OD and the predicted 1 in 1000 year water level at the present time is 4.47m OD. These predicted levels are lower than the defence levels on this section of the bank of the River Glen which are all higher than 5.00m OD.

Predicted water levels with climate change are 4.91m OD for the 1 in 100 year event and 4.98 OD for the 1 in 1000 year event. These are still below the defence levels.

Although the actual risk is extremely low there is still a residual risk if the defences were to fail. The River Glen has a 1 in 100 year standard of service at the present time, which will decrease in the future unless work is carried out by the EA to raise banks. However the most common reason for breaches is overtopping of earth banks. This type of failure is more likely to happen at locations to the west of Pinchbeck where the earth banks are lower.

This source of flooding is the greatest risk to the site, and the hazards will be reviewed later in this report.

4. Failures of Pinchbeck Pumping Station (IDB)

The original pumps at Pinchbeck Marsh had a capacity of 1.5 cumecs, and the new part of the pumping station built approximately five years ago added a further 1.5 cumecs of capacity. The catchment area that the pumps serve is 850 hectares. Therefore this pumping station provides a good standard of service for the catchment area, and the risk of flooding from this source can be considered to be extremely low.

5. Flooding from the IDB Drainage System

This area of Pinchbeck village is drained by a piped drains and open watercourses maintained by Welland and Deepings IDB. Surface water from the roads will discharge into these watercourses which run southwards and then eastwards alongside Market Way, and then to Pinchbeck Pumping Station. If any part of this system becomes blocked this could cause some minor flooding of lower areas of Pinchbeck, but the flooding would not rise to the level of the proposed building. Welland and Deepings IDB have a regular maintenance programme on all of their open and piped drains which reduces the risk of this happening.

If a failure occurred in any part of the IDB system levels would rise in the drainage channels and eventually lower agricultural land outside Pinchbeck would start to flood. If the situation continued, which is unlikely, some flooding of lower areas in Pinchbeck could start to take place. However this would happen over a period of at least 24 hours and residents in the area would have adequate time to assess the situation and take appropriate action.

Therefore this source of flooding can be considered to be extremely low..

6. Blockages in local surface water sewers and highway drains

Any flooding due to blockages in surface water sewers or highway drains could cause low level flooding in The Chase but the flood water would flow away from the site westwards to lower areas of Rotten Row and would not accumulate on the site.

Therefore this source of flooding can be discounted.

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 flooding from Environment Agency main river is very low. In an extreme tidal event the 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

There is a residual risk from extreme events on this site. The major risk to the site is from high water levels in the River Glen. The defences on the south side of the river seem to provide a satisfactory defence, being 300mm higher than the 1 in 1000 predicted level including climate change.

If a breach occurred in the bank, or the stone flood wall collapsed, flood water would flow southwards flooding many of the properties behind the defences. The maps of the predicted residual depths for the 0.1% probability event show maximum flood depths of between 0.5 and 1.0 metres for properties and land north of Knight Street and south of Knight Street. However the properties along the Chase and Primrose Crescent are shown to have a maximum depth of flooding of 500mm.

Conclusions

The following conclusions can be made:

- The proposed development is not in a functional flood plain as defined by PPS 25.
- Although the site is in flood zone 3, the actual risk of the site flooding from any Environment Agency water course is low.
- The map showing the 1% fluvial risk has been reproduced on page 11 with ground levels taken during the survey of the site. These levels show that areas of road with a level of 3.52m OD will suffer only 500mm flooding, and areas of road with levels of 3.35, 3.40, and 3.44m OD will suffer between 500mm and 1.0 metre of flooding. From this we can deduce that the maximum flood level predicted by these maps is 4.02m OD.
- Therefore as the maximum predicted flood level is 4.02m OD for both the 1% and 0.1% fluvial event the minimum recommended ground floor level of the proposed bungalow is 4.10m OD.
- With the predicted maximum level in the River Glen with climate change of 4.98m OD, this will be 880mm above the level of the proposed bungalow. As the water flows through any breach that may occur then initially there will be a head loss of at least 500mm as the water flows out of the river. After some time this may reduce, but so will the maximum level in the river as water escapes out of the river. This provides further evidence that any flood water will only reach a level of 4.02m OD at the proposed site.
- Any flooding from the IDB drain or local sewers or drains will occur very slowly and it is extremely unlikely that flooding from this source would reach a level of 4.10m OD and flood the proposed dwelling.
- 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.

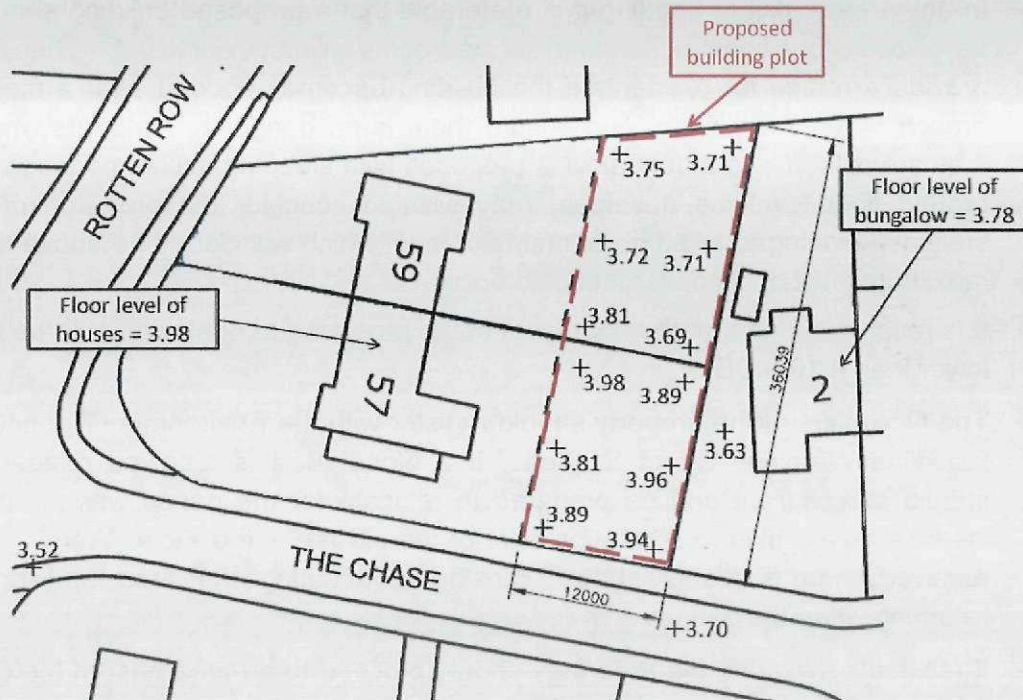
Recommendations

- In any area at risk of flooding it is preferable that a proposed building should be of two story construction with all bedrooms at first floor level. This will provide a refuge for residents if the building becomes flooded after a major breach of the River Glen, and ensure there is no danger to residents when they are asleep. As a bungalow is proposed with sleeping accommodation at ground floor level the developer may wish to consider the provision of a staircase leading to a refuge at first floor level which will clearly be above the maximum level of flooding that could occur.
- It is recommended that the floor level of the proposed bungalow should be no lower than 4.10m OD.
- The Occupiers of the property should register with the Environment Agency's Floodline Warnings Direct Service. If a Flood Alert is received residents should stay vigilant and be prepared to relocate for the period when water levels are very high to a location east of the old A16. If a Flood Warning is received then residents should consider evacuating the area and only returning when the danger is over.
- If residents evacuate the area they should proceed to an area east of the old A16 or to the central part of Spalding where the risk of flooding is less.
- On site surface water drainage should be discharged into soakaways and these should be designed to BRE Digest 365 and approved under Building regulations.
- The buildings should be designed incorporating flood resistant and resilient techniques to allow it to be refurbished after being flooded to a depth of approximately 300mm above the floor level of the new building. Consideration should be given to the electrics and heating pipes being distributed at ceiling level rather than at floor level. Materials used for the floor and walls should be able to withstand flooding for a period of a few days. Further details are given in Appendix A on page 12.

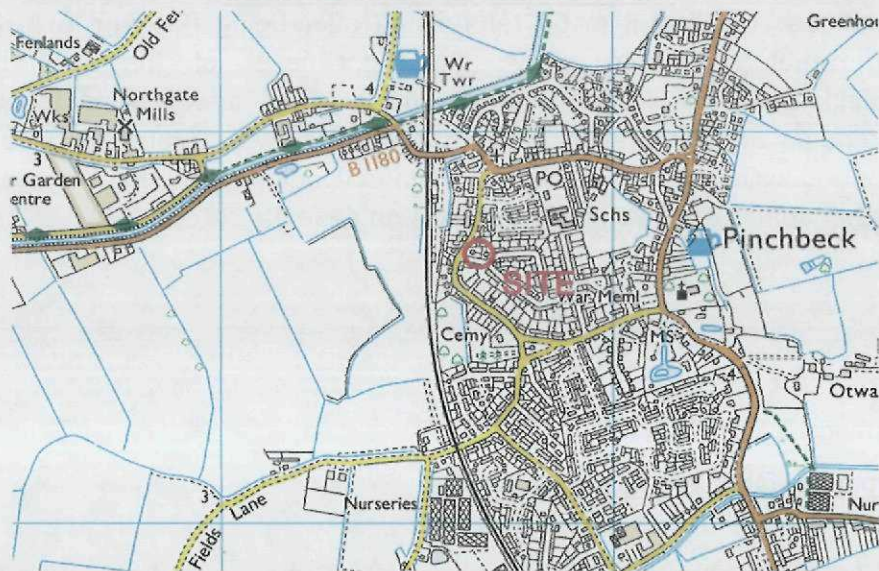
S M Hemmings B Sc C Eng MICE CMIWEM

Stuart.hemmings@btinternet.com

SITE PLAN WITH GROUND LEVELS



LOCATION PLAN



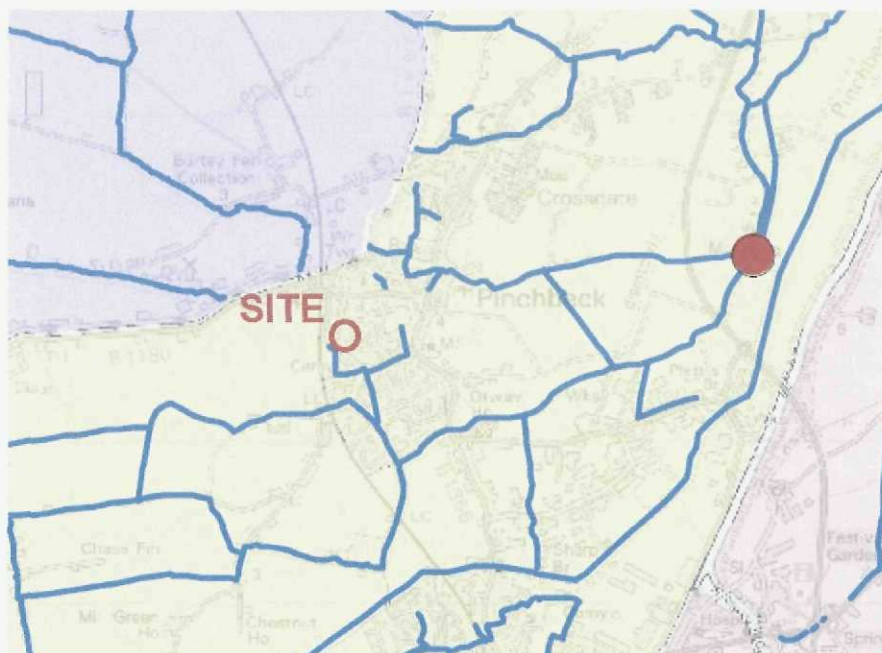
RESIDUAL PEAK DEPTH YEAR 2115 1% FLUVIAL / 0.5% TIDAL EVENT PROBABILITY



Dark blue.....predicted flood depth up to 500mm.

Light blue.....predicted flood depths between 500mm and 1.0metre.

PLAN OF IDB WATERCOURSES



APPENDIX A

RECOMMENDATIONS ON LIMITING FLOOD DAMAGE TO BUILDING

- Walls: Construction to first floor level should be carried out with good quality brickwork. Specification for blockwork should be checked and only blockwork that does not absorb water should be used. If possible brickwork should be used instead of blockwork to first floor level. Construction below DPC should be carried out with engineering brickwork.
- Ground Floor: Either precast concrete beams with concrete infill, or concrete above made up ground should be used. Dense concrete screeds should be used.
- Doors: Doors should be solid construction, or plastic should be considered. Butt hinges should be fitted to allow doors to be removed and placed in a dry area prior to any flooding.
- Kitchens: Install plastic base feet and if possible other plastic items to reduce damage from low level flooding. Raise fitted ovens as high as possible.
- Electrical Services: Place all of electrical wiring at first floor level and drop wiring down to sockets at least 1.0 metre above ground level.

Mr A Wilkerson
This I'LI Do
57 Rotten Row
Pinchbeck
Spalding
Lincs
PE11 3RQ

Date: 28 May 2015



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Dear Sir/Madam,

**TOWN AND COUNTRY PLANNING ACT 1990
PLANNING APPLICATION SUBMISSION: REQUEST FOR ADDITIONAL INFORMATION OR FEE**

Reference Number: H14-0476-15
Proposal: Residential development - erection of bungalow
Site Location: Rear Of 57 And 59 Rotten Row Pinchbeck Spalding Lincs
Applicant: Mr A Wilkerson

I am writing with reference to your recently submitted planning application and advise you that the application cannot be registered as it is currently considered to be invalid.

We will require the following before the application can be progressed:

Question 5 on the Application Form regarding Flood Risk has not been answered.

The site is within Flood Zone 3 and, therefore, an appropriate Flood Risk Assessment is required.

Please return one copy of this letter with your reply to enable us to deal with the application without further delay. The application will remain on hold until we are in receipt of the above information. If returning information by e-mail, please use the following address; planningadvice@sholland.gov.uk and include a copy of this invalidation letter in your e-mail.

If you have any queries regarding the above please contact Karen Porter on 01775 764562, quoting the above reference number.

Yours faithfully

K Porter.

Karen Porter
Planning Advice Assistant