

**FLOOD RISK ASSESSMENT FOR
PROPOSED RESIDENTIAL DEVELOPMENT
AT 15 SURFLEET RESERVOIR,
SURFLEET SEAS END,
SPALDING, Lincs**

REPORT

GEOFF BEEL CONSULTANCY

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GCB/ORREY

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1.0 INTRODUCTION

- 1.1 A full planning application has been submitted on behalf of Mrs Bianco Orrey for proposed residential development at No 15 Surfleet Reservoir, Surfleet Seas End, Spalding, Lincs.
- 1.2 Planning approval requires a Flood Risk Assessment to accompany the application to meet the requirements and general principles contained in the Planning Practice Guidance to the National Planning Policy Framework (NPPF) and for approval by the Environment Agency.

The site is shown within Flood Zone 3b (functional flood plain) of the Environment Agency Flood Map for Planning. The latest Flood Zone Maps have been created as a tool to raise awareness of flood risk with the public and partner organisations, such as Local Authorities, Emergency Services and Drainage Authorities. The Maps do not take into account any flood defences.

The site is also shown within a functional floodplain of the South East Lincs. Council's Strategic Flood Risk Assessment Map and located in the Welland and Deepings Internal Drainage Board district.

- 1.3 Geoff Beel Consultancy was appointed on 19th April 2021 to undertake a Flood Risk Assessment.
- 1.4 The Environment Agency has objected to the development by way of letter dated 23rd March as the submitted Flood Risk Assessment (FRA) fails to identify the necessary flood risk mitigation measures.

This FRA addresses the issues.

2.0 LOCATION

- 2.1 The development site is at No 15 Surfleet Reservoir, Surfleet Seas End, Spalding. The National Grid Reference of the site is TF 27922927.
- 2.2 The position and extent of the site are shown on Fig 1 – Location Plan at the end of the document.
- 2.3 The site, located within the Welland and Deepings Internal Drainage Board district is shown within Flood Zone 3b as detailed on the Environment Agency Flood Map for Planning and of the Council's Strategic Flood Risk Assessment Map. The site is within an existing flood storage area of the River Glen immediately upstream of Surfleet Sluice.

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is an existing timber framed dwelling constructed in 1930.
- 3.2 The area of development is approximately 0.043 hectare.

- 3.3 The proposed site layout consists a replacement timber framed building on blue brick piers above existing ground level after demolition of the existing dwelling..
- 3.4 The Sequential Test and Exception Test will require to be applied but the development may be permitted as the site may be protected against the 1 in 100 year fluvial event by a combination of existing defences with mitigation measures meeting the requirements of NPPF.

The development is for a replacement dwelling with flood mitigation measures incorporated to meet the requirements of the Sequential Test and Exception Test.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

- 4.1 The site is located at Surfleet Reservoir a formal flood storage area of the River Glen immediately upstream of Surfleet Sluice with existing land levels varying between 3.47m and 4.09m aOD.
- The standard of protection offered by existing land levels would be no more than the 1 in 2 year return period whilst ground floor levels of the existing dwelling are almost at the 1 in 5 year return period event.
- 4.2 Flooding of the flood storage reservoir occurred in both the Easter 1998 and November 2000 events.
- 4.3 The Surfleet Sluice Gate with the adjoining flood embankments offer protection against the tidal flood event of the River Welland. The existing 1 in 200 year modelled flood event of the River Welland is 5.99m aOD whilst the 1 in 1000 year modelled flood level of the River Glen inclusive of climate change is 4.83m aOD.
- 4.4 The site is located within the Welland and Deepings Internal Drainage Board district with the nearest 'main drain' open watercourse, some 100 metres south west of the site. Land levels at the site vary between 3.47m and 4.09m aOD. Existing ground floor level is at 4.14m aOD.
- 4.5 The existing standard of drainage for the Welland and Deepings Internal Drainage Board is 1 in 50 years return period, compatible with the Department of the Environment, Food and Rural Affairs target level of service for rural drainage and flood defence works. Freeboard of 1.00 metre is provided to the lowest land levels.
- 4.6 The surrounding land south of the River Glen drains to the Vernatts Drain which discharges into the tidal River Welland some 300 metres east of the site. a further IDB main drain the Blue Gowt Outfall discharges into the River Glen some 100 metres upstream of the development site.

- 4.7 Current maintenance standards within the Welland and Deepings Internal Drainage Board are generally very good. During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Boards assets are commensurate with the standard of protection that is sought. However, bank slips, blocked culverts etc may occur from time to time and these matters are usually dealt with promptly.
- 4.8 Maintenance standards of the Environment Agency's main rivers and defences are well maintained and regularly inspected for their asset condition.

5.0 POTENTIAL SOURCES OF FLOODING

- 5.1 Three potential sources of flooding have been identified as a result of this assessment:
- a) storm return period of 1 in 5 years being exceeded
 - b) failure of Surfleet Sluice
 - c) overtopping and breaching of the tidal River Welland defences
- 5.2 The probability of flooding from a) is medium due to the Environment Agency main river design standard incorporating storage in channel upstream whilst the reservoir area only provides freeboard up to the 1 in 5 year event.
- 5.3 Failure of Surfleet Sluice may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Environment Agency would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low.

Previous historic rainfall events of 1998 and 2000, estimated to be as great as than 1 in 100 year events, caused flooding to residential properties at the site which is a formal storage reservoir.

The probability of the site flooding from this potential source is therefore considered to be medium to high.

- 5.4 The possible overtopping and breaching of the tidal River Welland flood defences which may affect the site under extreme conditions is considered to be low. The present standard of defence of 1 in 200 years would most probably have to be exceeded to create such conditions. If a breach, however, did occur, it is estimated that the floodwaters could affect the development site, and a precautionary approach should be adopted as regards proposed floor levels.
- 5.5 The overtopping of existing ground levels will occur between the 1 in 2 year and 1 in 5 year fluvial flood events.

It is therefore recommended that proposed floor level of the development should be at 5.21m and some 1.12 metres above existing ground level to safeguard against the estimated 1 in 1000 year fluvial flood event inclusive of climate change. Flood resistant/resilient measures will also be incorporated into the design and construction of the dwelling such as all electricity points 450mm above ground level.

- 5.6 The developer will ensure that the eventual occupiers of the property are sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high. Indirect warnings are provided to all flood risk areas, even those at low risk of flooding. The main method is media broadcasts via local radio and also by television.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding, contact tel. no: 0345 988 1188. The occupiers of the dwelling should register with the Floodline Service to receive any future flood warnings.

6.0 EXTENT OF KNOWN FLOODING

- 6.1 During the preparation of this assessment, evidence was discovered of the site and adjoining properties being flooded during the Easter 1998 and November 2002 events.

7.0 PROBABILITIES AND TRENDS OF FLOODING

- 7.1 The probability of this development flooding from localised drainage systems is very low. It is also intended to construct floor level 1.12 metre above ground level such that it is above the 1 in 1000 year return period flood level inclusive of climate change.
- 7.2 The probability of the site flooding with water from any Welland and Deepings river system is less than 1% because of the standards of the existing flood defence systems, storage within existing drainage channels and the location of the site. Similarly the same standard is provided by the Environment Agency's main river and defences other than in the formal flood storage reservoir at Surfleet Reservoir.
- 7.3 If under very extreme events, levels of floodwater from any Environment Agency or Welland and Deepings river or arterial systems rose to such an extent that the site was affected, the situation would not be sudden. It is very probable that sufficient time would be available to take precautionary actions to limit the extent and potential impact of flooding.
- 7.4 The water levels in the drainage channels will tend to rise as a result of the impacts of climate change. However the existing systems and defences together with the raising of floor levels above existing ground level and estimated flood level will be appropriate for the design life of the development (i.e. 100 years).

8.0 IMPACTS OF FLOODING

- 8.1 No significant impacts of flooding are anticipated due to the mitigation measures being proposed.
- 8.2 Floor levels of the development will be raised 1.12 metre above existing ground levels offering additional protection against impacts arising from any extreme short duration, localised events. Surface water drainage will be discharged to soakaway designed to BRE365 specification and Building Regulations approval. Floodwaters will be able to flow beneath the structure as constructed on blue brick pier foundations.
- 8.3 The general location of the site within the catchment is such that if flooding occurred from any of the Environment Agency or Welland and Deepings river systems, then sufficient warning time would be available.
- 8.4 No displacement of water from the site will affect any adjoining properties and agricultural land. The original building with floor level of 4.14m aOD is 50mm above existing ground level whilst the replacement dwelling is located 1.12 metre above ground level founded on 450mm x 450mm blue brick piers to allow any floodwaters to flow beneath the dwelling.

9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme events is medium to high on this site, because of its location within a formal flood storage reservoir of the River Glen fluvial defences.
- 9.2 The site is within Flood Zone 3b according to NPPF classification, with a medium to high risk of flooding due to the current standards of drainage and flood defence and land levels. The site is located within a Functional Flood Plain of any 'main river' or 'main drain' as defined in NPPF. The Environment Agency Flood Map for Planning has been produced irrespective of existing flood defences and standards of protection.
- 9.3 South Holland District Council and Boston Borough Council in conjunction with the Environment Agency and the local IDB's within the Councils area have carried out a Strategic Flood Risk Assessment of the whole District by appointed Consulting Engineers.

The South East Lines Strategic Flood Risk Assessment has produced more definitive Flood Risk Maps than those published by the Environment Agency and at the same time has analysed flood return periods of all tidal and fluvial defences for years 2002 and 2052 to account for the effects of climate change.

Breach scenarios of embankments failing and/or being overtopped have also been carried out to establish Flood Risk Zones.

- 9.4 Safe access and egress to the site is available via the existing access track to Sluice Road with a carriageway level of 6.60m aOD subject to receipt of a flood warning from the Environment Agency Floodline Service.

10.0 CONCLUSIONS AND RECOMMENDATIONS

- 10.1 As a result of the assessment, the following conclusions have been reached:-

- The proposed development is in a Functional Floodplain as defined by NPPF. It is located in a formal flood storage area only protected by defences up to a 1 in 5 year return period.
- The site is in Flood Zone 3b, with the actual risk of flooding from the River Glen system being medium to high.
- Although the site is located within an Internal Drainage District with a minimum standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. Freeboard to design water level of 900mm to lowest land level is available for events greater than 1 in 25 years providing further storage within the drainage channels.
- Floor levels will be raised 1.13 metre above existing ground level and 380mm above the 1 in 1000 year modelled flood level plus 20% climate change allowance with flood resistant measures incorporated into the design and construction of the proposed dwelling and all electricity installation 450mm above floor level..
- On site surface water drainage will be discharged to soakaway to BRE365 specification and Building Regulations approval.