

**FLOOD RISK ASSESSMENT
FOR
PROPOSED RESIDENTIAL DEVELOPMENT
OFF SUNNYDALE CLOSE,
SURFLEET, SPALDING, LINCS.**

REVISED FINAL REPORT

GEOFF BEEL CONSULTANCY

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GCB/STATUS DESIGN

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1.0 INTRODUCTION

- 1.1 A full planning application is to be submitted by Status Design on behalf of M Parker & Sons Ltd for proposed residential development at land off Sunnydale Close, Surfleet, Spalding, Lincs.
- 1.2 Planning approval requires a Flood Risk Assessment to accompany the application to meet the requirements and general principles contained in Paragraph 9 of the Technical Guidance of the National Planning Policy Framework (NPPF) and for approval by the Environment Agency.

The site is shown within Flood Zone 3 of the Environment Agency's Flood Zone Map. 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 flooded area of the South Holland District 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 1st September 2014 to undertake a Flood Risk Assessment.
- 1.4 The Environment Agency have provided a Preliminary Opinion of the development proposal by way of letter dated 12th December, file ref. AN/2014/120736

2.0 LOCATION

- 2.1 The development site is at land off Sunnydale Close Surfleet, Spalding. The National Grid Reference of the central point of the site is TF 252502790.
- 2.2 The position and extent of the site are shown on Fig 1 – Site Plan as Existing 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 3 as detailed on both the Environment Agency Flood Zone Maps and the Council's Strategic Flood Risk Assessment Map.

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is agricultural land.
- 3.2 The area of development is approximately 2.10 hectares.
- 3.3 The proposed site layout consists the construction of some 20 dwellings off a shared access by way of an extension to Sunnydale Close.

- 3.4 The Sequential Test and Exception Test will require to be applied by the Local Planning Authority 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.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

- 4.1 The site is located at land off Sunnydale Close with existing land levels varying between 3.10m and 4.70m aOD. The site is also located some 200m south of the River Glen.
- 4.2 The Surfleet Sluice Gate some 3.00kms downstream of the site with the adjoining flood embankments offers protection against the tidal flood event of the River Welland and the River Glen. The existing 1 in 200 year modelled flood event of the River Welland is 5.99m aOD whilst the 1 in 100 year estimated flood level of the River Glen inclusive of climate change is 5.06m aOD.
- 4.3 The site is located within the Welland and Deepings Internal Drainage Board district with the nearest 'main drain' open watercourse on the western boundary of the site. Land levels at the site vary between 3.10m and 4.70m aOD.
- 4.4 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.
- 4.5 The surrounding land south of the River Glen drains to the Woods Lane Drain and hence to the Blue Gowt Outfall which discharges into the River Glen some 3.00kms downstream of the development site.
- 4.6 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 Board's 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.
- 4.7 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 Four potential sources of flooding have been identified as a result of this assessment:

- a) local blockages to IDB main drain system
- b) storm return period of 1 in 50 years being exceeded
- c) failure of Surfleet Sluice
- d) overtopping and breaching of the River Glen and River Welland defences

5.2 The probability of flooding from source a) is low due to the maintenance standards already achieved and managed by the IDB.

The probability of flooding from b) is also low due to the Welland & Deepings IDB main drain design standard incorporating a minimum 900mm freeboard to the lowest land level which provides adequate storage in events greater than 1 in 50 years.

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.

5.4 The possible overtopping and breaching of the fluvial River Glen and tidal River Welland flood defences which may affect the site under extreme conditions is considered to be low. The present standards of defence of 1 in 100 years and 1 in 200 years respectively 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 as shown on the South Holland Strategic Flood Risk Assessment and a precautionary approach should be adopted as regards proposed floor levels.

5.5 The South Holland Strategic Flood Risk Assessment shows the site to be affected by floodwaters of between 0.00 and 0.50m as a result of a breach to existing defences.

It is therefore recommended that proposed floor levels of the development should be 900mm above lowest existing ground levels at a minimum of 4.00m aOD. Flood resistant/resilient measures will also be incorporated into the design and construction of the dwellings up to 300mm above finished floor level. Safe refuge will be provided in the roof space of the single storey dwellings with escape windows in the roofs.

- 5.6 The developer will ensure that the eventual occupiers of the properties 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: 0845 988 1188.

All occupiers of the new dwellings should register with the Floodline Warnings Direct Services to receive any future flood warnings.

- 5.7 A flood warning and evacuation plan will be prepared for the development in discussion with the South Holland District Council emergency planners.

6.0 EXTENT OF KNOWN FLOODING

- 6.1 During the preparation of this assessment, no evidence was discovered of the site and adjoining properties being flooded.

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 levels 900mm above lowest existing ground level at a minimum of 4.00m aOD with safe refuge in the roof space of the single storey dwellings with escape windows.
- 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 of the River Glen.
- 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 900mm above lowest existing ground level at a minimum of 4.00m aOD and with flood resilient construction 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 900mm above lowest existing ground levels at a minimum of 4.00m aoD 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.
- 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.

9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme events is low on this site, because of its location with protection from both the River Glen fluvial and River Welland tidal defences.
- 9.2 The site is within Flood Zone 3 according to NPPF classification but with a low risk of flooding due to the current standards of drainage and flood defence and land levels. The site is not located within a Functional Flood Plain of any 'main river' or 'main drain'. The Environment Agency Flood Zone Maps have been produced irrespective of existing flood defences and standards of protection.
- 9.3 South Holland District Council in conjunction with the Environment Agency and the local IDB's within the Council area have carried out a Strategic Flood Risk Assessment of the whole District by appointed Consulting Engineers.

The 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 Sunnydale Close onto the B1356 road in a northerly direction to land in Flood Zone 1.
- 9.5 Safe refuge is provided at first floor level of all the new single storey dwellings with boarded loft space and escape windows as a minimum.

10.0 CONCLUSIONS AND RECOMMENDATIONS

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

- The proposed development is not in a Functional Floodplain. It is located in the Passive Floodplain of the River Welland and River Glen defences as well as the Welland & Deepings IDB.
- The site is in Flood Zone 3, with the actual risk of flooding from the River Glen system being low.
- 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 50 years providing further storage within the drainage channels.
- Floor levels will be raised 900mm above lowest existing ground level at a minimum of 4.00m aOD and flood resistant measures incorporated into the design and construction of the proposed dwellings 300mm above finished floor level. Safe refuge will be provided in the roof space of the single storey dwellings.
- On site surface water drainage will be discharged to soakaway to BRE365 specification and Building Regulations approval.
- Land Drainage Byelaw Consent will be required from the Welland & Deepings IDB for all works within 9.00m of the Woods Lane Drain. A permanent 9.00m access width alongside the Woods Lane Drain will be required.
- Anglian Water Byelaw will also apply to the existing foul sewer rising main alongside the Woods Lane Drain.
- A flood warning and evacuation plan will be prepared for the development in discussion with the South Holland emergency planners.