

**FLOOD RISK ASSESSMENT
FOR PROPOSED
RESIDENTIAL DEVELOPMENT AT
BACKGATE, COWBIT, LINCS.**

FINAL REPORT

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GCB/ASHLEY KING

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1.0 INTRODUCTION

- 1.1 A full planning application is to be submitted by Savills on behalf of Ashley King Developments Ltd for proposed residential development at land off Backgate, Cowbit, 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 2 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 Flood Zone 1 as a result of a breach to existing defences of the South Holland District Council's Strategic Flood Risk Assessment Map and located in the South Holland Internal Drainage Board district.

- 1.3 Geoff Beel Consultancy was appointed on 13th June 2011 to undertake a Flood Risk Assessment.

2.0 LOCATION

- 2.1 The development site is at land off Backgate, Cowbit, Spalding. The National Grid Reference of the central point of the site is TF 26501785.
- 2.2 The position and extent of the site are shown on Fig 1 – Location Plan and Fig 2 – Proposed Site Layout Plan at the end of the document.
- 2.3 The site, located within the South Holland Internal Drainage Board district is shown within Flood Zone 2 as detailed on the Environment Agency Flood Zone Maps and in Flood Zone 1 as a result of a breach to existing defences of 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 1.68 hectares.
- 3.3 The proposed site layout consists the construction of some 37 two-storey dwellings with garages and parking off a cul-de-sac from Backgate, Cowbit.

- 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 is protected against the 1 in 100 year fluvial event by a combination of defences, pumping stations and sluice gates meeting the requirements of NPPF.

The site is shown in Flood Zone 1 of the Council's Strategic Flood Risk Assessment and the Sequential Test is met.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

- 4.1 The site is located within the South Holland Internal Drainage Board district with the nearest 'main drain' open watercourse, Mil Dyke on the northern boundary of the site. Land levels are generally at 2.50m aOD.
- 4.2 The existing standard of drainage for the South Holland 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 1.00m is provided to the lowest land levels.
- 4.3 The site and surrounding land drains to the Mill Dyke on the northern boundary of the site which eventually discharges via Wisemans Pumping Station to the South Holland Main Drain.
- 4.4 Current maintenance standards within the South Holland 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.

- 4.5 The fluvial Coronation Channel is located approximately 4.00kms north of the site with a standard of protection of 1 in 100 years return period. The Coronation Channel is the flood bypass channel of the River Welland which with the Crowland and Cowbit Washes situated upstream offer an integrated protection to Spalding and the surrounding district.
- 4.6 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 Five potential sources of flooding have been identified as a result of this assessment:

- a) local blockages to existing IDB main drain system.
- b) storm return period of 1 in 50 years being exceeded
- c) failure of Wisemans Pumping Station
- d) overtopping and breaching of the fluvial Coronation Channel defences
- e) overtopping and breaching of the Cowbit Bank 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 South Holland 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.

Meetings have been held with officers of the South Holland IDB and an initial approach of the development proposals considered by the Board meeting on 2nd August 2011 - see Fig 7 of this Flood Risk Assessment

5.3 Failure of Wisemans Pumping Station 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 Internal Drainage Board 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 1968 and 1978, estimated to be greater than 1 in 100 year events, caused no flooding to any residential properties at the time and the Boards policy is to provide a standard of drainage which satisfies NPPF requirements of a 1 in 100 year return period for fluvial protection inclusive of the effects of climate change and development. The Boards policy regarding the connection of future developments to the arterial system enables a flexible approach to be adopted and meet the criteria for “sustainable urban drainage”.

The probability of the site flooding from this potential source is also considered to be low.

5.4 The possible overtopping and breaching of the fluvial River Welland Coronation Channel flood defences which may affect the site under extreme conditions is also considered to be very low. The present standard of defence of 1 in 100 years would most probably have to be exceeded to create such conditions. If a breach, however, did occur, the Council’s Strategic Flood Risk Assessment shows that floodwaters would not affect the development site.

- 5.5 The Coronation Channel earth embankment has a minimum crest level of 6.00m aOD which links with upstream defences to the River Welland of vertical steel sheet piling and concrete capping beam. The Cowbit Road bank along the development site frontage has a crest level of 5.50m aOD.

The embankments of the Coronation Channel were constructed in the 1950's to convey river flows around Spalding. The embankments offer a standard of protection against the 1 in 100 year modelled peak flow water level of 4.68m aOD inclusive of climate change during the next 100 years compared with embankment levels of 6.00m aOD offering a minimum of 1.32 metre freeboard.

- 5.6 a) The fluvial flood levels for the River Welland at Little London Bridge are as follows:

	Present	Present + Climate Change
1%	4.39m	4.68m
0.1%	4.40m	4.68m

Existing Cowbit Road level is 5.50m aOD to provide 3.00m of protection to the development site. Overtopping of the existing defence of floodwaters is therefore a very low risk.

The Council's Strategic Flood Risk Assessment shows residual flood depths of between 0.00m – 0.50m and proposed floor levels of the new dwellings should be raised 300mm above existing ground level

- 5.7 The developer should ensure that the occupiers of the new dwellings are sufficiently aware of the risk of flooding, and the standard of defence. 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 broadcast via local radio and also by television.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hours a day Floodline Service providing advice and information on flooding contacting 0845 988 1188

6.0 EXTENT OF KNOWN FLOODING

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

7.0 PROBABILITIES AND TRENDS OF FLOODING

- 7.1 The probability of this development flooding from localised drainage systems is very low.

As a result of the negotiations with the South Holland IDB a comprehensive surface water drainage scheme has been designed by RSK Ltd with the agreement of the Board's officers such that future run-off from the site will be attenuated before discharging to the existing culverted section of the Mill Dyke at the proposed site entrance.

- 7.2 The probability of the site flooding with water from any South Holland IDB drain 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.
- 7.3 If under very extreme events, levels of floodwater from any Environment Agency or South Holland IDB drain 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 raising of the dwellings 300mm above existing ground 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.
- 8.2 Surface water drainage will be discharged via a comprehensive drainage scheme designed to South Holland IDB 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 South Holland IDB river and drain systems, then probably 2 to 3 days warning time would be available.
- 8.4 No displacement of water from the site will affect any adjoining properties and agricultural land.
- 8.5 Safe access and egress to and from the site will be available via Backgate, Cowbit in a southerly direction where land is located in Flood Zone 1.

9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme events is very low on this site, because of its location, within a pumped sub-catchment of the South Holland IDB area and its location 4.00kms from the Coronation Channel fluvial defences consisting of earth embankments to the 1 in 100 year standard of protection.

- 9.2 Although within Flood Zone 2 according to NPPF classification, the site actually has a very 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.

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 protected by River Welland and South Holland IDB defences to a 1 in 100 year return period.
- Although the site is in Flood Zone 2, the actual risk of the site flooding from any Environment Agency river system is very low with existing defences of the River Welland, Cowbit Washes and the Coronation Channel.
- 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 of the new dwellings will be raised 300mm above existing ground levels.
- On site surface water run-off will be discharged via a comprehensive drainage scheme to South Holland IDB and Building Regulations approval.