FLOOD RISK ASSESSMENT
FOR PROPOSED
RESIDENTIAL DEVELOPMENT
OFF COWBIT ROAD, SPALDING, LINCS

FINAL REPORT

GEOFF BEEL CONSULTANCY

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GCB/WRIGHT

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CONTENTS

1.0 INTRODUCTION

2.0 LOCATION

3.0 THE SITE AND SEQUENTIAL TEST

4.0 EXISTING FLOOD ALLEVIATION MEASURES

5.0 POTENTIAL SOURCE OF FLOODING

6.0 EXTENT OF KNOWN FLOODING

7.0 PROBABILITIES AND TRENDS OF FLOODING

8.0 IMPACTS OF FLOODING

9.0 RESIDUAL RISKS – EXTREME EVENTS

10.0 CONCLUSIONS AND RECOMMENDATIONS

Fig 1 - Location Plan –
Andrew M Wright drg. no. 031705.PD01 Rev D2

Fig 2 - Topographical Survey – ACE Surveys drg. no. ACE/CR/02

Fig 3 - Environment Agency Flood Map for Planning

Fig 4 - South Holland District Council Updated Strategic Flood Risk Assessment Residual Flood Depths – 2116

Fig 5 - South Holland IDB District Plan

Fig 6 - Surface Water Drainage Strategy –
Sidebottom Richardson Cheng Ltd

1.0 INTRODUCTION

1.1 An outline planning application is to be submitted by Andrew M Wright Ltd on behalf of the Executors of the estate of the late Horace Andrew for proposed residential development at land off Cowbit Road, 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 3 of the Environment Agency's Flood Map for Planning. The latest Flood 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 existing flood defences.

The site is also shown partly within Flood Zones 1, 2 and 3 of the South Holland District Council's Updated Strategic Flood Risk Assessment Map and located in the South Holland Internal Drainage Board district.

1.3 Geoff Beel Consultancy was appointed on 18th May 2017 to undertake a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is at land off Cowbit Road, Spalding. The National Grid Reference of the central point of the site is TF 24602155.

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 South Holland Internal Drainage Board district is shown within Flood Zone 3 as detailed on the Environment Agency Flood Map for Planning and partly in Flood Zones 1, 2 and 3 of the Council's Updated Strategic Flood Risk Assessment Map.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is land at the rear of existing residential development and including 50 Cowbit Road, Spalding.

3.2 The area of development is approximately 1.38 hectare. Land levels vary between 4.30m and 2.30m aOD. Cowbit Road carriageway is at 5.50 m aOD.

3.3 The proposed site layout consists the construction of 26 two storey dwellings with access off Cowbit Road after demolition of the existing buildings.

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. Mitigation measures have been incorporated into the design and construction of the new dwellings.

Much of the site is in Flood Zone 1 and hence 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, Exeter Drain South some 400m east of the site.

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 in a southerly direction to eventually discharge via Wiseman's Pumping Station to the South Holland Main Drain system some 7.00kms south-east of the site.

4.4 The Coronation Channel and the Crowland and Cowbit Washes form part of the comprehensive system of river defences to Spalding acting as a flood relief channel and flood storage reservoir before discharging to the tidal River Welland.

4.5 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.

4.6 The fluvial Coronation Channel is located approximately 250m north of the site with a standard of protection of 1 in 100 years return period. The Coronation Chanel is the flood bypass channel of the River Welland which with the Crowland and Cowbit Washes situated upstream and 150m west of the site offer an integrated protection to Spalding and the surrounding district.

4.7 Maintenance standards of the Environment Agency's main rivers and defences are very good and regularly inspected for their asset condition. The Crowland and Cowbit Bank is nowadays a designated structure within the terms of the Reservoirs Act 1975 and inspected annually to ensure its safety to protect people and property.

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 existing IDB main drain system.
b) storm return period of 1 in 50 years being exceeded
c) failure of Wiseman's Pumping Station
d) overtopping and breaching of the fluvial 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 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.

5.3 Failure of Wiseman's 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. A surface water drainage strategy will be required to satisfy Lincolnshire County Council as the Lead Local Flood Authority.

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, 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 Coronation Channel earth embankment has a minimum crest level of 6.00m aOD which link with upstream defences to the River Welland of vertical steel sheet piling and concrete capping beam.The Crowland and Cowbit Washes Cradge Bank upstream of the Coronation Channel at Cowbit Road has a minimum crest level of 5.00m 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 4.80m aOD inclusive of climate change during the next 100 years compared with embankment levels of 6.00m aOD offering a minimum of 1.00 metre freeboard.

The South Holland Updated Strategic Flood Risk Assessment (2016) has carried out breach analysis of the combined effect of the 1 in 100 year fluvial and 1 in 200 year tidal events inclusive of climate change up to 2116.

The site is partly identified as being liable to flooding if a breach of the River Welland defences occurred up to a depth of between 0.25m – 1.00m. Finished floor levels will be raised 500mm above existing land levels at a minimum of 3.00m aOD with flood resilient construction up to 300mm above finished floor level.

Floodwaters would be partly dispersed into the IDB's main drain system via the Wells Drain flowing southwards to the Board's Wisemans Pumping Station.

5.6 The proposed development is for 26 two storey residential dwellings. It is therefore recommended that flood resilient measures should be incorporated into the new dwellings wherever practicable to safeguard against the remote possibility of a breach or overtopping of the River Welland defences.

5.7 The applicant should ensure that the eventual occupiers of the dwellings are sufficiently aware of the risk of flooding, and the standard of defence of the adjoining watercourse. 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 0345 988 1188 and the occupiers of all new dwellings should register with the Floodline Warnings Direct Service.

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. It is also intended to construct floor levels of the dwellings 500mm above ground level at a minimum of 3.00m aOD with flood resistant/resilient measures incorporated up to 300mm above finished floor levels.

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 flood resilient measures incorporated wherever practicable 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 Floor levels of the residential development will be 500mm above ground level at a minimum of 3.00m aOD with flood resilient construction up to 300mm above finished floor level offering additional protection against impacts arising from any extreme short duration, localised events. Surface water drainage from the dwellings will be discharged to soakaways with highways drainage via infiltration trenches to a detention pond and hence to a riparian drain all for approval by the Lead Local Flood Authority.

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 in a northerly direction to Spalding town centre where land is 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 250m from the Coronation Channel and 150m from the Cowbit Bank fluvial defences consisting of earth embankments to the 1 in 100 year standard of protection.

9.2 The site is partly within Flood Zones 1, 2 and 3 according to NPPF classification with 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 Map for Planning has been produced without taking into account 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 an Updated Strategic Flood Risk Assessment of the whole District by appointed Consulting Engineers.

The Updated Strategic Flood Risk Assessment has produced more definitive Flood Risk Maps similar to those published by the Environment Agency and at the same time has analysed flood return periods of all tidal and fluvial defences up to 2116 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 located in the Passive Floodplain protected by River Welland defences to a 1 in 100 year return period.
- The site is partly in Flood Zones 1, 2 and 3 with the risk of flooding from any Environment Agency river system being very 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 of the dwellings will be 500mm above ground level at a minimum of 3.00m aOD with flood resistant/resilient measures incorporated into the design and construction of the development up to 300mm above finished floor levels.
- On site surface water drainage from the dwellings will be discharged to soakaways with highways drainage via infiltration trenches to a detention pond and hence to a riparian drain all for approval by the Lead Local Flood Authority.