FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT AT 163-183 HIGH ROAD, WESTON, SPALDING, LINCS.

REVISED FINAL REPORT

GEOFF BEEL CONSULTANCY

SEPTEMBER 2018

GCB/STATUS DESIGN

DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment in support of a planning application for proposed Residential Development at land between 163-183 High Road, Weston, Spalding. Lincolnshire. "Geoff Beel Consultancy" accepts no responsibility or liability whatsoever for any use made of this document other than by the clients" Mr & Mrs Biehler" for the purposes it was originally commissioned and prepared. All comments and opinions made are based upon information available to "Geoff Beel Consultancy" during the necessary investigative process, and the conclusions and recommendations could therefore, differ in the event of material subsequently being found erroneous, incomplete or misleading. "Geoff Beel Consultancy" therefore, accepts no liability should this prove to be the case.

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 – Promap 1:2500

Fig 2 - Indicative Site Layout –
Status Design drg. no. SD17-044/1

Fig 3 - Environment Agency Flood Map for Planning

Fig 4 - South East Lincolnshire Strategic Flood Risk Assessment
Residual Hazard Map (2115)

Fig 5 - South East Lincolnshire Strategic Flood Risk Assessment
Residual Flood Depth Map (2115)

Fig 6 - South Holland Internal Drainage Board district plan

Fig 7 - Surface Water Drainage Strategy –
Sidebottom, Richardson, Cheng Ltd

1.0 INTRODUCTION

1.1 An outline planning application is to be submitted by Status Design on behalf of Mr & Mrs R Biehler for proposed residential development at land between 163-183 High Road, Weston, Spalding, Lincs.

1.2 A Flood Risk Assessment is required to accompany the planning application and meet the requirements and general principles contained in the Planning Practice Guidance to the National Planning Policy Framework (NPPF).

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

The site however is also shown partly in Flood Zone 1 and partly in a "Danger for Some" Hazard Zone of the South East Lincolnshire Strategic Flood Risk Assessment (2017).

The site is also located in the South Holland IDB drainage district.

1.3 Geoff Beel Consultancy was appointed on 11th July 2018 to undertake a Flood Risk Assessment.

1.4 The Environment Agency has objected to the proposed development by way of letter dated 20th August file ref: AN/2018/127813 for the following reason:

- The FRA refers to the hazard mapping within the South East Lincolnshire Strategic Flood Risk Assessment but the area is covered by the Environment Agency Tidal Hazard Mapping as shown on the Fluvial and Tidal Source Map.

The Environment Agency hazard mapping shows depths of up to 1.00m on the site in the 0.5% (1 in 200) and 0.1% (1 in 1000) plus climate change scenarios. Finished floor levels must be set 1.00m above ground level with flood resilient construction to a height of 300mm above the predicted flood depth.

This Revised FRA addresses the above issue.

2.0 LOCATION

2.1 The development site is located at land between 163-183 High Road, Weston. The National Grid Reference of the central point of the development is TF 28652475.

2.2 The position and extent of the site is 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 but partly in a "Danger for Some" Residual Hazard Zone and partly in Flood Zone 1 of the Council's Strategic Flood Risk Assessment Maps (2017) as defended by the Agency's tidal defences and the Internal Drainage Board system.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently agricultural land between 163-183 High Road.

3.2 The area of development is approximately 2.88 hectare.

3.3 The proposed site layout consists the construction of 53 dwellings, 7 to be single storey bungalows, the remainder being 2 storey houses.

3.4 The Sequential Test is met as the site is located partly in a "Danger for Some" Residual Hazard Zone of the Council's Strategic Flood Risk Assessment Maps (2017) and protected against both the 1 in 100 year fluvial event and the 1 in 200 year tidal event.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

4.1 The site is within a defended floodplain, as defined in Appendix 1 of the Environment Agency's 'Policy for the Protection of Floodplains' and is considered to be passive until such time as a flood greater than that for which the defences were designed occurs. The likelihood of flooding due to overtopping or failure of a flood defence embankment is considered to be small.

The development site within the South Holland Internal Drainage Board is protected by the River Welland and Wash tidal defences to the Holbeach Marsh frontage with embankment levels of a minimum of 7.00m aOD.

4.2 The site and the surrounding land drains by gravity to nearby IDB main drain north of the site and hence via other drains in the Lords Drain catchment to discharge into the tidal River Welland at the Lords Drain Outfall & Pumping Station.

4.3 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 900mm is provided to the lowest land levels.

4.4 Current maintenance standards within the South Holland Internal Drainage Board and of the Environment Agency defences 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.

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 Lords Drain Pumping Station
d) overtopping and breaching of the Wash 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 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.

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 developments to the arterial system enables a flexible approach to be adopted and meet the criteria for "sustainable urban drainage".

5.3 Failure of Lords Drain 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.

5.4 The flood embankments to the Wash and River Welland defences provide a 1 in 200 year return period level of protection.

The 1 in 200 year tidal event to the tidal River Welland and the Holbeach Marsh frontage inclusive of climate change to 2116 is estimated to be 7.20m aOD as against existing embankment levels of a minimum of 7.00m aOD.

There is a low risk during such an event for wave and wind action to cause overtopping and/or breaching of the first line defences. However, the site is further protected by second line defences with embankment levels of 6.00m aOD. Any overtopping/breaching would only therefore reach part of the development site to a depth of no greater than 0.50m as shown on the South East Lincolnshire Strategic Flood Risk Assessment Residual Flood Depth Maps (2017).

However, the Environment Agency hazard mapping shows depths of up to 1.00m on the site and hence finished floor levels have been raised 1.00m above ground levels to satisfy the Environment Agency objection.

Similarly, the River Welland and Crowland Cowbit Washes are located 3.00kms south west of the site and provide protection against the 1 in 100 year plus climate change fluvial flood event.

5.5 Finished floor level of all the development has been raised 1.00m above existing ground level for a consistent approach across the site.

Flood resilient construction will be incorporated up to a minimum level of 300mm above finished floor level with sleeping accommodation at ground floor level and safe refuge in the roof space of the bungalows whilst at first floor level in the proposed houses.

5.6 The Environment Agency has recently published The Wash Shoreline Management Plan 2 from Gibraltar Point to Old Hunstanton. The summary of the plan between Gibraltar Point and Wolferton Creek is as follows:-

The intent of management for this Policy Development Zone (PDZ) is to sustain flood defence for the communities and their hinterland on the low-lying areas around The Wash. This includes an increase of management as needed to sustain the current level of flood risk in the face of climate change.

5.7 Surface water drainage from the residential development will be to soakaways designed to BRE365 requirements and Building Regulations approval.

Surface water drainage from the proposed highways will be to the two improved lengths of riparian drain to the northern boundary of the site at a restricted discharge for subsequent responsibility by the South Holland IDB.

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.

7.2 The probability of the site flooding with water from any South Holland IDB main drain 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.

7.3 The probability of the site flooding with tidal waters from any main river system is less than 1% because of the standards of the existing flood defences and the location of the site.

7.4 If under very extreme events, levels of floodwater from the South Holland IDB main drains 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.

7.5 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 proposed floor levels at 1.00m above existing ground level with a further 300mm of flood resilient constriction above finished floor 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 Floor levels of the development will be 1.00m above existing ground level, which together with the flood resilient construction and proposed soakaway drainage and highway drainage system will offer additional protection against impacts arising from any extreme short duration, localised events.

8.3 The general location of the site within the catchment is such that if flooding occurred from any of the South Holland IDB main 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 as soakaway drainage to BRE365 design requirements will be installed for the proposed dwellings and a restricted discharge to the improved lengths of riparian drain from the proposed highways for future responsibility of the South Holland IDB.

8.5 The developer should ensure that the eventual occupiers of the dwellings 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 and the occupiers of the new dwellings should register with the Floodline Direct Warnings Service to receive future flood warnings.

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 the South Holland IDB area and its location 2.50kms from the River Welland tidal defences with secondary defences between the defences and the site. Also being 3.00kms from the River Welland fluvial defences and the Crowland & Cowbit Washes.

9.2 The site is partly within Flood Zone 1 of the Council's SFRA Maps as a result of existing defences 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 Map for Planning has been produced irrespective of existing flood defences and standards of protection.

9.3 South Holland District Council in conjunction with Boston Borough Council, the Environment Agency and the local IDB's within the Council's area have carried out a Strategic Flood Risk Assessment (2017) by appointed Consulting Engineers.

The South East Lincolnshire Strategic Flood Risk Assessment (2017) 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 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. As a result of the Strategic Flood Risk Assessment (2017) the site is partly within a "Danger for Some" Hazard Zone and partly within Residual Flood Depths in year 2115 as defended by tidal defences and tidal doors.

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 Defended Floodplain. It is located in the Passive Floodplain of The Wash defences and tidal and fluvial River Welland defences and the South Holland IDB protected by defences to both the 1 in 100 year and 1 in 200 year return period events.

- The site is partly in Flood Zone 1 as protected by existing defences the actual risk of site flooding from any Environment Agency river system is very low (less than 0.5%).

- 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.

- On site rainwater from the development will be discharged from the dwellings via soakaways to BRE 365 design requirements and to the improved riparian drain on the northern boundary from the proposed highways.

- Floor level of the new dwellings will be 1.00m above existing ground level with safe refuge in the roof space of the bungalows and sleeping accommodation at first floor level of the houses. Flood resilient construction will be incorporated up to 300mm above finished floor level of all dwellings.