# FLOOD RISK ASSESSMENT
# FOR PROPOSED
# RESIDENTIAL DEVELOPMENT
# AT COMMON WAY, TYDD ST MARY, LINCS.

**FINAL REPORT**

**GEOFF BEEL CONSULTANCY**

**FEBRUARY 2016**

**GCB/HOLT ARCHITECTURAL**

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## 1.0 INTRODUCTION

1.1 A full planning application is to be submitted by Holt Architectural Ltd on behalf of Mr P Woods for proposed residential development at land adjacent to Tysdale Farm, Tydd St. Mary, Lincs.

1.2 Planning approval requires a Flood Risk Assessment to accompany the planning application and be submitted to the Environment Agency to meet the requirements and general principles contained in the Planning Practice Guidance to the National Planning Policy Framework (NPPF) and be submitted to the Environment Agency for approval.

The site is partly within defended Flood Zones 2 and 3 of the Environment Agency's Flood Map. The likely source of flooding is from the South Holland Main Drain which is under the jurisdiction of the South Holland IDB.

The Agency's latest Flood Zone Maps have been created as a tool to raise aware ness of flood risk with the public and partner organisations such as Local Authorities, Emergency Services and Drainage Authorities. The Maps take into account existing flood defences.

The site is also shown located in a defended Flood Zone 1 of the South Holland District Council's Strategic Flood Risk Assessment Flood Zone Maps but floodwaters on the Residual Depth Map of the SHDC SFRA,

1.3 Geoff Beel Consultancy was appointed on 6th January 2016 to prepare a Flood Risk Assessment.

## 2.0 LOCATION

2.1 The development site is located immediately north of Common Way, Tydd St. Mary and 3.00 kms west of the tidal River Nene. The National Grid Reference of the site is TF 44401865.

2.2 The position and extent of the site are shown on Fig 1 – Location and Existing Site Plan and Fig 2 – Proposed Site Plan at the end of the document.

2.3 The site is located within the South Holland Internal Drainage Board district and is shown within a defended Flood Zones 2 and 3 as detailed on the Environment Agency Flood Zone Maps.

## 3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently part of an agricultural holding.

3.2 The area of development is approximately 0.12 hectare.

3.3 The proposed site layout consists the construction of a detached two storey dwelling with attached workshop, cart shed and storage facilities.

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 200 year return period tidal event as well as the 1 in 100 year return period fluvial event meeting the requirements of NPPF.

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

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 and Practice 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.

4.2 The site is located in the South Holland Drainage Board area, the nearest main drain is located immediately east of the site and drains in a northerly direction to the South Holland Main Drain.

4.3 The existing standard of drainage for the South Holland Internal Drainage Board district is 1 in 50 years return period, compatible with the Department of Environment, Food and Rural Affairs target level of service for rural urban drainage and flood defence works. The South Holland Main drain discharges to the tidal River Nene at the Sutton Bridge Outfall Sluice.

4.4 Tidal flood protection from the River Nene between Wisbech and Sutton Bridge is estimated to be a 1 in 200 years return period. The Environment Agency has recently carried out the River Nene Tidal Strategic Study, which covers the tidal River Nene from the Dog in a Doublet Sluice near Peterborough to its outfall in the Wash at Nene Lighthouses, a distance of some 39.5km.

4.5 The Strategic Study concluded that improvement works were cost effective to meet Department of the Environment, Food and Rural Affairs guidelines in order to sustain the existing tidal defences over the 50 year appraisal period up to a 1 in 200 year standard.

4.6 Current maintenance standards of the Environment Agency for tidal defences; and the North Level Internal Drainage Board for surface water and land drainage are considered to be very good.

During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board seek 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 existing IDB main drains
b) storm return period of 1 in 50 years being exceeded
c) failure of Sutton Bridge Outfall Sluice
d) overtopping and breaching of the River Nene and the North Level Main Drain outfall tidal defences

5.2 The probability of flooding from source a) is low due to the maintenance standards already achieved and managed by the South Holland IDB for the Board's main drains.

The probability of flooding from source b) is also low due to the South Holland 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.

There are many hectares of agricultural land that would flood in such circumstances before the development site was put at risk.

5.3 Failure of the Sutton Bridge Outfall Sluice may occur due to mechanical breakdown or electrical failure. 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 existing tidal defences between Wisbech and Sutton Bridge consist generally of strengthened and heightened earth embankments with a riverside berm. Crest levels are at 7.00m aOD. The highest recorded tidal surge level reached 5.60m aOD at Wisbech on 11th January 1978 when extensive areas of the town were flooded. The more recent tidal surge event of 5th December 2013 reached a level of 6.10m aOD and the town and surrounding areas were protected by the improved defences.

The site is located 3.00 kms west of the River Nene tidal defences which were raised and strengthened after the 1978 surge event.

More recent studies by the Environment Agency have concluded a design water level for the 1 in 200 year tidal event between Sutton Bridge and Wisbech to be below existing tidal defence crest level with sufficient freeboard to take into account sea level rise during the next 100 years.

5.5 The updated version of the South Holland district Council Strategic Flood Risk Assessment shows the extent and depths of floodwaters as a result of a breach to the River Nene tidal defences in 2115 – See Fig 7 of this report. The site is shown affected by floodwaters of between 0.00 – 0.50m.

Finished floor levels of the development should be raised 500mm above existing ground level with flood resilient construction up to 300mm above finished floor level.

5.6 The developer should 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 contacting 0845 988 1188 and the occupiers of the dwelling should register with the Floodline Direct Warnings Service to receive any future flood warnings.

## 6.0 EXTENT OF KNOWN FLOODING

6.1 During the preparation of this assessment, the site did not flood during the tidal surge event of February 1978 or December 2013 and since the 1978 date, the defences between Sutton Bridge and Wisbech have been raised to the 1 in 200 year standard.

The more recent tidal surge event of 5th December 2013 reached a level of 6.10m aOD on the River Nene at Wisbech and no flooding occurred as a result of the improved defences.

No flooding of this site has been experienced from the adjoining IDB main drains.

## 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 500mm above existing ground level.

7.2 The probability of the site flooding with water from the River Nene tidal river system is less than 0.5% because of the standards of the existing flood defences.

7.3 If under very extreme events, levels of floodwater from the South Holland Main drain or other IDB 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 floor levels at 500mm above existing ground level will be appropriate for the design life of the development (i.e. 100 years).

7.5 Safe access and egress from the site is available onto Common Way and hence in a westerly direction to Tydd St. Giles village where land is located in Flood Zone 1.

## 8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated.

8.2 Floor levels of the development will be 500mm above existing ground level offering 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 the IDB main drain or the River Nene tidal system sufficient warning time would be available.

8.4 No displacement of water from the site will affect any adjoining properties as the site will be provided with soakaway drainage to BRE 365 requirements and Building Regulations approval.

## 9.0 RESIDUAL RISK – EXTREME EVENTS

9.1 The residual risk from extreme events is very low on this site, because of its location, in the internal drainage system, existing levels of tidal and fluvial defences with proposed floor level compared to surrounding land and road levels.

9.2 Whilst the site is partly within Flood Zones 2 and 3 of the Council's Residual Depth Map for 2115 it is shown in Flood Zone 1 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 Zone maps have been produced irrespective of existing flood defences and standards of protection. The risk of flooding to adjoining properties in the vicinity is not increased in terms of probability by the proposed development.

9.3 In the extreme event of a serious pumping station failure occurring to the IDB main drain system, or the overtopping of tidal defences, protection will be afforded by the floor levels being above existing ground level.

## 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 existing tidal defences to a standard of 1 in 200 years and fluvial defences to standard of 1 in 100 years.

- The site is partly in Flood Zones 2 and 3 of the Council's Residual Depth Map for 2115 but shown in Flood Zone 1 according to NPPF classification with the actual risk of flooding from the tidal River Nene system being very low (less than 0.5%).