FLOOD RISK ASSESSMENT
FOR PROPOSED
CHANGE OF USE OF AN AGRICULTURAL BUILDING TO A DWELLINGHOUSE
AT HAELEN FELD FARM,
TWENTY PENCE ROAD, COTTENHAM, CAMBS.

FINAL REPORT

GEOFF BEEL CONSULTANCY

OCTOBER 2017

GCB/ACORUS

DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment in support of a planning application for proposed Recreational Development at Haelen Feld Farm, Twenty Pence Road, Cottenham, Cambs. "Geoff Beel Consultancy" accepts no responsibility or liability whatsoever for any use made of this document other than by the client [redacted] *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

1.0 INTRODUCTION

1.1 A planning application is to be resubmitted by Tibbett Architectural Services on behalf of [redacted] for proposed change of use of an agricultural building to a dwellinghouse (class C3) at Haelen Feld Farm,Twenty Pence Road, Cottenham, Cambs.

1.2 A Flood Risk Assessment is required to accompany the planning 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 situated within Flood Zone 1 with only the access to the new dwelling shown in Flood Zone 2 of the Environment Agency Flood Map for Planning. The latest Agency 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 take into account existing flood defences.

The site is also within the Old West Internal Drainage Board's area.

1.3 Geoff Beel Consultancy was appointed on 4th October 2017 to undertake a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is located at Haelen Feld Farm,Twenty Pence Road, Cottenham. The National Grid Reference of the site is TL 46756942.

2.2 The position and extent of the site are shown on Fig 1 - Location & Block Plan.

2.3 The site is located in Flood Zone 1 with only the access to the new dwelling shown in Flood Zone 2 of the River Ely Ouse and within the catchment area of the Old West Internal Drainage Board.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently part of the Haelen Feld Farm premises.

3.2 The area of development is approximately 0.50 hectare with vehicular access off the Twenty Pence Road.

3.3 The land adjacent to Haelen Feld Farm has historically been in agricultural use. It extends to approximately 3.20 hectares split into paddocks and a field area. There are a range of redundant agricultural buildings on the site. The proposal is to convert the existing central building to residential use retaining the other agricultural buildings for use with the surrounding land.

3.4 The development is for a single storey dwelling and access off the Twenty Pence Road.

3.5 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 return period fluvial event and in a defended flood zone. The Sequential Test is met as the site is located in Flood Zone 1.

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 within the catchment of the old West Internal Drainage Board with an existing Board's main drain Two Pole Dyke located 375m north east of the development. Land level at the site is generally at 3.80m aOD.

4.3 The existing standard f drainage for the Old West IDB is assessed at 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 provide to the lowest land levels.

4.4 The site and surrounding land drains by gravity to the Chear Fen Engine Pumping Station to discharge in to the Old West River and hence to the River Ely Ouse.

4.5 The Cottenham Lode, a designated 'main river' under the Water Resources Act 1991 and managed by the Environment Agency is a high level embanked watercourse located 300 m north west of Haelen Feld Farm offering protection against the 1 in 100 year return period event.

4.6 The Cottenham Lode, Old West River and the River Ely Ouse are embanked main rivers, the responsibility of the Environment Agency, with operating water levels controlled by the sluices and weirs of the Denver Complex, some 30.0kms downstream of the development.

4.7 The Environment Agency has commissioned in recent years the Ely Ouse Flood Defence Strategy; carried out by its Consulting Engineers. This Strategy included a hydraulic model of the River Ely Ouse system and the Old West River extending from Bottisham Lock on the River Cam downstream of Cambridge to the Wash downstream of Kings Lynn. As a result of this study, the River Ely Ouse flood defences have a minimum protection of 1 in 100 years return period against a fluvial event. There is a long term strategy for the maintenance of the defences which is reviewed and updated every 5 years. The main element of the strategy is the development of a programme for protecting the river banks from erosion.

The study also took into account the consequences of a combined tidal and fluvial event occurring at the Denver Complex. The probability of such extreme events occurring at the same time is negligible and would not affect the River Ely Ouse defences.

Likewise, the study analysed the impacts of climate change which the hydraulic model identified as a 250mm increase in sea level on fluvial flooding. This was found to have little effect on the 1 in 100 year fluvial flood event and well within the freeboard allowances of the River Ely Ouse defences.

4.8 Current maintenance standards of the Old West IDB main drains and the Environment Agency's flood embankments are generally 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 system
b) storm return period of 1 in 50 years being exceeded
c) failure of Chear Fen Engine Pumping Station
d) overtopping and breaching of the Cottenham Lode, Old West River and River Ely Ouse flood 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 Old West 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 Chear Fen Engine 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 Overtopping and breaching of the Cottenham Lode, Old West River and River Ely Ouse flood defences is also considered to be a low risk as a result of the River Ely Ouse Flood Defences Strategy which identified a minimum protection of 1 in 100 years allowing for climate change and the effect of a tidal event combining with a fluvial event.

5.5 The occupiers of the development should be sufficiently aware of the risk of flooding and the standard of the existing defences. The Environment Agency provides a Flood Warnings 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, event 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 hour a day Floodline Service providing advice and information on flooding contacting 0345 988 1188.

5.7 The standard of protection provided by the existing IDB main drain system gives a low risk of flooding due to high groundwater, overland flow and any surcharging of systems due to prolonged or intense rainfall.

6.0 EXTENT OF KNOWN FLOODING

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

7.0 PROBABILITIES AND TRENDS OF FLOODING

7.1 The probability of this development flooding from localised drainage systems is very low. The existing floor slab of the barn is approximately 100mm above adjacent ground level at 3.80m aOD. Part of the conversion works would be to lay a new damp proof membrane over the existing slab on top of which the floor insulation, screed and floor finishes would be laid. The build up of these finishes would be approximately 200mm giving a finished floor level of 4.1m above OD as required

The access route varies in level between 4.16m aOD at Twenty Pence Road to 3.80m aOD at the proposed dwelling site.

Therefore the Environment Agency Flood Map for Planning is misleading as it shows the Twenty Pence Road at a higher risk of flooding than the dwelling site whilst detailed site survey shows the opposite effect.

To clarify the position; the proposed access route will be raised with permeable surfacing to a minimum of 3.80m aOD which is the ground level identified in Flood Zone 1. Hence the access road and the dwelling as well as the junction with Twenty Pence Road are in Flood Zone 1.

7.2 The probability of the site flooding with water from any Environment Agency system is less than 1% because of the standards of the existing flood defence systems, storage within existing drainage channels and existing land level of the site.

7.3 If under very extreme events, levels of floodwater from the River Ely Ouse and the Old West IDB main drain 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 development above existing ground level will be appropriate for the design life of the development (i.e. 100 years). No adverse effect will be suffered at the site.

7.5 Safe access and egress is available in a southerly direction via the Twenty Pence Road and hence to Cottenham where land and facilities are in Flood Zone 1.

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated due to the existing standards of drainage provided by the Internal Drainage Board.

8.2 The development will be above existing ground levels shown to be all in Flood Zone 1.

8.3 The general location of the sites within the catchment is such that if flooding occurred from the River Ely Ouse and Old West IDB main drain systems, then probably sufficient warning time would be available.

8.4 Displacement of water from the site will not affect any adjoining properties and agricultural land due to the existing standard of drainage provided by the Internal Drainage Board.

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 catchment and the level of protection offered by the River Ely Ouse and the Old West IDB defences to surrounding land and road levels.

9.2 In the extreme event of a serious blockage or pumping station failure occurring to the arterial drainage system, protection will be afforded by the storage available within the IDB system and only affect existing agricultural land.

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 Cottenham Lode, the Old West River and River Ely Ouse.

- Although the site is located within an Internal Drainage Board catchment 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.

- Development will be at a minimum of 3.80m aOD to accord with Flood Zone 1 categorisation and finished floor level of the new dwelling raised 300mm above ground level at 4.10m aOD.