

**FLOOD RISK ASSESSMENT
FOR PROPOSED
RESIDENTIAL DEVELOPMENT
AT LODGE HALL, THREE HOLES, NORFOLK.**

FINAL REPORT

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GCB/COLLECTIVE COMMUNITY PLANNING

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1.0 INTRODUCTION

- 1.1 A full planning application is to be submitted by Collective Community Planning on behalf of Mr R Johnson for residential development at Lode Hall, Three Holes, Norfolk.
- 1.2 Planning approval requires a Flood Risk Assessment to accompany the planning application to meet the requirements and general principles of the Planning Guidance to the National Planning Policy Framework (NPPF) and for approval by the Environment Agency.

The site, as situated, is located within Flood Zone 1 of the Environment Agency's Flood Map for Planning with the access to the site being partly located in Flood Zone 3. 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 take into account any flood defences.

The site is also shown partly within fluvial Flood Zones 2 and 3 but outside any present day Hazard Zone of the Kings Lynn & West Norfolk Borough Council's Level 1 Strategic Flood Risk Assessment Maps (2018) and is located in the Upwell Internal Drainage Board area.

- 1.3 Geoff Beel Consultancy was appointed on 17th January 2023 to undertake a Flood Risk Assessment.
- 1.4 A previous planning application 13/01246/FM for 20 holiday homes at the site was approved by the Kings Lynn & West Norfolk Borough Council on 18th November 2013.

2.0 LOCATION

- 2.1 The development site is located on the south side of Silt Road at Lode Hall Three Holes. The National Grid Reference of the central point of the site is TF 52379893.
- 2.2 The position and extent of the site are shown on Figs 1 and 2 – Location Plans at the end of the document.
- 2.3 The site, located within the Upwell IDB district is shown in Flood Zone 1 of the Environment Agency Flood Map for Planning and partly in Flood Zones 2 & 3 but outside any present day Hazard Zone of the Council's Level 1 Strategic Flood Risk Assessment Maps (2018).

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site consists an existing holiday park with 7 homes already implemented of the approved 20 holiday homes.
- 3.2 The area of development is approximately 1.50 hectare with access to Silt Road and existing buffer area between the layout of the holiday park and the Fen Causeway Roman Road.
- 3.3 The proposed development consists a revised layout of the holiday park to accommodate 35 holiday homes with wardens accommodation as per the layout of Fig. 2.
- 3.4 The site is within the village residential area of Three Holes as designated by the Borough Council of Kings Lynn & West Norfolk and requires application of the Sequential Test and Exception Test of NPPF.
- 3.5 **Sequential Test.**

Initially it is required that other sites for development must be considered in the area that may offer a reduced flood risk, however, it is noted that no sites within a 5.0km radius of the River Great Ouse defences were outside the Zone 3 category Sequential Test was therefore passed.

However to ensure compliance these further consideration has been applied as under the requirements of NPPF. From the Environment Agency Flood Map for Planning it shows the site in Flood Zone 1 and partly in Flood Zones 2 & 3 of the BCKLWN SFRA maps and protected to 1 in 100 years for fluvial events and 1 in 200 years for tidal events; the area as it is protected to this degree can be considered to be a passive flood plain. The development therefore complies with the Appropriate Uses required in the table but is required to pass the Exception Test.

The Sequential Test is further met as planning approval of the site is already in place and is located in Flood Zone 1 of the Environment Agency Flood Map for Planning.

Exception Test.

Therefore applying the Exception Test shows that:

- a) the development provides wider sustainable economic benefits by utilising land within existing developed area
- b) the FRA demonstrates that the development will be safe and will not increase flood risk elsewhere nor detrimentally affect any other property

The site is compliant with a) and b).

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.

The Middle Level drainage area including the catchments of individual Internal Drainage Boards at the downstream limits are protected by the River Great Ouse tidal defences against a flood return period event of 1 in 200 years combined with the Ouse Washes Barrier Bank and River Delph defences offering protection against a 1 in 100 year return period fluvial event. The Middle Level Main Drain system also provides protection to the 1 in 100 year event.

- 4.2 The site is located within the rateable area of the Upwell IDB and the nearest Board main drain is located on the northern boundary of the site.
- 4.3 The existing standard of drainage for the Upwell IDB area 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 a minimum 900mm is provided to the lowest land
- 4.4 The Old Pophams Eau is part of the Middle Level drainage system with a major drainage function some 600 metres north west of the development site. The Pophams Eau hence discharges via St Germans Pumping Station to the tidal River Great Ouse.
- 4.5 Current maintenance standards within the Upwell IDB district and Middle Level drainage areas 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/Commissioners 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 Board/Commissioners 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 Maintenance standards of the Environment Agency's tidal and fluvial defences are good and their asset condition regularly inspected.

5.0 POTENTIAL SOURCES OF FLOODING

- 5.1 Seven potential sources of flooding have been identified as a result of this assessment:
- a) local blockages to proposed soakaway drainage and adjoining watercourses
 - b) local blockages to existing IDB main drain systems
 - c) storm return period of 1 in 50 years being exceeded
 - d) overtopping and breaching of the Middle Level/Pophams Eau flood embankments
 - e) failure of St Germans Pumping Station
 - f) overtopping or failure of the River Delph flood defences overtopping or failure of the River Great Ouse tidal defences
- 5.2 The probability of flooding from source a) is low as any soakaway system will be designed to satisfy BRE365 requirements and local authority building regulations and maintained by the holiday park owner.
- The probabilities of flooding from source b) is low due to the maintenance standards already achieved and managed by the Upwell IDB.
- The probability of flooding from c) is also very low due to the Upwell IDB main drain design standard incorporating minimum 900mm freeboard to the lowest land level which provides adequate storage in events greater than 1 in 50 years.
- Overtopping and breaching of the Pophams Eau flood embankment is also considered a low risk as the Middle Level system operates with its main drains design standard incorporating a minimum 900mm freeboard above the maximum designed water level providing further storage in events greater than 1 in 100 years plus climate change.
- The major flood event of Easter 1998 gave rise to the highest ever recorded flood water levels in the Middle Level system but no property flooding occurred as a result of any overtopping of embankments in the length of Middle Level Main Drain/Old Pophams Eau referred to.
- 5.3 Failure of St Germans Pumping Station designed to cater for the 1 in 100 year return period flood event plus climate change may occur due to long term mechanical breakdown or power supply being disrupted but has recently been replaced with a new structure. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Middle Level Commissioners 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.
- 5.3 The Environment Agency has confirmed that the site is outside the extent of any floodwaters as a result of a breach to the Middle Level Barrier Bank of the Ouse Washes.

5.4 The Kings Lynn & West Norfolk Borough Council Level 1 Strategic Flood Risk Assessment Maps do not take into account the effect of a potential breach to the Middle Level Barrier Bank. The site is located within the fluvial Flood Zone 3 but located some 3.50kms from the defences.

5.5 The standard of protection provided by the proposed soakaway drainage system gives a low risk of flooding due to high groundwater, overland flow and any surcharging of systems due to prolonged or intense rainfall. The standard of protection is to a 1 in 50 years return period event inclusive of the effects of climate change.

6.0 EXTENT OF KNOWN FLOODING

6.1 During the preparation of this assessment, no evidence was discovered of the site being flooded within the last 100 years.

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 main river or main 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.

7.3 If under very extreme events, levels of floodwater from main drain system 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 already incorporated into the holiday park 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 and dry access would be available to the development site onto Silt Road and hence via Three Holes village to Upwell where land is 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 above existing ground level with flood resilient measures incorporated offering additional protection against impacts arising from any extreme short duration, localised events. Land levels will remain as existing at generally 2.00m aOD.

- 8.3 The general location of the site within the catchment is such that if flooding occurred from the main drain and Middle Level river systems, then probably 2 to 3 days warning time would be available.
- 8.4 Displacement of water from the site will not affect any adjoining land and properties as future run-off will be accommodated by the proposed soakaway drainage. No raising of road levels will occur for access road development.
- 8.5 The developer will ensure that the eventual occupiers of the holiday park 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 owners of the holiday park should register with the Floodline Warning Direct Service to receive any future flood warnings.

- 8.6 A Flood Management Plan was prepared at the time of the previous planning approval and remains relevant today.

9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme events is very low on this site, because of its location, being some 1.50 kms. from the Middle Level Main Drain and some 3.50 kms from the Ouse Washes Barrier Bank and proposed ground floor levels compared to surrounding land and road level.
- 9.2 Although access to the site is partly within fluvial Flood Zones 2 & 3 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 and is located in Flood Zone 1 of the Environment Agency Flood Map for Planning. 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 taking account of existing flood defences and standards of protection.

The risk of flooding to adjoining properties in Three Holes village is not increased in terms of probability by the proposed development as surface water run-off from the site will be adequately discharged to soakaway drainage designed to BRE365 and local authority building regulations.

- 9.3 In the extreme event of a serious blockage occurring to the arterial drainage system, protection will be afforded by the proposed raising of floor levels above 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 Middle Level and Environment Agency defences to a 1 in 100 year return period.
- Although the site is partly in fluvial Flood Zones 2 & 3 of the Council's Maps, the actual risk of the site flooding from any fluvial main river or main drain is very low (less than 1.0%)
- Although the site is located within an Internal Drainage District with a standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. A minimum of 900mm freeboard is provided within the main drain design standard to the lowest land level which provides further storage to cater for events greater than 1 in 50 years.
- On site surface water drainage will be discharged via proposed soakaway system designed to BRE365 requirements and Building Regulations approval.
- Floor levels will be raised above existing ground level with flood resilient measures already incorporated into the holiday park development. A Flood Management Plan already exists.
- Land Drainage Byelaw Consent will be required from the Upwell IDB for any development within 9.00m of the adjoining IDB main drain.