FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
251 BROADGATE ROAD, SUTTON ST. EDMUND, SPALDING, LINCS.

FINAL REPORT

GEOFF BEEL CONSULTANCY

FEBRUARY 2022

GCB/HUMPHREY

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Fig 1 - Existing Plans & Elevations
Peter Humphrey Associates drg. no. 6085-PL02

Fig 2 - Building 2 Proposed
Peter Humphrey Associates drg. no. 6085-PL01B

Fig 3 - Environment Agency Flood Map for Planning

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Residual Hazard Map (2017)

Fig 5 - South East Lincs. Strategic Flood Risk Assessment
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Fig 6 - North Level IDB district plan

1.0 INTRODUCTION

1.1 A full planning application is to be submitted by Peter Humphrey Associates Ltd on behalf of Mr & Mrs O'Kane for proposed residential development at The Oaks, 251 Broadgate Road, Sutton St. Edmund, Spalding, Lincs.

1.2 Planning approval requires a Flood Risk Assessment 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, as situated, is located in Flood Zone 2 of the Environment Agency's Flood Map for Planning. The Agency's 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 any flood defences.

The site is however, shown outside of any Hazard Zone and in Flood Zone 1 of the South East Lincs. Strategic Flood Risk Assessment (2017).

The site is also located in the North Level Internal Drainage Board district.

1.3 Geoff Beel Consultancy was appointed on 17th February 2022 to prepare a Flood Risk Assessment.

1.4 Previous Flood Risk Assessments prepared by the author in July 2015, May 2016 and August 2018 formed part of planning approvals for development at the site H19-0852-15, H19-0539-16 and H19-0757-18..

2.0 LOCATION

2.1 The development site is located west of Broadgate Road, Sutton St. Edmund 2.50kms north-west of the North Level Main Drain and 13.50kms west of the River Nene. The National Grid Reference of the site is TF 36801311.

2.2 The position and extent of the site are shown on Fig 1 – Existing Plans & Elevations at the end of the document.

2.3 The site is located in the North Level Internal Drainage Board district and is shown within Flood Zone 2 as detailed on the Environment Agency Flood Map for Planning but outside of any Hazard Zone and in Flood Zone 1 of the South East Lincs. Strategic Flood Risk Assessment (2017).

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently a redundant agricultural barn at The Oaks, 251 Broadgate Road, Sutton St. Edmund.

3.2 The area of development is approximately 0.26 hectare.

3.3 The proposed site layout consists the conversion of the redundant barn to a single storey residential dwelling.

3.4 The Sequential Test and Exception Test will require to be applied but the development may be permitted as the site is protected against both 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 Sequential Test is met as the site is located outside of any Hazard Zone and in Flood Zone 1 of the South East Lincs. Strategic Flood Risk Assessment (2017).

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 North Level Drainage Board area, the nearest main drain is situated 250m west of the site. Land level is generally at 2.00m aOD.

The site drains to the North Level Main Drain south east of the site approximately 15.0kms upstream of Tydd Pumping Station which discharges into the tidal River Nene.

4.3 The existing standard of drainage for the IDB main drain 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 North Level Main Drain discharges to the tidal River Nene at the Tydd Pumping Station.

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 has concluded that improvement works are 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 Tydd Pumping Station
d) overtopping and breaching of the River Nene, Wisbech to Sutton Bridge tidal 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 source b) is also low due to the North Level 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.

The Board has confirmed that the IDB main drain discharges into the North Level Main Drain with a maximum design water level of minus 1.30m aOD. Freeboard of some 3.30 metres exists between maximum design water level of the North Level Main Drain and existing ground level at the development site.

5.3 Failure of the Tydd Pumping Station may occur due to mechanical breakdown or electricity power 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 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 approximately 13.50kms 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.

If any overtopping or breaching of the River Nene tidal defences occurred, floodwaters from east to west would be captured by the North Level Main Drain to return the floodwaters via Tydd Pumping Station to the tidal River Nene.

It is therefore highly unlikely that any overtopping or breaching of the tidal defences would affect the development site as confirmed by the South East Lincs. Strategic Flood Risk Assessment Maps (2017).

5.5 The developer should ensure that the eventual occupiers of the barn conversion 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 0345 988 1188.

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 and since that date, the defences between Sutton Bridge and Wisbech have been raised to the 1 in 200 year standard.

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 above existing ground level varying between 1.81m and 2.48m aOD.

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 North Level 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 main drains and tidal defences together with the raising of floor levels above existing ground level varying between 1.81m and 2.48m aOD respectively with a further 300mm of flood resilient construction 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 raised above existing ground levels varying between 1.81m and 2.48m aOD with a further 300mm of flood resilient construction above finished floor 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 BRE365 design requirements and Building Regulations approval.

8.5 Safe access and egress is available from the site onto Broadgate Road which remains 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 the internal drainage system, existing levels of tidal defences and proposed floor level compared to surrounding land and road levels.

9.2 The site is within Flood Zone 1 according to NPPF classification, with a very low risk of flooding due to the proposed 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. 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 proposed raising of floor levels above existing ground level.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 As a result of the assessment, the following conclusions have been reached:-

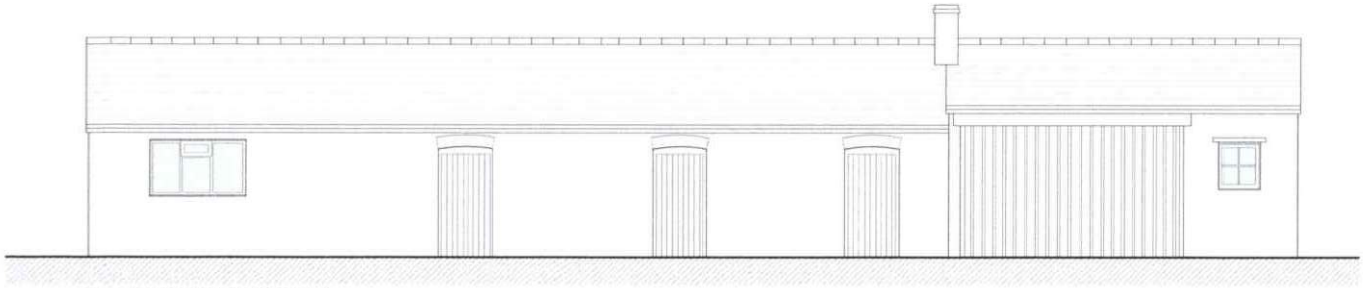
- The proposed development is not in a Functional Floodplain. It is located in the Passive Floodplain protected by existing River Nene tidal defences to a minimum standard of 1 in 200 years.

- The site is in Flood Zone 1 of the South East Lincs. Strategic Flood Risk Assessment Maps with the actual risk of site flooding from the tidal River Nene system being very low (less than 0.5%).

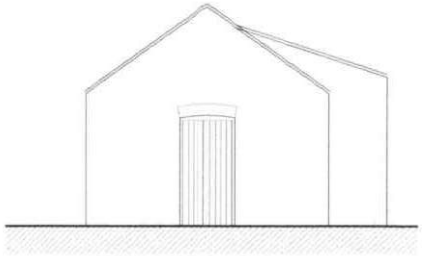
- Although the site is located within an Internal Drainage District with a standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. A minimum of 900mm freeboard is provided within the main drain design standard to the lowest land level which provides further storage to cater for events greater than 1 in 50 years.

- On site surface water drainage to be discharged via soakaways to BRE365 design requirements and Building Regulations approval.

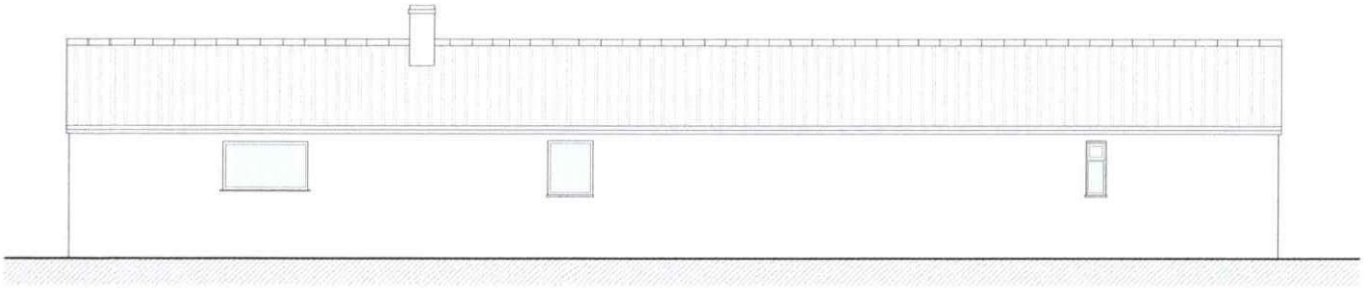
- Floor levels will be above existing ground level varying between 1.81m and 2.48m aOD with 300mm of flood resilient construction above finished floor level.



FRONT (NORTH) ELEVATION

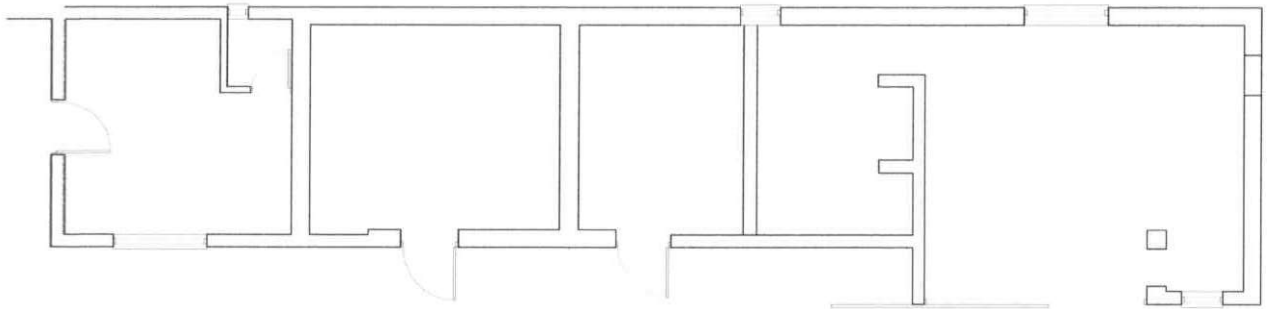


SIDE (EAST) ELEVATION



REAR (SOUTH) ELEVATION

EXISTING ELEVATIONS 1:100



BUILDING 2 EXISTING PLAN 1:100

Peter Humphrey Associates
ARCHITECTURAL DESIGN AND BUILDING

PROJECT
The Oaks
251 Broadgate
Sutton st Edmund
Lincolnshire

CLIENT Mr & Mrs O'Kane

DRAWING TITLE EXISTING PLANS & ELEVATIONS

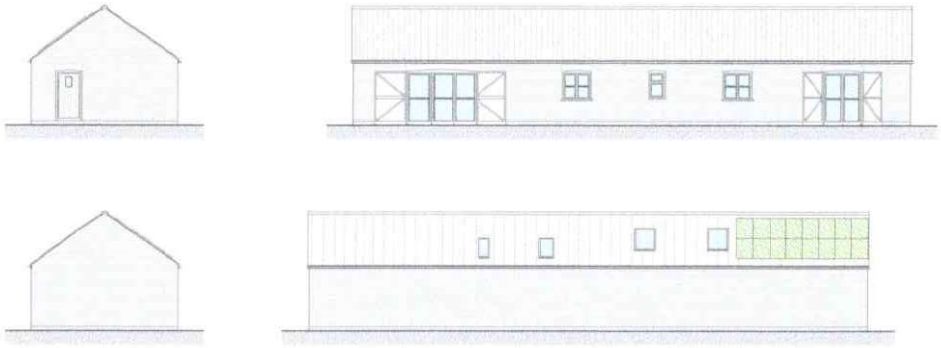
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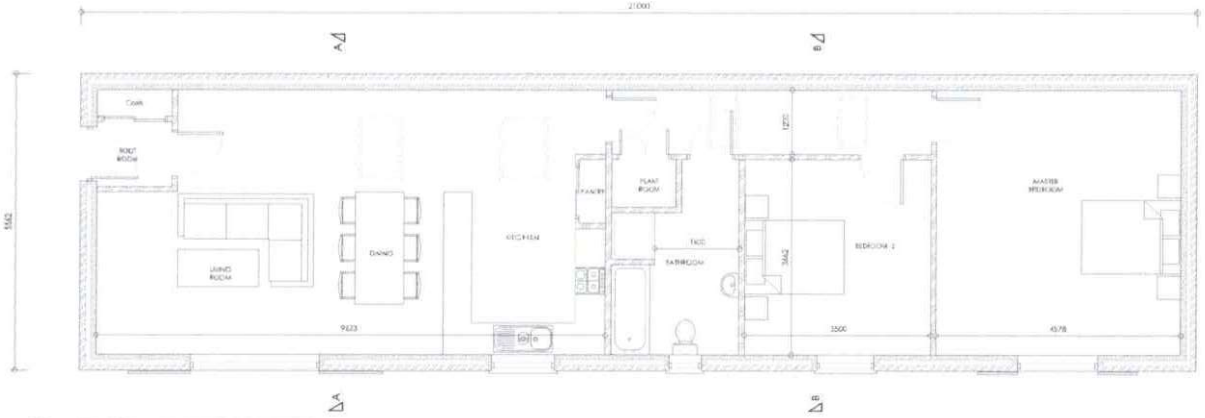
Fenland District Council
Building Design Awards
Building Excellence in Fenland
Category Winner 2008



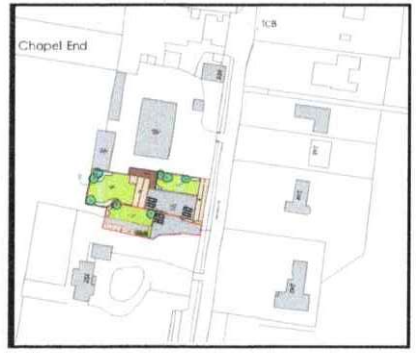
PROPOSED ELEVATIONS
SCALE 1:100



SITE PLAN
SCALE 1:200



PROPOSED FLOOR PLAN
SCALE 1:50



LOCATION PLAN
SCALE 1:1250

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PROJECT
The Oaks
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Sutton st Edmund
Lincolnshire

CLIENT Mr & Mrs O'Kane

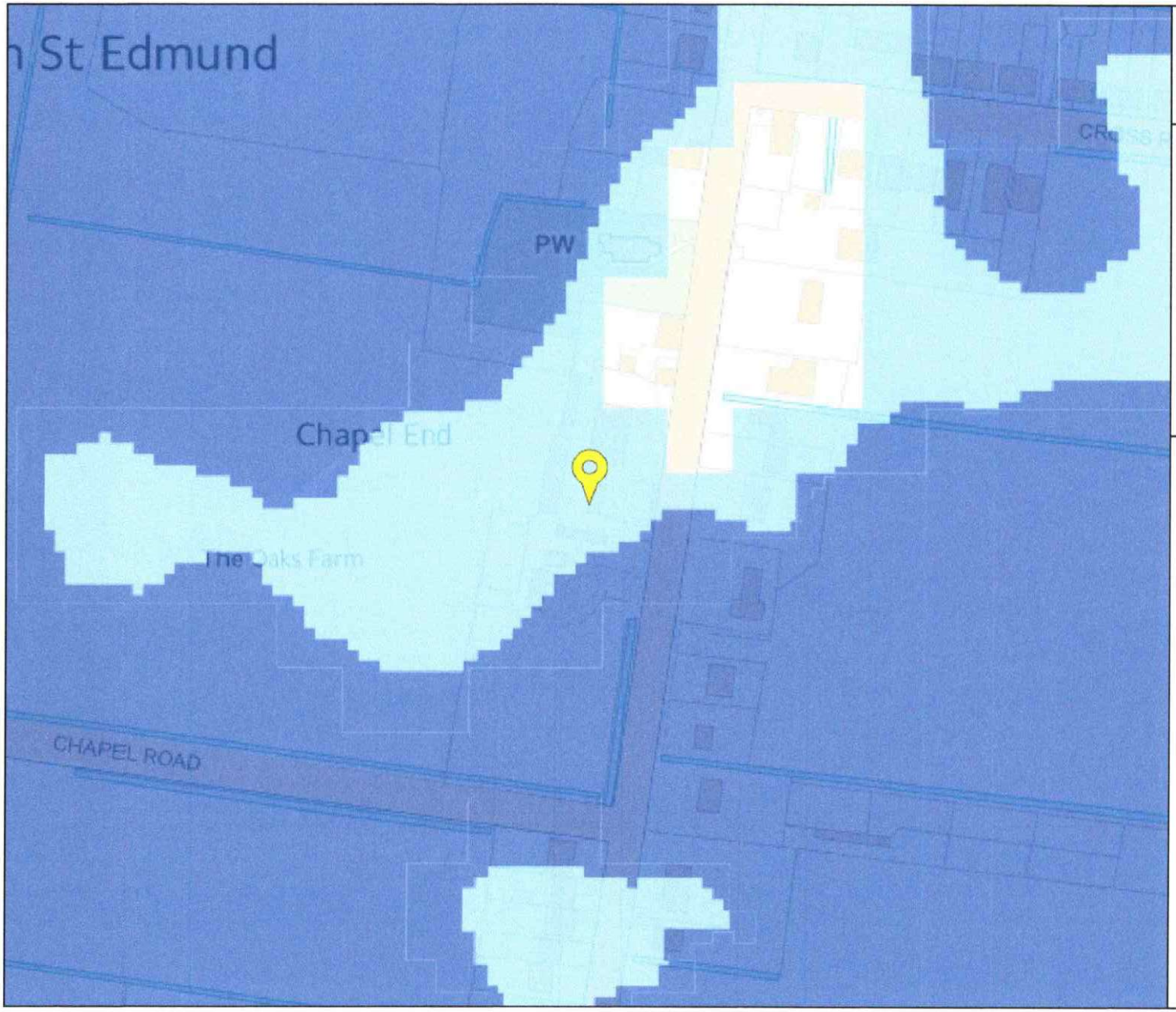
DRAWING TITLE BUILDING 2 PROPOSED

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Building Design Awards
Category Winner 2008



Environment Agency

Flood map for planning

Your reference
pe12 0lt

Location (easting/northing)
536802/313111

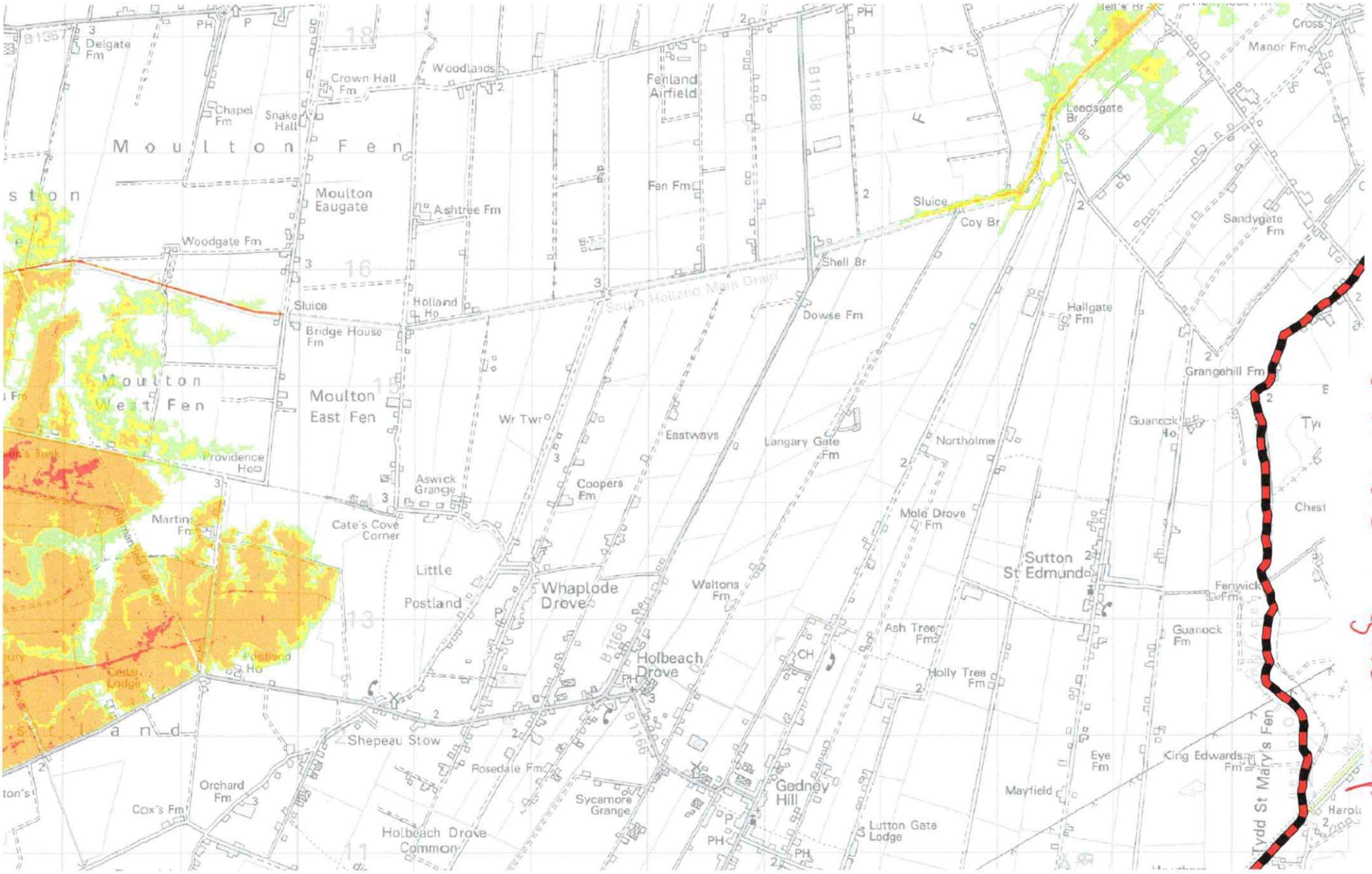
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- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 20 40 60m

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Residual Hazard Map
Moulton Fen
Moulton West Fen
Moulton East Fen
Moulton Eaugate
Delgate Fm
Crown Hall Fm
Woodlands
Chapel Fm
Snake Hall
Ashtree Fm
Fen Fm
Woodgate Fm
Sluice
Bridge House Fm
Holland Ho
Providence Ho
Martins Fm
Aswick Grange
Cate's Cove Corner
Coopers Fm
Wr Twr
Eastways
Langary Gate Fm
Little Postland
Postland Ho
Whaplode Drove
Waltons Fm
Holbeach Drove
Shepeau Stow
Rosedale Fm
Sycamore Grange
Holbeach Drove Common
Orchard Fm
Cox's Fm
Gedney Hill
Lutton Gate Lodge
Fenland Airfield
B1168
B1166
Shell Br
Dowse Fm
South Holland Main Drain
Coy Br
Leedsgate Br
Manor Fm
Sandygate Fm
Hallgate Fm
Grangehill Fm
Guanock Ho
Northolme
Mole Drove Fm
Sutton St Edmund
Ash Tree Fm
Holly Tree Fm
Fenwick Fm
Guanock Fm
Eye Fm
King Edwards Fm
Mayfield
Tydd St Mary's Fen
Chest


Residual Depth Map
Moulton Fen
Moulton West Fen
Moulton East Fen
Moulton Eaugate
Crown Hall Fm
Woodlands
Fenland Airfield
Chapel Fm
Snake Hall
Ashtree Fm
Fen Fm
Woodgate Fm
Sluice
Bridge House Fm
Holland Ho
Shell Br
Dowse Fm
Leedsgate Br
Coy Br
Manor Fm
Sandygate Fm
Halligate Fm
Grangehill Fm
Guanock Ho
Guanock Fm
Northolme
Langary Gate Fm
Eastways
Wr Twr
Coopers Fm
Aswick Grange
Providence Ho
Martins Fm
Cate's Cove Corner
Mole Drove Fm
Sutton St Edmund
Fenwick Fm
Chest
Ty
Little Postland
Whaplode Drove
Waltons Fm
Ash Tree Fm
Holly Tree Fm
Holbeach Drove
Postland Ho
Cedar Lodge
Shepeau Stow
Rosedale Fm
Sycamore Grange
Gedney Hill
Lutton Gate Lodge
Eye Fm
King Edwards Fm
Mayfield
Tydd St Mary's Fen
Orchard Fm
Cox's Fm
Holbeach Drove Common
Dowsdale
dismid rly
Makinder Fm
Hawthorn Fm
Holland's
B1168
B1166
B1108
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