

**FLOOD RISK ASSESSMENT
FOR PROPOSED RESIDENTIAL DEVELOPMENT
OFF HIGHSTOCK LANE, GEDNEY HILL,
SPALDING, LINCS**

FINAL REPORT

GEOFF BEEL CONSULTANCY

NOVEMBER 2019

GCB/MERCHANT

DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment in support of a planning application for proposed Residential Development at land off Highstock Lane, Gedney Hill, Spalding, Lincs. "Geoff Beel Consultancy" accepts no responsibility or liability whatsoever for any use made of this document other than by the client "D Brown (Building Contractors) Ltd" 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.

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G R Merchant drg. No. 3146-17-30J
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1.0 INTRODUCTION

- 1.1 A full planning application has been submitted by G R Merchant Ltd on behalf of D Brown (Building Contractors) Ltd for proposed residential development on land off Highstock Lane, Gedney Hill, Spalding, Lincs.
- 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 of the National Planning Policy Framework (NPPF).

The site is partly within Flood Zones 2 and 3 of the Environment Agency's Flood Zone Maps.

The Agency's latest Flood Zone 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 in a low risk area of the South Holland District Council's Strategic Flood Risk Assessment which has recently been reviewed by the Council's Consulting Engineers.

The site is also located in the South Holland IDB drainage area and the Board should be consulted regarding surface water drainage and flood risk.

- 1.3 Geoff Beel Consultancy was appointed on 4th August 2016 to prepare a Flood Risk Assessment.

2.0 LOCATION

- 2.1 The development site is located at land off Highstock Lane, Gedney Hill 4.0kms north west of the Middle Level Main Drain and 3.75km south of the South Holland Main Drain and 9.00kms south east of the River Welland. The National Grid Reference of the site is TF 33891113.
- 2.2 The position and extent of the site are shown on Fig 1 – Proposed Location & 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 partly within Flood Zones 2 & 3 as detailed on the Environment Agency Flood Zone Maps. The site is also located in a low risk area of the recently reviewed Council's Strategic Flood Risk Assessment as defended by the Internal Drainage Board system.

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is currently agricultural land.
- 3.2 The area of development is approximately 0.50 hectare.
- 3.3 The proposed site layout consists of a cul-de-sac estate off Highstock Lane..
- 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 both the 1 in 200 year return period tidal event and the 1 in 100 year return period fluvial event meeting the requirements of NPPF. The Sequential Test is met as located in Flood Zone 1 of the South Holland SFRA Residual Depths Map.

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 Internal Drainage Board area, the nearest main drain, the Bridgeford's Drain is located on the southern boundary of the site. Land levels are generally at 2.00 m aOD. The nearby main drains discharge in a northerly direction to the Board's Fleet Fen Pumping Station.
- 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 South Holland Outfall Sluice, Sutton Bridge.
- 4.4 The River Welland between Crowland and Spalding is protected by fluvial embankments as part of the Environment Agency 'main river' under the terms of the Water Resources Act 1991. The Crowland and Cowbit Washes are also alongside the River Welland and combined together offer protection of a minimum 1 in 100 years return period.
- 4.5 Current maintenance standards of the Environment Agency for tidal and fluvial defences and the South Holland 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 the Bridgefords Drain
- b) storm return period of 1 in 50 years being exceeded
- c) failure of Fleet Fen Pumping Station
- d) overtopping and breaching of the River Welland, Crowland to Spalding fluvial 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 Bridgefords 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 Fleet Fen 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 fluvial defences between Crowland and Spalding consist generally of strengthened and heightened earth embankments with the Crowland and Cowbit Washes Flood Storage area between the defences and the River Welland. Crest levels are at a minimum of 6.00m aOD.

The Crowland and Cowbit Washes are now a designated flood storage 'Washland' under the Reservoirs Act 1975 and liable to annual inspection by a nominated Supervising Engineer. It is therefore highly unlikely that any overtopping or breaching of the fluvial defences would affect the development site.

5.5 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 contacting 0845 988 1188.

- 5.6 Initial discussion with the South Holland Internal Drainage Boards as regards surface water drainage from the site has provided the following drainage strategy for Local Lead Flood Authority approval.

Due to the relatively heavy land in Gedney Hill, soakaways are not to be recommended but would suggest a restricted discharge to the Board's Bridgeford Drain with some on-site storage.

A restricted flow of 5.00 lit/sec would be permitted with the smallest hydro-brake installed to discharge to the Bridgeford Drain with the payment of a Surface Water Development Contribution payable to the Board.

The design of the on-site storage should take account of the possible high water table during certain parts of the year. The layout of the on-site storage should also take into account the responsibility and operations for future maintenance.

6.0 EXTENT OF KNOWN FLOODING

- 6.1 During the preparation of this assessment, no evidence of the site flooding has been experienced from the River Welland, South Holland Main Drain or 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 300mm above existing ground level.
- 7.2 The probability of the site flooding with water from the River Welland tidal and fluvial 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 raising of floor levels 300mm above existing ground 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 residential development will be raised 300mm above existing ground levels 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 Welland 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 a drainage strategy subject to the IDB requirements and to Local Lead Flood Authority approval.
- 8.5 Safe access and egress is available initially in a northerly direction to Gedney Hill village where land is in Flood Zone 1.

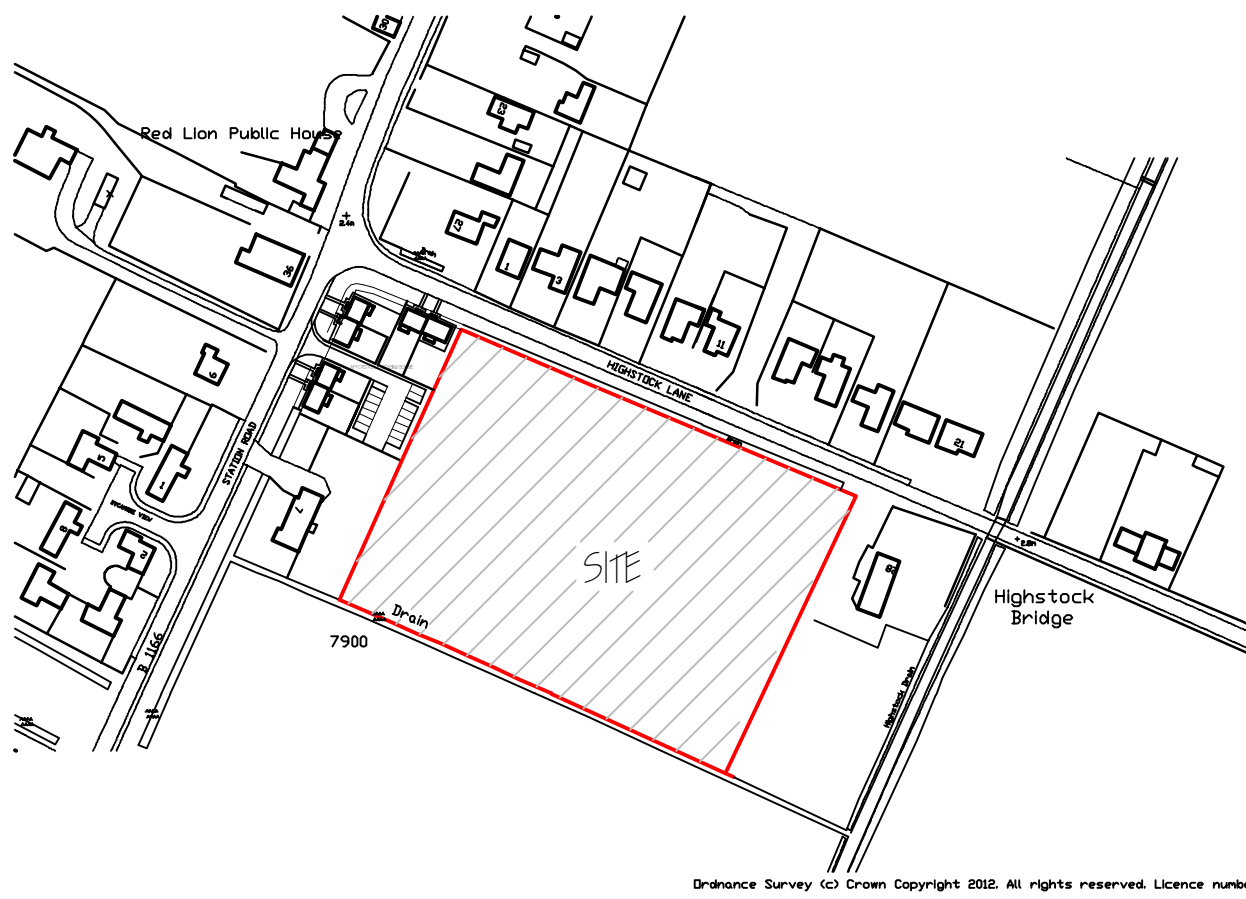
9.0 RESIDUAL RISK – EXTREME EVENTS

- 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 fluvial defences and proposed floor levels 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 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 fluvial 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 residential development is not in a Functional Floodplain. It is located in the Passive Floodplain protected by existing fluvial defences to a standard of 1 in 100 years and tidal defences of a 1 in 200 year standard.
- The site is within Flood Zone 1 with the actual risk of site flooding from the fluvial River Welland system being very low (less than 0.5%). The site is shown as defended by the South Holland IDB system in the South Holland Strategic Flood Risk Assessment.
- 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 have a restricted discharge to the adjoining Bridgefords Drain with on –site attenuation storage and a hydro-brake installed all to the requirements of the IDB and the Local Lead Flood Authority approval.
- Floor level of the residential dwellings will be raised 300mm above existing ground level.
- Any culverting works of the riparian drain alongside Highstock Lane will require Land Drainage Byelaw Consent from the South Holland IDB.
- No development within 9.00m of the Boards Bridgeford Drain will be permitted without Land Drainage Byelaw Consent from the IDB



LANDSCAPING, FENCING & TREE PLANTING SCHEME.

- A - MIXED HEDGE
(a) Hawthorn (Crataegus Monogyna)
(b) Beech (Fagus Sylvatica)
(c) Blackthorn (Prunus Spinosa)
(d) Buckthorn (Rhamnus Cathartica)

- B - SILVER BIRCH - Feathered
C - HAWTHORN - Feathered
D - WHITEBEAM - Feathered
E - Lincolnshire Wooden Post & Rail Fence
F - 18m High Wooden Close Boarded Fence
G - Gravel Driveway
H - Grass

Planting of Hedge to be double row staggered. Distance between plants to be 300mm.
Distance between rows to be 450mm. All as specified by The Woodland Trust.

All planting to be in accordance with BS 4428:1989 and amendment No. 1 (1991)
All trees to be planted with minimum 0.6m plastic mulch mat and to be staked, tied and tubed.

1/3 to 1/2 bag of peat free tree and shrub planting compost to be incorporated into backfill for each tree hole.

SITE PLAN 1:500

NEW ACCESSES TO THE REQUIREMENTS & SPECIFICATION OF THE L C C HIGHWAYS.

J	LANDSCAPING & BOUNDARY TREATMENT	NOV 2019
H	SURROUNDING STRUCTURES ADDED	NOV 2019
G	PLOTS 6, 7 & 8 AMENDED	OCT 19
F	PLANNING AMENDMENT - PLOT 4	SEPT 19
E	PLOTS 6, 7 & 8 AMENDED - CLIENT	AUG 2019
D	REVISED SCHEME FOLLOWING SITE SURVEY	AUG 2019
C	TREATMENT PLANT DISCHARGE HIGHLIGHTED	JUNE 2019
B	CLIENT AMENDMENTS	OCT 2018
A	CLIENT AMENDMENTS	OCT 2018

ref	revision	date
G. R. MERCHANT LTD. I. ENG AMICE FIWO ARCHITECTURAL, STRUCTURAL AND LAND DRAINAGE CONSULTANTS 4 Wrights Mews 12A Park Road, Holbeach, Spalding, Lincs. PE12 7EE Tel: 01406 490800 Fax: 01406 425744 E-Mail: gr.merchant@btconnect.com		

Project
RESIDENTIAL DEVELOPMENT, OFF HIGHSTOCK LANE, GEDNEY HILL, SPALDING, LINC'S.

Client
D. BROWN (BUILDING CONTRACTORS) LTD.

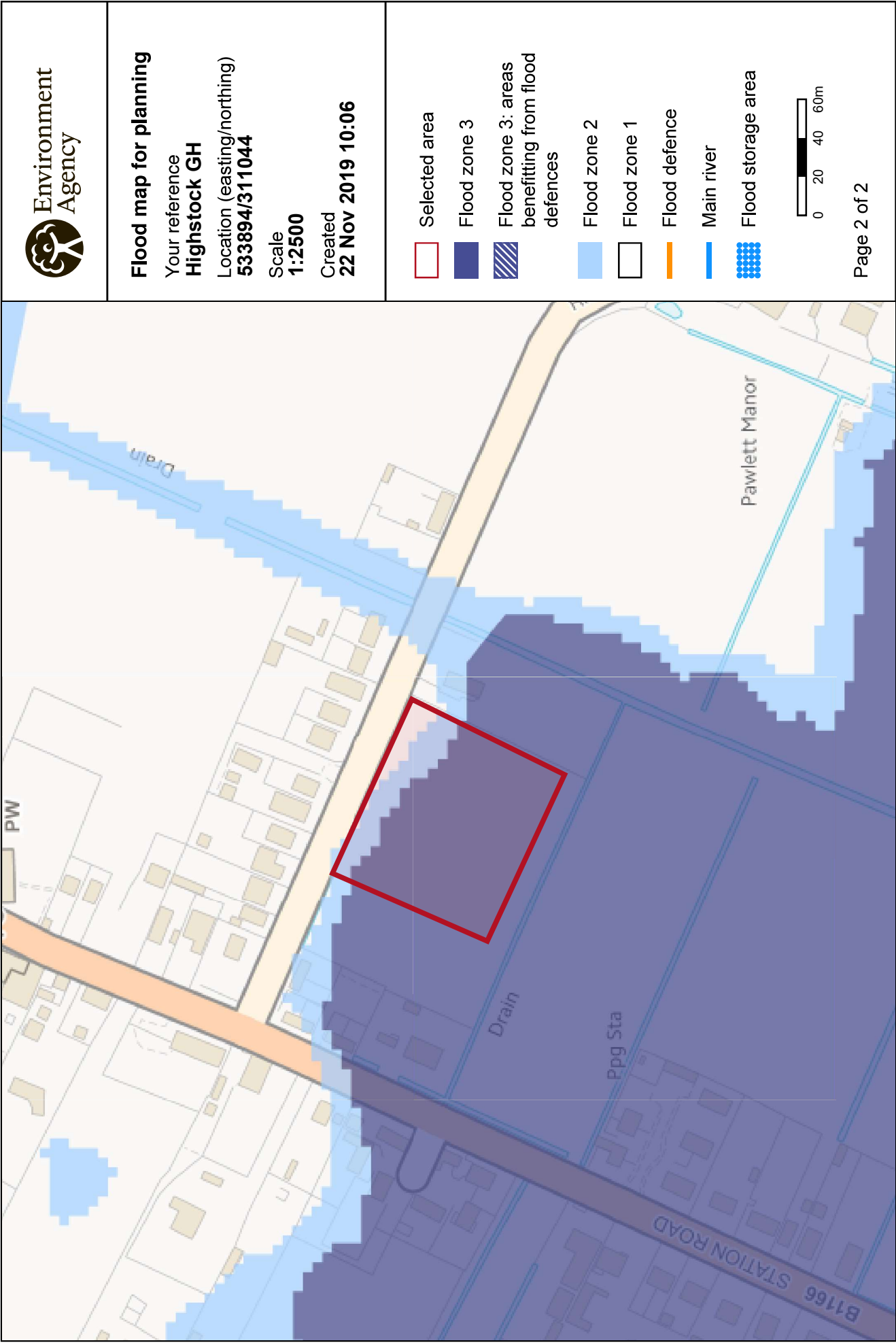
Drawing
LOCATION & SITE LAYOUT PLANS. REVISED SCHEME - OCTOBER 2018

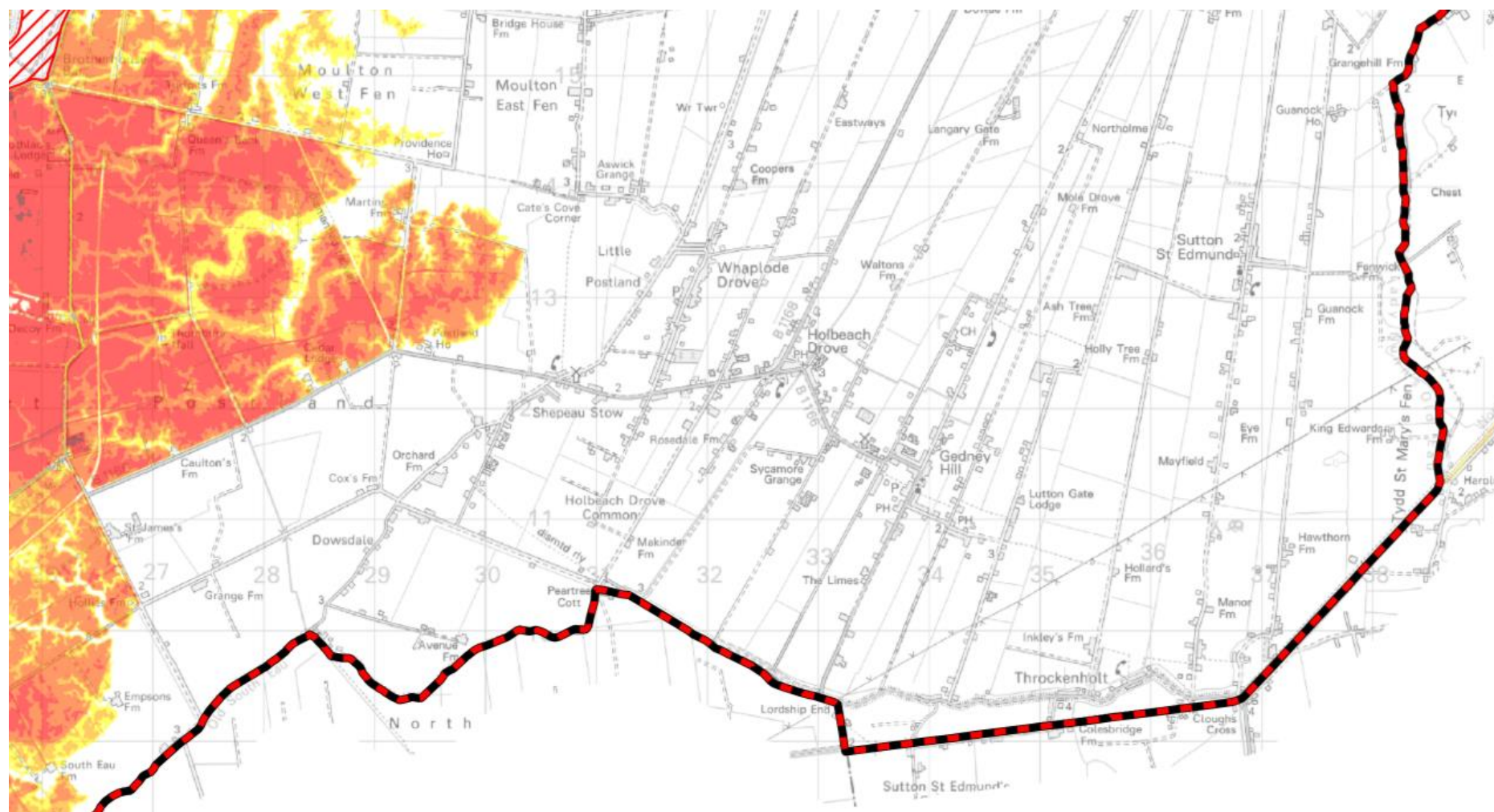
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3146-17.	30J

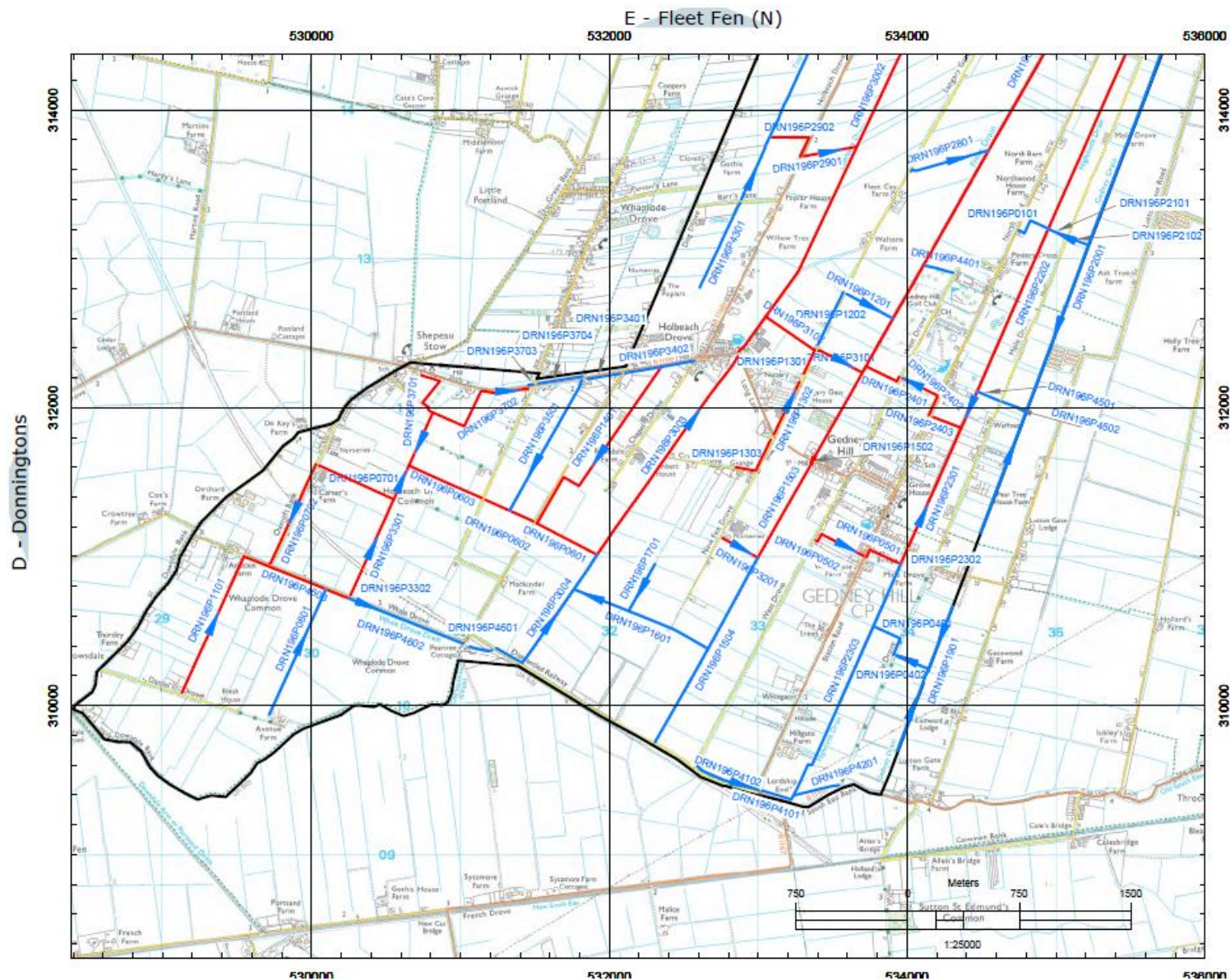
Date	Drawn
MARCH 2017.	GRM.

Scales
AS INDICATED.

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This drawing is copyright and may not be altered, copied, photocopied or used for any other purpose other than that for which it is issued. The General Contractor is to check all dimensions on site and report any discrepancies to the Architect. All details shown on this drawing are intended to be used as a guide only and are based upon typical site conditions related to the area. No responsibility can be accepted for abnormal conditions which may be discovered during construction unless reported to the Architect in the design amendments may be considered. Site soil surveys are recommended in respect of foundations to establish specific site conditions before foundation work is undertaken. This drawing is limited to the amount of information contained and does not purport to contain a full specification of the works. It is issued for the purpose of obtaining Planning / Building Regulation approval. This drawing must not be used as a contract document alone. The works will not be supervised or inspected on site by G.R. Merchant or any representative thereof. It is the client or their appointed agents responsibility to control workmanship, substitution of materials, adherence to specification, variations to contract or materials to be new unless otherwise stated and all components and materials etc. to be used fitted and installed etc. in strict accordance with manufacturers instruction and relevant code of practice. Materials shall conform to appropriate British standard specification or BSIA certificate or European code equivalent. The Employer / Client shall ensure that the selected contractor is consistent with all relevant requirements necessary to achieve compliance with Health and Safety legislation by complying with the Construction Design and Management Regulations an Independent Planning Supervisor will be retained. The works shall comprise of all that is shown on this drawing and shall include that may not specifically be shown but may be reasonably inferred as necessary to carry out the works shall be deemed to be included. It is the client and contractors responsibility to ensure that the works are carried out in accordance with the relevant regulations and standards. Party Wall etc. Act 1996, when building in close proximity to adjoining neighbours boundaries.







Fleet Fen (S)

South Holland
 Drainage Board

LEGEND

- Catchment Boundary
- High Priority Watercourse
- IDB Ordinary Watercourse
- - High Priority Pipeline
- - Ordinary Pipeline
- ⊕ Water Control Structure
- ⊗ Pumping Station
- ⊗ Inland Sluice
- ⊗ Tidal Sluice

KEY MAP

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SCALE	SHEET NUMBER
Best fit	© Crown Copyright and database rights (2012). All rights reserved OS licence number 100029527.
PLOT DATE	CMT196P
05/01/2016	
FILE NAME	
SHIDB_webmap2013.dwg	