FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT AT CRADGE BANK ROAD, SPALDING, LINCS

SHDC
Planning & Development
18 OCT 2010
Ref: 0872-10

FINAL REPORT

GEOFF BEEL CONSULTANCY

OCTOBER 2010

GCB/bdAr

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Fig 11 - Site Plan within Welland & Deepings IDB district

1.0 INTRODUCTION

1.1 A full planning application is to be submitted by bdAr architects and designers on behalf of the Wellington Pub Co. for proposed residential development at Cradge Bank Road, Spalding, Lincs.

1.2 Planning approval requires a Flood Risk Assessment to accompany the application to meet the requirements of Planning Policy Statement 25 (PPS25) - Development and Flood Risk for approval by the Environment Agency.

The site is shown within Flood Zone 3 of the Environment Agency's Flood Zone Map. The 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 also shown within a defended area and in Flood Zone 1 of the South Holland District Council's Strategic Flood Risk Assessment Maps (2010) and located in the Welland and Deepings Internal Drainage Board district.

1.3 Geoff Beel Consultancy was appointed on 12th August 2010 to undertake a Flood Risk Assessment.

1.4 A previous Flood Risk Assessment was prepared by the author in November 2009 for development on the opposite side of Cradge Bank Road which received approval from the Environment Agency on 10th December 2009 under file ref. no. AN/2009/108651.

2.0 LOCATION

2.1 The development site is the existing car park of the Golden Ball Public House, Cradge Bank Road, Spalding. The National Grid Reference of the central point of the site is TF 24252130.

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

2.3 The site, located within the Welland and Deepings Internal Drainage Board district is shown within Flood Zone 3 as detailed on the Environment Agency Flood Zone Maps and in a defended area and Flood Zone 1 of the Council's Strategic Flood Risk Assessment Maps (2010).

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is the car park to the Golden Ball Public House.

3.2 The area of development is approximately 0.08 hectare.

3.3 The proposed site layout consists the construction of two dwellings with access to Cradge Bank Road.

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 100 year fluvial event by a combination of defences, pumping stations and sluice gates meeting the requirements of PPS25.

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 embankments is considered to be small.

4.2 The site is located within the Welland and Deepings Internal Drainage Board protected by the River Welland defences to the 1 in 100 year return period flood event. The nearest 'main drain' open watercourse, the Little London Pipeline is located north of the site. Road level of Cradge Bank Road on the site frontage is 5.30m aOD.

4.3 The site and surrounding land drains to the Little London Pipeline and hence the Hills Drain to the South Drove Drain some 1750 metres upstream of Pode Hole Pumping Station. The Pode Hole Pumping Station discharges into the Vernatts Drain which ultimately flows into the tidal River Welland.

4.4 The Vernatts Drain is an embanked high level carrier conveying the surface water run-off from some 16165 hectares of land into the tidal River Welland at Surfleet Seas End.

The Welland and Deepings IDB have recently completed a three year programme to raise and strengthen the Vernatts Drain embankments to accommodate with 450mm freeboard, the design flood level of 3.96 metres aOD, estimated to be a 1 in 100 year return period event.

4.5 The South Drove Drain forms part of the comprehensive system of gravity and part pumped drainage providing an outfall from land and property situated between Spalding and Market Deeping.

4.6 Current maintenance standards within the Welland and Deepings Internal Drainage Board are generally very 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.

4.7 The fluvial River Welland is located approximately on the eastern boundary of the site with a standard of protection of 1 in 100 years return period. The Crowland and Cowbit Washes are situated upstream on the opposite bank of the River Welland offering integrated protection to Spalding and the surrounding district.

4.8 The site is positioned immediately landward side of vertical steel sheet piling to the River Welland frontage. The steel sheet piling is anchored beneath the development site with horizontal tie-rods to concrete anchor blocks.

An initial site meeting has been held with Environment Agency officers to determine the extent of the existing construction works below ground which will require to be amended and formal Flood Defence (Land Drainage) Byelaw Consent issued under the Water Resources Act 1991.

4.9 Fluvial flood levels of the River Welland at Little London Road Bridge are as follows:

	Present	Present + Climate Change
1%	4.39	4.68
0.1%	4.40	4.68

4.10 Maintenance standards of the Environment Agency's main rivers and defences are well maintained and regularly inspected for their asset condition.

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 drain system.
b) storm return period of 1 in 25 years being exceeded
c) failure of Pode Hole Pumping Station
d) overtopping and breaching of the fluvial River Welland 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 Welland and Deepings 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 25 years.

5.3 Failure of Pode Hole 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.

Previous historic rainfall events of 1968 and 1978, estimated to be greater than 1 in 100 year events, caused no flooding to any residential properties at the time and the Boards policy is to provide a standard of drainage which satisfies PPS25 requirements of a 1 in 100 year return period for fluvial protection inclusive of the effects of climate change and development. The Boards policy regarding the connection of future developments to the arterial system enables a flexible approach to be adopted and meet the criteria for "sustainable urban drainage". The probability of the site flooding from this potential source is also considered to be low.

5.4 The possible overtopping and breaching of the fluvial River Welland flood defences which may affect the site under extreme conditions is also considered to be very low. The standard of defence of 1 in 100 years would not be exceeded as the site frontage is protected with steel sheet piling and floodwaters would not affect the development site, as there is 620mm freeboard above the 1 in 100 year flood level inclusive of climate change.

It is therefore proposed that floor levels of the development are to be 300mm above existing Cradge Bank road level at 5.60m aOD to safeguard against the remote possibility of overtopping of the River Welland defences.

5.5 The developer should ensure that the eventual occupiers of the properties 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 including teletext.

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 should register with the Floodline Warnings Direct Service to receive any future flood warnings.

6.0 EXTENT OF KNOWN FLOODING

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

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 Cradge Bank road level at 5.60m aOD.

7.2 The probability of the site flooding with water from any Welland and Deepings river 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. Similarly the same standard is provided by the Environment Agency's main river and defences.

7.3 If under very extreme events, levels of floodwater from any Environment Agency or Welland and Deepings river or 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 proposed floor levels at 5.60m aOD will be appropriate for the design life of the development (i.e. 100 years).

7.5 Safe and dry access to and from the site would be available in a north easterly direction via Cradge Bank Road to Little London Road Bridge.

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated.

8.2 Floor levels of the development will be at 5.60m aOD offering additional protection against impacts arising from any extreme short duration, localised events. Surface water drainage will be discharged to soakaway designed to BRE365 specification and Building Regulations approval.

8.3 The general location of the site within the catchment is such that if flooding occurred from any of the Environment Agency or Welland and Deepings river systems, then probably 2 to 3 days warning time would be available.

8.4 No displacement of water from the site will affect any adjoining properties and agricultural land.

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 a pumped sub-catchment of the Welland and Deepings IDB area and its location immediately west of the River Welland fluvial defences consisting of vertical steel sheet piling and concrete capping beam.

9.2 Although within Flood Zone 3 according to PPS25 classification, the site actually has 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' as defined in PPS25. The Environment Agency Flood Zone Maps have been produced irrespective of existing flood defences and standards of protection.

9.3 South Holland District Council in conjunction with the Environment Agency and the local IDB's within the Council area have carried out a Strategic Flood Risk Assessment of the whole District by appointed Consulting Engineers.

The Strategic Flood Risk Assessment has produced more definitive Flood Risk Maps than those published by the Environment Agency and at the same time has analysed flood return periods of all tidal and fluvial defences for year 2115 to account for the effects of climate change.

Breach scenarios of embankments or defences failing and/or being overtopped have also been carried out to establish Flood Risk Zones. The site is shown to be outside of any Hazard Zone.

9.4 As a result of the Strategic Flood Risk Assessment the South Drove Drain has been determined as providing protection against a 1 in 100 year return period event.

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 as defined by PPS25. It is located in the Passive Floodplain protected by defences to a 1 in 100 year return period.
- Although the site is in Flood Zone 3, the actual risk of site flooding from any Environment Agency river system is very low. The site is shown in Flood Zone 1 of the South Holland District Council's Strategic Flood Risk Assessment Maps (2010).
- Although the site is located within an Internal Drainage District with a minimum standard of drainage of 1 in 25 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 25 years providing further storage within the drainage channels.

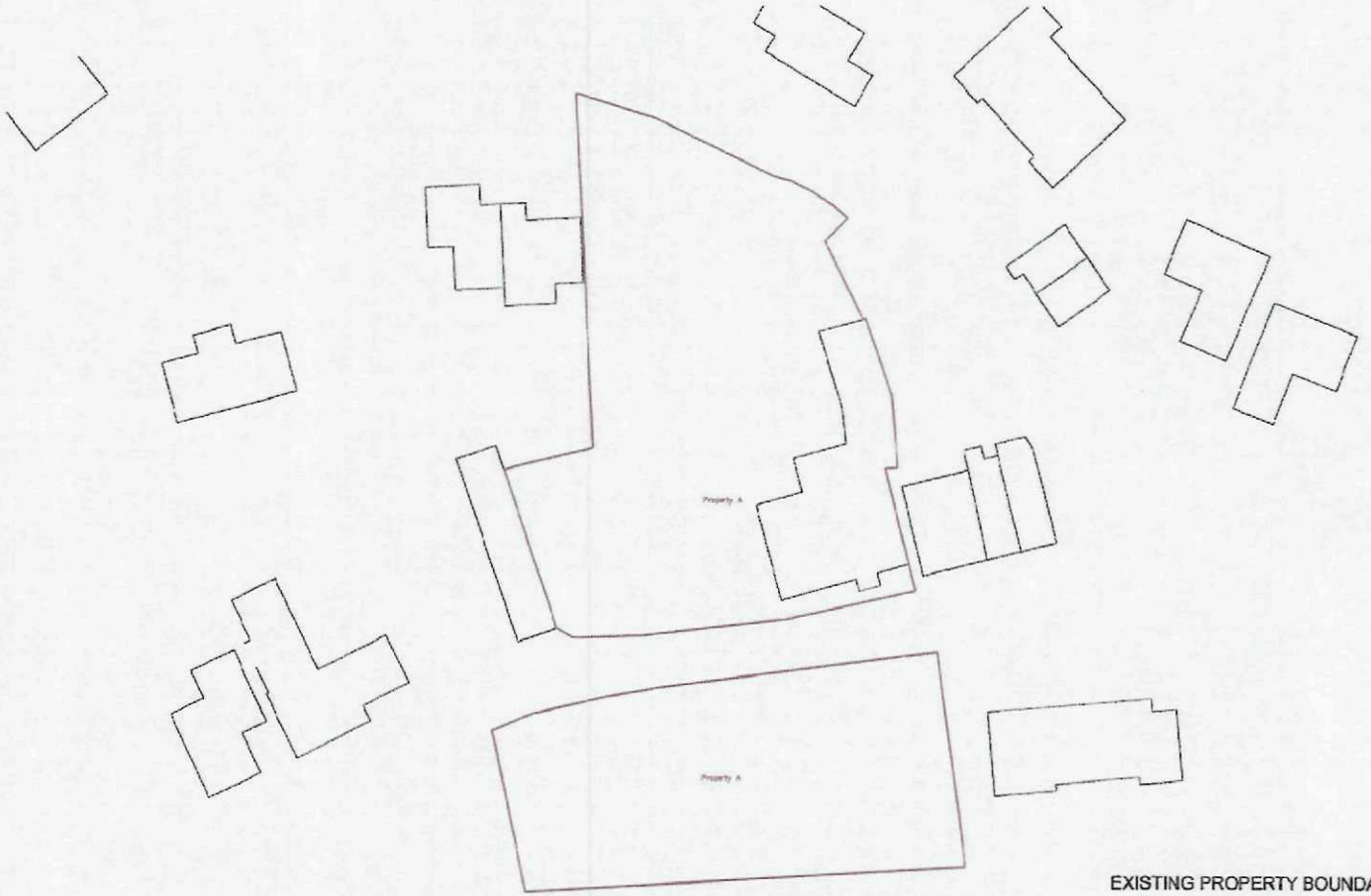
- Floor levels will be at 5.60m aOD and flood resistant/resilient techniques incorporated into the design and construction of the proposed dwellings.

- On site surface water drainage will be discharged to soakaway to BRE365 specification and Building Regulations approval.

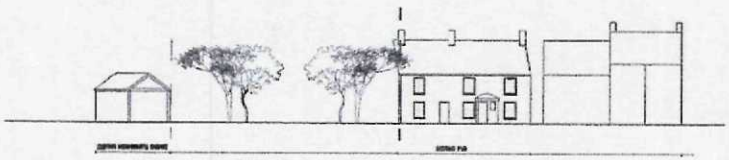
- Future occupiers of the properties should register with the Environment Agency's Floodline Warnings Direct service.

- Formal Flood Defence (Land Drainage) Byelaw Consent will be required for the development and associated steel sheet piling works from the Environment Agency.

EXISTING



EXISTING PROPERTY BOUNDARY



EXISTING FRONT[EAST] ELEVATION

REVISIONS:

CRITERION ASSET

GOLDEN BALL PUBLIC HOUSE

1/200 @ A1

JJ

EXISTING SITE PLAN AND ELEVATIONS

0650

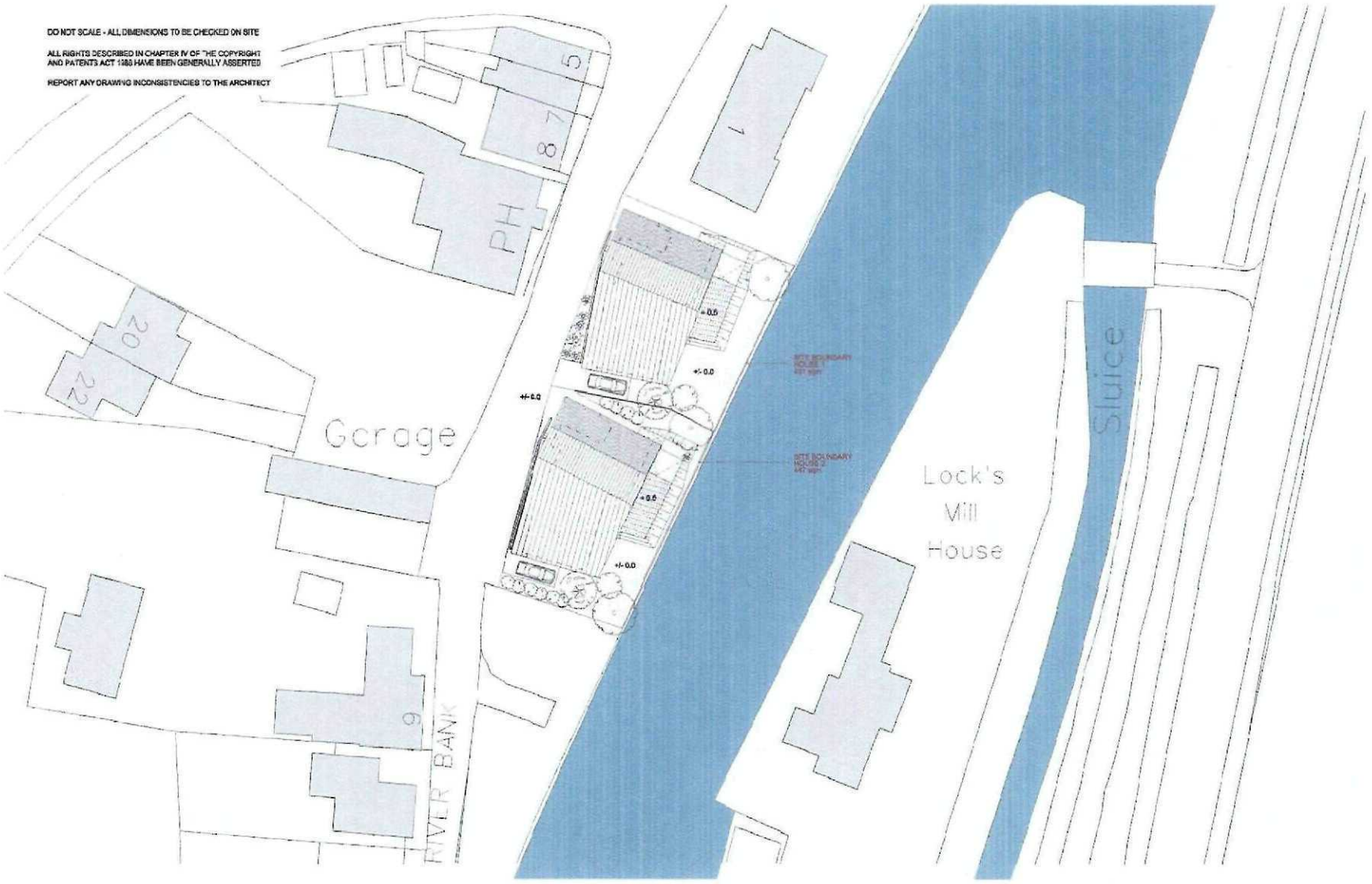
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NOTES:

REVISIONS:

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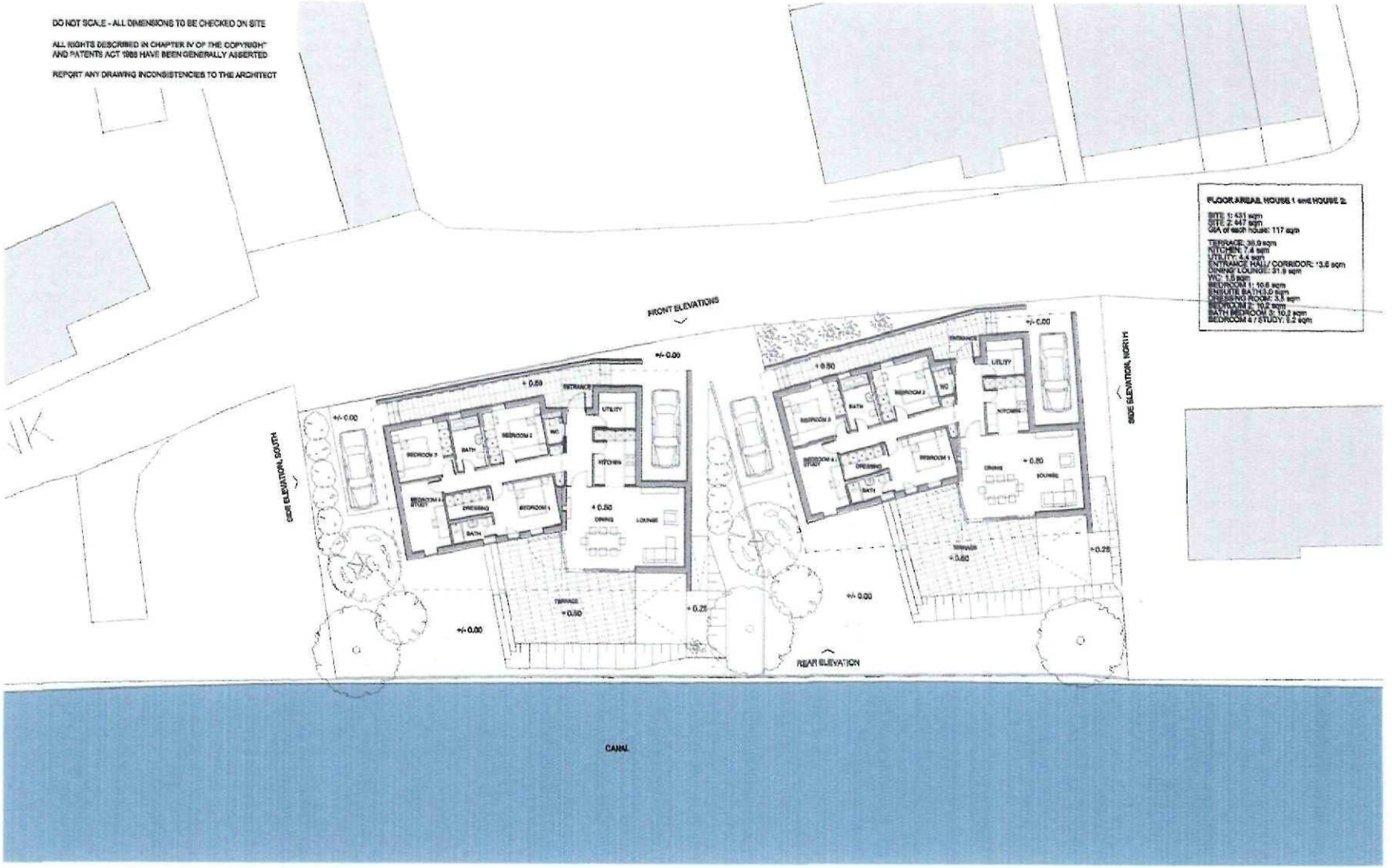
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REPORT ANY DRAWING INCONSISTENCIES TO THE ARCHITECT



FLOOR AREAS, HOUSE 1 and HOUSE 2:

SITE: 1: 631 sqm
SITE: 2: 643 sqm
GIA of each house: 117 sqm

TERRACE: 36.9 sqm
KITCHEN: 7.4 sqm
UTILITY: 4.4 sqm
ENTRANCE HALL/ CORRIDOR: 13.6 sqm
DINING/ LOUNGE: 31.9 sqm
WC: 1.8 sqm
BEDROOM 1: 10.6 sqm
ENSUITE BATH:3.0 sqm
DRESSING ROOM: 3.5 sqm
BEDROOM 2: 10.6 sqm
BATH BEDROOM 2: 10.2 sqm
BEDROOM 4 / STUDY: 8.2 sqm

NOTES:

REVISIONS:

			8 RIVER BANK SPALDING
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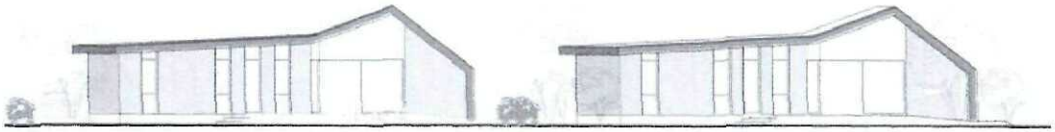
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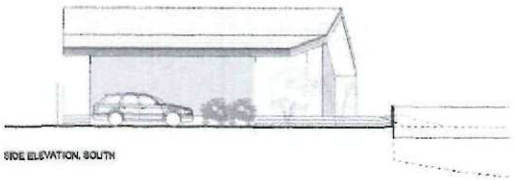
FRONT ELEVATION FROM ENTRANCE



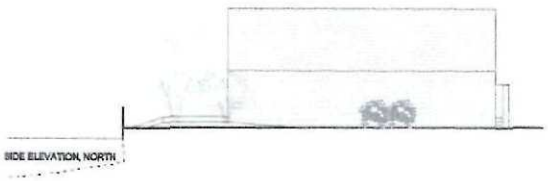
FRONT ELEVATION FROM STREET



REAR ELEVATION



SIDE ELEVATION, SOUTH



SIDE ELEVATION, NORTH

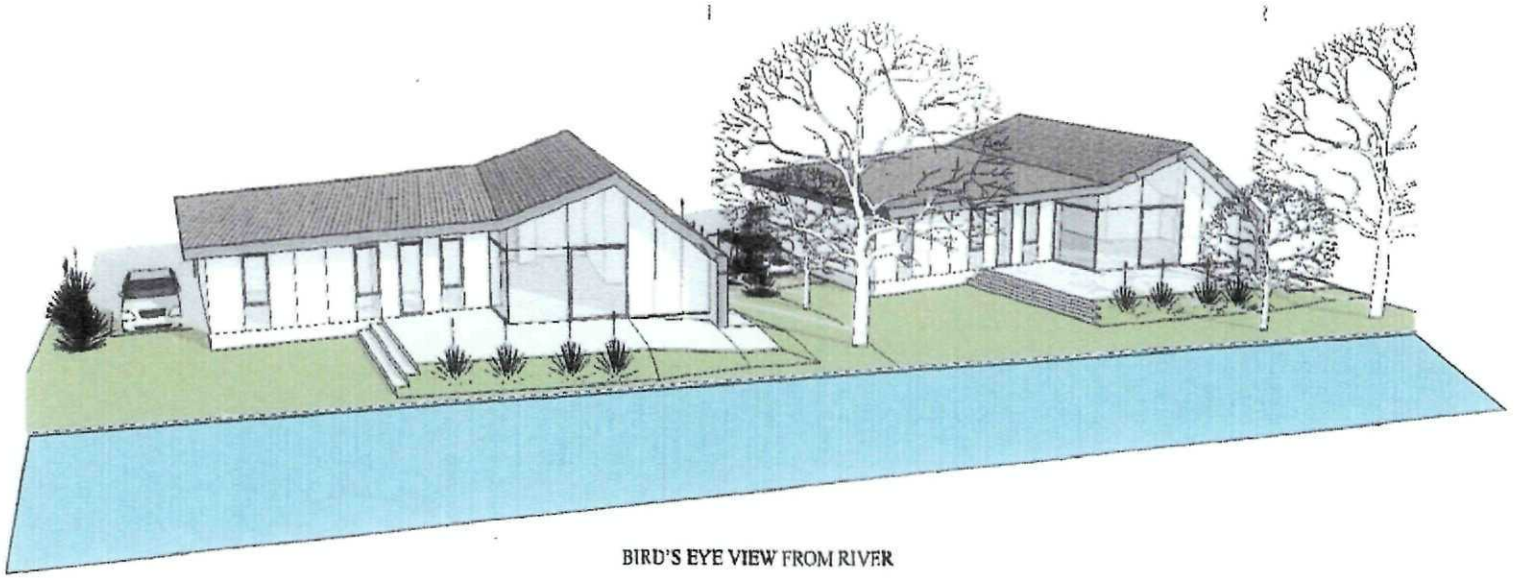
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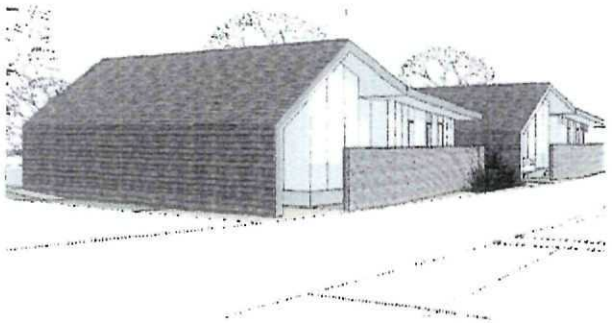
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3D SKETCHES



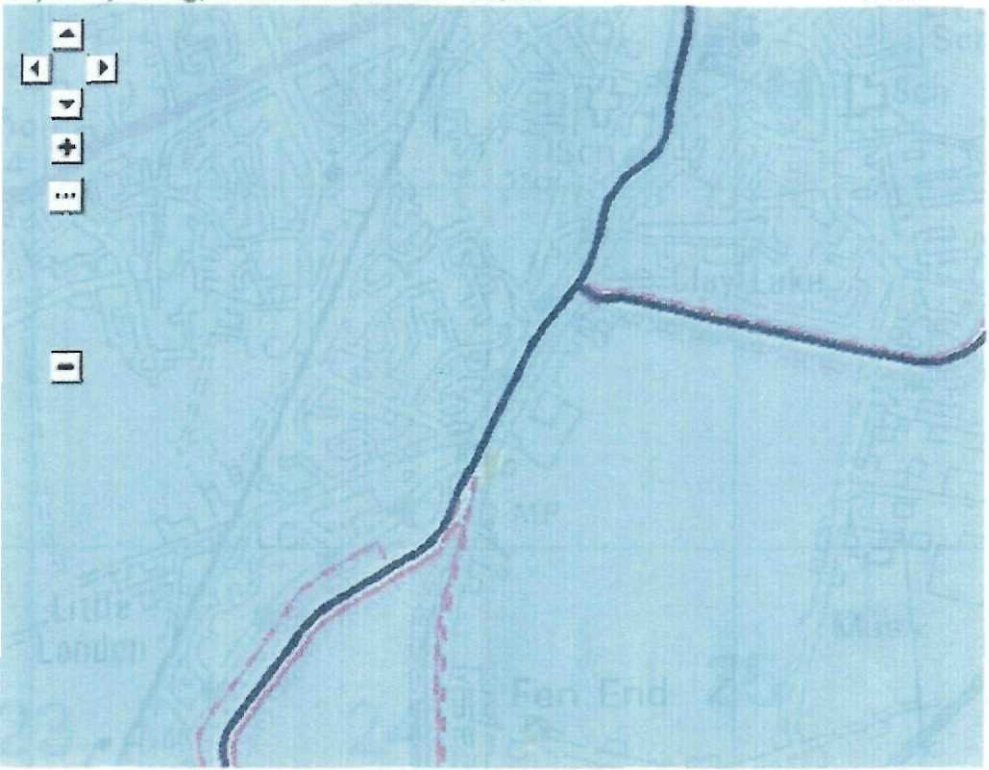
BIRD'S EYE VIEW FROM RIVER



STREET VIEW

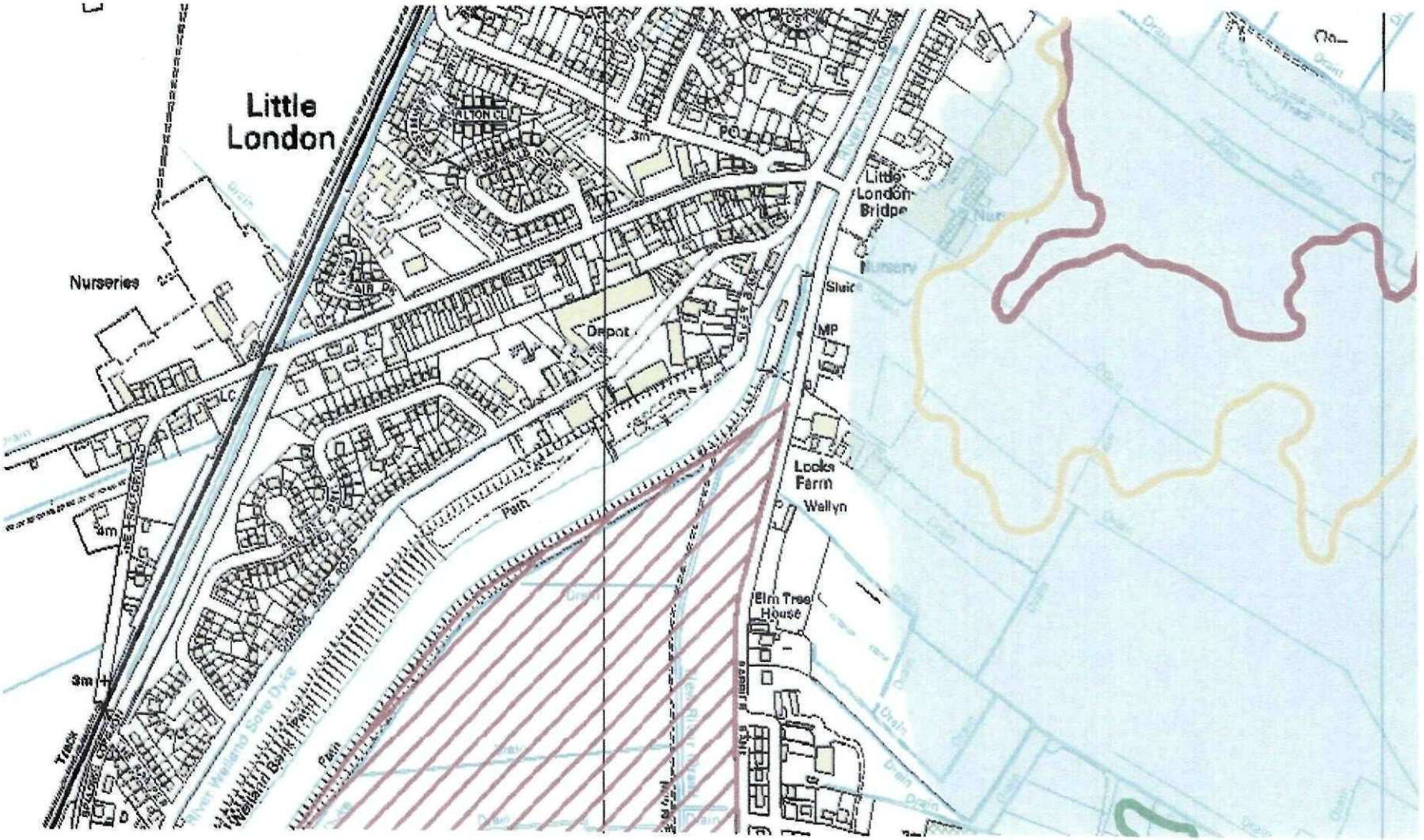
Map of Spalding, Lincolnshire at scale 1:20,000

Map Legend

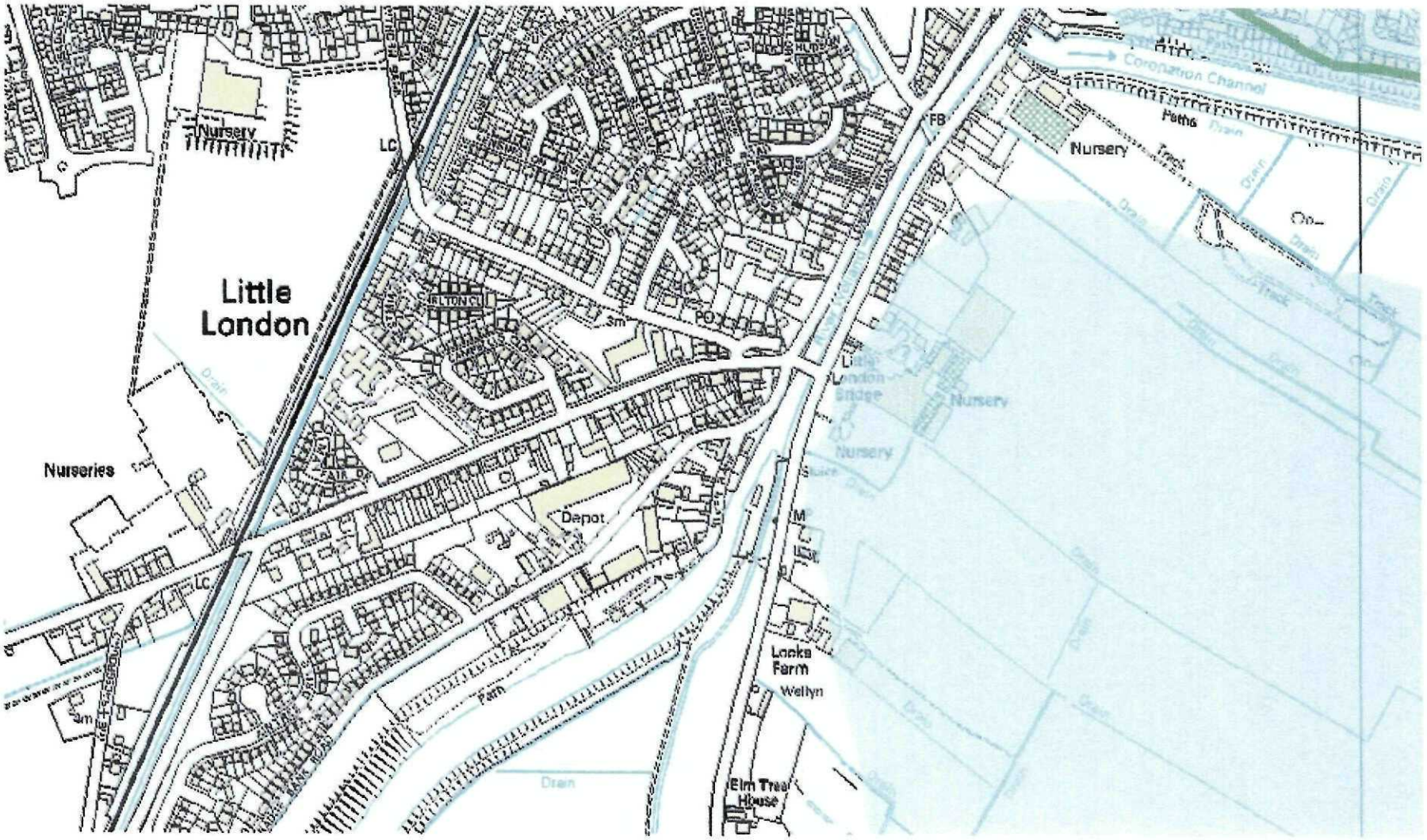


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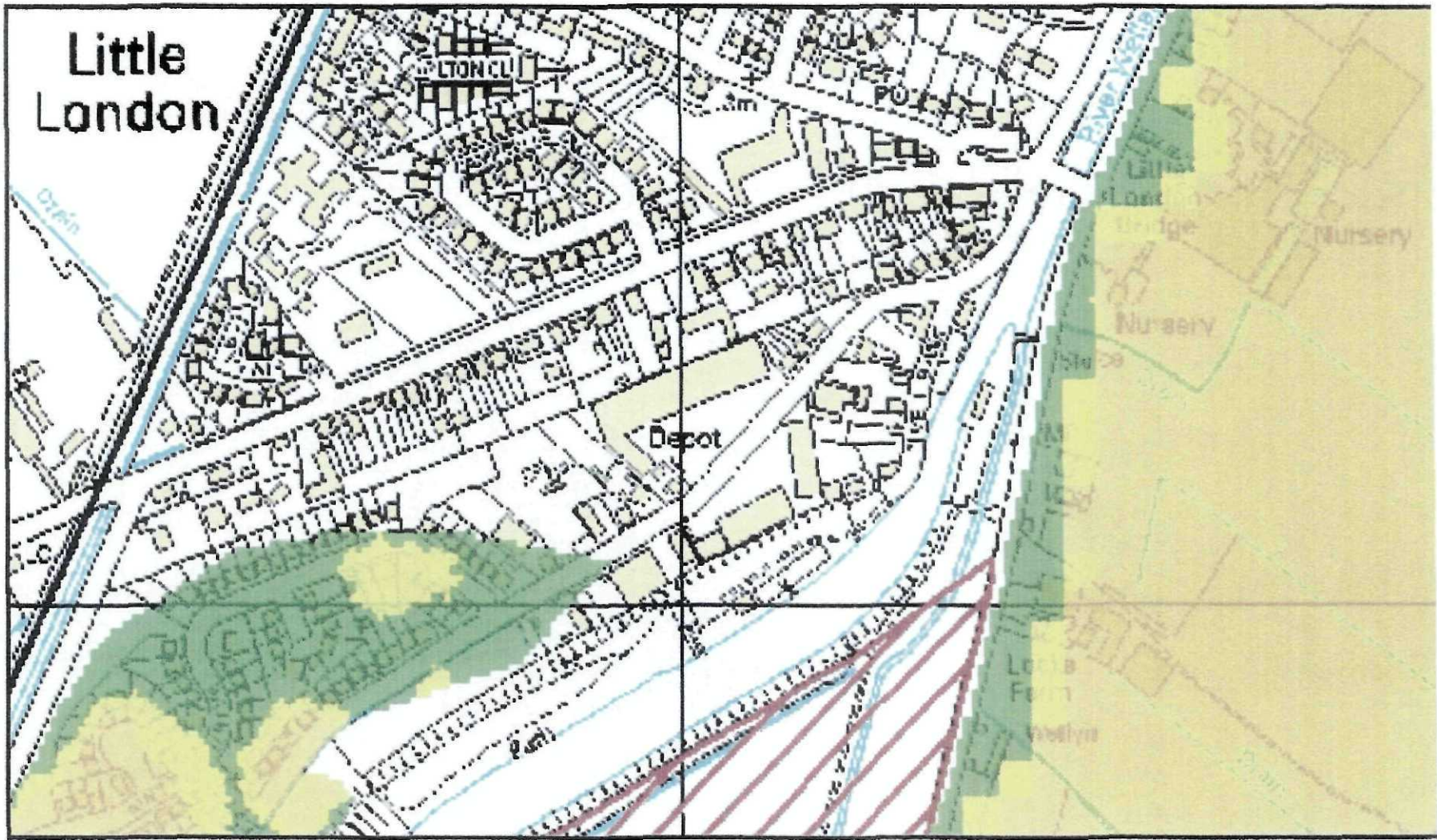
Actual Flood Extent
2115 Spalding

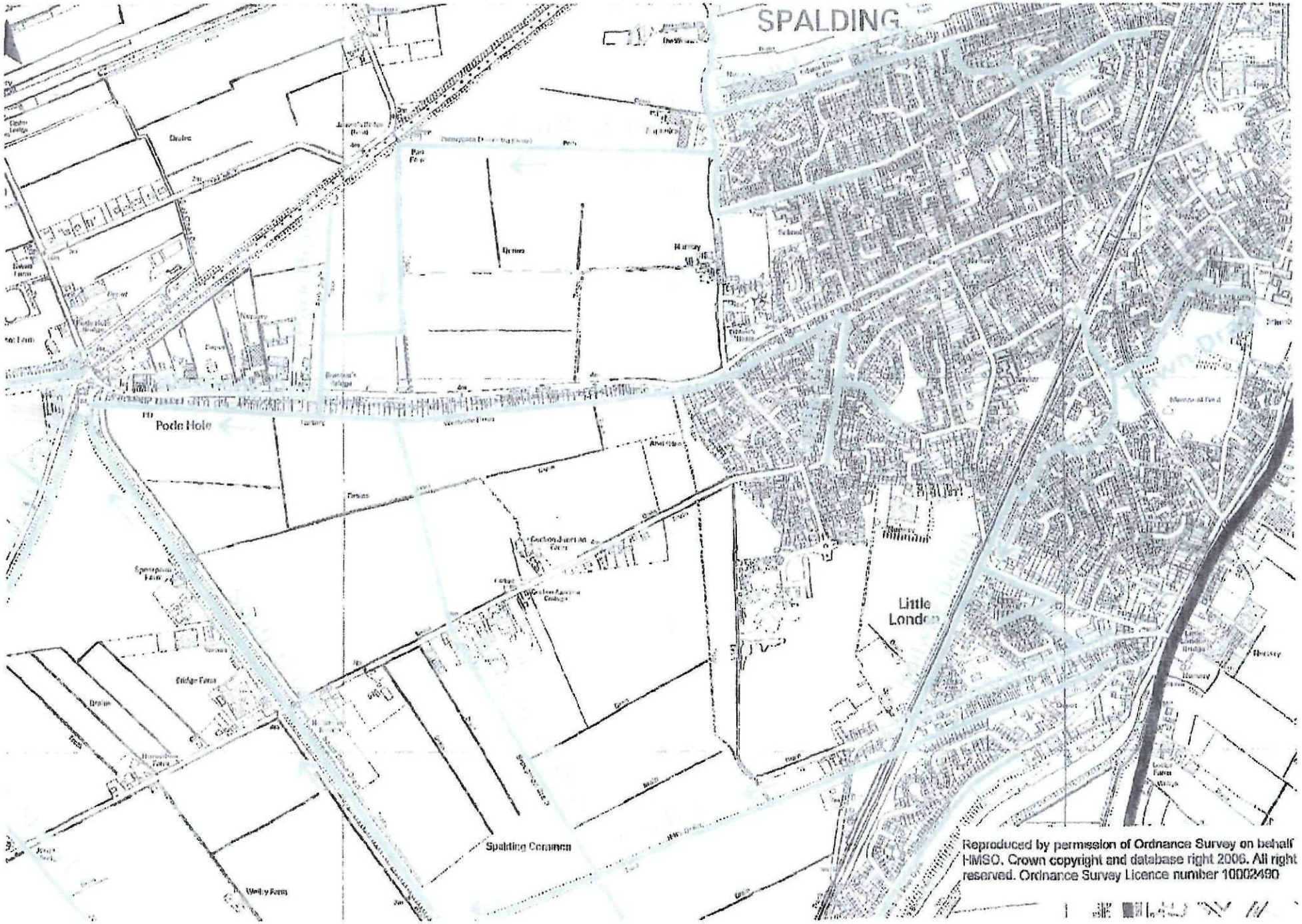


Actual Flood Extent
2115 - 1000 Spalding



Residual Flood Hazard
Spalding 2115 — 1 Fluvial 05 Tidal




SPALDING
Pode Hole
Spalding Common
Little
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Resident Flood Hazard
Spalding 2115 — 1 Fluvial or Tidal

