

**FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT
AT CHURCH STREET/WHARF STREET,
SUTTON BRIDGE, Lincs.**

FINAL REPORT

GEOFF BEEL CONSULTANCY

JUNE 2015

GCB/STATUS DESIGN

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1.0 INTRODUCTION

- 1.1 A full planning application is to be submitted by Status Design on behalf of Miss Sophie Hallam for proposed residential development at the junction of Church Street/Wharf Street, Sutton Bridge.
- 1.2 Planning approval requires a Flood Risk Assessment to be submitted to the Environment Agency to meet the requirements and general principles contained in Paragraph 9 of the Technical Guidance to the National Planning Policy Framework (NPPF).

The site is located within Flood Zone 3 as detailed on the Environment Agency's Flood Zone Maps. The latest Agency 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.

Furthermore, the site is also shown to be within the Tidal Zone 3 of the South Holland Strategic Flood Risk Assessment Maps and located in the South Holland Internal Drainage Board's area.

- 1.3 Geoff Beel Consultancy was appointed on 19th May April 2015 to undertake a Flood Risk Assessment.

2.0 LOCATION

- 2.1 The development site is located at the junction of Church Street and Wharf Street being west of the River Nene tidal defences at Sutton Bridge. The National Grid Reference of the central point of the site is TF 47952125.
- 2.2 The position and extent of the site is shown on Fig 1 – Partial Topographical Survey at the end of the document.
- 2.3 The site, located within the South Holland Internal Drainage Board area is shown within Flood Zone 3 as detailed on both the Environment Agency Flood Zone Maps and the Council's Strategic Flood Risk Assessment Flood Zone Maps.

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is currently waste ground.
- 3.2 The area of development is approximately 300 square metres with vehicular access to Wharf Street. Land level at the site is generally at 3.80m aOD.
- 3.3 The proposed site layout consists of a pair of two detached town houses. Proposed habitable accommodation floor level of the development is shown at a minimum of 30mm above existing ground level at 4.10m aOD due to other planning issues of the development affecting adjoining properties.

Flood mitigation measures have been incorporated into the development proposals to ensure the safe occupancy and to meet the Exception Test.

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 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 South Holland Internal Drainage Board area at Sutton Bridge is protected by the west embankment of the River Nene tidal defences.

- 4.2 The site and surrounding areas of development drain in a generally northerly direction to discharge into the tidal River Nene as part of the Westmere catchment of the Internal Drainage Board.
- 4.3 The existing standard of drainage for the South Holland Internal Drainage Board 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 900mm is provided to the lowest land levels.
- 4.4 Current maintenance standards within the South Holland Internal Drainage Board and of the Environment Agency tidal defences 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.*

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 sewerage
 - b) local blockages to IDB main drain
 - c) storm return period of 1 in 50 years being exceeded
 - d) overtopping of River Nene tidal defences at Sutton Bridge

- 5.2 The probability of flooding from source a) and b) are low due to the maintenance standards already achieved and managed by Anglian Water and the IDB.

The probability of flooding from c) is also low due to the South Holland 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 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 NPPF 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”.
- 5.4 The possible overtopping and breaching of the tidal River Nene defences at Sutton Bridge is also considered to be low. The Environment Agency has carried out the River Nene Strategic Study Report and concluded that the defences provide a level of protection against the 1 in 200 year’s period tidal event.
- 5.5 Further hydraulic modelling has been carried out by the Environment Agency of the impacts of a breach occurring to the Sutton Bridge tidal defences. The present day scenario is such the maximum depth of flooding would be up to 0.5m with a low to medium Danger Hazard rating.

By the year 2115, with no further improvements carried out to the Sutton Bridge tidal defences the scenario deteriorates such that the maximum depth of flooding would be up to 2.0m with a High Danger Hazard rating.

- 5.6 The potential maximum velocity of the floodwaters in 2115 is shown as at least 1.0m/sec and the dwellings will be designed to withstand the hydrostatic pressures resulting from the floodwaters.
- 5.7 Safe refuge is provided with all sleeping accommodation at first floor level.

6.0 EXTENT OF KNOWN FLOODING

- 6.1 During the preparation of this assessment, evidence was discovered of part of the site being flooded and adjoining properties during the tidal surge event of January 1978 since when tidal defences have been raised and strengthened to a 1 in 200 year standard of protection. No flooding occurred as a result of the most recent River Nene tidal surge event of 5th December 2013.

7.0 PROBABILITIES AND TRENDS OF FLOODING

- 7.1 The probability of this development flooding from localised drainage systems is low.
- 7.2 The probability of the site flooding with water from any South Holland main drain 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 The probability of the site flooding with tidal waters from the River Nene is less than 0.5% because of the standards of the existing flood defences and the location of the site. If the trend of climate change anticipated to occur continues over the next 100 years, the defences are considered adequate to sustain the 1 in 200 year standard of protection.
- 7.4 If under very extreme events, levels of floodwater from the South Holland main drains 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.
- 7.5 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 above existing ground level and flood resilient construction 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 due to the existing standards of tidal defence, however a precautionary approach has been adopted to protect against the remote possibility of tidal overtopping to the River Nene tidal defences.
- 8.2 Habitable floor levels of the development will be above existing ground level at a minimum of 4.10m aOD with flood resilient construction 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 any of the South Holland main drain 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 as being discharged to existing public surface water sewerage.

- 8.5 The developer will 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.

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: 0845 988 1188 and the occupiers will be required to register with the Floodline Direct Warning Service to receive any future flood warnings.

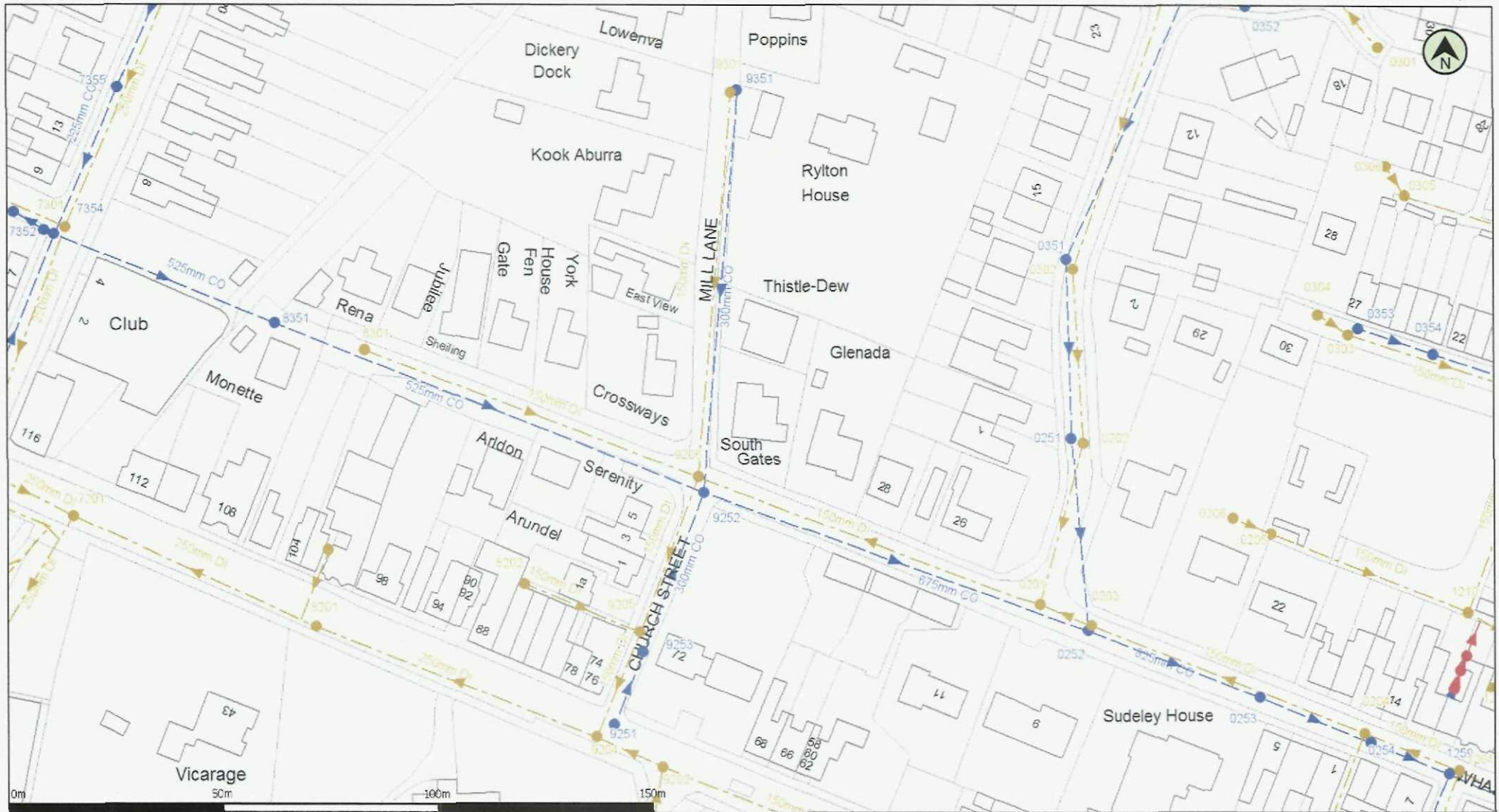
- 8.6 A Flood Evacuation Plan will be prepared for approval by the South Holland District Council Emergency Planner. The Plan will identify access to Bridge Road in an easterly direction to land in Flood Zone 1.

9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme events is low on this site, because of its location, existing tidal flood defences and the standard of surface water drainage already provided.
- 9.2 Although within Flood Zone 3 according to NPPF classification, the site actually has a 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.
- 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 years 2002 and 2052 to account for the effects of climate change.

- 9.4 As a result of the Strategic Flood Risk Assessment the South Holland IDB area has been determined as providing protection against a 1 in 100 year return period event whilst the River Nene tidal defences at Sutton Bridge provide protection against a 1 in 200 year return period event.



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Date: 25/06/15

Scale: 1:1250

Map Centre: 547939,321306

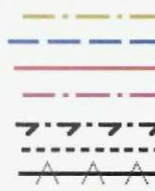
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Our Ref: 146932 - 1

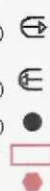
Wastewater Plan A4

This plan is provided by Anglian Water pursuant to its obligations under the Water Industry Act 1991 sections 198 or 199. It must be used in conjunction with any search results attached. The information on this plan is based on data currently recorded but position must be regarded as approximate. Service pipes, private sewers and drains are generally not shown. Users of this map are strongly advised to commission their own survey of the area shown on the plan before carrying out any works. The actual position of all apparatus MUST be established by trial holes. No liability whatsoever, including liability for negligence, is accepted by Anglian Water for any error or inaccuracy or omission, including the failure to accurately record, or record at all, the location of any water main, discharge pipe, sewer or disposal main or any item of apparatus. This information is valid for the date printed. The plan is produced by Anglian Water Services Limited from Ordnance Survey © Crown Copyright, 100022432. This map is to be used for the purposes of viewing the location of Anglian Water plant only. Any other uses of the map data or further copies is not permitted. This notice is not intended to exclude or restrict liability for death or personal injury resulting from negligence.

Foul Sewer
Surface Sewer
Combined Sewer
Final Effluent
Rising Main
(Colour denotes effluent type)
Private Sewer
(Colour denotes effluent type)
Decommissioned Sewer
(Colour denotes effluent type)



Outfall
(Colour denotes effluent type)
Inlet
(Colour denotes effluent type)
Manhole
(Colour denotes effluent type)
Sewage Treatment Works
Pumping Station



geoff.beel@tiscali.co.uk

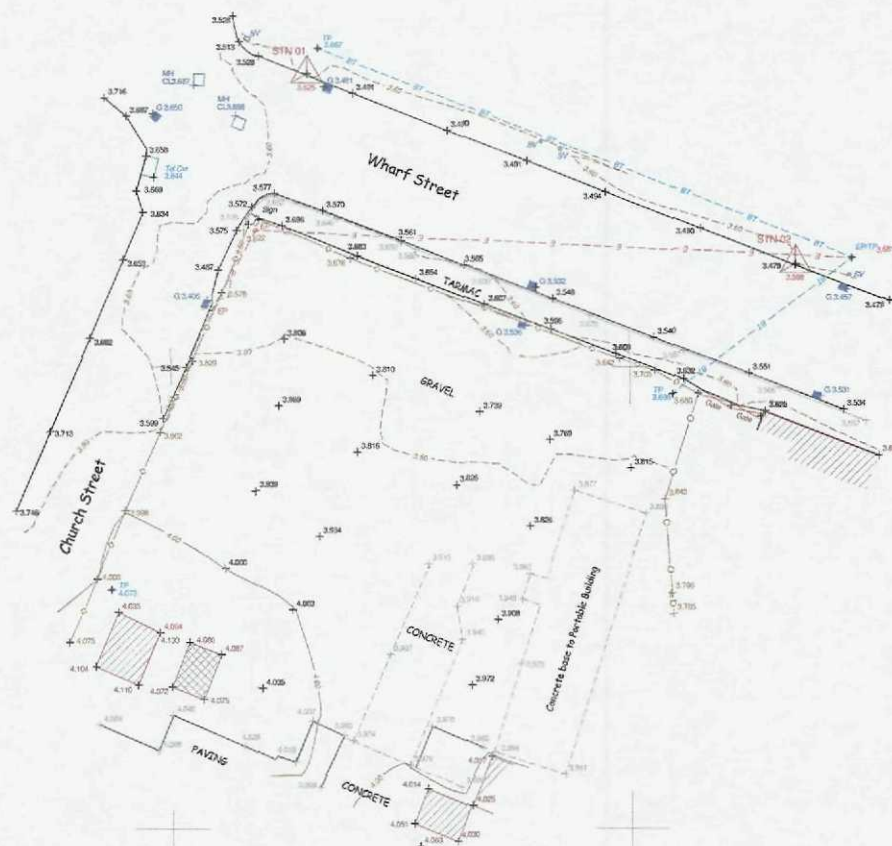
Wharf Street

love every drop
anglianwater

Key

SURVEY STATIONS				
Name	Griding	Northing	Height	Remark
STN 01	547300.2407	327150.8507	3.602	P.V. MALL
STN 02	547300.0004	327150.6117	3.598	P.V. MALL

The survey grid is the National Grid obtained from ETR589 GPS
Coordinates with OSTN02 transformation. Levels shown to Ordnance
Survey datum using ETR589 GPS with OS6M02 transformation.
Surveyed boundary features are not necessarily legal boundaries.
All utilities have been identified to the best of the surveyors knowledge.
The correct identification can not be 100% guaranteed and should be
independently verified prior to use in any design or building works.
Services may be obscured by parked cars, leaf litter or building materials etc.



Lincolnshire Surveys

John K Rowan ACABE

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Market Rasen, Lincolnshire LN8 3XN
Telephone: 01673 838464
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Project

Land at corner of
Church Street & Wharf Street
Sutton Bridge

Client

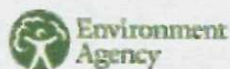
SRC Ltd

Title

Partial Topographical Survey

Surveyor		Client Ref:	
JKR		TEALBY	
DATE	May 2015	Drawn By	JKR
SCALE	1:200@A2	Checked By	JKR
CONTRACT NUMBER	15036	REVISION	
DRAWING NUMBER	01		*

ORIGINAL PAPER SIZE A2
Please quote Contract No., Drawing No. & Revision in all Correspondence



Enter a postcode or place name:

Sutton Bridge, Lincolnshire



Other topics for this area...

Flood Map for Planning (Rivers and Sea)



Flood Map for Planning (Rivers and Sea)

Map legend

Click on the map to see what Flood Zone (National Planning Policy Guidance definitions) the proposed development is in.

☒ Flood Map for Planning (Rivers and Sea)

Flood Zone 3

Flood Zone 2

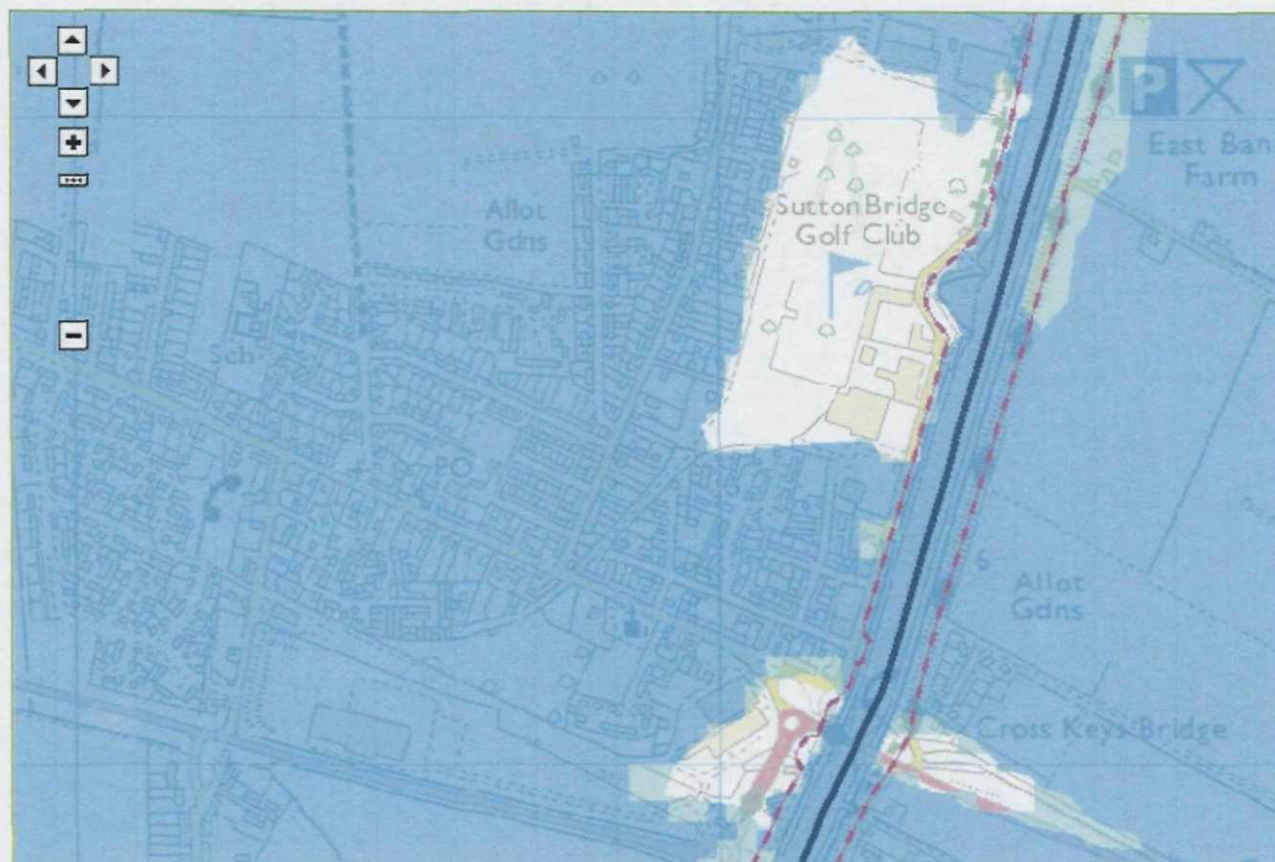
Flood defences (Not all may be shown*)

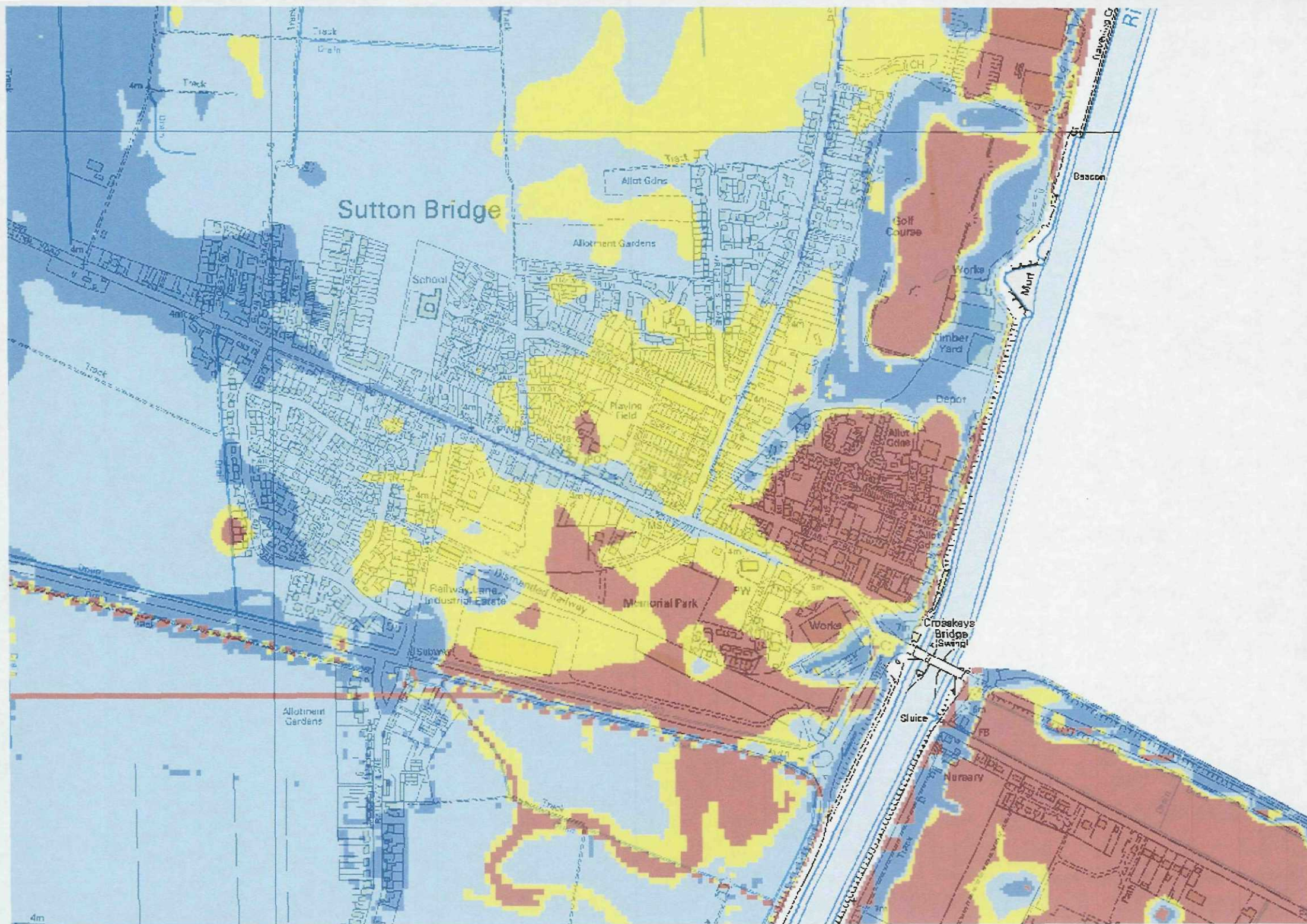
Areas benefiting from flood defences (Not all may be shown*)

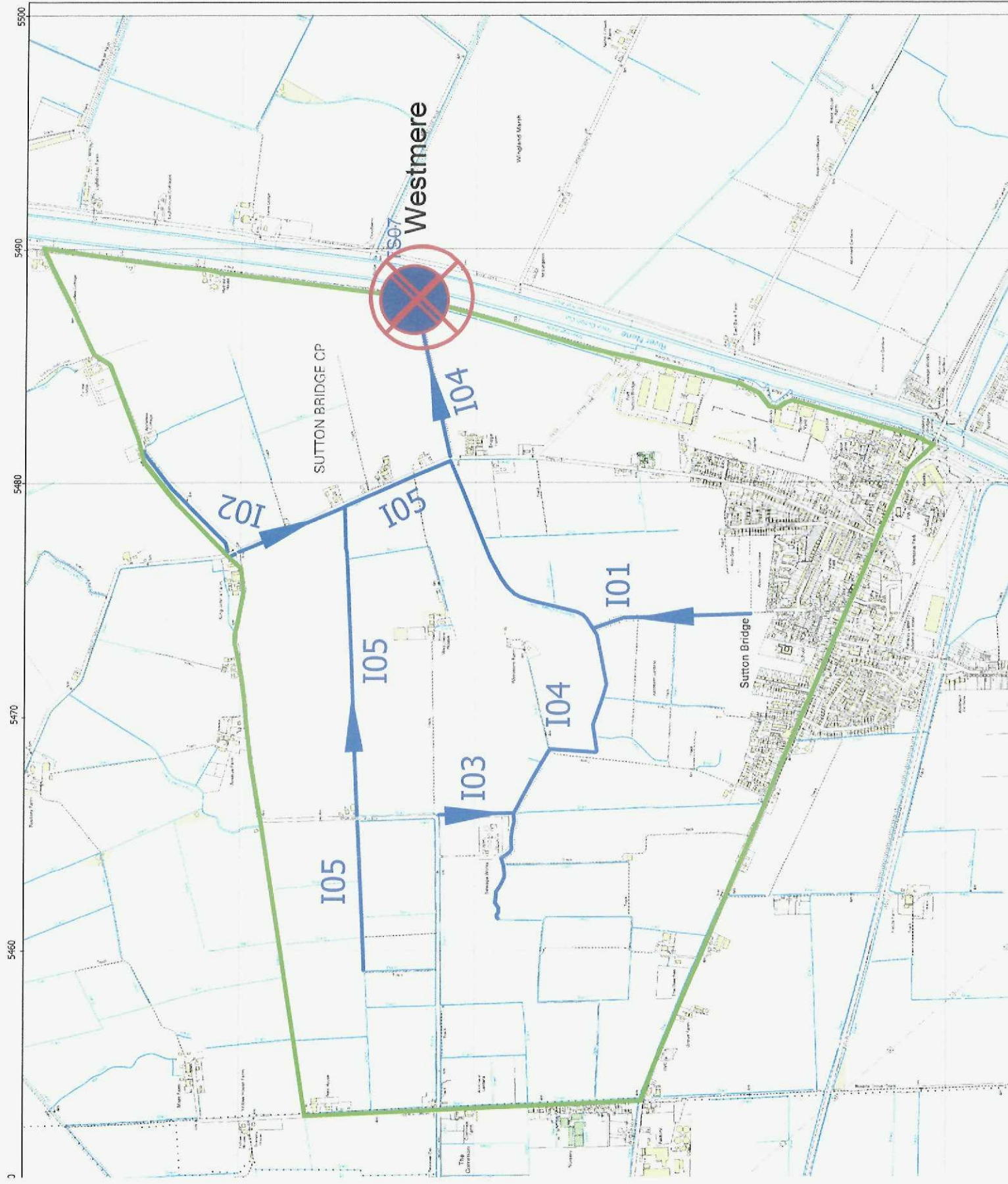
☒ Main Rivers

River line

Sutton Bridge, Lincolnshire at scale 1:10,000

[Other maps](#)[Data search](#)[Text only version](#)





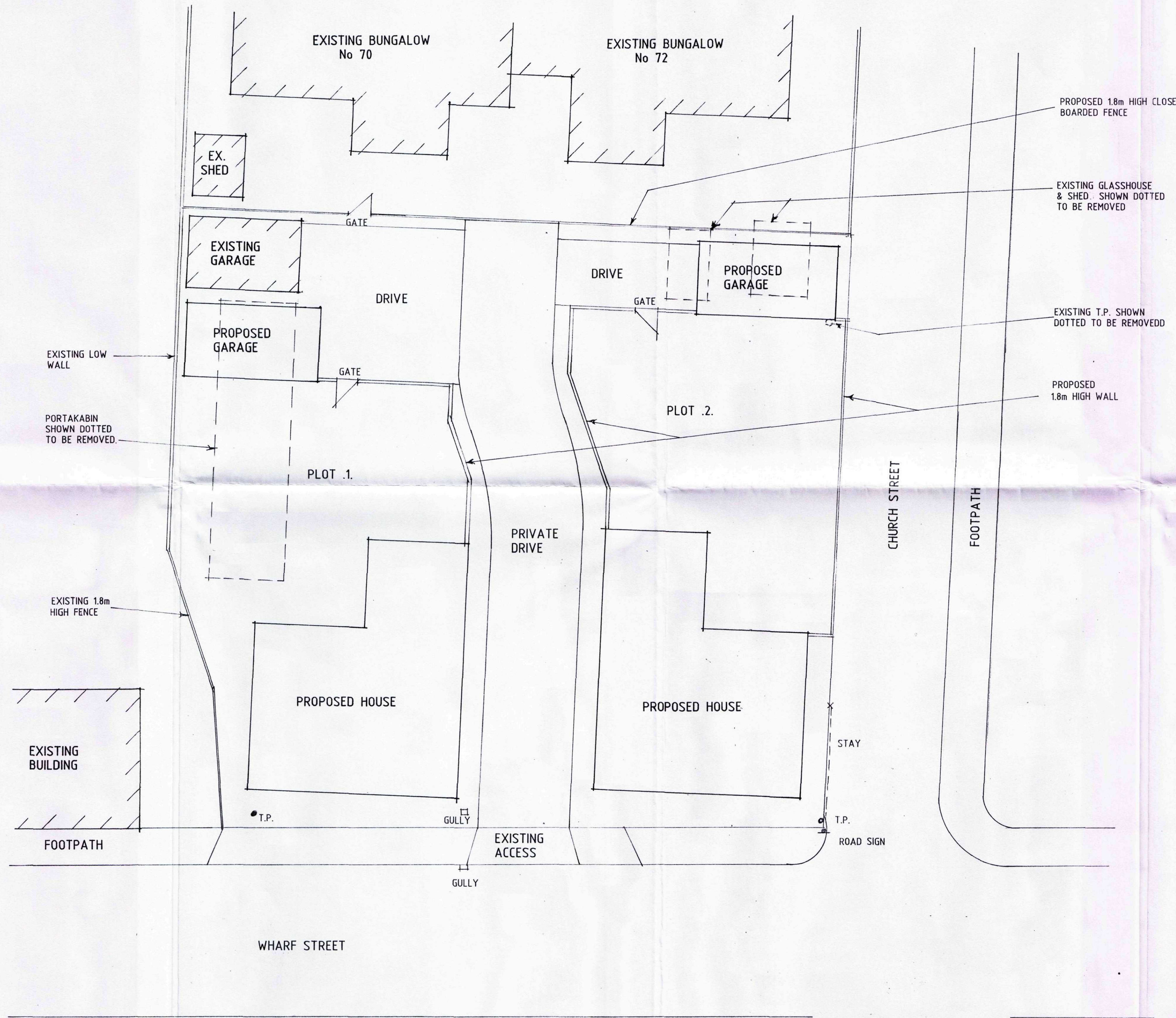
5460 5470 5480 5490 5500

HOUSES

PLOT .1. - SD15-006/2 HANDED
PLOT .2. - SD15-006/2

NOTE

GROUND FLOOR LEVEL TO BE 300mm ABOVE
GROUND LEVEL FOR BOTH HOUSES



THIS DRG. TO BE READ IN CONJUNCTION WITH
SD15-006/2

B - IMF. ADDED - 30.4.15
A - IMF. ADDED - 20.2.15

Status
DESIGN
CONSULTANTS IN ARCHITECTURE & PLANNING

PROPOSED 2No HOUSES
WITH GARAGES AT CHURCH
STREET / WHARF STREET
SUTTON BRIDGE FOR

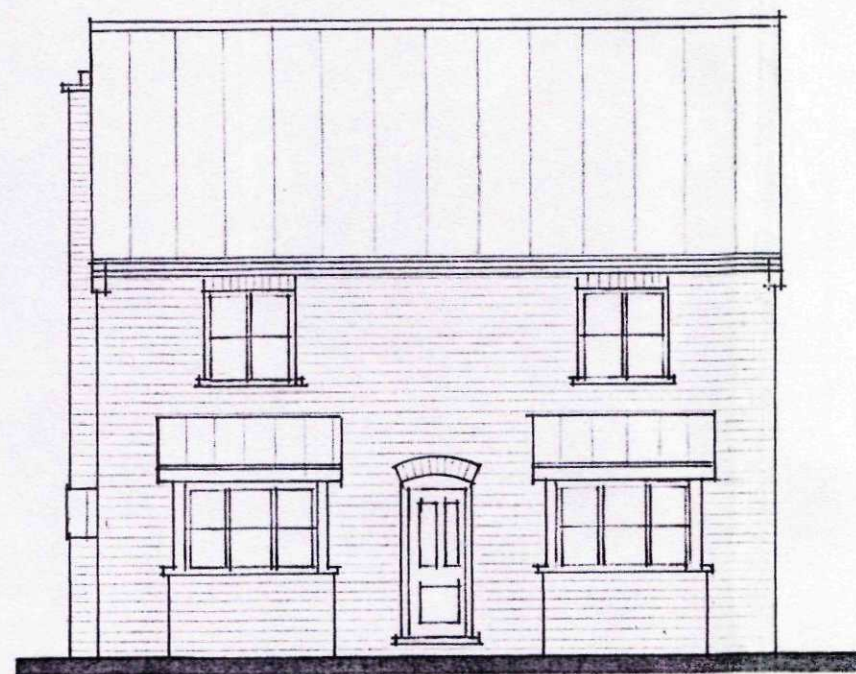
MISS SOPHIE HALLAM.

SITE LAYOUT

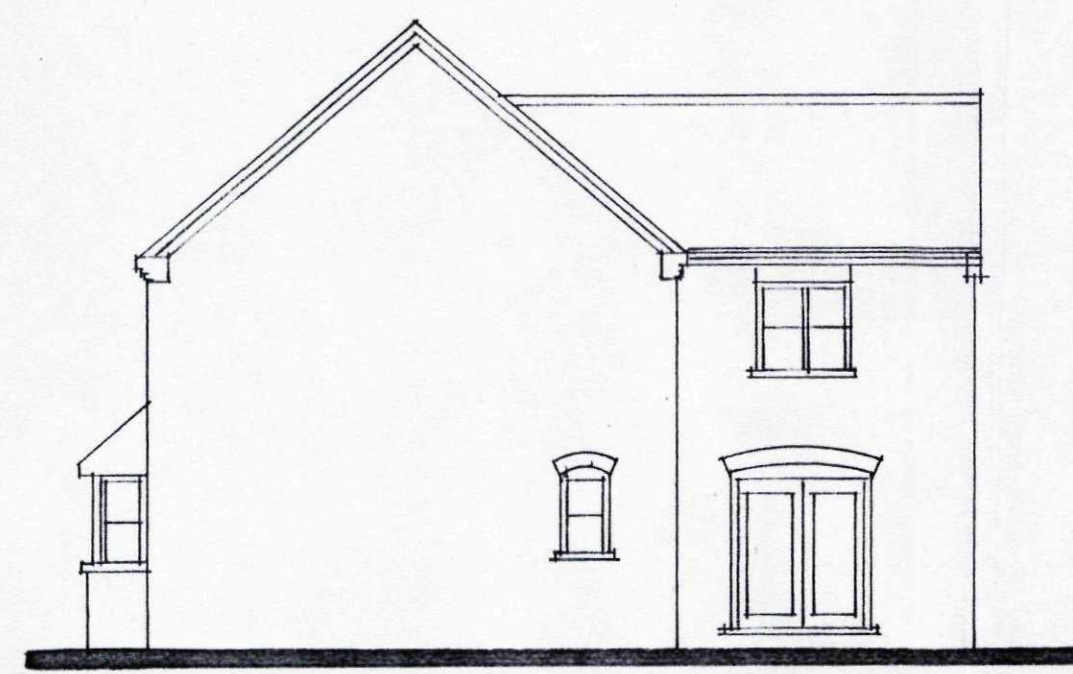
1:100 | SD15-006/1
FEB-15 | B.GILHAM.

2 Edinburgh Walk, Holbeach,
Spalding, Lincs. PE12 7AP.
Tel: 01406 426363 Fax: 01406 490702

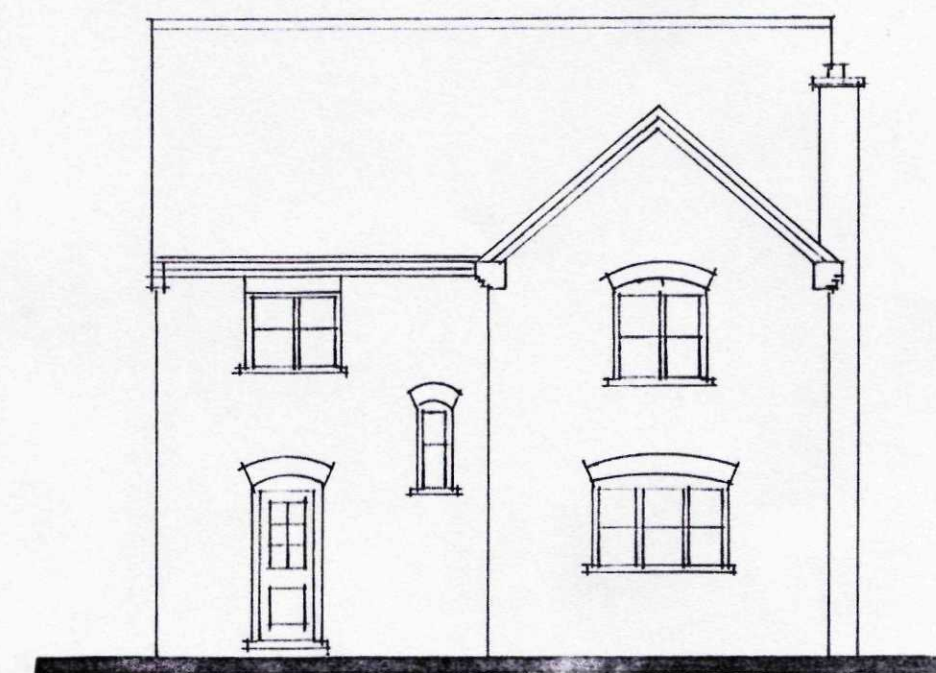




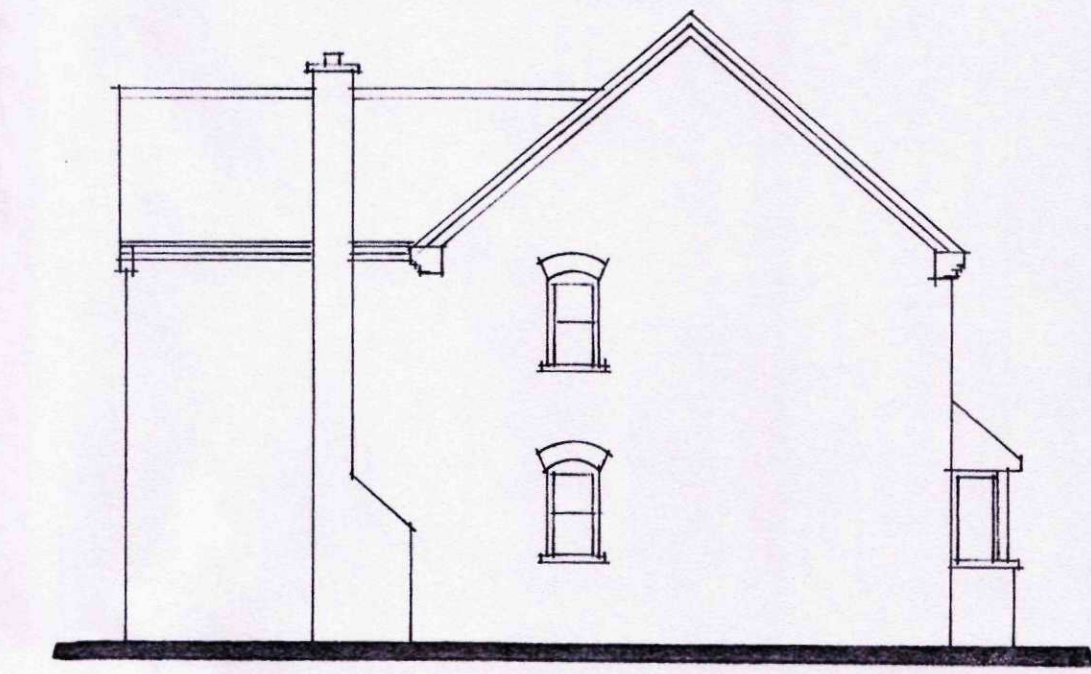
FRONT



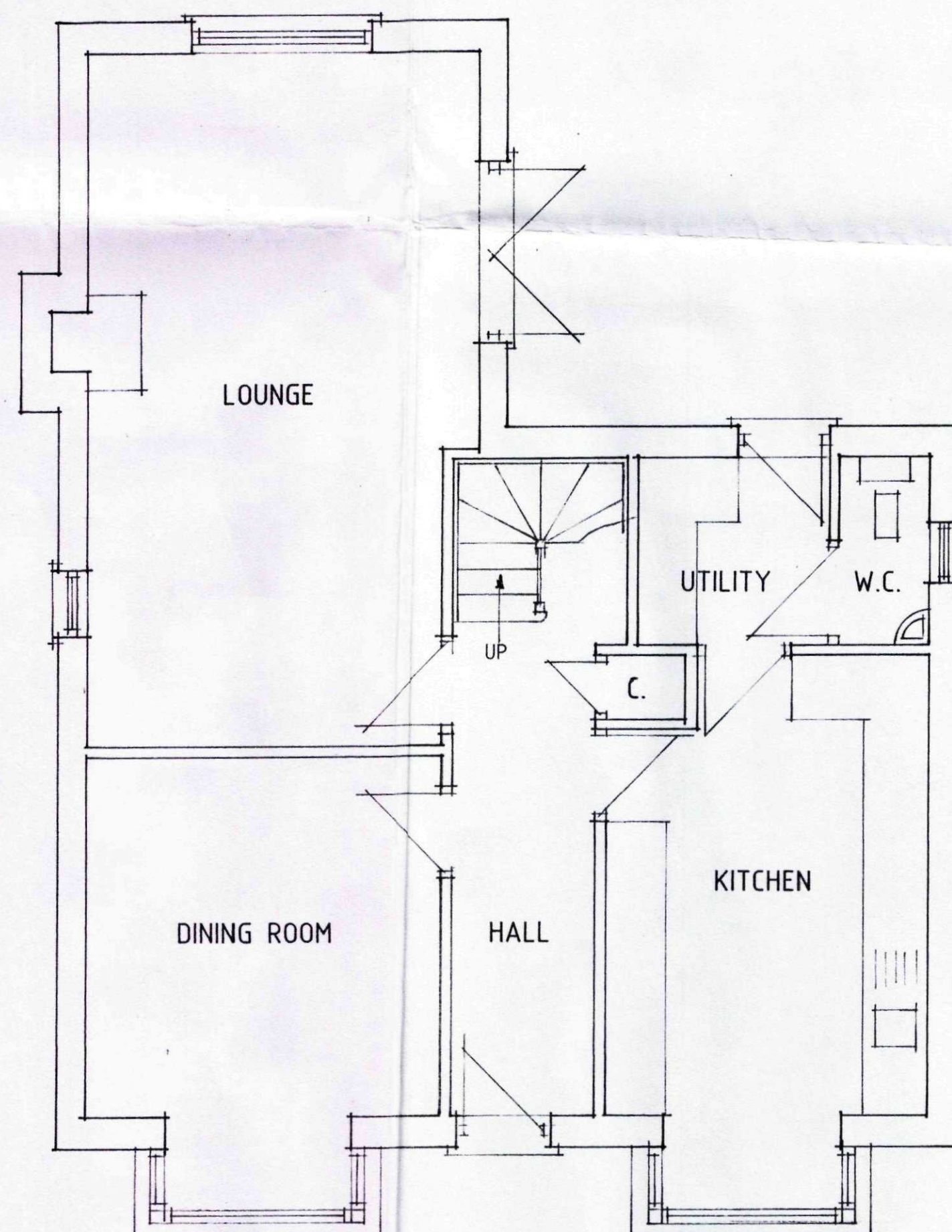
SIDE



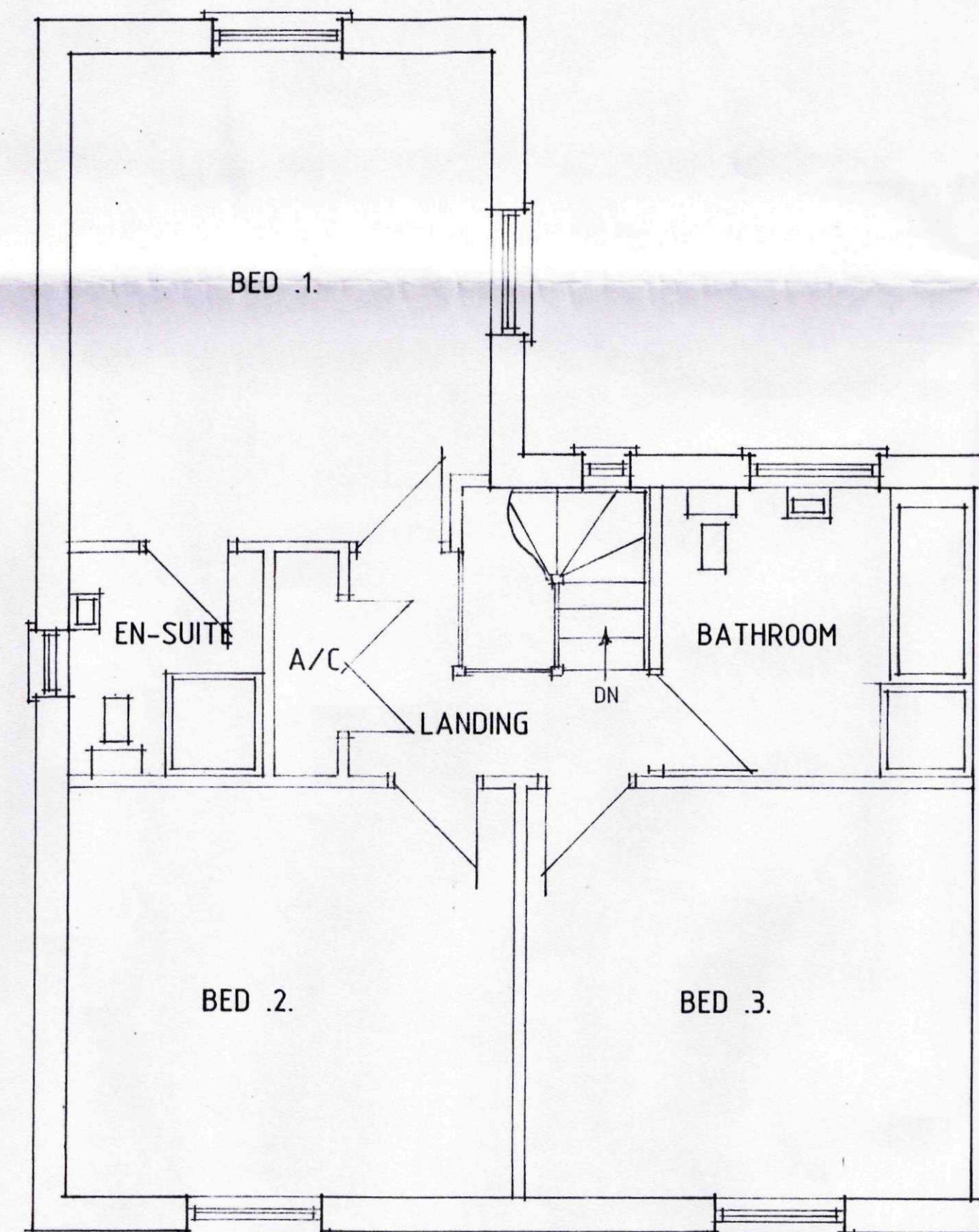
REAR



SIDE



GROUND FLOOR PLAN



FIRST FLOOR PLAN

A - IMF. ADDED - 19.2.15

Status
DESIGN
CONSULTANTS IN ARCHITECTURE & PLANNING

PROPOSED 2No HOUSES
WITH GARAGES AT CHURCH
STREET / WHARF STREET,
SUTTON BRIDGE FOR

MISS SOPHIE HALLAM.

DRAFT
HOUSE DESIGN

1:50 1:100 SD15-006/2
FEB-15 B.GILHAM.

2 Edinburgh Walk, Holbeach,
Spalding, Lincs. PE12 7AP.
Tel: 01406 424343 Fax: 01406 490702

