

**FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT
AT CLOOT DROVE, CROWLAND, LINCS.**

FINAL REPORT

GEOFF BEEL CONSULTANCY

JANUARY 2019

GCB/BOOR

DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment in support of a planning application for Residential Development at Cloot House, Cloot Drove, Crowland, Lincs.

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1.0 INTRODUCTION

- 1.1 A full planning application is to be submitted by Robert Boor on behalf of Mr & Mrs A Branton for residential development at Cloot House, Cloot Drove, Crowland.
- 1.2 Planning approval requires a Flood Risk Assessment to be submitted to the Environment Agency and to meet the requirements and general principles contained in the Planning Practice Guidance to the National Planning Policy Framework (NPPF) as the site is shown as situated in Flood Zone 2 of the Environment Agency Flood Map for Planning.

The latest Agency Maps have been created as a tool to raise awareness of flood risk with the public sector 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 located in the North Level IDB district and shown in a Low Hazard Zone of the South East Lincs. Strategic Flood Risk Assessment in year 2115.

- 1.3 Geoff Beel Consultancy was appointed on 4th December 2018 to undertake a Flood Risk Assessment.

2.0 LOCATION

- 2.1 The development site is located at Cloot House, Cloot Drove, Crowland. The National Grid Reference of the central point of the site is TF 24801432.
- 2.2 The position and extent of the site are shown on Fig 1 – Location Plan at the end of the document.
- 2.3 The site is shown within Flood Zone 2 as detailed on the Environment Agency Flood Map for Planning and is located within the North Level Internal Drainage Board district.
- 2.4 The site is also shown in a Low Hazard Zone of the South East Lincs. Strategic Flood Risk Assessment in year 2115.

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is redundant agricultural buildings.
- 3.2 The area of the site is approximately 1.00 hectare with existing access onto Cloot Drove.
- 3.3 The site layout consists the conversion of the redundant agricultural buildings to a two storey dwelling.

- 3.4 The Sequential Test and Exception Test will require to be applied by the Local Authority but the development may be permitted as the site is protected against the 1 in 100 year return period fluvial event and meets the requirements of NPPF.

The Sequential Test is met as the site is located in a Low Hazard Zone of the South East Lincs. Strategic Flood Risk Assessment.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

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 North Level drainage area is protected by flood embankments of the Folly River, the River Welland and the Crowland and Cowbit Washes against a flood return period event of 1 in 100 years plus climate change.

- 4.2 The site and adjoining agricultural land is located within the North Level Internal Drainage Board district with the nearest 'main drain' open watercourse 350m south east of the site. Land level at the site varies between 2.03m and 3.31m aOD.

- 4.3 The existing standard of drainage for the Postland district of the North Level Internal Drainage Board area is a minimum of 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 levels offering further storage in channel against higher return period flood events.

The site and surrounding land drains by gravity to the Board's Postland Pumping Station to discharge into the River Welland.

- 4.4 Current maintenance standards within the North Level Internal Drainage Board district are 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 Board's 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.

- 4.5 The flood defences of the River Welland are similarly well maintained by the Environment Agency and their asset condition regularly inspected.

The Crowland & Cowbit Washes are located immediately west of the site and provide protection against the 1 in 1000 year flood event. The Crowland & Cowbit flood embankment is nowadays a designated structure within the terms of the Reservoirs Act 1975 legislation.

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 IDB main drain
- b) Storm return period of 1 in 50 years being exceeded
- c) Failure of Postland Pumping Station
- d) Breaching of fluvial flood embankments to the River Welland

- 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 Postland 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 Failure of Postland Pumping Station may occur due to long term mechanical breakdown or power supply being disrupted. However in these circumstances, if conditions were such as 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 River Welland between Peakirk 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 located alongside the River Welland and combined together offer protection of a minimum 1 in 100 year return period plus climate change.

The last time any breaching of flood defences occurred in this particular section of river was 1947, since when substantial investment has been made to improve the standard of protection.

The Crowland and Cowbit Washes flood embankment is a designated structure under the Reservoirs Act 1975. A flood study has been carried out by the Environment Agency to meet the legislation requirements and one small recommendation to review and update the current flood operational procedures has been completed.

The risk of a breach or overtopping occurring to the River Welland defences is considered remote. The South East Lincs. Strategic Flood Risk Assessment Hazard Maps for year 2115 take into account the possible breaching of the Crowland and Cowbit Washes flood embankment.

The site is located in a Low Hazard Zone of the Residual Hazard Map with a potential Residual Flood Depth of between 0.00-0.50m as a result of a breach to the nearby River Welland defences in year 2115.

6.0 EXTENT OF KNOWN FLOODING

- 6.1 During the preparation of this assessment, no evidence was discovered of the site being flooded.

7.0 PROBABILITIES AND TRENDS OF FLOODING

- 7.1 The probability of this brownfield development flooding from localised drainage systems is very low because of the existing standards of drainage within the IDB system.

Surface water run-off from the development will be discharged to soakaways designed to BRE365 requirements and Building Regulations approval.

- 7.2 The probability of the site flooding with water from any main river system or from the arterial drainage system is less than 0.5% because of the standards of the existing flood defence systems and the location of the site.
- 7.3 If under very extreme events, levels of floodwater from main river or arterial systems rose to such an extent that the site was affected, the situation would not be sudden. It is highly probable that sufficient time would be available to take precautionary actions to limit the extent and potential impacts of flooding.
- 7.4 The water levels in the drainage channels and main river systems will tend to rise as a result of the impacts of climate change. However, the existing systems and defences are such that the standard of protection to the site will be appropriate for the design life of the development (100 years). Finished floor levels will be a maximum of 500 mm above existing ground levels with a further 300 mm of flood resilient construction incorporated above finished floor level.
- 7.5 The site is located immediately adjacent to the main river flood embankments and any overtopping or breaching of the defences is considered to have little effect on the development site. The site is shown in a Low Hazard Zone of the South East Lincs. Strategic Flood Risk Assessment in year 2115.

8.0 IMPACTS OF FLOODING

- 8.1 No significant impacts of flooding are anticipated.
- 8.2 Floor level of the development will be raised 500mm above existing ground level with a further 300 mm of flood resilient construction above finished floor level offering additional protection against impacts arising from any extreme short duration, localised events.
- 8.3 The developer will ensure that the occupiers of the dwelling 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. The occupiers of the dwelling should register with the Environment Agency Floodline Direct Warnings Service to receive any future flood warnings.

- 8.4 Safe access and egress to the site is available onto Clout Drove and hence in a northerly direction to Spalding where land is in Flood Zone 1. Safe refuge is available at first floor level of the barn conversion with some sleeping accommodation at ground floor level. Finished floor levels of the barn conversion will be raised a maximum of 500mm above existing ground level.

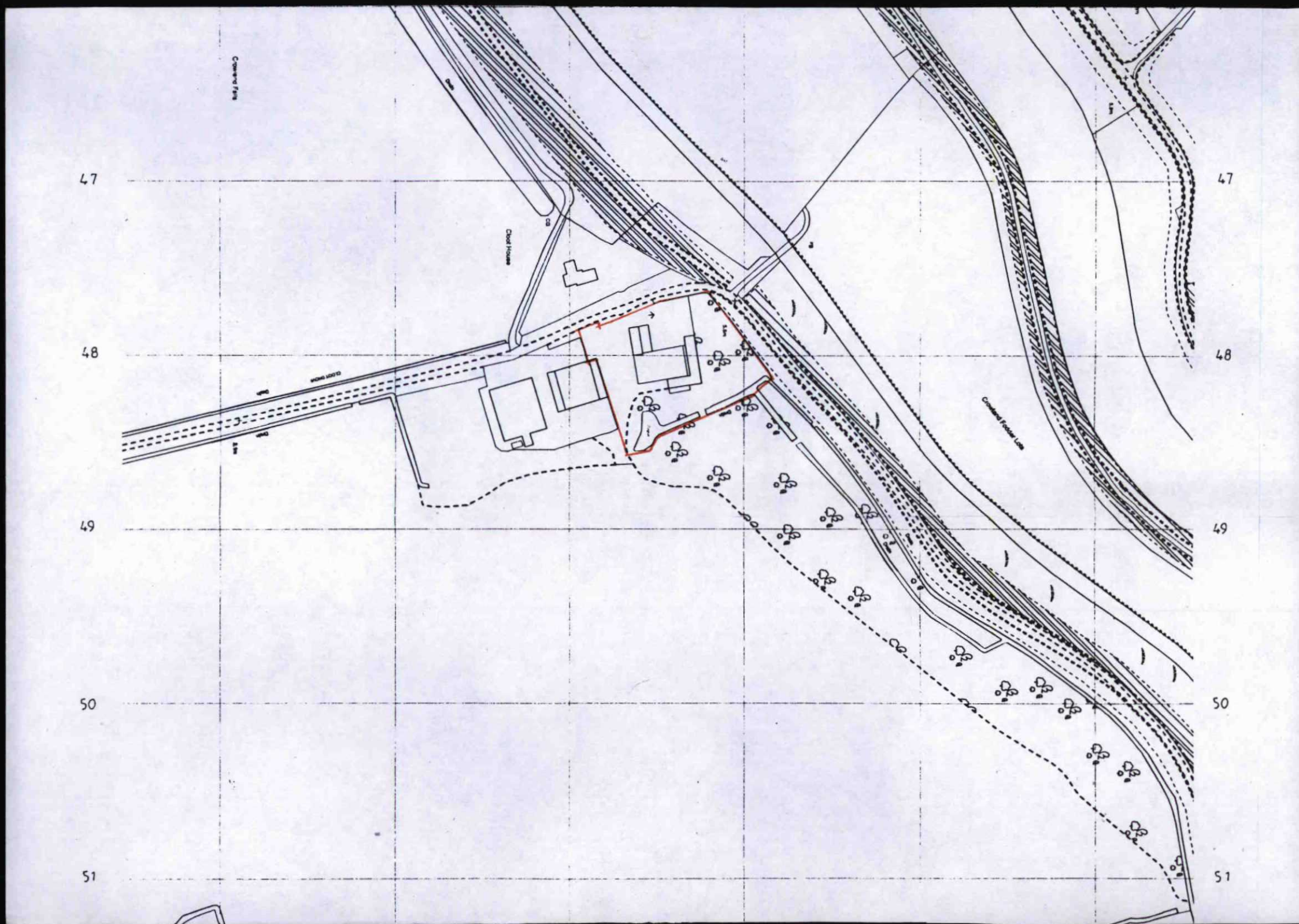
9.0 RESIDUAL RISK – EXTREME EVENTS

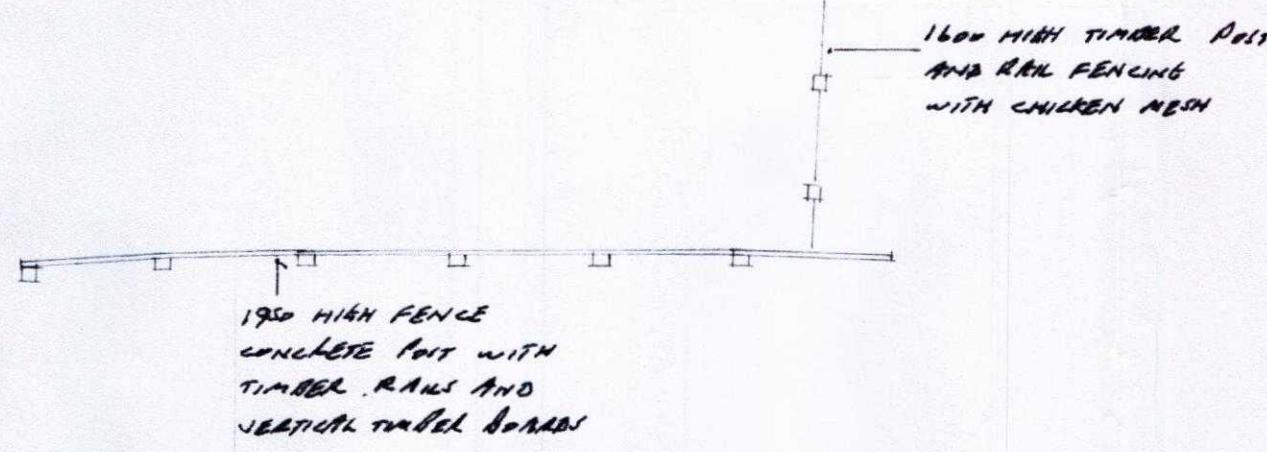
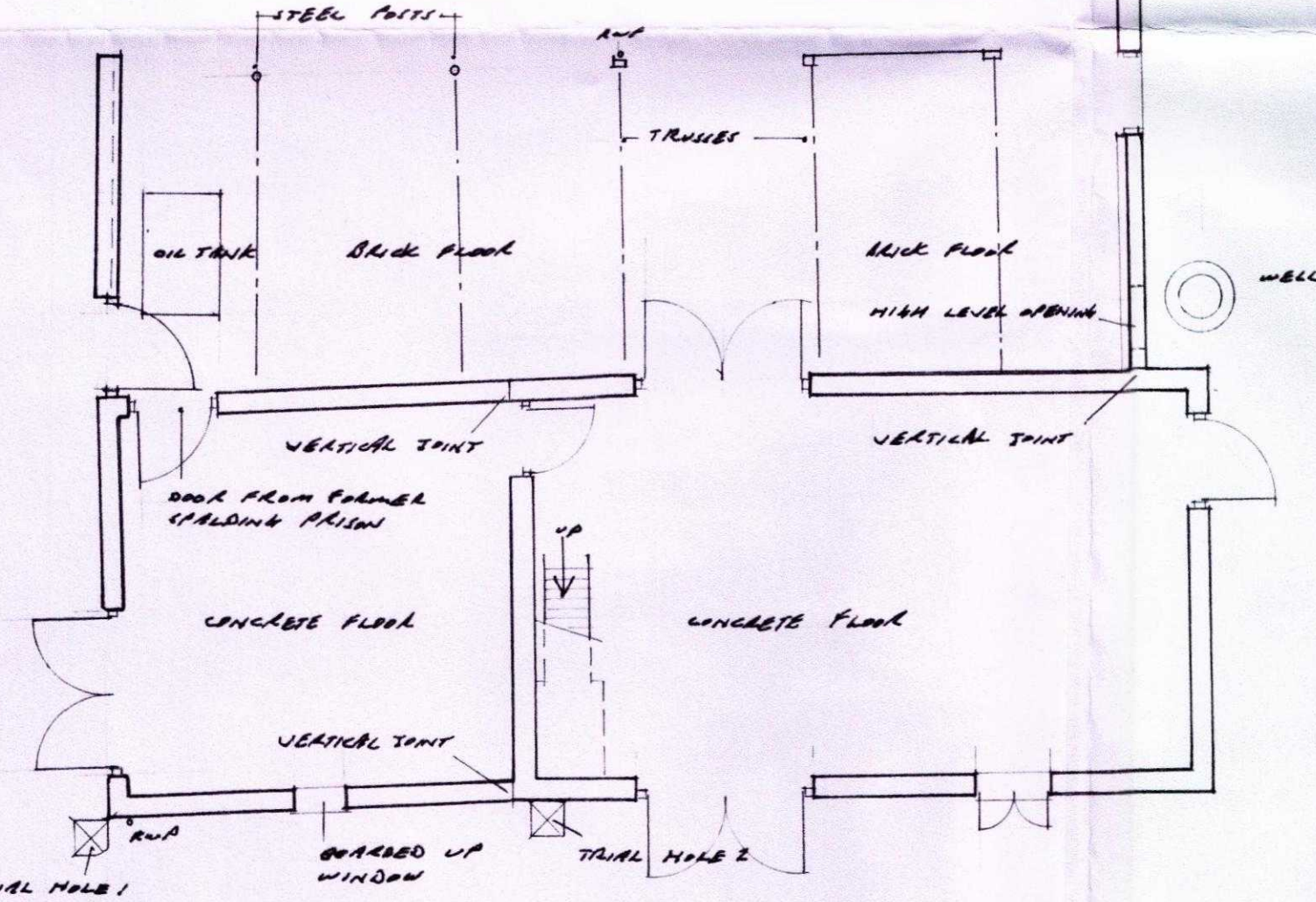
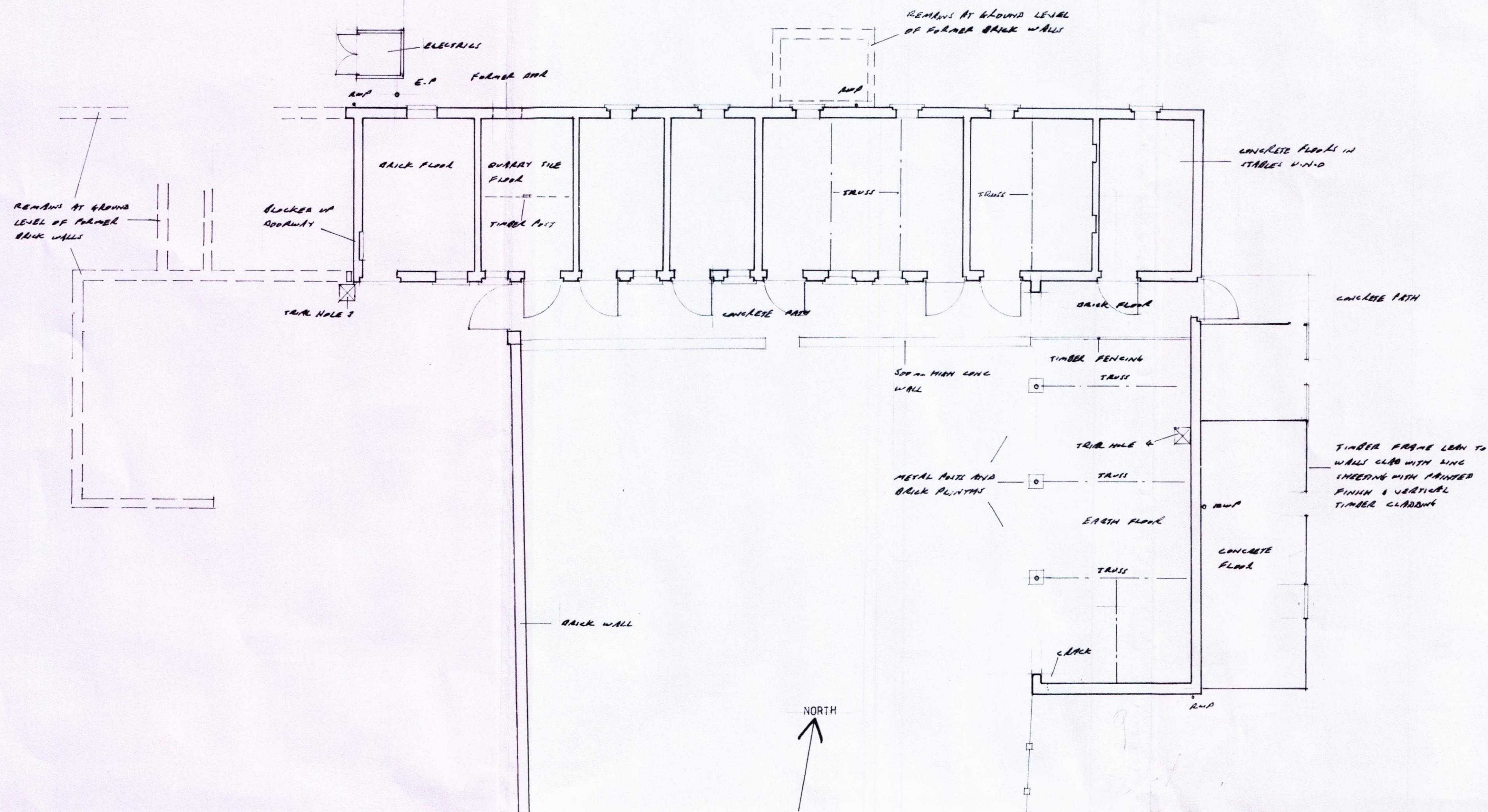
- 9.1 The residual risk from extreme events is very low on this site, because of its location within an IDB drainage area and protection offered by existing flood defences.
- 9.2 The site is shown in a Low Hazard Zone according to NPPF classification, the site has a very low risk of flooding due to the current standards of flood defence and surface water drainage with existing 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 taking into account existing flood defences and standards of protection. The risk of flooding is not increased in terms of probability by the proposed development.
- 9.3 In the extreme event of a serious blockage occurring to the IDB main drains coinciding with a high intensity, short duration storm, protection will be afforded by the finished floor levels being a maximum of 500 mm above existing ground level with a further 300mm of flood resilient construction incorporated above finished floor level.

10.0 CONCLUSIONS AND RECOMMENDATIONS

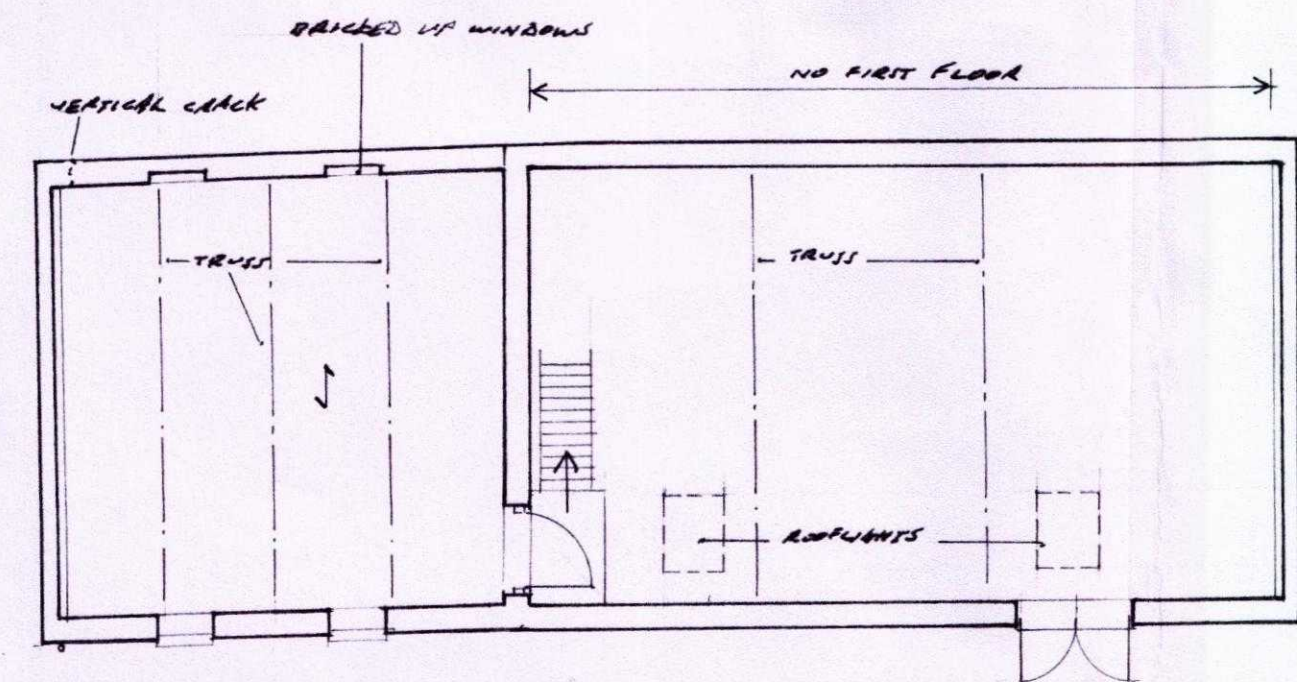
10.1 As a result of the assessment, the following conclusions have been reached:-

- The proposed development is not in a Functional Floodplain. It is in the Passive Floodplain of the River Welland and North Level IDB protected by defences to meet the 1 in 100 year return period fluvial event plus climate change.
- The site is shown in a Low Hazard Zone of the South East Lincs. Strategic Flood Risk Assessment with the actual risk of the site flooding from main river is very low (less than 0.5%).
- The site will drain to the arterial system of the North Level Internal Drainage Board via soakaways designed to BRE365 requirements and Building Regulations approval.
- Finished floor level of the new dwelling will be a maximum of 500 mm above existing ground levels with a further 300 mm of flood resilient construction incorporated above finished floor level and refuge at first floor level with some sleeping accommodation at ground floor.
- The Environment Agency confirmed by way of letter dated 16th August 2017, file ref: AHN/2017/125963 that the development can be made safe through the proposed mitigation. If the application was submitted to the Local Planning Authority, the Agency would be in a position to condition the Flood Risk Assessment.

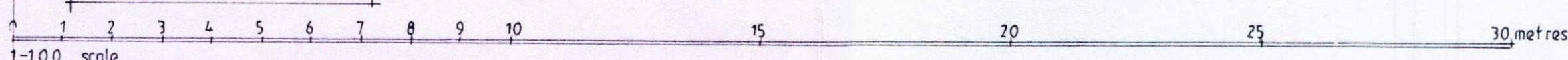




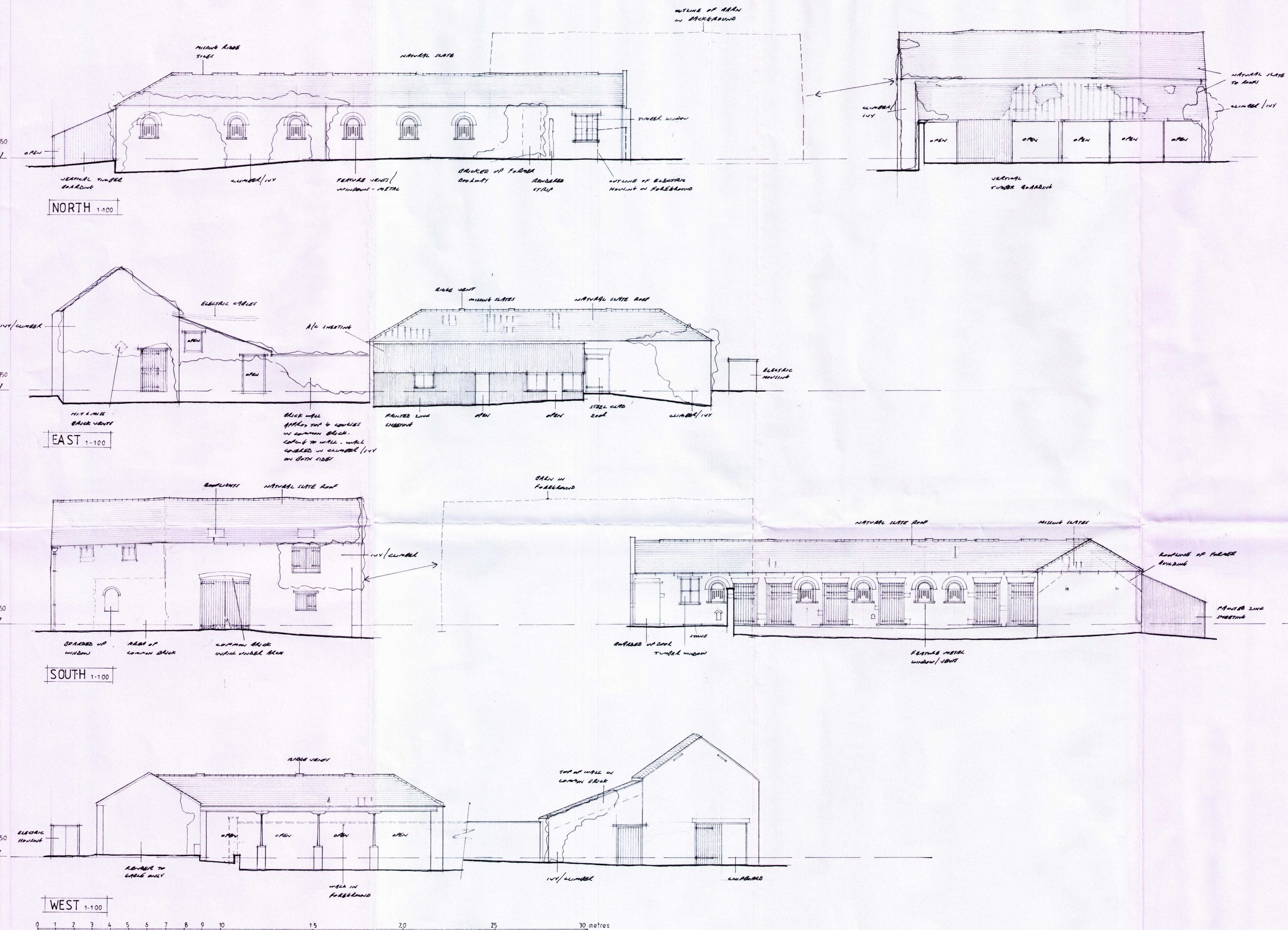
GROUND FLOOR 1-100



FIRST FLOOR 1-100



Contractor To Check All Dimensions On Site Before Work Commences.			
Rev.	Date.	Init.	Revision Details.
R. BOOR DRAUGHTSMAN 26 Fengate Moulton Chapel Spalding Lincolnshire PE12 0XL Phone & Fax: 01406 380279			
Project: MR & MRS A BRANTON. PROPOSED CONVERSION OF CLOOT HOUSE BARN AND OUTBUILDINGS.			
Drawing: PLAN AS EXISTING			
Scale: AS SHOWN		Drawing No. 3450-20	
Drawn: RMB		Date: NOV 2018	
Date: NOV 2018		Rev.	



Contractor To Check All Dimensions
On Site Before Work Commences.

Rev.	Date.	Init.	Revision Details.

R. BOOR DRAUGHTSMAN

26 Fengate
Moulton Chapel
Spalding
Lincolnshire
PE12 0XL

Phone & Fax:
01406 380279

Project:
MR & MRS A BRANTON.
PROPOSED CONVERSION OF
CLOOT HOUSE BARN AND
OUTBUILDINGS.

Drawing:
ELEVATIONS AS EXISTING

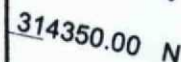
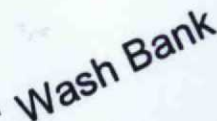
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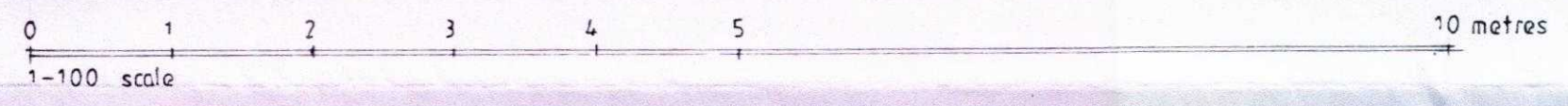
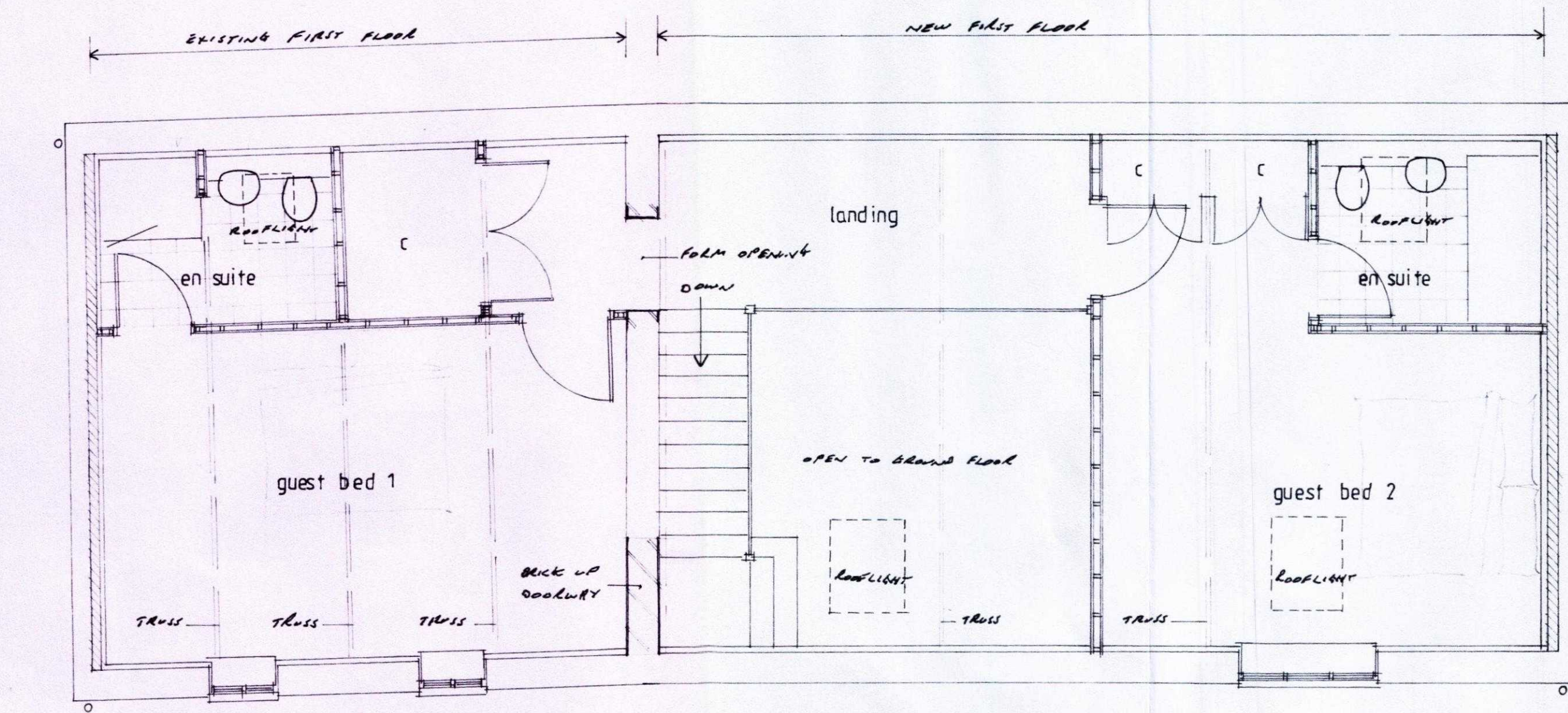
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3450-21

Drawn: RMB
Date: NOV 2018

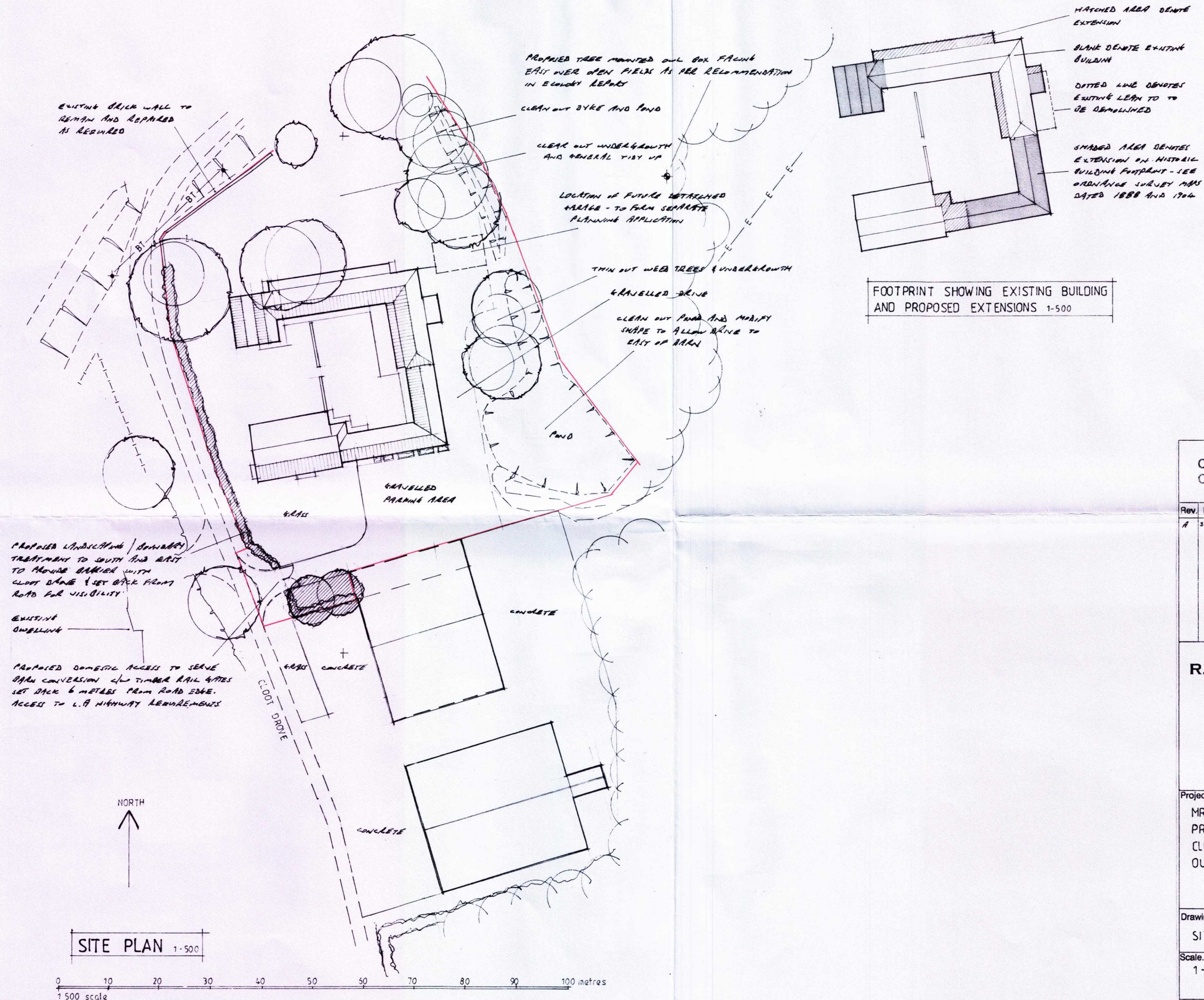
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Contractor To Check All Dimensions On Site Before Work Commences.			
Rev.	Date.	Init.	Revision Details.
R. BOOR DRAUGHTSMAN 26 Fengate Moulton Chapel Spalding Lincolnshire PE12 0XL Phone & Fax: 01406 380279			
Project. MR & MRS A BRANTON. PROPOSED CONVERSION OF CLOOT HOUSE BARN AND OUTBUILDINGS.			
Drawing. FIRST FLOOR PLAN PROPOSED			
Scale. 1:50		Drawing. No. 3450 - 16	
Drawn. RMB			
Date. SEPT 2018		Rev.	



Contractor To Check All Dimensions
On Site Before Work Commences.

Rev.	Date.	Init.	Revision Details.
A	30.11.18		UPDATE FOR PLANNING APP

R. BOOR DRAUGHTSMAN

26 Fengate
Moulton Chapel
Spalding
Lincolnshire
PE12 0XL

Phone & Fax:
01406 380279

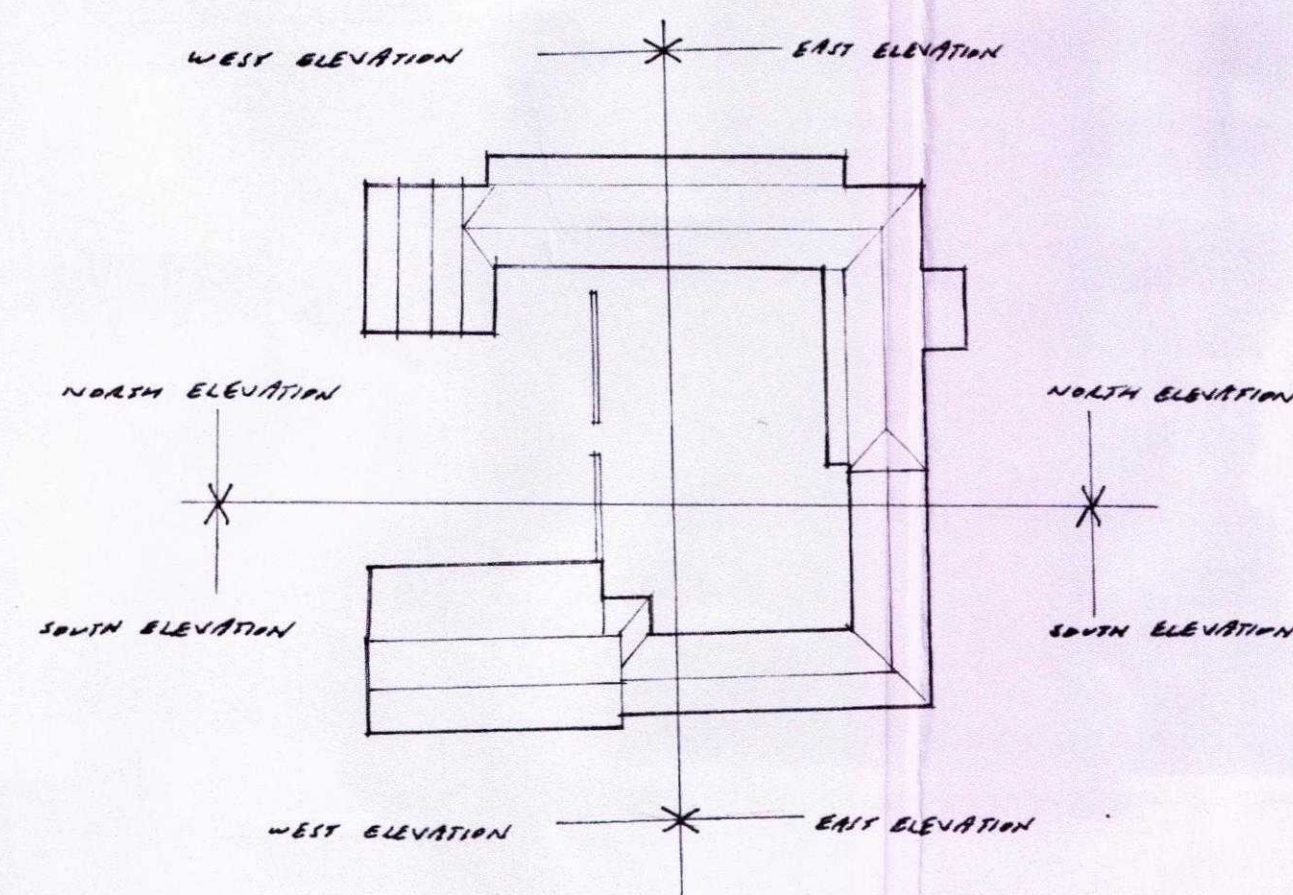
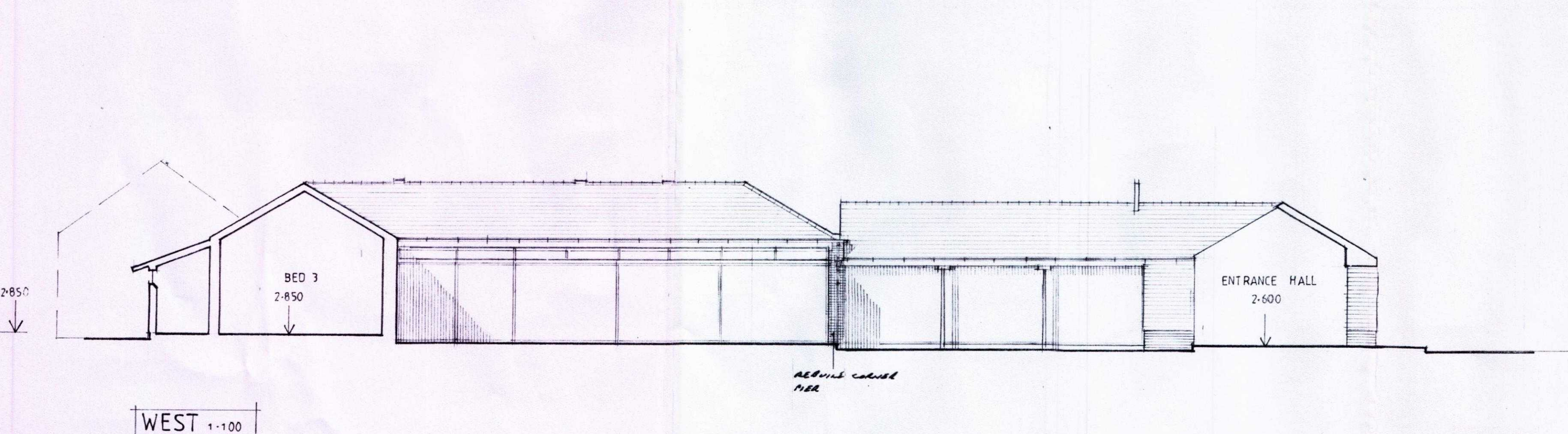
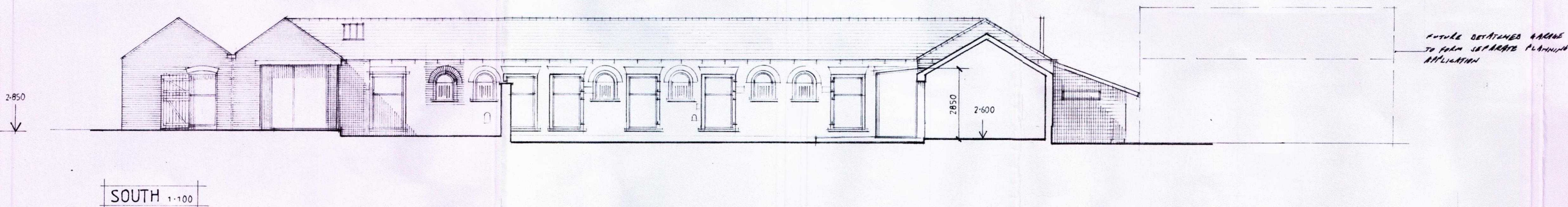
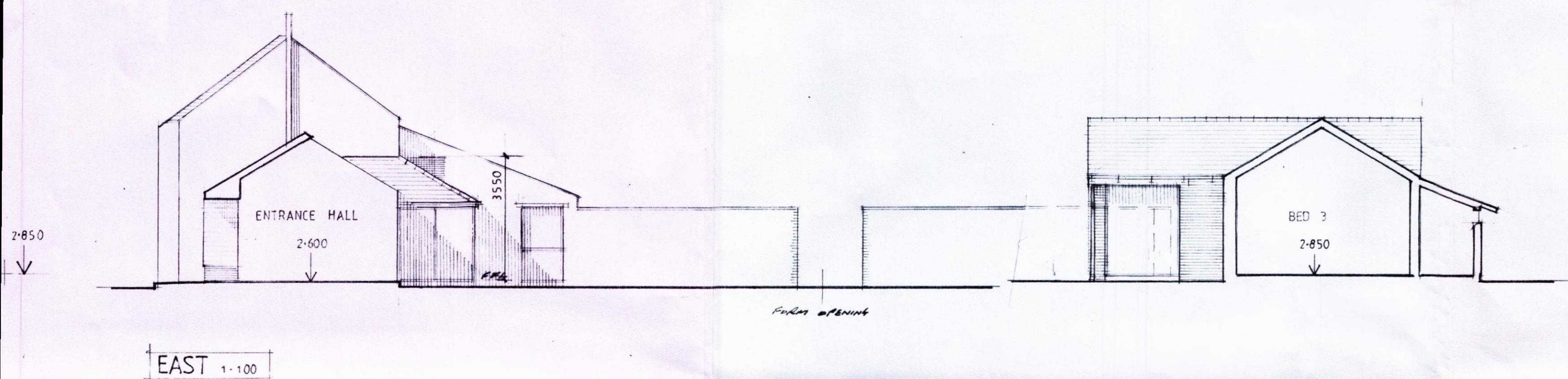
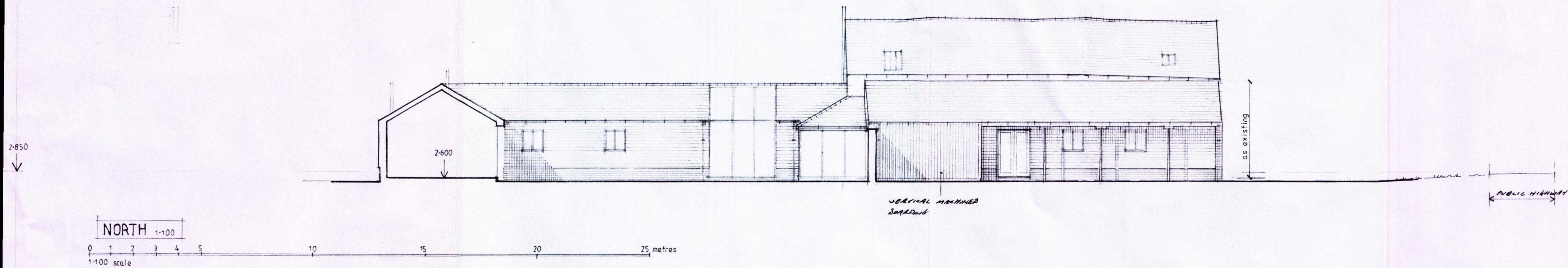
Project.

MR & MRS A BRANTON.
PROPOSED CONVERSION OF
CLOOT HOUSE BARN AND
OUTBUILDINGS.

Drawing.

SITE PLAN - PROPOSED

Scale. 1-500	Drawing. No. 3450-17
Drawn. RMB	Rev. A
Date. SEPT 2018	



Contractor To Check All Dimensions
On Site Before Work Commences.

Rev.	Date.	Init.	Revision Details.
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B	13.11.18		MODIFY FOR PLANNING APP

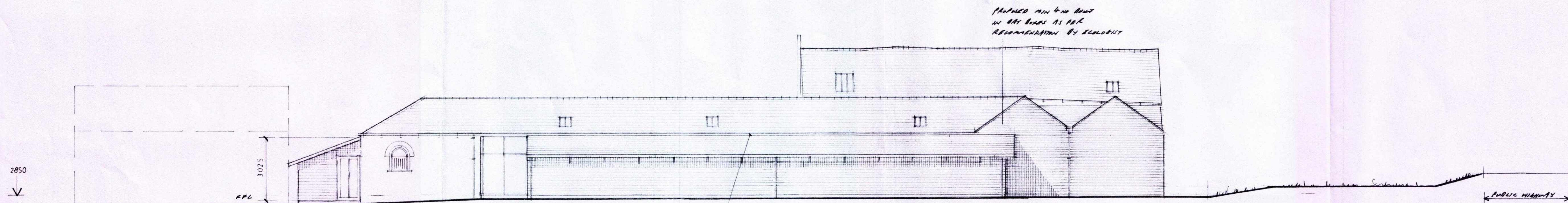
R. BOOR DRAUGHTSMAN

26 Fensgate
Moulton Chapel
Spalding
Lincolnshire
PE12 0XL
Phone & Fax:
01406 380279

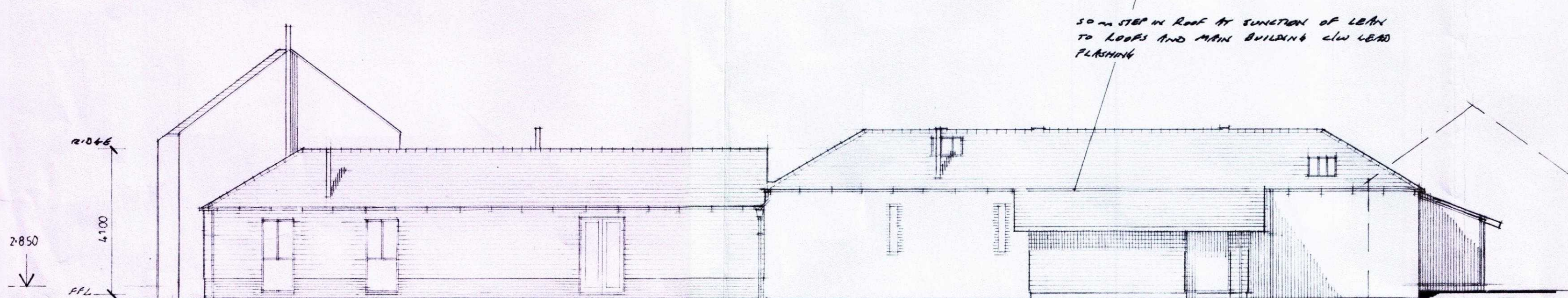
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CLOOT HOUSE BARN AND
OUTBUILDINGS.

Drawing:
ELEVATIONS INTERNAL PROPOSED

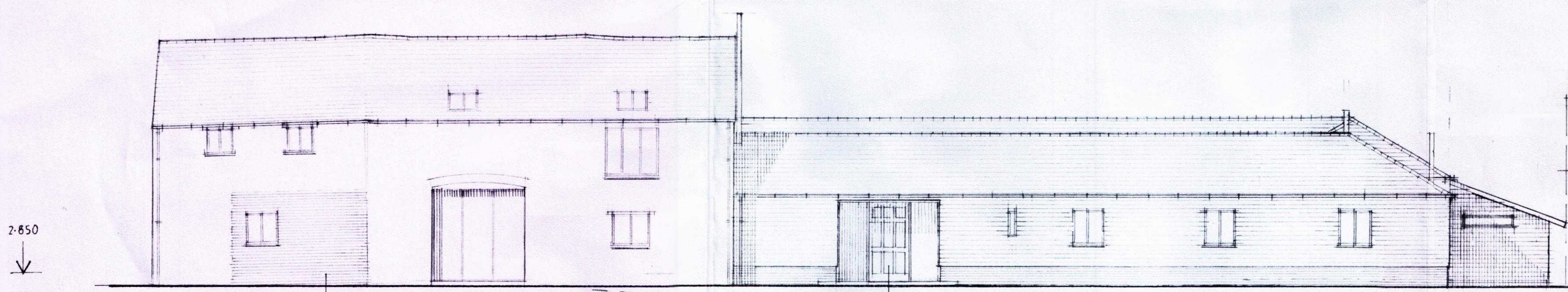
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Date: SEPT 2018	Rev. A 0



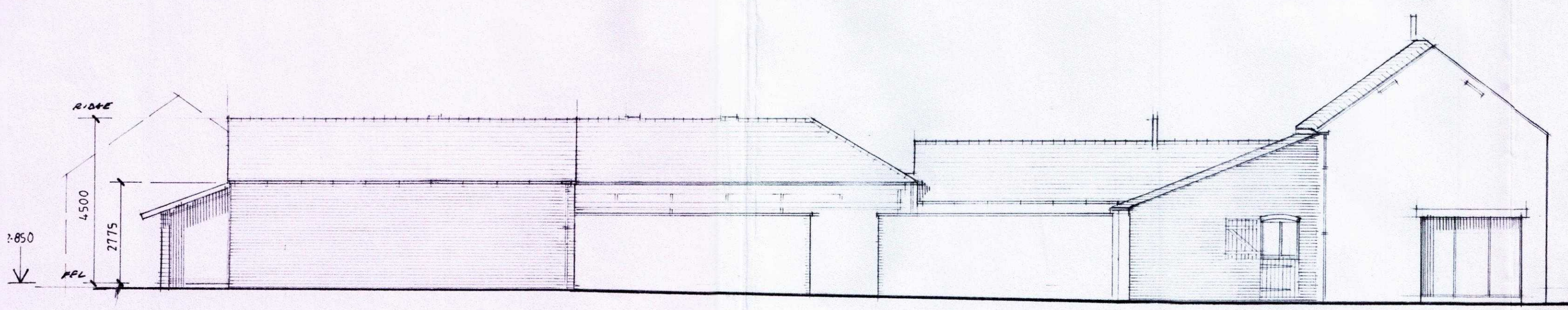
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1-100 scale
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EAST 1:100



SOUTH 1:100



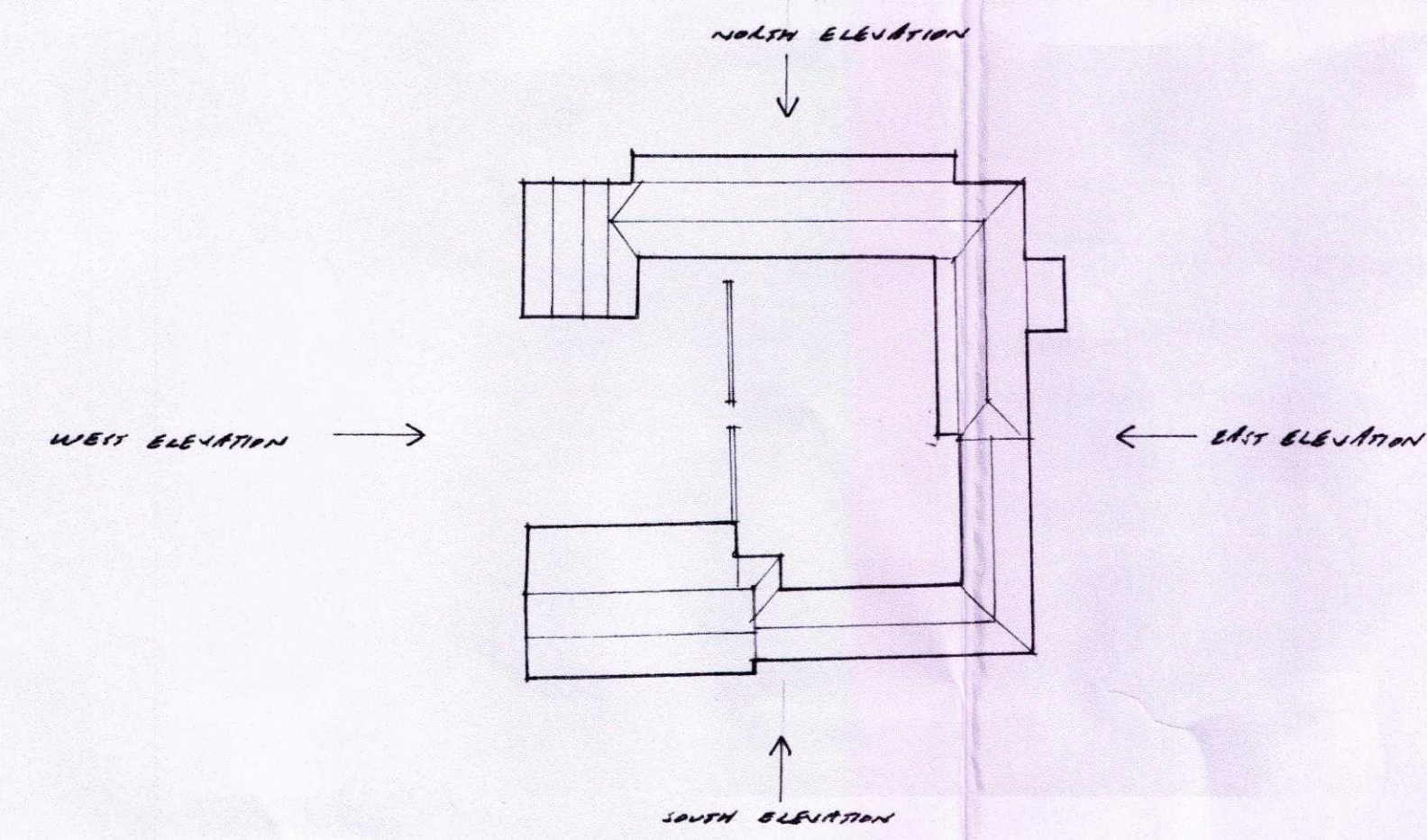
WEST 1:100

MATERIALS

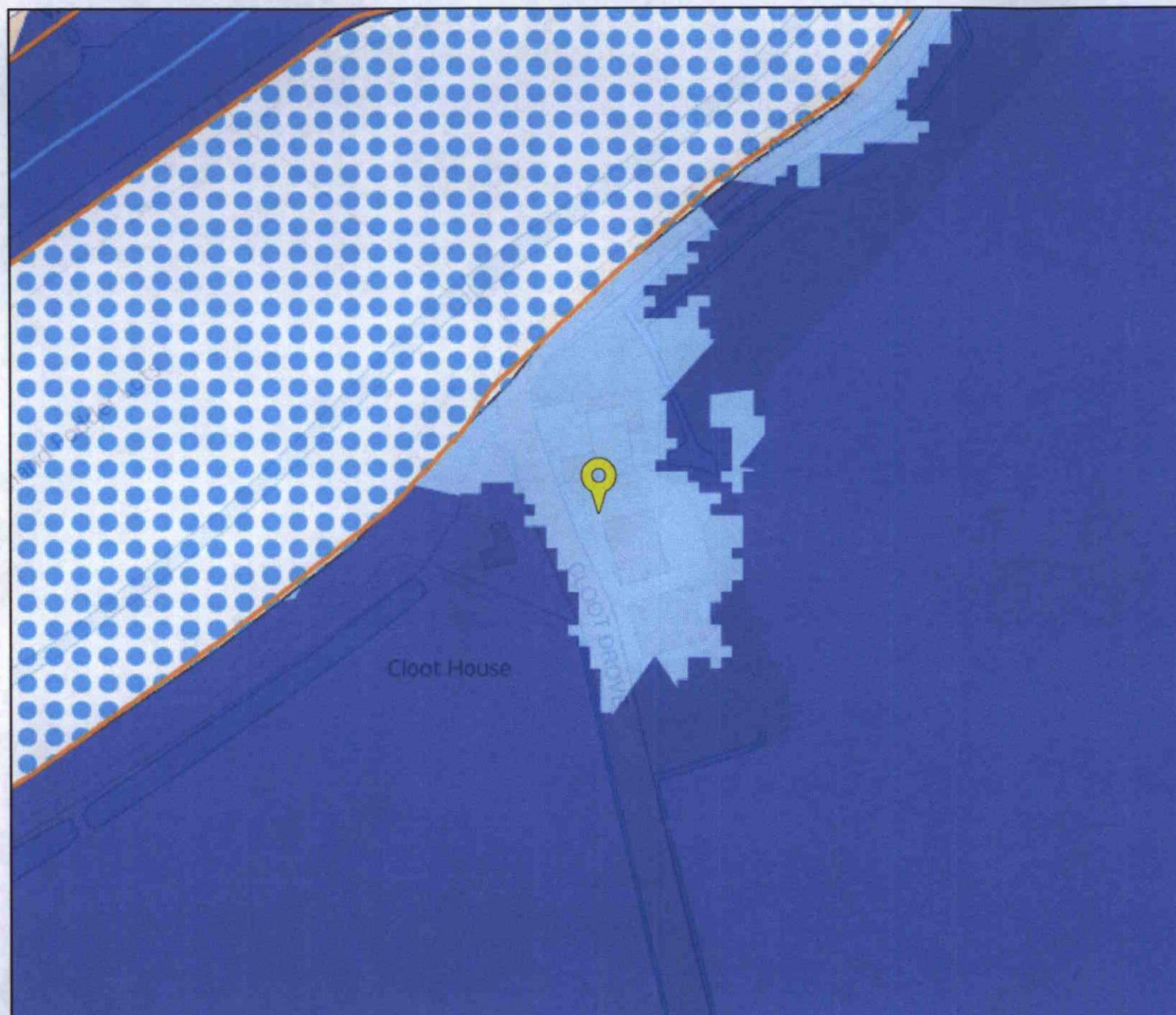
- ROOF**
- 1 RE USE EXISTING NATURAL SLATE WITH RECLAIMED NATURAL SLATE TO MATCH EXISTING TO MAKE UP CHIMNEY
 - 2 GLAZED ROOF TO LOCATIONS SHOWN - REAR OF ENTRANCE HALL, CORRIDOR SERVING BEDROOMS AND EXTENSION TO KITCHEN ALL IN POWDER COAT ALUMINIUM FRAMEWORK COLOUR TO BE AGREED
- WALLS**
- 1 LEAN TO SECTIONS (GUN ROOM AND CORRIDOR SERVING BEDROOMS) MAINTAINED HORIZONTAL TIMBER BOARDING SHIP LAP - NATURALLY DURABLE AND LEFT TO WEATHER NATURALLY
 - 2 ALL OTHER TIMBER CLADDING HORIZONTAL NATURALLY DURABLE FEATHER EDGE BOARDING SHIP FINISH AND LEFT TO WEATHER NATURALLY
 - 3 EXISTING BRICK WALLS REPLACE PERIMETER BRICKS & MORTAR
 - 4 REMAINING WALLS RECLAIMED FACE BRICK TO MATCH EXISTING ALONG WITH BRICK BAND AND MORTAR
- E.W.**
- 1 TO WALL TYPE 1 POWDER COAT ALUMINIUM DOOR BUTTER WITH 604 RAMP ALONG WITH POWDER COAT ALUMINIUM BACKS BOARD - COLOUR TO BE AGREED
 - 2 TO ALL OTHER ROOFS BLACK ALUMINIUM OR CAST IRON WITH 604 RAMP

- JOINERY**
- 1 ROOFLIGHTS TO BE CAST METAL BLACK IN COLOUR BY CLEMENT CONSERVATION STEEL ROOFLIGHTS
 - 2 WHERE GLAZED LINE IS CONTINUOUS FROM GLAZED WALL BELOW TO BE SHIP PROFILE POWDER COAT ALUMINIUM COLOUR TO BE AGREED
 - 3 POWDER COAT ALUMINIUM COLOUR TO BE AGREED TO WINDOW IN LEAN TO'S (WALL TYPE 1), LINK FROM HALL TO PARK OFFICE, INTERNAL SINKING, KITCHEN EXTENSION, NORTH SIDE OF ENTRANCE HALL, BED 1
 - 4 TO PRIMAL LOUNGE AND DINING SHIP SECTION CAST METAL COLOUR TO BE AGREED
 - 5 EXISTING EXTERIOR METAL WINDOWS TO BE RETAINED AND REFINISHED
 - 6 RE VISED PRISON DOOR GLOSS PAINT FINISH COLOUR TO BE AGREED
 - 7 2ND WINDOW IN KITCHEN (EXIST) DIRECT GLAZED - NO FRAME
 - 8 ALL OTHER JOINERY TO BE TIMBER - FINISH TO BE AGREED
- FENCES** BLACK STAINLESS STEEL

DOTTED LINE DETAINED GARAGE
BASED TO FORM EXISTING PLANNING
APPLICATION



Contractor To Check All Dimensions On Site Before Work Commences.			
Rev.	Date.	Init.	Revision Details.
A	11.9.18		CLIENT ALTS W/ROOF FOR PLANNING APP
B	12.11.18		
R. BOOR DRAUGHTSMAN 26 Fengate Moulton Chapel Spalding Lincolnshire PE12 0XL Phone & Fax: 01406 380279			
Project: MR & MRS A BRANTON. PROPOSED CONVERSION OF CLOOT HOUSE BARN AND OUTBUILDINGS.			
Drawing: ELEVATIONS EXTERNAL PROPOSED.			
Scale: AS SHOWN		Drawing. No. 3450-11	
Drawn: RMB			
Date: SEPT 2018		Rev. A 0	



Environment
Agency

Flood map for planning

Your reference

Clot House

Location (easting/northing)

524800/314320

Scale

1:2500

Created

1 Jan 2019 7:30



Selected point



Flood zone 3



Flood zone 3: areas
benefitting from flood
defences



Flood zone 2



Flood zone 1



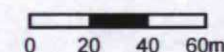
Flood defence



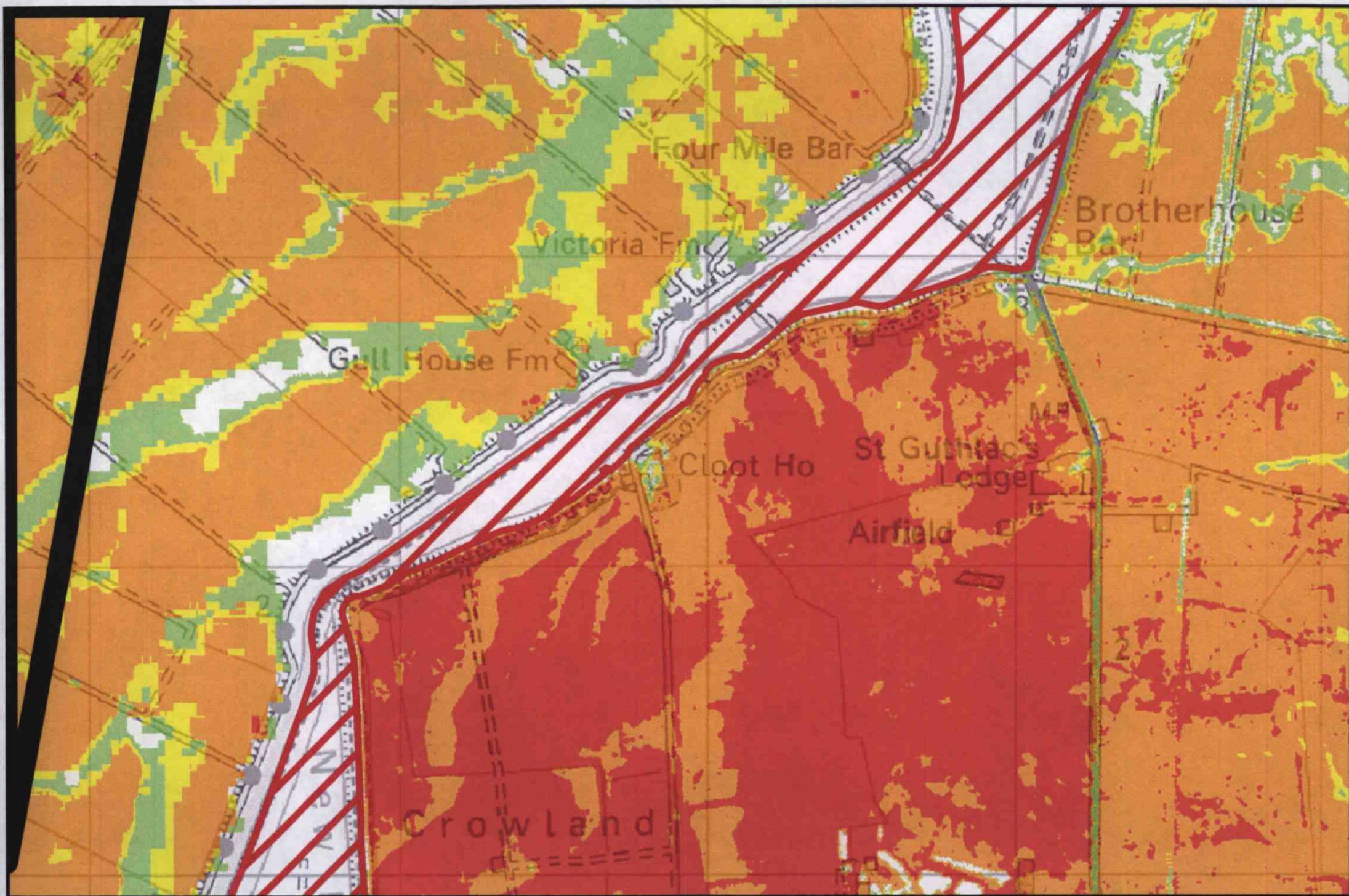
Main river

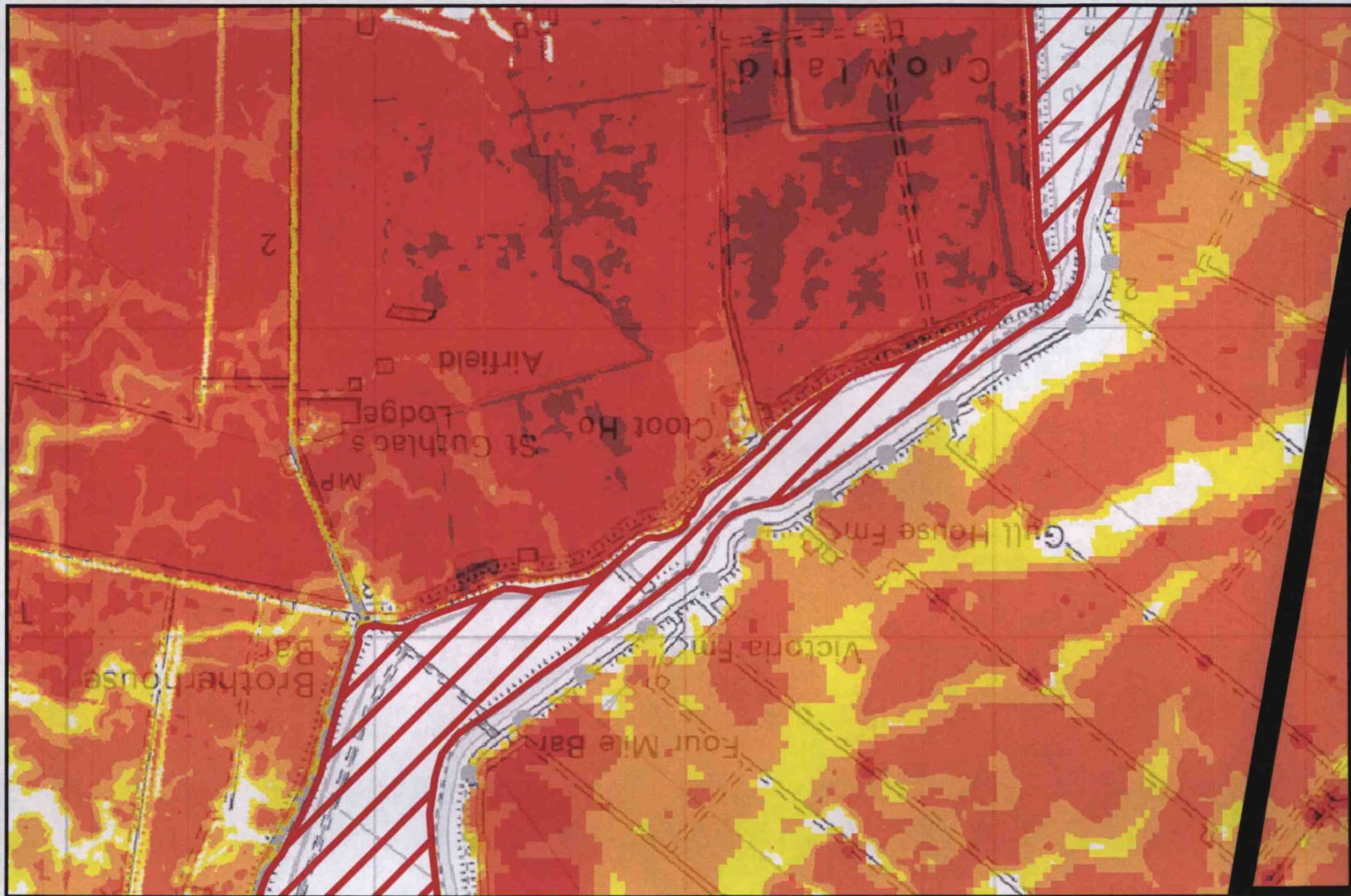


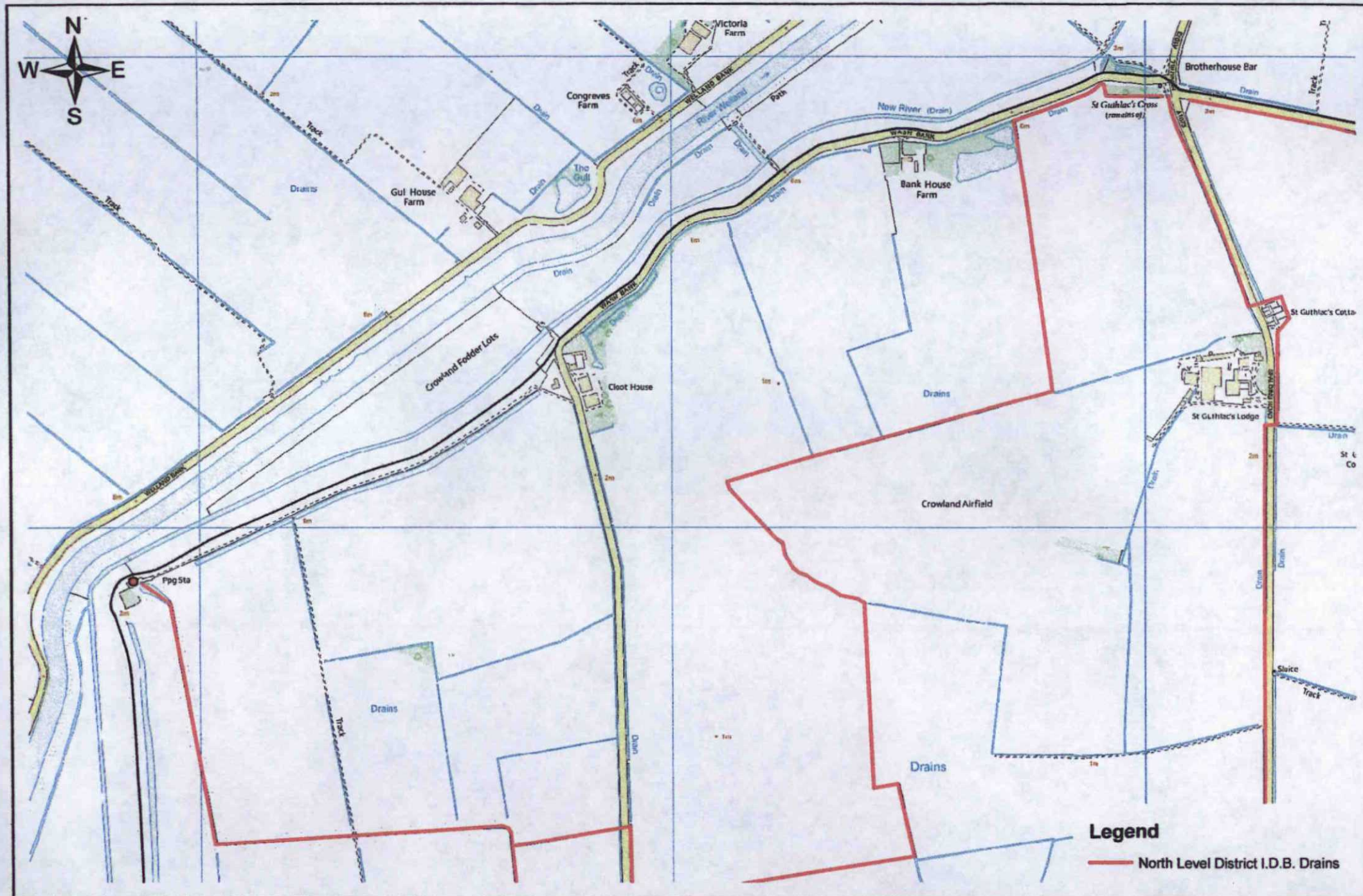
Flood storage area



Page 2 of 2







North Level District Internal Drainage Board

Produced by: K. Tizzard Date: July 2017 1:10,000

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creating a better place



Environment
Agency

Mr Geoff Beel
Geoff Beel Consultancy
44 Queens Road
WISBECH
Cambridgeshire
PE13 2PE

Our ref: AN/2017/125963/02-L01

Your ref:

Date: 16 August 2017

Dear Mr Beel

**Planning advice for residential development
Clout House Clout Drive**

Thank you for accepting our offer to provide planning advice on the proposed development at Clout Drive.

We are providing our planning advice under our agreement no. ENVPAC/LCNNTH/00180.

We have reviewed the flood risk assessment (FRA), dated July 2017, reference GCB/BOOR and the associated hazard mapping.

Although the property will have ground floor sleeping accommodation, we are satisfied that the development can be made safe through the proposed mitigation.

If the application was submitted to the Local Planning Authority, we would be in a position to condition the FRA.

In total we have taken three hours to provide this advice. Invoices are raised quarterly and sent out approximately 5 weeks after the end of each quarter.

Your project manager is Sharon Nolan, who can be contacted on 020302 53525 / sharon.nolan@environment-agency.gov.uk

Yours sincerely

OFFICIAL

