herrington
CONSULTING LIMITED

Mrs Zoe Wash
48 Elm View Road
Benfleet
Essex
SS7 5AS

Date: 22nd December 2014
Your Ref:
Our Ref : DM/1083/4139
email : dominic@herringtonconsulting.co.uk

By email only: zoewash@hotmail.co.uk

Dear Ms Wash

(Outline) Flood Risk Assessment appraising the risk of flooding to the proposed development on the land opposite Hawthorn Lodge, Highlands Road, Rawreth, Wicford, Essex, SS11 8TL

Herrington Consulting has been commissioned by Ms Zoe Wash to prepare an outline Flood Risk Assessment (FRA) to quantify the risk of flooding at the proposed development site at the above address.

The Local Planning Authority (LPA) has requested that a basic assessment of flood risk is required to accompany the planning application and as such, this outline FRA is only intended to quantify the depth of flooding at the development site and provide a general overview with regards to the risk of flooding at the study site. This report is not intended to constitute a full flood risk assessment, however, it has been prepared in accordance with the National Planning Policy Framework (March 2012) and the accompanying Planning Practice Guidance Suite (March 2014).

Site Location & Development Description

The site is located off of Highland Road in Rawreth. In total the whole site covers an area of approximately 1.5 hectares, although only a small part of the site is proposed for development (circa 0.01 hectares) and currently comprises an agricultural field. The site plan included in Appendix A.1 provides more detail in relation to the site location and layout.

The proposals for development are to construct a new two storey horse stable, with storage on the first floor.

Sequential & Exceptions Test

The location of the site is shown on the Environment Agency's (EA) flood zone map in Figure 1 below. The development site is outlined in red and the location of the proposed stable is shown in yellow.

Herrington Consulting Limited
Unit 6
Barham Business Park
Elham Valley Road
Barham
Canterbury
Kent
CT4 6DQ
Tel 01227 833855
Fax 01227 832416
www.herringtonconsulting.co.uk

Co Reg No 5418977
VAT No 860 5179 20
Company registered in England and Wales

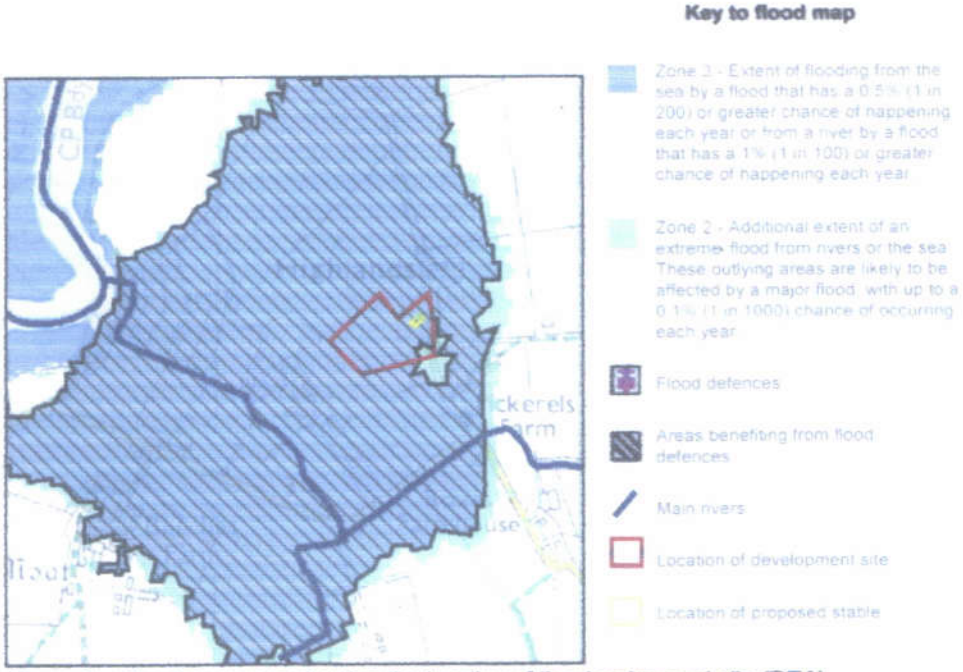


Figure 1 – Flood zone map showing the location of the development site (©EA)

The above mapping shows the area of the proposed development (outlined in yellow) to be located within Flood Zone 3 and to be benefiting from existing flood defences that have been constructed in the last 5 years.

In this case the proposals are for 'less vulnerable' development comprising commercial use, which when combined is classified as a low risk option. When considering other sites in the same flood risk zone (Flood Zone 3a), which have a higher risk classification i.e. 'more vulnerable' residential development, it is concluded that the proposals for this site are likely to meet the requirements of the Sequential Test. This will, however, need to be confirmed by the LPA.

Assuming that the Sequential Test requirements are met, it is subsequently necessary for the FRA to consider whether the Exceptions Test is applicable. Reference to Table 3 of the NPPF identifies that 'less vulnerable' developments in Flood Zone 3a, as is the case in this instance, do not require the Exception Test to be applied. However, it is still necessary to examine the impact of all sources of flood risk on the development to ensure that; (a) the proposals will not result in an unacceptable risk of flooding at the site, and (b) to ensure that the proposals will not exacerbate the risk of flooding elsewhere (i.e. offsite).

Potential Sources of Flooding

As part of the analysis phase the risk of flooding has been considered across a wide range of sources (e.g. sewer flooding, surface water flooding, groundwater flooding etc.) and it is only the risk of fluvial flooding from the (tidal) River Crouch that has been shown to have any bearing on the development. Consequently, the EA has been contacted to purchase modelled flood level data for this reach of the river, to enable the depth of flooding at the site from this source to be accurately appraised. The EA's modelled data is included in Appendix A.2 for reference. In addition to this, 2m LiDAR topographical data has also been purchased to establish the land levels across the site and within the surrounding area (relative to Ordnance Datum Newlyn).

From this data source it can be seen that land levels across the site vary between 3.1m and 3.7m Above Ordnance Datum Newlyn (AODN), falling gently in a south-westerly direction towards the River Crouch. The proposed stable building is to be located at the furthest point away from the river, on the highest part of the site where the land levels are shown to be 3.7m AODN.

The Likelihood of Flooding and the Impact on the Development

Reference to the historic records delineated in the data provided by the EA identifies that the site was not flooded in the 1953, nor 1958 historic flood events.

Inspection of the EA flood zone map (shown in Figure 1 above) also identifies that the development site currently benefits from flood defences. Further reference to the EA data reveals the defence infrastructure in this location comprises a number of clay seawalls with crest heights ranging from 4.33m to 4.75m AODN. The closest defences to the study site are shown to have a crest of 4.53m AODN and are described as being in 'good' condition (minor defects that will not reduce the overall performance of the asset).

The detailed information provided by the EA in relation to the design flood levels within the river delineate the defended tidal flood levels at three points (nodes) along the River Crouch. These are shown in Table 1 below for the closest modelled node to the subject site (Oldtree Point).

	Defended Tidal Flood Levels (m AODN)		
Node Point	**1 in 20 (5% AEP)**	**1 in 100 (1% AEP)**	**1 in 100 +CC (1% AEP +CC)**
Oldtree Point	4.47	4.59	4.92

Table 1 – Modelled defended flood levels provided by the Environment Agency (at Oldtree Point node).

When comparing the defence crest height of 4.53m AODN along this reach of the River Crouch with the flood levels above, it can be seen that under the 1 in 20 year (5% Annual Exceedance Probability [AEP]) return event the site is prevented from flooding by the defence infrastructure. Therefore it can be concluded that the site is not located within the functional floodplain.

Nonetheless, shallow flooding is predicted to affect the site under an extreme flood event with a 1 in 100 year (1% AEP) return period, albeit the flood depth shown on higher ground (where the proposed stable building is to be located) is likely to be less than 60mm.

When comparing the flood level for the design flood event (i.e. the 1 in 100 year return period including an allowance for climate change) with the land levels at the stable building, it is evident that flood depths could reach 390mm. However, this assumes that the depth of flooding at the site is directly equal to the level in the river and as such, this may represent an overestimation of flooding at this location. Nevertheless, in the absence of any further detailed site specific modelling a precautious approach has been adopted and this conservative estimate of flooding has been assumed to represent the worst case.

Conclusions & Recommendations

From the analysis undertaken it has been shown that the primary risk of flooding to this site is from the River Crouch. Inspection of the EA flood model data and the land level data has identified that the site is not located within the functional flood plain, however, the stable building could be subject to minor internal flooding under a flood event with a 1 in 100 year return period, and up to 390mm of flooding under the future climate change scenario.

Notwithstanding this, the proposed development is classified as having a 'low vulnerable' commercial planning use and the ground floor simply comprises stables and a hay store/preparation area. Consequently, considering the low probability of such an extreme event occurring, combined with the low vulnerability use of the building, it is unlikely that minor internal flooding will have a significant impact on the building itself.

With regard to the surrounding area, the tidal nature of the River Crouch means that there is no requirement to provide compensatory flood storage. Nonetheless, it is recognised that the wider flood plain is quite large and therefore if flood water was to reach the building, the volume of floodwater that could be displaced is only likely to have a marginal impact of the wider surrounding area.

With respect to the increase surface water runoff from the development, it is evident that the building will increase the impermeable area within the site and as such, it may be necessary to provide a suitable drainage strategy to ensure that any additional runoff is dealt with in a safe and sustainable manner. Ideally this should investigate the use of a Sustainable Drainage System (SuDS) and aim to use infiltration (if available) to discharge water into the ground. Consequently, at the detailed design stage it may be necessary to undertake site specific infiltration testing to determine whether the use of soakaways will be an acceptable method of discharging the entire roof area under the 1 in 100 year event (including the appropriate allowance for climate change).

Finally, it is recognised that the use of flood resilience and resistance techniques is recommended for low risk commercial developments of this nature and these measures are aimed at reducing the internal damage to the proposed building which could otherwise occur during an extreme flood event. A list of some of the flood resistant/resilient measures available are provided below and it is recommended that a combination of some of these measures are explored further at the detailed design phase.

- Raising floor slab level further
- Bringing the electrical supply in at first floor
- Placing boilers and meter cupboards on the first floor
- Water-resistant plaster/tiles on the walls of the ground floor
- Solid stone or concrete floors with no voids underneath
- Covers for doors and airbricks
- Non-return valves on new plumbing works
- Avoidance of studwork partitions on the ground floor

With the above mitigation measures incorporated into the design of the development it is concluded that the proposals are likely to be acceptable and sustainable in terms of flood risk and will therefore meet the requirements of the NPPF.

I trust this letter provides sufficient information pertaining to the risk of flooding at the development site from the River Crouch, as well as providing further information on the potential mitigation options available to help reduce the impact of flooding at the proposed site. However, if you require any further details or clarification on any of the above please do not hesitate to contact me.

Yours sincerely

D. Mulford

Dominic Mulford B.Sc
Environmental Technician

Appendices

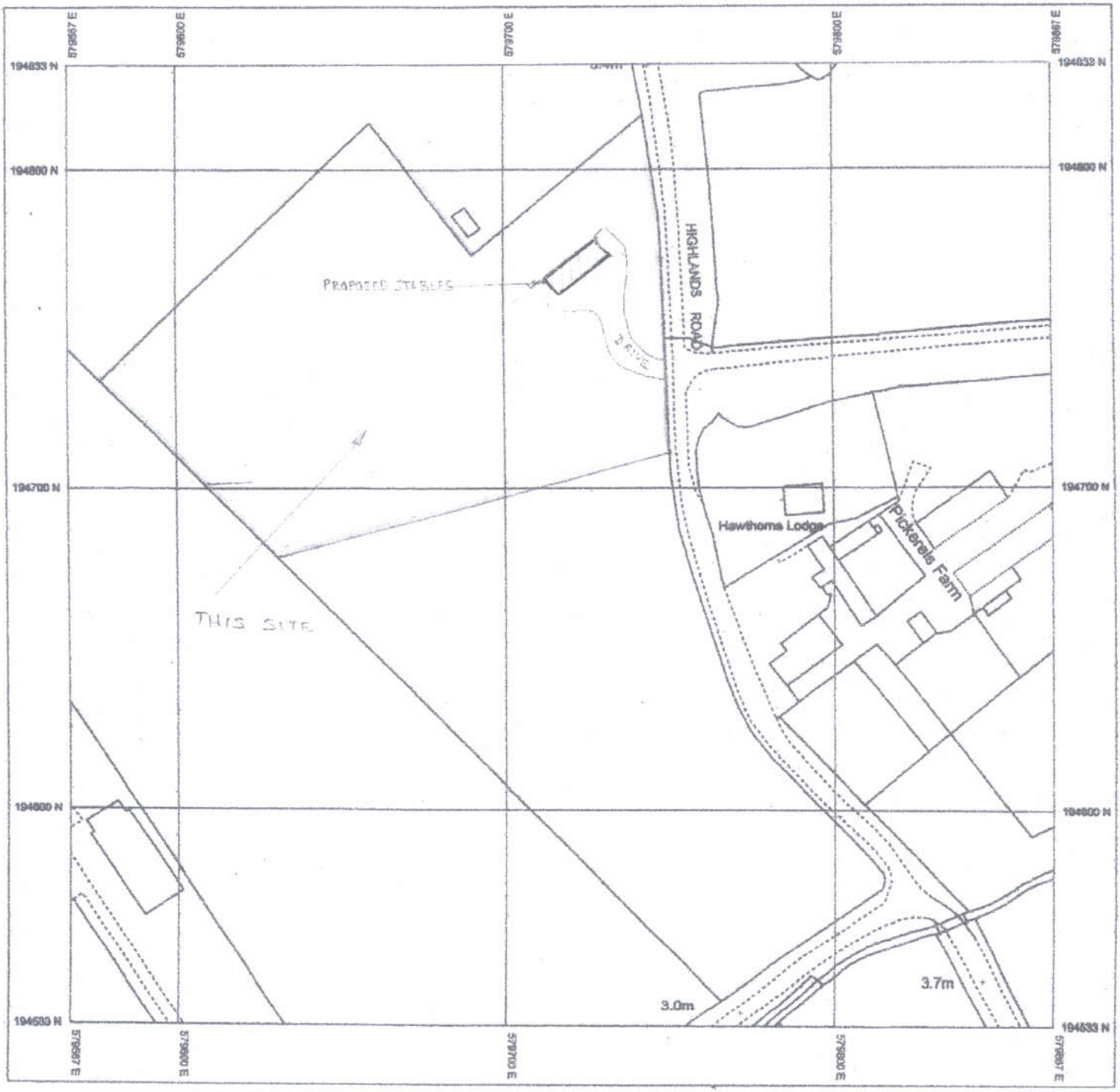
Appendix A.1 – Drawings

Appendix A.2 – Environment Agency Flood Report

Appendix A.1 – Drawings

Mapping sourced from Ordnance Survey

Location Map



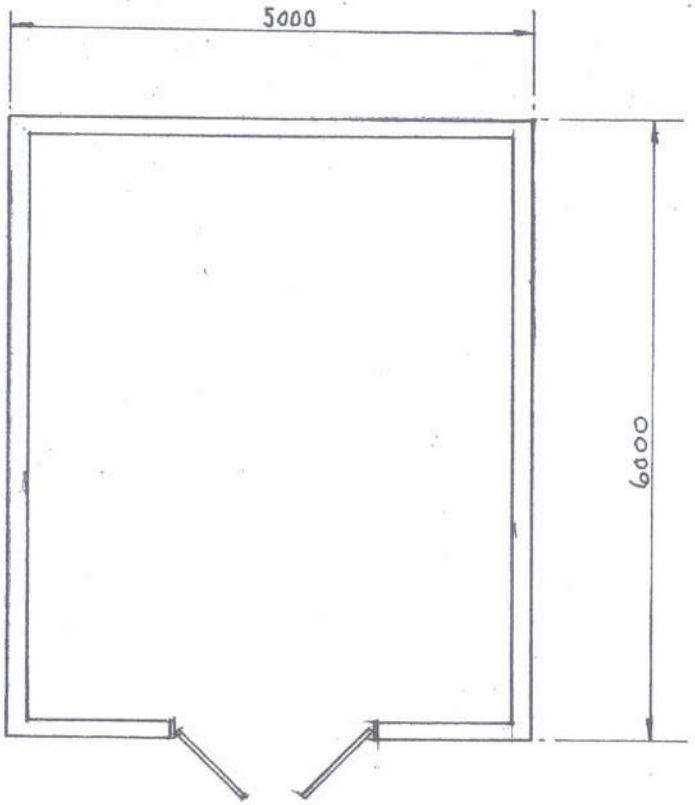
0 20 40

Scale 1:1250 – AT A3 SIZE

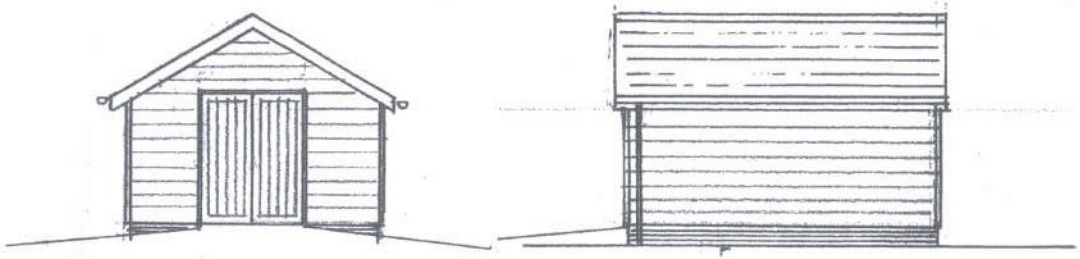
Supplied By: Hussey Knights Shenfield

Serial number: 001152002

Plot Centre Coordinates: 579717, 194683

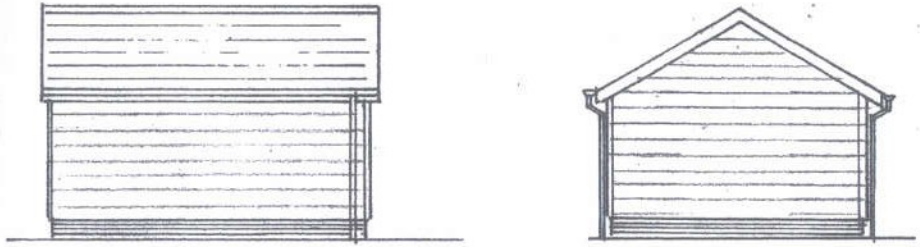


PLAN 1:50



FRONT ELEVATION

SIDE ELEVATION

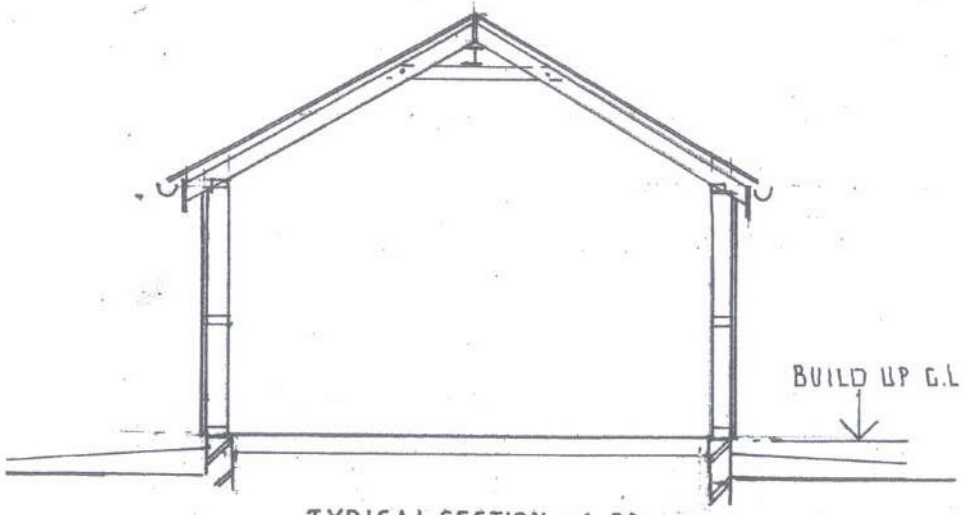


SIDE ELEVATION

REAR ELEVATION

1:100

SCALE AT A3

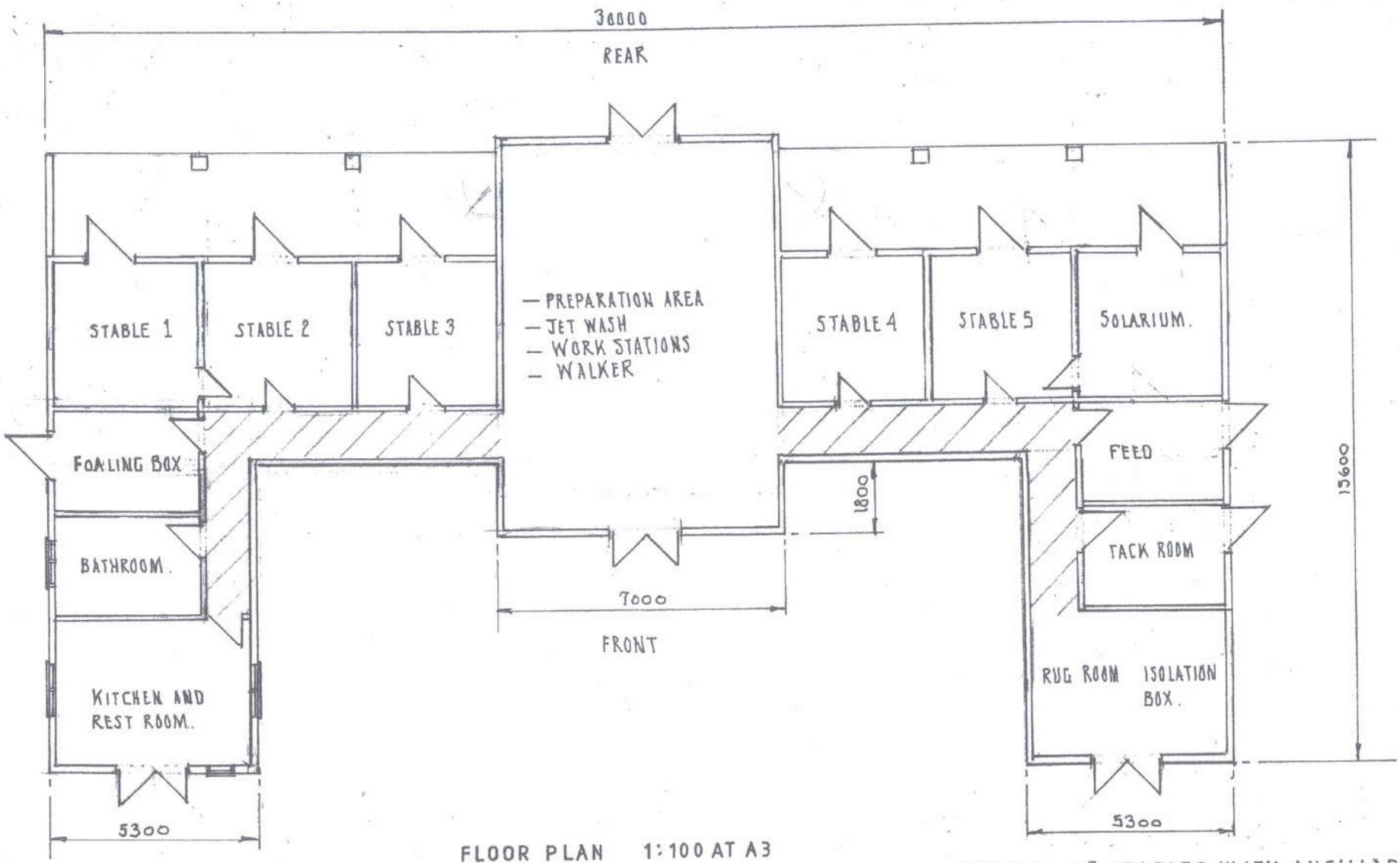


TYPICAL SECTION 1:50

NOTE. Finishes all as for the stable block.

DETAILS OF HAY BARN FOR USE WITH STABLES WITH ANCILLARY FACILITIES.

LAND OPPOSITE HAWTHORNS LODGE, HIGHLAND ROAD, RAWRETH, WICKFORD, ESSEX, SS11 8TL. DRG. NO. 2308/9A.



FLOOR PLAN 1:100 AT A3

DETAIL OF STABLES WITH ANCILLARY FACILITIES.

LAND OPPOSITE HAWTHORNS LODGE, HIGHLAND ROAD, RAWRETH, WICKFORD ESSEX SS11.8TL.

DRG NO 2308/10

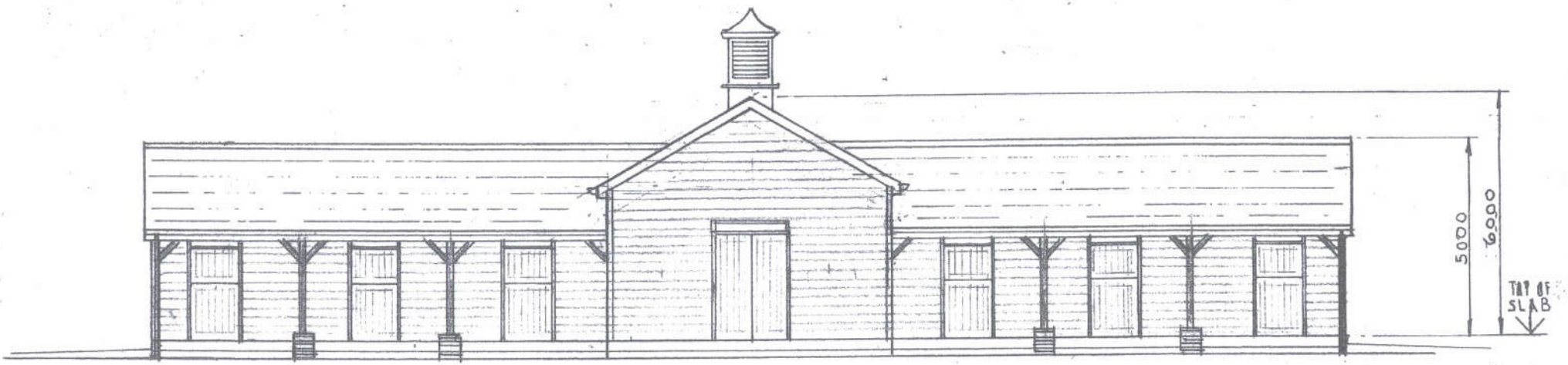
NOTE.

As recommended in the Flood Risk Assessment report.

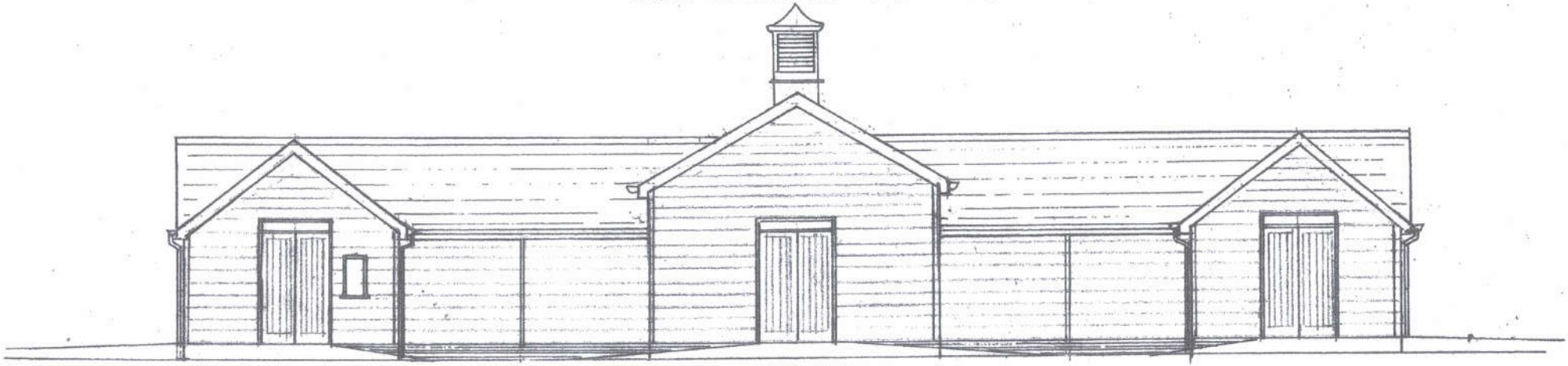
1/The top level of the stable ground bearing concrete floor slab is to at least 450 above outside ground level. Top level is to be verified.

2/At loft level over the preparation area bring in the electrical supply, place the boiler and meter cupboards.

3/Use non-return valves on all new plumbing works.



REAR ELEVATION 1:100 SCALE AT A3



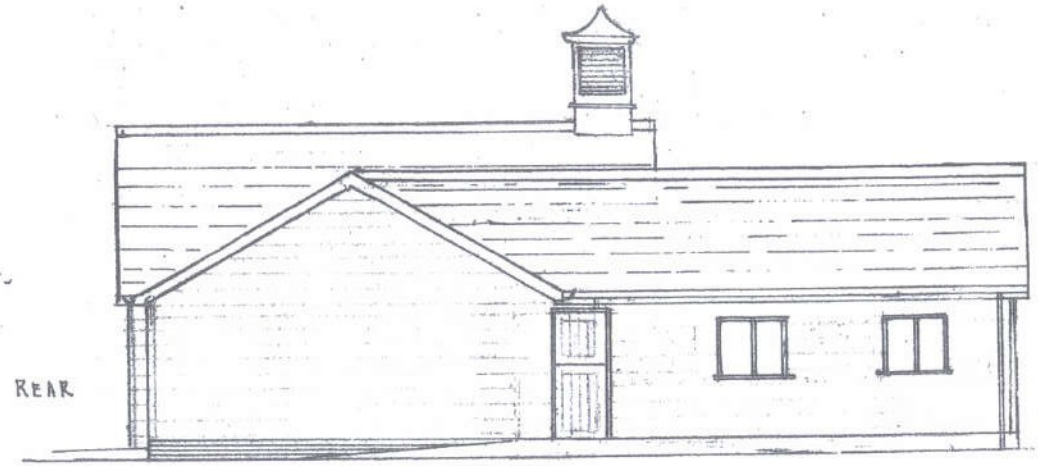
FRONT ELEVATION 1:100

NOTES.

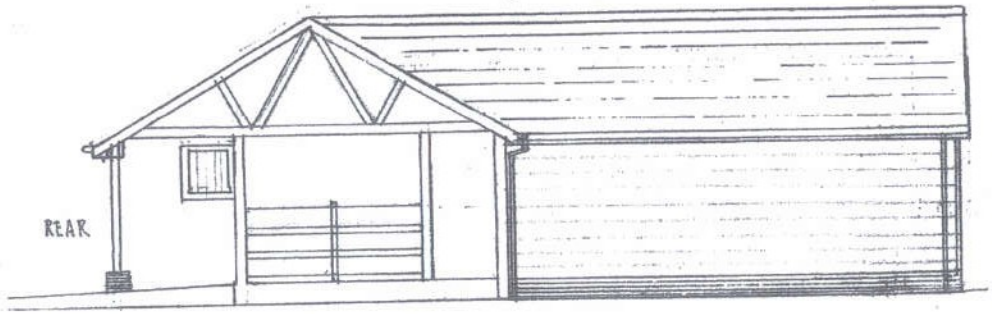
The roof tiles are to be red interlocking.
The external walls are to be finished with 'Barn Black' horizontal timber cladding.
The soffits and fascias are to match the external wall finish.

DETAIL OF STABLES WITH ANCILLARY FACILITIES.
LAND OPPOSITES HAWHORNS LODGE, HIGHLAND ROAD, RAWRETH, WICKFORD, ESSEX. SS11 8TL.

DRG. NO.2308/11/A

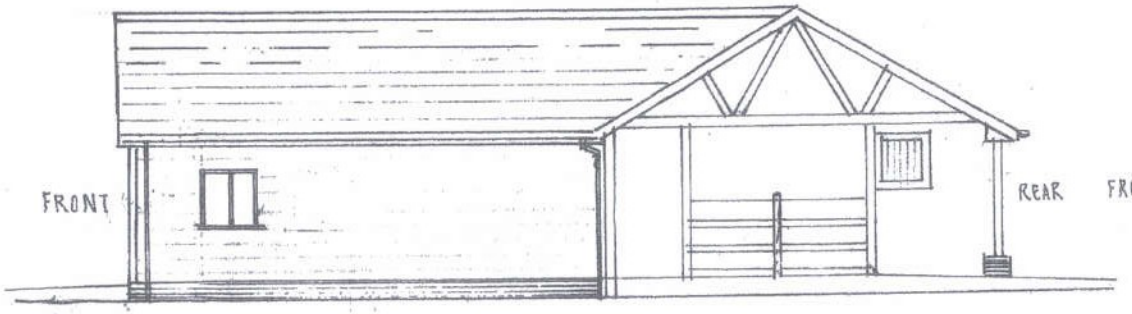


SIDE

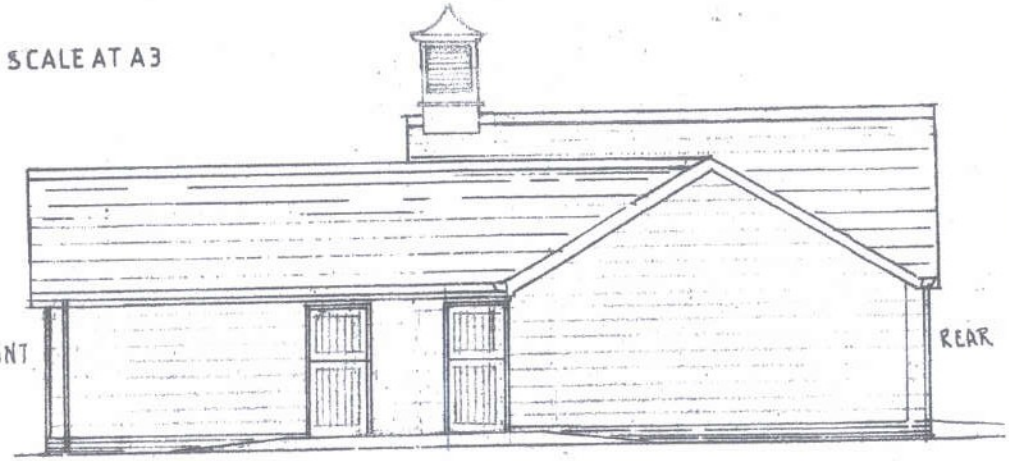


SECTION AND SIDE

1:100 SCALE AT A3



SIDE AND SECTION



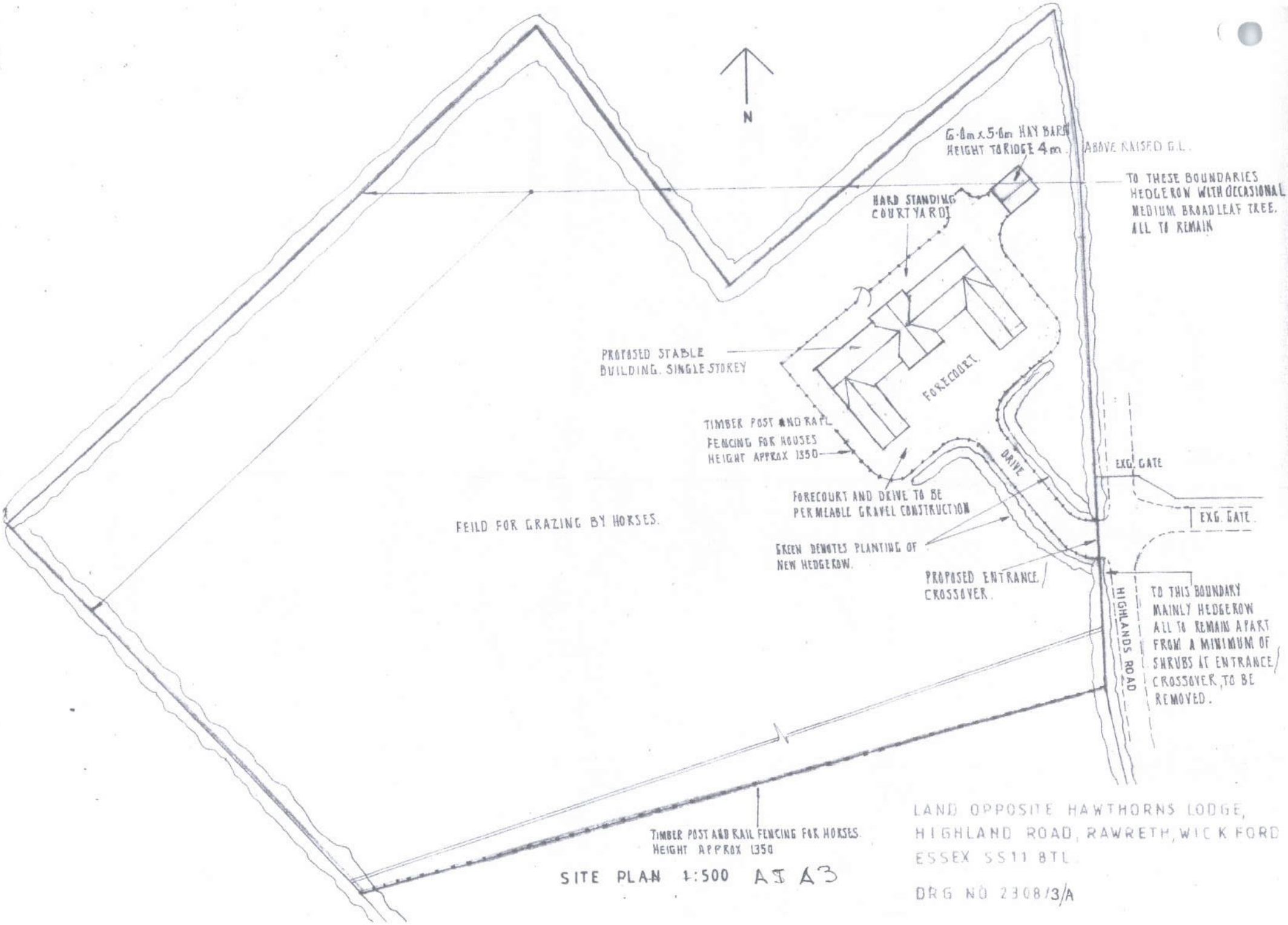
SIDE

NOTES.

The roof tiles are to be red interlocking.
The external walls are to be finished with 'Barn Black' horizontal timber cladding.
The soffits and fascias are to match the external wall finish.

DETAIL OF STABLES WITH ANCILLARY FACILITIES.
LAND OPPOSITES HAWHORNS LODGE, HIGHLAND ROAD, RAWRETH, WICKFORD, ESSEX. SS11 8TL.

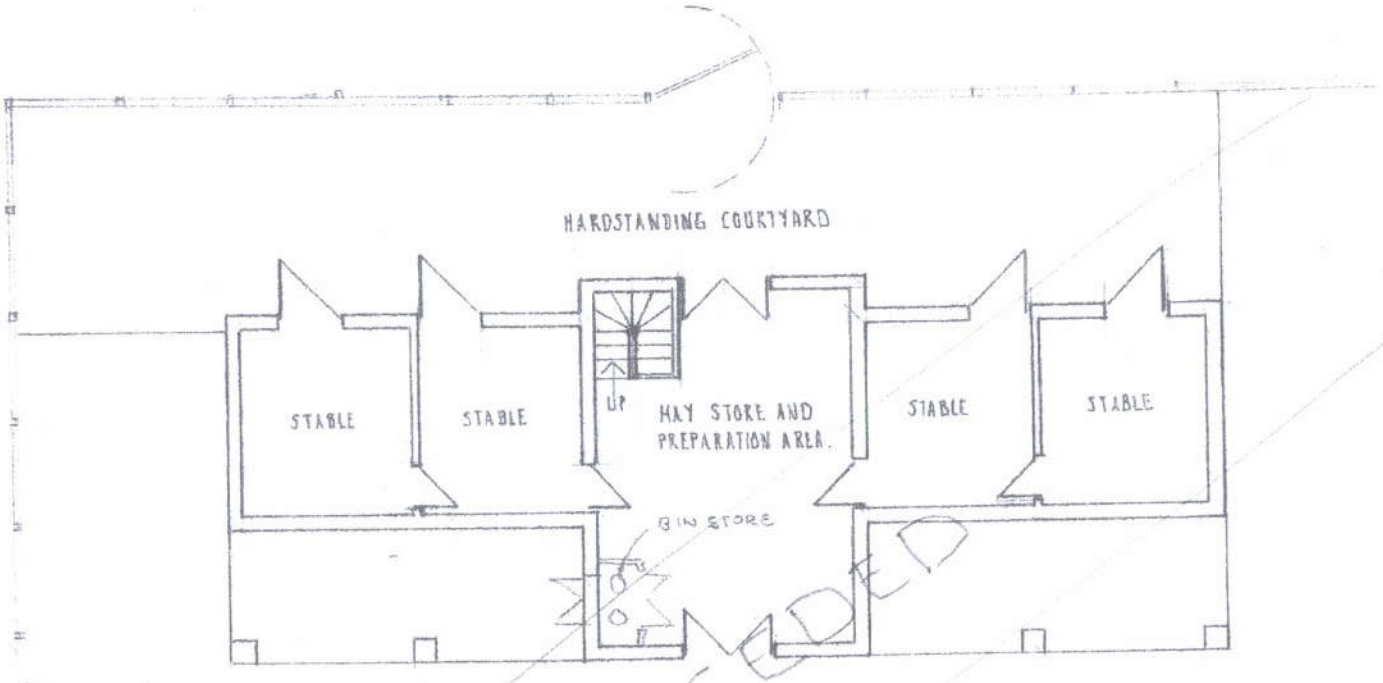
DRG. NO.2308/12/A



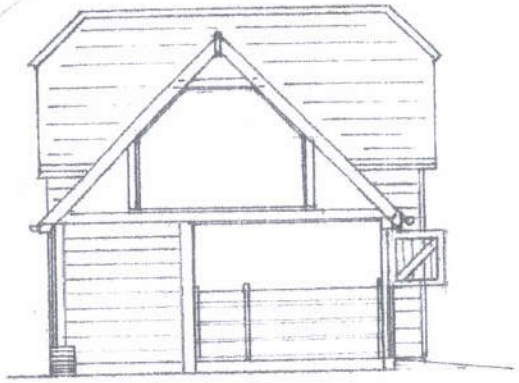
SITE PLAN 1:500 AT A3

LAND OPPOSITE HAWTHORNS LODGE,
HIGHLAND ROAD, RAWRETH, WICKFORD
ESSEX SS11 8TL.

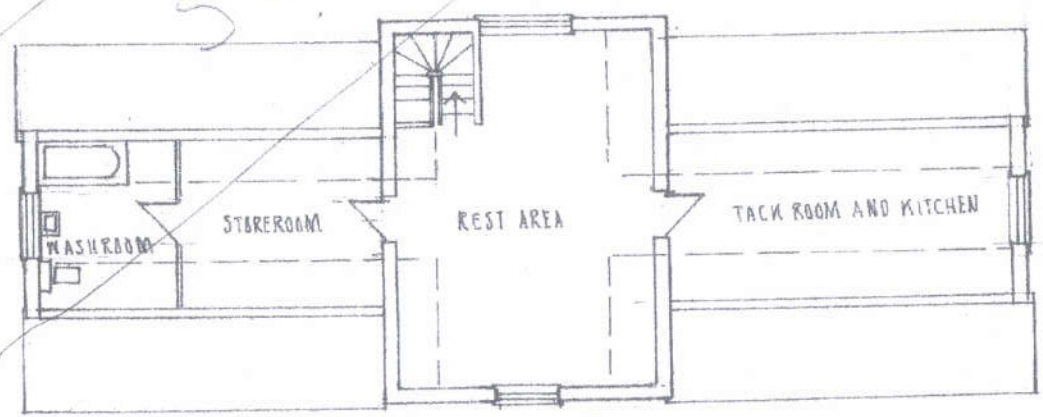
DRG NO 2308/3/A



GROUND FLOOR PLAN 1:100



TYPICAL SECTION 1:100



FIRST FLOOR PLAN 1:100

SUPERCEDED

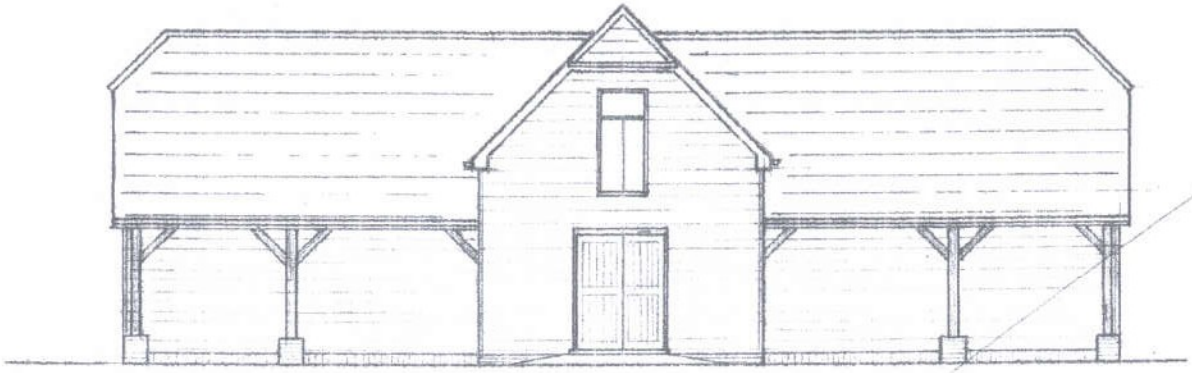
SCALE AT A3 SIZE

NOTES.
The roof tiles are to be red concrete interlocking.
The external walls are to be finished with 'Barn Black' horizontal timber cladding.
The external doors and windows are to be timber.
The soffits and fascias are to match the external wall finish.

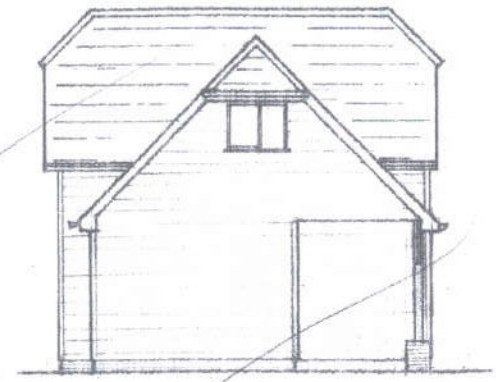
DETAIL OF STABLES WITH ANCILLARY FACILITIES.

LAND OPPOSITE HAWTHORNS LODGE, HIGHLAND ROAD, RAWRETH, WICKFORD ESSEX SS11 8TL.

DRG NO 2308/2

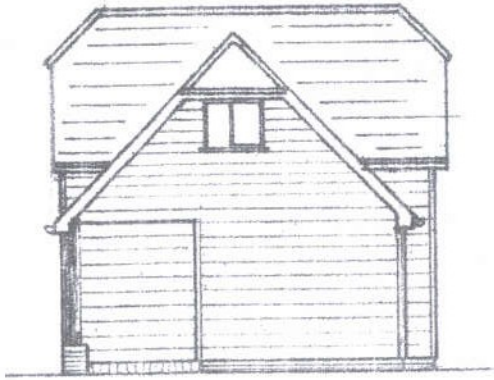


FRONT ELEVATION 1:100



SIDE ELEVATION 1:100

REAR ELEVATION 1:100



SIDE ELEVATION 1:100

SUPERSEDED

SCALE AT A3 SIZE

DETAIL OF STABLES WITH ANCILLARY FACILITIES.

LAND OPPOSITE HAWTHORNS LODGE,
HIGHLANDS ROAD,
RAWRETH, WICKFORD,
ESSEX, SS11 8TL.

DRG NO 2308/1

Appendix A.2 – Environment Agency Flood Report

Environment Agency

Dominic Mulford - Herrington Consulting Ltd
dominic@herringtonconsulting.co.uk

Our ref CCE/2014/54501
Your ref
Date 16 December 2014

Dear Dominic

Provision of Product 4 for Hawthron Lodge, Highlands Rd, Rawreth, Wickford,
Thank you for your request of 14 November 2014 to use Environment Agency data, Product 4, in the development of the above site. The following information is attached.

- Flood Map showing the Flood Zones (outlines) for the area of the site.
- Modelled Flood Levels.
- Modelled Flood Levels Location Map.
- Recorded Flood Events Outline Map.
- Defence information.
- Flood Defence Map.

If you have requested this information to help inform a development proposal, then you should note the detail in the attached advisory text on the use of Environment Agency Information for Flood Risk Assessments.

This area falls within Flood Zone 3, Tidal.

Flood Zone 1, (i.e. a less than 0.1% annual probability of flooding).

The Flood Zone 2 outline shows a 1 in 1000 chance of flooding at a location in any one given year (i.e., a 0.1% annual probability of flooding).

The Flood Zone 3 fluvial outline shows a 1 in 100 chance of flooding at a location in any one given year (i.e., a 1% annual probability of flooding).

The Flood Zone 3 tidal outline shows a 1 in 200 chance of flooding at a location in any one given year (i.e., a 0.5% annual probability of flooding).

The flood outlines show areas of potential flooding as a direct result of floodwater coming from rivers or sea. They do not show the risk of flooding to individual properties, because we do not hold this data.

Essex, Suffolk and Norfolk - Iceni House
Cobham Road, Ipswich, Suffolk, IP3 9JD
General Enquiries: 03708 506506 **Fax:** 01473 724205
Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls. These rules apply to calls from any type of line including mobile, BT, other fixed line or payphone.
Email: enquiries@environment-agency.gov.uk
Website: https://www.gov.uk/government/organisations/environment-agency

Please be aware that in recent years, there has been an increase in flood damage caused by surface water flooding or drainage systems that have been overwhelmed. We have worked with Lead local Flood Authorities (LLFAs) to develop a map which incorporates the best local and national scale information on surface water flood risk. These maps can be viewed on our website at the following:-

http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2

Examinations of our records of historic flooding show that the general area of Rawreth was flooded in 1953 & 1958. Please note that these records show flooding to the land and do not necessarily indicate that properties within the historic flood events were flooded internally. It is also possible that the pattern of flooding in this area has changed and that this area would now flood under different circumstances.

We have produced a map which shows the extent of flooding if a reservoir was to fail and release the water that it holds. The map shows the worst case scenario. These can be viewed on our website at the following:-

http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=reservoir#x=357165&y=355108&scale=2

Please be aware that we now charge for planning advice provided to developers, agents and landowners. If you would like us to provide you with advice to inform a future planning application for this site then please complete our pre-application enquiry form and email it to our Sustainable Places team. We will initially provide you with a free response identifying the following:

- the environmental constraints affecting the proposal;
- the environmental issues raised by the proposal;
- the information we need for the subsequent planning application to address the issues identified and demonstrate an acceptable development;
- any required environmental permits.

If you require any further information from us (for example a meeting or the detailed review of a technical document) we will need to set up a charging agreement. Further information can be found on our website.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004. Please get in touch if you have any further queries or contact us within two months if you would like us to review the information we have sent.

If you have any queries or would like to discuss the content of this letter further please contact Julian Adams (FCRM Officer) 01473 706805.

Essex, Suffolk and Norfolk - Iceni House
Cobham Road, Ipswich, Suffolk, IP3 9JD
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Email: enquiries@environment-agency.gov.uk
Website: https://www.gov.uk/government/organisations/environment-agency

Yours sincerely

N. Earrey

Nina Earrey
Customers and Engagement Officer

01473 706720

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Cobham Road, Ipswich, Suffolk, IP3 9JD
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Website: https://www.gov.uk/government/organisations/environment-agency

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Environment Agency

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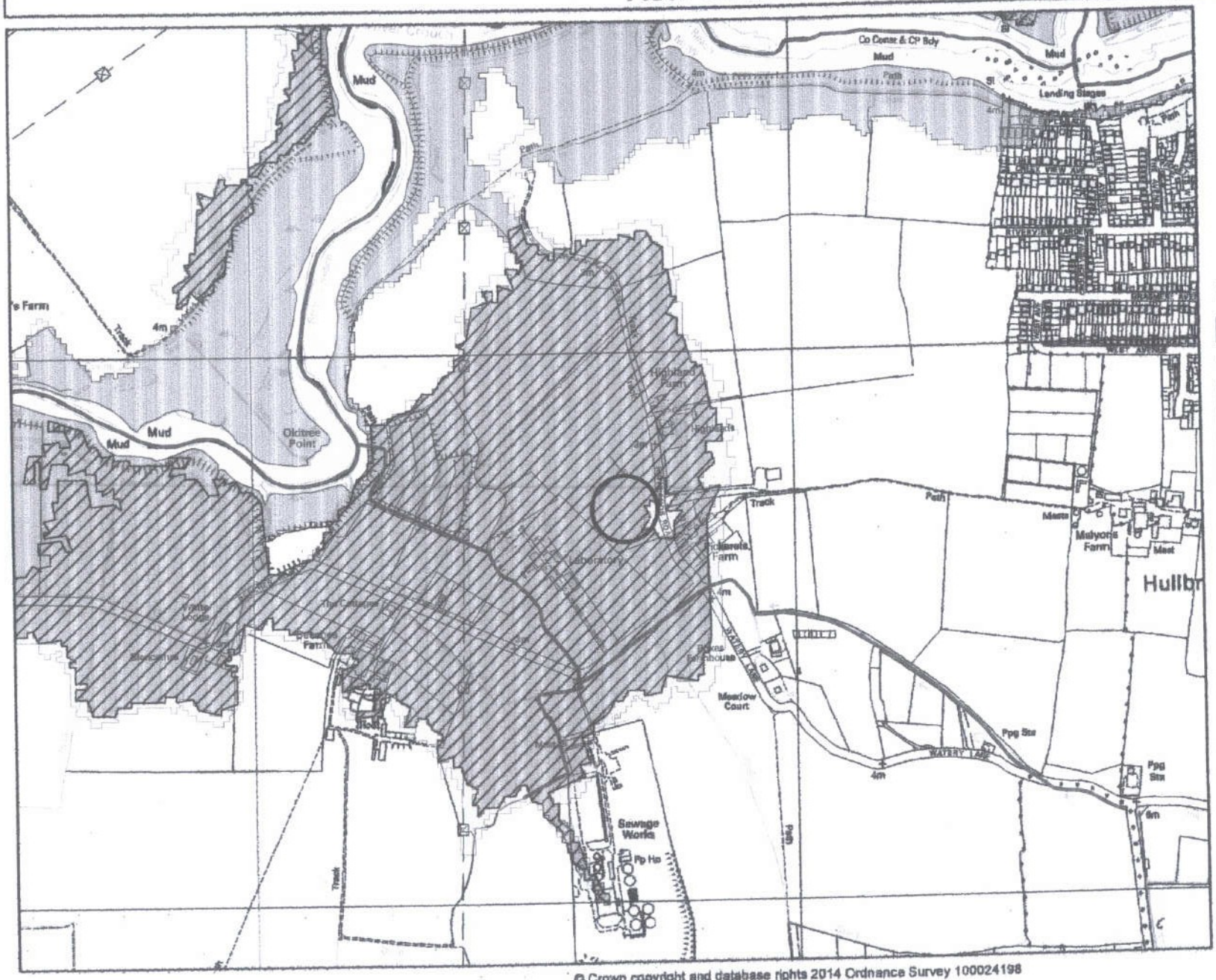
Detailed Flood Map centred on Rawreth - Created 2nd December 2014.
Ref: CCE/2014/54501



Environment Agency

Scale 1:10,000

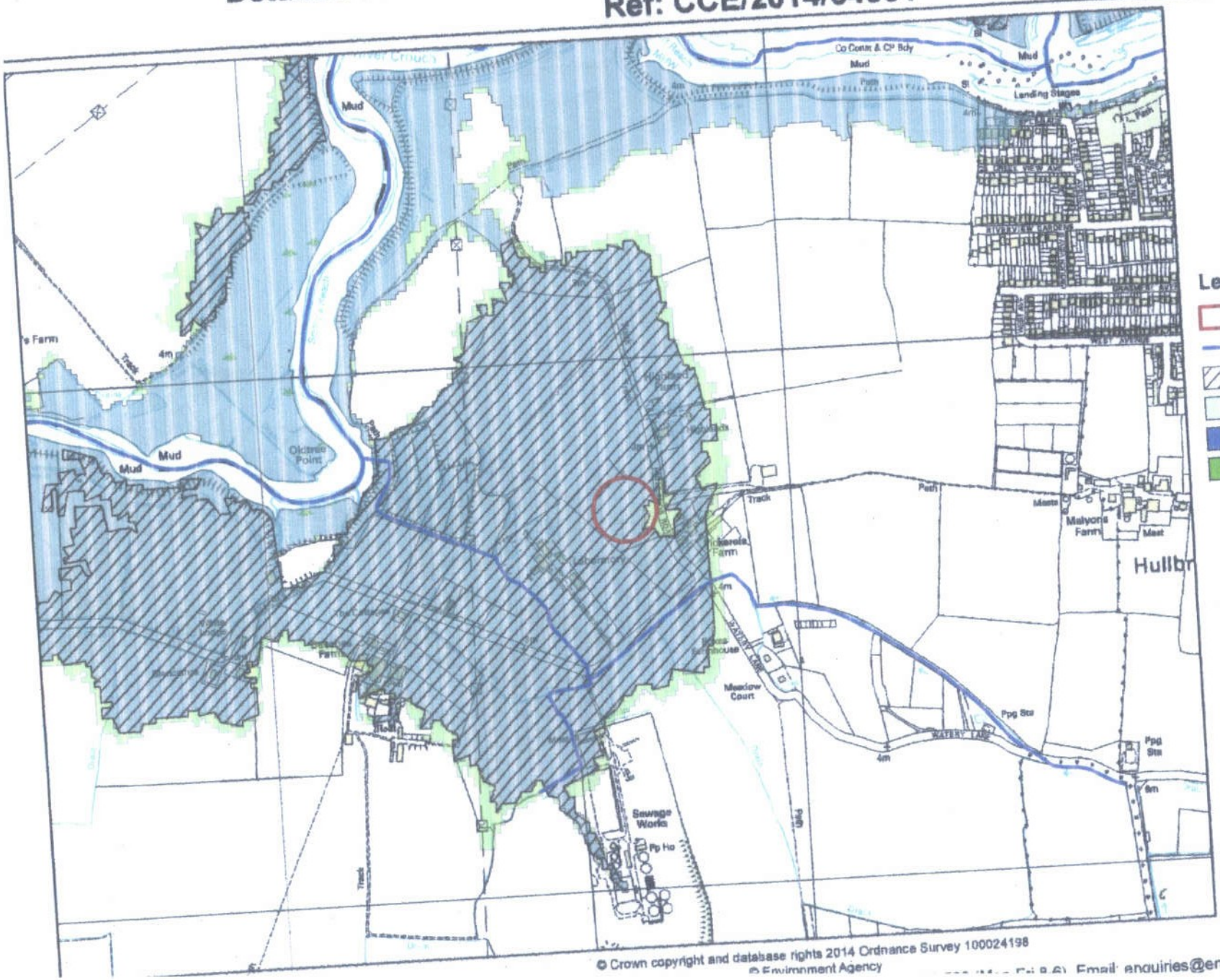
Legend

- Site Outline
- Main River
- Areas Benefit Flood Defence
- Flood Storage Area
- Flood Map - Flood Zone 3
- Flood Map - Flood Zone 2

N

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Detailed Flood Map centred on Rawreth - Created 2nd December 2014.
Ref: CCE/2014/54501



Environment Agency

Scale 1:10,000

Legend

- Site Outline
- Main River
- Areas Benefit Flood Defence
- Flood Storage Area
- Flood Map - Flood Zone 3
- Flood Map - Flood Zone 2

N

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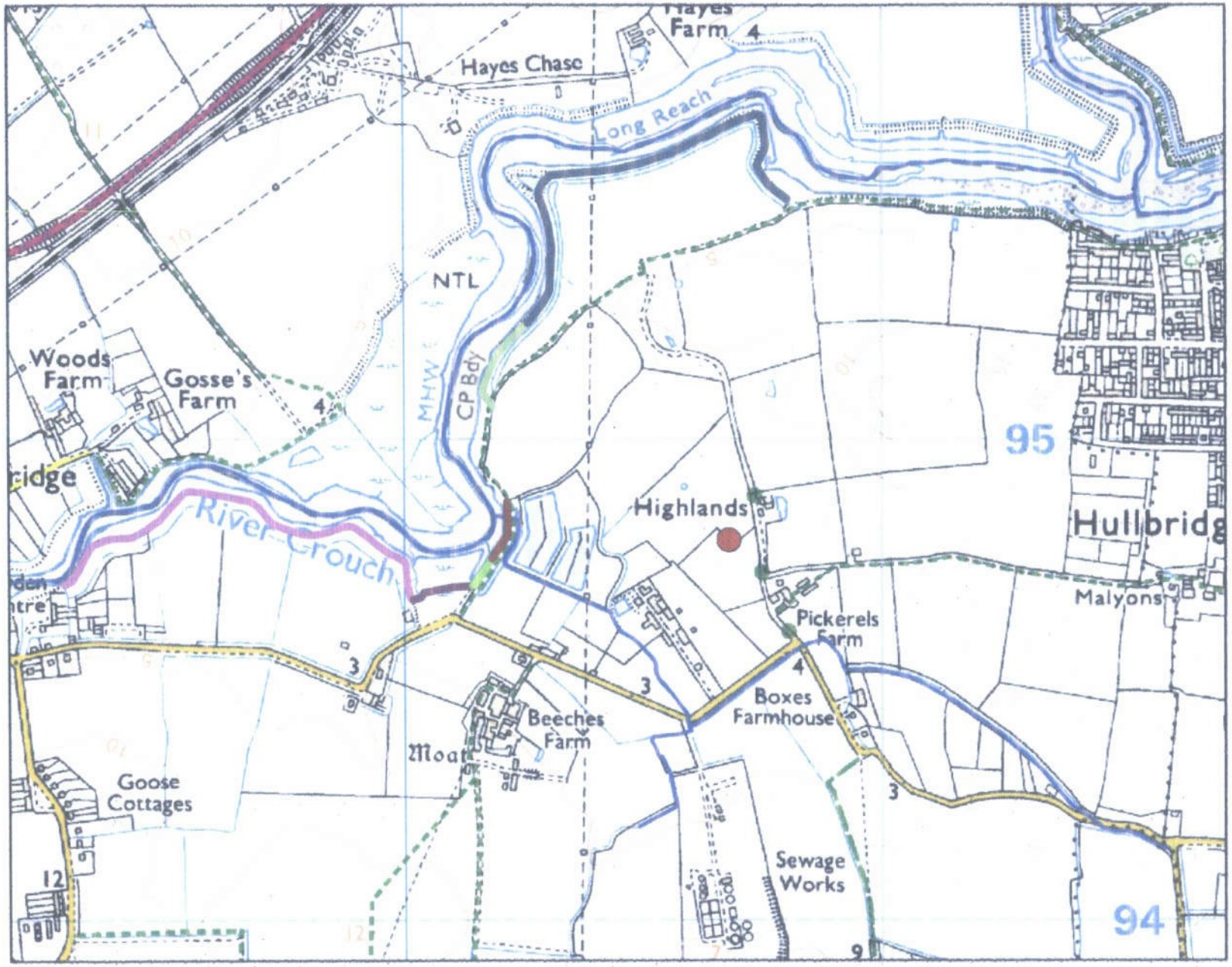
Flood Defence Location Map centred on Highlands Road, Wickford
Ref: CCE/2014/54501



Environment Agency

Scale 1:11,601

Legend

Site

Assets

ASSET_ID

- 98455
- 148280
- 149630
- 149631
- 165171
- 166716
- Main River

N

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Date: 03/12/2014
Datasheet Reference: CCE/2014/54501

Environment Agency

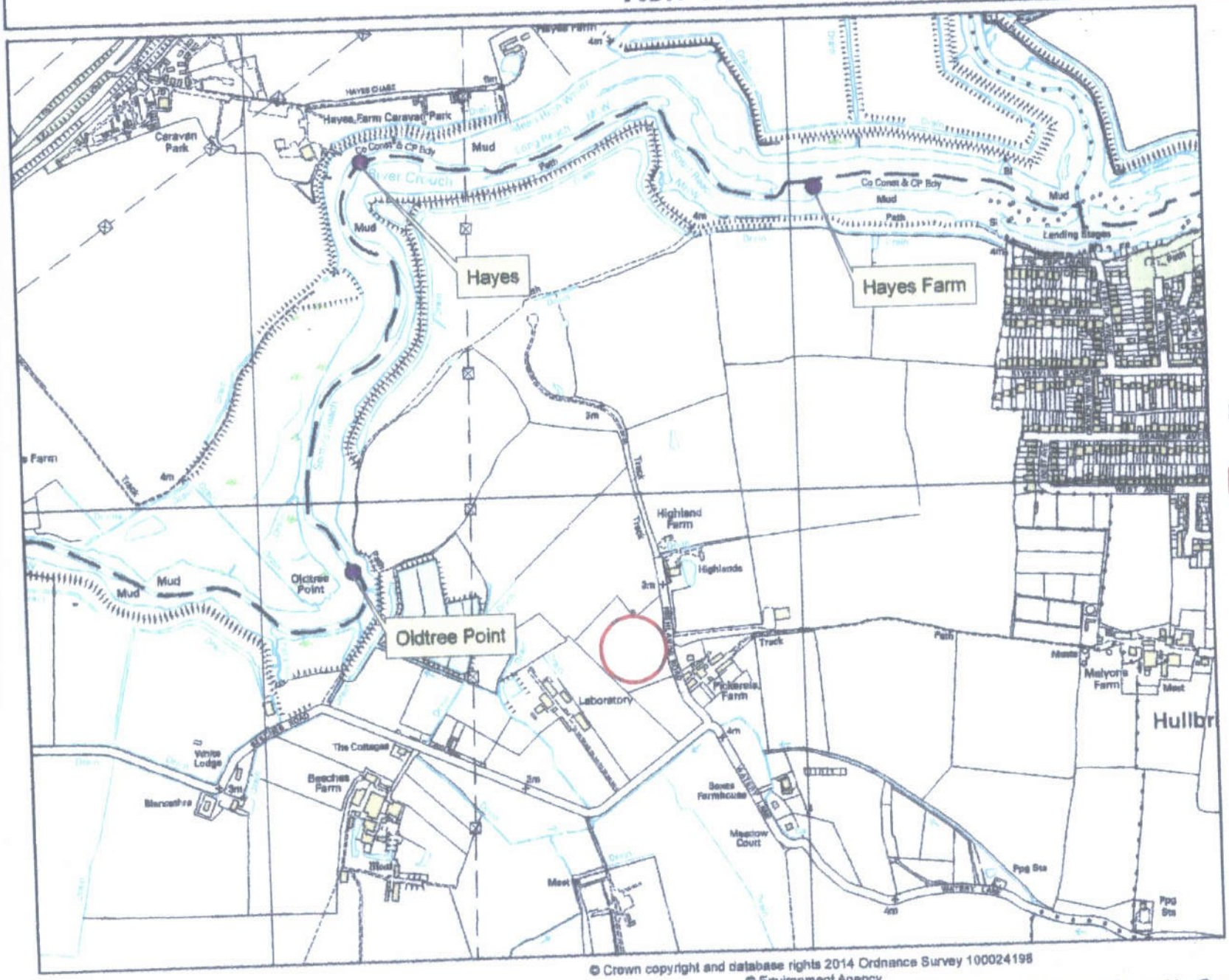
Defence Information

Asset Reference	Maintainer	Bank	Asset Type	Asset Description	Standard of Protection	Overall Condition Grade	Crest Level
98455	Environment Agency	coastal	embankment	Clay seawall		2	4.330
148280	Environment Agency	coastal	embankment	Clay seawall		3	4.620
149630	Environment Agency	coastal	embankment	Clay seawall		3	4.750
149631	Environment Agency	coastal	embankment	Clay seawall		2	4.750
165171	Environment Agency	coastal	embankment	Clay seawall		4	4.410
166716	Environment Agency	coastal	embankment	Clay seawall - Essex blockwork revetment		2	4.530

Key to Overall Condition Grades

Grade	Rating	Description
1	Very Good	Cosmetic Defects that will have no effect on performance.
2	Good	Minor defects that will not reduce the overall performance of the asset.
3	Fair	Defects that could reduce performance of the asset
4	Poor	Defects that would significantly reduce the performance of the asset. Further investigation.
5	Very Poor	Severe defects resulting in complete performance failure.

Modelled Flood Level Location Map centred on Rawreth - Created 2nd December 20
Ref: CCE/2014/54501



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Scale 1:10,000

Legend

- Modelled Flood Level Node Points
- Site Outline

N

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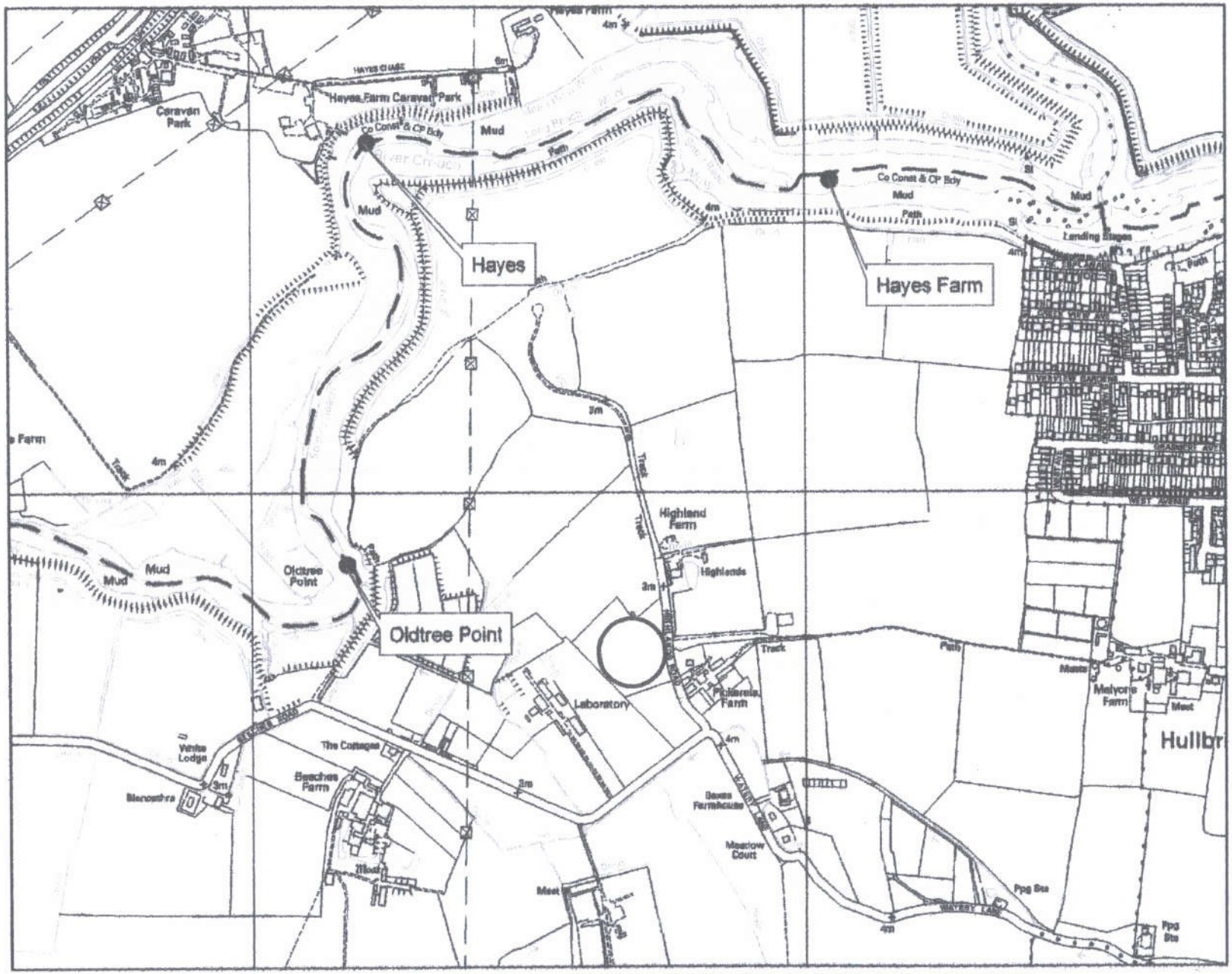
Modelled Flood Level Location Map centred on Rawreth - Created 2nd December 2014.
Ref: CCE/2014/54501



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Scale 1:10,000

Legend

- Modelled Flood Level Node Points
- Site Outline

N

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Date: 2nd December 2014
Datasheet Reference CCE/2014/54501

Environment Agency

Tidal flood levels (mAODN)

UNDEFENDED LEVELS **Annual Exceedance Probability – Maximum water levels (mAODN)**

Node	50% (1:2)	20% (1:5)	10% (1:10)	5% (1:20)	5% (1:20) +CC	2% (1:50)	1.3% (1:75)	1% (1:100)
Hayes Farm	3.32	3.46	3.57	3.71	4.81	3.90	3.98	4.03
Hayes	3.32	3.45	3.57	3.72	4.80	3.90	3.97	4.03
Oldtree Point	3.29	3.44	3.58	3.73	4.79	3.91	3.98	4.03

Node	1% (1:100)+CC	0.75% (1:150)	0.5% (1:200)	0.5% (1:200)+CC	0.33% (1:300)	0.1% (1:1000)	0.01% (1:10000)
Hayes Farm	5.10	4.11	4.17	5.24	4.23	4.44	5.52
Hayes	5.09	4.11	4.16	5.23	4.23	4.43	5.51
Oldtree Point	5.08	4.11	4.16	5.22	4.23	4.43	5.51

Tidal flood levels (mAODN)

DEFENDED LEVELS **Annual Exceedance Probability – Maximum water levels (mAODN)**

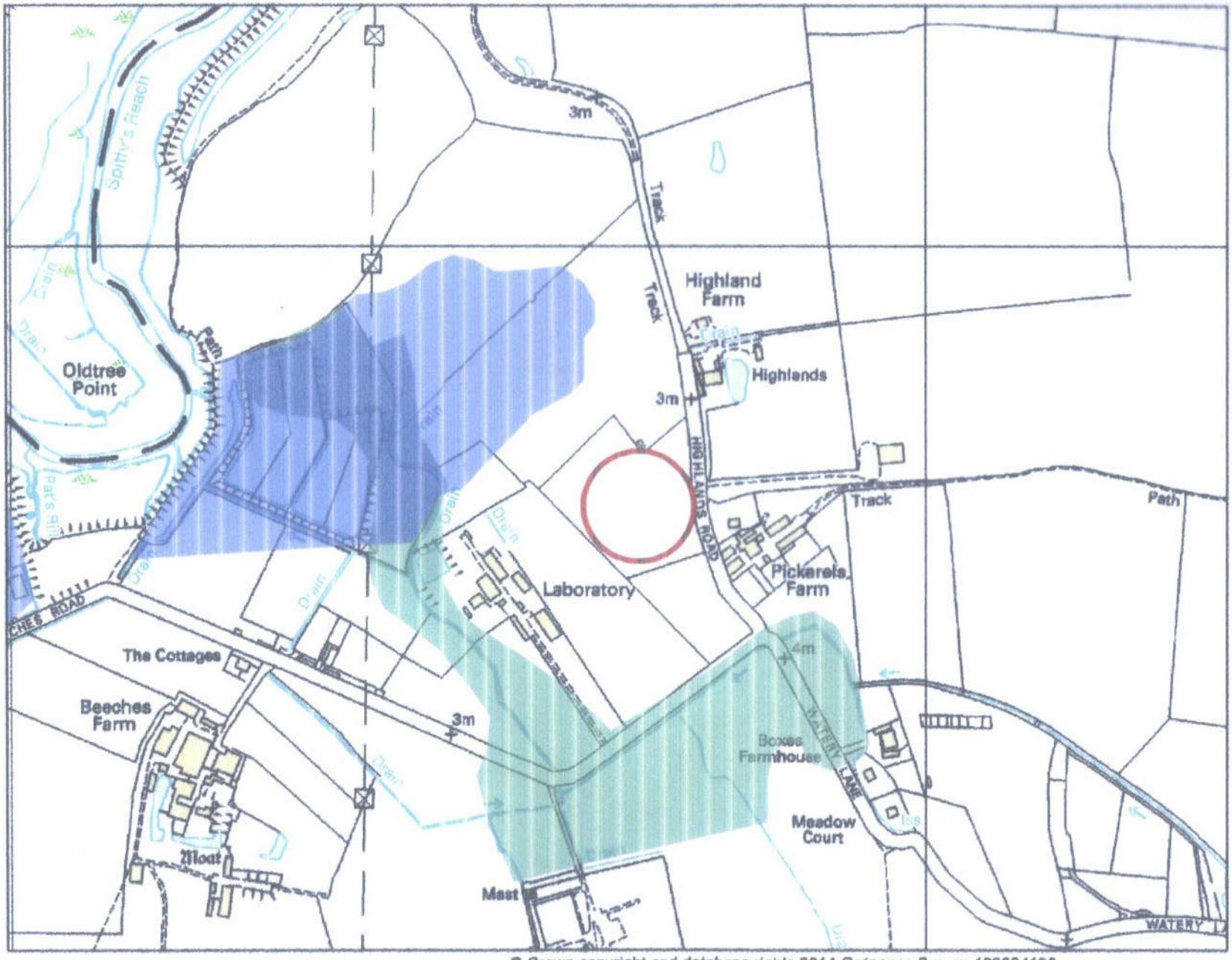
Node	50% (1:2)	20% (1:5)	10% (1:10)	5% (1:20)	5% (1:20) +CC	2% (1:50)	1.3% (1:75)	1% (1:100)
Hayes Farm	4.07	4.23	4.35	4.46	4.89	4.55	4.57	4.59
Hayes	4.08	4.23	4.36	4.47	4.89	4.55	4.58	4.59
Oldtree Point	4.09	4.24	4.36	4.47	4.88	4.55	4.58	4.59

Node	1% (1:100)+CC	0.75% (1:150)	0.5% (1:200)	0.5% (1:200)+CC	0.33% (1:300)	0.1% (1:1000)	0.01% (1:10000)
Hayes Farm	4.94	4.61	4.62	4.95	4.64	4.69	4.97
Hayes	4.93	4.61	4.62	4.95	4.64	4.70	4.96
Oldtree Point	4.92	4.61	4.62	4.93	4.64	4.71	4.94

CC=Climate Change

Source Of Information: Roach and Crouch Strategy Study by JBA 2011 for the Environment Agency

Recorded Flood Events Outlines Map centred on Rawreth - Created 2nd December 2014. Ref: CCE/2014/54501



Environment Agency

Scale 1:6,000

Legend

- Site Outline
- 1958 Flood Outline
- 1953 Flood Outline

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