

Flood Risk Assessment

Residential Development

Potash Farm

Holbrook Road (B1080)

Holbrook

Suffolk

Report Ref: BLI.2023.91

December 2023

Rev 00

Prepared for

Mr. M. McGarr

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1 Introduction

- 1.1 BLI Consulting Engineers Ltd have been commissioned by Mr. M. McGraff to prepare a Flood Risk Assessment in accordance with the:
- National Planning Policy Framework (NPPF).
 - Flood Risk and Coastal Change Planning Practice Guidance (PPG).
- 1.2 This report will form part of the supporting technical documentation to accompany a full planning application comprising of three residential dwellings and associated hard and soft landscaping.
- 1.3 The application will be submitted by Design and Conservation Ltd to Babergh District Council and the purpose of this report shall be to provide information on the flood risks associated with the application site and to present appropriate mitigation measures for the proposed development where flood risk has been identified.
- 1.4 This is to enable the development to obtain planning permission without objection from the Local Planning Authority (LPA) or their consultees and so that the site, its occupants, and the surrounding development is at the minimum risk of flooding.

2 Development Details

Site Location

2.1 The application site is located:

- **Site Address:** – Potash Farm, Holbrook Road (B1080), Holbrook, Suffolk
- **Post Code:** - IP9 2PJ
- **Central Grid Reference:** – TM 16731 37756

2.2 Refer to Figure 2.1 below for Site Location.

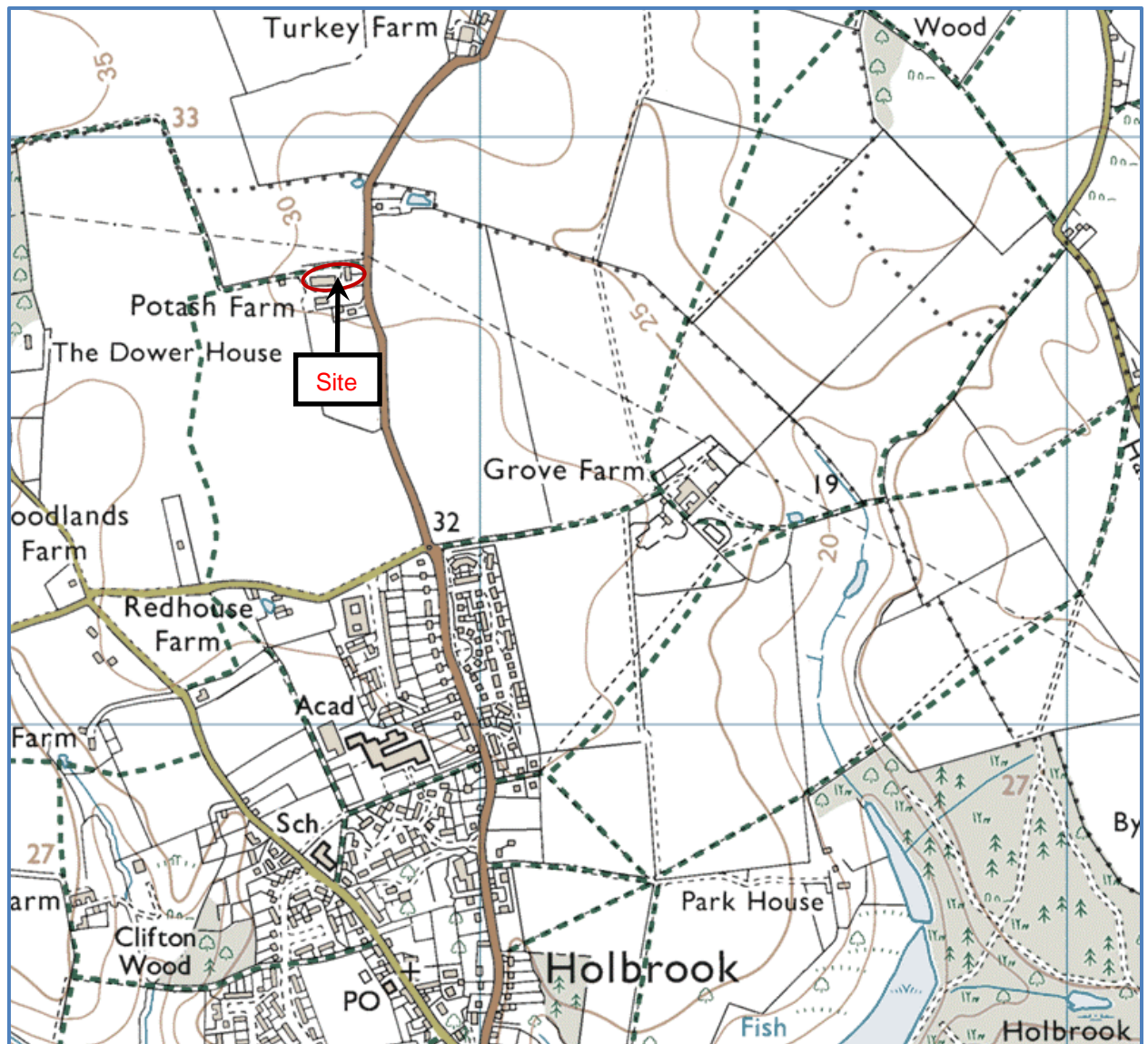


Figure 2.1 – Site Location Plan

Existing Site Layout

- 2.3 The application boundary encloses an area of approximately 0.216 ha and is surrounded by:
- Agricultural farmland to the north and west.
 - A residential dwelling and a barn structure to the south with agricultural farmland beyond.
 - Residential dwellings and Holbrook Road to the east with agricultural farmland beyond
- 2.4 A Topographical Survey of the existing site layout has been undertaken by Parish Land Surveys and a copy of the survey has been included within Appendix A.
- 2.5 The existing site layout currently comprises of:
- A large agricultural building with an existing Finished Floor Level of circa 29.40m AOD.
 - An access track/private road which extends around the perimeter of the agricultural buildings and also provides access to the agricultural farmland to the west.
 - Areas of concrete hardstanding and rough grassland/vegetation.
- 2.6 Ground levels fall in a north-easterly direction across the site with levels ranging between circa 29.70m AOD along the southern site boundary and circa 28.80m AOD along the northern site boundary, adjacent to the ditch.
- 2.7 Vehicular and pedestrian access to the site is currently achieved off Holbrook Road – B1080 (adoptable highway) located to the east of the site.

Development Proposal

- 2.8 The proposed development as shown in Appendix B comprises of:
- The conversion of the agricultural buildings into 3No. residential dwellings.
 - Associated driveways, garden/patio areas and general soft landscaping.
- 2.9 Vehicle and pedestrian access will continue to be achieved via the existing access track/private road leading onto Holbrook Road – B1080 (adoptable highway) to the east of the site.

3 Flood Hazard Review

Source of Flooding

- 3.1 **Fluvial Flooding** - is caused by rivers and occurs when the river channel capacity is exceeded by the flow. Most rivers have a natural flood plain which in built up areas is sometimes encroached upon by development.
- 3.2 The indicative fluvial and tidal flood mapping available on the GOV.UK website and as shown in Figure 3.1 below demonstrates that the entire development site is located within Flood Zone 1 in accordance with Table 1 of the Flood Risk and Coastal Change PPG.
- 3.3 Therefore, the proposed development is considered to be at a 'LOW RISK' of flooding from this source.

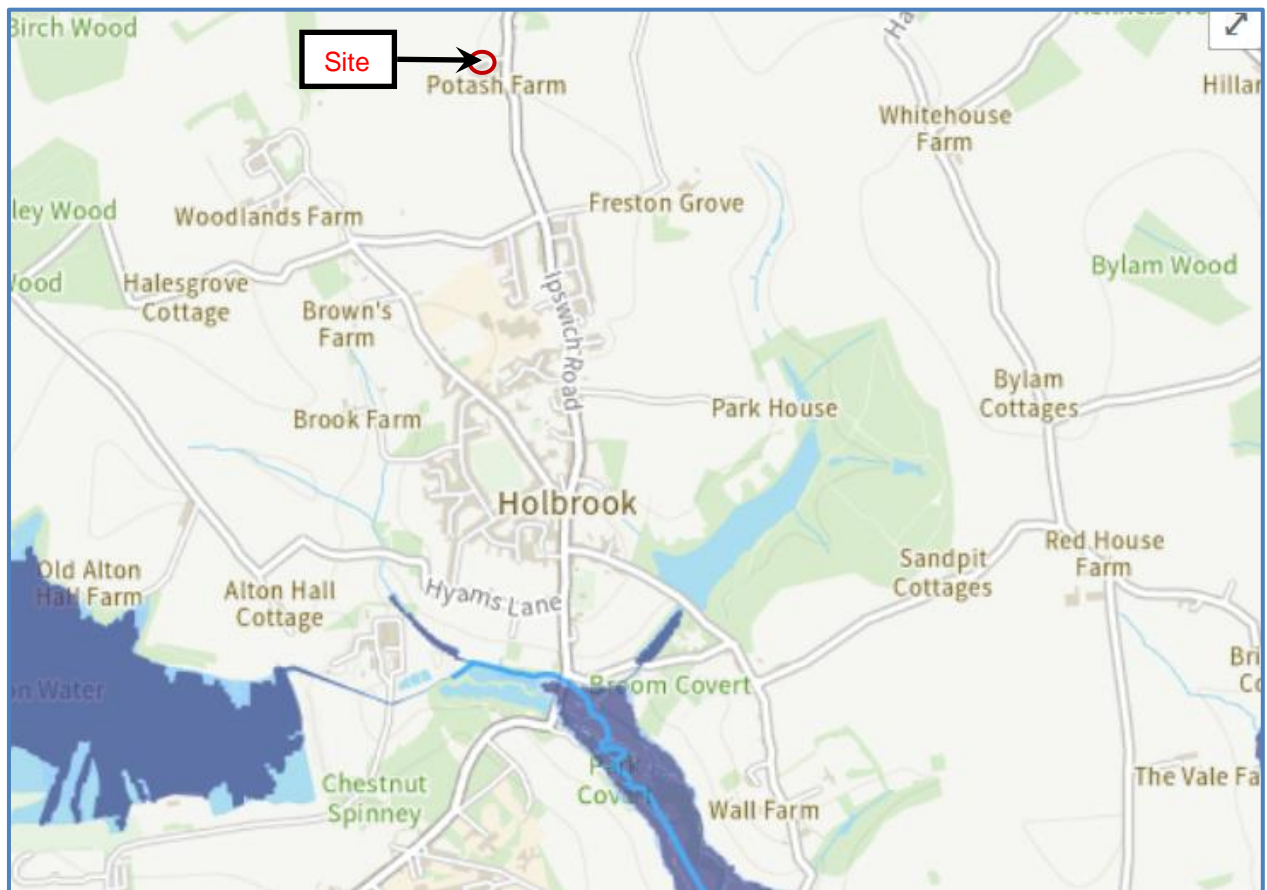


Figure 3.1 – Fluvial and Tidal Indicative Flood Mapping

- 3.4 **Tidal Flooding** - from the sea occurs when high tides and storm surges raise the level of tidal waters above the level of the shore or riverbank. They can be sudden and severe but are dependent on a number of factors.

- 3.5 As shown within Figure 3.1 above, the proposed development site is located within Flood Zone 1 in accordance with Table 1 of the Flood Risk and Coastal Change PPG.
- 3.6 Therefore, the development is also considered to be at a 'LOW RISK' of flooding from this source.
- 3.7 **Surface Water Flooding** – commonly occurs within highly dense urban areas where there are large areas of impermeable surfacing e.g., roof areas, car parking and roads. It is possible during high intensity rainfall storms events for surface water run-off to be unable to soak into the ground or enter the man-made drainage systems at a quick enough rate. Where this occurs, the excess water can flow across land and potentially cause flooding.
- 3.8 The indicative surface water flood mapping available on the GOV.UK website and as shown in Figure 3.2 below demonstrates that the application site is partially located within the extent of surface water flooding.



Figure 3.2 – Surface Water Indicative Flood Mapping

3.9 To obtain a more accurate understanding of the surface water flood risk, flood data has been downloaded from the online Defra Data Download website and uploaded into QGIS software. The proposed development layout has also been uploaded into the QGIS software to enable a comparison of the flood extents against the proposed development during the 30-year, 100-year and 1000-year storm events.

30-Year Storm Event

3.10 The surface water flood mapping included within Appendix C represents the 'High Risk' flood scenario which equates to flooding of greater than 3.3% probability (30-year event).

3.11 The mapping demonstrates that:

- The proposed dwellings (residential barn conversion) are located outside of the anticipated flood extents and has a risk rating of 'Very Low'.
- An area of surface water flooding/ponding has been identified to the north and west of the residential barn conversion and along the private access road. The mapping demonstrates a typical flood depth between 0mm and 300mm, and a typical flow velocity between 0.00 m/s and 0.50 m/s.

100-Year Storm Event

3.12 The surface water flood mapping included within Appendix D represents the 'Medium Risk' flood scenario which equates to flooding between the 1.0% and 3.3% probability (30-year event to 100-year event).

3.13 The mapping demonstrates that:

- The proposed dwellings (residential barn conversion) have remained located outside of the anticipated flood extents and have a risk rating of 'Very Low'.
- The extent of surface water flooding/ponding identified to the north and west of the residential barn conversion has increased. The mapping demonstrates that the typical flood depth has remained between 0mm and 300mm, and the typical flow velocity is between 0.25 m/s and 0.50 m/s.

1000-Year Storm Event

- 3.14 The surface water flood mapping included within Appendix E represents the 'Low Risk' flood scenario which equates to flooding between the 0.1% and 1.0% probability (100-year event to 1000-year event).
- 3.15 The mapping demonstrates that:
- The western residential dwelling and its rear garden are partially located within the surface water flood extent. The mapping demonstrates that the adjacent area of surface water flooding has a typical flood depth between 0mm and 300mm, and a typical flow velocity between 0.00 m/s and 0.50 m/s.
 - The remaining two dwelling (residential barn conversion) to the east have remained located outside of the anticipated flood extents and have a risk rating of 'Very Low'.
 - The extent of surface water flooding/ponding identified to the north and west of the residential barn conversion has significantly increased. The mapping demonstrates a typical flood depth between 0mm and 300mm, with some smaller areas between 300mm and 600mm. The typical flow velocity is between 0.50 m/s and 1.0 m/s.
- 3.16 In summary, the surface water flood mapping demonstrates that the proposed dwellings (residential barn conversion) are located outside of the 100-year surface water flood extent. Plot 1 is partially located within the 1000-year surface water flood event while Plot 2 and Plot 3 remain located outside of the flood extent. In addition to the above, the mitigations measure put forward within Section 4 on this report will further reduce this risk.
- 3.17 Therefore, the proposed development is considered to be at a 'LOW to MEDIUM RISK' of flooding from this source.
- 3.18 **Groundwater Flooding** - occurs in areas where the level of groundwater is high. Rainfall that soaks into the ground can raise it to a level where structures within the ground are at a risk of flooding. Structures such as basements or detention ponds can be at risk, although this is dependent upon the ground conditions of the site.
- 3.19 A review of the Groundwater Susceptibility Mapping included within the Babergh & Mid Suffolk Level 1 Strategic Flood Risk Assessment (JBA Consulting – August 2020) has been undertaken and an extract of the mapping has been included within Figure 3.3 below.

3.20 The mapping demonstrates that the site is located within an area where there is a 'risk of groundwater flooding to surface and subsurface assets'. Therefore, it is possible that groundwater could emerge at the surface locally.

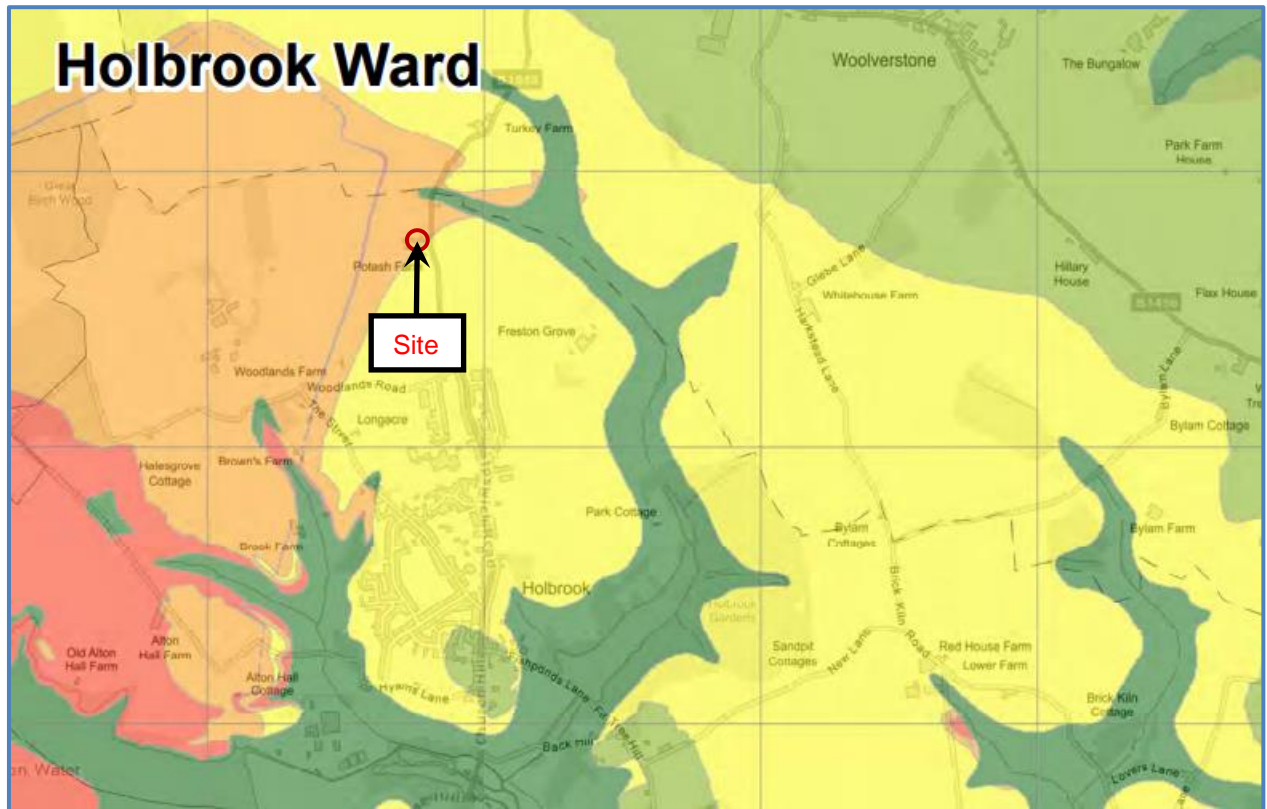


Figure 3.3 – Groundwater Flooding Susceptibility Map

3.21 However, to minimise the risk of groundwater flooding, the proposed development:

- Does not include any below ground basement construction.
- Will incorporate raised Finished Floor Levels as part of the surface water mitigation strategy detailed within Section 4 of this report.

3.22 It is also recommended that further ground investigation works, including groundwater monitoring is undertaken to fully understand the site specific risk/likelihood of groundwater flooding and the possible requirements of additional flood mitigation measures.

3.23 Therefore, the proposed development is considered to be at a 'LOW to MEDIUM RISK' of flooding from this source.

- 3.24 **Non-natural or Artificial Flooding** - can include reservoirs, canals, and lakes where water is retained above the natural ground level and flooding may occur as a result of the facility becoming overwhelmed or as a result of dam or bank failure. The potential effects of flood risk management infrastructure should also be considered.
- 3.25 The indicative reservoir flood mapping available on the GOV.UK website and included within Figure 3.4 below demonstrates that the proposed development site is located outside the extent of any reservoir breach flooding scenario.

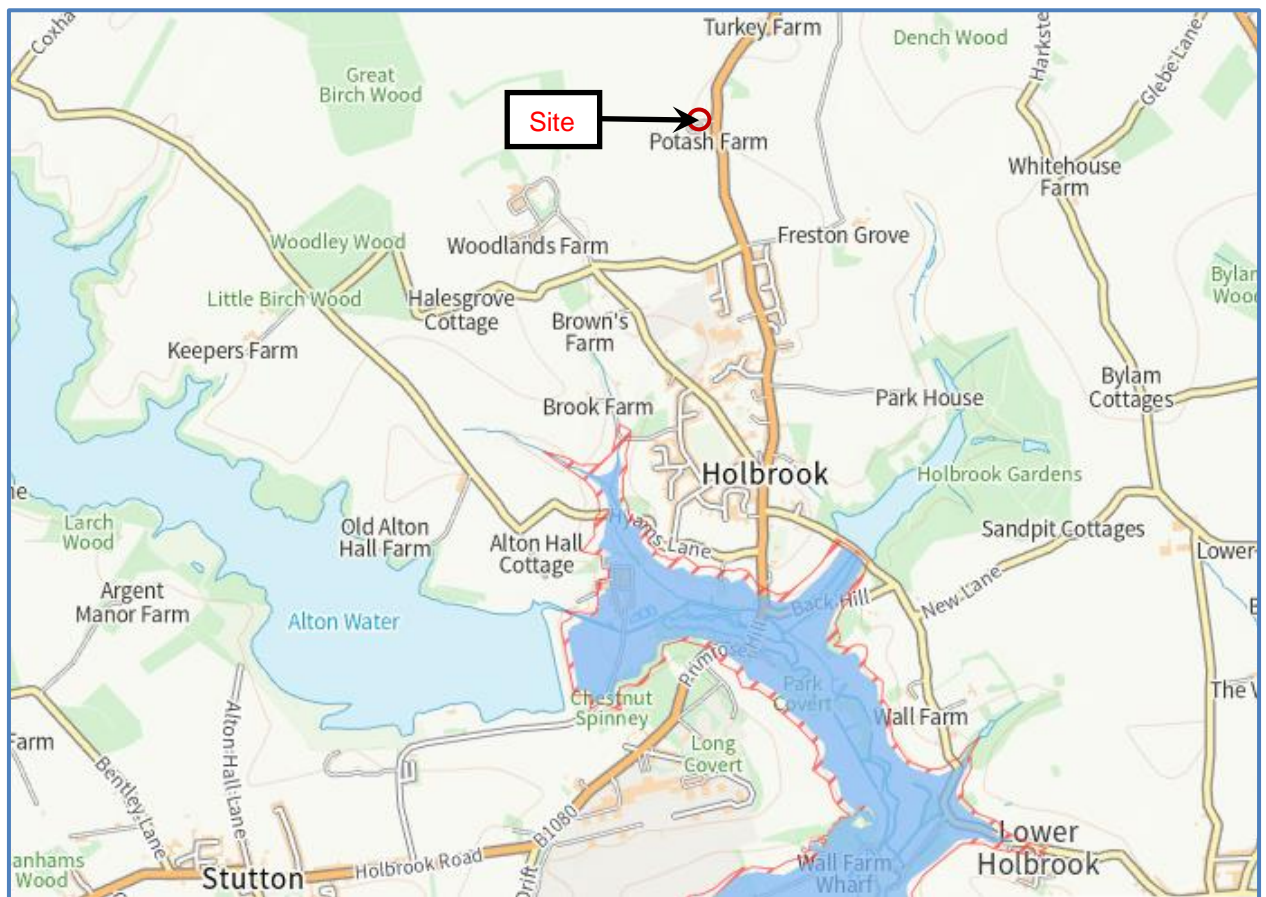


Figure 3.4 – Reservoir Indicative Flood Mapping

- 3.26 In addition to the above flood mapping, a review of the OS mapping did not identify any artificial sources of flooding which could affect the proposed development.
- 3.27 Therefore, the proposed development is considered to be at a ‘LOW RISK’ of flooding from this source.

Strategic Flood Risk Assessment

- 3.28 As part of the site assessment, a review of the following documents has been undertaken:
- Babergh & Mid Suffolk Level 1 Strategic Flood Risk Assessment (JBA Consulting – August 2020)
 - Babergh & Mid Suffolk Level 2 Strategic Flood Risk Assessment (JBA Consulting – October 2020)
- 3.29 The above reports did not provide any site-specific comments in relation to flood risk and surface water drainage beyond the above site-specific assessment.

Description of Flooding

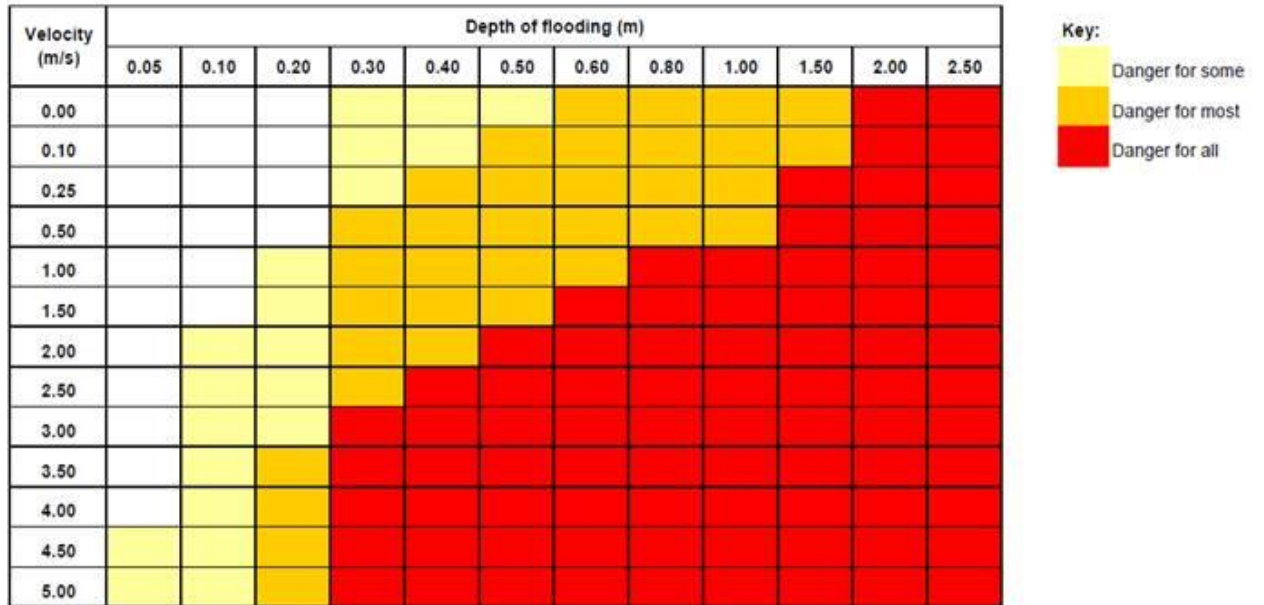
- 3.30 The site is considered to be a low risk of flooding from all sources except surface water and groundwater flooding which is considered to present a 'Low' to 'Medium' risk due to:
- The site's partial location within an area at risk of surface water flooding as identified by the Environment Agency surface water flood mapping exercise.
 - The site's location within an area considered to be at risk of groundwater flooding to surface and subsurface assets as identified by the Groundwater Susceptibility Mapping included within the Babergh & Mid Suffolk Level 1 Strategic Flood Risk Assessment (JBA Consulting – August 2020).
- 3.31 Therefore, the focus of this report will be to mitigate the flood risk posed from these sources of flooding by implementing the mitigation measures stated within Section 4. However, flood risk from other sources will not be overlooked and the measures put forward to mitigate the risk of surface and groundwater water flooding will also further reduce the already low risk from other sources of flooding.

Access and Egress

- 3.32 In accordance with the NPPF and the Flood Risk and Coastal Change PPG, access and egress to the site during a range of storm events should be considered with preference being over dry land. However, where this is not possible, evacuation should fall within the white cells as classified within Table 13.1 of FD2320_TR2 and shown below.

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3.33 The access and egress route for the proposed dwellings have been included within Figure 3.5 below. The route includes direct access onto Holbrook Road – B1080 (adopted highway) via the private access road which currently serves the site.

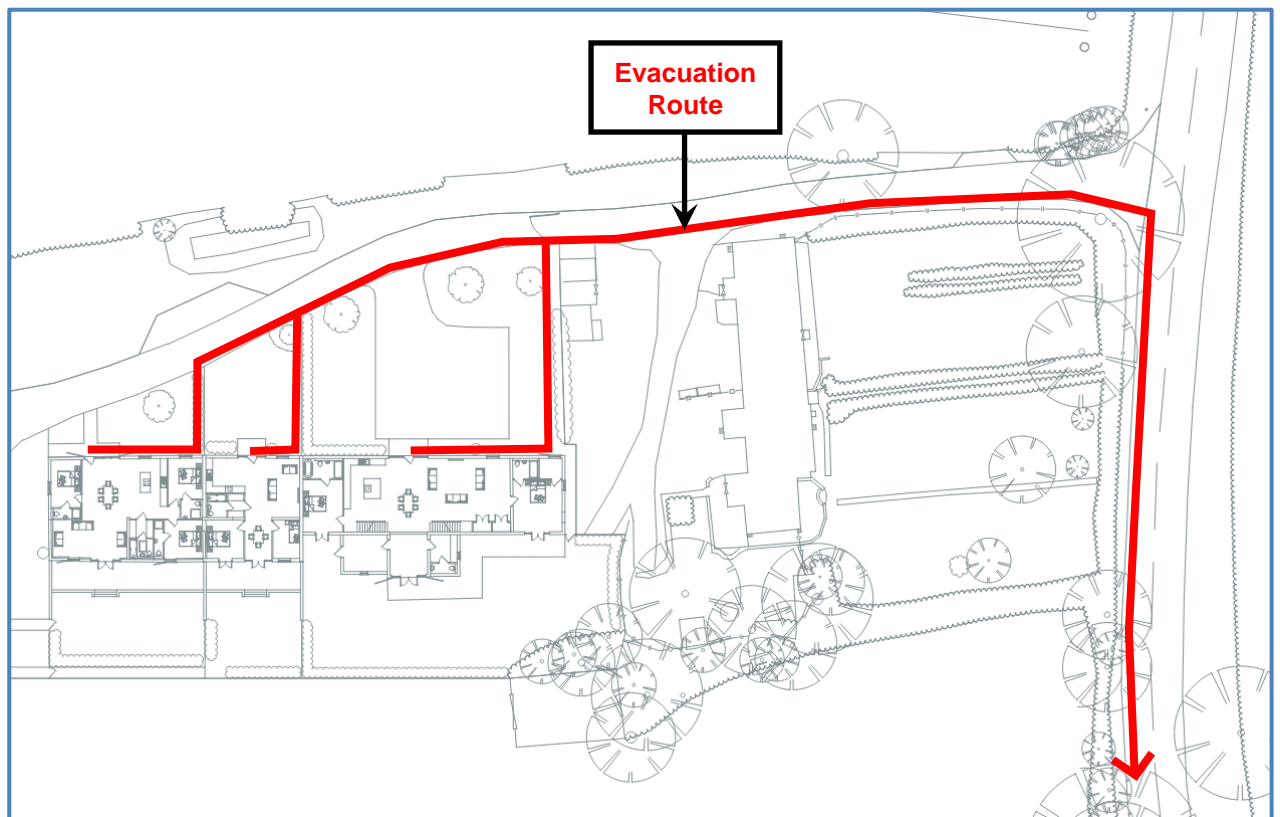


Figure 3.5 – Evacuation Route

- 3.34 When comparing the above access and egress route with the surface water flood mapping included within Appendix C, D and E, the following conditions will be encountered.
- **30-Year Event** – with the careful selection of the evacuation route along the southern edge of the existing private road, evacuation would be over dry land. Any minor encroachment encountered would be through flood depths of less than 150mm.
 - **100-Year Event** – with the careful selection of the evacuation route along the southern edge of the existing private road, evacuation would be over dry land. Any minor encroachment encountered would be through flood depths of less than 150mm.
 - **1000-Year Event** – evacuation along the existing private road will encounter a flood depth between 150mm – 300mm and a velocity between 0.5m/s – 1.0m/s. This would place the access and egressing conditions within the orange cells (Danger for Most) of Table 13.1 of FD2320_TR2 which are considered to be acceptable conditions for the emergency services.
- 3.35 The occupant of the residential dwelling will be encouraged to sign up to the Met Office weather warning service which provides email alerts in addition to those provided by the local/regional media.
- 3.36 The use of this free service will enable early preparation of a potential flood event depending on the level of warning provided. It will also enable early and calm evacuation of the site over dry land if the occupants choose not to remain within the safe refuse of the residential dwelling.

4 Flood Risk Mitigation Measures

4.1 To enable the site to be considered in line with the NPPF and the Flood Risk and Coastal Change PPG, appropriate flood mitigation measures need to be set in place. The measures laid out below, are put forward as those that will be incorporated within the detailed design and operation of the proposed development.

Site Level Strategy

4.2 The existing Finished Floor Level (FFL) of the agricultural building intended for residential conversion is set at circa 29.40m AOD.

4.3 Therefore, the FFL of the three residential dwelling will be constructed as following:

- **Plot 1** is located within the western extent of the agricultural building and has been shown to be partially located within the 1000-year surface water flood extent. The maximum flood level within this area has been identified as 0.3m although this is not likely to be representative within the building as the FFL is at least 100mm higher than the external ground levels. Therefore, the FFL of Plot 1 will be raised by 0.3m which equates to 29.70m AOD and this will provide a circa 0.1m freeboard above the 1000-year surface water flood level. Further increases in the height of the FFL are not possible due to insufficient headroom within the property.
- **Plot 2 and Plot 3** are located centrally and to the east of the agricultural building and have been shown to be located outside of the 1000-year surface water flood extent. Therefore, the FFL of Plot 2 and Plot 3 will be raised by a further 0.15m (Minimum) which equates to 29.55m AOD. This will provide additional protection against all sources of flood risk.

4.4 Where topography permits, all external hard and soft landscaping areas should be designed to fall away from the proposed and existing dwellings. This will reduce flood risk in the event of a sewer surcharging or overland flow flood event and prevent flood water entering the buildings and instead will be flood routed towards the garden area.

Flood Resilient Construction Techniques

4.5 The use of flood resilient construction techniques in accordance with 'Improving the Flood Performance of New Buildings: Flood Resilient Construction' and 'Prepare your Property for Flooding' will be considered during the detailed design of the proposed development.

Flood Warning & Evacuation

- 4.6 The occupant of the residential dwellings will be encouraged to sign up to the Met Office weather warning service which provides email alerts in addition to those provided by the local/regional media.
- 4.7 The Met Office provides three levels of weather warning as shown on the Warning Impact Matrix within Figure 4.1 below.

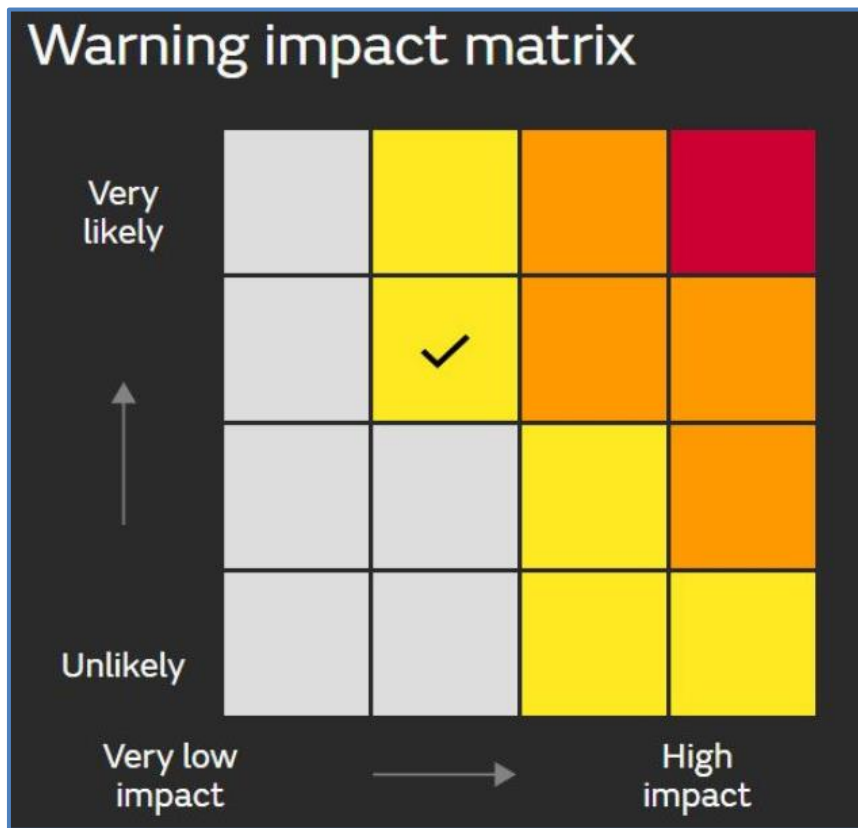


Figure 4.1 – Warning impact Matrix (Met Office)

- 4.8 A detail description for each warning has been provided by the Met Office and included below:
 - **Yellow Warning** – Can be issued for a range of weather situations. Many are issued when it is likely that the weather will cause some low-level impacts, including some disruption to travel in a few places. Many people may be able to continue with their daily routine, but there will be some that will be directly impacted and so it is important to assess if you could be affected. Other yellow warnings are issued when the weather could bring much more severe impacts to the majority of people but the certainty of those impacts occurring is much lower. It is important to read the content of yellow warnings to determine which weather situation is being covered by the yellow warning.

- **Amber Warning** – There is an increased likelihood of impacts from severe weather, which could potentially disrupt your plans. This means there is the possibility of travel delays, road and rail closures, power cuts and the potential risk to life and property. You should think about changing your plans and taking action to protect yourself and your property. You may want to consider the impact of the weather on your family and your community and whether there is anything you need to do ahead of the severe weather to minimise the impact.
- **Red Warning** – Dangerous weather is expected and, if you haven't already done so, you should take action now to keep yourself and others safe from the impact of the severe weather. It is very likely that there will be a risk to life, with substantial disruption to travel, energy supplies and possibly widespread damage to property and infrastructure. You should avoid travelling, where possible, and follow the advice of the emergency services and local authorities.

4.9 The use of this free service will enable early preparation of a potential flood event depending on the level of warning provided. It will also enable early and calm evacuation of the site over dry land if the occupants choose not to remain within the safe refuse of the residential dwelling.

Detailed Design

4.10 It is proposed that the mitigation measures set out above are controlled by conditions to the planning consent which will be approved by the LPA and their consultees.

5 Discussion and Conclusion

5.1 This Flood Risk Assessment has been undertaken in accordance with the:

- National Planning Policy Framework (NPPF).
- Flood Risk and Coastal Change Planning Practice Guidance (PPG).

5.2 The site is considered to be a low risk of flooding from all sources except surface water and groundwater flooding which is considered to present a 'Low' to 'Medium' risk due to:

- The site's partial location within an area at risk of surface water flooding as identified by the Environment Agency surface water flood mapping exercise.
- The site's location within an area considered to be at risk of groundwater flooding to surface and subsurface assets as identified by the Groundwater Susceptibility Mapping included within the Babergh & Mid Suffolk Level 1 Strategic Flood Risk Assessment (JBA Consulting – August 2020).

5.3 Therefore, subject to the implementation of the recommended mitigation measures put forward as part of this report, the proposed development is considered appropriate from a flood risk perspective.

Appendices

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Appendix A

Existing Site Layout

ABBREVIATIONS

AV	Air Valve	Tree	Tree - Scaled With Canopy and Girth. Canopy is Approx and Girth is Taken at 1.5m Above Ground - Level is Ground Level at Trunk
BCH	Beacon (No. if known)	IB	Individual Bushes Scaled for Size Ground Level at Centre
BH	Borehole	FF	Safety Fence FF@GL
BLX	LL Bollard (No. if known)	FF@GL	Safety Fences are Shown at Front Face FF at Ground Level GL
B	Bollard		
BMP	Boundary Marker		
BS	Bus Stop		
BT	Small Telecoms		
CATV	Small Cable TV		
CCTV	Small CCTV		
MH	Small Electrical Manhole		
EP	Electric Pole		
ER	Earth Rod		
FEED	Feeder Pillar (No. if known)		
FH	Fire Hydrant		
FLP	Flag Pole		
IL	Pipe Invert Level		
KI	Kerb Inlet (Water onto Rd)		
KO	Kerb Outlet (Water off Rd)		
LP	Lampost (No. if known)		
Mast	Telecoms Mast		
MH	Manhole		
MP	Marker Post		
POB	Post Box		

To Reduce Clutter and Improve Clarity All Other Selected Features Can be Identified by Their CAD Layer or By Annotation in CAD Layer NOTES

DRAWING NOTES

This survey has been carried out using a Trimble S7 Total Station and fixed to OSTN15 / OSGM15 using Trimble R12 GPS.

Ordnance Survey Data has been shown in dark grey for perspective only.

All Dimensions are in metres.

Trees are not drawn to scale. Trunk size diameter and spread are estimated and should be used as a guide only.

All building descriptions and construction type are indicative only and taken externally from ground level.

There may be inspection covers on site which were not visible at the time of survey. It is possible that they are buried or covered by dense vegetation. Please consult your local drainage authority if you have any doubts.

All below ground details have been identified from above ground and therefore all details relating to these features including, sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

General Notes

Please check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Parish Land Surveys.

The accuracy of the digital data is the same as the plotting scale implies.

Parish Land Surveys holds the copyright to all the information contained within this document and their written consent must be obtained before copying or using the data other than for the purpose it was originally supplied.

Do not scale from this drawing.

Station Name	PLS Station Table - OSTN15 Forced To Scale Factor 1		Station Marker
	Easting (m)	Northing (m)	Height (OSGM15)
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STNPLS2	616810.419	23787.468	29.216
STNPLS3	616813.853	237691.635	30.593



REV	Survey Date	Created By	First Issue	Comments
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Scale at A1	Project Number
NTS	PLS - 1482

Drawing Status

<input checked="" type="checkbox"/>	Topographical Survey
<input type="checkbox"/>	Revised Survey
<input type="checkbox"/>	Drainage Survey

Parish Land Surveys Ltd,
 Aylsham Business Park, Richard Oakes Road, Aylsham, Norfolk, NR11 6FD

office: 01603 898950
 mob: 07810 726138
 email: nick@parishlandsurveys.co.uk
 web: www.parishlandsurveys.co.uk

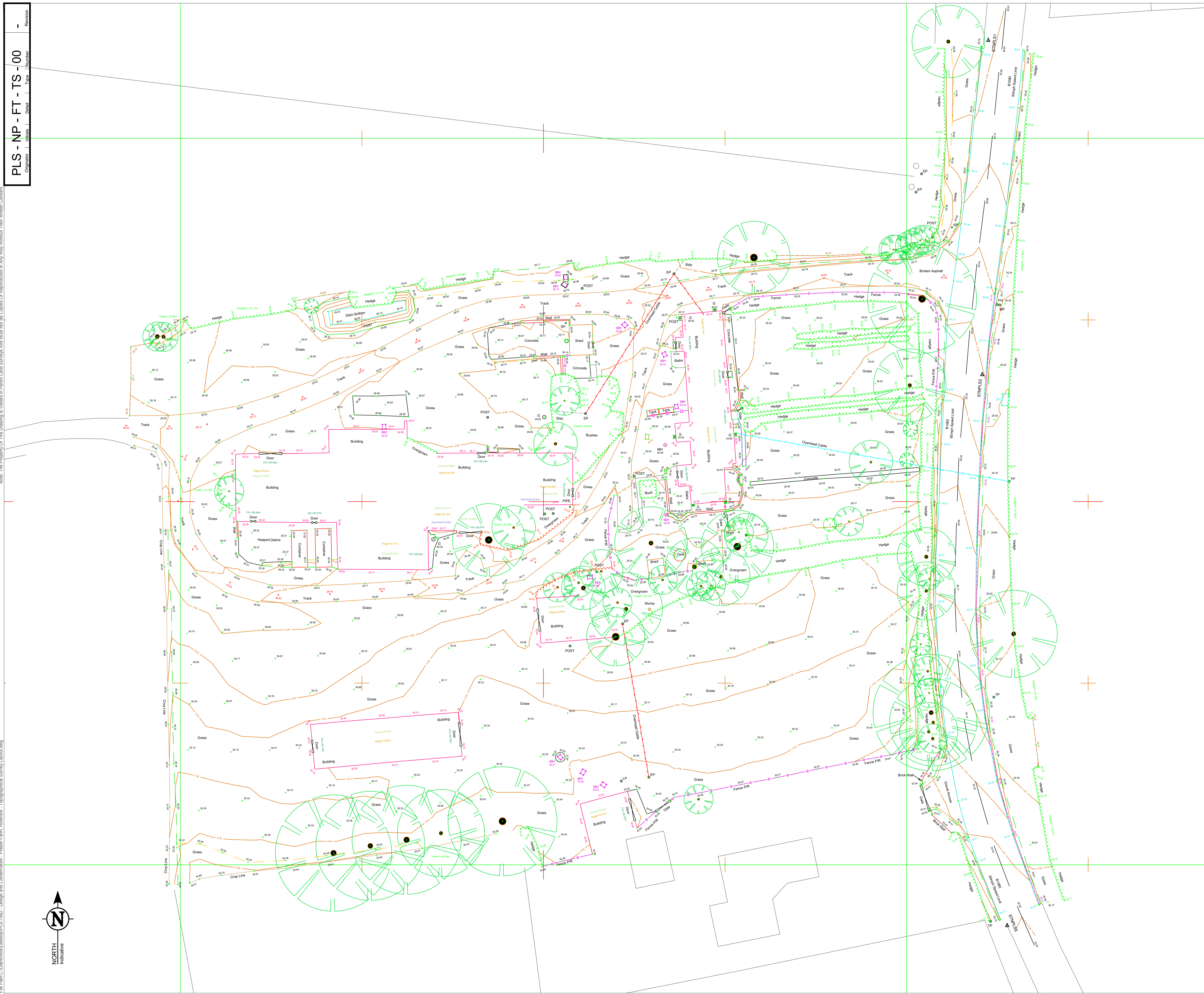
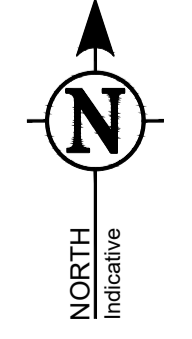
Client
OAK DESIGN & CONSTRUCTION LTD

Project
Potash Farm, Holbrook, IP9 2PJ

Title
Topographical Survey OVERVIEW

Note: The Property Of This Drawing Is Vested In Parish Land Surveys And Must Not Be Copied Or Reproduced In Any Way Without Their Written Consent.

File Path: C:\Users\nick\Desktop\PLS-1482 - Design and Conservation - Potash Farm, Holbrook - Topographical Survey Layout.dwg
 Plot Date: 27.03.23 Plot Style: --- Saved By: Nick on 27 March 2023



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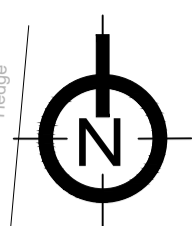


Appendix B

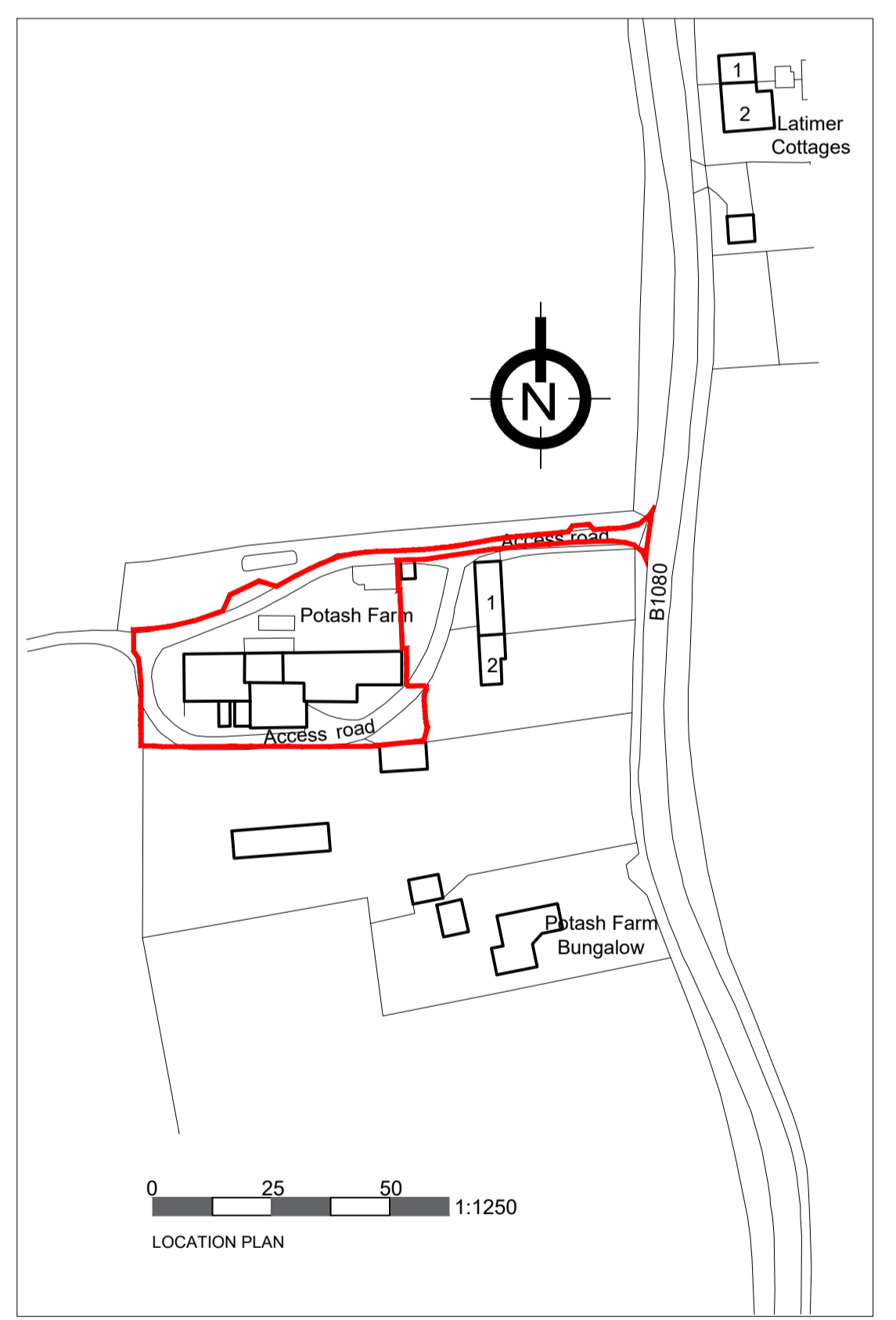
Proposed Development Layout

NOTE: All drawings to be read in conjunction with consultant structural engineers, mechanical and electrical consultants, acoustic engineers, energy consultants, specification, and detailed drawings. Drawing to be issued for the purposes shown within the drawing status box.

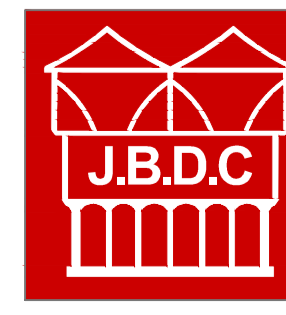
NOTE: Drawing to not be scale and written dimensions to be used only. Refer to drawing scale, paper size and scale bar.



- Portion of existing barn to be demolished
- Proposed 1.2m post & rail fence
- Existing 1.2m post & rail fence
- Existing tree
- Proposed tree
- Existing hedgerow
- Proposed native hedgerow
- Proposed parking space 5.5m X 2.9m
- Shingle area
- Electric vehicle charging point
- Timber gate



0 25 50 1:1250
LOCATION PLAN



jbell design and conservation ltd
 Suite 02, Holly House Business Centre
 220-224 New London Road, Chelmsford, CM2 9AE
 T: 07484 791794
 E: jbell@designandconservation.co.uk
 www.designandconservation.co.uk

Client : Mike McGarr	Scale : 1:200/1:1250 @ A1
Project : Barns @ Potash Farm, B1080 Holbrook, IP9 9PJ	Status : Planning
Drawing : Proposed Site Plan	Dwg No : 2023-729-003
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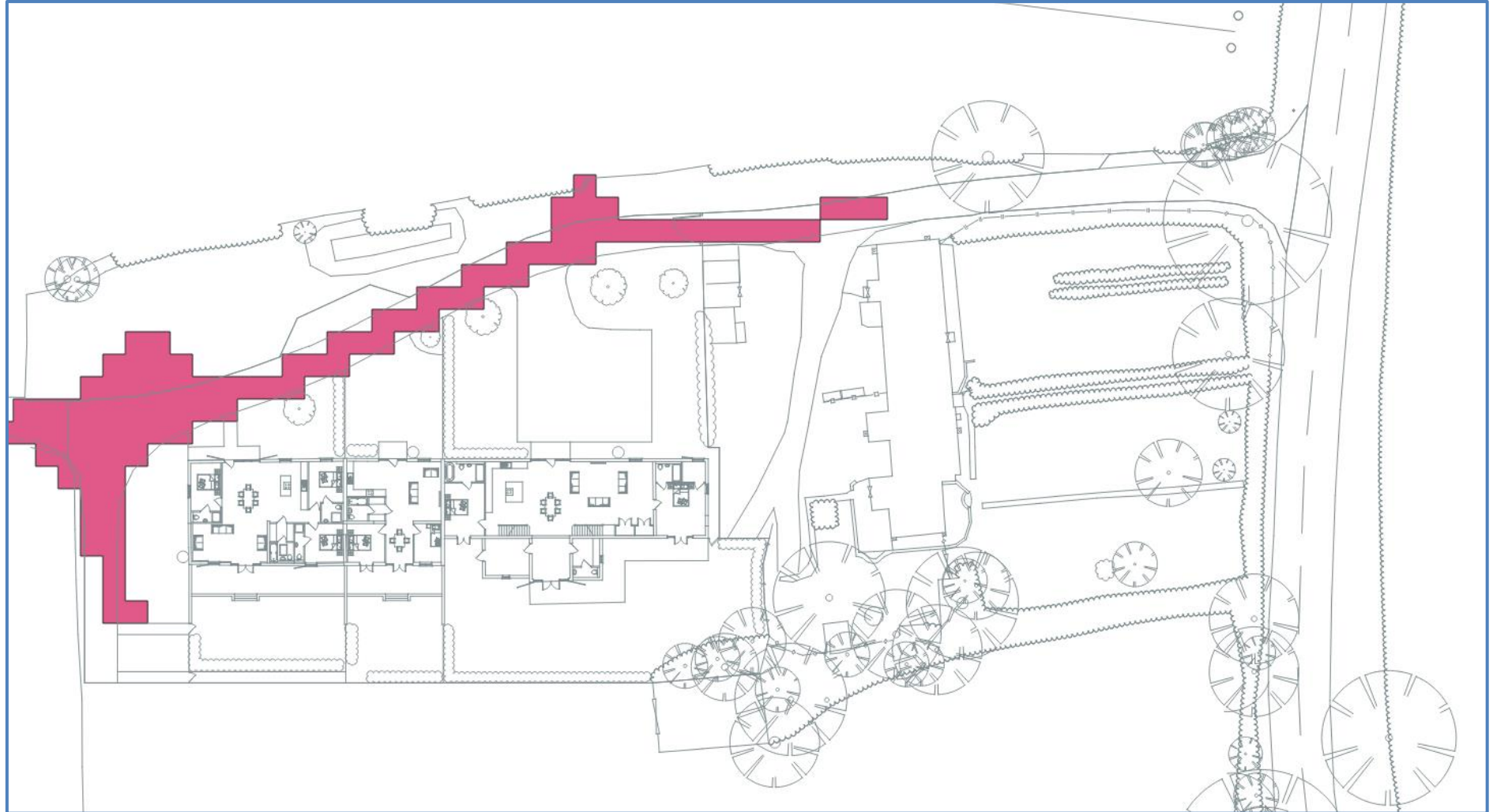


Appendix C

M30 Surface Water Flood Mapping

30-Year Surface Water Flood Mapping

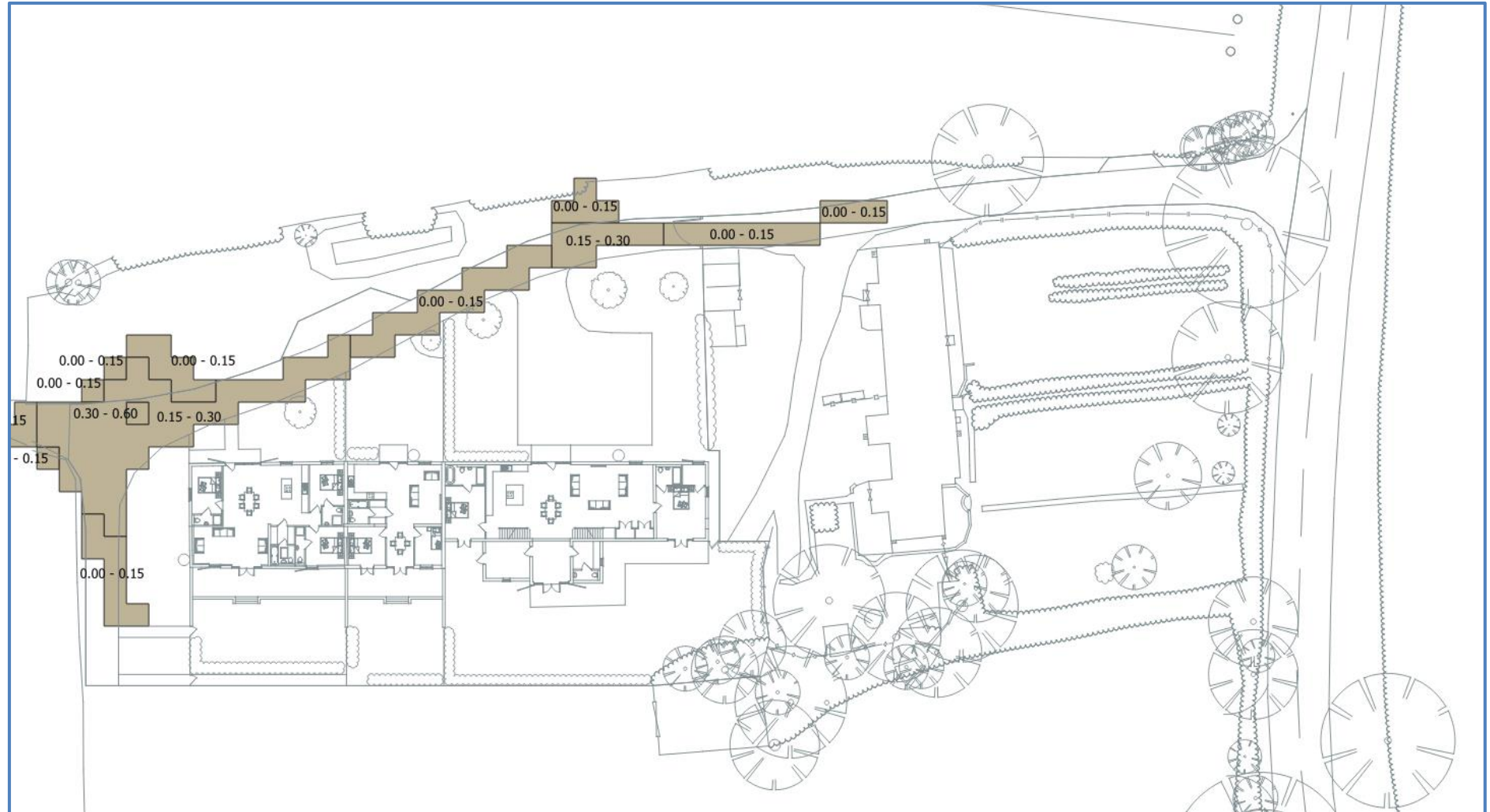
Residential Development – Potash Farm, Holbrook Road (B1080), Holbrook, Suffolk, IP9 2PJ



30-Year Surface Water Flood Extent

30-Year Surface Water Flood Mapping

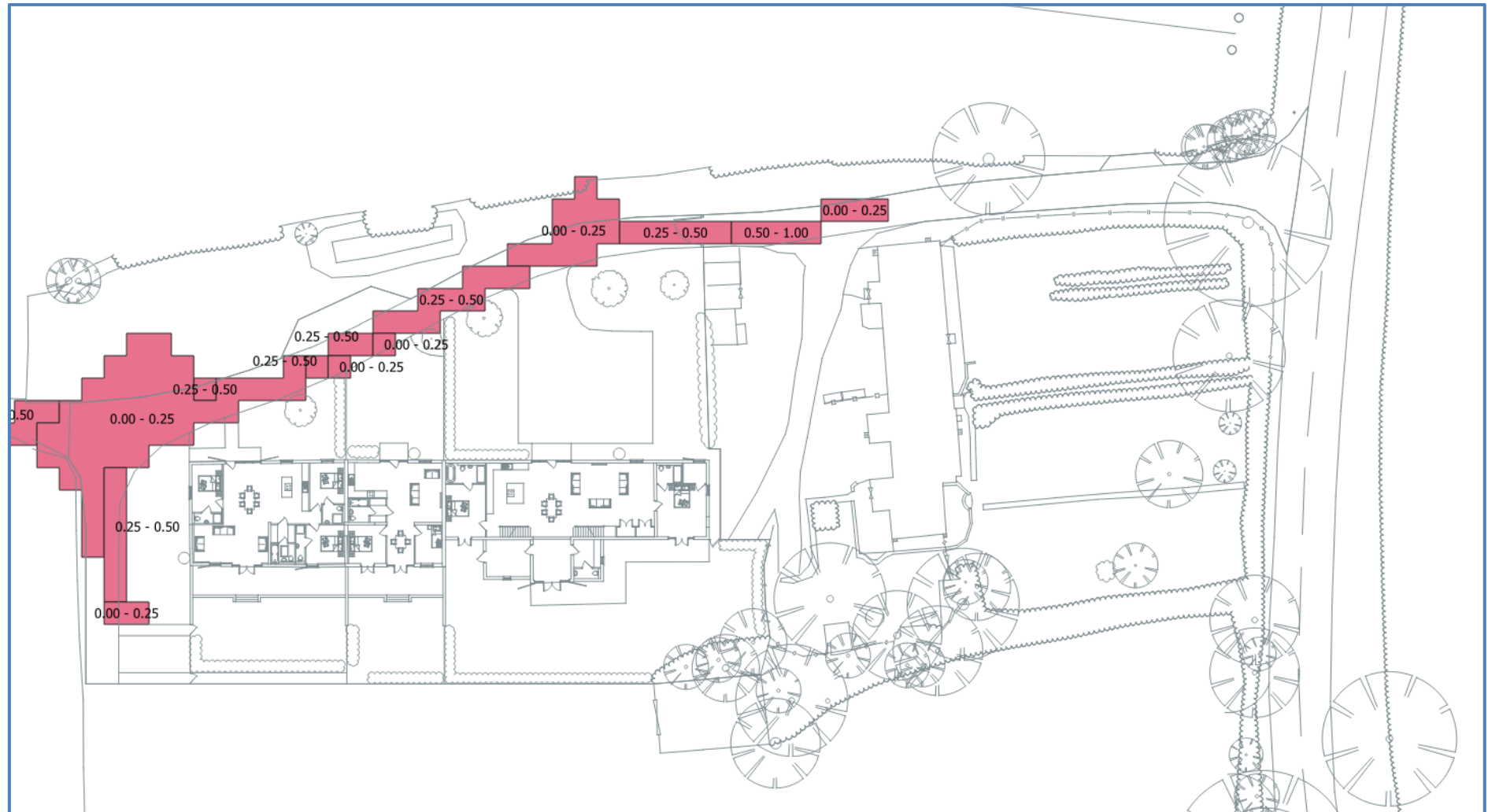
Residential Development – Potash Farm, Holbrook Road (B1080), Holbrook, Suffolk, IP9 2PJ



30-Year Surface Water Flood Depth

30-Year Surface Water Flood Mapping

Residential Development – Potash Farm, Holbrook Road (B1080), Holbrook, Suffolk, IP9 2PJ



30-Year Surface Water Flood Velocity

Appendix D

M100 Surface Water Flood Mapping

100-Year Surface Water Flood Mapping

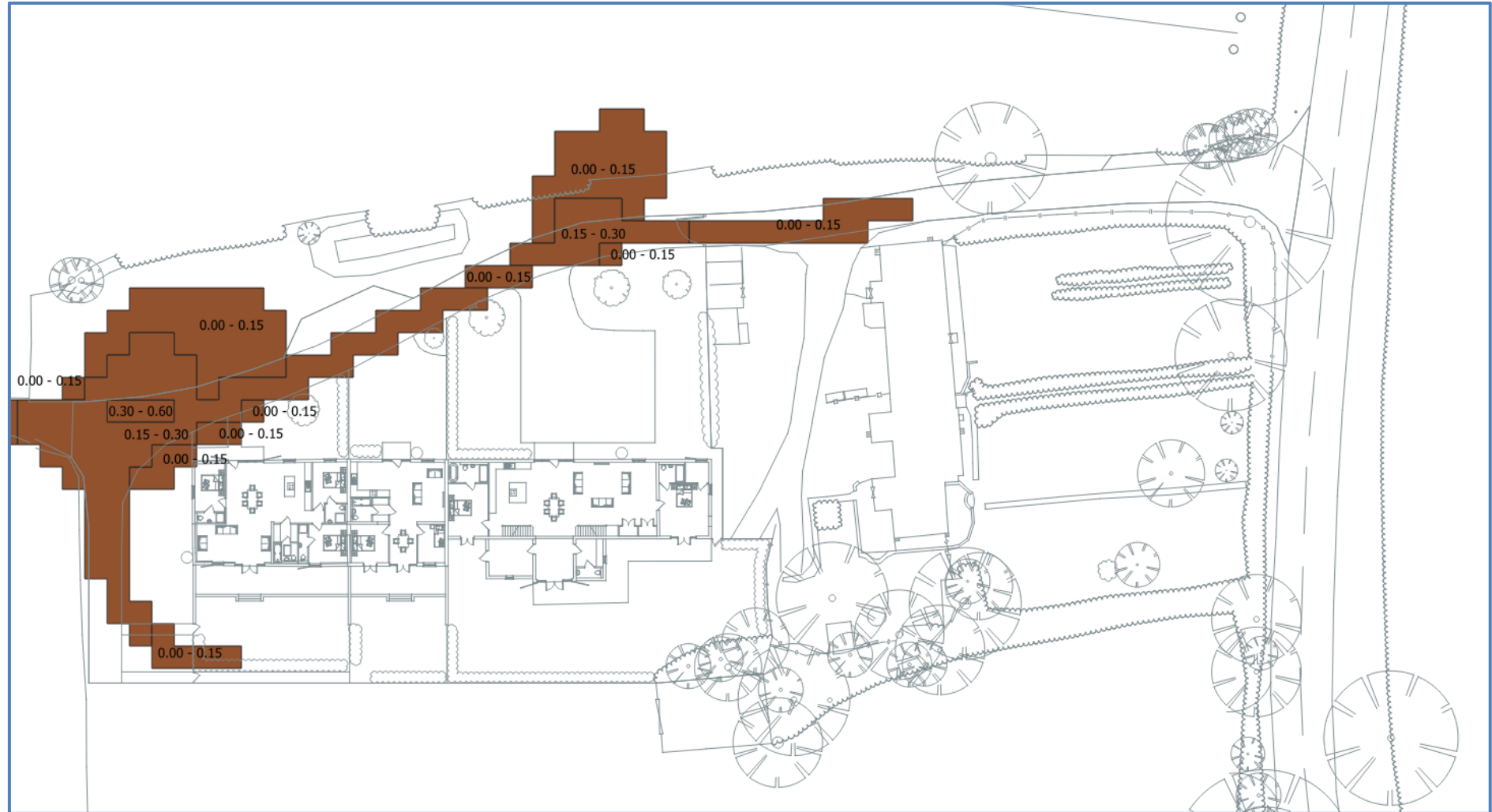
Residential Development – Potash Farm, Holbrook Road (B1080), Holbrook, Suffolk, IP9 2PJ



100-Year Surface Water Flood Extent

100-Year Surface Water Flood Mapping

Residential Development – Potash Farm, Holbrook Road (B1080), Holbrook, Suffolk, IP9 2PJ



100-Year Surface Water Flood Depth

100-Year Surface Water Flood Mapping

Residential Development – Potash Farm, Holbrook Road (B1080), Holbrook, Suffolk, IP9 2PJ



100-Year Surface Water Flood Velocity

Flood Risk Assessment

Residential Development – Potash Farm, Holbrook Road (B1080), Holbrook, Suffolk



Appendix E

M1000 Surface Water Flood Mapping

1000-Year Surface Water Flood Mapping

Residential Development – Potash Farm, Holbrook Road (B1080), Holbrook, Suffolk, IP9 2PJ



1000-Year Surface Water Flood Extent

1000-Year Surface Water Flood Mapping

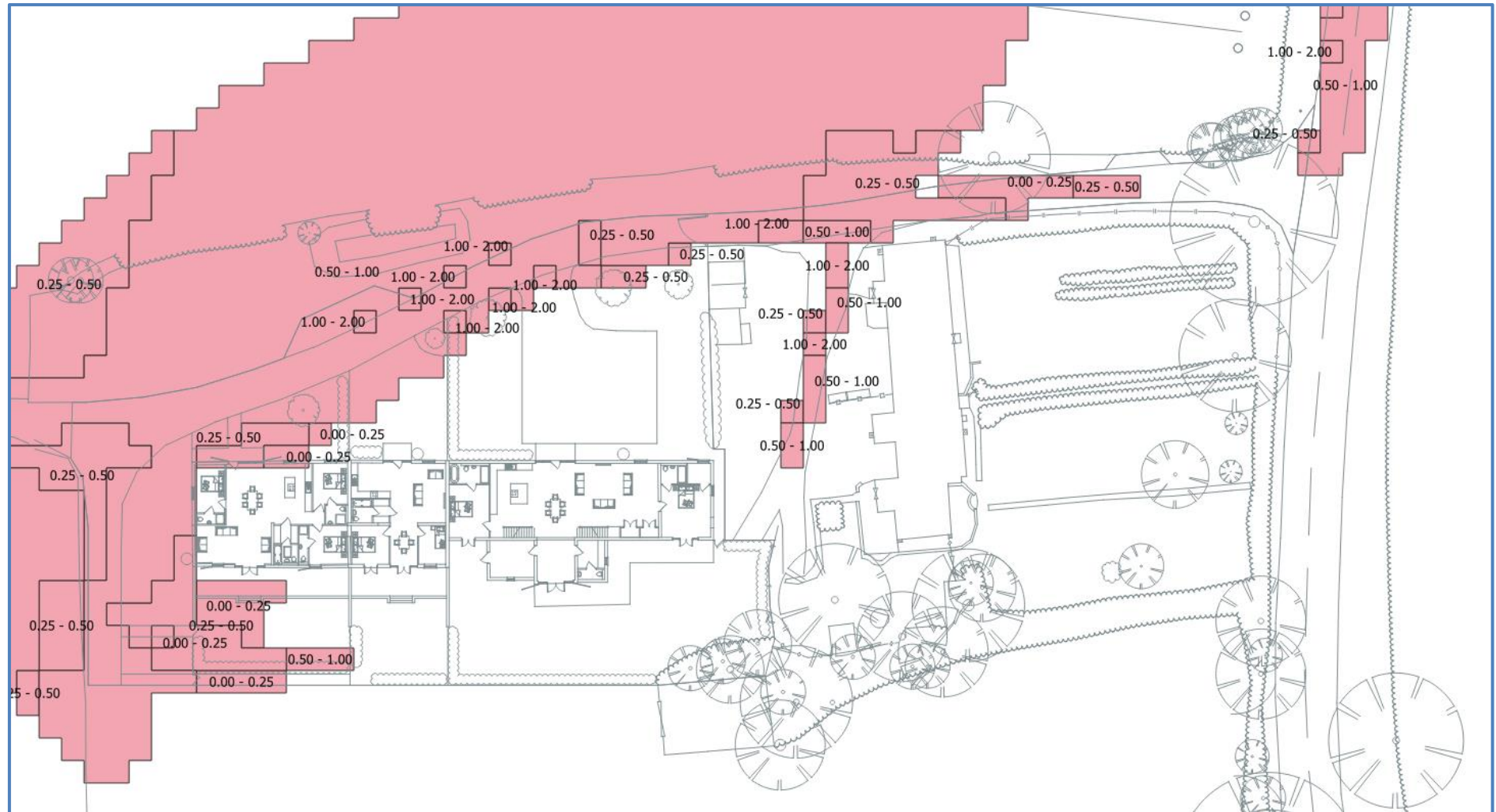
Residential Development – Potash Farm, Holbrook Road (B1080), Holbrook, Suffolk, IP9 2PJ



1000-Year Surface Water Flood Depth

1000-Year Surface Water Flood Mapping

Residential Development – Potash Farm, Holbrook Road (B1080), Holbrook, Suffolk, IP9 2PJ



1000-Year Surface Water Flood Velocity