

FLOOD RISK ASSESSMENT

Change of Use of Redundant Barns
to Holiday Lets,
Leadenhall Farm,
Holbeach St. Marks
Holbeach
PE12 8HB

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FLOOD RISK ASSESSMENT FOR CHANGE OF USE OF REDUNDANT BARN TO HOLIDAY LETS, LEADENHALL FARM, HOLBEACH St. MARKS, HOLBEACH, PE12 8HB

INTRODUCTION

The Government has placed increasing priority on the need to take full account of the risk associated with flooding at all stages of the planning and development process. This seeks to reduce the future damage to property and the risk to life from incidents of flooding. Their expectations relating to flooding are contained in the National Planning Policy Framework Feb 2019, (NPPF), which identifies how the issue of flooding is dealt with in the drafting of planning policy and the consideration of planning applications by avoiding inappropriate development in areas at risk from flooding and to direct development away from areas at highest risk.

The NPPF provides that development in areas at risk of flooding should be avoided and seeks to direct development away from areas at highest risk. There is a sequential, risk-based approach to the location of development avoiding where possible, flood risk to people and property managing any residual risk and taking account of the impacts of climate change.

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APPLICATION SITE

The barns are located at located at Leadenhall Farm, Holbeach St. Marks, Holbeach PE12 8HB, within the administrative area of South Holland District Council. The National Grid Reference is TF36042 33105. **Plan 1**

This flood risk assessment has been prepared for a planning application for the change of use of two, single storey, redundant agricultural barns, into four holiday let units only and that they will not be used for permanent residential purposes. **Plans 2, 3 & 4**

The Site would be classed as Non-Major Development applying the Town & Country Planning (Consultation) (England) Direction 2009 as the site is to be developed is for less than 10 dwellings.

The National Planning Policy Framework Technical Guidance (NPPG) defines three levels of flood risk depending upon the annual probability of fluvial flooding occurring.

Zone 1 – Low Probability (<0.1%)

Zone 2 – Medium Probability (0.1 – 1.0%)

Zone 3 – High Probability (>1.0%)

The proposed area for development is shown to be within Flood Zone 3a 'High Probability' as detailed on the Environment Agency's Flood Zone Maps without defences, and as defined in Table 1 of NPPG. **Map 1**

Table 1: Flood Zones Definition

Flood Zone 3- High Probability
Definition Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. The water-compatible and less vulnerable uses of land are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable and essential infrastructure uses should only be permitted in this zone if the Exception Test is passed. Essential Infrastructure permitted in this zone should be designed and constructed to remain operational and safe for uses in times of flood Flood Risk Assessments requirements All proposals in this zone should be accompanied by a Flood Risk Assessment. Policy aims Developers and local authorities should seek opportunities to: • reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques; • relocate existing development to land with a lower probability of flooding; • create space for flooding to occur by allocating and safeguarding open space for flood storage.

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPG, the proposed holiday use for the site is classified as "More Vulnerable," Table 1 of NPPG states that such uses are permitted in this zone, subject to a specific warning and evacuation plan.

Table 2: Flood Risk Vulnerability Classification

More Vulnerable
• Hospitals • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels • Non-residential uses for health services, nurseries and educational establishments • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravan and camping, subject to a specific warning and Evacuation Plan.

From the topographic survey, to Ordnance Datum, the average site ground levels around Barn 1 average 2.97mODN to the front and to the inner courtyard 2.80mODN, for Barn 2 average 3.00mODN to the front and to the inner courtyard 2.65mODN and the floor level is 3.08mODN, The road level at the site entrance is elevated at 5.42mODN. **Plan 5**

It is proposed that Barn 1 (Holiday Lets Units 1 & 2) will have a FFL of 3.36mODN. Barn 2 (Holiday Lets Unit 3 & 4) to have a FFL of 3.21mODN.

DRAINAGE AUTHORITIES

Environment Agency

The Environment Agency is responsible for reducing the risk of flooding from designated main rivers and from the sea.

The potential source of flooding which could affect the development site has been identified as:

- River Welland/ Wash Estuary

The River Welland lies some 1.6km to the north of the site.

The flood zone maps indicate that the area would be flooded without flood defences.). The Flood Map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood event with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater. In some locations, such as around the fens and the large coastal floodplains there are many kilometres of raised flood defences. To meet the requirements of the National Planning Policy Framework, these defences are removed in their entirety to produce the Flood Map for Planning (Rivers and Sea). The map therefore shows the full extent of areas that would be at risk of flooding if no defences existed and water could spread out across these large floodplains. This flooding could cover large areas of land but to relatively shallow depths and could leave pockets of locally slightly higher land as isolated dry islands.

These maps show that the site of the proposed holiday lets is considered at risk from flooding as it is all located within an area zoned as Flood Zone 3a. The maps indicate that the area would be flooded without flood defences, which are in place, (with an annual probability of more than 0.5% i.e. return frequency of less than 1 in 200 years for tidal flooding or more than 1.33% return frequency of less than 1 in 100 years for fluvial flooding). **Map 1**

The Flood Zone Maps identify river catchments over 3 sq. km. These maps are a theoretical estimate of areas that could be inundated should no defence exist. In practice current standards of protection would result in flood envelopes substantially less than shown by these maps. The maps make no allowance for local, site specific features. The flood zone maps indicate that the area would be flooded without flood defences.). The Flood Map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood event with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

The risk of flooding from Rivers and Sea Map shows that the site is at a Low risk of flooding. **Low risk** means that each year this area has a chance of flooding of between 0.1% and 1%. This takes into account the effect of any

flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped or fail. This takes into account the effect of any flood defences that may be in this area. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail. **Map 2**

The tidal defences protecting this site consist of earth embankments. They are in fair condition and reduce the risk of flooding (at the defence) to a 0.67% (1 in 150) chance of occurring in any year. The crest of the defences is 7.69mODN.

The area is not affected by any flooding from a Main River and therefore would only be affected by tidal flooding from the Wash. The Wash Banks constitute the first line of defence against any tidal flooding. These consist of earth embankments along the shores of the wash and are invariably behind an area of intertidal salt marsh which protects them against damage from wave action, though in the relatively sheltered environment of the Wash this is less of a hazard than the North Sea coastline. The site lies behind two lines of earth sea defences

The tidal defences protecting this site consist of earth embankments. They are in fair condition and reduce the risk of flooding (at the defence) to a 0.67% (1 in 150) chance of occurring in any year. The Environment Agency inspect these defences routinely to ensure potential defects are identified. These earth embankments crest levels are circa:
- first defence 7.69mODN (main defence) and the second defence 5.75m ODN.

From Lidar 2m DTM the flood bank at the edge of the river is 7.77mODN and the levels of the floodplain vary from 3.50mODN to 3.25mODN. Approximately 85m to then north of the site the land rises to 5.42mODN and a further 470m to the north there is an old sea defence bank at a level 5.69mODN This floodplain which is over 1.5km wide would provide storage of flood water and protect the site from rapid inundation of flood water.



Lidar 2m DTM Section

Breach Analysis to Wash Tidal Defences

From Lincolnshire & Northampton shire Area Tidal Modal Analysis (June 2006) **Map 3**

The base date for the data is 2014 for the South Humber and 2006 for the East Coast and The Wash Peak tide levels Present Day (2006) at Layers Sluice 0.1% (1 in 1000) = 6.29mODN

Higher Central Peak tide levels (2120) at Layers Sluice 0.1% (1 in 1000) = 6.29mODN plus climate change from Table 3 (2006 – 2020) 1089mm = 7.48mODN

Taking the precautionary approach, the Hazard Rating following a breach which in Flood Risk Assessment (FD 2320) Guidance for New Development Phase 2 R& D Technical Report these are classified as low <0.75, moderate 0.75-1.25, significant 1.25-2.50 and extreme >2.50 based upon an empirical measure of velocity and depth.

Flood Hazard			Description
	<0.75	Low	Caution – Flood Zone with shallow flowing water or deep standing water.
	0.75 – 1.25	Moderate	Danger for Some - (i.e. children) Danger Flood Zone with deep or fast flowing water.
	1.25 – 2.0	Significant	Danger for Most – Danger Flood Zone with deep fast flowing water.
	>2.0	Extreme	Danger for All – Extreme Danger Flood Zone with deep fast flowing water.

$$HR = d \times (v + 0.5) + DF$$

Where V = Flood flow velocity (m/sec) D = Flood depth (m)

DF = A debris factor included to represent the greater damage, or risk of injury to people, that can occur if debris is swept along with the water. = 0.5 for depths <0.25 or 1.0 for depths

For the degree of Flood Hazard to be classified as low HR must be <0.75.

The Environment Agency has recently carried out a Tidal Hazard Mapping for the Wash following a breach to the defences. Following a breach to the defences, the Lincolnshire & Northampton shire Area Tidal Hazard Maps Scenario year 2006, for the 1 in 1000-year event, shows that the site is in a Hazard rating area between 1.25 and 2.0 (Danger for Most) with a predicated depth of flow of 0.5 – 1.0m and velocity of flow 0 – 0.3m/sec.

With climate change up to year 2115 the maps show that for Scenario annual chance 1 in 1000-year that the site is in a Hazard rating area Greater than (Danger for All) with a predicated depth of flow of greater than 1.6m and velocity of flow 0 – 0.3m/sec for part and the remainder 0.3 – 1.0m/sec.

Map 4 shows the Hazard Rating for the present day and **Map 5** shows the results for Hazard Rating, Depth, & Velocity, for year 2115, for the Wash scenario annual chance 1 in 1000, taken from the Environment Agency's, Lincolnshire & Northampton shire Area Tidal Hazard Mapping.

The Environment Agency has also produced maps based on computer modelling of simulated overtopping of

defences along the coastline for specific tidal scenarios. The maps only consider the consequences of overtopping of defences and do not show the possible consequences of breaches of the tidal defences. For future climate change scenarios, it is assumed that the defences remain at 2006 heights.

For the scenario year 2006 site is not affected by overtopping of the defences and for scenario year 2115 the 1 in 1000-year annual chance from overtopping, the site is in a Hazard rating area between 1.25 – 2.0 (Danger for Most) with a predicated depth of flow of between 0.5 – 1.0m and velocity of flow 0 – 0.3m/sec. **Map 6**

The minimum mitigation measures required for single storey developments or developments that do have any ground floor sleeping shall be determined by the flood depths arising from the 2115 0.1% breach scenario. Any proposals that do not included ground floor sleeping shall be determined by the flood depths arising from the 2115 0.5% breach scenario.

With the main risk of flooding to the site being from tidal sources and as the floor level of the holiday lets cannot be raised to be above the worst case flood level, it is recommended that the period of occupancy is restricted so that they will not be occupied between 1st November (or the following Sunday if half term extends into November) in any one year and the 14th March in the succeeding year, this length of season is in line with the current guidance. The restricted season will ensure that the building is not occupied during the winter months when the likelihood of flooding is increased due to the chance of coastal storms and tidal surges.

River Welland

The River Welland is approximately 1.60km to the north of the site. The flood defence to the river consists of an earth embankment. The crest level, of the earth embankment is 7.69mODN and the Higher Central 0.1% (1 in 1000year with climate Change) level at Layers Sluice is circa 7.48mODN.

The following is the maximum height for raising the floor level, that can be achieved given the available ceiling height. It is proposed that the existing floor level of Barn 1, for the ground floor habitable accommodation for the holiday lets, be raised to 3.36mODN. and for Barn 2, the ground floor habitable accommodation for the holiday lets, be raised to 3.21mODN. In addition to the above a robust evacuation and warning plan will be prepared and the holiday lets would not be occupied when a severe flood warning has been issued by the Environment Agency for the area.

This will ensure that the development remains safe for its residents when taking in to account the restricted occupancy period. Although the ground floor level for the holiday lets would be below the predicted flood level, following a breach or overtopping of the flood defences, which may result in some damage to the interior of the building.

SOUTH HOLLAND DISTRICT COUNCIL

In order to inform the process of risk assessment and site selection the District Council commissioned Haskoning UK Ltd Consultants to prepare a Strategic Flood Risk Assessment in December 2002. They have carried out an

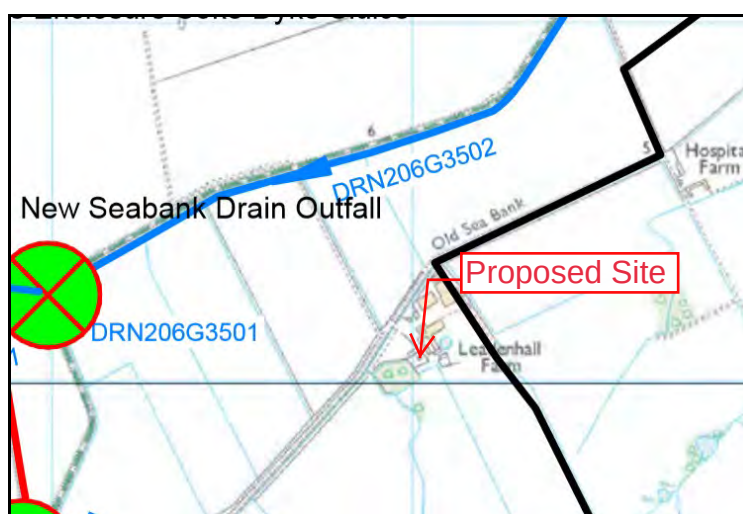
update of this report and this report was published in January 2010 and this was further updated in February 2017.

The Hazard maps contained within the DFRA confirm the EA maps.

SOUTH HOLLAND INTERNAL DRAINAGE BOARD

The farm holding lies with the catchment area South Holland Internal Drainage Board who have a responsible to operate and maintain the arterial fluvial system.

The site lies within two catchment areas, most of the farm holding within Catchment 'P' Holbeach River (N) Catchment.



Extract from South Holland Drainage map

IDB drains were designed to provide at least a 1 in 10-year standard of service with a freeboard of at least 900mm. This normally provides at least a 1 in 50-year standard of service against overtopping and in many cases a 1 in 100-year standard at the present time.

There are no IDB maintained watercourses close to the site.

SURFACE WATER FLOODING

The Surface Water, Low Risk Scenario, Flood Depth Map (1 in 1000-year) indicates that the site is generally at Very Low risk from surface water flooding. A small area of the site is indicated to be at a Low Risk, up to 300mm deep, from surface water flooding. This would be rerouted by the development proposals

Very Low risk from surface water flooding. Very low risk means that each year this area has a chance of flooding of less than 0.1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. **Map 7**

Unlike the fluvial mapping, which is based on a detailed hydraulic model, this mapping is based purely on applying

rainfall to a digital terrain model.

FLOODING FROM OTHER SOURCES

Flooding is a natural process and can happen at any time from sources other than watercourses and the sea.

- Flooding from land can occur from intense rainfall, often over short duration of time that is unable to soak into the ground or enter the drainage system. However, with the natural topographic nature of the ground being flat, with no high ground around the site this will not cause any rapid inundation of the site and is likely only lead to local ponding of shallow depth and low velocity following the natural land contours. It is concluded that flooding from this source is limited to minor isolated cases and is not of strategic significance as regards to flood risk, as the lowest holiday lets are above the ground level.
- The area is not known to suffer from any groundwater problems and therefore is taken as having no strategic significance as regards to flood risk.
- Flooding from sewers can occur from over loading from heavy rainfall caused by blockages or having inadequate capacity. There are no public sewers in the vicinity of the site.
- Non-natural or artificial sources of flooding such as reservoirs, lakes or canals where water is stored above natural ground level could cause flooding if the structure fails or is over topped. There are no known sources within the vicinity of the site.

SEQUENTIAL APPROACH

When considering the sequential approach for flood risk from fluvial flooding in accordance with NPPF the site would fall into Zone 3 (High Probability) as defined in Table 1: Flood Zones and illustrated on the Environment Agency's Flood Maps.

The flood zones as detailed on the flood map show the area of land, which theoretically, would be inundated by floodwater during a flooding event from fluvial sources without flood defences. The Environment Agency categorise land into one of three Flood Zones.

- Flood Zone 1 is land outside the 0.1% floodplain (with a chance of flooding of less than 0.1% chance in any given year). (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
- Flood Zone 2 is land that falls between the 1 in 100-year extent and the 1 in 1000-year extent (with a chance of flooding between 1% and 0.1% in any given year). (Land shown in light blue on the Flood Map)
- Flood Zone 3a is land which falls within the 1 in 100-year flood extent (has a 1% chance of a flood occurring in any given year). (Land shown in dark blue on the Flood Map)

The proposed holiday let use for the site falls within “More Vulnerable” uses of land in Table 3 Flood Risk Vulnerability Classification and Table 1 shows that developments of this nature are appropriate in Flood Zone 3a. All development is permitted in Zone 1. Development in Zones 2 and 3 is restricted based on Table 3 of NPPF replicated below.

Table 3: Flood risk vulnerability and flood zone ‘compatibility’

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Flood Zone 1	✓	✓	✓	✓	✓
	Flood Zone 2	✓	✓	Exception Test Required	✓	✓
	Flood Zone 3a	Exception Test Required	✓	✗	Exception Test Required	✓
	Flood Zone 3b Functional Floodplain	Exception Test Required	✓	✗	✗	✗

Sequential & Exception Test

NPPF Guidance Paragraphs 155 - 165 requires development within high areas of flood risk be determined using a sequential risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account the impacts of climate change.

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. The NPPF states that development should not be permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. It is important to note that the Sequential Test does not specifically mean that sites such as this cannot be developed, rather that sites at less risk should be developed first.

Within Flood Zone 3, generally “More Vulnerable” developments such as residential are discouraged, however, due to this being a change of use to an existing building, the Sequential Test and Exception Test are not applicable as moving the existing buildings is not an option. As set out in the National Planning Policy Framework Technical Guidance (para.164), change of use should not be subject to the sequential and exception tests but will still need to meet the requirements of a site-specific flood risk assessment.

CLIMATE CHANGE

Global warming is now recognised that it is likely to affect the frequency and severity of extreme events as both tidal and fluvial flooding. The climate change allowances in the NPPF Guidance was updated on the 19th February 2016 and again on the 17th December 2019.

Table 1 Peak river flow allowances by river basin district (1981 to 2000 baseline)				
River basin District	Allowance category	Total potential change anticipated for '2020s' (2015 to 2039)	Total potential change anticipated for '2050s' (2040 to 2069)	Total potential change anticipated for '2080s' (2070 to 2115)
Anglian	Upper End	25%	35%	65%
	Higher central	15%	20%	35%
	Central	10%	15%	25%

The effect of global warming on peak rainfall allowances is given in Table 2.

Table 2 Peak rainfall intensity allowance in small and urban catchments (1981 - 2000 baseline)			
Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper End	10%	20%	40%
Central	5%	10%	20%

The annual sea rise due to climate change is given in NPPF and the recommended contingency allowances are stated in Table 3.

Table 3 Peak sea level allowance for each epoch in (mm) per year with cumulative sea level rise for each epoch in brackets (use 1981 to 2000 baseline)						
Area of England) (Use River Basin	Allowance	2000 to 2035	2036 to 2065	2066 to 2095	2096 to 2125	Cumulative Rise 2000 to 2125 (m)
Anglian	Higher Central	5.8 (203mm)	8.7 (261mm)	11.6 (348mm)	13 (390mm)	1.20m
Anglian	Upper End	7 (245mm)	11.3 (339mm)	15.8 (474mm)	18.1 (543mm)	1.6m

Higher Central

Base year 2006 – 2035 @ 5.8mm/year (29 years x 5.8mm) = 783mm

2036 – 2055 @ 8.7mm/year (30 years x 8.7) = 261mm

2066 – 2095 @ 11.6mm/year (30 years x 11.6) = 348mm

2096 – 2120 @ 13mm/year (24 years x 13) = 312mm

Overall total = **1089mm**

Peak tide levels Present Day (2006) at Layers Sluice 0.1% (1 in 1000) = 6.29mODN and for year 2120 = 7.38mODN

Upper End

Base year 2006 – 2035 @ 7mm/year (29 years x 7mm) = 168mm

2036 – 2055 @ 11.3mm/year (30 years x 11.3) = 339mm

2066 – 2095 @ 15.8mm/year (30 years x 15.8) = 474mm

2096 – 2120 @ 18.1mm/year (24 years x 18.1) = 434mm

Overall total = **1415mm**

Peak tide levels Present Day (2006) at Layers Sluice 0.1% (1 in 1000) = 6.29mODN and for year 2120 = 7.71mODN

The current Hazard Mapping has a Base year 2006 – 2115

Table 3 Peak sea level allowance for each epoch in (mm) per year with cumulative sea level rise for each epoch in brackets (use 1990 baseline)					
Area of England) (Use River Basin maps	1990 to 2025	2026 to 2050	2051 to 2080	2081 to 2115	Cumulative Rise 1990 to 2115 (m)
East, Midlands, London, South East	4 (140mm)	8.5 (212.5mm)	12 (360mm)	15 (525mm)	1.24m

Base year 2006 – 2025 @ 4mm/year (29 years x 4mm) = 96mm

2026 – 2050 @ 85mm/year (30 years x 8.7) = 212.5mm

2051 – 2080 @ 11.6mm/year (30 years x 12) = 360mm

2091 – 2115 @ 15mm/year (24 years x 15) = 525mm

Overall total = **1194mm**

Peak tide levels Present Day (2006) at Layers Sluice 0.1% (1 in 1000) = 6.29mODN and for year 2115 Higher Central) = 7.48mODN

It is therefore concluded, that until the Environment Agency undertake new modelling for the Coastal Hazard Mapping, that the present-day breach mapping can be used for determining finished floor levels for residential development.

DRAINAGE STATEMENT

Surface Water

Construction on any undeveloped area has the potential to increase the rates and volumes of surface water runoff, due to the replacement of pervious land with impervious surfaces. In this case, the areal footprint of the building, access tracks and other infrastructure is unchanged. As there are no proposals to increase the footprint of the buildings, post development, the roof water from the building will continue to discharge to the existing outlets which have functioned over many years without giving any cause for complaint. These will be checked and cleaned out as necessary.

All access roads and parking areas are already available.

Foul Drainage

As the site is not located within an area served by public sewers an appropriate sized package treatment plant will be provided for the proposed development.

As there is a positive drainage system capable of receiving flows from the development there is no likely impact on neighbouring property.

FLOOD PROTECTION

Any impact of damage to the properties can be foreseen and mitigated against by relatively simple design and

construction techniques. There are two forms of flood protection works: -

- **Flood-resistance or proofing works:** - these try to reduce the amount of water entering a building.
- **Flood-resilient works:** - these reduce the amount of damage caused by water entering the building.

The proposed property will have the following resilient measures incorporated in the construction in accordance with “Improving the flood performance of new buildings” CLG (2007).

- It is proposed that Barn 1 (Holiday Lets Units 1 & 2) will have a FFL of 3.36mODN. Barn 2 (Holiday Lets Unit 3 & 4) to have a FFL of 3.21mODN.
- It is recommended that all external doorways to be flood doors manufactured by Stormguard or similar. These flood doors have been tested against the standard set of tests as defined in PAS 1188-1:2014 which represent typical conditions that might be experienced during a flood in the UK. This will provide some additional protection during the winter months when the holiday lets are not occupied.
- Use closed cell cavity insulation to the ground floor with a solid concrete slab with a ceramic tiled finish. All tiles to be bedded on a water-resistant cement bedding with a water-resistant grout.
- An internal cement render will be used for a minimum of 600mm above the finished floor level to reduce flood water leakage.
- Arrange for all service circuits to be routed at high level and fed downwards, where practical socket outlets, boilers etc. to be a minimum of 1.0m above the raised ground floor level.
- As this site is in an area that can receive flood warnings from the Environment Agency Floodline Warning Direct system. It is recommended that the property Owner contact the Environment Agency's Floodline on 0845 988 1188 to register the property to receive advance warning of flooding by telephone, mobile, fax, SMS text, email or pager. The Environment Agency aim to issue a 'severe flood warning' approximately 2 hours before existing defences are overtopped.

CONCLUSION

- o The site does have the protection of tidal flood defences which are well maintained by the Environment Agency.
- o The proposed holiday lets are shown to be located within Flood Zone 3a 'High Probability' as detailed on the Environment Agency's Flood Zone Maps **without defences**, and as defined in Table 1 of NPPG.
- o The Flood Risk Vulnerability Classification in Table 2 of NPPG the proposed residential development is classified as “More Vulnerable”, with Table 1 of NPPG stating that such uses are appropriate in this flood zone.

- o It is proposed that Barn 1 (Holiday Lets Units 1 & 2) will have a FFL of 3.36mODN. Barn 2 (Holiday Lets Unit 3 & 4) to have a FFL of 3.21mODN. This the maximum height that can be achieved given the available ceiling height.
- o The risk of flooding from Rivers and Sea Map shows that the site is at a Low risk of flooding. **Low risk** means that each year this area has a chance of flooding of between 0.1% and 1%.
- o With the main risk of flooding to the site being from tidal sources and as the floor level of the holiday lets cannot be raised to be above the worst case flood level, following a breach or over topping the defences, it is recommended that the period of occupancy is restricted so that they will not be occupied between 1st November (or the following Sunday if half term extends into November) in any one year and the 14th March in the succeeding year, this length of season is in line with the current guidance. The restricted season will ensure that the building is not occupied during the winter months when the likelihood of flooding is increased due to the chance of coastal storms and tidal surges. They will not be used as a permanent residence.
- o A Flood Warning and Evacuation Plan will be prepared, the units will not be occupied when a Severe Flood Warning has been issued by the Environment Agency.
- o The proposal for holiday lets would result in the reuse of existing buildings, which would maintain the character and appearance of the buildings. This use would provide economic growth which is supported by the NPPF and the Local Plan.
- o There are no local site-specific risks that would adversely affect the flood risk categorisation of the site. Similarly, there are considered to be no increased risk of offsite flooding risks as a result of the development.
- o Flooding from other sources is unlikely to affect the site.

Flood map for planning

Your reference
Leadenhall Fa

Location (easting/northing)
536046/333093

Created
17 Jan 2020 14:19

Your selected location is in flood zone 3, an area with a high probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Map 1

Flood map for planning

Your reference
Leadenhall Fa

Location (easting/northing)
536046/333093

Scale
1:2500

Created
17 Jan 2020 14:19

Site



-  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

0 20 40 60m

Extent of flooding



Map 2

PE12 8HB



Extent of flooding from rivers or the sea

● [High](#) ● [Medium](#) ● [Low](#) ● [Very low](#)

Lincolnshire & Northamptonshire Area

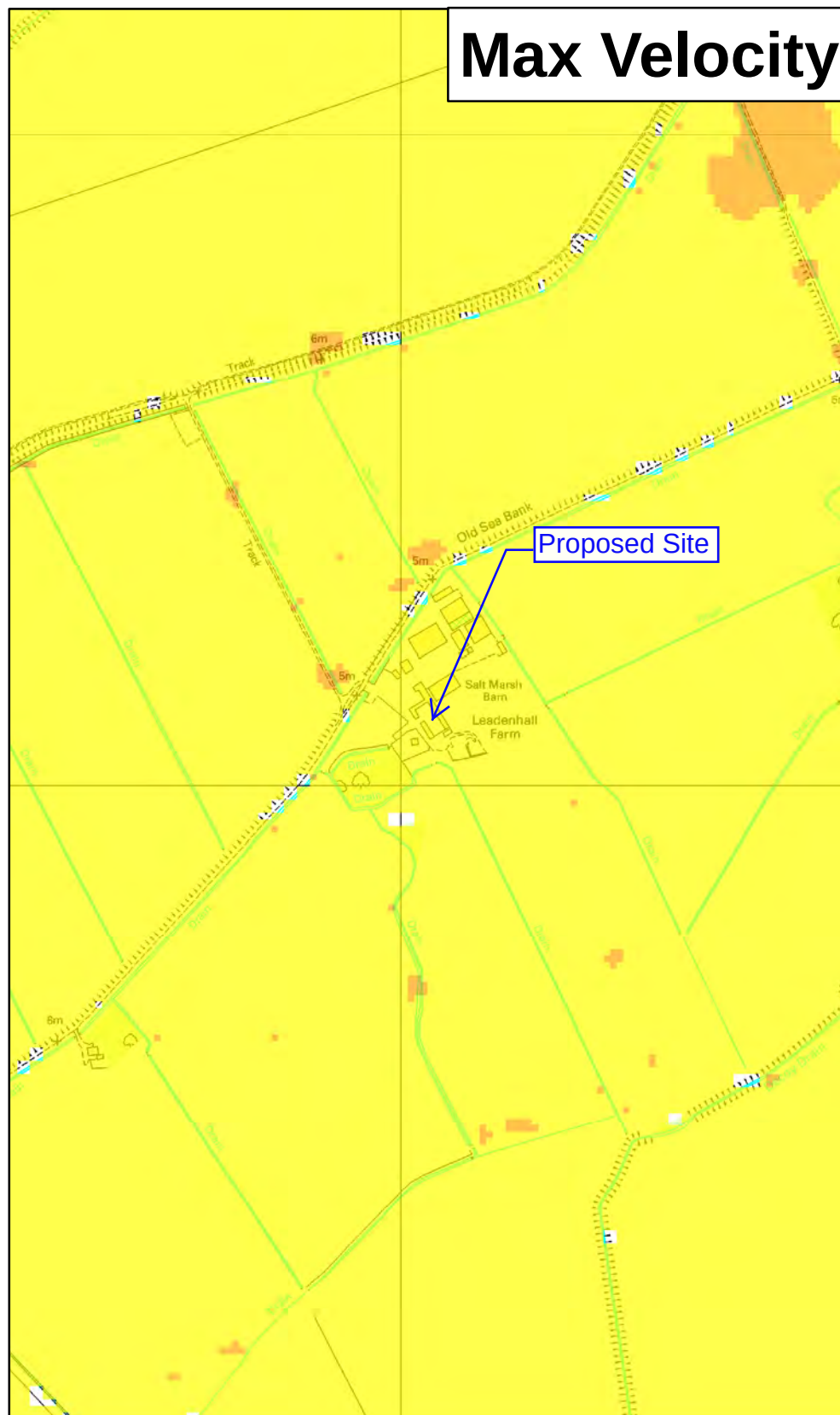
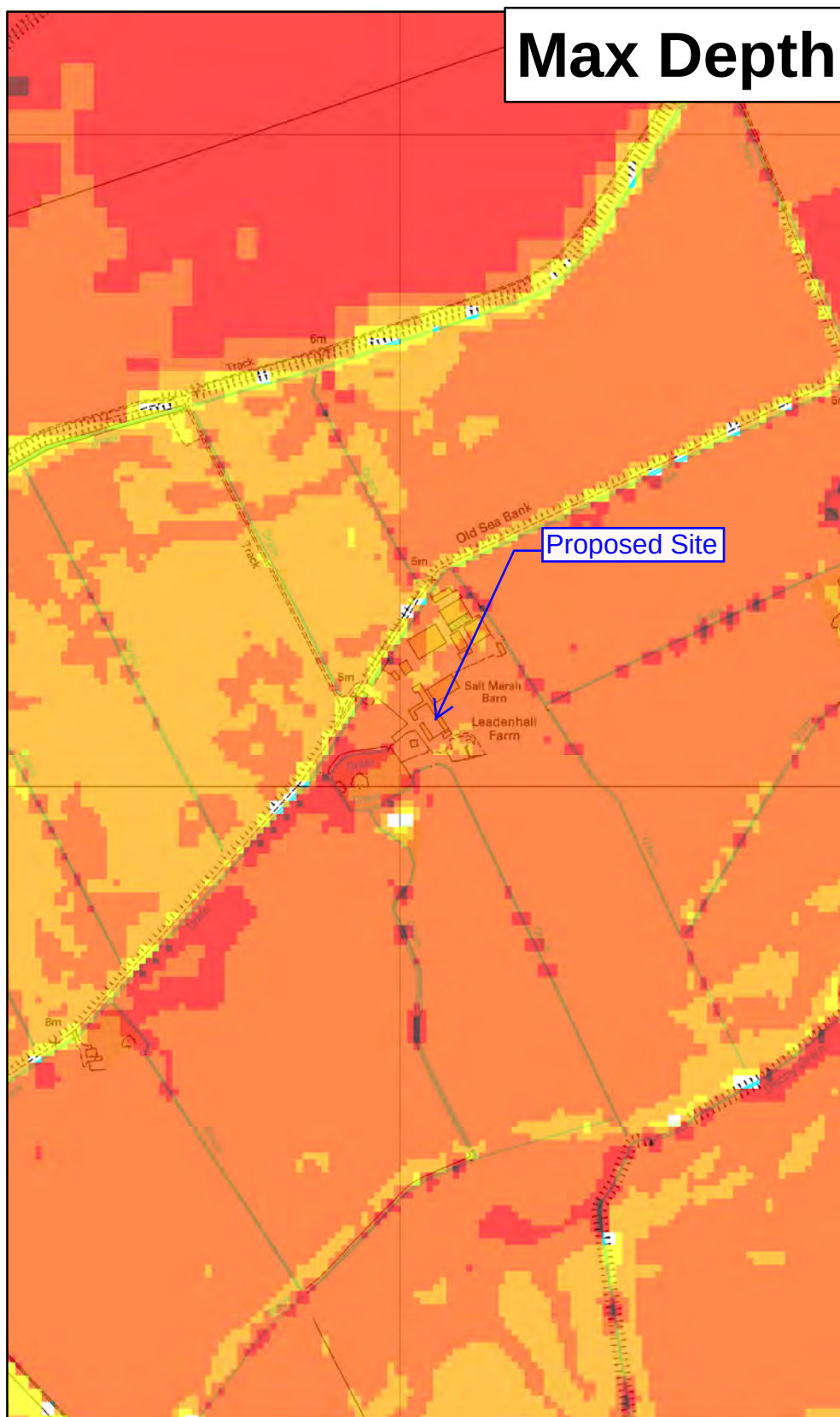
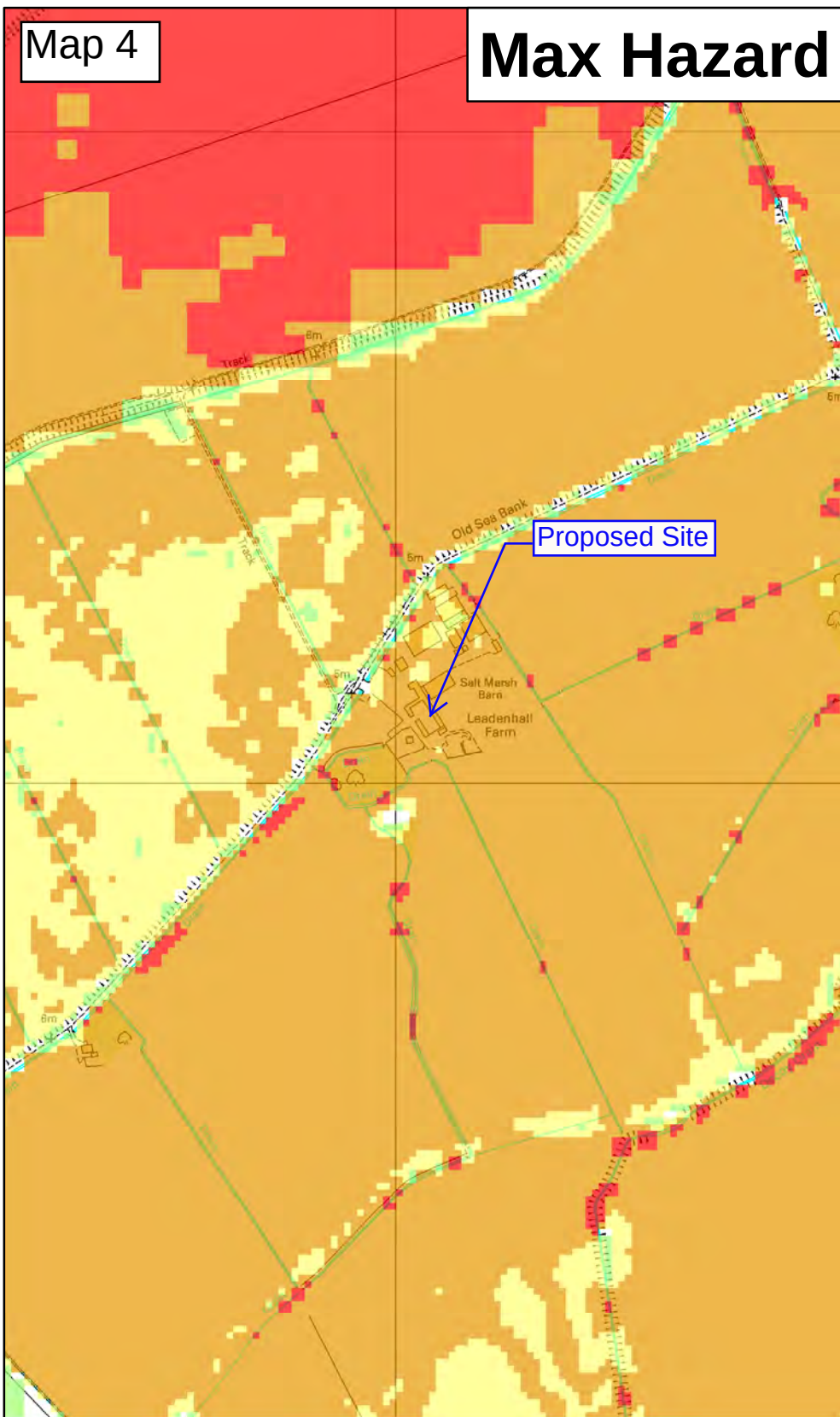


Tidal Water Levels for the South Humber, East Coast and The Wash

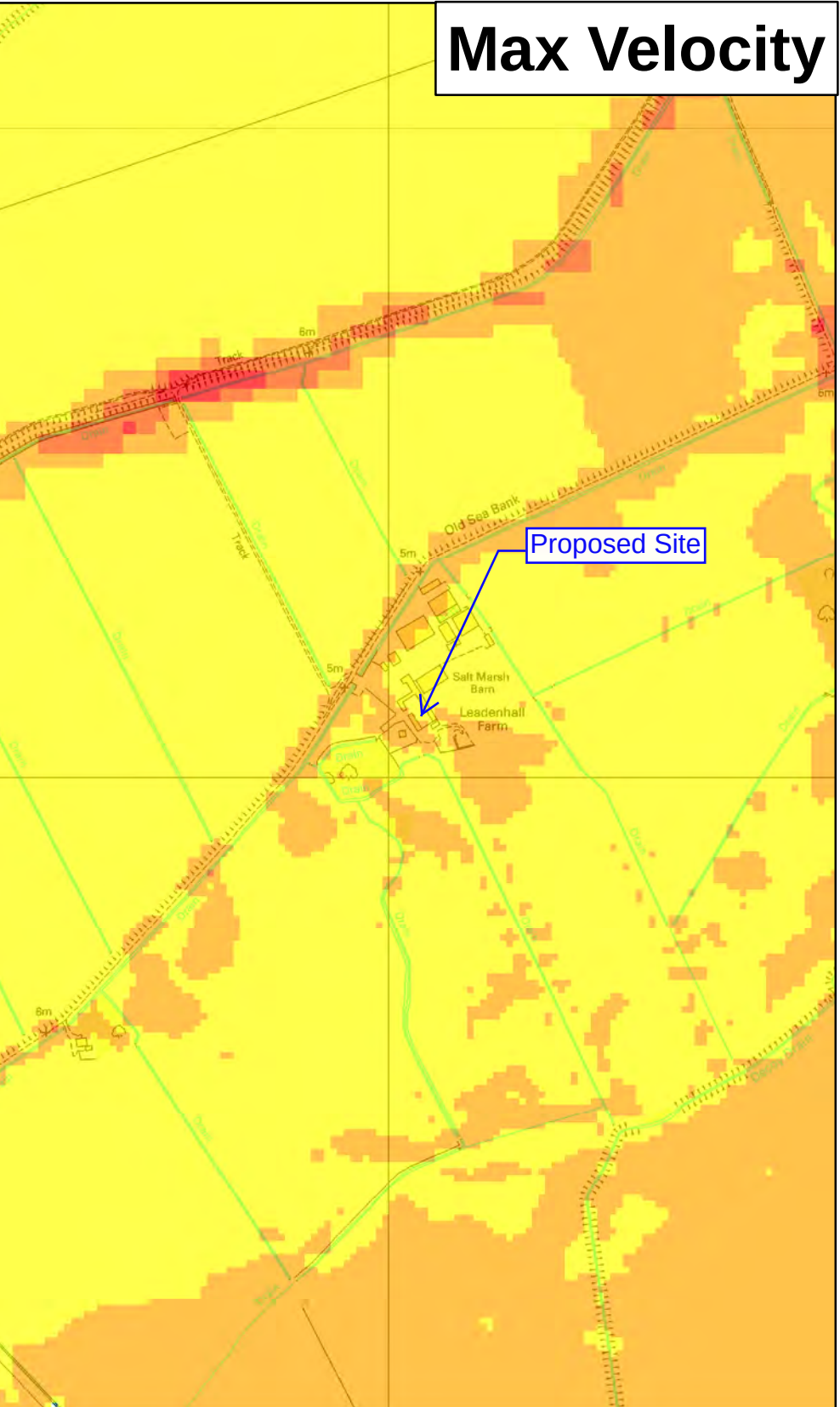
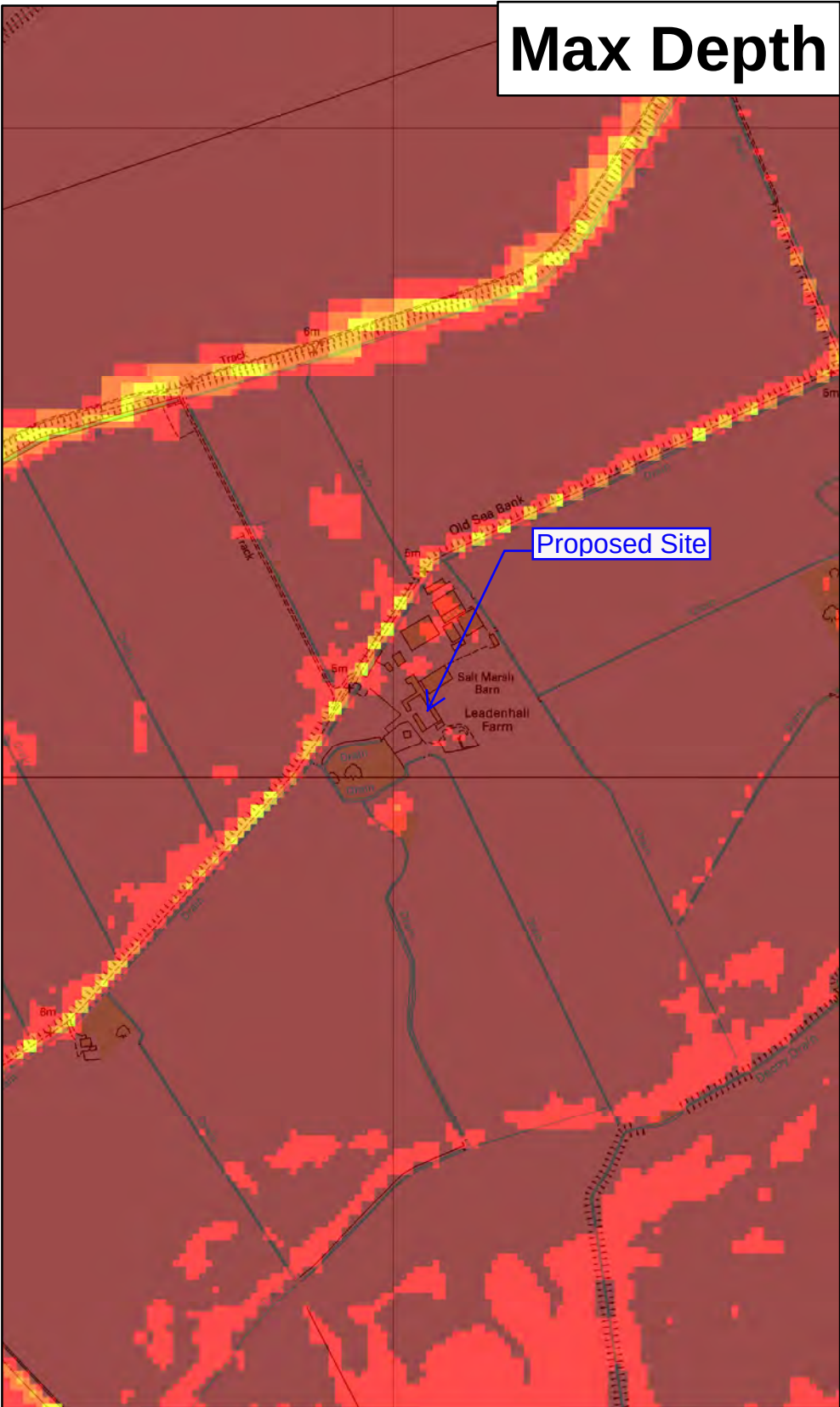
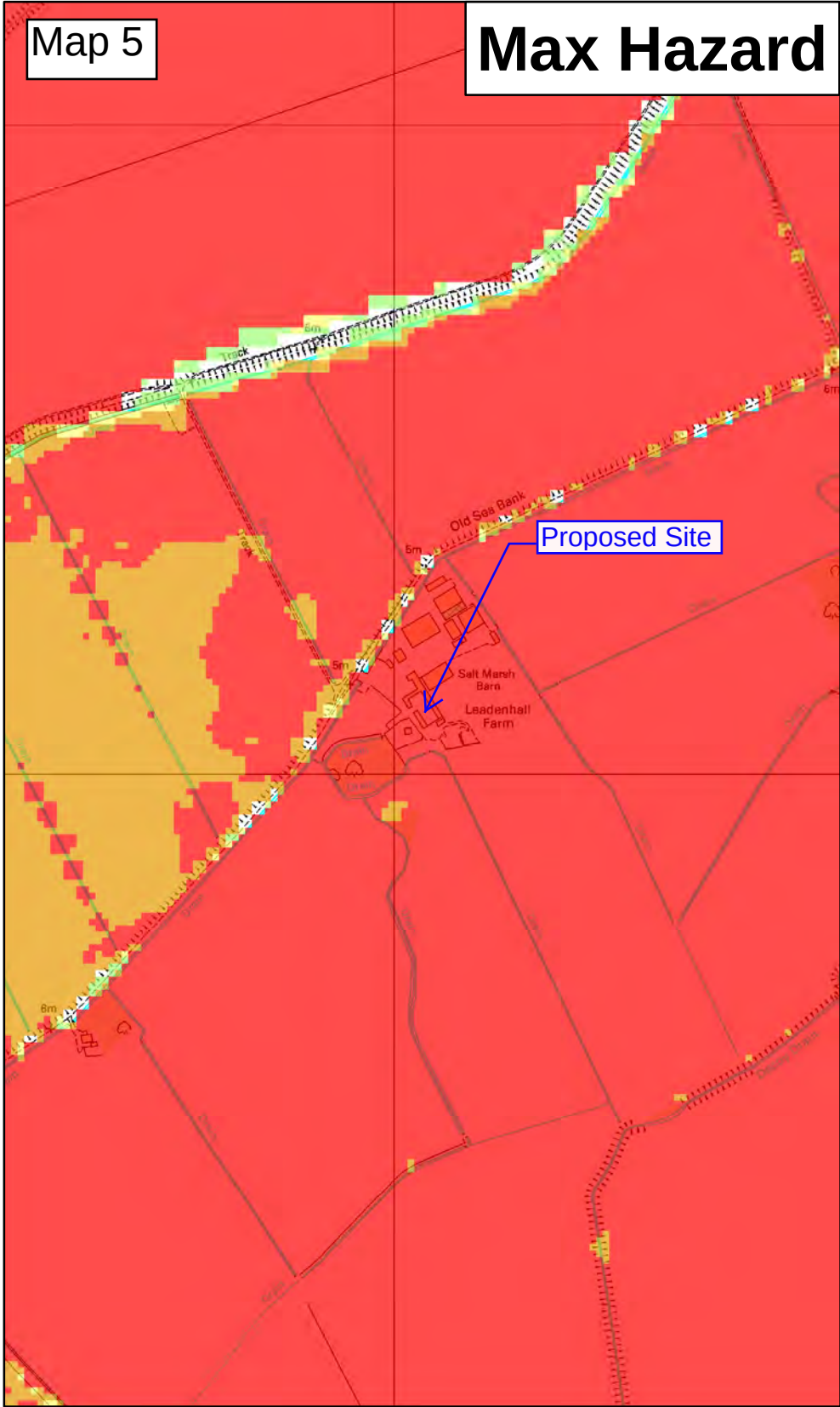
The table below shows still water levels for locations, from the above location map, around the South Humber Estuary, East Coast and The Wash. It is important to note the following:

- The base date for the data is 2014 for the South Humber and 2006 for the East Coast and The Wash.
- The data are still water levels. Depending on the use of the data it may be necessary to consider wave heights and / or joint probability analysis of water level and other variables.
- The water level quoted is the ‘Best Estimate’ water level. Depending on the use of the data it may be necessary to carry out sensitivity testing. Upper and Lower 95% confidence bandings are available upon request.
- Levels for other annual chance scenarios are available if required.

Ref	Location	Easting	Northing	Annual Chance (1 in x) of Tide Level					
				metres ODN					
				1	10	50	100	200	1000
HUMBER									
H030	Tetney	535420	403180	3.94	4.29	4.56	4.69	4.82	5.15
H050	Buck Beck	532700	406580	4.03	4.36	4.62	4.74	4.87	5.18
H060	Grimsby	527878	411346	4.10	4.43	4.70	4.82	4.95	5.27
H080	Haborough Marsh	520790	415740	4.26	4.61	4.88	5.01	5.14	5.47
H090	Immingham	519141	417449	4.26	4.61	4.88	5.01	5.14	5.47
H100	South Killingholme	518700	417120	4.41	4.77	5.05	5.18	5.32	5.66
H130	North Killingholme	516530	420000	4.51	4.87	5.15	5.28	5.42	5.77
H150	East Halton	514450	422870	4.59	4.96	5.25	5.39	5.53	5.89
H170	Goxhill	511970	425440	4.67	5.04	5.34	5.47	5.61	5.95
H200	New Holland	508020	424330	4.87	5.26	5.55	5.68	5.81	6.12
H210	Barrow Haven	506380	422620	4.92	5.31	5.60	5.73	5.86	6.17
H220	Ferriby	497550	421150	5.04	5.42	5.67	5.77	5.86	6.04
H230	Winterton	493420	422830	5.14	5.51	5.74	5.83	5.90	6.02
H250	Blacktoft	484247	424190	5.25	5.62	5.83	5.90	5.96	6.04
H270	Goole	474857	422960	5.46	5.85	6.07	6.15	6.21	6.29
East Coast									
~	Great Eau	545500	393800	3.80	4.19	4.46	4.57	4.69	4.96
~	Boygrift	553300	379800	3.84	4.24	4.53	4.65	4.77	5.05
~	Burgh Sluice	555190	358620	4.26	4.45	4.76	4.90	5.03	5.34
Wash									
~	Hobhole	536610	339940	4.82	5.30	5.64	5.78	5.93	6.27
~	Lawyers Sluice	540750	334550	4.84	5.32	5.66	5.80	5.95	6.29
~	West Lighthouse	549150	325750	4.88	5.37	5.71	5.86	6.01	6.35
~	Grand Sluice	532400	344500	4.88	5.33	5.65	5.78	5.93	~
~	Fosdyke Bridge	531700	332200	4.91	5.38	5.71	5.85	5.99	~
~	Marsh Road	526000	324000	5.04	5.44	5.73	5.85	5.98	~
~	Wisbech	546100	310000	4.83	5.25	5.53	5.66	5.78	~
~	Dog In Doublet	527300	299300	3.67	4.00	4.22	4.32	4.42	~



★ Modelled Breach Locations - see also the accompanying plan "Location of Modelled Breaches"							
Max Hazard (Flood Risk to People : FD2320)		Max Depth (m)		Max Velocity (m/s)		This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped. The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results. The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.	
Less than 0.75 (Low Hazard) Between 0.75 and 1.25 (Danger for Some) Between 1.25 and 2.0 (Danger for Most) Greater than 2.0 (Danger for All)		0 - 0.25 0.25 - 0.50 0.50 - 1.0 1.0 - 1.6 1.6 +		0 - 0.3 0.3 - 1.0 1.0 - 1.5 1.5 - 2.5 2.5 +			
Date Printed	September 2019	Scenario year	2006	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2019-141844
General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary.							
Environment Agency Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping Map Centred on TF 36043 33107 This map is reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationary Office. Crown copyright. All rights reserved. Environment Agency 100026380, 2019. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.							



★ Modelled Breach Locations - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard

(Flood Risk to People : FD2320)

Less than 0.75
(Low Hazard)

Between 0.75 and 1.25
(Danger for Some)

Between 1.25 and 2.0
(Danger for Most)

Greater than 2.0
(Danger for All)

Max Depth (m)

0 - 0.25

0.25 - 0.50

0.50 - 1.0

1.0 - 1.6

1.6 +

Max Velocity (m/s)

0 - 0.3

0.3 - 1.0

1.0 - 1.5

1.5 - 2.5

2.5 +

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.

Environment Agency

Lincolnshire and Northamptonshire
Tidal Breaching Hazard
Mapping

Map Centred on TF 36043 33107

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Date Printed

September 2019

Scenario year

2115

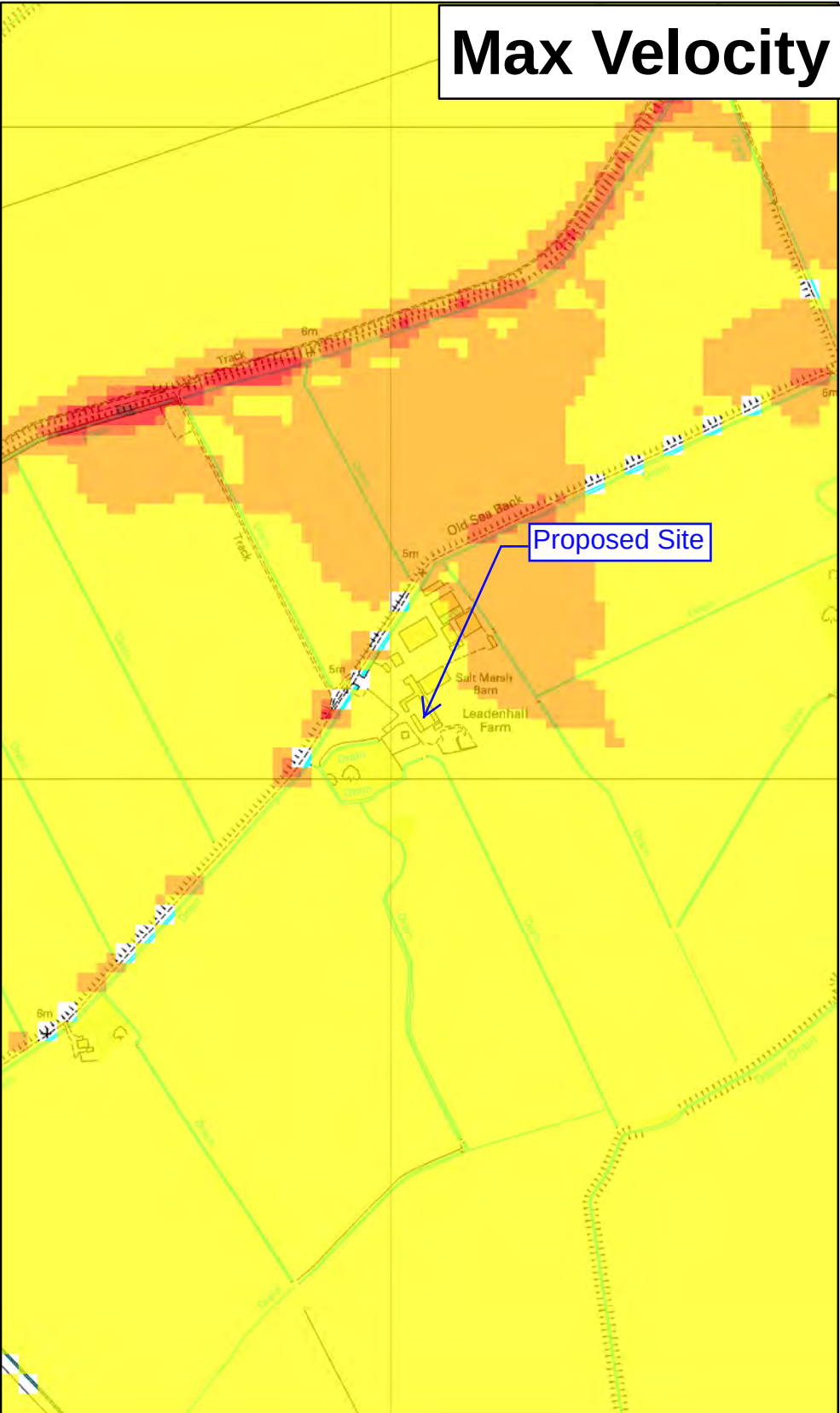
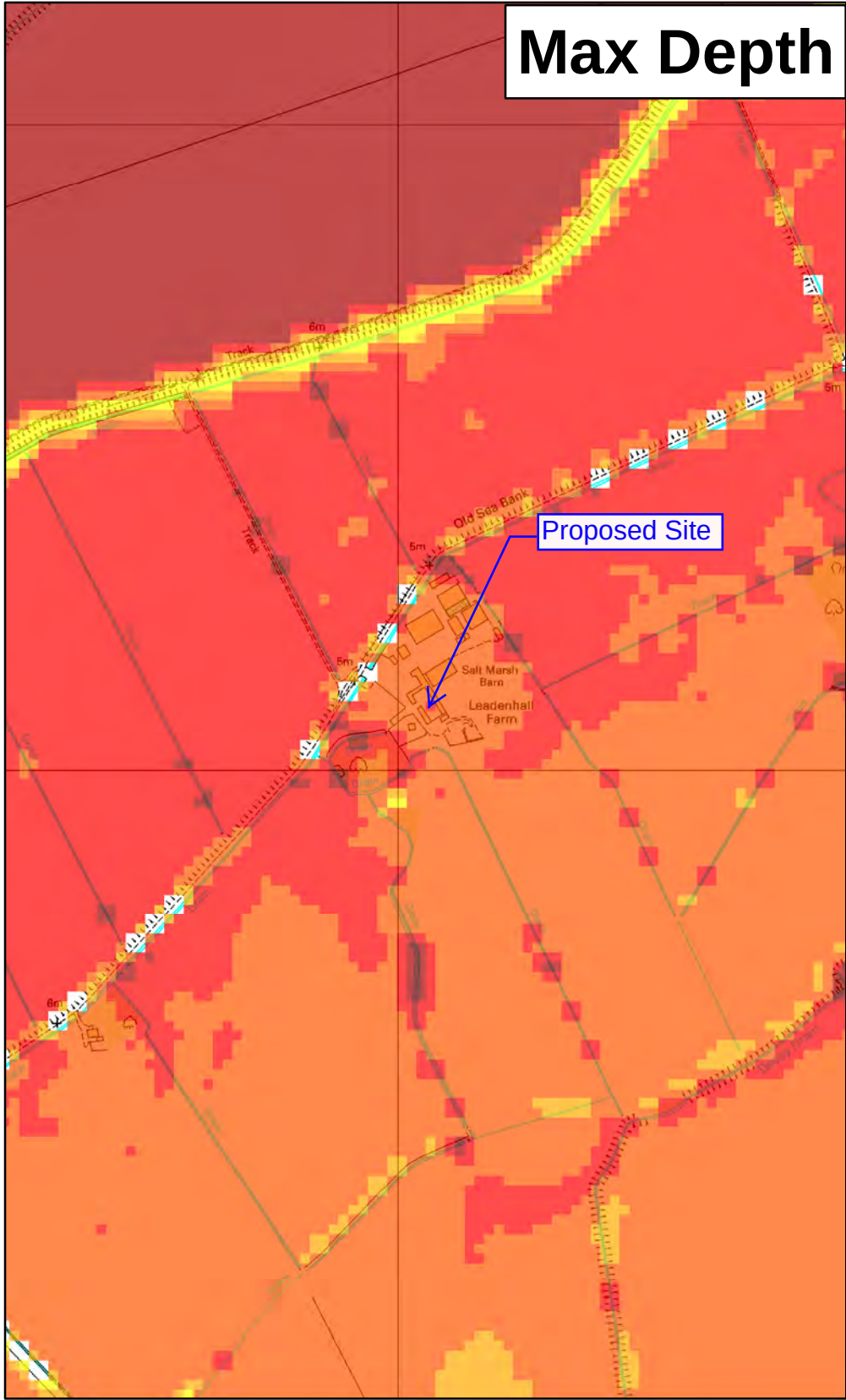
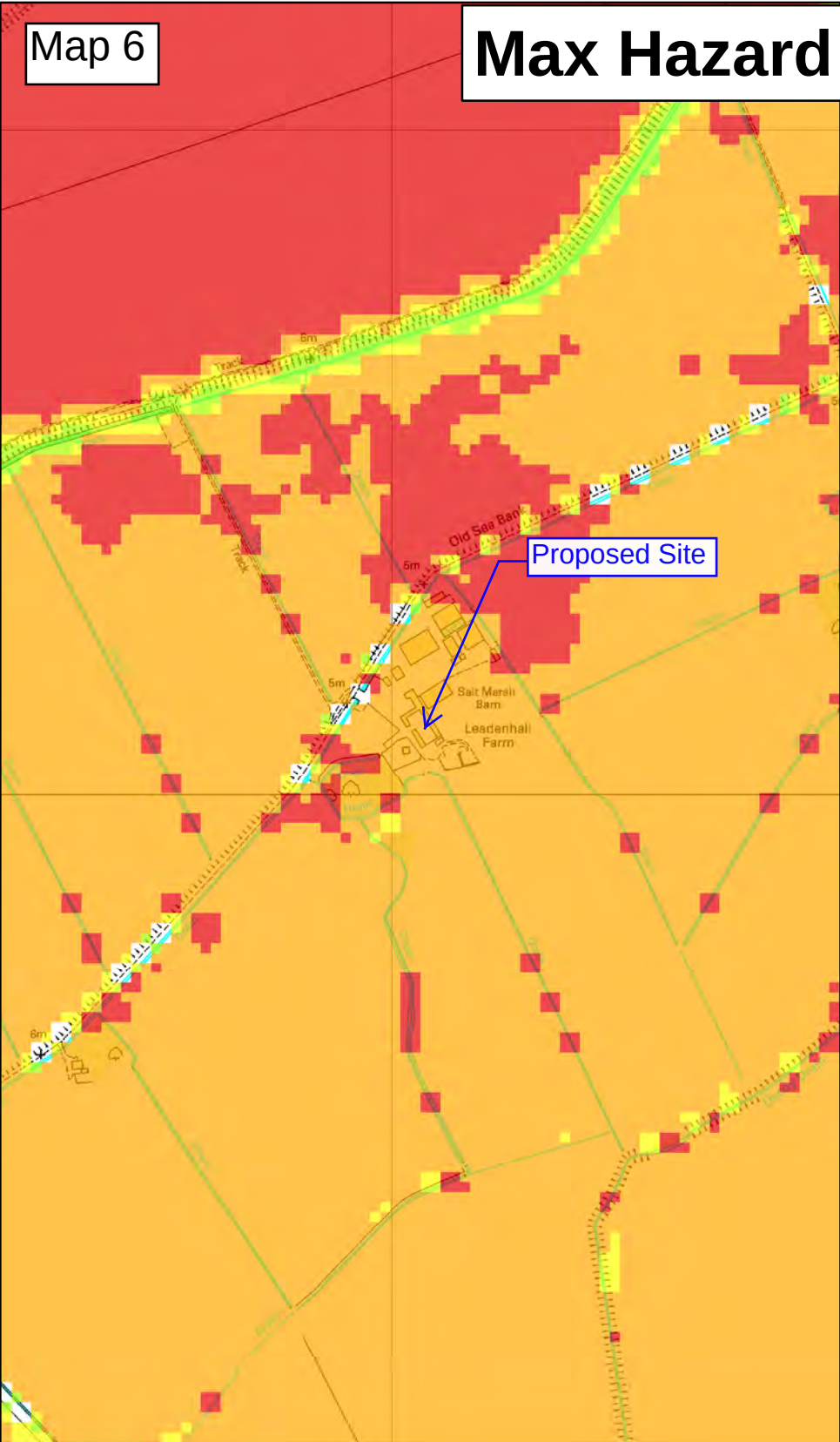
Scenario Annual Chance

0.1%
(1 in 1000)

CCN Number

CCN-2019-141844

General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

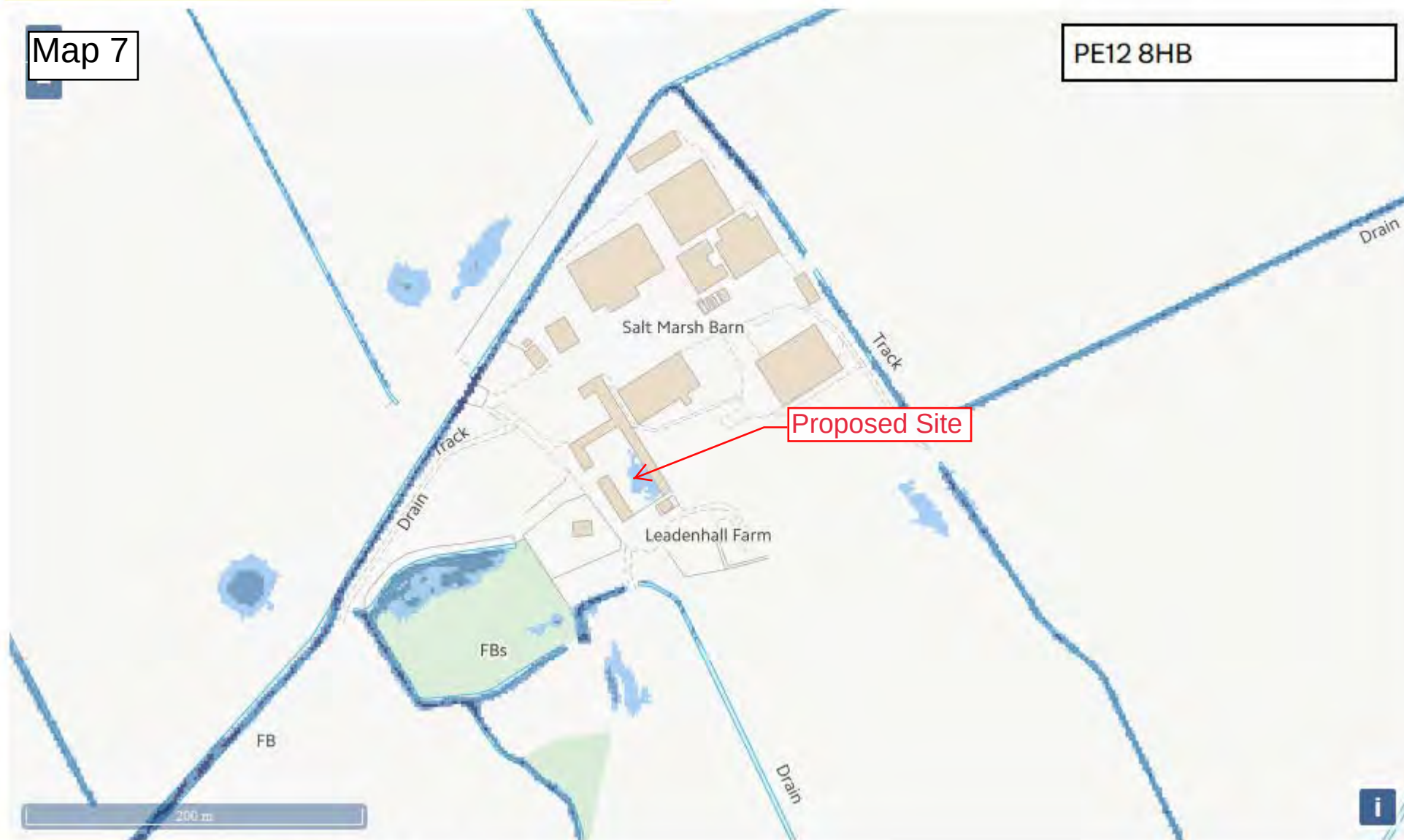


Max Hazard (Flood Risk to People : FD2320)				Max Depth (m)		Max Velocity (m/s)		The map is based on computer modelling of simulated overtopping of the main coastal defences for specific tidal scenarios. It does not include overtopping along the following tidal rivers which are currently being investigated: Witham Haven (upstream of Hobhole), and Welland (upstream of Fosdyke Bridge) The map only considers the consequences of overtopping of the defences, and does not show the possible consequences of breaches of the tidal defences. Separate maps of the flood extent from just breaching of the defences are available. For future climate change scenarios it is assumed that defences remain at 2006 heights. These maps do not replace the flood zone maps used in the National Planning Policy Framework (NPPF) General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary		
- Less than 0.75 (Low Hazard) - Between 0.75 and 1.25 (Danger for Some) - Between 1.25 and 2.0 (Danger for Most) - Greater than 2.0 (Danger for All)				0 - 0.25 0.25 - 0.50 0.50 - 1.0 1.0 - 1.6 1.6 +		0 - 0.3 0.3 - 1.0 1.0 - 1.5 1.5 - 2.5 2.5 +			Lincolnshire and Northamptonshire Tidal Overtopping Hazard Mapping	
Date Printed	September 2019	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2019-141844		Map Centred on TF 36043 33107	
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Low risk: depth

Map 7

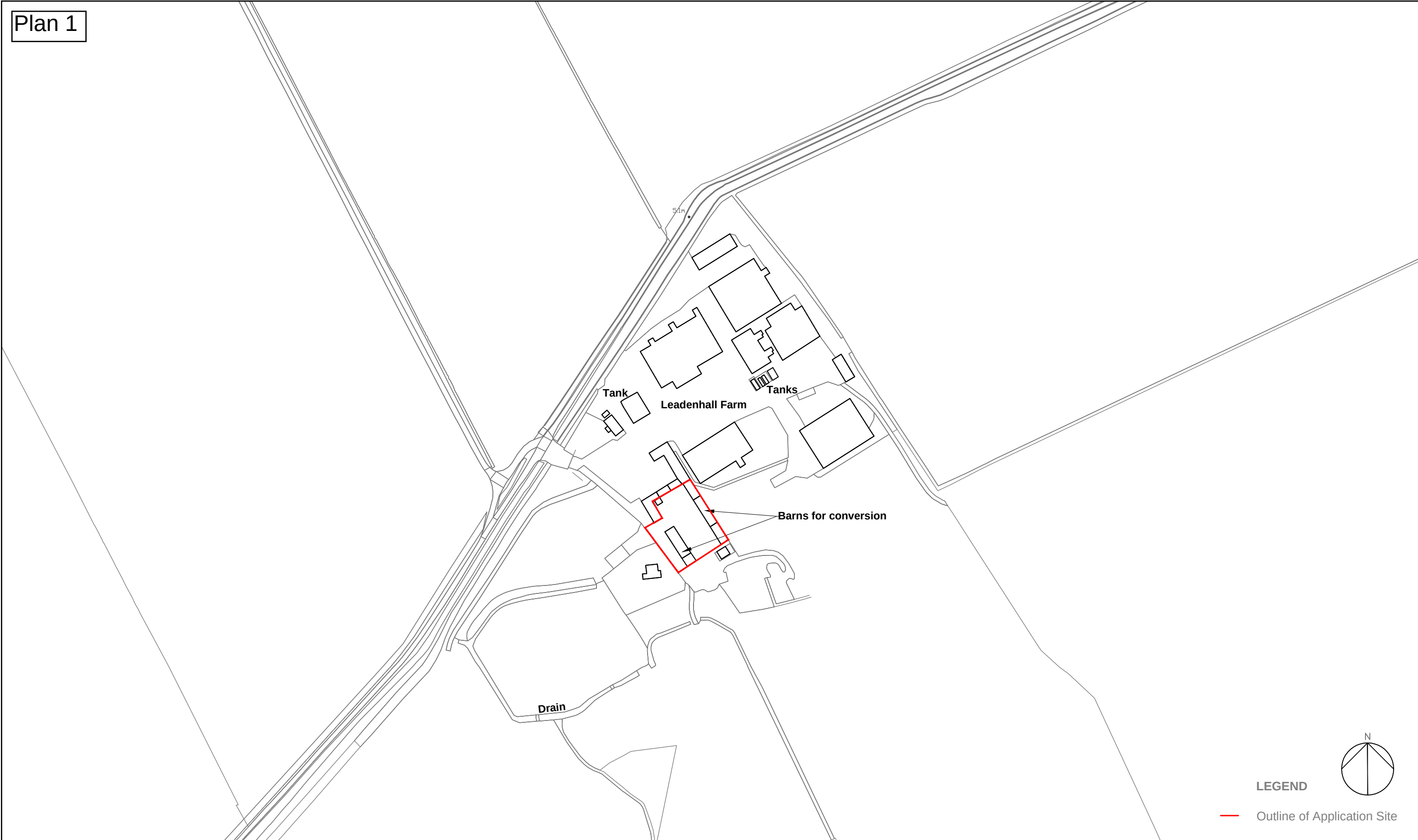
PE12 8HB



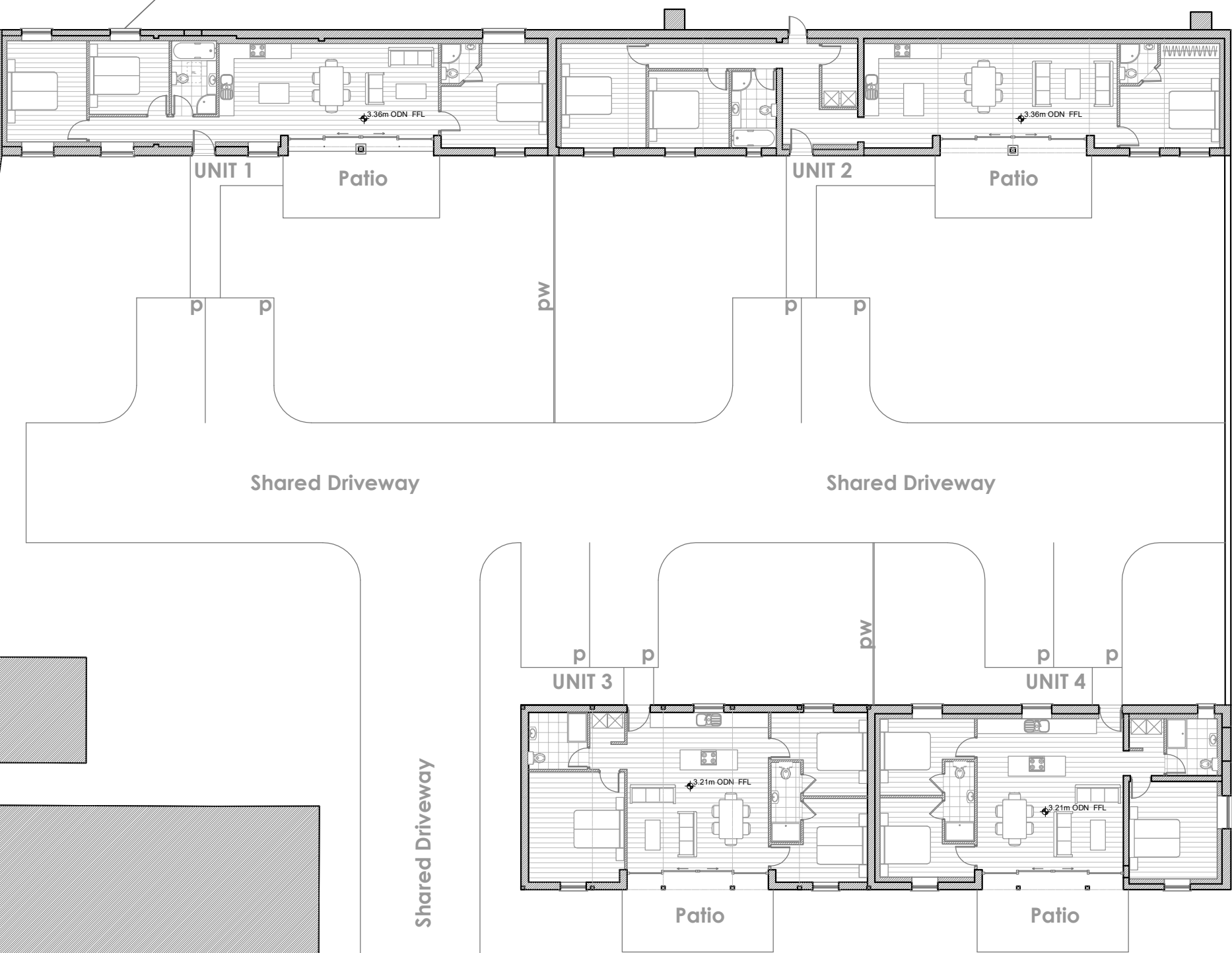
Surface water flood risk: water depth in a low risk scenario

Flood depth (millimetres)

Over 900mm 300 to 900mm Below 300mm



guyforman ARCHITECT Guy Forman BA (Hons) MArch tel 07958 188257	Leadenhall Farm, Holbeach		Rev	Description	Date	By	Chk	
	Proposed Conversion of Barns to 4 x Holiday Lets		For Information					
	Site Location Plan		Scale:	1:2500 @ A3	Date:	13/01/20	Drawn:	GF
			Checked:	GF	Rev:	335-PLN-E-00		DRFT
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Legend

- p Parking Space
- pw Post and wire fence

guyforman
ARCHITECT
Guy Forman BA (Hons) MArch
tel 07958 188257

Leadenhall Farm, Holbeach
Proposed Conversion of Barns to 4 x Holiday Lets

Proposed Site Plan

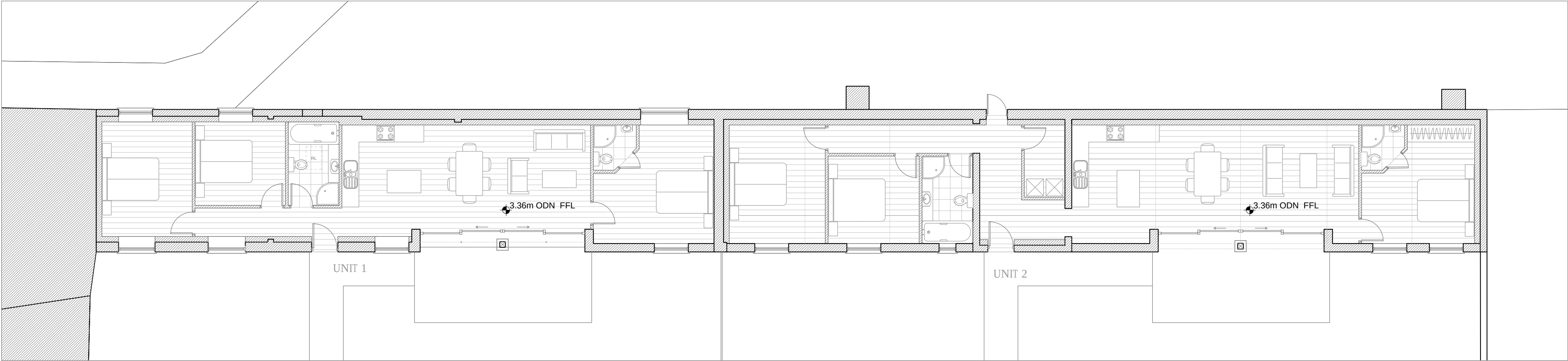
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Rev	Description	Date	By	Chl
For Information				
Scale: 1:200 @ A3		Date: 13/01/20	Drawn: GF	Checked: GF
Drawing No.: 335-PLN-P-01			Rev: DRF1	

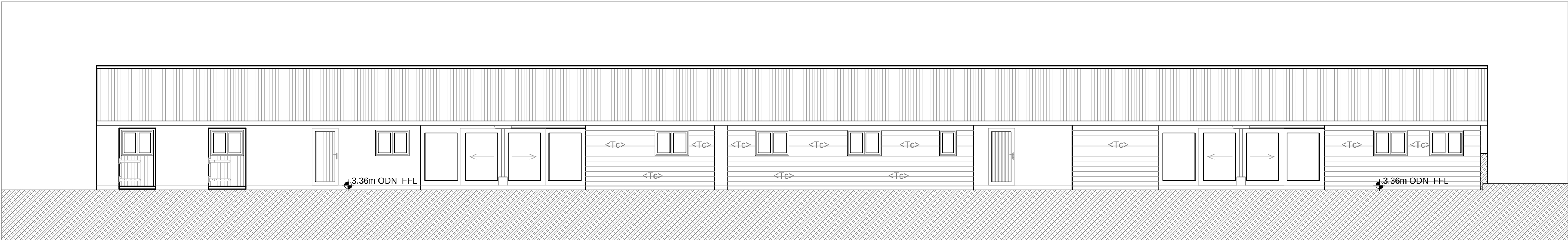
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Do not scale off this drawing - All dimensions and setting out to be verified on site. If in doubt contact the originator for clarification.

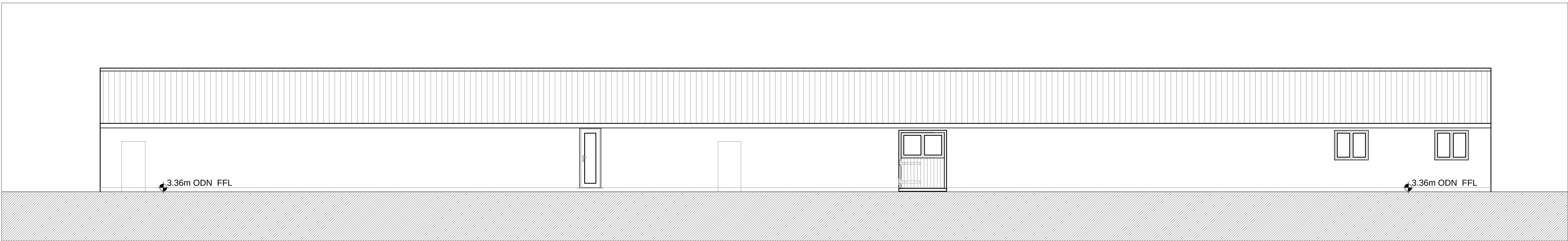
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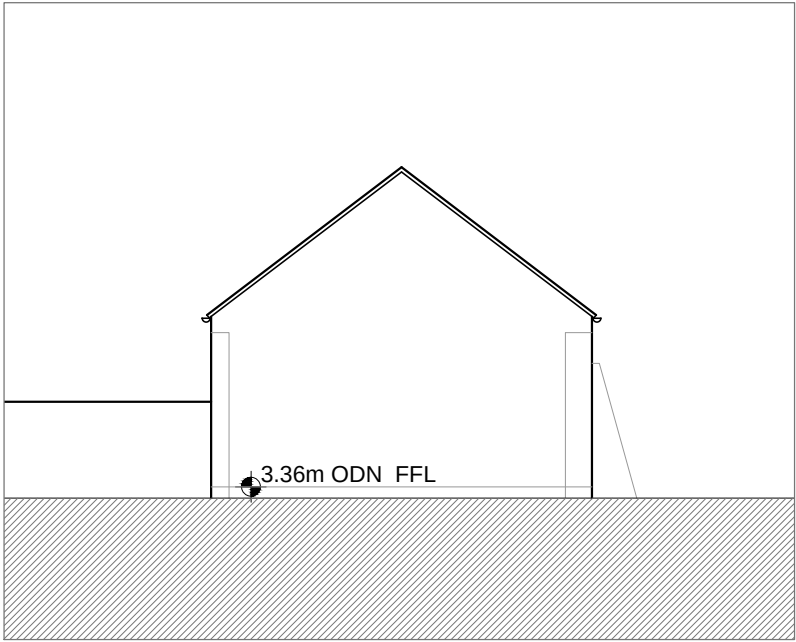
Proposed Ground Floor Plan 1:100



Proposed South West Elevation 1:100



Proposed North East Elevation 1:100



Proposed South East Elevation 1:100

MATERIALS
Walls: <Ps> = Medium Grey Profiled Vertical Sheeting
<Tc> = T&G Horizontal Timber Cladding (Oak)
Roof: Medium to Dark Grey Profiled Vertical Sheeting (Oak)
Windows: Grey Flush Casement Windows

Rev	Description	Date	By	Chk
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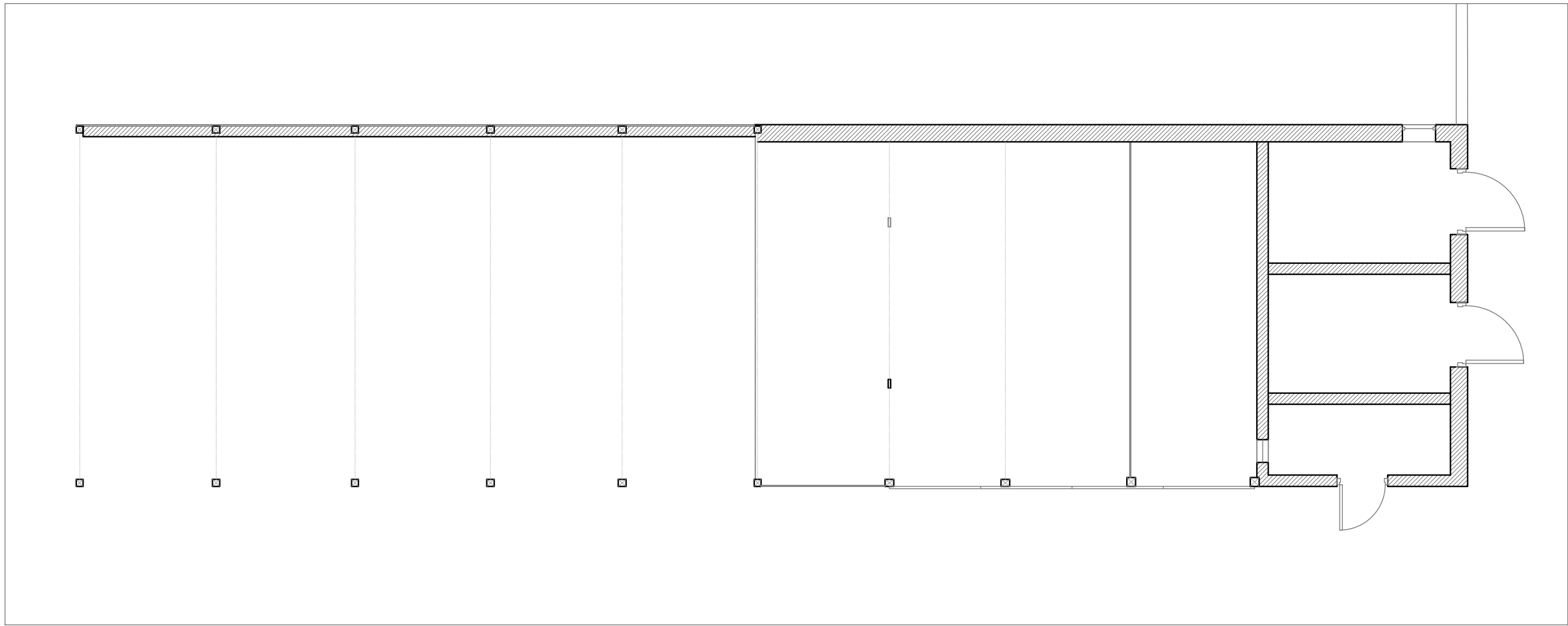
For Information

Leadenhall Farm, Holbeach
Proposed Conversion of Barns to 4 x Holiday Lets

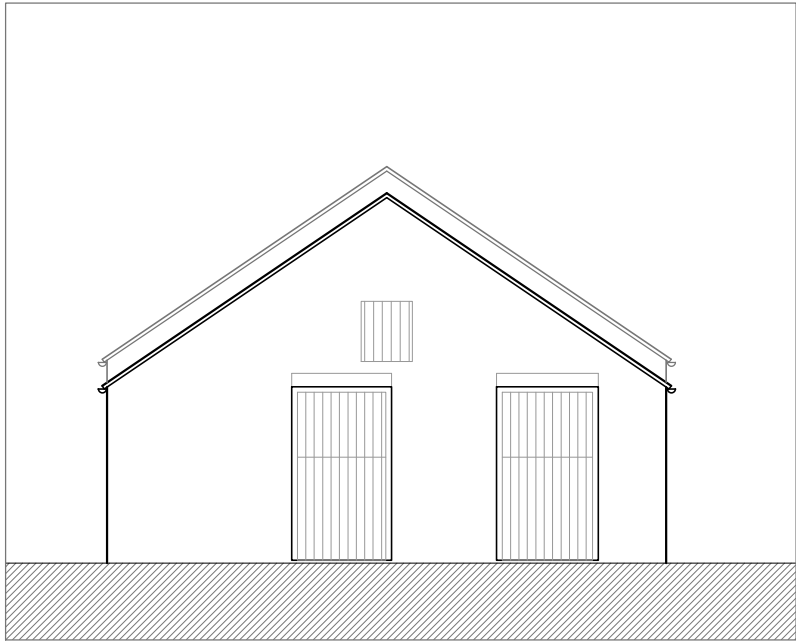
guyforman
ARCHITECT
Guy Forman BA (Hons) MArch
tel 07958 188257

Barns 1: Proposed
Plans & Elevations

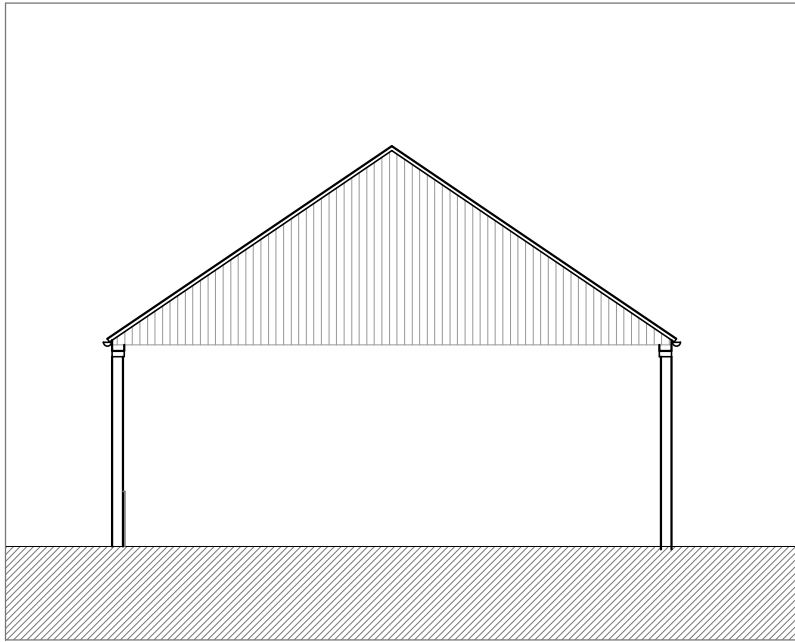
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Drawing No.: 335/1-SPE-P-01	Rev: DRFT		



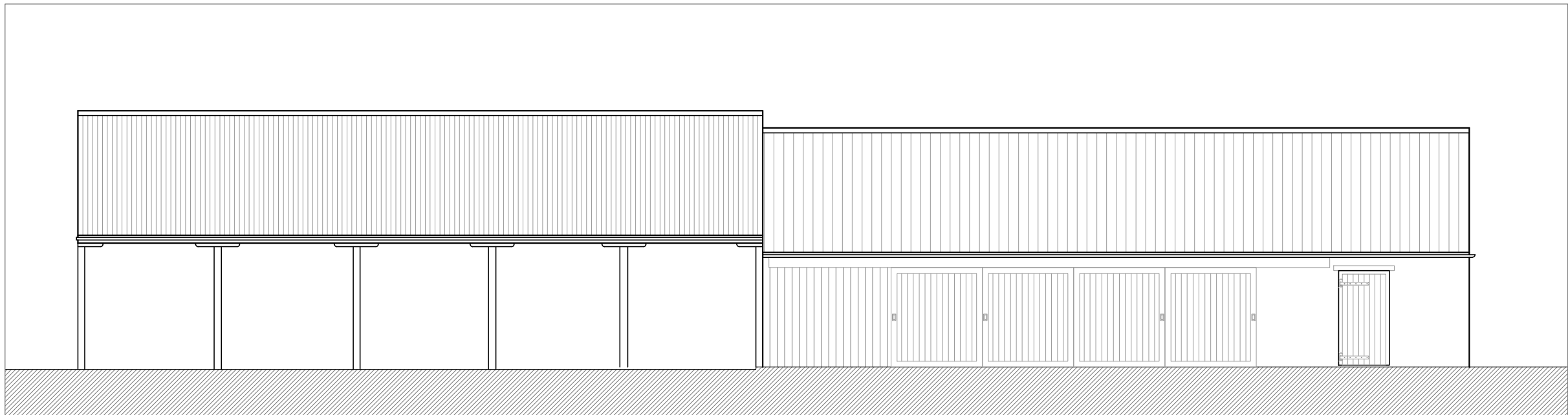
Existing Ground Floor Plan 1:100



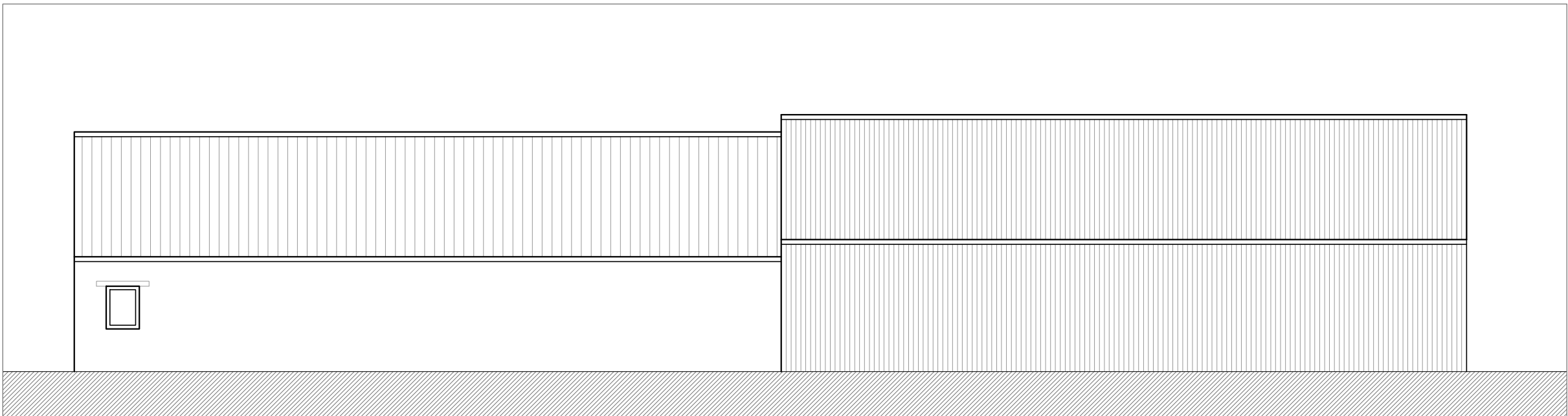
Existing South East Elevation 1:100



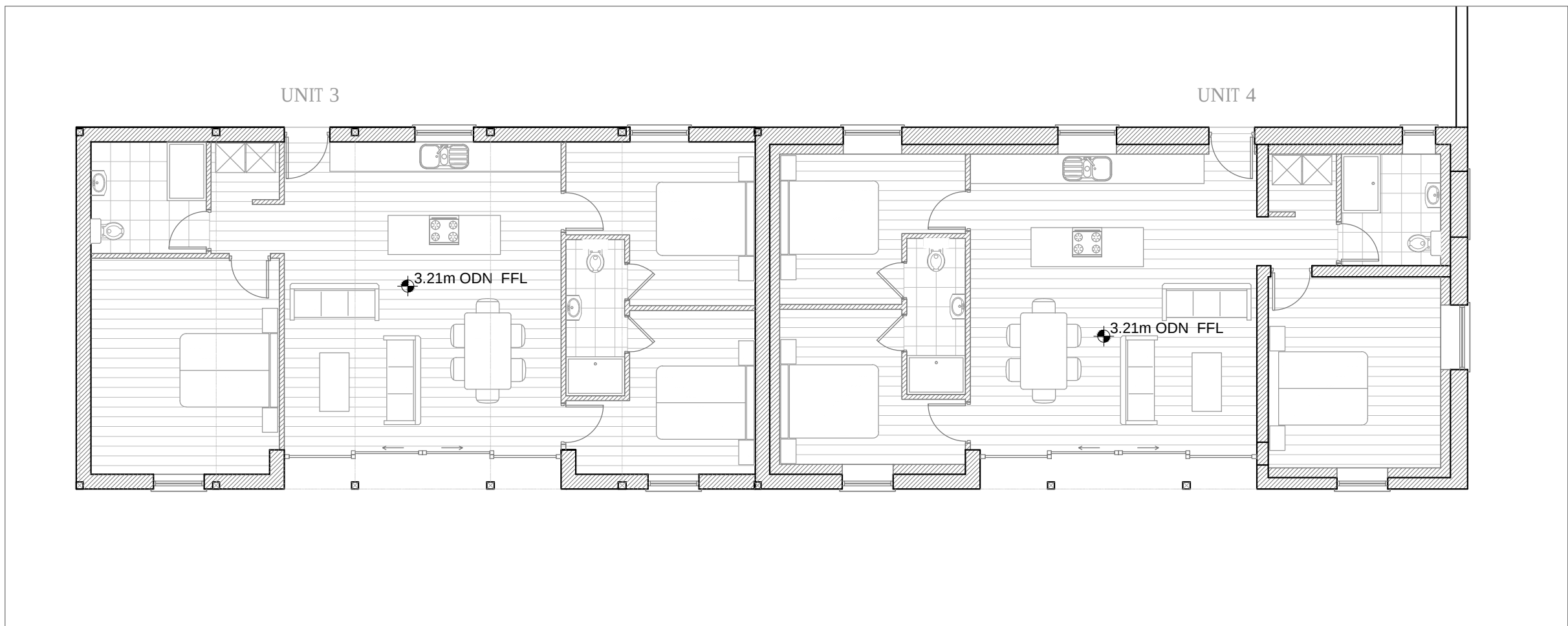
Existing North West Elevation 1:100



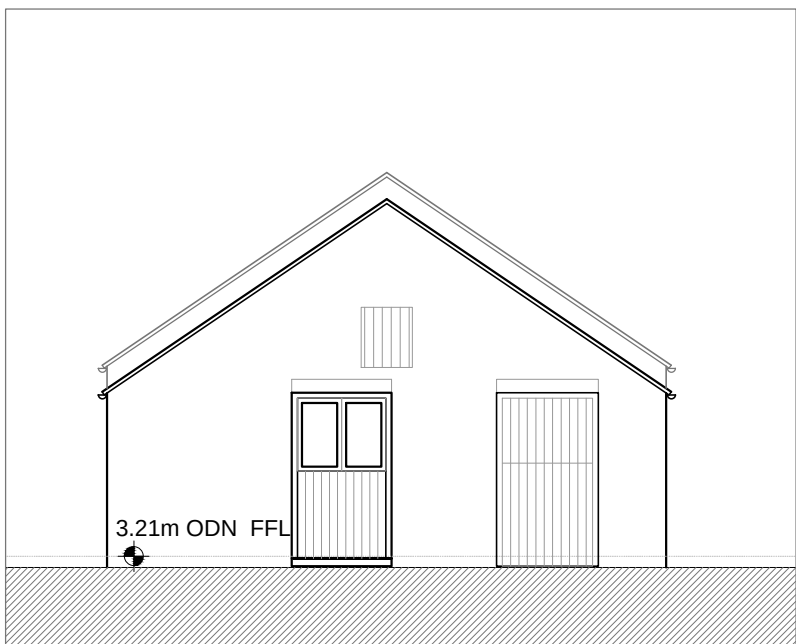
Existing South West Elevation 1:100



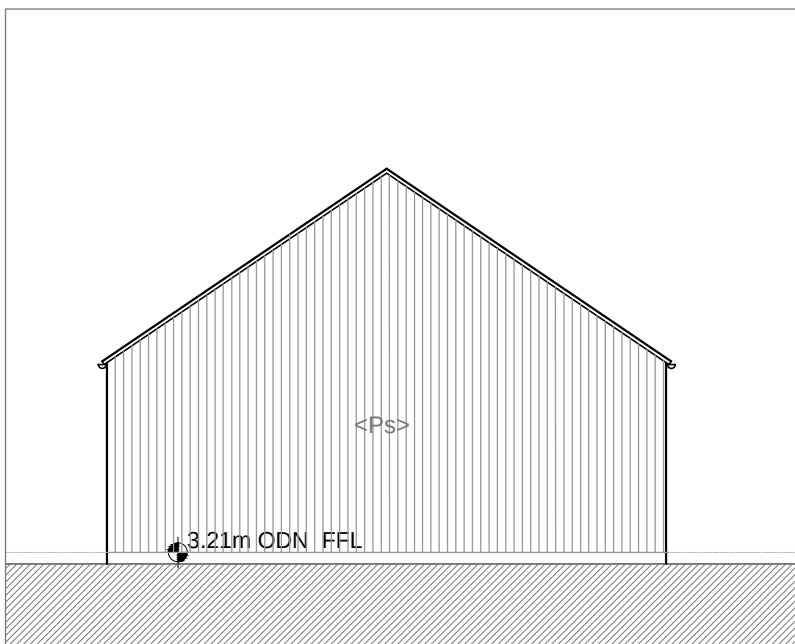
Existing North East Elevation 1:100



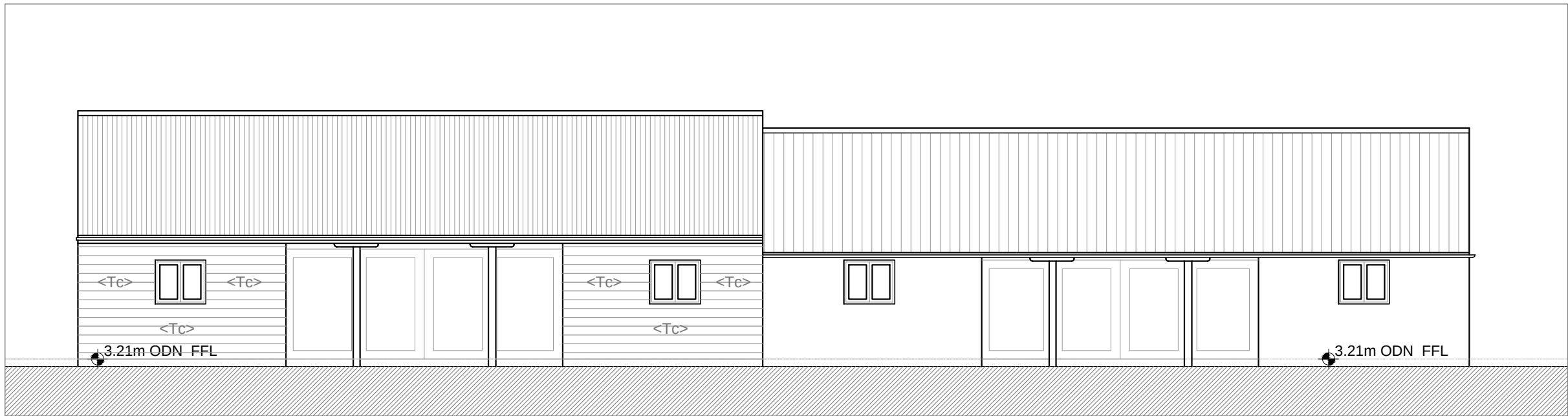
Proposed Ground Floor Plan 1:100



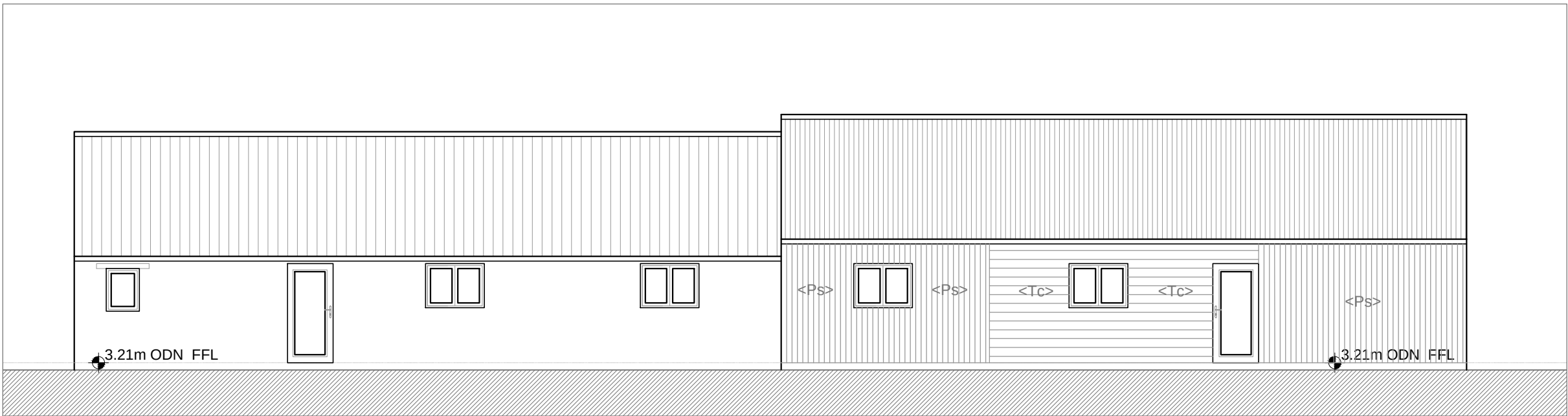
Proposed South East Elevation 1:100



Proposed North West Elevation 1:100



Proposed South West Elevation 1:100



Proposed North East Elevation 1:100

Notes

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Rev	Description	Date	By	Chk
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For Information

Leadenhall Farm, Holbeach
Proposed Conversion of Barns to 4 x Holiday Lets

guyforman
ARCHITECT
Guy Forman BA (Hons) MArch
tel 07958 188257

Barns 2: Existing/ Proposed
Plans & Elevations

Scale: A1 Sheet	Date: 13/01/20	Drawn: GF	Checked: GF
Drawing No.: 335/2-SPE-EP-01	Rev: DRFT		

Plan 5

