FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
MIDDLE MARSH FARMHOUSE, HOLBEACH ST MARKS

FINAL REPORT

ECL0548/ANDREW M WRIGHT LTD

DATE DECEMBER 2021

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1.0 INTRODUCTION

This Flood Risk Assessment has been prepared in accordance with National Planning Policy Framework (NPPF) and supporting planning practice guidance (PPG) on Flood Risk and Coastal Change.

In areas at risk of flooding or for sites of 1 hectare or more, developers are required to undertake a site-specific Flood Risk Assessment to accompany an application for planning permission. This Flood Risk Assessment has been produced on behalf of Mr M Udensi in respect of a development that consists of an annex building at Middle Marsh Farmhouse, Middle Marsh Road, Holbeach St Marks.

A planning application for the proposed development is to be submitted by Andrew M Wright Ltd.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at Middle Marsh Farmhouse, Middle Marsh Road, Holbeach St Marks, Spalding, PE12 8DU. The National Grid Reference of the site is 53668/32930.

The location of the site is shown in Figure 1.

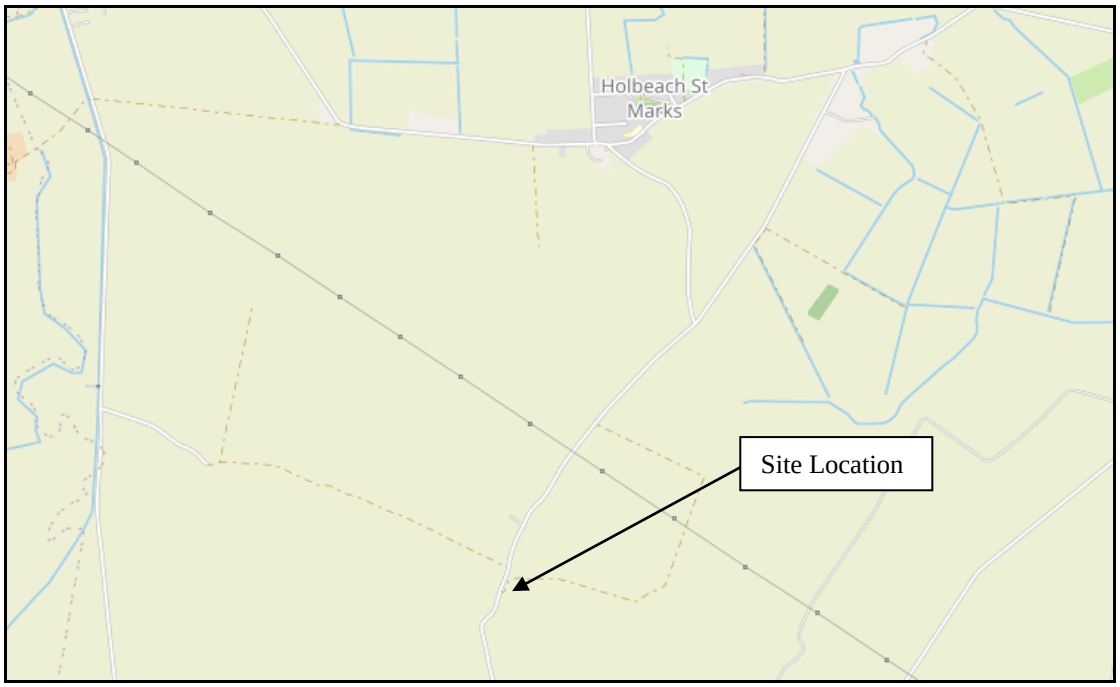


Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is located on the eastern side of Middle Marsh Road. The site consists of the remnants of a former outbuilding. The area of development is approximately 0.99 hectares.

Environment Agency LIDAR shows that site levels in the area of the proposed dwelling are typically +3.8m OD. The surrounding agricultural land is in general lower than +3.5m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. Surface water at the site would naturally drain through soakaway and hence to the IDB drain system. There is a riparian drain on the eastern side of Middle Marsh Road 70m west of the site and an IDB Main Drain 450m east of the site.

The online British Geological Survey maps indicate that the site is likely to be underlain by West Walton Formation Mudstone and Siltstone. The bedrock is shown to be overlain with superficial deposits of clay and silt.

2.3 Proposed Development

The proposed development consists of an annex building. The building will be single storey and ancillary to the main dwelling.

2.4 Local Development Documents

The South East Lincolnshire Local Plan 2011 – 2036, adopted in March 2019, is the Local Plan for the district. Policy 4: Approach to Flood Risk states the requirements for flood risk reduction.

The South East Lincolnshire Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA) was prepared in June 2017.

The Joint Lincolnshire Flood Risk and Drainage Management Strategy has been prepared by Lincolnshire County Council as the Lead Local Flood Authority. The purpose of the Strategy is to increase the safety of people across Lincolnshire by reducing the number of people at risk of flooding, increasing the resilience of local communities, and reducing the impact of flooding

2.5 Flood Zones

The site is located within Flood Zone 3, an area with a high probability of flooding, of the Environment Agency Flood Maps for Planning as shown in Figure 2.

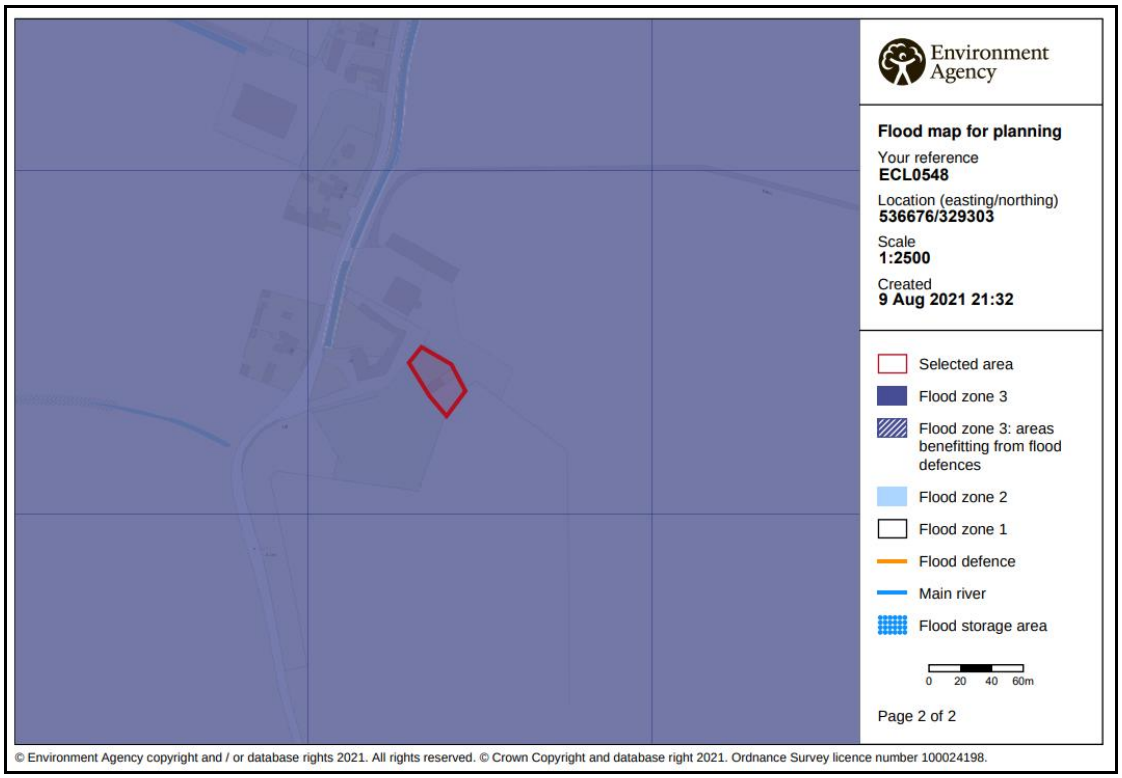


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a low risk of flooding from rivers or the sea (annual probability between 0.1% and 1%);
- the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
- the site is not within an area at risk of reservoir flooding.

Table 1 shows the level of risk at the site within the South East Lincolnshire SFRA.

SFRA Map	Present Day	2116
Residual Flood Hazard Map for the 1% fluvial and 0.5% tidal event	The site is outside the 'Low Hazard' area	The site is in the 'Danger for Some' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal	The site is outside the area at risk of flooding.	The site has a peak flood depth between 0.25 and 0.5m

Table 1 – Flood Risk within SFRA Maps

3.0 FLOOD RISK VULNERABILITY

3.1 The Sequential and Exception Test

The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding.

The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

3.2 Vulnerability Classification

Table 2 of the PPG Flood Risk and Coastal Change categorises different types of uses and development according to their vulnerability to flood risk. The proposed development is covered by the description of buildings used for dwellings and is classified as 'More Vulnerable'.

Table 3 of the PPG Flood Risk and Coastal Change sets out Flood Risk Vulnerability and flood zone 'compatibility'. The site is in Flood Zone 3 and the development is 'More Vulnerable' therefore it is necessary to complete the Exception Test.

PPG Flood Risk and Coastal Change defines that the lifetime of the development in terms of flood risk and coastal change is 100 years.

3.3 Application of the Sequential and Exception Test

The Sequential Test and Exception Test are required to be applied by the Local Planning Authority.

Large parts of the South Holland district between the River Welland and River Nene lie within Flood Zone 3. As such, opportunities to undertake the development at an alternative site with a lower flood risk are limited.

The SFRA states that as it is necessary to use the refined flood risk information (hazard and depth maps) to assist with the application of the sequential test. The refined flood risk information contained within the SFRA demonstrates the site is not at risk during the present day 1% fluvial and 0.5% tidal event. The site therefore has a low probability of flooding and is considered to pass the Sequential Test.

The Exception Test requires consideration of the wider sustainability benefits of a development and that the development would be safe and residual risks managed.

The Local Plan has a target of a net increase of at least 11,681 dwellings in South Holland over the 25-year local plan period. The Plan considers this new housing is required to ensure the sustainability of the Local Plan area. The proposed annex provides a benefit because it will contribute to meeting the demand for housing.

Section 5 of this Flood Risk Assessment describes the flood mitigation measures and the management of the residual risks, demonstrating that this development will be safe and not increase flood risk elsewhere. The development is considered to pass the Exception Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The South Holland IDB district is protected by the Wash tidal defences along the Holbeach Marsh frontage with embankment levels at a minimum of +7.0m OD. The Wash tidal defences are approximately 6km from the site. The River Nene tidal defences are approximately 13km to the east of the site. The River Welland tidal defences are approximately 5.0 km to the north west of the site. All three defences are the responsibility of the Environment Agency.

There is a long-term strategy for the maintenance of the Environment Agency defences which is reviewed and updated periodically.

There is an extensive local drainage network managed by South Holland IDB. There is an IDB High Priority Watercourse 450m east of the site. The site and the surrounding land are within the Lawyers catchment and drains in a northerly direction to discharge to the Wash at the Lawyers Pumping Station.

During the operation and maintenance of its pumping stations, associated structures, and channel systems, the IDB seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Boards assets are commensurate with the standard of protection that is sought.

Current maintenance standards of the South Holland Internal Drainage Board and the Environment Agency are generally good.

4.2 Sources of Flooding

The potential sources of flooding that have been identified during this assessment are:

- local blockages to the IDB drainage system;
- an event in the local drainage network that exceeds the standard of protection;
- failure of Lawyers Pumping Station; and
- overtopping and breaching of the Wash, River Nene, or River Welland tidal defences.

4.3 Probability of Flooding

The probability of flooding associated with blockages in the South Holland IDB drainage system is low due to the maintenance standards achieved and managed by the IDB.

The standard of drainage provided by South Holland IDB is assessed at 2% annual probability (1 in 50 chance each year), compatible with the Department of the

Environment, Food and Rural Affairs (DEFRA) target level of service for rural drainage and flood defence works. The risk associated with flooding due to events greater than 2% annual probability (1 in 50 chance each year) is lowered due to the South Holland IDB high priority watercourses incorporating a freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

The site is within an area benefitting from defences. The flood embankments to the Wash and the River Nene and River Welland tidal defences provide protection during a 0.5% annual probability (1 in 200 chance each year) event. The flood risk from the Wash is lowered further by second line defences and various informal banks constructed during the reclamation of Holbeach Marsh.

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded. Previous historic rainfall events of 1968 and 1978, estimated to be greater than 1% annual probability (1 in 100 chance each year), caused no flooding to any residential properties.

4.5 Climate Change

Climate change is likely to impact the site through increased rainfall intensity and duration affecting the local drainage network and increased tide levels.

The tidal flood level during the 0.5% annual probability (1 in 200 chance each year) event inclusive of climate change to 2115 is estimated to be 7.2m AOD. The minimum defence level of the Wash, River Nene, and River Welland embankments is 7.0m AOD. There is a low risk during such an event for wave and wind action to cause overtopping and/or breaching of the tidal defences. However, the second line defences with embankment levels of 6.0m AOD would further reduce the probability of flood water reaching the development site. This level of risk is confirmed by the SFRA.

4.6 Residual Risk

The South East Lincolnshire SFRA includes maps demonstrating the impact of climate change in 2116. The Residual Peak Depth maps within the SFRA indicate the maximum flood depths associated with a breach of the tidal defences. These show that when the climate change allowances are applied to the combination of a 1% annual probability (1 in 100 chance each year) fluvial event and a 0.5% annual probability (1 in 100 chance each year) tidal event the peak depth at the site would be between 0.25m and 0.5m. An extract from this map is shown in Figure 3.

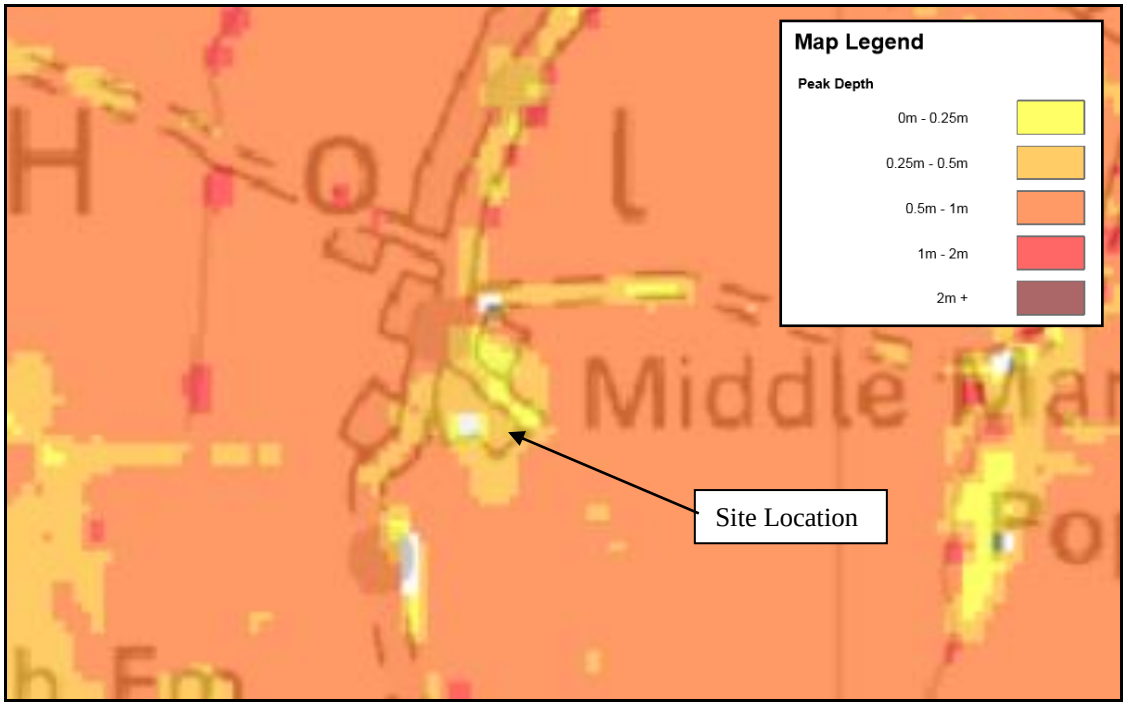


Figure 3 – SFRA 2116 Residual Peak Depth Map

Based upon LiDAR ground levels and extent and depths of flooding in Figure 3 the flood level is estimated to be +4.2m OD which is a depth of flooding of 0.4m.

The proposed development is single storey and therefore any mitigation measures will need to consider the 0.1% annual probability (1in 1000 chance each year) event in 2115. The South East Lincolnshire SFRA includes 0.1% annual probability (1 in 1000 chance each year) maps for specific locations, but these do not cover the site. Through a comparison of the flood depths in the areas covered by the maps during the 1% and 0.1% annual probability events for 2115 it can be estimated that flood depths are 0.1m higher for the more extreme event.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Lawyers Pumping Station could lead to an increased level of risk at the site.

The probability of the site flooding from any Environment Agency system is less than 0.5% annual probability (1 in 200 chance each year) because of the standards of the existing flood defences. Over time there will be a gradual increase in risk to the site due to climate change. During the design life of the development, it is not anticipated that the site would flood from overtopping of the defences.

The SFRA considers the residual risk associated with a breach in the defences in 2116. The maps show that the peak flood depth at the site is between 0.25m and 0.5m. The breach depth during the 0.1% (1 in 1000 chance each year) event in 2115 is estimated to be 0.5m.

Any increase in impermeable area associated with the development will be minimal so there is no potential that flood risk will be increased elsewhere due to surface water.

5.2 Mitigation Measures

Based upon the information available during the preparation of this flood risk assessment, to mitigate against the risk of flooding it is recommended that the floor level of the annex is 0.5m above surrounding ground levels. It is recommended that there is 0.3m of flood resilient construction above finished floor level.

The proposed development is an annex to a two-storey dwelling and therefore in the unlikely event of a breach safe refuge is available.

The developer should ensure that the eventual occupier of the annex is sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding. The occupier of the annex should register with the Floodline Direct Warnings Service to receive any future flood warnings.

During an exceedance event it is anticipated that sufficient time would be available to take precautionary actions to limit the potential impact of flooding.

Should there be a failure of Lawyers Pumping Station and conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take

emergency action to maintain the drainage level of service by using temporary pumping equipment.

It is recommended that surface water run-off is managed so that stormwater from the development will not affect any adjoining properties or increase the flood risk elsewhere.

6.0 CONCLUSIONS

As a result of the assessment, the following conclusions have been reached.

- The proposed development consists of an annex building at Middle Marsh Farmhouse, Middle Marsh Road, Holbeach St Marks.

- The proposed development is in Flood Zone 3. The development is protected by defences during the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 200 chance each year) tidal event including an allowance for climate change. During a breach, the flood depths at the site could be up to 0.5m.

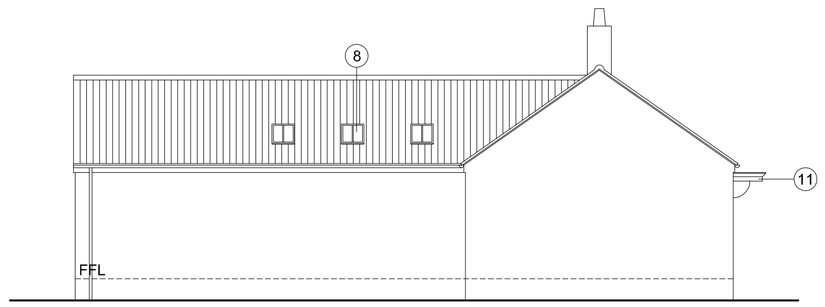
- The site is located within an Internal Drainage Board catchment with a minimum standard of drainage of 2% annual probability (1 in 50 chance each year) which accords with DEFRA guidelines for rural development. The risk of flooding is lowered further due to the South Holland IDB high priority watercourses incorporating a significant freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

- To mitigate the risk of a breach in the tidal defences it is recommended that the finished floor level is 0.5m above surrounding ground levels and there is 0.3m of flood resilient construction above finished floor level.

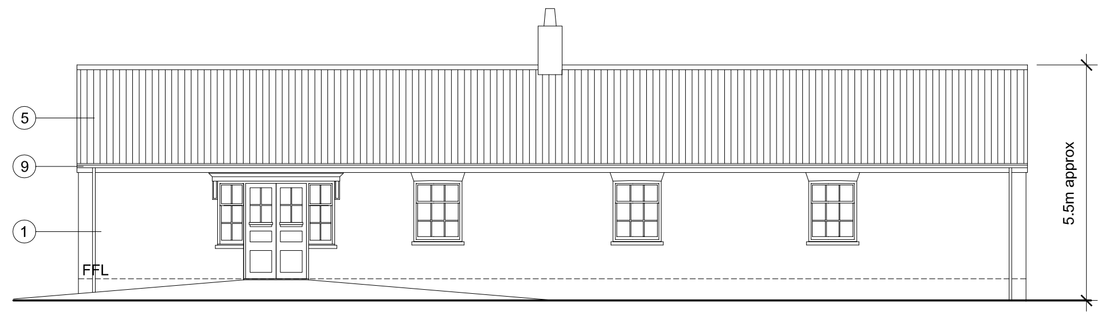
- The development passes the Sequential Test and Exception Test and is therefore suitable for the proposed location.

ATTACHMENT 1

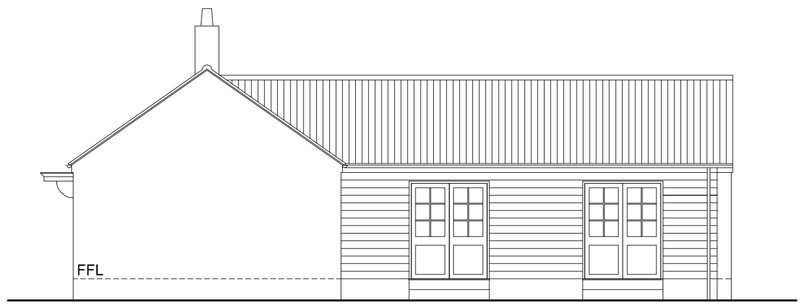
PROPOSED PLANS, ELEVATIONS & SECTIONS
(Dwg 112002 PD02 D1)



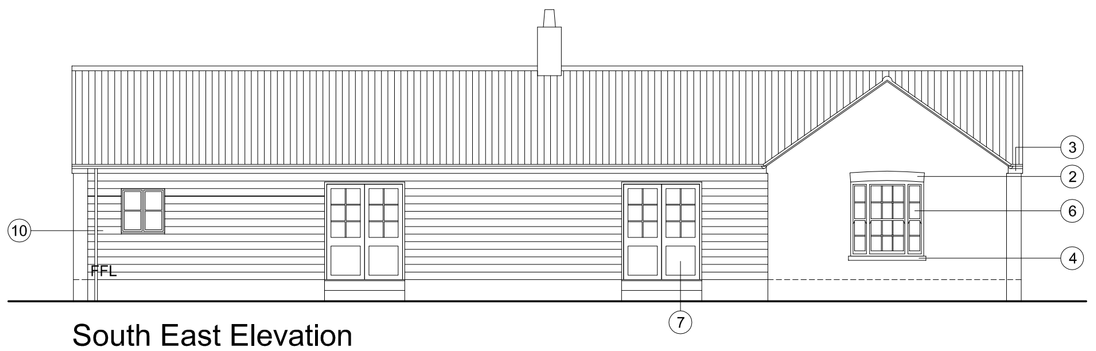
North East Elevation (1:100)



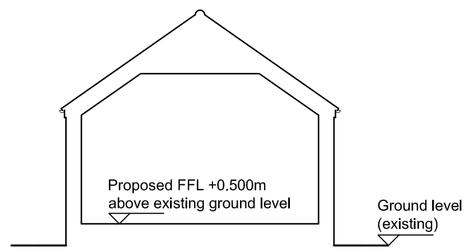
North West Elevation



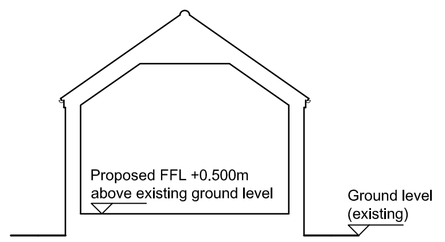
South West Elevation



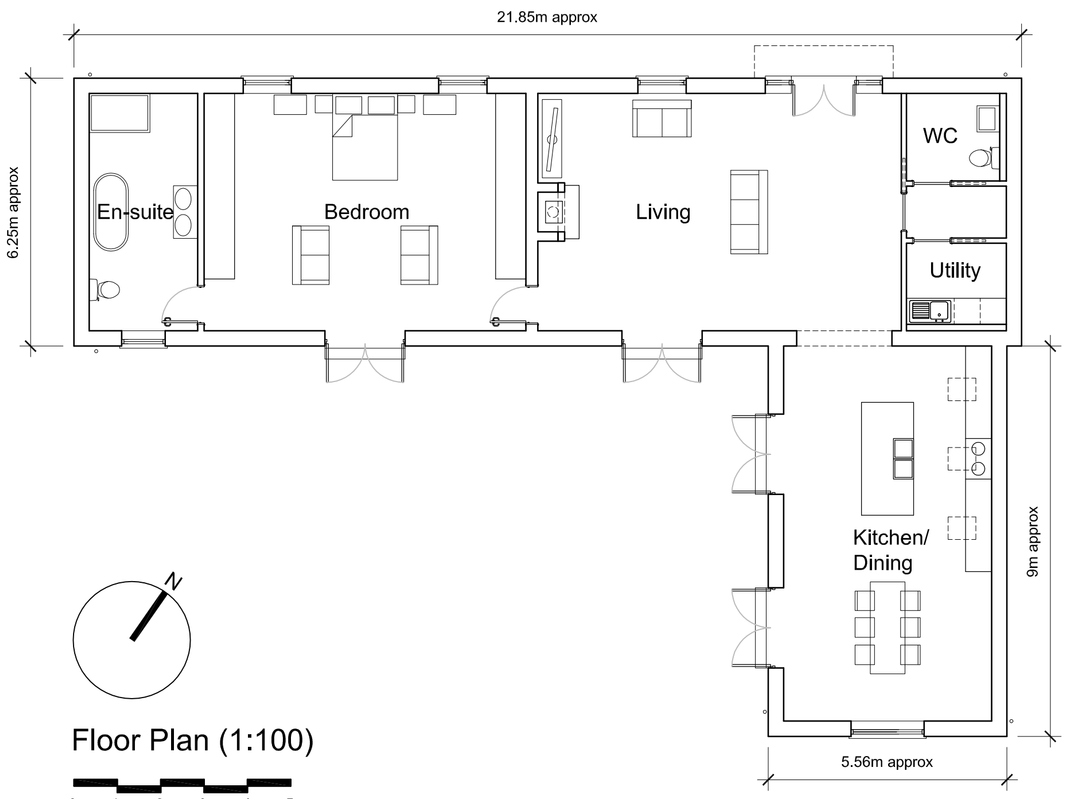
South East Elevation



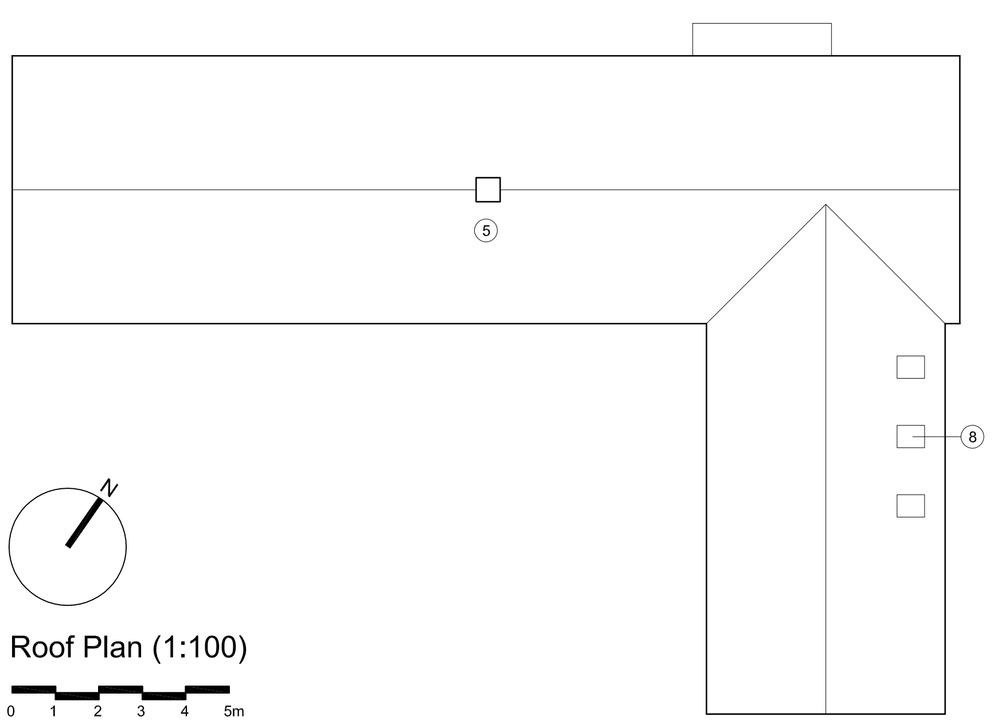
Section thro Living & Bedroom (1:100)



Section thro Kitchen/Dining



Floor Plan (1:100)



Roof Plan (1:100)



Site Plan (1:500)

All dimensions to be verified on site by Main Contractor before the start of any shop drawings or work whatsoever either on their own behalf or that of sub-contractors.

Report any discrepancies to the Contract Administrator at once.

This drawing is to be read with all relevant Architect's and Engineer's drawings and other relevant information.

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LEGEND: DO NOT SCALE

Legend to materials:-

1 = Salvaged / reclaimed brickwork (red)

2 = Brick arched heads (red)

3 = Projecting brick detail (red)

4 = Reconstituted stone cills (buff)

5 = Pantiles (orange)

6 = Painted timber windows (grey)

7 = Half glazed painted timber doors (grey)

8 = Conservation metal rooflights (black)

9 = Metal gutter on rise and fall brackets & downpipes (black)

10 = Timber (or timber effect) boarding (black)

11 = Painted timber porch (grey)

Revision:	Date:	Description:	Drw:	Chk:
D1	26.11.21	Draft Issue -	AMW	AMW

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Project:
Middle Marsh Farmhouse
Middle Marsh Road
Holbeach St Marks
Spalding

Drawing Title:
Proposed Plans, Elevations & Sections

Client:
Mr M M Udensi

Drawn:	Checked:	Date:	Scale:	Paper Size:
AMW	AMW	04.05.21	As shown	A1

Job No.:	Dwg No.:	Stage:	Revision:
112002	PD02	Planning	D1