# FLOOD RISK ASSESSMENT
# FOR COMMERCIAL DEVELOPMENT AT
# ROMAN BANK, HOLBEACH

**FINAL REPORT**

**ECL0415-2/PETER HUMPHREY ASSOCIATES**

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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 DGM Growers in respect of a commercial development that consists of one pallet store at Roman Bank, Holbeach.

A planning application for the proposed development is to be submitted by Peter Humphrey Associates.

# 2.0 SITE LOCATION AND DESCRIPTION

## 2.1 Site Location

The site is at DGM Growers, Roman Bank, Holbeach Bank, Lincolnshire, PE12 8BB. The National Grid Reference of the site is 53466/32705.

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 land to the south of Roman Bank and to the north of Washway Road. The site is a horticultural nursery and consists of existing buildings, green houses, and the surrounding land. The area of development is approximately 4 hectares.

Environment Agency LIDAR show that the site is flat with a typical ground level of +3.4m OD. The access along the western boundary of the site is typically at a level of +3.6m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. Surface water at the site naturally drains through soakaway and hence to the IDB drain system. The nearest IDB Watercourse is 200m 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 a new pallet store measuring 30m x 15m. A Site Plan is provided in Attachment 1.

## 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

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

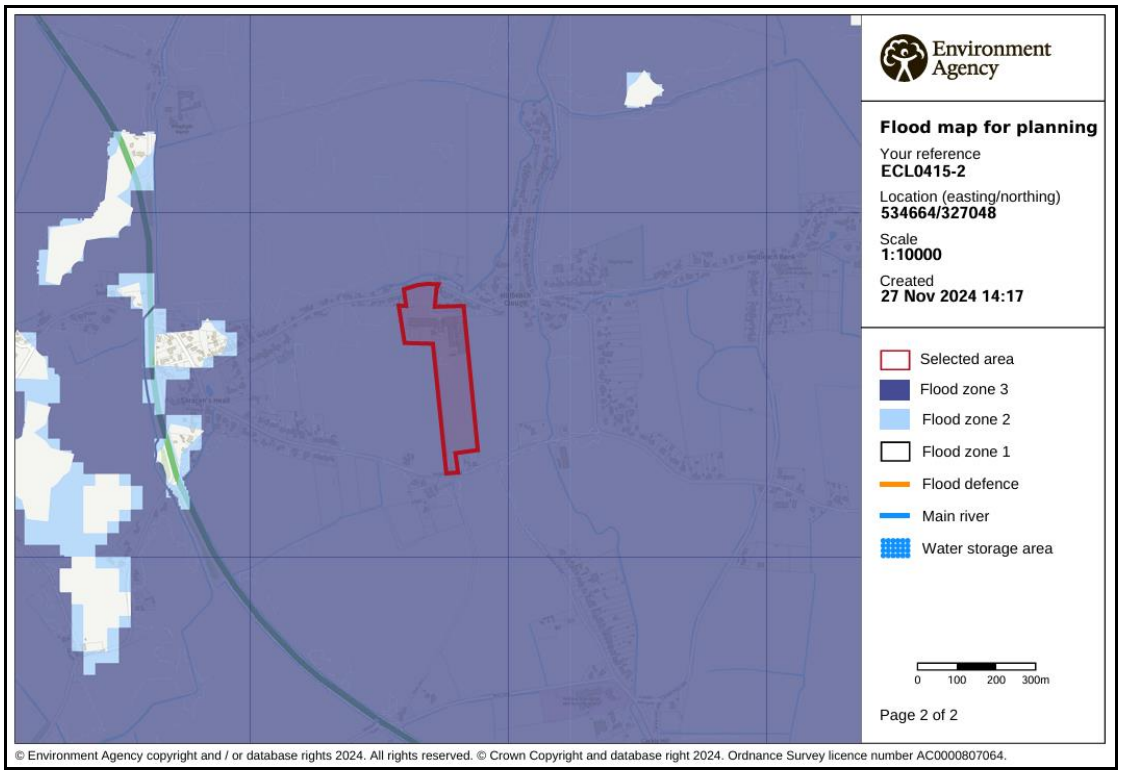



Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site is within areas with 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 event | The site is outside the area at risk of flooding. | The peak flood depth at the site is between 0.25m 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 develop is covered by the description of buildings used for agriculture and is classified as 'Less 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 'Less Vulnerable' therefore it is not 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 Test

It is for the Local Planning Authority, using the evidence provided and taking advice from the Environment Agency as appropriate, to consider whether an application passes the Sequential Test.

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 actual risk of flooding at the site is low and the site is considered to pass the Sequential 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 9km from the site.

The River Welland tidal defences are approximately 5.9km to the north west of the site. The tidal defences between Spalding and Fossdyke also have minimum embankment levels of +7.0m OD.

Both 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 200m east of the site. The site and the surrounding land are within the Holbeach River catchment and drains in a northerly direction to discharge to the tidal River Welland at the Holbeach River Outfall Sluice.

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

A summary of the sources of flooding is provided in Table 2.

| Source of Flooding | Level of Risk |
|---|---|
| Drainage Network Flooding | The risk is assessed in Section 4.3. |
| Surface Water Flooding | Based upon the EA maps the risk is very low. |
| Fluvial Flooding | The risk is not at risk of fluvial flooding. |
| Tidal Flooding | The risk is assessed in Section 4.3, 4.5 and 4.6. |
| Reservoir Flooding | Based upon the EA maps the site is not at risk of flooding from reservoirs. |
| Groundwater Flooding | There is no evidence to suggest the site is at risk of groundwater flooding. |

Table 2 – Sources of Flooding

## 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.

Through the operation and maintenance of the pumping stations and the channel system the Board seek to maintain a general standard capable to providing flood protection to agricultural land and developed areas of 1 in 20 years and 1 in 100 years, respectively. The risk associated with flood events that exceed the standard of protection provided is lowered due to the South Holland IDB main drains incorporating freeboard. This freeboard provides storage during the exceedance events.

The site is within an area benefitting from defences. The flood embankments to the Wash and the 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 flood level in the River Welland at Fossdyke during the 0.5% annual probability (1 in 200 chance each year) event inclusive of climate change to 2069 is estimated to be 6.41m AOD. The minimum defence level of the River Welland embankments is 7.0m AOD.

In summary the site is not at risk for the design life of the development (i.e. 100 years).

## 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 200 chance each year) tidal event the peak flood depth at the site is between 0.25m and 0.5m.

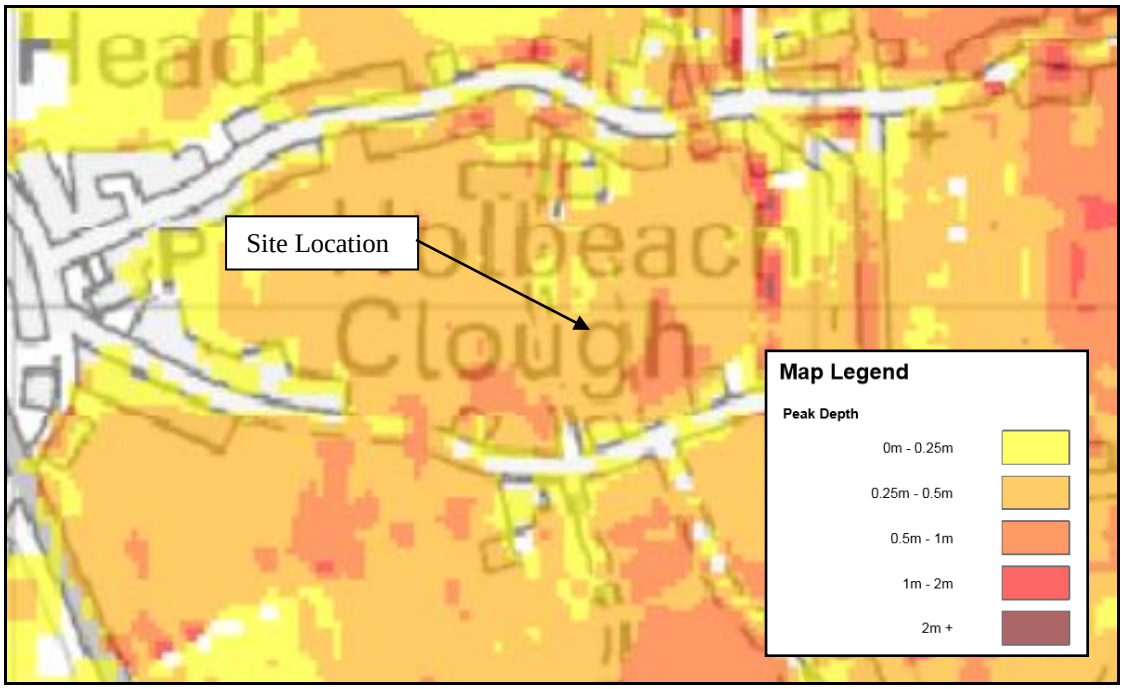



Figure 3 – SFRA 2115 Residual Peak Depth Map during the 1% fluvial and 0.5% tidal Annual Probability Event

# 5.0 FLOOD RISK MITIGATION

## 5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Holbeach River Outfall Sluice 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. The maps show that the site is at risk of flooding up to a depth of 0.5m during the 0.5% annual probability (1 in 200 chance each year) tidal event.

The proposed arrangement increases the impermeable area and therefore there will be an increased volume of surface water that has the potential to increase flood risk.

## 5.2 Mitigation Measures

The NPPF Planning Practice Guidance (PPG) on Flood Risk and Coastal Change provides direction regarding Making Development Safe from Flood Risk. Paragraphs 059 and 060 advise on flood resistance and flood resilience. It states that the first preference should be to avoid flood risk by raising the development above the flood level. For this development this is not practical.

The PPG states that resistance and resilience measures may be suitable in some circumstances. One example given when it is suitable is as a measure to manage residual flood risk. The mitigation measures required at this site are to manage the residual risk from a breach in the defences therefore flood resilience is appropriate.

Based upon the information available during the preparation of this flood risk assessment, to mitigate against the risk of a breach, the following flood resilience measures are recommended:

- there is a water entry strategy allowing flood water to enter the building and drain freely from it;
- the main electrical supply and switchboard are elevated above the flood level;
- the user of the site should register to receive flood warnings from the Environment Agency to reduce the vulnerability of people at the site; and
- the user of the site should identify the actions to be undertaken in the event of receiving a flood warning.

## 5.3 Sustainable Drainage

The proposed pallet store is to be constructed on an undeveloped area of the site. The existing site drains through infiltration and potentially by overland flows.

The building to the north of the proposed pallet store discharges to a drainage ditch. It is proposed that the runoff from the pallet store is connected to the existing building rainwater drainage.

# 6.0 CONCLUSIONS

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

- The proposed development consists of a pallet store at Roman Bank, Holbeach.

- The site is located within an Internal Drainage Board catchment and through the operation and maintenance of the pumping stations and the channel system the Board seek to maintain a general standard capable to providing flood protection to agricultural land and developed areas of 1 in 20 and 1 in 100 years, respectively.

- The proposed development is in Flood Zone 3. The site is protected during the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 200) tidal event including climate change by the Wash tidal defences and River Welland tidal defences.

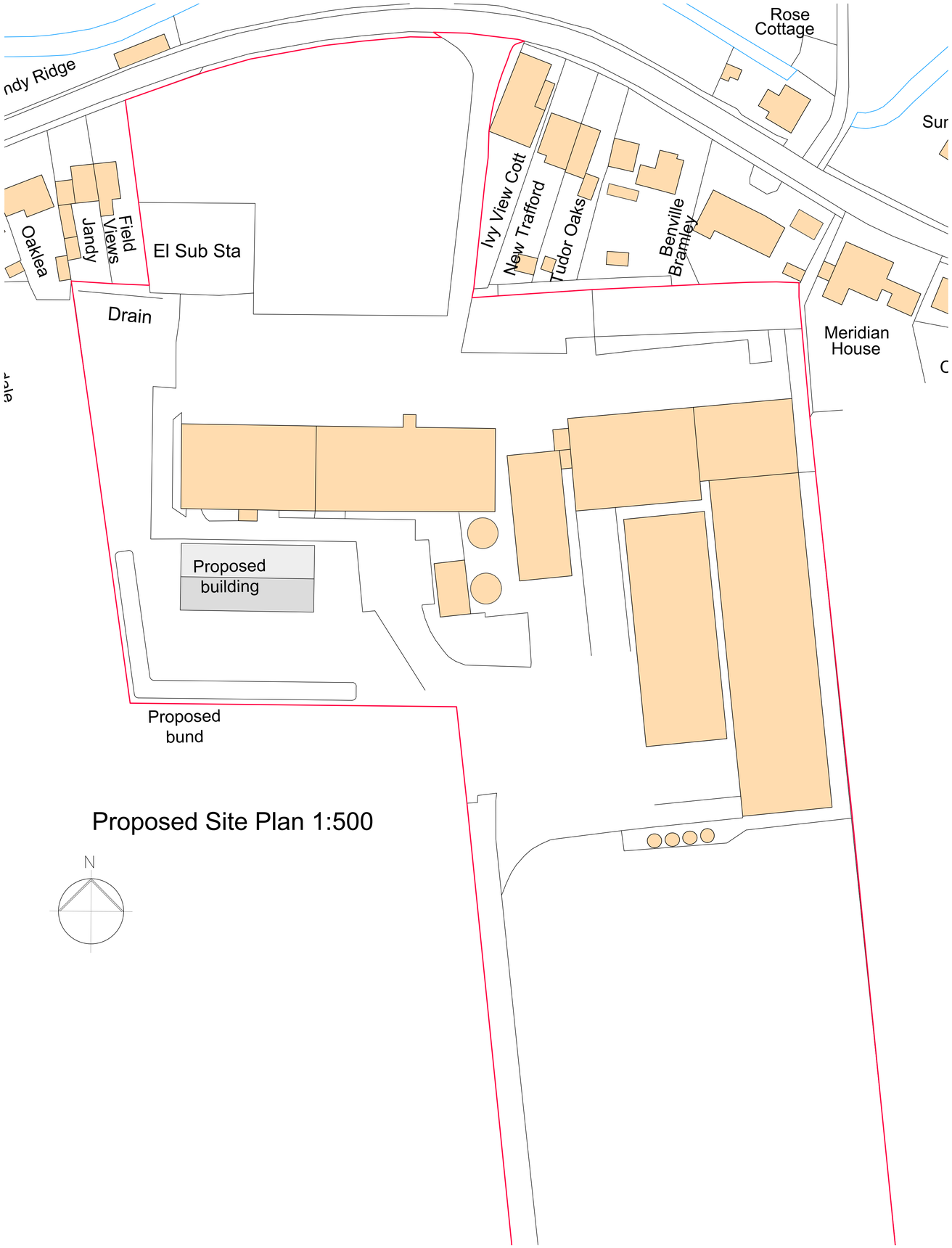
- There is a residual risk associated with a breach of the defences with an estimated flood depth of up to 0.5m.

- It is recommended that flood resilience measures are adopted to manage the risk of a breach. These include a water entry strategy, elevating services above the flood level, and reducing the vulnerability of people.

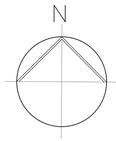
- The development passes the Sequential Test and is therefore suitable for the proposed location.

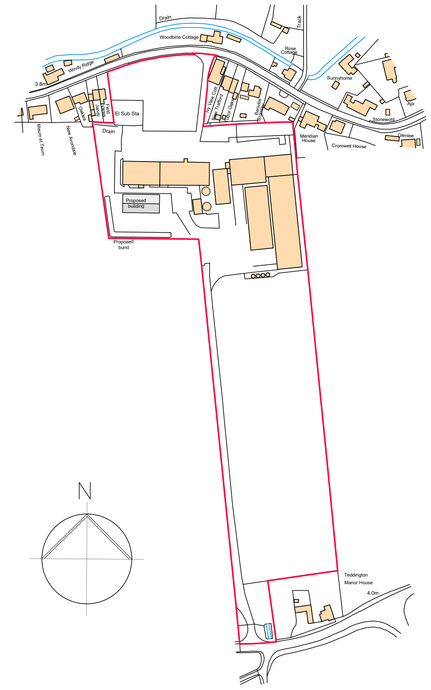
# ATTACHMENT 1

# SITE PLAN AND LOCATION PLAN
# (Dwg 7090-PL01)




Proposed Site Plan 1:500




Location Plan 1:2500




Proposed Shed

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REVISIONS

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