

**FLOOD RISK ASSESSMENT
FOR INDUSTRIAL DEVELOPMENT AT
SPALDING DROVE, SPALDING**

FINAL REPORT

ECL1290-1a

DATE JANUARY 2025

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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 J Johnson in respect of a proposed development that consists of two industrial units on Spalding Drove, Spalding.

A planning application for the proposed development is to be submitted.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at Spalding Drove, Spalding, PE12 6BJ. The National Grid Reference of the site is 52519/32079.

The location of the site is shown in Figure 1.



Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is on the western side of Spalding Drove. The site is an area of agricultural land. There is an industrial business to the north of the site. The area of development is approximately 0.18 hectares.

Environment Agency LIDAR information shows that the site is between +1.9m OD and +2.0m OD. The carriageway level of Spalding Drove alongside the site is typically +2.7m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. Surface water at the site drains through a local network and hence to the IDB drain system. There is an IDB High Priority Watercourse, Exeter Drain, on the western side of Spalding Drove close to the eastern boundary of the site.

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

2.3 Proposed Development

The proposed development consists of two industrial units. A new access will be created including a bridge over Exeter Drain. Details of the proposed development are 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.

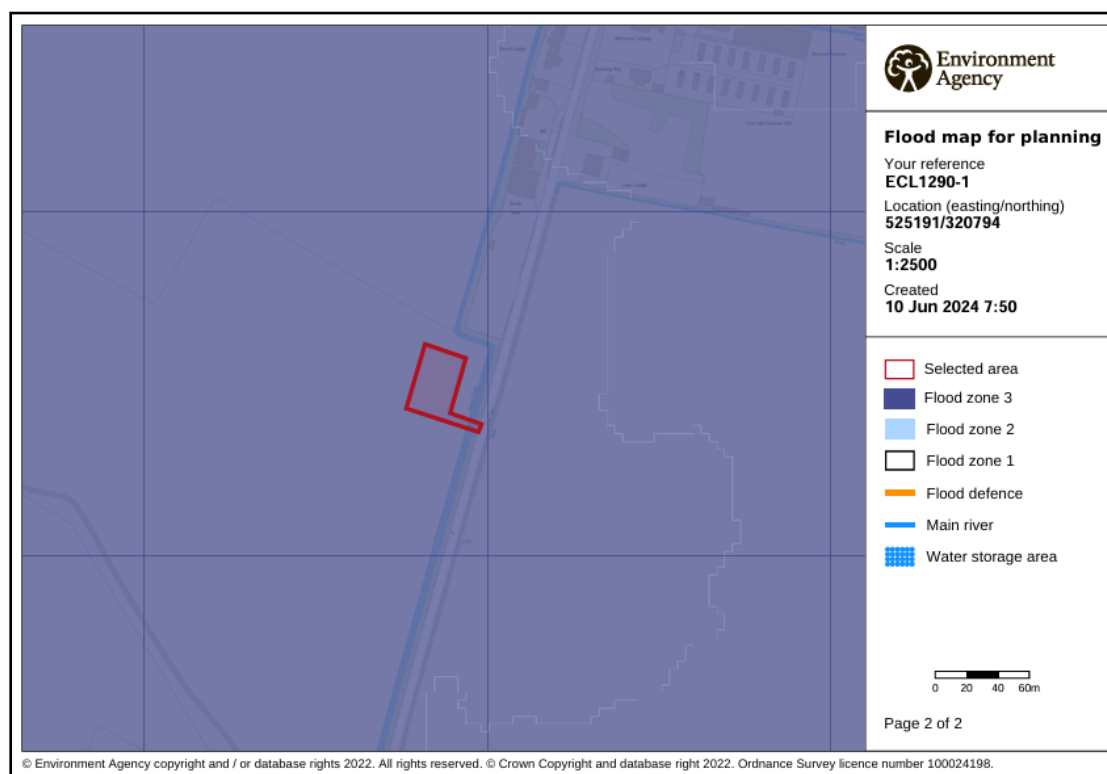


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site 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 at risk of reservoir flooding when river levels are normal.

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 in the 'Danger for Most' area	The site is in the 'Danger for Most' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal event	The peak flood depth at the site is between 0.5m and 1.0m	The peak flood depth at the site is between 1.0m and 2.0m

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 general industry 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. In this context it is noted that SE Lincolnshire Local Plan allocations are within flood risk areas due to the lack of availability of sites within areas of lower flood risk.

The River Welland has defences that provide protection during the 1% annual probability (1 in 100 chance each year) fluvial event including climate change. The site therefore has a low probability of flooding and is considered to pass the Sequential Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The site is 1.0km east of the River Welland. Cowbit Wash is the floodplain to the River Welland and the site is protected from the River Welland by the Cowbit Wash Barrier Bank.

The site is 750m south of the Coronation Channel, a bypass channel of the River Welland. The embankments of the Coronation Channel were constructed in the 1950's to convey river flows around Spalding. The Coronation Channel together with the Crowland and Cowbit Washes offer flood reduction to Spalding and the surrounding district. The Cowbit Wash Barrier Bank and the Coronation Channel 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, Exeter Drain, on the western side of Spalding Drove. The site and surrounding land drain into the Wisemans catchment and drain by gravity to Wisemans Pumping Station. The pumped water enters the South Holland Main Drain that discharges to the tidal River Nene at the Sutton Bridge 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
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Drainage Network Flooding	This risk is assessed in Section 4.3.
Surface Water Flooding	Based upon the Environment Agency maps the site is not at risk of surface water flooding.
Fluvial Flooding	The risk of fluvial flooding is assessed in Section 4.3 and 4.5
Tidal Flooding	The site is not at risk of tidal flooding.
Reservoir Flooding	The residual risk of a breach of the River Welland is assessed in Section 4.6.
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. Failure of Wisemans Pumping Station could increase the level of risk in the IDB Catchment.

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 Coronation Channel earth embankment has a minimum crest level of +6.0m OD. The 1% annual probability (1 in 100 chance each year) peak flood level inclusive of climate change during the next 100 years in the River Welland is +5.45m OD. The Coronation Channel embankment provides a standard of protection of 1% annual probability (1 in 100 chance each year) with a minimum 0.55m freeboard.

The Cowbit Wash Barrier Bank is at a level of +5.90m OD and therefore provides 0.45m of freeboard above the flood level during the 1% annual probability (1 in 100 chance each year) event with climate change. The Cowbit Wash Barrier Bank falls within the Reservoirs Act 1975 legislation. As such it is inspected annually by a Supervising Engineer who will assess its structural integrity to provide protection to people and property.

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded.

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 flood levels in the River Welland.

The River Welland defences have been designed to include an allowance for climate change.

In summary the existing systems and defences are appropriate for the design life of the development (i.e. 100 years).

4.6 Residual Risk

There is a residual risk of flooding at the site should a breach occur. The South East Lincolnshire SFRA includes maps demonstrating the impact of a breach in 2116. 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 depth is between 1.0m and 2.0m. An extract from this map is shown in Figure 3 below.

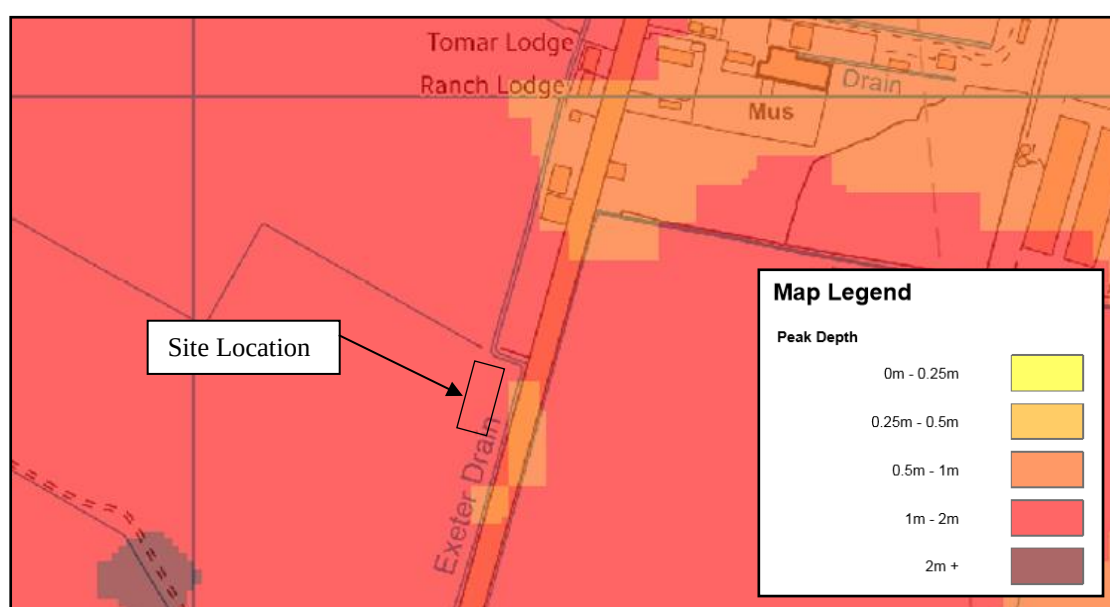


Figure 3 – SFRA 2116 Residual Peak Depth Map

Based upon LiDAR and the flood extents shown in Figure 3 the flood depth at the site is estimated to be up to 1.4m.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Wisemans 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 1% annual probability (1 in 100 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 maximum flood depth during the 0.5% annual probability (1 in 200 chance each year) event in 2115 is estimated to be 1.4m.

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.

These risks will be addressed through the mitigation measures set out below.

5.2 Mitigation Measures

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 units and drain freely from it;
- the main electrical supply and switchboard are elevated above the estimated level of flood water; and
- the user of the site should identify the actions to be undertaken in the event of receiving a flood warning.

The developer should ensure that the users of the units are sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency operates a flood warning system for properties at risk of flooding to enable householders to protect life or take actions to manage the effect of flooding on property. Floodline Warnings Service is a national system run by the Environment Agency for broadcasting flooding warnings. The users of the units should register to receive flood warnings.

Should there be a failure of Wisemans 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.

Surface water run-off will be managed so that stormwater from the development will not affect any adjoining properties or increase the flood risk elsewhere.

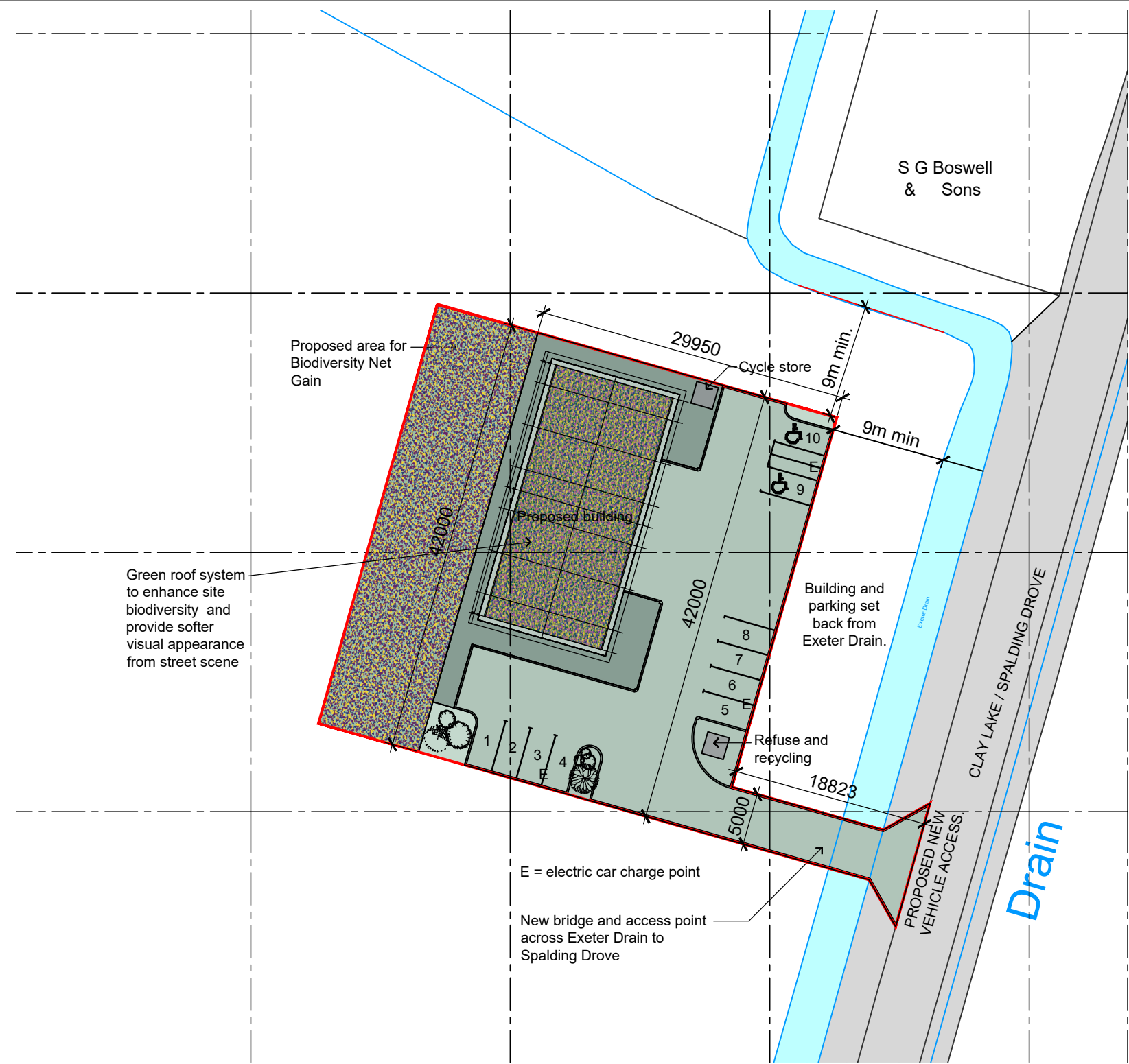
6.0 CONCLUSION

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

- The proposed development consists of two industrial units at Spalding Drove, Spalding.
- 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 benefits from defences on the River Welland and Coronation Channel that provide protection during the 1% annual probability (1 in 100 chance each year) fluvial event including an allowance for climate change.
- There is a residual risk associated with a breach of the defences. During the design life of the development, including an allowance for climate change, the peak flood depth at the site is estimated to be 1.4m.
- 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 LOCATIONS AND BLOCK PLANS (DWG A1726-01 P1)

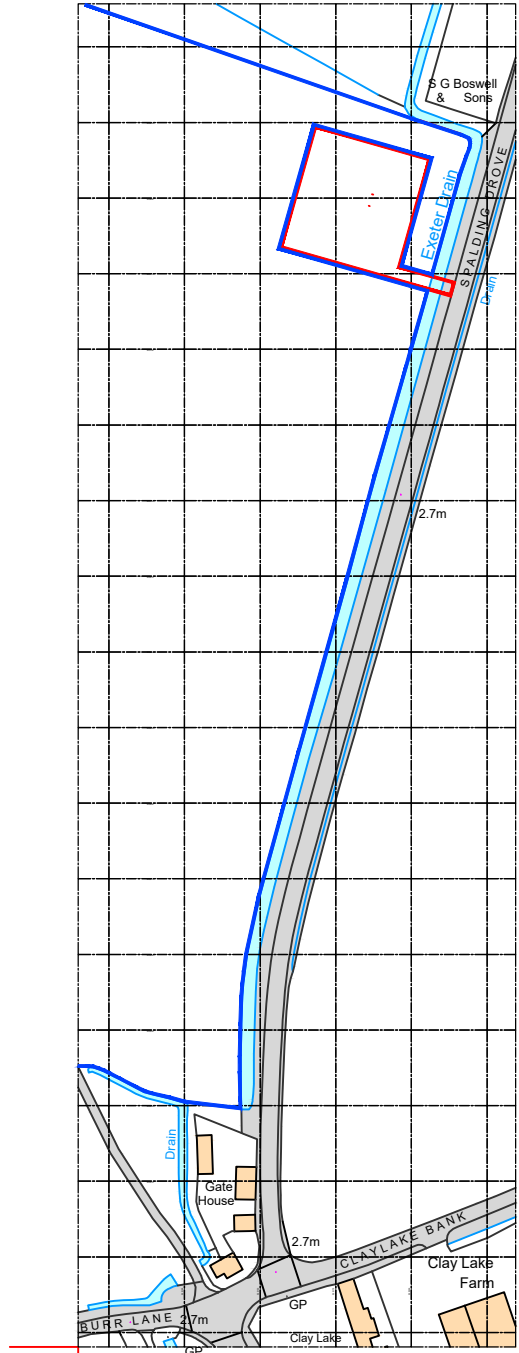
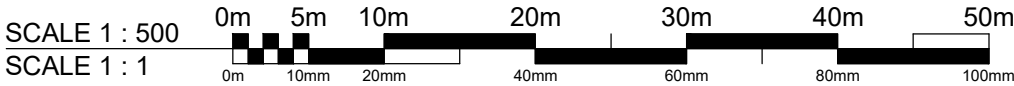


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Site Block Plan - as proposed

Scale 1:500 @ A3

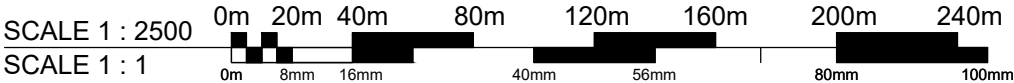
Site of proposal outlined in red



Site Location Plan

Scale 1:2500 @ A3

Site of proposal outlined in red.



Client:

Mr James Johnson

Project:

**Proposed industrial development
Spalding Drive, Clay Lake, Spalding**

Date: July 2024

Scale: As shown @ A3

Drawn by: AJO

Checked by: CLS

Drawing Number:

A1726-01

Rev:

P1

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