FLOOD RISK ASSESSMENT
FOR COMMERCIAL DEVELOPMENT AT
ELSOMS WAY, PINCHBECK

FINAL REPORT

ECL0866a/SHIELDS WILSON

DATE FEBRUARY 2023

ELLINGHAM CONSULTING LTD
Email: tim@ellinghamconsulting.co.uk

CONTENTS

1.0 INTRODUCTION

2.0 SITE LOCATION AND DESCRIPTION
- 2.1 Site Location
- 2.2 Existing Site
- 2.3 Proposed Development
- 2.4 Local Development Documents
- 2.5 Available Flood Risk Information

3.0 FLOOD RISK VULNERABILITY
- 3.1 The Sequential and Exception Test
- 3.2 Vulnerability Classification
- 3.3 Application of the Sequential Test

4.0 SITE SPECIFIC FLOOD RISK
- 4.1 Local Flood Assets
- 4.2 Sources of Flooding
- 4.3 Probability of Flooding
- 4.4 Historic Flooding
- 4.5 Climate Change
- 4.6 Residual Risk

5.0 FLOOD RISK MITIGATION
- 5.1 Summary of Risks
- 5.2 Mitigation Measures

6.0 CONCLUSIONS

ATTACHMENT 1 – Topographic Survey (Dwg SE1202-1)

ATTACHMENT 2 – Plans, Sections and Location Plan (Dwg SE-1856 PP1000A)

DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment in support of a planning application for proposed commercial development at Elsoms Way, Pinchbeck. "Ellingham Consulting Ltd" accepts no responsibility or liability whatsoever for any use made of this document other than by the client "Shields Wilson" for the purposes it was originally commissioned and prepared. All comments and opinions made are based upon information available to "Ellingham Consulting Ltd" during the necessary investigative process, and the conclusions and recommendations, could therefore, differ in the event of material subsequently being found erroneous, incomplete, or misleading. "Ellingham Consulting Ltd" therefore, accepts no liability should this prove to be the case.

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 Shields Wilson in respect of a development that consists of one warehouse with office accommodation at Elsoms Way, Pinchbeck.

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 Elsoms Way, Pinchbeck, Spalding, PE11 3BG. The National Grid Reference of the site is 52595/32565.

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 eastern side of Elsom Way. The site is an area of agricultural land. The A16 is to the east of the site. The area of development is approximately 1.3 hectares.

A topographic survey of the site has been undertaken and is provided in Attachment 1. The survey shows that the site is flat with ground levels typically between +2.9m OD and +3.3m OD.

The site is in the Welland and Deepings Internal Drainage Board (IDB) District. Surface water at the site would discharge to the local drainage network and hence to the IDB drain system. There is a riparian drain on the eastern boundary of the site and Blue Gowt Drain, and IDB Main Drain, forms the northern 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 a warehouse that includes office accommodation. The warehouse will be surrounded by a yard and car parking. Details of the proposed warehouse are provided in Attachment 2.

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 Available Flood Risk Information

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.

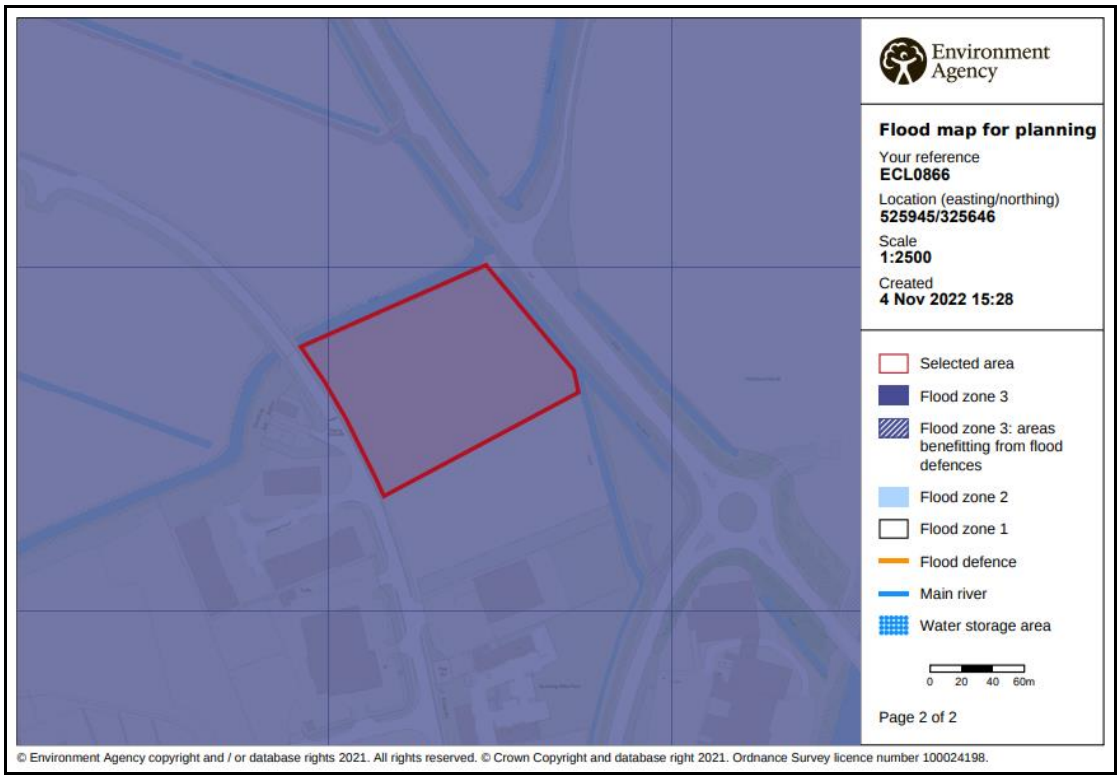


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a very low risk of flooding from rivers or the sea (annual probability less than 0.1%);
- 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	Part of the site is in the 'Danger for Some' area	Part of the site is in the 'Danger for Most' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal	The peak flood depth is between 0.25m and 0.5m.	The peak flood depth is between 0.5m and 1.0m.

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 close to the River Welland lie within Flood Zone 3. As such opportunities to undertake the development at an alternative site with a lower flood risk are limited. At this location it is not possible to position the development on higher ground within the proposed site.

The River Welland has defences that provide protection during the 0.5% annual probability (1 in 200 chance each year) event. Considering the change in use from agricultural to industrial together with the standard of protection provided by the Environment Agency defences the site is considered to pass the Sequential Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The site is approximately 500mm west of the River Welland downstream of Spalding. The River Welland tidal defences, which are downstream of the confluence of the Coronation Channel and River Welland, provide protection to Pinchbeck. The tidal 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 Welland and Deepings IDB. There is an IDB maintained watercourses, the Blue Gowt Drain on the northern boundary of the site. The site and the surrounding land are within the Pinchbeck catchment and drain in a north westerly direction to Pinchbeck Marsh Pumping Station. Pinchbeck Marsh Pumping Station discharges to Vernatts Drain which flows into the River Welland at Surfleet.

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 Welland and Deepings IDB 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 Welland and Deepings IDB main drain system;
- an event in the local drainage network greater that exceeds the standard of protection;
- failure of Pinchbeck Marsh Pumping Station; and
- overtopping and / or breaching of the River Welland tidal defences.

Based upon the Environment Agency Long Term Flood Risk Maps the area of the site where the warehouse will be located is not at risk of surface water flooding. As such surface water flooding has not been considered further in this assessment.

4.3 Probability of Flooding

The probability of flooding associated with blockages in the Welland and Deepings 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 Welland & Deeping IDB main drains incorporating freeboard. This freeboard provides storage during the exceedance events.

The River Welland tidal defences provide protection during the 0.5% annual probability (1 in 200 chance each year) tidal event including climate change.

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.

The River Welland tidal 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 tidal breach occur. The South East Lincolnshire SFRA includes maps demonstrating the residual peak depth in 2115. When climate change allowances are applied to 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 the peak depth at the site is between 0.5m and 1.0m. An extract from the SFRA map is shown in Figure 3 below.

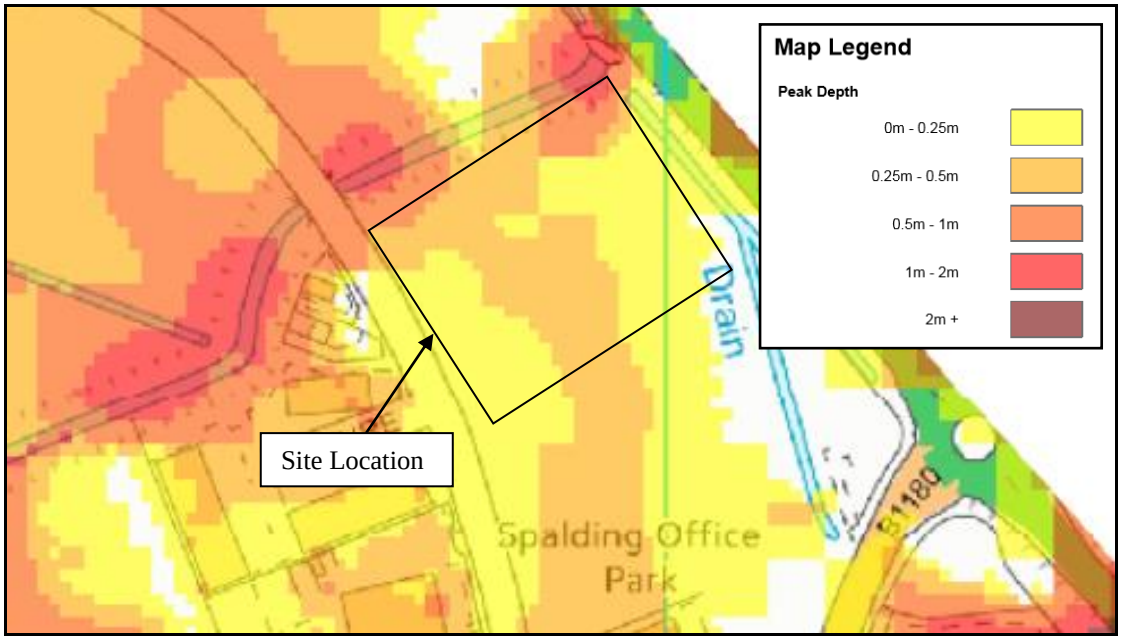


Figure 3 – SFRA 2116 Residual Peak Depth Map during the 1% fluvial and 0.5% tidal Annual Probability Event

The warehouse will occupy an area where the peak flood depth is up to 0.5m.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Pinchbeck Marsh 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 defence systems. 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.

The SFRA considers the residual risk associated with overtopping and a breach in the defences in 2116. During the 0.5% annual probability (1 in 200 chance each year) plus climate change event the maximum flood depth at the site is between 0.5m and 1.0m. The warehouse will occupy an area where the peak flood depth is up to 0.5m.

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 it 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.

Considering the nature and scale of the risk it is recommended that the finished floor levels of the warehouse is a minimum of 0.15m above surrounding ground levels and the following resilience measures are considered:

- there is a water entry strategy allowing flood water to enter the warehouse 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.

Should there be a failure of Pinchbeck Marsh Pumping Station and conditions were such to put properties and land at risk of flooding, the IDB would take emergency action to maintain the drainage level of service by using temporary pumping equipment.

A SuDS Strategy is being prepared for the site so that surface water run-off is managed so that stormwater from the site will not 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 one warehouse with office accommodation at Elsom Way, Pinchbeck.

- 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 proposed development benefits from tidal defences on the River Welland that provide protection 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 climate change.

- There is a residual risk associated with a breach of the defences. Based upon the information available during the preparation of this Flood Risk Assessment it is recommended that the finished floor level is a minimum of 0.15m above surrounding ground levels and flood resilience measures are adopted to manage the risk of a breach. These include a water entry strategy, reducing the vulnerability of people and safe access and egress.

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

ATTACHMENT 1

TOPOGRAPHIC SURVEY
(Dwg SE1202-1)

SCALE BAR

0m 10 20 30 40 50 100m

N

SURVEYED EXTENTS SUCH AS FENCELINES, WALLS AND HEDGES ETC DO NOT REPRESENT A LEGAL BOUNDARY OR LEGAL OWNERSHIP AND FURTHER ADVICE SHOULD BE SOUGHT IN THIS MATTER.

SURVEYED DATA IS A RESULT OF MEASUREMENTS TO EXISTING FEATURES AT THE TIME OF THE SURVEY.
SURVEY DATA SHOWN IS ALSO DEPENDANT ON THE CLIENTS SPECIFICATION.

AREAS OF VEGETATION OR HEAVY TRAFFIC MAY CAUSE DETAIL TO BE MISSED.

MANHOLE CHAMBERS WILL NOT BE INSPECTED IF THERE IS A RISK TO PUBLIC OR ANY STAFF MEMBERS. CRACKED COVERS AND THOSE THAT DO NOT LIFT WITH REASONABLE FORCE WILL NOT BE LIFTED. CHAMBERS, PIPES AND FLOWS ARE MEASURED ABOVE GROUND ANSD SHOULD BE CHECKED PRIOR TO ANY CONSTRUCTION/ALTERATIONS.

DRAWING UNITS, LEVELS AND DIMENSIONS ARE SHOWN IN METRES.

THE DATA USED FOR THE HORIZONTAL AND VERTICAL CONTROL FOR THIS SURVEY HAS BEEN RECORDED USING OUR SURVEY GRADE GNSS RECIEVERS. THIS DATA WAS PROVIDED BY TRIMBLE VRS CORRECTION SERVICE AND PRIMARY SURVEY CONTROL IS BASED ON OSGB36(15)
CONTROL WAS ESTABLISHED USING THE BEST PRACTICE GUIDELINES OF THE SURVEY ASSOCIATION.

THIS SURVEY HAS A SCALE FACTOR OF 1 APPLIED AND HAS BEEN BASED ON SE1 AND REFERENCED TO SE2.

PLOTTING ON PAPER MAY LEAD TO ERRORS AND SCALING RISKS. PLEASE DO NOT SCALE FROM THIS DRAWING.

ALL DIMENSIONS SHOULD BE CHECKED ON SITE PRIOR TO CONSTRUCTION.

THIS DRAWING IS TO BE USED FOR ITS ORIGINAL PURPOSE ONLY, NO RESPONSIBILTY WILL BE ACCEPTED IF THIS IS SUPPLIED TO ANY OTHER PARTY OTHER THAN THE ORIGINAL CLIENT.

SE Surveys LIMITED

JOB TITLE
TOPOGRAPHIC SURVEY OF THE LAND TO THE EAST OF ELSOMS WAY, SPALDING

CLIENT
SWANN EDWARDS

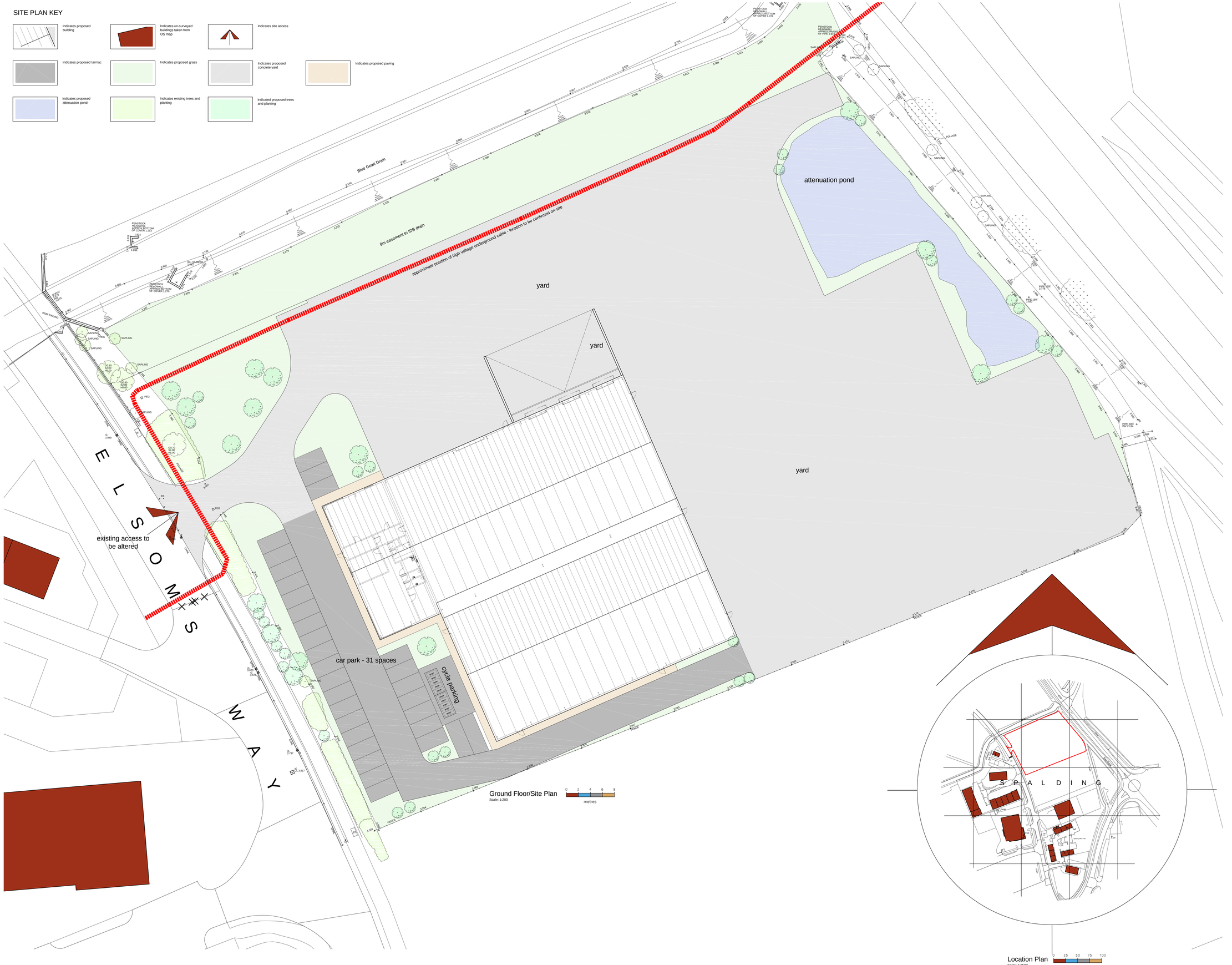
SE REF	DRAWN BY
SE1202-1	AR
SHEET SIZE & SCALE	**DATE OF SURVEY**
A0 @ 1:200	AUGUST 2022

ATTACHMENT 2

PLANS, SECTIONS AND LOCATION PLAN
(DWG SE-1856 PP1000A)

SITE PLAN KEY

- Indicates proposed building
- Indicates un-surveyed buildings taken from OS map
- Indicates site access
- Indicates proposed tarmac
- Indicates proposed grass
- Indicates proposed concrete yard
- Indicates proposed paving
- Indicates proposed attenuation pond
- Indicates existing trees and planting
- indicated proposed trees and planting



General Notes

1. All dimensions are shown in 'mm' unless otherwise stated.
2. The contractor, sub-contractors and suppliers must verify all dimensions on site prior to the commencement of any work.
3. This drawing is to be read in conjunction with all relevant engineers and specialist sub-contractors drawings and specifications.
4. Any discrepancies are to be brought to the designers attention.

Revisions

A	Dec 2022	Client Amendments

Status: FOR APPROVAL

SWANN EDWARDS ARCHITECTURE

Swann Edwards Architecture Limited, Swann Edwards Architecture, Black Barn, Fen Road, Guyhirn, Wisbech, Cambs. PE13 4AA
t 01945 450694 e info@swannedwards.co.uk w www.swannedwards.co.uk

Job Title: Proposed Storage Building with Ancillary Accommodation Elsoms Way, Pinchbeck	
Date: September 2022	Drawn by: CW
	Checked by: JB
Drawing Title: Planning Drawing Site and Location Plans	
Job No.: SE-1856	Sheet Size: A0
Dwg No.: PP1000	Revision: A