

**FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
HOOK'S DROVE, MURROW**

FINAL REPORT

ECL1153/SWANN EDWARDS ARCHITECTURE

DATE NOVEMBER 2023

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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 N Malik in respect of a development that consists of two workers caravans at Hook's Drove, Murrow.

A planning application for the development is to be submitted by Swann Edwards Architecture.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is at The London Halal Meat Co Ltd, Hook's Drive, Murrow, Wisbech, PE13 4HH. The National Grid Reference of the site is 53598/30586.

The location of the site is shown on Figure 1.

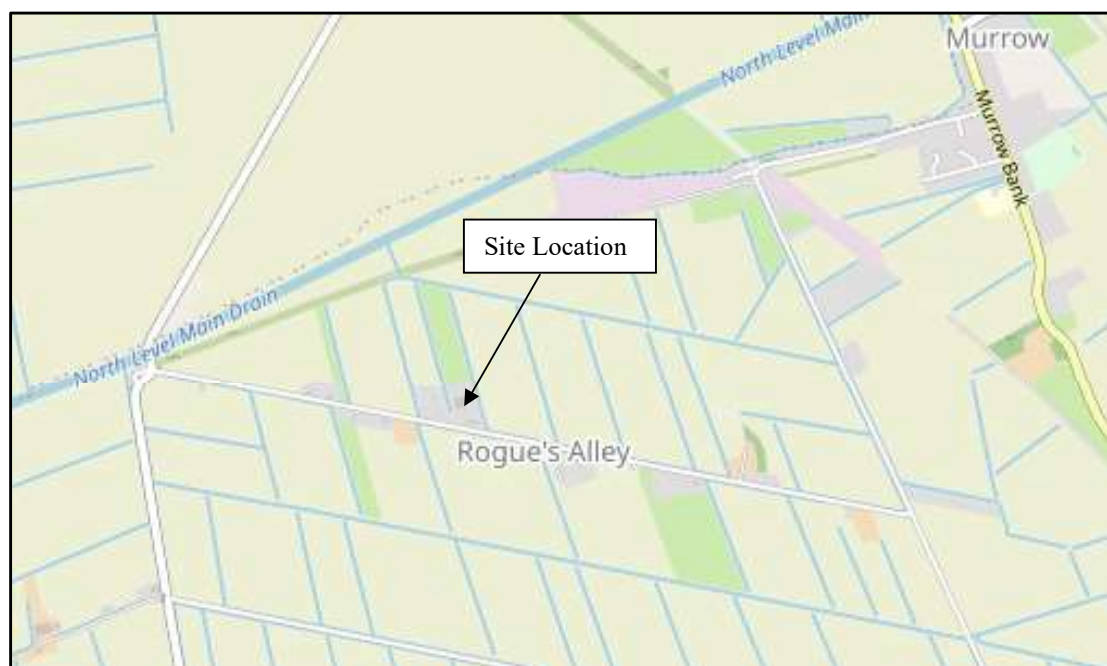


Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is on the northern side of Hook's Drive. The site consists of a commercial building and the surrounding land. The site has access to Hook's Drive and is set to the north of the dwellings alongside Hook's Drive. The area of development is 0.75 hectares.

Environment Agency LiDAR shows that ground levels at the site are typically between +0.4m OD and +0.6m OD. The carriageway level of Hook's Drive adjacent to the site is at a level of +0.9m OD.

The site is in the North Level Internal Drainage Board's (IDB) district. Surface water at the site would naturally drain through soakaway and hence to the riparian drainage network and then to the Board's main drain system. There are riparian drains on the eastern and western boundaries of the site and Straight Dyke, an IDB Watercourse, is 350m north of the site.

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

2.3 Development

The development is a retrospective application for two workers caravans and a cabin which will be located in the south western corner of the site. Details of the proposed development are shown in Attachment 1.

2.4 Local Development Documents

The Fenland Local Development Plan is the adopted Local Plan for the district. Policy LP14 for Responding to Climate Change and Managing the Risk of Flooding in Fenland states the requirements for flood risk reduction.

The Fenland Level 1 Strategic Flood Risk Assessment (SFRA) was prepared in June 2022.

The Cambridgeshire Flood and Water Supplementary Planning Document has been prepared by Cambridgeshire County Council (as the Lead Local Flood Authority) in conjunction with the other Cambridgeshire local planning authorities and other relevant stakeholders to support the implementation of flood risk and water related policies.

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.

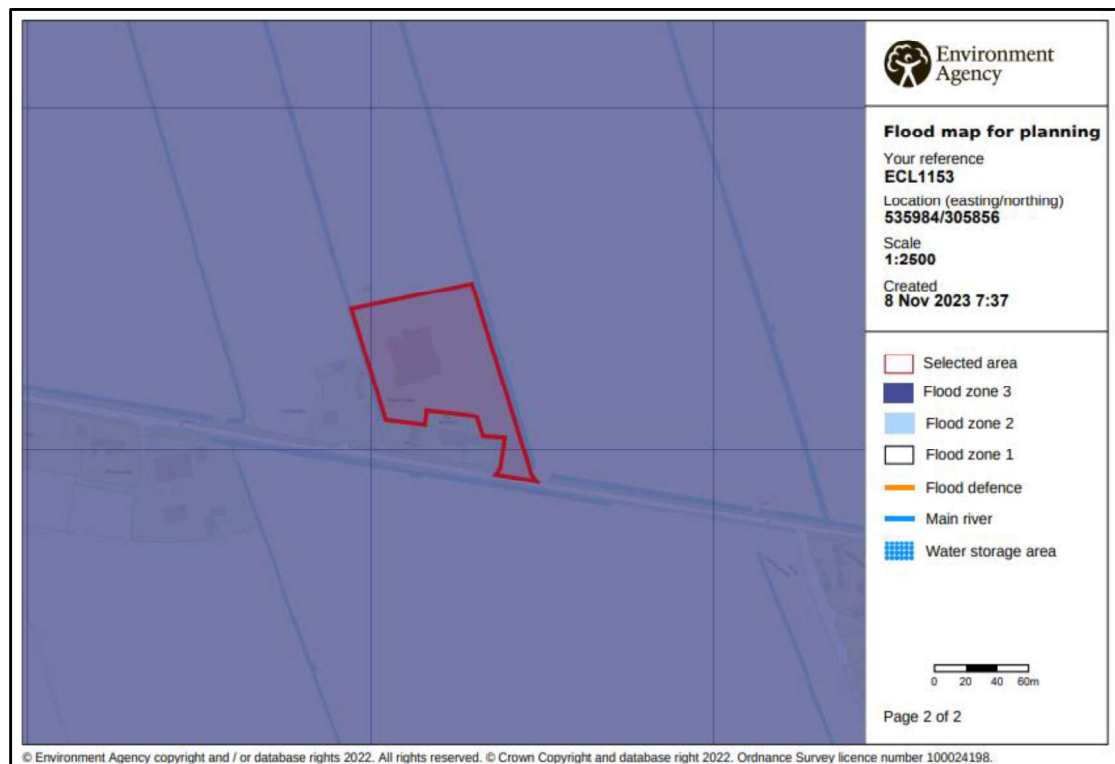


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site is in an area with a medium risk of flooding from rivers or the sea (annual probability between 1% and 3.3%);
- the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
- the site is within an area at risk of reservoir flooding when there is also flooding from rivers.

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 Test and Exception 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 Fenland District Council in the area around the River Nene lie in Flood Zone 3. As such there are limited opportunities to undertake the development at an alternative site with a lower flood risk.

The caravans will provide accommodation for workers who are employed by the business at the site. The development 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 development provides wider sustainable economic benefits. The economic value of rural areas can be constrained by the availability of labour. Provision of housing to meet all needs can reduce this constraint and therefore benefit the rural economy.

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 site is approximately 3.9km north west of the River Nene tidal defences. The tidal defence at that location consists of a flood embankment at a level of +6.30m OD. This defence is 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.

The site is in the North Level Internal Drainage Board's (IDB) district with the nearest Board Drain, Straight Drain, located 350m north of the site. The extensive local drainage network drains by gravity in a northerly direction to the North Level Main Drain. The North Level Main Drain discharges into the tidal River Nene at the Tydd 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 Board's assets are commensurate with the standard of protection that is sought.

Current maintenance standards of the North Level IDB and the Environment Agency's defences are generally good.

4.2 Sources of Flooding

A summary of the sources of flooding is provided in Table 1.

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 assessed in Section 4.3 and Section 4.5.
Tidal Flooding	The risk is assessed in Section 4.3 and Section 4.5.
Reservoir Flooding	The residual risk associated with a breach of defences is considered in Section 4.6.
Groundwater Flooding	There is no evidence to suggest the site is at risk of groundwater flooding.

Table 1 – Sources of Flooding

4.3 Probability of Flooding

The probability of flooding associated with blockages within the IDB drainage system is low due to the maintenance standards already achieved and managed by the IDB. Failure of Tydd Pumping Station could lead to an increased level of risk within 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 North Level IDB main drains incorporating freeboard. This freeboard provides storage during the exceedance events.

The River Nene tidal defences provide protection during the 1% annual probability (1 in 100 chance each year) fluvial event and the 0.5% annual probability (1 in 200 chance each year) tidal event.

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 flood levels in the River Nene.

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

The Cradge Bank between the tidal River Nene and the Whittlesey Washes is at a level of +4.5m OD. Water levels in the tidal River Nene above +4.5m OD will be discharged into the Whittlesey Washes. Consequently, the tide level in the River Nene is highly unlikely to exceed the defence level of +6.3m OD.

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 to the land north of the River Nene should there be a breach. Level 1 and Level 2 Strategic Flood Risk Assessments (SFRA) were prepared for Peterborough in January 2008 and February 2010, respectively. As part of the Level 2 SFRA a combined 1D-2D ISIS-TUFLOW model of the River Nene and Stanground Lode was used to assess the flood risk due to overtopping of, and breaches in, the existing defences. The maps produced within the SFRA cover the proposed site.

Figure 3 below shows that the site is not at risk should a breach occur during the 1% annual probability (1 in 100 chance each year) with climate change event.

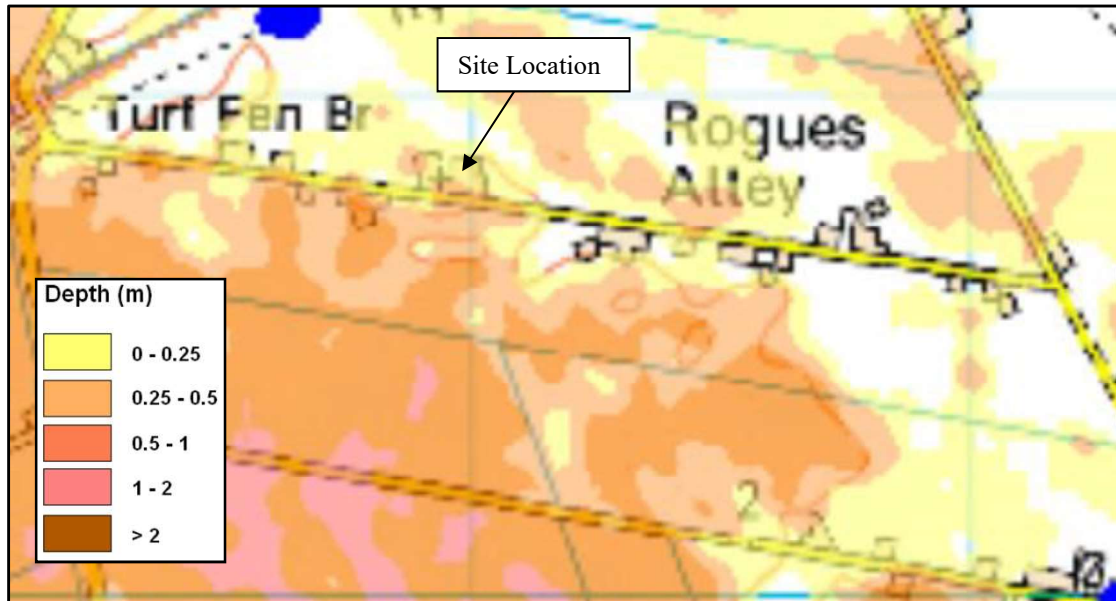


Figure 3 – Breach depths during 1% annual probability event with climate change

The maps shows that the breach depths within the site are 0.0m-0.25m.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of the Tydd Pumping Station could increase the 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 the site is not at risk during the 0.5% annual probability (1 in 200 chance each year) event.

There is a residual risk to the site during a breach of the River Nene defences with depths up to 0.25m.

The development increases the impermeable area and therefore has the potential to increase flood risk elsewhere.

5.2 Mitigation Measures

Based upon the information available during the preparation of this flood risk assessment the site has a very low level of flood risk. The caravans located at the site will mitigate any residual risk because the finished floor level is a minimum of 0.25m above ground.

The developer should ensure that the occupiers of the caravans 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 occupiers of the caravans should register to receive flood warnings.

Failure of Tydd Pumping Station may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if 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.

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

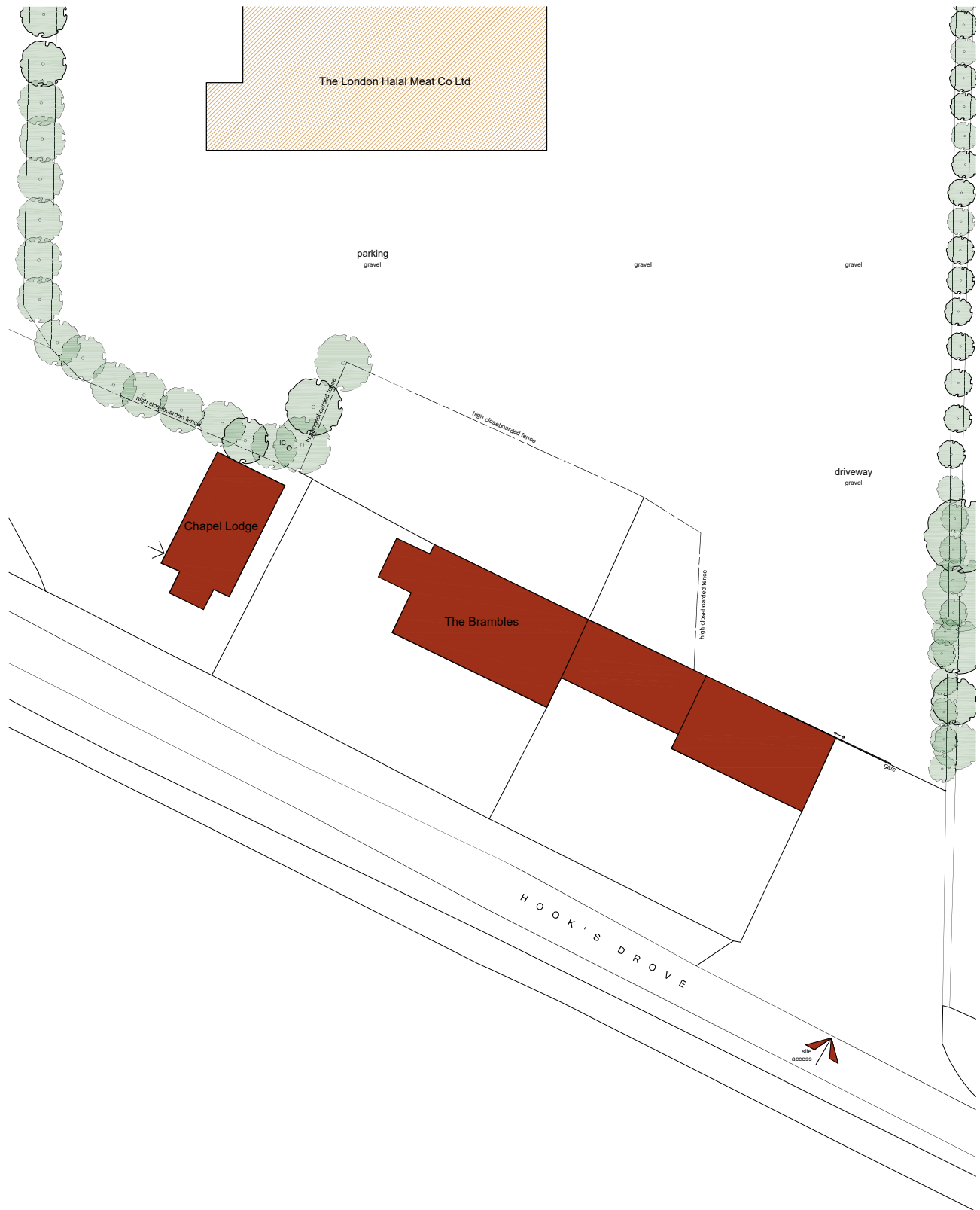
6.0 CONCLUSIONS

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

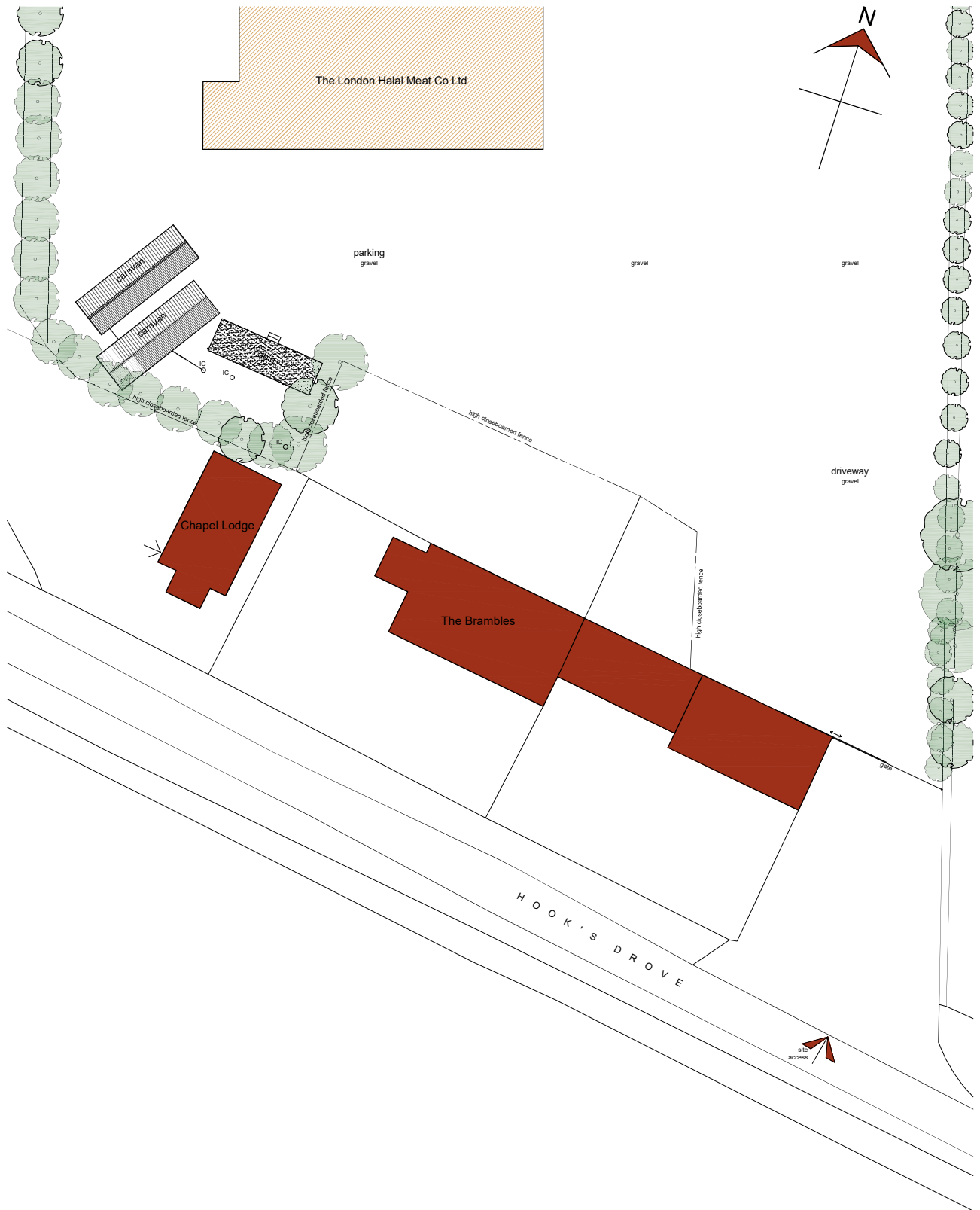
- The proposed development consists of for two workers caravans and a cabin at The London Halal Meat Co Ltd, Hook's Drove, Murrow.
- The site is located within an Internal Drainage Board catchment and through the operation and maintenance of the pumping stations and the channel system the Board seek 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 defences on the tidal River Nene that protect against the 0.5% annual probability (1 in 200 chance each year) event including climate change.
- The residual risk of flooding to the caravan would be mitigated as the floor level of the caravan would be a minimum of 0.25m above ground levels.
- The development passes the Sequential Test and Exception Test and is therefore suitable for the proposed location.

ATTACHMENT 1

**SITE PLANS
(DWG SE-1955 100)**



Original Site Plan
Scale: 1:250
0 2.5 5 7.5 10
metres



Proposed Site Plan
Scale: 1:250
0 2.5 5 7.5 10
metres

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.

SITE PLAN KEY

- Indicates site access
- Indicates surveyed buildings on site
- Indicates unsurveyed buildings on site
- Indicates buildings taken from OS map
- Indicates foul drainage
- Indicates unsurveyed trees and planting

Status
FOR APPROVAL

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Job Title Proposed Workers Accommodation The London Halal Meat Co Ltd Hook's Drive, Murrow PE13 4HH	Date April 2023	Drawn by BR
Drawing Title Survey Drawing Site Plans For: Mr N Miak	Job No. SE-1955	Checked by SHe
	Dwg No. 100	Sheet Size A1 Revision