

**FLOOD RISK ASSESSMENT
FOR HOLIDAY LODGE ACCOMMODATION AT
BANKS DROVE, DEEPING ST NICHOLAS**

FINAL REPORT

ECL1710/SEVEN22 ARCHITECTURE LTD

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DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment in support of a planning application for proposed holiday accommodation at Banks Drove, Deeping St Nicholas. "Ellingham Consulting Ltd" accepts no responsibility or liability whatsoever for any use made of this document other than by the client Mr G Mason 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 Mr G Mason in respect of a development that consists of two holiday lodges at Banks Drove, Deeping St Nicholas.

A planning application for the proposed development is to be submitted by Seven22 Architecture.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located on land adjacent to Poplar Kennels, Banks Drove, Deeping St Nicholas, Lincolnshire, PE11 3BJ. The National Grid Reference of the site is 52141/31936.

The location of the site is shown in Figure 1.

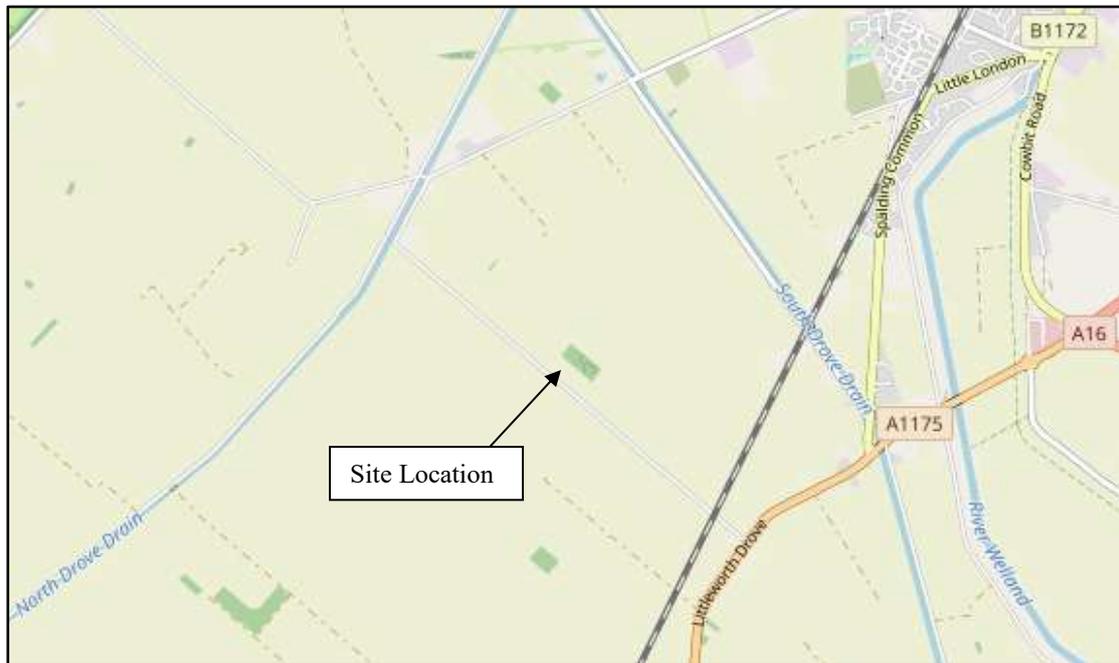


Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is on the northern side of Banks Drove approximately 200m west of Poplar Farm. The site consists of a rectangular area of agricultural land. The site is surrounded by agricultural land. The area of development is approximately 0.3 hectares.

Environment Agency LiDAR shows that ground levels at the site are typically between +2.6m OD and +2.8m OD. The carriageway level of Banks Drove adjacent to the site is +2.9m OD.

The site is in the Welland and Deepings Internal Drainage Board (IDB) District. The site and the surrounding land are within the Deeping Fen catchment. There is a riparian drain on the western boundary of the site and Jordans Drain, an IDB Main Drain, is 700m north 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 holiday lodges. A Site Layout is 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 2, an area with a medium probability of flooding.

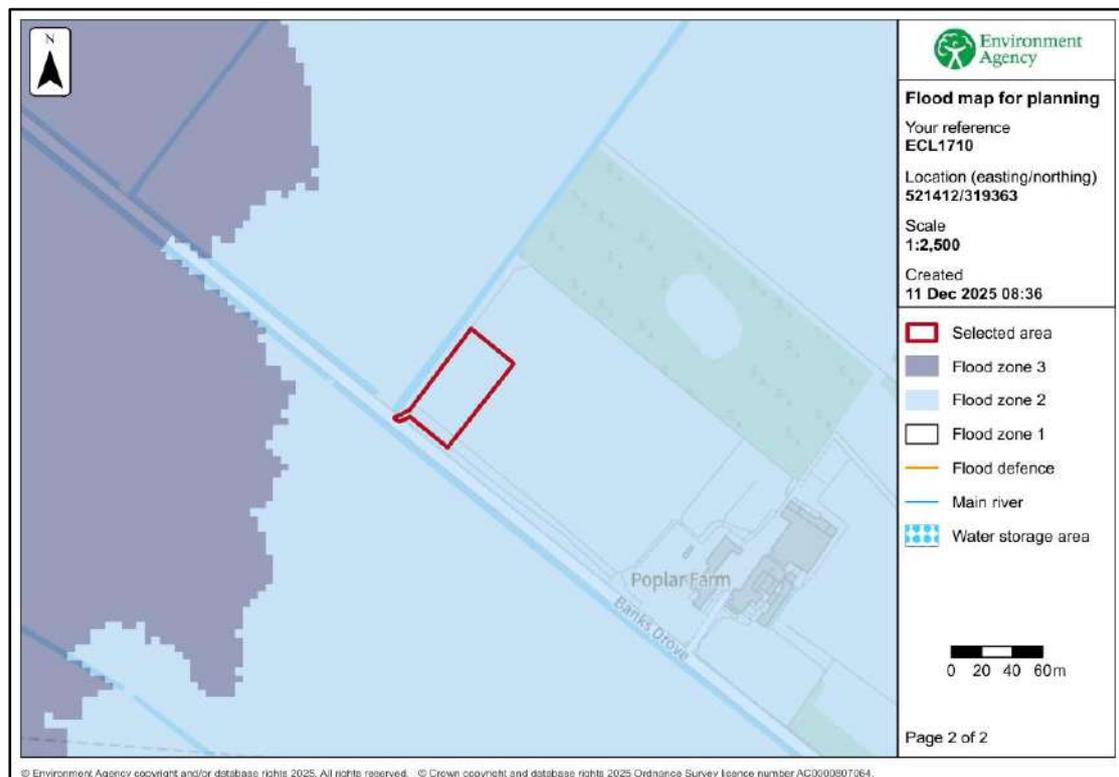


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps provide an indication of the risk from the primary sources of flooding. The details provided with these maps are summarised in Table 1. The depth of flooding identified is the maximum depth that occurs during a low chance (between 0.1% and 1% chance each year) event.

	Present Day		2050 Epoch	
	Chance of Flooding	Depth (Low chance)	Chance of Flooding	Depth (Low chance)
Rivers and the Sea	The site has a low chance (between 0.1% and 1% chance each year)	No data available	No data available	No data available
Surface Water	The site has an isolated area with a high chance (more than 3.3% chance each year)	Below 0.2m	The site has an isolated area with a high chance (more than 3.3% chance each year)	Below 0.2m
Reservoir	At risk when there is also flooding from rivers.			

Table 1 – Environment Agency Long Term Flood Risk Maps

Table 2 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 outside the 'Low Hazard' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal event	The site is outside the area at risk	The site is outside the area at risk

Table 2 – 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 'sites used for holiday or short-let caravans and camping' 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 2 and the development is 'More 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.

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 1% annual probability fluvial and 0.5% annual probability tidal 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 2.3km west of the River Welland as it flows through Spalding. Cowbit Wash is the floodplain to the River Welland and the land to the west of the Cowbit Wash is protected from the River Welland by the Cowbit Wash Cradge Bank.

To the east of the site the River Welland has an inlet to 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.

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. The site and the surrounding land are within the Deeping Fen catchment and drain in a northerly direction to Pode Hole Pumping Station. Pode Hole 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 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 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 3.

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 chance is very low apart from an isolated area with a high chance.
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 risk of a breach is considered in Section 4.6.
Groundwater Flooding	There is no evidence to suggest the site is at risk of groundwater flooding.

Table 3 – Sources of Flooding

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 Coronation Channel and the Cowbit Washes protect the site from the River Welland. These flood relief measures provide protection during the 1% annual probability (1 in 100 chance each year) fluvial event.

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 flood levels.

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 in and around Spalding site should a breach occur in the defences. The South East Lincolnshire SFRA includes maps demonstrating the impact of a breach in 2116. The Residual Peak Depth maps within the SFRA indicate the maximum flood depths associated with a breach and overtopping of defences during a 1% fluvial event and 0.5% tidal event. As shown in Figure 3 the site is not within an area at risk.

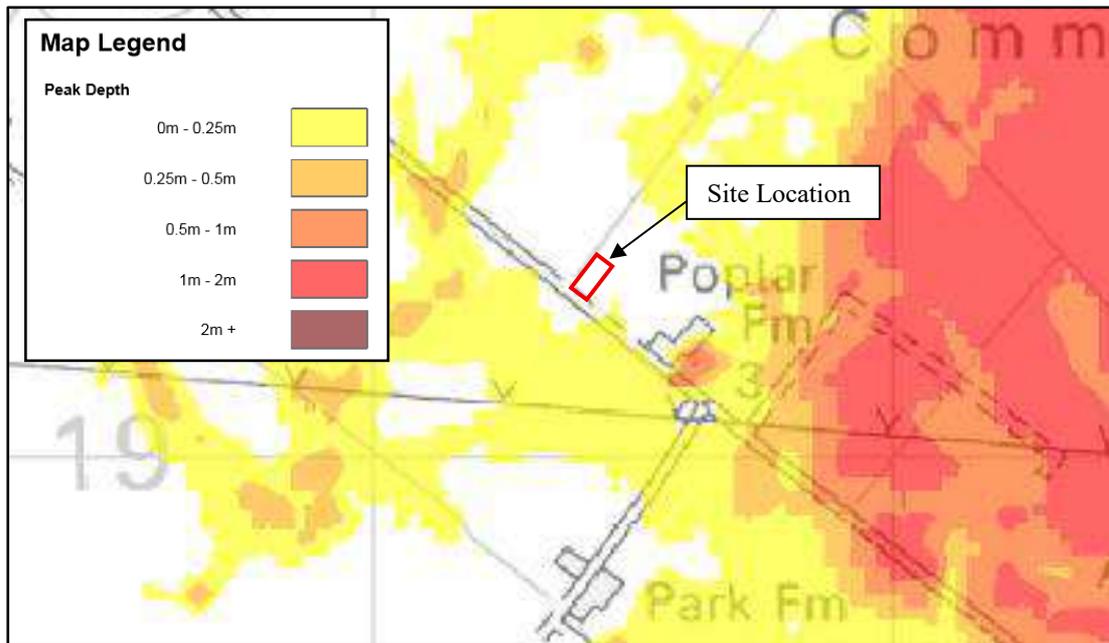


Figure 3 – SFRA 2116 Residual Peak Depth Map during the 1% fluvial and 0.5% tidal Annual Probability Event

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Pode Hole Pumping Station could lead to an increased level of risk within the IDB Catchment.

The site benefits from any Environment Agency defences that provide protection 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. 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 a breach event including an allowance for climate change the site is not at risk.

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 site has a low 'actual risk' of flooding. Based upon the information available during the preparation of this flood risk assessment, it is recommended that the floor level of the lodges area a minimum of 0.3m above ground level.

The developer should ensure that the operator of the site is 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 operator of the site should register to receive flood warnings.

Should there be a failure of Pode Hole 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 proposed that surface water runoff from the roofs of the lodges is discharged to a wet ditch within the north east of the site. The access and parking will be reinforced grass track. A biodisc package treatment plant will treat foul waste from the development.

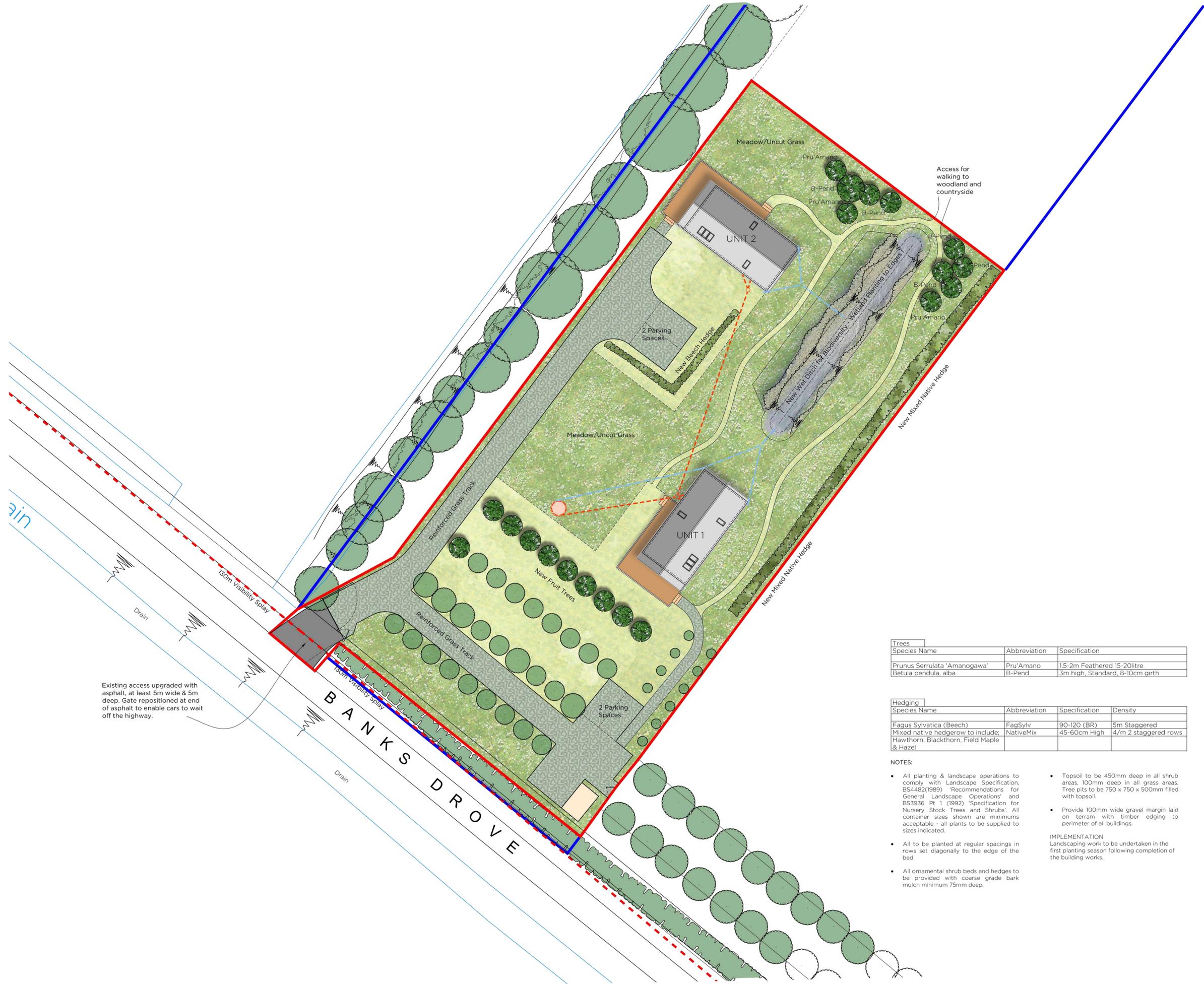
6.0 CONCLUSION

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

- The proposed development consists of two holiday lodges on land adjacent to Poplar Kennels, Banks Drove, Deeping St Nicholas.
- 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 that provide protection 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 climate change.
- During a breach of the defences the site is not at risk.
- It is recommended that the lodges have a floor level 0.3m above general ground levels and the operator of the site receives flood warnings.
- The development passes the Sequential Test and is therefore suitable for the proposed location.

ATTACHMENT 1

**PROPOSED SITE LAYOUT
(DWG 118 P01)**



Legend

- Proposed Hedge
- Proposed Tree
- Edge of wetland planting
- Asphalt
- Reinforced Grass (Bodpave 85 or similar)
- Maintained/Cut Grass
- Meadow/Long Grass (With native flower seed mixes)
- Visibility Splay
- Proposed Surface Water to Soakaways
- Proposed Foul Drainage Layout
- Biodisc Domestic Sewage Treatment Plant



Existing access upgraded with asphalt, at least 5m wide & 5m deep. Gate repositioned at end of asphalt to enable cars to wait off the highway.

Trees		
Species Name	Abbreviation	Specification
Prunus Serrulata 'Amanogawa'	Pru/Amano	1.5-2m Feathered 15-20litre
Betula pendula, alba	B-Pend	3m high, Standard, 8-10cm girth

Hedging			
Species Name	Abbreviation	Specification	Density
Fagus Sylvatica (Beech)	FagSylv	90-120 (BR)	5m Staggered
Mixed native hedgerow to include: Hawthorn, Blackthorn, Field Maple & Hazel	NativeMix	45-60cm High	4/m 2 staggered rows

- NOTES:**
- All planting & landscape operations to comply with Landscape Specification, BS4482(1989) 'Recommendations for General Landscape Operations' and BS3936 Pt 1 (1992) 'Specification for Nursery Stock Trees and Shrubs'. All container sizes shown are minimums acceptable - all plants to be supplied to sizes indicated.
 - All to be planted at regular spacings in rows set diagonally to the edge of the bed.
 - All ornamental shrub beds and hedges to be provided with coarse grade bark mulch minimum 75mm deep.
 - Topsoil to be 450mm deep in all shrub areas, 100mm deep in all grass areas. Tree pits to be 750 x 750 x 500mm filled with topsoil.
 - Provide 100mm wide gravel margin laid on terram with timber edging to perimeter of all buildings.
- IMPLEMENTATION**
Landscaping work to be undertaken in the first planting season following completion of the building works.



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PROJECT
PROPOSED HOLIDAY LODGES
LAND ADJACENT TO POPLAR KENNELS
BANKS DROVE
DEEPING ST NICHOLAS
LINCOLNSHIRE
PE11 3BJ

CLIENT
Mr MASON

TITLE
PROPOSED SITE LAYOUT

DRAWING No.
118 P01

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