FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
CREASE DROVE, CROWLAND

FINAL REPORT

ECL1938/ASPECT ARCHITECTURAL DESIGN

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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 S Allen in respect of a development that consists of two residential dwellings at Crease Drove, Crowland.

A planning application for the proposed development is to be submitted by Aspect Architectural Design.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located on land to the rear of 14-16 Crease Drove, Crowland, Lincolnshire, PE6 0BN. The National Grid Reference of the site is 52375/309816.

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 Crease Drove. The site is land within the curtilage of a pair of semi-detached dwellings, 14 and 16 Crease Drove. The site consists of land to the side and rear of the dwellings. The site is surrounded by residential development. The area of development is 0.09 hectares.

Environment Agency LiDAR shows that ground levels within the site are typically between +2.4m OD and +2.7m OD. The carriageway level of Crease Drove adjacent to the site is +2.9m OD.

The site is in the North Level Internal Drainage Board (IDB) district. Surface water at the site would naturally drain through soakaway and hence to the IDB drainage system. The nearest IDB Main Drain is East Divisional Drain approximately 200m south east 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 Abbey Sand and Gravel.

2.3 Proposed Development

The proposed development consists of two dwellings. The dwellings will have 2 storeys. 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 1, an area with a low probability of flooding.

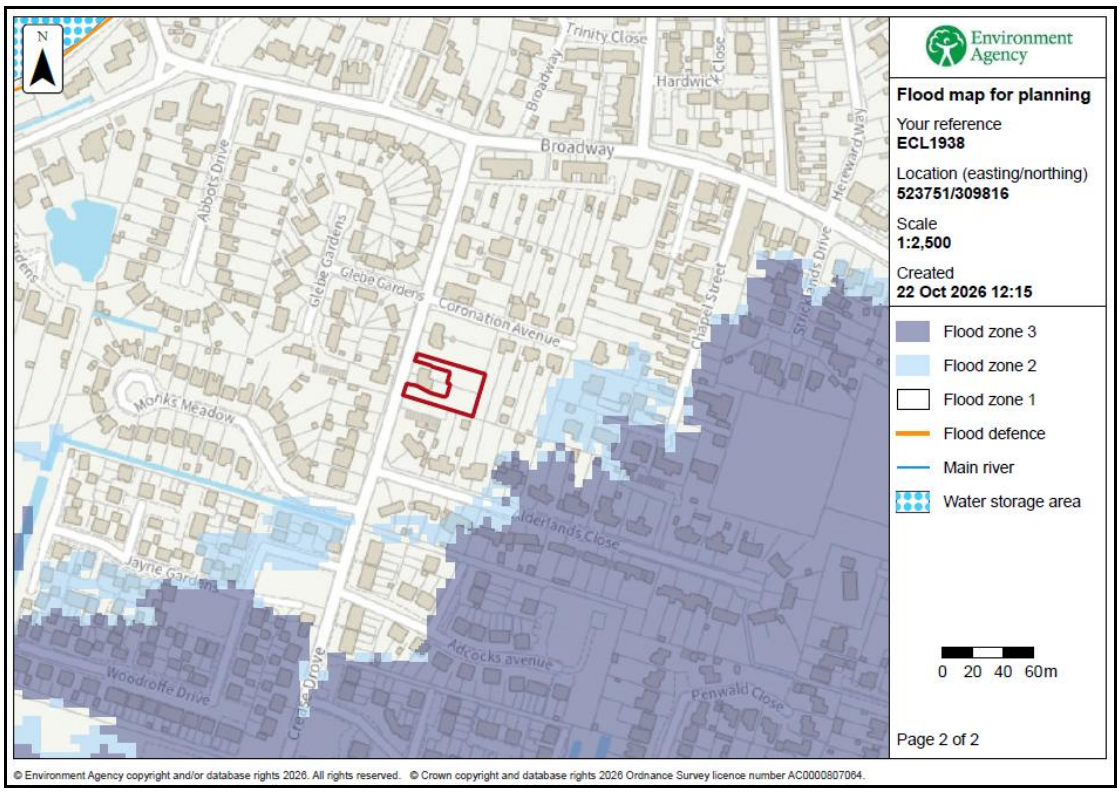


Figure 2 – Environment Agency Flood Map for Planning

The Flood Map for Planning shows that during the event with a 1 in 100 annual likelihood an isolated area on the northern boundary of the site is at risk of surface water flooding. When climate change is considered during this event the maximum flood depth in the area at risk is 0.15m.

The Environment Agency Long Term Flood Risk maps provide an indication of the risk from the primary sources of flooding. The map shows that the site is in an area at risk of reservoir flooding when there is also flooding from rivers.

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 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

Annex F (Table 2) of NPPF 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'.

Annex F (Table 3) of NPPF sets out Flood Risk Vulnerability and flood zone 'compatibility'. The site is in Flood Zone 1 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.

The site is located in Flood Zone 1 and therefore it is therefore not possible to undertake the development at an alternative site with a lower probability of flooding. The site is considered to pass the Sequential Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The site is 1.1km east of the River Welland. Crowland Washes provides floodplain storage for the River Welland. The village of Crowland is protected from the River Welland by the Corporation Bank approximately 300m west of the site.

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 North Level Internal Drainage Board. There nearest IDB Main Drain, East Divisional Drain, is approximately 200m south east of the site, discharges to the Newborough Main Drain and then into the River Welland via Newborough 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 Boards assets are commensurate with the standard of protection that is sought.

Current maintenance standards of the North Level 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 Flood Map for Planning the risk is low / very low
Fluvial Flooding	The risk is assessed in Section 4.3 and 4.5.
Tidal Flooding	The site is not at risk of tidal flooding.
Reservoir Flooding	The risk of reservoir flooding 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 North Level 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 North Level IDB main drains incorporating freeboard. This freeboard provides storage during the exceedance events.

The Corporation Bank provides protection against the 1% annual probability (1 in 100 chance each year) event. The defence 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. The Corporation Bank provides protection against the 1% annual probability (1 in 100 chance each year) event including climate change.

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. 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 site is at risk with depths between 0.5m and 1.0m. An extract from this map is shown in Figure 3 below.



Figure 3 – SFRA 2116 Residual Peak Depth Map

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

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

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.

The SFRA considers the residual risk associated with a breach in the defences. The residual flood depth during 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 in 2116 is between 0.5m and 1.0m.

The proposed development increases the impermeable area and therefore has the potential to increase the rate of surface water runoff from the site.

5.2 Mitigation Measures

Based upon the information available during the preparation of this flood risk assessment, it is recommended that the finished floor level of the dwellings is +3.4m OD (1.0m above the lowest ground levels in the site) and there is 0.3m of flood resilient construction above finished floor level.

The risk of flooding is lowered as the proposed dwellings have 2 storeys with all sleeping accommodation on the first floor.

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

Should there be a failure of Tydd 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 recommended that surface water run-off is managed so that stormwater from the development 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 two 2 storey dwellings on land to the rear of 14-16 Crease Drove, Crowland.

- 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 site is in Flood Zone 1. The Corporation Bank provides protection against the 1% annual probability (1 in 100 chance each year) event including climate change in the River Welland. During the life of the development, a flood depth between 0.5m and 1.0m could occur at the site should there be a breach of the Corporation Bank.

- It is recommended that the floor level of the dwellings is +3.4m OD (1.0m above the lowest ground levels in the site) and there is 0.3m of flood resilient construction above finished floor level.

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

ATTACHMENT 1

PROPOSED BLOCK PLAN
(DWG 299 01)



0M 10M 20M

Scale 1: 1250 @ A3

Project
CHALET BUNGALOWS
REAR OF 14-16 CREASE DROVE

Title
PROPOSED BLOCK PLAN

Scale	Date	Job No	
1:200	SEPT 26	299	
Category	CiSfb Element	Sequential No	Revisions
D	(--)	01	

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