

FLOOD RISK ASSESSMENT FOR RESIDENTIAL DEVELOPMENT AT SMALL DROVE LANE, WEST PINCHBECK

FINAL REPORT

ECL0092a/ STATUS DESIGN LTD

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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 Franks in respect of a development that consists of one dwelling at Kingfisher, Small Drove Lane, West Pinchbeck.

A full planning application for the proposed development is to be submitted by Status Design.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at Kingfisher, Small Drove Lane, West Pinchbeck, Spalding, PE11 3NL. The National Grid Reference of the site is 52056/32606.

The location of the site is shown in Figure 1.



Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is a residential plot on the western side of Small Drove Lane. The dwelling at the site has been demolished. To the western extent of the site are a series of out buildings. The area of development is approximately 0.06 hectares.

Environment Agency LIDAR information shows that levels within the site vary. It is thought that this is a consequence of the previous dwelling being demolished. The site level is estimated to be approximately +3.0m OD. The level of Small Drove Lane adjacent to the property is approximately +3.4m OD.

The site is in the Black Sluice Internal Drainage Board's (IDB) district. The site and the surrounding land are within the Gosberton catchment and drain in a north westerly direction to Gosberton Pumping Station.

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 one new dwelling. The proposed dwelling will be a bungalow.

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

The site is partially located within Flood Zone 3, an area with a high probability of flooding, of the Environment Agency Flood Maps for Planning as shown in Figure 2. The site is not within a functional floodplain and is therefore in Flood Zone 3a.

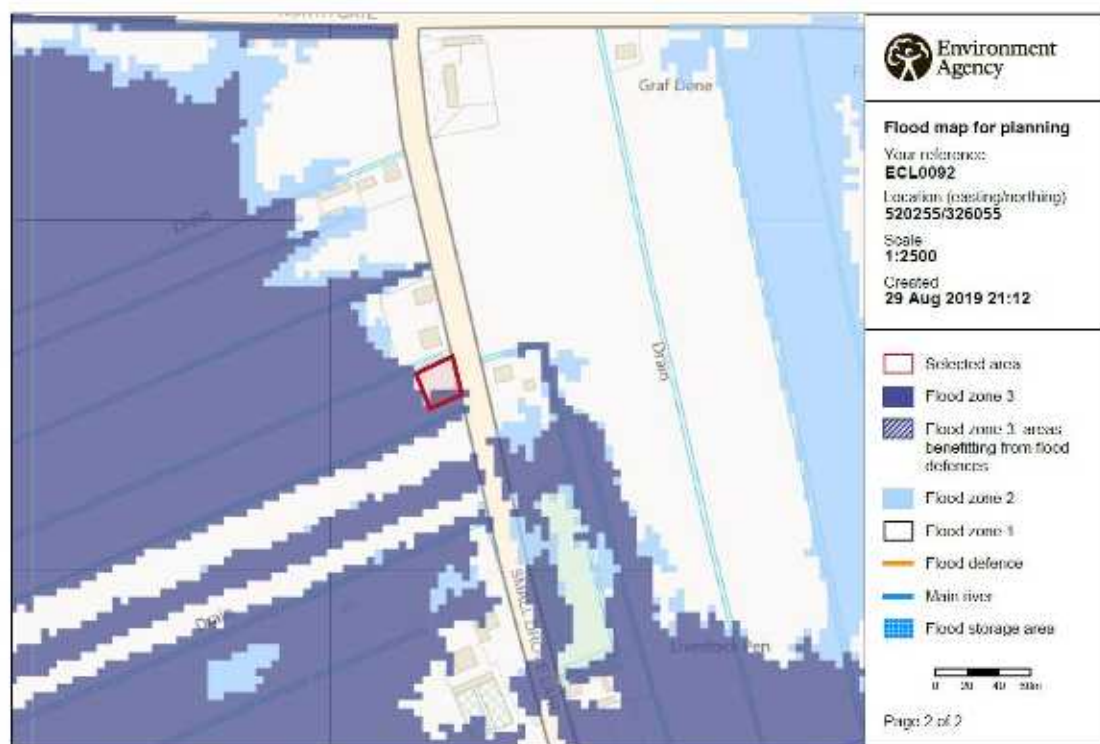


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- part of the site has a low risk of flooding (annual probability between 0.1% and 1%);
- the site is not at risk of surface water flooding; and
- the site is not within an area at risk of reservoir flooding.

Table 1 shows the level of residual risk at the site as identified within the South East Lincolnshire SFRA.

SFRA Map	Present Day	2116
Residual Flood Hazard Map for the 1% fluvial and 0.5% tidal event	Outside of the 'Low Hazard' area	Part of the site is in the 'Low Hazard' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal	Outside of the area at risk of flooding	Part of the site has a peak flood depth of 0.0m to 0.25m

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 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 and Exception Test

The Sequential Test and Exception Test are required to be applied by the Local Planning Authority.

Large parts of the South Holland district close to the River Welland and River Glen lie within Flood Zone 3. As such opportunities to undertake the development at an alternative site within Flood Zone 1 are very limited. At this location it is not possible to position the development on higher ground within the proposed site.

The SFRA states that 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% fluvial event and 0.5% tidal event. The site therefore has a low probability of flooding and 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 Local Plan has a target of a net increase of at least 11,681 dwellings in South Holland over the 25-year local plan period. The Plan considers this new housing is required to ensure the sustainability of the Local Plan area. The proposed

development will contribute to this target and the provision of rural housing is a benefit.

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 5.9km 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 the site. The tidal defences are the responsibility of the Environment Agency.

The site is 1.0km from the River Glen. The risk of flooding at the site is reduced by an embankment on the northern bank of the River Glen. The site is 3.6km from the South Forty Foot Drain. The South Forty Foot Drain is an embanked high-level carrier conveying run off from south Lincolnshire to the River Witham. The risk of flooding at the site is reduced by an embankment on the eastern bank of the South Forty Foot. Both 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 every 5 years.

There is an extensive local drainage network managed by Black Sluice IDB. There is an IDB maintained watercourses, the Small Drove Lane Drain, on the eastern side of Small Drove Lane. The site and the surrounding land are within the Gosberton catchment and drain in a north westerly direction to Gosberton Pumping Station. Gosberton Pumping Station discharges to South Forty Foot Drain which flows into the River Witham at Boston.

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 Black Sluice 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 Black Sluice IDB main drain system;
- an event in the local drainage network that exceeds the standard of protection;
- failure of Gosberton Pumping Station;
- overtopping of the River Glen; and
- overtopping and / or breaching of the River Welland tidal defences.

Based upon the Environment Agency Long Term Flood Risk Map the site 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 Black Sluice IDB drainage system is low due to the maintenance standards achieved and managed by the IDB.

The standard of drainage provided by Black Sluice IDB is assessed at 2% annual probability (1 in 50 chance each year), compatible with the Department of the Environment, Food and Rural Affairs (DEFRA) target level of service for rural drainage and flood defence works. The risk associated with flooding due to events greater than 2% annual probability (1 in 50 chance each year) is lowered due to the Black Sluice IDB main drains incorporating a freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

The fluvial defences on the River Glen provide protection against the 1% annual probability (1 in 100 chance each year) event. Flood levels in the Welland Catchment Model show that the 1% annual probability (1 in 100 chance each year) level in the River Glen is +4.46m OD with defence level at +5.10m.

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. 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 tide levels.

Flood levels taken from the Welland Catchment Model show that the 1% annual probability (1 in 100 chance each year) with climate change flood level in the River Glen is +4.66m OD. This represents a 0.20m increase on the present day 1% annual probability level. This increase is less than the freeboard provided by the existing defences and therefore the site is protected from overtopping during the life of the development.

4.6 Residual Risk

There is a residual risk of flooding at the site should a breach occur in the defences. The South East Lincolnshire SFRA includes maps demonstrating the impact of a

breach in 2115. The Residual Peak Depth maps within the SFRA indicate the maximum flood depths associated with a breach and overtopping of defences. These show a peak flood depth at the site of between 0.0m and 0.25m.

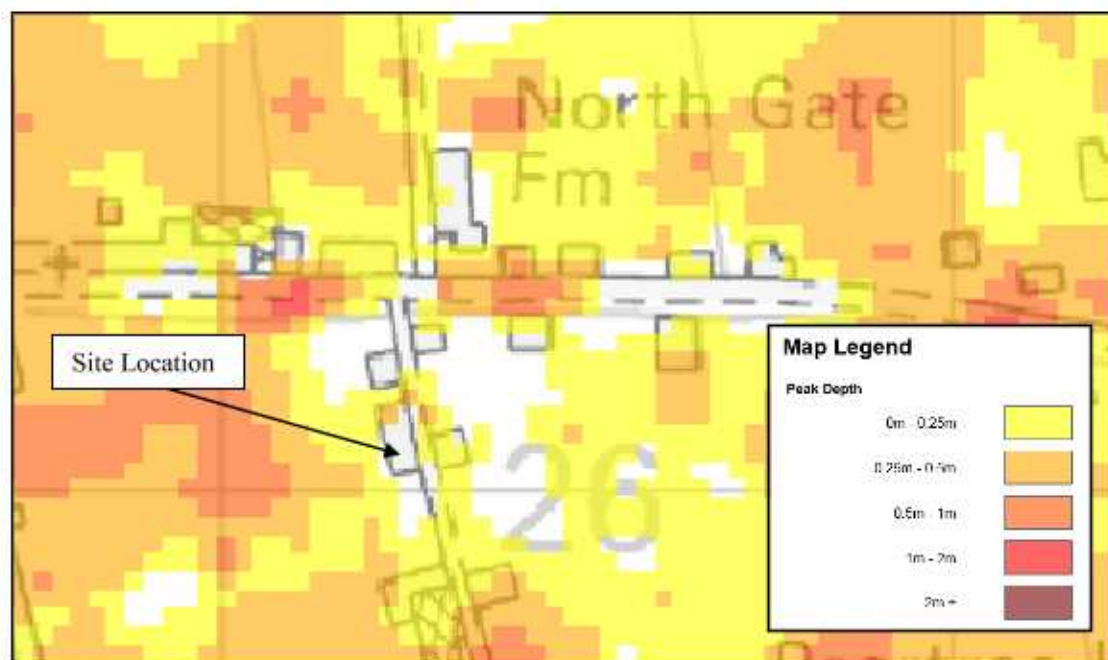


Figure 3 – SFRA 2115 Residual Peak Depth Map during the 1% fluvial and 0.5% tidal Annual Probability Event

The proposed development is single storey and therefore the finished floor level needs to consider the 0.1% annual probability (1in 1000 chance each year) event in 2115. The South East Lincolnshire SFRA includes 0.1% annual probability (1in 1000 chance each year) maps for specific locations but these do not cover the site. However, these maps cover the area around West Pinchbeck and through comparison of the flood depths in this area during the 1% and 0.1% annual probability events for 2115 it can be estimated that flood depths are 0.1m higher for the more extreme event. A peak flood depth of 0.35m can therefore be estimated for the 0.1% annual probability (1in 1000 chance each year) event in 2115.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Gosberton Pumping Station could lead to an increase 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.

The SFRA considers the residual risk associated with a breach in the defences. The maps show that the site is at risk of flooding up to a depth of 0.25m during the 1% annual probability event. A peak flood depth of 0.35m has been estimated for the 0.1% annual probability event. If during extreme events, levels of floodwater rose to such an extent that the site was affected, the situation would not be sudden.

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, in order to mitigate against the remote risk of flooding, it is recommended that the floor level of the dwelling is constructed 0.1m above the carriageway level of Small Drove Lane. This is estimated to be +3.5m OD and approximately 0.5m above ground levels at the site. Furthermore, there should be 0.3m of flood resilient construction above finished floor level.

The developer should ensure that the eventual occupier of the dwelling is sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding. The occupier of the dwelling should register with the Floodline Direct Warnings Service to receive any future flood warnings.

Should there be a failure of Gosberton 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 utilising temporary pumping equipment.

It is recommended that surface water run-off is discharged to soakaways to BRE365 design requirements and therefore water from the site will not affect any adjoining properties or increase the flood risk elsewhere.

6.0 CONCLUSIONS AND RECOMMENDATIONS

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

- The proposed development is in a defended floodplain. It is in the floodplain of the River Welland and River Glen and protected 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. During the design life of the development it would be at risk in the event of a breach of the defences.
- The site is located within an Internal Drainage Board catchment with a minimum standard of drainage of 2% annual probability (1 in 50 chance each year) which accords with DEFRA guidelines for rural development. The risk of flooding is lowered further due to the Black Sluice IDB main drains incorporating a significant freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).
- It is recommended that the floor level of the dwelling is constructed 0.1m above the carriageway level of Small Drove Lane with 0.3m of flood resilient construction above finished floor level to mitigate against the risk of flooding during a breach. Surface water run-off from the development should be discharged to soakaways to BRE365 design requirements so that adjoining land and properties are not affected.
- The development passes the Sequential Test and Exception Test and is therefore suitable for the proposed location.

ATTACHMENT 1

SITE PLAN (Dwg SD19-029-1B)

Abstract

The *Speed* formula is an effect on dimensions on the left hand

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The authors also anticipate that the use of the model will be limited to the study of the effects of the environment on the development of the individual.

It is the "open" character of responsibility to be seen as the very foundation of a new social order.

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