# FLOOD RISK ASSESSMENT
# FOR RESIDENTIAL DEVELOPMENT ON LAND ADJACENT TO 51 SEAS END ROAD, MOULTON SEAS END

**FINAL REPORT**

**ECL0293a/JULIAN WARRICK**

**DATE JULY 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 BLM Builders in respect of a residential development that consists of three dwellings on land adjacent to 51 Seas End Road, Moulton Seas End.

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

Outline approval for two dwellings was granted in August 2021. The findings and recommendations of this Flood Risk Assessment are consistent with Flood Risk Assessment prepared to support the Outline Application.

# 2.0 SITE LOCATION AND DESCRIPTION

## 2.1 Site Location

The site is located on land adjacent to 51 Seas End Road, Moulton Seas End, Spalding, Lincolnshire, PE12 6LD. The National Grid Reference of the site is 53221/32722.

The location of the site is shown in Figure 1.

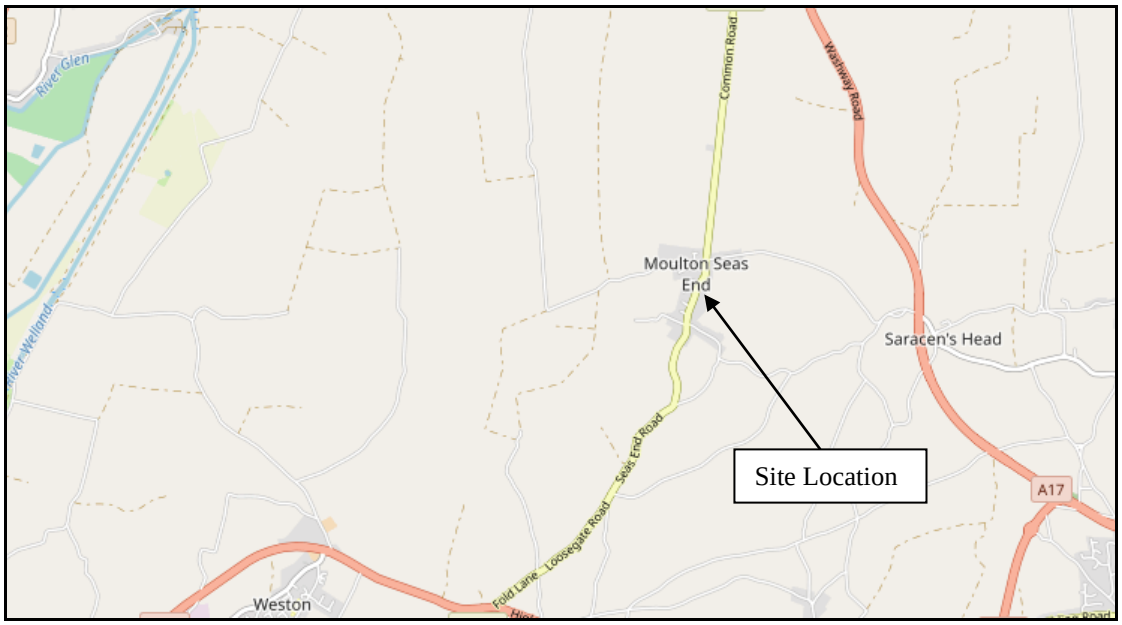



Figure 1 – Location Plan (© OpenStreetMap contributors)

## 2.2 Existing Site

The site is located on land to the east of Seas End Road to the rear of an existing war memorial. The site is currently a grass paddock. The area of development is approximately 0.12 hectares.

Environment Agency LIDAR show that site levels vary between +3.2m OD and +3.8m OD with the higher levels towards the western boundary of the site closest to Seas End Road. The level of Seas End Road adjacent to the site is +3.8m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. Surface water at the site naturally drains through soakaway and hence to the IDB drain system. There is a riparian drain approximately 70m south east of the site. The nearest IDB Watercourse is 300m south east of the site.

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

## 2.3 Proposed Development

The proposed development consists of three new dwellings. The dwellings will be detached, two dwellings will be single storey and the other will have two storeys.

## 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 partly located within Flood Zone 3, an area with a high probability of flooding.

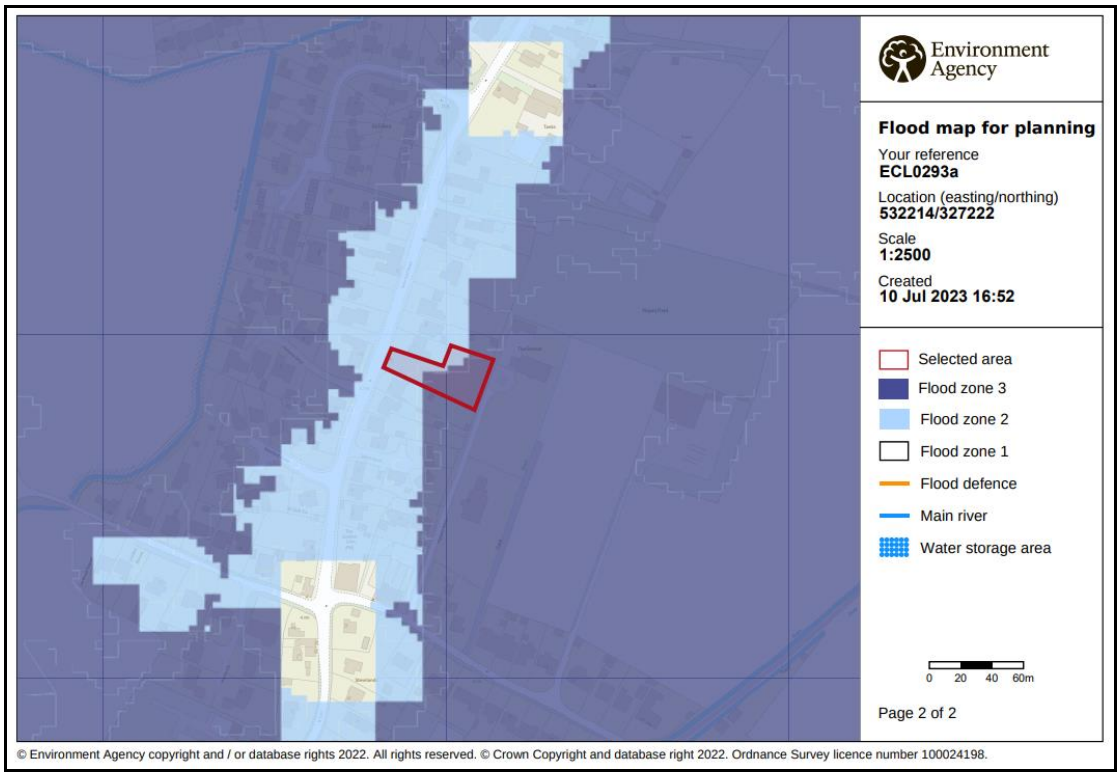



Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site is within areas with a low risk of flooding from rivers or the sea (annual probability between 0.1% and 1%) and 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 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 | The site is outside the 'Low Hazard' area | The site is in 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 of flooding. | The peak flood depth at the site is between 0.0m and 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

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 between the River Welland and River Nene 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 present day 1% fluvial 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.

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 development site within the South Holland Internal Drainage Board is protected by the River Welland tidal defences between Spalding and Fossdyke. The defences are 4.3 km north west of the site and minimum embankment levels of +7.0m OD.

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 South Holland IDB. There is an IDB Ordinary Watercourse 300m south east of the site. The site and the surrounding land are within the Lords catchment and drain in a northerly direction to discharge to the River Welland at Lords Sluice Outfall.

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 South Holland 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 1.

| Source of Flooding | Level of Risk |
|---|---|
| Drainage Network Flooding | This risk is assessed in Section 4.3. |
| Surface Water Flooding | Based upon the Environment Agency maps the site is not at risk of surface water flooding. |
| Fluvial Flooding | The risk of fluvial flooding is assessed in Section 4.3 and 4.5 |
| Tidal Flooding | The site is not at risk of tidal flooding is assessed in Section 4.3 and 4.5 |
| Reservoir Flooding | Based upon the Environment Agency Long term Flood Risk Maps the site is not at risk of reservoir flooding. |
| 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 in the South Holland IDB drainage system is low due to the maintenance standards achieved and managed by

the IDB. Failure of Lord's Sluice Outfall could lead to an increased level of risk at the site.

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 South Holland IDB main drains incorporating freeboard. This freeboard provides storage during the exceedance events.

The site is within an area benefitting from defences. The River Welland tidal defences provide protection during a 0.5% annual probability (1 in 200 chance each year) 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 tide levels.

The flood level in the River Welland at Fossdyke during the 0.5% annual probability (1 in 200 chance each year) event inclusive of climate change to 2069 is estimated to be 6.41m AOD. The minimum defence level of the River Welland embankments is 7.0m AOD.

In summary the site is not at risk for the design life of the development (i.e. 100 years).

## 4.6 Residual Risk

The South East Lincolnshire SFRA includes maps demonstrating the impact of climate change in 2116. The Residual Peak Depth maps within the SFRA indicate the maximum flood depths associated with a breach of the tidal defences. 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 100 chance each year) tidal event the peak flood depth at the site is between 0.0m and 0.25m.

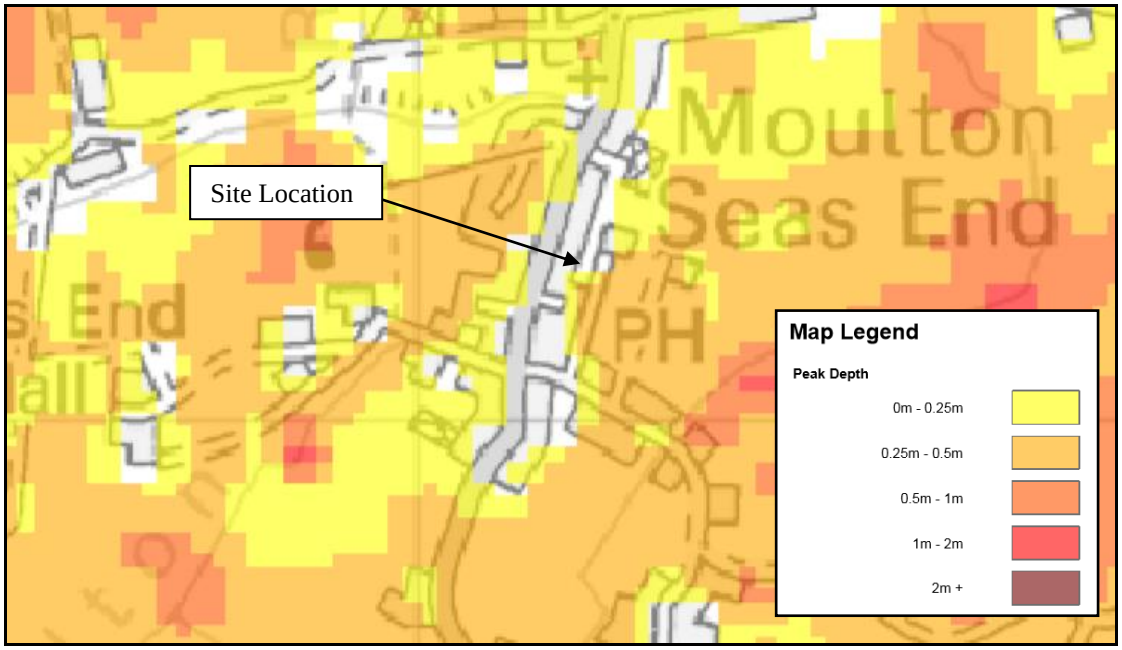



Figure 3 – SFRA 2115 Residual Peak Depth Map during the 1% fluvial and 0.5% tidal Annual Probability Event

The proposed development includes single storey dwellings and therefore the finished floor levels need to consider the 0.1% annual probability (1 in 1000 chance each year) event in 2115. The South East Lincolnshire SFRA includes 0.1% annual probability (1 in 1000 chance each year) maps for specific locations but theses do not cover the site. Through a comparison of flood depths during the 1% and 0.1% annual probability events for 2115 for the areas that the maps cover it can be estimated that the flood depths are 0.1m higher for the more extreme event. A peak flood depth of up to 0.35m could therefore be anticipated during the 0.1% annual probability (1 in 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 Lords Sluice Outfall 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 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 from overtopping of the defences.

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.

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.

These risks will be addressed through the mitigation measures set out below.

## 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 single storey dwellings is 0.4m above surrounding site levels and the floor level of the two storey dwelling is 0.3m above surrounding site levels. It is recommended that there is flood resilient construction to a height 0.3m above finished floor level.

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.

During an exceedance event it is anticipated that sufficient time would be available to take precautionary actions to limit the potential impact of flooding.

Should there be a failure of Lords Sluice Outfall 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 is for three residential dwellings on Seas End Road, Moulton on Sea.

- 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 partly within 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) tidal event including climate change.

- It is recommended that the finished floor levels of the single storey dwellings are 0.4m above surrounding site levels and the finished floor level of the two storey dwelling is 0.3m above surrounding site levels. There should be 0.3m of flood resilient construction above finished floor level.

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

# ATTACHMENT 1

# BLOCK PLAN
# (Dwg J185-SK 1B)




BLOCK PLAN

PROPOSED RESIDENTIAL DEVELOPMENT
3 PLOTS ADJACENT 51 SEAS END ROAD
MOULTON SEAS END SPALDING LINCS for
BLM BUILDERS

DO NOT SCALE FROM THIS DRAWING

| | | |
|---|---|---|
| A | LAYOUT ALTERATIONS | JUN 23 |
| B | PLOT 1 & 2 AMENDMENTS | JUN 23 |

BLOCK PLANS

| | |
|---|---|
| 1/200 1/1250 | 14/6/23 |

# J185-SK 1B

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