FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
THE RISING SUN, GEDNEY DROVE END

FINAL REPORT

ECL0319/ANDREW M WRIGHT 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 A Chase in respect of a residential development at the Rising Sun, Gedney Drove End.

A planning application for the proposed development is to be submitted by Martin M Wright Ltd.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at The Rising Sun, Pit Lane, Gedney Drove End, Lincolnshire, PE12 9PG. The National Grid Reference of the site is 54635/32921.

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 the southern side of Pit Lane. The land is part of the garden of The Rising Sun public house. The area of development is approximately 0.03 hectares.

A topographic survey of the site has been undertaken and is provided in Attachment 1. Ground levels are typically between +3.6m OD and +3.8m OD. Marsh Road, which is to the east of the site, is at a level of +3.8m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. Surface water at the site would naturally drain through soakaway and hence to the IDB drainage system. There is an IDB High Priority Watercourse approximately 75m south east of the site.

The online British Geological Survey maps indicate that the site is likely to be underlain by Ampthill 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 up to two new dwellings. The dwellings will have a minimum of two storeys and use an existing access to Pit Lane.

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

The site is 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.

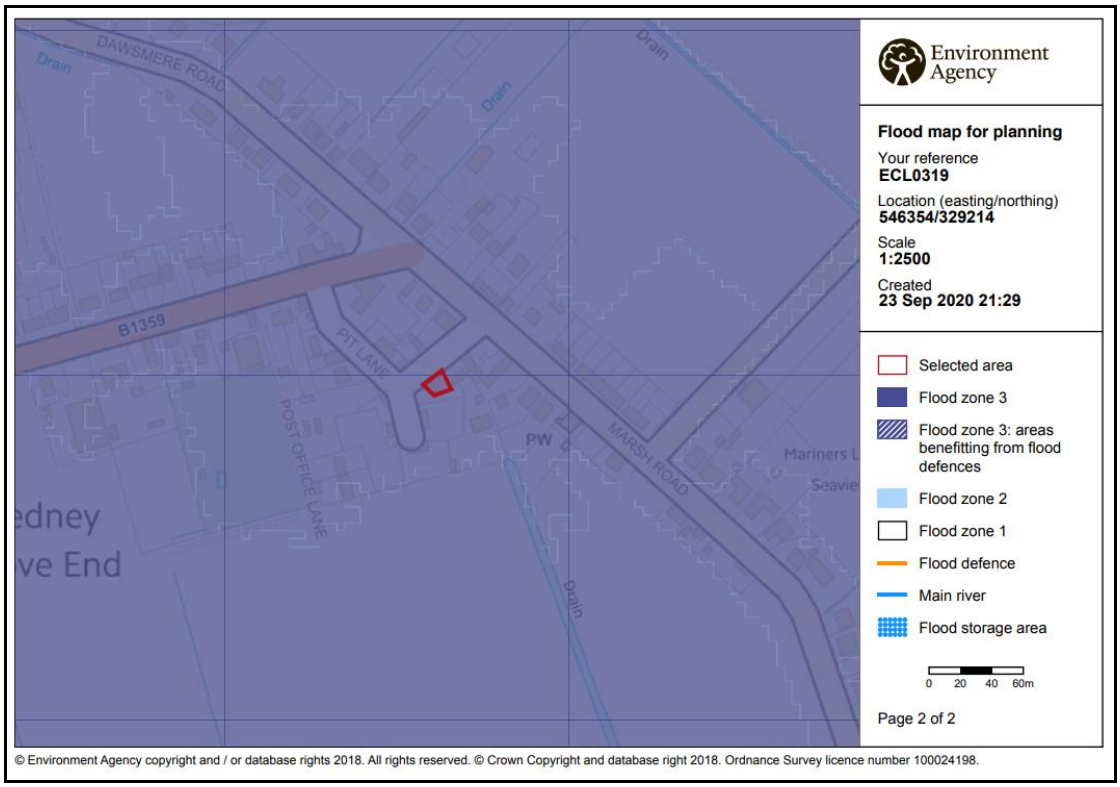


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a low risk of flooding from rivers or the sea (annual probability between 0.1% and 1%);
- 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 in the 'Danger for All' area	The site is in the 'Danger for All' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal	The site has a peak flood depth between 1.0m and 2.0m	The site has a peak flood depth greater than 2.0m

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

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, taking advice from the Environment Agency as appropriate, to consider 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. At this location it is not possible to position the development on higher ground within the proposed site.

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 breach information contained within the SFRA demonstrates that during the present day 0.5% tidal breach event, all of Gedney Drove End is at risk with depths between 1m and 2m. Consequently, there would be no sites with a lower risk of flooding within Gedney Drove End as 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 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 South Holland IDB district is protected by the Wash tidal defences along the Gedney Marsh frontage with embankment levels at a minimum of +7.0m OD. The Wash tidal defences are approximately 1km from the site. The River Nene tidal defences are approximately 4km to the south east of the site. The River Welland tidal defences are approximately 12km to the north west of the site. All three 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 South Holland IDB. There is an IDB High Priority Watercourse 75m south east of the site. The site and the surrounding land are within the Lutton Leam catchment and drains in a south easterly direction to discharge to the tidal River Nene at the Lutton Leam Tidal Sluice.

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

The potential sources of flooding that have been identified during this assessment are:

- local blockages to the IDB drainage system;
- an event in the local drainage network that exceeds the standard of protection;
- failure of Lutton Leam Tidal Sluice; and
- overtopping and breaching of the Wash, River Nene, or River Welland tidal defences.

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.

The standard of drainage provided by South Holland 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 South Holland IDB high priority watercourses incorporating a freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

The Environment Agency Long Term Flood Risk Maps show that part of the site has a low risk of flooding from surface water. During events with a low annual probability, flood depths up to 0.3m can occur.

The site is within an area benefitting from defences. The flood embankments to the Wash and the River Nene and River Welland tidal defences provide protection during a 0.5% annual probability (1 in 200 chance each year) event. The flood risk from the Wash is lowered further by second line defences and various informal banks constructed during the reclamation of Gedney Marsh.

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 tide levels.

The tidal flood level during the 0.5% annual probability (1 in 200 chance each year) event inclusive of climate change to 2115 is estimated to be 7.2m AOD. The minimum defence level of the Wash, River Nene, and River Welland embankments is 7.0m AOD. During such an event wave and wind action is likely to cause overtopping. However, the second line defences with embankment levels of 6.0m AOD would further reduce the probability of flood water reaching the development site.

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 200 chance each year) tidal event the peak depth at the site would be greater than 2.0m. An extract from this map is shown in Figure 3.



Figure 3 – SFRA 2116 Residual Peak Depth Map

The Environment Agency LIDAR data shows that the Marsh Road, to the east of the site, is typically at +3.8m OD. The flood depth on Marsh Road is between 1.0m and 2.0m. The maximum flood level is estimated to be +5.8m OD with a depth of flooding of between 2.0m and 2.2m at the site.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Lutton Leam Tidal Sluice 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 the risk to the site from overtopping of the defences is low.

The SFRA considers the residual risk associated with a breach in the defences in 2116. The maps show that the peak flood depth at the site is greater than 2.0m and based upon terrain data is estimated to be 2.2m.

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 proposed mitigation measures follow the South East Lincolnshire Standing Advice Matrix. Based upon the information available during the preparation of this flood risk assessment, to mitigate against the remote risk of flooding it is recommended that:

- the development is a minimum two storeys with no ground floor habitable accommodation;
- the first floor living accommodation has a minimum floor level of +5.8m OD; and
- there is flood resilient construction to a height of +5.8m OD.

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 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 occupiers of the dwellings should register with the Floodline Direct Warnings Service to receive any future 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 Lutton Leam Tidal Sluice 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 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 consists of up to two dwellings that will have a minimum of two storeys.

- The proposed development is in a defended floodplain. It is in the floodplain of the Wash, River Nene, and River Welland tidal defences and protected during the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 200) tidal event.

- 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 South Holland IDB high priority watercourses incorporating a significant freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

- To mitigate the risk of a breach in the tidal defences it is recommended that there is no habitable accommodation on the ground floor, the first floor is at a minimum level of +5.8m OD and there is flood resilient construction to a level of +5.8m OD.

- 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

TOPOGRAPHIC SURVEY
THE RISING SUN, GEDNEY DROVE END
(Dwg 7638-1)

Station	Easting	Northing	Level
7638-1	546385.261	329259.648	3.920
7638-2	546340.877	329214.052	3.392
7638-3	546379.282	329225.219	3.996
7638-4	546361.808	329210.294	3.839



The depiction of a wall, fence or hedge does not necessarily represent a legal boundary. It is the clients responsibility to confirm legal boundaries with the vendor.

Unless previously agreed, all services existing on site have been surveyed apart from where access is restricted by vehicles or other significant obstructions.

If applicable, manhole covers will be lifted unless this significantly obstructs the flow of traffic or vehicular access.
Manhole will not be lifted if this were to present any health & Safety risk to staff or the public. Irreplaceable or cracked covers will not be lifted.
All pipe directions are indicative only and have not been proved unless specifically instructed.
For safety reasons, pipe sizes and directions are estimated from above ground and are therefore approximate values.

All drawing units, levels and dimensions are in metres, unless otherwise stated.

The data used for the computation of the horizontal and vertical control for this survey was recorded using our survey grade GNSS receivers.
This data was provided by Leica Geosystems Smartnet RTK correction service.
Therefore primary survey control is based on OSGB36(15)

A scale factor of 1 has been applied to this survey which has been based on station 1 and referenced to station 2

Plotting on paper may lead to a variety of scaling risks/errors due to paper stretching or inaccurate plotter settings etc.
Therefore any dimensions scaled from a paper reproduction of this survey should be treated with caution.
This drawing must be used in conjunction with all other relevant documentation.

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JOB TITLE
Topographic survey at The Rising Sun, Gedney Drove End

SHEET SIZE & SCALE	*DATE SURVEYED*	*DRAWN BY*
A2@1:200	SEP 2020	SL

DRAWING NUMBER
7638-1

CLIENT
Andrew M Wright Ltd