FLOOD RISK ASSESSMENT
FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENT
AT SUTTON BRIDGE CONSTITUTIONAL CLUB

FINAL REPORT

ECL0139a/G R MERCHANT LTD

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ELLINGHAM CONSULTING LTD
Email: tim@ellinghamconsulting.co.uk

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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 G R Merchant Ltd in respect of a development that consists of two commercial units and two residential dwellings at Sutton Bridge Constitutional Club, Bridge Road.

A planning application for the proposed development is to be submitted by G R Merchant Ltd.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at Sutton Bridge Constitutional Club, Bridge Road, Sutton Bridge, Lincolnshire, PE12 9SA. The National Grid Reference of the site is 54779/32130.

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 Bridge Road and is used for car parking. The area of development is approximately 0.03 hectares.

Environment Agency LIDAR information shows that the site has a shallow slope downwards away from Bridge Road. The level at the northern extent of the site is +3.9m OD and the level of the southern extent and the level of Bridge Road is +4.3m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. The site and the surrounding land are within the Westmere catchment and discharges under gravity to the tidal River Nene at the Westmere Tidal Sluice.

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 two commercial units on the ground floor and two residential dwellings on the first floor. The proposed site plan is shown 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

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 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 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 'Danger for All' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal	The site is outside the area at risk of flooding.	The peak flood depth is between 1.0m and 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

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

Large parts of the South Holland district that are near the River Nene lie within Flood Zone 3. As such, the 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 River Nene has defences that provide protection during the 0.5% annual probability (1 in 200 chance each year) event including climate change. Therefore the 'actual risk' of flooding at the site is low 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 site is 470m west of the tidal River Nene. The site is protected by the River Nene tidal defences through Sutton Bridge. The River Nene is 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 Pipeline approximately 600m north west of the site. The site and the surrounding land are within the Westmere catchment and discharge to the tidal River Nene at the Westmere Tidal Sluice. The site is 1.3km north of the South Holland Main Drain.

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 South Holland IDB drainage system;
- an event in the local drainage network greater that exceeds the standard of protection;
- failure of Westmere Tidal Sluice; and
- overtopping and/or breaching of the tidal River Nene.

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 site benefits from defences on the River Nene that provide protection during a 0.5% annual probability (1 in 200 chance each year) tidal event and a 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.

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 in the River Nene.

The River Nene tidal defences have been designed to include an allowance for climate change. In summary the site is not at risk for the design life of the development (i.e. 100 years).

4.6 Residual Risk

There is a residual risk of flooding at the site should a breach of the tidal defences occur. The South East Lincolnshire SFRA includes maps demonstrating the residual peak depth in 2116. When climate change allowances are applied to the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 100 chance each year) tidal event the peak depth at the site from direct overtopping together with breach failure is between 1.0m and 2.0m. An extract from this map is shown in Figure 3 below.



Figure 3 – SFRA 2115 Residual Peak Depth Map

To determine the actual depth of flooding at site during a breach the Environment Agency LIDAR data has been used. The level of Bridge Road adjacent to the site is +4.3m OD and the peak flood depth is 0.5m to 1.0m. Based upon this ground level and the peak flood depth at this location a peak flood level of +5.3m can be estimated. The peak flood depth on the lowest part of the site would be 1.4m.

5.0 FLOOD RISK MITIGATION AND RESIDUAL RISKS

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Westmere 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 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 overtopping and a breach in the defences in 2116. The maps show that the peak flood depth at the site is between 1.0m and 2.0m and a peak depth of 1.4m on the lowest part of the site has been estimated.

Any increase in impermeable area associated with the development will be minimal so there is no potential that flood risk will be increased elsewhere due to surface water.

5.2 Mitigation Measures

The proposed mitigation measures follow the South East Lincolnshire Standing Advice Matrix. The advice for commercial premises states that "Single storey buildings should be built with finished floor levels above the flood level. If this is not practical an area of safe refuge will need to be provided or an appropriate flood warning and evacuation plan will need to be submitted and approved by the LPA".

The approach followed to develop mitigation is based upon:

- it is not practicable to build finished floor levels above the flood level due to the proposed residential units above;
- provision of either a safe refuge or an appropriate flood warning and evacuation plan have been considered
- it is not practicable to provide a safe refuge above the flood level due to the proposed residential units; and
- an appropriate flood warning and evacuation plan will be submitted to the LPA.

Based upon the information available during the preparation of this flood risk assessment:

- the finished floor level of the commercial units should be raised as high as practicable (a minimum of 0.3m above ground level);
- there is flood resilient construction to a height of 0.3m above the finished floor level of the commercial units;

- a flood warning and evacuation plan for the commercial units has been prepared and is provided in Attachment 2; and
- there are no specific recommendations for the residential dwellings on the basis that they do not have any ground floor habitable accommodation and the first floor living accommodation is above the height of the highest predicted flood depth.

The developer should ensure that the occupiers of the dwellings and users of the commercial units 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 and users of the commercial units should register with the Floodline Direct Warnings Service to receive any future flood warnings.

During an extreme 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 Westmere 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 is in a defended floodplain. It is in the floodplain of the tidal River Nene and protected during the 0.5% annual probability (1 in 200 chance each year) tidal event. During the design life of the development, including an allowance for climate change, it is not anticipated that there would be flooding at the site.

- 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).

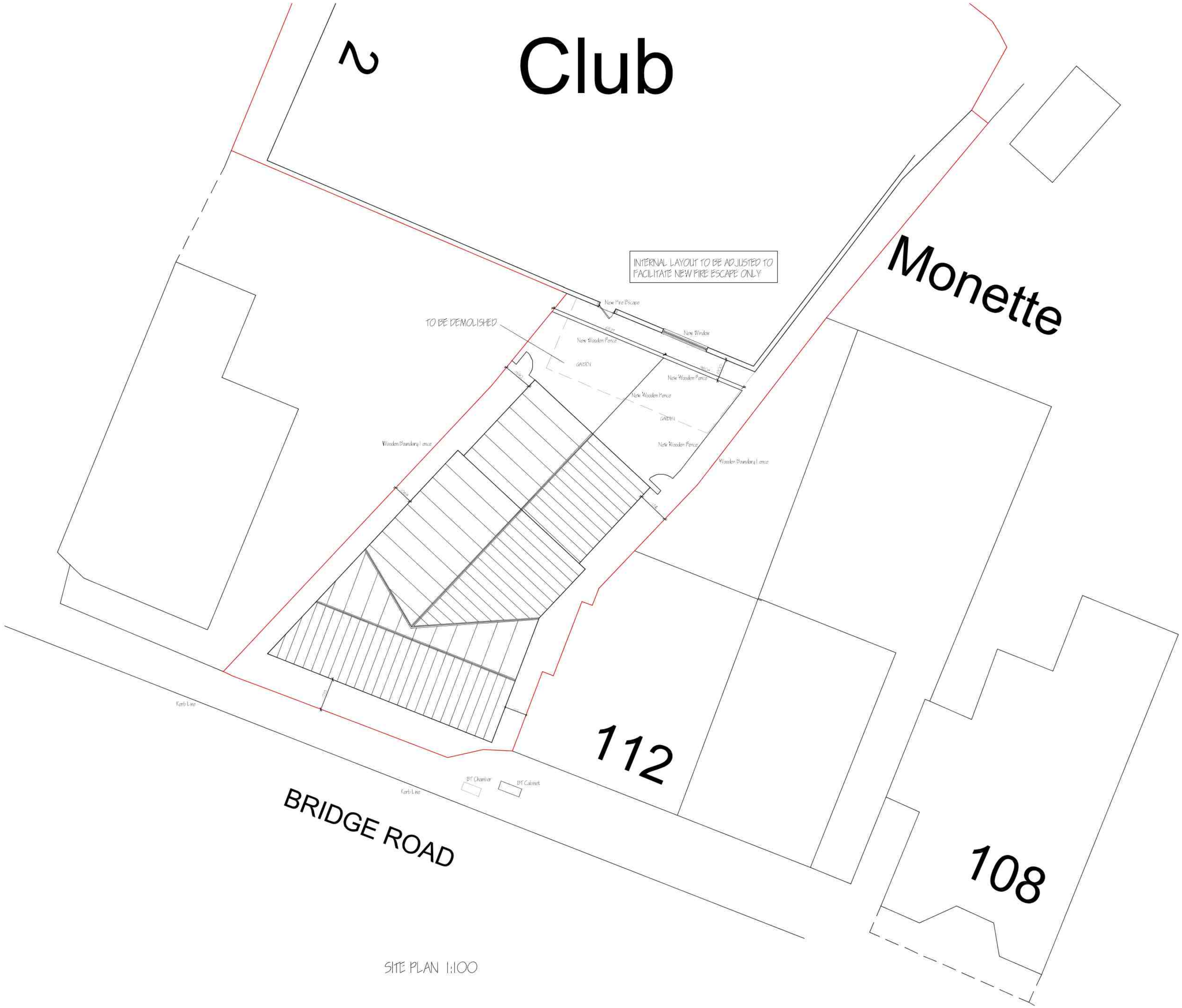
- The finished floor level of the commercial units should be raised as high as practicable (a minimum of 0.3m above ground level) and there should be flood resilient construction to a height of 0.3m above the finished floor level. A flood warning and evacuation plan has been prepared for the commercial units. There are no specific recommendations for the residential dwellings.

- 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 PROPOSED
(Dwg 3571/19-03)



SITE PLAN 1:100

ref:	revision	date

G. R. MERCHANT LTD.
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ARCHITECTURAL, STRUCTURAL AND LAND DRAINAGE CONSULTANTS

4 Wrights Mews
12A Park Road, Holbeach,
Spalding, Lincs. PE12 7EE
Tel: 01406 490800
Fax: 01406 425744
E-Mail: gr.merchant@btconnect.com

Project
PROPOSED DEVELOPMENT
BRIDGE ROAD
SUTTON BRIDGE
SPALDING, LINCS. PE12 9RA

Client
SUTTON BRIDGE CONSTITUTIONAL CLUB

Drawing
PART SITE PLAN - PROPOSED LOCATION PLAN

Job Ref.	Drawing No.
3571-19	03
Date	**Drawn**
OCT 2019	SLB

Scales
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ATTACHMENT 2

FLOOD WARNING AND EVACUATION PLAN

Flood Warning and Evacuation Plan for:
Constitutional Club, Bridge Road, Sutton Bridge, Lincolnshire, PE12 9SA. The development consists of two commercial units and the National Grid Reference of the site is 54779/32130.

Flood Risk and Flood Warning Area	
This development is in an area at risk of flooding. The site is in Flood Zone 3 of the Environment Agency Flood Map for Planning and in a "Danger for Most" hazard area of the South East Lincolnshire Strategic Flood Risk Assessment. The site is protected by flood defences however is at risk if the existing defences were overtopped or breached.	
You should be signed up to receive free notifications from the Environment Agency's flood warning service Floodline	
This flood warning area is called:	"Tidal River Nene in Sutton Bridge"
To sign up or get latest flood information call **0345 988 1188** or online www.gov.uk/flood	

Categories of Flood Warning	
There are three categories of flood warning.	
Flood Alert	Flooding is possible. Be prepared.
Flood Warning	Flooding is expected. Immediate action required.
Sever Flood Warning	Severe flooding. Danger to life.

If a flood warning is received take the following action:
• Listen to local radio for latest information – KLFM 96.7 / Radio Lincolnshire 94.9 • Charge mobile phones in case you need to evacuate. • Know how to turn off your gas, electricity and water. • Pack a "flood kit" in case you need to leave. Include phone numbers, insurance documents, bankcards and personal items. • Install any property level flood protection e.g. flood boards or gates. • Listen to the emergency services – if you are asked to evacuate or a severe flood warning is issued, evacuate without delay. DO NOT WAIT FOR THE HIGH TIDE

If evacuation is required, then take the following actions:
Relocate to higher ground taking a safe route to avoid any flooding. The best route from this property is:
Evacuation from the development should be in a westerly direction along Bridge Road towards Long Sutton. The area to the south west of Long Sutton is at a lower risk and the villages of Sutton St James and Tydd St Mary outside of the area at risk.
• Before evacuating make premises secure and take valuables with you • Tell friends and family where you are going • Avoid contact with flood water and wash your hands regularly • Do not return until the emergency services say it is safe to do so

Useful contacts:
Floodline – for latest flood information call **0345 988 1188** or www.gov.uk/flood
Lincolnshire Prepared – for information on how floods are responded to in Lincolnshire and how to prepare for evacuation www.lincolnshire.gov.uk/lincolnshire-prepared