FLOOD RISK ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT, SEAGATE ROAD, LONG SUTTON

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DOCUMENT HISTORY

ISSUE NO	COMMENTS	DATE

1 INTRODUCTION

1.1 This Flood Risk Assessment (FRA) has been prepared to accompany a full planning application for a proposed residential development at land to Seagate Road, Long Sutton, Spalding, Lincolnshire.

1.2 The site (Los015) is allocated for residential development in the South East Lincolnshire local plan and has previously been granted planning permission for a large residential development of approximately 215 dwellings, South Holland District Council Reference H11-1207-17.

1.3 The Government has placed increasing priority on the need to take full account of the risks associated with flooding at all stages of the planning and development process. This course of action seeks to reduce the future damage to property and risk to life resulting from incidents of flooding. National Planning Policy does not prevent all development in flood risk areas as this would be unsustainable and result in economic stagnation, depriving existing communities of much needed homes, services, employment opportunities etc. It is in the essential interests of the vitality of settlements and for the wider economic and social wellbeing of the community, that development opportunities are not unnecessarily constrained. Accordingly, the aims of this site-specific FRA will be as follows:

- Identify and address flood risk issues associated with the development.
- Assess if the project is likely to be affected by flooding from all relevant sources both now and in the future.
- Demonstrate that the project is safe and where possible, reduces flood risk.
- Propose measures to deal with the identified effects and risks.

2 SITE LOCATION

2.1 The site is approximately 1.13 hectares and is located to the north of Seagate Road in Long Sutton (See Figure 1). The grid reference for the site is TF 4322 SE. The site is allocated for residential development in the local plan as a part of site Los015.

2.2 The levels on site vary between 2.90m OD and 3.10m OD. The BGS geology of Britain Map suggests the geology is mainly clay.

2.3 The site is located in a mixed context formed of residential, agricultural and community uses. The land located directly to the south and east is allocated as countryside in the local plan. There is land further to the east that is allocated for existing employment areas as well as proposed. To the north of Long Sutton there is also land allocated for residential (Los008 & Los026) as well as some to the west (Los046) In the wider context the majority of the land to the north has a residential use. It has previously been granted planning permission for a large residential development of approximately 215 dwellings, South Holland District Council Reference H11-1207-17.

2.4 The site is located within Flood Zone 3a (See Figure 2). The Flood Map indicates the area at risk of flooding, assuming no flood defences exist, for a flood with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

2.5 The site is within a defended flood plain, as defined in Appendix 1 of the Environment Agency's "Policy and Practice for the Protection of Flood Plains", which is considered to be passive until such time that a flood greater than the defences can withstand occurs. The likelihood of flooding

occurring due to overtopping or failures of the defences is considered to be very low.



Figure 1- Aerial photograph showing the location of the site

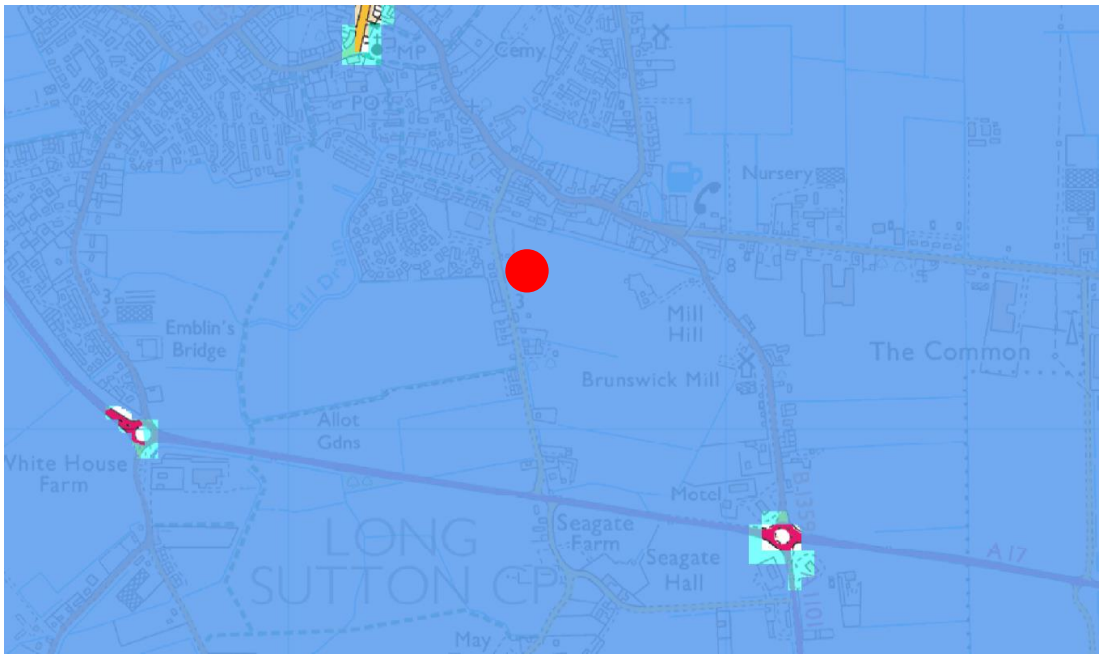


Figure 2- Extract from Flood Map showing the site located in flood Zone 3A

3 HISTORY OF FLOODING

3.1 The Environment Agency has advised that there are no records of flooding in this area. It is possible recent flooding may have occurred, but they have no information relating to this. No evidence has been discovered of the site or any adjoining properties having been flooded in the past.

4 PROPOSED SCHEME

4.1 The proposed development involves the erection of 9 dwellings and formation of new access.

5 SEQUENTIAL & EXCEPTIONS TESTS

5.1 Within the National Planning Policy Framework (NPPF) and its accompanying Planning Practice Guidance (PPG) there is an expectation that proposals within the flood zone should be subject to the Sequential Test, and if necessary, the Exception Test at the planning application stage. The Guidance provides advice to Local Planning Authorities (LPA's) to ensure the effective implementation of the planning policy set out in the NPPF on development in areas at risk of flooding. It states that the overall aim should be to steer new development to Flood Zone 1 but adds that where there are no reasonably available sites in Flood Zone 1, LPA's allocating land in local plans or determining planning applications for development at any particular location should take into account the flood risk vulnerability of land uses (as set out in Table 2 of the document) and consider reasonably available sites in Flood Zone 2, applying the Exception Test if required.

5.2 Paragraph 3.2.2 of the Local Plan confirms that as large parts of South East Lincolnshire, are at high risk of flooding, a sequential approach to flood risk has been applied to inform the spatial strategy. Accordingly, Policy 4 (Approach to Flood Risk) states that the sequential test is not required for

sites allocated in the Local Plan. This Policy does still require the exception test to be passed and this is discussed in the following section.

5.3 Policy 4 also provides further guidance on what is required within a site-specific FRA and this has been taken into consideration during the preparation of this document.

5.4 The PPG discusses the concept of flood risk vulnerability and flood zone compatibility, providing a mechanism for assessing the appropriateness of proposed uses against the various degrees of flood risk. Applying the likelihood of flooding identified from the flood maps to Table 1: Flood Zones of the PPG, the site falls into Zone 3, classified as having a 'high' probability of flooding. Table 2: Flood Risk Vulnerability Classification, classifies the proposed residential use as 'more vulnerable'. Table 3: Flood Risk Vulnerability and Flood Zone 'Compatibility' compares the Flood Zone classification from Table 1 against the Vulnerability Classification from Table 2. Table 3 (reproduced below) confirms that the proposed dwellings are appropriate in Flood Zone 3 subject to passing the Exception Test.

FLOOD RISK VULNERABILITY AND FLOOD ZONE 'COMPATIBILITY' *Source: PPG, Table 3*					
Flood Risk Vulnerability classification (Table 2)	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water compatible
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	Exception Test Required	✓	✓	✓
Flood Zone 3a	Exception Test Required	✗	**Exception Test Required**	✓	✓
Flood Zone 3b 'Functional Floodplain,	Exception Test Required	✗	✗	✗	✓

5.5 Therefore it can be seen that for "More vulnerable" development the sequential and the exception tests need to be applied to the development.

5.5 There are two parts to the Exception Test, and both need to be passed for a development to be considered acceptable. The two parts of the Test require proposed development to show that it will provide wider sustainability benefits to the community that outweigh flood risk and that it will be safe for its lifetime; without increasing flood risk elsewhere and where possible reduce flood risk overall.

5.6 In relation to the first aspect (community benefit), the proposed scheme includes the provision of 9 dwellings to address the current need for affordable dwellings within Long Sutton. The community benefits of the scheme are therefore considered to be significant.

5.7 In relation to the second aspect of the test (safety), this Flood Risk Assessment has been prepared in accordance with the NPPF and accompanying PPG. Later in this document it will be demonstrated the mitigation measures proposed are appropriate to the type of development and that users of the site will be safe. The amount of impermeable area within the site will be increased as a result of the development, affecting surface water runoff. As such a surface water strategy, based on sustainable drainage methods, has been produced and is submitted as part of the planning application documents. As a result of this strategy, it is considered that the proposed scheme will have no adverse effect on the floodplain and will not increase the risk of flooding elsewhere.

5.8 Both the sequential and exception tests have been demonstrated as part of the sites previously approved planning application South Holland District Council Reference H11-1207-17. It is therefore considered that both tests are also passed for this application.

6 ASSESSMENT OF POTENTIAL SOURCES OF FLOODING AND MITIGATION MEASURES

6.0 This section presents an assessment of Flood Risk to the development from external sources;

TABLE 1: POSSIBLE FLOODING MECHANISMS

Source	Significant?	Comment
Fluvial	Low	Distance form water courses
Tidal/Coastal	Low	If a breach of the defences occurs
Pluvial (drainage)	No	On site run off
Groundwater	Low	Unlikely due to local drainage network
Overland flow	Low	No higher ground adjacent to the site
Blockage	Low	No culverts or bridges close to the site
Infrastructure failure	Low	No major infrastructure has been identified
Rainfall ponding	No	No depressed areas which could encourage ponding.

6.1 The major potential source of flooding to the site is Fluvial, from the nearby River Nene

6.2 The west bank of the River Nene is approximately 4.4 km east of the site of the proposed development, and the Wash Banks are 10km north of the site at their nearest point. The hazard from the River Nene east of the development site if a breach occurred in the length of bank between the South Holland Main Drain Outfall and the A17 bridge will be considered to be the major risk to the site.

6.3 The maps in the SFRA do not predict any actual flooding to this area of Long Sutton in either the present day or 2115 in a 1 in 200 year event.

6.4 The maps supplied by the Environment Agency predict flood depths of between 500mm and 1.0 metre if a breach were to occur in a 1 in 200 year event in 2115. It is likely that this flood water will take at least 24 hours to reach the site, during which time residents will have been warned of the eventuality. The EA breach mapping also assumes no attempt is made to immediately repair the breach. It is also likely that the EA will undertake further bank raising within the next 100 years to ensure that there is a continuing 1 in 200 year defence to Long Sutton and Sutton Bridge.

SUMMARY OF HAZARD MAPS			
Breach Scenario	**Hazard Rating**	**Max Depth (m)**	**Max Velocity (m/s)**
Year 2006, 1 in 200 (0.5%)	'Low Hazard'	n/a	n/a
Year 2006, 1 in 1000 (0.1%)	'Danger for Some'	0.00 – 0.25	0.00 – 0.30
Year 2115, 1 in 200 (0.5%)	'Danger for Most'	0.50 – 1.00	1.00 – 1.50
Year 2115, 1 in 1000 (0.1%)	'Danger for Most'	0.50 – 1.00	1.00 – 1.50

6.5 The most relevant hazards shown on Table 2 are the Breach Event for the year 2115 0.5% Breach scenarios (highlighted in red) which show a maximum flood depth of 0.5m - 1.0m.

6.6 The Hazard Maps are based on computer modelling of simulated breaches at specific locations. Although these maps show a theoretical risk of flooding to the site should a breach occur, they do not consider the likelihood of a breach occurring. The likelihood of a breach occurring will depend on several factors, including the construction and condition of the defences in the area. It is understood that the tidal defences protecting this site consist of earth embankments on the Tidal Haven and earth embankments which are supplemented by saltmarsh on the coast to maintain foreshore levels. The Environment Agency have advised that

these defences are in good condition and reduce the risk of flooding to a 0.67% (1 in 150) chance of occurring in any year. The defences are inspected routinely to ensure potential defects are identified.

6.8 With the condition and maintenance of the defences in mind, it is considered that the likelihood of them breaching is low. However, mitigation measures (discussed later in Section 6.11) should still be considered.

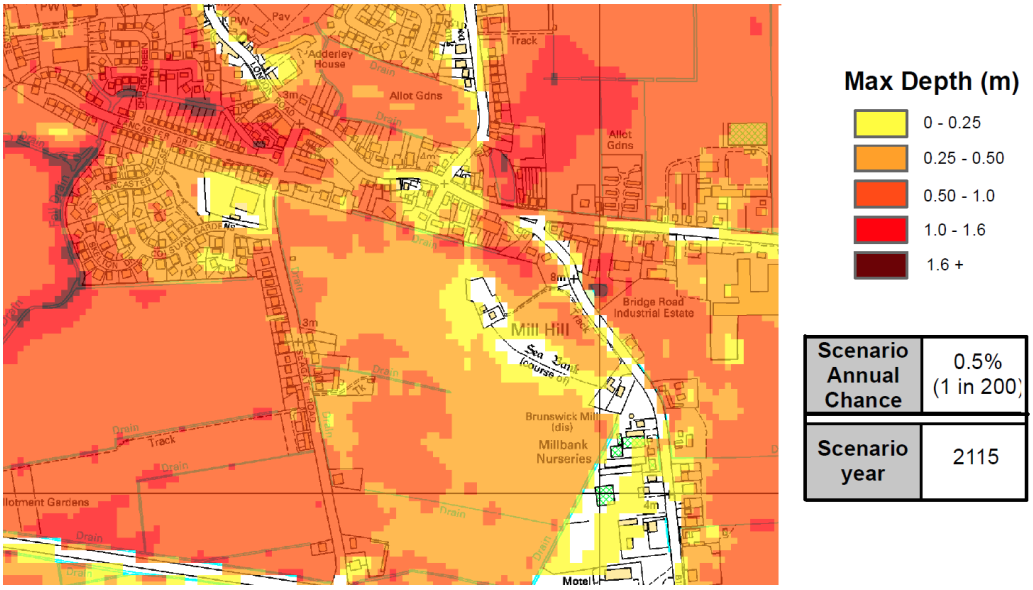
6.9 Potential Flood Risk from Elsewhere

6.9.1 Flood risk from other locations is considered to be low. The area is not known to suffer from any ground water problems, but the water is to drain into existing water course.

6.10 Summary of Risk of Flooding to the Site

6.10.1 The main risk of flooding is fluvial, if a breach were to occur in the west bank of the River Nene. The risk of this happening along this section of bank can be considered to be low. The bank has a wide top and bank slopes are not steep.

6.10.2 The Hazard Maps show the predicted maximum depths in this area if a breach occurred in 2115 in a 1% fluvial and 0.5% tidal event probability.



6.10.3 The map above predicts flood depths of between 250mm and 1.0 metre across most of the site.

6.10.4 It has been concluded that the highest estimated flood level at this site is 3.70m OD in a 1 in 200 year event in 2115.

6.11 MITIGATION MEASURES AND DISCUSSION

6.11.1 The NPPF requires that a precautionary approach is adopted to ensure that development is safe and not exposed unnecessarily to flooding.

6.11.2 The Hazard Mapping shows that for the 2115 0.5% Breach scenario the predicted flood risks will be 0.25m-1.0m above the existing site levels, therefore mitigation measures should address this level of flood risk. The development should, therefore, incorporate the following mitigation measures;

- Finished Floor Level (FFL) set a minimum of 3.70m OD which was also agreed in the previous planning application, South Holland District Council Reference H11-1207-17.
- Flood resilient construction should be incorporated to a minimum height of 300mm above the predicted flood level, and all of the electrical installation should be a similar height above finished floor level.
- Avoid the use of plasterboard and gypsum plaster and use water resistant cement render or lime mortar, or fix the plasterboard horizontally to the ground floor walls.
- Avoid the use of absorbent cavity insulation to the ground floor level.
- Treated and sealed timber skirting and architraves.
- Arrange for all service circuits to be routed at first floor level where practical socket outlets, boilers etc. to be a minimum of 0.3m above the raised ground floor level.
- It is recommended that the site is registered with the Environment Agency's 'Warnings Direct' flood warning system. The Agency provides this flood warning service in England and Wales and supports the public taking action to prepare and respond when these warnings are issued. The warnings are provided for flooding from rivers and the sea but not for localised flash flooding that cannot be predicted, for example from blocked or overloaded sewers or local groundwater flooding. The Agency issues warnings through media on TV and radio weather bulletins and on its

website (www.environment-agency.gov.uk/floodline). In areas of particular risk, the Agency can send a warning message direct to people at home or at work by telephone, fax or pager using an Automatic Voice Messaging (AVM) system.

- Surface water from the roofs of the proposed properties should be discharged into soakaways and these should be designed to BRE Digest 365 and approved under Building regulations. The surface water from the roads in the development should be discharged into swales adjacent to these roads and this should be attenuated and discharged into the dyke on the western side of the development, subject to the consent of the South Holland IDB.
- All future owners and occupiers of the building should be given a copy of the Flood Risk Assessment so that they are fully aware of the risk of flooding in this area.

6.11.3 All these measures are in accordance with the previously approved application for the site, South Holland District Council Reference H11-1207-17.

7 CONCLUSION

7.1 The following conclusions, in relation to the questions posed at the start of this document, are as follows:

Identify and address flood risk issues associated with the proposed development:

The potential sources of flood risk have been discussed within this report. It has been established that main source of flooding to the site is if a breach were to occur in the west bank of the tidal River Nene. The risk of this happening along this section of bank can be considered to be low

Assess if the project is likely to be affected by flooding from all relevant sources both now and in the future:

The breach hazard maps show that the site is theoretically at risk of flooding up to a depth of 0.25m to 1.0m.

Demonstrate the project is safe and where possible reduces flood risk overall and proposes measures to deal with the identified effects and risks:

It is proposed that the ground floor levels will be set at least 3.70m OD which was also agreed in the previous planning application (South Holland District Council Reference H11-1207-17); with an additional 300mm (minimum) flood resilient construction. Flooding events are generally predicted, with warnings being given on pending events at least two hours in advance. There is a good road network in the town and surrounding area which would allow escape in the event of an unpredicted flooding event. If flooding did occur occupants could also escape to the first floor where they could await rescue if evacuation was not possible. It is considered that the risks to occupants and buildings are low and there is an adequate standard of protection against flooding for the anticipated life of the development.