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Flood Risk Assessment

Client Mr and Mrs Bartle

Address The Stables – Slothby Lane - Hogsthorpe

REVISION TABLE

DATE	DESCRIPTION	Revision	INITIALS
06.10.20	FOR APPROVAL	P1	I.B.
18.09.22	<i>Site Amended</i>	P2	I.B.

NOTES

Flood Risk Assessment to be read in conjunction with all Architect details

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Details of Building Design

1.1 Design of Flood Risk Assessment for Planning Application

DESIGN TEAM DETAILS

Client

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1.0 INTRODUCTION

Government Guidance states:

'Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere.'

To demonstrate the appropriateness of any new development in areas at risk of flooding a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

The requirements for flood risk assessments are generally as set out in the National Planning Policy Framework (NPPF) and the National Planning Policy Framework Planning Practice Guidance. The FRA should be commensurate with the risk of flooding to the proposed Development, for example, where the risk of flooding to the site is negligible (e.g. 'low probability' Flood Zone 1), there is little benefit to be gained in assessing the potential risk to life and/or property as a result of fluvial (river) flooding. Rather, emphasis should be placed on ensuring that runoff from the site does not exacerbate flooding lower than in the catchment.

This assessment has been produced in accordance with "Preparing a Flood Risk Assessment: Standing Guidance" by DEFRA and the Environment Agency.

This Flood Risk Assessment considers the impact of the proposed development in addition to the common ways in which flooding can occur. The conditions that currently exist in the location of the site are described, together with the methods used to identify and assess potential impacts caused from the development proposals.

Instruction has been received to produce a Flood Risk Assessment in support of a planning application for a proposed new detached dwelling and garage on a site off Sloothby High Lane, Hogsthorpe, Skegness, Lincolnshire PE24 5PG.

This report is for the sole use of the applicant and only in respect of the application for which it was prepared. The report is, in part, based upon information provided by others and on the assumption that all relevant information has been provided by those parties from whom it has been requested. Information obtained from any third party has not been independently verified unless otherwise stated in the report.

2.0 SITE DESCRIPTION

The site is located on the north side of Sloothby High Lane centred approximately on national grid reference TF 53393 71825. It is located to the South of the village of Hogsthorpe, close to the junction of the A52 and Sloothby High Lane.

The application site is approximately 85m x 50m and is currently grass paddocks with a detached stable block, which are part of a larger curtilage in the ownership of the applicant. To the east of the development site is the applicant's detached dwelling and workshops which were constructed following approval of East Lindsey District Council (ELDC) full planning application N/084/02351/12 (see fig 1 overleaf)

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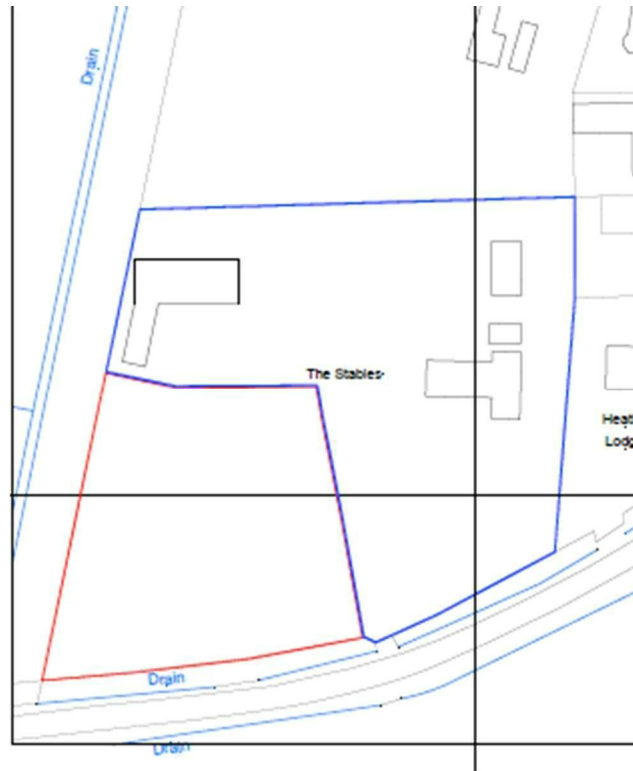


Fig.1. Site Location

Along the South boundary of the site is Slothby High lane alongside which is a surface water drain running along its entire length. Site access is via two culverted sections of the drain.

Topographically, the site sits at approximately 2.5m AOD in a notionally flat landscape. The site is within the coastal which is between 2m and 3m AOD. Local areas of high ground of up to 5 or 6m AOD include the western lands of Hogsthorpe (between West End and Thames Street)

There is a general fall of approximately 300mm from the West side of the site to the East and likewise a similar fall from the rear of the site to the front. The ground to the existing dwelling in the eastern part of the curtilage is built up approximately 450-650mm above the general site level with the FFL elevated a further 150mm, meaning the dwelling ground floor is approximately 600mm above the surrounding ground.

There are a number of watercourses in the relatively flat landscape which surrounds the site. The site lies approximately 100m north of the main river, Willoughby High Drain (rising as Burlands Beck). Four Hundred Acre

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Drain collects runoff from a series of land drainage ditches to the west of Hogsthorpe and flows southerly along the west boundary before turning east along the site frontage. and approximately 1.5km further east is Orby Drain.

The local drainage flows easterly and into the sea at Chapel St Leonards, where the North Sea is defended, approximately 3km east of the site.

The drains surrounding the site are maintained by Lindsey Marsh Internal Drainage Board.

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2.1 DEVELOPMENT PROPOSALS

At the time of writing the detailed design for the site and buildings have not been developed, however it is confirmed that a two-storey detached dwelling with separate, detached garage is proposed. The access to the proposed dwelling is anticipated to be via the western culvert crossing.

The applicant is the owner and occupant of the adjacent dwelling and it is proposed that the new dwelling would be occupied by a family member who has an interest in the joinery business that is based from the workshops on the adjacent plot, that approved under N/084/02351/12.

In the context of the National Planning Policy Framework the proposed use is classified 'More Vulnerable'. Further information is included in Section 6 for further info in respect of the Sequential and Exception tests.

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3.0 FLOOD RISK SUMMARY

Source of Flooding	Description	Significance of risk prior to mitigation			Mitigation Measures	Significance of risk post mitigation		
		L	M	H		L	M	H
Rivers	The site lies within Flood Zone 3a (unprotected). Burlands Beck and Hogs Beck contribute to Willoughby High Drain which may overtop/breach in extreme events			✓	Investigate modelled river levels for a range of events. Propose welfare FFL above 1 in 100 cc flood. Propose flood resilient construction measures and recommend flood action plan	✓		
Water Courses	Several Water courses contribute to the IDB system but are not known to affect the site		✓			✓		
Tidal/Coastal	The site is in flood zone 3a (unprotected) and is therefore classified as high-risk tidal flooding. The Lincolnshire coastal defences provide protection against tidal flooding			✓	Investigate existing flood defences and assess breach scenario. Propose welfare FFL above 1 in 200 cc flood. Propose flood resilient construction measures and recommend flood action plan		✓	
Groundwater	BGS identifies the site as being at low risk	✓				✓		
Overland flow (Surface Water)	Gov.uk data shows the majority of site at 'very low risk' but an area within the curtilage at 'low risk'		✓		Ensure buildings are sited away from areas of flood risk. Detailed design to avoid exacerbation of flooding	✓		
Ponds/Swales	\there are numerous fishing ponds in the district. None are	✓				✓		

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	considered to directly affect the site							
Public infrastructure failure	There are Anglian water and LCC sewers in the village but none in the immediate vicinity of the site	✓					✓	
Private infrastructure failure	The existing dwelling on the site uses a package sewage treatment plant and soakaway drainage.	✓			Ensure existing and proposed systems are designed for ease of future maintenance and that a suitable maintenance regime is in place		✓	
Pluvial (urban drainage)	New impermeable roof areas are proposed and new porous driveways		✓		Design new surface water drainage systems in accordance with latest relevant SuDS guidance		✓	
Artificial sources	Several man-made drainage systems form part of the North Level District IDB catchments		✓		Seek evidence of flooding from IDB maintained systems. Consider flood flow routes from artificial sources and ensure fluvial mitigation measures are sufficient		✓	

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3.1 ANALYSIS OF FLOOD RISKS

3.1.1 RIVER AND TIDAL FLOOD

Planning policy generally requires development to be designed to accommodate 1 in 100 (1%) annual probability flood events from rivers and pluvial sources and 1 in 200 (0.5%) annual probability flood events from seas. Figure 2 below is the flood map for rivers and seas from the Government ‘flood map for planning’ service.

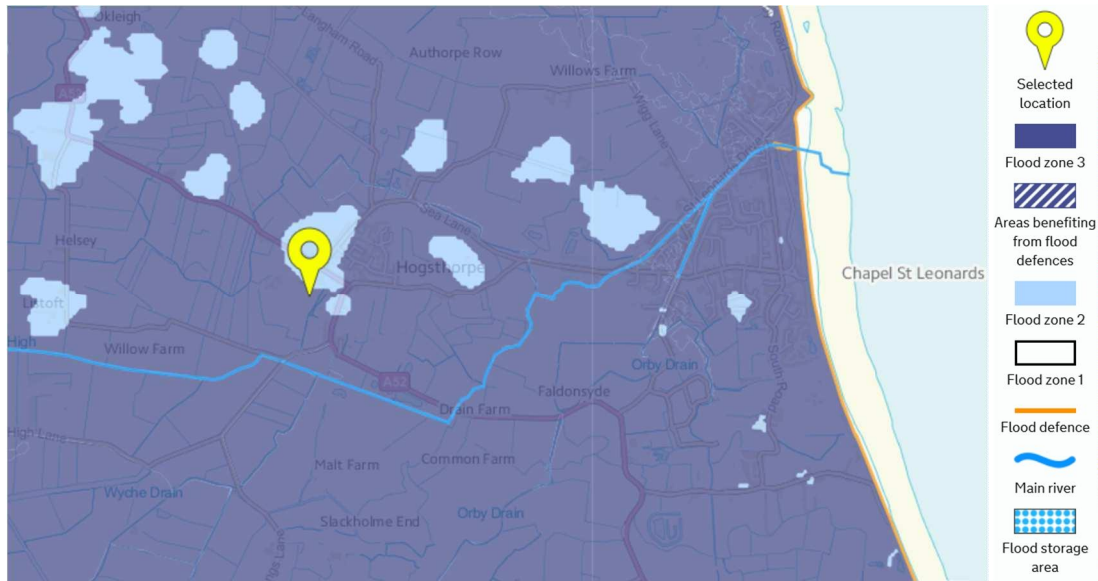


Fig.2: Flood Maps for Rivers and Seas (<https://flood-warning-information.service.gov.uk>)

The Flood Map indicates that the site is within flood zone 3a and therefore at risk of flooding, assuming no flood defences exist, for a flood with a 0.5% (1 in 200) chance of occurring in any year for flooding from the sea, or a 1% (1 in 100) chance of occurring for fluvial (river) flooding.

There is no history of the site flooding within EA records.

The effects of extreme fluvial and tidal events in cognisance of the existing defences are discussed in greater detail in the following sections:

3.1.1.1 FLUVIAL (RIVER AND WATERCOURSE) FLOODING

The Willoughby High Drain has no formal flood defences protecting the proposal site. The natural channel is maintained by the Environment Agency to provide a nominal protection against a flood event with a 4% chance of occurring in any year (1 in 25). The drain is the subject of a programme of regular de-silting and maintenance.

There is also a network of several private land drains to the boundaries of surrounding land including the western and southern boundaries of the site. The Internal Drainage Board has confirmed that where

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catchments serve urban areas or mixed rural and urban areas, then the indicative standard is usually in excess of this standard and increases to the 2% (1 in 50 years) level. Ultimately the surface water within them would find its way to the Willoughby High Drain so this remains the primary source of potential fluvial flooding at the site.

The Environment Agency (EA) flood map for rivers and seas centred on grid ref TF 53393 71825 was provided in response to enquiry CCN-2020-177660 in July 2020, an excerpt from the map which shows outputs from the 2018 Willoughby High Drain Model is shown in figure 3 below.



Fig.3: Flood Maps for Rivers and Seas (Environment Agency July 2020)

Corresponding to the modelled nodes, the EA provided the latest fluvial flood levels in the Willoughby High Drain, these are tabulated in Appendix B for reference and are summarised as follows:

Location	Annual Exceedance Probability – Maximum Water levels (mODN)					
	1% (1 in 100)	1% (1 in 100) incl. climate change	0.5% (1 in 200)	0.5% (1 in 200) incl. climate change	0.1% (1 in 1000)	0.1% (1 in 1000) incl. climate change
WILL01_3501	1.88	2.04	1.96	2.06	2.12	2.21
WILL01_3700	1.89	2.05	1.98	2.07	2.14	2.23
WILL01_3926	1.90	2.06	1.99	2.09	2.16	2.26

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When considering river flooding in the context of new developments, the critical level in the design of mitigation is generated by a 0.1% (1 in 100) annual probability event with climate change allowance.

The modelled flood extents map included in Appendix B indicates that the 0.1% (1 in 100) event does not affect the development. The development is therefore at low risk of flooding from fluvial sources.

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3.1.1.2 TIDAL FLOODING

The primary tidal flooding source is the North Sea to the North East of the site. The EA have provided still water tide levels at various monitoring stations along the east coast, these are included in Appendix B. The closest point on the coast to the site is Chapel St Leonards which lies mid-way between Boygrift (3942) and Gibraltar Point (3968). The relevant levels for the two points and the interpolated level for Chapel St Leonards is tabulated below:

Location	2018 Still Water levels (mODN)	
	0.5% (1 in 200)	0.1% (1 in 1000)
Boygrift (3942)	5.13	5.82
Gibraltar Point (3968)	5.49	6.09
Chapel St Leonards (interpolated)	5.31	5.96

While the site level is below that of the 1 in 200 annual probability tidal event, tidal defences are in place along the Lincolnshire coast consisting of natural dunes & concrete floodwalls supplemented by a programme of beach nourishment to maintain healthy beach levels. Information from the EA in Appendix B confirms that the defences are in good condition and have a current level of protection of 0.5% (1 in 200) annual probability.

The primary risk of flooding at the site is therefore a in the improbable event of a breach in the coastal flood defences, which would allow water to flow through the defences and spread across the large, flat plain and along existing watercourses towards the site. The effects of this breach on the development site must be understood to ascertain whether it is appropriate and to determine mitigation measures.

The ELDC Strategic Flood Risk Assessment (SFRA) has considered the risk of flooding from a breach or overtopping of the defences. A plan of the Flood Hazard Map for Hogsthorpe for a 0.5% (1 in 200) probability event in 2115 has been extracted from the SFRA is shown in figure 4 below.

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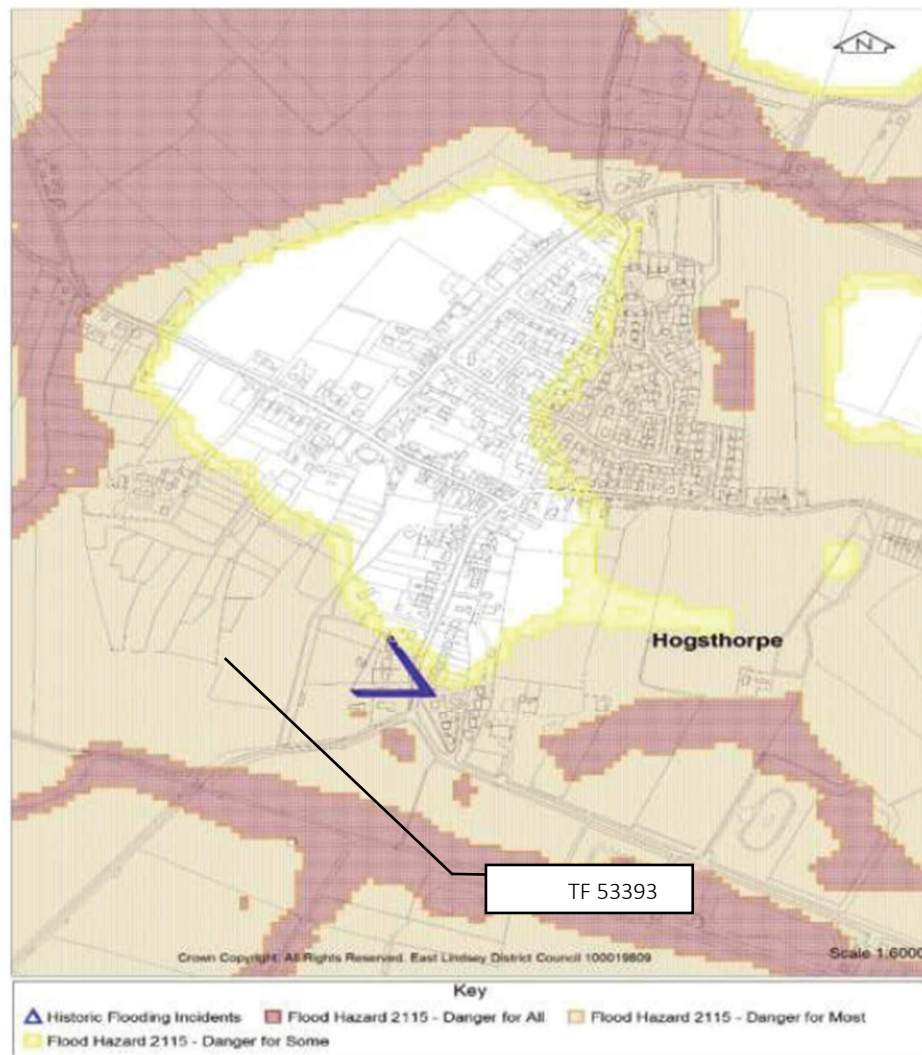


Fig.4: Tidal Breach Hazard Map 2115 (ELDC SFRA 2017)

The map suggests that the proposed development site is in an area where tidal breach flooding is considered to represent 'Danger for Most'.

The ELDC SFRA states that their hazard map should be verified with the EA at the time of application to confirm the latest modelled scenarios. Accordingly, the Fig 4 hazard map is superseded by the flood hazard mapping in Appendix B which was produced by the EA in July 2020 in response to enquiry CCN-2020-177660.

The tables below clarify the latest breach and overtopping flood information for the application site.

Scenario Year and Hazard Type	Hazard Mapping Scenario Results 0.5% (1 in 200) Annual Probability		
	Max Hazard Category	Max Flood Depth (m)	Max Flood Velocity (m/s)
2006 Breach Hazard	Danger for Most	0.5 – 1.0	0.3 – 1.0

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2115 Breach Hazard	Danger for Most	0.5 – 1.0	0.3 – 1.0
2006 Overtopping Hazard	N/A	N/A	N/A
2115 Overtopping Hazard	Danger for Some	0.25 – 0.5	0.0 - 0.3

Scenario Year and Hazard Type	Hazard Mapping Scenario Results 0.1% (1 in 1000) Annual Probability		
	Max Hazard Category	Max Flood Depth (m)	Max Flood Velocity (m/s)
2006 Breach Hazard	Danger for Most	0.5 – 1.0	0.3 – 1.0
2115 Breach Hazard	Danger for Most	1.0 – 1.6	0.3 – 1.0
2006 Overtopping Hazard	N/A	N/A	N/A
2115 Overtopping Hazard	Danger for Most	0.5 – 1.0	0.3 – 1.0

The latest mapping confirms the same result, that the worst-case overtopping and breach scenarios would represent 'Danger to Most' at the site.

Figure 5 below is excerpted from Appendix B and shows the hazard map for the 0.1% (1 in 1000) annual probability breach scenario which is the most onerous of the breach scenarios relative to the site.

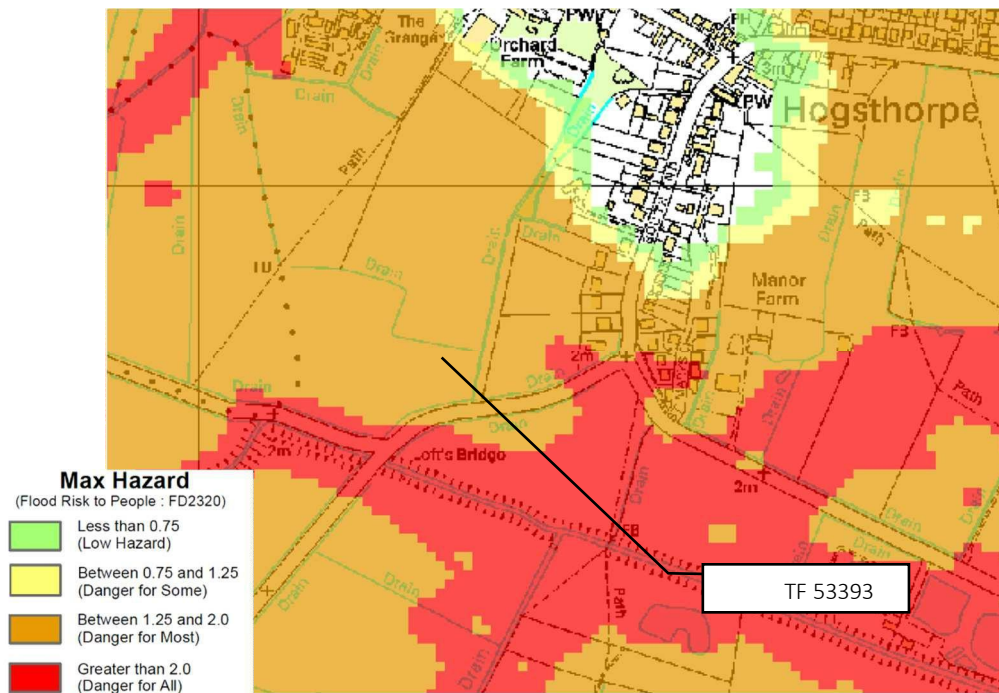


Fig.5: Tidal Breach Max Hazard Map 2115 (Environment Agency July 2020)

To mitigate risk to occupants, floor levels and resilient measures should be designed such that occupied areas are not inundated during 0.5% (1 in 200) annual probability events.

Figure 6 below shows the modelled flood level at the site in the event of a coastal defence breach during a 0.5% (1 in 200) annual probability event. The map shows that the depth of water at the site would be between 0.5 and 1.0m in depth in this scenario.

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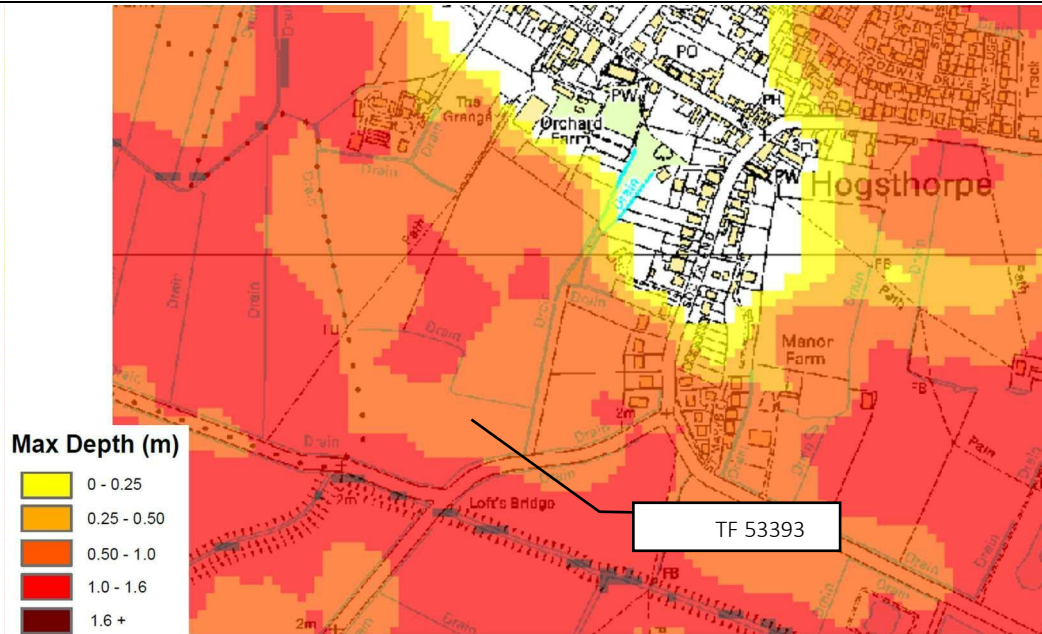


Fig.6: Tidal Breach Max Depth Map 2115 (Environment Agency July 2020)

3.1.2 OVERLAND FLOW (SURFACE WATER)

The site is located in an open, flat landscape which is predominantly used for arable agriculture and is drained by a regular network of ditches. During periods of heavy rainfall, the ground may become saturated and surface water may collect in shallow depressions and in areas which are paved.

Figure 6 below from the Government online flood warning information service shows that the area where the dwelling is proposed is not at risk of surface water flooding.

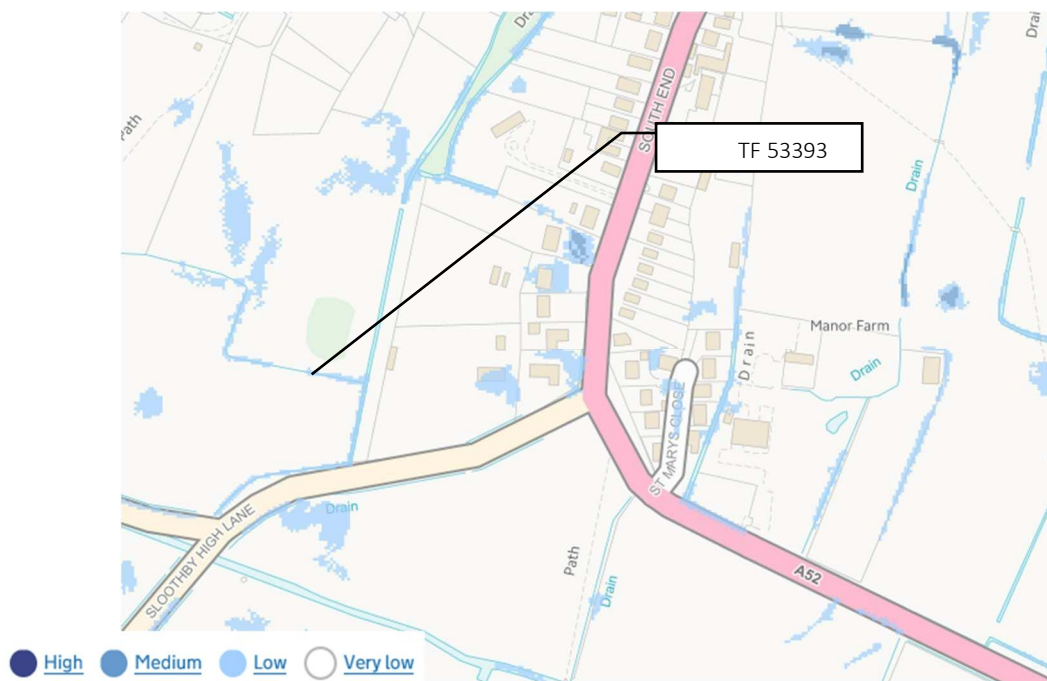


Fig.7: Flood Maps for Surface Water (<https://flood-warning-information.service.gov.uk>)

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3.1.3 PLUVIAL FLOODING

Although there is only a marginal proposed increase to the impermeable coverage of the site, a highly likely source of flooding will be as a result of rain falling directly onto its surfaces. There is no anecdotal evidence of the site flooding during storms and it is considered that the drainage system for the existing dwelling is functioning and fit for purpose in terms of roof and pavement drainage.

The detailed design of any new finished levels for the site must consider the volume and rate of rainfall and ensure that surface water is adequately conveyed away from occupied areas and a suitable surface water drainage system should be provided as part of the new development.

3.1.2 ARTIFICIAL SOURCES

Artificial flooding sources include man made channels and structures which convey, compound or affect flows of water. These include Canals, reservoirs, dams, to name a few. The coastal area of East Lindsey District and indeed much of Lincolnshire is low lying fen lands which are drained in carefully managed man-made channels which are generally pumped into higher level main rivers and these must be considered.

ELDC SFRA does not include details of flood risk from artificial sources and at the time of writing flood risk information has not been received from Lindsey Marsh Internal Drainage Board, but it is considered that there is low risk of flooding from these sources as the networks are manually regulated and maintained.

3.2 RESIDUAL FLOOD RISK

The development is proposed within flood zone 3a and review of the detailed flood mapping information provided by the EA confirm that the site could be affected if the sea defences are overtopped or breached in the vicinity of Chapel St Leonards. A breach would result in 'Danger to Most' for the 0.5% (1 in 200) and 0.1% (1 in 1000) annual probability scenarios.

Mitigation should be considered in the elevation of finished floor levels, the design of the new dwelling and implementation of flood resilient construction.

Pluvial flood risk may affect the site and downstream properties following development due to the construction of impermeable roofs and new porous surfaces. This risk should be managed through the design of suitable sustainable drainage systems (SuDS) to manage rain falling directly on the site.

An indirect risk to occupants may arise in the event of a significant flood as they attempt to leave the site and gain access to other areas. This risk should be mitigated through the implementation of a Flood Warning and Evacuation Plan (FWEP).

Risk of flooding from all other sources is considered to be low without mitigation.

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4.0 CLIMATE CHANGE

National Planning Policy Framework (which details government requirements for the management and reduction of flood risk) requires the investigation of climate change on any proposed development. The Environment Agency have produced guidance on the allowances that are to be made to mitigate the future impact of climate change.

Climate change allowances are predictions of anticipated change for:

- peak river flow
- peak rainfall intensity
- sea level rise
- offshore wind speed and extreme wave height

They are based on UK climate change projections. There are different allowances for different epochs or periods of time over the next century.

4.1 RIVER FLOW CHANGE

For more vulnerable development in flood zone 3(a) the higher central and upper end should be used to assess the range of allowances.

River basin district	Allowance category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Humber	H++	20%	35%	65%
	Upper end	20%	30%	50%
	Higher central	15%	20%	30%
	Central	10%	15%	20%

Fig 8: Climate Change Guidance to the National Planning Policy Framework, Table 1 (extract)

4.2 RAINFALL INTENSITY CHANGE

Due to the nature of the development the design life of the residential development is likely to be more than 50 years and therefore the on-site drainage design and flood risk mitigation measures must ensure climate change of 40% is taken into account in accordance with table 2, below.

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Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

Fig 9: Climate Change Guidance to the National Planning Policy Framework, Table 2 (extract)

4.3 SEA LEVEL CHANGE

For 'more vulnerable development' in flood zone 3(a) the higher central and upper end should be used to assess the range of allowances.

Area of England	Allowance	2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2000 to 2125 (metres)
Humber	Higher central	5.5 (193)	8.4 (252)	11.1 (333)	12.4 (372)	1.15
Humber	Upper end	6.7 (235)	11 (330)	15.3 (459)	17.6 (528)	1.55

Fig 10: Climate Change Guidance to the National Planning Policy Framework, Table 3 (extract)

To bring this into the context of the development today, it is recommended that climate change contingency allowances are applied in accordance with NPPF guidance for planners. Assuming construction would commence in 2021 and the current tidal data has a 2018 model date the following calculation provides the relevant adjustment to the still tide level:

$$2018 \text{ to } 2021 = 3\text{yrs} \times 7\text{mm/yr} = 21\text{mm}$$

Therefore the current 1 in 200 (0.5%) annual probability still tide level at Chapel St Leonards = 5.321AOD

Given that principal risk of flooding at the site is from a breach in the coastal defences, it is considered that the marginal increase at the coast approximately 3km from the application site with represent a negligible increase in flood hazard or water depth for the proposed development.

Changes in sea level should be anticipated within the lifetime of the development and should be further considered for any future development at the site, alongside the latest flood risk guidance.

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5.0 FLOOD RISK MITIGATION

5.1 FLOOR LEVELS AND SITE LAYOUT

Environment Agency guidance requires finished floor levels to be set to the highest of 300mm above the general ground level of the site or 600mm above the 1 in 200 (1%) annual probability + climate change tidal flood level. Where this is not possible due to local constraints, guidance states that suitable flood resilience measures should be incorporated into the building design.

Section 3.1.1.1 indicates that the most local river node point is WILL01_3926 on the Willoughby High Drain. As this drain outfalls to the sea at Chapel St Leonards it is considered that the conservative approach would be to design floor levels to suit the 0.5% (1 in 200) annual probability flood scenario. This scenario yields a modelled flood water level of 2.090 AOD and therefore the ground floors of any new dwelling on the site should be a minimum level of 2.690AOD.

Section 3.1.1.2 describes tidal flood risk at the site due to a breach of the coastal defences and includes the max flood water depth at the site during the 0.5% (1 in 200) annual probability flood scenario on Figure 6. The map shows that the depth of water in this scenario would reach a modelled maximum between 0.5m and 1.0m above existing ground level.

The Government's standing advice for buildings in areas which are vulnerable to flooding is that finished floor levels should be set a minimum of 600mm above the modelled flood water levels and 300mm above existing ground levels. To achieve this, the ground floor of any dwelling on the site would need to be 1.6m above the existing ground level, at approximately 3.600AOD.

Full planning permission was granted in November 2011 with reference N/084/02351/12 for a single detached dwelling on the adjacent site (outlined blue on Figure 1). The EA consultation on this development recommended that the ground floor levels were elevated 1.0m above the existing ground level, that flood resilient measures were specified for a further 1.0m, flood defence barriers were included across doorways (or raise the FFL an additional 200mm) and non-return valves to be fitted on all drains and water inlet pipes.

By ensuring that ground floor levels are at 3.600AOD, an additional 600mm of protection compared with the existing house would be afforded to the new dwelling. This should be discussed and agreed with the Environment Agency as part of the detailed design.

It is unlikely that safe egress can be provided from any proposed dwelling on the site at a level with sufficient freeboard from the critical flood event, therefore a warning and evacuation procedure should be in place for the development which will ensure that users are alerted in advance of such events and directed to safety.

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5.2 SURFACE WATER DRAINAGE

Wherever possible SuDS should be used on the scheme in compliance with building regulations Part H, NPPF and the CIRIA SUDS manual.

Development should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

1. Store rainwater for future use
2. Use infiltration techniques, such as porous surfaces and soakaway drainage
3. Attenuate rainwater in ponds or open water features for gradual release to a watercourse
4. Attenuate rainwater by storing in tanks or sealed water features for gradual release to a watercourse
5. Discharge rainwater direct to watercourse
6. Discharge rainwater to a surface water drain
7. Discharge rainwater to the combined sewer

It is proposed that the impermeable area at the site will be increased and it is therefore recommended that a surface water drainage system for the site is designed in accordance with this hierarchy.

The development on the adjacent site, which was approved under planning application

N/084/02351/12, uses infiltration drainage in the form of soakaways, porous driveways and permeable paved surfaces. It is recommended that these principles are employed for the proposed development.

Soakaways should be designed in accordance with latest SuDS guidance and site specific infiltration rates should be determined, in accordance with BRE digest 365, to inform the design.

Through the design of an effective surface water drainage system for the new development it is considered the risk of flooding to properties downstream of the site is would be unaffected by the development.

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5.3 FLOOD WARNING AND EVACUATION PROCEDURE

The site is shown to lie within Flood Zone 3 and in an area at risk of river/tidal flooding. The proposed use of the premises is such that occupants would be familiar with their surroundings, although they may be asleep at the time of the flooding event; they are therefore potentially vulnerable during such an event.

The operator of the holiday letting business should sign up to flood warnings using Flood Warning Information service operated by the Government. Using this, they will be provided a warning of high-water levels within the catchment, thereby providing advanced warning of flood waters reaching the site. Local flood information is available from the Government Flood Warning Information website or obtained by their 'Quickdial' recorded information service.

It is recommended that a Flood Warning and Evacuation Plan (FWEP) is produced which would inform the occupants of actions to take before, during and after a flood event to ensure their safety, and to ensure their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.

The FWEP should include:

1. How flood warning is to be provided, such as:

- Availability of existing flood warning systems;
- Where available, rate of onset of flooding and available flood warning time; and
- How flood warning is received.

2. What will be done to protect the development and contents, such as:

- How easily damaged items (including parked cars) or valuable items will be relocated;
- How services can be switched off (gas, electricity, water supplies);
- The use of flood protection products (e.g. flood boards, airbrick covers etc);
- The availability of staff/occupants/users to respond to a flood warning, including preparing for evacuation, deploying flood barriers across doors etc; and
- The time taken to respond to a flood warning.

3. Ensuring safe occupancy and access to and from the development, such as:

- Occupant awareness of the likely frequency and duration of flood events, and the potential need to evacuate;
- Safe access route to and from the development;
- If necessary, the ability to maintain key services during an event;
- Vulnerability of occupants, and whether rescue by emergency services will be necessary and feasible; and
- Expected time taken to re-establish normal use following a flood event (clean up times, time to re-establish service etc).

The Government provide a Personal Flood Plan template which should be kept up to date by the owner of the development. Further guidance on the creation of a personal flood plan can be found using the following link:

<https://www.gov.uk/government/publications/personal-flood-plan>

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5.4 FLOOD RESILIENT CONSTRUCTION

Flood-resilient buildings are designed to reduce the consequences of flooding and facilitate recovery from the effects of flooding sooner than conventional buildings. This is typically achieved through the use of water-resistant materials for floors, walls and fixtures and the siting of electrical controls, cables and appliances at higher than normal level.

If it is not possible to raise the lowest floor above the predicted flood level for the new areas during 0.5% (1 in 200) annual probability events and it is not practical to accommodate more extreme events this way. It is recommended that flood resilient measures are included in the detailed design and construction of the premises. Government guidance recommends key flood resilient measures as follows:

- Replace timber floors with concrete and cover with tiles,
- Replace window frames and doors with flood protective units of man-made materials
- Fit flood defence barriers to existing doorways and openings,
- Install flood protection plates or replace standard air bricks with special flood resistant ones
- Replace chipboard/MDF kitchen and bathroom units with stainless steel or plastic equivalents,
- Replace gypsum plaster with more water-resistant material, such as lime plaster or cement render,
- Route ground floor services from above and locate service meters and electrical points a minimum of 1500mm above floor level,
- Install main parts of the heating and ventilation system, such as a boiler, upstairs or significantly raised above the ground floor
- Put one-way valves into drainage pipes to prevent sewage backing up into the house

This list is not exhaustive and further advice should be sought from an architect or engineer to obtain site specific flood protection information. More comprehensive guidance on the design of flood resilient buildings is also available via the following link:

http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf

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6.0 SEQUENTIAL AND EXCEPTION TEST

Table 2 of NPPF is shown below and confirms that buildings used for dwelling houses are classified as 'More Vulnerable' in terms of flood risk.

More Vulnerable
<ul style="list-style-type: none"> • Hospitals • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill* and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

Fig 11: Technical Guidance to the National Planning Policy Framework, Table 2 (extract)

Table 3 of the Technical Guidance to the NPPF shown below suggests that dwelling houses (as characterised within table 2) are appropriate for Flood Zone 3a subject to the Sequential and Exceptions Tests being passed.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	x	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	x	x	x	✓*

Key:

✓ Development is appropriate

x Development should not be permitted.

Fig 12: Technical Guidance to the National Planning Policy Framework, Table 3 (extract)

Planning Policy Guidance states that all developments in areas of flood risk have to show how they have passed the sequential and exception tests.

The aim of the Sequential Test, as set out in the Planning Practice Guidance, is to ensure that a sequential approach is followed to steer new development to areas with the lowest probability of flooding through a review of available sites in the local area and their relative flood risk categorisation.

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Once the Sequential Test has been satisfied the development must pass the Exceptions Test, for this it must be demonstrated that:

1. The development provides wider sustainability benefits to the community that outweigh flood risks, informed by the Strategic Flood Risk Assessment; and
2. A site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking into account of the vulnerability of its users, without increasing flood risk elsewhere, and where possible will reduce flood risk overall.

Both parts of this test must be satisfied in order for the development to be considered appropriate in terms of flood risk and there must be robust evidence in support of every part of the test.

The ELDC SFRA considers the District in two parts – The Coastal Zone, in which the primary risk of flooding at the site is from tidal flooding, and the remainder of the (inland) district. Hogsthorpe is identified within the coastal zone on the East Lindsey area map within the SFRA document.

Chapter 10 of the ELDC Core Strategy sets out the Council’s policy approach to development in the Coastal Zone. This policy sets out development the Council will and will not support in this area of flood risk.

NPPF states that local authorities must be proactive in their approach to delivering new housing and in the ELDC Core Strategy (July 2018), it is identified that 7819 new homes are to be delivered in the district between 2017 and 2031 to meet new housing demand and to account for previous shortfalls.

To ensure the housing demand is not underdelivered, ELDC have allocated sites for housing throughout the district, these are identified at settlement level in the ‘Settlement Proposals development Plan Document’ (July 2018).

While the council are seeking to limit new development in the Coastal Zone, the strategy identifies that the allocations only account for 3810 of the requires new homes, therefore the requirement for the balance of 4009 new homes must be filled through existing commitments. As there is no guarantee that all of the existing permissions will be delivered between 2017 and 2031, the council will be reliant, in part, on windfall developments such as this to ensure their commitments are met.

6.1 SEQUENTIAL TEST

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ELDC Core Strategy (July 2018) provides guidance on those types of development which will be deemed by the council to have automatically passed the sequential test based on flood risk vulnerability classification and by use category. The table identifies that residential developments do not automatically pass the sequential test and therefore the national approach has been taken to demonstrate that other sites, at a lower risk of flooding, are not reasonably available locally.

Planning Practice Guidance outlines that application of the sequential test should be proportionate and appropriate for the given proposal. Given that the application seeks to provide a new residential dwelling for family members with an interest in the business on the adjacent site, the search radius for equivalent sites was limited to 3 miles (5km), which is equivalent to the catchment of the Hogsthorpe Primary School, and which is a reasonable distance in cognisance of the link between the proposed dwelling and the existing business on the site.

Having looked at the areas listed and cross referencing them from the EA and ELDC Flood maps we can confirm that there actually very few areas within the search radius that are not in Flood Zone 3 with the main source of flooding being the North Sea to the East.

One factor which further reduced the search field was the availability of land in sustainable settlements. Many of the smaller villages have limited services and facilities to sustain further growth. Even if there were sites available in these settlements in Flood Zones 1 or 2 they would not accord with the general principles of the Local Plan or the NPPF.

Within the 5km search radius the following settlements were identified within the ELDC Core Strategy and Adopted Settlements Proposals Document (ASPD):

Large Villages: Chapel St Leonards, Hogsthorpe, Huttoft, Ingoldmells

Medium Villages: Addlethorpe

Small Villages: Anderby (village)

Further analysis of the settlements can be found below. The analysis includes excerpts from the ASPD and market research using web-based agent searches. The relevant pages from the ASPD document form Appendix C of this document.

Chapel St Leonards

- There are no allocated housing sites in Chapel St Leonards.
- Within the town there are only small pockets of land within FZ2, and none which could support a development of the type.

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- To the NW of the town is an area of land in FZ2 measuring approximately 12ha, between Blindwell Lane and Sycamore Farm, this land is currently arable farmland and is outside the current settlement boundary. This land is therefore currently unavailable to the applicant

Hogsthorpe

- Hogsthorpe is a large village with 3 food shops, primary school, employment and a large employer, 2 public houses and a commuter bus service. It has a post office (reopened in 2018), a community hall, a playing field, a children's play area, a place of worship, a petrol filling station. It is on mains drainage and on the strategic road network
- Population is stated to be 'top heavy' meaning younger persons and families are to be encouraged to the area.
- Hogsthorpe Primary school was extended in 2016 and has no capacity issues.

Two sites were allocated in the 2018 Local Plan:

- HOG306 – 4.62ha supporting 89 dwellings. Outline permission was granted in September 2019 for the erection of 89 dwellings and associated infrastructure, this planned development occupies the entire site. At this stage the site is on the open market and as such, there is no indication of when the development will commence, it is therefore considered unavailable to the applicant.
- HOG309 – 1.02 suggested as having capacity for 19 dwellings however 2 have been allocated on the site. The site owner has confirmed that they are bringing forward this site and it is currently unavailable to the applicant.

A site off Skegness Road (within FZ3a) has recently been granted full permission for detailed particulars relevant to outline permission in 2015 (Reference N/084/00876/15). The site provides no sequential benefit in terms of flood risk. The site is not currently on the market and is therefore unavailable to the applicant.

Huttoft

- Huttoft is a large village with a food shop, a primary school, a large employer, a public house, a commuter bus service. The village is on the strategic road network, has a community hall, a playing field, a children's play area, a bank cash point. It is on mains drainage, has two places of worship, a cemetery and a petrol filling station.
- Population is stated to be 'top heavy' meaning younger persons and families are to be encouraged to the area.
- Huttoft lies predominantly outside the Coastal flood hazard zones with only the northern and far eastern reaches of the village affected by FZ2.
- Two sites were considered suitable for allocation in the Plan, both now have planning permission. The existing commitments in the settlement are considered acceptable and no further allocations are proposed.
- At the time of writing only one building plot is available on the open market (off Alford Road), this is modest in scale so would not support the type of development proposed. While it is feasible that other

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sites may become available in the future, no suitable sites are currently available to the applicant in the settlement limits of Huttoft.

Ingoldmells

- There are no allocated housing sites within Ingoldmells.
- Ingoldmells is entirely within FZ3 and therefore offers no sequential benefit in terms of flood risk.

Addlethorpe

- There are no allocated housing sites within Addlethorpe.
- Addlethorpe is entirely within FZ3 and therefore offers no sequential benefit in terms of flood risk.

Anderby (village)

- There are no allocated housing sites within Anderby Village
- Anderby Village is a linear settlement with the Parish Church of St Andrew as its only notable local amenity.
- The central part of the village lies within FZ3a and FZ2 however the eastern and western extents include areas of higher ground that are within FZ1.
- At the time of writing no suitable plots are available within the settlement which would support the proposed development.

The aim of the Sequential Test, as set out in the Planning Practice Guidance, is to ensure that a sequential approach is followed to steer new development to areas with the lowest probability of flooding.

NPPF guidance states that a pragmatic approach should be taken to applying the sequential test and in particular when considering planning applications associated with existing businesses. As the proposed dwelling would be occupied by a family member associated with the existing joinery business on the site, it is considered that the location is appropriate.

It is therefore considered that there are no sites in the local area which could pragmatically offer a similar development opportunity in a zone of lower flood risk and that the sequential test is passed.

6.2 EXCEPTIONS TEST

As the Sequential Test has been satisfied the development must pass the Exceptions Test, for this it must be demonstrated that:

1. The development provides wider sustainability benefits to the community that outweigh flood risks, informed by the Strategic Flood Risk Assessment; and
2. A site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking into account of the vulnerability of its users, without increasing flood risk elsewhere, and where possible will reduce flood risk overall.

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Both parts of this test must be satisfied in order for the development to be considered appropriate in terms of flood risk and there must be robust evidence in support of every part of the test.

6.2.1 EXCEPTIONS TEST PART 1

ELDC Core Strategy, as with the sequential test, provides a table which identifies the type of site that is automatically deemed to have passed Part 1 of the Exception Test. All other development must demonstrate that they pass the Test using the Sustainability Appraisal Form. The table is shown in figure 13 below:

Essential Infrastructure	✓
Water Compatible	✓
Holiday Accommodation (static caravans, log cabins, chalets)	✓
Holiday Accommodation (Hotels, bed and breakfast accommodation, touring caravans and camping)	✓
Employment developments (other than those associated with holiday accommodation)	✓
Wider community buildings or uses	✓
Social Housing	✓
Housing for specified vulnerable people as set out in the Councils Housing Strategy	✓
Specialist housing for older persons where there is an identified care need	✓
Housing on brownfield blighted land as set out in SP13a	✓

Residential development on greenfield sites where the residents do not have a specified need does not automatically meet exceptions test criteria and the Sustainability Appraisal is therefore relevant to this application.

The Sustainability Appraisal Form forms Appendix D of this document. On balance it is concluded that the proposed development would provide wider sustainability benefits that outweigh the flood risks, particularly given that the flood risks are able to be mitigated through appropriate design – as discussed in section 6.2.2 below.

6.2.2 EXCEPTIONS TEST PART 2

This FRA assesses the relevant risk of flooding from all sources and describes mitigating measures that would ensure that the proposals would provide flood safety for the lifetime of the development and not increase flood risk elsewhere. Therefore the second part of the Exceptions test is satisfied.

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7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the work carried out in preparation of this report the following summary, conclusions and recommendations are made:

- 1 From Environment Agency and publicly available flood data, and in the context of NPPF, the site is classified as lying within Flood Zone 3a and has a high (1 in 200 annually) probability of flooding due to tidal defence breach.
- 2 Risk of flooding from all other sources is considered to be low.
- 3 The proposed dwelling is linked to the existing employment use on the site and therefore exceptional circumstances exist which support the development.
- 4 The sequential test is passed as there are no local sites which could pragmatically support the development in an area of lower flood risk. The Exception Test is considered to be passed in accordance with guidance set out in in the ELCD SFRA and if the recommendations of this report are adopted in terms of flood risk mitigation. The development is therefore considered appropriate within Flood Zone 3a.
- 5 To ensure that the proposed dwelling is not at risk from flooding in a 0.5% (1 in 200) annual probability breach scenario the finished floor levels should be raised a minimum of 1.0m and ideally 1.6m above the existing round levels at the site.
- 6 There is an increase proposed to the impermeable coverage of the site; it is therefore recommended that a suitable surface water drainage system is designed in accordance with the SuDS hierarchy.
- 7 The site owner should sign up for the government Flood Warning Service.
- 8 It is recommended that a Flood Warning and Evacuation Plan (FWEP) is created for the development.
- 9 The site owner should develop, and keep up to date, a Personal Flood Plan for the property
- 10 Flood resilient construction and flood protection measures should be employed as recommended in this report and in accordance with government guidance if ground floors are finished less than 1.6m above the existing ground level at the site. This should be agreed with the Environment Agency as part of the detailed design.
- 11 Maintenance the buildings and associated drainage infrastructure should be carried out as detailed within this report and in accordance with all manufacturer recommendations.
- 12 It is recommended that advice is sought from insurers on the insurability of the proposed development.

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