

FLOOD RISK ASSESSMENT

RESIDENTIAL DEVELOPMENT
TREETOPS LODGE,
WHITEHOUSE LANE,
BOSTON
PE21 0BE



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RMA

FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT, WHITEHOUSE LANE, BOSTON, PE21 0BE

INTRODUCTION

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 seeks to reduce the future damage to property and the risk to life from incidents of flooding. Their expectations relating to flooding are contained in the National Planning Policy Framework (NPPF) July 2018, which identify how the issue of flooding is dealt with in the drafting of planning policy and the consideration of planning applications by avoiding inappropriate development in areas at risk from flooding.

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. Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change.

The Environment Agency's flood maps show areas that are at risk, from fluvial and tidal flooding. These maps show the limits of the flood plain of the area which could be affected by flood events, over topping or breaching of flood defences. They are based on the approximate extent of floods with a 1% annual probability of exceedance (1 in 100-year flood) for rivers and 0.5% annual probability of exceedance (1 in 200-year flood) for coastal areas under present expectations or the highest known flood. However, they do not take into account of the presence of defences or the likelihood that flood return intervals will be reduced by climate change.

This Flood Risk Assessment has been prepared in support of the planning application and considers the risk of flooding from fluvial and tidal sources. It also considers the risks of localised flooding due to inadequate Foul and Surface Water Sewers, Failure of Reservoirs, Water Main pipe bursts, Sewer Blockages, Pump Failures or High Ground Water Table etc.

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APPLICATION SITE

The site is located on land to the side of Treetops Lodge, Whitehouse Lane, Boston. PE21 0BE and lies within the administrative area of Boston Borough Council. The National Grid Reference for the centre of the site is TF34481 43231. The total site area is 0.03 Hectares or thereabouts. **Plan 1**

This flood risk assessment has been prepared for a planning permission, for the erection of a two-storey detached dwelling, and parking area, located in the side garden area of Treetops Lodge. with access from Whitehouse Lane. **Plans 2, 3 & 4**

The Site would be classed as Non-Major Development applying the National Planning Policy Guidance (NPPG) as the site is to be developed for less than 10 dwellings.

The proposed development site is shown to be within Flood Zone 3a 'High Probability' as detailed on the Environment Agency's Flood Zone Maps **without defences**, and as defined in Table 1 of NPPG. It is proposed that the ground floor living accommodation for the two storey dwelling is to be raised above the 1 in 200-year breach level for scenario year 2115 for the Haven

The National Planning Policy Framework (NPPF) defines three levels of flood risk depending upon the annual probability of fluvial flooding occurring.

Zone 1 – Low Probability (<0.1%)

Zone 2 – Medium Probability (0.1 – 1.0%)

Zone 3 – High Probability (>1.0%)

Table 1: Flood Zones Definition

Flood Zone 3- High Probability
<p>Definition Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.</p> <p>The water-compatible and less vulnerable uses of land are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable and essential infrastructure uses should only be permitted in this zone if the Exception Test is passed. Essential Infrastructure permitted in this zone should be designed and constructed to remain operational and safe for uses in times of flood</p>
<p>Flood Risk Assessments requirements All proposals in this zone should be accompanied by a Flood Risk Assessment.</p>
<p>Policy aims Developers and local authorities should seek opportunities to:</p> <ul style="list-style-type: none">• reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques;• relocate existing development to land with a lower probability of flooding;• create space for flooding to occur by allocating and safeguarding open space for flood storage.

Applying the Flood Risk Vulnerability Classification in Table 2 of (NPPG), the proposed residential use for the site is classified as "More Vulnerable," Table 2 of NPPG states that such uses are permitted in this zone subject to passing the Exception Test.

Table 2: Flood Risk Vulnerability Classification

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 caravan and camping, subject to a specific warning and Evacuation Plan.

From the topographic survey the site is a reasonably level with levels varying from 2.50mODN on the western boundary to 2.90mODN on the eastern boundary with the average being 2.65mODN, The level on Whitehouse Lane at the site entrance at 2.34mODN. the ground floor level of Treetop Lodge is 2.86mODN. **Plan 5**

DRAINAGE AUTHORITIES

Environment Agency

The Environment Agency is responsible for reducing the risk of flooding from designated main rivers and from the sea.

The following potential sources of flooding which could affect the development site have been identified as:

- The Haven (tidal)

The Flood Zone Maps identify river catchments over 3 sq. km. These maps are a theoretical estimate of areas that could be inundated should no defence exist. In practice current standards of protection would result in flood envelopes substantially less than shown by these maps. The maps make no allowance for local, site specific features.

These maps indicate that the area would be flooded without flood defences, which are in place along the coastal edge (with an annual probability of more than 0.5% return frequency of less than 1 in 200 years for tidal flooding). The site is shown to lie in Flood Zone 3a (High Probability). **Map 1**

The Environment Agency Risk of flooding from Rivers and Sea shows that the site is at Low risk of flooding. Low means that each year, this area has a chance of flooding less than 1 in 100 (1%) but greater than or equal to 1 in 1000 (0.1%). This takes into account the effect of any flood defences that may be in this area. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail. **Map 2**

Tidal Haven

The Haven which lies some 650m to the southeast of the site is embanked for the whole length to its

outfall into the Wash. The first 3 kilometres through Boston the channel is confined within “hard” defence’ s i.e. concrete walls, sheet piling etc. but downstream of the docks the defences are conventional earth banks.

The Haven Banks constitute the first line of defence against any tidal flooding. These consist of earth embankments, within in the relatively sheltered environment of the Haven; this is less of a hazard from wave action than the North Sea coastline. These earth embankment crest level is circa 6.50mODN with a predicted 1 in 200-year peak tide of 5.93mODN. They are in good condition and reduce the risk of flooding to a 0.67% (1 in 150) chance of occurring in any year. The Environment Agency inspect these defences routinely to ensure potential defects are identified.

Breach Analysis to The Haven Tidal Defences

Lincolnshire & Northamptonshire Area Tidal Modal Analysis (June 2006) **Map 3**

Peak tide levels Present Day (2006) at Hobhole(Tidal River) 0.5% (1 in 200) = 5.93mODN
 Peak tide levels (2115) at Hobhole (Tidal River) 0.5% (1 in 200) = 5.93mODN plus climate change of 1143mm (Table 3) = 7.07mODN

Taking the precautionary approach, the Hazard Rating following a breach which in Flood Risk Assessment (FD 2320) Guidance for New Development Phase 2 R& D Technical Report these are classified as low <0.75, moderate 0.75-1.25, significant 1.25-2.50 and extreme >2.50 based upon an empirical measure of velocity and depth.

Flood Hazard Value	Degree of Flood Hazard	Description	Indicative Depth Range
<0.75	Low	Caution Flood Zone with shallow flowing water or deep standing water	Up to 0.25m
0.75 – 1.25	Moderate	Danger for Some (i.e. children) Danger; flood zone with deep or fast flowing water	Up to 0.5m
1.25 – 2.0	Severe	Danger for Most Danger Flood Zone with deep fast flowing water	0.5 -3.0m
>2.0	Extreme	Danger for All Extreme Danger; flood zone with deep fast flowing water	0.5 to over 3.0m

$$HR = d \times (v + 0.5) + DF$$

Where V = Flood flow velocity (m/sec)

D = Flood depth (m)

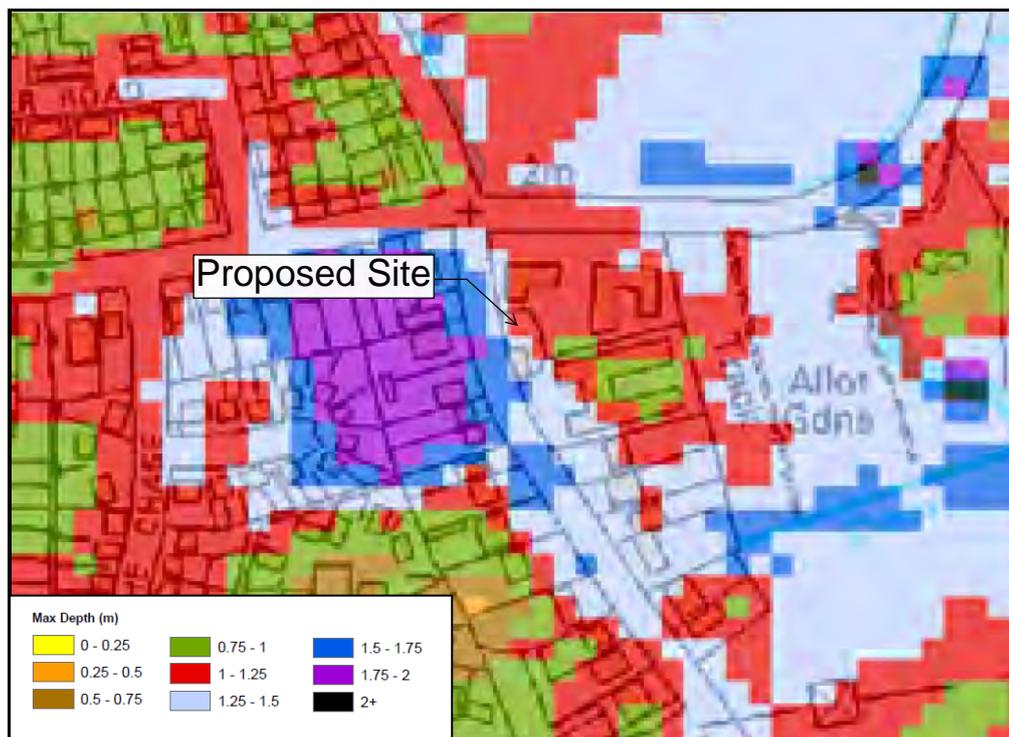
DF = A debris factor included to represent the greater damage, or risk of injury to people, that can occur if debris is swept along with the water. = 0.5 for depths <0.25 or 1.0 for depths.

For the degree of Flood Hazard to be classified as low HR must be <0.75

The Environment Agency has recently carried out a Tidal Hazard Mapping for the Haven following a

breach to the defences. The Lincolnshire & Northamptonshire Area Tidal Hazard Maps (2009) for Scenario year 2006 for the 1 in 200-year event show that the site is within a Hazard Rating area of between 1.25 – 2.0 (Danger for Most), depth of flow 1.0 – 1.6m and velocity 0.3 – 1.0m/sec. With climate change, up to year 2115 the maps show that the site is within a Hazard Rating area of between 1.25 – 2.0 (Danger for Most) with a velocity of 0.3 – 1.0m/sec and depth of flow 1.0 – 1.6m.

Map 4 shows the Hazard rating for the present day and **Map 5** shows the results for the Hazard rating and Velocity for The Haven, for scenario year 2115, taken from the Environment Agency Lincolnshire & Northamptonshire Area Tidal Hazard Mapping.



250mm Band Depth Map 1 in 200-year 2115

The 250mm band depth map shows that the depth of flooding is 1.0 – 1.25m deep.

The Environment Agency has also produced maps based on computer modelling of simulated overtopping of defences along the coastline for specific tidal scenarios. The maps only consider the consequences of overtopping of defences and do not show the possible consequences of breaches of the tidal defences. For future climate change scenarios, it is assumed that the defences remain at 2006 heights. The outputs are based on computer modelling of simulated overtopping of the main coastal defences for specific tidal scenarios. At present this information is available along the full coastal / tidal floodplain, except the tidal Witham Haven in Boston (upstream of Hobhole) where only breaching and not overtopping has been modelled and the tidal River Welland upstream of Fosdyke Bridge where neither breaching nor overtopping are available

The Environment Agency recommends that appropriate mitigation measures / flood resilience techniques are incorporated in the design of the development. The minimum mitigation measures required for single storey developments or developments that do include ground floor sleeping shall be determined by the

flood depths arising from the 2115 0.1% breach scenario. Any developments that do not include ground floor sleeping can be informed by the flood depths arising from the 1 in 200-year 0.5% breach scenario. The finished floor level FFL of any new dwellings shall be informed by the flood depths. For flood depths between 1.0 – 1.6m deep the FFL shall be set at a minimum of 1000mm above the ground level and flood resilient construction incorporated to a minimum height of 300mm above the predicted flood levels. In addition, demountable defences to a height of 600mm should be installed to all ground floor doorways.

The design of the dwelling has taken this into account, and it is proposed that the finished ground floor for the new dwelling be raised 1.0m above the average ground level, set at 3.65mODN, with flood resilient construction incorporated to a minimum height of 300mm above the predicted flood levels. In addition, demountable defences to a height of 600mm should be installed to all ground floor doorways.

The greatest risk of flooding of the site would therefore be from a breach to the tide earth embankments for the Boston Haven and the 2115 breach hazard maps have been assessed for this report. The depth of tidal flooding will be greater than that from fluvial sources.

Surface Water Flooding

The Environment Agency Low Risk Scenario Flood Depth Map indicates that the site is generally at Very Low risk from surface water flooding. Very low risk means that each year this area has a chance of flooding of less than 0.1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. **Map 6**

BOSTON BOROUGH STRATEGIC FLOOD RISK ASSESSMENT

In order to inform the process of risk assessment and site selection the Borough Council commissioned Consultants to prepare a Strategic Flood Risk Assessment, this has recently been updated for the South-east Lincolnshire Local Plan.

The detailed assessment of flood risk in the study areas is based on the predicted level of risk in 2115, allowing for the impacts of climate change and further detailed information on flooding is available from the Environment Agency.

FLOODING FROM OTHER SOURCES

Flooding is a natural process and can happen at any time from sources other than watercourses and the sea.

- Flooding from land can occur from intense rainfall, often over short duration of time that is unable to soak into the ground or enter the drainage system. However, with the natural topographic nature of the ground being flat, with no high ground around the site this will not cause any rapid inundation of the site and is likely only lead to local ponding of shallow depth and low velocity following the natural land contours. The properties are also raised 1000mm above the average

ground level. It is concluded that flooding from this source is limited to minor isolated cases and is not of strategic significance as regards to flood risk.

- The area is not known to suffer from any groundwater problems and therefore is taken as having no strategic significance as regards to flood risk.
- Flooding from sewers can occur from over loading from heavy rainfall caused by blockages or having inadequate capacity. The resulting back pressure could cause foul sewage to flow from manholes which would flow over areas of the carriageway at a lower level and be contained within the confines of the kerb lines following the natural land contour to the south. Also, with the ground floor levels being at 3.65mODN well above the average ground level. It is therefore concluded that flooding from sewers is limited to minor isolated cases and is not of strategic significance as regards to flood risk.
- Non-natural or artificial sources of flooding such as reservoirs, lakes or canals where water is stored above natural ground level could cause flooding if the structure fails or is over topped. There are no known sources within the vicinity of the site.

SEQUENTIAL APPROACH

When considering the sequential approach for flood risk from fluvial flooding in accordance with NPPG the site would fall into Zone 3a (High Probability) as defined in Table 1: Flood Zones and illustrated on the Environment Agency's Flood Maps.

The flood zones as detailed on the flood map show the area of land, which theoretically, would be inundated by floodwater during a flooding event from either tidal or fluvial sources without flood defences. The Environment Agency categorise land into one of three Flood Zones.

- Flood Zone 1 is land outside the 0.1% floodplain (with a chance of flooding of less than 0.1% chance in any given year).
- Flood Zone 2 is land that falls between the 1 in 100-year extent and the 1 in 1000-year extent (with a chance of flooding between 1% and 0.1% in any given year)
- Flood Zone 3a is land which falls within the 1 in 100-year flood extent (has a 1% chance of a flood occurring in any given year).

The Sequential Test principal aim is the steering of new development to areas of the lowest probability of flooding (Flood Zone 1). Where there are no reasonably available sites in Flood Zone 1 then decision makers should first consider Zone 2 and then Zone 3 taking into account the flood risk vulnerability of land uses as categorised in Table 2 of NPPG.

The proposed residential use for the site falls within “More Vulnerable” uses of land in Table 3 Flood Risk Vulnerability Classification and Table 1 shows that developments of this nature are appropriate in Flood Zone 1. All development is permitted in Zone 1. Development in Zones 2 and 3 is restricted based on Table 3 of NPPG replicated below.

Table 3: Flood risk vulnerability and flood zone ‘compatibility’

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	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	✓	✗	✗	✗

Sequential Test & Exception Test

NPPF 2018 Guidance Paragraphs 155 - 165 requires development within high areas of flood risk be determined using a sequential risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account the impacts of climate change.

Within Flood Zone 3, generally “more vulnerable” developments such as residential are discouraged. However, the site is located within a sustainable location within the built-up area of the town. The site is also located within a residential area.

The Council does not have a 5-year supply of housing and therefore policies relevant to the supply of housing are out of date. The tilted balance in paragraph 11 of the National Planning Policy Framework (NPPF) is therefore engaged and on this basis, there is a presumption in favour of sustainable development which presumes in favour of the grant of permission unless harm significantly and demonstrably outweighs the benefits of the scheme.

In the absence of a 5 year supply this site makes a valid contribution towards development and provides wider sustainability benefits to the community that outweigh flood risk.

Given the significant proportion of the Borough which is deemed to be at risk of flooding, to rigidly apply the Sequential Test would undermine the ability of the Borough to meet its strategic housing need by further restricting available, developable land. This approach would therefore undermine the wider strategic objectives of the NPPF in ensuring there are enough deliverable sites to meet wider housing needs.

This windfall site, is available for development now, is sustainable and would contribute to the housing stock within the Borough at a time when the number of deliverable sites falls well short of what is required.

Accordingly, the Sequential Test is passed.

As the Sequential Test, has been satisfied then development must pass the Exceptions Test to demonstrate that it provides wider community benefit to meet the overall requirements of sustainable development for this windfall site. It is considered that the use of the properties for people living within the town would help to provide wider sustainability benefits to the community through access to accommodation for those people living in the area whom are in need of housing. Developing close to the town centre will allow a choice for more sustainable modes of travel i.e. walking and cycling to key services. It is therefore concluded that the development would meet the requirements of the first part of the Exception Test and would be in accordance with the NPPF.

This FRA in support of the development and indicates that the second part of the Exceptions test is satisfied, and that the development would be safe for the lifetime of the development (100 years) and not increase flood risk elsewhere.

Also, with the risk of flooding being from the sea there would be a significant amount of time for the Authorities to predict the risk of flooding and to issue appropriate warnings so that the owner of the properties can take the necessary precautions to protect and /or vacate the properties.

CLIMATE CHANGE

Global warming is now recognised that it is likely to affect the frequency and severity of extreme events as both tidal and fluvial flooding. The Climate change allowances in the NPPF Guidance was updated on the 19th February 2016.

The site is located within the Anglian River Basin, for sites within Flood Zone 3a and for “More Vulnerable” land uses the Higher Central and Upper End river flow allowances figures in Table 1 should be used.

Table 1 Peak river flow allowances by river basin district (1961 to 1990 baseline)				
River basin District	Allowance category	Total potential change anticipated for '2020s' (2015 to2039)	Total potential change anticipated for '2050s' (2040 to2069)	Total potential change anticipated for '2080s' (2070 to2115)
Anglian	Upper End	25%	35%	65%
	Higher central	15%	20%	35%
	Central	10%	15%	25%

The effect of global warming on peak rainfall allowances is given in Table 2.

Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper End	10%	20%	40%
Central	5%	10%	20%

The annual sea rise due to climate change is given in NPPF and the recommended contingency allowances are stated in Table 3

Area of England) (Use River Basin maps	1990 to 2025	2026 to 2050	2051 to 2080	2081 to 2115	Cumulative Rise 1990 to 2115 (m)
East, Midlands, London, South East	4 (140mm)	8.5 (212.5mm)	12 (360mm)	15 (525mm)	1.24m

From Information requested from the Environment Agency the main risk of flooding of the site is from the tidal sources. The Still Water Tidal Levels mODN. - Tidal Model Analysis 2006 for the 1 in 200-year flood level is 5.93mODN at Hobhole. The 1 in 200-year tide flood level for year 2115 is 5.93m plus 1.14m climate change to 2115 (taken from Table 3), = 7.07mODN). **Map 3.**

With the main risk of flooding being tidal then any fluvial flooding has been mitigated against.

MANAGEMENT OF SURFACE WATER RUN-OFF

This drainage strategy for the site is the preliminary overview and will be subject to the detailed design being undertaken when planning permission and final layout has been determined. It is proposed to utilise infiltration techniques to reduce the storm water discharge from the proposed development in order to minimise the impact of the development on the surrounding area and to comply with EA guidelines, which require at least one workable solution for managing surface water.

The proposal includes for the construction of a private access serving a detached dwellings accessed from White House Lane, as shown on the schematic plan.

In accordance with recognised guidance, National Planning Policy Framework 2012, there is a hierarchy of where surface water should discharge. This hierarchy should be followed where practicable, and is as follows:

- 1) Infiltration
- 2) Watercourse
- 3) Public sewer

Infiltration

Infiltration can be used as the method of disposal of surface water from all areas of the development, subject to the relevant approvals. For robustness and, to ensure no overland exceedance flows, all infiltration structures will be designed to the 100 years plus 30% climate change standard:

- i) **Domestic Curtilage Roof area** can, for example, discharge to individual shallow cellular soakaways undertaken to the design criteria in BRE 365 Digest. The base of the soakaway structure would be set to be at least 1m above the water table and soakaways would need to be sited 5m away from buildings. These can be finalised at detailed design stage. It is however possible to incorporate source control (water quality) SuDS into the scheme design. A water butt of at least 120litre internal capacity shall be installed to intercept rainwater draining from the roofs of all the buildings, to reduce the risk of flooding and demand for water by recycling and to increase the level of sustainability of the development.
- ii) **Domestic Curtilage Driveways** will be constructed in permeable materials such as gravel, porous tarmac or porous block paving.

Watercourse

There are no proposals for any surface water to discharge to watercourse.

Public Sewer

There are no proposals for any surface water to discharge to public sewer.

Foul Water Drainage

The new foul drainage from the proposal will be connected into a new foul drainage system within the site which will be connected to the Anglian Water Foul Sewer in Whitehouse Lane.

As there is a positive drainage system capable of receiving flows from the development there is no likely impact on neighbouring property.

HISTORIC FLOOD EVENTS

On the 5th December 2013 the East Coast suffered the most serious tidal surge in 60 years, which was reported to be 600mm above the 1953 event. Parts of Boston suffered from overtopping of the defences, but Whitehouse Lane however, did not suffer any flooding from this event.

FLOOD PROTECTION

Any impact of damage to the properties can be foreseen and mitigated against by relatively simple design and construction techniques. There are two forms of flood protection works: -

- **Flood-resistance or proofing works:** - these try to reduce the amount of water entering a building.
- **Flood-resilient works:** - these reduce the amount of damage caused by water entering the building.

The proposed property will have the following resilient measures incorporated in the construction in accordance with “Improving the flood performance of new buildings” CLG (2007).

- The ground floor accommodation for the single storey dwelling is to be raised above the 1 in 200-year breach level for scenario year 2115 for the Boston Haven to a level of 3.65mODN, which is considered to be appropriate for the predicted 1 in 200-year breach flood level for scenario year 2115. If a beam type floor is to be used, provision should be incorporated for draining the under-floor voids. The wall vents are to be fitted with ‘Flood Angel’ air bricks which allow air to free pass through as a usual, (complying with BS493:1995) but under flood conditions it shuts down when in contact with water. A removable mesh prevents the passage of debris which may otherwise impinge on the moving part.
- Use closed cell 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 0.5m above the raised upper ground floor level.
- As this site is in an area that is capable of receiving flood warnings from the Environment Agency Floodline Warning Direct system. It is recommended that the individual Property Owner contact the Environment Agency’s Floodline on 0345 988 1188 to register the property to receive an advanced warning of flooding by telephone, mobile, fax, SMS text, email or pager. The Environment Agency aim to issue a ‘severe flood warning’ approximately 2 hours before existing defences are overtopped. The site should be evacuated immediately if a severe flood warning is given or if instructed to do so by the emergency authorities.

CONCLUSION

- The site does have the protection of both tidal and fluvial flood defences which are well maintained by the Environment Agency.
- The Environment Agency has recently carried out a Tidal Hazard Mapping for the Haven following a breach to the defences. The Lincolnshire & Northamptonshire Area Tidal Hazard Maps (2009) for Scenario year 2006 for the 1 in 200-year event show that the site is within a Hazard Rating area of between 1.25 – 2.0 (Danger for Most), depth for the site 1.0 – 1.6m

and velocity 0.3 - 1.0m/sec. With climate change, up to year 2115 the maps show that the site is within a Hazard Rating area of between 1.25 – 2.0 (Danger for Most) with a velocity of 0.3 – 1.0m/sec and depth of flow 1.0 – 1.6m.

- It is proposed that the ground floor living accommodation for the two storey dwelling is to be raised 1.0m above the average ground level to a level of 3.65mODN, with 600mm high flood barriers to ground floor doorways, which is considered to be appropriate to prevent flooding for the 1 in 200-year tidal breach level for scenario year 2115 for the Haven.
- It is recommended that all external doorways to be fitted with “Stormguard” flood doors or other approved, instead of demountable 600mm high flood barriers. These flood doors have been tested against the standard set of tests as defined in PAS 1188-1:2014 which represent typical conditions that might be experienced during a flood in the UK. This includes testing the flood door for leakage under static water levels of 600mm above aperture threshold level, waves of up to 0.1 m high and parallel currents up to 1.0 m/s.
- The Flood Risk Vulnerability Classification in Table 2 of NPPG the proposed residential development is classified as “More Vulnerable”, with Table 1 of NPPG stating that such uses are appropriate in this zone subject to the exception test.
- The proposal has satisfied the requirements for the Sequential and Exception Test as required by the NPPF.
- For Non-Major developments the NPPF states that only ‘brief’ mention of drainage is required in an FRA; The Drainage Strategy proposes that the development site to be a ZERO DISCHARGE site with all surface water being infiltrated back to ground to mimic the existing situation.
- There are no local site-specific risks that would adversely affect the flood risk categorisation of the site. Similarly, there are considered to be no increased risk of offsite flooding risks as a result of the development.
- Flooding from other sources is unlikely to affect the site.

APPENDIX

Map 1	Environment Agency Flood Map
Map 2	Flooding from Rivers & Sea Map
Map 3	Lincolnshire & Northamptonshire Area Tidal Model Analysis 2006 Map
Map 4	Tidal Breach Hazard Maps 1 in 200 Year Event 2006
Map 5	Tidal Breach Hazard Maps 1 in 200 Year Event 2115
Map 6	Surface Water Flood Map
Plan 1	Location Plan
Plan 2	Site Layout Plan
Plan 3	Proposed Floor Plans
Plan 4	Proposed Elevations
Plan 5	Topographical Survey

Flood map for planning

Your reference
Whitehouse La

Location (easting/northing)
534486/343234

Created
15 Feb 2019 9:31

Your selected location is in flood zone 3, an area with a high probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

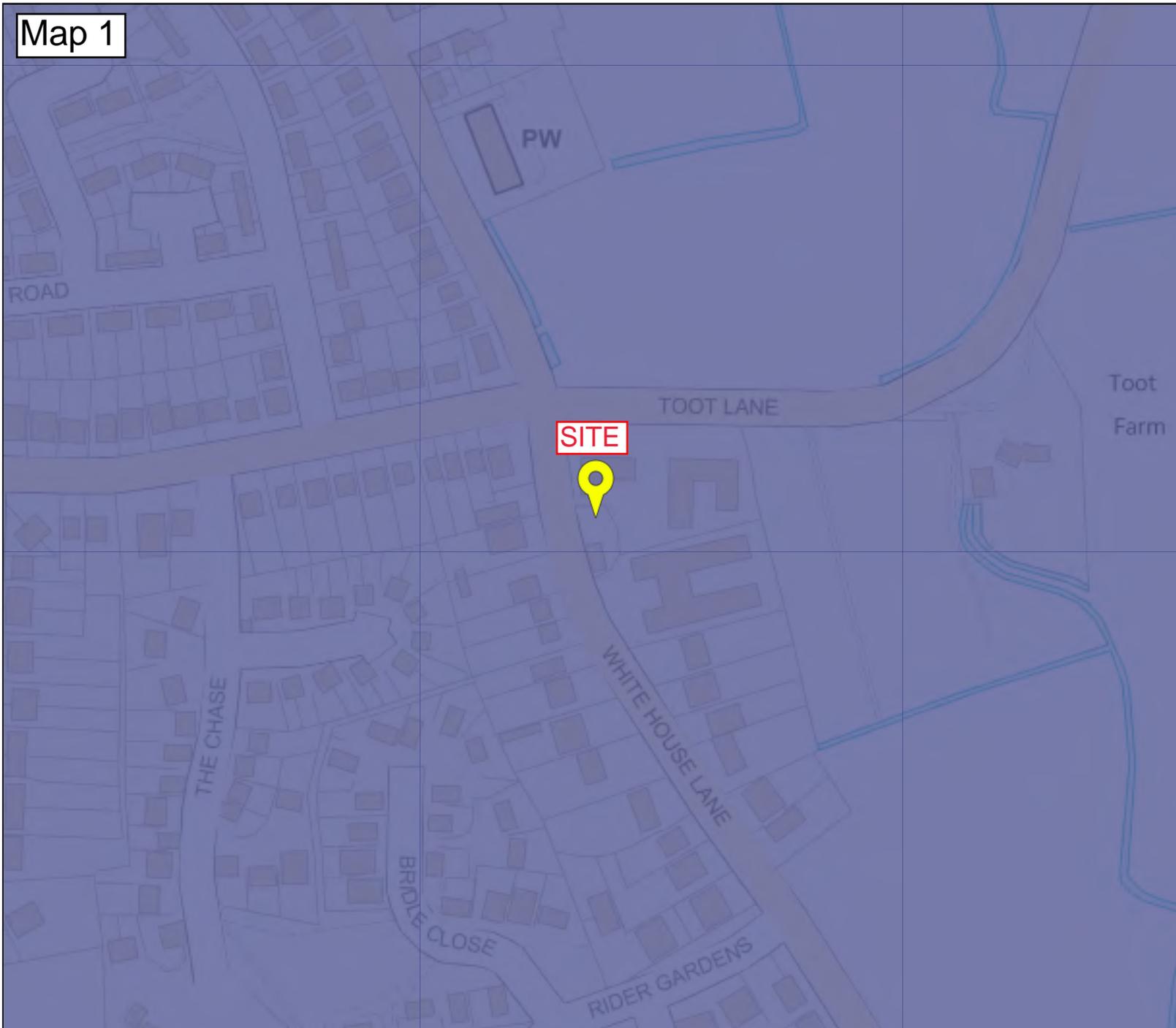
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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Map 1



Flood map for planning

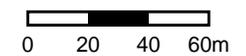
Your reference
Whitehouse La

Location (easting/northing)
534486/343234

Scale
1:2500

Created
15 Feb 2019 9:31

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefiting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area





Flood risk from rivers or the sea

- Extent of flooding
- Depth and flow estimates at monitoring stations

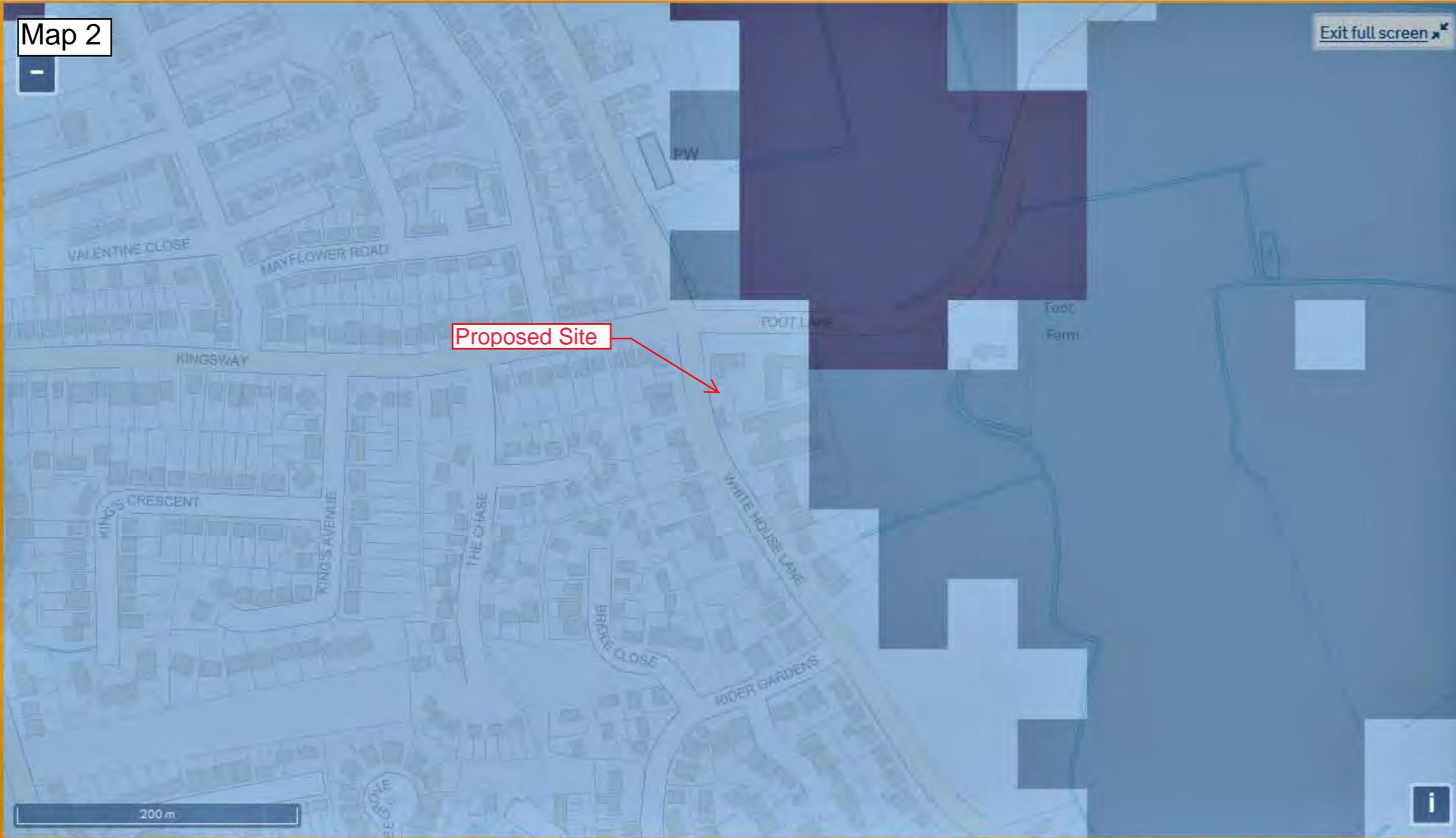
Flood risk from surface water

- Extent of flooding
- High risk: depth
- High risk: velocity
- Medium risk: depth
- Medium risk: velocity
- Low risk: depth
- Low risk: velocity

Flood risk from reservoirs

- Extent of flooding
- Flood depth
- Flood speed

Map 2



Flood risk



High



Medium



Low



Very low



Location you selected

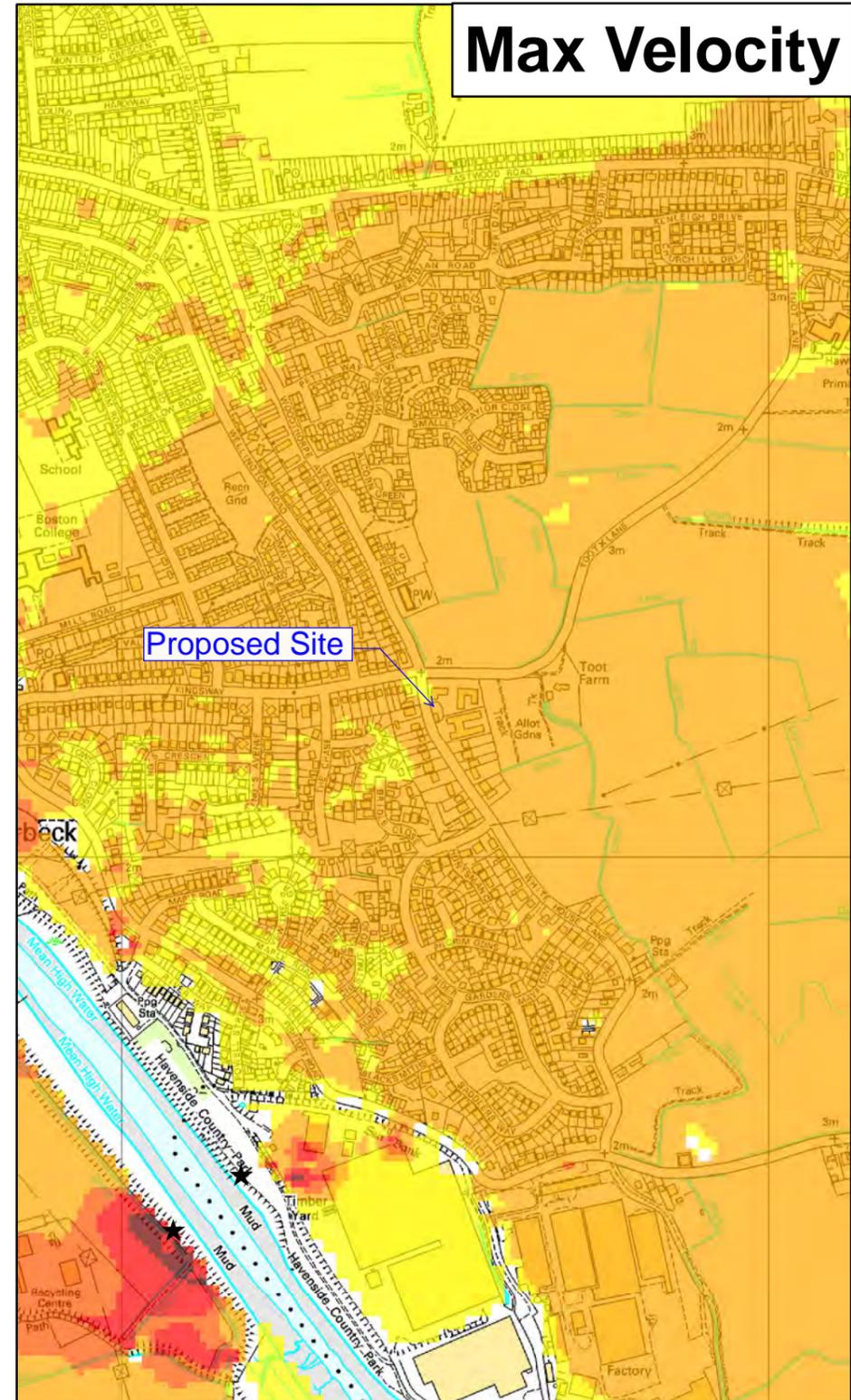
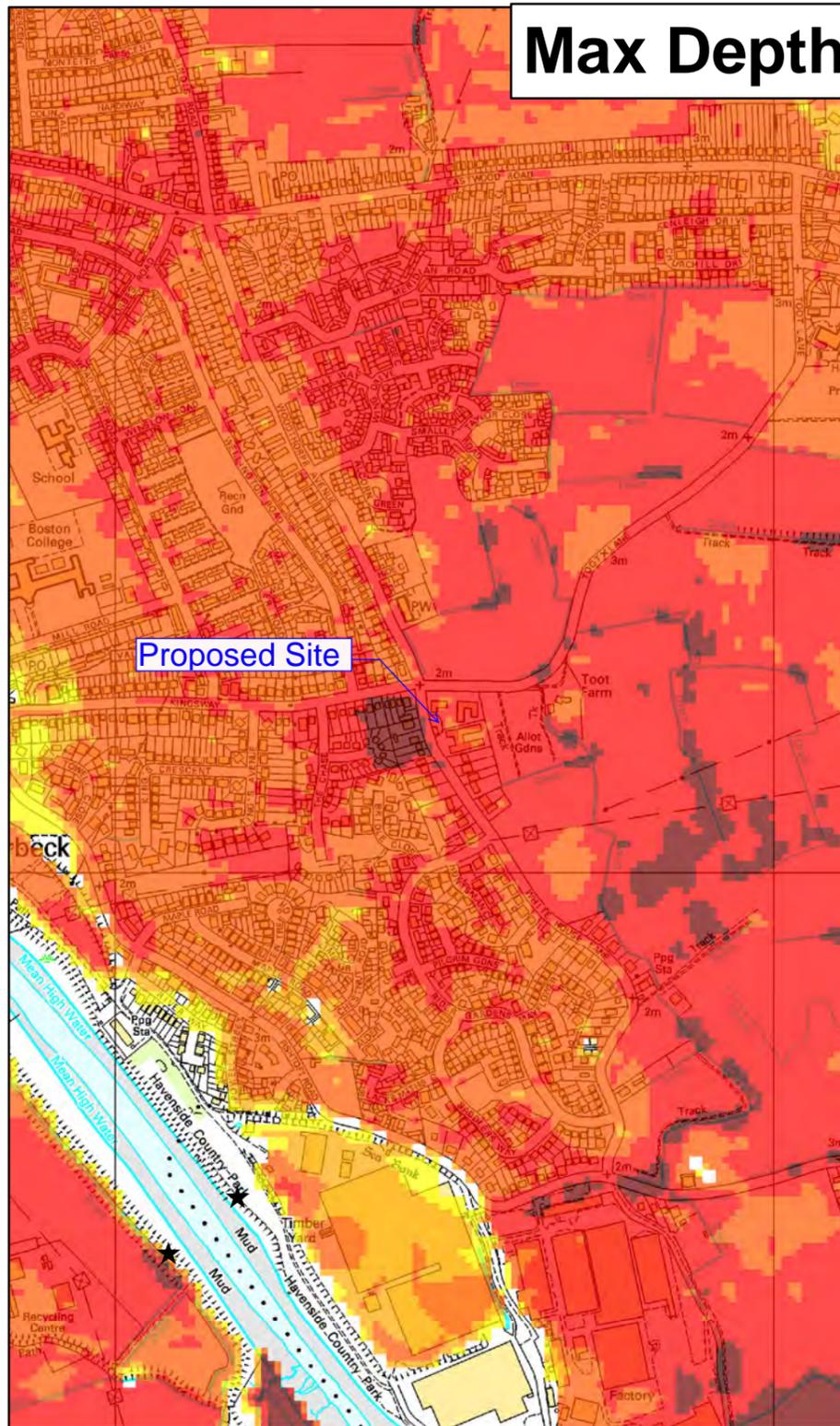
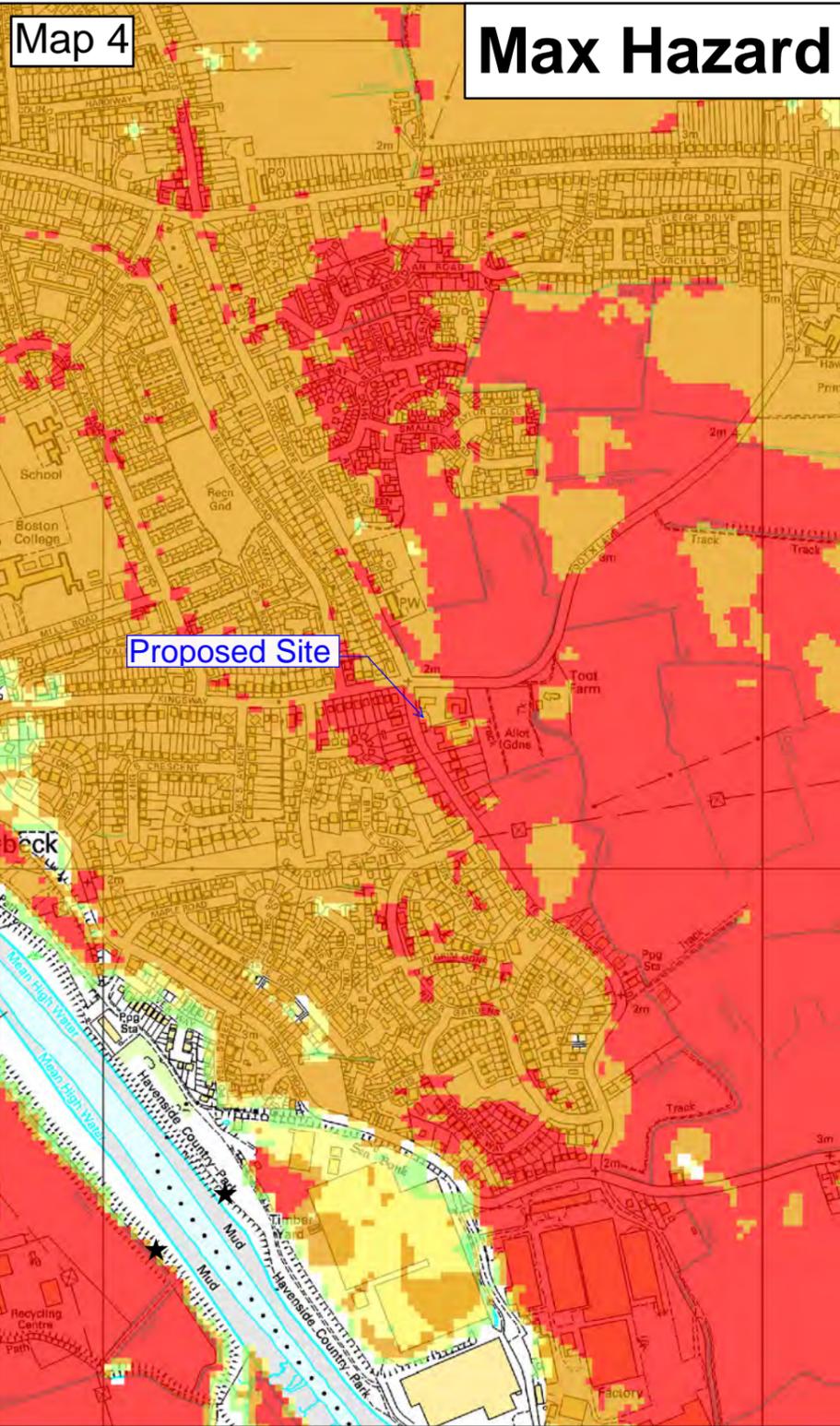


Tidal Water Levels for the South Humber, East Coast and The Wash

The table below shows still water levels for locations, from the above location map, around the South Humber Estuary, East Coast and The Wash. It is important to note the following:

- The base date for the data is 2014 for the South Humber and 2006 for the East Coast and The Wash.
- The data are still water levels. Depending on the use of the data it may be necessary to consider wave heights and / or joint probability analysis of water level and other variables.
- The water level quoted is the 'Best Estimate' water level. Depending on the use of the data it may be necessary to carry out sensitivity testing. Upper and Lower 95% confidence bandings are available upon request.
- Levels for other annual chance scenarios are available if required.

Ref	Location	Easting	Northing	Annual Chance (1 in x) of Tide Level					
				metres ODN					
				1	10	50	100	200	1000
HUMBER									
H030	Tetney	535420	403180	3.94	4.29	4.56	4.69	4.82	5.15
H050	Buck Beck	532700	406580	4.03	4.36	4.62	4.74	4.87	5.18
H060	Grimsby	527878	411346	4.10	4.43	4.70	4.82	4.95	5.27
H080	Haborough Marsh	520790	415740	4.26	4.61	4.88	5.01	5.14	5.47
H090	Immingham	519141	417449	4.26	4.61	4.88	5.01	5.14	5.47
H100	South Killingholme	518700	417120	4.41	4.77	5.05	5.18	5.32	5.66
H130	North Killingholme	516530	420000	4.51	4.87	5.15	5.28	5.42	5.77
H150	East Halton	514450	422870	4.59	4.96	5.25	5.39	5.53	5.89
H170	Goxhill	511970	425440	4.67	5.04	5.34	5.47	5.61	5.95
H200	New Holland	508020	424330	4.87	5.26	5.55	5.68	5.81	6.12
H210	Barrow Haven	506380	422620	4.92	5.31	5.60	5.73	5.86	6.17
H220	Ferriby	497550	421150	5.04	5.42	5.67	5.77	5.86	6.04
H230	Winterton	493420	422830	5.14	5.51	5.74	5.83	5.90	6.02
H250	Blacktoft	484247	424190	5.25	5.62	5.83	5.90	5.96	6.04
H270	Goole	474857	422960	5.46	5.85	6.07	6.15	6.21	6.29
East Coast									
~	Great Eau	545500	393800	3.80	4.19	4.46	4.57	4.69	4.96
~	Boygriff	553300	379800	3.84	4.24	4.53	4.65	4.77	5.05
~	Burgh Sluice	555190	358620	4.26	4.45	4.76	4.90	5.03	5.34
Wash									
~	Hobhole	536610	339940	4.82	5.30	5.64	5.78	5.93	6.27
~	Lawyers Sluice	540750	334550	4.84	5.32	5.66	5.80	5.95	6.29
~	West Lighthouse	549150	325750	4.88	5.37	5.71	5.86	6.01	6.35
~	Grand Sluice	532400	344500	4.88	5.33	5.65	5.78	5.93	~
~	Fosdyke Bridge	531700	332200	4.91	5.38	5.71	5.85	5.99	~
~	Marsh Road	526000	324000	5.04	5.44	5.73	5.85	5.98	~
~	Wisbech	546100	310000	4.83	5.25	5.53	5.66	5.78	~
~	Dog In Doublet	527300	299300	3.67	4.00	4.22	4.32	4.42	~



★ **Modelled Breach Locations** - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard (Flood Risk to People : FD2320)		Max Depth (m)	Max Velocity (m/s)
	Less than 0.75 (Low Hazard)		0 - 0.25
	Between 0.75 and 1.25 (Danger for Some)		0.25 - 0.50
	Between 1.25 and 2.0 (Danger for Most)		0.50 - 1.0
	Greater than 2.0 (Danger for All)		1.0 - 1.6
			1.6 +
			0 - 0.3
			0.3 - 1.0
			1.0 - 1.5
			1.5 - 2.5
			2.5 +

Date Printed	February 2019	Scenario year	2006	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2019-114666
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This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.

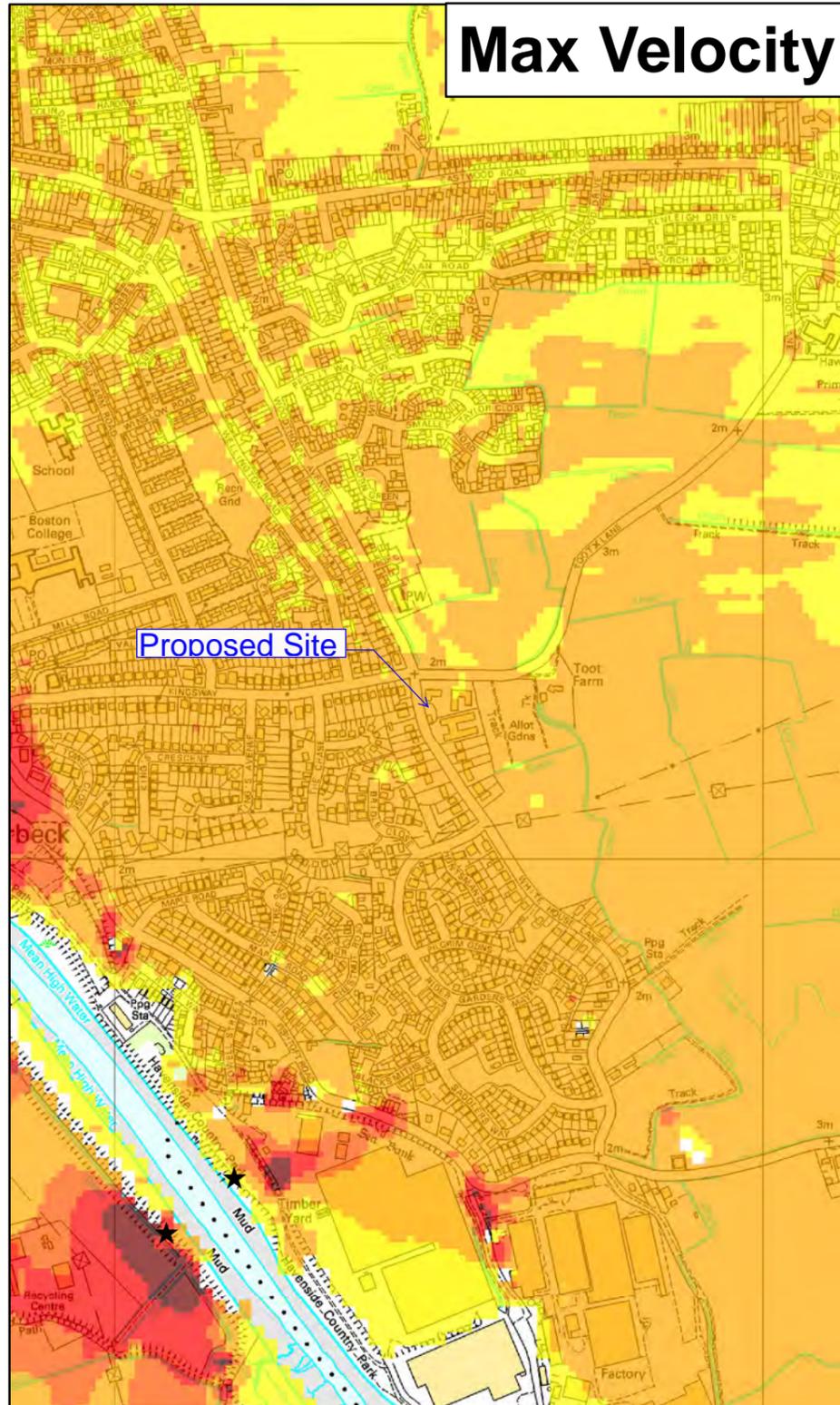
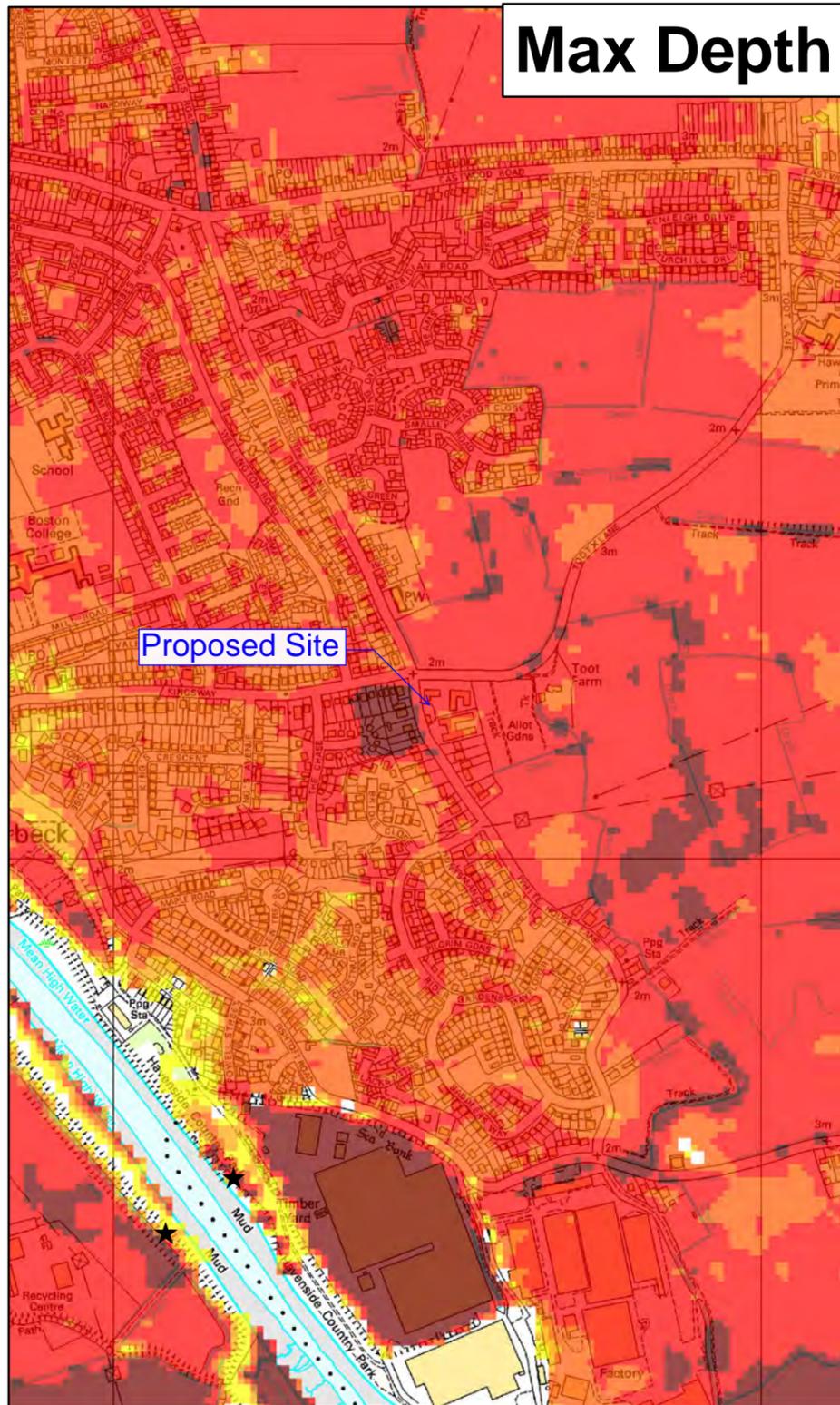
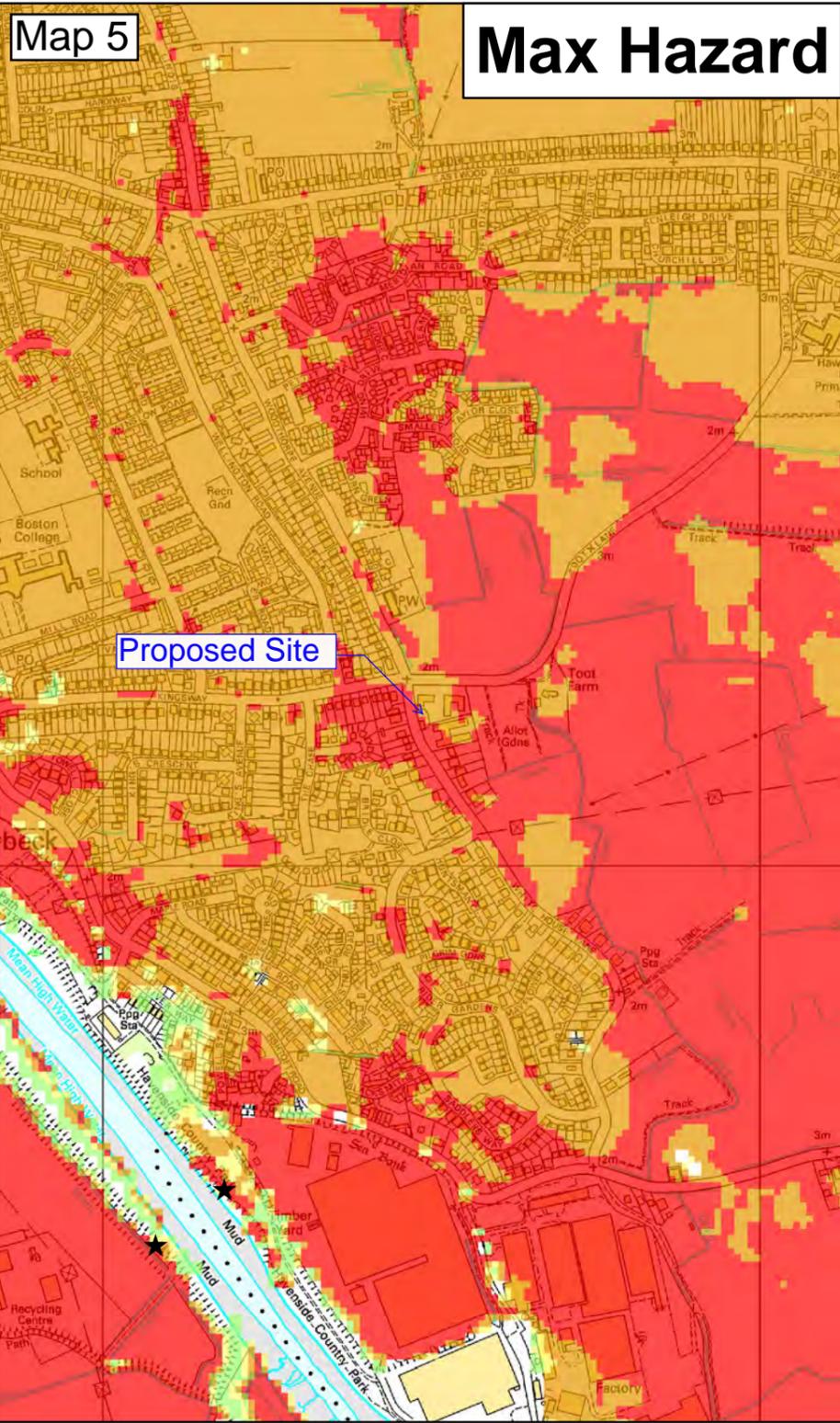
General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary



Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Centred on TF 34482 43233

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★ **Modelled Breach Locations** - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard (Flood Risk to People : FD2320)		Max Depth (m)	Max Velocity (m/s)
	Less than 0.75 (Low Hazard)		0 - 0.25
	Between 0.75 and 1.25 (Danger for Some)		0.25 - 0.50
	Between 1.25 and 2.0 (Danger for Most)		0.50 - 1.0
	Greater than 2.0 (Danger for All)		1.0 - 1.6
			1.6 +
			2.5 +

Date Printed	February 2019	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2019-114666
---------------------	---------------	----------------------	------	-------------------------------	--------------------	-------------------	-----------------

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Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Centred on TF 34482 43233

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 Flood risk from rivers or the sea

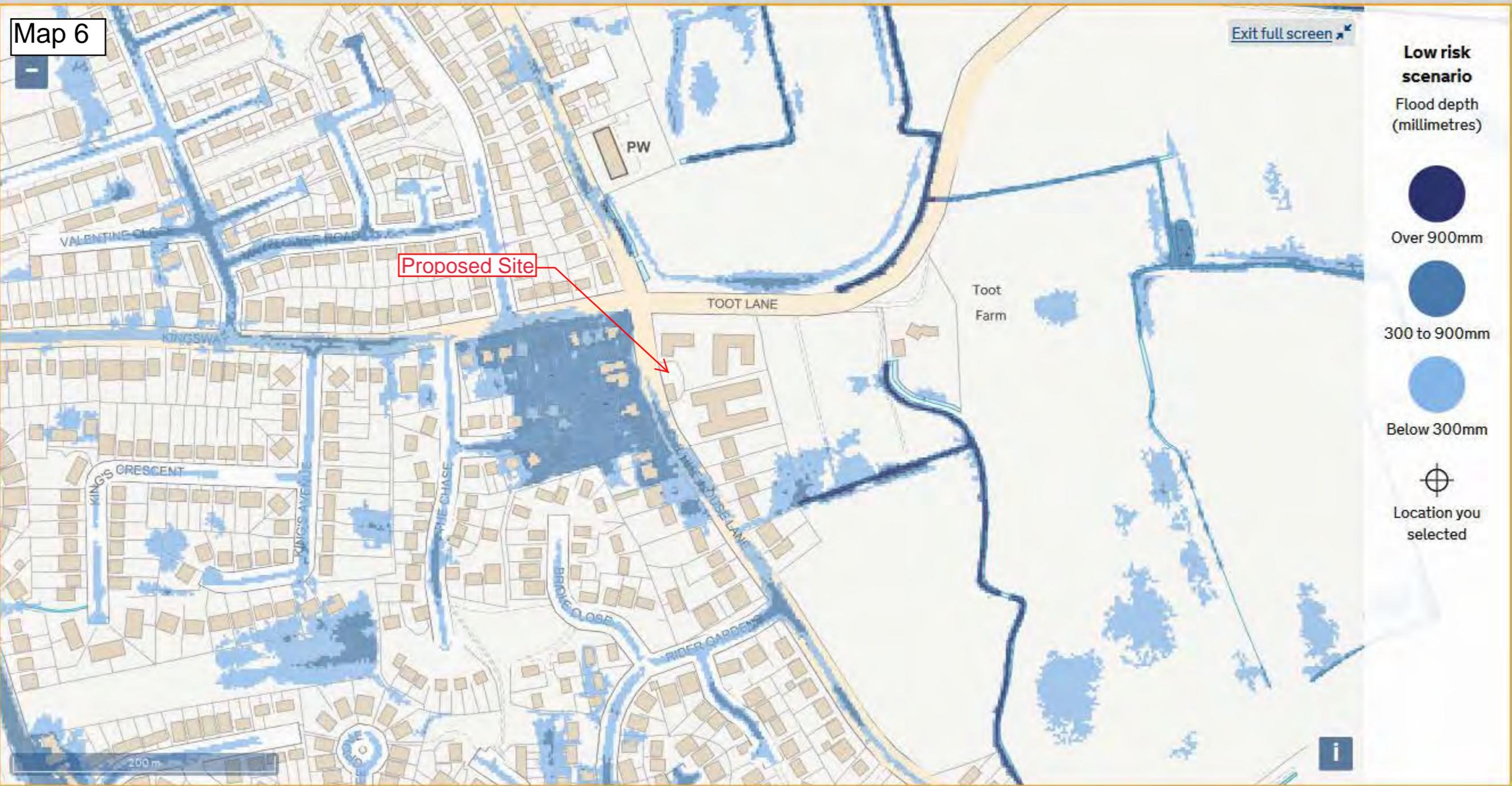
- Extent of flooding
- Depth and flow estimates at monitoring stations

 Flood risk from surface water

- Extent of flooding
- High risk: depth
- High risk: velocity
- Medium risk: depth
- Medium risk: velocity
- Low risk: depth
- Low risk: velocity

 Flood risk from reservoirs

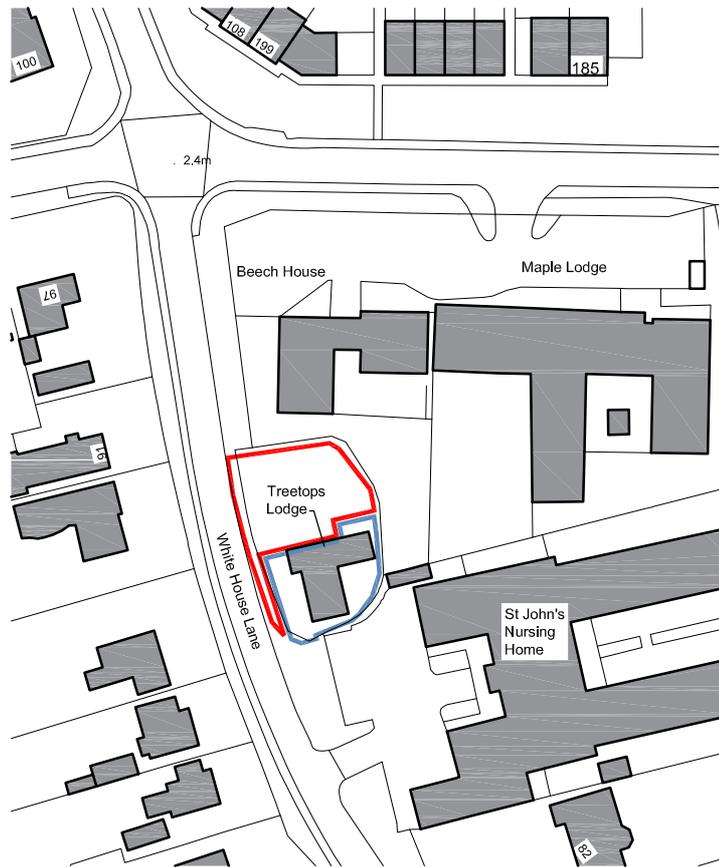
- Extent of flooding
- Flood depth
- Flood speed



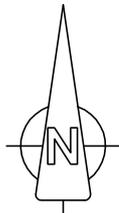
Low risk scenario

Flood depth (millimetres)

-  Over 900mm
-  300 to 900mm
-  Below 300mm
-  Location you selected

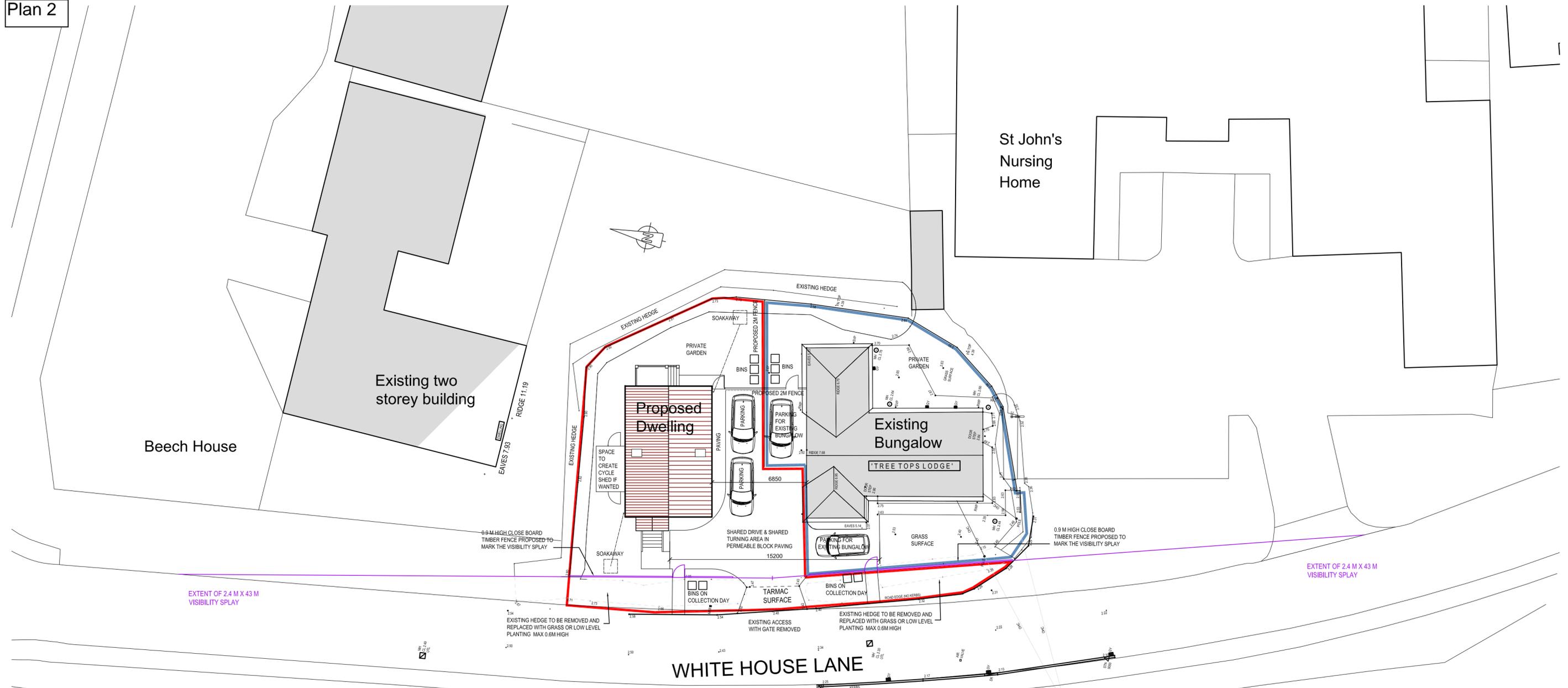


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Location Plan

JMAD Architecture www.jennymcintee.co.uk info@jmadarch.co.uk Tel 01205 875885			
Project:	Proposed Dwelling	Date:	January 2020
Address:	Tree Tops Lodge, Whitehouse Lane, Boston PE21 0BE	Scale:	1:1250 on A4
		drawn:	MG checked: JM
Client:	Stuart Adams	Job No:	18212
Drawing Title:	Location Plan	Dwg No:	101 A



EXTENT OF 2.4 M X 43 M VISIBILITY SPLAY

EXTENT OF 2.4 M X 43 M VISIBILITY SPLAY

WHITE HOUSE LANE

97

91

Foul Drainage to existing Mains Sewer

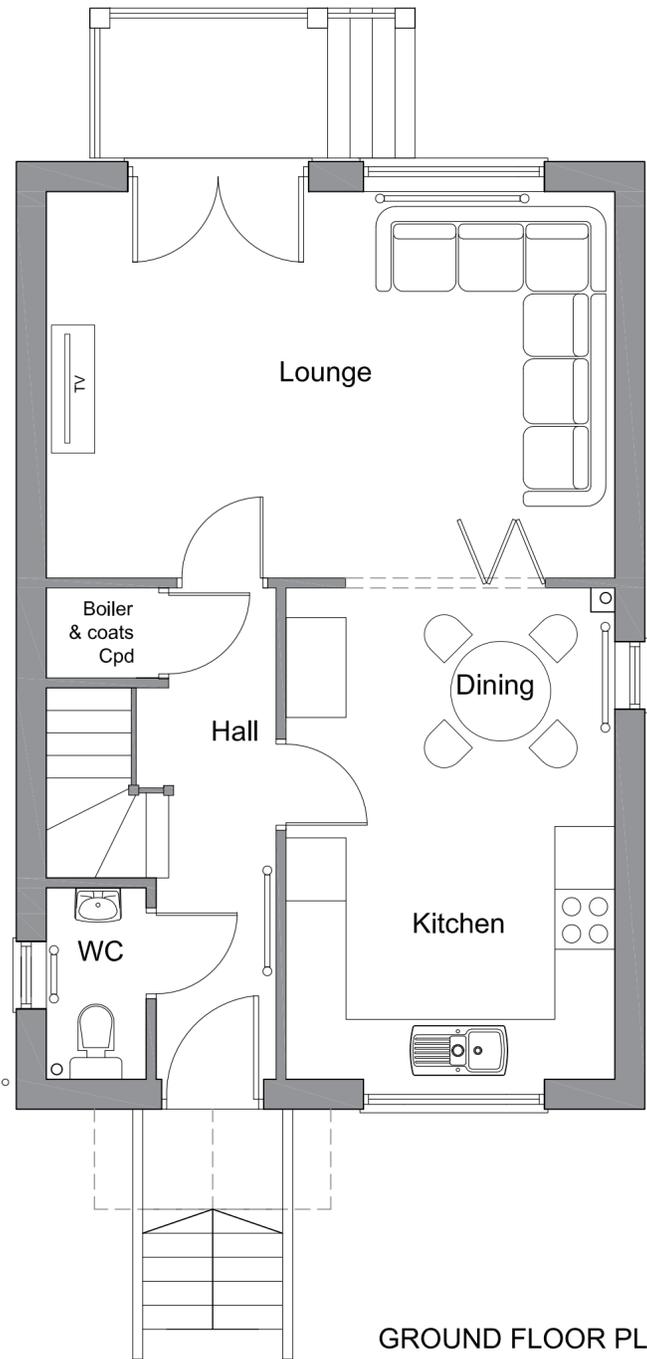
Surface Water Drainage to new soakaways



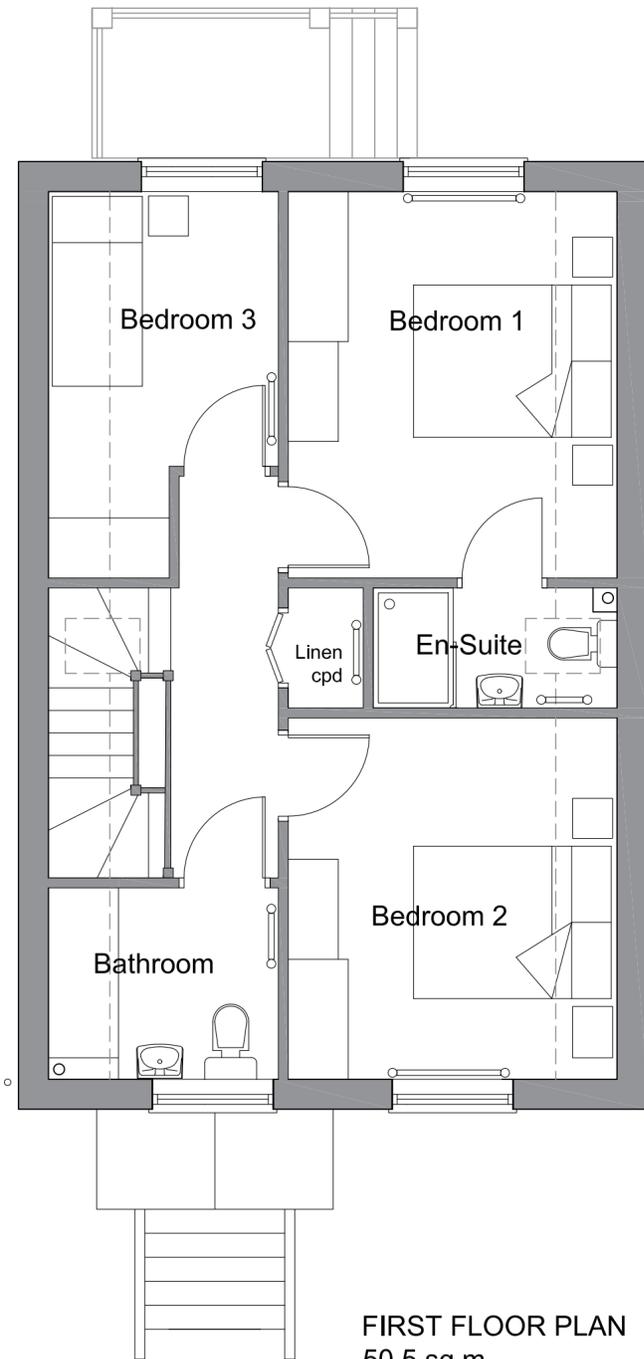
Site Plan As Proposed

Revision B - July 2020 - Design updated and detail added
 Revision A - January 2020 - Design Revisions

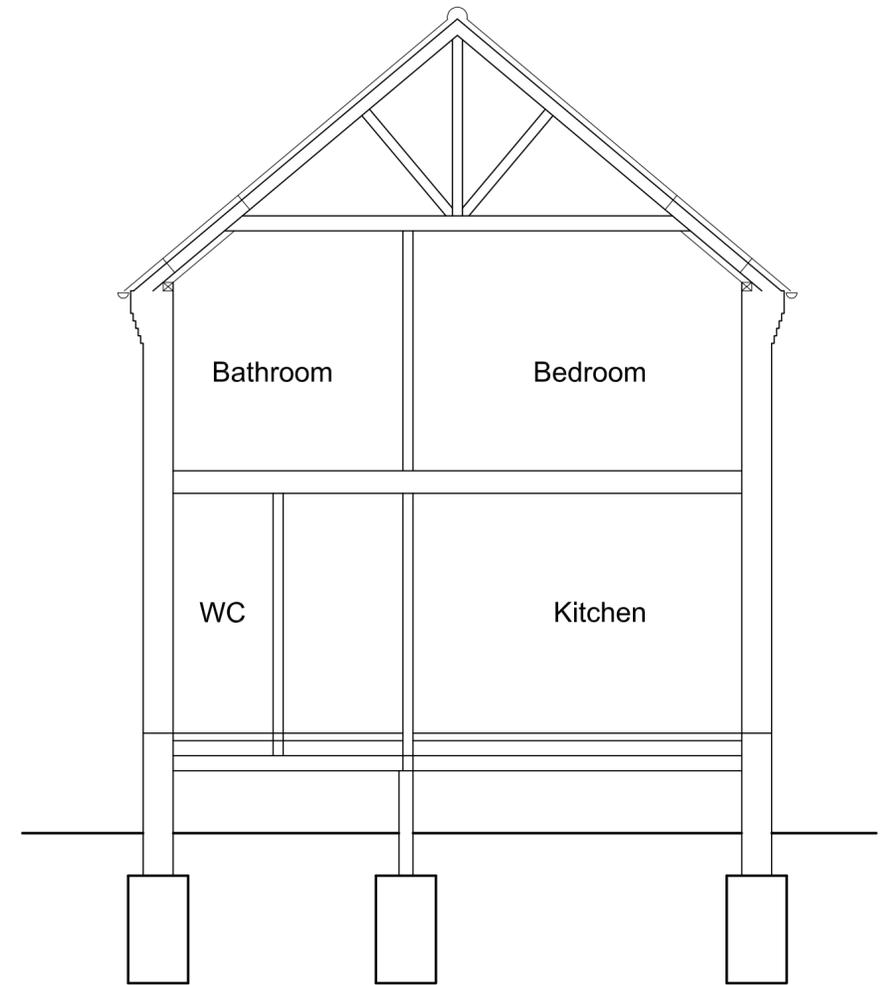
JMAD Architecture www.jennymcintee.co.uk info@jmadarch.co.uk Tel 01205 875885			
Project:	Proposed Dwelling	Date:	January 2020
Address:	Tree Tops Lodge, Whitehouse Lane, Boston PE21 0BE	Scale:	1:200 on A2
		drawn:	JM checked: JM
Client:	Stuart Adams	Job No:	18212
Drawing Title:	Site Plan	Dwg No:	102 B



GROUND FLOOR PLAN
50.5 sq m

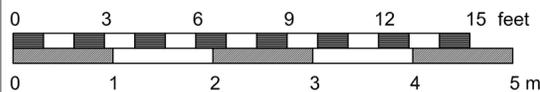


FIRST FLOOR PLAN
50.5 sq m



PRELIMINARY SECTION

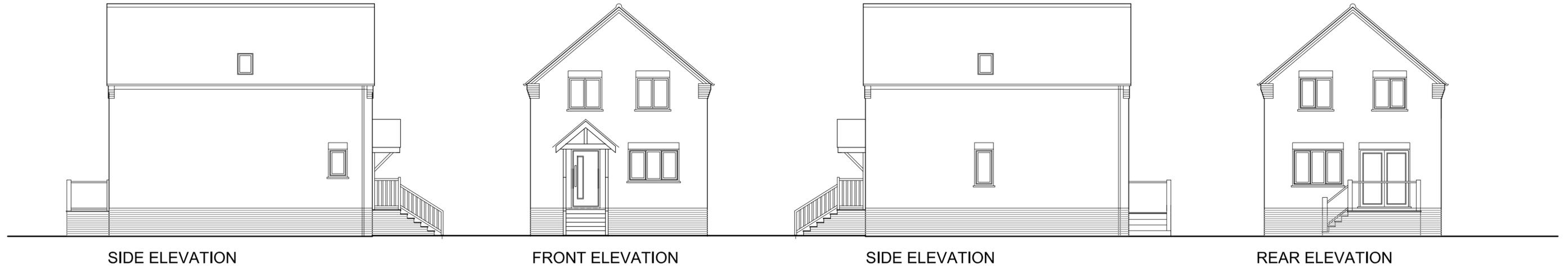
Gross Internal Floor Area = 101m²



Proposed Floor Plans & Section

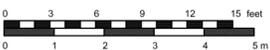
Revision B - July 2020 Design updates

JMAD Architecture www.jennymcintee.co.uk info@jmadarch.co.uk Tel 01205 875885			
Project:	Proposed Dwelling	Date:	January 2020
Address:	Tree Tops Lodge, Whitehouse Lane, Boston PE21 0BE	Scale:	1:50 on A2
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Client:	Stuart Adams	Job No:	18212
Drawing Title:	Proposed Floor Plans & Section	Dwg No:	103 B

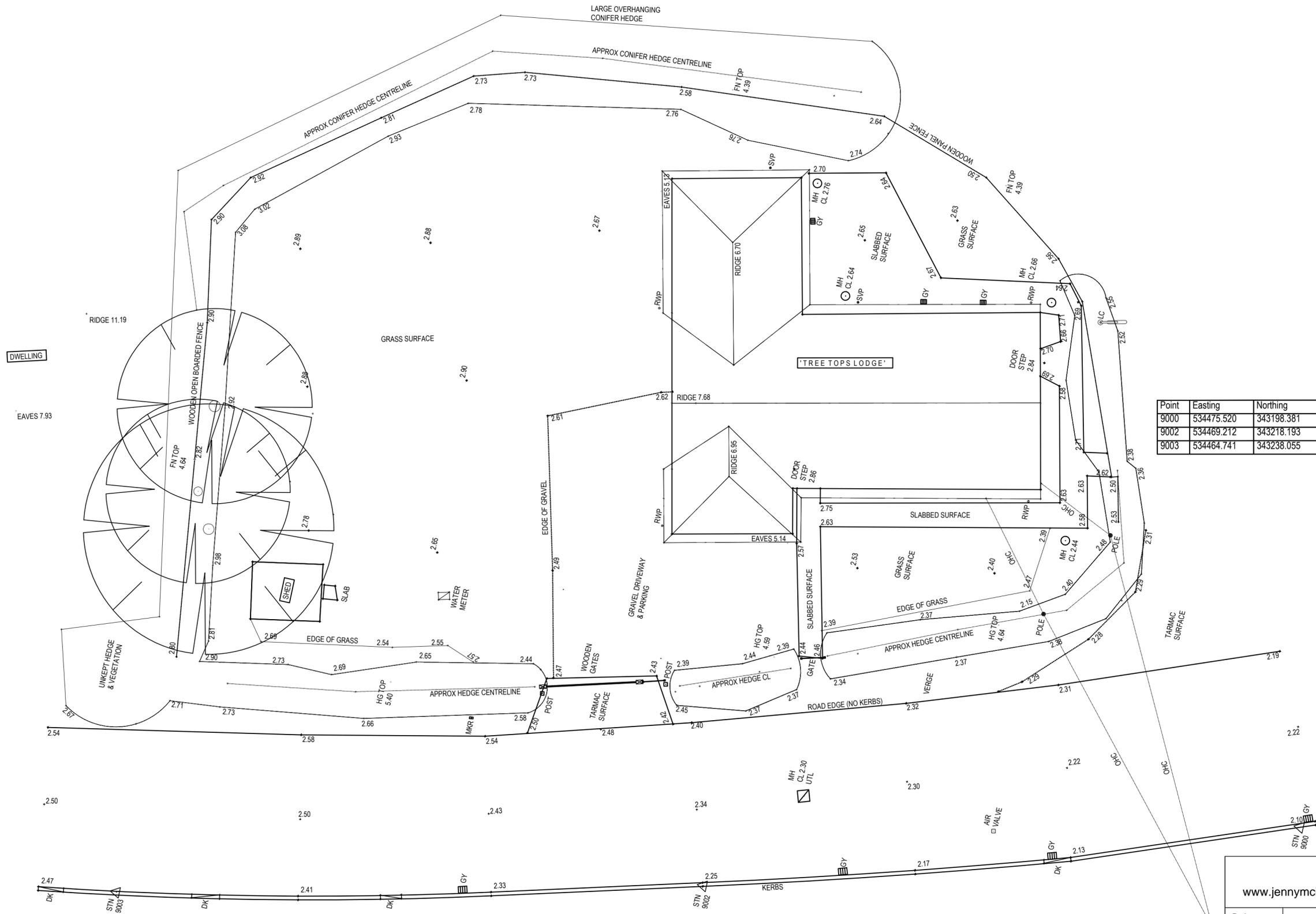


Revision B - July 2020 - Levels corrected, house design updated, detail added

JMAD Architecture www.jennymcintee.co.uk info@jmadarch.co.uk Tel 01205 875885			
Project:	Proposed Dwelling	Date:	January 2020
Address:	Tree Tops Lodge, Whitehouse Lane, Boston PE21 0BE	Scale:	1:100 on A2
		drawn:	JM checked: JM
Client:	Stuart Adams	Job No:	18212
Drawing Title:	Proposed Elevations and street scene	Dwg No:	104 B

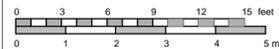


Proposed Elevations / Proposed Street Scene



Point	Easting	Northing	Elevation
9000	534475.520	343198.381	2.244
9002	534469.212	343218.193	2.375
9003	534464.741	343238.055	2.560

Topological Survey



JMAD Architecture www.jennymcintee.co.uk info@jmadarch.co.uk Tel 01205 875885			
Project:	Potential Building Plot	Date:	January 2019
Address:	Tree Tops Lodge, Whitehouse Lane, Boston PE21 0BE	Scale:	1:100 on A2
		drawn:	OL checked: JM
Client:	Stuart Adams	Job No:	18212
Drawing Title:	Topological Survey	Dwg No:	06