FLOOD RISK ASSESSMENT

Proposed Residential Development
Pear Tree Farm
St James Road
Long Sutton
PE12 9BA

RM ASSOCIATES

10 Main Street
Thorpe on the Hill
Lincoln
LN6 9BG
Tel 01522 681728
Mobile 07967 304737
emailray.rmassociates@gmail.com
March 2018 Version 1

RMA

FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT, PEAR TREE FARM, St. JAMES ROAD, LONG SUTTON PE12 9BA

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) March 2012, 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.

RM Associates accepts no responsibility or liability for any use of this document other than by the client, Mr. G. Franklin, for the purposes for which it was originally commissioned and prepared. If any unauthorised Third Party comes into procession of this report, they rely on it at their own risk and RM Associates owe them no duty of care or skill. All comments contained in this report, including any conclusions are based upon information available at the time of writing the report. RM Associates accepts no liability if additional information exists or becomes available after the time of writing this report.

This document is the copyright of RM Associates The reproduction or transmission of all or part of this document, whether by photocopying or storing in any medium by electronic means or otherwise, without the prior written consent of RM Associates is prohibited.

This report contains Environment Agency information © Environment Agency and database.

APPLICATION SITE

The site is located at Pear Tree Farm, St James Road, Long Sutton, Lincolnshire PE12 9BA within the administrative area of South Holland District Council. The National Grid Reference for the middle of the site is TF40858 20266 with a site area 0.483Ha or thereabouts. **Plan 1**



The current planning application is for the erection of a new contemporary, 5 bedrooms, two storeys detached dwelling under Paragraph 55 of the National Planning Policy Framework. **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 National Planning Policy Framework Technical Guidance 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%)

Flood Zone	Shading	Risk	Flood Risk Probability
1	Clear	Low	Less than 0.1% (1 in 1000 yrs)
2	Light blue	Medium	Rivers: between 1% (1 in 100 yrs) and 0.1% (1 in 1000 yrs) Sea: between 0.5% (1 in 200 yrs) and 0.1% (1 in 1000 yrs)
3	Dark Blue	High	Rivers: greater than 1% (1 in 100 yrs) Sea: greater than 0.5% (1 in 200 yrs)

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 NPPF.

Table 1: Flood Zones Definition (Ignoring the presence of defences)

Flood Zone 3 – High Probability
Definition This zone comprises 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. **Appropriate uses** The water-compatible and less vulnerable uses of land (Table 2) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable uses and essential infrastructure 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 users in times of flood. **Flood Risk Assessment requirements** All development proposals in this zone should be accompanied by a Flood Risk Assessment. **Policy aims** In this zone, developers and Local Authorities should seek opportunities to: • 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 systems; • Relocate existing development to land in zones with a lower probability of flooding; and • Create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPF the proposed residential development is classified as “More Vulnerable”, with Table 1 of NPPF stating that such uses are appropriate in this zone subject to the Exception Test.

Table 2: Flood Risk Vulnerability Classification

More Vulnerable
• 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.

From the topographical survey the site is reasonably level, the levels for the footprint of the building vary from 2.19mODN to 2.56mODN averaging 2.30m ODN. The road level on the B1390 at the site entrance, is 2.80mODN. **Plan 5**

It is proposed that the lowest ground floor level of the dwellings be raised 500mm above the existing ground level to a minimum level of 2.80mODN.

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 affecting the development site have been identified as:

- From the River Nene (Tidal)
- South Holland Internal Drainage Board system

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.

The flood zone maps show that the site of the proposed development is considered at risk from flooding. These maps indicate that the area would be flooded without flood defences, which are in place, (with an annual probability of more than 0.5% i.e. return frequency of less than 1 in 200 years for tidal flooding or more than 1.33% return frequency of less than 1 in 100 years for fluvial flooding). **Map 1**

The National Flood Risk Assessment Map shows that the site is at Medium risk of flooding. Medium means that each year, this area has a chance of flooding of less than 1 in 30 (3.3%) but greater or equal to 1 in 100 (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**

River Nene

The River Nene lies some 4.5km to the south-east of the site and is tidal and the present day 1 in 200-year tide flood level is 5.98mODN. The tidal flood defences of the tidal River Nene consist of earth embankments which are in good condition and the crest heights are circa 7.00mODN.

From Northern Area, Tidal Modal Analysis (June 2006) **Map 3**

Peak tide levels Present Day (2006) at (Tidal River) 0.5% (1 in 200) = 5.98mODN
Peak tide levels (2116) at (Tidal River) 0.5% (1 in 200) = 5.98mODN plus climate change allowances from Table 3 of 1.21mm = 7.11mODN

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 0.25 m
0.75 – 1.25	Moderate	Danger for some (i.e. children) 'Danger: flood zone with deep or fast flowing water'	Up to 0.5 m
1.25 – 2.0	Severe	Danger for most 'Danger: flood zone with deep fast flowing water'	0.5 m to 3 m
> 2.0	Extreme	Danger for all 'Extreme danger: flood zone with deep fast flowing water'	0.5 m to over 3 m

HR = d x (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

Flood depth (m)	All areas (rural and urban)
≤ 0.25	0.5
> 0.25	1

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 Tidal River Nene 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 the site is not within a Hazard Rating area. With climate change up to year 2115 the maps show part of the site is within a Hazard Rating Area of between 0.75 -1.25 (Danger for Some) and the remainder in an area of Low Hazard (Less than 0.75), with a velocity of 0 - 0.3/sec and depth of flow for part 0 – 0.25 and the remainder 0.25 – 0.50m.

Map 4 shows the results for the year 2115, 1 in 200 breach scenarios, taken from the Environment Agency Lincolnshire & Northamptonshire Area Tidal Hazard Mapping.

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. They do not include overtopping along the following tidal rivers which are currently being investigated the Witham Haven upstream of Hobhole and Welland upstream of Fossdyke Bridge.

The Environment Agency has confirmed that for the scenario years 2006 and 2115, the 1 in 200-year and the 1 in 1000-year annual chance from overtopping, the site is not affected.

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 0.25 – 0.5m deep the FFL shall be set at a minimum of 500mm above the ground level.

The design of the buildings has taken this into account, the ground floor level for all are to be raised a minimum of0.5m above the lowest ground level to 2.80mODN.

With the main risk to flooding of the site being tidal flooding following a breach to the tidal defences, any flooding from fluvial flooding sources has been mitigated against.

South Holland District Council

In order to inform the process of risk assessment and site selection the District Council commissioned Haskoning UK Ltd Consultants to prepare a Strategic Flood Risk Assessment in December 2002.They have carried out an update of this report and this report was published in January 2010 and this was further updated in the South-East Lincolnshire SFRA March 2017

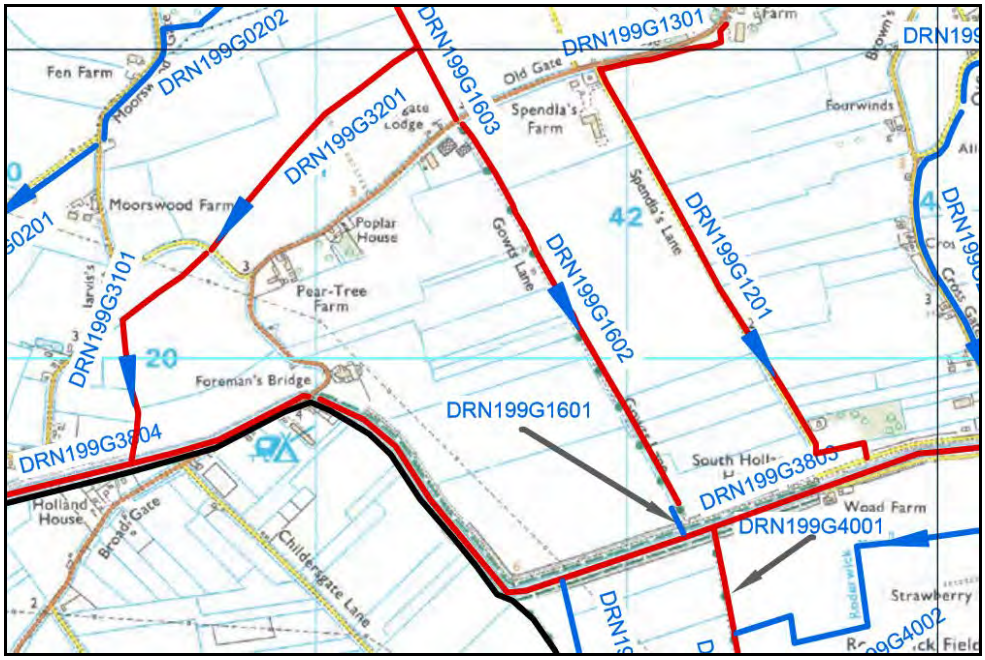
The whole of the tidal flooding information has been replaced by the mapping from the latest Environment Agency Tidal Hazard mapping. Where the mapping for an area contains both fluvial and tidal components, the more severe of the two has been presented.

From the Residual Flood Hazard, Depth and Velocity Spalding - Year 2115 0.1% Tidal Event Probability maps, from the update of strategic flood risk assessment for South Holland District Council the site is affected from a breach to the flood defences.

South Holland Internal Drainage Board

The proposed development site is located within Catchment area ‘H-Free Discharge’ of South Holland Internal Drainage Board. The Board is responsible to operate and maintain the arterial fluvial system.

The Board’s nearest watercourse is the Naylor’s Gate Drain Ref DRN199G3201 located 215m to the north west of the site, which outfalls into the South Holland Main Drain which is located 420m south of the site.



Extract from South Holland IDB Drainage Map

Surface Water Flooding

Most the site is shown to be at no risk from surface water. The site is, there considered to be at low risk. Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. **Map 5**

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 property is also raised 500mm above the average ground level. The updated SFRA 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. Due to the location of the site there are no sewers which could affect the development

- 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.

SEQUENTIAL APPROACH

When applying the sequential approach for flood risk in accordance NPPF he site would fall into Zone 3a (High Probability) as the site is shown to be within the tidal flood plain as shown on the Environment Agency's Flood Map without defences in place.

However, the results of the updated SHSFRA shows that the site is located within a low/medium probability flood zone but the area is reliant on protection by flood defences providing a standard of protection of 1 in 100 years return period.

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPF, the proposed residential development is classified as "More Vulnerable", with Table 1 of NPPF stating that such uses are appropriate in this zone (as summarised in Table 3 NPPF).

TABLE 3: Flood risk vulnerability and flood zones '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

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. The NPPF states that development should not be permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. It is important to note that the Sequential Test does not specifically mean that sites such as this cannot be developed, rather that sites at less risk should be developed first. There could be a significant number of other, available sites suitable for such development. It would therefore be extremely difficult to ascertain the location of all other available, less vulnerable sites, whether they would be suitable for development and whether they had any reasonable prospect of being brought forward.

With the proposal to build a NPPF Paragraph 55 House, which is a new dwelling of exceptionally high quality, whist achieving the highest sustainability standards with low energy uses, this is considered to meet both the Sequential and Exception test requirements. A Sequential and Exception Test has been prepared by others and for the purpose of this report it is deemed to have satisfied these tests.

This FRA meets the second part of the Exception Test.

The property will have the provision of a safe haven, which is above the predicted flood level, for residents to await the flood level to recede or to be rescued.

DRAINAGE STATEMENT

This drainage statement, for the site, is a 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 attenuation techniques to reduce the storm water discharge from the proposed development and 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.

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

The preference to be utilised for the disposal of surface water from the development would be to use soakaways following the facilities for rainwater harvesting and permeable surfacing to be used, to be deigned in accordance with the requirements of BSE Digest 365

Watercourse / Public Sewer

There are no proposals to discharge surface water to these sources.

Foul Water

As the site has no public sewers close by, the disposal of foul water from the new dwelling will be connected to a 6- person package treatment unit.

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

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.

Table 2 Peak rainfall intensity allowance in small and urban catchments (1961 to 1990 baseline)			
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

Table 3 Peak sea level allowance for each epoch in (mm) per year with cumulative sea level rise for each epoch in brackets (use 1990 baseline)					
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

The Main risk of flooding of the site, is from the tidal River Nene which is located some 4.50Km south-east of the site. The 1 in 200-year tide flood level at chainage 6.0m, for year Present Day (2007) at (Tidal River) 0.5% (1 in 200) = 5.84mODN. Peak tide levels (2116) at (Tidal River) 0.5% (1 in 200) = 6.98mODN using climate change allowances from Table 3.

The tidal flood defences of the tidal River Nene consist of earth embankments which are provided with a soak dyke on the landward toe, they are in good condition and the minimum crest heights are 7.17mODN.

With the floor level being decided from the tidal flood depths any flooding from fluvial sources is considered to be less than that resulting from tidal flooding.

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 habitable accommodation floor level for the dwelling are to be raised a minimum of 0.5m above the existing ground level to 2.80mODN. This is considered to be appropriate, to achieve a protection against flooding following a breach to the flood defences 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.

- External doors to be of construction not susceptible to moisture.

- Arrange for all new service circuits to be routed at first floor level where practical socket outlets, boilers etc. to be a minimum of 0.5m above the ground floor level.

- As this site is in an area that can receive flood alerts from the Environment Agency Floodline Warning Direct system. It is recommended that the property Owner contact the Environment Agency's Floodline on **0845 988 1188** to register the property to receive warnings 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.

CONCLUSION

- 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.

- The site does have the protection of both tidal and fluvial flood defences which are well maintained by the Environment Agency.

- The habitable ground floor level for the property is to be raised 500m above the existing average

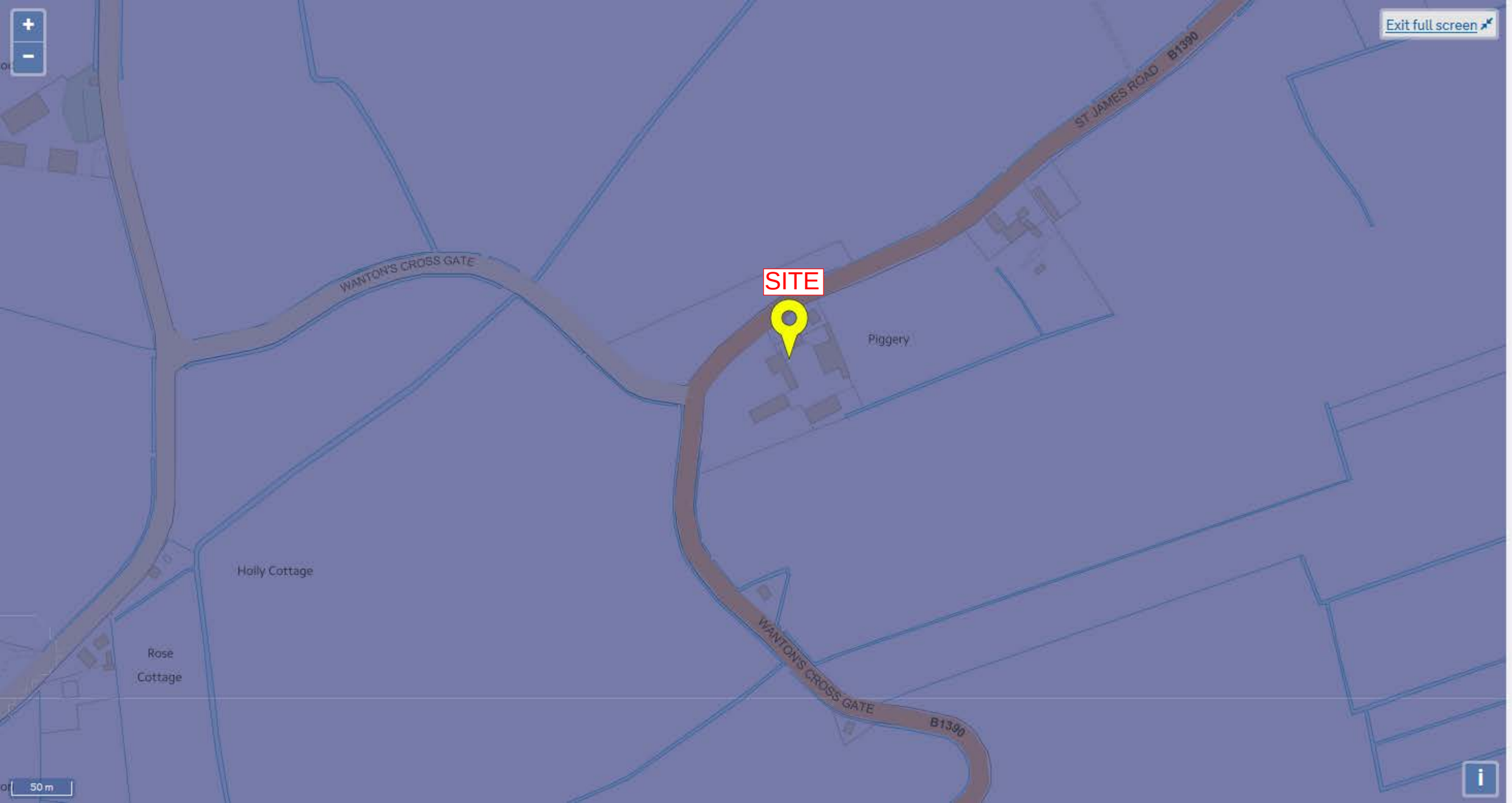
ground level with the lowest level being 2.80mODN, which is considered to be above the 2115 climate change breach level at the site.

- The Flood Risk Vulnerability Classification in Table 2 of NPPF Technical Guide the proposed residential development is classified as “More Vulnerable”, with Table 1 of NPPF Technical Guide stating that such uses are appropriate in this zone subject to the Exception Test.
- The drainage strategy for the development is the utilisation of on- site Suds attenuation methods.
- Any impact of damage to the properties can be foreseen and mitigated against by relatively simple design, including such flood resilient materials and using such flood resistant construction techniques as appropriate for the properties location.
- Flooding from other sources is unlikely to affect the site.

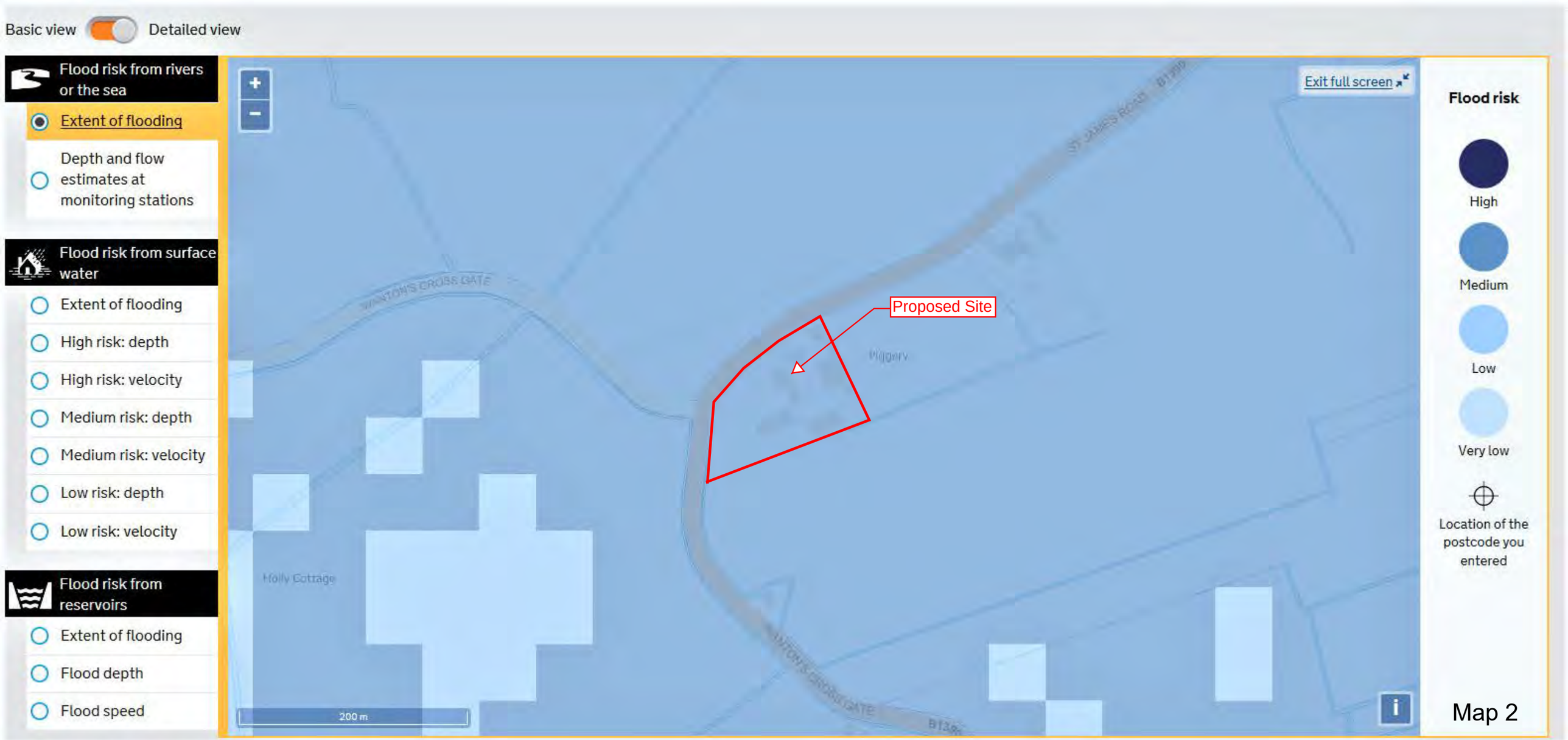
****

APPENDIX

Map 1	Extract from Environment Agency Flood Zone
Map 2	Flooding from Rivers and Sea Map
Map 3	Tidal Model Analysis 2006 Map
Map 4	Lincolnshire & Northamptonshire Area Tidal Breach Mapping 2115 – 1 in 200year
Map 5	Surface Water Flood Map
Plan 1	Location Plan
Plan 2	Site layout plan
Plan 3	Proposed Ground Floor Layout Plan
Plan 4	Proposed First Floor Layout Plan
Plan 5	Topographical Survey


Exit full screen
SITE
WANTON'S CROSS GATE
ST JAMES ROAD
B1390
Piggery
Holly Cottage
Rose
Cottage
WANTON'S CROSS GATE
B1390
50 m
Development location
Flood zone 3
Flood zone 2
Flood zone 1
Areas benefiting from flood defences
Flood defence
Main river
Flood storage area

Map 1


Basic view
Detailed view
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
Exit full screen
Proposed Site
Pilgery
Holly Cottage
WINTON'S CROSS GATE
200 m
Flood risk
High
Medium
Low
Very low
Location of the postcode you entered
Map 2

Tidal Level Location Map
Lincolnshire & Northamptonshire Area



Map 3

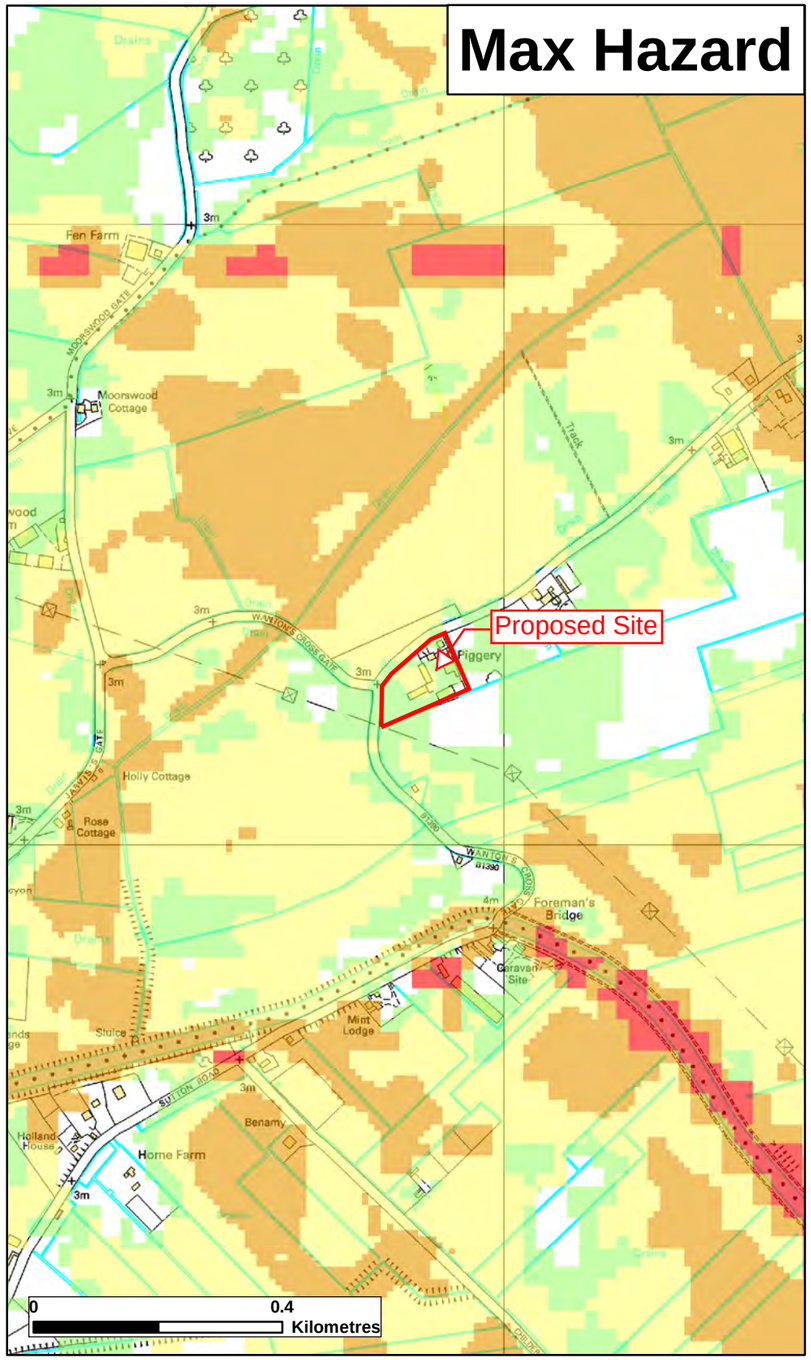
© Environment Agency copyright and / or database rights 2017. All rights reserved. © Crown Copyright and database right. All rights reserved. Environment Agency, 100026380, 2017.

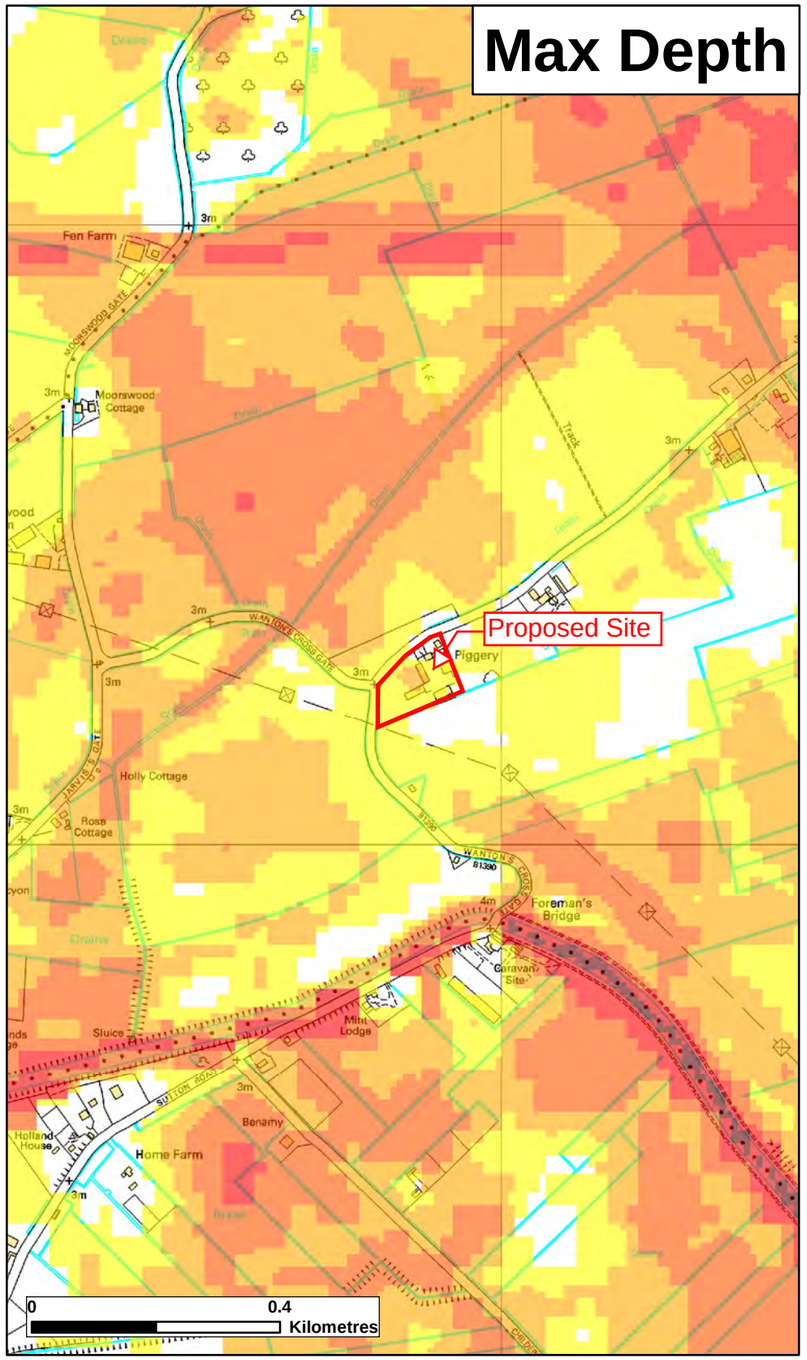
Tidal Water Levels for the South Humber, East Coast and The Wash

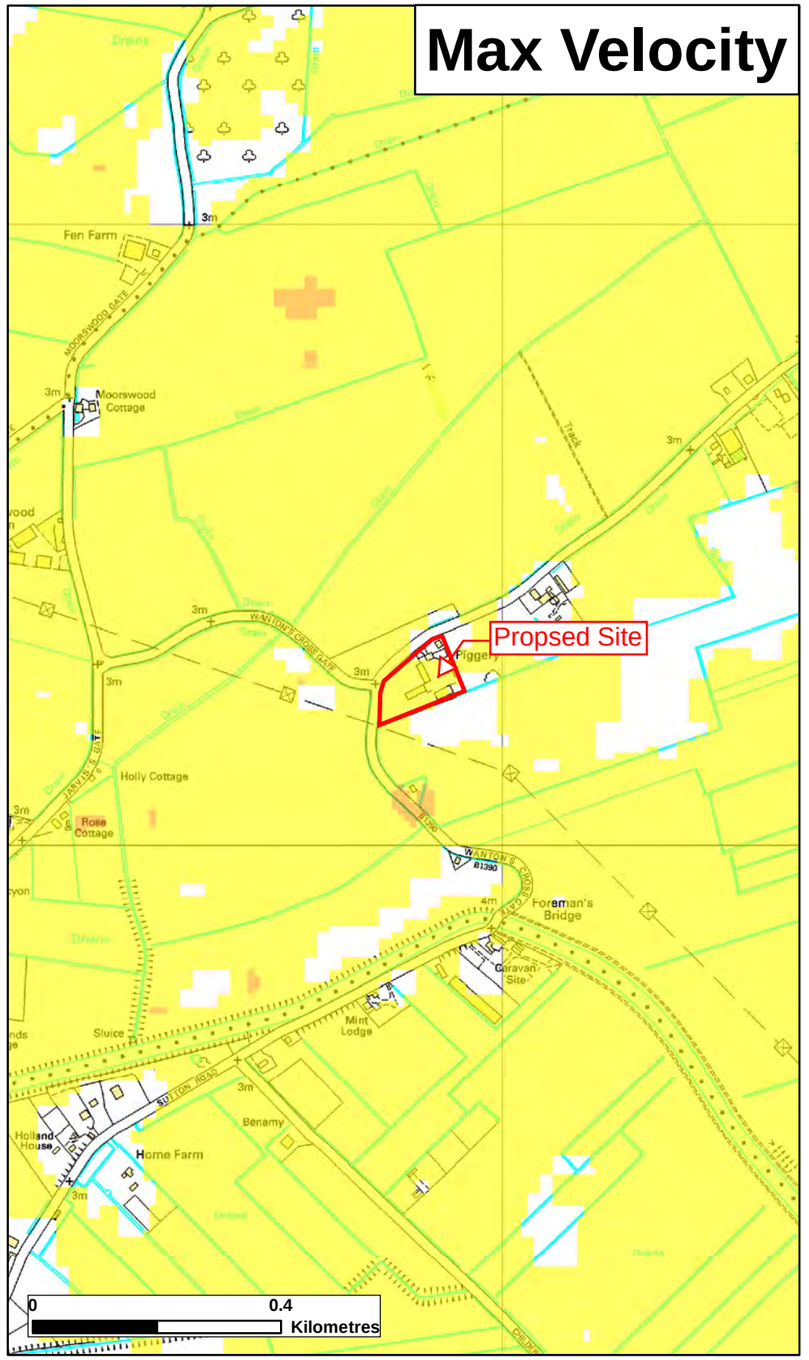
The table below shows still water levels for locations, from the above location map, around the South Humber Estuary, East Coast and The Wash. It is important to note the following:

- 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
~	Boygrift	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)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

Date Printed	March 2017	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2017-39803

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

Environment Agency

Lincolnshire and Northamptonshire Breach Hazard mapping

Map Centred on TF 40841 20264

This map is reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationary Office. Crown copyright. All rights reserved. Environment Agency 100026380, 2017. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Basic view Detailed view

Flood risk from rivers or the sea

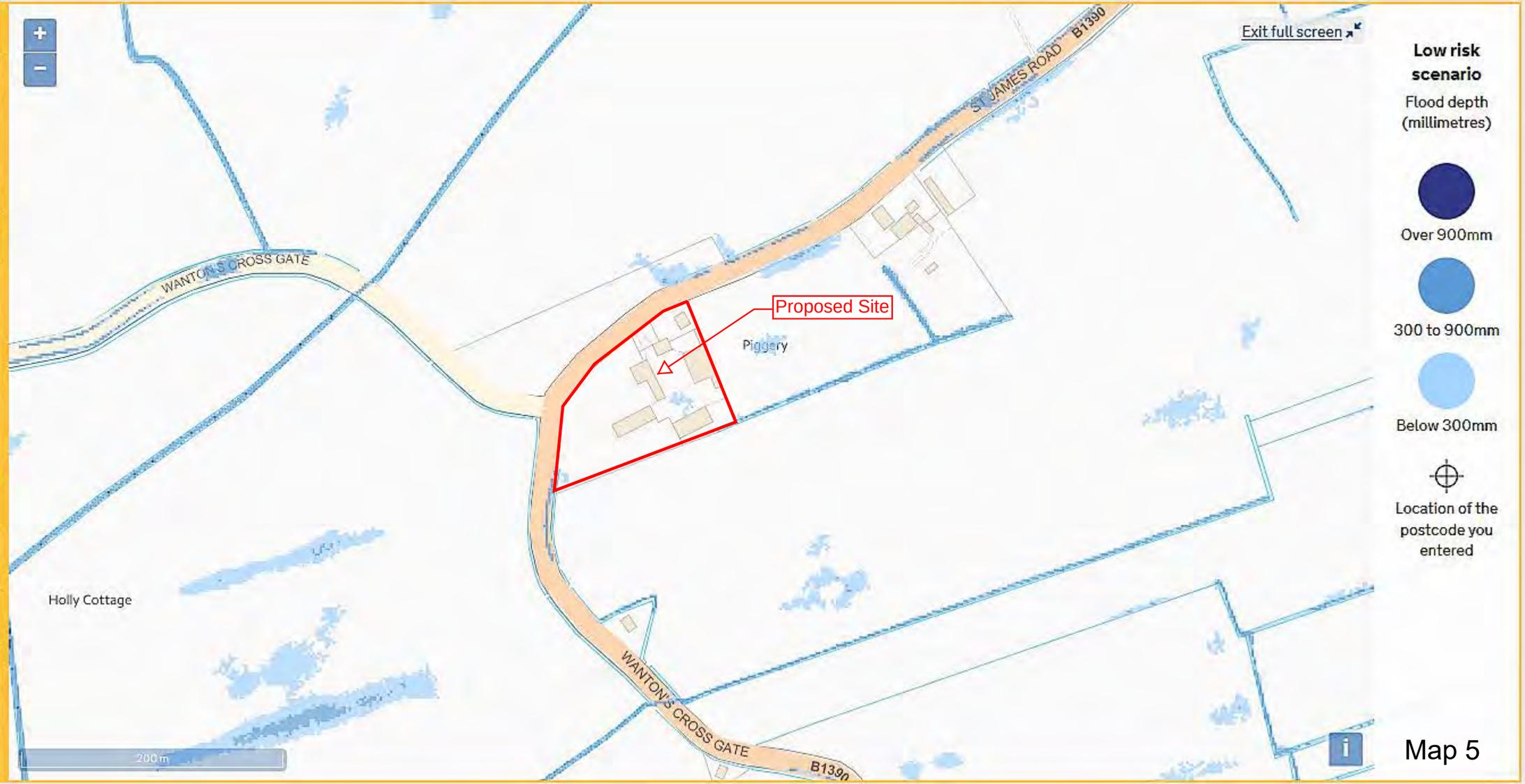
- Extent of flooding
- Depth and flow estimates at monitoring stations

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 5

Notes

Ordnance Survey Map
© Crown Copyright 2018. OS Licence No: AR 100010613



N

0 10 20 30 40 50m

Rev	By	Notes	Date

rdc
Robert Doughty Consultancy

32 High Street, Helpringham
Sleaford, Lincolnshire NG34 ORA

Tel: 01529 421646
Fax: 01529 421358
Email: admin@rdc-landplan.co.uk
Web: www.rdc-landplan.co.uk

Client
Mr. G. Franklin

Project
Pear Tree Farm, Long Sutton

Drawing title
Location Plan

Drawing No	Rev	Drawn
1185-2_PL_LP01	-	WW

Scale	Date	Checked
1:1250 @ A3	08.02.18	CS

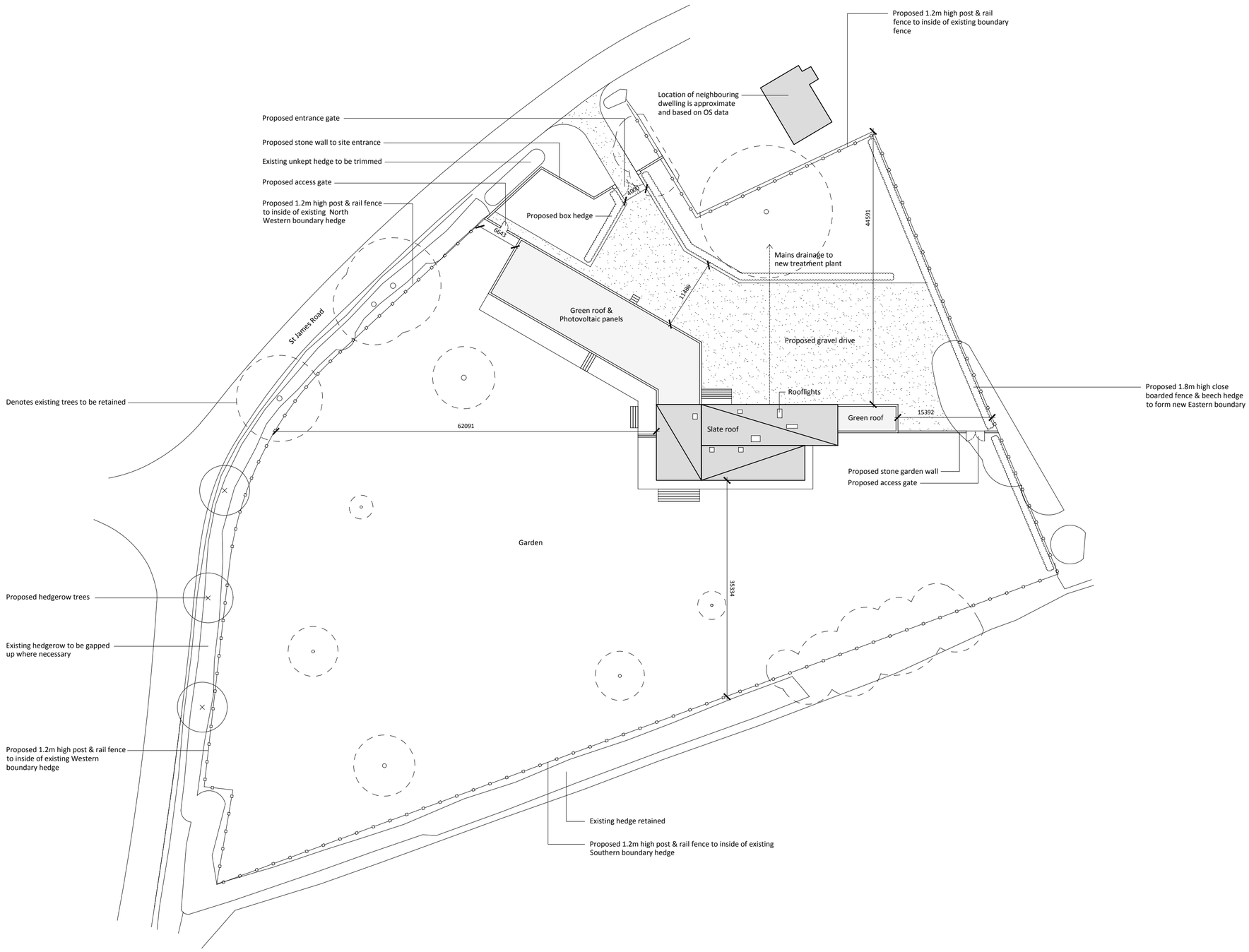
Plan 1

Notes

Measurements
Do not scale from this drawing.
All measurements should be checked against on site conditions and any discrepancies should be brought to the attention of the Robert Doughty Consultancy.

Ordnance Survey Map
© Crown Copyright 2018. OS Licence No: AR 100010613

CDM 2015
This drawing is for illustrative purposes and/or obtaining the relevant planning permission only. It should not be used for construction and accordingly, risk identification under the Construction (Design & Management) Regulations 2015 has not been undertaken.



N

0 5 10 15 20 25m

Rev	By	Notes	Date

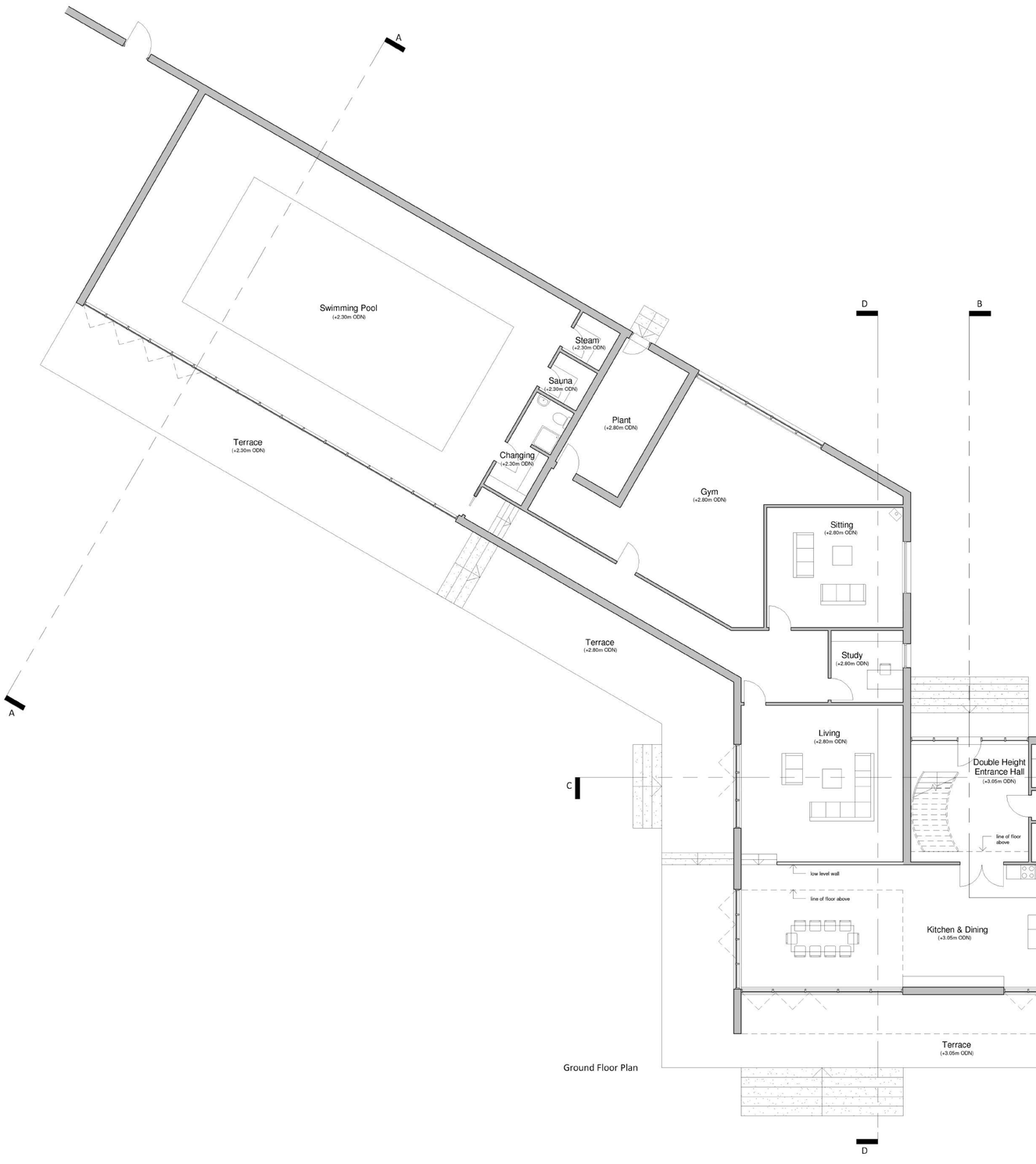
rdc
Robert Doughty Consultancy
32 High Street, Helpringham
© Sleaford, Lincolnshire NG34 ORA
Tel: 01529 421646
Fax: 01529 421358
Email: admin@rdc-landplan.co.uk
Web: www.rdc-landplan.co.uk

Client: Mr. G. Franklin		
Project: Pear Tree Farm, Long Sutton		
Drawing title: Proposed Block Plan		
Drawing No: 1185-2_PL_BP02	Rev: -	Drawn: WW
Scale: 1:500 @ A2	Date: 08.02.18	Checked: CS

Notes

Measurements
Do not scale from this drawing.
All measurements should be checked against on site conditions and any discrepancies should be brought to the attention of the Robert Doughty Consultancy.

CDM 2015
This drawing is for illustrative purposes and/or obtaining the relevant planning permission only. It should not be used for construction and accordingly, risk identification under the Construction (Design & Management) Regulations 2015 has not been undertaken.



Ground Floor Plan

N

0 1 2 3 4 5m

Rev	By	Notes	Date

rdc
Robert Doughty Consultancy

32 High Street, Helpringham
Sleaford, Lincolnshire NG34 ORA

Tel: 01529 421646
Fax: 01529 421358
Email: admin@rdc-landplan.co.uk
Web: www.rdc-landplan.co.uk

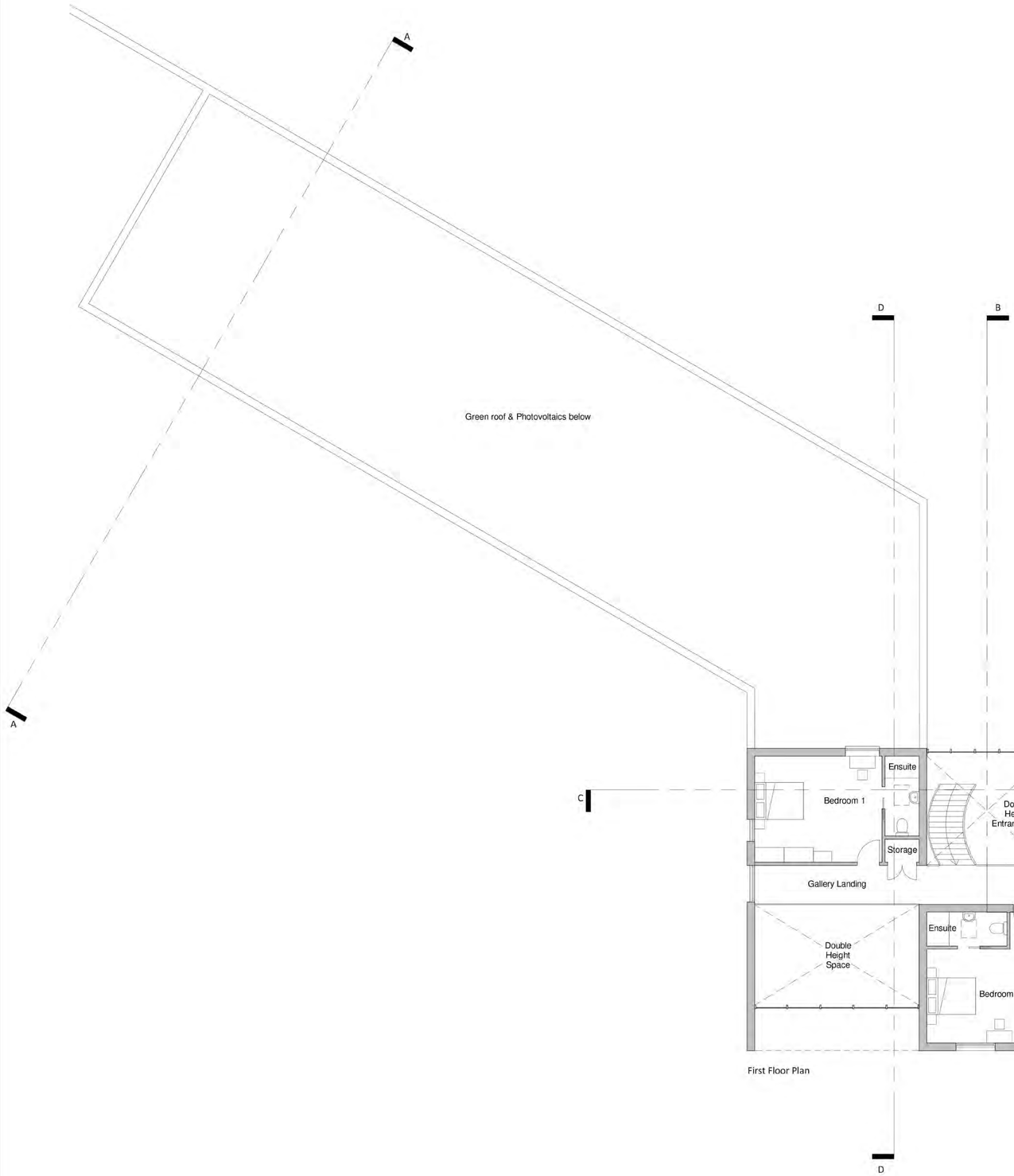
©

Client: Mr. G. Franklin		
Project: Pear Tree Farm, Long Sutton		
Drawing title: Proposed Ground Floor Plan		
Drawing No: 1185-2_PL_PL01	Rev: -	Drawn: CS
Scale: 1:100 @ A1	Date: 09.02.18	Checked: CS

Notes

Measurements
Do not scale from this drawing.
All measurements should be checked against on site conditions and any discrepancies should be brought to the attention of the Robert Doughty Consultancy.

CDM 2015
This drawing is for illustrative purposes and/or obtaining the relevant planning permission only. It should not be used for construction and accordingly, risk identification under the Construction (Design & Management) Regulations 2015 has not been undertaken.



First Floor Plan



Rev	By	Notes	Date

rdc
Robert Doughty Consultancy

© 32 High Street, Helpringham
Sleaford, Lincolnshire NG34 ORA

Tel: 01529 421646
Fax: 01529 421358
Email: admin@rdc-landplan.co.uk
Web: www.rdc-landplan.co.uk

Client: Mr. G. Franklin		
Project: Pear Tree Farm, Long Sutton		
Drawing title: Proposed First Floor Plan		
Drawing No: 1185-2_PL_PL02	Rev: -	Drawn: CS
Scale: 1:100 @ A1	Date: 09.02.18	Checked: CS


NORTH
B1397 / ST JAMES ROAD
WANTONS CROSS GATE
APPROXIMATE EDGE OF TARMAC (NO KERBS)
RUBBLE CHANNEL
KERB TOP
KERB BOTTOM
GRASS VERGE
EDGE OF CARRIAGEWAY
ROUGH GROUND
CONCRETE SURFACE
WATER TROUGH
METAL GATES
POLE
DWELLING
EAVES 7.72
RIDGE 10.21
RIDGE 9.85
RIDGE 9.80
RIDGE 9.60
RIDGE 9.55
RIDGE 9.10
RIDGE 8.95
RIDGE 8.90
RIDGE 7.40
EAVES 6.95
EAVES 6.90
EAVES 6.70
EAVES 6.55
EAVES 6.50
EAVES 6.45
EAVES 6.40
EAVES 6.35
EAVES 6.30
EAVES 6.25
EAVES 6.20
EAVES 6.15
EAVES 6.10
EAVES 6.05
EAVES 5.95
EAVES 5.90
EAVES 5.85
EAVES 5.80
EAVES 5.75
EAVES 5.70
EAVES 5.65
EAVES 5.60
EAVES 5.55
EAVES 5.50
EAVES 5.45
EAVES 5.40
EAVES 5.35
EAVES 5.30
EAVES 5.25
EAVES 5.20
EAVES 5.15
EAVES 5.10
EAVES 5.05
EAVES 5.00
EAVES 4.95
EAVES 4.90
EAVES 4.85
EAVES 4.80
EAVES 4.75
EAVES 4.70
EAVES 4.65
EAVES 4.60
EAVES 4.55
EAVES 4.50
EAVES 4.45
EAVES 4.40
EAVES 4.35
EAVES 4.30
EAVES 4.25
EAVES 4.20
EAVES 4.15
EAVES 4.10
EAVES 4.05
EAVES 4.00
EAVES 3.95
EAVES 3.90
EAVES 3.85
EAVES 3.80
EAVES 3.75
EAVES 3.70
EAVES 3.65
EAVES 3.60
EAVES 3.55
EAVES 3.50
EAVES 3.45
EAVES 3.40
EAVES 3.35
EAVES 3.30
EAVES 3.25
EAVES 3.20
EAVES 3.15
EAVES 3.10
EAVES 3.05
EAVES 3.00
EAVES 2.95
EAVES 2.90
EAVES 2.85
EAVES 2.80
EAVES 2.75
EAVES 2.70
EAVES 2.65
EAVES 2.60
EAVES 2.55
EAVES 2.50
EAVES 2.45
EAVES 2.40
EAVES 2.35
EAVES 2.30
EAVES 2.25
EAVES 2.20
EAVES 2.15
EAVES 2.10
EAVES 2.05
EAVES 2.00
EAVES 1.95
EAVES 1.90
EAVES 1.85
EAVES 1.80
EAVES 1.75
EAVES 1.70
EAVES 1.65
EAVES 1.60
EAVES 1.55
EAVES 1.50
EAVES 1.45
EAVES 1.40
EAVES 1.35
EAVES 1.30
EAVES 1.25
EAVES 1.20
EAVES 1.15
EAVES 1.10
EAVES 1.05
EAVES 1.00
EAVES 0.95
EAVES 0.90
EAVES 0.85
EAVES 0.80
EAVES 0.75
EAVES 0.70
EAVES 0.65
EAVES 0.60
EAVES 0.55
EAVES 0.50
EAVES 0.45
EAVES 0.40
EAVES 0.35
EAVES 0.30
EAVES 0.25
EAVES 0.20
EAVES 0.15
EAVES 0.10
EAVES 0.05
EAVES 0.00
PADDOCK (LARGELY NETTLES & LONG GRASS)
APPROXIMATE ROOF MTK 6.65
APPROXIMATE EDGE OF TARMAC (NO KERBS)
APPROXIMATE EDGE OF TARMAC (NO KERBS)
KERB TOP
KERB BOTTOM
GRASS VERGE
GRASS VERGE (NO KERBS)
DYKE
APPROXIMATE EXTENT OF HV OVERHEAD CABLES
OPEN SHED
OPEN SHED
OPEN SHED