FLOOD RISK ASSESSMENT

PROPOSED FLOWER PACKHOUSE & STORE
VICKERS FARM
WASHWAY ROAD
MOULTON SEAS END
SPALDING



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RMA

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FLOOD RISK ASSESSMENT FOR A PROPOSED FLOWER PACKHOUSE & STORE VICKERS FARM, WASHWAY ROAD, MOULTON SEAS END, SPALDING

INTRODUCTION

The Government has placed increasing priority on the need to take full account of the risk 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 Feb 2019, (NPPF), which identifies 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 and to direct development away from areas at highest risk.

The NPPF provides that development in areas at risk of flooding should be avoided and seeks to direct development away from areas at highest risk. There is a sequential, risk-based approach to the location of development avoiding where possible, flood risk to people and property managing any residual risk and taking account of the impacts of climate change.

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APPLICATION SITE

The site is located on land at Vickers Farm, Washway Road, Moulton Seas End, Spalding, PE12 6LP, within the administrative area of South Holland District Council. The National Grid Reference is TF33065 29751, the site area is 2.18 Ha. or thereabouts. **Plan 1**

This is a Full Planning Application for the erection of a flower packhouse (4452m^2) and an office block (187m^2) close to Vickers Farm, Moulton Seas End. **Plan 2**

The rectangular-shaped, level site, set close to the “Vickers Farm” yard area, bordering the A 17, that provides access to and from the site, substantially surrounded by arable farmland that is predominantly utilised in connection with the applicant’s business.

The Site would be classed as Major Development applying the National Planning Policy Guidance (NPPG) as the site is to be developed for more than 1000m^2.

The National Planning Policy Framework Guidance NPPG 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%)

The proposed development site is shown mainly to be within Flood Zone 3 High Probability' as detailed on the Environment Agency's Flood Zone Maps **without defences**, and as defined in Table 1 of NPPG**. Map1**

Table 1: Flood Zones Definition

Flood Zone 3- High Probability
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. 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 Flood Risk Assessments requirements All proposals in this zone should be accompanied by a Flood Risk Assessment. Policy aims 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 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 commercial use for the site is classified as “Less Vulnerable,” Table 1 of NPPG states that such uses are permitted in this zone.

Table 2: Flood Risk Vulnerability Classification

Less Vulnerable
• Police ambulance and fire stations that are not required to be operational during flooding • Buildings used for shops, financial, professional, and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in “more vulnerable” and assembly and leisure. • Land and buildings used for agricultural and forestry. • Waste treatment (except land fill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works that do not need to remain operational during times of flood. • Sewage treatment works (if adequate measures to control pollution and manage sewage during flood events are in place).

Site Levels

From topographical survey the existing site is roughly a flat rectangle. The ground levels vary from 3.64mODN to

3.92mODN, averaging 3.84mODN, the A17 road level at the site entrance is 4.00mODN. **Plan 3**

DRAINAGE AUTHORITIES

Environment Agency

The Environment Agency has permissive powers 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:

- The Wash/River Welland

The site is not considered to be at risk of flooding from a fluvial main river.

The flood zone maps indicate that the area would be flooded without flood defences.). The Flood Map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood event with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater. In some locations, such as around the fens and the large coastal floodplains there are many kilometres of raised flood defences. To meet the requirements of the National Planning Policy Framework, these defences are removed in their entirety to produce the Flood Map for Planning (Rivers and Sea). The map therefore shows the full extent of areas that would be at risk of flooding if no defences existed, and water could spread out across the floodplain.

Flood Zones

These maps show that the site is considered at risk from tidal/fluvial flooding as it is all located within an area zoned as Flood Zone 3a.The maps indicate that the area would be flooded without flood defences, which are in place, (with an annual probability of more than 0.5% 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**

Risk of Flooding from Rivers & Sea

The Risk of flooding from Rivers and Sea shows that the site for the site is at Low risk. Low means that each year this area has a chance of flooding of 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 over-topped or fail. **Map 2**

The River Welland/Wash Tidal Defences

The site lies approximately 2.95km from the primary sea defence embankments bordering “The River Welland”

and 9.38km from “The Wash” estuary in an area that is protected from tidal flooding to a very high standard by the primary defences, maintained by the Environment Agency. These primary defences protect an extensive area of valuable fenland and numerous properties from flooding. The flood defences protecting this site consist of earth embankments which are supplemented by saltmarsh.

They are in good to fair condition and reduce the risk of flooding (at the defence) 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 River Welland/Wash Tidal Defences

Peak tide levels (2017) for the 1 in 200-year 50% confidence bound tide level is 5.98mODN at Fosdyke Bridge. From Lincolnshire & Northamptonshire Area Tidal Modal Analysis, levels for East Coast and Wash: Immingham to the West Lighthouse. The base date for the data is 2017, which should be used in any consideration of future increases due to climate change. **Map 3**

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			Description
	<0.75	Low	**Caution –** Flood Zone with shallow flowing water or deep standing water.
	0.75 – 1.25	Moderate	**Danger for Some -** (i.e. children) Danger Flood Zone with deep or fast flowing water.
	1.25 – 2.0	Significant	**Danger for Most –** Danger Flood Zone with deep fast flowing water.
	>2.0	Extreme	**Danger for All** – Extreme Danger Flood Zone with deep fast flowing water.

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

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

The Environment Agency has carried out a Tidal Hazard Mapping for the East Coast following a breach to the defences. Following a breach to the defences, the Lincolnshire & Northamptonshire Area Tidal Hazard Maps Scenario year 2006, for the 1 in 200-year event, shows that the site is not within a hazard rating area.

With climate change up to year 2115 the maps show that for Scenario annual chance 1 in 200-year that the site is still not within a Hazard rating area.

Map 4 shows the Hazard Rating for the present day and **Map 5** shows the results for Hazard Rating, Depth, & Velocity, for year 2115, for the Wash scenario annual chance 1 in 200, taken from the Environment Agency's, Lincolnshire & Northampton shire 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.

For the scenario year 2006 site is not affected by overtopping of the defences. With climate change up to year 2115 the maps show that for Scenario annual chance 1 in 200-year that part of the site is within a hazard rating area less than 0.75 (Low Hazard), depth 0 – 0.25m and velocity 0 – 0.3m/sec.

It is recommended that for industrial developments that the finished floor level should be a minimum of 300mm above the existing ground level.

It is therefore proposed, in accordance with the Environment Agency's recommendations that the ground floor accommodation for the building will be 300mm above the average ground level set at 4.14mODN.

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 February 2017.

This Flood Risk Assessment has taken the results of the latest Environment Agency Tidal Hazard mapping. into account in its findings.

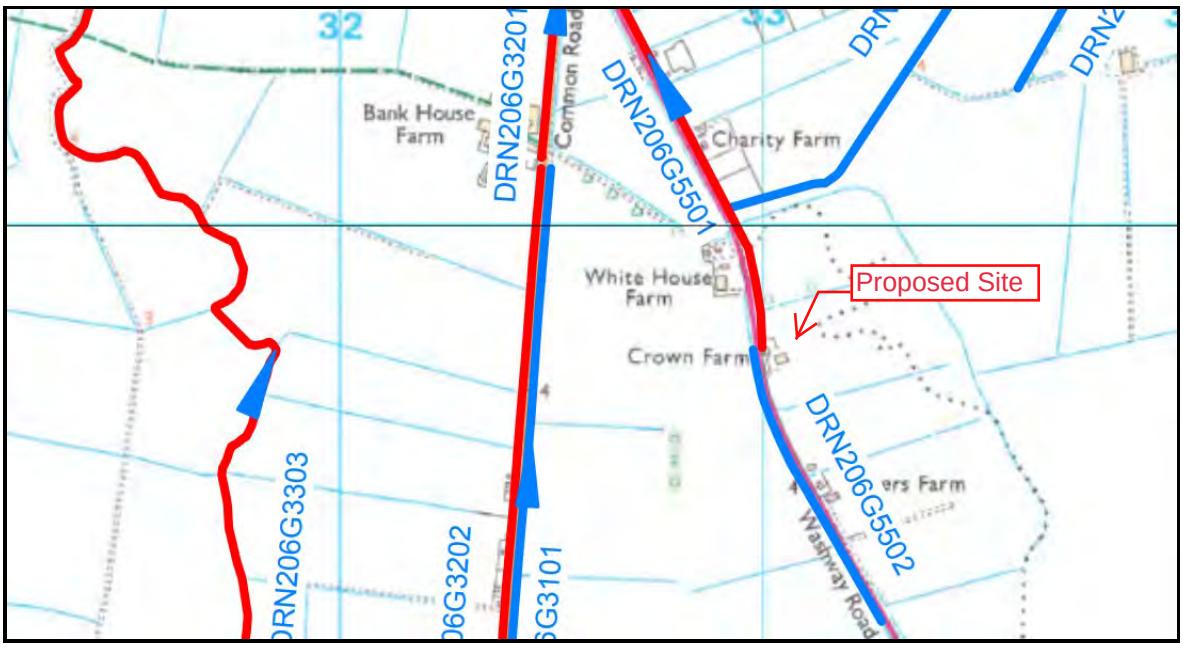
The whole of the tidal flooding information has been replaced by the mapping from the latest Environment Agency Tidal Hazard mapping. Where the mapping for an area contains both fluvial and tidal components, the more severe of the two has been presented.

The proposed development is in accordance with the South East Lincolnshire Standing Advice Matrix, which falls within Cell G4.which is allowed subject to appropriate mitigation.

South Holland Internal Drainage Board

The proposed development site is located within the Board's Holbeach River S catchment. The Board maintain a high priority watercourse ref DRN206G5501 to the west of the site, which is known as P55 Washway Road, length 1087m, which flows northwards to eventually discharge into the River Welland.

The Board are therefore responsible to operate and maintain the arterial fluvial system.



Extract from South Holland IDB Drainage Map

The Board's prior written consent will be required for any of the following works:

- No person without the previous consent of the Board shall erect any building or structure, whether temporary or permanent, or plant any tree, shrub, willow or other similar growth within 9 metres of the landward toe of the bank where there is an embankment or wall or within 9 metres of the top of the batter where there is no embankment or wall, or where the watercourse is enclosed within 9 metres of the enclosing structure.

- No person shall, without the previous consent of the Board, for any purpose, by means of any channel, siphon, pipeline or sluice or by any other means whatsoever, introduce any water into the District or, whether directly or indirectly, increase the flow or volume of water in any watercourse in the District.

- The erection or alteration of any mill dam, weir or other like obstruction to the flow, or erection or alteration of any culvert within the channel of a riparian watercourse.

When planning approval has been issued an application will be made to the Board to discharge the attenuated surface water from the site and the effluent from the treatment plant into the Boards drain ref DRN206G5501.

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 having no high ground around the site, and with the proposed ground floor level being set at 300mm

above the existing ground level, this will not cause any rapid inundation of the site.

- The area is not known to suffer from any groundwater problems.
- Flooding from sewers can occur from over loading from heavy rainfall caused by blockages or having inadequate capacity. There are no public sewers in the vicinity of the site.

- 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.

SURFACE WATER FLOODING

The site for the proposed dwelling is shown on the Low-Risk scenario Surface Water flood maps, for the 1 in 1000-year event, not to be affected from surface water flooding. **Map 6**

The maps for surface water and revised maps for river and sea flooding define the risk as High, Medium, Low and Very Low. The chance of flooding for the area defined in any given year is shown below:

- **High:** greater than 1 in 30 (3.3%).
- **Medium:** between 1 in 100 (1%) and 1 in 30 (3.3%).
- **Low:** between 1 in 1000 (0.1%) and 1 in 100 (1%).
- **Very Low:** less than 1 in 1000 (0.1%)

Unlike the fluvial mapping, which is based on a detailed hydraulic model, this mapping is based purely on applying rainfall to a digital terrain model. As such this mapping serves to represent a worst-case scenario which may well overstate the actual probability of flooding in this area.

There is a caveat on the Defra Data website, as to the use of these maps and that they are not to be used to identify that an individual property will flood. Because of the way they have been produced and the fact that they are indicative, these maps are not appropriate to act as the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to flooding at any scale without further supporting studies or evidence.

SEQUENTIAL APPROACH

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

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 (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).

Applying the Flood Risk Vulnerability Classification in Table 2 of NPPG, the proposed development for industrial use is classified as, “Less Vulnerable” with Table 1 of NPPG stating that such uses are appropriate in this zone (as summarised in Table 3 NPPG)

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 and Exceptions Test

NPPF 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.

The NPPF requires the application of the Sequential Test to steer new development to areas with the lowest probability of flooding. If, following the application of the Sequential Test, it is not possible, consistent with wider sustainability objectives, for the development to be located in zones with a lower probability of flooding, the Exceptions Test can be applied if appropriate.

The site is located within Environment Agency Flood Zone 3 and the Environment Agency Tidal Breach maps 2115 identifies that the site would not be exposed to flooding from a breach to the flood defences.

The Sequential Test will be defined by local circumstances relating to the catchment area for the development., when applying the Sequential Test, a pragmatic approach on the availability of alternative sites should be taken in considering for example, planning applications for extensions of existing business premises such as farm holdings, where it might be impracticable to suggest that there are more suitable alternative locations for that development elsewhere

In this case, the farm business is centred on the land owned and farmed by the applicant and to consider areas outside the farm holding would not be practical.

This Flood Risk Assessment in terms of making the development safe, would result in the development having a

property raised above the predicted flood level, with a safe refuge at first floor level. This would be sufficient to mitigate against flood risk and demonstrates that the development will be safe for its lifetime and it will not increase flood risk elsewhere.

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 17th of December 2019.

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

Table 1 Peak River Flow Allowances

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

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 Rise

Table 3 Peak sea level allowance for each epoch in (mm) per year with cumulative sea level rise for each epoch in brackets (use 1981to 2000 baseline)						
Area of England) (Use River Basin	Allowance	2000 to 2035	2036 to 2065	2066 to 2095	2096 to 2125	Cumulative Rise 2000 to 2125 (m)
Anglian	Higher Central	5.8 (203mm)	8.7 (261mm)	11.6 (348mm)	13 (390mm)	1.20m
Anglian	Upper End	7 (245mm)	11.3 (339mm)	15.8 (474mm)	18.1 (543mm)	1.6m

With the site being some 5.3Km from the coast. it is concluded, that until the Environment Agency undertake

new modelling for the Coastal Hazard Mapping, that the present-day breach mapping can be used for determining finished floor levels for residential development.

DRAINAGE STATMENT

A drainage strategy has been prepared by others and this together with the drawings and calculations should be read in conjunction with this FRA. **Plan 4**

FLOOD RESILIENCE CONSTRUCTION

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 development 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 for the property will be raised 300mm above the existing ground level. This would be sufficient to mitigate against flood risk and demonstrates that the development will be safe for its lifetime and it will not increase flood risk elsewhere.

- Water, electricity, and gas meters: should be located above the predicted flood level. Electrical services: electrical sockets, heating systems: boiler units and ancillary devices should be installed at least 500mm above the ground floor level to minimise damage to electrical services Electric ring mains should be installed at high level with drops to ground floor sockets and switches.

- The ground floor to be constructed with a solid concrete floor with no voids beneath and no low-level wall vents.

- Avoid the use of absorbent cavity insulation to the ground floor level and use the closed cell type.

- Plasterboard to be fixed horizontally to the ground floor area, for ease of replacement.

- Where possible, all service entries should be sealed (e.g., with expanding foam or similar closed cell material). Closed cell insulation should be used for pipes which are below the predicted flood 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 property Owner contact the Environment Agency’s Floodline on 0845 988 1188 to register the property to receive

advance 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.

CONCLUSION

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

- The proposed site for the proposed packhouse & office is shown to be within Flood Zone 3 ‘High Probability' as detailed on the Environment Agency's Flood Zone Maps without defences.

- The Lincolnshire & Northamptonshire Area Tidal Hazard Maps the Lincolnshire & Northamptonshire Area Tidal Breach Hazard Maps Scenario year 2006, for the 1 in 200-year event shows that the site is not within a hazard rating area. With climate change up to year 2115 the maps show that for Scenario annual chance 1 in 200-year that the site is within a Hazard rating area less than 0.75 (Low Risk) depth of flow 0 – 0.25m and velocity of flow 0 – 0.3m/sec.

- The ground floor level for the building will be raised 300mm above the existing ground level. This would be sufficient to mitigate against flood risk and demonstrates that the development will be safe for its lifetime and it will not increase flood risk elsewhere.

- The Flood Risk Vulnerability Classification in Table 2 of NPPG the proposed Industrial development is classified as “Less Vulnerable”, with Table 1 of NPPG stating that such uses are appropriate in this zone.

- Any impact of damage to the property can be foreseen and mitigated against by relatively simple design and construction techniques. They will be constructed using materials which are flood resilient construction as outlined in the report.

- Flooding from other sources is unlikely to affect the site.

- No obvious constraints have been identified that may impact the proposed development and the type of mitigation measures that can be used to reduce the flood risk, there is no increase in the flood risk to others.

Flood map for planning

Your reference	Location (easting/northing)	Created
Moulton Seas	**533082/329752**	**27 Apr 2021 10:30**

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)

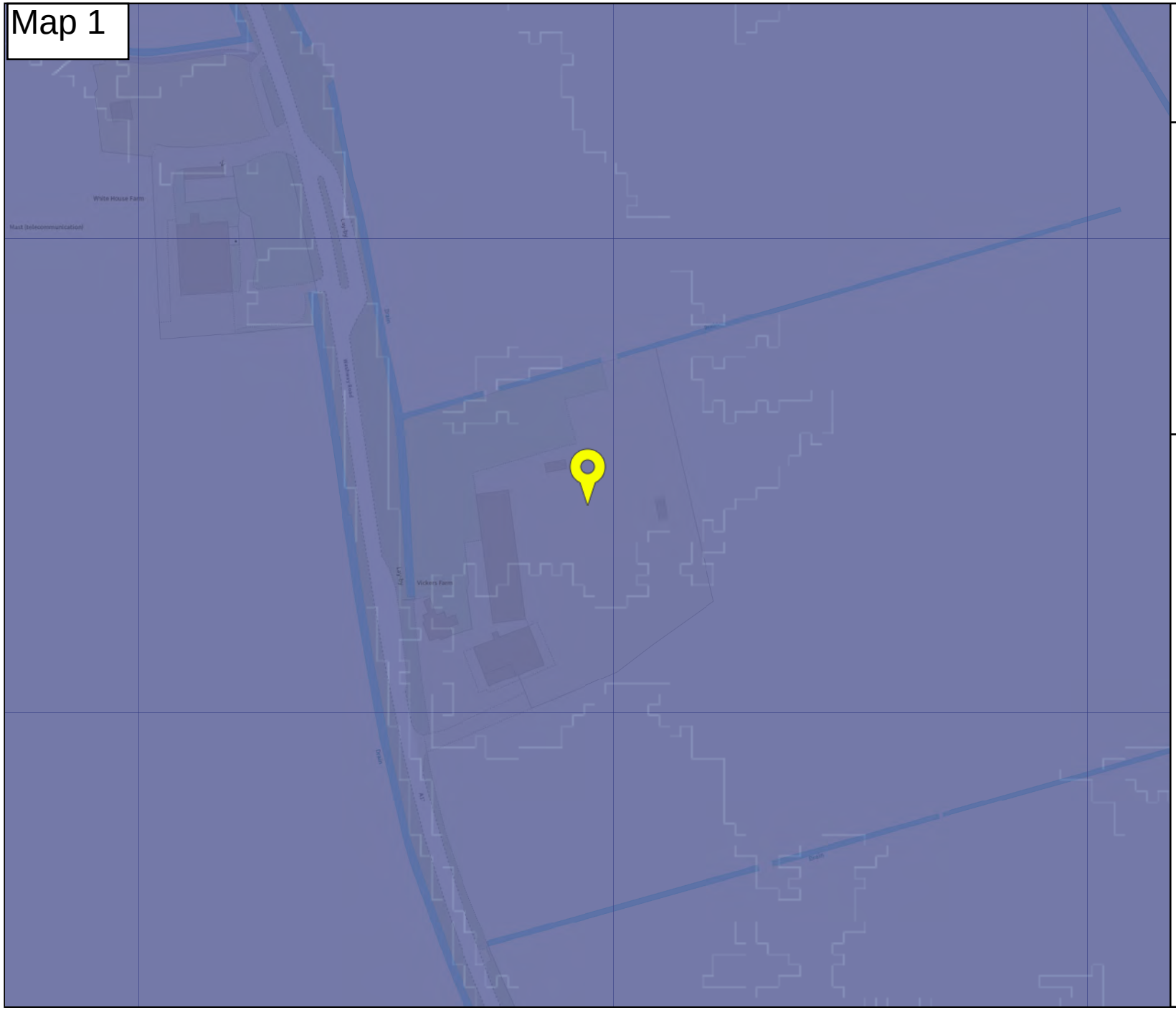
Notes

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



Environment Agency

Flood map for planning

Your reference
Moulton Seas

Location (easting/northing)
533082/329752

Scale
1:2500

Created
27 Apr 2021 10:30

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

0 20 40 60m

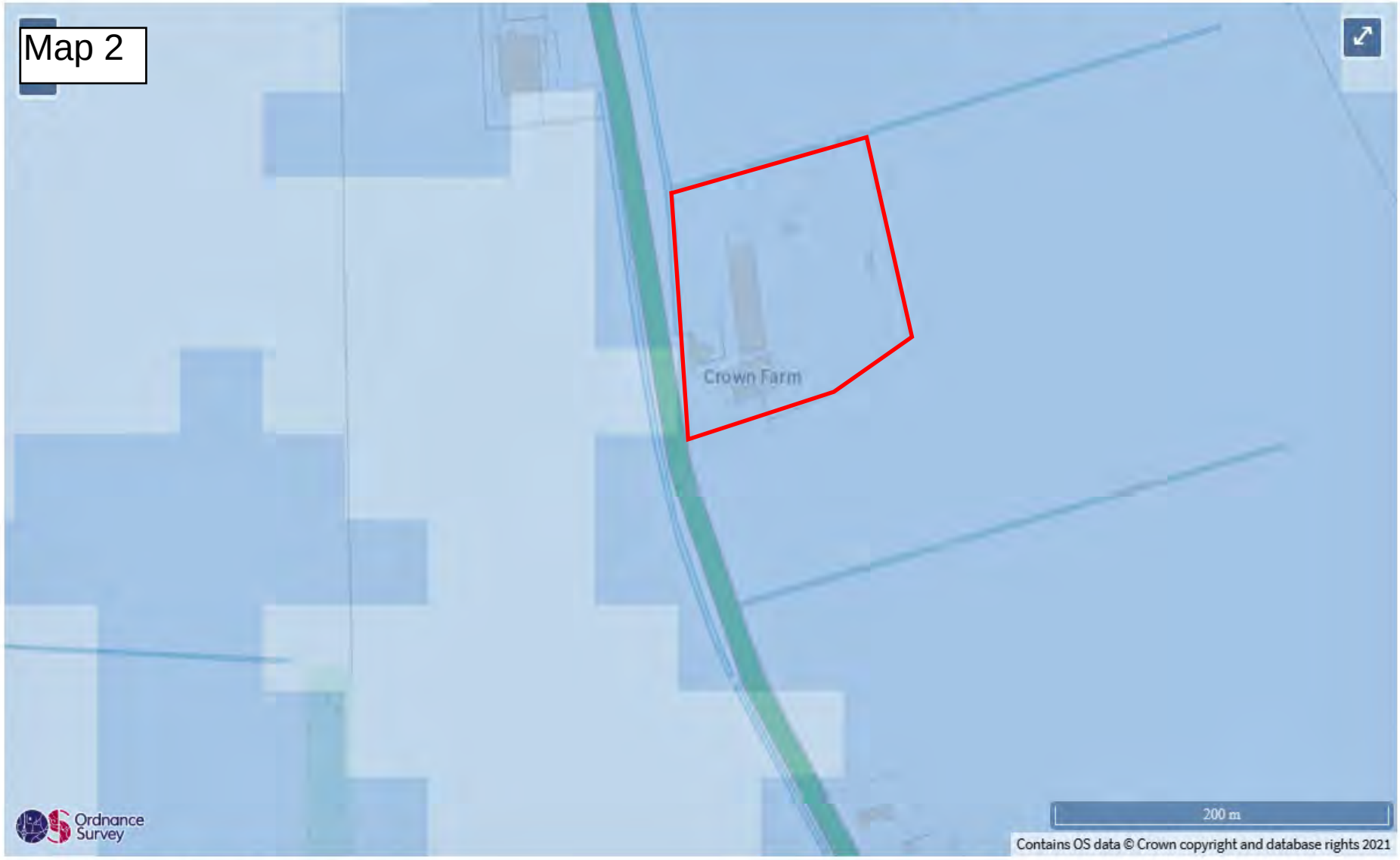
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Flood risk

Extent of flooding

Location

Moulton Seas End

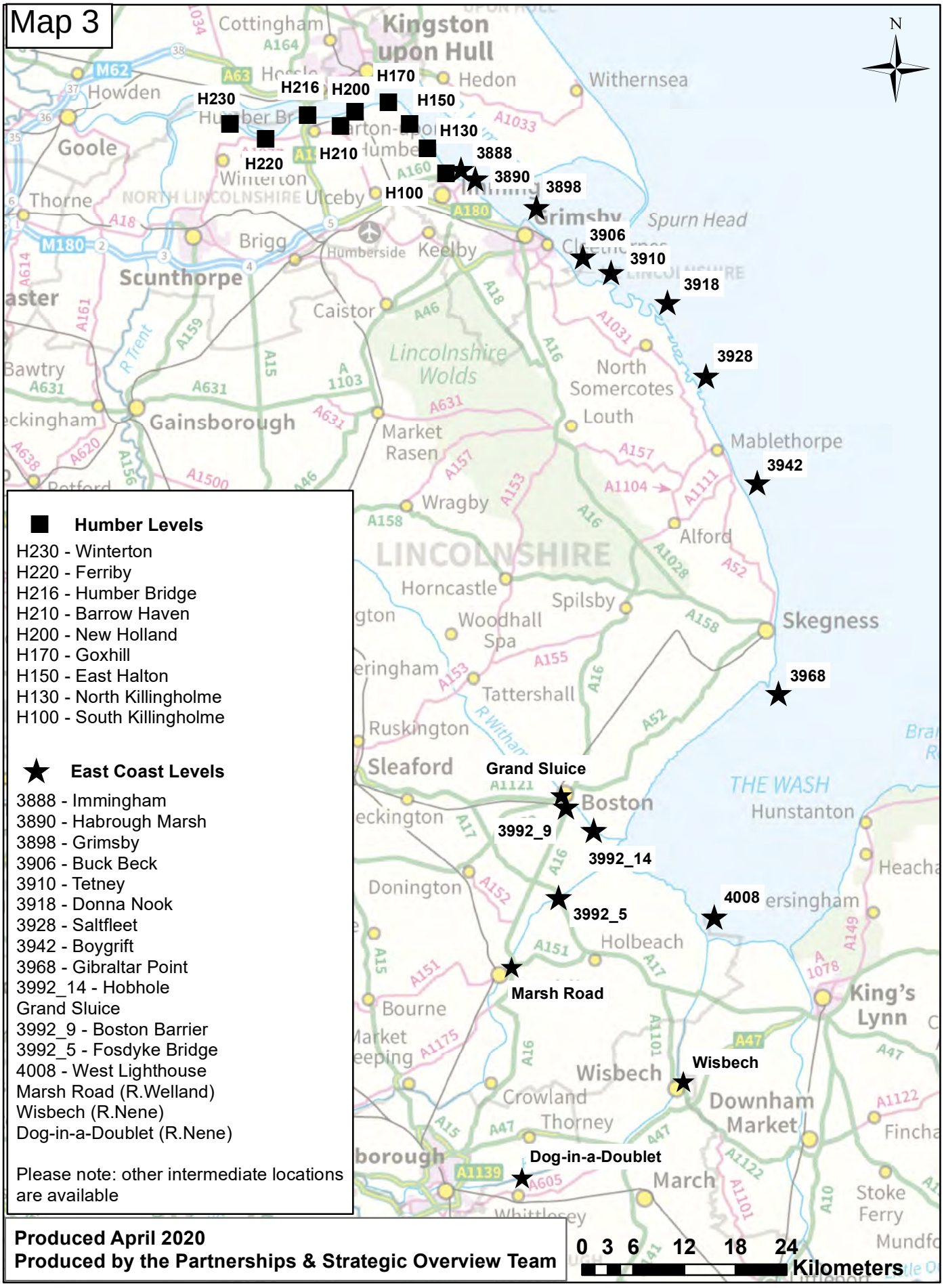


Extent of flooding from rivers or the sea

High Medium Low Very low

Tidal Level Location Map
Lincolnshire & Northamptonshire Area

Environment Agency



Humber Levels

H230 - Winterton
H220 - Ferriby
H216 - Humber Bridge
H210 - Barrow Haven
H200 - New Holland
H170 - Goxhill
H150 - East Halton
H130 - North Killingholme
H100 - South Killingholme

East Coast Levels

3888 - Immingham
3890 - Habrough Marsh
3898 - Grimsby
3906 - Buck Beck
3910 - Tetney
3918 - Donna Nook
3928 - Saltfleet
3942 - Boygrift
3968 - Gibraltar Point
3992_14 - Hobhole
Grand Sluice
3992_9 - Boston Barrier
3992_5 - Fosdyke Bridge
4008 - West Lighthouse
Marsh Road (R.Welland)
Wisbech (R.Nene)
Dog-in-a-Doublet (R.Nene)

Please note: other intermediate locations are available

Produced April 2020
Produced by the Partnerships & Strategic Overview Team

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Humber Estuary

2014 Interim Water Level Profile

Ref	Location	Easting	Northing	Annual Chance (1 in x) of Tide Level metres ODN																			
				1			10			50			100			200			300			1000		
				Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound		
				5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%
H230	**Winterton**	493420	422830	5.13	5.14	5.15	5.47	5.51	5.56	5.67	5.74	5.82	5.74	5.83	5.92	5.81	5.90	6.00	5.84	5.94	6.03	5.94	6.02	6.06
H220	**Ferriby**	497550	421150	5.03	5.04	5.05	5.38	5.42	5.47	5.59	5.67	5.77	5.67	5.77	5.89	5.74	5.86	6.00	5.78	5.91	6.06	5.91	6.04	6.19
H216	**Humber Bridge**	502478	423914	4.97	4.98	4.99	5.33	5.37	5.42	5.55	5.64	5.74	5.64	5.75	5.88	5.72	5.86	6.02	5.75	5.92	6.10	5.88	6.09	6.31
H210	**Barrow Haven**	506380	422620	4.91	4.92	4.93	5.27	5.31	5.36	5.50	5.60	5.72	5.60	5.73	5.89	5.69	5.86	6.08	5.74	5.94	6.18	5.87	6.17	6.51
H200	**New Holland**	508020	424330	4.86	4.87	4.88	5.21	5.26	5.31	5.45	5.55	5.67	5.55	5.68	5.84	5.64	5.81	6.03	5.68	5.89	6.13	5.82	6.12	6.47
H170	**Goxhill**	511970	425440	4.66	4.67	4.68	5.00	5.04	5.09	5.24	5.34	5.46	5.33	5.47	5.65	5.43	5.61	5.85	5.47	5.69	5.96	5.62	5.95	6.37
H150	**East Halton**	514450	422870	4.58	4.59	4.60	4.91	4.96	5.01	5.15	5.25	5.38	5.25	5.39	5.57	5.34	5.53	5.77	5.39	5.62	5.90	5.54	5.89	6.33
H130	**North Killingholme**	516530	420000	4.50	4.51	4.52	4.82	4.87	4.92	5.05	5.15	5.28	5.15	5.28	5.46	5.24	5.42	5.66	5.29	5.51	5.78	5.43	5.77	6.19
H100	**South Killingholme**	518700	417120	4.41	4.41	4.42	4.72	4.77	4.82	4.95	5.05	5.17	5.05	5.18	5.35	5.14	5.32	5.55	5.18	5.40	5.67	5.33	5.66	6.08
3888	**Immingham***	520440	417625	4.16	4.17	4.19	4.50	4.53	4.62	4.73	4.80	5.00	4.83	4.93	5.19	4.93	5.06	5.41	4.98	5.14	5.55	5.15	5.38	6.01

NOTE:

- The base date for the data is 2014.
- The levels 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.
- Levels for other annual chance probabilities are available if required.
- The information is due to be updated in mid-2020
- *The levels for Immingham are taken from the 2018 Coastal Flood Boundary dataset.

Customer services line: 03708 506 506
Calls to 03 numbers cost the same as calls to standard geographic numbers
(i.e. numbers beginning with 01 or 02)

Email: enquiries@environment-agency.gov.uk
www.gov.uk/environment-agency

East Coast and Wash: Immingham to the West Lighthouse

2018 Coastal Flood Boundary Extreme Sea Levels

CFB Ref	Location	Easting	Northing	Annual Chance (1 in x) of Tide Level in metres ODN																	
				1			10			50			100			200			300			1000		
				Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound		
				2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%
3888	**Immingham**	520440	417625	4.16	4.17	4.19	4.50	4.53	4.62	4.73	4.80	5.00	4.83	4.93	5.19	4.93	5.06	5.41	4.98	5.14	5.55	5.15	5.38	6.01
3890	**Haborough Marsh**	522100	416512	4.14	4.15	4.17	4.48	4.51	4.60	4.70	4.77	4.97	4.80	4.90	5.16	4.90	5.03	5.38	4.94	5.10	5.51	5.11	5.34	5.97
3898	**Grimsby**	529295	413162	3.98	3.99	4.01	4.31	4.34	4.43	4.53	4.60	4.80	4.61	4.71	4.97	4.71	4.84	5.19	4.74	4.90	5.31	4.88	5.11	5.74
3906	**Buck Beck**	534709	407369	3.87	3.88	3.90	4.19	4.23	4.31	4.41	4.50	4.68	4.50	4.61	4.86	4.61	4.75	5.10	4.64	4.82	5.22	4.80	5.05	5.66
3910	**Tetney**	538035	405537	3.85	3.86	3.89	4.17	4.22	4.30	4.40	4.50	4.67	4.49	4.61	4.86	4.60	4.75	5.10	4.63	4.82	5.21	4.80	5.06	5.66
3918	**Donna Nook**	544641	401997	3.82	3.83	3.86	4.14	4.19	4.27	4.38	4.48	4.65	4.47	4.60	4.85	4.58	4.74	5.10	4.63	4.82	5.22	4.81	5.08	5.68
3928	**Saltfleet**	549131	393360	3.78	3.79	3.82	4.11	4.16	4.26	4.36	4.46	4.64	4.47	4.59	4.86	4.57	4.74	5.11	4.63	4.83	5.25	4.83	5.11	5.74
3942	**Boygrift**	555131	380860	3.72	3.74	3.77	4.06	4.11	4.22	4.33	4.43	4.65	4.43	4.57	4.87	4.56	4.73	5.13	4.62	4.83	5.28	4.85	5.15	5.82
3968	**Gibraltar Point**	557652	356181	4.16	4.17	4.20	4.51	4.56	4.67	4.76	4.85	5.08	4.85	4.97	5.27	4.94	5.10	5.49	4.99	5.18	5.63	5.14	5.41	6.09
3992_14	**Hobhole**	535990	340116	4.96	4.97	5.01	5.40	5.44	5.56	5.66	5.76	5.98	5.78	5.90	6.20	5.88	6.04	6.44	5.92	6.11	6.57	6.03	6.31	6.99
	Grand Sluice*	532366	344510	4.93	4.94	4.98	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
3992_9	**Boston Barrier**	532754	342852	4.93	4.94	4.98	5.41	5.45	5.57	5.73	5.83	6.05	5.85	5.97	6.27	5.93	6.09	6.49	5.94	6.13	6.59	5.98	6.26	6.94
3992_5	**Fosdyke Bridge**	531886	332234	4.87	4.88	4.92	5.31	5.35	5.47	5.58	5.68	5.90	5.71	5.83	6.13	5.82	5.98	6.38	5.87	6.06	6.52	6.01	6.29	6.97
4008	**West Lighthouse**	550094	329971	4.87	4.88	4.91	5.21	5.26	5.37	5.46	5.56	5.78	5.56	5.68	5.98	5.66	5.82	6.21	5.71	5.90	6.35	5.86	6.14	6.81
-	**Marsh Road**	525988	324065	-	5.04	-	-	5.44	-	-	5.73	-	-	5.85	-	-	5.98	-	-	-	-	-	-	-
-	**Wisbech**	546110	309940	-	4.83	-	-	5.25	-	-	5.53	-	-	5.66	-	-	5.78	-	-	-	-	-	-	-
-	**Dog-in-a-Doublet**	527200	299287	-	3.67	-	-	4.00	-	-	4.22	-	-	4.32	-	-	4.42	-	-	-	-	-	-	-

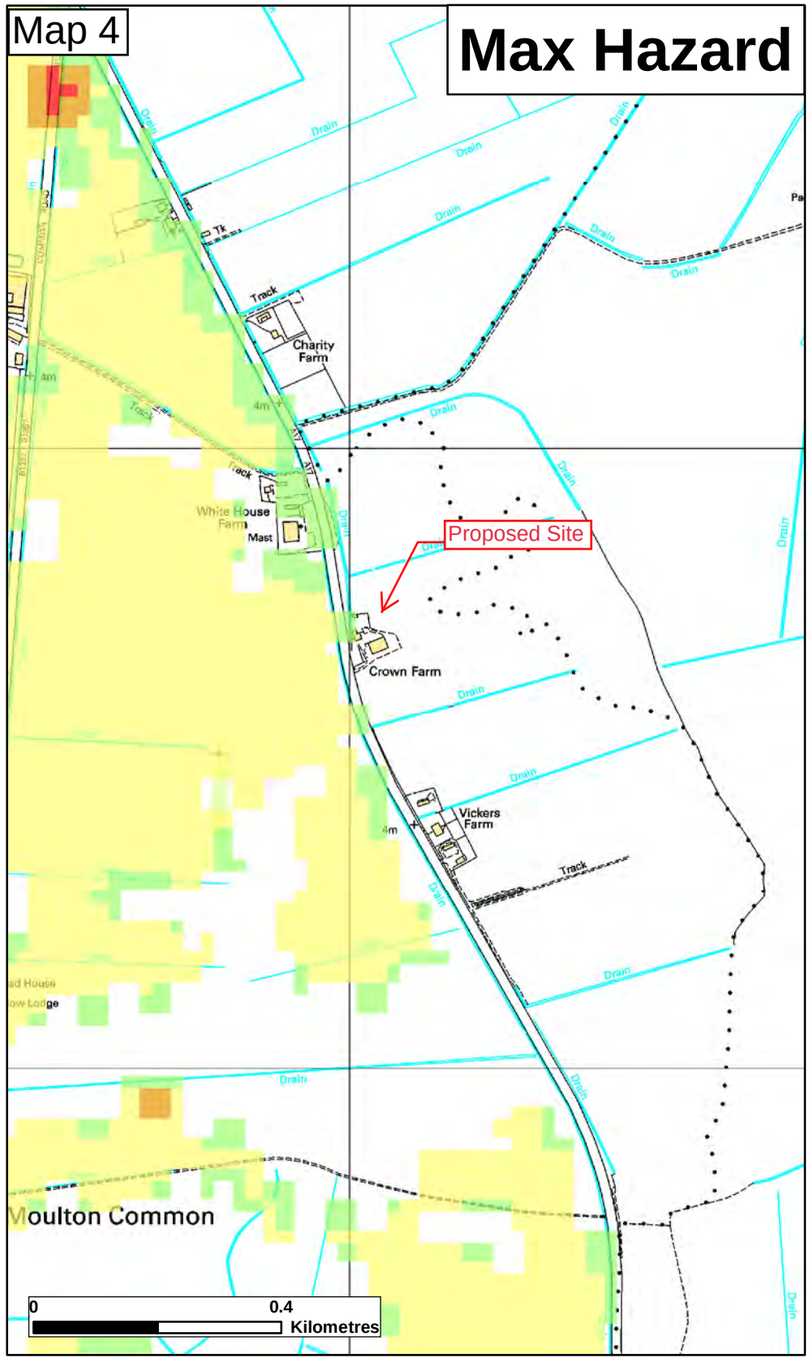
See next page for notes

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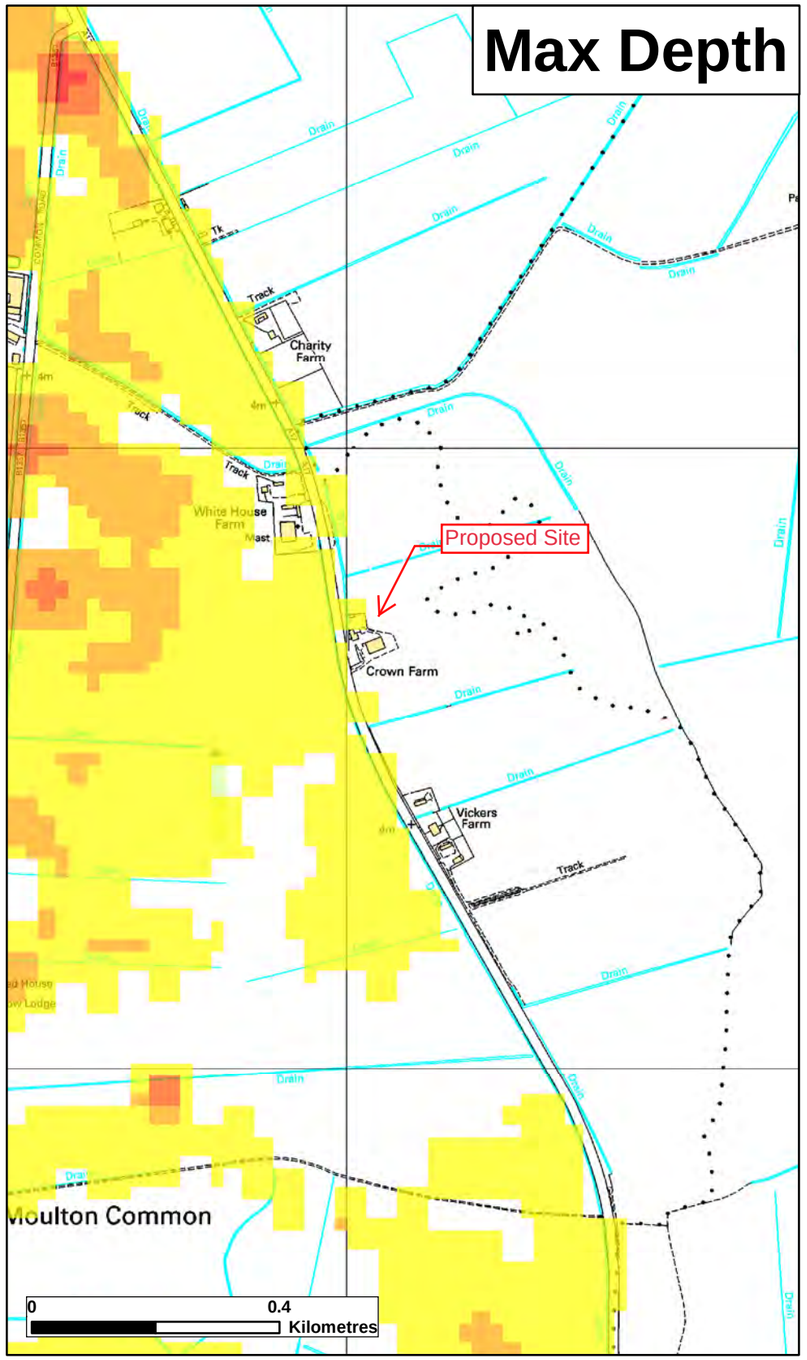
Email: enquiries@environment-agency.gov.uk
www.gov.uk/environment-agency

Map 4

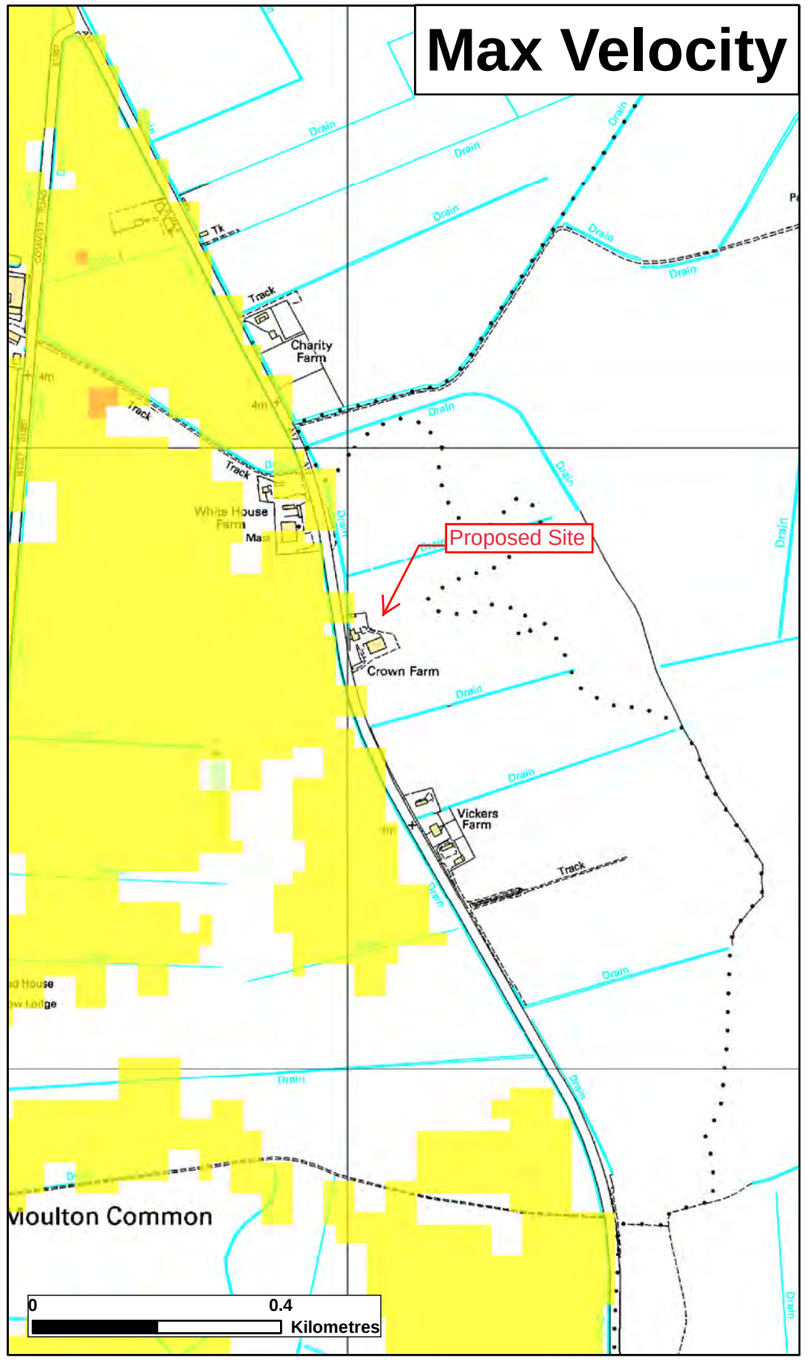
Max Hazard



Max Depth



Max Velocity



★ **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	December 2016	Scenario year	2006	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2016-30754

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

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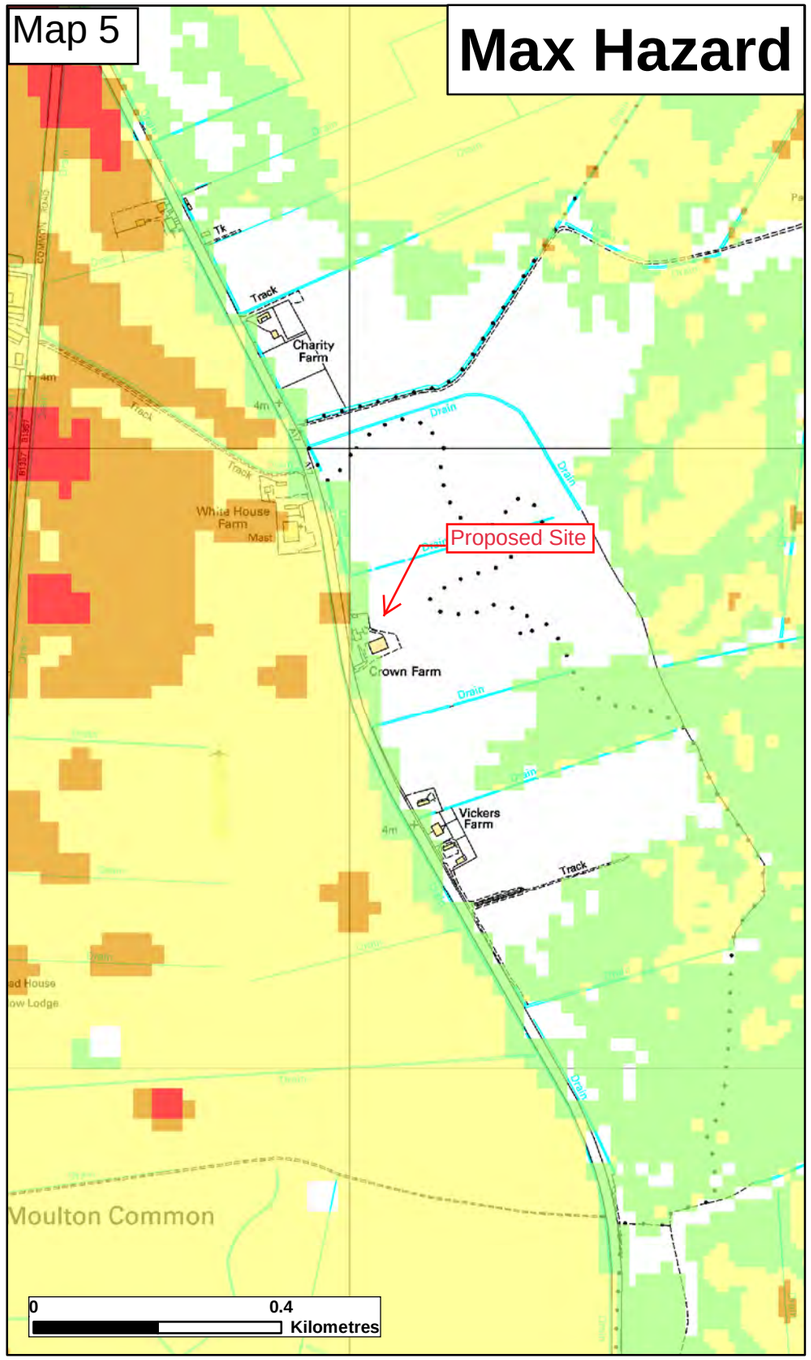
Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Centred on TF3309029625

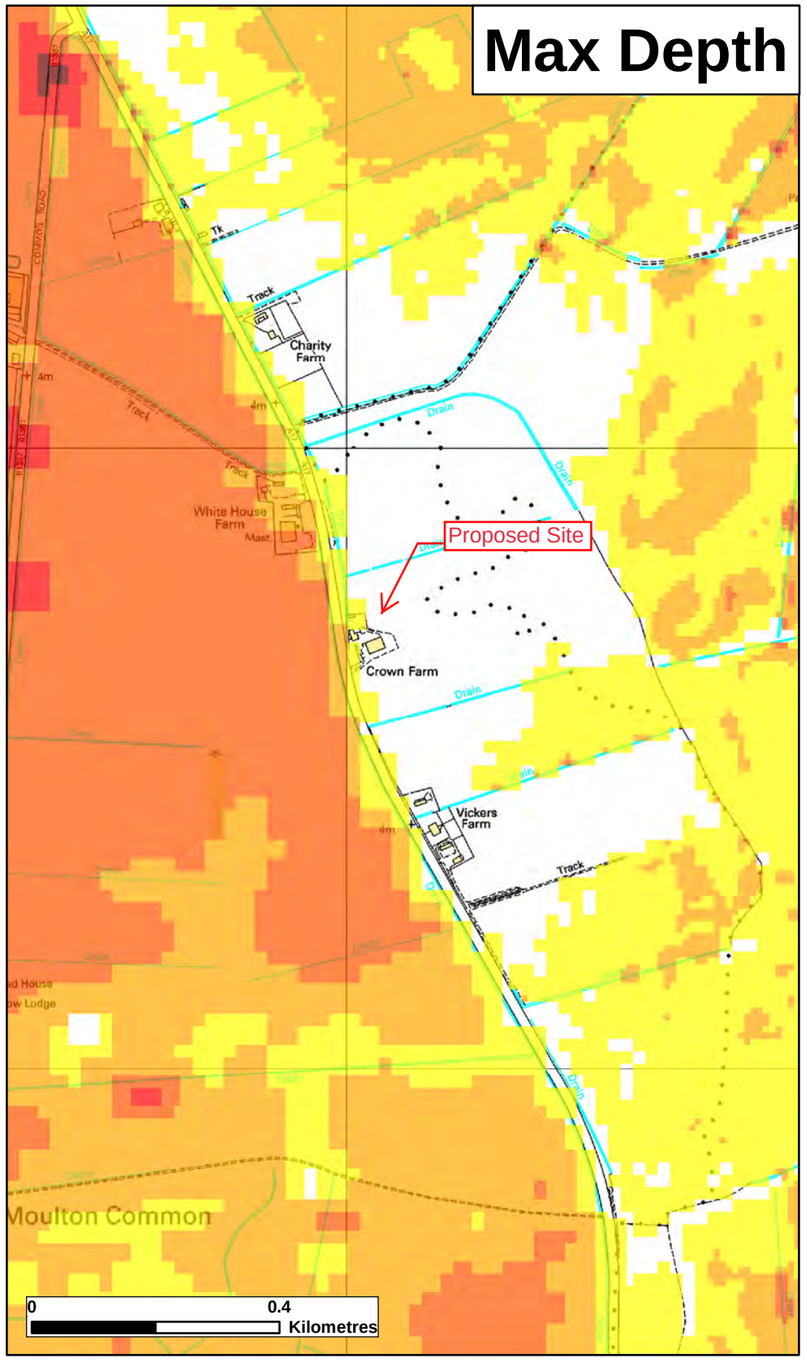
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Map 5

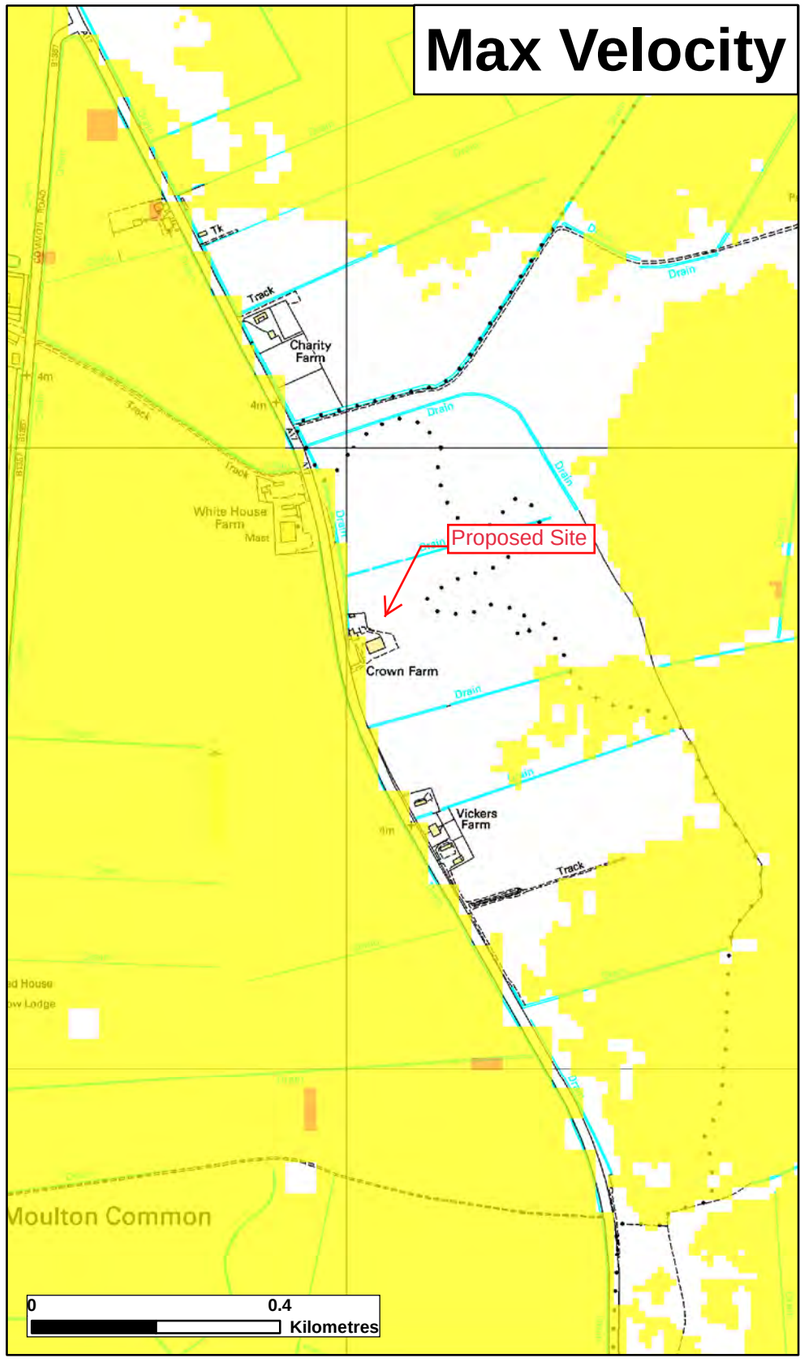
Max Hazard



Max Depth



Max Velocity



★ **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	December 2016	**Scenario year**	2115	**Scenario Annual Chance**	0.5% (1 in 200)	**CCN Number**	CCN-2016-30754

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

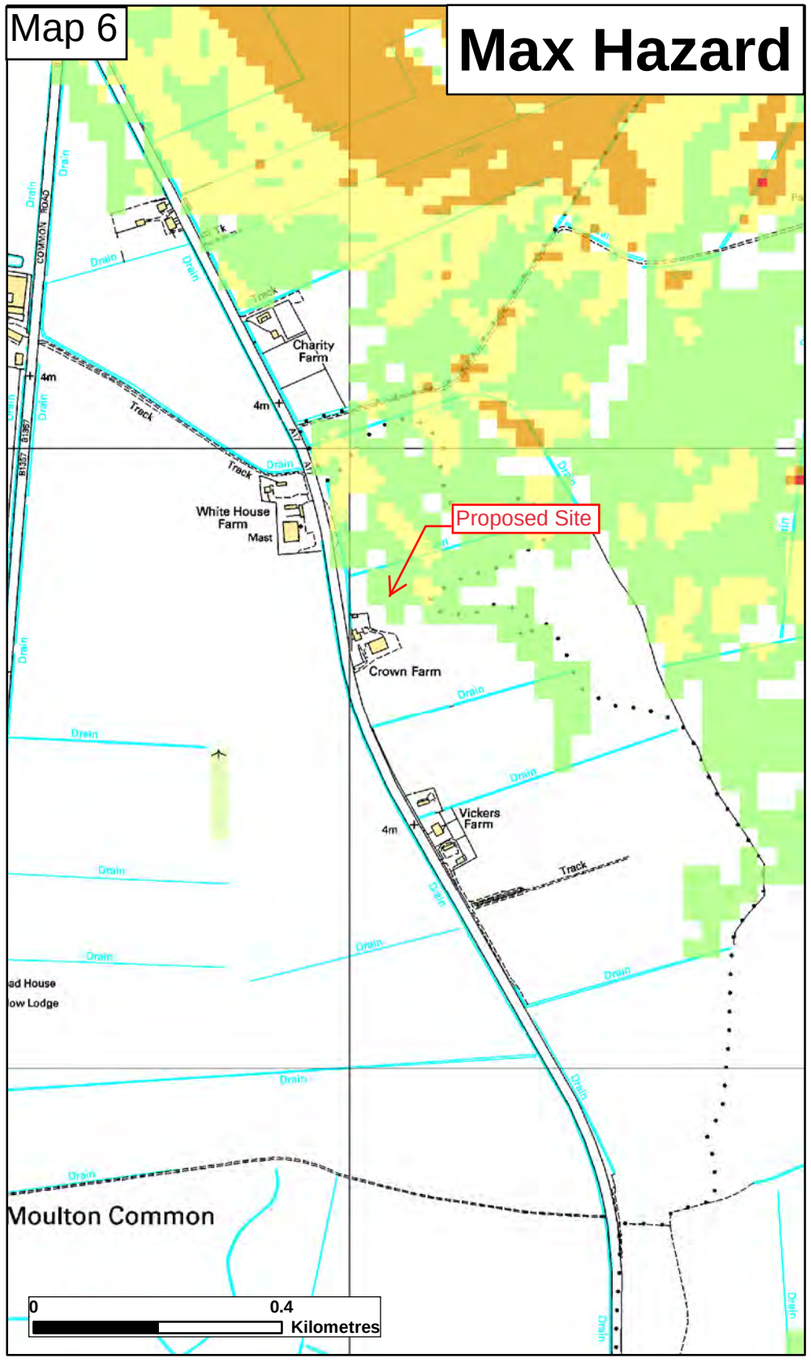
Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Centred on TF3309029625

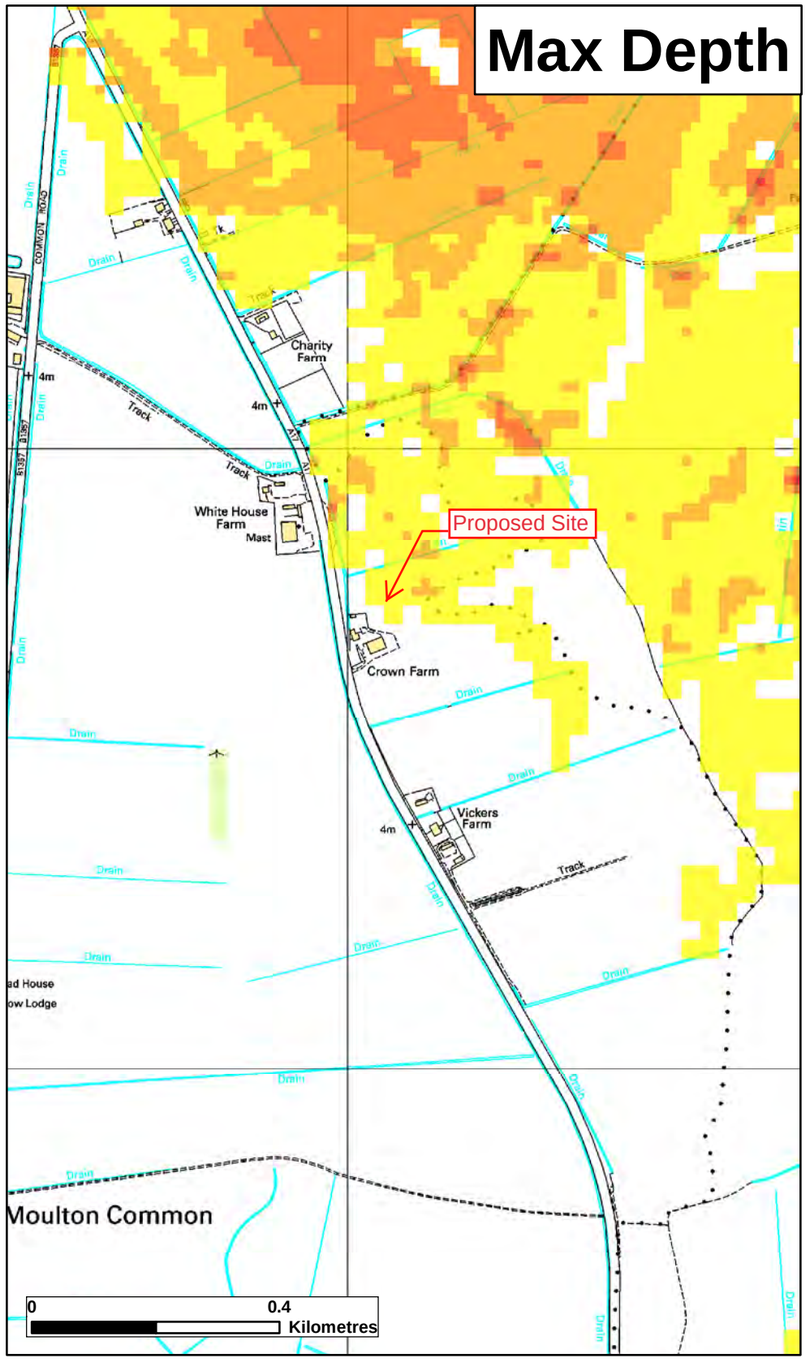
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Map 6

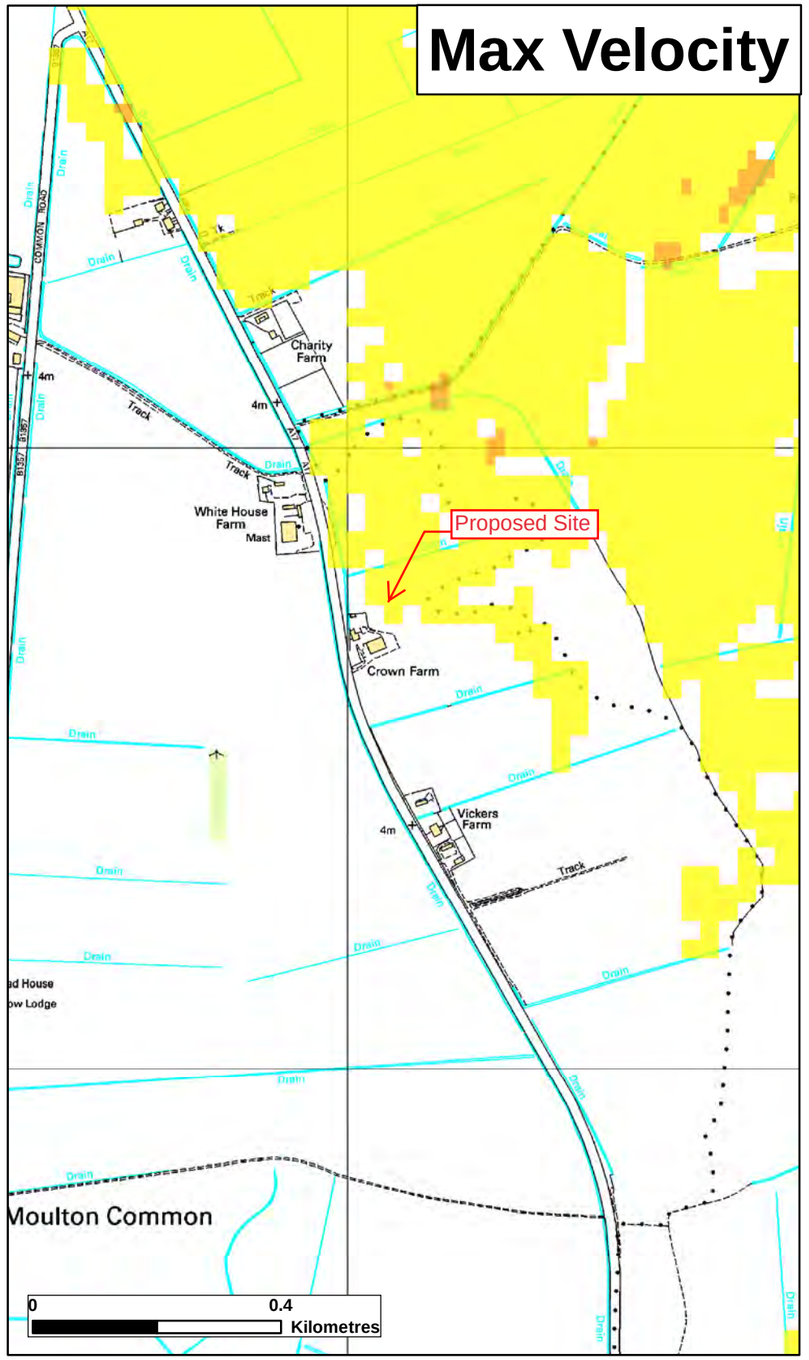
Max Hazard



Max Depth



Max Velocity



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	December 2016	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2016-30754

The map is based on computer modelling of simulated overtopping of the main coastal defences for specific tidal scenarios. It does not include overtopping along the following tidal rivers which are currently being investigated: Witham Haven (upstream of Hobhole), and Welland (upstream of Fosdyke Bridge)

The map only considers the consequences of overtopping of the defences, and does not show the possible consequences of breaches of the tidal defences. Separate maps of the flood extent from just breaching of the defences are available.

For future climate change scenarios it is assumed that defences remain at 2006 heights.

These maps do not replace the flood zone maps used in the National Planning Policy Framework (NPPF)

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 Tidal Overtopping Hazard Mapping

Map Centred on TF 3309029625

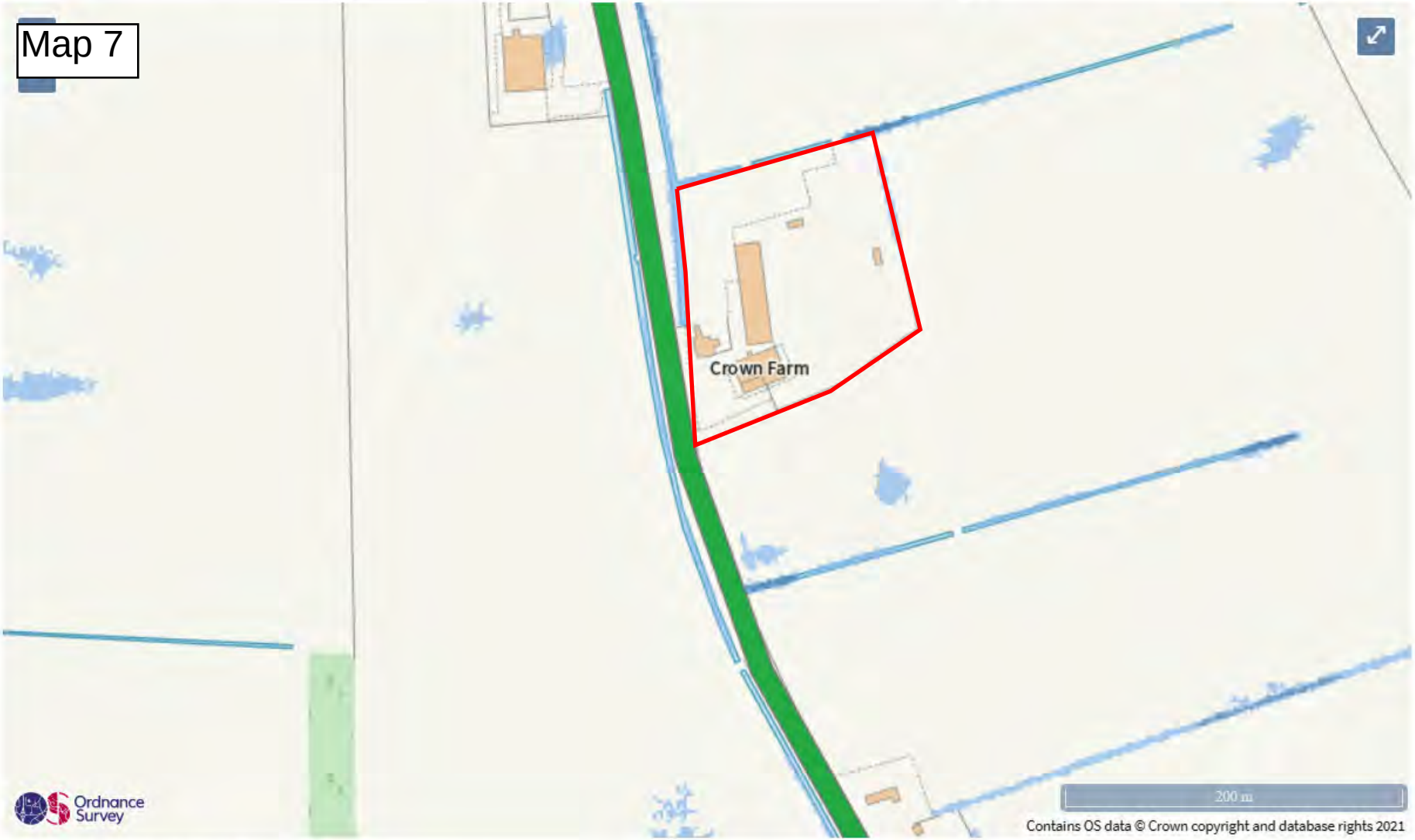
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Flood risk

Extent of flooding

Location

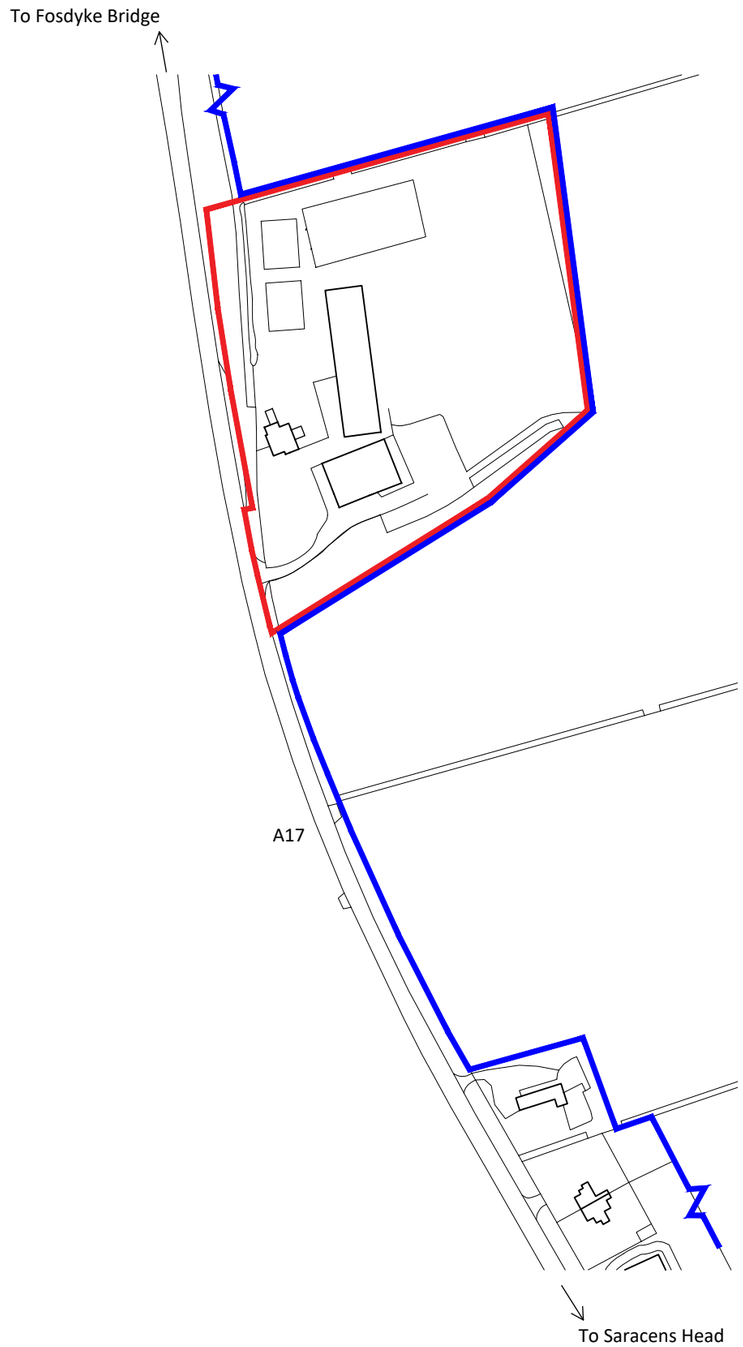
Moulton Seas End



Extent of flooding from surface water

High Medium Low Very low

Plan 1



Notes

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N

0 20 40 60 80 100m

Rev	Description	Date
-	-	-

Robert Doughty Consultancy

32 High Street, Helpringham
Sleaford, Lincolnshire, NG34 0RA

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

Client
Matthew Naylor

Project
Flower packing building
Vickers Farm

Drawing
Location Plan

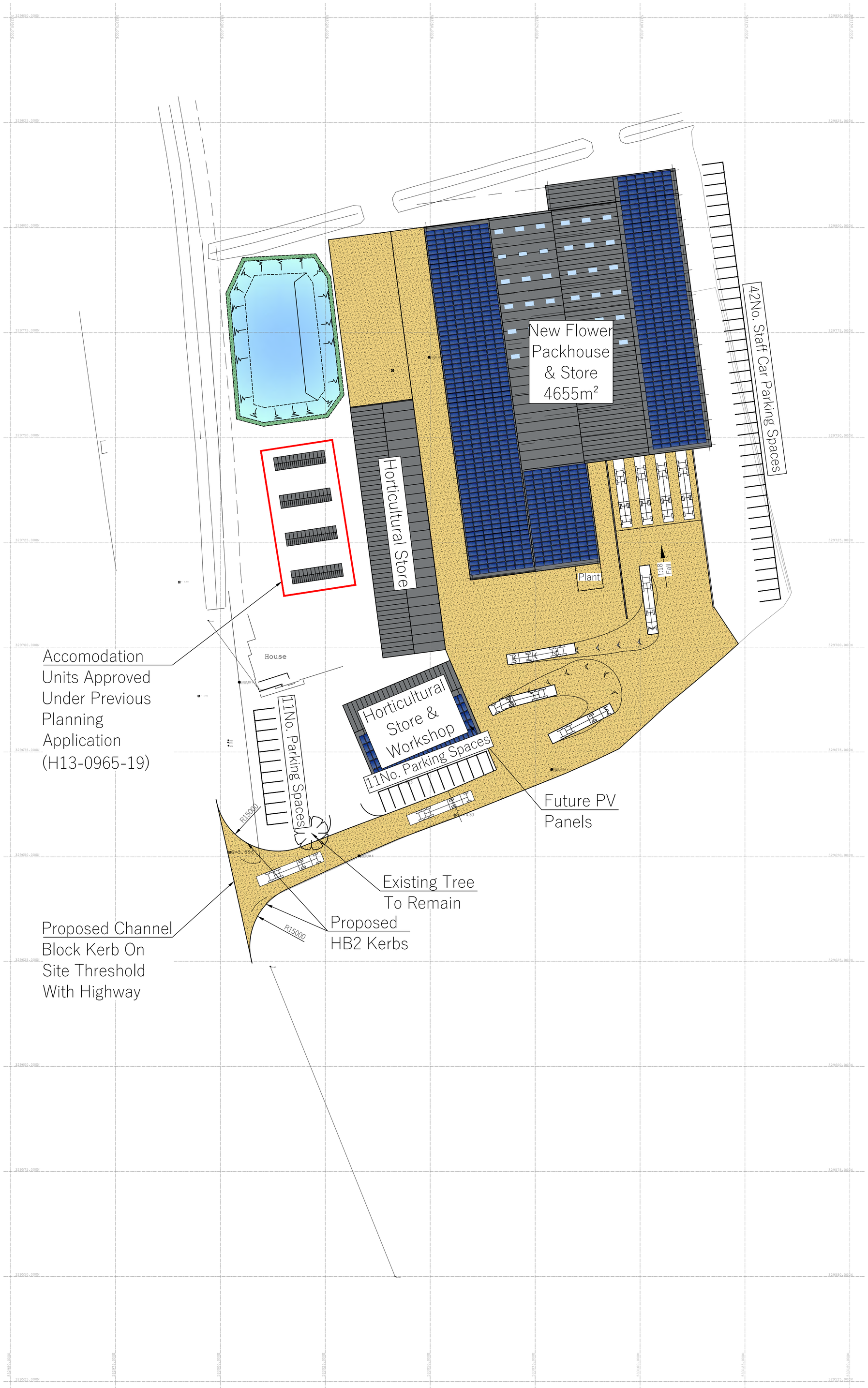
Scale @ A3	Date
1: 2500	30/04/21

Drawn By	Checked By
WW	LMS

Job Number	Status	Purpose of Issue
1246-4	PL	Planning

Drawing No.	Rev
1246-4_PL_LP01	-

Plan 2



Rev	Revision	Drn	App	Date
P5	DEVELOPED FOLLOWING CLIENTS COMMENTS	APW	APW	04/21
P4	DRAINAGE BASIN MOVED	APW	APW	04/21
P3	FOR PLANNING	APW	APW	04/21
P2	PRELIMINARY – FOR APPROVAL	APW	APW	04/21
P1	PRELIMINARY – FOR APPROVAL	APW	APW	04/21

SHIELDS WILSON
e: info@shieldswilson.co.uk f: 01775 729252
STRUCTURAL AND CIVIL ENGINEERING

Status: FOR PLANNING

Client: NAYLOR FLOWERS

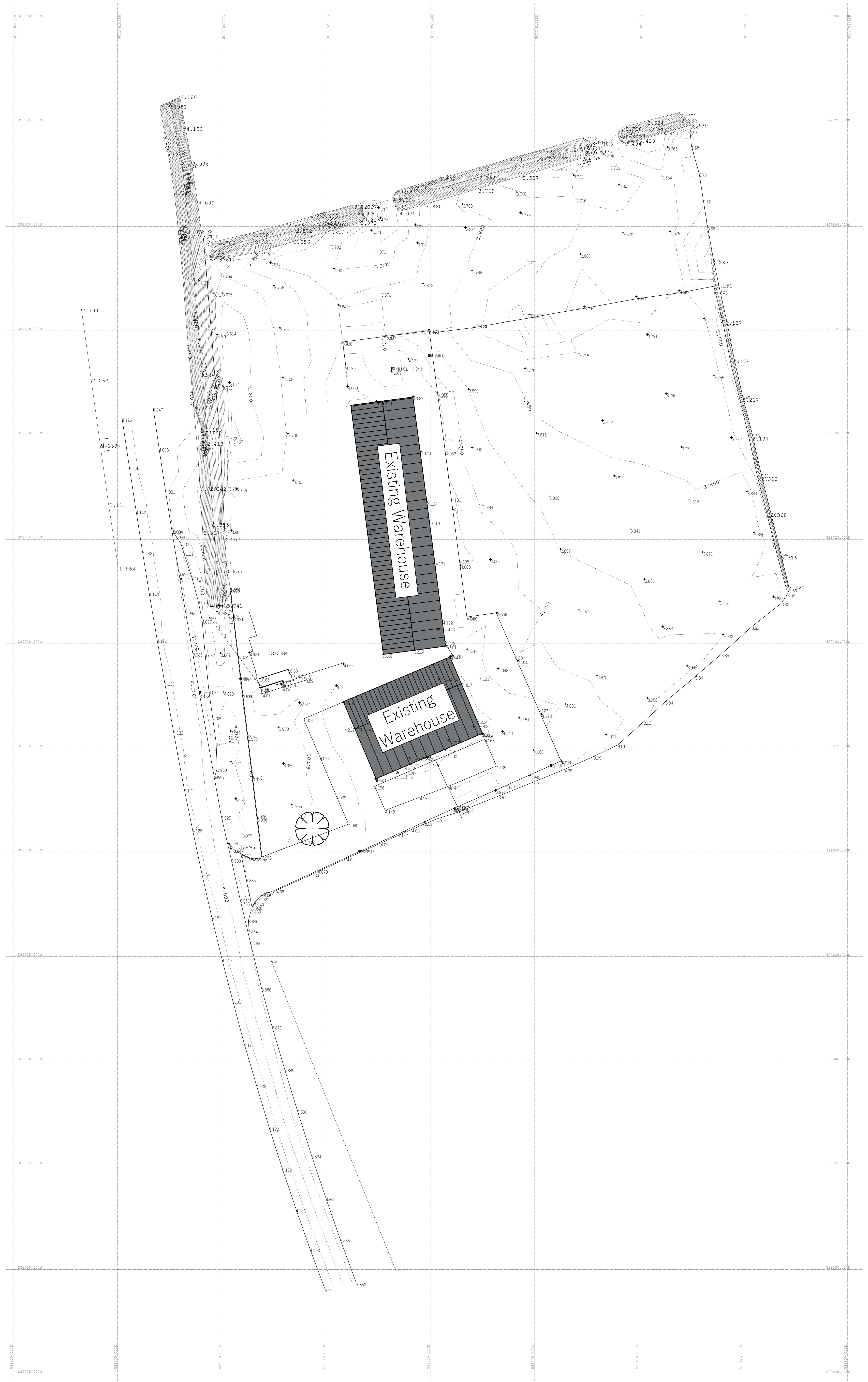
Project: Proposed Flower Packhouse & Store
Vickers Farm, off A17, Fosdyke

Title: PROPOSED SITE ARRANGEMENT

Date	Apr. '21	Scale @A1	Drawing No.	Rev
Appr	APW	1:500	21–130–101	P5

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Plan 3



Rev	Revision	Drn	App	Date
P1	PRELIMINARY – FOR APPROVAL	APW	APW	04/21

SHIELDS WILSON

e: info@shieldswilson.co.uk t: 01775 729252

STRUCTURAL AND CIVIL ENGINEERING

Status: FOR COMMENT

Client: NAYLOR FLOWERS

Project: Proposed Packing Sheds
Vickers Farm, off A17, Fosdyke

Title: TOPOGRAPHICAL SURVEY OF EXISTING SITE

Date	Apr. '21	Scale @A1 1:500	Drawing No. 21-130-100	Rev –
Appr	APW			

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Plan 4

FOUL WATER TREATMENT PLANT
WITH INTERGRAL PACKAGE PUMP TO
DISACHRGE TO RIPARIAN DYKE Via
63Ø RISING MAIN

FLOW CONTROL
CHAMBER WITH FLOW
CONTROL DEVICE
RESTRICTING
DISCHARGE RATE TO
2.6l/s

NON-RETURN FLAP
VALVE TO BE FITTED
OVER OUTLET PIPE

9m IDB Easement

FLOW THROUGH REED BED
AND FILTER STONE CHANNEL
TO PROVIDE TREATMENTS
TRAINS FOR HARDSTANDING
RUN-OFF/

TOP OF POND
PROFILE TO BE
FINALISED
DURING DETAILED
DESIGN STAGE

1050m3 VOLUME (1.45m DEEP) ATTENUATION FLOW
THROUGH BASIN TO ACCOMMODATE
1 IN 100 YEAR STORM EVENT PLUS 20% CLIMATE
CHANGE & 10% IMPERMEABLE CREEP.
TOP LEVEL OF 3.800
INVERT LEVEL 2.358
506m² BASE AREA
MAX WATER LEVEL 3.395

FFL
4.140

Package Pump Station.
63Ø Rising Main

1:18
Fall

R15000

R15000

CL = 4.23

CL = 4.30

DRAINAGE STRATEGY

THE PRINCIPLES OF THE DRAINAGE STRATEGY WILL FOLLOW THOSE SET OUT WITHIN THE CIRIA SUDS MANUAL AND SUDS HIERARCHY.

THE SITE IS CONSIDERED UNSUITABLE FOR LARGE SCALE INFILTRATION TECHNIQUES.

1. AS THE IMPERMEABLE AREA IS SUCH A LARGE PERCENTAGE OF THE SITE, AND FROM LOCAL KNOWLEDGE THE INFILTRATION RATE WILL BE POOR AT BEST.
2. AS THE GROUND WATER TABLE IN THE LOCAL AREA IS KNOWN TO RISE TO 1.5M BELOW GROUND LEVEL.

THE ABOVE MAKE THE USE OF AN INFILTRATION METHOD UNVIABLE.

A FLOW THROUGH ATTENUATION BASIN HAS BEEN PROPOSED AS THE MOST EFFECTIVE OPTION WHICH WILL DISCHARGE VIA A FLOW CONTROL DEVICE. INTO THE SOUTH HOLLAND IDB SYSTEM ON THE WEST BOUNDARY OF THE SITE.

THE ALLOWABLE DISCHARGE HAS BEEN LIMITED TO A PRACTICAL MINIMUM BASED UPON THE 1 IN 1 YEAR QBAR RATE 2.6 l/s.

THE FLOW THROUGH BASIN WILL FEATURE SUITABLE FILTRATION TECHNIQUES TO PROVIDE TREATMENT TRAINS FOR THE HARDSTANDING YARD RUN-OFF WATER.

IN SUMMARY OF THE ABOVE THE PROPOSED SW OUTLINE DRAINAGE SCHEME IS INLINE WITH CURRENT PLANNING REQUIREMENTS AND THE SUDS HIERARCHY.

Rev	Revision	Drn	App	Date
P2	PRELIMINARY – FOR APPROVAL	APW	APW	04/21
P1	PRELIMINARY – FOR APPROVAL	APW	APW	04/21

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STRUCTURAL AND CIVIL ENGINEERING

Status: FOR PLANNING

Client: NAYLOR FLOWERS

Project: Proposed Flower Packhouse & Store
Vickers Farm, off A17, Fosdyke

Title: PROPOSED DRAINAGE STRATEGY ARRANGEMENT

Date	Apr. '21	Scale @A1	Drawing No.	Rev
Appr	APW	1:500	21–130–201	P2

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