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Appendix 9.A – Flood Risk Assessment

NeuConnect: Great Britain to Germany Interconnector

GB Onshore Scheme

Environmental Statement

Appendix 9A – Flood Risk Assessment

NeuConnect Britain Ltd

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1. Introduction

Introduction

- 1.1 AECOM has been commissioned by NeuConnect Britain Limited (hereafter referred to as the 'Applicant') to prepare an Environmental Statement (ES) that will support the outline planning application for an electricity converter station and substation on the Isle of Grain, Kent. The proposed converter station and substation will form part of a 1400 megawatt (MW) interconnector between Great Britain and Germany.
- 1.2 This document provides a Flood Risk Assessment (FRA) to inform the ES and forms Appendix 9A of the ES.
- 1.3 This FRA has been prepared in accordance with the National Planning Policy Framework (NPPF)¹ and supporting Planning Practice Guidance (PPG)².

Background to the project

- 1.4 NeuConnect (the 'Project'), is a 1400 MW interconnector between Great Britain and Germany. The Project will create the first direct electricity link between Great Britain and German energy networks and will allow electricity to be passed in either direction. The Project will be formed by over 700 kilometres (km) of subsea and underground High Voltage Direct Current (HVDC) cables, with on-shore converter stations linking into the existing electricity grids in Great Britain and Germany.
- 1.5 The components of the Project that are 'onshore' in Great Britain – the GB Onshore Scheme – will comprise the interconnector as well as the additional works necessary to facilitate a connection to the National Electricity Transmission System (NETS).

Objectives

- 1.6 The aim of this FRA is to assess the flood risk to and from the GB Onshore Scheme in accordance with the requirements of the NPPF and suggest measures to avoid and/ or reduce the risks to acceptable levels. The following objectives have been achieved to fulfil this aim:
 - Gather desktop information relating to geology, topography and local water features that may influence the risk of flooding to the GB Onshore Scheme;
 - Obtain flood modelling outputs from the Environment Agency associated with tidal flooding from the Thames Estuary to determine the risk of tidal flooding to the site over its lifetime, allowing for the effects of climate change;
 - Assess the risk of flooding from all sources (tidal, fluvial, surface water, groundwater, sewers and ordinary watercourses) to and from the GB Onshore Scheme allowing for the effects of climate change over the lifetime of the development;
 - Identify the potential effects of the GB Onshore Scheme on the surface water flood risk to the site and surrounding area, including alterations to permeable surfacing and surface water flow paths;

¹ National Planning Policy Framework', available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733637/National_Planning_Policy_Framework_web_accessible_version.pdf, accessed 30th May 2019.

² Planning Practice Guidance' available at <https://www.gov.uk/government/collections/planning-practice-guidance>, accessed 30th May 2019.

- Identify mitigation measures required to avoid or reduce potential adverse impacts on flood risk to the GB Onshore Scheme or elsewhere, and where possible identify measures to reduce the level of flood risk overall;
- Identify measures to ensure the safe operation of the GB Onshore Scheme and safety of site personnel; and,
- Present the conclusions of the FRA in support of the application of the Exception Test for the GB Onshore Scheme in accordance with the NPPF.

Data sources and consultation

1.7 AECOM has consulted with the Environment Agency to obtain flood risk information and modelling datasets of relevance to the Project Area (shown in FRA Annex 9A-1) and to obtain agreement regarding the parameters for future site planning and design in this location (FRA Annex 9A-2).

1.8 The following sources of information have been used to inform the FRA:

- LiDAR Topographic Survey data.
- Environment Agency online flood risk mapping <https://flood-map-for-planning.service.gov.uk/>
- Environment Agency 'Product 4' data request (FRA Annex 9A-1).
- Environment Agency, 2015, Kent Coastal Modelling Study.
- Consultation with Environment Agency (FRA Annex 9A-2).
- Consultation with North Kent Marshes Internal Drainage Board.
- Outline Surface Water Drainage Strategy (ES Appendix 9B and 9C).
- Medway Council Strategic Flood Risk Assessment (Mott MacDonald, August 2006).
- Medway Council Local Flood Risk Management Strategy (Capita Symonds URS, July 2014).
- Thames Estuary 2100 Plan, Environment Agency, November 2012.
- Isle of Grain to South Foreland Shoreline Management Plan (2008, and Review Halcrow 2010) extract included in FRA Annex 9A-3.

2. Site Location and Development Proposals

Site Location

- 2.1 The area in which the GB Onshore Scheme is proposed (the 'Project Area') is entirely within the boundary of Medway Council and is centred on the Isle of Grain located at the tip of the Hoo Peninsula between the Thames Estuary to the north and the Medway Estuary to the south. The Project Area is located to the west of the settlement of Grain, NGR 587613,176675 and nearest post code ME3 0AW. The Project Area is approximately 66 hectares (ha) when incorporating the land up to The Mean Low Water Springs (MLWS) level. The site location plan is shown in Figure 9A-1.
- 2.2 Land use comprises a mix of industrial development to the south, the small settlement of Grain to the southeast and undeveloped land, much of which is designated for ecological interests, to the north (along the coastline) and to the west. There are also some small areas of brownfield or derelict land and some small areas of agricultural land (some of these coincide with brownfield land). The existing 400 kilovolt (kV) overhead line (OHL) which is broadly routed east to west generally marks the boundary between the extent of industrial or brownfield land and settlement or undeveloped coastal land. The only road access to the peninsula is from the B2001 Grain Road.

Geology

- 2.3 BGS online mapping³ identifies the superficial geology in the area is reported to comprise River Terrace Deposits, comprising sand and gravel. In the intertidal area between Mean High Water Springs (MHWS) and MLWS the deposits are Beach and Tidal Flat Deposits (Undifferentiated) (Clay, Silt and Sand).
- 2.4 The superficial deposits at the site are recorded to be underlain by the London Clay. This comprises blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt, plus sometimes silts and layers of sandy clay.

Topography

- 2.5 LiDAR topographic survey identifies the majority of the Project Area, and the settlement of Grain itself, are located at approximately 7-12 m Above Ordnance Datum (AOD). The north eastern and western fringes of the Project Area slope down towards the marshes. In this part of the Project Area ground levels fall to 3-5 m AOD. The Grain Marshes are located at below 2 m AOD.

Current use

- 2.6 The Project Area is located on the fringes of industrial land (this is based on the existing 400 kV OHL defining the extent of industrial land) and extends north/ northeast to the coast. Land within the Project Area and in the immediate vicinity is either in agricultural use or is brownfield land which has no current discernible use. The Project Area is located approximately 0.5 km to the west of Grain; however, there are individual unnamed properties in the centre of and to the west (Rose Court Farm) of the Project Area. Access to the Project Area is by a small unnamed road

³ <https://www.bgs.ac.uk/data/mapViewers/home.html>

which is connected to Grain Road. An alternative access is from West Lane which is routed along the northern boundary of the Project Area in a broadly east-west direction.

- 2.7 Land within the Project Area and in the immediate vicinity has historically been used for the extraction of gravel and sand and the resultant voids used for landfill. The historic landfill to the northeast of the proposed substation location has been capped however an existing permitted leachate monitoring system still operates from this landfill (to the east of Perry's Farm) to the pond (to the northeast of Rose Court Farm).

Flood Zone

- 2.8 The Environment Agency's Flood Map for Planning (Rivers and Sea)⁴ shows that the western fringe of the Project Area is located within Flood Zone 3. Flood Zone 3 is defined as land assessed as having a 0.5% or greater annual exceedance probability (AEP) (1 in 200 year or greater annual probability) of flooding from the sea. This area is shown to benefit from flood defences, which are located along the frontage of the Thames Estuary.

GB Onshore Scheme

- 2.9 The proposed GB Onshore Scheme is presented in Figure 2.2 of the ES. The GB Onshore Scheme will comprise the following main elements extending as far as MLWS:
- A new sealing end compound, to facilitate the connection between the GB Onshore Scheme and the existing OHL.
 - A new substation approximately 120 m by 60 m (or up to 0.72 hectare (ha)) with a maximum height of approximately 14 m. The substation will also include down leads from the existing OHL tower.
 - An underground Alternating Current (AC) cable route from the substation to the converter station.
 - A converter station approximately 250 m by 250 m (or up to 5 ha) with a maximum height of approximately 26 m.
 - A new permanent access track from Grain Road (B2001) to the proposed converter station and proposed substation. Access will be achieved by upgrading the existing gravel path that extends along the southern boundary of the Project Area.

Development vulnerability classification

- 2.10 The GB Onshore Scheme comprises the construction of a converter station and substation and associated infrastructure. In accordance with NPPF Table 2¹, this development is classified as 'Essential Infrastructure'.
- 2.11 Essential Infrastructure is permitted in Flood Zones 1 and 2. Where Essential Infrastructure is proposed in Flood Zone 3, it must be demonstrated that the Exception Test can be satisfied.

Lifetime of development

- 2.12 Subject to outline planning permission being granted it is anticipated that construction will start in early 2021 and will take approximately 36 months to complete.

⁴ <https://flood-map-for-planning.service.gov.uk/>

- 2.13 The lifetime of the development is 40 – 50 years. The development is therefore anticipated to be in place until 2064 – 2074.

Sequential Test

- 2.14 The Sequential Test is a decision making tool designed to ensure that vulnerable development is directed towards sites at lowest risk of flooding prior to the consideration of sites at greater risk.
- 2.15 Given the Project's use of subsea cables, a coastal site is required to minimise onshore infrastructure and the extent of associated impacts. The large majority of the Project Area is in Flood Zone 1 and therefore at low probability of flooding. As a result, these components pass the Sequential Test.
- 2.16 The positioning of the converter station requires careful placement due to a number of sensitive receptors with respect to noise, landscape and visual impact. The edge of the area which will accommodate the converter station is defined as Flood Zone 3, high probability of flooding from the sea.
- 2.17 Chapter 4 of the ES 'Consideration of Alternatives' provides an overview of the alternative sites that were considered for the Project, and the justification for the selection of this site.
- 2.18 The PPG (paragraph 34) states that *"it is for local planning authorities, taking advice from the Environment Agency as appropriate, to consider the extent to which Sequential Test considerations have been satisfied, taking into account the particular circumstances in any given case.....Ultimately the local planning authority needs to be satisfied in all cases that the proposed development would be safe and not lead to increased flood risk elsewhere"*.
- 2.19 One of the purposes of this FRA is to demonstrate how the proposed development has been suitable designed to be safe and not lead to increased flood risk elsewhere.

3. Site Specific Flood Risk

Overview

- 3.1 This chapter provides an assessment of the flood risk to and from the GB Onshore Scheme from all sources of flooding.

Tidal flooding

- 3.2 The Isle of Grain is located at the mouth of the Thames Estuary. The majority of the Isle of Grain is shown to be within Flood Zone 3 on the Environment Agency's 'Flood Map for Planning'⁵ which is defined as areas at High Probability of tidal flooding (greater than a 1 in 200 annual probability, or 0.5% Annual Exceedance Probability (AEP)). The Isle of Grain benefits from the presence of tidal flood defences.
- 3.3 A map of the flood zones and Areas Benefitting from Defences (ABD) is included in FRA Annex 9A-1.
- 3.4 The majority of the Project Area, and the settlement of Grain itself, are located at a slightly higher elevation (7-12 m AOD) and are therefore within an area defined as Flood Zone 1 Low Probability of tidal flooding (less than 1 in 1000 annual probability, or 0.1% AEP). The exception is the north eastern and western fringes of the Project Area, where ground levels fall to 3-5 m AOD. The current site layout plan identifies that the western edge of the proposed convertor station and a parcel of laydown area may be located partially within Flood Zones 2 and 3.
- 3.5 The edge of the Project Area identified within Flood Zone 3 experienced flooding during the tidal flood event of February 1953. A map of this historic flood extent is included in FRA Annex 9A-1.

Flood defences

- 3.6 An initial review of the Isle of Grain to South Foreland Shoreline Management Plan (2008) identifies existing defences from Yantlet Creek (west of the Project Area) to Horseshoe Point (south of the Project Area) comprising *"a number of clay embankment type, seawalls with concrete/ concrete block front slopes. There are timber groynes at Grain to the north of which is a short section of eroding coastline with no hard defences"*.
- 3.7 The Environment Agency has provided details of the following flood defences in the vicinity of the site in FRA Annex 9A-1:
- Standard of protection – 1:200 (0.5% AEP)
 - Asset Maintainer - Environment Agency
 - Type and location – 4.8km of Embankment North West of site

 - Standard of protection – 1:1000 (0.1% AEP)
 - Asset Maintainer - Environment Agency
 - Type and location – 1.2km of Embankment South West of site

 - Standard of protection – 1:1000 (0.1% AEP)
 - Asset Maintainer - Environment Agency

⁵ <https://flood-map-for-planning.service.gov.uk/>

- Asset Owner – Private

- 3.8 The Isle of Grain to South Foreland Shoreline Management Plan (SMP) sets out the proposed plan for the Allhallows-on-Sea to Grain policy unit 4a01. In the short term, the plan is to hold the line to continue protecting the low lying assets. In the future, the medium and longer term plan is to implement a change of policy to managed realignment, at a set-back position and allowing the current shoreline position to migrate landwards. A policy of managed realignment will allow some inundation and erosion (of the slopes at Grain) and a degree of natural coastal processes seawards of the realigned defence as well as reduce the probability of uncontrolled large scale flooding. Construction of a realigned flood defence may be required whilst the shoreline defences are allowed to fail. An extract from the SMP showing the potential realignment is included in FRA Annex 9A-3.
- 3.9 The Thames Estuary 2100 Plan⁶ also identifies that the policy for this area is to maintain and improve the level of flood defences to keep up with climate change.

North Kent Modelling

- 3.10 The flood modelling at this location is informed by detailed tidal modelling of the North Kent Coast⁷, completed in August 2015. This modelling data has been obtained from the Environment Agency to inform the understanding of the risk of flooding in this location. Outputs from the modelling are included in FRA Annex 9A-1.
- 3.11 The modelling shows that the Isle of Grain and the Project Area is protected by the flood defences under present conditions for the year 2012. However, with increased tidal levels in the future, as a result of climate change, the Isle of Grain and the edge of the Project Area may be at risk of flooding.
- 3.12 The modelled flood levels in proximity to the location for the proposed converter station and substation in the south western corner of the Project Area are detailed in Table 3.1 for the years 2070 and 2115.

Table 3.1: Modelled Flood Levels (North Kent Coast Modelling, FRA Annex 9A-1)

Modelled Scenario	Maximum flood level (m AOD) in south west corner of the Project Area
Defended scenario, still water level; 0.5% AEP for the year 2070	Not shown to flood
Defended scenario, still water level; 0.5% AEP for the year 2115	3.1
Defended scenario, wave overtopping; 0.5% AEP for the year 2115*	3.11
Undefended scenario; still water level; 0.5% AEP for the year 2070	5.2
Undefended scenario; still water level; 0.5% AEP for the year 2115	5.83

*a wave overtopping model scenario was not undertaken for the year 2070, therefore only the scenario for 2115 has been referred to.

⁶ Environment Agency, November 2012 Thames Estuary 2100 Plan
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/322061/LIT7540_43858f.pdf

⁷ Environment Agency, North Kent Coast Modelling Study, August 2015

Actual Risk

- 3.13 The results show that over the lifetime of the development to the year 2070, under the defended scenario, parts of the Grain Marsh may experience tidal flooding, but the Project Area is at low risk of tidal flooding.

Residual Risk

- 3.14 The undefended modelled scenarios identify any areas that could be at residual risk i.e. at risk of flooding in the event the defences are not in place due to a breach of failure.
- 3.15 During the undefended modelled scenarios, the results show an increased extent of flooding in the Grain Marshes, and the western fringe of the Project Area may therefore be at residual risk of flooding in the future during the undefended 0.5% AEP event for the year 2070.

Fluvial flooding

- 3.16 There are several land drains and unnamed ponds within the Project Area, and a number of tidal creeks, ponds and ordinary watercourse to the west of the site within the Grain Marsh, including the Hamshill Fleet (ordinary watercourse) and Millmarsh Fleet (Main River).
- 3.17 The closest watercourses to the Project Area are the network of ditches adjacent to the south western edge of the Project Area which connect to the Hamshill Fleet, located approximately 0.5 km to the west of the Project Area. The LiDAR topographic survey identifies that the Project Area is located above 3 m AOD and the marshland is located below 2 m AOD. The risk of flooding from this watercourse is therefore considered to be low. The Flood Zones in this location are primarily associated with the tidal Thames Estuary and therefore do not provide an indication of the risk of flooding from these watercourses.

Surface water flooding

- 3.18 There are a number of drains that are present within the Project Area, as well as ponds to the north and on the western boundary (at the end of West Lane). These ponds occupy areas of previous gravel and sand extraction. To the west of the Project Area is the South Thames Estuary and Marshes Site of Special Scientific Interest (SSSI), a low lying wetland area.
- 3.19 The Environment Agency mapping 'Risk of Flooding from Surface Water'⁸ identifies the main risks of surface water flooding close to the Project Area are associated with the drainage ditches in the lower lying areas around the Project Area. The higher elevation of the Project Area means that it is not at risk of surface water flows from adjacent land.
- 3.20 Development within the Project Area has the potential to increase the amount of surface water runoff to neighbouring areas and should be carefully managed through the site planning and design.
- 3.21 The risk of surface water flooding to and from the site is considered to be Medium prior to mitigation.

Groundwater flooding

- 3.22 The Project Area is situated on superficial deposits of sand and gravel, which are classified as a 'Secondary A' aquifer. The bedrock is the London Clay Formation, which is typically impermeable

⁸ <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

and has no aquifer classification/designation. Therefore, there is a significant risk of the groundwater level being close to the ground level in this area.

- 3.23 The Medway Council Local Flood Risk Management Strategy (LFRMS) (Capita Symonds URS, July 2014) includes mapping from the British Geological Survey (BGS) which shows an approximate guide to areas that may be susceptible to groundwater flooding. The mapping shows a band passing north/ south through the centre of the Project Area which may be susceptible to groundwater flooding. However for all new developments, site investigation is required to confirm local groundwater levels and therefore risk of groundwater flooding.
- 3.24 As part of the Ground Investigation works for the site, monitoring of groundwater levels is currently being undertaken. The results will be used to determine the risk to the site and the implementation of suitable techniques during construction.

Sewers

- 3.25 No details regarding the sewer network local to the site have been provided to inform the FRA.

Reservoir failure

- 3.26 The Environment Agency Flood Risk from Reservoirs⁹ mapping does not identify the Project Area to be at risk of flooding in the event of uncontrolled release of water associated with the failure of a reservoir.

Summary

- 3.27 Table 3.2 provides a summary of the risk of flooding to the Project Area from each source.

Table 3.2 Summary of Project Area Flood Risk

Source of flooding	Summary for Project Area
Tidal: Thames Estuary	Actual risk (i.e. defended): Low. Residual risk (i.e. undefended): Western fringe of Project Area at High residual risk when considering the impacts of climate change over the lifetime of the development.
Fluvial: Hamshill Fleet	Low
Surface water	Low – Medium prior to mitigation
Groundwater	To be confirmed following GI
Sewer	Unknown
Reservoir	Not applicable

⁹ <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

4. Risk Mitigation and Management

Overview

- 4.1 This chapter provides a summary of the measures that will need to be implemented during the construction and operational phases of the GB Onshore Scheme to mitigate the risk of flooding to and from the Project Area. This includes measures that have been incorporated into the design as well as those that will need to be implemented through a Construction and Environmental Management Plan (CEMP) for the Project Area or by the management authority during the operation of the GB Onshore Scheme.

Construction phase

Works adjacent to flood defences

- 4.2 The proposed works include the installation of a cable beneath the existing tidal flood defence line. Such activity requires a Flood Risk Activity Permit from the Environment Agency.
- 4.3 During construction the existing coastal flood defences will be avoided by the use of horizontal directional drilling (HDD) construction methods (as opposed to trenching or cut and cover techniques) to drill underneath the defences. The depth of the defences and appropriate standoff distances will be agreed in consultation with the Environment Agency prior to works being undertaken.

Surface water management

- 4.4 Suitable arrangements must be put in place to ensure no increase in surface water runoff from the site during the construction phase. Construction phasing should be planned such that sustainable drainage systems (SuDS) features described for the operational phase are constructed first. This would ensure that any rainfall events during construction of the substation and converter building would be captured and stored in the SuDS.
- 4.5 Details will be provided in the CEMP.

Flood warning

- 4.6 The Environment Agency issue flood warnings as notification of the potential risk of flooding during tidal surge conditions. It is recommended that those managing the construction phase subscribe to the Environment Agency's Flood Warning Service for the '*Isle of Grain and Stoke*' Flood Warning Area¹⁰ as part of their Flood Warning and Response Plan and incorporates the warnings into the health and safety planning for the construction of the Scheme.

Flood warning and response plan

- 4.7 A Flood Warning and Response Plan is recommended to be prepared detailing the planned response in the event of receiving a flood warning, and in the event of a breach or overtopping of the flood defences. This is likely to be a part of a health and safety planning prepared for the construction phase.

¹⁰ <https://riverlevels.uk/flood-warning-isle-of-grain-and-stoke>

Access and egress

- 4.8 The A228/ B2001 Grain Road is the only road access to the Isle of Grain. Access to the proposed converter station will be via the B2001 Grain Road from the development of a new access point and internal road; this will be the primary point of access during construction and operation of the GB Onshore Scheme. Temporary access for construction of the proposed DC cable route will also be taken from West Lane further to the north which provides access to Rose Court Farm.
- 4.9 This route provides safe dry access to an area in Flood Zone 1 low probability of tidal flooding.

Operational phase

Finished floor levels

- 4.10 The converter station and substation are located in the southwestern part of the Project Area, located away from the settlement of Grain and towards the existing industrial developments in the vicinity.
- 4.11 Correspondence with the Environment Agency (FRA Annex 9A-2) has confirmed that proposed infrastructure associated with the converter station and substation should be set above the flood level for the defended 0.5% AEP flood event, including climate change over the lifetime of the development. In this location, this corresponds to a flood level of 3.1 m AOD.
- 4.12 The platform for the converter station and substation will be set above this flood level including a 600 mm freeboard. The exact levels will be confirmed at detailed design stage.

Surface water management

- 4.13 In order to ensure that the GB Onshore Scheme does not increase the risk of surface water flooding to the site and the surrounding area an Outline Surface Water Drainage Strategy has been prepared (Environmental Statement Chapter 9 and Appendix 9B).
- 4.14 The Kent County Council Drainage and Planning Policy Statement¹¹ states that “*the drainage system must be designed to operate without any flooding occurring during any rainfall event up to (and including) the critical 3.33% AEP storm (1 in 30 year). The system must also be able to accommodate the rainfall generated by events of varying durations and intensities up to (and including) the critical, climate change adjusted 1% AEP storm (1 in 100 year) without any on-site property flooding and without exacerbating the off-site flood-risk. Sufficient steps are to be taken to ensure that any surface flows between the 3.33% AEP and 1% AEP events are retained on site. The choice of where these volumes are accommodated may be within the drainage system itself or within other areas designated within the site for conveyance and storage.*”
- 4.15 Consideration needs to be made for the impact of climate change on the risk of surface water flooding over the lifetime of the GB Onshore Scheme in accordance with the NPPF. Table 4 1 provides the range of climate change allowances that should be applied for different time horizons. A climate change allowance of 20% has been used based on a Project design life of 40 years with construction taking 3 years starting in 2021.

¹¹ Kent County Council (June 2017) Drainage and Planning Policy Statement, Local flood risk management strategy guidance https://www.kent.gov.uk/_data/assets/pdf_file/0003/49665/Drainage-and-Planning-policy-statement.pdf

Table 4.1 Peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 baseline) (Planning Practice Guidance¹²)

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

- 4.16 Surface water runoff arising from the areas of hardstanding will be conveyed to a SuDS wetland area via a pipe network. The wetland area will outfall to an existing watercourse in the Grain Marsh, to the west of the Project Area.
- 4.17 The pipe network will be designed to ensure that no part of the site floods during the 1 in 30 year storm event. Surface water runoff arising from events greater than the 3.33% AEP (1 in 30 year) storm event which cannot be accommodated by the pipe network will be contained within the boundary of the site.
- 4.18 The Project Area falls from east to west, towards Grain Marsh. During storms greater than the 1% AEP (1 in 100 year) plus 20% climate change event, exceedance flows will be directed away from buildings on the site and towards Grain Marsh due to the local topography of the Project Area.

Flood warning

- 4.19 It is recommended that the operating company for the Project subscribes to the Environment Agency's Flood Warning Service for the 'Isle of Grain and Stoke' FWA as part of their Flood Warning and Response Plan and incorporates the warnings into the Business Continuity Plan for the operation of the Scheme.

Flood warning and response plan

- 4.20 A Flood Warning and Response Plan should be prepared detailing the planned response in the event of receiving a flood warning, and in the event of a breach or overtopping of the flood defences. This is likely to be a part of a wider business continuity and health and safety planning prepared by NeuConnect for the GB Onshore Scheme.

Access and egress

- 4.21 As during construction, access to the proposed converter station will be via the B2001 Grain Road from the development of a new access point and internal road. This route provides safe dry access to an area in Flood Zone 1 low probability of tidal flooding.

Safe refuge

- 4.22 During ordinary operation the proposed converter station will be staffed by a small team on site with a minimum of two operators present at all times. During normal operation there will be approximately six personnel on site, divided between three shifts over a 24-hour period. During regular maintenance and/ or repairs the number of personnel present on site would increase with

¹² <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

the number of staff proportionate to the nature of the maintenance or repair works being undertaken.

- 4.23 The residual risk is the risk that remains after flood defence measures have been taken into consideration. In order to manage this residual risk it is recommended that a place of safe refuge should be provided within the Project Area.
- 4.24 The safe refuge will be set above the flood level for the undefended 0.5% AEP flood event including an allowance for climate change over the lifetime of the development i.e. above 5.2 m AOD including a suitable freeboard. It is noted that should the platform for the converter station as a whole be set above this level, this will be a suitable place of safe refuge. The exact levels will be confirmed at the detailed design phase.

5. Applying the Exception Test

- 5.1 Given that part of the proposed GB Onshore Scheme is partly located within Flood Zone 3, the NPPF requires the Exception Test to be applied.
- 5.2 The Exception Test includes two parts that require the proposed development to show that:
 - i. it will provide wider sustainability benefits to the community that outweigh flood risk, and,
 - ii. it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.
- 5.3 Information to inform part (1) can be found in the Planning Statement.
- 5.4 This FRA has demonstrated how part (2) can be achieved.

6. Summary and Conclusions

- 6.1 A review of existing readily available information identifies that there is a risk of surface water flooding to the Project Area and neighbouring area in the event that surface water runoff is not managed effectively. The risk of surface water flooding is considered to be Medium prior to mitigation.
- 6.2 The site is at low risk of tidal flooding due to the presence of tidal flood defences. However the south western edge of the Project Area is at residual risk of tidal flooding in the future in the event of a breach of the flood defences.
- 6.3 To manage these risks it is recommended that the following measures are implemented:
- Appropriate building design above the defended 0.5% AEP flood level including an allowance for climate change over the lifetime of the development (3.1 m AOD) including a freeboard of at least 600mm;
 - Flood warning and response planning during the construction and operational phases;
 - Provision of a place of safe refuge above the undefended 0.5% AEP flood level including an allowance for climate change over the lifetime of the development (5.2 m AOD) including a freeboard;
 - Implementation of a surface water management strategy (detailed in Environmental Statement Appendix 9B) to convey runoff to a SuDS attenuation pond prior to discharge to an existing water body within the Grain Marsh.

Annex 9A-1

Environment Agency Product 4

Product 4 (Detailed Flood Risk) for: A site on the Isle of Grain, ME3 0AW
Requested by: Sarah Littlewood - AECOM
Reference: KSL 101725 LB
Date: 5 October 2018

Contents

- Flood Map Confirmation
- Flood Map Extract
- Model Output Data
- Data Point Location Map
- Modelled Flood Outlines Map
- Defence Details
- Historic Flood Data
- Historic Flood Event Map
- Additional Data
- Use of information for Flood Risk Assessment and Updated Climate Change Allowances (2016)

The information provided is based on the best data available as of the date of this letter.

You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made to the data for this location. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

Please refer to the [Open Government Licence](#) which explains the permitted use of this information.

Flood Map Confirmation

The Flood Map:

Our Flood Map shows the natural floodplain for areas at risk from river and tidal flooding. The floodplain is specifically mapped ignoring the presence and effect of defences. Although flood defences reduce the risk of flooding they cannot completely remove that risk as they may be over topped or breached during a flood event.

The Flood Map indicates areas with a 1% (0.5% in tidal areas), Annual Exceedance Probability (AEP) - the probability of a flood of a particular magnitude, or greater, occurring in any given year, and a 0.1% AEP of flooding from rivers and/or the sea in any given year. The map also shows the location of some flood defences and the areas that benefit from them.

The Flood Map is intended to act as a guide to indicate the potential risk of flooding. When producing it we use the best data available to us at the time, taking into account historic flooding and local knowledge. The Flood Map is updated on a quarterly basis to account for any amendments required. These amendments are then displayed on the internet at www.gov.uk/prepare-for-a-flood.

At this Site:

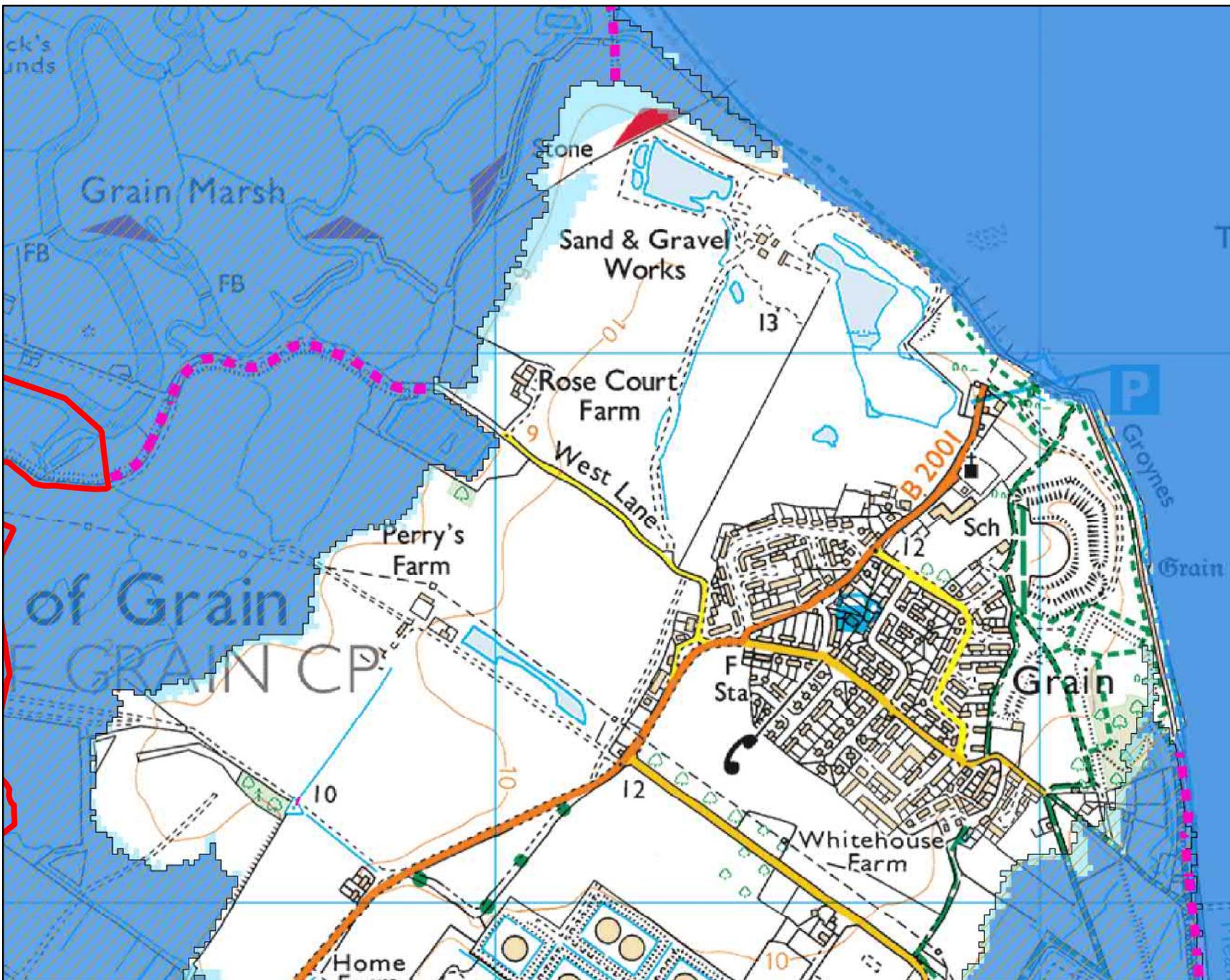
The Flood Map shows that this parts of this site lie within the outline of the 0.5% chance of flooding in any given year from the sea.

Enclosed is an extract of our Flood Map which shows this information for your area.

Method of production

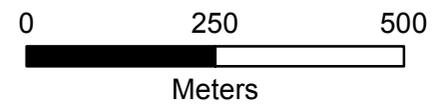
The Flood Map at this location has been derived using detailed tidal modelling of the North Kent Coast, completed in August 2015.

Flood Map centred on a site on the Isle of Grain, ME3 0AW
Created 05/10/2018 (Ref KSL 101725 LB)



Legend

- Main Rivers
- Flood Defences
- Flood Storage Area
- Areas Benefiting From Flood Defence
- Flood Zone 3
- Flood Zone 2



Scale 1:10,000

Model Output Data

You have requested flood levels for various return periods at this location.

The modelled flood levels for the closest most appropriate model grid cells, any additional information you may need to know about the modelling from which they are derived and/or any specific use or health warning for their use are set out below.

Using a 2D TuFLOW model the floodplain has been represented as a grid. The flood water levels have been calculated for each grid cell.

A map showing the location of the points from which the data is taken is enclosed. Please note you should read the notice enclosed for your specific use rights.

Table 1: Defended Modelled Tidal Flood levels for Annual Exceedance Probability shown in mAOD

Node Location ID	Modelled Tidal Flood levels for Annual Exceedance Probability shown in mAOD												
	National Grid Ref		Defended - Still Water						Defended - Wave Overtopping				
	Easting	Northing	5% AEP 2012	1.33% AEP 2012	0.5% AEP 2012	0.5% AEP 2070	0.5% AEP 2115	0.1% AEP (2012)	5% AEP 2012	1.33% AEP 2012	0.5% AEP 2012	0.5% AEP 2115	0.1% AEP (2012)
1	587389	176365	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
2	587339	176415	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
3	587389	176415	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
4	587439	176415	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
5	587489	176415	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
6	587389	176465	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
7	587439	176465	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
8	587489	176465	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>

35	587789	176815	<Null>	<Null>	<Null>	<Null>	3.10	<Null>	<Null>	<Null>	<Null>	3.11	<Null>
36	587839	176815	<Null>										
37	588089	177215	<Null>										
38	588139	177215	<Null>										
39	588439	177365	<Null>	<Null>	<Null>	<Null>	5.80	<Null>	<Null>	<Null>	<Null>	5.80	<Null>
40	588489	177365	<Null>	<Null>	<Null>	<Null>	5.80	<Null>	4.82	4.82	4.84	5.80	4.86
41	588539	177365	4.18	4.47	4.69	5.17	5.80	5.11	4.18	4.47	4.69	5.80	5.11
42	588589	177365	4.18	4.47	4.69	5.17	5.80	5.11	4.18	4.47	4.69	5.80	5.11
43	588389	177415	<Null>	<Null>	<Null>	<Null>	5.80	<Null>	<Null>	<Null>	<Null>	5.80	<Null>
44	588439	177415	<Null>	<Null>	<Null>	<Null>	5.80	<Null>	4.19	4.20	4.21	5.80	4.49
45	588639	177415	4.18	4.47	4.68	5.17	5.80	5.11	4.18	4.47	4.68	5.80	5.11
46	588689	177465	4.18	4.47	4.68	5.17	5.80	5.11	4.18	4.47	4.68	5.80	5.11
47	588739	177515	4.18	4.47	4.68	5.17	5.80	5.11	4.18	4.47	4.68	5.80	5.11
48	588789	177565	4.18	4.47	4.68	5.17	5.80	5.11	4.18	4.47	4.68	5.80	5.11
49	588839	177615	4.18	4.47	4.68	5.17	5.80	5.11	4.18	4.47	4.68	5.80	5.11

Table 2: Undefended Modelled Tidal Flood levels for Annual Exceedance Probability shown in mAOD

Node Location ID	Modelled Tidal Flood levels for Annual Exceedance Probability shown in mAOD						
	National Grid Ref		Undefended				
	Easting	Northing	5% AEP 2012	0.5% AEP 2012	0.5% AEP 2070	0.5% AEP 2115	0.1% AEP (2012)
1	587389	176365	<Null>	<Null>	<Null>	5.83	<Null>
2	587339	176415	4.18	4.71	5.20	5.83	5.13
3	587389	176415	<Null>	4.71	5.20	5.83	5.13

4	587439	176415	<Null>	4.71	5.20	5.83	5.13
5	587489	176415	<Null>	<Null>	<Null>	5.83	<Null>
6	587389	176465	4.18	4.71	5.20	5.83	5.13
7	587439	176465	4.18	4.71	5.20	5.83	5.13
8	587489	176465	4.18	4.72	5.20	5.83	5.13
9	587539	176465	<Null>	<Null>	<Null>	5.83	<Null>
10	587589	176465	<Null>	<Null>	<Null>	5.83	<Null>
11	587639	176465	<Null>	<Null>	<Null>	5.83	<Null>
12	587439	176515	4.18	4.71	5.20	5.83	5.13
13	587489	176515	4.18	4.72	5.20	5.83	5.13
14	587539	176515	4.19	4.72	5.20	5.83	5.13
15	587589	176515	4.19	4.72	5.20	5.83	5.13
16	587639	176515	<Null>	4.72	5.20	5.83	5.13
17	587489	176565	4.19	4.72	5.19	5.83	5.13
18	587539	176565	4.19	4.72	5.20	5.83	5.13
19	587589	176565	4.19	4.72	5.20	5.82	5.13
20	587639	176565	4.19	4.72	5.20	5.83	5.13
21	587539	176615	4.19	4.72	5.19	5.83	5.13
22	587589	176615	4.19	4.72	5.19	5.83	5.13
23	587639	176615	4.19	4.72	5.20	5.83	5.13
24	587689	176615	<Null>	<Null>	<Null>	5.83	<Null>
25	587639	176665	4.19	4.72	5.19	5.83	5.13
26	587689	176665	4.19	4.72	5.20	5.82	5.13
27	587739	176665	<Null>	<Null>	<Null>	5.82	<Null>
28	587689	176715	4.19	4.72	5.19	5.82	5.13
29	587739	176715	4.19	4.73	5.19	5.82	5.13

30	587789	176715	4.19	4.73	5.19	5.83	5.13
31	587839	176715	<Null>	4.73	5.19	5.83	5.13
32	587739	176765	4.19	4.73	5.19	5.82	5.13
33	587789	176765	4.19	4.73	5.19	5.82	5.13
34	587839	176765	4.19	4.73	5.19	5.83	5.13
35	587789	176815	4.19	4.73	5.19	5.82	5.13
36	587839	176815	4.19	4.73	5.19	5.82	5.13
37	588089	177215	<Null>	<Null>	5.19	5.82	<Null>
38	588139	177215	<Null>	<Null>	<Null>	5.82	<Null>
39	588439	177365	<Null>	<Null>	<Null>	5.81	<Null>
40	588489	177365	<Null>	<Null>	5.19	5.81	5.11
41	588539	177365	4.18	4.68	5.18	5.81	5.11
42	588589	177365	4.18	4.68	5.18	5.81	5.11
43	588389	177415	<Null>	4.69	5.18	5.81	5.11
44	588439	177415	4.20	4.69	5.18	5.81	5.11
45	588639	177415	4.18	4.68	5.18	5.81	5.11
46	588689	177465	4.18	4.68	5.18	5.81	5.11
47	588739	177515	4.18	4.68	5.17	5.80	5.10
48	588789	177565	4.18	4.68	5.17	5.80	5.10
49	588839	177615	4.18	4.68	5.17	5.80	5.10

Values of <Null> indicate locations at which the selected points lie outside of a particular modelled flood extent.

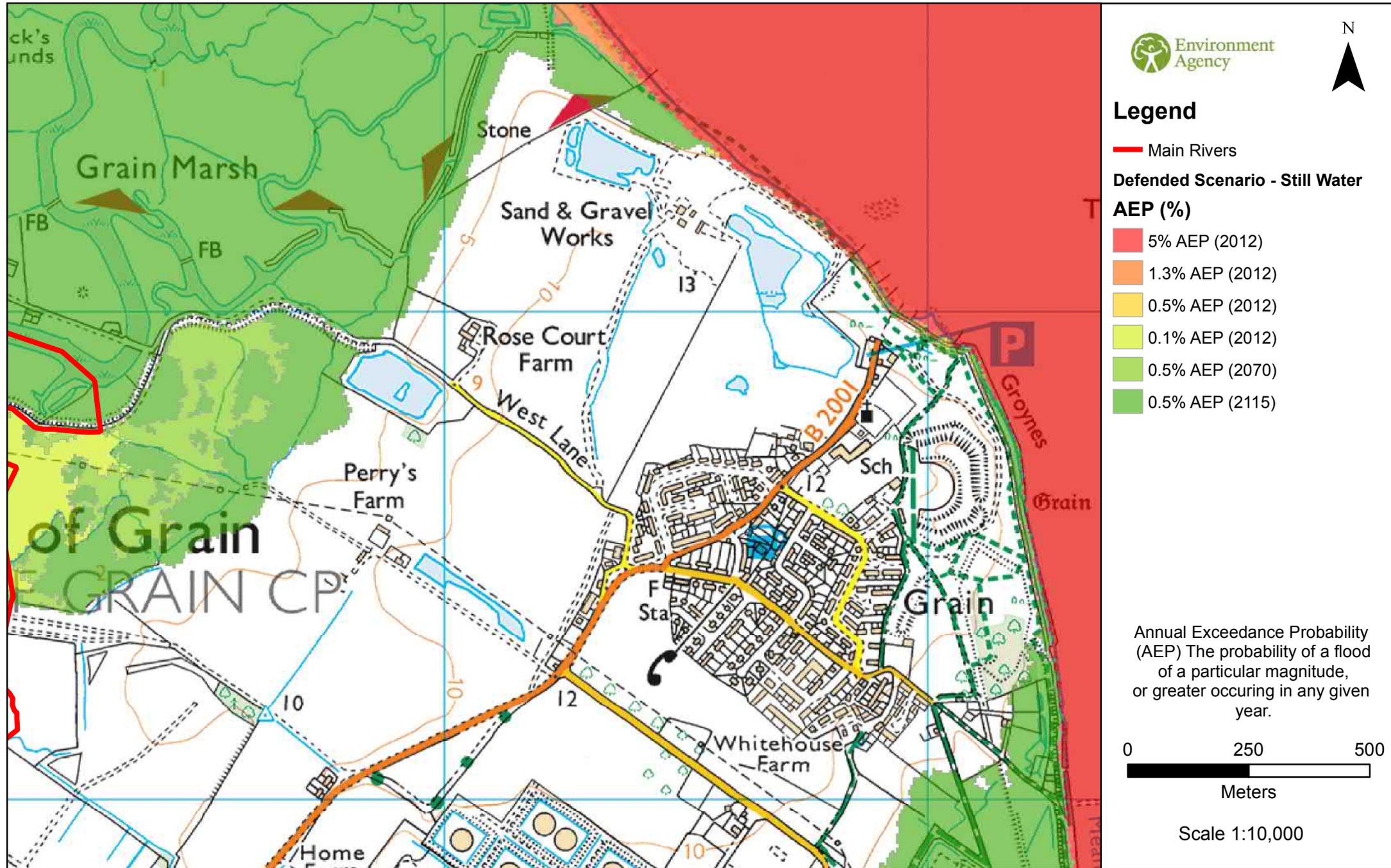
Data taken from North Kent Coast Modelling and Mapping Study, completed by JBA Consulting, in August 2015.

There are no health warnings or additional information for these levels or the model from which they were produced.

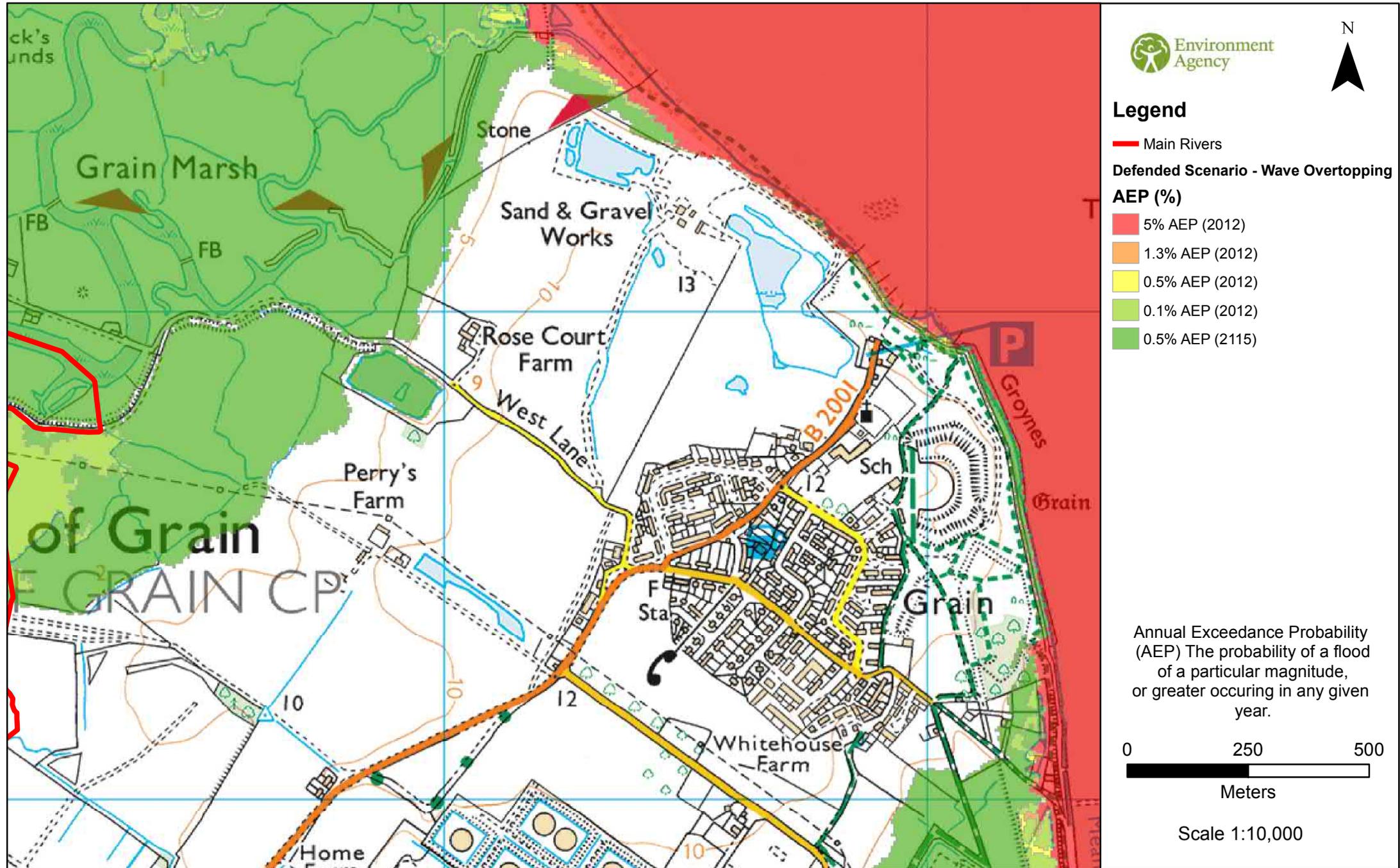
Node Map centred on a site on the Isle of Grain, ME3 0AW
Created 05/10/2018 (Ref KSL 101725 LB)



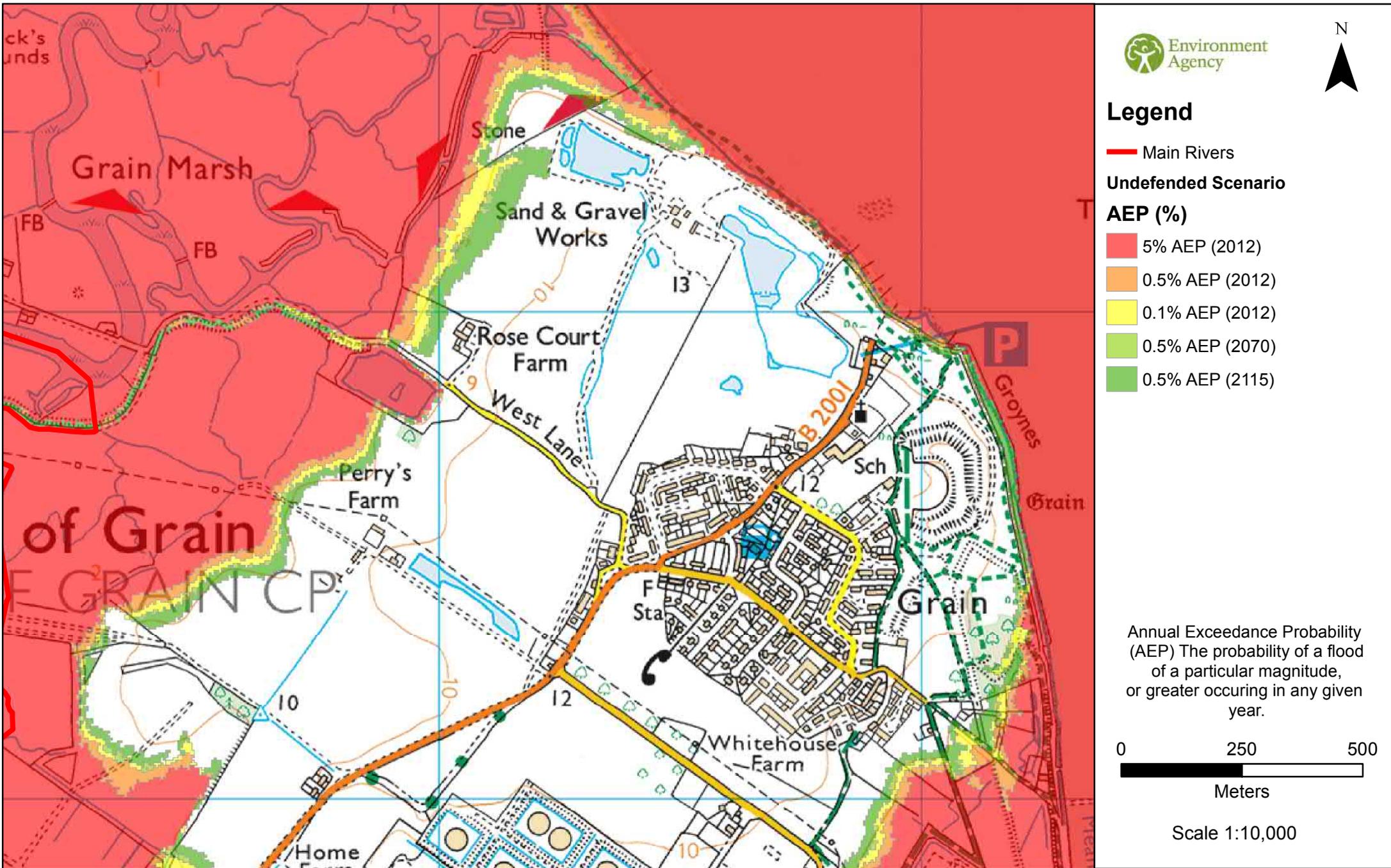
Modelled Maximum Defended Flood Extent (Still Water) centred on a site on the Isle of Grain, ME3 0AW
Created 05/10/2018 (Ref KSL 101725 LB)



Modelled Maximum Defended Flood Extent (Wave Overtopping) centred on a site on the Isle of Grain, ME3 0AW
Created 05/10/2018 (Ref KSL 101725 LB)



Modelled Maximum Undefended Flood Extent centred on a site on the Isle of Grain, ME3 0AW
Created 05/10/2018 (Ref KSL 101725 LB)



Defence Details

Type and location – 737m of Embankment west of site
Standard of protection – 1:200 (0.5% AEP)
Asset Maintainer - Environment Agency

Type and location – 4.8km of Embankment North West of site
Standard of protection – 1:1000 (0.1% AEP)
Asset Maintainer - Environment Agency

Type and location – 1.2km of Embankment South West of site
Standard of protection – 1:1000 (0.1% AEP)
Asset Maintainer - Environment Agency
Asset Owner - Private

Areas Benefiting from Flood Defences

Parts of this site are within an area benefiting from flood defences, as shown on the enclosed extract of our Flood Map. Areas benefiting from flood defences are defined as those areas which benefit from formal flood defences specifically in the event of flooding from rivers with a 1% (1 in 100) chance in any given year, or flooding from the sea with a 0.5% (1 in 200) chance in any given year.

If the defences were not there, these areas would be flooded. An area of land may benefit from the presence of a flood defence even if the defence has overtopped, if the presence of the defence means that the flood water does not extend as far as it would if the defence were not there.

Historic Flood Data

We hold records of historic flood events from rivers and the sea. Information on the floods that may have affected the area local to your site are provided below and in the enclosed map (if relevant).

Flood Event Data

Dates of historic flood events in this area – February 1953

Please note that our records are not comprehensive. We would therefore advise that you make further enquiries locally with specific reference to flooding at this location. You should consider contacting the relevant Local Planning Authority and/or water/sewerage undertaker for the area.

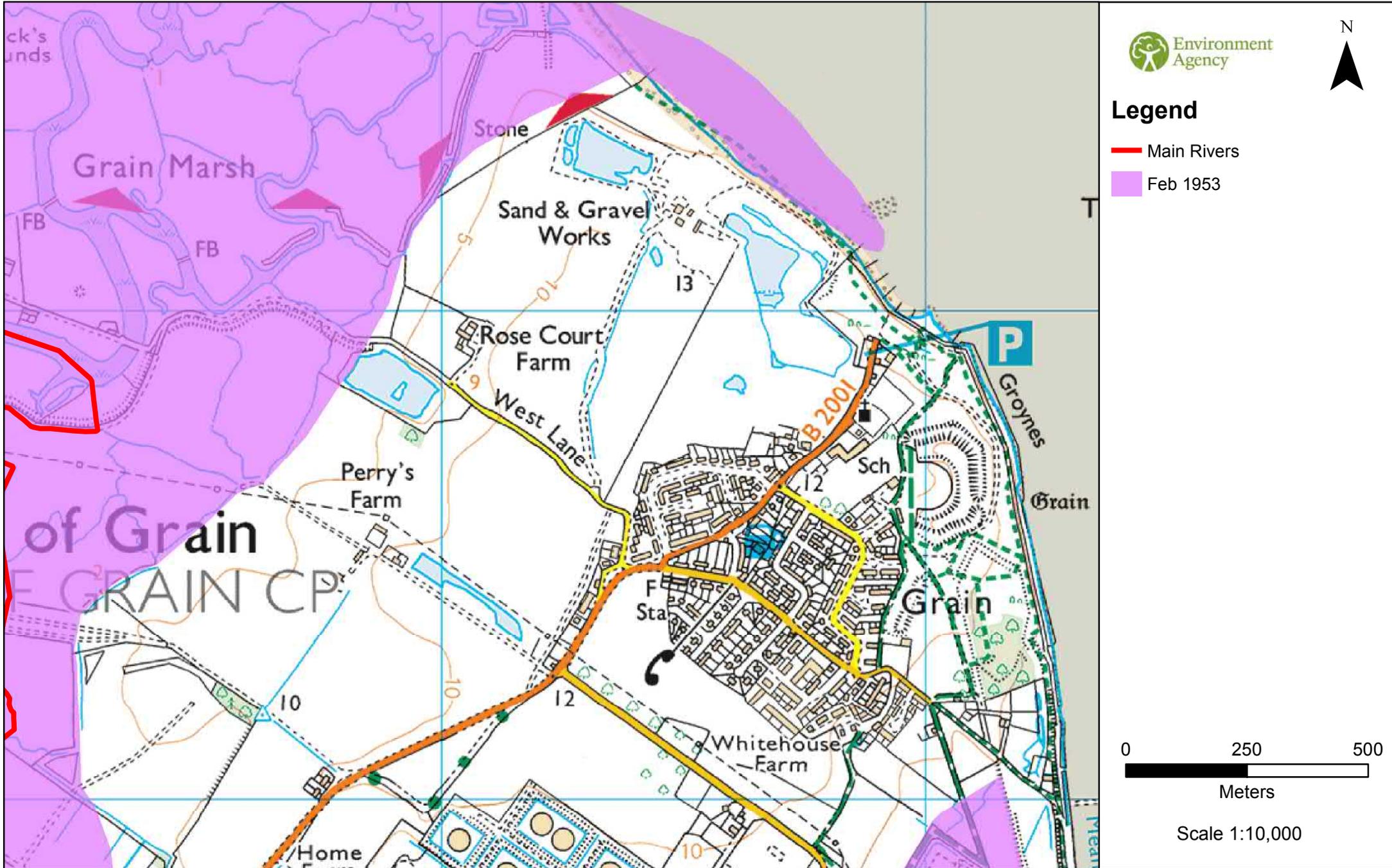
We map flooding to land, not individual properties. Our historic flood event record outlines are an indication of the geographical extent of an observed flood event. Our historic flood event outlines do not give any indication of flood levels for individual properties. They also do not imply that any property within the outline has flooded internally.

Please be aware that flooding can come from different sources. Examples of these are:

- from rivers or the sea;
- surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system);
- overflowing or backing up of sewer or drainage systems which have been overwhelmed,
- groundwater rising up from underground aquifers

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea. However you should be aware that in recent years, there has been an increase in flood damage caused by surface water flooding or drainage systems that have been overwhelmed.

Historic Flood Extent centred on a site on the Isle of Grain, ME3 0AW
Created 05/10/2018 (Ref KSL 101725 LB)



Additional Information

Information Warning - OS background mapping

The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.

Planning advice and guidance

The Environment Agency are keen to work with partners to enable development which is resilient to flooding for its lifetime and provides wider benefits to communities. If you have requested this information to help inform a development proposal, then we recommend engaging with us as early as possible by using the pre-application form available from our website:

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Complete the form in the link and email back to kslplanning@environment-agency.gov.uk

We recognise the value of early engagement in development planning decisions. This allows complex issues to be discussed, innovative solutions to be developed that both enables new development and protects existing communities. Such engagement can often avoid delays in the planning process following planning application submission, by reaching agreements up-front. We offer a charged pre-application advice service for applicants who wish to discuss a development proposal.

We can also provide a preliminary opinion for free which will identify environmental constraints related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

Flood Risk Assessments guidance

Flood risk standing advice for applicants

In preparing your planning application submission, you should refer to the Environment Agency's Flood Risk Standing Advice and the Planning Practice Guidance for information about what flood risk assessment is needed for new development in the different Flood Zones. This information can be accessed via:

<https://www.gov.uk/flood-risk-assessment-standing-advice>

<http://planningguidance.planningportal.gov.uk/>

<https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>

<https://www.gov.uk/guidance/flood-risk-and-coastal-change>

You should also consult the Strategic Flood Risk Assessment and flood risk local plan policies produced by your local planning authority.

You should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment where one is required, but does not constitute such an assessment on its own.
2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. You should discuss surface water management with your Lead Local Flood Authority.
3. Where a planning application requires a FRA and this is not submitted or deficient, the Environment Agency may well raise an objection due to insufficient information

Surface Water

We have provided two national Surface Water maps, under our Strategic Overview for flooding, to your Lead Local Flood Authority – Medway / Kent County Council, who are responsible for local flood risk (i.e. surface runoff, ground water and ordinary watercourse), which alongside their existing local information will help them in determining what best represents surface water flood risk in your area.

Medway / Kent County Council have reviewed these and determined what it believes best represents surface water flood risk. You should therefore contact this authority so they can provide you with the most up to date information about surface water flood risk in your area.

You may also wish to consider contacting the appropriate relevant Local Planning Authority and/or water/sewerage undertaker for the area. They may be able to provide some knowledge on the risk of flooding from other sources. We are working with these organisations to improve knowledge and understanding of surface water flooding.

Annex 9A-2

Environment Agency Correspondence

Littlewood, Sarah

From: Waterman-Gay, Michelle <michelle.waterman-gay@environment-agency.gov.uk>
Sent: 07 March 2019 08:57
To: Littlewood, Sarah
Subject: RE: NeuConnect project - meeting 10/09/2018

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Sarah

Thank you for your email. I can confirm that you can design to the defended level.

Kind regards,

Michelle Waterman-Gay - Planning Advisor (Dartford, Medway, Maidstone)
Sustainable Places, Kent

kslplanning@environment-agency.gov.uk
Telephone: 020 8474 6762

Environment Agency, Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent ME19 5SH



Does your proposal have Environmental Issues or Opportunities? Speak to us Early!

If you are planning a new development, we want to work with you to make the process as easy as possible. We offer a bespoke planning advice service where you will be assigned a project manager who be a single point of contact for you from the Environment Agency, giving you detailed specialist advice within guaranteed timescales. This early engagement can significantly reduce uncertainty and delays to your project. More information can be found [here](#).

Please note – Our hourly charge is now £100 per hour plus VAT from 1st April 2018.

From: Littlewood, Sarah [mailto:sarah.littlewood@aecom.com]
Sent: 27 February 2019 14:33
To: KSLPlanning <KSLPLANNING@environment-agency.gov.uk>
Subject: RE: NeuConnect project - meeting 10/09/2018

Dear Michelle
Many thanks for your email back in November about this site on the Isle of Grain.

Regarding the following statement, "We consider the use of 600mm freeboard above the 0.5% + climate change event to be suitable", please can you clarify whether this relates to the 0.5% + climate change modelled level for the defended scenario or the undefended scenario. Apologies I didn't make this clearer in my original email. I look forward to hearing from you.

Kind regards,
Sarah

Sarah Littlewood BSc (Hons)
Senior Flood Risk Consultant – Water, Ports & Power. EMEA
Working Hours: Tues – Thurs, 8am-4pm
D +44-1256-310-419
sarah.littlewood@aeom.com

From: KSLPlanning [<mailto:KSLPLANNING@environment-agency.gov.uk>]
Sent: 16 November 2018 13:40
To: Littlewood, Sarah
Subject: RE: NeuConnect project - meeting 10/09/2018

Dear Sarah

Thank you for your email.

The current modelled scenarios modelled within the North Kent Coast model are suitable for use for this site and application. If the lifetime of the development is confirmed at 40-50 years then the 2070 climate change flood levels can be used.

We consider the use of 600mm freeboard above the 0.5% + climate change event to be suitable.

Any elements of the site located within flood zone 1 will be appropriate and will pass the sequential test. However if any elements of the development are located within flood zones 2 or 3 then the sequential test will still apply. I would suggest contacting the local authority to confirm how this needs to be addressed in the planning application.

We have no other specific requirements for the Flood Risk Assessment.

Please note that further advice may fall under our cost recovery programme. Please contact us if you would like us to review the FRA under this before submission to the local planning authority.

If you require any further information, please do not hesitate to contact me.

Michelle Waterman-Gay - Planning Advisor
Sustainable Places, Kent

kslplanning@environment-agency.gov.uk
Telephone: 020 8474 6762

Environment Agency, Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent ME19 5SH



Does your proposal have Environmental Issues or Opportunities? Speak to us Early!

If you are planning a new development, we want to work with you to make the process as easy as possible. We offer a bespoke planning advice service where you will be assigned a project manager who be a single point of contact for you from the Environment Agency, giving you detailed specialist advice within guaranteed timescales. This early engagement can significantly reduce uncertainty and delays to your project. More information can be found [here](#).

Please note – Our hourly charge is now £100 per hour plus VAT from 1st April 2018.

From: Littlewood, Sarah [<mailto:sarah.littlewood@aecom.com>]
Sent: 18 October 2018 12:40
To: KSLPlanning <KSLPLANNING@environment-agency.gov.uk>; Byne, Jon G <jon.byne@environment-agency.gov.uk>
Cc: Cramond, Tom <Tom.Cramond@aecom.com>
Subject: RE: NeuConnect project - meeting 10/09/2018

Hi Jon

I am working with Tom Cramond on the flood risk assessment work for the NeuConnect site on the Isle of Grain. As per your email below, we have received a product 4 data request through from your enquiries team. Based on the information provided we are keen to clarify a few points regarding requirements for the proposed development on the site as well as the requirements for the supporting FRA to accompany outline planning in due course. I have set out a few points for confirmation below. Please let me know if you require any clarification on would like to arrange a telecom to discuss further.

Tidal Modelling

Water levels from the North Kent Coast Modelling and Mapping Study (JBA Consulting, August 2015) have been provided to us (attached). This provides maximum flood levels in proximity to the site for a range of scenarios and time horizons. We propose to refer to this modelling to inform the site development. Given the lifetime of the development is within the region of 40-50 years, this is considered to be within the range of time horizons that have been modelled within this study with respect to climate change (to the years 2070, 2115). Please can you confirm whether you consider this appropriate, or whether there is a reason we would need to undertake additional modelling to inform development at this site?

Freeboard

Please can you confirm the freeboard requirements that you would be seeking on this site? We are currently assuming 600mm above the 0.5% AEP event including climate change for the lifetime of the development.

Sequential Test

The site is located in Flood Zone 1 and as such is considered to satisfy the requirements of the NPPF flood risk Sequential Test. Please can you confirm that you agree with this position for the purposes of the FRA Report.

Lastly, are there any requirements you would be seeking within the FRA specific to this site or area which we should be aware of at this stage?

I look forward to hearing from you.

Kind regards

Sarah

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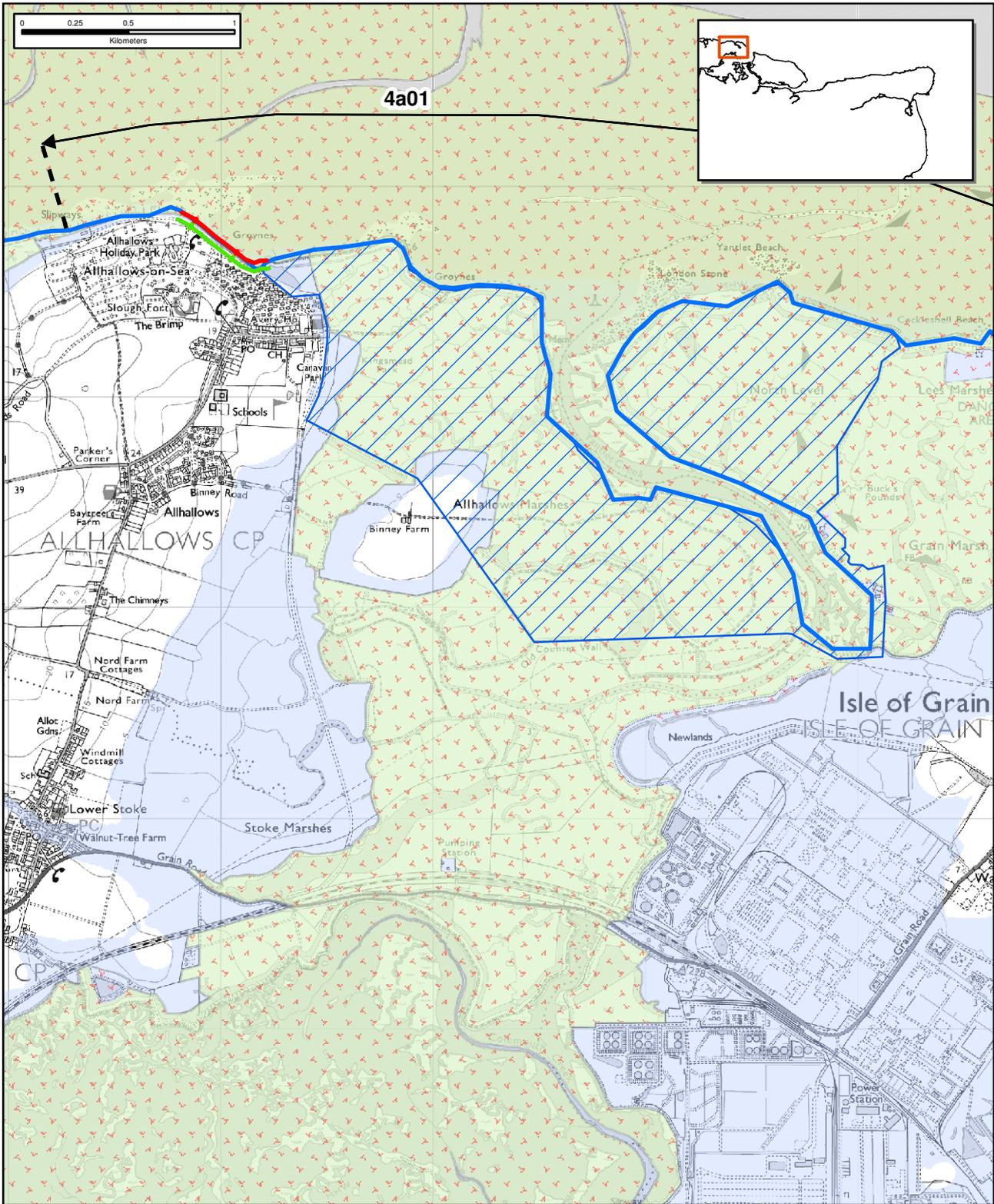
My working week is Tuesday - Thursday

Annex 9A-3

Extract from Isle of Grain to South Foreland Shoreline Management Plan Review

Isle of Grain to South Foreland Shoreline Management Plan

Policy Unit 4a 01: Allhallows-on-Sea to Grain - Map 1 of 2



Policy

From Present Day:	Medium-Term:	Long-Term:
Hold the Line	Managed Realignment	Managed Realignment

Erosion Lines

- 0-20 year erosion
- 20-50 year erosion
- 50-100 year erosion

- Policy Unit Boundary
- Current shoreline



Indicative realignment extent



2005 Indicative floodplain © Environment Agency

Environmental/Cultural Heritage

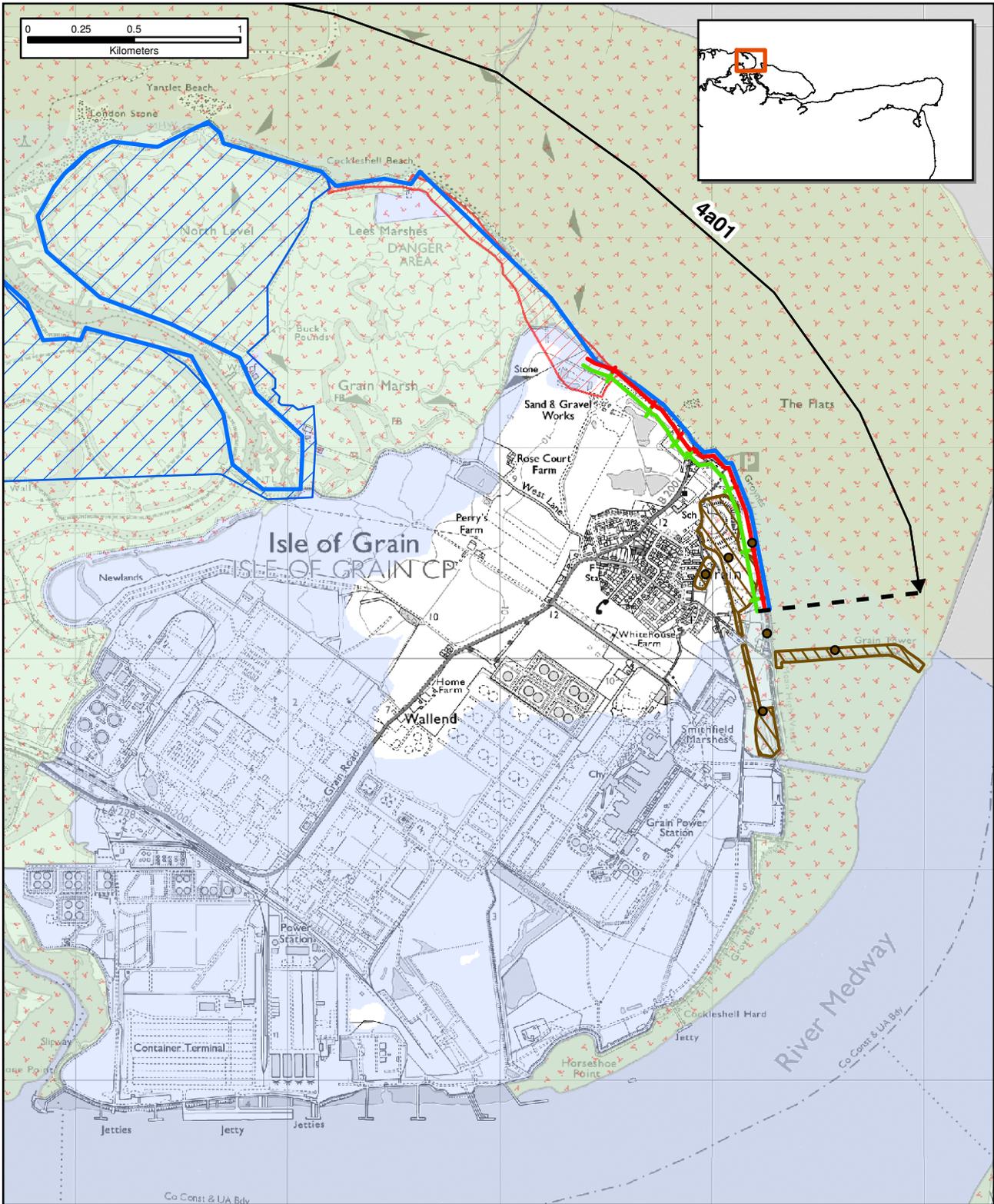
National Nature Conservation Designation

International and National Nature Conservation Designation

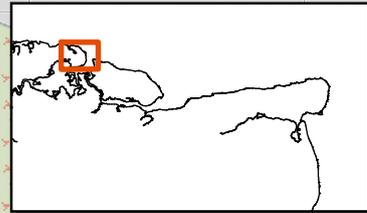
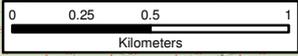
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Isle of Grain to South Foreland Shoreline Management Plan

Policy Unit 4a 01: Allhallows-on-Sea to Grain - Map 2 of 2



4a01



Policy

From Present Day:	Medium-Term:	Long-Term:
Hold the Line	Managed Realignment	Managed Realignment

Erosion Lines

- 0-20 year erosion
- 20-50 year erosion
- 50-100 year erosion

- Policy Unit Boundary
- Current shoreline



Indicative realignment extent



2005 Indicative floodplain © Environment Agency

Environmental/Cultural Heritage

- National Nature Conservation Designation
- International and National Nature Conservation Designation
- Important Heritage Sites (Scheduled Monuments)

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Location reference:	Allhallows-on-Sea to Grain
Policy Unit reference:	4a01

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

Allhallows-on-Sea to Grain marks the western extremity of the SMP frontage and marks the interface between the open coast and the Medway Estuary (Policy Unit E4 01: Grain Tower to Colemouth Creek – Medway Estuary and Swale SMP. The preferred policies for the estuary unit are Hold the Line in the short, medium and long terms).

In the short term the plan is to continue protecting the low lying assets, which include properties, roads, agricultural land and coastal grazing marsh. However, in the medium and long term the plan is to realign the defences, to realise potential environmental, engineering and coastal process benefits. Under rising sea levels it is anticipated that it will become increasingly difficult to defend the shoreline and maintain a beach on this frontage, due to coastal squeeze and a general lack of natural sediment inputs. This would result in a need for very substantial hard defences, if the current alignment were to be held in the long-term. Managed realignment would avoid the need for such defences, possibly creating cost savings and environmental enhancement. No specific realignment position has been defined under the SMP, only an indicative extent. There is potential for loss of buried unknown heritage with managed realignment in the latter two epochs. This approach would involve the managed loss of assets; however it is intended that the villages of Allhallows and Grain, and the electricity / railway line would be protected.

The marshland is a designated freshwater habitat and its loss needs to be compensated for. Delaying realignment until the 2nd epoch will give time for compensatory habitat to be established and allow for consistency with the TE2100 strategy. Although the hinterland varies, the coastal processes are consistent along the unit and treating this frontage as a single unit is the most appropriate way forward.

Preferred policies to implement Plan:

From present day: The present day policy for Allhallows-on-Sea to Grain is to **hold the line** by maintaining existing defence structures and management practises. This will ensure that current flood protection measures will remain in place.

Medium-term: In the medium term, if the socio-economic, environmental and technical benefits are confirmed, then it will be appropriate to implement a change of policy to **managed realignment**, at a set-back position and allowing the current shoreline position to migrate landwards. A policy of managed realignment will allow some inundation and erosion (of the slopes at Grain) and a degree of natural coastal processes seawards of the realigned defence as well as reduce

Location reference: Allhallows-on-Sea to Grain

Policy Unit reference: 4a01

the probability of uncontrolled large scale flooding.

No specific realignment position has been identified for the SMP. However, any set back could involve the loss of built assets, and could potentially include properties, roads, agricultural land and freshwater habitat. Realignment would create a coast that will not require ever increasing expenditure to maintain in the coming centuries, together with the creation of important brackish and saline habitats, as well as coastal process benefits i.e. reducing the impact of coastal squeeze.

The loss of the designated freshwater habitats would normally require mitigation measures to be implemented, and this aspect will require more detailed appraisal if it is still required in the long term.

Long-term:

Providing the socio-economic, environmental and technical benefits have been confirmed then the long-term policy for Allhallows-on-Sea to Grain is a continuation of **managed realignment**. This policy will continue to deliver technical and environmental benefits and eliminate / reduce the risk of uncontrolled large scale flooding.

Depending on the realignment extent the shoreline has the potential to reach a position more in keeping with its natural form. As such, providing sediment supply is sufficient to keep pace with sea level rise, a fronting beach and in the vicinity of Yantlet Creek, mudflats and saltmarsh, could be maintained.

Note: The amount of realignment and subsequent flood (spatial) extent implemented along this frontage, has the potential to (slightly) increase tidal levels in the upstream sections of the Thames Estuary.

Location reference:	Allhallows-on-Sea to Grain (south)					
Policy Unit reference:	4a01					
IMPLICATIONS OF THE PLAN FOR THIS LOCATION						
Time Period	Management Activities	Property, Built Assets and Land Use	Landscape	Nature Conservation	Historic Environment	Amenity and Recreational Use
2025	No change from the current management practises, construction of a realigned flood defence structure could take place during this epoch.	No built assets will be at risk during this epoch.	The current landscape will be maintained.	Current habitats will be maintained. Constructing a realigned defence structure will disturb the existing habitats.	Existing heritage assets will be maintained. Defence construction may affect heritage assets.	Current amenity usage maintained.
2025 – 2055	Construction / maintenance of a realigned flood defence structure. Current shoreline defences will be allowed to fail.	Some built assets and land anticipated to be at risk, the extent depends upon the position of the realigned defence.	The current landscape will change, giving way to an increasingly natural landscape.	Some freshwater areas give way to saline habitats.	Some unknown heritage assets could be at risk and will therefore need recording and / or relocating.	Improving the landscape and increasing the habitat variety could lead enhance the amenity use.
2055 – 2105	Maintain the realigned flood defence.	Some built assets and land anticipated to be at risk, the extent depends upon the position of the realigned defence.	An increasingly natural landscape will continue to develop.	Further freshwater areas give way to saline habitats. Saline habitats will establish themselves.	Some unknown heritage assets could be at risk and will therefore need recording and / or relocating.	Improving the landscape and increasing the habitat variety could lead enhance the amenity use.

