FENWICK SOLAR FARM

Fenwick Solar Farm
EN010152

Environmental Statement

Volume III Appendix 9-3: Flood Risk Assessment

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Revision History

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Prepared for:
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Executive Summary

ES1 This Flood Risk Assessment (FRA) has been prepared as part of an application for a Development Consent Order (DCO Application) for Fenwick Solar Farm (the Scheme). The Scheme comprises the construction, operation and maintenance, and decommissioning of a solar photovoltaic (PV) electricity generating facility with a total capacity exceeding 50 megawatts (MW) together with energy storage (referred to as the Battery Energy Storage System (BESS)) and an export connection to the National Grid via the Existing National Grid Thorpe Marsh Substation.

ES2 The Scheme is proposed to be located within the administrative area of the City of Doncaster Council. A Grid Connection Corridor is proposed with a point of connection at the Existing National Grid Thorpe Marsh Substation. Due to its proposed generating capacity being above 50 MW the Scheme is classified as a Nationally Significant Infrastructure Project (NSIP) and requires a DCO under the Planning Act 2008.

ES3 The FRA reports on the assessment of the risk of flooding to and from the Scheme and the potential impact of the Scheme on flooding mechanisms which affect third party property and land. The FRA has been produced in accordance with regulation 5(2)(e) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, the National Policy Statement (NPS) for Energy EN-1, NPS for Renewable Energy EN-3 (November 2023), NPS for Electricity Networks Infrastructure EN-5 (November 2023) and the National Planning Policy Framework (NPPF). The FRA informs **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1].**

ES4 The Scheme is to be located on land shown on **ES Volume II Figure 1-2: Site Boundary Plan [EN010152/APP/6.2].** The Scheme comprises the Solar PV Site, Grid Connection Corridor and Site Access as shown on **ES Volume II Figure 1-3: Elements of the Site [EN010152/APP/6.2]**. The land required for these elements is collectively referred to as the Site, and the Site boundary is referred to as the Order limits.

ES5 Consultation with the Environment Agency, City of Doncaster Council and the relevant Internal Drainage Boards has been undertaken as part of the assessment set out in the FRA. The assessment covers both the construction and operation and maintenance phases of the Scheme.

ES6 The assessment has been split into two separate parts due to the differing nature of elements of the Scheme: (1) Solar PV Site; and (2) Grid Connection Corridor.

Solar PV Site

ES7 The majority of the south and west areas of the Solar PV Site are located within Flood Zone 1. The north and east areas of the Solar PV Site are located within Flood Zones 2 and 3 associated with the River Went (Main River) and Fleet Drain (Ordinary Watercourse). Some areas of Flood Zone 3 within the Solar PV Site are shown to be in areas where there is a reduction in risk of flooding from rivers and the sea due to defences.

ES8 The BESS Area and On-Site Substation will be located within Flood Zone 1. Some Field Stations will be located within Flood Zone 2 and some Solar PV Panels will be located within areas of Flood Zone 2 and 3. On-Site Cables will be required to connect the Solar PV Panels and string inverters which will typically be above ground level (along a row of racks fixed to the Solar PV Mounting Structure or fixed to other parts of nearby components). All other On-Site Cables will be underground.

ES9 To further inform flood risk to the Solar PV Site, hydraulic models were received from the Environment Agency and a new hydraulic model was created of the River Went, Fleet Drain and Fleet Common Drain. The results from the hydraulic modelling have been used to inform the design of any panels located within the Flood Zone 3 extent, allowing for an appropriate freeboard above the design flood event. While some panels are located within Flood Zone 3, all Field Stations and On-Site Substation will be located outside of Flood Zone 3.

ES10 As part of the River Went hydraulic modelling, breach modelling was undertaken at two locations, one at the location of the River Went outfall and one along the left bank of the River Don near Trumfleet, to understand the flood risk to the Solar PV Site if there was failure of defences. This shows that the site is at risk of flooding during a breach event, in particular from the River Don breach. An Emergency Response Plan will be secured through the Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP) which will provide details of the response to an impending flood including an evacuation plan.

ES11 In relation to surface water flooding, the risk to the majority of the Solar PV Site is generally very low. There are isolated areas at low to high risk of flooding which are likely associated with areas of low topography. The map also shows areas at low to high risk associated with smaller ordinary watercourses and/or local land drains.

ES12 The British Geological Survey (BGS) Groundwater Flood Map shows that the Solar PV Site is located in an area where there is no or limited potential for groundwater flooding to occur and therefore the risk of groundwater flooding to the Solar PV Site is considered to be low.

ES13 The risk of flooding from sewers is considered to be very low due to the Solar PV Site being located within arable fields with no existing sewerage assets in these areas. The risk of flooding from artificial sources is also considered to be low.

Grid Connection Corridor

ES14 The Grid Connection Corridor is largely located within areas of Flood Zone 3 with smaller areas of Flood Zone 2 along its central section. Flood Zone 2 and 3 in this area is associated with the River Don. Approximately 0.7km of the Grid Connection Corridor is located within Flood Zone 1 towards its northern extent. Some of the Flood Zone 3 area along the Grid Connection Corridor is located within an area with a reduction in risk of flooding from rivers and the sea due to defences. The Existing National Grid Thorpe Marsh Substation is located within Flood Zones 2 and 3 with a small portion located within an area with a reduction in risk of flooding from rivers and the sea due to defences.

ES15 The Grid Connection Corridor intersects the flood defence embankments along the Thorpe Marsh Drain. The Grid Connection Corridor crosses the Thorpe Marsh Drain Main River and five ordinary watercourses (Mill Dyke, Wrancarr Drain, Engine Dyke under Marsh Road, Engine Dyke parallel to Thorpe Marsh Drain and Hawkehouse Green Dyke) which pose a fluvial flood risk.

ES16 The Grid Connection Corridor runs parallel to the tidally influenced River Don at is southern extent. However, the Grid Connection Cables will be buried and therefore unlikely to be impacted from tidal sources.

ES17 The risk of flooding from surface water to the land within the Grid Connection Corridor is generally very low. There are isolated areas at low to high risk of flooding which are likely associated with areas of low topography. The map also shows areas at low to high risk associated with smaller ordinary watercourses and/or local land drains which the Grid Connection Corridor crosses.

ES18 The BGS Groundwater Flood Map shows that the northern part of the Grid Connection Corridor is in an area where there is no potential for groundwater flooding to occur. The middle stretch of the Grid Connection Corridor is in an area where there is ‘limited potential’ or ‘potential for groundwater flooding of property situated below ground level’. The southern stretch of the Grid Connection Corridor is located in an area where there is potential for groundwater flooding of property situated below ground and potential for groundwater flooding to occur at surface. Therefore there is considered to be low risk of groundwater flooding to the southern stretch of the land within the Grid Connection Corridor, medium risk to the middle stretch and high risk to the southern stretch.

ES19 The risk of flooding from sewers is also considered to be very low due to the land within the Grid Connection Corridor being located within arable fields with no existing sewerage assets in the Grid Connection Corridor. The risk of flooding from artificial sources is considered to be negligible.

Mitigation

ES20 The assessment of flood risk from the construction and decommissioning phases of the Scheme has concluded that with embedded mitigation, the risk to other receptors from all sources of flooding would be low. To prevent an increase in flood risk to vulnerable receptors, temporary construction embedded mitigation measures will be secured through the CEMP. A **Framework CEMP [EN010152/APP/7.7]** is included in the DCO Application, and is secured within the requirements of the draft DCO **[EN010152/APP/3.1]**.

ES21 The assessment of flood risk during the operation and maintenance phase of the Scheme has concluded that with embedded mitigation, the risk to the Scheme from all sources of flooding would be low taking into account climate change. Embedded mitigation measures will be secured through the DCO as part of the OEMP to prevent an increase in flood risk to vulnerable receptors. A **Framework OEMP [EN010152/APP/7.8]** is included in the DCO Application, and is secured within the requirements of the draft DCO **[EN010152/APP/3.1]**.

Sequential and Exception Tests

ES22 A sequential approach, as presented in **Annex B**, has been applied in selecting the land for the Scheme. The Scheme has been located, as far as practicable, in areas with the lowest risk of flooding from any source and is therefore considered to pass the Sequential Test.

ES23 As some of the Scheme’s infrastructure is proposed to be located within Flood Zone 3, it is necessary to apply the Exception Test. It has been demonstrated that the Scheme would provide wider sustainability benefits to the community which outweigh flood risk, and the FRA has demonstrated that the development will be safe for its lifetime, without increasing flood risk elsewhere when considering the embedded mitigation. Therefore, the Scheme is considered to pass the Exception Test.

Summary

ES24 In summary, the Scheme is considered appropriate, meeting the requirements of the NPS EN-1 (November 2023) and the NPPF and will remain safe throughout its lifetime.

1. Introduction

1.1 Context

1.1.1 This Flood Risk Assessment (FRA) forms an appendix to the **Environmental Statement (ES) Volume I Chapter 9: Water Environment [EN010152/APP/6.1]** for Fenwick Solar Farm (the Scheme). Further information on the Scheme is included within **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**.

1.1.2 This report considers the flood risk posed to, and from the Scheme from all sources of flooding in accordance with the National Policy Statements (NPS) for Energy NPS EN-1 (November 2023) (Ref. 1), NPS EN-3 (November 2023) (Ref. 2), NPS EN-5 (November 2023) (Ref. 3), the National Planning Policy Framework (NPPF) (December 2023) (Ref. 4), supporting Planning Practice Guidance (PPG) (Ref. 5), and other relevant legislation and policy related to Development Consent Orders (DCOs). Further information on planning policy and guidance is detailed in **ES Volume III Appendix 9-1: Legislation, Policy and Guidance (Water Environment) [EN010152/APP/6.3]**.

1.2 FRA Objectives

1.2.1 The minimum requirements for FRAs, as outlined in the NPS EN-1 (November 2023) (Paragraph 5.8.15) (Ref. 1) are to:

a. be proportionate to the risk and appropriate to the scale, nature and location of the project;

b. consider the risk of flooding arising from the project in addition to the risk of flooding to the project;

c. take the impacts of climate change into account, across a range of climate scenarios, clearly stating the development lifetime over which the assessment has been made;

d. be undertaken by competent people, as early as possible in the process of preparing the proposal;

e. consider both the potential adverse and beneficial effects of flood risk management infrastructure, including raised defences, flow channels, flood storage areas and other artificial features, together with the consequences of their failure and exceedance;

f. consider the vulnerability of those using the site, including arrangements for safe access and escape;

g. consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and include information on flood likelihood, speed-of-onset, depth, velocity, hazard and duration;

h. identify and secure opportunities to reduce the causes and impacts of flooding overall, making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management;

i. consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes;

j. include the assessment of the remaining (known as ‘residual’) risk after risk reduction measures have been taken into account and demonstrate that these risks can be safely managed, ensuring people will not be exposed to hazardous flooding;

k. consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of the project may affect drainage systems;

l. detail those measures that will be included to ensure the development will be safe and remain operational during a flooding event throughout the development’s lifetime without increasing flood risk elsewhere;

m. identify and secure opportunities to reduce the causes and impacts of flooding overall during the period of construction; and

n. be supported by appropriate data and information, including historical information on previous events.

1.2.2 The principal objectives of the FRA, taking into account the above, are to:

a. Identify potential sources of flooding, including rivers, watercourses, surface water flooding, groundwater flooding, flooding from sewer systems and other sources of flooding, relevant to the Scheme;

b. Establish the risk of flooding in relation to the Scheme;

c. Determine the effects of the Scheme on flooding elsewhere either through displacement of floodwaters or increased runoff; and

d. Suggest appropriate flood mitigation measures for the Scheme, including a strategy for management of surface water runoff following the principles of SuDS.

1.3 Consultation

1.3.1 Statutory consultation was undertaken at the Preliminary Environmental Information (PEI) Report stage and a Preliminary FRA was produced. This consultation has continued with the Environment Agency and Lead Local Flood Authorities (LLFAs) during the production of this FRA. The following stakeholders have provided comment on matters relating to flood risk and drainage:

a. Doncaster Council (LLFA);

b. Yorkshire Water;

c. Danvm Drainage Commissioners Internal Drainage Board (IDB); and

d. The Environment Agency.

1.3.2 Further details of the consultation undertaken are presented in **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**.

1.3.3 The comments received have been considered in revisions to the Scheme layout in conjunction with other topics. Additional information regarding the consultation process and content of each statutory consultee’s comments, and how the Applicant has had regard to these comments, can be found in the **Consultation Report [EN010152/APP/5.1]** submitted as part of the DCO Application.

1.3.4 The Environment Agency and LLFAs provided hydraulic modelling data and additional hydraulic modelling has been undertaken to inform this FRA. The methodology of the hydraulic modelling undertaken as part of this FRA was agreed with the Environment Agency. The hydraulic modelling report (**Annex A** of this FRA) and model data was sent to the Environment Agency for review and approval in advance of submission of the DCO Application and their comments and approval are pending.

2. The Scheme and Site Description

2.1 The Scheme

2.1.1 The Scheme is a proposed solar farm which will generate renewable energy for exporting to the National Grid.

2.1.2 The Scheme will comprise the construction, operation and maintenance, and decommissioning of a solar photovoltaic (PV) electricity generating facility with a total capacity exceeding 50 megawatts (MW) together with energy storage (referred to as the Battery Energy Storage System (BESS)) and an export connection to the National Electricity Transmission System (NETS) via the Existing National Grid Thorpe Marsh Substation. The Scheme will be located within the Order limits (as described in Section 2.2) and will be the subject of the DCO Application. The Order limits include a section of highway at the junction of the A19 and Station Road in the town of Askern to allow for abnormal indivisible load (AIL) vehicle access and escort. No development is planned along the AIL route, therefore this has not been considered as part of the FRA. Further information on the Scheme is included within **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**.

2.2 Location

2.2.1 The Order limits, shown on **ES Volume II Figure 1-2: Site Boundary Plan [EN010152/APP/6.2]**, identify the maximum extent of land anticipated to be acquired or used for the construction, operation and maintenance, and decommissioning phases of the Scheme. The Site is a collective term for all land within the Order limits.

2.2.2 The Site comprises an area of approximately 509 hectares (ha) located within the administrative area of the City of Doncaster Council.

2.2.3 The Site comprises the Solar PV Site, Grid Connection Corridor and the Existing National Grid Thorpe Marsh Substation. The rationale for selecting the Site is described in **ES Volume I Chapter 3: Alternatives and Design Evolution [EN010152/APP/6.1]**.

2.2.4 The Site comprises of land which is predominantly agricultural in nature. Landscape features immediately surrounding the Solar PV Site comprise largely agricultural fields and small rural villages, including Fenwick, Moss and Sykehouse, as well as the hamlet of Topham.

2.2.5 A full description of the Site is contained within **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**.

3. Legislation and Planning Policy

3.1 Introduction

3.1.1 Legislation, planning policy and guidance relating to flood risk and pertinent to the Scheme is set out in the following sections.

3.2 National Planning Policy

Overarching National Policy Statement for Energy (EN-1)

3.2.1 NPS EN-1 (November 2023) (Ref. 1) sets out the Government's policy for the development of nationally significant infrastructure projects (NSIPs) which must be authorised by a DCO.

3.2.2 The objectives of this FRA are in line with Paragraph 5.8.15 of NPS EN-1 (November 2023) which are outlined in Paragraph 1.2.1 above.

3.2.3 Paragraph 5.8.18 of NPS EN-1 (November 2023) recommends that applicants should arrange pre-application discussions with the Environment Agency, and, where relevant, other bodies such as LLFAs, IDBs, sewerage undertakers, navigation authorities, highways authorities and reservoir owners and operators. Discussions should identify the likelihood and possible extent and nature of the flood risk, help scope the FRA, and identify the information that will be required by the Secretary of State to reach decision on the application when it is submitted. This FRA is compliant with Paragraph 5.8.18 of NPS EN-1 (November 2023), as consultation has been undertaken with relevant stakeholders.

3.2.4 NPS EN-1 (November 2023) states at Paragraph 5.8.6 to 5.8.8 that the "*aims of planning policy on development and flood risk are to ensure that flood risk from all sources of flooding is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to steer new development to areas with the lowest risk of flooding. [5.8.7] Where new energy infrastructure is, exceptionally, necessary in flood risk areas (for example where there are no reasonably available sites in areas at lower risk), policy aims to make it safe for its lifetime without increasing flood risk elsewhere and, where possible, by reducing flood risk overall. It should also be designed and constructed to remain operational in times of flood. [5.8.8] Proposals that aim to facilitate the relocation of existing energy infrastructure from unsustainable locations which are or will be at unacceptable risk of flooding, should be supported where it would result in climate-resilient infrastructure.*" This FRA is compliant with Paragraphs 5.8.6 to 5.8.8 of NPS EN-1 (November 2023), as it documents how flood risk has been considered in all planning stages and describes how the Scheme will remain safe for its lifetime without increasing flood risk elsewhere.

3.2.5 NPS EN-1 (November 2023) states at Paragraph 5.8.9 that "*If, following application of the Sequential Test, it is not possible, (taking into account wider sustainable development objectives), for the project to be located in areas of lower flood risk the Exception Test can be applied as defined in https://www.gov.uk/guidance/flood-risk-and-coastal-change#table2. The test provides a method of allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available*."

This FRA is compliant with Paragraph 5.8.9 of NPS EN-1 (November 2023), as the Sequential and Exception Tests have been applied as described in Section 8.

3.2.6 NPS EN-1 (November 2023) states at Paragraph 5.8.10 that "*The Exception Test is only appropriate for use where the Sequential Test alone cannot deliver an acceptable site. It would only be appropriate to move onto the Exception Test when the Sequential Test has identified reasonably available, lower risk sites appropriate for the proposed development where, accounting for wider sustainable development objectives, application of relevant policies would provide a clear reason for refusing development in any alternative locations identified. Examples could include alternative site(s) that are subject to national designations such as landscape, heritage and nature conservation designations, for example Areas of Outstanding Natural Beauty (AONBs), [Sites of Special Scientific Interest (SSSI)] and World Heritage Sites (WHS) which would not usually be considered appropriate*." This FRA is compliant with Paragraph 5.8.9 of NPS EN-1 (November 2023), as the Sequential and Exception Tests have been applied as described in Section 8.

3.2.7 Paragraph 5.8.11 of NPS EN-1 (November 2023) states that "*Both elements of the Exception Test will have to be satisfied for development to be consented. To pass the Exception Test it should be demonstrated that:*

- *The project would provide wider sustainability benefits to the community that outweigh flood risk; and*
- *The project will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible will reduce flood risk overall."*

3.2.8 This FRA is compliant with Paragraph 5.8.11 of NPS EN-1 (November 2023), as the Exception Test has been applied in accordance with these requirements, as described in Section 8.

3.2.9 Paragraph 5.8.12 of NPS EN-1 (November 2023) states that "*Development should be designed to ensure there is no increase in flood risk elsewhere, accounting for the predicted impacts of climate change throughout the lifetime of the development. There should be no net loss of floodplain storage and any deflection or constriction of flood flow routes should be safely managed within the site. Mitigation measures should make as much use as possible of natural flood management techniques.*" This FRA is compliant with Paragraph 5.8.12 of NPS EN-1 (November 2023), as the Scheme will be designed to ensure no increase in flood risk elsewhere, accounting for climate change.

3.2.10 Paragraph 5.8.29 of NPS EN-1 (November 2023) requires a sequential approach to be applied to the layout and design of the Scheme with more vulnerable uses being located on parts of the site at lower probability and residual risk of flooding by using SuDS. This FRA is compliant with Paragraph 5.8.29 of NPS EN-1 (November 2023), as a sequential approach has been applied to the layout and design of the Scheme and SuDS have been proposed, as described in Section 7.

3.2.11 Paragraphs 5.8.41 of NPS EN-1 (November 2023) states that energy projects should not normally be consented within Flood Zone 3b or on land expected to fall within this zone within its predicted lifetime. However, it clarifies that where essential energy infrastructure has to be located in such areas, for operational reasons, they should only be consented if the Scheme will not result in a net loss of floodplain storage, and will not impede water flows. This FRA is compliant with Paragraph 5.8.41 of NPS EN-1 (November 2023) as a sequential approach has been applied to the Scheme to avoid areas at high flood risk and no development is located within Flood Zone 3b.

3.2.12 Paragraph 5.8.27 of NPS EN-1 (November 2023) states that "*the surface water drainage arrangements for any project should, accounting for the predicted impacts of climate change throughout the development's lifetime, be such that the volumes and peak flow rates of surface water leaving the site are no greater than the rates prior to the proposed project, unless specific off-site arrangements are made and result in the same net effect*". This FRA is compliant with Paragraph 5.8.27 of NPS EN-1 (November 2023), as it considers drainage for the Scheme.

3.2.13 Paragraph 5.8.28 of NPS EN-1 (November 2023) also states that it "*may be necessary to provide surface water storage and infiltration to limit and reduce both the peak rate of discharge from the site and the total volume discharged from the site. There may be circumstances where it is appropriate for infiltration facilities or attenuation storage to be provided outside the project site, if necessary through the use of a planning obligation*". This FRA is compliant with Paragraph 5.8.28 of NPS EN-1 (November 2023), as it considers drainage for the Scheme.

National Policy Statement for Renewable Energy Infrastructure NPS EN-3

3.2.14 Paragraph 2.4.11 of NPS EN-3 (November 2023) (Ref. 2) notes that "*Solar photovoltaic (PV) sites may also be proposed in low lying exposed sites. For these proposals, applicants should consider, in particular, how plant will be resilient to:*

a. Increased risk of flooding; and

b. Impact of higher temperature."

3.2.15 Paragraph 2.10.60 states "*[…] applicants will consider several factors when considering the design and layout of sites, including, proximity to available grid capacity to accommodate the scale of generation, orientation, topography, previous land – use and ability to mitigate environmental impacts and flood risk*". This FRA is compliant with Paragraph 2.10.60 of NPS EN-3 (November 2023), as design of the Scheme has considered all factors as described in Section 8.

3.2.16 Paragraph 2.10.84 notes that "*Where a Flood Risk Assessment has been carried out this must be submitted alongside the applicant's ES. This will need to consider the impact of drainage. As solar PV panels will drain to the existing ground, the impact will not, in general, be significant*." This FRA is compliant with Paragraph 2.10.84 of NPS EN-3 (November 2023), as it considers drainage for the Scheme.

3.2.17 Paragraph 2.10.154 states "*Water management is a critical component of site design for ground mount solar plants. Where previous management of the site has involved intensive agricultural practice, solar sites can deliver* *significant ecosystem services value in the form of drainage, flood attenuation, natural wetland habitat, and water quality management.*" This FRA is compliant with Paragraph 2.10.154 of NPS EN-3 (November 2023), as it considers water management as described in Section 8.

National Policy Statement for Electricity Networks Infrastructure (EN-5) (November 2023)

3.2.18 National Policy Statement for Electricity Networks Infrastructure EN-5 (NPS EN-5) (November 2023) (Ref. 3) principally concerns high voltage transmission systems and distribution systems in addition to associated infrastructure.

3.2.19 Paragraph 2.3.2 of NPS EN-5 (November 2023) explain that as climate change is likely to increase risks to the resilience of electrical infrastructure it requires applicants to "*set out to what extent the proposed development is expected to be vulnerable, and, as appropriate, how it has been designed to be resilient to:*

- *flooding, particularly for substations that are vital to the network; and especially in light of changes to groundwater levels resulting from climate change;*
- *the effects of wind and storms on overhead lines;*
- *higher average temperatures leading to increased transmission losses;*
- *earth movement or subsidence caused by flooding or drought (for underground cables).*[…]*"*

National Planning Policy Framework (NPPF)

3.2.20 The NPPF (December 2023) (Ref. 4) was first published in March 2012, superseding previous national planning policy statements and guidance. The NPPF was subsequently revised in July 2021, September 2023 and December 2023, and this FRA complies with the revised version of the NPPF (December 2023).

3.2.21 Section 14 of the NPPF (December 2023) (Ref. 4), entitled Meeting the Challenge of Climate Change, Flooding and Coastal Change (Paragraphs 157-179), sets out the requirements to assess flood risk and climate change for developments. Paragraph 175 expects "*major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate […].*"

3.2.22 NPPF (December 2023) (Ref. 4) Annex 3: Flood risk vulnerability classification classifies the Flood Risk Vulnerability of various land uses. The Scheme falls within the definition of 'Essential Infrastructure'.

3.2.23 The Flood Risk and Coastal Change Planning Practice Guidance (PPG) (Ref. 5) is referenced in footnote 214 of NPS EN-1 (November 2023) and provides guidance on application of the Sequential Test. The PPG was last updated in August 2022; this FRA complies with this and all other current national and local policy.

3.2.24 The assessment of flood risk is based on the definitions in Table 3-1 as extracted from Table 1 of the PPG (Ref. 5). Flood Zones are displayed on **ES**

Volume II Figure 9-4: Environment Agency Flood Map for Planning (Rivers and Seas) [EN010152/APP/6.2].

Table 3-1: Flood Zones

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 0.1% annual probability of river or sea flooding. (Shown as 'clear' on the Environment Agency Flood Risk Map (for Rivers and Sea) (Ref. 6) – all land outside Zones 2 and 3).
Zone 2 Medium Probability	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding. (Land shown in light blue on the Environment Agency Flood Risk Map (for Rivers and Sea)).
Zone 3a High Probability	Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea flooding. (Land shown in dark blue on the Environment Agency Flood Risk Map (for Rivers and Sea)).
Zone 3b The Functional Floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: • Land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • Land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments (SFRA) areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Environment Agency Flood Risk Map (for Rivers and Sea).

The Sequential Test and Exception Test

3.2.25 NPS EN-1 (November 2023) and the NPPF (December 2023) (Ref. 4) set out the details of the Sequential Test, which is a risk-based test that should be applied at all stages of development.

3.2.26 All plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:

a. Applying the sequential test and then, if necessary, the exception test as set out below;

b. Safeguarding land from development that is required, or likely to be required, for current or future flood management;

c. Using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding (making as much use as possible of natural flood management techniques); and

d. Where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.

3.2.27 The aim of the Sequential Test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the development in areas with a lower risk of flooding. The SFRA will provide the basis for applying this test. The sequential test approach should be used in areas known to be at risk now or in the future from any forms of flooding.

3.2.28 If it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the Exception Test may have to be applied. The need for the Exception Test will depend on the potential vulnerability of the site and of the development proposed, (in line with the Flood Risk Vulnerability Classification set out in Annex 3 of the NPPF (December 2023)). Table 3-2 below reproduces the flood risk vulnerability and flood zone compatibility, as set out in Table 2 of the PPG (Ref. 5). It does not show the application of the Sequential Test which should be applied first to guide development to the lowest flood risk areas.

Table 3-2: Flood Risk Vulnerability and Flood Zone Compatibility

Flood Zone	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a	Exception Test Required	×	Exception Test Required	✓	✓
Zone 3b (functional floodplain)	Exception Test Required	×	×	×	✓

✓ Exception test is not required

× Development should not be permitted

Flood Zones that the Scheme sits within (shaded)

3.2.29 The NPPF (December 2023) states in Paragraph 170 that "*To pass the exception test it should be demonstrated that:*

a. the development would provide wider sustainability benefits to the community that outweigh the flood risk; and

b. the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall".

3.2.30 The NPPF (December 2023) provides at Paragraph 171 that both elements of the Exception Test should be satisfied for development to be allocated or permitted.

3.3 Local Planning Policy

Local Plan

3.3.1 The Doncaster Local Plan (Ref. 7) was adopted in 2021 and sets out how Doncaster Borough will grow and develop from 2015 to 2035. Within the document, the following policies are relevant to flood risk and drainage:

Policy 56: Drainage

"Development sites must incorporate satisfactory measures for dealing with their drainage impacts to ensure waste water and surface water run-off are managed appropriately and to reduce flood risk to existing communities. Proposals will be supported therefore in line with the following requirements:

a. There is adequate means of foul sewage disposal and treatment or that capacity can be made available in time to serve the development.

b. They will not increase flood risk on site and ensure no flooding to land or buildings elsewhere.

c. They achieve a reduction in surface water run off on brownfield sites, and no increase on existing rates for greenfield sites.

d. They secure the removal of culverting and avoid building over a culvert or new culverting of watercourses and a 10 metre buffer zone is left free from development from the water's edge.

e. They make use of Sustainable Drainage Systems unless it can be shown to be technically unfeasible.

f. They dispose of surface water appropriately according to the following networks in order of preference:

1. *to an infiltration-based system wherever possible (such as soakaways).*
2. *discharge into a watercourse with the prior approval of the landowner and navigation authority (following treatment where necessary).*
3. *discharge to a public water sewer or highway drain.*

Policy 57: Flood Risk Management

A. "All development proposals will be considered against the NPPF, including application of the sequential test and, if necessary, the exception test.

B. The extent and detailed boundaries of the functional flood plain (flood zone 3b) are identified through the Council's Strategic Flood Risk Assessment, in agreement with the Environment Agency, where national policy will be applied.

C. All windfall development proposals outside of Development Allocations in Flood Zones 2 and 3a will be supported as follows:

[…]

All other proposals: will normally require a borough-wide area of search unless a case can be made to narrow the search area due to certain locational needs of the development or specific catchment requirements.

D. The Council's Strategic Flood Risk Assessment identifies a number of residual flood risk areas and details development planning advice for these which should be considered when looking to develop in these areas. The Council will ensure it keeps its evidence base on flood risk up to date, including commissioning a Level 2 Strategic Flood Risk Assessment at the earliest opportunity, so that proposals outside of Development Allocations have the best available evidence on which to prepare their own site specific flood risk assessments and appropriate mitigation and to assist with successful pass of the sequential and exception Tests".

3.3.2 In respect of Policy 57, the Scheme is captured as an 'other proposal' as it does not fall within the other categories listed withing the Policy, being Housing, Offices, Retail and Mixed Use activities.

Strategic Flood Risk Assessment

3.3.3 The Doncaster Level 1 SFRA (Ref. 8) was published in 2015 and is part of the evidence base for the Local Plan. The Doncaster SFRA assesses flood risk from all sources within the local authority area. Information, where applicable, has been extracted from the Doncaster SFRA to inform the risk of flooding within this FRA, as documented in Section 5.

Local Flood Risk Management Strategy

3.3.4 As LLFA, City of Doncaster Council has the responsibility to produce and maintain a Local Flood Risk Management Strategy (LFRMS). The Doncaster LFRMS (Ref. 9) is currently being consulted on and covers the period 2023–2029. The LFRMS considers all local sources of flooding including from surface water, groundwater and ordinary watercourses. Information, where applicable has been extracted from the LFRMS to inform the risk of flooding within this FRA, as documented in Section 5.

South Yorkshire Interim Local Guidance for Sustainable Drainage Systems

3.3.5 The South Yorkshire Interim Local Guidance for Sustainable Drainage Systems (Ref. 10) has been prepared by a number of local authorities (Barnsley, Doncaster, Rotherham and Sheffield) to provide developers guidance for local standards for the South Yorkshire LLFAs and promotes the use of SuDS.

3.4 Climate Change

3.4.1 The design life of the Scheme is expected to be 40 years, currently anticipated to operate from 2030 to 2070. For the purposes of this FRA it is anticipated that the Scheme will be decommissioned 40 years after final commissioning, i.e. in 2070, and the assessment of flood risks which may arise from the impacts of climate change has therefore been considered for this period.

Peak River Flow Allowances

3.4.2 The Environment Agency provide peak river flow allowances that show the anticipated changes to peak flow for each management catchment (Ref. 11). The range of allowances is based on percentiles, which describe the proportion of possible scenarios that fall below an allowance level. For example, an allowance based on the 50th percentile is exceeded by 50% of the scenarios in the range. An allowance value is provided for the 50th, 70th and 95th percentile and management catchment across three epochs: 2020s, 2050s and 2080s.

3.4.3 The Scheme is located within the Don and Rother Management Catchment, where the peak river flow allowances are presented in Table 3-3.

Table 3-3: Don and Rother Management Catchment Peak River Flow Allowances

Epoch	Central (50%)	Higher Central (70%)	Upper (95%)
2020s	11%	15%	25%
2050s	15%	21%	36%
2080s	28%	38%	60%

3.4.4 Guidance from the Environment Agency states that for 'Essential Infrastructure' developments in Flood Zone 2 or 3a the Higher Central allowance should be used. As the lifetime of the development is 40 years, the 2050 epoch would need to be considered. This results in a necessary allowance of 21%. As a conservative approach, the 2080 epoch higher central allowance of 38% has been applied as the design event within the hydraulic modelling, as agreed with the Environment Agency.

Peak Rainfall Intensity Allowances

3.4.5 The Environment Agency provides allowances for peak rainfall intensity (Ref. 11). The range of allowances is based on percentiles, which describe the proportion of possible scenarios that fall below an allowance level. An allowance value is provided for the 50th (Central) 95th (Upper End) percentiles for 1% Annual Exceedance Probability (AEP) and 3.3% AEP events.

3.4.6 The Scheme is located within the Don and Rother Management Catchment, where the peak rainfall intensity allowances are applicable, as presented in Table 3-4 and Table 3-5.

Table 3-4: Don and Rother Management Catchment Peak Rainfall Intensity Allowances (1% AEP Event)

Epoch	Central (50%)	Upper (95%)
2050s	20%	40%
2070s	25%	40%

Table 3-5: Don and Rother Management Catchment Peak Rainfall Intensity Allowances (3.3% AEP Event)

Epoch	Central (50%)	Upper (95%)
2050s	20%	35%
2070s	25%	35%

3.4.7 Guidance from the Environment Agency states that for developments with a lifetime between 2061 and 2100, the Central allowance should be used for the 2070s epoch for both the 1% AEP and 3.3% AEP events. This results in a necessary allowance of 25% for both events. The **Framework Drainage Strategy** (**ES Volume III Appendix 9-4 [EN010152/APP/6.3]**) for the

Scheme has been designed to account for the 1% AEP event plus 40% climate change for resilience.

Credible Maximum Scenario

3.4.8 In line with Environment Agency guidance (Ref. 11), NSIPs such as power stations and power lines, flood risk should also be assessed for a credible maximum climate change scenario. The credible maximum scenario includes:

a. The H++ climate change allowance for sea level rise (not applicable for the Scheme).

b. The Upper end allowance for peak river flow (60% for Don and Rother Management Catchment for the 2080s epoch).

c. The sensitivity test allowances for offshore wind speed and extreme wave height (not applicable for the Scheme).

d. An additional 2 mm for each year on top of sea level rise allowance from 2017 for storm surge (not applicable for the Scheme).

3.4.9 The Credible Maximum Scenario sensitivity assessment has been undertaken as part of the FRA.

4. Assessment of Flood Risk Methodology

4.1.1 As stated in Section 1.3.4, the methodology for the hydraulic modelling was agreed with the Environment Agency.

4.1.2 As outlined above at Section 3.2.20 and Section 3.2.21 the NPPF (December 2023) and NPS EN-1 (November 2023) require that all potential sources of flooding that could affect the Scheme are considered. This section of the FRA assesses the flood risk posed to the Site from: rivers and the sea, directly from rainfall on the ground surface, rising groundwater, overwhelmed sewers and drainage systems, from reservoirs, canals, lakes and other artificial flood sources.

4.1.3 Whilst developments are typically assessed as a whole site, this assessment is split into two separate assessment sections due to the differing nature of these elements:

a. Solar PV Site (including the BESS Area and On-Site Substation); and

b. Grid Connection Corridor (including the Existing National Grid Thorpe Marsh Substation).

4.1.4 Flood risk from all sources is being assessed against the maximum extent of land that is expected to be included within the DCO Application for the Scheme (see **ES Volume II Figure 1-2: Site Boundary Plan [EN010152/APP/6.2]**). These sources are:

a. Fluvial – flooding occurs when the capacity of a river is exceeded either due to high flows from the catchment draining into the river or a combination of high flows and high tides which causes the river to overflow or overtop the banks;

b. Tidal – flooding occurs during extreme high tide and/or storm surge events which may cause wave overtopping or the unlikely event of a breaching scenario of existing tidal defences. High water levels within tidally influenced estuaries and rivers may also contribute to tidal flooding;

c. Surface water – Surface water runoff is defined as water flowing over the ground that has not yet entered a drainage channel or similar. An intense period of rainfall which exceeds the infiltration capacity of the ground usually results in surface water runoff and can also occur when the capacity of the sewer or drainage network is exceeded. Typically, runoff occurs on sloping land or where the ground surface is relatively impermeable. The ground can be impermeable, either naturally through the soil type or geology, or unnaturally due to development, which places large areas of impervious material over the ground surface (e.g. paving and roads);

d. Sewer – Sewer flooding can occur because of infrastructure failure, for example blocked sewers or failed pumping stations. It can also occur when combined sewer systems surcharge due to the volume or intensity of rainfall exceeding the capacity of the sewer, or if the system becomes blocked by debris or sediment;

e. Groundwater – flooding occurs when the natural level of water stored within the ground rises above local ground level. This can result in deep and long-lasting flooding of low lying or below ground areas such as underpasses and basements. It tends to occur after long periods of sustained high rainfall, and the areas at most risk are often low-lying where the water table is more likely to be at shallow depth. Groundwater flooding is most likely to occur in areas underlain by major aquifers, although it is also associated with more localised floodplain sands and gravels; and

f. Artificial sources – flood sources include raised channels such as canals or storage features such as ponds and reservoirs:

   i. Reservoir failure can be particularly dangerous as it causes the release of a large volume of water at a high velocity, which can result in deep and widespread flooding. However, reservoir inspection and design procedures as regulated under the Reservoirs Act 1975 are very rigorous such that the probability of failure is generally regarded as extremely low;

   ii. Canals do not pose a direct flood risk given they are regulated water bodies with controlled water levels; however, flooding can still occur through a breach or overtopping. Control structures such as weirs or locks could experience a blockage or failure resulting in rising water levels and overtopping. Structural failure could lead to a breach which can potentially be hazardous as they may involve the rapid release of a large volume of water at high velocity.

4.1.5 The methodology used to assess the flood risk is detailed below:

a. **Very Low**: where very little risk is identified or any theoretical risk identified is classified as very low within Local Authority SFRAs and/or Environment Agency flood risk mapping extents, with very low probability of flooding occurring;

b. **Low**: where little risk is identified or any theoretical risk identified is classified as low within Local Authority SFRAs and/or Environment Agency flood risk mapping extents, with low probability of flooding occurring;

c. **Medium**: where risk is identified within Local Authority SFRAs and/or Environment Agency flood risk mapping extents indicating a medium probability, but manageable flood risk with little to no mitigation required; and

d. **High**: where modelled levels within Local Authority SFRA and/or Environment Agency flood risk mapping extents show risk to the Scheme as a high probability of flood risk and where mitigation needs to be considered and residual risks controlled.

5. Assessment of Flood Risk to the Solar PV Site

5.1 Overview

5.1.1 This section provides the assessment of flood risk posed to the Solar PV Site.

5.2 Fluvial

5.2.1 The majority of the south and west areas of the Solar PV Site are located within Flood Zone 1. The north and east areas of the Solar PV Site are located within Flood Zones 2 and 3 associated with the River Went (Main River) and Fleet Drain (Ordinary Watercourse). Flood Zones are illustrated on **ES Volume II Figure 9-4: Environment Agency Flood Map for Planning (Rivers and Seas) [EN010152/APP/6.2].** Some areas of Flood Zone 3 within the Solar PV Site are shown to be in areas where there is a reduction in risk of flooding from rivers and the sea due to defences (Ref. 12).

5.2.2 According to information provided by the Environment Agency, there are flood defences present along the River Went in the form of natural high ground and embankments. The reported Standard of Protection offered by the natural high ground is unknown, however the embankments which are maintained by the Environment Agency have a recorded Standard of Protection of 1.33% AEP (where this information is available). There are also flood defences along the River Don in the form of embankments and walls. These are maintained by the Environment Agency and have a reported Standard of Protection of 1.33% AEP. Hydraulic modelling has been undertaken for the River Went including the presence of these defences to understand risk to the Site.

5.2.3 The BESS Area and On-Site Substation will be located within Flood Zone 1. Some Field Stations will be located within Flood Zone 2 and some Solar PV Panels will be located within areas of Flood Zone 2 and 3. On-Site Cables will be required to connect the Solar PV Panels and string inverters which will typically be above ground level (along a row of racks fixed to the Solar PV Mounting Structure or fixed to other parts of nearby components). All other On-Site Cables will be underground.

5.2.4 To inform the FRA and provide the basis for the hydraulic modelling undertaken, the Environment Agency provided hydraulic models for the Main Rivers in the Study Area where models were available (Lower Don 2018 and Upper Humber 2016). The models provided did not include representation of the River Went, Fleet Drain and Fleet Common Drain, therefore a new 1D-2D hydraulic model was developed to represent these watercourses (model referred to as River Went 2024) and associated flood defences. The main mechanism for flooding from the River Went is caused by the locking of the River Went Outfall. The downstream water level and duration of the locking is influenced by the tidal Humber Estuary and the fluvial flows from the River Don. To account for this in the hydraulic modelling, a downstream boundary during the 5% AEP event was extracted from the Lower Don 2018 model and applied to the new 1D-2D model.

5.2.5 The Lower Don 2018 model results demonstrate that there is no interaction between the River Went and River Don floodplain at the Site up to the 0.1% AEP event in the defended scenario. Therefore, fluvial flood risk from the River Don has been assessed using the existing Lower Don 2018 1% AEP + 50% climate change model results. The 1% AEP + 50% climate change results have been assessed as this was the closest available simulation to the 38% climate change allowance required as discussed in Section 3.4 and is therefore a conservative approach.

5.2.6 The scope of the River Went 2024 hydraulic modelling was agreed with the Environment Agency (see Section 1.3). The hydraulic model was simulated for the 50% AEP, 3.33% AEP, 1% AEP, 1% AEP plus 38% climate change and 1% AEP Credible Maximum defended scenarios. Further details on the hydraulic modelling are available in **Annex A** of this report.

5.2.7 **Figure 9-3-1** of this report shows the River Went 2024 maximum modelled flood depths across the Site during the defended 1% AEP plus 38% climate change event. This shows that the majority of the Solar PV Site and all Field Stations are located outside of the modelled flood extent. Two solar PV Fields are shown to be partially located within the modelled flood extent: SW5 and SE3, with depths reaching up to approximately 0.5 m.

5.2.8 To determine the Flood Zone 3b extent, the River Went 2024 hydraulic model has been simulated for the 3.3% AEP event. **ES Volume II Figure 9-4: Environment Agency Flood Map for Planning (Rivers and Seas) [EN010152/APP/6.2]** displays the Flood Zone 3b extent. **ES Volume II Figure 2-3: Indicative Site Layout [EN010152/APP/6.2]** displays the Site layout. These figures indicate that no elements of the Scheme will be located within Flood Zone 3b.

5.2.9 **Figure 9-3-2** of this report shows the Lower Don 2018 maximum modelled flood depths across the Site during the 1% AEP plus 50% climate change event. This shows that the Solar PV Site is located outside of the modelled flood extent from the River Don.

5.2.10 **Figure 9-3-3** of this report shows the River Went 2024 maximum flood depths during the Credible Maximum Scenario (H++) as a sensitivity test including plus 60% allowance for climate change as noted in Section 3.4. This shows greater extents and depths when compared to the defended 1% AEP plus 38% climate change event but the majority of the Solar PV Site remains unaffected during the H++ scenario. Some solar PV Fields are shown to be partially located within the modelled flood extent including SW5, SE2, SE3, SE4, SE5, NE11, NE9 and NE10 with depths reaching up to approximately 0.8 m. This could potentially reach the lower edge of the Solar PV Panels without mitigation. One Field Station in Field NE9 is also located within the modelled flood extent with depths reaching up to 0.2m without mitigation. Mitigation measures are discussed in Section 8 below.

Historic Flooding

5.2.11 Historic flood mapping and recorded flood outlines (Ref. 13) for the Site and surrounding area show that there have been a number of flood events where fluvial flooding occurred in the Solar PV Site. These events were recorded in 1947, 2000, 2007, 2019, 2020, 2021 and 2022. The recorded flood outlines can be seen on **Figure 9-3-4** of this report.

Summary

5.2.12 Based on this information, the flood risk from fluvial sources to the Solar PV Site is considered to be low during construction, operation and maintenance and decommissioning, as the majority of the Solar PV Site is located outside of the modelled flood extents during the 1% AEP plus climate change event.

5.3 Tidal

5.3.1 The closest tidal source to the Solar PV Site is the River Don, located to the south and east of the Solar PV Site and is tidally influenced near to the Site. The River Don, at its closest point, is located approximately 3.6km to the south of the Solar PV Site and is tidally influenced in this location. The Humber Estuary is another tidal source in the surrounding area, the tidal limit of the Humber Estuary is located approximately 14km to the northeast of the Site. Due to the distance from tidal sources, the flood risk to the Solar PV Site from tidal sources is considered to be low during construction, operation and maintenance and decommissioning.

5.4 Tidal/Fluvial – Residual Risk

5.4.1 Due to the presence of flood defences along sections of the River Went and River Don, there is a residual risk of flooding to the Solar PV Site if there was overtopping or a breach of the flood defences. Details of the Standard of Protection of these defences is available in Section 5.2. The Environment Agency Reduction in Risk of Flooding from Rivers and the Sea (Ref. 6) mapping shows that some areas of the Solar PV Site in Flood Zone 3 are shown as being in an area where there is a reduction in the risk of flooding, due to defences as seen on **ES Volume II Figure 9-4: Environment Agency Flood Map for Planning (Rivers and Seas) [EN010152/APP/6.2].**

5.4.2 To understand residual risk, breach modelling has been undertaken at two locations including one at the River Went Outfall as failure of this structure is likely to have the largest impact at the site, and one to the south of the Site at the River Don defences between Thorpe in Blane and Krik Bramwith. The breach events have been simulated during the 1% AEP + 50% climate change event as a conservative approach.

5.4.3 **Figure 9-3-5** of this report shows the maximum modelled flood depths across the Site during the River Went Outfall breach for the 1% AEP plus 50% climate change event. This shows that the northern and eastern parts of the Solar PV Site are within the modelled flood extent, including Solar PV Panels and Field Stations. Maximum flood depths across the Solar PV Panels reach up to approximately 1.0m in Field SE3. The maximum flood depth reached at any Field Station is approximately 0.3m located in Field NE9.

5.4.4 **Figure 9-3-6** of this report shows the maximum modelled flood depths across the Site during the River Don breach to the south of the Site for the 1% AEP plus 50% climate change event. This shows that the entire area from the River Don to the River Went including the settlements of Moss and Trumfleet are located within the modelled flood extent. Maximum flood depths reach up to approximately 0.5m at the On-Site Substation and approximately 0.8m at the BESS. Maximum flood depths across the Solar

PV Panels reach up to approximately 2.0m in Field SE3. The maximum flood depth reached at any Field Station is approximately 1.4m located in Field NE9.

5.4.5 The likelihood of a breach occurring is low as the flood defences in the area are maintained by the Environment Agency, however based on the hydraulic modelling results, the fluvial/tidal residual risk in the event of a breach is assessed as high across the Solar PV Site during construction, operation and maintenance and decommissioning.

5.5 Surface Water

5.5.1 As defined by the Environment Agency (Ref. 14), the levels of surface water flood risk can be classified as follows:

a. Very Low Risk – the area has a chance of flooding of less than 0.1% each year;

b. Low Risk – the area has a chance of flooding of between 0.1% and 1% each year;

c. Medium Risk – the area has a chance of flooding of between 1% and 3.3% each year; or

d. High Risk – the area has a chance of flooding of greater 3.3% each year.

5.5.2 A review of the Environment Agency Long Term Flood Risk Map (Ref. 14) indicates that the risk to the majority of the Solar PV Site is generally very low. There are isolated areas at low to high risk of flooding which are likely associated with areas of low topography. The map also shows areas at low to high risk associated with smaller ordinary watercourses and/or local land drains. The risk of surface water flooding is illustrated in **ES Volume II Figure 9-5: Risk of Flooding from Surface Water [EN010152/APP/6.2]** and **ES Volume II Figure 2-3: Indicative Site Layout [EN010152/APP/6.2]** displays the site layout. These figures show that all Field Stations and the On-Site Substation are shown to be outside of the surface water flood extents. The BESS Area is partially located within the surface water flood extents, however the **Framework Drainage Strategy** (**ES Volume III Appendix 9-4 [EN010152/APP/6.3]**) takes account of this risk. Based on this information, the flood risk from surface water to the majority of the Solar PV Site is considered to be very low, with isolated areas at low to high risk during construction, operation and maintenance and decommissioning.

5.6 Groundwater

5.6.1 The British Geological Survey (BGS) Groundwater Flood Map can be seen in **Figure 9-3-7** of this report which shows that the Solar PV Site is located in an area where there is no or limited potential for groundwater flooding to occur.

5.6.2 A review of the Doncaster Level 1 SFRA (Ref. 8) indicates that the Solar PV Site is located in an area where there is a <25% chance of groundwater emergence. It is considered that groundwater flood risk is unlikely to increase from the Solar PV Site as the majority of the infrastructure (e.g. Solar PV Panels, Field Stations, BESS Containers, On-Site Substation, etc.) will be above the ground surface. Additional runoff from impermeable areas will discharge to surrounding watercourses and will not infiltrate to ground. Consequently, infiltration into the soil and underlying geology will remain as existing conditions. Therefore, it is considered that there is a low risk of groundwater flooding to the Solar PV Site during construction, operation and maintenance and decommissioning.

5.7 Sewer

5.7.1 As the Solar PV Site is located within a rural area, it is unlikely flooding from sewers will impact the Solar PV Site. A search undertaken to identify Yorkshire Water sewerage assets within the Solar PV Site did not identify any public sewers. The Doncaster Level 1 SFRA mapping (Ref. 8) shows no historic sewer flooding incidents at the Solar PV Site. Therefore, it is considered that there is a very low risk of sewer flooding to the Solar PV Site during construction, operation and maintenance and decommissioning.

5.8 Artificial Sources

5.8.1 According to the Environment Agency Long Term Flood Risk Map (Ref. 14), the north, east and southern areas of the Solar PV Site are located within an area at risk of flooding from reservoirs when there is also flooding from rivers. The risk of flooding from reservoirs is illustrated in **Figure 9-3-8** of this report and Table 5-1 details the reservoirs which are shown to have the potential to impact the Solar PV Site. The consequences from a reservoir failure could be severe, however, reservoir safety is regulated through the Reservoir Act 1975 (Ref. 15) to ensure large raised reservoirs (>25,000 m^3) are properly constructed and well managed and maintained. Owners of large raised reservoirs must ensure reservoirs are inspected every 10 years by specially licensed civil engineers and the owner must act on any measures in the interests of safety identified in an inspection report. Therefore, reservoirs are maintained to a very high standard and are extremely unlikely to fail.

Table 5-1: Reservoirs shown to have the potential to impact the Solar PV Site

Reservoir	Grid Reference	Owner	Risk Designation
Walshaw Dean Middle	SD9665033550	Yorkshire Water	High risk*
Walshaw Dean Upper	SD968345	Yorkshire Water	High risk*
Warley Moor	SE0300031700	Yorkshire Water	High risk*
Widdop	SD9300033000	Yorkshire Water	High risk*
Withens Clough	SD9840023000	Yorkshire Water	High risk*
Baitings	SE0100018900	Yorkshire Water	High risk*
Deanhead	SE0380015200	Yorkshire Water	High risk*
Gorple Upper	SD9240031400	Yorkshire Water	High risk*
Scammonden	SE0520016520	Yorkshire Water	High risk*

Reservoir	Grid Reference	Owner	Risk Designation
Snailsden	SE1360004000	Yorkshire Water	Not high risk+
Winscar	SE1530002600	Yorkshire Water	High risk*
Harden	SE1530003700	Yorkshire Water	Not high risk+

** High risk: in the very unlikely event the reservoir fails it is predicted that there is risk to life.*

+ Not high risk: in the very unlikely event the reservoir fails it is predicted that there would not be a risk to life.

5.8.2 In the very unlikely event of reservoir flooding, the fluvial and residual risk mitigation measures detailed in Section 8 will also mitigate the impacts of reservoir flooding to the Solar PV Site.

5.8.3 The closest other artificial source of flooding is the New Junction Canal, however this is located approximately 1.8km to the east of the Solar PV Site and is therefore unlikely to pose a flood risk.

5.8.4 Based on this information, the flood risk from artificial sources to the Solar PV Site is considered to be low during construction, operation and maintenance and decommissioning.

5.9 Summary

5.9.1 A summary of flood risk from all sources to the Solar PV Site is provided in Table 5-2.

Table 5-2: Summary of Flood Risk to the Solar PV Site

Flood Mechanism	Source	Flood Risk to the Scheme	Mitigation Required
Fluvial	Main Rivers/Ordinary Watercourses	Low	Yes: sequential location of infrastructure, within Flood Zone 1 and Flood Zone 2. The minimum height of the lowest part of the Solar PV Panels will be 300 mm above the design flood level. Where panels are located within the Credible Maximum Scenario flood extent, they will be raised 400 mm above the flood level associated with this event. Where Field Stations are located within the Credible Maximum Scenario flood extent, they will be raised 300 mm above the flood level associated with this event. Where On-Site Cables are required above ground (for example, in archaeologically sensitive areas),

Flood Mechanism	Source	Flood Risk to the Scheme	Mitigation Required
			these will be designed to be fully submersible.
Tidal	Tidally influenced River Don	Low	No
Tidal/Fluvial Residual Risk	Residual risk associated with failure of flood management infrastructure	High	Yes: **Framework Construction Environmental Management Plan (CEMP) [EN010152/APP/7.7]** and **Framework Operational Environmental Management Plan (OEMP) [EN010152/APP/7.9]** include flood risk mitigation measures. On-Site Substation and BESS to be bunded to provide additional protection. The height of this bund will be up to 1.15m as this is 300 mm above the maximum flood depths during the River Don breach scenario where depths reach up to 0.85m at the BESS Area.
Surface Water	Runoff from surrounding land and hard surfaces	Very low (majority), low – high (localised areas)	Yes: Any Field Stations within high surface water flood risk areas will be raised 300 mm above expected surface water flood level.
Groundwater	Rising groundwater levels in the underlying geology	Low	None during operation. Yes during construction: **Framework CEMP [EN010152/APP/7.7]** includes flood risk mitigation measures.
Sewer	Surrounding public/private drainage systems	Very low	No
Artificial Sources	Reservoirs/canals	Low	No

6. Flood Risk to the Grid Connection Corridor

6.1 Overview

6.1.1 As detailed in **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**, the On-Site Substation will connect to the Existing National Grid Thorpe Marsh Substation via a Grid Connection Line Drop within the Solar PV Site or Grid Connection Cables in the Grid Connection Corridor. If the Grid Connection Line Drop is taken forward by the Scheme, the Grid Connection Corridor will not be required. This section assesses the flood risk posed to the Grid Connection Corridor (including the Existing National Grid Thorpe Marsh Substation), should this option be taken forward.

6.2 Fluvial/Tidal

6.2.1 The risk of flooding to the Grid Connection Corridor is predominantly from the River Don which is tidally influenced near the Grid Connection Corridor. The Grid Connection Corridor is largely located within areas of Flood Zone 3 with smaller areas of Flood Zone 2 along its central section. Flood Zone 2 and 3 in this area is associated with the River Don. Approximately 0.7km of the Grid Connection Corridor is located within Flood Zone 1 towards its northern extent. Flood Zones are illustrated on **ES Volume II Figure 9-4: Environment Agency Flood Map for Planning (Rivers and Seas) [EN010152/APP/6.2]**. Some of the Flood Zone 3 area along the Grid Connection Corridor is located within an area with a reduction in risk of flooding from rivers and the sea due to defences. The Existing National Grid Thorpe Marsh Substation is located within Flood Zones 2 and 3 with a small portion shown to be located within an area with a reduction in risk of flooding from rivers and the sea due to defences.

6.2.2 The Grid Connection Corridor intersects the flood defence embankments along the Thorpe Marsh Drain. The Grid Connection Corridor crosses the Thorpe Marsh Drain Main River and five ordinary watercourses (Mill Dyke, Wrancarr Drain, Engine Dyke under Marsh Road, Engine Dyke parallel to Thorpe Marsh Drain and Hawkehouse Green Dyke) which pose a fluvial flood risk.

6.2.3 **Figure 9-3-2** of this report shows the Lower Don 2018 maximum modelled flood depths across the Site during the 1% AEP plus 50% climate change event. This shows that a small portion of the Grid Connection Corridor is located within the River Don flood extent, with depths reaching up to approximately 1.3 m.

6.2.4 As the Grid Connection Cables will be buried, it is considered that fluvial/tidal sources pose a very low risk during construction, operation and maintenance, and decommissioning.

6.3 Surface Water

6.3.1 A review of the Environment Agency Long Term Flood Risk Map (Ref. 14) indicates that the risk of flooding from surface water is generally very low. There are isolated areas at low to high risk of flooding which are likely associated with areas of low topography. The map also shows areas at low to high risk associated with smaller ordinary watercourses and/or local land drains which the Grid Connection Corridor crosses. Flood risk from surface water is illustrated in **ES Volume II Figure 9-5: Risk of Flooding from Surface Water [EN010152/APP/6.2]**. Based on this information and due to the Grid Connection Cables being buried, the flood risk from surface water to the majority of the Grid Connection Corridor is considered to be very low, with isolated areas at low to high risk during construction, operation and maintenance and decommissioning.

6.4 Groundwater

6.4.1 The BGS Groundwater Flood Map can be seen in **Figure 9-3-7** of this report which shows that the northern part of the Grid Connection Corridor is in an area where there is no potential for groundwater flooding to occur. The middle stretch of the Grid Connection Corridor is in an area where there is limited potential or potential for groundwater flooding of property situated below ground level. The southern stretch of the Grid Connection Corridor is located in an area where there is potential for groundwater flooding of property situated below ground and potential for groundwater flooding to occur at surface.

6.4.2 A review of the Doncaster Level 1 SFRA (Ref. 8) indicates that the northern stretch of the Grid Connection Corridor is located in an area where there is a <25% chance of groundwater emergence. The middle stretch of the Grid Connection Corridor is in an area where there is between >25% and >=50% chance of groundwater emergence. The southern stretch of the Grid Connection Corridor where it connects to the Existing National Grid Thorpe Marsh Substation is located in an area where there is a >=75% chance of groundwater emergence. Therefore, it is considered that there is a low risk of groundwater flooding to the northern stretch of the Grid Connection Corridor, medium risk to the middle stretch, and a high risk to the southern stretch of the Grid Connection Corridor during construction, operation and maintenance and decommissioning.

6.5 Sewer

6.5.1 As the Grid Connection Corridor is located within a rural area, it is unlikely that flooding from sewers will impact the Grid Connection Corridor. A search undertaken to identify Yorkshire Water sewerage assets within the Grid Connection Corridor did not identify any public sewers. The Doncaster Level 1 SFRA mapping (Ref. 8) shows no historic sewer flooding incidents within the Grid Connection Corridor. Therefore, it is considered that there is a very low risk of sewer flooding within the Grid Connection Corridor during construction, operation and maintenance and decommissioning.

6.6 Artificial Sources

6.6.1 According to the Environment Agency Long Term Flood Risk Map (Ref. 14), the majority of the Grid Connection Corridor is located within an area at risk of flooding from reservoirs when there is also flooding from rivers. Small areas of the Grid Connection Corridor are also located within areas where there is a risk of flooding from reservoirs when river levels are normal. The risk of flooding from reservoirs is illustrated in **Figure 9-3-8** of this report and **Table 6-1** details the reservoirs which are shown to have the potential to impact the Grid Connection Corridor. The Environment Agency's Asset Information and Maintenance Programme (AIMS) dataset (Ref. 16) shows that the Grid Connection Corridor intersects the Thorpe Marsh Water Storage Area (WSA) (asset ID 343124). The consequences from a reservoir failure could be severe, however, reservoir safety is regulated through the Reservoir Act 1975 (Ref. 15) to ensure reservoirs are properly constructed and well managed and maintained. Owners of large raised reservoirs (>25,000 m^3) must ensure reservoirs are inspected every 10 years by specially licensed civil engineers and the owner must act on any measures in the interests of safety identified in an inspection report. Therefore, reservoirs are maintained to a very high standard and are extremely unlikely to fail.

Table 6-1: Reservoirs shown to have the potential to impact the Grid Connection Corridor

Reservoir	Grid Reference	Owner	Risk Designation
Winscar	SE1530002600	Yorkshire Water	High risk*
Harden	SE1530003700	Yorkshire Water	Not high risk+
Agden	SK2610092300	Yorkshire Water	High risk*
Broadstone	SE1960006400	Yorkshire Water	High risk*
Broomhead	SK2645095950	Yorkshire Water	High risk*
Dale Dyke	SK2430091700	Yorkshire Water	High risk*
Damflask	SK2840090700	Yorkshire Water	High risk*
Ingbirchworth	SE2150006000	Yorkshire Water	High risk*
Langsett	SE2140000200	Yorkshire Water	High risk*
Midhope	SK2230099400	Yorkshire Water	High risk*
Strines	SK2300090400	Yorkshire Water	High risk*
Thrybergh	SK4765095950	Rotherham Metropolitan Borough Council	High risk*
Underbank	SK2500099300	Yorkshire Water	High risk*
More Hall	SK2840595781	Yorkshire Water	High risk*
Royd Moor	SE2220004800	Yorkshire Water	High risk*

** High risk: in the very unlikely event the reservoir fails it is predicted that there is risk to life.*

+ Not high risk: in the very unlikely event the reservoir fails it is predicted that there would not be a risk to life.

6.6.2 The closest other artificial source of flooding is the Don Navigation Canal, located approximately 0.1km to the east of the Grid Connection Corridor at its closest point. However, the canal levels are monitored and maintained by the Canal and Rivers Trust. As a result, overtopping is unlikely. From a review of mapping, the River Don is situated between the Dun Navigation Canal and the Grid Connection Corridor and it appears that the River Don is raised above surrounding ground levels. In the unlikely event that the Dun Navigation Canal fails, floodwaters would propagate into the River Don. Based on the above, the Grid Connection Corridor is at low risk of flooding from the canal.

6.6.3 The risk of flooding from artificial sources is considered low during construction, operation and maintenance and decommissioning as the Grid Connection Cables will be buried.

6.7 Summary

6.7.1 A summary of flood risk from all sources to the Grid Connection Corridor is provided in Table 6-2.

Table 6-2: Summary of Flood Risk to the Grid Connection Corridor

Flood Mechanism	Source	Flood Risk to the Scheme	Mitigation required
Fluvial	Main Rivers/Ordinary Watercourses	High	None during operation: Grid Connection Corridor is via buried cables, therefore cannot be impacted by above ground fluvial sources. Yes during construction: **Framework CEMP [EN010152/APP/7.7]** includes flood risk mitigation measures.
Tidal	Tidally influenced River Don	High	None during operation: Grid Connection Corridor is via buried cables, therefore cannot be impacted by above ground tidal sources. Yes during construction: **Framework CEMP [EN010152/APP/7.7]** includes flood risk mitigation measures.
Surface Water	Runoff from surrounding land and hard surfaces	Very low (majority), low – high (localised areas)	No
Groundwater	Rising groundwater levels in the underlying geology	Low (northern section), Medium (middle	Yes: The cable, cable joints and cable ducting will be designed to prevent water ingress.

Flood Mechanism	Source	Flood Risk to the Scheme	Mitigation required
		section) High (southern section)	
Sewer	Surrounding public/private drainage systems	Very low	No
Artificial Sources	Reservoirs/canals	Low	No

7. Flood Risk from the Scheme

7.1 Overview

7.1.1 Built development can lead to an increased risk of flooding by increasing surface water runoff. Development often increases the area of impermeable surfaces thereby promoting rapid runoff to surface water sewers or watercourses rather than percolation into the ground. The effect can be to increase both total and peak water flows, contributing to flooding.

7.1.2 However, the NPS EN-3 (November 2023) (Renewable Energy Infrastructure) highlights in Paragraph 2.10.84 that:

“As solar PV panels will drain to the existing ground, the impact will not, in general, be significant.”

7.1.3 **ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]** provides information on the embedded mitigation measures to manage surface water flood risk from the Scheme.

7.2 Solar PV Site

7.2.1 The construction of mounts to support the Solar PV Panels may cause a small reduction in floodplain storage, however the results of the hydraulic modelling indicate that only a small number of panels will be located within the 1% AEP plus 38% climate change extent within Fields SE3 and SW5. The approximate maximum flood depth during the 1% AEP plus 38% climate change event is 0.5 m. The cumulative cross-sectional area of the legs of the Solar PV Mounting Structures within the modelled flood extent during the 1% AEP + 38% climate change event is approximately 2.6 m^2, resulting in a negligible loss of floodplain storage of approximately 1.3 m^3. In Field SE3, concrete block footings for the Solar PV Panels may be required for archaeological mitigation. The cumulative cross-sectional area of the block footings within the modelled flood extent during the 1% AEP + 38% climate change event is approximately 26 m^2. This also results in a negligible loss of floodplain storage of approximately 13 m^3.

7.2.2 The Scheme proposes, as a design principle, to utilise existing water crossing locations (where practicable) to avoid the need for new crossings. However, should a new crossing be required, an open span bridge crossing will be used, with the specific type of crossing selected being determined based on site specific factors and in consultation with the relevant authority (generally the IDB/LLFA for the Solar PV Site).

7.2.3 As noted in Paragraph 7.1.2, Solar PV Panels will drain to the existing ground and the impact will not, in general, be significant. A Framework Drainage Strategy has been prepared to support the DCO Application (see **ES Volume III Appendix 9-4: Framework Drainage Strategy [EN010152/APP/6.3]**). A summary of the main embedded mitigation measures to manage surface water flood risk are provided below:

a. Individual Solar PV Panels will be held above the ground surface on Solar PV Mounting Structures (see **ES Volume I Chapter 2: The Scheme [EN010152/APP/6.1]**). This will avoid sealing the ground with impermeable surfaces. As a result, it is assumed that the impermeable area will remain largely consistent with its pre-development state. The areas surrounding the panels will be planted with native grassland to intercept and absorb rainfall running off the panels, preventing it from concentrating and potentially forming channels in the ground. However, runoff from the Solar PV Panels and the small impermeable areas associated with the proposed Field Stations, compounds for the On-Site Substation and BESS Area may alter the existing routing of runoff in localised areas. To prevent ponding occurring in these areas a series of boundary and routing swales will be constructed to convey surface water runoff away from the Solar PV Panels and towards receiving watercourses.

b. The swales will be sized to accommodate the attenuation required for the 1% AEP + 40% climate change rainfall event. Due to current understanding of ground conditions within the Solar PV Site, it is unlikely that runoff will be able to discharge via infiltration. Therefore, surface water from the swales is proposed to be discharged to local watercourses. The discharge to these watercourses will be maintained at existing greenfield runoff rates by restricting rates using a flow control. The flow control will use a restriction on the outlet of the swale which will hold water back within the swale and release it at a controlled rate.

c. Where proposed access tracks cross watercourses, the intention is to use open span crossings and not introduce any new culverts for temporary or permanent access routes. Existing culverts may be upgraded or slightly extended as required. Access tracks will use permeable materials such as crushed rock/gravel and localised SuDS, such as swales and infiltration trenches, to control runoff where required. Small areas of impermeable surfacing will be included on the open span crossings.

d. The On-Site Cables will be underground, apart from cables between the Solar PV Panels and string inverters which will typically be above ground.

7.3 Grid Connection Corridor

7.3.1 If the Grid Connection Line Drop is not taken forward, Grid Connection Cables in the Grid Connection Corridor will be required to connect to the Existing National Grid Thorpe Marsh Substation. The Grid Connection Cables will be buried cables, therefore the likelihood of increased flood risk from this is considered to be low. In particular, for flood risk sources above ground (fluvial, tidal, surface water and artificial), there will not be a quantifiable increase in risk from these sources.

7.3.2 The Environment Agency’s Asset Information and Maintenance Programme (AIMS) dataset (Ref. 16) shows that the Grid Connection Corridor intersects the Thorpe Marsh Water Storage Area (WSA) (asset ID 343124) and therefore has the potential to impact this asset. The Grid Connection Corridor is also shown to intersect the flood defence embankments along the Thorpe Marsh Drain (asset ID 25600 and 25326). The depth and construction around the Thorpe Marsh WSA and flood defence embankments will be identified through liaison with the Environment Agency and horizontal directional drilling will be used at a sufficient depth to avoid compromising the structural integrity of the flood defence embankments and WSA.

7.3.3 Small watercourse crossings are currently assumed to be crossed using open cut installation techniques as a worst-case assumption. For intrusive crossings of small watercourses, it is assumed that water flow will be maintained by temporarily damming the watercourse and over pumping or fluming the flow through the works, maintaining existing conditions. Therefore, the likelihood of increased flood risk from the Grid Connection Cables crossings during construction and operation is considered to be low.

7.3.4 The Grid Connection Cables will not increase flood risk from sewers as no sewerage assets were identified by the utilities search undertaken.

7.3.5 The Grid Connection Cables may impede groundwater flow locally. The Grid Connection Corridor is within green open space (arable fields and roadside verges) and where the Grid Connection Corridor is located within road corridors the impermeable surfacing will prevent ground water emergence. Therefore, any increases are unlikely to affect vulnerable receptors.

8. Mitigation Measures

8.1 Introduction

8.1.1 It has been demonstrated that the primary flood risk to the Solar PV Site will be from fluvial and surface water sources during the three project phases. The mitigation measures required to alleviate the risk of fluvial and surface water flooding to the Site are detailed in this section.

8.2 Fluvial

8.2.1 The north and east areas of the Solar PV Site are located within Flood Zones 2 and 3 associated with the River Went and Fleet Drain as seen on **ES Volume II Figure 9-4: Environment Agency Flood Map for Planning (Rivers and Seas) [EN010152/APP/6.2].** At the construction, operation and maintenance and decommissioning phases, the following mitigation measures will be incorporated which will reduce the assessed fluvial flood risk to low (Table 5-2).

Construction/Decommissioning

8.2.2 Measures to prevent an increase in flood risk during the construction/decommissioning works will be contained within the detailed Construction Environmental Management Plan (CEMP) and detailed Decommissioning Environmental Management Plan (DEMP). Framework versions of these plans are provided with the DCO application as documents **[EN010152/APP/7.7]** and **[EN010152/APP/7.9]**. Delivery of the detailed CEMP and DEMP is secured through the DCO requirement. Examples of flood risk mitigation measures that will be implemented include:

a. Topsoil and other construction materials will be stored outside of the 0.5% AEP extent for areas at tidal flood risk and outside of the 1% AEP extent for areas at fluvial flood risk. If areas located within Flood Zone 3 are to be utilised for the storage of construction materials, this would be done in accordance with the applicable flood risk activity regulations, if required;

b. Connectivity will be maintained between the floodplain and the adjacent watercourses, with no changes in ground levels within the floodplain as far as practicable;

c. During the construction/decommissioning phase, the Contractor will monitor the weather forecasts daily, and review the weekly and monthly weather forecasts each week, and plan works accordingly. For example, works in the channel of any watercourses would be avoided or halted were there to be a significant risk of high flows or flooding;

d. The construction compound site office and supervisor will be notified of any potential flood occurring by use of the Floodline Warning Service or equivalent service; and

e. The Main Construction Compound along with the northern most temporary Construction Compound will be located outside of areas of fluvial Flood Zones 2 and 3. The eastern most temporary Construction Compound is located in Flood Zones 2 and 3, however the River Went

2024 modelling shows that it is located outside of the 1% AEP plus climate change flood extent.

8.2.3 The Contractor will be required to produce an Emergency Response Plan as part of the detailed CEMP and DEMP which will provide detail of the response to an impending flood and include:

a. A 24-hour availability and ability to mobilise staff in the event of a flood warning;
b. The removal of all plant, machinery and material capable of being mobilised in a flood for the duration of any holiday close down period where there is a forecast risk that the site may be flooded;
c. Details of the evacuation and site closedown procedures;
d. Arrangements for removing any potentially hazardous material;
e. Arrangements for removing any potentially hazardous material and implement more stringent protection measures;
f. If water is encountered during below ground construction, suitable de-watering methods would be used. Any groundwater dewatering required in excess of the exemption thresholds would be undertaken in line with the requirements of the Environment Agency (under the Water Resources Act 1991 as amended) and the Environmental Permitting Regulations (2016); and
g. Safe egress will be maintained at all times when working in excavations. When working in excavations a banksman is to be present at all times.

8.2.4 The Scheme proposes, as a design principle, to utilise existing water crossing locations (where practicable) to avoid the need for new crossings. However, should a new crossing be required, an open span bridge crossing will be used, with the specific type of crossing selected being determined based on site specific factors and in consultation with the relevant authority (generally the IDB/LLFA for the Solar PV Site). There will be no new culverts as part of the Scheme, but existing culverts may be upgraded or slightly extended.

Operation

8.2.5 Mitigation measures provided during operation of the Scheme ensure that the Scheme will be safe throughout its lifetime. These are also outlined in the **Framework Operational Environmental Management Plan (OEMP) [EN010152/APP/7.8]** which, through the DCO requirement, will secure the provision of a detailed OEMP in general accordance with the Framework OEMP prior to commencement of the operation and maintenance phase.

8.2.6 Where Solar PV Panels are located within Flood Zone 3, the panels will be raised to ensure a 300 mm freeboard above the design flood event (1% AEP plus 38% climate change) in that location.

8.2.7 Where Solar PV Panels are located within the Credible Maximum Scenario flood extent, these will be raised 400 mm above the flood level associated with this event.

8.2.8 All Field Stations are located outside of the Credible Maximum Scenario modelled flood extent apart from the Field Station in Field NE9. The flood depths during this event at this location reach up to 0.2 m. The Field Station in this location will be raised 300 mm above the Credible Maximum Scenario modelled flood level.

8.2.9 The Contractor will be required to develop an Emergency Response Plan as part of the detailed OEMP which will include details of the response to an impending flood, such as an evacuation plan. This will be secured through the Framework CEMP.

8.2.10 Infrastructure will be offset from the bank of watercourses by 10m (except where crossings are required).

8.3 Fluvial/Tidal – Residual Risk

8.3.1 The Solar PV Site is shown to be at risk of tidal/fluvial flooding during a breach scenario as shown on **Figure 9-3-5 and Figure 9-3-6** of this report. At the construction, operation and maintenance and decommissioning phases, the following mitigation measures will be incorporated which will reduce the assessed residual flood risk to low (Table 5-2).

Construction/Decommissioning

8.3.2 The Contractor will be required to produce an Emergency Response Plan as part of the detailed CEMP and DEMP which will provide detail of the response to an impending flood. This measure is included within the **Framework CEMP [EN010152/APP/7.7]** and the **Framework DEMP [EN010152/APP/7.9]**.

Operation

8.3.3 The Contractor will be required to develop an Emergency Response Plan as part of the detailed OEMP which will include details of the response to an impending flood, such as an evacuation plan. This is secured through the **Framework OEMP [EN010152/APP/7.8]**.

8.3.4 The On-Site Substation and BESS Area are shown to be at risk of tidal/fluvial flooding during a breach scenario. As the most vulnerable aspects of the development, these features will be bunded to provide protection during the unlikely event of a breach of the flood defences. These vulnerable assets are not located within the design flood event when no breach occurs.

8.4 Groundwater

Construction/Decommissioning

8.4.1 There may be potential for shallow groundwater across the Solar PV Site and Grid Connection Corridor, and therefore potential for groundwater ingress during construction. This will be managed following standard construction techniques potentially including pumping, damming, use of trench boxes or shoring up excavation pits with sheet piling which will be secured by the **Framework CEMP [EN010152/APP/7.7]**. It is noted that there is less potential for groundwater ingress during decommissioning as it is expected that if cables do not remain in situ, they will be removed by opening up the ground at regular intervals and pulling the cable through to the extraction point, avoiding the need to re-excavate the entire length of the cable.

8.4.2 Significant groundwater ingress is not anticipated as these works are expected to be within the thick superficial deposits (up to 11 m) which are largely of low permeability material.

Operation

8.4.3 Due to the largely low permeability superficial geology, no continuous foundations present in the design, the regularly spaced discrete Solar PV Panel foundations, and shallow cabling trenches, mitigation during operation is not required.

8.5 Surface Water

Construction/Decommissioning

8.5.1 The **Framework CEMP [EN010152/APP/7.7]** and **Framework DEMP [EN010152/APP/7.9]** incorporate examples of measures to prevent an increase in surface water flood risk during the construction/decommissioning works including a temporary drainage system.

8.5.2 As stated previously these Framework management plans will be the basis of the detailed CEMP/DEMP to be prepared prior to the commencement of the relevant phase, as secured through the **draft DCO [EN010152/APP/3.1]** requirements.

Operation

8.5.3 A **Framework Drainage Strategy** has been prepared (see **ES Volume III Appendix 9-4 [EN010152/APP/6.3]**) which sets out the drainage strategy for the Scheme as described in Section 7.2. This provides details on the management of surface water runoff from new infrastructure required by the Scheme (e.g. Solar PV Panels, BESS Area, Onsite Substation, access tracks and areas of hardstanding across the Solar PV Site). A detailed strategy will be provided post-consent following the detailed design of the BESS Area and Onsite Substation and informed by infiltration testing, as secured through the DCO.

8.5.4 No surface water drainage is proposed for the Grid Connection Corridor as the cables will be buried, and the corridor will be restored to greenfield conditions post construction.

9. Demonstrating the Sequential and Exception Tests

9.1 Introduction

9.1.1 As set out in Section 3, the NPS EN-1 (November 2023) (Ref. 1) and the NPPF (December 2023) (Ref. 4) require the application of both the Sequential Test and the Exception Test where relevant. The aim of the Sequential Test is to steer new development to areas with the lowest risk of flooding from any source. The Scheme is classified as 'Essential Infrastructure' as defined in Annex 3 of the NPPF (December 2023) (see Table 3-2 in Section 3 above) and the majority of the Scheme is situated within areas with the lowest risk of flooding from any source. However, there are certain areas that lie in Flood Zone 2 and 3a, which need to undergo the Sequential Test. Table 3-2 in Section 3.2 indicates that this type of development can be located in Flood Zones 3 if the Exception Test is passed. In accordance with national planning policy the Secretary of State will need to be satisfied that the Scheme passes the Sequential Test and, as the Solar PV Site and Grid Connection Corridor are within Flood Zone 3, the Exception Test is required.

9.2 Sequential Test

Solar PV Site

9.2.1 A sequential approach has been applied in selecting the land for the Scheme and to the layout and design of the solar infrastructure within the Solar PV Site to date with the Scheme being located, as far as practicable, in areas with the lowest risk of flooding from any source.

9.2.2 The location of the Solar PV Site has been selected on the basis of a number of different factors which are discussed in more detail in **ES Volume I Chapter 3: Alternatives and Design Evolution [EN010152/APP/6.1]**. The Sequential Test Report provided at Annex B explains the site selection criteria and the areas of land at lower risk of flooding from all sources that have been considered. The Sequential Test Report concludes that suitable and reasonably available alternative sites at lower risk of flooding have not been identified for the Solar PV Site

9.2.3 A sequential approach has been applied to the layout and design of the solar infrastructure within the Solar PV Site to date whereby the On-Site Substation, BESS Area and the majority of the Solar PV Panels are in areas with the lowest risk of flooding from any source.

9.2.4 Given the above the Sequential Test is therefore considered passed for the Solar PV Site.

Grid Connection Corridor

9.2.5 The Grid Connection Corridor is predominantly located within areas of high risk (Flood Zone 3) and medium risk (Flood Zone 2) of fluvial and tidal flooding. As noted above in section 6.2 once constructed cabling within the Grid Connection Corridor will be buried and not at risk of flooding. Therefore the application of the Sequential Test in relation to the Grid Connection Corridor applies only to the construction phase.

9.2.6 As explained in **ES Volume I Chapter 3: Alternatives and Design Evolution [EN010152/APP/6.1]** the identification of the Grid Connection Corridor considered the operational and engineering requirements, including the need to connect to the Existing National Grid Thorpe Marsh Substation; planning and environmental constraints, which included the flood risk context; and other land use and land ownership constraints. This confirmed that a Grid Connection Corridor outside Flood Zones 2 and 3 would not be possible and no reasonable alternatives are available in Flood Zone 1. Areas of the Grid Connection Corridor within Flood Zone 3 were also unable to be avoided by using Flood Zone 2 land.

9.2.7 Following application of the Sequential Test it is not considered to be possible for the Grid Connection Corridor to be located in areas of lower flood risk.

9.3 Exception Test

9.3.1 As a result of areas of the Solar PV Site and Grid Connection Corridor being located within Flood Zone 3, it is necessary to apply the Exception Test to the Scheme in accordance with national planning policy set out in Section 3 of this FRA. The Exception Test in NPS EN-1 (paragraph 5.8.11) requires it to be demonstrated that:

a. *"The development would provide wider sustainability benefits[216] to the community that outweigh the flood risk; and*

b. *The development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall".*

9.3.2 Footnote 216 in NPS EN-1 (November 2023) states that sustainability benefits to the community would include the benefits (including need), for the infrastructure set out in Part 3 of NPS EN-1

9.3.3 In response to meeting part a of the Exception Test a summary of the need for the Scheme is explained in the **Statement of Need [EN010152/APP/7.3]**. Through the generation of low carbon electricity, the Scheme will contribute to the urgent need to decarbonise electricity generation in the UK as required by the latest national renewable energy policy and will contribute to the UK's legally binding climate change targets. Specifically, it will deliver a significant amount of low carbon energy delivering the benefits to the energy system set out in NPS EN-1. The Scheme will have both a national, and global significance, through its contribution to decarbonisation of the UK's electricity generation. The use of the BESS provides additional carbon saving opportunities as explained in the **Statement of Need [EN010152/APP/7.3]** and **ES Volume I Chapter 6: Climate Change [EN010152/APP/6.1].**

9.3.4 Ecological enhancements as part of the Scheme's design set out in the **Framework Landscape and Ecological Management Plan (LEMP) [EN010152/APP/7.14]**; and benefits of the Scheme also include from employment generation and GVA contribution during construction. Similar economic benefits are also anticipated for the decommissioning phase.

9.3.5 In summary, it is considered that the Scheme will provide wider sustainability benefits to the community, including job creation in the local area during construction and decommissioning and deliver a significant amount of low carbon energy delivering the benefits to the energy system, that outweigh its impacts on flood risk in accordance with NPS EN-1. The Scheme therefore satisfied part (a) of the Exception Test.

9.3.6 In response to meeting part (b) of the Exception Test, this is addressed through this FRA (sections 6,7, and 8), which demonstrates that, with mitigation, the Scheme will be safe from flooding from all sources throughout its lifetime without increasing flood risk elsewhere. Therefore, the Scheme satisfies part (b) of the Exception Test.

9.3.7 As the Scheme satisfies both elements of the Exception Test, development of solar infrastructure within Flood Zones 2 and 3 can proceed in accordance with the policy framework.

9.3.8 In summary, the above demonstrates that the Scheme is considered to pass the Sequential and Exception Tests.

10. Conclusion

10.1 Overview

10.1.1 This FRA has assessed flood risks to and from the Scheme. The majority of the Solar PV Site lies in Flood Zone 1. The north and east areas of the Solar PV Site are located within Flood Zones 2 and 3 associated with the River Went and Fleet Drain. The majority of the Grid Connection Corridor is in Flood Zone 3, associated with the River Don and its floodplain. Other sources of flood risk (fluvial, surface water, sewer, groundwater and artificial) also impact both elements of the Scheme to differing degrees.

10.1.2 The Scheme is classed as 'Essential Infrastructure' under the NPPF (December 2023) and therefore should avoid Flood Zone 3a and 3b where feasible and consider the availability of suitable sites at lower risk of flooding. Where this is unavoidable, the Scheme is required to pass the Exception Test and should be designed and constructed to remain operational and safe in times of flooding.

10.1.3 Additional hydraulic modelling has been undertaken to determine the impacts of climate change on the fluvial and tidal flood extents the outputs of which have been used to inform the FRA and mitigation measures.

10.2 Flood Risk – to the Scheme

10.2.1 The following potential sources of flooding which could affect the Solar PV Site have been considered and assessed as follows:

a. With a large area of the Scheme, including the BESS Area and On-Site Substation, located in Flood Zone 1, the current risk from fluvial sources is considered to be 'low'. However, the Scheme does have areas of higher flood risk (Flood Zones 2 and 3) which increases the risk in these locations to 'high'. The Scheme has been designed accordingly in order to remain operational during times of flood and a sequential approach has been applied to avoid the location of solar PV infrastructure including Solar PV Panels in Flood Zone 3 as far as practicable. Where Solar PV Panels are located in areas of Flood Zone 2 and 3 (including the impacts of climate change), the minimum height of the lowest part of the Solar PV Panels will be 300 mm above the design flood level. Where panels are located within the Credible Maximum Scenario flood extent, they will be raised 400 mm above the flood level associated with this event. No Field Stations are located within the design flood event, however one Field Station is located within the Credible Maximum Scenario flood extent. This Field Station will be raised 300 mm above the flood level associated with this event in this location. On-Site Cables above ground will be 300 mm above the design flood level. Based on the design, the risk within these areas is considered to be low;

b. The residual risk of tidal/fluvial flooding during a breach scenario is considered to be 'high' based on the hydraulic modelling results. An Emergency Response Plan will be included as part of the detailed CEMP, DEMP and OEMP which will provide details of the response to an impending flood defence breach scenario including an evacuation plan. The On-Site Substation and BESS Area will be bunded to provide additional protection during an unlikely breach of the flood defences. Based on this embedded mitigation, the residual risk of tidal/fluvial flooding is considered to be ‘low’;

c. The risk of surface water flooding to the majority of the Solar PV Site is considered to be ‘very low’. There are a few areas where the risk is higher but these generally cover a small spatial extent. Where any Field Stations are located within high surface water flood risk areas, they will be raised 300 mm above the design flood level. A Drainage Strategy incorporating SuDS will be implemented to manage these flow paths to ensure that the Scheme remains safe throughout its lifetime. A **Framework Drainage Strategy** has been prepared to support the DCO Application (**ES Volume III: Appendix 9-4: Framework Drainage Strategy [EN010152/APP/6.3]**);

d. The risk of groundwater is likely to be ‘low’ based on available information.

e. The risk of flooding from sewers is considered to be ‘very low’; and

f. The risk of flooding from artificial sources is considered to be ‘low’.

10.2.2 The following potential sources of flooding which could affect the Grid Connection Corridor have been considered and assessed as follows:

a. The majority of the Grid Connection Corridor (including the Existing National Grid Thorpe Marsh Substation) is in Flood Zone 3, associated with the River Don and its floodplain. An Emergency Response Plan will be included as part of the detailed CEMP, DEMP and OEMP which will provide details of the response to an impending flood including an evacuation plan. The Grid Connection Cables will be buried, meaning they are inherently flood protected, and protected by existing flood defences; it will therefore remain operational during times of flood. Based on these factors, the risk within these areas is considered low;

b. The risk of surface water flooding to the majority of the Grid Connection Corridor (including the Existing National Grid Thorpe Marsh Substation) is considered to be ‘very low’. There are a few isolated areas where the risk is high but these generally cover a small spatial extent. A Drainage Strategy will be implemented to manage these flow paths to ensure that the Scheme remains safe throughout its lifetime;

c. The risk of groundwater flooding is considered to be ‘low’ risk to the northern stretches of the Grid Connection Corridor, ‘medium’ risk to the middle stretch, and ‘high’ to the southern stretch of the Grid Connection Corridor (including the Existing National Grid Thorpe Marsh Substation) based on available information. The cable and cable ducting will be designed to prevent water ingress. As a result, based on the design, the overall risk is considered to be ‘low’.

d. The risk of flooding from sewers is considered to be ‘very low’; and

e. The risk of flooding from artificial sources is considered to be ‘very low’, due to the combined factors of existing flood defences, low likelihood of reservoir failure, and that the cable will be buried during operation the risk from this source is mitigated.

10.3 Flood Risk – from the Scheme

10.3.1 With the exception of fluvial and surface water sources, an increase in flood risk from other sources (tidal, groundwater, sewer and artificial sources) from the Scheme is considered unlikely or very localised i.e. small areas within the Order limits.

Fluvial

10.3.2 The following potential sources of flooding which could come from the Solar PV Site have been considered and assessed as follows:

a. Within the Solar PV Site, Solar PV Mounting Structures and Solar PV Panels have been sequentially located to avoid areas of high fluvial flood risk and raised to a sufficient height to avoid floodwater, being preferentially located in Flood Zone 1 and then Flood Zone 2. The On-Site Cables between Solar PV Panels and inverters will typically be above ground with all other cabling buried. The majority of the Solar PV Site and On-Site Cables are in Flood Zone 1. Where Solar PV Panels are located within Flood Zone 3, these will be raised 300 mm above the design flood level. Where panels are located within the Credible Maximum Scenario flood extent, they will be raised 400 mm above the flood level associated with this event. Field Stations have also been sequentially located to avoid high fluvial flood risk areas. One Field Station is located within the Credible Maximum Scenario flood extent, therefore this will be raised 300 mm above the flood level associated with this event.

b. The Scheme proposes, as a design principle, to utilise existing water crossing locations (where practicable) to avoid the need for new crossings. However, should a new crossing be required, an open span bridge crossing will be used, with the specific type of crossing selected being determined based on site specific factors and in consultation with the relevant authority (generally the IDB/LLFA for the Solar PV Site).

c. The On-Site Cables between Solar PV Panels and string inverters will typically be above ground and remaining cabling will be underground so there will be no loss of floodplain storage, impedance of water flows or increase to flood risk elsewhere.

10.3.3 The following potential sources of flooding which could come from the Grid Connection Corridor have been considered and assessed as follows:

a. The Grid Connection Cables will be underground so there will be no loss of floodplain storage, impedance of water flows or increase to flood risk elsewhere.

Surface Water

10.3.4 A **Framework Drainage Strategy** (**ES Volume III Appendix 9-4 [EN010152/APP/6.3]**) has been developed outlining how surface water will be managed to prevent any increase in flood risk. This will be developed into a detailed Drainage Strategy prior to construction, as secured through the DCO. The Strategy provides measures to manage surface water runoff from new infrastructure required by the Scheme (e.g. BESS Containers and On-

Site Substation) and manage any required changes to existing land drainage arrangements (**ES Volume I Chapter 9: Water Environment [EN010152/APP/6.1]**).

10.4 Sequential and Exception Test

10.4.1 Section 9 of this FRA has provided the rationale and justification for the Scheme meeting the Sequential and Exception Tests set out in NPS EN-1.

10.4.2 For the Solar PV Site, none of the alternative areas to the Solar PV Site considered which are at lower risk from all sources of flooding were considered suitable and reasonably available and therefore this confirms the Applicant has identified land within the Solar PV Site in accordance with the Sequential Test policy requirements.

10.4.3 A sequential approach has been applied to the layout and design of the solar infrastructure within the Solar PV Site whereby the On-Site Substation, BESS, and the majority of the Solar PV Panels are located in areas with the lowest risk of flooding from any source. There are a number of areas where Solar PV Panels are located within Flood Zone 2 and 3. Where Solar PV Panels are located within Flood Zone 3, mitigation will be in place to ensure the development remains safe throughout its lifetime.

10.4.4 The Grid Connection Corridor is predominantly located within Flood Zone 3 (for fluvial and tidal sources). Taking into consideration operational and engineering requirements including the need to connect to the Existing National Grid Thorpe Marsh Substation; planning and environmental constraints which included the flood risk context; and other land use and land ownership constraints, a corridor outside Flood Zones 2 and 3 would not be possible and therefore no reasonable alternatives are available in Flood Zone 1. Areas of the Grid Connection Corridor within Flood Zone 3 were also unable to be avoided by using Flood Zone 2 land.

10.4.5 In summary, it has been demonstrated that the Sequential Test has, where relevant, been met for the Solar PV Site and for construction phase of the Grid Connection Corridor (as during operation cables will be buried).

10.4.6 As a result of areas of the Solar PV Site and Grid Connection Corridor being located within Flood Zone 3, the Exception Test has been applied. The Scheme will provide wider sustainability benefits which outweigh flood risk and appropriate mitigation has been considered to ensure that the Scheme remains operational and is safe during times of flooding. It has therefore been demonstrated that both parts of the Exception Test has been met.

11. References

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Figures

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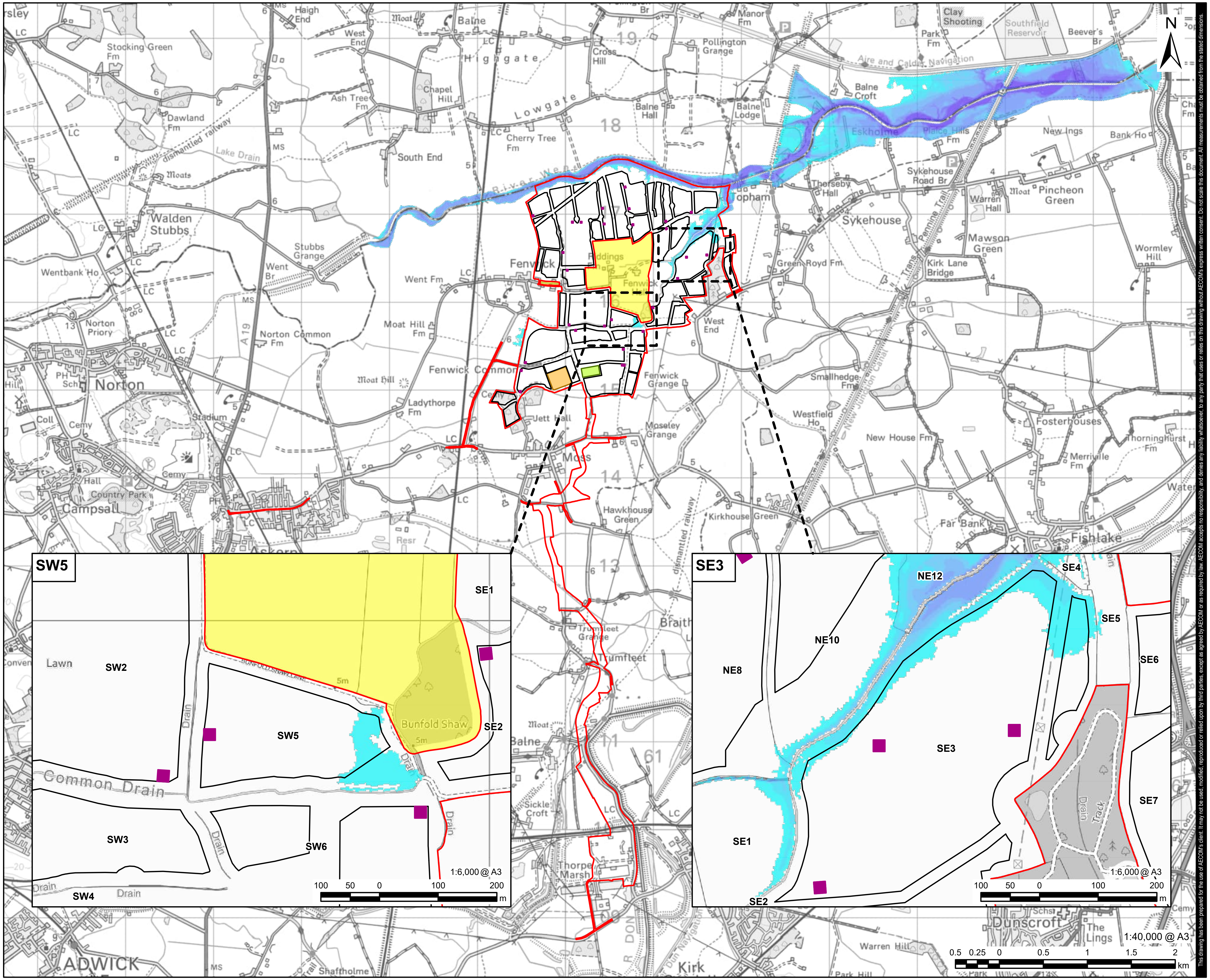

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LEGEND

- Order limits
- Land not included in the Order limits
- On-Site Substation
- BESS Area
- PV Developable Area
- Field Substation

River Went 2024 Maximum Modelled Flood Depth (m)

- < 0.25
- ≥ 0.25 - < 0.50
- ≥ 0.50 - < 0.75
- ≥ 0.75 - < 1.0
- ≥ 1.0 - < 1.5
- ≥ 1.5 - < 2.0
- ≥ 2.0 - < 2.5
- ≥ 2.5 - < 3.0

NOTES

ISSUE PURPOSE

Environmental Statement

PROJECT NUMBER

60698207

FIGURE TITLE

River Went 2024 Maximum Modelled Flood Depth 1% AEP + 38% Climate Change

FIGURE NUMBER

Figure 9-3-1

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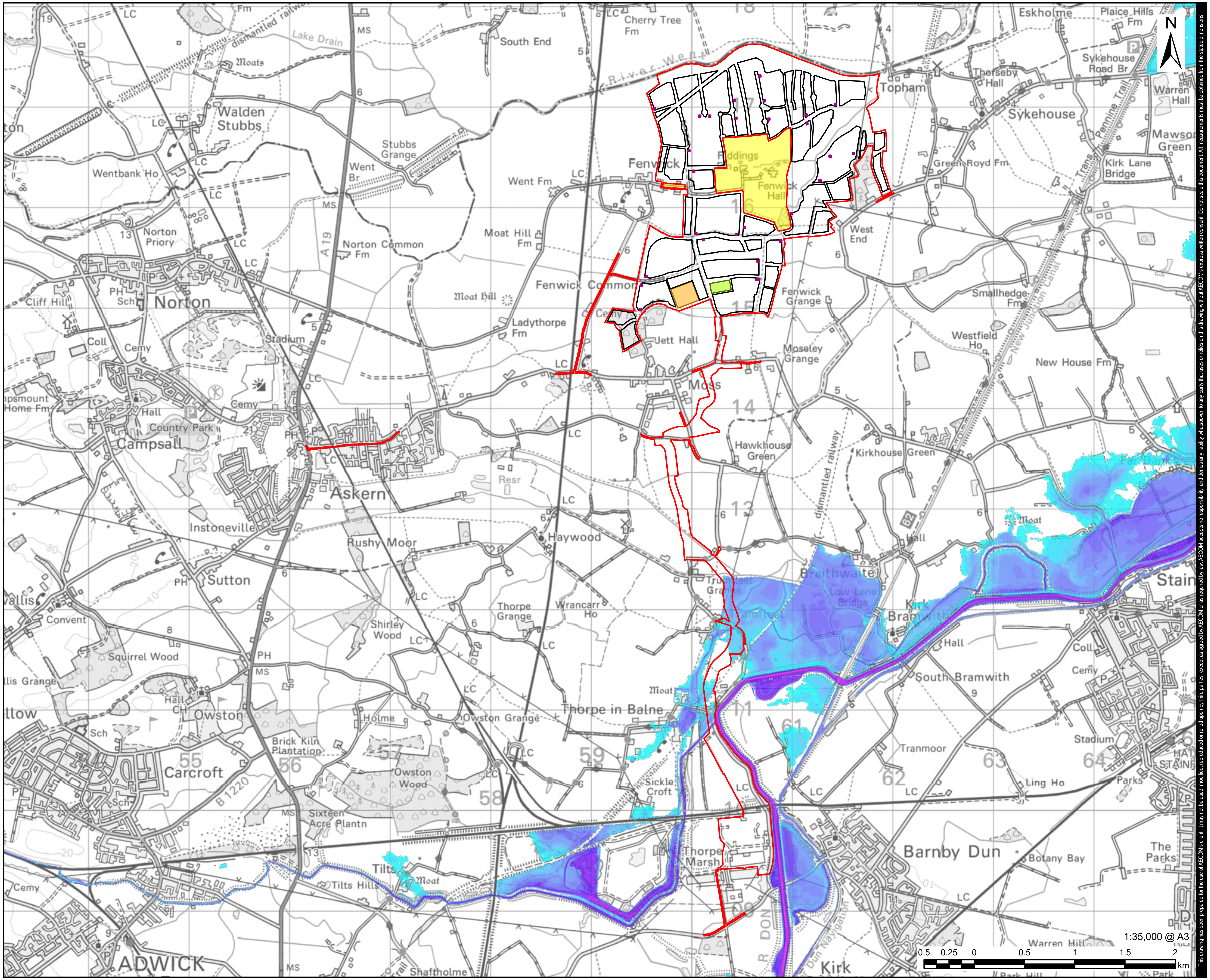

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LEGEND

- Order limits
- Land not included in the Order limits
- On-Site Substation
- BESS Area
- PV Developable Area
- Field Substation

Lower Don 2018 Maximum Modelled Flood Depth (m)

- < 0.25
- ≥ 0.25 - < 0.50
- ≥ 0.50 - < 0.75
- ≥ 0.75 - < 1.0
- ≥ 1.0 - < 1.5
- ≥ 1.5 - < 2.0
- ≥ 2.0 - < 2.5
- ≥ 2.5 - < 3.0
- ≥ 3.0 - < 3.5
- ≥ 3.5 - < 4.0
- ≥ 4.0 - < 4.5
- ≥ 4.5 - < 5.0
- ≥ 5.0 - < 5.5
- ≥ 5.5 - < 6.0
- ≥ 6.0 - < 6.5
- ≥ 6.5 - < 7.0
- ≥ 7.0 - < 7.5

NOTES

ISSUE PURPOSE

Environmental Statement

PROJECT NUMBER

60698207

FIGURE TITLE

Lower Don 2018 Maximum Modelled Flood Depth 1% AEP + 50% Climate Change

FIGURE NUMBER

Figure 9-3-2

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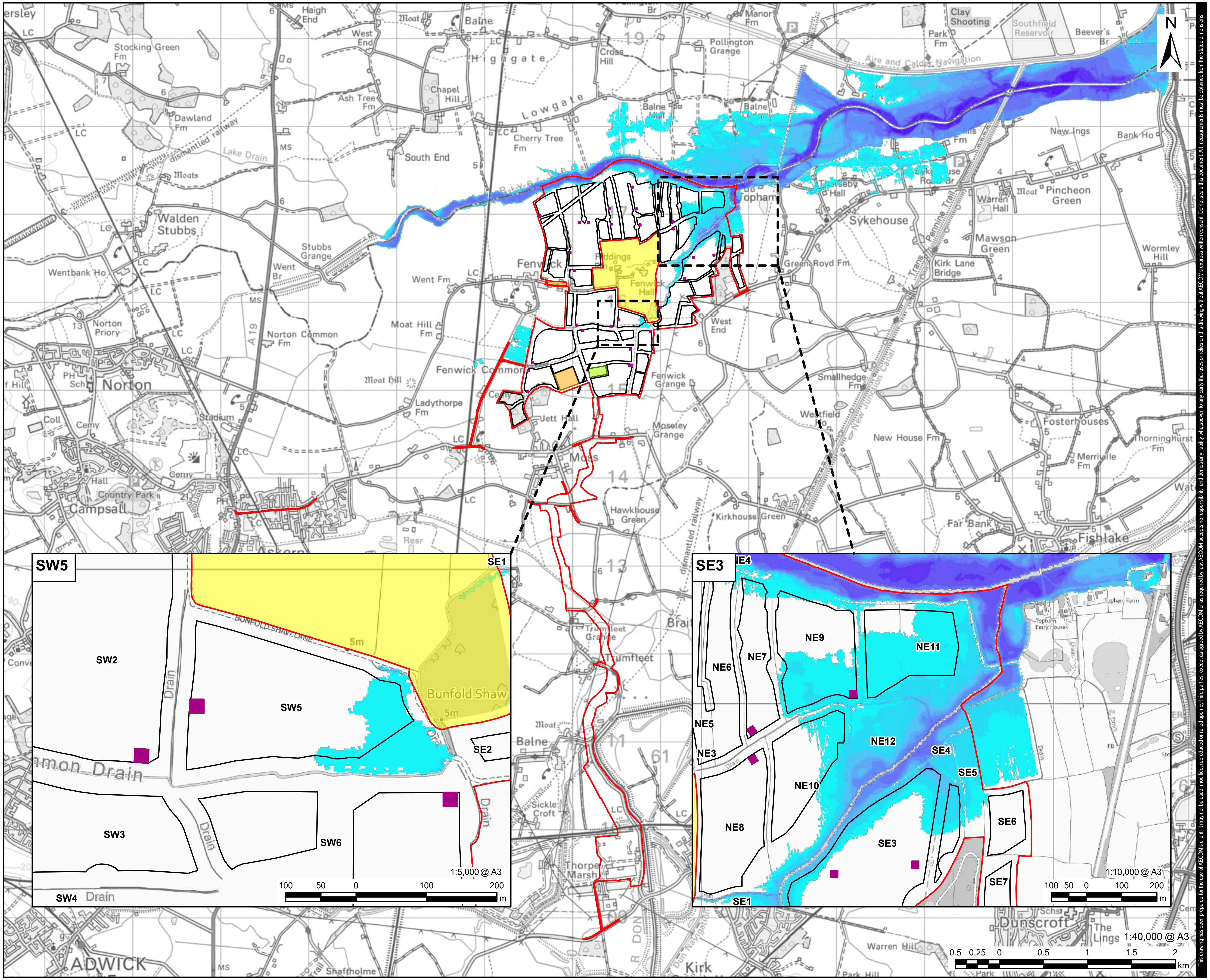

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LEGEND

- Order limits
- Land not included in the Order limits
- On-Site Substation
- BESS Area
- PV Developable Area
- Field Substation

River Went 2024 Maximum Modelled Flood Depth Credible Maximum Scenario (m)

- < 0.25
- ≥ 0.25 - < 0.50
- ≥ 0.50 - < 0.75
- ≥ 0.75 - < 1.0
- ≥ 1.0 - < 1.5
- ≥ 1.5 - < 2.0
- ≥ 2.0 - < 2.5
- ≥ 2.5 - < 3.0
- ≥ 3.0 - < 3.5

NOTES

ISSUE PURPOSE

Environmental Statement

PROJECT NUMBER

60698207

FIGURE TITLE

River Went 2024 Maximum Modelled Flood Depth Credible Maximum Scenario

FIGURE NUMBER

Figure 9-3-3

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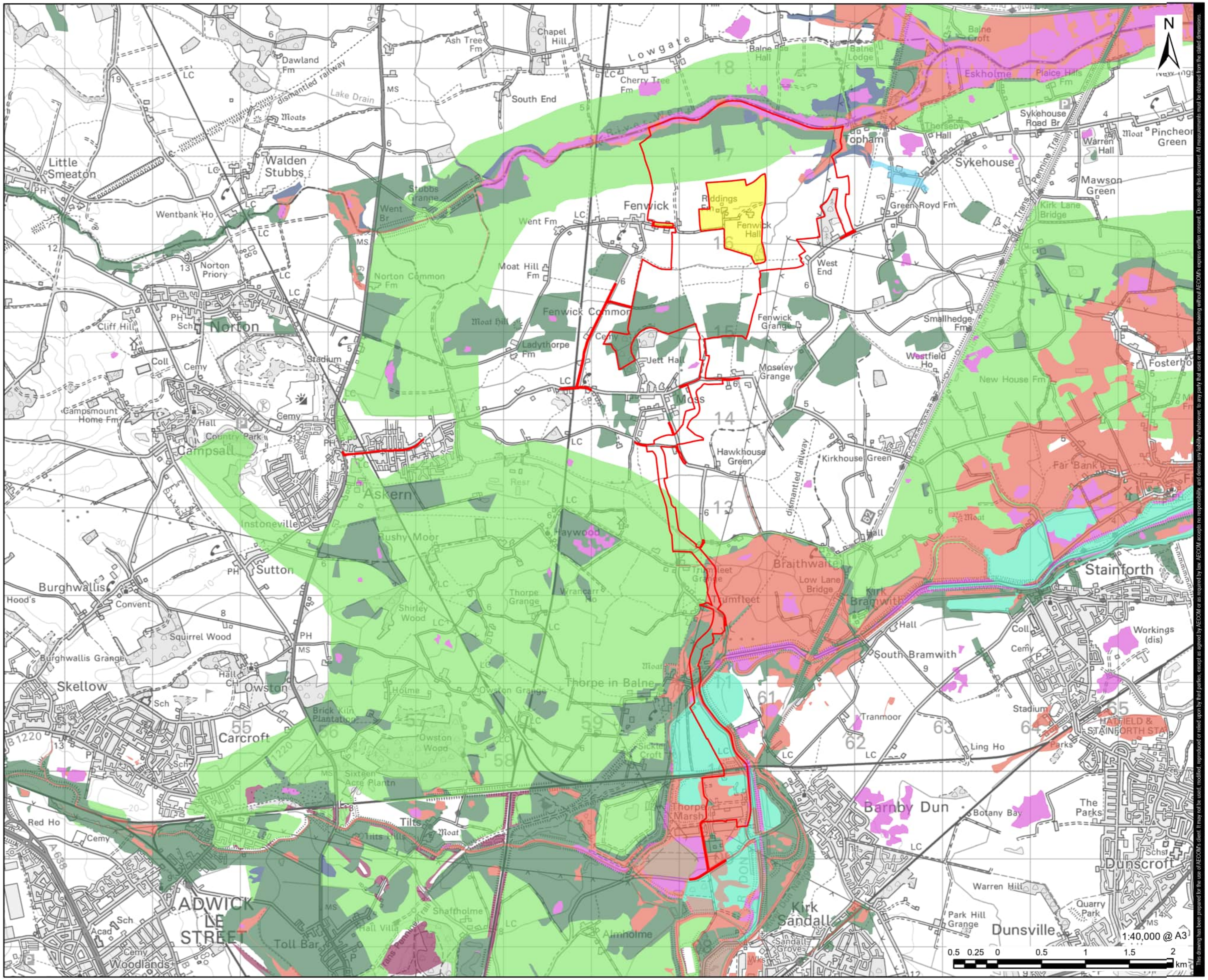

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LEGEND

- Order limits
- Land not included in the Order limits

Recorded Flood Outline (Year)

- 1932
- 1947
- 1968
- 1982
- 1995
- 2000
- 2007
- 2019
- 2020
- 2021
- 2022

NOTES

ISSUE PURPOSE

Environmental Statement

PROJECT NUMBER

60698207

FIGURE TITLE

Recorded Flood Outlines

FIGURE NUMBER

Figure 9-3-4

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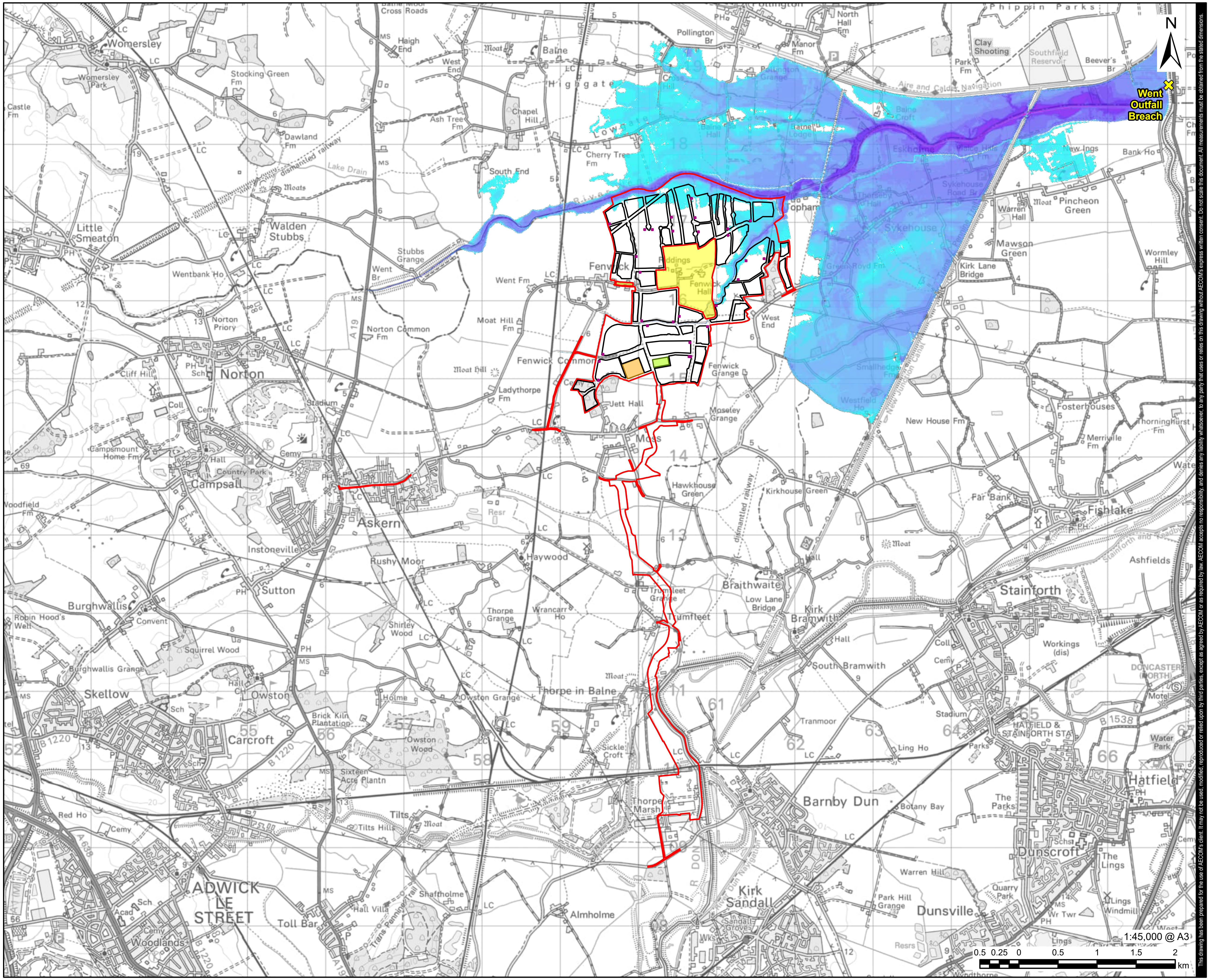

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LEGEND

- Order limits
- Land not included in the Order limits
- Breach Location
- On-Site Substation
- BESS Area
- PV Developable Area
- Field Substation

2024 Maximum Modelled Flood Depth River Went Outfall Breach (m)

- < 0.25
- ≥ 0.25 - < 0.50
- ≥ 0.50 - < 0.75
- ≥ 0.75 - < 1.0
- ≥ 1.0 - < 1.5
- ≥ 1.5 - < 2.0
- ≥ 2.0 - < 2.5
- ≥ 2.5 - < 3.0
- ≥ 3.0 - < 3.5
- ≥ 3.5 - < 4.0
- ≥ 4.0 - < 4.5
- ≥ 4.5 - < 5.0
- ≥ 5.0 - < 5.5
- ≥ 5.5 - < 6.0
- ≥ 6.0 - < 6.5

NOTES

ISSUE PURPOSE

Environmental Statement

PROJECT NUMBER

60698207

FIGURE TITLE

Maximum Modelled Flood Depth River Went Outfall Breach 1% AEP + 50% Climate Change

FIGURE NUMBER

Figure 9-3-5a

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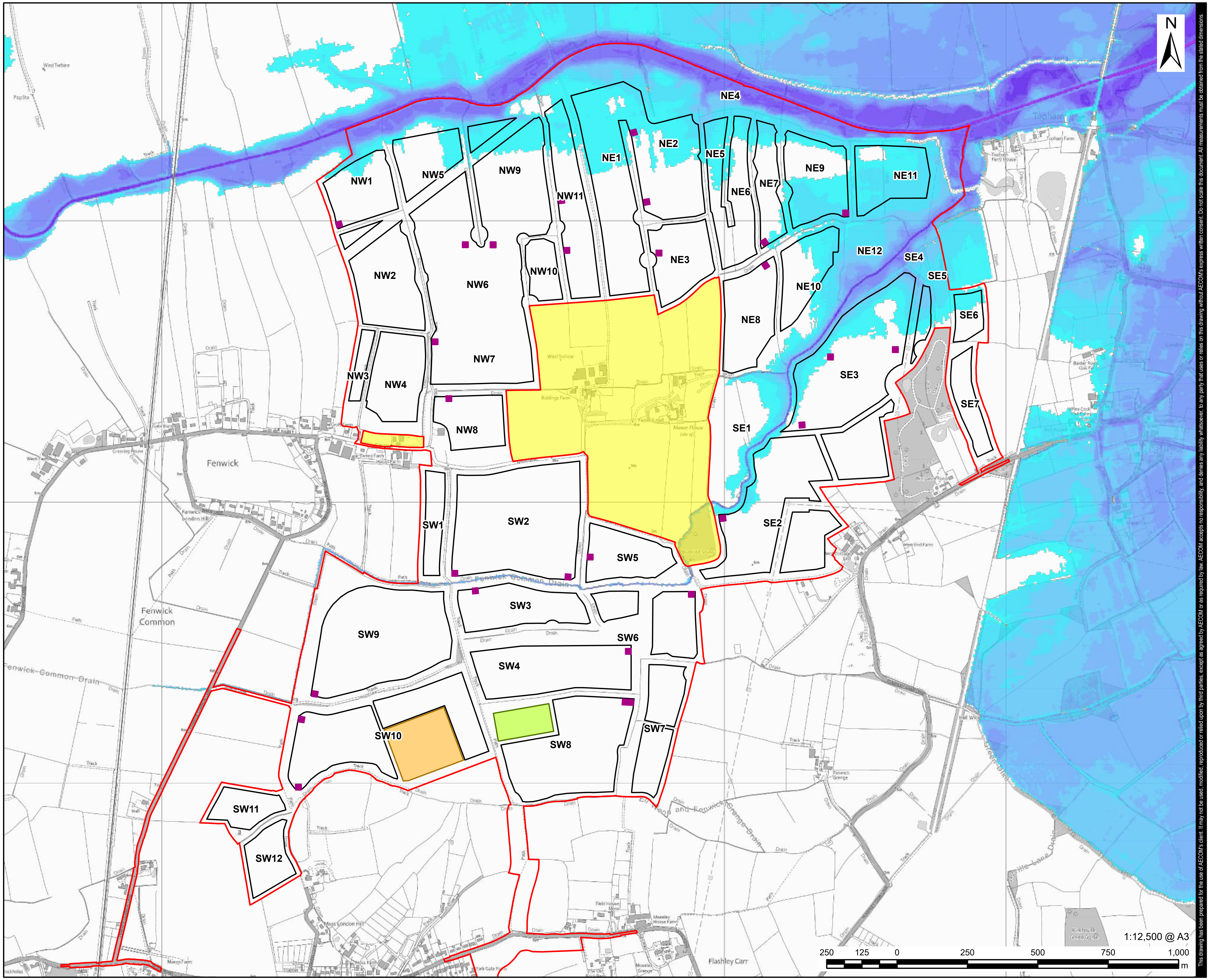

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LEGEND

- Order limits
- Land not included in the Order limits
- On-Site Substation
- BESS Area
- PV Developable Area
- Field Substation

Maximum Modelled Flood Depth River Went Outfall Breach (m)

- < 0.25
- ≥ 0.25 - < 0.50
- ≥ 0.50 - < 0.75
- ≥ 0.75 - < 1.0
- ≥ 1.0 - < 1.5
- ≥ 1.5 - < 2.0
- ≥ 2.0 - < 2.5
- ≥ 2.5 - < 3.0
- ≥ 3.0 - < 3.5
- ≥ 3.5 - < 4.0
- ≥ 4.0 - < 4.5
- ≥ 4.5 - < 5.0
- ≥ 5.0 - < 5.5
- ≥ 5.5 - < 6.0
- ≥ 6.0 - < 6.5

NOTES

ISSUE PURPOSE

Environmental Statement

PROJECT NUMBER

60698207

FIGURE TITLE

Maximum Modelled Flood Depth River Went Outfall Breach 1% AEP + 50% Climate Change - Solar PV Site

FIGURE NUMBER

Figure 9-3-5b

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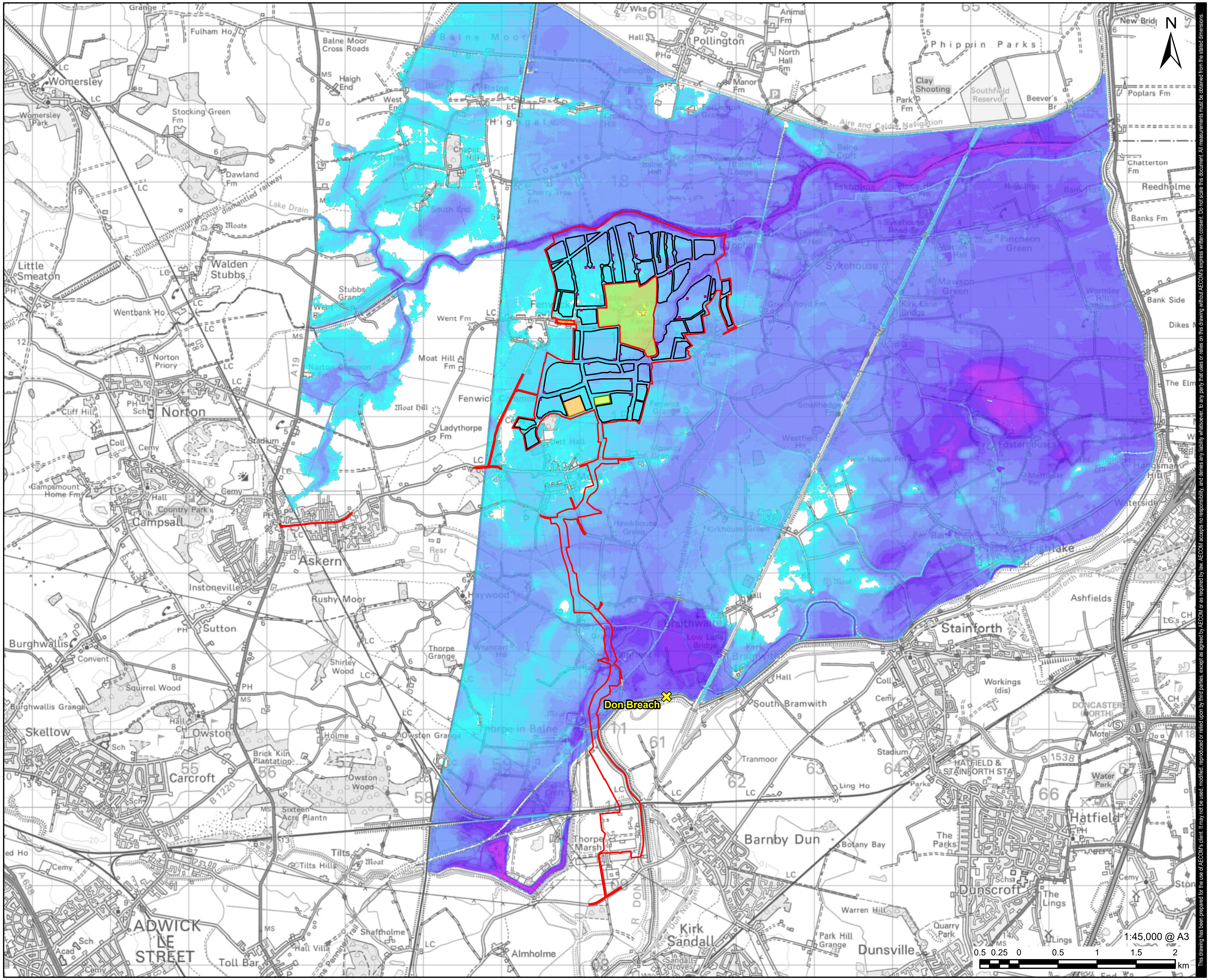

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LEGEND

- Order limits
- Land not included in the Order limits
- Breach Location
- On-Site Substation
- BESS Area
- PV Developable Area
- Field Substation

Maximum Modelled Flood Depth River Don Breach (m)

- < 0.25
- ≥ 0.25 - < 0.50
- ≥ 0.50 - < 0.75
- ≥ 0.75 - < 1.0
- ≥ 1.0 - < 1.5
- ≥ 1.5 - < 2.0
- ≥ 2.0 - < 2.5
- ≥ 2.5 - < 3.0
- ≥ 3.0 - < 3.5
- ≥ 3.5 - < 4.0
- ≥ 4.0 - < 4.5
- ≥ 4.5 - < 5.0
- ≥ 5.0 - < 5.5
- ≥ 5.5 - < 6.0
- ≥ 6.0 - < 6.5
- ≥ 6.5 - < 7.0
- ≥ 7.0 - < 7.5

NOTES

ISSUE PURPOSE

Environmental Statement

PROJECT NUMBER

60698207

FIGURE TITLE

Maximum Modelled Flood Depth River Don Breach 1% AEP + 50% Climate Change

FIGURE NUMBER

Figure 9-3-6a

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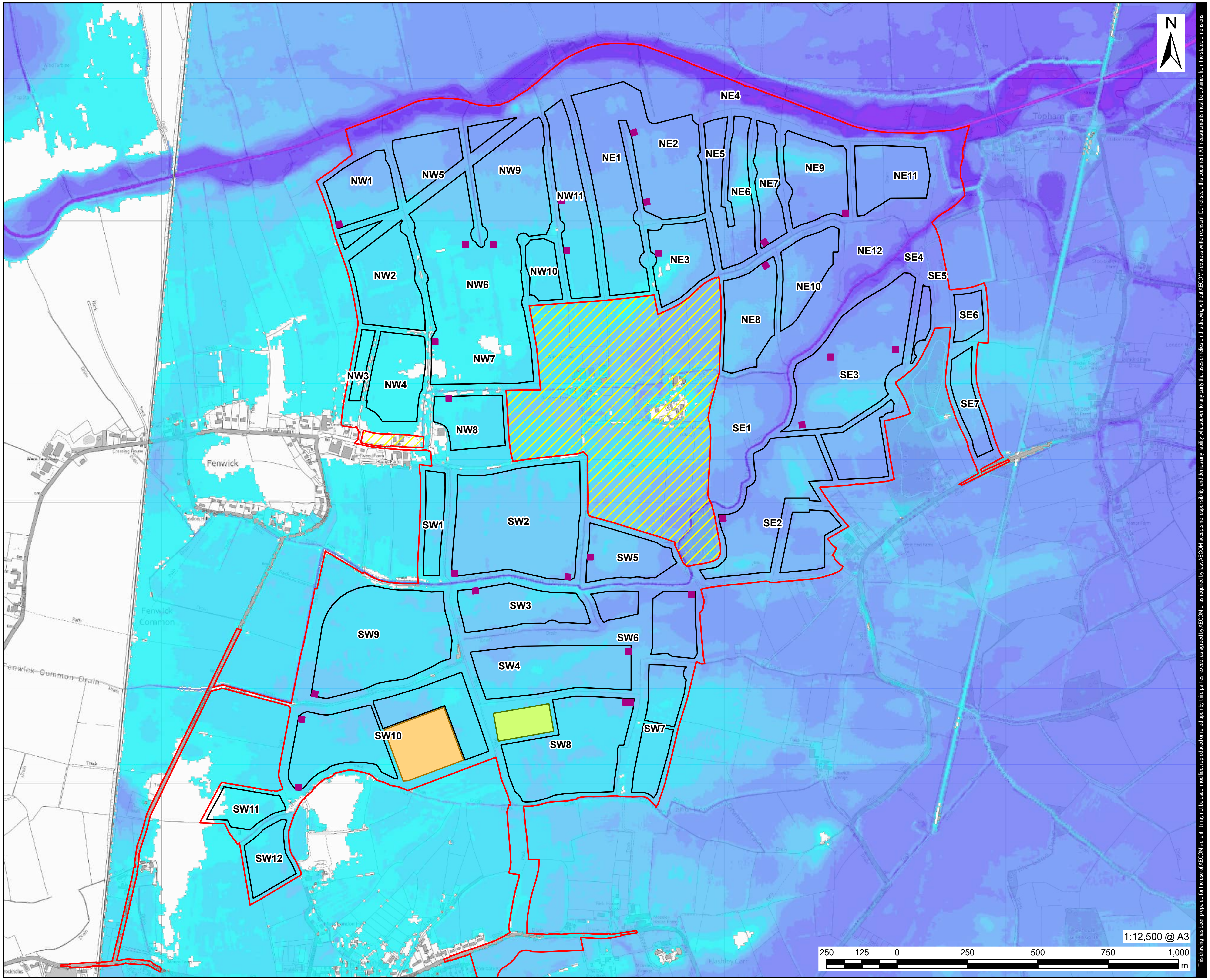

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LEGEND

- Order limits
- Land not included in the Order limits
- On-Site Substation
- BESS Area
- PV Developable Area
- Field Substation

Maximum Modelled Flood Depth River Don Breach (m)

- < 0.25
- ≥ 0.25 - < 0.50
- ≥ 0.50 - < 0.75
- ≥ 0.75 - < 1.0
- ≥ 1.0 - < 1.5
- ≥ 1.5 - < 2.0
- ≥ 2.0 - < 2.5
- ≥ 2.5 - < 3.0
- ≥ 3.0 - < 3.5
- ≥ 3.5 - < 4.0
- ≥ 4.0 - < 4.5
- ≥ 4.5 - < 5.0
- ≥ 5.0 - < 5.5
- ≥ 5.5 - < 6.0
- ≥ 6.0 - < 6.5
- ≥ 6.5 - < 7.0
- ≥ 7.0 - < 7.5

NOTES

ISSUE PURPOSE

Environmental Statement

PROJECT NUMBER

60698207

FIGURE TITLE

Maximum Modelled Flood Depth River Don Breach 1% AEP + 50% Climate Change - Solar PV Site

FIGURE NUMBER

Figure 9-3-6b

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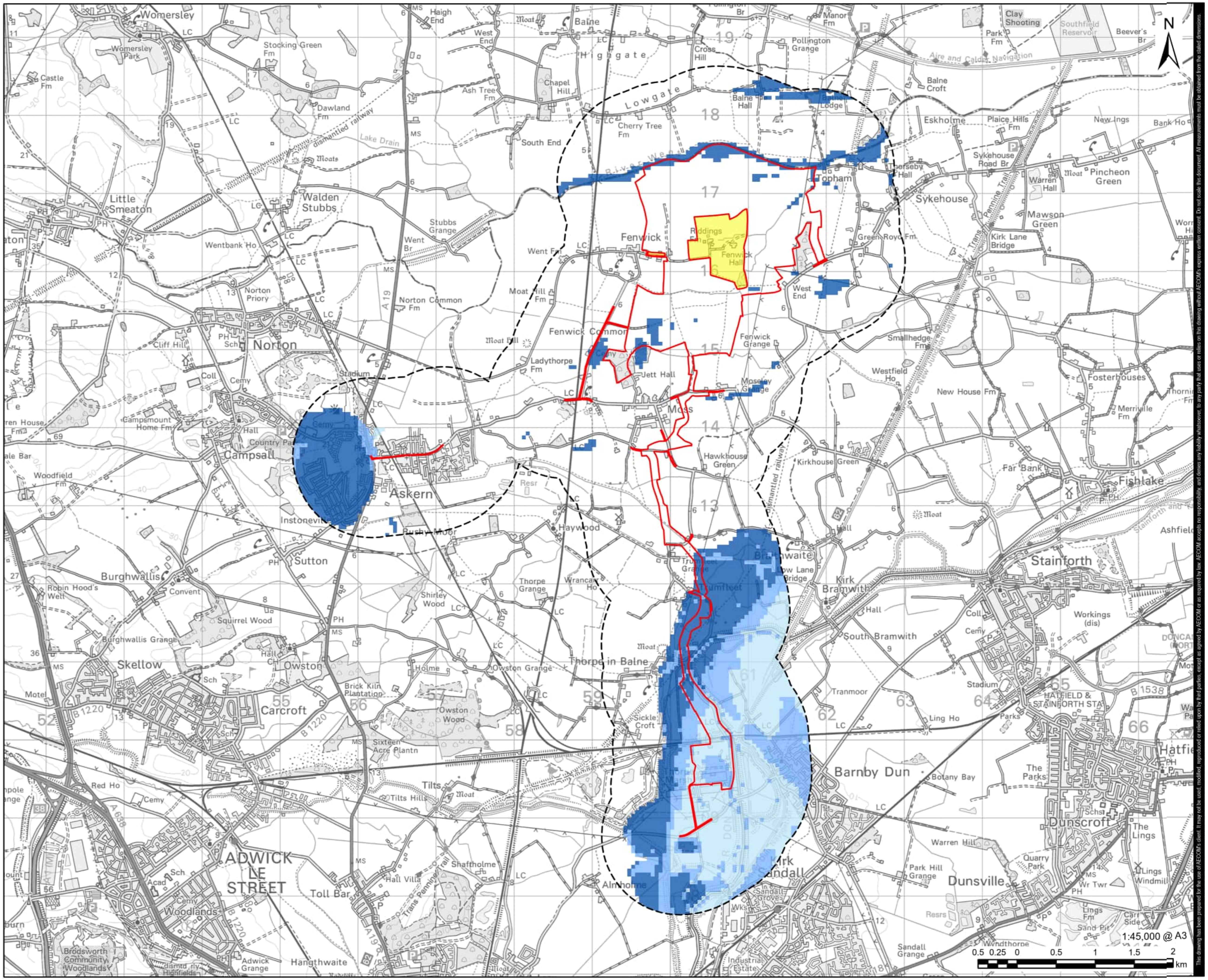

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LEGEND

- Order limits
- Land not included in the Order limits
- Extent of BGS Groundwater Flooding Data (1km Buffer of the Order limits)
- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

NOTES

ISSUE PURPOSE

Environmental Statement

PROJECT NUMBER

60698207

FIGURE TITLE

BGS Groundwater Flood Risk Map

FIGURE NUMBER

Figure 9-3-7

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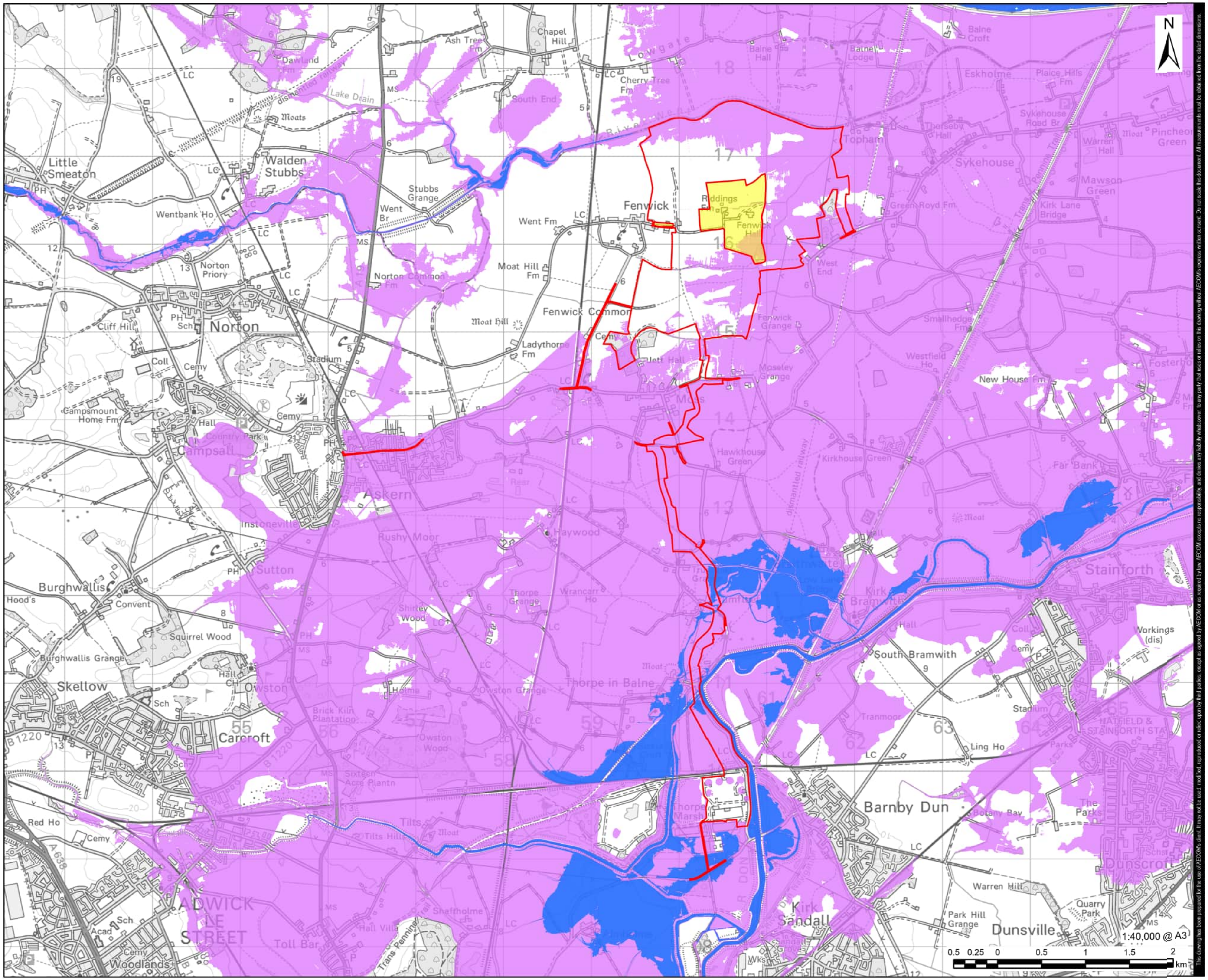

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LEGEND

- Order limits
- Land not included in the Order limits

Reservoir Flood Extent

- Risk of Flooding from Reservoirs When River Levels are Normal (Dry Day)
- Risk of Flooding from Reservoirs When There is Also Flooding from Rivers (Wet Day)

NOTES

ISSUE PURPOSE

Environmental Statement

PROJECT NUMBER

60698207

FIGURE TITLE

Reservoir Flood Extents - Wet and Dry Day

FIGURE NUMBER

Figure 9-3-8


BOOM
POWER
BUILD | OWN | OPERATE | MAINTAIN
BOOM-POWER.CO.UK