Meridian Solar

Meridian Solar Farm

EN010169

Volume 6

Environmental Statement

6.3 ES Appendix 11-3: Flood Risk Assessment (Rev 1) (Clean)

APFP Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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1.1.1. This Flood Risk Assessment (FRA) forms a technical appendix to **Environmental Statement (ES) Chapter 11: Hydrology and Flood Risk** (Doc Ref. 6.1) for the proposed Meridian Solar Farm (the Scheme).

1.1.2. Meridian Solar Farm Ltd (hereafter referred to as 'the Applicant') is seeking a Development Consent Order (DCO) for the construction, operation and decommissioning of the Meridian Solar Project (hereafter referred to as the 'Scheme'). The decision on whether to grant the DCO will be made by the Secretary of State for Energy Security and Net Zero (Secretary of State), in accordance with the Planning Act 2008 (PA 2008)[1] (hereafter referred to as the 'DCO Application').

1.1.3. The Scheme would comprise the construction, operation (including maintenance) and decommissioning of a solar PV electricity generating station with associated infrastructure, including co-located Battery Energy Storage System (BESS), Inter-Array Connections to link the land parcels that form the Solar Development Areas, and an up to 13km overhead line Grid Connection (with one short undergrounded section) which would run north towards a point of connection (PoC) at the proposed Weston Marsh B National Grid Electricity Transmission (NGET) substation, to the north of Weston. The Solar PV generating station, associated BESS, on-site substations and other associated infrastructure would be located within four land parcels (A, B, C and D) referred to collectively as the Solar Development Area, as shown in **ES Figure 1-1** (Doc Ref. 6.2).The Inter-Arrays would be the areas within which 132kV connection cables (the 'Inter-Array Connections') would link the land parcels of the Solar Development Area. The configuration of the Inter-Array Connections would comprise underground cabling between Land Parcels A and B ('the Underground Inter-Array') and an overhead line between Land Parcels C and D ('the Overground Inter-Array').The Grid Connection Route would be the area between the Solar Development Area and the National Grid Weston Marsh B Substation in which a 400kV overhead line (the 'Grid Connection') would be located. There is one section where the Grid

[1] The Planning Act 2008, Available at: https://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf [Accessed 10/10/2025]

Connection would route underground to avoid conflicts with an existing 132kV overhead line. Cable Sealing End Compounds (CSECs) would join the proposed underground cable at that section with the proposed overhead line. A full description of the Scheme is included in **ES Chapter 2: Scheme** (Doc Ref. 6.1). An overview of the Scheme and its environmental impacts is provided in the **ES Non-Technical Summary** (Doc Ref. 6.1).

1.1.4. The design life of the Scheme will be 40 years and decommissioning is expected to commence thereafter. Upon decommissioning, the above-ground physical infrastructure will be dismantled and removed. In addition, concrete foundations to these elements would be removed to a depth agreed with the relevant landowner from the area within the Order Limits and recycled or disposed of in accordance with good practice and market conditions at that time. The mode of any underground cable decommissioning will be dependent upon Government policy, best practice and landowner agreement at that time.

1.1.5. The National Planning Practice Guidance[2], paragraph 006, suggests that for non-residential development, an assessment period of 75 years can be used to form a starting point for assessment. However, as the operational design life is stated as 40 years, it is considered appropriate to assess the design life for 40 years.

1.1.6. The Site is located to the south of Spalding and north-east of Crowland within flat, open countryside. The main land use across the Site is agricultural. The landscape features within the vicinity consist of steep man-made agricultural drainage ditches typically bordering arable field boundaries.

1.1.7. This FRA has been prepared in accordance with the requirements of the in force Overarching National Policy Statement (NPS) as of 6 January 2026 for Energy (EN-1)[3], the NPS for Renewable Energy Infrastructure (EN-3)[4], and Electricity Networks Infrastructure (EN-5)[5], and the National Planning Policy

[2] Department of Communities and Local Government (2014, updated September 2025) National Planning Practice Guidance: Flood Risk and Coastal Change. https://www.gov.uk/guidance/flood-risk-and-coastal-change
[3] Overarching National Policy Statement for Energy (EN-1) (2025). Available at: https://assets.publishing.service.gov.uk/media/695d1015f41883f4e50ed9ab/overarching-national-policy-statement-for-energy-en-1-web-accessible.pdf [Accessed 9 January 2026]
[4] National Policy Statement for Renewable Energy Infrastructure (EN-3) (2025). Available at: https://assets.publishing.service.gov.uk/media/695d1368b5c46330350ed9a2/national-policy-statement-for-renewable-energy-infrastructure-en-3-web-accessible.pdf [Accessed 9 January 2026]
[5] National Policy Statement for Electricity Networks Infrastructure (EN-5) (2025). Available at: https://assets.publishing.service.gov.uk/media/695d12e1b5c46330350ed9a1/national-policy-statement-for-electricity-networks-infrastructure-en-5-web-accessible.pdf [Accessed 9 January 2026]

Framework (NPPF)[6]. The proposed use of the Scheme would be classed as 'Essential Infrastructure' in accordance with Annex 3 of NPPF.

1.1.8. This FRA discusses fluvial flood risk to the Solar Development Area (in Section 5.3), fluvial flood risk to the Grid Connection Route (in Section 5.4) and fluvial flood risk in the Inter-Array Connections (in Section 5.5). Flood risk from tidal, surface water, and other sources is discussed in Sections 5.6 to 5.8.

1.1.9. Flood risk during the construction of the Scheme is to be managed by the on-site contractors through the final Construction Environment Management Plan (CEMP), to be developed post DCO Consent. An **Outline Construction Environment Management Plan (CEMP)** (Doc Ref. 7.10) is submitted with the DCO Application. However, the consideration of flood risk and mitigation measures associated with the presence of temporary construction compounds have been assessed within this FRA.

1.1.10. The flood risk summary table below indicates the overall flood risk across the Scheme; the report assesses the Scheme in more detail relative to each flood risk area.

Table 1-1: Flood Risk Summary

Flood Risk Source	Pre-Development Flood Risk Level	Post-Proposed Development Flood Risk Level	Comments
Fluvial	High	High	<u>River Welland</u> The 400kV Substation and BESS in Land Parcel B and two of the 132kV Substations in Land Parcel A and C lie within Flood Zone 2 and 3a, according to Flood Map for Planning. However, the Scheme benefits from flood defences up to the 1 in 1000 (0.1% AEP plus climate change) year event

[6] National Planning Policy Framework (March 2012, updated December 2024). Available at: https://assets.publishing.service.gov.uk/media/669a25e9a3c2a28abb50d2b4/NPPF_December_2023.pdf [Accessed 9 January 2026]

Flood Risk Source	Pre-Development Flood Risk Level	Post-Proposed Development Flood Risk Level	Comments
			with a low residual risk from a breach of the River Welland; therefore, there is a low residual risk of fluvial flooding to the Scheme from the River Welland. Substations and BESS that sit within the breach flood extent[7] are bunded with 300mm freeboard to ensure it will remain operational in times of flood. <u>Postland Catchment</u> All infrastructure other than solar PV panels are located outside of the Flood Zone 3b flood extents. Mitigation for solar stations and substations within the Postland catchment is provided for the breach scenario of the River Welland. Modelled flood extents of the Postland catchment during pump failure are significantly shallower and to a lesser flood extent than the breach of the River Welland. No additional mitigation is required for the Postland catchment. <u>South Holland Main Drain (SHMD)</u> Hydraulic modelling indicates Gotts Fen includes areas of Flood Zone 3b and 3a. Fleet Fen and Wisemans catchments are not impacted by Flood

[7] Flood extent: The lateral extent of flooding, defining the area that may be inundated during a specified flood event.

Flood Risk Source	Pre-Development Flood Risk Level	Post-Proposed Development Flood Risk Level	Comments
			Zone 3a or 3b (flows remain in channel, including for climate change). The 0.1% AEP plus 28% climate change flood extent from pump failure extends across all SHMD catchments. However, where the SHMD shares its catchment with the River Welland breach flood extents, mitigation is already provided for infrastructure, above the 1 in 1000 year (0.1% AEP plus climate change) depth of the SHMD. The 132kV Substation in Parcel D is located outside of the flood extents during the pump failure scenario, with no additional mitigation required. Mitigation required for PV panels and solar stations is discussed below. <u>PV Panels / Solar Stations</u> The lower edge of solar PV panels will have a minimum height above ground of 0.8m to remain operational in times of flood, and will be raised up to a maximum of 1.3m above ground to ensure upper panels will remain operational in times of flood. Other than in the Gotts Catchment which includes the northern most fields within Land Parcel D (field D-1), all solar stations have also been located outside of Flood Zone 3b flood extents. The maximum height of any plinths used to raise solar stations above flood

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Flood Risk Source	Pre-Development Flood Risk Level	Post-Proposed Development Flood Risk Level	Comments
			depths will be 0.8m (0.5m plus 0.3m freeboard). Where solar stations are located within the flood extents and the plinths do not raise the solar stations above the worst-case flood depths and provide 0.3m freeboard, they are to have a flood defence wall or bund for protection. As requested by the EA during a meeting with them in January 2026, solar stations within Land Parcel D-1 that are located in Flood Zone 3b flood extents would be provided freeboard of up to 0.6m, and therefore the maximum height of any plinths used to raise solar stations above flood depths in Land Parcel D-1 would be 1.35m (0.75m plus 0.6m freeboard), resulting in a maximum height of 4.85m above the ground for solar stations raised on plinths. Fluvial floodplain volume loss from infrastructure has been assessed in Section 5.3 of this FRA.
Tidal	Low	Low	The EA has been contacted to obtain product data, which confirmed that tidal flood risk is low across all land parcels within the Site. The River Welland is a tidal river that flows west of the Scheme. This river is defended by the Crowland-Cowbit Washes and embankments. Land parcels A, B and C are protected against a flood event with a 1 in 1000 year chance of

Flood Risk Source	Pre-Development Flood Risk Level	Post-Proposed Development Flood Risk Level	Comments
			occurring in any year (0.1% AEP plus climate change). Review of the River Nene model shows the River Nene tidal flood risk or extreme overtopping during a in 1000 year (0.1% plus climate change) does not encroach into the Order Limits.
Pluvial	Low-High	Low-High	The EA 'Flood Risk from Surface Water' Map shows areas that may be susceptible to surface water flooding following an extreme rainfall event. The mapping shows that the majority of the Solar Development Area is at a 'Very Low' risk of surface water flooding. Only isolated and localised areas are shown to be at high, medium and low risk of surface water flooding. Flooding is generally very localised. Risks range from low chance to high chance. The areas of risk are likely areas of low topography where surface water sits and pools rather than draining away.
Groundwater	Low	Low	The South East Lincolnshire Strategic Flood Risk Assessment (SFRA) and online data have been reviewed to try and establish the existing groundwater risk. The GOV website for long term flood risk was used to obtain information regarding ground water flooding in the Site. These data sources show that flooding from groundwater is unlikely in this area. Groundwater

Flood Risk Source	Pre-Development Flood Risk Level	Post-Proposed Development Flood Risk Level	Comments
			risk will be mitigated by discharging surface runoff to watercourses and using shallow swales, therefore, not increasing risk of groundwater flooding. Platform levels will be set above the fluvial flood risk levels by at least 0.3m which will mitigate against groundwater emergence.
Sewers	Low	Low	The Scheme has no proposed connection to public foul or surface water sewers. No change to flood risk level.
Artificial Sources	High	High	The EA reservoirs map shows the Site is seen to be at risk of flooding from reservoirs, apart from the east of the Site boundary, which shows no risk of flooding. This is due to the nearby reservoirs, Eyebrook Reservoir and Rutland Water that are located far west of the Scheme.

1.1.11. When considered within the context of national, regional and local planning policy in respect of development and flood risk, this FRA concludes that the area of the Scheme would remain safe for its lifetime, does not increase flood risk elsewhere, and fulfils the Government's wider criteria for sustainable development.

2. Introduction

2.1. Background

2.1.1. This Flood Risk Assessment (FRA) forms a technical appendix to **Environmental Statement (ES) Chapter 11: Hydrology and Flood Risk** for the proposed Meridian Solar Farm (the Scheme).

2.1.2. This FRA has been prepared in accordance with the requirements of the Overarching National Policy Statement (NPS) for Energy (EN-1), the NPS for Renewable Energy Infrastructure (EN-3), and Electricity Networks Infrastructure (EN-5), and the National Planning Policy Framework (NPPF). The proposed use of the Scheme would be classed as 'Essential Infrastructure' in accordance with Annex 3 of NPPF.

2.1.3. The draft NPPF issued in December 2025, and which is currently in consultation, has been reviewed against the current NPPF. The FRA is compliant with the requirements of both the existing and the draft NPPF.

2.1.4. This FRA discusses fluvial flood risk to the Solar Development Area (in Sections 5.3), fluvial flood risk to the Grid Connection Route (in Section 5.4) and fluvial flood risk in the Inter-Array Connections (in Section 5.5). Flood risk from tidal, surface water, and other sources is discussed in Sections 5.6 to 5.8.

2.1.5. Flood risk during the construction of the Scheme is to be managed by the on-site contractors through the final Construction Environment Management Plan (CEMP), to be developed post-consent. An **Outline Construction Environment Management Plan** (OCEMP) (Doc Ref. 7.10) is submitted with the DCO Application. However, the consideration of flood risk and mitigation measures associated with the presence of temporary construction compounds have been assessed within this FRA.

2.1.6. This appendix identifies and proposes measures to address the potential impacts and likely significant effects of the Scheme on flood risk, during the construction, operation and decommissioning phases of the Scheme.

2.1.7. The following aspects of the FRA have been scoped in and are presented within this report:

- Identify potential forms of flooding including rivers, watercourses, surface water flooding, groundwater flooding, flooding from sewer systems and other forms of flooding;
- Establish the risk of flooding;

- Determine the effects of the development on flooding elsewhere either through displacement of floodwaters or increased runoff;
- Suggest appropriate flood mitigation measures, including a strategy for disposal of surface water run-off following the principles of Sustainable Drainage Systems (SuDS).

2.1.8. The detail included in the FRA, and the accompanying drainage strategy (**ES Appendix 11-4: Outline Drainage Strategy**) (Doc Ref 6.3) is sufficient to support a DCO Application for the Scheme.

2.1.9. This report is supported by the following ES figures:

- **ES Figure 2-2: Illustrative Solar Development Area and Inter-Array Connections Layout Plan** (Doc Ref. 6.2);
- **ES Figure 2-4: Illustrative Grid Connection Route Layout Plan** (Doc Ref. 6.2);
- **ES Figure 2-6: Solar Development Area and Inter-Array Connections Illustrative Construction Layout Plan** (Doc Ref. 6.2);
- **ES Figure 2-7: Grid Connection Route Illustrative Construction Layout Plan** (Doc Ref. 6.2); and
- **ES Figure 11-1: Surface Water Features And Their Attributes** (Doc Ref. 6.2).

2.2. FRA Objectives

2.2.1. The minimum requirements for FRAs, as outlined in the Overarching National Policy Statement (NPS) for Energy (NPS EN-1) (paragraph 5.8.15)[3] are to:

- *"Be proportionate to the risk and appropriate to the scale, nature, and location of the project;*
- *Consider the risk of flooding arising from the project in addition to the risk of flooding to the project;*
- *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;*
- *Be undertaken by competent people, as early as possible in the process of preparing the proposal;*

- *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;*
- *Consider the vulnerability of those using the site, including arrangements for safe access and escape;*
- *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;*
- *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;*
- *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;*
- *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;*
- *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. Information should include:*
    - *Describe the existing surface water drainage arrangements for the site.*
    - *Set out (approximately) the existing rates and volumes of surface water run-off generated by the site. Detail the proposals for restricting discharge rates.*
    - *Set out proposals for managing and discharging surface water from the site using sustainable drainage systems and accounting for the predicted impacts of climate change. If sustainable drainage systems have been rejected, present clear evidence of why their including would be inappropriate.*
    - *Demonstrate how the hierarchy of drainage options has been followed*
    - *Explain and justify why the types of SuDS and method of discharge have been selected and why they are considered appropriate.*

  - *Explain how sustainable drainage systems have been integrated with other aspects of the development such as open space or green infrastructure, so as to ensure an efficient use of the site.*
  - *Describe the multifunctional benefits the sustainable drainage system will provide.*
  - *Set out which opportunities to reduce the causes and impacts of flooding have been identified and included as a part of the proposed sustainable drainage system.*
  - *Explain how run-off from the completed development will be prevented from causing an impact elsewhere.*
  - *Explain how the sustainable drainage system been designed to facilitate maintenance and, where relevant, adoption. Set out plans for ensuring an acceptable standard of operation and maintenance throughout the lifetime of the development.*
- *Detail those measurements 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.*
- *Identify and secure opportunities to reduce the causes and impacts if flooding overall during the period of construction, and*
- *Be supported by appropriate data and information, including historical information on previous events."*

2.2.2. The principal objectives of the FRA, accounting for the above, are to:

- Identify potential forms of flooding, including rivers, watercourses, surface water flooding, groundwater flooding, flooding from sewer systems and other forms of flooding, relevant to the Scheme;
- Establish the risk of flooding in relation to the Scheme;
- Determine the effects of the Scheme on flooding elsewhere either through displacement of floodwaters or increased runoff; and
- Suggest appropriate flood mitigation measures for the Scheme, including a strategy for disposal of surface water run-off following the principles of SuDS.

2.3. Scope of Work

2.3.1. In preparing the FRA, the following work has been completed:

- Obtained relevant data and information from statutory and other authorities;
- Considered the potential sources of flooding;
- Assessed the risk of flooding to the Site;
- Assessed the impact of off-site flooding (displaced water) on third parties;
- Considered the impact of climate change;
- Considered likely mitigation requirements and any residual risk.

2.4. Scheme Description

2.4.1. The proposed Scheme is located within the administrative areas for Lincolnshire County Council (LCC), South Holland District Council and South Holland Internal Drainage Board (SHIDB) and North Levels Internal Drainage Board (NLIDB). The Welland and Deepings IDB lies adjacent to the western boundary of the Order Limits, just north of Crowland but is not affected by the Scheme.

2.4.2. The Solar Development Area is located approximately 2km to the north and north-east of Crowland and approximately 10km south-east of Spalding, within flat, open countryside. The main land use across the Site is agricultural. The landscape features within the vicinity consist of steep man-made agricultural drainage ditches typically bordering arable field boundaries, with water levels across the area generally managed via pumping.

2.4.3. **ES Chapter 2: The Scheme** (Doc Ref 6.1) provides further details of the proposed Scheme and programme for site preparation, construction, and decommissioning works.

2.4.4. Settlements within the surrounding area consist of small clusters of development with occasional individual properties scattered throughout. Nearby residential receptors include but are not limited to properties in Crowland, Moulton, and Gedney Hill.

2.4.5. The principal watercourses in the area are the River Welland (to the west of the Scheme) and the River Nene (to the east), whilst the Solar Development Areas is bisected by the South Holland Main Drain and the St. James Drain, along with other small field ditches across the Solar Development Areas.

2.4.6. The Site sits within National Character Area 46 (NCA) The Fens, recognised by its large, low-lying, flat landscape with drainage ditches, dykes and rivers.

There are no statutory landscape designations within the Order Limits such as National Parks or National Landscapes.

2.4.7. The Wash Ramsar/ Special Protection Area (SPA)/ Special Area of Conservation (SAC)/ Site of Special Scientific Interest (SSSI) is the closest designated site of international importance, located 8.4km north-east of the Grid Connection Route. Within a 15km radius, there are also the Baston Fen SAC / SSSI 10km west of Land Parcel A and Nene Washes Ramsar / SPA/ SAC/ SSSI is located 11km south of land parcel D. In addition, the Cowbit Wash SSSI is located approximately 4km west and the Surfleet Lows SSSI approximately 3.5km north-west of the Grid Connection Route. There are also numerous non-statutory designated sites (local wildlife sites) within 2km of the Order Limits, as described within **ES Chapter 9: Ecology and Biodiversity** (Doc Ref. 6.1).

2.5. Proposed Scheme Extent

2.5.1. The Scheme includes three primary elements;

- The Solar Development Area;
- The Grid Connection Route; and
- The Inter-Array Connections.

2.5.2. The Site constitutes the total land area within the Order Limits of the Scheme, including the Solar Development Area, Inter-Array Connections and Grid Connection Route. A summary of the areas for each part of the Scheme is provided below:

- Solar Development Area - Land Parcel A: 197ha;
- Solar Development Area - Land Parcel B: 335ha;
- Solar Development Area - Land Parcel C: 205ha;
- Solar Development Area - Land Parcel D: 330ha;
- Underground Inter-Array between Land Parcel A & B: 15ha;
- Overhead Inter-Array between Land Parcel C & D: 46ha;
- Grid Connection Route: 510ha; and
- Site (total): 1616ha*

*Note the sum of parts for the areas of the Scheme exceeds the total area of the Order Limits due to an overlap of the Grid Connection Route with Solar Development Area Land Parcel B.

2.5.3. Plate 2-1 shows the location of the Scheme.

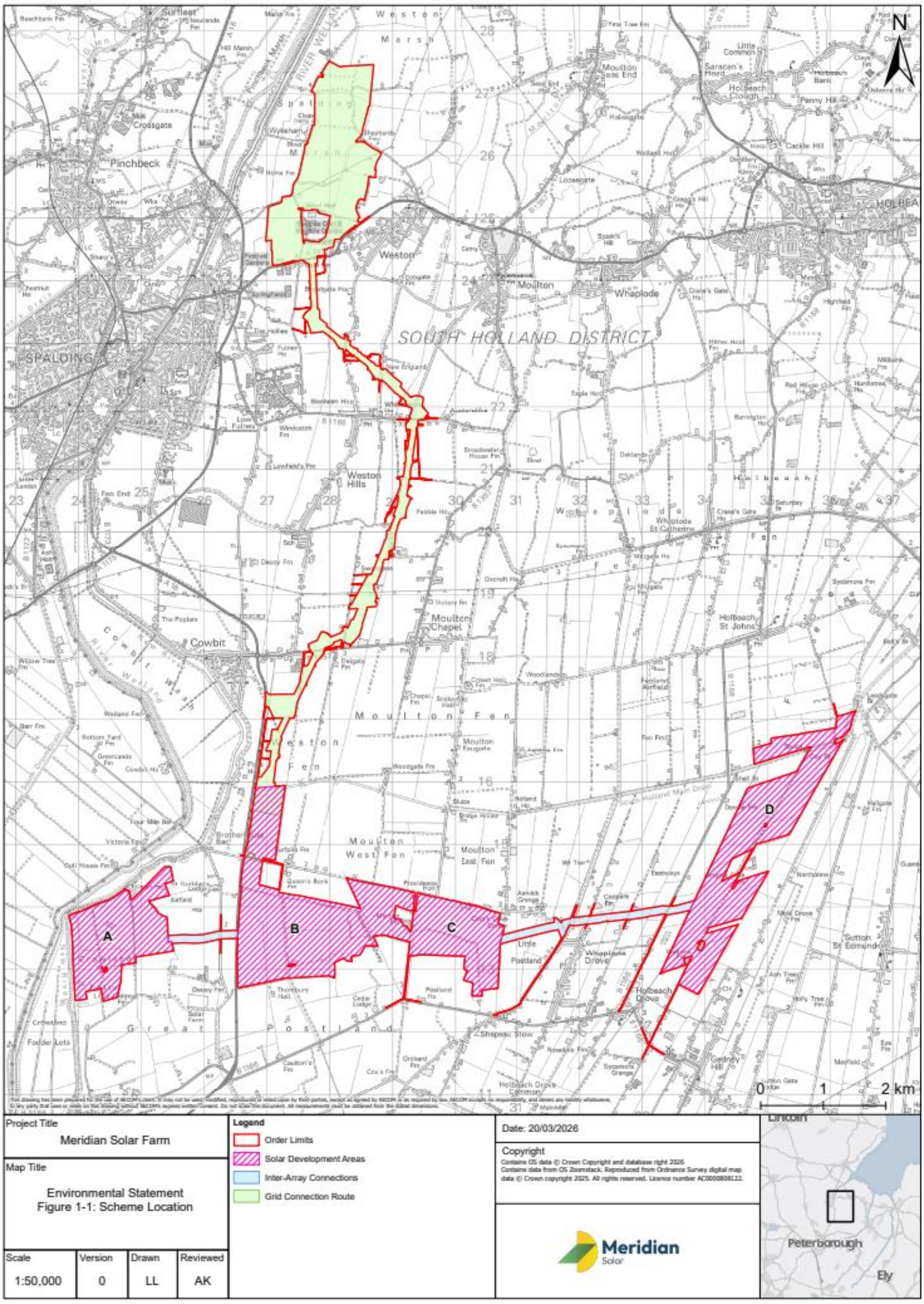

Plate 2-1: Location of the Scheme

2.6. Existing Land Use

2.6.1. The main land use across the Site is agricultural. The landscape features within the vicinity consist of steep man-made agricultural drainage ditches typically bordering arable field boundaries with isolated pockets of plantation.

2.6.2. Settlements within the surrounding area consist of small clusters of development with occasional individual properties scattered throughout. Nearby residential receptors include but are not limited to properties in Crowland, Moulton, and Gedney Hill.

2.6.3. Three Scheduled Monuments are either within, or border, the current Solar Development Areas, a further five are located within 2.5km of the Order Limits.

2.6.4. The Order Limits has been set to only occupy natural landscape, avoiding existing developments and buildings. It is estimated to be less than 1% impermeable area; therefore, the Site is considered 100% permeable (0% impermeable) for the purposes of this assessment. This represents a worst case approach to the existing catchment surface water greenfield runoff rates.

2.6.5. The habitats on the Solar Development Areas comprise arable farmland, ditches, isolated areas of plantation woodland, a small number of hedgerows and small parcels of scrub.

2.6.6. As mentioned above, the majority of the Scheme is currently in agricultural use and therefore comprises permeable surfaces, such that surface water run-off generally infiltrates into the ground or is routed to the various ditches/drains that bisect the site. Table 2-1: 'Contributing Areas' below provides the existing site permeable and impermeable areas:

Table 2-1: Contributing Areas

	Total Area (ha)	Permeable Areas (ha)	Impermeable Areas (ha)	Percentage Impermeable
Extent of Order Limits	1615.90	1615.90	Considered 0 ha (<1%)	0%

2.7. Development Proposals

2.7.1. The proposed Scheme comprises the following infrastructure:

- Solar PV Infrastructure, including Solar PV modules and module mounting structures;
- Solar PV Supporting Infrastructure, including Solar Stations comprising;
  - Inverters;
  - Transformers; and
  - Switchgear.
- BESS Compound;
- On-site electrical compounds comprising of substation(s), storage buildings and control buildings;
- On-site cabling within Solar Development Area Land Parcels;
- Inter-Array Connections:
  - Overhead Inter-Array Connection cabling on wooden H poles between Solar Development Area Land Parcels C and D; and
  - Underground Inter-Array Connection cabling between Land Parcels A and B.
- Grid Connection Route:
  - 400kV Overhead Line;
  - Steel lattice Pylons;
  - Underground Transmission Electrical Cables; and
  - Cable Sealing End Compounds and associated equipment.
- Fencing and security measures;
- Temporary construction compounds, access tracks and potential minor works on local road network;
- Permanent access tracks; and
- Landscaping and biodiversity enhancements.

2.7.2. A full description of the Scheme is included in **ES Chapter 2: The Scheme** (Doc Ref 6.1). The Indicative Site Layout plans for the proposed Scheme are shown in **ES Figure 2-2 and ES Figure 2-4** (Doc Ref 6.2).

2.8. Consultees

2.8.1. A **Consultation Report** (Doc Ref. 5.1) submitted as part of the DCO Application provides an account of consultation and engagement activities carried out as part of the development of the Scheme. A summary of further meetings held and key correspondence with relevant stakeholders relating to flood risk is also provided in the **ES Chapter 11: Hydrology and Flood Risk** (Doc Ref. 6.1). Correspondence has been undertaken with the following Risk Management Authorities when undertaking this FRA:

- Lead Local Flood Authority – Lincolnshire County Council;
- The Environment Agency (see Annex A);
- The sewerage undertaker – Anglian Water;
- The Highway Authority (Local and/or National) – Lincolnshire County Council;
- South Holland District Council;
- The Internal Drainage Boards:
  - South Holland Internal Drainage Board;
  - North Level District Internal Drainage Board.

3. Existing Legislation and Policy

3.1. Overview

3.1.1. Legislation, planning policy, and guidance relating to flood risk and pertinent to the Scheme is set out in the following sections. For legislation, planning policy and guidance relating to **ES Chapter 11: Hydrology and Flood Risk** (Doc Ref. 6.1), please see **ES Appendix 11-1: Hydrology and Flood Risk Legislation, Policy and Guidance** (Doc Ref. 6.3).

3.2. National Planning Policy

3.2.1. National Policy Statements (NPS) set out the Government's national policy for energy infrastructure. They have effect in relation to the decisions by the Secretary of State on applications for energy developments that are nationally significant under the Planning Act 2008.

3.2.2. Since the first publication of the NPS for Energy in 2011, reviews have been undertaken by the Government to ensure the policies are updated to align with the policies set out in the Governments Energy White Paper: Powering our Net Zero Future[8], setting out how the UK will clean up its energy system and reach net zero emissions by 2050, which was published in 2020.

3.2.3. This FRA considers the in force NPS documents from 6th January 2026 as follows:

- NPS for Energy EN-1[3];
- NPS for Renewable Energy Infrastructure EN-3[4]; and
- NPS for Electricity Networks EN-5[5].

Overarching National Policy Statement (NPS) for Energy (EN-1)

3.2.4. NPS EN-1[3] sets out the Government's policy for delivery of major energy infrastructure.

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[8] DESNZ and DBEIS (2020). Energy White Paper: Powering our net future. Available at: https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future [Accessed 05/11/2025]

3.2.5. The objectives of this FRA are in line with paragraph 5.8.15 of NPS EN-1.

3.2.6. Paragraph 5.8.13 of NPS EN-1 states: "*a site-specific flood risk assessment should be provided for all energy projects in Flood Zones 2 and 3 in England or or Defended Flood Zones 2 and 3 in Wales. In Flood Zone 1 in England or Zone 1 in Wales, an assessment should accompany all proposals involving:*

- *Sites of 1 hectare or more;*
- *Land which has been identified by the Environment Agency (EA) or National Resources Wales (NRW) as having critical drainage problems;*
- *Land identified (for example in a local authority strategic flood risk assessment) as being at increased flood risk in future;*
- *Land that may be subject to other sources of flooding (for example surface water),*
- *Where the EA or NRW, Lead Local Flood Authority, Internal Drainage Board or other body have indicated that there may be drainage problems."*

3.2.7. Paragraph 5.8.14 states the assessment should:

"*identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account*".

3.2.8. Paragraph 5.8.18 NPS EN-1 recommends that applicants should arrange:

"pre-application discussions before the official pre-application stage of the NSIP process with the EA or NRW, and, where relevant, other bodies such as Lead Local Flood Authorities, Internal Drainage Boards, sewerage undertakers, navigation authorities, highways authorities and reservoir owners and operators".

3.2.9. Paragraphs 5.8.25 NPS EN-1 explains the range of sustainable approaches to surface water drainage management.

3.2.10. Paragraph 5.8.26 of NPS EN-1 states:

"Site layout and surface water drainage systems should cope with events that exceed the design capacity of the system, so that excess water can be safely stored on or conveyed from the site without adverse impacts".

3.2.11. Paragraph 5.8.27 NPS EN-1 states:

"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".

3.2.12. Paragraph 5.8.28 of NPS EN-1 states:

"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".

3.2.13. Paragraph 5.8.29 of NPS EN-1 requires

"The sequential approach should be applied to the layout and design of the project. Vulnerable aspects of the development should be located on parts of the site at lower risk and residual risk of flooding. Applicants should seek opportunities to use open space for multiple purposes such as amenity, wildlife habitat and flood storage uses. Opportunities should be taken to lower flood risk by reducing the built footprint of previously developed sites and using SuDS."

3.2.14. Paragraph 5.8.30 of NPS-EN-1 states

"where a development may result in an increase in flood risk, on-site level-for-level compensatory storage, accounting for the predicted impacts of climate change over the lifetime of the development, should be provided."

3.2.15. Paragraph 5.8.32 of NPS EN-1 states

"where development may contribute to a cumulative increase in flood risk elsewhere, the provision of multifunctional sustainable drainage systems, natural flood management and green infrastructure can also make a valuable contribution to mitigating this risk whilst providing wider benefits."

3.2.16. Paragraph 5.8.33 of NPS EN-1 also requires flood warning and evacuation plans for areas of development identified to be at risk of flooding.

3.2.17. Paragraph 5.8.36 of NPS EN-1 states that:

"in determining an application for development consent, the Secretary of State should be satisfied that where relevant:

The application is supported by an appropriate FRA".

3.2.18. Paragraph 5.8.41 of NPS EN-1 states that:

"Energy projects should not normally be consented within Flood Zone 3b, or Zone C2 in Wales, or on land expected to fall within these zones within its predicted lifetime. This may also apply where land is subject to other sources of flooding (for example surface water). However, where essential energy infrastructure has

to be located in such areas, for operational reasons, they should only be consented if the development will not result in a net loss of floodplain storage and will not impede water flows".

3.2.19. Paragraph 5.8.42 of NPS EN-1 states:

"Exceptionally, where an increase in flood risk elsewhere cannot be avoided or wholly mitigated, the Secretary of State may grant consent if they are satisfied that the increase in present and future flood risk can be mitigated to an acceptable and safe level and taking account of the benefits of, including the need for, nationally significant energy infrastructure as set out in Part 3 above. In any such case the Secretary of State should make clear how, in reaching their decision, they have weighed up the increased flood risk against the benefits of the project, taking account of the nature and degree of the risk, the future impacts on climate change, and advice provided by the EA or NRW or other relevant bodies".

National Policy Statement for Renewable Energy (EN-3)

3.2.20. The NPS for Renewable Energy (EN-3)[4], taken together with the Overarching NPS for Energy (EN-1), provides the primary policy for decisions by the Secretary of State on applications they receive for nationally significant renewable energy infrastructure.

3.2.21. Paragraph 2.4.11 of NPS EN-3 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:

Increased risk of flooding; and

Impact of higher temperatures."

3.2.22. While NPS EN-3 does not mention a need for an FRA or implications for drainage, paragraph 2.10.76 of NPS EN-3 does state:

"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."

3.2.23. Paragraph 2.10.77 of NPS EN-3 states,

"Where access tracks need to be provided, permeable tracks should be used, and localised Sustainable Drainage Systems (SuDS), such as swales and infiltration trenches, should be used to control any run-off where recommended."

3.2.24. Paragraph 2.10.79 of NPS EN-3 states:

"Culverting existing watercourses/drainage ditches should be avoided."

3.2.25. The Scheme has a design parameter to utilise existing water crossing locations to avoid the need for new culverts, therefore having less impact on both flood risk and biodiversity. Should a new crossing, requiring a culvert to be proposed, it is expected that the least impacting design be utilised, (e.g. arch rather than box or pipes) to mitigate impact to flood risk levels.

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

3.2.26. The NPS for Electricity Networks Infrastructure (EN-5)[5] principally concerns high voltage transmission systems and distribution systems in addition to associated infrastructure.

3.2.27. Paragraph 2.3.2 of NPS EN-5 explains 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); and*
- *Coastal erosion – for the landfall of offshore transmission cables and their associated substations in the inshore and coastal locations respectively*."

3.2.28. Paragraph 2.3.3 of NPS EN-5 reiterates the requirements set out in NPS EN-1[3] that *"future increased risk of flooding would be covered in any flood risk assessment"*.

3.2.29. The infrastructure for the four onsite Substations, the solar stations and the BESS compound are located within Flood Zone 2 and 3. Mitigation measures will be implemented to the Scheme, ensuring the infrastructure will remain operational in times of flood. These mitigation measures are discussed in detail in this FRA. The proposed solar infrastructure is explained in further detail in **ES Chapter 2: The Scheme** (Doc Ref 6.1).

3.2.30. For solar PV Panels located in Flood Zone 2 and 3, these will have mitigation, if required, in the form of raised mounting heights to ensure they remain operational in times of flood with suitable freeboard above the predicted design flood levels (fluvial flood risk to solar PV panels is discussed further in Section 5.3).

National Planning Policy Framework

3.2.31. The NPPF[9] was first published in March 2012, superseding previous national planning policy statements and guidance, The NPPF was subsequently revised in July 2021, September 2023, December 2023 and most recently in February 2025. This FRA complies with the latest revised version of the NPPF.

3.2.32. Flood Risk and Coastal Change Planning Practice Guidance (PPG)[10] was also published in 2014 to support the implementation of the NPPF. The PPG was last updated in September 2025; this FRA complies with this and all other current national and local policy.

3.2.33. A draft version of the proposed update to the NPPF was issued in December 2025, and is currently undergoing consultation. The draft NPPF has been reviewed against the current NPPF to confirm that The FRA remains compliant with the requirements of the draft NPPF.

3.2.34. Section 14 of the current NPPF, entitled "*Meeting the challenge of Climate Change, Flooding and Coastal Change*" (paragraphs 161-186), sets out the requirements to assess flood risk and climate change for developments.

3.2.35. Paragraph 182 notes

> *"applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity. Sustainable drainage systems provided as part of proposals*

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[9] National Planning Policy Framework (March 2012, updated December 2023). Available at: https://assets.publishing.service.gov.uk/media/669a25e9a3c2a28abb50d2b4/NPPF_December_2024.pdf [Accessed 05/11/2025]

[10] Department of Communities and Local Government (2014, updated September 2025) National Planning Practice Guidance: Flood Risk and Coastal Change. https://www.gov.uk/guidance/flood-risk-and-coastal-change [Accessed 05/11/2025]

for major development should: take account of advice from the Lead Local Flood Authority; have appropriate proposed minimum operational standards; and have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development."

3.2.36. The assessment of flood risk is based on the definitions presented in in Table 3-1, as extracted from the PPG.

Table 3-1: Flood Zones – Reproduced from Table 1 of the PPG 2014[10]

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic FRAs areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

3.2.37. Annex 3: "*Flood* Risk *vulnerability classification*" of the NPPF, classifies the Flood Risk Vulnerability of various land uses as extracted in Table 3-2.

Table 3-2: Development Type and Vulnerability Classification – Reproduced from Annex 3 of the NPPF[9]

Development Type	Classifications
Essential infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines. • Solar farms.
Highly vulnerable	• Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure'.)
More vulnerable	• Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.

Development Type	Classifications
	• Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non–residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less vulnerable	• Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non–residential institutions not included in "more vulnerable", and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place). • Car Parks
Water-compatible development	• Flood control infrastructure. • Water transmission infrastructure and pumping stations.

Development Type	Classifications
	• Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of Defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in his category, subject to a specific warning and evacuation plan.

3.2.38. The Scheme falls within the definition of 'Essential Infrastructure'. The overall aim of the sequential approach is to steer new development to areas of lowest flood risk, from all sources. Where there are no reasonable sites available outside areas at risk of flooding, areas within Flood Zones 2 and 3 may be considered, subject to passing the Exception Test, as required and set out in Section 3.4 and Section 6 below, and assessing flood risk from all other sources.

3.2.39. Surface water flood risk has been reviewed alongside the EA published Updated Flood Map for Surface Water (EA uFMfSW[11] which now includes climate change impacts (i.e. for the period 2040-2060).

3.2.40. The EA uFMfSW[11] shows where areas could be potentially susceptible to surface water flooding in an extreme rainfall event.

3.2.41. The latest mapping assesses flooding resulting from severe rainfall events based on the following three scenarios:

- High Risk: 1 in 30 year (3.3%) annual probability event;
- Medium Risk: 1 in 100 year (1%) annual probability event; and
- Low Risk: 1 in 1000 year (0.1%) annual probability event.

3.2.42. Land at lower than a 1 in 1000 (0.1% AEP) annual probability of flooding is considered to be a "Very Low" risk.

3.3. Sustainable Drainage

3.3.1. Paragraph 182 of the NPPF states applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity. Sustainable drainage systems provided as part of proposals for major development should:

- Take account of advice from the Lead Local Flood Authority;
- Have appropriate proposed minimum operational standards; and
- Have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development

3.4. The Sequential Test and Exception Test

3.4.1. NPS EN-1[3] and the NPPF[9] set out the requirements of the Sequential Test, which is a risk-based test that should be applied at all stages of development.

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[11] Environment Agency (Gov.uk) published Updated Flood Map for Surface Water (uFMfSW). Available online: https://www.gov.uk/check-long-term-flood-risk. [Accessed 5 October 2025].

3.4.2. 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:

- Applying the sequential test and then, if necessary, the exception test as set out below;
- Safeguarding land from development that is required, or likely to be required, for current or future flood management;
- 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
- 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.

3.4.3. 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. A Strategic FRA 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.

3.4.4. Avoiding flood risk through the Sequential Test is the most effective way of addressing flood risk because it places the least reliance on measures like flood defences, flood warnings and property level resilience features. Even where a flood risk assessment shows the development can be made safe throughout its lifetime without increasing risk elsewhere, the sequential test still needs to be satisfied.

3.4.5. Furthermore, large sites partially affected by Flood Zones 2 and 3 should be developed sequentially, placing the most vulnerable land uses in the areas with lowest risk of flooding.

3.4.6. Plate 3-1 below, extracted from Paragraph 025 of the PPG for Flood Risk and Coastal Change, sets out the process for the Sequential Test:

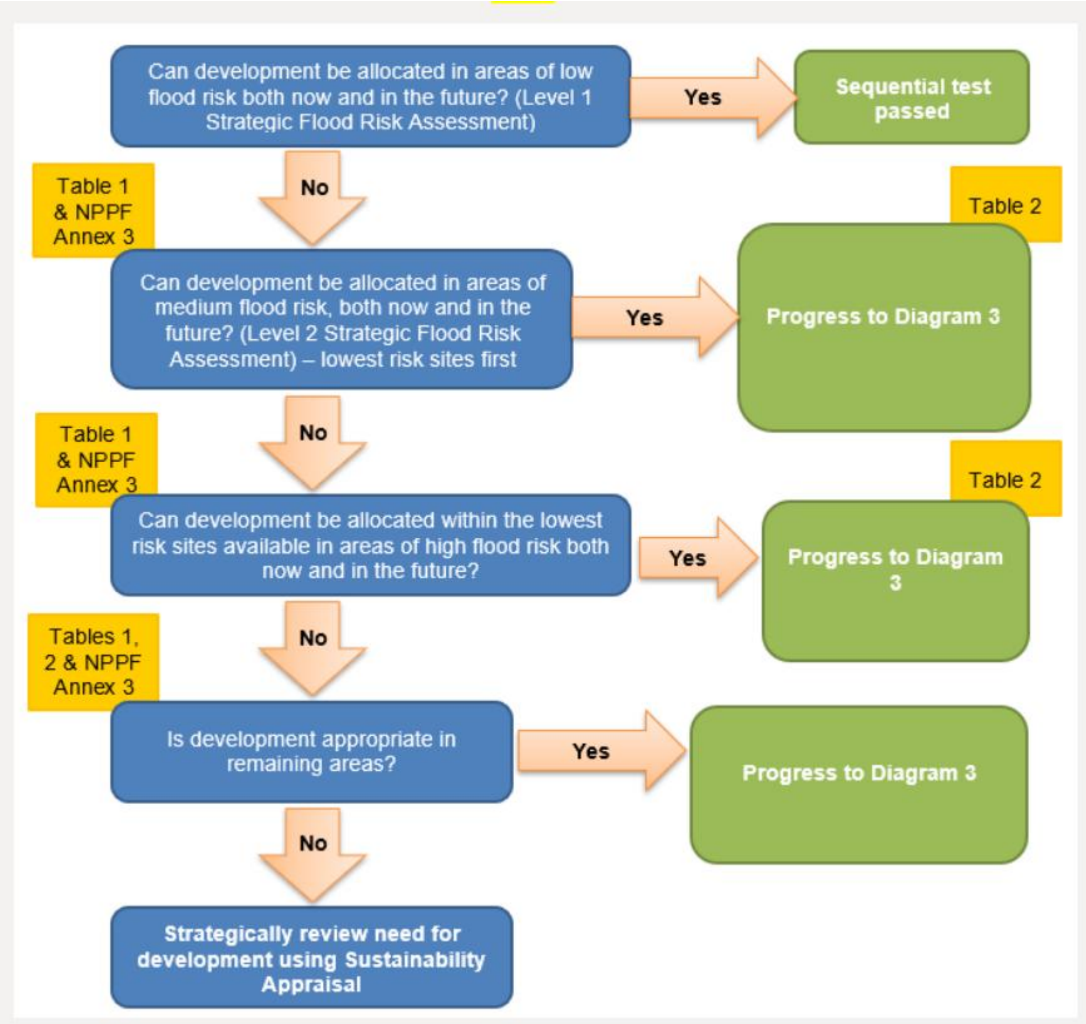

Plate 3-1: Sequential Test Flowchart

3.4.7. If it is not possible for development to be located within areas of 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: *"Flood Risk vulnerability classification"* of the NPPF.

3.4.8. Table 3-3 reproduces the flood risk vulnerability and flood zone compatibility, as set out in Table 2 of the PPG[10].

Table 3-3: Flood Risk Vulnerability and Flood Zone ‘Compatibility’ – Reproduced from Table 2 of the PPG 2025[6]

		Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water Compatible
Flood Zone	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

3.4.9. The NPPF[9] states in paragraph 178 that, for the Exception Test to be passed, it should be demonstrated that both of the following elements should be satisfied for development to be allocated or permitted:

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

3.4.10. Both elements of the Exception Test should be satisfied for development to be allocated or permitted.

3.4.11. The sequential approach to the design and layout of the Scheme complies with paragraph 5.8.29 of NPS EN-1[3] in relation to the layout of the Scheme’s infrastructure.

3.4.12. Paragraph 2.3.9 of NPS EN-3[4] states:

- *"As most renewable energy resources can only be developed where the resource exists and where economically feasible, and because there are no limits on the need established in Part 3 of EN-1, the Secretary of State should not use a sequential approach in the consideration of renewable energy projects (for example, by giving priority to the re-use of previously developed land for renewable technology developments)."*

3.4.13. The sequential approach in selecting the location of the Site for the Scheme is set out in **Appendix D: Site Selection Report** of the **Planning Statement** (Doc Ref. 7.1), and summarised in **ES Chapter 3: Alternatives and Design Evolution** (Doc Ref 6.1), submitted as part of the DCO Application.

3.5. Local Planning Policy

3.5.1. Lincolnshire County Council is the Lead Local Flood Authority (LLFA) and will adjudge the FRA (through consultation with the Environment Agency as necessary) for the Site.

3.5.2. The following key planning documents and salient policies have been consulted to inform this FRA:

- South East Lincolnshire Local Plan (SELLP) 2019[12].
  - The Plan includes the follow planning policies which are relevant to flood risk, drainage and surface water:
    - Policy 3: Design of New Development.
    - Policy 4: Approach to Flood Risk.
    - Policy 30: Pollution.
    - Policy 31: Climate Change and Renewable and Low Carbon Energy.
- South East Lincolnshire Strategic Flood Risk Assessment (SFRA)[13].

[12] South East Lincolnshire Joint Strategic Planning Committee (2019) South East Lincolnshire Local Plan 2011-2036. Available at: southeastlincslocalplan.org/wp-content/uploads/2019/02/Local-Plan-text-March-2019.pdf). [Accessed 13/10/2025].
[13] South East Lincolnshire Joint Strategic Planning Committee (2017) South East Lincolnshire Strategic Flood Risk Assessment. Available at: https://www.sholland.gov.uk/media/7937/South-East-Lincolnshire-Strategic-Flood-Risk-Assessment-Report-March-2017-including-guidance-on-applying-the-Sequential-Test-for-planning-applications/pdf/SE_Lincolnshire_SFRA_2017_v6.pdf?m=1607959961710. [Accessed 13/10/2025].

- Joint Lincolnshire Flood Risk and Water Management Strategy[14].
- Lincolnshire County Council; Preliminary Flood Risk Assessment, 2011[15].
- Lincolnshire Minerals & Waste Local Plan Core Strategy and Development Management Policies document[16].
- Lincolnshire Minerals and Waste Local Plan[17].

3.6. Internal Drainage Boards

3.6.1. Internal Drainage Boards (IDB) are local public authorities that manage water levels within areas of special drainage need (Internal Drainage Districts) in England and Wales. Works relating to watercourses within these designated areas of the Site must seek consent from the relevant IDB.

3.6.2. The Site is located across two IDBs: South Holland Internal Drainage Board and the North Level District Internal Drainage Board. The Welland and Deepings Internal Drainage Board lies adjacent to the western boundary of the Order Limits just north of Crowland but is not affected by the Scheme. Although the Welland and Deepings Internal Drainage Board is not directly affected by the Scheme, their documentation has been reviewed due to the IDB's location adjacent to the Order Limits. Documentation includes Flood and Water Management Act[18] and the Land Drainage Byelaws[19]. This ensures relevant local drainage information has been acknowledged, even though formal consultation with the IDB has not been required.

3.6.3. The following documents have been considered to inform this FRA:

- South Holland Internal Drainage Board;

[14] Lincolnshire Flood Risk and Water Management Partnership (2019) Joint Lincolnshire Flood Risk and Water Management Strategy 2019-2050. Available at: https://www.lincolnshire.gov.uk/downloads/file/2365/joint-lincolnshire-flood-risk-and-water-management-partnership-framework-draft-strategy-2019-2050-pdfa . [Accessed 1/12/2025].
[15] Lincolnshire County Council, Preliminary Flood Risk Assessment Preliminary Assessment Report (2011, reviewed 2017). Available at: https://www.lincolnshire.gov.uk/downloads/file/4382/preliminary-flood-risk-assessment-report. [Accessed 13/10/2025].
[16] Lincolnshire County Council (2016) Lincolnshire Minerals and Waste Local Plan: Core Strategy and Development Management Policies. Available at: https://www.lincolnshire.gov.uk/downloads/file/2361/core-strategy-and-development-management-policies. Accessed: [13/10/2025].
[17] Lincolnshire County Council, Lincolnshire Minerals and Waste Local Plan (2016). Available at: https://www.lincolnshire.gov.uk/downloads/file/2361/core-strategy-and-development-management-policies. [Accessed 13/10/2025].
[18]) The Welland and Deepings Internal Drainage Board (2010) Flood and Water Management Act. Available at: https://www.wellandidb.org.uk/downloads/flood-and-water-management-act-2010_32Pc.pdf. [Accessed 1/12/2025].
[19] The Welland and Deepings Internal Drainage Board (2022) Land Drainage Byelaws. Available at: S25C-0i22090609400. [Accessed 1/12/2025].

  - South Holland Internal Drainage Board Byelaws[20];
- North Level District Internal Drainage Board;
  - North Level Internal Drainage Board Byelaws[21];
- Welland and Deepings Internal Drainage Board;
  - Welland and Deepings Internal Drainage Board Byelaws[22].

[20] South Holland Internal Drainage Board, Development Control Byelaws (2013). Available at: https://www.wlma.org.uk/uploads/SHIDB_Byelaws.pdf. [Accessed 13/10/2025].
[21] North Level District Internal Drainage Board, Land Drainage Bylaws (2021). Available at: https://www.northlevelidb.org/wp-content/uploads/2023/02/BOARD-BYELAWS.pdf. [Accessed 13/10/2025].
[22] Welland and Deepings Internal Drainage Board, Land Drainage Byelaws (2022). Available at: https://www.wellandidb.org.uk/downloads/wdidb-byelaws-2022_vTGK.pdf. [Accessed 13/10/2025].

4. Baseline Information

4.1. Contributing Areas

4.1.1. Within hydrology, it is generally understood that permeable surfaces absorb rainfall whilst impermeable surfaces repel rainfall leading to surface water runoff. For a site, the total impermeable area is often referred to as the site's Contributing Area. The Contributing Area is used as part of the calculation to determine the volume of surface water runoff generated within the site. Developing greenfield sites (typically entirely permeable land) often increases the site's Contributing Area as natural permeable surfaces are sealed by impermeable surfaces.

4.1.2. For the Scheme, some existing permeable surfaces will be replaced by proposed impermeable surfaces; these areas are located at the single BESS Compound (AC-coupled BESS) and the 400kV and 132kV On-site Substations, Solar Stations and the CSEC compounds. A comparison of the proposed and existing site has been undertaken to demonstrate how the Scheme would affect the Order Limits' Contributing Area. While solar PV developments are not typically associated with significant flood impacts, including risk in relation to surface water drainage, some ancillary elements of the Scheme, such as the substations, transformers, pylon bases, CSEC compounds and electrical connections across the Inter-Array Connections and the Grid Connection Route, should be considered regarding flood sensitivity as they may lead to surface water run-off and flood effects.

4.1.3. There will be underground cabling for the proposed Underground Inter-Array Connection between land parcels A and B, and underground cabling to connect the solar PV modules to the proposed 132kV and 400kV substations. An Overhead Line is proposed for the Overhead Inter-Array Connection between land parcels C and D. The overhead line wooden H poles (Inter-Array Connections) do not materially impact flood risk due to the non-significant footprint occupied by this structure and the distance spacing between each (approximately 120m).

4.1.4. Within the Grid Connection Route, there are two CSEC compounds where the overhead line is brought underground. One of the CSEC compounds is not within any flood extents, i.e. Flood Zone 1. The second CSEC compound abuts the edge of Flood Zone 3. It is proposed to bund the CSEC, taking a cautionary approach, to account for any minor increase in flood depth.

4.1.5. The solar PV panels are assumed to not contribute to the total post-development impermeable area as the mounting structures holding the solar PV panels are usually supported by galvanised steel poles/legs driven into the ground, therefore mitigating the need for concrete footings. This assumption is compliant with Paragraph 2.10.76 of NPS EN-3[4]. The ground beneath the solar PV panels remains permeable, where runoff from the panels can drain at source for the majority of rainfall events.

4.1.6. In a limited number of areas where ground conditions do not permit the installation of piled steel supports, concrete pads will be used as an alternative foundation type. As the project has committed to avoiding the use of concrete feet within areas subject to flood risk, these have not been included or assessed further within the flood displacement calculations.

4.1.7. It is considered that interception of rainfall by the solar PV panels will impose negligible impact on the with Scheme surface water runoff rates as the ground below and surrounding the solar PV panels is proposed to consist of suitable planting such as native grassland and wildflower mix, which will provide a permeable surface area and reduce the risk of erosion of soils.

4.1.8. A comparison of the proposed and existing Site has been undertaken to demonstrate how the with-development contributing area will be affected compared to the pre-development scenario.

4.1.9. The area contributing to surface discharge from the Site was estimated for both the proposed and existing Site area. The contributing areas for the existing and proposed Sites are shown in Table 4-1. Refer to **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref 6.3) for detailed breakdowns of impermeable areas within the Site.

Table 4-1: Contributing Areas

	Total Area (ha)	Pre-Development PIMP* (%)	Post-Development PIMP (%)	Pre-Development Contributing Area (ha)	Post-Development Contributing Area (ha)
Development Site	1615.90	0.001%	0.88	0	14.3

*- Percentage Impermeable (PIMP)

4.2. Existing Drainage

4.2.1. LiDAR, topographic survey and Ordnance Survey mapping have been interrogated to establish approximate ground levels across the Site.

4.2.2. Within the Solar Development Areas, drainage ditches characterise the vast majority of land parcels, separating the arable fields.

4.2.3. Land Parcel A has surface elevations within a range of approximately 0.13m AOD to 1.8m AOD. There is no even surface elevation pattern or slope across the land parcel, only arable fields with areas of low surface elevations around the Land Parcel A in no pattern or general slope.

4.2.4. Land Parcel B has surface elevations within the range of approximately 0.4m AOD to 2.5m AOD, slightly higher than Land Parcel A. Similar to the previous Land Parcel A, it comprises arable fields bounded by drainage ditches, with areas of low surface elevations cross the Land Parcel.

4.2.5. Land Parcel C, which borders Land Parcel B, has surface elevations within the range of approximately 0.8m AOD to 3m AOD.

4.2.6. Land Parcel D has surface elevations within the range of approximately 0.5m AOD to 2.5m AOD, with areas of low surface elevations across the Parcel.

4.2.7. There are two reservoirs near to the Order Limits, the Eyebrook Reservoir and Rutland Water, which are located southwest of the Site, outside of the Order Limits. Both are owned / operated by Anglian Water.

4.3. Baseline Flood Risk from all Sources

4.3.1. The following section summarises the pre-development flood risk across the Order Limits. The Order Limits has been marked indicatively on the maps within this report to include the Solar Development Areas, the Inter-Array Connections and the Grid Connection Route and surroundings in the context of the flood map for planning[23].

4.3.2. Refer to **ES Figure 2-2 and ES Figure 2-4** (Doc Ref 6.2) for the detailed extent of the Order Limits.

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[23] Flood Map for Planning. Available at: Flood map for planning - GOV.UK. [Accessed 5 October 2025].

Fluvial Flood Risk – High Risk (Without Defences)

4.3.3. The mapping indicates the flood risk level of fluvial flooding to the Site is high. The majority of the Site is located in Flood Zones 2 and 3. The mapping below does not take into account the flood defences, although defences are shown in the mapping.

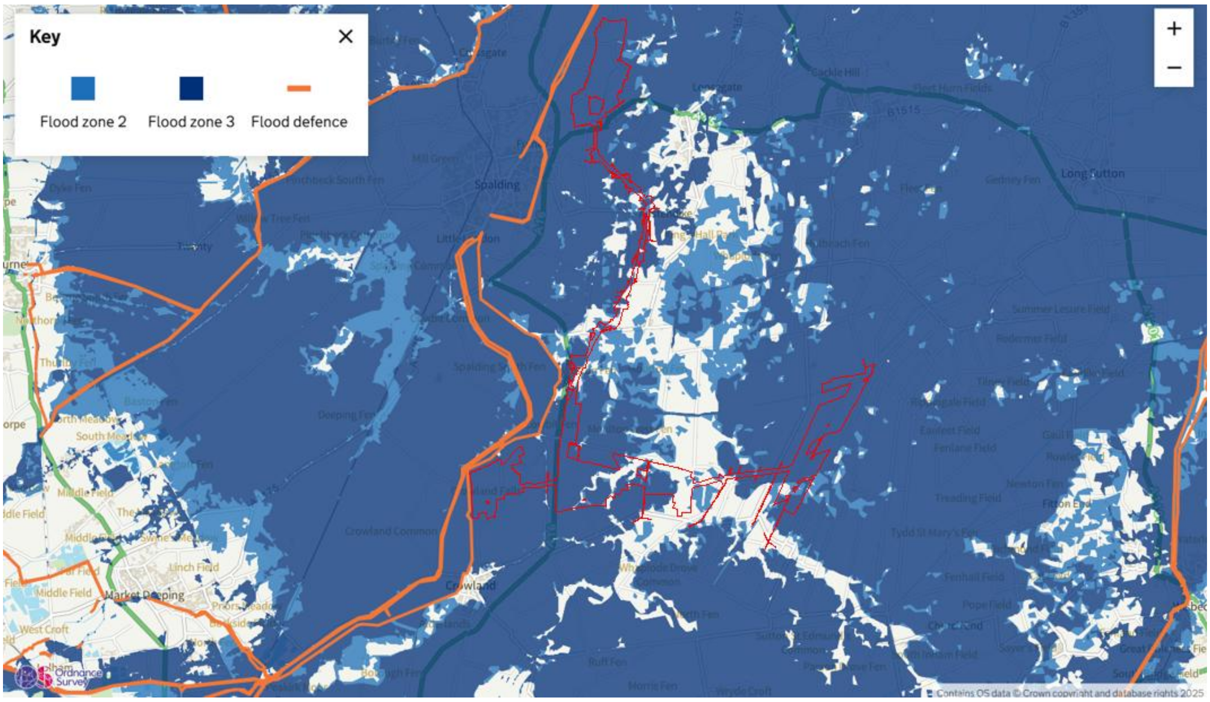

Plate 4-1: Flood Map for Planning (Accessed September 2025)[23]

Rivers and Sea Flood Risk – Long Term Flood Risk – Medium to Very Low Risk

4.3.4. The mapping below shows the risk of flooding from rivers and sea across the Site ranges from very low to medium from the long-term flood map for planning. This is due, for the majority of the Scheme being protected by flood defences, providing protection against a flood event with a 0.1% AEP (plus Climate Change) chance of occurring in any year by the Crowland-Cowbit Washes and embankment, for the River Welland.

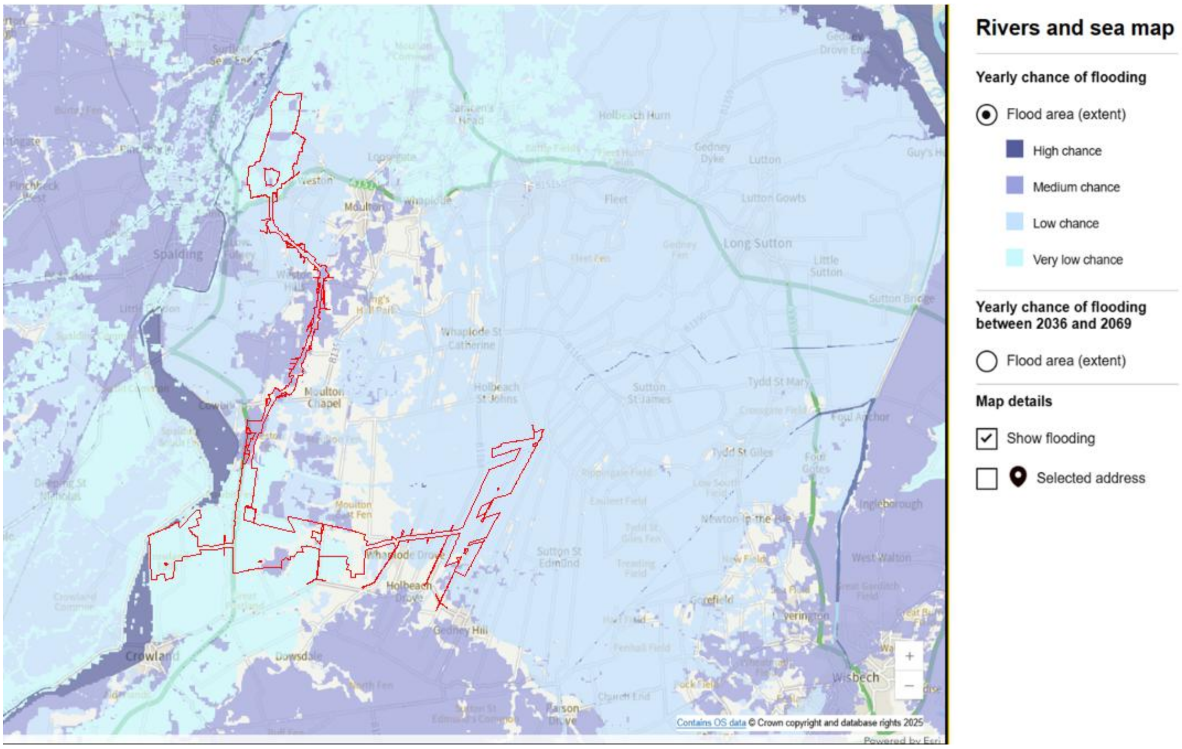

Plate 4-2: Online Map for Rivers and Sea – Long Term Risk (Accessed September 2025)[23]

Existing flood defences for the River Welland – Residual Low Risk to Scheme

4.3.5. The River Welland has flood defences to stop water from the river overflowing into the surrounding areas. These existing flood defences consist of both an inner raised embankment (EA Asset ID: 510051), a Water Storage Area (EA Asset ID: 343253) and an outer raised Embankment (EA Asset IDs: 124918, 503744, 503746, 503748, 503750, 124179, 503832). The outer raised embankment creates a storage area between the river and itself.

4.3.6. These flood defences, consisting of Crowland-Cowbit Washes and embankment are operated and maintained by the EA, and are in fair condition. According to the EA product 4 data requested in May 2025, the Crowland-Cowbit Washes and embankment provide protection against a flood event with a 1% chance of occurring in any year (1 in 100). However, modelling of the River Welland undertaken has confirmed that the River Welland is defended for a flood event up 0.1% plus 28% climate change. Therefore, the flood risk up to and including the return periods noted is considered a low residual risk. These flood defences are inspected regularly to ensure that any potential defects are identified early.

4.3.7. Plate 4-3 indicates the flood defences along the River Welland, taken from the Environment Agency flood map for planning online.

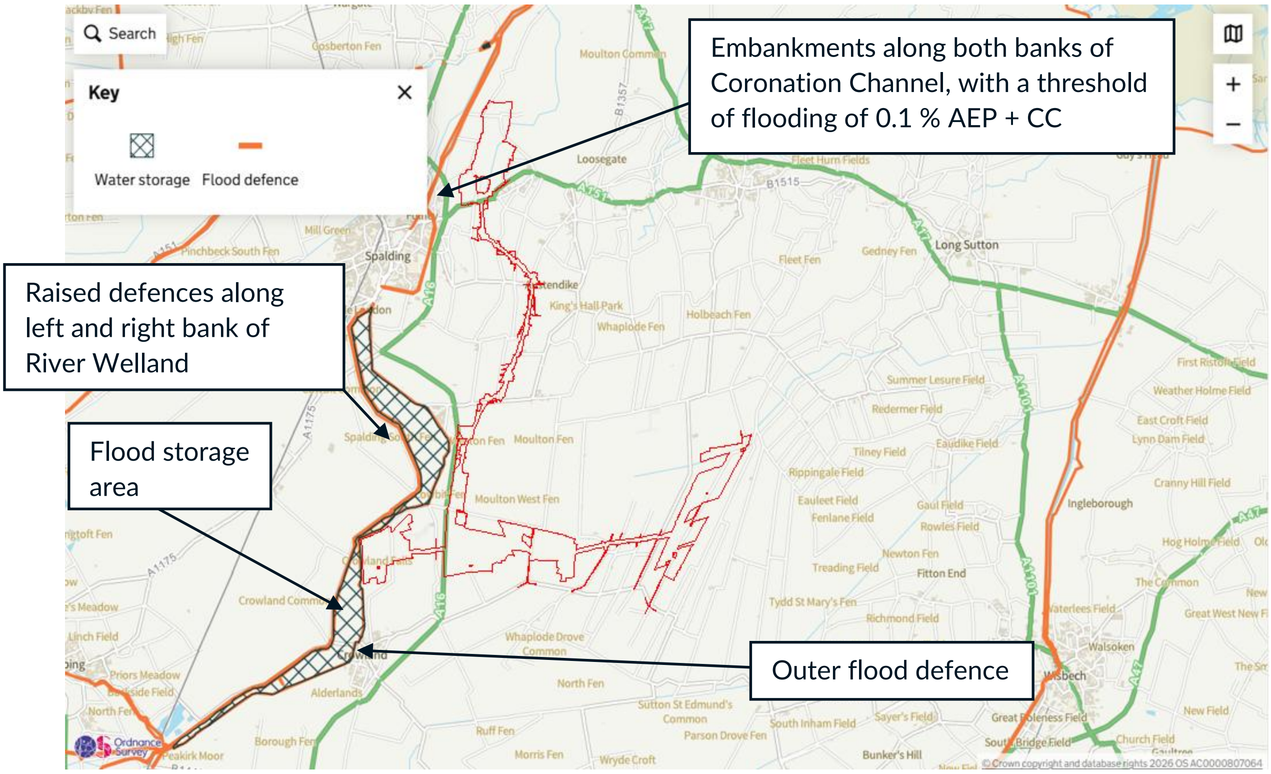

Plate 4-3: Existing flood defences for the River Welland (Accessed September 2025)[23]

Tidal Flood Risk – Low Risk

4.3.8. The tidal limit of the River Welland is controlled by the tidal sluices, at Fulney Lock, in Spalding. Therefore, tidal risk is a low residual risk from the River Welland, if the lock was to fail or overtop.

4.3.9. The River Nene tidal limit is at Dog in a Doublet Lock, north of Peterborough. Review of the River Nene hydraulic model provided by the EA, notes the Scheme is not at risk of tidal flooding, or from a breach or overtopping of the River Nene Defences in Wisbech. Refer to Section 5 for assessment of flood risk to and from the Scheme.

4.3.10. The EA has been contacted to obtain product data, which confirmed that tidal flood risk is low across all land parcels within the Site. The River Welland is a tidal river that flows west of the Scheme. This river is defended by the Crowland-Cowbit Washes and embankments. Land parcels A, B and C are protected against a flood event with a 1 in 1000 year chance of occurring in any year (0.1% AEP plus climate change). Review of the River Nene model shows the River Nene tidal flood risk or extreme overtopping during a in 1000 year (0.1% plus climate change) does not encroach into the Order Limits due to the Wisemans pumping station restricting tidal flow upstream in normal operating conditions.

4.3.11. Therefore, the Site is not considered to be at risk of tidal flooding. The west of the Scheme is protected against a flood event with a 0.1% chance of occurring in any year (1 in 1000) by the Crowland-Cowbit Washes and embankment.

Surface Water Flood Risk – Low Risk

4.3.12. The mapping shows the majority of the Site is generally considered to be at low risk of surface water flooding, with very small areas of medium to high risk of surface water flooding. These areas are likely associated with areas of low topography where surface water sits and pools rather than draining away.

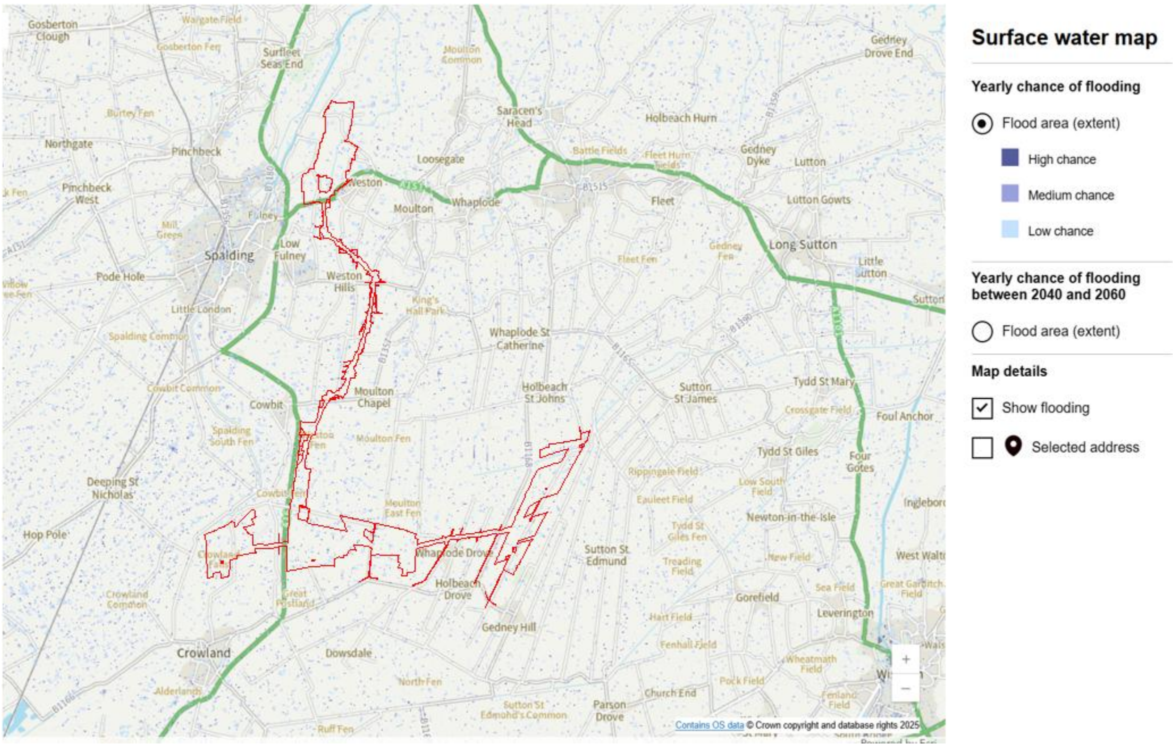

Plate 4-4: Online Map for Surface Water Flood Risk (Accessed September 2025)[23]

Groundwater Flood Risk - Low Risk

4.3.13. Online data has been reviewed to try and establish the existing groundwater risk. The GOV flood maps for planning[23] was used to obtain information regarding ground water flooding in the Site. It is noted on the website that flooding from groundwater is unlikely in this area.

Sewers – Low Risk

4.3.14. The Site is located predominantly within rural agricultural land. Review of sewer records indicates no sewers within 30m of the On-Site Substations. It is considered unlikely that flooding from sewers will impact the Site as it is located within arable fields. The South East Lincolnshire SFRA[24] does not identify any public sewers or historic flood incidents.

Artificial Sources Flood Risk – Low Residual risk

4.3.15. The Scheme is at low residual risk of flooding from reservoirs, apart from the east of the boundary, which shows no risk of flooding. This is due to the nearby reservoirs, Eyebrook Reservoir and Rutland Water that are located far west of the Scheme. The reservoirs are of a size that would fall within the Reservoirs Act 1975 (as amended)[25], above 25,000m^3, with both reservoirs operated and managed by Anglian Water. As such it is considered the reservoirs are maintained to a strict inspection and maintenance regime with very low risk of collapse.

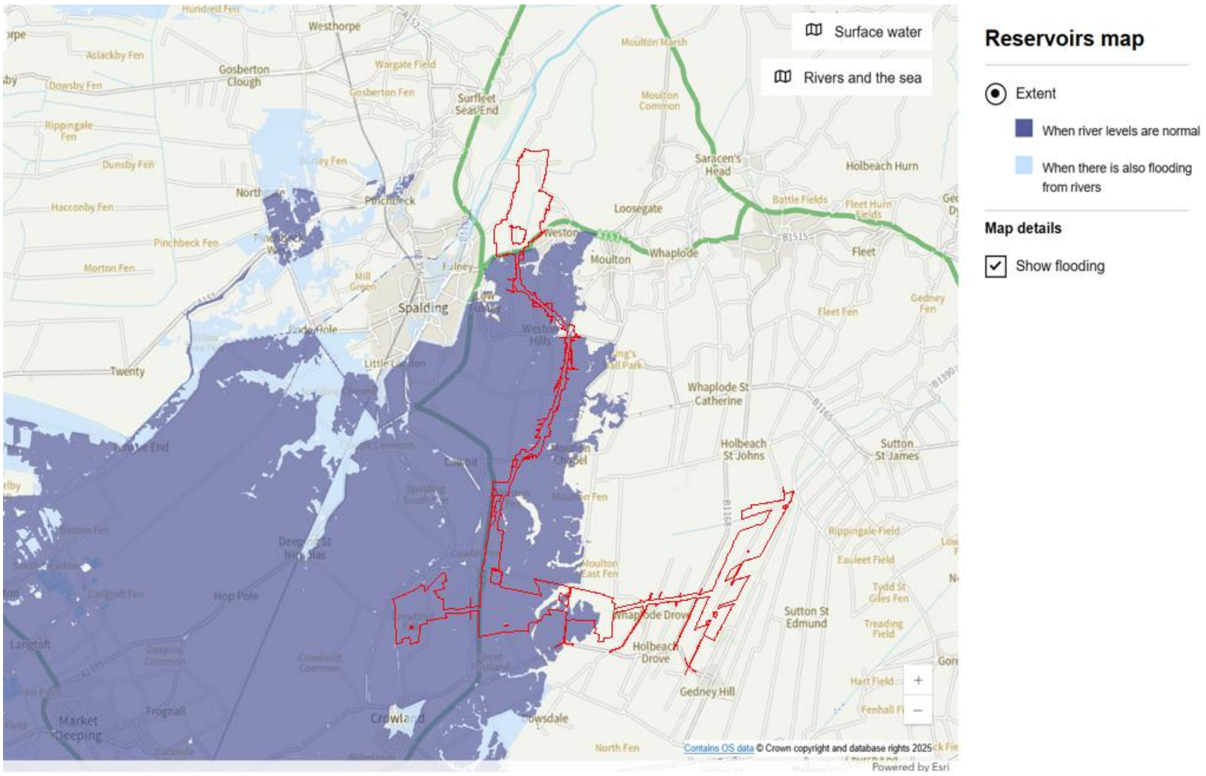

Plate 4-5: Online Maps for Reservoir Flood Risk (Accessed December 2025)[23]

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[24] South East Lincolnshire Joint Strategic Planning Committee (2017) South East Lincolnshire Strategic Flood Risk Assessment. Available at: https://www.sholland.gov.uk/media/7937/South-East-Lincolnshire-Strategic-Flood-Risk-Assessment-Report-March-2017-including-guidance-on-applying-the-Sequential-Test-for-planning-applications/pdf/SE_Lincolnshire_SFRA_2017_v6.pdf?m=1607959961710. [Accessed 13/10/2025].

[25] Reservoirs Act 1975. Available at: https://www.legislation.gov.uk/ukpga/1975/23 [Accessed 03/02/2026]

4.4. Watercourses

4.4.1. Watercourses are designated as main rivers or ordinary watercourses, main rivers are identified on the Statutory Main River Map and are maintained by the Environment Agency whereas, ordinary watercourses are maintained by the Lead Local Flood Authority.

4.4.2. The following watercourses lie near the Order Limits.

Main River

4.4.3. The River Welland is the major surface waterbody flowing north-eastwards adjacent to the western edge of the Order Limits. The River Nene is another Main River which flows east of the Scheme, it drains to the South Holland Main Drain at Wisbech, Vernatt's Drain lies to the west of the Order Limits. Refer to **ES Figure 11-1 Surface Water Features And Their Attributes** (Doc Ref 6.2) for locations.

Ordinary Watercourses

4.4.4. Solar Development Area Land Parcel A: New River (Drain) is located north of the Site as shown on **ES Figure 11-1 Surface Water Features and Their Attributes** (Doc Ref 6.2). St James' Drain, oriented north south, to the west of Spalding Road where the Site is linked to Solar Development Area B. Additionally, many unnamed drainage ditches are present.

4.4.5. Solar Development Area Land Parcel B: Cox's Drain located adjacent to the track running north from Patchett's Bridge and Wheat Mere Drain to the north of Queen's Bank. South Holland Main Drain crosses through the Site to the north of Parcel B-5. Additionally, many unnamed drainage ditches are present.

4.4.6. Solar Development Area Land Parcel C: There are no named water features in this area, although multiple unnamed drainage ditches are present.

4.4.7. Solar Development Area Land Parcel D: the following named water features are present; Lambert Drain and Fleet Drain. These drain north to South Holland Main Drain, which crosses through the northern part of Parcel D.

4.4.8. Inter-Array Connections: Within the Inter Array Connections, the named water features of Tinsley's Drain and Division Drain are present, alongside multiple unnamed ditches.

4.5. Geology and Hydrogeology

4.5.1. A desktop assessment has been completed to determine bedrock and superficial geology within the Order Limits.

4.5.2. British Geological Survey[26] information records the bedrock geology of a site. The bedrock geology of the majority of the western half of site (Areas A, B, C) is the Oxford Clay Formation, while the geology of the eastern side of the Site (Area D), is the West Walton Formation. Superficial deposits of Tidal Flats (clay and silt) are recorded to overlie the entire site.

4.5.3. The online "Landis SoilScape" map viewer[27] was used to gather more information about the soils that underlay the Order Limits and describes the soils beneath the Site as 'a loamy and clayey soil of coastal flats with naturally high groundwater' with 'naturally wet' drainage properties, meaning it will 'drain to local groundwater'.

4.6. Groundwater Susceptibility

4.6.1. The DEFRA Magic Map[28] groundwater vulnerability classification indicates that the majority of the Site is located in an area of unproductive groundwater vulnerability.

[26] British Geological Survey (2023). BGS Geology Viewer. [online] British Geological Survey. Available at: https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/. [Accessed 14/10/25].
[27] LandIS (2023). Soilscapes Soil Types Viewer. [online] www.landis.org.uk. Available at: https://www.landis.org.uk/soilscapes/. [Accessed 14/10/2025].)
[28] DEFRA (2025). Magic Map Application. [online] Defra.gov.uk. Available at: https://magic.defra.gov.uk/MagicMap.html [Accessed 30/10/2025].

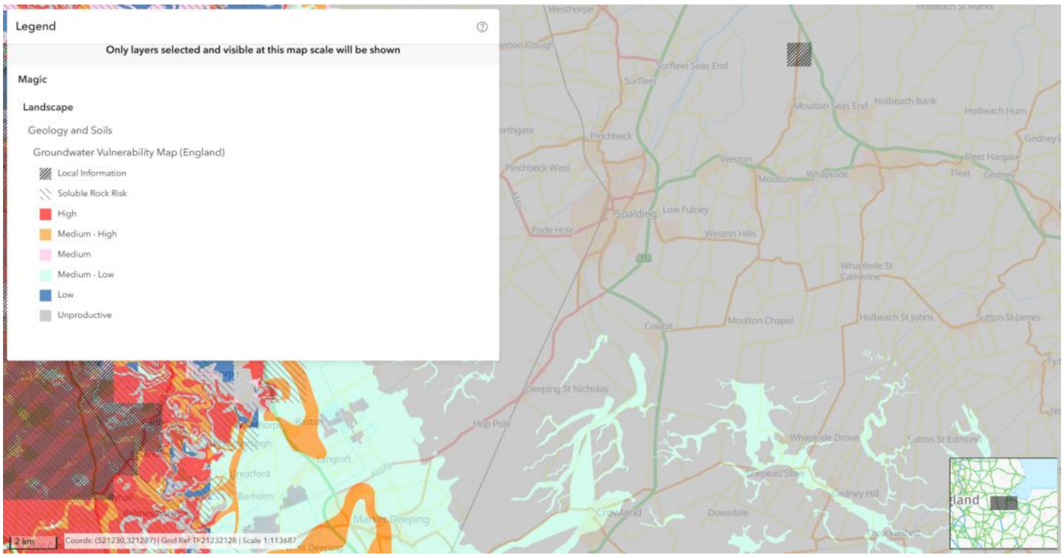

Plate 4-6: Groundwater Vulnerability Map

5. With Scheme Assessment of Flood Risk

5.1. Overview

5.1.1. This Section assesses flood risk from the following sources against the indicative Site layout plans as shown within **ES Figure 2-2, ES Figure 2-4, ES Figure 2-6** and **ES Figure 2-7** (Doc Ref 6.2):

- Fluvial (Rivers and the Sea);
- Surface Water;
- Sewers;
- Groundwater; and
- Artificial waterbodies.

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

- **Low**: where little risk is identified or any theoretical risk identified is classified as low within Local Authority SFRAs and/or EA flood risk mapping extents, with low probability of flooding occurring.
- **Medium**: where risk is identified within Local Authority SFRA and/or EA flood risk mapping extents indicating a medium probability, but manageable flood risk with little to no mitigation required; and
- **High**: where modelled levels within Local Authority SFRA and/or EA flood risk mapping extents show risk to the Order limits as a high probability of flood risk and where mitigation needs to be considered and residual risks controlled.

5.1.3. In line with the sequential approach, the 400kV Substation and BESS Compound and all the 132kV Substations will be located outside of Flood Zone 3b, within areas of low residual risk due to the presence of flood defences along the River Welland and, in the case of IDB controlled watercourses, pumped drains. Land Parcels A, B, C and D include some solar PV panels within Flood Zone 3b.

5.1.4. Solar stations are located outside Flood Zone 3b in Land Parcels A, B and C. However, there are 6 solar stations within Flood Zone 3b in land parcel D associated with Gotts Catchment. This is assessed in Section 5.3.

5.1.5. Hydraulic fluvial modelling has been undertaken on the three fluvial catchments that interact with the Solar Development Area, to inform the proposed Scheme flood risk and mitigation requirements. The hydraulic model reports are available in Annex B. These are discussed throughout this section, with the catchments models undertaken as follows:

- **River Welland** (EA provided Main River model with new model created for Scheme flood extents), associated with Land Parcels A, B and C;
- **Postland Catchment** (IDB provided model), associated with Land Parcels A, B and C; and
- **South Holland Main Drain** (new IDB model built for this Scheme), associated with Land Parcels B, C and D.

5.1.6. Mitigation from the Scheme is discussed within this section.

5.1.7. Flood risk associated with Main Rivers and other Ordinary Watercourses within the Grid Connection Route and Inter-Array Connections will not be impacted by the Scheme development proposals as the overhead line wooden H poles (Inter-Array Connections) and steel lattice pylons (Grid Connection Route) do not materially impact flood risk due to the non-significant footprint occupied by these structures and the distance spacing between each (approximately 120m and 350m respectively).

5.1.8. Within the Grid Connection Route, there are two CSEC compounds where the overhead line is brought underground. One of the CSEC compounds is not within any flood risk extents, i.e. Flood Zone 1. The second CSEC compound abuts the edge of Flood Zone 3. It is proposed to bund the southern CSEC, taking a cautionary approach, to account for any minor increase in flood depth. Further information is provided within Sections 5.4 and 5.5.

5.2. Climate Change

Overview

5.2.1. As of July 2021, the climate change allowances used in FRAs have changed, and now propose peak river flow allowances based on Water Framework Directive catchment areas, instead of nationwide allowances in previous iterations of guidance.

5.2.2. The DEFRA mapping website '*Climate change allowances for peak river flow in England*' has been reviewed to confirm the revised climate change allowances for the catchment areas that cover the Site; these are the Nene Management Catchment and the Welland Management Catchment. These values have been used in this assessment.

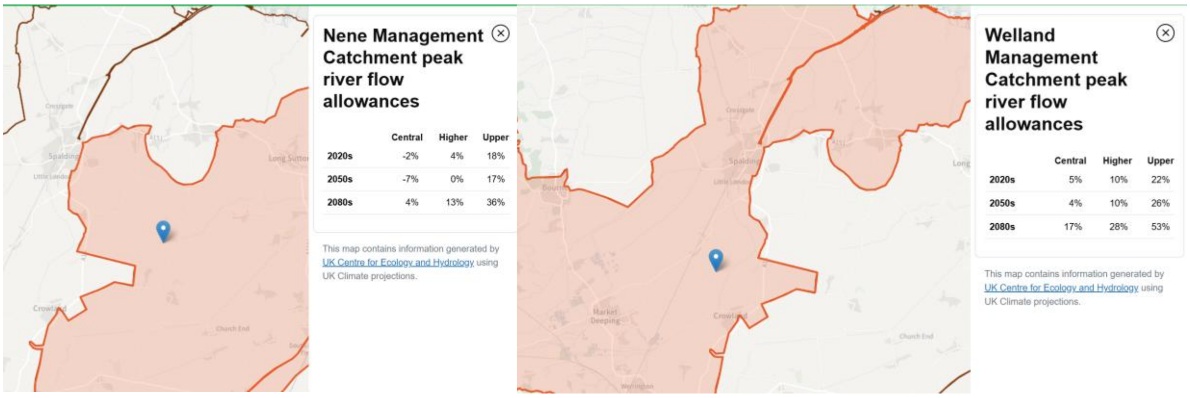

Plate 5-1: Management Catchments of the Site

5.2.3. Climate change allowances relate to predicted percentage increase in peak river flows as a result of the effects of climate change, which development projects like the Scheme must take into account in their design.

5.2.4. The current allowances for design purposes for the Scheme are the higher allowance of 13% and 28% for Essential Infrastructure, for the Nene Management Catchment and the Welland Management Catchment, respectively.

5.2.5. An additional assessment for Essential Infrastructure projects is the application of the H++ Scenario climate change allowance for sea level rise; a sensitivity assessment to ensure infrastructure can operate in extreme events involving a tidal influence. The H++ scenario provides an estimate of sea level rise beyond the likely range (i.e. an extreme event beyond expected climate change allowances) but within physical plausibility. It is useful for contingency planning to understand what might be required if climate change were to happen much more rapidly than expected.

5.2.6. Section 5.6 discusses the H++ Scenario for the Scheme.

Credible Maximum Scenario (CMS)

5.2.7. The online Environment Agency guidance ("Flood risk assessments: climate change allowances")[29] indicates that for "Assessing credible maximum scenarios for nationally significant infrastructure projects, new settlements or urban extensions":

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[29] Environment Agency (2016, last updated 2022). Flood risk assessments: climate change allowances. [online] GOV.UK. Available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances. [Accessed 1/12/2025].

- “*If you develop NSIPs you may need to assess the flood risk from a credible maximum climate change scenario*” (CMS).

5.2.8. The test should be treated as a ‘sensitivity test’, to help assess how sensitive a proposal is to changes in the climate for different future scenarios. This will ensure the Scheme can be adapted to large-scale climate change over its lifetime.

5.2.9. During the meeting with the EA on 25 July 2025, (details of meeting minutes are found in Annex A) it was agreed to apply the 0.1% AEP plus 28% climate change to assess the CMS (the CMS is usually the assessment of the 1% AEP plus climate change allowance). The 0.1% AEP plus 28% climate change assessment provides a more conservative assessment of the CMS for the Scheme, noting flood depths varying very little between the 1% AEP and 0.1% AEP plus climate change scenarios, with the 0.1% AEP plus 28% climate change being 0.1m higher.

5.3. With-Scheme Solar Development Area Fluvial Flood Risk

5.3.1. The following section provides an assessment of the fluvial flood risk level to and from the Solar Development Area. The assessment demonstrates that the Scheme will not result in an increase to existing flood risk within and surrounding the Site through the implementation of the Drainage Strategy and identifies any areas within the Scheme where mitigation measures may be required to protect the Scheme, to on-site infrastructure and off-site, from future fluvial flood events when taking climate change into consideration.

5.3.2. To illustrate discussion on flood risk to Solar Development Area Land Parcels, refer to drawings 60753382-ACM-ZZ-XX-DR-CE-000001 to 000005-P01 within **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref. 6.3).

Fluvial Flood Risk as a result of the Scheme Infrastructure

5.3.3. **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref. 6.3) proposes that increased surface water flows from the Scheme as a result of new impermeable areas, within the Site, will be managed by swales located in the Solar Development Areas and discharged to watercourses (or to ground via “Rural SuDS” (RSuDS) techniques where watercourses are not in close proximity). Surface water discharge will be limited to existing greenfield rates via sustainable drainage techniques. Surface water discharge will be limited to existing greenfield rates via orifice plate.

5.3.4. The strategy to control the discharge rates to mimic the pre- Scheme run-off conditions, mitigates any increases to peak river flow rates within the local watercourses utilised for outfall locations within the Scheme. This strategy will result in no increase to fluvial flood risk levels within vicinity of the Scheme throughout the design life of the Scheme.

Fluvial Flood Risk to the Scheme Infrastructure

5.3.5. In general, the majority of the Scheme is located within defended Flood Zone 3, with most of the Solar Development Areas located in Flood Zone 3, whereas the Grid Connection Route generally lie within a combination of Flood Zones 2 and 3 (refer to **Plate 4-1** for Fluvial Flood Risk Mapping).

5.3.6. As noted in paragraph 5.1.5, modelling of the three fluvial catchments has been undertaken to inform flood risk to the Scheme, pre and post Scheme assessment. The modelling approach is summarised below; refer to Annex B for the hydraulic modelling reports.

5.3.7. A summary of the modelling parameters and approach is as follows:

- **River Welland Breach Hydraulic Modelling:**
  - A bespoke hydraulic model of the River Welland has been prepared to assess the defended and breach scenarios and their impact upon the Scheme, for the baseline and post Scheme scenarios.
  - The fluvial flood risk was assessed by analysing the existing 2016 River Welland hydraulic model published by the EA and adding a 28% uplift to fluvial peak flows to account for climate change for the 1% AEP and 0.1% AEP events. Breach modelling was required to confirm the residual risk to the Scheme and elsewhere.
  - Four breach locations along the Crowland-Cowbit Washes embankment were modelled to determine the flood risk water levels for the Proposed Infrastructure. During a meeting with the EA on 25 July 2025, the EA confirmed the breach locations are suitable for the assessment.
- **Postland Catchment Modelling:**
  - The existing hydraulic modelling was assessed for peak water levels associated with a baseline and post Scheme scenario for the:
    - 3.3% AEP
    - 1% AEP plus 28% Climate Change

    - 0.1% AEP plus 28% Climate Change (pumping on) and a failure of the pumping stations scenario during an extreme rainfall event
    - 0.1% AEP plus 28% Climate Change with pump failure as the worst case event for the Scheme
- **South Holland Main Drain Modelling:**
  - A new hydraulic model was built to assess the peak water levels associated with baseline and post Scheme scenarios for the:
    - 3.3% AEP
    - 1% AEP plus 13% Climate Change
    - 0.1% AEP plus 13% Climate Change (pumping on) and a failure of the pumping stations scenario during an extreme rainfall event,
    - 0.1% AEP plus 13% Climate Change with pump failure as the worst case event for the Scheme.

5.3.8. **Plate 5-2** indicates the catchments that have been modelled across the Scheme.

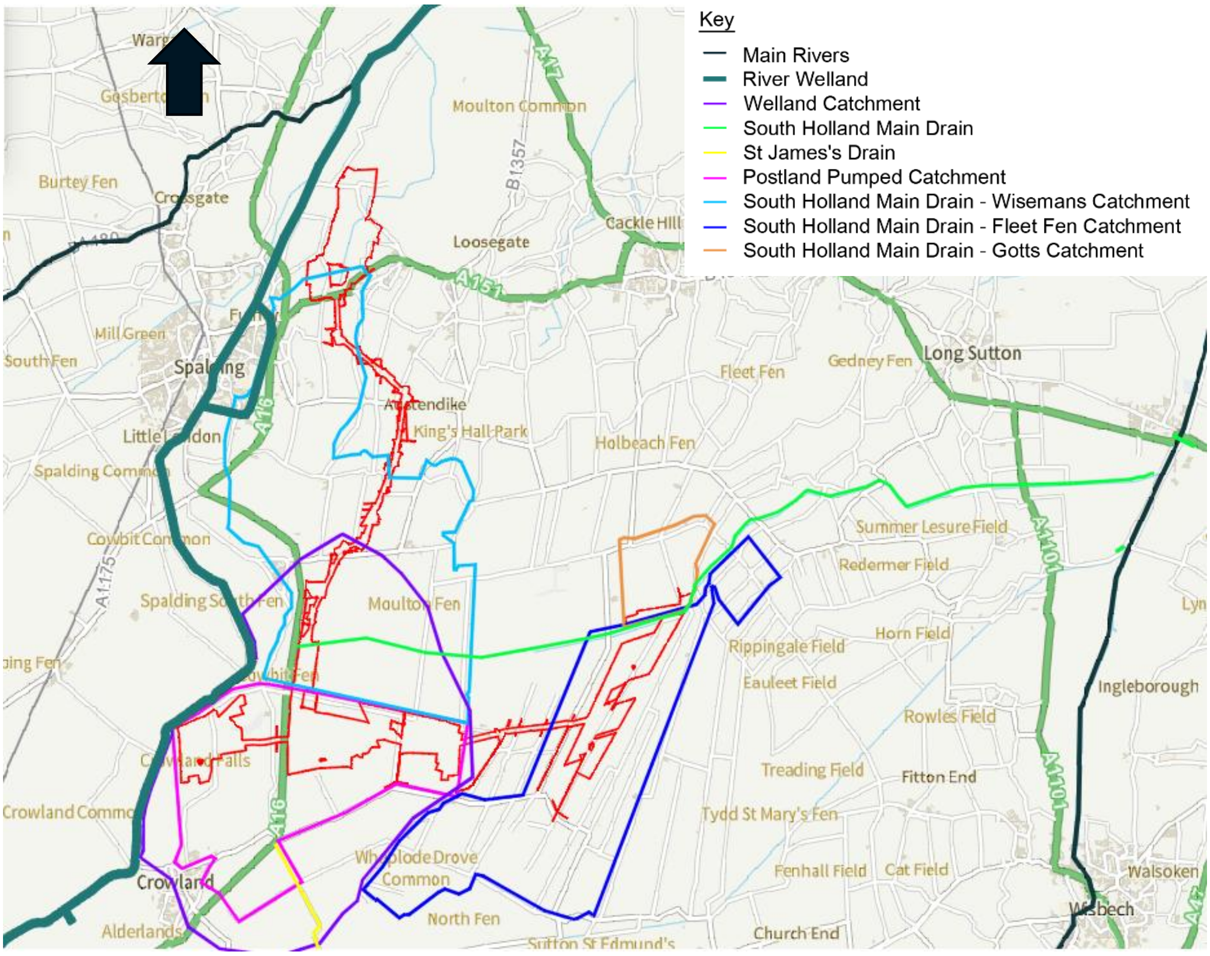

Plate 5-2: The fluvial catchments that have been modelled (not to scale)

Flood Model Outputs

River Welland

5.3.9. The modelling confirms the Scheme benefits from flood defences up to the 0.1% AEP plus 28% climate change event, with a resulting low residual risk from a breach of the River Welland to Land Parcels A, B and C.

5.3.10. Model shows that floodwater fills up the storage area between the inner and outer defences but does not overtop the outermost embankment and enter the development.

5.3.11. Therefore, there is a low residual risk of fluvial flooding to the Scheme from the River Welland.

5.3.12. Breach modelling undertaken for the River Welland results in flood risk impacts to Land Parcels A, B and C. Mitigation is discussed further under heading *Fluvial Flood Risk and Floodplain Compensation Assessment*.

Postland Catchment

5.3.13. The model assessed the 3.3%, 1% plus 28% climate change, and the 0.1% AEP plus 28% climate change events, pump on and 0.1% AEP plus 28% Climate Change pump off.

5.3.14. The model shows the Scheme is impacted during the 3.3% AEP (Flood Zone 3b), the 1% AEP plus 28% Climate Change, and the 0.1% AEP plus 28% Climate Change scenarios.

5.3.15. Mitigation is discussed further under heading *Fluvial Flood Risk and Floodplain Compensation Assessment*.

South Holland Main Drain

5.3.16. The model assessed the 3.3%, 1% plus 13% climate change, and the 0.1% AEP plus 13% climate change events, pump on and 0.1% AEP plus 13% Climate Change pump off.

5.3.17. The model incorporates three IDB catchments into a combined model:

- The Wisemans Catchment (Land Parcel B and C);
- Fleet Fen catchment (Land Parcel D);
- Gotts catchment (Land Parcel D).

5.3.18. The results indicate Fleet Fen and Wisemans Catchments (Land Parcels B and D) are not impacted by Flood Zone 3a or 3b (flows remain in channel), including for 13% climate change. The 0.1% AEP plus 13% flood extent, from scenarios of both pumps being operational and pump failure extends across all SHMD catchments in Land Parcels B, C and D.

5.3.19. The Pump On baseline model results show that the Gotts Catchment has an increased flood risk during the pumping scenario than when the pumps are off. This is due to the pumping operations within the Fleet catchment, where two pumps discharge into the SHMD adjacent to the Gotts catchment. The water levels pumped from Fleet Fen into the bank-full SHMD overtop into the Gotts catchment due to its lower bank crest levels.

5.3.20. The modelling also showed that because of this, the 1 in 30 year and the 1 in 100 year plus 13% climate change flood extent for the SHMD Pump On scenario for the Gotts catchment exceeds the 1 in 1000 year, including 13% climate change, Pump Failure flood extents.

5.3.21. Within the Gotts catchment, the results indicate fields D 1-01, D 1-02 and D 1-03 include flood extent of modelled Flood Zone 3a and 3b (please refer to Annex D for the flood extents).

5.3.22. The results from the pump failure model shows that the maximum depth in the Fleet Fen and Gotts Catchment, where Land Parcel D is located, is 0.5m.

5.3.23. The maximum flood depth in the Wisemans catchment, more specifically where the 400kV Substation and BESS compound is located in, had a maximum flood depth of 0.6m for the 1 in 1000 year event plus 13% climate change for a pump failure scenario.

5.3.24. Mitigation is discussed further under heading *Fluvial Flood Risk and Floodplain Compensation Assessment*.

Fluvial Flood Risk from River Nene

5.3.25. Although not directly linked to the Scheme, the River Nene was also assessed to inform the flood risk to the Scheme.

5.3.26. For the River Nene watercourse, the EA has undertaken detailed hydraulic modelling in 2011 for a range of scenarios to assess flood hazards, depths and velocities for each breach event, and overtopping with no breach. The Tidal Nene and Tidal Welland 2016 hydraulic model are a rerun of the overtopping modelling for the 2011 model. It was stated by the EA to use the breach hydraulic modelling from the 2011 model, and the overtopping modelling from the 2016 model.

5.3.27. The Tidal Nene overtopping results show no overtopping for a 0.5% AEP event, and a small amount of overtopping in 0.1% AEP at two locations, the

Sutton Bridge area, east of the Scheme, and at the downstream end of Wisbeck, southeast of the Scheme. The overtopping in these two locations does not affect the Solar Development Areas as it is located far east of the Scheme.

5.3.28. Significant overtopping occurs in both 0.5% AEP and 0.1% AEP events with a climate change allowance of 13%, however, this does not affect the Scheme as the overtopping does not come close to the Scheme.

5.3.29. The results of overtopping using the 2016 hydraulic model show that the flood extents of the River Nene would not extend out into the flood channel far enough to impact the Solar Development Areas.

5.3.30. Plate 5-3 shows the flood extent of a breach on the River Nene, and the location of the Site.

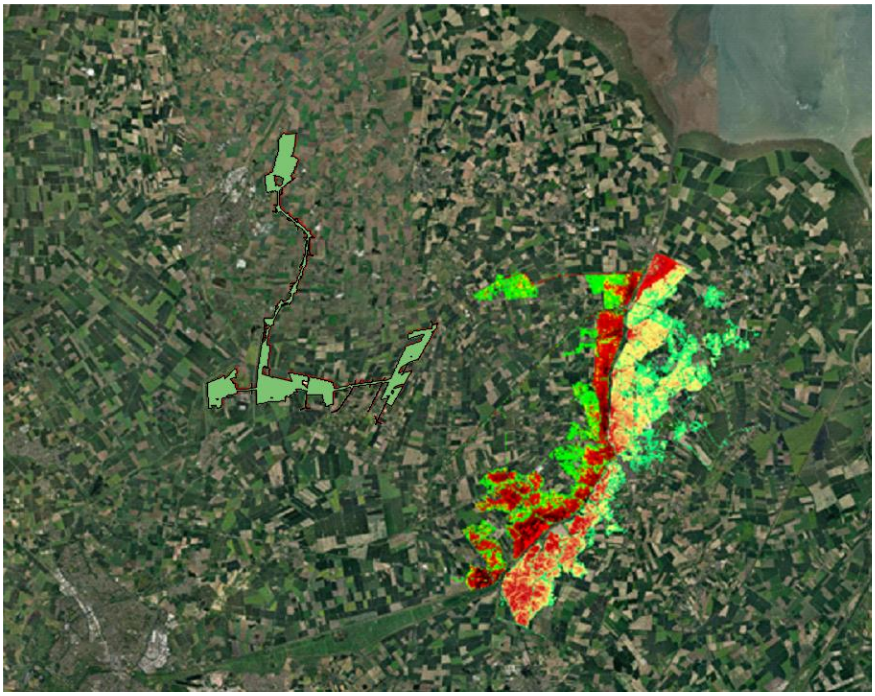

Plate 5-3: River Nene Flood Extent Map of a Breach in a 0.1% AEP event with Climate Change Allowance

5.3.31. The analysis, therefore, concludes that there is effectively no residual fluvial flood risk from the River Nene, incorporating the impacts of climate change, to the Scheme and relative infrastructure located within the Solar Development Area for the duration of its lifespan, and there is no mitigation required in this area.

5.3.32. The subsequent section discusses the fluvial flood risk to the Scheme from watercourses that directly impact the Solar Development Area.

Fluvial Flood Risk and Floodplain Compensation Assessment

5.3.33. With any proposed scheme that has potential flood risk and consequential floodplain loss impacts, an assessment of the compensation requirement should be provided. Permanent infrastructure is proposed to be located outside of the Postland Catchment and South Holland Main Drain Flood Zone 3a and 3b flood extent, except for Solar PV panels and infrastructure within Parcel D-1 (please see Annex D for flood extents).

5.3.34. The maximum height of any plinths used to raise solar stations above flood depths will be 0.8m (0.5m plus 0.3m freeboard) (except for Parcel D-1). Where solar stations are located within the flood extent and the plinths do not raise the solar stations above the worst-case flood depths and provide 0.3m freeboard, they are to have a flood defence wall or bund for protection. Solar stations in Land Parcel D-1, within the Gotts Catchment, that are located in Flood Zone 3b flood extent would be provided freeboard of up to 0.6m. Therefore, the maximum height of any plinths used to raise solar stations above flood depths in Land Parcel D-1 would be 1.35m (0.75m plus 0.6m freeboard), Mitigation for the permanent infrastructure is discussed further in Section 8.

5.3.35. During an EA meeting on 25 July 2025, it was agreed floodplain compensation would be assessed for the following (for whatever is the worst case where model flood extent overlap):

- River Welland 0.1% AEP plus 28% Climate Change;
- Postland 0.1% AEP plus 28% Climate Change Pump Failure;
- South Holland Main Drain 0.1% AEP plus 13% Climate Change Pump Failure.

5.3.36. The modelling carried out for the Welland Breach, using the climate change allowances of 28%, indicated a maximum flood depth of 2.1m across the Site within the Land Parcel A, B and C (the model does not impact Land Parcel D).

Post Scheme Impact of PV Panel and Panel Volumes for all Catchments

5.3.37. Solar panel legs sit within the River Welland, Postland catchment and the South Holland Main Drain flood extents.

5.3.38. Each solar PV panel is supported on two individual steel poles/legs. The proposed density of the panels is listed in Table 5-1 below. Land Parcel A was taken as the worst-case scenario as it was shown to be the most affected by the flooding from the River Welland and the Postland Catchment. Land Parcel D was also assessed as it was the most affected by the South Holland Main Drain flood extents.

Table 5-1: Panel Densities

Land Parcel	Modules/ha
A	1449
D	1189

5.3.39. Volumetric floodplain compensation calculation, assessing all three of the identified fields has been undertaken to determine if floodplain compensation is required. Refer to model reports in Annex B for full detail of the assessment.

Table 5-2: Volume loss calculations for the solar panels and the mounting infrastructure

Land Parcel	Flood extent assessed and average depth of flood risk (m)	Total volume loss (m^3)	Approximate depth increase (m)
A, B, C	River Welland – 1.7m	1927	0.0010
	Postland Catchment – 1.5m	1700	0.0009
D	South Holland Main Drain – 0.5m	795	0.0002

5.3.40. The total volume loss, and the approximate depth increase across the selected Land Parcels were obtained using the total number of solar PV panel structures in the Land Parcels, the density, and the panel pole/leg properties. It was taken that the average number of legs per panel array was 4.5.

5.3.41. Table 5-2 notes the results of the volumetric loss assessment, applying a conservative approach. The results indicate that, taking the worst-case scenario, the maximum increase in the flood depth is approximately 0.001m, which is equivalent to 1mm.

5.3.42. During a meeting with the EA on 28 July 2025, the EA advised a depth increase of approximately 0.001m would be non-significant. Refer to Annex A for minutes of the meeting.

5.3.43. Therefore, it is considered, with the estimated maximum flood depth increase of 0.001m, there will be no material increase in flood risk on the Site or elsewhere and, therefore, no mitigation for volumetric loss of floodplain from panels is required.

5.3.44. Additionally to panel legs, some Solar PV panels will be affected if a breach were to occur, as the maximum flood depth of the breach event is approximately 2.1m, which is higher than the required minimum flood depth allowed for the solar panels to remain operational, which is 1.55m. Calculations were undertaken to provide an area of the solar PV panels that will be submerged and not operational, without mitigation and with mitigation measures implemented by raising the solar PV panels by 0.5m (the base of the panel above ground would be 1.3m). Subsequently, following mitigation, the required maximum flood depth allowed for the solar panels to remain operational would be 2.05m.

5.3.45. It was observed that, without mitigation, the area of solar PV panels that will be submerged and not operational is 43.9ha (4.1% of total Solar Development Areas). With mitigation measures implemented, the area of solar PV panels that will be submerged by up to 0.80m (2.1m depth minus 1.3m panel height above ground) and become non-operational is 2.7ha (0.3% of total Solar Development Area). Please refer to Annex D to see the area of PV panels submerged post-mitigation of increasing the panel heights.

5.3.46. Table 5-3 below provides the results of the floodplain loss from the submerged solar panels in Land Parcel A. Parameters to assess the solar panel volumes are set out below:

- Overall design thickness of panel: 0.1m (Allows for 36mm panel and 64mm average for the space occupied by PV panels).
- Worst case panel angle of 10 degrees (the Scheme allows between 10-25 degrees).
- Max Submerged Panel Depth: 0.80m (total 2.1m flood depth – 1.3m panel height)
- Length of single PV panel: 7.192m
- With a Panel density of 1449/ha: at 2.74 ha, the no. PV panels 3978

Table 5-3: Floodplain loss from the submerged solar panels in Land Parcel A

Land Parcel	Worst Case Panel Cross Section Area in flood conditions (m^2)	Total length of PV panels submerged (m)	Total volume loss (m^3)	Approximate depth increase (m)
A	0.614	27,937	17,154	0.009

5.3.47. The approximate depth increase due to submerged panels within Land Parcel A is 0.009m (9mm). This depth is realistically below both the certainty of vertical resolution of standard hydraulic modelling outputs and the precision achievable in topographic survey data, and is considered to have no material impact on flood risk to the Scheme, or elsewhere, with such level differences and vertical tolerances of LiDAR levels and topographical survey levels giving rise to no discernible increase in flood extents. It is noted that the potential flood risk in this scenario is a low residual risk from a breach of the River Welland defences, and not flood risk in an undefended scenario.

5.3.48. The overall floodplain depth increase across Land Parcel A is 0.01m (10mm), including the panel legs themselves. With the residual risk of a breach of the River Welland being unlikely and the PV panels only submerged during this residual risk event, it is considered the total depth increase results in no material increase to flood risk.

5.3.49. It is key to note that Land Parcels B, C and D are not affected, i.e. panels remain operational, since the flood depths do not exceed 1.55m in these areas. Therefore, no panels will be submerged to the extent that they would stop being operational in these Land Parcels; this is reflected in Figure 1-2 of Annex D of the FRA, identifying panels at risk of being submerged and non-operational in Land Parcel A only. All remaining panels will be operational in these land parcels with no additional raising of solar PV panels required. However, while remaining operational, some PV panels in Land Parcel B may be submerged by up to 0.25m, with the maximum flood depths of 1.55m in Land Parcel B, with embedded mitigation in place raising PV panels by 0.5m.

5.3.50. Table 5-4 below provides the results of the floodplain loss assessment from the submerged solar panels in Land Parcel B. Parameters to assess the solar panel volumes are set out below:

- Overall design thickness of panel: 36mm taken as the thickness of the panel.

- Worst case panel angle of 10 degrees (the Scheme allows between 10-25 degrees).
- Max Submerged Panel Depth: 0.25m (total 1.55m flood depth – 1.3m panel height).
- Length of single PV panel: 7.192m.
- With a Panel density of 1066/ha: at 4.55ha, the no. PV panels 4849.

Table 5-4 - Floodplain loss from the submerged solar panels in Land Parcel B

Land Parcel	Worst Case Panel Cross Section Area in flood conditions (m^2)	Total length of PV panels submerged (m)	Total volume loss (m^3)	Approximate depth increase (m)
B	0.042	34,877	1472	0.0004

5.3.51. The approximate depth increase due to submerged panels within Land Parcel B is 0.0004m (0.4mm). This depth is realistically below both the certainty of vertical resolution of standard hydraulic modelling outputs and the precision achievable in topographic survey data, and is considered to have no material impact on flood risk to the Scheme, or elsewhere, with such level differences and vertical tolerances of LiDAR levels and topographical survey levels giving rise to no discernible increase in flood extents. It is noted that the potential flood risk in this scenario is a low residual risk from a breach of the River Welland defences, and not at fluvial flood risk in an undefended scenario from other sources (Postland Pumped Catchment and South Holland Main Drain catchments).

River Welland Breach Assessment

5.3.52. The Land Parcels which include the proposed solar PV modules benefit from existing flood defences along the River Welland which defend against a 0.1% AEP +28% climate change storm event. Plate 5-4 indicates the flood defences along the River Welland, taken from the EA flood map for planning online.

5.3.53. Breach modelling is required to confirm and quantify the residual risk to the Scheme, which currently benefits from a reduction in flood risk due to existing flood defences.

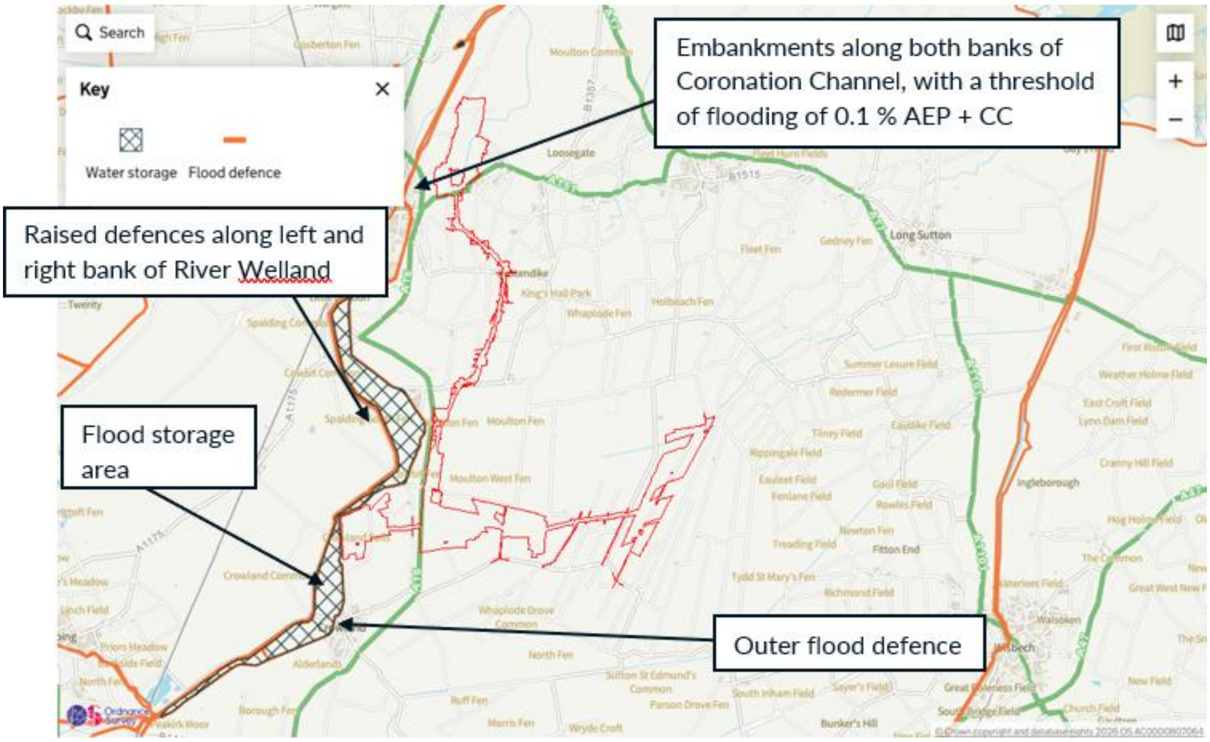

Plate 5-4: Flood Defences of the River Welland

5.3.54. The River Welland Breach Hydraulic Model considers risk of flooding with flood defences and without flood defences; however, the flood defences provide protection up to a 0.1% AEP +28% climate change event. A flood defence breach is associated with a failure of above ground man-made raised defences.

5.3.55. For the four breach locations assessed in the model, a flood defence breach would start when the water level reaches half the height of the flood defence.

5.3.56. The results for a 0.1% AEP with 28% climate change allowance for a breach occurring in the River Welland shows the maximum flood depth of approximately 2.1m is recorded within Land Parcel A, with flood depths across the Land Parcels not exceeding this value. For Land Parcel B, the maximum flood depth decreases to 1.6m. The overall average flood depth is approximately 1.7m. The hydraulic modelling carried out recorded localised higher depths; these values are linked to river channel depth and not the flood depth in fields. Therefore, these values have been excluded for this FRA.

5.3.57. All solar PV panels have an electrical box located in the middle of each solar PV Panel. When this box is submerged fully, the solar PV panel will go offline and become non-operational. The solar PV panels are designed that if the bottom panel is submerged, but the water does not submerge the electrical box, then the upper panel will remain operational. Before any mitigation, the panel would be able to flood up to 1.55m depth with the upper panels remaining operational. The minimum height of the base of the solar PV panel above ground is 0.8m, and in areas at risk of flooding, the base of the solar PV panels will have a height above ground of 1.3m to ensure upper panels can remain operational in times of flood.

Post Scheme Impact of River Welland Breach event on Solar Stations and substations and mitigation required

5.3.58. In total, there are proposed to be approximately 128 indicative solar stations across the Site within the illustrative design. The solar stations have also been purposefully placed outside of the Postland Catchment and South Holland Main Drain Flood Zones 3a and 3b, except for Parcel D-1, i.e. they only interact with the River Welland breach flood extents.

5.3.59. Analysis was undertaken to determine which solar stations are in the flood extents of the River Welland Breach flooding, and where the flood depth is greater than 0.5m in order to determine which solar stations should be bunded or raised on plinths.

5.3.60. The final infrastructure layout of the Solar Development Area will be subject to detailed design. Solar stations will be subject to the following design parameters: Solar stations which are located where flood depths are greater than 0.5m would require bunding or a flood defence wall. Plinths can be provided for solar stations in locations where the predicted flood depths are 0.5m or less. This requirement is to provide a minimum of 0.3m freeboard in addition to the 0.5m depth. Plinths are limited to a maximum height of no more than 0.8m to ensure the overall height of the solar stations will not exceed the height of the PV panels, avoiding any landscape, visual and noise issues. Further detail of bunding for the solar stations would be designed in the next stage of design post DCO consent. However, as discussed under heading *Fluvial Flood Risk and Floodplain Compensation Assessment* for the Gotts catchment, 6 solar stations are to be raised to provide 0.6m freeboard where located within Flood Zone 3b flood extents.

5.3.61. Solar stations in Land Parcel D will not be affected by the Welland breach event, as the flood extents do not reach this Land Parcel.

5.3.62. Figure 1-5, presented in Annex D of this FRA, illustrates the Solar Station flood mitigation design parameters across the Site, split into five distinct bands:

- Band 1 shows areas within the Site where no solar stations are allowed due to the presence of the Flood Zone 3a / 3b extent of the Postland and SHMD (except for the Gotts catchment of SHMD).
- Band 2 shows the areas where solar stations are to be bunded (as the provision of plinths would not be able to provide sufficient freeboard within the maximum height parameter for the solar station).
- Band 3 shows the areas where solar stations will require plinths up to a height of 0.8m to provide 0.3m freeboard.
- Band 4 shows areas where solar stations will require plinths up to a height of 1.35m to provide 0.6m freeboard, which is only in the Gotts Catchment; and
- Band 5 shows areas where no flood mitigation is required, which is any area within Work No.1 that does not fall into the previous bands.

5.3.63. The figure provides a spatial representation of the mitigation measures required for solar stations across the Site, demonstrating how these measures vary in response to the flood risk identified through the hydraulic modelling results for every catchment. Minimum heights for raising infrastructure, and the bands set out above, were determined by combining the ground level at the infrastructure location from the topographical survey, the maximum flood depth at that location and the required freeboard (0.3m across the Site, except for Gotts catchment where 0.6m freeboard is to be provided for solar stations).

5.3.64. An assessment of flood risk to substations has also been undertaken. Assessment for the On-Site 132kV Substations were carried out, as they are critical infrastructure that require protection against fluvial flooding since they are located in the River Welland breach flood extent of a 1 in 1000-year plus 13% climate change flood event. To ensure resilience, the design incorporates bunding around the substations on Parcel A and Parcel C, with heights informed by flood level analysis. The 132kV Substation on Parcel D is located outside the River Welland breach flood extent.

5.3.65. Calculations were undertaken to provide an estimate for the bund height for the 132kV Substations and the 400kV Substation and BESS Compound in order to prevent fluvial flood impact to the infrastructure. Bund heights were determined by combining the ground level at the substation site from the topographical survey, the maximum flood depth at that location, and an additional 0.3m freeboard. The table below provides the proposed bund or wall height for each substation, including a 0.3m freeboard.

Table 5-5: Substation Bund or Defence Wall Height

Substation and Land Parcel	Bund Height (m AOD)
132kV substation in Land Parcel A	2.5
132kV substation in Land Parcel C	2.4
400kV substation and BESS compound in Land Parcel B	2.6

5.3.66. All bunding, if used in lieu of walls, associated with the substations, BESS Compound and solar stations will be constructed from suitable impermeable materials, with final specifications confirmed through geotechnical testing at the detailed design stage, post DCO consent. Material arising from the Site will be reused elsewhere within the Scheme, where appropriate. Any reuse of material will be managed to ensure that ground levels within flood risk areas are not raised and that floodplain storage is not affected.

Post Scheme River Welland Flood Depth Assessment

5.3.67. Drawing WHS10217-T01-0008, an extract of which is included within the hydraulic modelling report, within Annex B of this document indicates the post Scheme impact against the baseline breach model of the River Welland. Breach location 4 has been chosen as the worst case breach impact in this location.

5.3.68. The majority of depth increases are within the Order Limits, with depths up to 0.2m (200mm) within Land Parcel A, associated with fields and watercourses; there are no high risk receptors impacted by the depth changes, such as farm infrastructure, local roads or dwellings.

5.3.69. An area to the south of the Order Limits indicated a flood depth reduction in the with-Scheme scenario, associated with fields and watercourses.

5.3.70. However, there are also two areas beyond the Order limits that show an increase in flood depth of between 0.05m (50mm) and 0.2m (200mm). These flood depth increases are within fields surrounding the Order Limits, and a surface waterbody to the west. These flood depths are during the low risk breach scenario event, and not during the defended scenario.

5.3.71. No areas of depth increase are associated with a high risk receptor; although it is noted that Little Lodge Farm is within 40m of the increased flood depths of up to 0.1m (100mm) in the field north of Postland Main Drain.

5.3.72. The Postland Main Drain acts as a boundary for flood risk from the depth increases to the property. LiDAR levels of the area in and around Little Lodge Farm indicate the property lies on raised ground at approximately 1.4m AOD to 1.5m AOD. The flood extent and the up to 0.1m (100mm) increase in flood depth do not exceed 1.0m AOD, as they align with the LiDAR contours in this area. Therefore, there is a very low risk of any flood depth increase across the areas impacting the property.

5.3.73. Comparison of the overall impact of the depth changes outside of the Order Limits is presented in Table 5-6 below, with an overall volume comparison.

Table 5-6: Depth Change Volume Assessment – River Welland

Flood Depth	Volume (m^3)	Net Volume (m^3)
50-200mm increase	+2,361	
10-50mm reduction	- 2,039	
		+322

5.3.74. The net volume shows an increase flooding of 322m^3 outside of the Order limits. This is contained within fields, with no impact to high risk receptors as confirmed in paragraphs 5.3.71 and 5.3.72.

5.3.75. No other locations showing a depth increase are near to a high risk receptor, i.e. the areas are located in field areas and woodland areas. Therefore, there is no material increase in flood risk to properties or roads within the River Welland breach scenario catchment.

Mitigation Assessment for PV Panels to Provide Protection against the River Welland Breach Flood Event

5.3.76. The base of the solar PV panels will have a height above ground of 1.3m in areas at risk of flooding to ensure upper panels can remain operational in times of flood. This will be done by raising the solar PV panels an additional 0.5m above the minimum height of 0.8m above ground.

5.3.77. Due to this mitigation measure for the solar PV panels, fluvial flood risk from a breach event for the PV panels is reduced and considered to be low.

5.3.78. In conclusion, with the embedded mitigation proposed of raising the solar PV panels by 0.5m in areas of flood risk where the maximum allowable flood depth to the lower panels would be more than 1.55m, the Scheme's fluvial flood risk for the River Welland is considered to have been appropriately assessed for the solar PV panels, ensuring the Scheme will remain operational in times of flood.

Figure 1-4, presented in Annex D of this FRA, illustrates the solar panel flood mitigation design parameters across the Site. The figure identifies areas where panels will be installed at a minimum height of 0.8m above ground, as well as areas where panel heights vary between 0.8m and 1.3m above ground, measured from the base of the panel. These ranges are categorised as Band 1 and Band 2 to distinguish between the different panel height requirements. The bands are defined by the hydraulic modelling outputs, based on the maximum (worst-case) flood depth mapping across each assessed catchment and the required freeboard of 0.3m where this is possible to achieve within the maximum height parameter for the solar panels.

South Holland Main Drain Fluvial Assessment

5.3.79. The South Holland Main Drain flows westerly through the northern section of Land Parcel B, C and D.

5.3.80. The Site lies in three catchments of the South Holland Main Drain: Wisemans, Fleet Fen and Gotts. Land Parcel D lies within the Fleet Fen and Gotts Catchment, while the 400kV Substation and BESS Compound in Land Parcel B are located in the Wisemans Catchment.

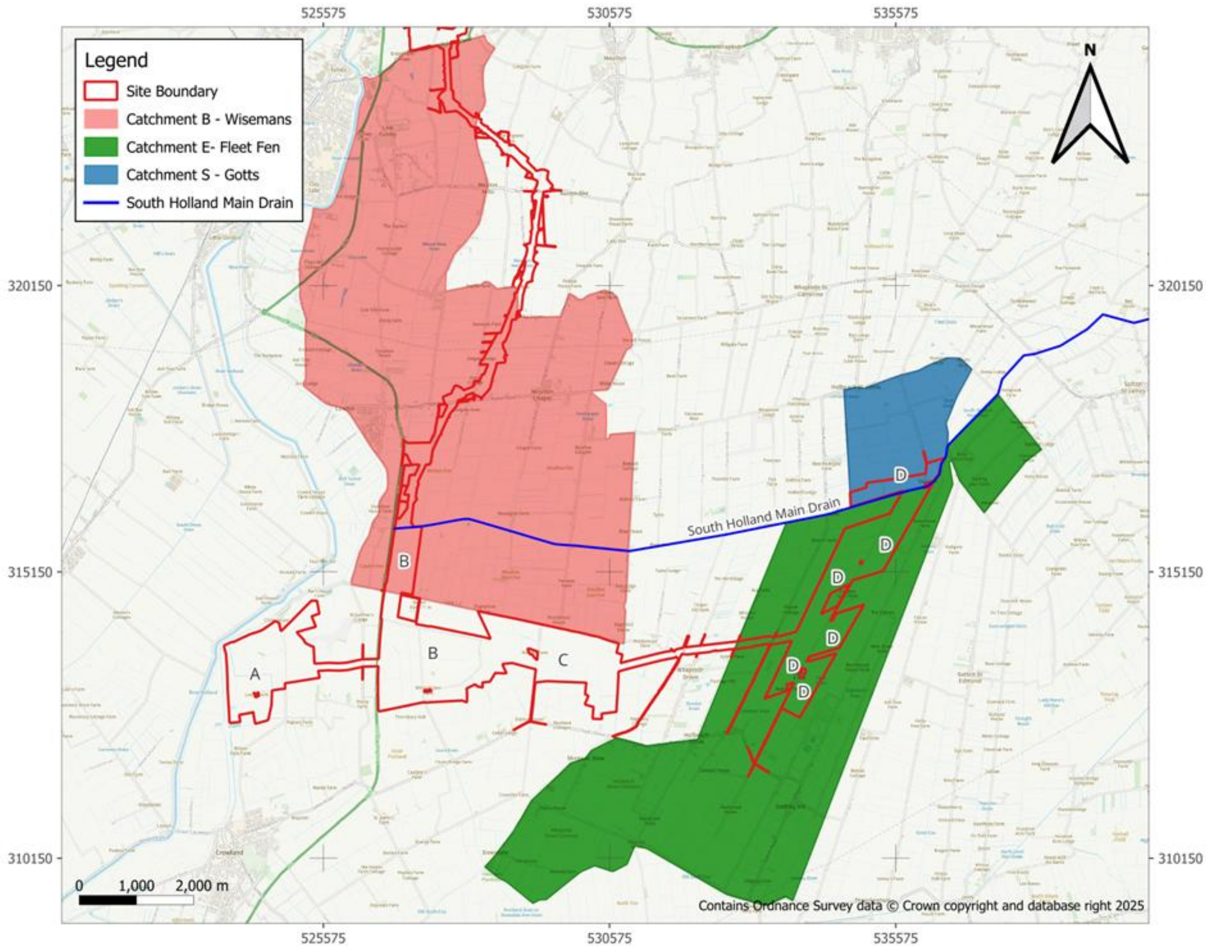

Plate 5-5: South Holland Main Drain Catchments

5.3.81. Three scenarios were assessed: the baseline scenario where the pumps are operational, the pump failure scenario and the post-development scenario. A higher-end climate change allowance of 13% for the 2080s epoch was applied for the Nene Management Catchment.

Gotts Catchment Fluvial Assessment

5.3.82. The 3.3% AEP flood extent for the pump-on scenario in the Gotts Catchment impacts six indicative solar stations located in the Gotts Catchment in the north of Land Parcel D. Refer to Plate 5-7 below. Subject to detailed design, the number and location of the solar stations will be assessed, seeking to reduce the number of solar stations within Flood Zone 3b, and thus reduce the volume of floodplain loss. The locations of the six solar stations assessed in this report represents the worst case scenario.

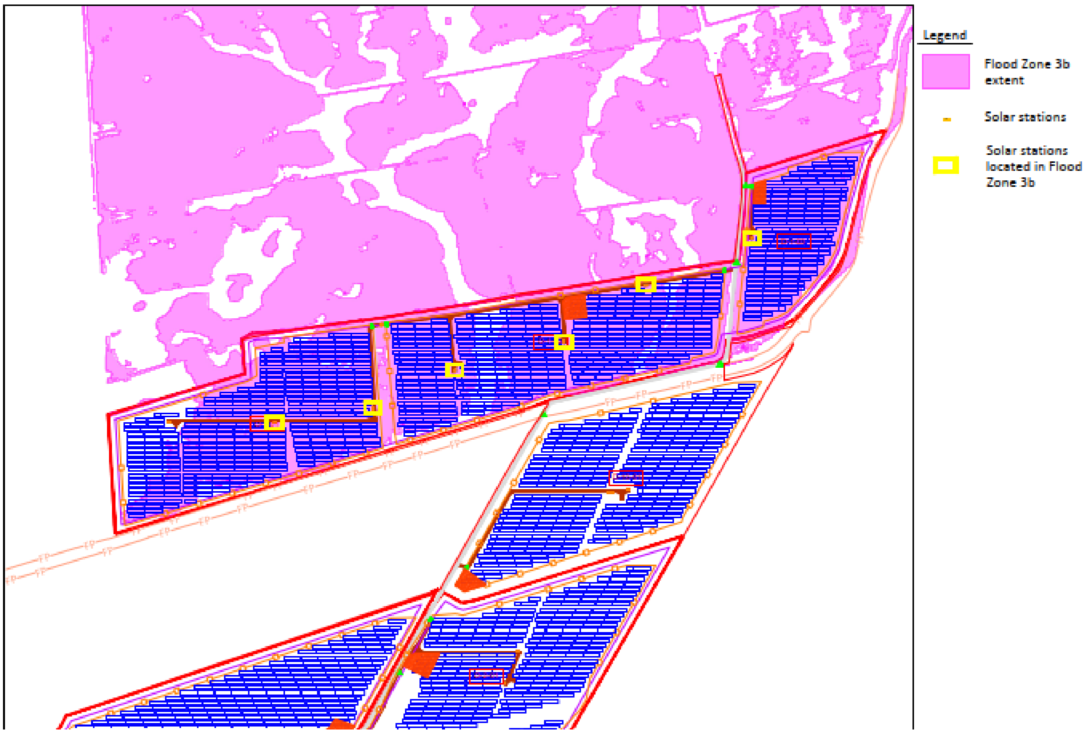

Plate 5-6: Drawing showing the indicative solar stations in Flood Zone 3b – Gotts Catchment

5.3.83. Plate 5-6 shows the six indicative solar stations that are located in the Flood Zone 3b flood extents, within the Gotts Catchment of the SHMD flood extents. The maximum flood depth recorded at the six solar stations is 0.73 m, with an average depth of 0.5m across those locations. No other solar stations across the Scheme are located in a Flood Zone 3b flood extents. Please refer to Figure 1-5: Illustration of Solar Station Flood Mitigation Design Parameters located in Annex D of this report which shows how the different mitigation requirements for solar stations vary across the Site based on the level of flood risk identified.

5.3.84. The remainder of the South Holland Main drain and tributaries do not flood during the 3.3% AEP event (or for the 1.0% AEP event, including 13% climate change).

5.3.85. Review of the Flood Zone 3b flood extents indicates coverage of approximately 34.46ha across solar PV fields D 1-01, D 1-02 and D 1-03.

5.3.86. It is noted for the with-Scheme assessment of Land Parcel D, for the 0.1% AEP plus 13% climate change, maximum flood depths during the pump-off scenario across Land Parcel D do not exceed 0.5m. Noting two erroneous depths of 0.6m and 0.7m are associated with in channel depths in Fleet Fen, not depths effectively within Land Parcel D, and are excluded from assessment.

5.3.87. With the pump-on scenario, the flood depth across Gotts catchment increases to approximately 0.75m depth for the 1% AEP event (Flood Zone 3a) and 0.5m during the 3.33% (Flood Zone 3b). This is due to the Fleet Fen catchment pumps increasing flows within the South Holland Main Drain, along with the Gotts catchment pumped flows, causing increases in the in-channel flows (which are greater than in the pump off scenario). With lower embankment crest levels along the South Holland Main Drain in the Gotts catchment, the river levels overflow into Gotts.

5.3.88. A quantitative assessment has been undertaken to determine the potential impact on the floodplain associated with the installation of six solar station units located within Flood Zone 3b and 3a of the Gotts catchment. The assessment considers whether the Scheme would give rise to any measurable change in flood depth, floodplain storage loss, or flood extent under design flood conditions.

5.3.89. Each solar station has a footprint of approximately $56m^2$ (16m × 3.5m), resulting in a combined total base area of 336 m^2 for the six solar stations. Applying a conservative assumption that the full base area of each structure would act as an obstruction to flood storage at a maximum flood depth of 0.75 m (1% AEP plus climate change scenario), the total displaced volume is approximately $252m^3$. The flood depth during the 3.33% AEP event is up to 0.5m and would produce a small volume of displacement ($168m^3$).

5.3.90. This displaced volume, when distributed across the Flood Zone 3a and 3b flood extent of approximately 34.6ha, equates to a maximum average increase in flood depth of 0.0007 m (0.7mm) during the 1% AEP plus climate change event. This value is several orders of magnitude below both the vertical resolution of standard hydraulic modelling outputs and the precision achievable in topographic survey data.

5.3.91. Review of topographic levels and the flood depth mapping, indicates there is no material change within the floodplain extents, with no discernible alteration to flood depth contours or to the spatial extent of inundation. Consequently, the proposed structures are assessed to have no measurable or material influence on floodplain hydraulics.

5.3.92. The indicative solar stations can also be located to shallower depths of flooding within the immediate vicinity of the solar stations as currently shown, reducing the flood depth to less than 0.5m, including for during the 1% AEP plus climate change event where flood depths are greater during the pump-on scenario. This enables the solar station plinths to be raised so they will remain operational in times of flood without the need for additional bunding or flood wall mitigation.

5.3.93. As the floodplain extents do not exceed current modelled extents, and the receptors to flood risk are the solar PV fields themselves, with no highly vulnerable receptors within the Scheme, or within the influence downstream or elsewhere, it is considered the solar stations do not require mitigation.

5.3.94. The modelled flood depth increase of 0.0007m (0.7mm) is considered to have no material impact to the functional floodplain within Gotts Catchment, with no further mitigation.

5.3.95. With a flood depth of 0.5m the plinths can be raised by 0.8m to provide 0.3m freeboard. However, after correspondence with the EA in January 2026, taking a cautionary approach, with solar stations within undefended fluvial Flood Zone 3b flood extent (this occurs only in the Gotts Catchment), it is proposed to provide 0.6m freeboard above the design flood depth, during the 1% AEP plus 13% climate change event, complying with the EA's suggestion of providing a 0.6m freeboard rather than a 0.3m freeboard for solar stations within the Gotts Catchment Plinths will be provided up to a height of 1.35m to provide this freeboard allowance for the six solar stations in the Gotts catchment.

5.3.96. Surface water flow velocities within the Gotts catchment have been reviewed using the Defra Risk of Flooding from Surface Water – Speed[30] mapping. Mapping is presented in Plate 5- below. The mapping shows an absence of defined overland flow paths from surface water, with surface water velocities predicted to be very low, speeds below 0.25m/s. This is reflective of the flat topography that characterises the Solar Development Area, where surface water runoff is generally retained locally and gathers in low spots across the area, rather than forming continuous overland flow paths. As a result, there is limited potential for surface water to carry debris across the area. Therefore, the risk of debris impact on infrastructure, including voids beneath elevated

[30] DEFRA, Risk of Flooding from Surface Water – Speed [2025]. Available online at: https://environment.data.gov.uk/explore/7ce4d959-b285-4d25-aefd-2e0cab12548c [Accessed 27/01/26].

infrastructure, is assessed to be low. The potential for debris accumulation is also considered to be low due to the lack of flow required to convey material across the floodplain, combined with the fact the surrounding area has limited vegetation that cause reasonably cause large blockages (such as branches form larger trees).

5.3.97. The **Outline OEMP** (Doc Ref 7.11) states that during the operational phase of the Scheme, a maintenance check of the panels would be performed following a storm or a flood event. This will ensure any debris that does accumulate will be cleared.

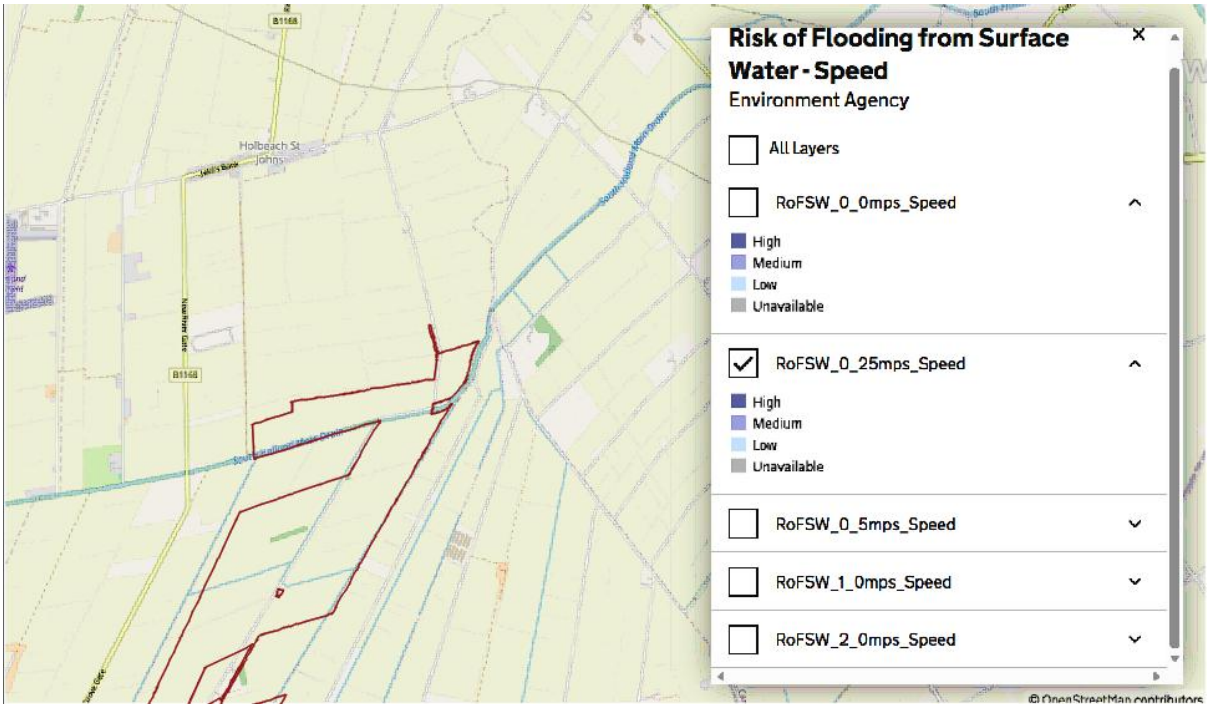

Plate 5-7 - Defra Risk of Flooding from Surface Water: Speed (Accessed 25 January 2026)

Fleet Fen Catchment Fluvial Assessment

5.3.98. The solar stations and the 132kV On-Site Substation located within the Fleets Fen Catchment in Land Parcel D are not affected by the 1% AEP plus 13% climate change Pump On Scenario, as the flood extents do not lie within this area, being retained within the watercourse channels (Plate 5-8).

5.3.99. Therefore, no mitigation is required for the 132kV On-Substation and solar stations located in the Fleet Fen Catchment as there is no flooding for the 1%

AEP plus 13% climate change Pump On Scenario in this location, including for impacts of climate change.

Plate 5-8: 1% AEP plus 13% climate change Pump On Scenario flood extent in the Fleet Fen Catchment

5.3.100. The flood extent for the 0.1% AEP plus 13% Climate Change Pump Off scenario impacts all South Holland Main Drain catchments. The maximum flood depth located across Land Parcel D is 0.5m (within Gotts Catchment). The solar stations that are located within the flood extent for this event will require further mitigation to protect against the 0.1% AEP plus Climate Change Pump Off Scenario.

5.3.101. Although this flood extent impacted the Fleet Fen Catchment, the 0.1% AEP plus 13% climate change pump off scenario flood extents do not materially impact the 132kV substation in Land Parcel D (Fleet Fen). The fluvial flood extent during this event marginally encroach around the edges of the substation area. The design of this area will ensure there is no above ground critical infrastructure in the flood extents; therefore, no bunding is required for the 132kV substation in Land Parcel D (Plate 5-9).

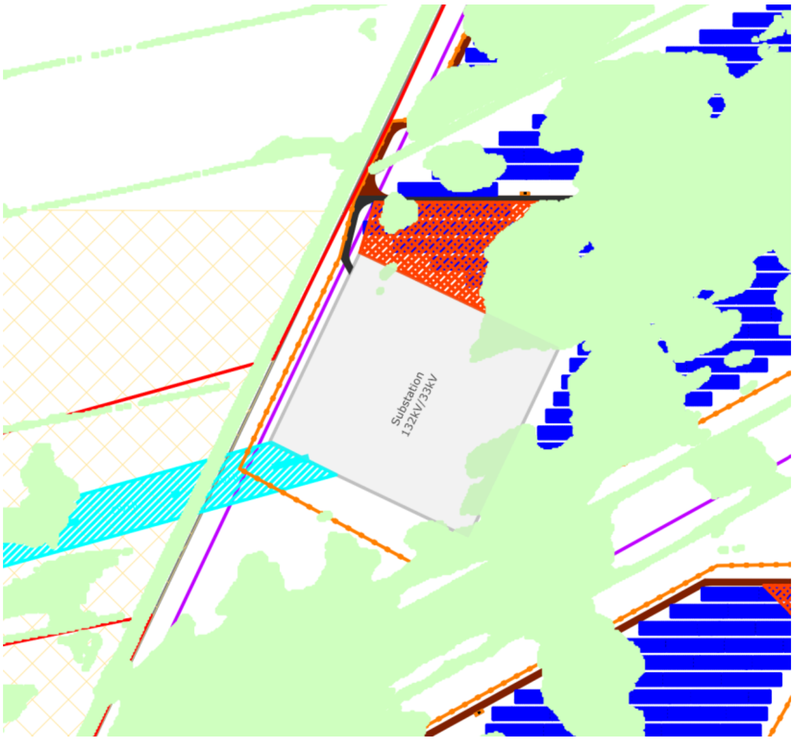

Plate 5-9: 1 in 1000 year plus 13% climate change Pump Failure Scenario flood extents in the Fleet Fen Catchment (Land Parcel D)

Wisemans Catchment Fluvial Assessment

5.3.102. The Wisemans Catchment, where the 400kV Substation and BESS Compound are located, are not affected by the 3.3% AEP flood extents, nor the 1% AEP plus climate change flood extents (Plate 5-10). Therefore, no additional mitigation is required to protect the 400kV Substation and BESS Compound against this flood event, than that already provided for the breach of the River Welland.

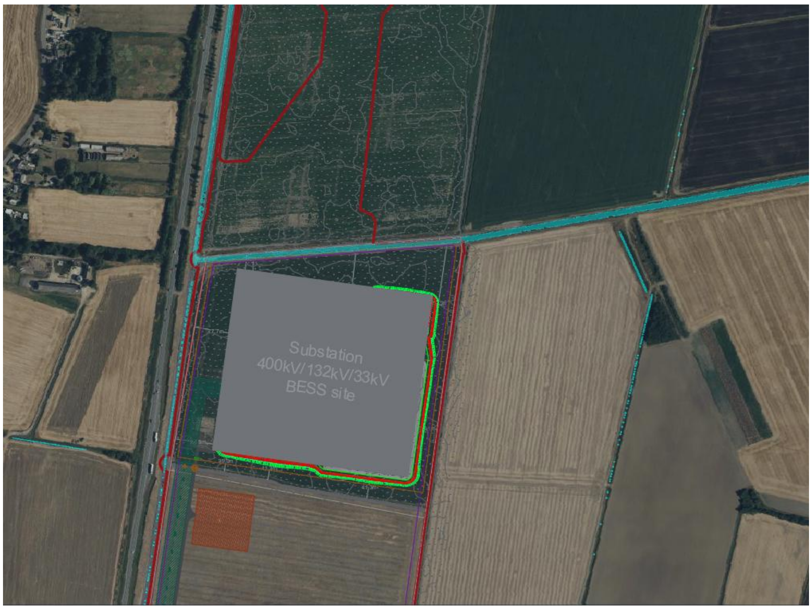

Plate 5-10: 1% AEP plus 13% climate change Pump On Scenario flood extents in Wisemans Catchment

5.3.103. The flooding for the 0.1% AEP plus Climate Change Pump Off Scenario extends further into the Wisemans Catchment, where the 400kV Substation and BESS compound is located. The maximum flood depth in this area is 0.6m. However, the SHMD shares this catchment with the River Welland breach flood extents, so mitigation is already provided for infrastructure above the 0.1% AEP plus Climate Change depth of the SHMD.

5.3.104. Therefore, no further mitigation is required for the 400kV Substation and BESS compound to protect against the 0.1% AEP plus Climate Change Pump Off Scenario for the SHMD as mitigation has already been provided in the form of bunding for the River Welland breach event, as it has higher flood depths than the SHMD flood depths.

5.3.105. Mitigation is required for the solar stations located within the flood extents of the SHMD. It is proposed that plinths will be provided for solar stations in locations where the predicted flood depths are up to 0.5m or less in order to provide a minimum of 0.3m freeboard in addition to the 0.5m, making the maximum height of a plinth 0.8m. Where flood depths are greater than 0.5m, bunding or a flood defence wall would be required for the solar stations. This is to avoid the solar stations being raised higher than the maximum height of the panels. As the maximum flood depth across Land Parcel D is 0.5m during the pump failure scenario, plinths would be provided for the solar stations so they can remain operational in times of flood, and there is no requirement for bunding or flood defence wall. Please refer to Figure 1-5: Illustration of Solar Station Flood Mitigation Design Parameters located in Annex D of this report which shows how the different mitigation requirements for solar stations vary across the Site based on the level of flood risk identified.

5.3.106. As requested by the EA during a meeting with them in January 2026, solar stations in Land Parcel D-1 within the Gotts catchment that are located in Flood Zone 3b flood extents would be provided freeboard of up to 0.6m. Therefore, the maximum height of any plinths used to raise solar stations above flood depths in Land Parcel D-1 would be 1.35m (0.75m plus 0.6m freeboard), resulting in a maximum height of 4.85m above the ground for solar stations raised on plinths. The increase in freeboard for solar stations located in Land Parcel D-1 is to avoid any objects and debris getting caught in the void underneath the solar stations and potentially increasing flood depths.

Mitigation Assessment for Scheme Infrastructure from the SHMD flood extents

5.3.107. The maximum flood depth of the SHMD pump failure model was found to be 0.6m within Land Parcel B, and 0.5m in Parcel D; Parcels A and C were not impacted.

5.3.108. The solar PV panels have a minimum base height of 0.8m above the ground. Mitigation in Land Parcel B from the River Welland breach scenario supersedes any mitigation requirements from the SHMD results. Therefore, no additional mitigation is required.

5.3.109. Mitigation was also considered for the solar stations located within the flood extents of the SHMD. It is proposed that plinths will be provided for solar stations in locations where the predicted flood depths are up to 0.5m or less in order to provide a minimum of 0.3m freeboard in addition to the 0.5m making the maximum height of a plinth 0.8m. Where flood depths are greater than 0.5m, bunding or a flood defence wall would be required for the solar stations. As mentioned previously, solar stations in Land Parcel D-1, within the Gotts Catchment, that are located in Flood Zone 3b flood extents would be provided freeboard of up to 0.6m. Therefore, the maximum height of any plinths used to raise solar stations above flood depths in Land Parcel D-1 would be 1.35m (0.75m plus 0.6m freeboard).

5.3.110. As the maximum flood depth across Land Parcel D is 0.5m, plinths would be provided for the solar stations, and there is no requirement for bunding or flood defence wall.

5.3.111. The analysis concludes that there is no residual fluvial flood risk to the Scheme PV panels in Land Parcel D for the duration of its lifespan. There is no mitigation required for the PV panels in this Land Parcel.

5.3.112. The pump failure flooding extends to the north of the Land Parcel B. No PV panels are proposed in this area, so no mitigation for the panels is required for this area. The 400kV Substation and BESS Compound is located in the pump failure flood extents, however, the River Welland breach event mitigation supersedes any required mitigation for the 400kV Substation and BESS Compound from the SHMD flood extents and for the 132kV substations and solar stations in Land Parcel C.

5.3.113. There is, therefore, a low residual risk to the PV panels across the Solar Development Area from the SHMD 1 in 1000 year pump failure flood extents.

Post Scheme South Holland Main Drain Flood Depth Assessment

5.3.114. The hydraulic model of the South Holland Main Drain is a 1D model, unlike the 1D-2D model for the River Welland and Postland catchments. Therefore, it is not possible to create a flood depth difference map to discreetly show specific changes.

5.3.115. However, the hydraulic model report, within Annex B, undertook an assessment of the baseline and post Scheme modelling to assess the change in elevation curves for both scenarios. This is discussed in Section 5.1.3 of the modelling report in Annex B.

5.3.116. The results indicate immaterial increases in the depth profile of the South Holland Main Drain catchment in the post Scheme scenario; therefore, it is considered the immaterial volume loss (discussed under heading *Post Scheme Impact of PV Panel and Panel Volumes for all Catchments* and *Gotts Catchment Fluvial Assessment* for the Solar Station assessment) from PV panels and defended Solar Stations does not cause any material increase in flood depths across the catchment or elsewhere beyond the Order limits.

Postland Pumped Catchment (PPC) Fluvial Assessment

Post Scheme Impact of Postland fluvial event on Solar stations and substations and mitigation required

5.3.117. Hydraulic modelling was carried to assess the flood risk of the Postland Pumped Catchment (PPC) model, which covers land parcels A, B and C of the Site. A higher-end climate change allowance of 28% for the 2080s epoch was applied for the Welland Management Catchment, which the PPC falls within.

5.3.118. Two scenarios were used for the analysis; a baseline 0.1% AEP plus 28% Climate Change event, the 'PUMP_OFF' scenario, which simulates a failure at the pumping station during a flood event, and a post-development "PUMP_OFF" scenario, which simulates a failure at the pumping station with the proposed solar farm infrastructure in place. The catchment area is shown below in Plate 5-11 and includes the location of Land Parcels A, B and C.

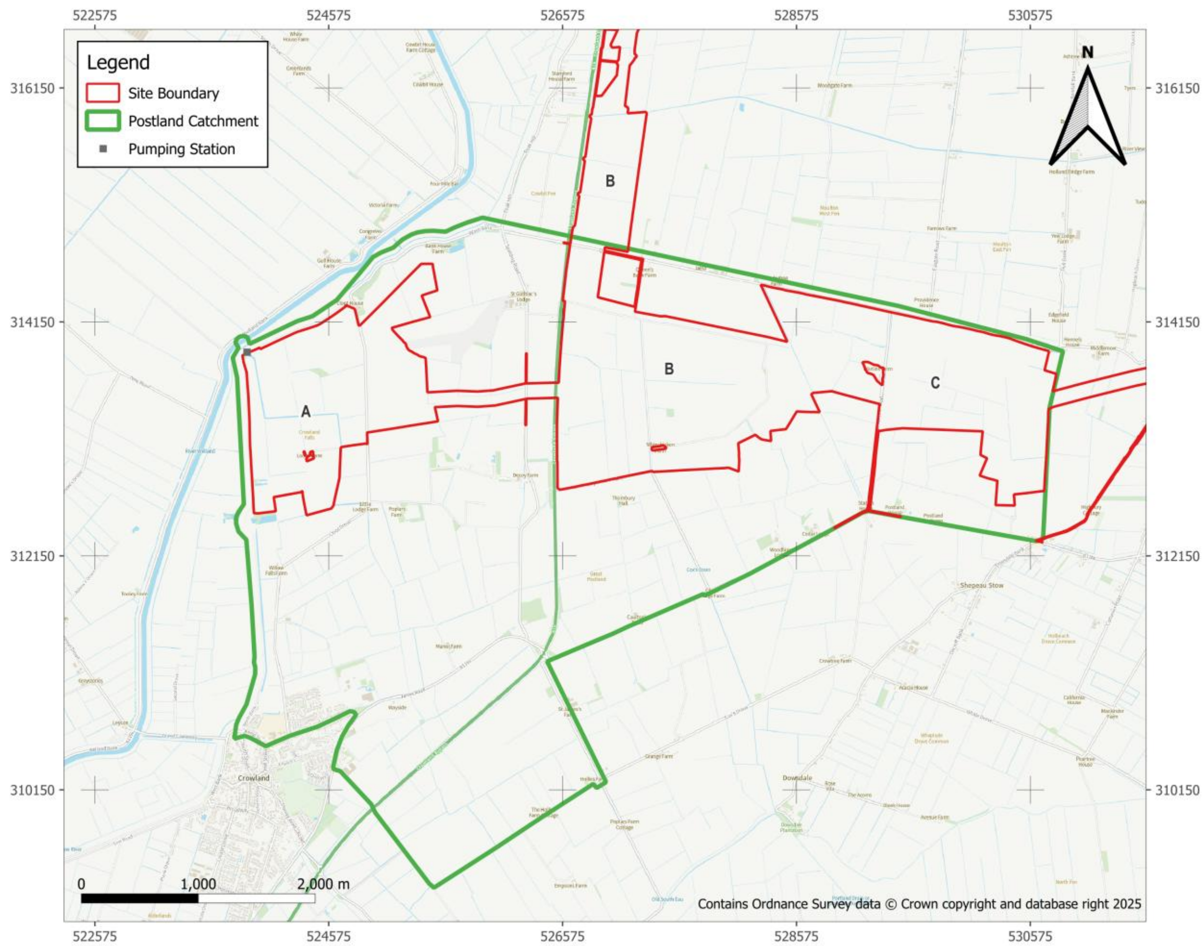

Plate 5-11: Postland Pumped Catchment Boundary

5.3.119. The results for the worst-case scenario of a 0.1% AEP + 28% climate change storm event shows that the flood extents affect Land Parcels A, B and C with Land Parcel A being the most affected by the flood extents of this storm event for this model.

5.3.120. The areas with the deepest floodwater are situated near the pumping station located at the north end of the PPC. This occurrence can be attributed to the topography of the land, where water flows toward the pump and backs up, eventually spilling over the banks of the Postland and neighbouring drains.

5.3.121. The results have been mapped based on the minimum road level of the lowest point on the perimeter of the catchment, which is 1.38m AOD. It was assumed that any flooding above this level would drain out of the catchment at the southern edge.

5.3.122. The maximum flood depth for the 0.1% AEP plus 28% climate change storm event pump failure scenario is located in Land Parcel A and is 1.5m, with an average flood depth of approximately 0.7m across Land Parcels A, B and C. The minimum height for a PV panel to remain operational is 1.55m. This height means the lower panels could be submerged, but the upper panels will not be submerged, resulting in the PV panels remaining operational in times of flood.

Mitigation Assessment for The Permanent Infrastructure to Provide Protection Against the PPC Flood Event

5.3.123. The River Welland breach event has been assessed under the heading *River Welland Breach Assessment* in this report. The River Welland breach event overlaps the flood extent of the PPC. This section assesses the fluvial flood extent of the PPC to locate all critical infrastructure outside of Flood Zones 3b and 3a, except for PV panels and to assess if additional mitigation is required beyond that provided for the River Welland.

5.3.124. Mitigation measures were considered for the solar PV panels by including a freeboard of 0.3m to protect against the PPC Flood Zone 3a flood extents. Assessment was undertaken to show the percentage of the solar PV panels that will be submerged at a flood depth of 0.5m if no mitigation for the panels was required, and the area of panels submerged if the panels were raised by 0.3m.

5.3.125. The calculations were undertaken by seeing how many of the solar PV panels were submerged at a flood depth of greater than 0.5m for a storm event of 1 in 100 + 28% climate change, to account for a 0.3m freeboard. The results are listed in Table 5-7 below.

Table 5-7: PV panels submerged for a 1 in 100 year + 28% cc storm event for the PPC above 0.5m

Postland 1 in 100 year + 28% climate change flood depths	Total PV panels that are submerged at a flood depth greater than 0.5m	Total area of PV panels submerged at a flood depth greater than 0.5m	Total area of PV panels in Land Parcel A
	52 panels	1.2ha	85.55ha

5.3.126. The number of solar PV panels that would be submerged was then counted after having raised the panels by 0.3m, providing results for the area of the panels submerged if this mitigation was proposed. The results show that no panels would be submerged if the panels were to be raised by 0.3m to mitigate against the Postland Catchment, 1 in 100 year + 28% cc storm event.

However, this mitigation was superseded by the mitigation required for the River Welland breach event, which had greater flood depths in Land Parcel A than that of the PPC. Flood Depths do not exceed 1.55m in any other Land Parcel that would require any mitigation to solar PV panels, i.e. no raising of panels is required in Land Parcel B and C as a result of the Postland modelling. Refer to Plate 5-12 for PPC model flood extent for 1 in 100 year plus 28% climate change.

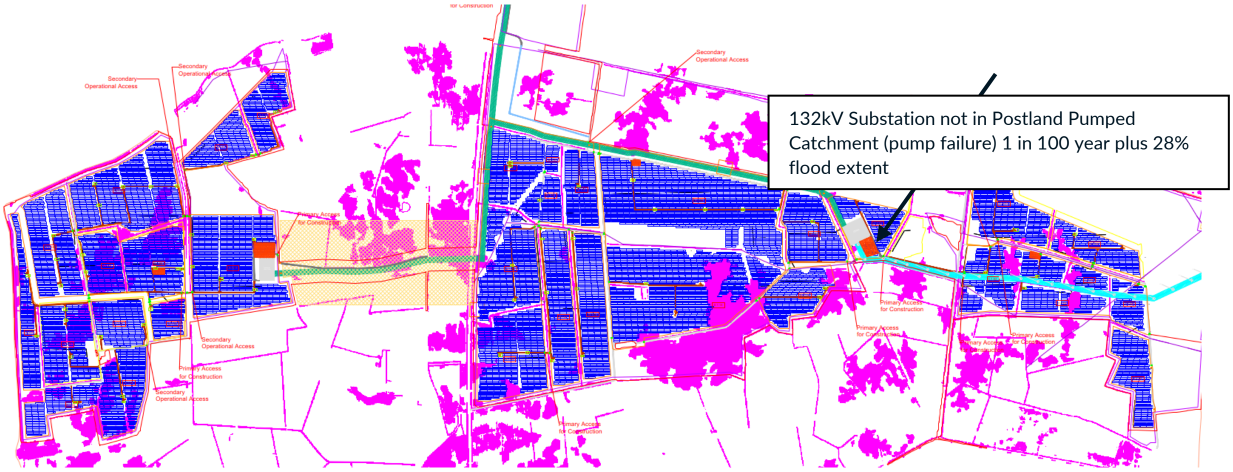

Plate 5-12: Layout of Land Parcel A, B and C showing the Postland Pumped Catchment flood extent for a 1 in 100 year + 28% cc storm event

Post Scheme Postland Flood Depth Assessment

5.3.127. Drawing WHS10217-T01-0007, an extract of which is included within the hydraulic modelling report, within Annex B of this report, indicates some very small isolated areas within and outside the Order Limits that show an increase in flood depths of up to 0.1m (100mm) across the Postland catchment. The majority of increases are within the Order Limits, with only some very small pockets outside the Order Limits.

5.3.128. The majority of these small pockets of depth increase are associated with existing ponds in the catchment (which show depths over 0.1m (100mm). The results indicate depths in these low topographical spots where ponds are located do not exceed the pond extents, with no material increase in flood risk resulting from the pond depth increases.

5.3.129. The remaining pockets of depth increases outside the Order Limits are associated with fields and apparent localised low spots along watercourse banks where the depth increases appear more prevalent.

5.3.130. There are no high risk receptors that are impacted by these depth increases. However, one area north of the A16, off Spalding Road, is approximately 100m south of an area of flood depth increase of up to 0.1m (100mm).

5.3.131. Review of LiDAR in and around the property and the flood depth increase note the ground level around the property is approximately 2.4m AOD, and the area where the flood depth increase is shown sits at approximately 1.5m AOD at its highest level.

5.3.132. With a positive level difference of approximately 0.9m, it is considered the property is not at risk due to the flood depth increase.

5.3.133. No other locations showing a depth increase are near to a high risk receptor, located in field areas and woodland areas. Therefore, there is no material increase in flood risk to properties or roads within the Postland catchment.

Fluvial Flood Risk Assessment Summary

5.3.134. A summary of the hydraulic models used to inform the fluvial flood risk assessment, and their results are presented below:

River Nene

- The EA has undertaken detailed hydraulic modelling in 2011 for a range of scenarios to assess flood hazards, depths and velocities for each breach event, and overtopping with no breach. The Tidal Nene 2016 hydraulic model is a rerun of the overtopping modelling for the 2011 model. It was stated by the EA to use the breach hydraulic modelling from the 2011 model, and the overtopping modelling from the 2016 model.

- For the 0.5% AEP event, the Tidal Nene results show no overtopping.
- For the 0.1% AEP event, a small amount of overtopping occurred at two locations, the Sutton Bridge area, east of the Scheme, and at the downstream end of Wisbeck, south-east of the Scheme. The overtopping in these two locations does not affect the Scheme as it is located far east of it.
- For the 0.5% AEP and 0.1% AEP events with a climate change allowance of 13%, significant overtopping occurs, however, this does not affect the Scheme as the overtopping does not come close to the Scheme.
- The results of overtopping using the 2016 hydraulic model show that the flood extents of the River Nene would not extend out into the flood channel far enough to impact the Scheme.

River Welland

- The fluvial flood risk was assessed using the 2016 River Welland hydraulic model published by the EA with an added 28% climate change uplift applied to peak flows for the 1% and 0.1% AEP events.
- The modelling confirms the Scheme benefits from flood defences up to the 0.1% AEP plus 28% climate change event, with a resulting low residual risk from a breach of the River Welland to Land Parcels A, B and C.

Postland Pumped Catchment

- The existing hydraulic modelling was reviewed to assess peak water levels for baseline and post-Scheme conditions.
- The model assessed the 3.3%, 1% plus 28% climate change, and the 0.1% AEP plus 28% climate change events, pump on and 0.1% AEP plus 28% Climate Change pump off.
- The model shows the Scheme is impacted during the 3.3% AEP (Flood Zone 3b), the 1% AEP plus 28% Climate Change, and the 0.1% AEP plus 28% Climate Change scenarios.
- The 0.1% AEP plus 28% climate change event with pump failure represents the worst case scenario. This scenario results in flooding across Land Parcels A, B and C, with Parcel A most impacted. The deepest flooding occurs near

the northern PPC pumping station due to local topography causing water to back up and overtop banks. Maximum flood depths reach up to 1.5 m in Parcel A, with an average depth of approximately 0.7 m across the Site. While lower PV panels may be submerged, panels above 1.55 m remain operational, and the Scheme is therefore expected to continue functioning during flood events.

South Holland Main Drain

- A new hydraulic model was built to assess the peak water levels associated with baseline and post Scheme scenarios for the 3.3% AEP, 1% AEP plus 13% Climate Change, and 0.1% AEP plus 13% Climate Change (pumping on) and a failure of the pumping stations scenario during an extreme rainfall event, 0.1% AEP plus 13% Climate Change with pump failure as the worst case event for the Scheme.

- The model incorporates three IDB catchments into a combined model:
  - The Wisemans Catchment (Land Parcel B and C);
  - Fleet Fen catchment (Land Parcel D);
  - Gotts catchment (Land Parcel D).
- For the 3.3% AEP and 1% AEP plus 13% Climate Change event, the results indicate Fleet Fen and Wisemans Catchments (Land Parcels B and D) are not impacted (flows remain in channel).
- The 0.1% AEP plus 13% flood extent, from scenarios of both pumps being operational and pump failure extends across all SHMD catchments in Land Parcels B, C and D.
- The Pump On baseline model results show that the Gotts Catchment has an increased flood risk during the pumping scenario compared to when the pumps are off. This is due to the pumping operations within the Fleet catchment, where two pumps discharge into the SHMD adjacent to the Gotts catchment. The water levels pumped from Fleet Fen into the bank-full SHMD overtop into the Gotts catchment due to its lower bank crest levels. The modelling also showed that because of this, the 3.3% AEP and the 1% AEP plus 13% Climate Change flood extents for the SHMD Pump On scenario for the Gotts catchment exceeds the 0.1% AEP plus 13% Climate Change.

5.3.135. Table 5-8 below provides a tabulated summary of the modelling undertaken, and the discussion on model results and mitigation proposed, which has been discussed within Section 5.

Table 5-8: Summary of hydraulic modelling and results for the Solar Development Area

Catchment	Hydraulic Models Reviewed	Worst-Case Model Extent Scenario	Embedded Mitigation Across Solar Development Area	Impact On-Site with Scheme	Impact Off-Site with Scheme
River Nene	EA's 2011 hydraulic model & 2016 overtopping model: • 0.1% AEP + 13% climate change (CC) allowance Overtopping (breach) and Tidal Extent • 0.5% AEP + 13% CC Extent	0.1% AEP +13 CC Overtopping (breach) Plate 5-3	Not Required - extents do not reach the Site.	Not Required - extents do not reach the Site.	Not Required - extents do not reach the Site.
River Welland	Annex B: River Welland Hydraulic Modelling Report: • 0.1% AEP + 28% CC without breach (Confirms no overtopping for extreme event) • 0.1% AEP + 28% CC with breach	0.1% AEP + 28% CC with breach Figure 15 to Figure 18 of Annex B River Welland Hydraulic Modelling Report	As set out within **Design Parameters** (Doc Ref. 7.4): (Measures combine impacts from River Welland, Postland Pumped Catchment and South Holland Main Drain models) **PV Panels (see Figure 1-4 in Annex D):** Minimum height above ground of the lower edge of the solar PV modules	Up to 0.2m flood depth increase within Order Limits 0.01m flood depth increase as a result of solar panel mounting infrastructure and submerged solar panels in Land Parcel A	Two areas beyond the Order limits that show an increase in flood depth of between 0.05m (50mm) and 0.2m (200mm). These areas are contained within fields and existing surface

Catchment	Hydraulic Models Reviewed	Worst-Case Model Extent Scenario	Embedded Mitigation Across Solar Development Area	Impact On-Site with Scheme	Impact Off-Site with Scheme
			would be raised 0.3m above the worst-case flood extent (see column to the left). **Solar Stations (see Figure 1-5 in Annex D)**: No solar stations would be located in areas of Flood Zone 3a (i.e. 1% AEP + 28% CC pump on Postland scenario and 1% AEP + 13% CC pump on South Holland Main Drain scenario) or Flood Zone 3b (i.e. pump on 3.3% AEP and pump on 3.3% AEP South Holland Main Drain Depths), except for the Gotts catchment in Parcel D-1. In areas affected by the worst-case flood extents,	(Residual risk from the Welland breach event). 0.0010m flood depth increase as a result of solar panel mounting infrastructure in Land Parcels B and C (Residual risk from the Welland breach event).	waterbody, with no impact to high risk receptors.
Postland Pumped Catchment (PPC)	Annex B: Postland Pump Failure Analysis report: • Pump on 3.3% AEP Extent • Pump on 1% AEP + 28% CC Extent	Pump off 0.1% AEP +28% CC Figure 8 of Annex B: Postland		0.0009m flood depth increase as a result of solar panel mounting infrastructure	Increase in flood depths of up to 0.1m (100mm) across the Postland catchment. These small

Catchment	Hydraulic Models Reviewed	Worst-Case Model Extent Scenario	Embedded Mitigation Across Solar Development Area	Impact On-Site with Scheme	Impact Off-Site with Scheme
	• Pump on 0.1% AEP +28% CC Extent • Pump failure 0.1% AEP + 28% CC Extent	Pump Failure Analysis report	the following design principles apply: • Flood protection would be provided in the form of plinths, a bund or a flood protection wall. • The maximum height of any plinths used to raise solar stations above flood depths would be 0.8 m, except for Parcel D-1, where the maximum height of plinths can be up to 1.35m. • Where solar stations are located within the design	in Land Parcels A, B and C.	pockets of depth increase are associated with existing ponds, localised low spots within fields and watercourses. No high risk receptors impacted.
South Holland Main Drain (SHMD)	Annex B: South Holland Main Drain Modelling Report: • Pump on 3.3% AEP Extent • Pump on 1% AEP + 13% CC Extent • Pump on 0.1% AEP +13% CC Extent • Pump failure 0.1% AEP + 13% CC Extent	***Wisemans catchment (Land Parcels B & C) and Fleet Fen catchment (Land Parcel D south of SHMD):***		0.0002m flood depth increase as a result of solar panel mounting infrastructure in Land Parcel D. 0.0007 m flood depth increase as a	None

Catchment	Hydraulic Models Reviewed	Worst-Case Model Extent Scenario	Embedded Mitigation Across Solar Development Area	Impact On-Site with Scheme	Impact Off-Site with Scheme
		Pump off 0.1% AEP +13% CC Figure 13 of Annex B: South Holland Main Drain Modelling Report ***<u>Gotts catchment (Land Parcel D north of SHMD):</u>*** Pump on 0.1% AEP +13% CC Figure 12 of Annex B: South	flood extent and the plinths do not raise the solar stations above the worst-case flood depths and provide 0.3 m freeboard, they are to have a flood defence wall or bund for protection. Any flood defence wall or a bund provided may be up to a maximum height of 2.3m above ground level. The maximum width of a bund may be up to 21m. This is with the exception of Parcel D-1, where the maximum	result of six solar stations within Gotts catchment.	

Catchment	Hydraulic Models Reviewed	Worst-Case Model Extent Scenario	Embedded Mitigation Across Solar Development Area	Impact On-Site with Scheme	Impact Off-Site with Scheme
		Holland Main Drain Modelling Report	height of plinths can be up to 1.35m and 0.6m freeboard would be provided for any solar stations located within the South Holland Main Drain Catchment Flood Zone 3b flood extent. **On-Site 400kV Substation and BESS Compound**: A bund or a flood protection wall and gate would be provided, to a maximum height of 2.6m AOD. **On-Site 132kV Substation Compounds**:		

Catchment	Hydraulic Models Reviewed	Worst-Case Model Extent Scenario	Embedded Mitigation Across Solar Development Area	Impact On-Site with Scheme	Impact Off-Site with Scheme
			A bund or a flood protection wall and gate would be provided, to a height of: • 132kV Substation on Parcel A: 2.5mAOD; • 132kV substation on Parcel C: 2.4mAOD; No substation infrastructure would be located within the 0.1% AEP + 13% CC (pump off) for South Holland Main Drain flood modelling extent in Land Parcel D.		

Temporary Construction Compounds Within Solar Development Area

Safe Refuge assessment for Temporary Construction Compounds

5.3.136. Temporary construction compounds for the Solar Development Area may be located within the areas captured by Work Number 5 within the **Works Plans** (Doc Ref. 2.3). For the purposes of this assessment, the indicative temporary construction compounds shown on **ES Figure 2-6: Solar Development Area and Inter-Array Connections Illustrative Construction Layout Plan** (Doc Ref. 6.2) provide a representation of how the compounds could be accommodated within the Solar Development Area, to demonstrate the feasibility of siting compounds within the modelled flood extents. These locations are indicative only and have not been assessed as fixed or final positions. To ensure a robust assessment, calculations have been undertaken based on a worst-case scenario, using the maximum modelled flood depths identified within each land parcel, irrespective of the indicative locations of construction compounds shown on **ES Figure 2-6: Solar Development Area and Inter-Array Connections Illustrative Construction Layout Plan** (Doc Ref. 6.2). This approach assumes that temporary construction compounds could be positioned within areas experiencing the greatest flood depths, therefore, providing a conservative assessment of potential flood risk and ensuring that the proposed mitigation measures are appropriate and sufficient for any potential compound locations within the areas defined by Work Number 5 in the **Works Plans** (Doc Ref. 2.3.).

5.3.137. The indicative compound locations are subject to a lower level of flood risk than that represented by the worst-case scenario assessment. Nevertheless, the indicative compound locations have also been assessed to confirm this. Mitigation measures outlined below are considered appropriate and sufficient for all potential compound locations, whether situated at the indicative locations or elsewhere within the areas defined by Work Number 5 in the **Works Plans** (Doc Ref. 2.3.).

5.3.138. The assessment below is based on a typical site cabin's external dimension of (8m (L) x 3.5m (W) x 2.5 (H)).

5.3.139. The construction compounds are assumed to be in place for a maximum of 2 years at each Parcel, in accordance with the indicative construction programme set out within **ES Chapter 2: The Scheme** (Doc Ref. 6.1). As such, the assessment has used the worst-case maximum depth of:

- Defended River Welland Breach: i.e. the 0.1% AEP plus 28% climate change; or
- Postland Pumped Catchment: 1% AEP + 28% climate change; or
- South Holland Main Drain Catchment: 1% AEP + 13% climate change

5.3.140. It is considered assessing the undefended 0.1% AEP plus climate change event for River Welland and the 0.1% AEP plus climate change event for the Postland and South Holland Main Drain Catchments is overly cautious, considering the amount of time that the compounds are expected to remain in place, i.e. assessing a worst-case scenario.

5.3.141. In total there are 18 indicative construction compounds shown on **ES Figure 2-6: Solar Development Area and Inter-Array Connections Illustrative Construction Layout Plan** (Doc Ref. 6.2) at the Solar Development Areas, with 7 of these located within fluvial flood risk extents:

- 2 within Land Parcel A (noting these are shared compounds with the Underground Inter-Array Connection);
- 2 within Land Parcel B;
- 1 within Land Parcel C; and
- 2 within Land Parcel D (Gotts Catchment).

5.3.142. Of the 7 locations within fluvial flood risk extents, five indicative construction compounds within Land Parcels, A, B and C fall within fluvial flood risk extents of the River Welland Breach flood extent, i.e. from a residual flood risk from a breach of the flood defences.

5.3.143. No construction compounds are to be located within the modelled 3.3% AEP or 1% AEP plus climate change flood extent of the Postland Pumped Catchment or South Holland Main Drain Catchments in Land Parcels A, B or C, in accordance with the **Outline CEMP** (Doc Ref. 7.10).

5.3.144. While the locations set out above represent the indicative construction compounds, the assessment has been undertaken based on a worst-case scenario, considering the maximum modelled flood depth within each land parcel. This approach ensures that the assessment remains robust and applicable to any potential compound location, including those subject to the greatest flood risk. An assessment of the requirements for the provision of safe refuge at each of these compounds is set out below. The assessment has informed the **Outline CEMP** (Doc Ref. 7.10), which incorporates requirements for the provision of safe refuge at temporary construction compounds, where required, noting that the final location of the compounds is subject to the development of detailed design and confirmation of construction methodology. The measures outlined are considered sufficient to address the worst-case flood conditions and are therefore applicable across all potential compound locations defined by Work Number 5 in the **Works Plans** (Doc Ref. 2.3.).

5.3.145. Subsequently, only the assessment of flood depth increases has been discussed for the River Welland Breach flood extent, as fluvial compensation is not required for the 0.1% AEP plus climate change flood extent, from a residual breach event. Floodplain compensation has been assessed where a construction compound lies within the undefended Flood Zone 3a or 3b flood extent, i.e. Land Parcel D Gotts Catchment which is discussed further separately.

Land Parcel A

5.3.146. Land Parcel A is located within the River Welland breach flood extent. A worst-case scenario has been assessed based on the maximum modelled flood depth within Land Parcel A, which is 2.27m associated with the River Welland breach flood extent. Within the conservative conditions of assessing the maximum depth scenario, it is proposed that safe refuge is provided by locating a welfare cabin, either raised on a platform or stacked on top of the ground floor unit. Based on the standard cabin height of 2.5m, this would provide a minimum safe refuge level of 2.65m AOD to provide safe refuge above the River Welland breach event. Assuming the height of a cabin is at least 2.5m, this equates to a minimum safe refuge height of approximately 0.23m above the maximum flood depth in Land Parcel A.

5.3.147. The indicative construction compound locations in Land Parcel A identified within **ES Figure 2-6: Solar Development Area and Inter-Array Connections Illustrative Construction Layout Plan** (Doc Ref. 6.2) are situated in areas of lower maximum flood depth than the worst-case scenario presented above; the compound located north, and west of the 132kV substation is located in an area where the flood depth is 1.93m, and the compound located west of the 132kV substation is located in an area where flood depth is 1.6m. Therefore, the provision of safe refuge at these locations would provide a greater freeboard to the maximum flood depths, approx. 0.57m and 0.90m respectively, than those derived for the worst-case scenario calculations. Shallower flood depths in these indicative locations also results in a reduced displacement of floodplain storage. Nevertheless, the worst-case assessment set out above is considered appropriate to demonstrate that safe refuge can be achieved across all potential compound locations within the Land Parcel A.

Land Parcel B

5.3.148. Land Parcel B is also located within the River Welland breach flood extent. The worst-case scenario has been assessed based on the maximum modelled flood depth within Land Parcel B, which is 1.64m associated with the River Welland breach flood extent. It is proposed that safe refuge is provided at the location of the maximum flood depth by locating a welfare cabin, either raised on a platform or stacked on top of the ground floor unit, set at a minimum of 2.64m AOD to provide safe refuge for the River Welland breach event. This equates to a minimum height of 0.30m above the maximum flood depth. The indicative construction compound locations within Land Parcel B identified within **ES Figure 2-6: Solar Development Area and Inter-Array Connections Illustrative Construction Layout Plan** (Doc Ref. 6.2) are situated in areas of lower maximum flood depth than the worst-case scenario presented above. The compound located south of the 400 kV Substation and BESS Compound is located in an area where flood depth is 1.6m, and the second compound is located in an area where flood depth is 1.4m. Therefore, the provision of safe refuge at these locations would provide a greater freeboard to the maximum flood depths, approx. 0.34m and 0.54m respectively. Shallower flood depths in these indicative locations also results in a reduced displacement of floodplain storage. Nevertheless, the worst-case assessment set out above is considered appropriate to demonstrate that safe refuge can be achieved across all potential compound locations within the Land Parcel B.

Land Parcel C

5.3.149. For Land Parcel C, the worst-case scenario has been assessed based on the maximum modelled flood depth within the parcel, which is 1.22m associated with the River Welland breach flood extent. Therefore, it is proposed that safe refuge is provided at this compound by locating a welfare cabin, raised on a platform, set at a minimum of 2.52m AOD to provide safe refuge for the River Welland breach event. This equates to a minimum height of 0.3 m above the flood depth (with a raised welfare cabin and 1.28m above the flood depth if a cabin is placed on top of another).

5.3.150. The indicative construction compound location within Land Parcel C identified within **ES Figure 2-6: Solar Development Area and Inter-Array Connections Illustrative Construction Layout Plan** (Doc Ref. 6.2) is situated in an area of lower maximum flood depth than the worst-case scenario presented above, at a flood depth of 0.26m. As such, safe refuge can be achieved at by raising the cabins by a minimum of 0.56m providing a 0.3m freeboard. Shallower flood depths in these indicative locations also results in a reduced displacement of floodplain storage.

5.3.151. Table 5-9 notes the results of the flood depth assessment, applying a conservative approach for a maximum flood depth in each land parcel.

Table 5-9: Flood Depth assessment for construction compound locations based on the worst case scenario (Land Parcels A, B and C)

Location of construction compound	Flood model/Catchment assessed and maximum compound flood depth in Land Parcel	Approximate flood depth increase (m)
Land Parcel A	River Welland – 2.27m	0.0001
Land Parcel B	River Welland – 1.64m	0.00006
Land Parcel C	River Welland – 1.22m	0.00006

5.3.152. For Land Parcels A, B, and C, the results indicate the maximum increase in flood depth are approximately 0.0001 m (0.1 mm), 0.00006 m (0.06 mm), and 0.00006 m (0.06 mm), respectively. These increases are considered non-significant flood depths and, in all likelihood, an immeasurable difference within modelling software. Therefore, no mitigation measures for the volumetric loss of floodplain associated with the construction compounds are required across all assessed land parcels.

5.3.153. The table below summarises the indicative construction compounds within Land Parcel A, B and C. The same calculations for the indicative construction compounds shown in **ES Figure 2-6: Solar Development Area and Inter-Array Connections Illustrative Construction Layout Plan** (Doc Ref. 6.2) were undertaken to determine the approximate flood depth increase associated with these indicative locations. The results indicate that the magnitude of flood depth increase associated with these indicative compounds is lower than those calculated in the worst case scenario above, reflecting their locations in shallower flood depths. Therefore, the effects identified for the indicative construction compounds are considered to be less than those of the worst case scenario.

Table 5-10 - Flood depth assessment of indicative construction compound locations (Land Parcels A, B and C)

Location of construction compound	Flood model/Catchment assessed and maximum compound flood depth in Land Parcel	Approximate flood depth increase (m)
Land Parcel A – Compound located north of 132kV substation	River Welland – 1.93m	0.0001
Land Parcel A – Compound located west of 132kV substation	River Welland – 1.60m	0.0001
Land Parcel B – Compound located in Land Parcel B	River Welland – 1.40m	0.00004
Land Parcel B – Compound located south of 400kV substation	River Welland – 1.60m	0.00006
Land Parcel C	River Welland – 0.26m	0.00001

Floodplain Volume Loss and Depth Assessment of Construction Compounds (Land Parcel D: Gotts Catchment).

5.3.154. For Land Parcel D, which lies within undefended Flood Zone 3a and 3b of the Gotts Catchment, a quantitative assessment has been undertaken for a worst-case scenario to determine the potential impact on the floodplain loss associated with the temporary construction compounds within both the undefended Flood Zone 3a and 3b flood extent of the Gotts catchment. The assessment is based on the maximum modelled flood depths within the Gotts Catchment, rather than the specific indicative compound locations, as with the assessment in Land Parcels A, B and C. It considers whether the Scheme would give rise to any measurable change in flood depth, floodplain storage loss, or flood extent under design flood conditions. By adopting a worst-case scenario, the assessment ensures that the potential impacts remain applicable irrespective of the final locations of the construction compounds within the floodplain. As mentioned previously, each unit has a footprint of approximately 28m² (8m × 3.5m) and a height of 2.5m. It is proposed to have two units on the ground; therefore, the combined area would be 56m². Two sets of these compounds would therefore have a total base area of 112m².

5.3.155. Applying a worst case assumption that the full base area of each welfare cabin would act as an obstruction to flood storage at the maximum modelled flood depth within the Gotts Catchment which is 1.18m (1% AEP plus 13% climate change scenario), the total displaced volume is approximately 132.2m³ at the location of the maximum design flood depth in this catchment. This displaced volume, when distributed across the Flood Zone 3a flood extent of approximately 41.3ha, equates to a maximum average increase in flood depth of 0.00032 (0.32mm) during the 1% AEP plus 13% climate change event. This value is several orders of magnitude below both the vertical resolution of standard hydraulic modelling outputs and the precision achievable in topographic survey data. Table 5-11 below summarises the floodplain loss and flood depth change assessment for the Gotts Catchment.

Table 5-11: Floodplain volume loss assessment for construction compounds – Land Parcel D Gotts Catchment

Location of construction compound	Flood model/Catchment assessed and maximum flood depth in Land Parcel D	Floodplain Volume Loss (m^3)	Approximate flood depth increase (m)
Land Parcel D - Compound located within the area of maximum flood depth in the Gotts Catchment	Flood Zone 3b - SHMD Gotts Catchment – 1.18m	132.2	0.00032

5.3.156. In accordance with the **Outline CEMP** (Doc Ref. 7.10). there will be no material storage within the Flood Zone 3b extent.

5.3.157. Review of topographic levels and the flood depth mapping, indicates there is no material change to the modelled flood extent for Flood Zone 3a or 3b as a result of the construction compounds, with no discernible alteration to flood depth contours or to the spatial extent of inundation. Consequently, the proposed structures are assessed to have no measurable or material influence on floodplain volume loss or floodplain hydraulics.

5.3.158. In summary, safe refuge has been considered and provided for all potential locations of construction compounds within the Solar Development Area. Floodplain compensation has also been assessed, and it is concluded that there is no material change to the Flood Zone 3a and 3b flood extent within the Gotts Catchment of Land Parcel D; therefore, resulting in no additional mitigation being required. Construction compounds will not be located in areas with flood depths deeper than assessed above; therefore, this assessment represents a worst-case scenario for assessing flood risk from the construction compounds. As such, the indicative construction compound locations would result in a lower floodplain volume loss than that presented within this worst-case assessment.

5.3.159. The table below summarises the two indicative construction compounds within the Gotts Catchment in Land Parcel D. The same calculations for the indicative construction compounds shown in **ES Figure 2-6: Solar Development Area and Inter-Array Connections Illustrative Construction Layout Plan** (Doc Ref. 6.2) were undertaken to determine the approximate flood depth increase associated with these indicative locations. The results indicate that the magnitude of flood depth increase associated with these indicative compounds is lower than those calculated in the worst-case scenario above, reflecting their locations in shallower flood depths. Therefore, the effects identified for the indicative construction compounds are considered to be less than those of the worst-case scenario.

Table 5-12: Floodplain volume assessment for indicative construction compound locations - Land Parcel D Gotts Catchment

Location of construction compound	Flood model/Catchment assessed and maximum compound flood depth in Land Parcel	Floodplain Volume Loss (m^3)	Approximate flood depth increase (m)
Land Parcel D – Compound located within the Gotts Catchment	Flood Zone 3b – SHMD Gotts Catchment – 0.90m	100.80	0.00029

Location of construction compound	Flood model/Catchment assessed and maximum compound flood depth in Land Parcel	Floodplain Volume Loss (m^3)	Approximate flood depth increase (m)
Land Parcel D – Compound located north west of the Gotts Catchment	Flood Zone 3a – SHMD Gotts Catchment – 1.14m	127.68	0.00031

5.4. With-Scheme Grid Connection Route Flood Risk

Steel Lattice Pylons

5.4.1. The Grid Connection Route runs through areas of medium to high fluvial flood risk, according to the flood map for planning[23]. However, the route benefits from flood defences of the River Welland along the route. It is considered the Grid Connection Route is at low residual risk of fluvial flooding. The dimensions are discussed further in **ES Chapter 2: The Scheme** (Doc Ref. 6.1).

5.4.2. Other sources of flooding have been assessed for the whole Scheme in Section 5.6 to 5.8, with no change to flood risk from all sources occurring as a result of the Grid Connection Route.

5.4.3. The Grid Connection Route proposes a 400kV overhead line route from the 400kV On-Site Substation and BESS Compound to the proposed National Grid Weston Marsh B substation.

5.4.4. Each pylon has 4 support legs. For the purposes of this assessment, a concrete pad foundation is assumed rather than a piled foundation, as this represents a worst-case assessment. The final design of the pylon foundations will be subject to detailed design. Indicative diameters for the size of each of the four concrete pads is 4.3m x 4.3m. The pylon pad foundations are set at existing ground level, with no pad structure above ground, with only the pylon legs placed at ground level. The diameter of the pylon legs is 0.7m.

5.4.5. Allowing a conservative (and unlikely) 2.0m flood depth for a pond, this equates to approximately 3.1m^3 per pylon of floodplain compensation lost. Relatively speaking, across 1.0ha of land, this results in a depth increase of

0.00031m (0.31mm). In reality the average depth will be less as the pylons are well spaced apart.

5.4.6. Given the length of the Grid Connection Route benefits from flood defences, with a low residual flood risk, it is considered floodplain compensation is not required for the steel lattice pylons; it is unlikely a detailed hydraulic model would recognise such a small depth increase with the inherent tolerances of flood models being in the region of +/- 0.01m (10mm).

5.4.7. Regarding possible debris build up around steel pylons; lattice pylons are unlikely to cause significant debris buildup during flood events because their open steel framework allows water and floating materials to pass through with minimal obstruction. In rural settings, where surrounding vegetation and infrastructure are sparse, there is limited debris available to be transported by floodwaters. Furthermore, the expansive nature of the floodplain results in low flow velocities and widespread water dispersion, reducing the force and concentration of material that could accumulate around the pylons. Consequently, the risk of debris accumulation or flow diversion due to the lattice tower structures is minimal.

Temporary Indicative Construction Compounds

5.4.8. Temporary Construction Compounds for the Grid Connection Route may be located within Work Number 16 areas set out within the **Works Plans** (Doc Ref. 2.3). For the purpose of assessment, indicative temporary construction compounds have been identified within these areas, as shown on **ES Figure 2-7: Grid Connection Route Illustrative Construction Layout Plan** (Doc Ref. 6.2). The mitigation measures presented below would continue to apply should the indicative construction compound location change whilst remaining within the Work Number 16 areas set out by the **Works Plans** (Doc Ref. 2.3). Four temporary indicative construction compounds are located in the Grid Connection Route. Three of these compound locations are located in Flood Zone 2 and 3 flood extents for Rivers and Sea (see **ES Figure 2-7** (Doc Ref. 6.2)). Whilst located in this flood extent, they benefit from defences associated with the floodplain of the River Welland, resulting in low residual long term flood risk.

5.4.9. The construction compound situated south of Moulton Chapel Road has been assessed under a worst case scenario. Flood modelling results from the River Welland breach model were used to assume a maximum flood depth of approximately 2m at this location. This assumption has been applied as the flood extent of the River Welland breach model does not cover the compound location, and therefore flood depths at this location are not directly defined by the model. Therefore, it is proposed that safe refuge is provided at the compound by locating a welfare cabin, raised on a platform, set at a minimum of 4.3m AOD. This equates to a minimum height of 2.3m above the flood depth for this construction compound.

5.4.10. The construction compound located north-east of Spalding, north end of the Order Limits, will have the same mitigation measures as it is located in the Flood Zone 3 flood extents and benefits from the defences associated with the floodplain of the River Welland. Assuming a worst-case scenario and using the results from the River Welland breach model to assume 2m maximum flood depth in this area, safe refuge will be set at a minimum of 5.3m AOD. This equates to a minimum height of 2.3m above the flood depth at this location.

5.4.11. The construction compound located south of the 400 kV Substation and BESS Compound in Land Parcel B is located within the River Welland breach flood extent. The maximum flood depth at this construction compound is 1.61m. It is proposed that safe refuge is provided at this compound by locating a welfare cabin, either raised on a platform or stacked on top of the ground floor unit, set at a minimum of 3.23m to provide safe refuge for the River Welland breach event. This equates to a minimum height of 1.91 above the flood depth at the compound.

5.4.12. The construction compound located north of Roman Road is not located within the Rivers and Sea flood extent, and therefore, no further mitigation is required for this construction compound.

5.4.13. As the temporary construction compounds would be in place during the period of construction only, and will be returned to the existing current conditions, it is considered there would be no change to long term flood risk from all sources for the compounds.

Assessment of flood risk of Cable Sealing End Compounds (CSEC) and mitigation

5.4.14. Within the Grid Connection Route, there are two Cable Sealing End Compounds (CSEC) where the overhead line is brought underground.

5.4.15. Named CSEC North and South for this assessment; CSEC north is not within any flood risk extents, i.e. Flood Zone 1.

5.4.16. CSEC South abuts the edge of Flood Zone 3. Given the flat levels in this area and the likelihood that impacts of climate change will have a limited, not material, impact on flood depths at the flood extent of the Flood Zone 3, it is proposed to protect the CSEC with a bund or a flood wall, taking a cautionary approach, 1.3m high (including 0.3m freeboard) to account for any minor increase in flood depth. Refer to Plate 5-13.

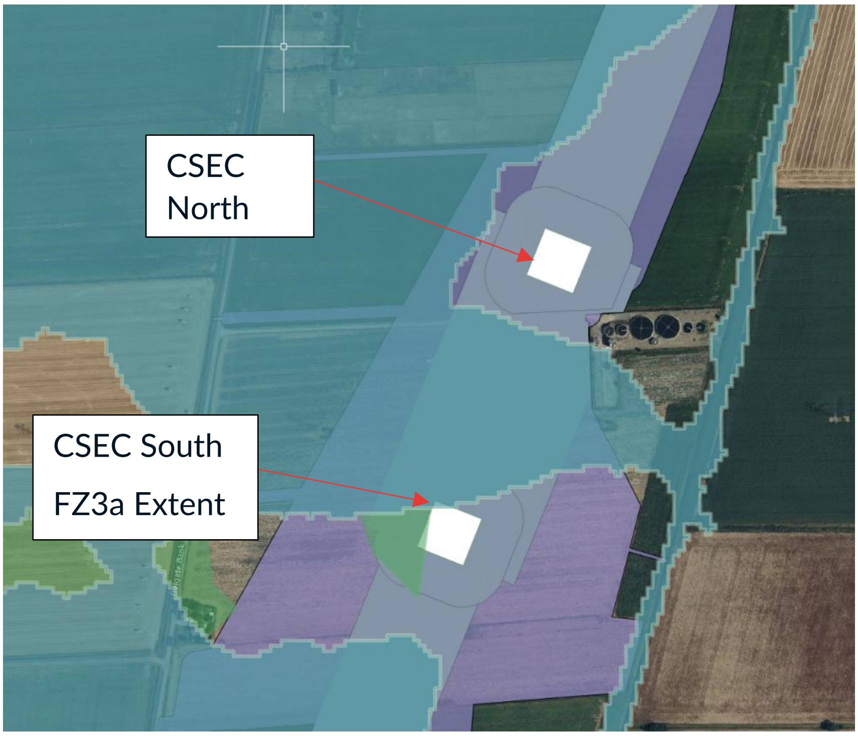

Plate 5-13: CSEC compounds in relation to Flood Zone 3

5.5. With-Scheme Inter-Array Connections Flood Risk

5.5.1. The configuration of the Inter-Array Connection (up to 132kV) would comprise underground cabling between land parcels A and B. No permanent above ground infrastructure will be located in the Inter Array Connection between Land Parcels A and B. As these works do not introduce any above-ground infrastructure, they will not impede floodplain storage. For this reason, the underground inter-array connection is not considered relevant to flood risk impacts. Temporary Construction Compounds required to construct the Underground Inter-Array Connection would be the same as assessed for Land Parcel A under the heading *Temporary Construction Compounds Within Solar Development Area.* Should temporary construction compounds be located within other areas in Work Number 5, the worst-case assessment in Section 5.3 concludes there will be no material increase in flood risk should they be located within the worst case depths observed in each Land Parcel.

5.5.2. Between the Land Parcels C and D, it is proposed to utilise 132kV overhead lines, using timber H poles. The H poles are typically smaller in diameter than the steel lattice pylon legs, and are located approximately 120m apart. With very little land take per H pole, and with the detailed hydraulic model of the South Holland Main Drain and the Postland Catchment noting flood risk is very low between Land Parcel C and D, with majority of flood risk flood extents present only during the 0.1% AEP plus climate change events in this area, it is considered any potential floodplain loss will be non-significant with no mitigation required.

5.5.3. Temporary Construction Compounds for the Overhead Inter-Array Connection may be located within Work Number 5 areas set out within the **Works Plans** (Doc Ref. 2.3). For the purpose of assessment, two indicative temporary construction compound locations have been identified within the Overhead Inter-Array Connection area, as shown on **ES Figure 2-6: Solar Development Area and Inter-Array Connections Illustrative Construction Layout Plan** (Doc Ref. 6.2).

5.5.4. The two indicative construction compounds are not located within any of the detailed worst-case hydraulic modelling flood extents summarised within Table 5-8. In accordance with the commitments set out within the **Outline CEMP** (Doc Ref. 7.10), temporary construction compounds would not be located within the Flood Zone 2 and 3 extents of the Postland Catchment and the South Holland Main Drain Catchment. The Overhead Inter-Array Connection is outside of the River Welland breach extent and the Gotts catchment assessed for the Solar Development Area in Section 5.3 above

5.5.5. The construction compound located adjacent to Eaugate Road is not within the EA's online Rivers and Sea flood extent; however, the construction compound located west of Holbeach Drove Gate is shown to be in the online Rivers and Sea flood extent. Nevertheless, the detailed hydraulic modelling undertaken shows the compound does not lie within the worst-case modelled flood extent, within Table 5-8. The detailed hydraulic modelling (as presented in the hydraulic modelling reports in Annex B) provides a more representative assessment of flood risk than the national scale mapping of the Rivers and Sea flood extent; therefore, the compound west of Holbeach Drove Gate is considered not to be at risk of fluvial flooding. As such, no further mitigation is required for the construction compounds within the overhead Inter-Array Connection.

5.6. With-Scheme Tidal Flood Risk

5.6.1. Tidal flooding occurs when an exceptionally high tide, almost always accompanied by a storm tide surge, overtops and/or breaches the tidal defences along a coastline or tidal estuary.

5.6.2. Although the Scheme does not lie along a coastline, the River Welland and River Nene are tidally influenced rivers that flow past the Scheme. Therefore, the Scheme must be assessed for tidal flood risk.

With-Scheme Tidal Flood Risk of the River Welland

5.6.3. The River Welland, which runs along the west of the Order Limits, bordering Land parcel A, is considered a tidal flood risk source. The nearest sluice gates that prevent high tides from travelling up the River Welland are located at E: 526030 and N: 324030, northeast of Spalding. Another sluice gate that is in close proximity to the Site is located at E: 524260 and N: 321190. This gate is assumed to be closed during flood events to prevent flow from the River Welland into New River, the drain on which this Sluice is situated. And Surfleet Sluice, located at E: 527940 and N: 329247 to prevent high tides form travelling up Glen. The catchment of the River Welland extends from its headwaters south-west of Market Harborough, through Stamford and Spalding to its outfall into The Wash at Fosdyke. The River Glen discharges into the River Welland at Surfleet, north of the site and north of Spalding.

5.6.4. WHS modelling of the River Welland incorporates the influence of the spring high water tide at the downstream boundary, meaning typical tide locking effects are represented. However, it does not include allowance for tidal surge events and therefore does not fully represent the potential residual tidal flood risk.

5.6.5. The hydraulic modelling of the River Welland incudes a downstream tidal boundary based on the Mean High Water Spring level of 4.1m AOD at Fosdyke Bridge, with an additional 1.1m applied to account for climate change. This allowance is more conservative than the EA’s published sea level cumulative rise allowance for the Anglian region. Model results demonstrate that peak river levels at the Site are largely insensitive to changes in the tidal boundary, with only negligible differences even under the higher tidal climate change uplift. Consequently, tidal flood risk from the River Welland to the Site is considered minimal, with fluvial flooding representing the primary source of flood risk.

Sea Level Rise (H++ Scenario)

5.6.6. Sea level rise allowances account for slow land movement. This is due to glacial isostatic adjustment from the release of pressure at the end of the last ice age. The northern part of the UK is slowly rising, and the southern part is slowly sinking. This is why net sea level rise is predicted to be less for the northwest and north-east than the rest of the country.

5.6.7. Sea level rise has been considered in the modelling carried out for the River Welland. An assessment of the impacts of future sea level rise has been undertaken to demonstrate the Site is not at risk during its expected operational design life, taking into account the risk of flooding to the Scheme in the event of a breach of the existing flood defences.

5.6.8. The H++ is required to assess a site as part of a sensitivity test for NSIP, to ensure a proposed NSIP scheme is safe from flood risk for its lifetime.

5.6.9. There are a range of allowances for each river basin district and epoch for sea level rise. The Scheme is located in the Anglian River Basin District.

5.6.10. The design life of the Scheme will be 40 years from 2033 to 2073, as set out in **ES Chapter 2: The Scheme** (Doc Ref. 6.1), and decommissioning is expected to commence thereafter, around the year of 2073.

5.6.11. The derivation of the tidal boundary in the existing hydraulic model of the River Welland used observed data at Fosdyke Bridge from June 2014, and it was estimated that the mean high water spring level is 4.1m AOD.

5.6.12. Climate change up to 2115 (100 years from the baseline year) was applied to the existing model by adding 1.10m to the water levels.

5.6.13. To validate the sea level rise allowance in the existing model, it was compared with current allowances. The cumulative rise to 2073 was 481.4mm and 619.4mm for the higher central and upper end respectively.

5.6.14. This shows that the 1.10m applied to the existing River Welland model is greater than the cumulative rise for the higher central and upper end allowances in the Anglian area through to 2073. Therefore, the use of 1.10m uplift for climate change for the tidal boundary was retained and is considered to be a conservative approach for the CMS.

5.6.15. Modelling undertaken for the South Holland Main Drain also considered the tidal influence of the River Nene at the outfall of the SHMD based on data provided by the EA.

5.6.16. The Sutton Bridge sluice was modelled as closed due to the lack of information.

5.6.17. Levels in the SHMD will be mainly based on the tidal surge levels in the Nene overtopping the closed sluice.

5.6.18. The hydraulic modelling undertaken for the South Holland Main Drain accounts for the tidal influence from the River Nene which controls water levels at the outfall. The model's downstream boundary was taken as the confluence of the SHMD and the River to account for the tidal influence of the Nene at the outfall of the drain.

5.6.19. Due to limited information on the river channel structures, these features were excluded from the model. This represents a conservative approach, as it assumes tidal surges from the River Nene can propagate unimpeded into the Site. The Sutton Bridge sluice was modelled in a closed position, with more extreme events represented by overtopping, based on surrounding LiDAR ground levels.

5.6.20. The model was run for combined fluvial and tidal events, with the worst-case scenario being the 0.1% AEP + 13% climate change allowance flood event applied to the pumped catchments with tidal 0.1% AEP event + climate change horizon from the Tidal River Nene. A higher-end climate change allowance of 13% for the 2080s epoch was applied for the Nene Management Catchment.

5.6.21. The modelling of the Tidal Nene excluded the Wisemans Pumping Station on the South holland Main Drain / River Nene confluence, to provide a worst case approach. Under normal operation, the sluice gates at Wisemans pumping station remain closed to tidal surges which would not impact the Scheme.

5.6.22. The modelled flood extents of the South Holland Main Drain for the 0.1%AEP plus 13% climate change include Tidal Nene surge within the flood extents and modelled depths

5.6.23. Model results indicate that under the joint fluvial and tidal design event, during the 0.1% plus 13% climate change, the maximum flood depth in the Solar Development Area is 0.5m.

5.6.24. No mitigation for solar PV panels will be required as panels will have a minimum height of 0.8m above ground and therefore will not be affected by tidal flooding of the SHMD (River Nene dominated).

5.6.25. Therefore, sea level rise from both the River Welland and River Nene, does not provide a material flood risk to the Scheme and is considered a low residual risk when taking into account the already proposed mitigation measures.

5.7. With-Scheme Development Surface Water Flood Risk

5.7.1. As the Scheme covers a large area, the Surface Water Flood Map[11] shows the surface water flood risk level varies from low to medium across the Site for the pre-Proposed Scheme scenario with areas of higher risk associated with topographical low spots and/or areas bordering watercourses where surface water sits and pools rather than draining away.

5.7.2. **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref. 6.3) sets out how increases in surface water runoff as a result of the Scheme are proposed to be managed via SuDS techniques to ensure the existing surface water drainage regime is mimicked, mitigating the risk of increased surface run off from and to the Scheme.

5.7.3. The increases to impermeable areas are envisaged to be a result of localised runoff from the 400kV Substation, the BESS Compound and the three 132kV Substations and the solar stations The increase in surface water runoff from these areas is proposed to be managed via sustainable drainage techniques to mimic the pre-Scheme conditions for up to and including the 1 in 100 year + 40% climate change event. Surface water runoff from the 400kV Substation and BESS Compound will be attenuated, and the outfall flows restricted to limit peak surface water flows exiting the facility to the existing greenfield rate for up to and including the 1 in 100 year (+40%) event. Fire water runoff will be stored in an additional 1087m^3 attenuation tank, which can be lined to ensure no pollution discharges to the hydrological network. Pollution risk from 400kV Substation and BESS compound will be managed within the **Outline CEMP** (Doc Ref. 7.10).

5.7.4. It is considered that total impermeable areas where solar PV panels are proposed for the with-Scheme scenario will remain consistent to the pre-Scheme state. Therefore, the proposed solar PV panel areas are considered to not impact the post-Scheme surface water flood risk level associated specially in relation to solar PV panel areas nearby watercourses.

5.7.5. The Lincolnshire County Council Statutory Consultation response states that the "*solar PV modules would have negligible effect upon the surface water drainage regime, as rainwater would be shed to ground, such that it infiltrates*." However, "*the BESS and On-Site Substation Compounds would give rise to an* *increase in the impermeable area within the catchment, thereby increasing surface run-off to the adjacent drains*". This has the potential to increase flood risk to existing development and infrastructure. Therefore, such effects will be controlled by mitigation measures outlined in the **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref. 6.3).

5.7.6. Surface water runoff for the Site will be intercepted with the use of swales placed across the Solar Development Areas, where the water will collect in the swales and discharge into a local watercourse via a piped outfall at the Qbar rate. If a swale is located where there are no nearby watercourses, the water will infiltrate to ground, mimicking the existing drainage conditions. An attenuation basin will be located north of the 400kV substation and BESS Compound to allow surface water runoff from the compound to discharge into it by gravity, and to store firewater runoff in the event of a fire.

5.7.7. Surface water runoff from the three 132kV Substations located in Land Parcels A, B and D will be attenuated in the form of a basin. The 132kV Substations located in Land Parcels B and D will discharge to a nearby watercourse to the existing greenfield rate, and the Substation located in Land Parcel A will discharge by infiltration.

5.7.8. The Outline Drainage Strategy for the Grid Connection Route is included in Annex E - Grid Connection Route Outline Drainage Strategy of **ES Appendix 11-4: Outline Drainage Strategy** and follows the same principles to control surface water runoff form the Scheme.

5.7.9. Surface Water flood risk resulting from the with-Scheme scenario will not increase; the drainage strategy will provide betterment to existing watercourse flood risk downstream where impermeable areas are limited to Qbar greenfield rates for up to and including the 1 in 100 year plus 40% climate change event (Refer to Plate 5-14).

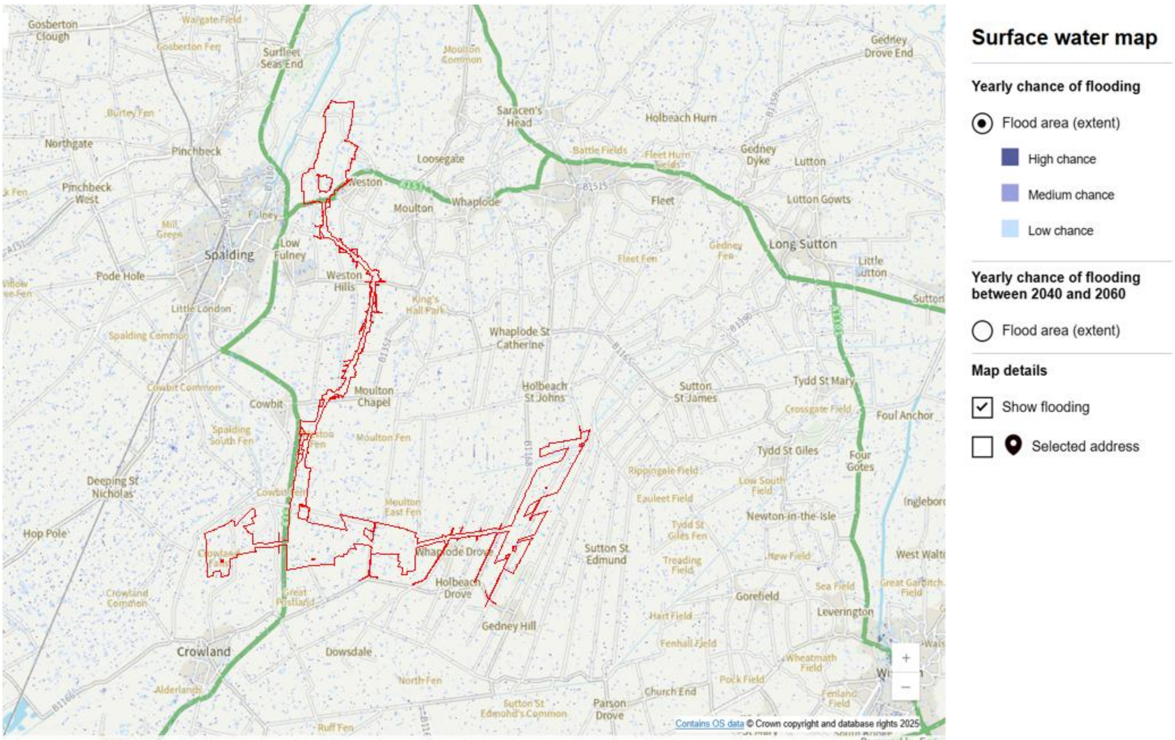

Plate 5-14: Surface Water Flood Risk Map

5.8. With-Scheme Development Other Sources of Flood Risk

Groundwater

5.8.1. The GOV website for flood risk summary was used to obtain information regarding ground water flooding in the Site. It is said that flooding from groundwater is unlikely in this area.

5.8.2. Swales are proposed across the Site, where all but 15 swales are to discharge to the closest watercourse via piped outfall. However, where there is no viable discharge location, swales are to use infiltration.

5.8.3. Alongside certain swales proposed for infiltration, the 132kV Substation located in Land Parcel A does not have a suitable watercourse in proximity for the discharge of its surface water. Therefore, the proposed attenuation for this substation will rely on infiltration to ground as the primary means of drainage. The attenuation volumes calculated in **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref. 6.3), have been derived on the basis of zero infiltration, representing a worst-case design condition. A freeboard allowance of approximately 700m^3 (76% additional volume) has been incorporated into the design of the proposed attenuation for this substation. Given this allowance, it is considered unlikely that two storm events of equivalent magnitude would occur within the timeframe required for the basin to fully infiltrate and drain down to ground and the system will drain effectively without overtopping.

5.8.4. This attenuation has been designed to ensure no increase in flood risk to the Site or elsewhere.

5.8.5. Considering the relatively small areas of the Scheme that will infiltrate to ground, and given the vast majority of remaining impermeable infrastructure will drain to watercourses, it is considered the small areas of infiltration will not materially impact ground water flood risk to the Scheme or elsewhere.

5.8.6. Therefore, groundwater flood risk remains unchanged.

Sewers

5.8.7. The with-Scheme scenario does not propose to interact or alter any existing sewer infrastructure and therefore will result in no change to flood risk from such sources. Construction risk of exposing or damaging sewers during the construction phase of the Scheme will be included and managed within the **Outline CEMP** (Doc Ref. 7.10).

5.8.8. Therefore, sewer flood risk remains unchanged.

Reservoirs and Artificial Sources

5.8.9. One of the artificial sources that border the Scheme is the South Holland Main Drain, which is an artificial watercourse that is located Approximately 1km directly north from Land Parcels B-1 and B-3 and Land Parcel D. Modelling was undertaken to assess the flood risk of the South Holland Main Drain to the Scheme. Mitigation measures were implemented to protect the infrastructure of the Scheme against a 1 in 1000 year plus climate change Pump Off Scenario. Due to the mitigation measures implemented, residual risk from this artificial source is low.

5.8.10. The EA maps for planning for reservoirs shows the flood extents affects the Scheme greatly, having an impact on Land Parcels A, B and C, refer to Plate 5-15.

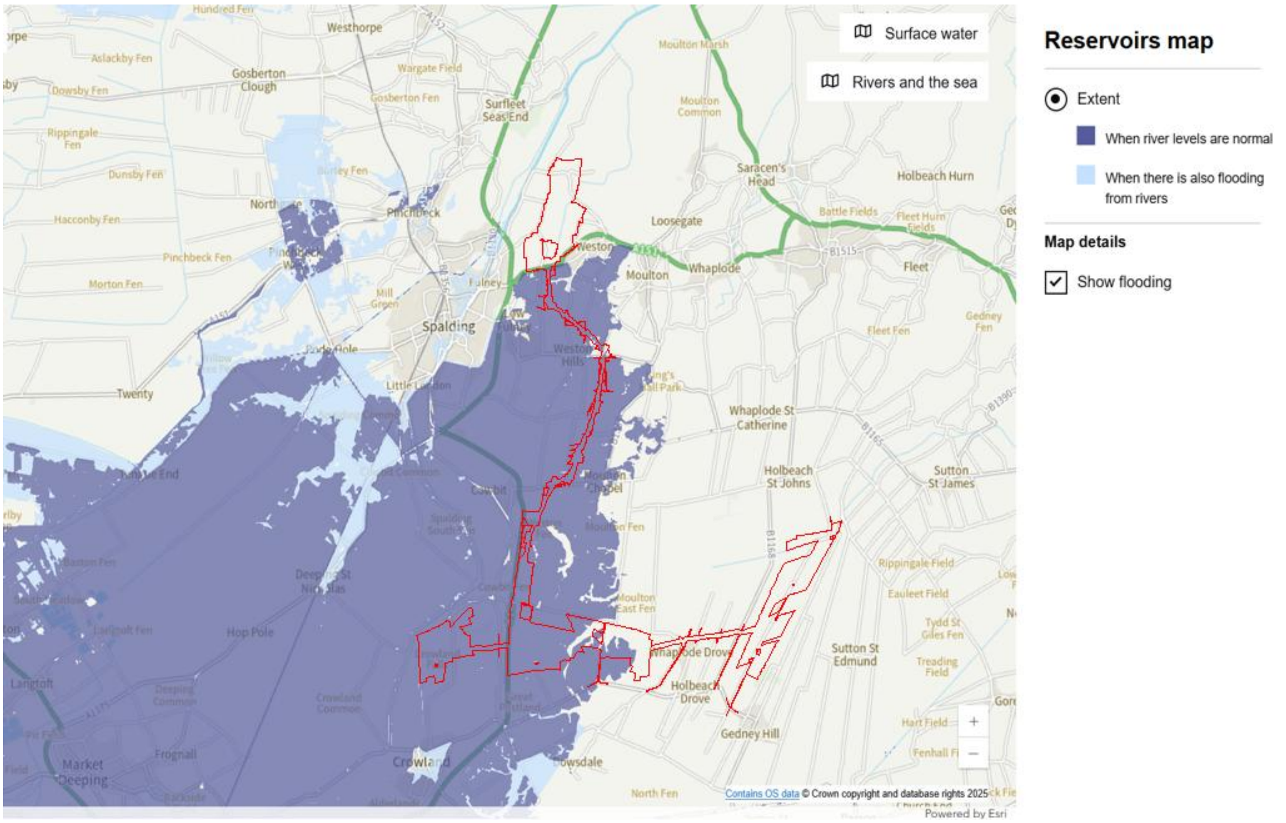

Plate 5-15: Online Flood Map for Reservoirs (Accessed September 2025)[23]

5.8.11. The Site is seen to be at risk of flooding from reservoirs, apart from the east of the Order Limits, which shows no risk of flooding. This is due to the nearby reservoirs, Eyebrook Reservoir and Rutland Water that are located far west of the Scheme.

5.8.12. Flood risk from reservoirs and artificial sources remains unchanged.

5.9. Flood Risk Summary

5.9.1. The increase in surface water runoff rates as a result of the with-Scheme scenario will be managed via sustainable drainage techniques proposed to mimic the pre-Scheme conditions detailed within **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref. 6.3).

5.9.2. Mitigation measures are proposed to be put in place for infrastructure to provide protection against locations of flood risk.

5.9.3. In summary, it is considered that flood risk levels from all sources within and surrounding the Order Limits will remain unchanged, i.e. no increase in flood risk to the Scheme or elsewhere, with the embedded mitigation proposed, and the Scheme will remain operational in times of severe flooding.

6. The Sequential Test and Exception Test

6.1. Introduction

6.1.1. The Sequential and Exception Tests have been considered to satisfy both the National Policy Statements, and NPPF requirements.

6.1.2. The Sequential and Exception Tests have been undertaken to satisfy both NPS EN-1[3] and NPPF[9] requirements, as set out in Section 3.4 of this FRA.

6.2. Sequential Test

6.2.1. The location of the Site itself was dictated in part by the availability of a Point of Connection (PoC) to new large scale NGET substation (subsequently called the Weston Marsh Substation). Due to the confirmation of the availability and confirmed capacity at the PoC to be developed, this became the starting point for the area of search for the development of the Meridian Solar Farm. **Appendix D: Site Selection Report** of the **Planning Statement** (Doc Ref. 7.1) provides an explanation of site selection process. **ES Chapter 3: Alternatives and Design Evolution** (Doc Ref. 6.1) describes how the Scheme had considered alternatives taking into account wider environmental and planning considerations.

6.2.2. As summarised in **ES Chapter 3: Alternatives and Design Evolution** (Doc Ref. 6.1), the location of the Site was informed by the considerations outlined in the NPS EN-3[4] in relation to the siting of solar PV infrastructure. A detailed description of the site selection factors and process is set out in **Appendix D: Site Selection Report** of the **Planning Statement** (Doc Ref. 7.1).

6.2.3. The nearest large, contiguous area of land which is located wholly outside of Flood Zone 3 is the area to the east of the A15, north of Bourne. This area of land is approximately 18-20km to the west and north-west of Spalding. Multiple constraints are present in this direction, including significant areas of protected woodland, a network of Public Rights of Way (PRoW) and substantial areas of Crown land which would restrict the availability and deliverability of a scheme, as well as presenting a constraint to the routing of a connection to the Weston Marsh PoC.

6.2.4. The pockets of Flood Zone 1 identified to the south of Weston are of such a size they could not fully accommodate an NSIP scale solar development of this scale alone or in combination; therefore, additional land is required to utilise the connection. These areas free of fluvial flood risk were discounted at the site selection stage because they were not suitable for the development of large scale solar, taking into account wider sustainable development objectives, as set out in paragraphs 5.8.9 and 10 of NPS EN-1[3], , including for the following reasons:

- The landowners were not willing to put their land forward for the Scheme and the Applicant's aim is to secure the land parcels by voluntary agreement where possible;
- The land is Crown land, and therefore subject to more stringent land acquisition requirements;
- The land is already developed; or
- The land is in unacceptably close proximity to built up areas.

6.2.5. Locating the Scheme entirely outside areas of Flood Zones 3a and 3b would, therefore, require development to be sited substantially further from the PoC and this was not considered reasonable, given the likely significant additional effects this would then generate from an increased grid connection route.

6.2.6. A review of the flood risk constraints on land within a suitable vicinity of the PoC showed that the majority of remaining potential land is located within Flood Zones 3a and 3b.

6.2.7. Following identification of the proposed Site and the Land Parcels, detailed hydraulic modelling was undertaken for the River Welland, Postland Pumped Catchment and the South Holland Main Drain to guide the layout of proposed solar PV infrastructure within the Order Limits. The results of the modelling have been applied to avoid areas of high fluvial flood risk where possible.

6.2.8. The Solar Development Area is located mostly within Flood Zone 2 and 3, which is largely defended by the flood defences of the River Welland. The River Welland flood defences provide protection to the Scheme, and the wider area, up to the 0.1% AEP plus climate change event. Therefore, a residual low risk remains from a breach of the defences.

6.2.9. The hydraulic modelling of a breach scenario event of the River Welland has been undertaken to determine the mitigation required to ensure infrastructure remains operational during times of flood. Furthermore, following statutory consultation, the 132kV Substation, previously located in Land Parcel B was moved to Land Parcel C, with the revised location partially avoiding the River Welland breach flood extent.

6.2.10. Within the Postland Pumped Catchment, all infrastructure has been located outside of the Flood Zone 3b flood extents, other than some of the Solar PV panels. solar stations and substations located within this catchment area, are designed with mitigation that accounts for the River Welland breach scenario, ensuring flood risk to the Scheme is appropriately managed.

6.2.11. Hydraulic modelling of the SHMD indicates the Gotts Catchment includes areas of Flood Zones 3a and 3b, while Fleet Fen and Wisemans Catchments are not affected by these flood zones (please see Annex D for flood extents). All infrastructure other than the solar PV panels are located outside of Flood Zone 3b, with the exception of the Gotts Catchment, which affects the northern most fields within Land Parcel D. Six solar stations in this catchment area are located within Flood Zone 3b due to site specific constraints as there are no reasonably available alternative locations within the Gotts Catchment where solar stations could be relocated outside of Flood Zone 3a and 3b flood extents.

6.2.12. This FRA has sequentially assessed the proposed Scheme layout, to inform the fixed design layout, locating critical infrastructure, other than solar PV panels, and where practicable within the limits of design requirements, to areas of lowest flood risk, from all sources.

6.2.13. Where critical infrastructure, other than raised solar PV panels, cannot be located outside areas of fluvial flood risk, taking into account flood risk from all other sources, mitigation has been proposed to ensure these remain operational in times of flood. Where this is the case within Flood Zone 3a and 3b, the Exception Test has been applied.

6.2.14. It is considered that the Scheme has appropriately applied the Sequential Test and has met its requirements, excluding few exceptions that have been identified, where site-specific constraints limit the ability to achieve full compliance. These exceptions have been clearly defined and supported by justification within this assessment.

6.3. Exception Test

6.3.1. Paragraph 5.8.11 of NPS EN-1[3] states that, for the Exception Test to be passed, it should be demonstrated that both of the following elements have been satisfied for development to be allocated or permitted:

- The development would provide wider sustainability benefits to the community that outweigh the flood risk; and

- 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.

6.3.2. The Scheme falls within the definition of 'Essential Infrastructure'. The overall aim of the sequential approach is to steer new development to areas of lowest flood risk, from all sources. Where there are no reasonable sites available outside areas at risk of flooding from all sources, for developments classified as "Essential Infrastructure", areas within Flood Zone 3a and 3b may be considered, subject to passing the Exception Test. Details of this application of the Exception Test can be found in Section 5.3 through the assessment of flood risk to the Scheme.

6.3.3. Solar PV panels are proposed in Flood Zone 2 and 3. This approach is acceptable subject to appropriate mitigation measures, noting that Flood Zone 2 is extensive across the Site and further avoidance would render the Scheme unviable. This approach has been agreed by the EA, with Solar Stations located within the Gotts Catchment subject to additional detailed assessment.

6.3.4. All other infrastructure has been located outside of Flood Zones 3b, with the exception of Solar PV panels across the Solar Development Area, and six Solar Stations within the Gotts catchment of the South Holland Main Drain, within PV fields D 1-02, D 1-02 and D-1-03 in the north of the Land Parcel D.

6.3.5. Solar Stations must be located close to the solar PV panels. Within Land Parcels D-1-02, D-1-02, and D-1-03 of the Gotts catchment, almost all available land lies within Flood Zone 3b. The flood extent of land outside of Flood Zone 3b within the Gotts catchment is limited in both size and configuration and is insufficient to accommodate a solar station within a practical distance to the solar PV panels. As a result, the Solar Stations are necessarily situated within Flood Zone 3b. Mitigation measures have been implemented within the design in order for infrastructure to remain operational in times of flood. As agreed with the EA during a meeting on 20 January 2026, solar stations in Land Parcel D-1, within the Gotts Catchment, that are located in the Flood Zone 3b flood extents would be provided freeboard of up to 0.6m. Therefore, the maximum height of any plinths used to raise solar stations above flood depths in Land Parcel D-1 would be 1.35m (0.75m height plus 0.6m of freeboard above modelled flood levels). The increase in freeboard for solar stations located in Land Parcel D-1 is to avoid any objects and debris getting caught in the void underneath the solar stations.

The indicative Solar Stations in the Gotts Catchment can be located to shallower depths of flooding within the immediate vicinity of the indicative locations of the Solar Stations, reducing the flood depth to less than 0.5m. This enables the Solar Station plinths to be raised so they will remain operational in times of flood without the need for additional bunding or flood wall mitigation, whilst providing 0.6m freeboard.

6.3.6. The six solar stations proposed at Land Parcel D may increase flood depths within Flood Zone 3b and 3a by up to 0.0007m (0.7mm) across the Gotts catchment. This is discussed in detail in paragraphs 5.3.83- 5.3.94.

6.3.7. The assessment carried out for the six indicative Solar Stations in the Gotts Catchment demonstrates that the impact is non-significant, impacting fields and no other receptors, and does not increase flood risk elsewhere. Mitigation in the form of raised Solar Stations ensures they will remain operational in times of flood.

6.3.8. Regarding solar PV panel legs, Solar PV panels are raised at least 800mm above ground level and can be raised up to 1.3m above ground in total. PV panel legs themselves do not materially impact flood risk with, approximately, a maximum 0.001m (1mm) potential depth increase across the Solar Development Area. It has been agreed with the EA that this increase is non-significant and will not materially increase flood risk elsewhere.

6.3.9. Regarding the risk of submerged PV panels in a breach scenario; the impact of the River Welland breach flood extent during the with-scheme scenario for the 0.1% AEP plus 28% climate change may submerge certain PV panels in Land Parcel A only, and may increase the flood depth across the Land Parcel A by up to 0.009m in total (9mm). The FRA considers an increase of such small magnitude will not materially increase flood risk elsewhere.

6.3.10. The assessment of submerged panels confirms the upper panels will remain above the flood level and remain operational in times of flood, confirming there is no area of PV panels that will not be operational during the lifetime of the Scheme, taking into account the 0.1% AEP plus 28% climate change scenario. Solar PV panels can be raised sufficiently above the critical flood level in all other Land Parcels.

6.3.11. The post-Scheme flood depth assessment sets out how the calculated changes in flood depths, discussed in paragraphs starting from 5.3.68, have been considered within the Sequential Test and Exception Test, with regards to solar PV panels and Solar Stations.

6.3.12. The depth assessment notes a small net increase in flood risk outside of the Order Limits, in certain discreet locations, and is discussed in detail in paragraphs 5.3.68- 5.3.75 and noted in Table 5-6. The review of site levels confirms no impact to high risk receptors, a maximum depth increase in of up to 0.1m is retained within one agricultural field which already floods during a breach event.

6.3.13. In terms of the Exception Test and the increase of flood risk elsewhere and provision of wider sustainability benefits, the Scheme will include habitat creation and enhancement as set out in **ES Chapter 9: Ecology and Biodiversity** (Doc Ref 6.1). This will contribute to the Scheme providing biodiversity net gain in line with the Environment Act 2021.

6.3.14. As discussed, the site selection process to identify a contiguous site and including mitigation to ensure the Scheme remains operational in times of flood has resulted in very small areas of flood risk increases beyond the Order Limits. Through the generation of low carbon electricity, the Scheme will contribute to the urgent need to decarbonise electricity generation in the UK as established in the Net Zero Strategy: Build Back Greener (October 2021)[31] and the British Energy Security Strategy (April 2022)[32]. It will contribute to the UKs obligations for net zero under the Climate Change Act (2008)[33] It is also in line with the current planning policy on renewable energy (NPS EN-3[4]) which recognises the need for sustained growth in solar capacity to meet net zero emissions by 2050. Therefore, the Scheme will have a national significance in respect of sustainability benefits, through its decarbonisation of the nation's electricity generation, and is clearly commensurate with national energy policy. This is considered to provide greater significance than the very minor increases in flood risk to low risk receptors outside of the Order limits.

6.3.15. With the above assessment, it is considered that the Scheme meets the Exception test as:

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[31] Net Zero Strategy: Build Back Greener: https://www.gov.uk/government/publications/net-zero-strategy. [Accessed 2 February 2026].
[32] British Energy Security Strategy (April 2022)[32]: https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy. [Accessed 2 February 2026].
[33] Climate Change Act 2008: https://www.legislation.gov.uk/ukpga/2008/27/contents. [Accessed 2 February 2026].

- The Scheme would clearly provide wider sustainability benefits to the community via its contribution to UK national energy goals that outweigh the flood risk; and
- The development will be safe for its lifetime with the mitigation above in place, and would cause negligible increase of flood risk elsewhere.

6.4. Conclusion

6.4.1. The layout of the Solar Development Area has been informed by a detailed, iterative assessment of fluvial flood risk. Critical infrastructure has been located outside areas of fluvial flood risk wherever reasonably practicable. Where avoidance has not been possible, and where no reasonable alternative locations exist within the Order limits, residual flood risk has been fully assessed and addressed through the incorporation of appropriate mitigation measures.

6.4.2. Section 7 of this FRA demonstrates how flood risk is managed through embedded mitigation measures incorporated within **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref 6.3). These measures will be secured by a requirement in the **Draft DCO** (Doc Ref 3.1) and implemented to ensure that the Scheme will remain safe for its operational lifetime, without increasing flood risk elsewhere.

6.4.3. Taking into account the discussion above and throughout to the report, and having regard to national planning policy and guidance, it is concluded that the Solar Development Areas, Grid Connection Route and Inter-Array Connections satisfy the requirements of the Sequential Test and, where relevant, the Exception Test.

7. Outline Drainage Strategy

7.1.1. **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref. 6.3) proposes a system for new impermeable areas during the with-Scheme scenario designed to accommodate the 1 in 100-year storm, plus a 40% allowance for an increase in peak rainfall intensity due to climate change.

7.1.2. The Drainage Strategy assumes:

- Permanent infrastructure has been moved out of Flood Zone 3a and 3b of the Postland flood extents, except for Solar PV panels in some instances and outside the South Holland Main Drain Flood Zone 3a and 3b flood extents, with the exception of the infrastructure in Parcel D-1.

- The solar PV panels will be mounted from the ground by a minimum of 0.8m, allowing rainfall/runoff to infiltrate into the ground beneath the panels. Therefore, the solar PV panels will not lead to a substantial increase in impermeable area within the Site. The drainage regime of the solar PV panel areas is therefore assumed to remain consistent with its pre-developed state.
- New operational access roads will be permeable. Therefore, the Site's access roads will not lead to an increase in impermeable area. The drainage regime of the access roads is therefore assumed to remain consistent with its pre-developed state.
- Solar Stations (Inverters, transformers and switchgear), 400kV Substation and BESS Compound, and the three 132kV Substations are considered to be 100% impermeable as a worst-case scenario. An allowance for runoff from the single BESS Compound has been included, reasonably assuming a lined gravel build up will capture and evaporate some of the runoff before it enters the drainage system, a Volumetric Runoff Coefficient (Cv) of 0.85 has been used.
- The drainage system for new impermeable areas has been designed to accommodate the 1 in 100-year storm, plus a 40% allowance for an increase in peak rainfall intensity due to climate change.
- The discharge of surface water for new impermeable areas via infiltration will not be prioritised. However, when it is required and there is no viable discharge to nearby watercourse, infiltration will be used. This will be confirmed with on-site ground investigation works during detailed design post-consent.

7.1.3. **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref. 6.3) proposes to attenuate runoff via sustainable drainage techniques and restrict at greenfield rates to watercourses within the Order Limits as per the existing conditions. Where a watercourse is not in proximity, discharge by infiltration will be used.

7.1.4. Foul drainage is not considered within the drainage strategy as no connection to the public sewer is proposed. Drainage will be dealt with via a septic tank arrangement or similar sealed system for the compound areas, emptied and maintained to recommended manufacturer advice.

7.1.5. Further details including contributing areas, runoff rates, water quality assessment and maintenance requirements are included within the **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref. 6.3).

7.1.6. The solar PV panels will be mounted above the ground, allowing rainfall/runoff to infiltrate into the ground beneath the panels. Existing research by Cook and McCuen[34] and Pennsylvania State University[35] supports the conclusion that the impact of solar panels and vegetated ground cover on runoff characteristics is non-significant. Both studies found that maintaining healthy vegetation beneath the panels mitigates potential changes to runoff with no significant increase in runoff, time to peak, peak volume or runoff rates. The proposed use of a native grassland and wildflower mix, and engineered stormwater controls, such as edge swales, is therefore considered adequate to manage the flood risk to and from PV panel areas. The drainage regime of the solar PV panel areas is therefore assumed to remain consistent with its pre-developed state. For further information relating to the research, refer to Annex C of this FRA.

7.1.7. **ES Appendix 11-4: Outline Drainage Strategy, Annex E – Grid Connection Route Outline Drainage Strategy** (Doc Ref 6.3) has been prepared separately to assess drainage requirements along the Grid Connection Route.

[34] Cook, D. D., & McCuen, R. H. (2013). Hydrologic Response of Solar Farms. Journal of Hydrologic Engineering, 18(5), 538-543. https://ascelibrary.com/doi/abs/10.1061/%28ASCE%29HE.1943-5584.0000530. [Accessed 2 February 2026].
[35] Pennsylvania State University, 2024
https://www.sciencedirect.com/science/article/abs/pii/S0022169424008709?via%3Dihub [Accessed 2 February 2026].

8. Residual Risk and Mitigation

Steel Pylons

8.1.1. Due to the spacing and relatively non-significant loss of floodplain across such a large area, no mitigation is proposed for the pylons in the Grid Connection Route.

Panel Legs and PV Panels

8.1.2. Solar panels will be tilted at a fixed angle in the range of between 10 to 25 degrees from horizontal with a minimum fixed height of 0.8m above the ground, the lowest height of any proposed PV panel as presented in **ES Chapter 2: The Scheme** (Doc Ref. 6.1).

8.1.3. Panel legs can be raised by up to 0.5m, to provide 1.3m height above ground level from the base of the panel. Panels can flood up to 1.55m depth, whilst still remaining operational during times of flood. Raised 1.3m the maximum submerged depth of PV panels would be 0.8m, which is well within the 1.55m maximum allowable submerged depth. To reduce impact of solar panels occupying floodplain volume, the panels will be raised by 0.5m as much as reasonably practicable to minimise loss of floodplain volume. These measures are secured as part of this application through the **Design Parameters Document** (Doc Ref. 7.4).

8.1.4. Floodplain volume loss has determined to be no more than 10mm depth increase across Land Parcel A, and non-significant across the remainder of the scheme due to panels not being submerged in any other Land Parcel; therefore, no floodplain compensation is required for the PV panel legs or PV panels.

River Welland

8.1.5. As discussed in Section 5.3, bunding is proposed to the 400kV Substation and BESS Compound area in Land Parcel B, and the two 132kV substations in Land Parcels Areas A and C.

8.1.6. Bunding or a walled defence is also proposed for Solar Stations within the breach flood extents of the River Welland, with a 0.3m freeboard, to remain operational in times of flood

8.1.7. Where the SHMD shares its catchment with the River Welland in Land Parcel B breach flood extents, mitigation is already provided for infrastructure, above the 0.1% AEP plus 28% climate change depth of the SHMD pump failure scenario.

8.1.8. In Parcel D, Solar Stations that sit within 0.1% AEP plus 28% climate change flood extents are bunded or walled with 0.3m freeboard to ensure it will remain operational in times of flood. The eastern edge of the 132kV Substation in Land Parcel D encroaches into the 0.1% AEP plus 28% climate change flood extents; all infrastructure associated with the substation will be located outside of these flood extents with no mitigation required.

8.1.9. It is considered mitigation is not required for any depth flood increase within or outside the Order Limits.

Postland

8.1.10. All infrastructure other than solar PV panels are shown to be located outside of the Flood Zone 3b flood extents. Mitigation for solar stations and substations within the Postland catchment is already provided for from the breach scenario of the River Welland. Modelled flood extents of the Postland catchment during the 0.1% AEP plus 28% climate change pump failure are significantly shallower and to a lesser flood extent than the breach of the River Welland.

8.1.11. Therefore, the River Welland flood risk exceeds the risk from the Postland catchment, with no additional mitigation required for the Postland catchment.

8.1.12. It is considered mitigation is not required for any depth flood increase within or outside the Order Limits.

South Holland Main Drain

8.1.13. Within Land Parcels A, B and C, all infrastructure other than solar PV panels are shown to be located outside of the Flood Zone 3b flood extents. Mitigation for solar stations and substations within the Land Parcels A, B and C is already provided for from the breach scenario of the River Welland. Modelled flood extents of the South Holland Main Drain catchment during the 0.1% AEP plus 28% climate change pump failure are significantly shallower and to a lesser flood extent than the breach of the River Welland.

8.1.14. However, there are 6 solar stations within Flood Zone 3b in land parcel D associated with Gotts Catchment. This is assessed under the heading *Gotts Catchment Fluvial Assessment* in Section 5.3.

8.1.15. Within Land Parcel D, for the Fleet Fen catchment, solar stations within the 0.1% AEP plus 28% Climate Change are to be raised or bunded to provide 0.3m freeboard, to remain operation in times of flood. The with-Scheme model notes no material change in flood depth above the baseline scenario; therefore, no additional mitigation or compensation is required.

8.1.16. The 132kV substation in Fleet Fen within Land Parcel D does not require mitigation, as the 0.1% AEP flood extents encroach minimally on the edges of the substation area. These small pockets will not include any above ground infrastructure.

8.1.17. It is considered mitigation is not required for any depth flood increase within or outside the Order Limits.

Land Parcel D (Gotts)

8.1.18. The 3.3% AEP flood extent for the pump-on scenario in the Gotts Catchment impacts six solar stations located in the Gotts Catchment in the north of Land Parcel D. The remainder of the South Holland Main drain and tributaries do not flood during the 3.3% AEP event (or for the 1.0% AEP event, including 13% climate change).

8.1.19. The total volume displaced by the six solar stations has been calculated as approximately 252m^3, which, when distributed across the 34.6ha extent of Flood Zone 3b and 3a, results in an average flood depth change of only 0.0007m (0.7mm). This is significantly below the resolution of hydraulic modelling and survey accuracy. As such, the presence of the solar stations in Flood Zone 3b is not expected to result in any measurable change to flood depths or floodplain extent and therefore has no material impact on floodplain hydraulics.

8.1.20. The solar stations can be located in areas of shallower flood depth (generally less than 0.5m), including during the 1% AEP plus 13% climate change and pump-on scenarios. In these locations, raising the solar stations on plinths allows them to remain operational without requiring bunds or flood defence walls. As the floodplain extent does not exceed the currently modelled flood envelope, and the only receptors affected are the solar PV fields themselves, the solar stations are therefore considered to not require additional flood mitigation.

Safe Access

8.1.21. Through application of the Sequential Test process and design iterations, there are no manned or habitable buildings located within in Flood Zone 3b. The 400kV Substation and BESS Compound and all 132kV Substations have been located out of Flood Zone 3b and it is envisaged access to solar PV panels within Flood Zone 3a and 3b would not be undertaken during flooding conditions.

8.1.22. During a flood event, any affected infrastructure will not be accessed or manned until flood waters recede.

9. Conclusion

9.1.1. This FRA has been prepared to support the ES. It demonstrates there will not be any material increase in flood risk, from all sources, as a result of the Scheme, within the Order Limits or elsewhere, with the proposed embedded mitigation in place.

9.1.2. It is concluded that the report has appropriately assessed flood risk to and from the Solar Development Areas, Grid Connection Route and Inter-Array Connection, demonstrating the Scheme satisfies the requirements of the Sequential Test and, where relevant, the Exception Test.

9.1.3. **ES Appendix 11-4: Outline Drainage Strategy** (Doc Ref. 6.3) includes the Solar Development Area Outline Drainage Design and incorporates the Grid Connection Route Outline Drainage Strategy in **Annex E** of **ES Appendix 11-4** (Doc Ref. 6.3). These demonstrates surface water drainage will be manged effectively to ensure there is no increase in surface water runoff from the Scheme above the existing regime.