

Flaxlands Solar Farm

Flood Risk Assessment

Ampyr Solar Europe

Project Number: 60727989

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Prepared for:

Ampyr Solar Europe

Prepared by:

AECOM Limited

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1 Introduction

1.1 Commission

- 1.1.1 AECOM Limited (AECOM) has been commissioned by Ampyr Solar Europe (hereafter referred to as 'the Applicant') to undertake a Flood Risk Assessment (FRA) for the proposed Flaxlands Solar Farm (hereafter referred to as 'the Proposed Development'), comprising the construction, operation and decommissioning of a solar photovoltaic (PV) array with an installed capacity of up to 49.9MW and 49.9MW of battery energy storage systems (BESS). The Proposed Development Site (hereafter referred to as 'the Site') is located approximately 1.7km north of the town of Royal Wootton Bassett, approximately 3.2km west of Swindon and approximately 150m north of the M4. The Site consists of two land parcels: a western and eastern land parcel both of which are located within the administrative area of Wiltshire Council (WC).
- 1.1.2 The centre of the western land parcel is located at the approximate National Grid Reference (NGR) SU 06286 85377 and the centre of the eastern land parcel is located at NGR SU 07146 84949. The nearest postcode to the Site is SN4 8DY. The total area of the Site is approximately 87.09 hectares (ha).
- 1.1.3 The aim of this FRA is to assess the flood risk to and from the Site. The assessment demonstrates to the decision-maker how flood risk will be managed now and over the development's lifetime, taking climate change into account, with regard to the vulnerability of its users. This FRA considers the flood risk to the Site from all sources (based on freely available data), potential mitigation options (where required) and associated constraints. AECOM's approach to this FRA has involved a desk-based review of publicly available information to establish the likely flooding sources and mechanisms for the Site and has been prepared in accordance with the National Planning Policy Framework (NPPF)¹ and the supporting Planning Practice Guidance (PPG)².

1.2 Policy Context

- 1.2.1 According to the Environment Agency's Flood Map for Planning (FMfP)³ (Figure 1-1), which takes into account the National Flood Risk Assessment 2 updates⁴ the entirety of the Site is located in Flood Zone 1. This is land assessed as having less than 0.1% chance of fluvial or tidal flooding in any given year.

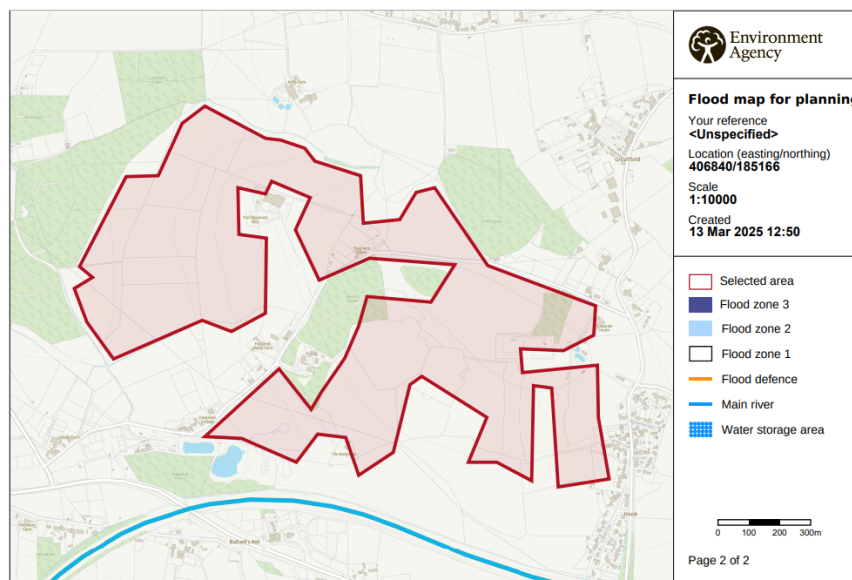


Figure 1-1: Environment Agency's Flood Map for Planning (March 2025)

¹ National Planning Policy Framework: <https://www.gov.uk/government/publications/national-planning-policy-framework--2> [Accessed March 2025].

² Planning Practice Guidance: <https://www.gov.uk/government/collections/planning-practice-guidance> [Accessed March 2025].

³ Environment Agency's Flood Map for Planning: <https://flood-map-for-planning.service.gov.uk/> [Accessed March 2025].

⁴ National Assessment of Flood and Coastal Erosion Risk in England 2024: <https://www.gov.uk/government/publications/national-assessment-of-flood-and-coastal-erosion-risk-in-england-2024> [Accessed April 2025]

- 1.2.2 According to the NPPF, an FRA should accompany all proposals located within Flood Zone 2 and 3. When a site is located within Flood Zone 1, an FRA should be produced for: sites of 1 hectare (ha) or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a Strategic Flood Risk Assessment (SFRA) as being at increased flood risk in the future; and/or land that could be subject to other sources of flooding, where its development would introduce a more vulnerable use.
- 1.2.3 As the Site has a footprint in Flood Zone 1 exceeding 1 hectare (the total Site area is approximately 87.09 ha), an FRA is required to support the planning application to meet the requirements of the NPPF.

1.3 Flood Risk Assessment Methodology

- 1.3.1 The aim of an FRA is to assess the risks of all forms of flooding to and arising from development. A risk-based approach is adopted by planning authorities through the application of the Source-Pathway-Receptor model. Our approach to this FRA is based on this model.
- 1.3.2 The Source-Pathway-Receptor model first identifies the causes or 'sources' of flooding to and arising from development. The identification is based on a review of local conditions and consideration of the effects of climate change. The nature and likely extent of flooding arising from any one source is considered, e.g. whether such flooding is likely to be localised or widespread.
- 1.3.3 The presence of a flood source does not always imply a risk. It is the exposure pathway or the 'flooding mechanism' that determines the risk to the receptor and the effective consequence of exposure. For example, sewer flooding does not necessarily increase the risk of flooding unless the sewer is local to the site and ground levels encourage surcharged water to accumulate.
- 1.3.4 The varying effect of flooding on the 'receptors' depends largely on the sensitivity of the target. Receptors include any people or buildings within the range of the flood source, which are connected to the sources of flooding by a pathway.
- 1.3.5 In order for there to be a flood risk, all elements of the model (a flood source, a pathway and a receptor) must be present. Furthermore, effective mitigation can be provided by removing one element of the model, for example by removing the pathway or receptor.
- 1.3.6 The approach to this FRA involves a desk-based review of available information to establish the likely flooding sources and mechanisms for the Site. Once the flood risk has been established, mitigation measures are proposed (where necessary) and residual risk explained.

1.4 Aims and Objectives

- 1.4.1 In producing this FRA, the following objectives have been met:
- Collect and review Environment Agency and WC flood risk data, topographic data, scheme proposals and available planning policy documents;
 - Assess the risk of flooding from all sources (tidal, fluvial, groundwater, surface water, sewers, and reservoirs) to and from the Site allowing for the effects of climate change over the lifetime of the Proposed Development;
 - Summarise how surface water will be managed from the Proposed Development;
 - Propose recommendations for appropriate flood risk mitigation measures (where applicable); and
 - Produce an FRA report in full accordance with the NPPF to accompany the planning application.

2 Site Description

2.1 Location

2.1.1 The Site covers an area of approximately 87.09 ha and is located approximately 1.7km north of the town of Royal Wootton Bassett and approximately 3.2km west of Swindon. The Site is comprised of two distinct but connected land parcels: a western and eastern land parcel. The National Grid Reference (NGR) for the approximate centre of the eastern land parcel is SU073848 and for the western parcel is SU061855. The Site consists of multiple agricultural fields bounded by hedgerows and tree lines with isolated trees and existing farm tracks across the Site (Figure 2-1). Solar PV arrays will be situated in both western and eastern land parcels with the location of the BESS in the north of the Site within the western parcel, adjacent to an area of land designated for Biodiversity Net Gain (BNG). Within the vicinity of the Site are the following:

- Immediately north of the Site is a mixture of fields and agricultural land, with some developed land comprising of residential and commercial properties situated in the small settlement of Green Hill.
- The east of the Site is bound immediately by fields and agricultural land. There are smaller settlements including Hook to the southeast and Greatfield to the northeast of the Site. These settlements are connected by Greatfield Road.
- Located centrally between the two Site land parcels is Flaxlands Lane with various residential, commercial and agricultural properties located along it, including Flaxlands Manor Farm, Four Acre Farm and a community church. There is a road approximately 320m in length that splits off from Flaxlands Lane which leads to an agricultural/residential development, Flaxlands Field Farm, located between the central boundary of the western land parcel.
- The south is bound by fields and agricultural land. The M4 is located approximately 150m south of the Site.
- The west of the Site is bound by hedgerows, trees, fields and agricultural land. The B4696 is approximately 470m west of the western boundary of the Site.

2.2 Local Water Features

2.2.1 According to the Environment Agency⁵, the closest Statutory Main River to the Site is Thunder Brook which is approximately 1.5km south of the Site and flows in a westerly direction away from the Site to meet Brinkworth Brook.

2.2.2 Brinkworth Brook, classified as a Main River and a tributary of the River Avon, is located approximately 2.5km southwest of the Site and flows in a westerly direction away from the Site.

2.2.3 There are no flood defences located within close proximity to the Site.

2.2.4 Figure 2-2 is taken from the Otter and Water Vole Survey (2024)⁶ and depicts the water features present within the Site boundary. The following water features are present in the local area:

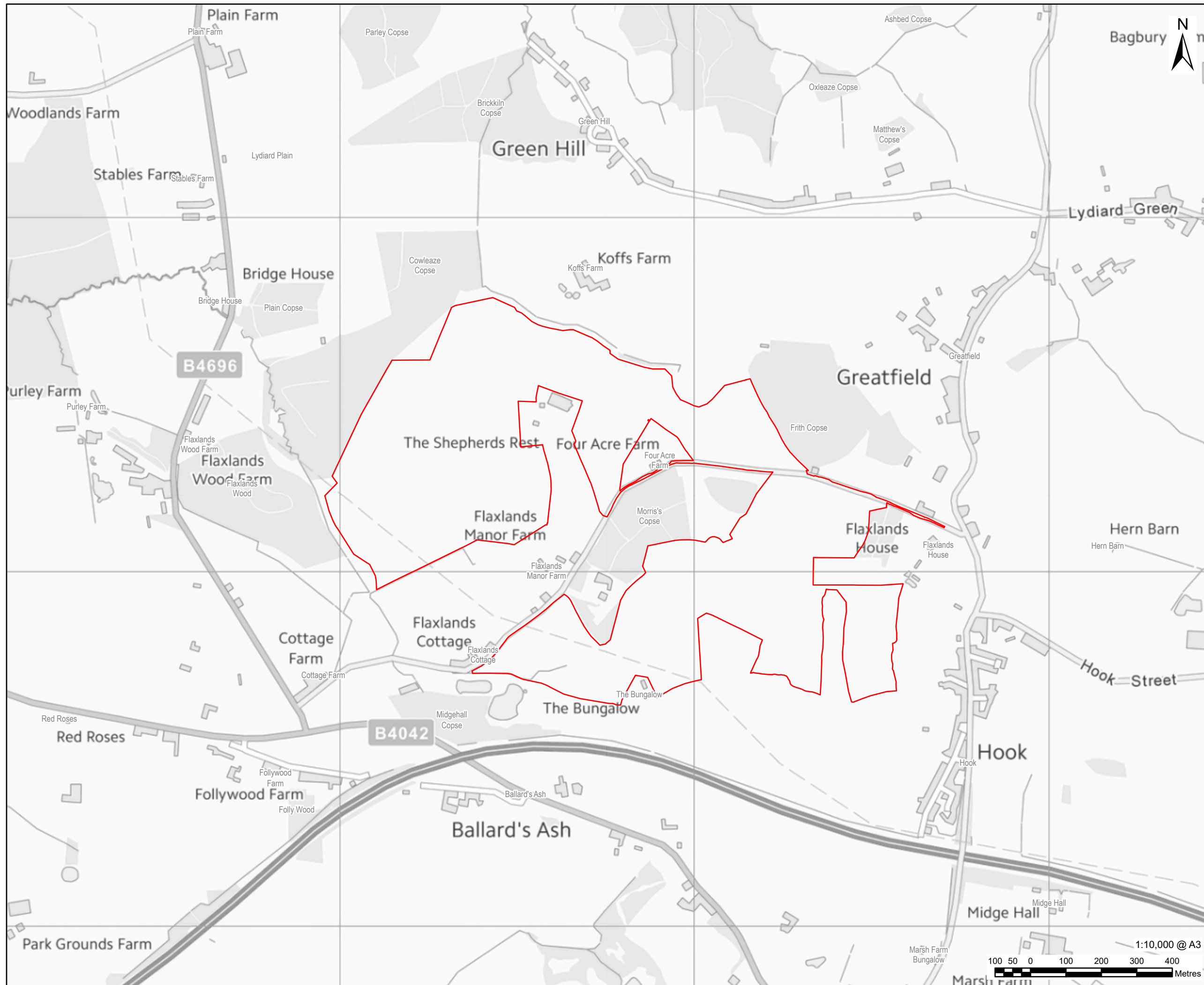
- The Lydiard Brook, classified as an Ordinary Watercourse, flows within and parallel to the Site's northern margin with a c.250 m section cutting into and across the Site. It flows from east to west.
- A small drainage channel is present immediately west of the western parcel's boundary, flowing south to north, away from the Site.
- A land drain is also located towards the southwest of the western parcel of the Site, with drainage likely to be flowing south westerly into the Woodbridge Brook.
- There is a drainage channel southeast of the eastern parcel, draining south.
- Several ponds are distributed across the Site's interior.

⁵ Environment Agency Statutory Main River Map:
<https://www.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386>

⁶ AECOM (2024) Flaxlands Solar Farm Otter and Water Vole Survey

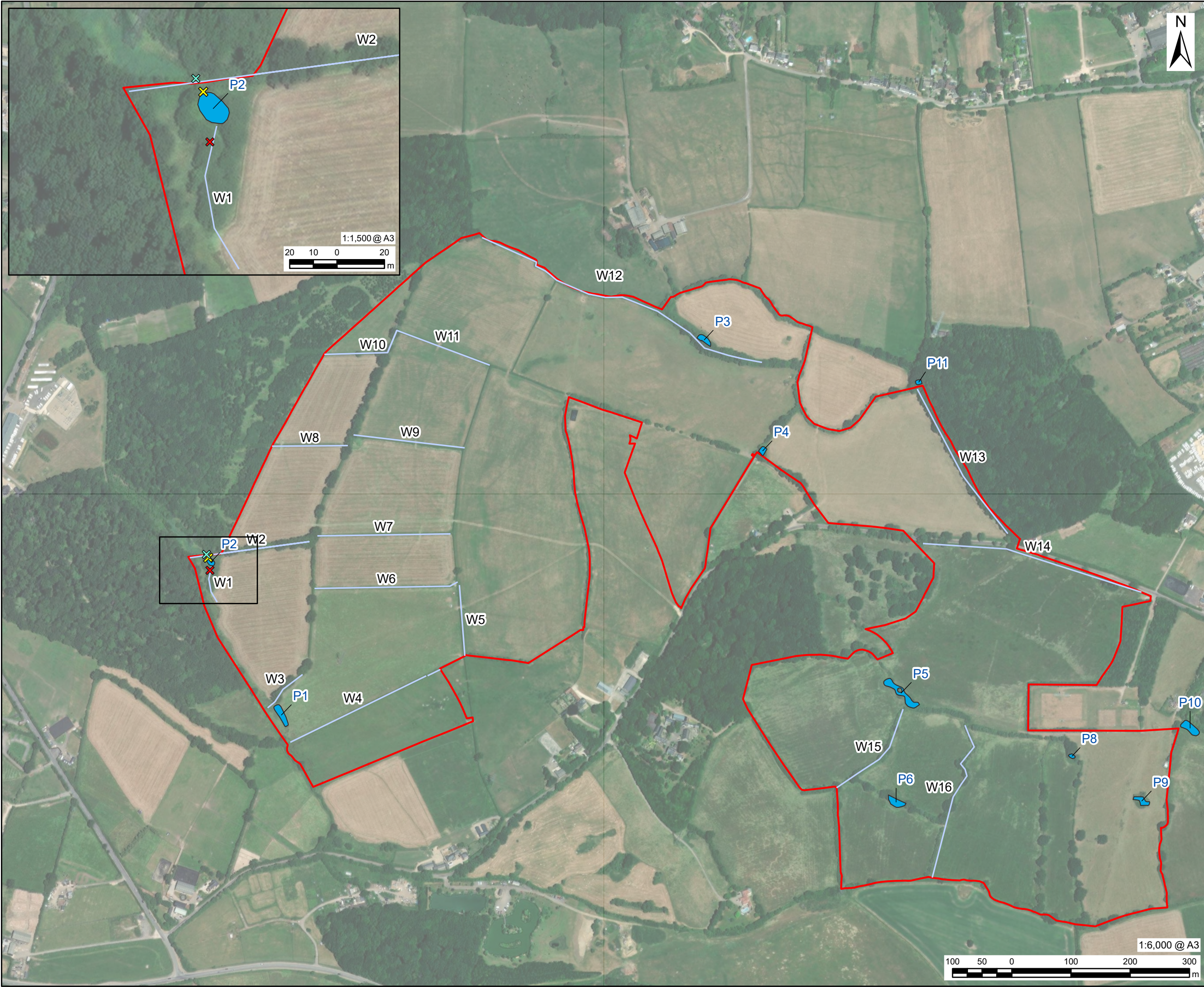
- Man-made ponds at the Flaxland's Fishery, located approximately 250m to the south of the Site, appear to be connected to the Woodbridge Brook but are upstream of the Site.

2.2.5 As discussed within Section 3.2, observations of watercourses within the vicinity of the Site were made during a site walkover which concentrated on wet ditches. Therefore, some of the watercourses depicted in Figure 2-2 were not observed during the walkover due to being seasonally dry.



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LEGEND	
	Site Boundary
NOTES	
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FIGURE TITLE	
Site Location Plan	
FIGURE NUMBER	
Figure 2-1	



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LEGEND

Ecology Assessment Boundary

Surveyed Watercourses

Pond

Water Vole Field Signs

X FS1 - Feeding Remains

X FS3 - Dropping

X FS2 - Burrow

NOTES

Maxar, Microsoft

ISSUE PURPOSE

FINAL

PROJECT NUMBER

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FIGURE TITLE

Otter and Water Vole Survey Map

FIGURE NUMBER

Figure 2-2

2.3 Geology and Hydrogeology

2.3.1 The British Geological Survey (BGS)⁷ 1:50,000 geological map shows that the Site is situated across five bedrock formations. These include:

- Ampthill Clay Formation – Mudstone;
- Ampthill Clay Formation and Kimmeridge Clay Formation – Mudstone;
- Hazelbury Bryan Formation and Kingston Formation – Sandstone;
- Stanford Formation – Limestone; and
- Oxford Clay formation – Mudstone.

2.3.2 The Site is situated within an area recorded to be largely free of superficial deposits, however a portion in the eastern parcel is identified as being overlain by superficial deposits of sand and gravel.

2.3.3 The Cranfield University Soil and Agrifood Institute's online Soilsclapes map⁸ shows that two soil classes are present within the boundary of the Site. These are designated as 'shallow, lime-rich soils over chalk or limestone' and 'slowly permeable, seasonally wet, slightly acid but base-rich loamy and clayey soils'.

2.3.4 The Defra Magic Map Application⁹ indicates that the bedrock and superficial drift aquifer classifications for the Site are as follows:

- The bedrock aquifer underlying parts of both parcels is categorised as 'Secondary A', which refers to permeable layers that can support local water supplies and may form an important source of base flow to rivers; and
- The superficial aquifer underlying parts of the eastern parcel is categorised as 'Secondary A'.

2.3.5 The Defra Magic Map Application also shows that the Site falls within Source Protection Zone (SPZ) 2-Subsurface Activity. This is the area around an abstraction point for domestic supply or for food production purposes that meets one of the following definitions:

- The area within 250m of the abstraction point if the maximum allowable annual volume, divided by 365, is less than 2000m³ per day;
- The area within 500m of the abstraction point if the maximum allowable annual volume, divided by 365, is equal to or greater than 2000m³ per day. This is when this is authorised by an abstraction licence under Section 24 of the Water Resources Act 1991; and
- The area where it takes groundwater that is used to supply water for domestic or food production purposes up to 400 days to travel to the groundwater abstraction point.

2.3.6 The Environment Agency extended the Source Protection Zones to include areas where there is protective geology cover, such as clay. Thus, whilst the Site does lie directly within Source Protection Zone 2 – Outer Zone, activities below the surface, such as deep drilling, could create pathways for pollutants to enter the groundwater. However, the development would impose this risk to the Site as no below ground activities would penetrate beyond the clay soil layers.

2.3.7 The Defra Magic Map Application shows that there is a band of High groundwater vulnerability that runs through the Site. The band appears to follow the Hazelbury Bryan and Kingston (Sandstone) and Stanford (Limestone) bedrock geology formations. High groundwater vulnerability areas are defined as areas that easily transmit pollution to groundwater and characterised by high-leaching soils and the absence of low-permeability superficial deposits.

⁷ BGS Geology of Britain viewer: <https://geologyviewer.bgs.ac.uk/> [Accessed March 2025].

⁸ Cranfield Soil and Agrifood Institute Soilsclapes map: <http://www.landis.org.uk/soilsclapes/> [Accessed March 2025].

⁹ DEFRA MAGIC map application: <https://magic.defra.gov.uk/magicmap.aspx> [Accessed March 2025].

2.4 Topographic Data

2.4.1 In the absence of a detailed topographic survey, LiDAR data obtained in 2022 as part of the National LiDAR programme¹⁰, has been utilised to interrogate elevations across the Site (Figure 2-3). To summarise:

- Eastern parcel - Elevations generally fall from north to south. The highest elevations are approximately 154m Above Ordinance Data (AOD) in the north and approximately 138m AOD to the south.
- Western parcel - Elevations generally fall from east to west. The highest elevations are approximately 150m AOD to the east and 108m AOD to the west. The lowest elevations are associated with a flow path to the southwest of the western parcel where elevations are approximately 106m AOD.
- The average elevation for the Site is 129m AOD.

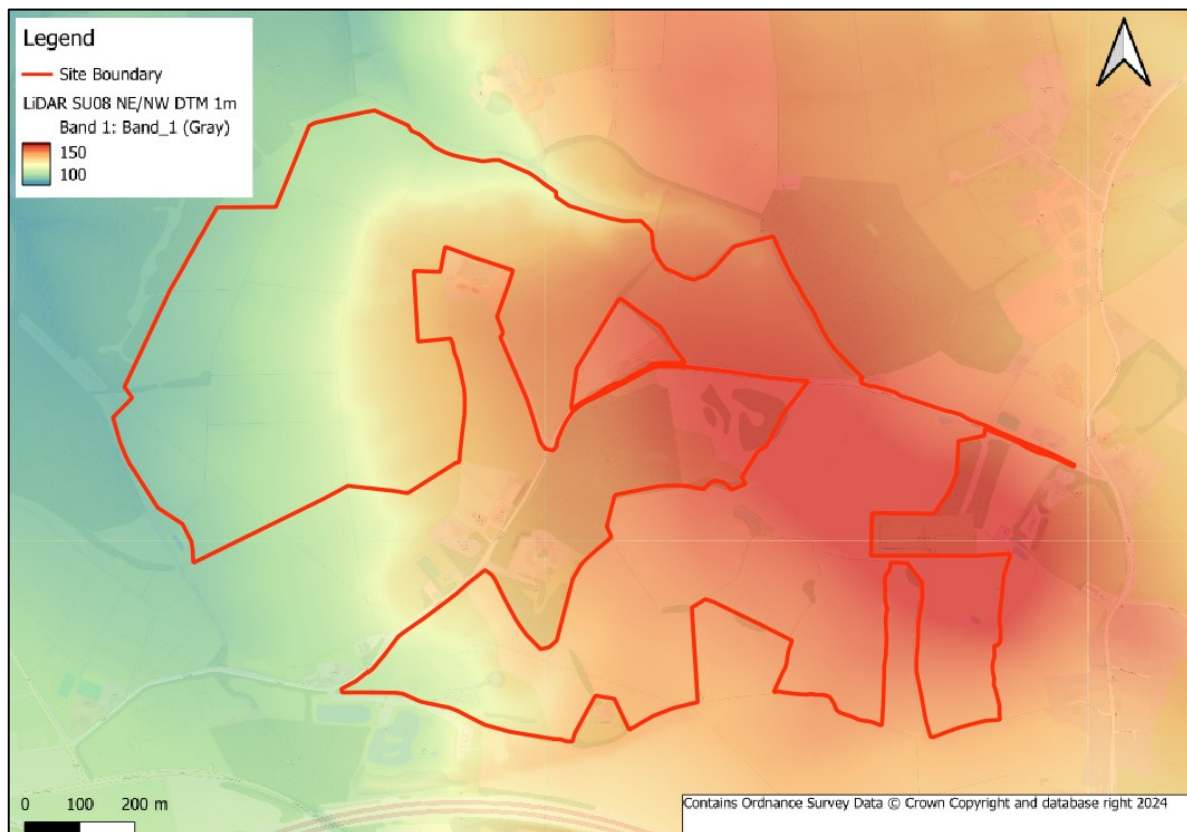


Figure 2-3: LiDAR data at the site (2022)

2.5 Proposed Development

2.5.1 The Proposed Development, which has a projected lifespan of 40 years, will comprise a solar PV array with an installed capacity of 49.9MW solar farm and 49.9MW BESS. Solar PV arrays will be situated in both western and eastern land parcels with the location of the BESS in the north of the Site adjacent to an area of land designated for Biodiversity Net Gain.

2.5.2 The design plan for the Site is shown in the Proposed Layout drawing in Appendix A.

2.5.3 The solar farm will include the following equipment:

- Solar PV panels;

¹⁰ National LiDAR Programme (2023): <https://environment.data.gov.uk/dataset/2e8d0733-4f43-48b4-9e51-631c25d1b0a9> [Accessed March 2025].

- BESS units and Substation;
- Storage containers;
- MV Station;
- DNO Control Substation;
- Communication tower;
- Water storage tank;
- Car parking;
- Attenuation basin;
- Access road; and
- Perimeter tracks.

2.5.4 Access roads/perimeter tracks have been proposed within the Site boundary, as depicted within Appendix A. These will cross over watercourses 5 and 7 as shown in Figure 2-2, however they will utilise existing farm tracks and therefore no new crossings or culverts will be required to accommodate these.

3 Sources of information

3.1 Sources of information

3.1.1 The following sources have been consulted during the preparation of this document:

- Environment Agency 1m Digital Terrain Model (DTM) Light Imaging Detection and Radar (LiDAR)¹⁰.
- Environment Agency online mapping (FMfP, Main River Map¹¹, Long Term Flood Risk Assessment Map¹²).
- Environment Agency Recorded Flood Outlines¹³.
- Environment Agency Risk of Surface Water Flooding GIS extent layers for the 0.1%¹⁴, 1%¹⁵, and 3.3%¹⁶ Annual Exceedance Probability (AEP) events.
- Environment Agency Fluvial Flood Zones 2¹⁷ and 3¹⁸.
- Ordnance Survey 1:10,000 mapping.
- British Geological Survey (BGS) online mapping: Geology of Britain Viewer⁷.
- Cranfield Soil and Agrifood Institute: Soilscales online mapping¹⁹.
- DEFRA's MAGIC Map⁹ (source protection zones, groundwater vulnerability, and aquifer designations).

3.2 Site walkover

3.2.1 AECOM staff carried out a site walkover on 25th October 2024. Observations of watercourses within the vicinity of the Site and surface water flow paths through the Site were used to inform the site description, assess flood risk to the Site and to confirm the proposed mitigation measures. The condition of the Site after rainfall was observed including areas in which local water features are present and have a surface water flood risk according to the Environment Agency.

3.2.2 It was observed that during the site walkover, even after a period of rainfall, the Site did not show evidence of flooding within the Site boundary.

3.2.3 Some surface water channels were present outside of the Site boundary during the site walkover and did not appear to pose any risk to the Site.

3.2.4 There were some areas of standing water present as shown in plates below.

¹¹ Statutory Main River Map: <https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386> [Accessed March 2025].

¹² Long-term flood risk map: <https://check-long-term-flood-risk.service.gov.uk/map> [Accessed March 2025].

¹³ Environment Agency Recorded Flood Outlines: <https://environment.data.gov.uk/dataset/8c75e700-d465-11e4-8b5b-f0def148f590> [Accessed March 2025].

¹⁴ Risk of Flooding from Surface Water Extent: 0.1% annual chance: <https://environment.data.gov.uk/dataset/90abef91-d465-11e4-b63a-f0def148f590> [Accessed March 2025].

¹⁵ Risk of Flooding from Surface Water Extent: 1% annual chance: <https://environment.data.gov.uk/dataset/9089254f-d465-11e4-9265-f0def148f590> [Accessed March 2025].

¹⁶ Risk of Flooding from Surface Water Extent: 3.3% annual chance: <https://environment.data.gov.uk/dataset/90d2ff8f-d465-11e4-8cb5-f0def148f590> [Accessed March 2025].

¹⁷ Flood Map for Planning (Rivers and Sea) – Flood Zone 2: <https://environment.data.gov.uk/dataset/86ec354f-d465-11e4-b09e-f0def148f590> [Accessed March 2025].

¹⁸ Flood Map for Planning (Rivers and Sea) – Flood Zone 3: <https://environment.data.gov.uk/dataset/87446770-d465-11e4-b97a-f0def148f590> [Accessed March 2025].

¹⁹ Cranfield Soil and Agrifood Institute Soilscales map: <http://www.landis.org.uk/soilscales/> [Accessed March 2025].



Plate 3-1: Surface water and loamy, clayey soils located in the northern extent of the Western Parcel



Plate 3-2: Contained pond located within north-eastern extent of the Western Parcel with heavy vegetation and high ground surrounding the body of water



Plate 3-3: Surface water flow path located in the northern extent of the Western Parcel

4 Planning Policy and Guidance

- 4.1.1 National planning policy sets out the overarching policy framework and local planning policy sets out the flood risk planning requirements for the local area, both of which must be adhered to. For this FRA, national guidance includes the NPPF and the accompanying PPG while local policy relates to the Wiltshire Core Strategy.

4.2 NPPF

- 4.2.1 Section 14 of the NPPF and the associated PPG details current policy with respect to flood risk in England. Paragraph 181 (footnote 63) of the NPPF outlines that a site-specific FRA should be provided for all development located in Flood Zones 2 and 3, and for all sites that are greater than 1ha in Flood Zone 1.
- 4.2.2 The NPPF considers the vulnerability of different types of development to flooding. According to Annex 3 of the NPPF²⁰, as the Site is proposed for a 'solar farm', it would be classified as 'Essential Infrastructure'. According to Table 2 of the PPG, which provides a matrix identifying the development vulnerability classifications that are compatible within each flood zone, 'Essential Infrastructure' development is acceptable in Flood Zone 1 and the Exception Test is not required.

4.3 Wiltshire Core Strategy

- 4.3.1 The Wiltshire Core Strategy Development Plan²¹ is the main planning policy document for the county. It sets out local planning policy for the area, covering up to the period of 2026. The Core Strategy was adopted in January 2015. It includes core strategies and development management policies relevant to flood risk specific to the local region. These are outlined as follows:

4.3.2 Core Policy 67: Flood Risk

- The Core Strategy supports a sustainable approach to surface water drainage, and development will be expected to incorporate Sustainable Urban Drainage Systems (SuDS) such as rainwater harvesting, green roofs, permeable paving, and ponds, wetlands and swales, wherever possible. The provision of green infrastructure, including woodland, should also be considered as a measure to reduce surface water run-off. Prospective developers will be expected to follow the 'surface water management train' approach recommended by the Environment Agency. This involves a three-step process, considering first reducing the quantity of run-off, then slowing velocity of runoff to allow settlement filtering and infiltration, and finally providing passive treatment to collected surface water before discharge into groundwater or to a watercourse. It is considered that all developments will be able to incorporate measures to reduce the quantity of run-off, but site specific geological or soil conditions may mean that measures to reduce run-off velocity and provide passive treatment would not be appropriate. Where this is the case, proposals will be expected to demonstrate why the use of such measures is not appropriate on the site in question.*
- In addition to the requirement for development to provide SuDS, any opportunities to reinstate or create additional natural, functional floodplain through the development process will be encouraged.*
- Development proposed in Flood Zones 3 and 3 as identified within the Strategic Flood Risk Assessment will need to refer to the SHLAA when providing evidence to the local planning authority in order to apply the sequential test on line with the requirements of national policy established best practice.*
- All new development will include measures to reduce the rate of rainwater run-off and improve rainwater infiltration to soil and ground (sustainable urban drainage) unless site or environmental conditions make these measures unsuitable.*

4.3.3 Core Policy 68: Water Resources

- Development must not prejudice the delivery of the actions and targets of the relevant River Basin Management Plan, and should contribute towards their delivery where possible. Non-residential*

²⁰ National Planning Policy Framework: <https://www.gov.uk/government/publications/national-planning-policy-framework--2> [Accessed March 2025].

²¹ Wiltshire Core Strategy 2015: <https://www.wiltshire.gov.uk/planning-policy-core-strategy> [Accessed March 2025]

development will be required to incorporate water efficiency measures. Developers will be expected to submit details of how water efficiency has been taken into account during the design of proposals.

- *Development proposals within a Source Protection Zone, Safeguard Zone or Water Protection Zone must assess any risk to groundwater resources and demonstrate that these would be protected throughout the construction and operational phases of development.*

4.4 Strategic Flood Risk Assessment

4.4.1 Strategic Flood Risk Assessments (SFRAs) are used by Local Planning Authorities (LPAs) to support their Local Plan and assist in making planning decisions. There are two SFRA levels:

- Level 1 provides enough information to apply the Sequential Test; and
- Level 2 builds on Level 1 and includes the information required to apply the Exception Test.

4.4.2 Wiltshire Council Level 1 SFRA²² describes its approach to flooding within the county and how it will work with other organisations. Flood risk within Wiltshire is usually a complex interaction between river, surface, groundwater and sewer flooding, and the local geology is a significant factor as discussed in Section 5. The Wiltshire Council's SFRA seeks to:

- Improve knowledge regarding flood risk,
- Improve protection from flooding,
- Improve resilience to flooding,
- Improve the environment,
- Improve communications about flooding issues.

4.4.3 Information, where applicable, has been extracted from the SFRA to inform the risk of flooding within this FRA, as documented in Section 5.

²² Wiltshire Council Level 1 SFRA 2013: <https://cms.wiltshire.gov.uk/documents/s158907/FR092013SFRAUpdateReport.pdf>
[Accessed October 2024]

5 Flood Risk to Development

5.1 Overview

- 5.1.1 The NPPF requires that all potential sources of flooding that could affect the Proposed Development are considered. This section of the FRA assesses the flood risk posed to the Site from: rivers and the sea, rising groundwater, directly from rainfall on the ground surface, overwhelmed sewers and drainage systems, as well as from reservoirs, canals, lakes and other artificial flood sources.

5.2 Tidal

- 5.2.1 At its closest point, the Site is located approximately 40km northeast of the River Avon, which is the closest tidally influenced source of flooding to the Site. The Site is therefore considered to be inland and at no risk of tidal flooding.
- 5.2.2 Based on the distance from tidal sources of flooding, the risk of tidal flooding to the Site is considered **Negligible**.

5.3 Fluvial

- 5.3.1 Fluvial flooding generally occurs when high levels of rainfall within a catchment causes the flow within a river to exceed its bankfull capacity.
- 5.3.2 As noted in Section 1.2, the Environment Agency's FMfP (Figure 1-1) shows that the Site is located in Flood Zone 1, i.e. at low risk of fluvial flooding. Flood zones on the FMfP are related to main river flooding and therefore there will not be representation of flood zones for ordinary watercourses. In order to understand the risk posed by ordinary watercourses close to the Site, the Environment Agency's surface water flood map has been assessed and reported in Section 5.4.
- 5.3.3 A review of flood maps within the SFRA, alongside historical fluvial flood records, indicate that fluvial flooding is unlikely to present a significant risk to the Site. Based on the nature of the Proposed Development, the vicinity of watercourses (as described in Section 2.2) and the fact that people will not be permanently working from the development, detailed hydraulic fluvial modelling was not required.
- 5.3.4 Based on the above justification, the risk of fluvial flooding is considered to be **Very Low** for the Site.

5.4 Surface Water

- 5.4.1 Surface water flooding occurs when rainwater cannot drain away through the normal drainage systems. Instead, it ponds or flows over the ground.
- 5.4.2 The Environment Agency has recently updated its Flood Map for Surface Water²³ which incorporates the latest data, technology and modelling techniques, offering a more precise understanding of flood risks across various locations. The new Flood Map for Surface Water estimates flood depths and includes climate change impacts on future flood risk.
- 5.4.3 The map demonstrates that for the majority of the Site, there is a 'very low' chance of annual surface water flooding up to 20cm in a present-day scenario, defined as having a chance of flooding of less than 0.1% each year. This is shown within Figure 5-1. The layer marked as 'unavailable' in the dataset corresponds to areas of 'very low' surface water flood risk, which is not displayed due to scale limitations or rendering issues within QGIS.
- 5.4.4 For flooding up to 20cm in a present-day scenario, there are very small and localised parts of the Site that are 'low' (between 0.1% and 1% chance each year), 'medium' (between 1% and 3.3% chance each year) and 'high' (more than 3.3% chance each year), as shown within Figure 5-1 below. However, these areas appear to correlate with the ordinary watercourses / drains identified throughout the Site as outlined in Section 2.2.

²³ Environment Agency's Flood Map for Surface Water: <https://check-long-term-flood-risk.service.gov.uk/map> [Accessed March 2025]

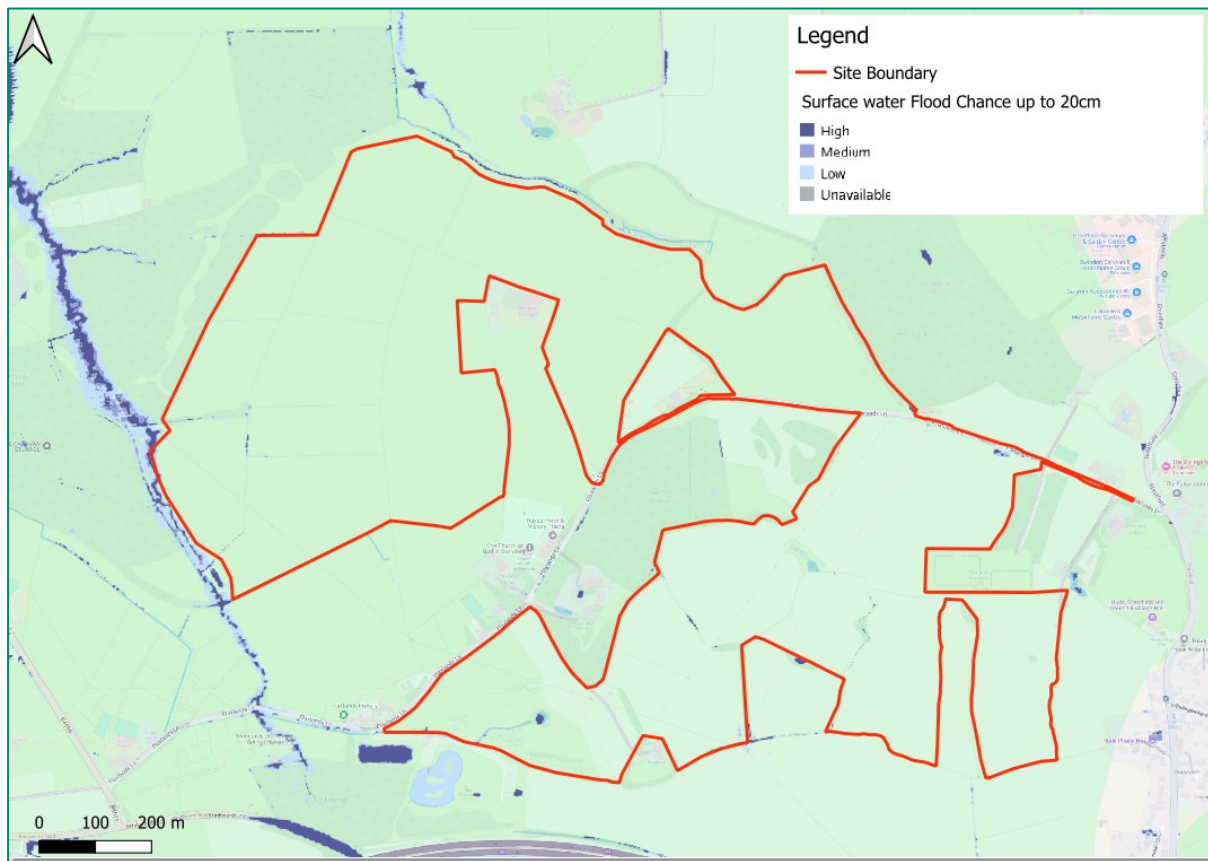


Figure 5-1: Environment Agency's Flood Map for Surface Water (March 2025) – chance of flooding to 20cm

- 5.4.5 The Environment Agency's Flood Map for Surface Water also depicts the yearly chance of flooding between 2040 and 2060 as shown in Figure 5-2 below. This map also shows the majority of the Site to have a 'very low' chance of annual surface water flooding up to 20cm. The extents of flooding in a climate change scenario have increased slightly in the western parcel, however depths remain shallow and are generally located in areas where watercourses / drains are present.
- 5.4.6 According to the SFRA, the geological characteristics in the northern half of the county often leads to potentially high runoff rates because of the impermeable nature of the clay deposits and associated soil structure which can lead to surface water flooding.
- 5.4.7 Wiltshire SFRA states that the modelling of potential surface water flooding indicates that the communities in Wiltshire with the most properties at risk of flooding are Salisbury, Trowbridge, Warminster and Calne. The Site is positioned in closest proximity to Calne which is located approximately 13km southwest of the Site.
- 5.4.8 It is worth noting that during a Site walkover which followed a period of heavy rainfall, there was no surface water flooding observed within the Site boundary. According to the Environment Agency's Flood Map for Surface Water, the majority of the Site is at 'very low' risk of surface water flooding and although there are areas of 'medium' and 'high' risk, these are isolated and generally on the boundary of the Site and associated with watercourses / drains. Consequently, the risk to the Site from surface water flooding is considered to be **Very Low**

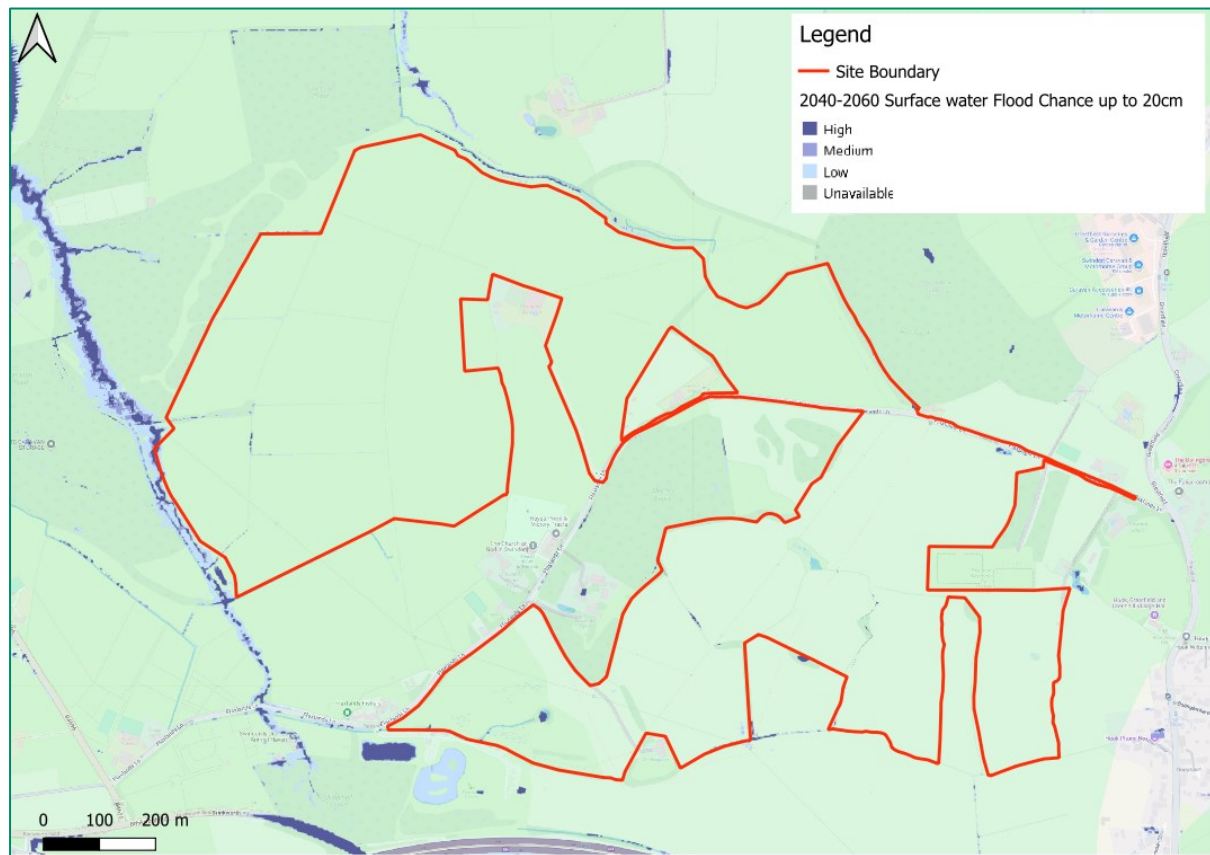


Figure 5-2: Environment Agency's Flood Map for Surface Water 2040-2060 (March 2025) – chance of flooding up to 20cm

5.5 Groundwater

- 5.5.1 Groundwater flooding occurs when water levels in the ground rise above surface elevations and is dependent on regional geology. The geology dictates where this type of flooding takes place; it is most likely to occur in low-lying areas underlain by permeable rocks (aquifers).
- 5.5.2 The SFRA states that the nature of the clay deposits and associated soil structure of the northern part of the county accounts for low permeability and therefore groundwater flooding is unlikely to pose a risk. Groundwater flooding within Wiltshire mainly occurs in the south of the county, due to the nature of the underlying chalk deposits. There are no historical records of groundwater flooding in close proximity to the Site, according to the Wiltshire Council Groundwater Management Strategy (2016)²⁴.
- 5.5.3 The government allows for local determination based on historic events, as groundwater is unlikely to pose a significant risk in areas which have not experienced groundwater flooding previously. The Environment Agency Historic Flood Map²⁵ was interrogated which revealed that the Site had not experienced any kinds of historical flooding and subsequently no groundwater flooding.
- 5.5.4 To further validate this, the BGS's Borehole Records Viewer²⁶ was reviewed to examine groundwater levels at the Site in the absence of a detailed Ground Investigation Report. According to historical borehole records, groundwater was encountered between 1.67m to 3.00m depth within firm clay, interpreted as Oxford Clay formation (SU08SE11 drilled: 04/11/1966/SU08SE12 drilled: 08/11/1966), and at 8.00m at the boundary between clay and limestone interpreted as the Hazelbury Bryan & Kingston Formation and Oxford Clay formation (SU08NE65 drilled: 14/03/2008).

²⁴ Wiltshire Council Groundwater Management Strategy (2016): <https://www.wiltshire.gov.uk/media/205/Wiltshire-groundwater-management-strategy/pdf/Groundwater-management-2016-strategy-civil-emergencies.pdf?m=1588785986543> [Accessed March 2025]

²⁵ Environment Agency's Historic Flood Map: <https://environment.data.gov.uk/dataset/889885c0-d465-11e4-9507-f0def148f590> [Accessed March 2025]

²⁶ BGS Borehole records viewer: <https://www.bgs.ac.uk/information-hub/borehole-records/> [Accessed March 2025]

- 5.5.5 Taking into account the information and evidence available, the risk of flooding at the Site from groundwater is considered **Low**. However, it is recommended that a ground investigation is carried out to confirm the groundwater conditions on the Site, to investigate and assess anticipated risks, and to inform detailed design.

5.6 Sewer

- 5.6.1 Sewer flooding generally occurs when the available discharge capacity of the system is exceeded by the inflow, the system becomes blocked by debris or sediment, or it cannot be released at the outfall due to a high water level within the receiving water body. In all three cases, water could back up through the sewerage system and may surcharge through manholes, flooding highways and properties.
- 5.6.2 The SFRA states that sewer flooding is most likely to occur in the urban areas of the Wiltshire. The Site is over 1km from the urban centre of Royal Wootton Bassett and is predominantly rural consisting of agricultural fields. Additionally, while it has not been possible to attain sewer records in this area, it is not anticipated that there would be public sewers at this location. As there are no records of historical flooding at the Site including sewer flooding, the risk is considered to be **Very Low**.

5.7 Artificial Sources

- 5.7.1 Artificial flood sources include raised channels such as canals, or storage features such as ponds and reservoirs.
- 5.7.2 The Environment Agency's Flood Risk from Reservoirs Map²⁷ shows that the Site is not located within the 'dry day' or 'wet day' inundation extent for any major reservoir. 'Dry day' refers to a scenario in which a major reservoir suffers a breach when river levels are normal, whilst the 'wet day' scenario refers to the same event occurring when local rivers have already overtopped their banks. The nearest inundation extent is located approximately 200m southwest of the Site which is a 'wet day' inundation. The nearest 'dry day' inundation extent is located approximately 3.5km southwest of the Site.
- 5.7.3 Based on the information above, the flood risk from artificial sources to the Site is considered **Very Low**.

5.8 Flood Risk Summary

- 5.8.1 The flood risk to the Site is summarised in Table 5-1.

Table 5-1: Summary of flood risk to the Site

Flood Mechanism	Source	Flood risk to the Site	Mitigation required?
Tidal	The Sea	Negligible	None
Fluvial	Main river/ ordinary watercourse	Very Low	None
Surface Water	Runoff from surrounding land and hard surfaces	Very Low	Yes – drainage strategy for BESS
Groundwater	Rising groundwater levels in the underlying geology	Low	None
Sewers	Surrounding public/private drainage systems	Very Low	None
Artificial Sources	Reservoirs / Canals	Very Low	None

²⁷ Environment Agency's Flood Risk from Reservoir Map: <https://check-long-term-flood-risk.service.gov.uk/map> [Accessed March 2025]

6 Flood Risk from Development

6.1 Drainage Strategy

6.1.1 An Outline Drainage Strategy²⁸ has been developed for the Proposed Development, which has been developed to replicate the existing drainage regime in order that the existing catchments continue to outfall at their existing location. The Outline Drainage Strategy is summarised as follows:

- An attenuation basin is proposed to attenuate runoff from the BESS and Substation area to restrict post-development runoff rates to the equivalent greenfield rate;
- Where Site access roads drain onto solar PV fields, boundary swales are proposed to capture and attenuate runoff and maintain the existing runoff regime. Boundary swales will not be connected to the existing ordinary watercourses. Instead, they will convey runoff to the current outfall points identified by the existing catchments; and
- The solar PV fields will be planted to ensure the introduction of solar PV fields does not lead to channelised flow of runoff.

²⁸ AECOM (2025) Flaxlands Solar Farm Outline Drainage Strategy

7 Mitigation

7.1.1 To reduce the consequences of surface water flooding, the following flood risk mitigation measures are proposed to be incorporated into the development.

- **Drainage strategy-** A surface water drainage strategy as outlined in Section 6.1 has been produced for the Site which details measures to mitigate any increase in impermeable area to ensure there is no increase in surface water runoff from the Site.
- **Panel Design-** The solar PV panels are located within Flood Zone 1. In most areas of the Site the panels are also located outside of the surface water flood extents. The panels are fixed (south facing) and will be raised at least 0.60m above the ground level providing a suitable freeboard above the surface water flood level. As mentioned in Section 5 there is a 'very low' chance of annual surface water flooding up to 20cm both in the present day and in the future.
- **BESS & Substation-** These are both located within Flood Zone 1 and outside the surface water flood extents.
- **Access Roads-** It is assumed that all access roads will be permeable and consequently will not increase surface water flood risk. All access roads will utilise existing farm track and therefore no new crossings or culverts will be required to accommodate these.
- **Construction-** In terms of minimising the risk of surface water flooding to equipment and personnel, primarily during the construction phase, the following measures are provided:
 - All mobile equipment will be stored in areas outside of those identified as being at risk from surface water flooding when not required for scheduled works;
 - Stockpile facilities and compounds will be located outside of the surface water flood extent wherever practicable; and
 - During construction, control measures to manage the potential impact of flood risk will be implemented, such as minimising impermeable areas and providing swales where necessary.
- **Pollution control-** A Geotechnical and Geo- Environmental Desk Study Report²⁹ has been produced for the Site and outlines how pollution risk, both to receiving watercourses and to groundwater will be managed throughout both the construction and operation phases. Within the report, Table 8-5 produces a summary of preliminary conceptual site model and includes a risk assessment. All risk identified are classified as either 'Low' or 'Very Low'.

7.1.2 With the implementation of the proposed mitigation measures and surface water drainage strategy, increased flood risk to third-party and adjacent land is considered to be minimal.

²⁹ AECOM (2024) Flaxlands Solar Farm Geotechnical and Geo- Environmental Desk Study- Ampyr Solar Europe [Accessed March 2025]

8 Conclusions

8.1 Overview

- 8.1.1 This FRA has appraised the risk of flooding to and from the Site. The Proposed Development has been assigned to the flood risk vulnerability category of 'Essential Infrastructure' (solar farm) in line with Annex 3 of the NPPF. The entirety of the Site is located within Flood Zone 1.
- 8.1.2 According to Table 2 of the PPG, as the Site has a footprint in Flood Zone 1 exceeding 1 hectare, an FRA is required to support the planning application to meet the requirements of the NPPF.

8.2 Flood Risk – To Development

- 8.2.1 The following potential sources of flooding which could affect the Site have been considered and assessed as follows:
- The current and future risk of tidal flooding is considered **Negligible** due to the distance from tidal sources.
 - The risk of fluvial flooding to the Site is **Very Low**. This has been concluded following a review of Environment Agency and SFRA data, and given the site is located in Flood Zone 1.
 - The risk of surface water flooding to the Site is deemed **Very Low** (both present day and in the future) across the majority of the Site. There are small areas where the risk of surface water flooding up to 20cm increases to 'Medium' and an area of 'High' risk, however these are located at and beyond the Site boundary of the northern extent of the Western Parcel and are generally associated with watercourses / drains.
 - The risk of groundwater flooding to the Site is deemed **Low** based on information provided by BGS Borehole Records Viewer and the Environment Agency's historical flood data.
 - The risk of flooding from sewers is considered to be **Very Low** due to the distance from the nearest urban centre and the lack of historical records of sewer flooding in this area.
 - The risk of flooding from artificial sources is considered to be **Very Low**, due to the Site being situated outside the flood extent for any major reservoirs.

8.3 Flood Risk- From Development

- 8.3.1 Aspects of the Proposed Development, such as the solar PV panels, BESS area and Substation, will increase the area of impermeable surfaces and alter the existing surface water drainage routes within the Site, increasing the risk of surface water flooding to the development and third-party land.
- 8.3.2 Therefore, as detailed in Section 6.1, a surface water drainage strategy has been prepared for the Site, including attenuation for the BESS and Substation area to reduce runoff rates, boundary swales to capture and attenuate runoff where site access roads drain onto the solar PV fields, and solar PV fields will be planted in such a way that ensures no channelised flow of runoff from the solar PV fields.

8.4 Mitigation

- 8.4.1 The following mitigation measures will be implemented to address the flood risk to, and arising from the Proposed Development:
- An Outline Drainage Strategy has been produced for the Site and details measures to mitigate any increase in impermeable areas to ensure there is no increase in surface water runoff from the Site.
 - Panel Design - panels are located within Flood Zone 1 and the majority are located outside the surface water flood extents. Panels will be raised at least 0.60m above ground levels.
 - BESS & Substation - these will be located within Flood Zone 1 and outside the surface water flood extents.
 - Access Roads - it is assumed all access roads will be permeable and not increase surface water flood risk. All access roads will utilise existing farm track and therefore no new crossings or culverts will be required to accommodate these.

- During construction, control measures to manage the potential impact of flood risk will be implemented. This includes:
 - Storing mobile equipment outside of the surface water flood extent;
 - Locating stockpile facilities and compounds outside of the surface water flood extent; and
 - Minimising impermeable areas and providing swales where necessary to control and manage the potential impact of flood risk during construction.
- Pollution control - Table 8-5 of AECOM's Geotechnical and Geo-Environmental Desk Study Report identifies and outlines pollution risk, both to receiving watercourses and to groundwater and how this will be managed throughout both the construction and operation phases. All risks identified are classified as either 'Low' or 'Very Low'.