EAST PARK ENERGY

East Park Energy

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Volume 1 – Main Report

Chapter 8: Hydrology and Flood Risk

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8.0 HYDROLOGY AND FLOOD RISK

8.1 Introduction

8.1.1 This chapter presents the findings of the preliminary assessment of the likely hydrological and flood risk effects arising from the construction, operation and decommissioning of the East Park Energy project ('the Scheme').

8.1.2 This chapter details the methodology followed for the assessment, summarises the regulatory and policy framework and describes the existing environment in the area surrounding the Scheme. Following this, the design, mitigation and residual effects of the Scheme are discussed, along with the limitations of the assessment.

8.1.3 Hydrology and flood risk aspects considered within the chapter for the Scheme include:

- Effects of water quality due to the Scheme on surface water, groundwater, designated sites and water abstractions; and
- Fluvial flood risk and surface water drainage.

8.1.4 This chapter is supported by the following Appendices in ***PEIR Volume 2***:

- Appendix 8-1: Preliminary Flood Risk Assessment;
- Appendix 8-2: Outline Surface Water Management Plan (oSWMP); and
- Appendix 8-3: Preliminary WFD Assessment.

8.1.5 This chapter is supported by the following figures in ***PEIR Volume 3***:

- Figure 8-1: Watercourses;
- Figure 8-2: Environment Agency Fluvial Flood Map;
- Figure 8-3: Modelled Flood Extent (0.1% AEP);
- Figure 8-4: Environment Agency Pluvial Flood Map;
- Figure 8-5: Bedrock Geology;
- Figure 8-6: Superficial Geology;
- Figure 8-7: Topography;

- Figure 8-8: Designated Sites; and
- Figure 8-9: Licenced Abstractions.

8.2 Legislation, Policy and Guidance

8.2.1 The relevant legislation, planning policy and guidelines which underpin the assessment methodology for hydrology and flood risk and inform the scope of the assessment are outlined in this section.

Legislation

8.2.2 The Water Framework Directive (2000/60/EC) (WFD), has the main objectives of protecting, enhancing and restoring Europe's waters, with the aim of achieving 'good' status, establishing a baseline of no deterioration and encouraging the sustainable use of water resources and the water environment. This directive resulted in the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003, which transposed the WFD into law in England and Wales and provided a timetable for its implementation (since replaced by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017).

8.2.3 Where relevant, the assessment takes into account the legislative protection afforded to water resources. The main national legal and policy framework is se[1]t by the following:

- Water Environment (Water Framework Directive) (England and Wales) Regulations 2017;
- Water Act 2003[2];
- Water Act 2014[3];
- Land Drainage Act 1991[4];
- Water Industry Act 1991[5];
- Water Resources Act 1991[6];
- Environmental Permitting (England and Wales) Regulations 2016[7];
- Control of Pollution (Oil Storage) (England) Regulations 2001[8];
- Environmental Damage (Prevention and Remediation) Regulations 2015[9];

- The EC Groundwater Directive (2006/118/EC)[10];
- The EC Nitrates Directive (91/676/EEC)[11];
- The EU Priority Substances Directive (2013/39/EU)[12];
- The Conservation of Habitats and Species Regulations 2017 (which implement the EC Habitats Directive 92/43/EEC)[13];
- The Flood Risk Regulations 2009 (which implement the EC Flood Directive 2007/60/EC);[14]
- Flood and Water Management Act 2010[15]; and
- Environment Act 2021[16].

Water Quality Standards and Objectives

8.2.4 The water quality of England's rivers is classified by the Environment Agency (EA), which has developed a classification scheme for surface waters following the requirements of the (WFD),as part of their River Basin Management Plans (RBMP).

8.2.5 The classification scheme assesses the condition of each river, lake, estuary and coastal water and assigns it a 'status' from high, good, moderate, poor to bad. If a water body is classified as high or good status, then it has a healthy ecology which deviates only slightly from natural conditions. Such a water body is an important natural heritage asset and can support a wide range of uses such as recreation, fishing and drinking water supply. If a water body is classified as moderate, poor or bad, then the ecology is adversely affected and the range of uses which can be supported is reduced.

8.2.6 As part of the RBMPs, water body data is published by the EA containing details of the current water body classification, current pressures on the water body, measures to address these and classification objectives for 2021 and 2027.

Planning Policy

8.2.7 The following national and local policies of relevance have been considered:

National Policy

National Policy Statements (NPS)

8.2.8 The following policies have been taken into account as part of the assessment:

i) NPS for Energy (EN-1)[17] with reference to Section 4.1 (General Policies and Considerations), 4.12 (Pollution Control and Other Environmental Regulatory Regimes), Section 5.8 (Flood Risk) and Section 5.16 (Water Quality and Resources). These highlight the requirement for site specific flood risk assessments, the need for the decision maker to assess whether the development proposes an acceptable use of the land, the need for early engagement with regulators and the requirement for development to have pollution control in place.

ii) NPS for renewable Energy Infrastructure (EN-3)[18] –this document highlights the importance of considering potential impacts arising from solar energy developments on water quality, water resources and flood risk, taking into account climate change. The document promotes the use of SuDS where required and measures for the crossing of watercourses for access roads. It is acknowledged that because solar PV panels will drain to the existing ground surface, the water related impacts will not generally be significant.

8.2.9 The updated NPS EN-1 also sets out additional information on the requirements for flood risk assessments and encourages Applicants to manage surface water during construction. It also makes it clear that it is necessary to have regard to current River Basin Management Plans and that development must meet the requirements of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

8.2.10 The updated EN-3 sets out requirements for use of permeable surfacing and Sustainable Drainage Systems (SuDS) to control runoff and states that water management is a critical component of site design for ground mount solar panels.

National Planning Policy Framework

8.2.11 The National Planning Policy Framework (NPPF)[19] sets out the planning policies for England and describes how these should be applied. The NPPF also sets out the aims for development to contribute towards sustainable development. The NPPF does not currently contain any specific policies for NSIPs. Paragraph 5 states that NSIPs are determined by the framework set out in the Planning Act 2008[20] and relevant NPSs, as well as any other matters that are relevant (which may include the NPPF). The Secretary of State may consider the NPPF, or parts of it, to be a relevant and important matter for their consideration of this Scheme.

8.2.12 Sections of the NPPF relevant to the water environment include Section 14: 'Meeting the challenge of climate change, flooding and coastal change. This section considers the impact of climate change to flood risk, coastal change, and water supply.

8.2.13 Paragraphs 159 to 169 set out the need to avoid areas at risk of flooding and for developments to be made safe for their lifetime. Where this cannot be achieved, national policy is clear that new development should not be allowed.

8.2.14 Section 15 of the NPPF: 'Conserving and enhancing the natural environment' is relevant to water quality and sets out the requirement of:

8.2.15 *'e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.'*

National Planning Practice Guidance

8.2.16 The NPPF is supported by the National Planning Practice Guidance (NPPG)[21] and provides guidance across a range of topic areas. The section entitled 'Flood Risk and Coastal Change' provides guidance on the 'sequential test'

and ‘exception test’ which must be applied to steer development to areas with the lowest probability of flooding. The document also provides guidance on Flood Risk Assessments (FRA) and sets out flood risk issues from different types of development. Guidance on surface water management including consultation with the Lead Local Flood Authority (LLFA) is also included.

8.2.17 Guidance on climate change focuses on suitable mitigation and adaptation measures in the planning process. This includes considering availability of water and water infrastructure for the lifetime of a development and designing responses to promote water efficiency and protect water quality.

Local Policy

8.2.18 The Scheme lies within the administrative boundaries of Bedford Borough Council and Huntingdonshire District Council. Planning policy of relevance to the assessment that will be considered includes:

Huntingdonshire Local Plan to 2036[22]

8.2.19 Local Plan (LP) 5 – Flood Risk; sets out the Council’s approach in relation to risk of flooding as follows:

i) The location of development will only be supported where all forms of flood risk, including breaches of flood defences or other defence failures, have been addressed as detailed in NPPG and in reference to the Cambridgeshire Flood and Water Supplementary Planning Document (SPD)[23].

ii) Where a proposal is considered to be acceptable within the 1% annual probability flood extent (Flood Zone 3), including an allowance for climate change for the lifetime of the development, the development must not result in a loss of flood storage capacity, reduce flow performance, increase rate of flooding onset or result in an unsustainable form of flood storage requiring on-going silt removal, maintenance or renewal.

iii) Proposed sites at risk of flooding from any form, where there are critical drainage problems or on site of 1 hectare or more will only be supported if a site-specific flood risk assessment has been produced.

8.2.20 LP 15 – Surface Water; sets out the Council's approach in relation to the management of surface water in a sustainable manner. It states that a development should consider surface water management from the outset as an integral part of the design process and incorporate sustainable drainage systems (SuDS) in accordance with Cambridgeshire Flood and Water Supplementary Planning Document (SPD) or successor documents and advice from Cambridgeshire County Council as LLFA.

8.2.21 LP 30 – Biodiversity and Geodiversity; states that a proposal will be required to demonstrate that all potential adverse impacts on biodiversity and geodiversity have been investigated.

8.2.22 The Huntingdonshire Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA)[24]. Level 1 recommends the criteria that should be used to assess future development proposals and the development of a sequential approach to flood risk. Level 2 makes recommendations on the requirements for drainage control and impact mitigation such as SuDS and design solutions that could reduce flood risk.

Bedford Borough Local Plan 2030[25]

8.2.23 Policy 50S – Water Resources; states that development must not adversely affect the quality, quantity and flow of both ground and surface water. Development should be designed to avoid Source Protection Zones unless it can be demonstrated that there would be no adverse effect from the proposal.

8.2.24 Policy 92 – Flood Risk; states that in considering new development water management and flood risk must be addressed.

8.2.25 Policy 93 – Sustainable Drainage Systems; states that all development proposals must incorporate surface water drainage systems appropriate to

the nature of the site. Post-development runoff rates should aim to achieve greenfield equivalents. It also outlines the drainage priority in order of discharge locations.

8.2.26 The Bedford Borough Council Level 2 Strategic Flood Risk Assessment (SFRA)[26] aims to provide a greater understanding of fluvial, surface water, groundwater and reservoir related flooding risks to sites and identifies sites for further risk analysis at the site-specific Flood Risk Assessment (FRA) stage.

Guidance

8.2.27 Assessment of the effects of the Scheme on the water environment has been undertaken in accordance with the legislation and policy summarised above. Where appropriate, informed professional judgement has been used where interpretation of legislation and policy has been required and also where there is a lack of published guidance to date.

8.2.28 Flood risk has been assessed in accordance with the requirements of the National Policy Statements for Energy, including those that apply specifically to solar developments. The NPPF[19] and the accompanying online flood risk guidance provide necessary detail on the requirements for assessing flood risk for development.

8.2.29 Additionally, the CIRIA Environmental Good Practice on Site[27] and Control of Water Pollution from Construction Sites[28] have been taken into consideration when identifying mitigation measures.

8.3 Assessment Methodology

Baseline Methodology

8.3.1 The purpose of the EIA is to support the Applicant in providing information to the regulatory authorities to assist in their determination on whether to consent the development. Critical to this process is the initial identification of significant effects and the subsequent commitment to mitigate these effects, either by

features embedded within the engineering design or applied as good practice during construction and/or operational activities. Significance is based upon the sensitivity of the receptors and the magnitude of the impact. These terms are explained and defined in detail below. The manner in which sensitivity and magnitude are ultimately combined in order to determine significance, is set out in Table 8.1.

Table 8.1 Significance Criteria

Sensitivity (Value) of Receptor	**Magnitude of Impact**			
	Negligible	**Minor**	**Moderate**	**Major**
Low	Negligible	Negligible	Minor	Minor
Moderate	Negligible	Minor	Moderate	Moderate
High	Negligible	Moderate	Moderate	Major
Very high	Negligible	Moderate	Major	Major

8.3.2 The significance criteria in Table 8.1 are applied, based upon the principles of the Design Manual for Roads and Bridges[29] and follows guidance produced by the Institute of Environmental Management and Assessment[30].

8.3.3 Effects of Moderate Significance or above are likely to be considered significant in terms of the EIA regulations. Where effects are initially identified as significant, the design of the development is amended where possible to mitigate the effect by following a mitigation hierarchy of: avoid, reduce, remediate and offset/compensate. Effects that are of a Minor or Negligible significance are generally judged to be not significant in EIA terms. Differentiations between categories in Table 8.1 are based upon the application of criteria explained below.

8.3.4 Source, pathway, receptor style language (SPR) is used to formulate the hydrological assessment. Development that disturbs hydrological pathways may have significant effects on the hydrological cycle. For instance, it can

reduce infiltration rates and the water storage capacity of soils and increase surface run-off rates. This can have the effect of increasing erosion risk, downstream flood risk within river catchments and changing water table levels in receiving sites and lower-lying areas.

8.3.5 The soil is also a pathway for the transmission of waterborne contamination that may be mobilised by ground disturbance caused by development, resulting in downstream and other water transmission effects. Particulate contamination can arise from increased surface run-off and erosion. Examples are the nitrogen and phosphate enrichment and eutrophication of watercourses and an increase in suspended solids like silt. Further examples of hydrological pathways are provided in Table 8.2**.**

Table 8.2 Examples of Hydrological Pathways

Pathway	Examples
Surface Runoff	Overland flow and lateral flow within soils (volumes, rates and direction) as well as constituent pathways created by entrainment of dissolved phase and particulates within surface runoff impacting surface water quality.
Groundwater Recharge	Infiltration vertically through soils and then percolation towards nearby water bodies (surface water and groundwater) as well as contaminant pathways created by mobilisation of pollutants held within soils from present or historic land use.
Coastal Processes	Tidal effects on estuaries and coastlines, groundwater levels and flow (and saline intrusion), erosion and discharges to sea.

8.3.6 Receptors vulnerable to development include residents in urban areas and species within habitats sensitive to hydrological change. Further examples of receptors considered are provided in Table 8.3**.**

Table 8.3 Examples of Hydrological Receptors

Receptor	Examples
Water bodies	• Surface water (springs, streams, rivers, lakes, estuaries and sea) • Subsurface soil water, groundwater (Principal and Secondary Aquifers)

	• Reservoirs (drinking, irrigation and hydroelectric) • Directions of flow, volumes, rates, storage of water and water quality
People, Industry & Agriculture	• Housing, commercial and industrial property • Water supplies (quantity and quality), flood defences (and protection) • Energy production, transmission and distribution • Critical Infrastructure such as electrical, gas, water, telecommunications, highways (including tunnels and underground services), railways and airports • Manufacturing, chemical, pharmaceutical sites • Farmland and livestock • Recreation related to rivers, lakes and the sea
Ecology	• Designated areas, riparian areas and protected species • Habitats that rely on remaining inundated (wetlands) or are periodically inundated (meadows) • Fish (especially migratory fish) • Amphibians (e.g. Great Crested Newts and Natterjack Toad) • Invertebrates (e.g. Freshwater Pearl Mussels) consider the water column and substrate
Mineral Extraction	• Extractive industries and construction (especially sub-water table)

Sensitivity (Value) Criteria

8.3.7 The sensitivity of a receptor, i.e. its sensitivity to change or its value, is determined with reference to nationally recognised standards e.g. the Flood Risk Section of technical guidance to the NPPF[31]. The sensitivity (value) of receptors depends on:

- environmental policies and designations;
- the environmental, social and economic value and sensitivity of a receptor to a change of baseline conditions at the location of the Scheme; and
- a receptor's resilience and capacity to sustain its current condition and function apply.

8.3.8 The criteria for determining the sensitivity of hydrological receptors are provided in Table 8.4. Note that criteria for lower levels of sensitivity are included within the qualifying criteria for higher levels of sensitivity, therefore the highest level of sensitivity appropriate to each receptor is selected.

8.3.9 This process establishes the baseline conditions upon which the magnitude of the impacts associated with the development are then assessed.

Magnitude Criteria

8.3.10 The predicted magnitude of impacts should be classified according to whether they are considered to be beneficial or adverse and either major, moderate, minor or negligible. This will provide a consistent approach to expressing the results of the assessments undertaken as part of the EIA. The terms used are defined as follows:

- beneficial - advantageous or positive change to an environmental resource or receptor;
- adverse - detrimental or negative change to an environmental resource or receptor;
- negligible – small, short-term and highly localised effect;
- minor – short-term or localised impact;
- moderate – long-term impact of more than local importance; and
- major - considerable long-term impact of more than district importance or in breach of recognised standards, policy or legislation.

8.3.11 The magnitude of impacts depends on concepts of scale and duration, examples of which are as follows:

- the scale and nature of the Scheme compared to the receptor, including the mix of hard and soft development;
- spatial extent of the effect - local, district, regional or national;
- temporal nature of the effect - frequency of occurrence, duration and intensity;
- nature of the effect - direct or indirect, permanent or temporary;

- whether it occurs in isolation or ‘knocks on’ and/or is cumulative;
- number of receptors affected; and
- performance of mitigation measures considering environmental standards.

8.3.12 The criteria for determining the magnitude of hydrological impacts are provided in Table 8.5. Note that criteria for lower levels of magnitude are included within the qualifying criteria for higher levels of magnitude, therefore the highest level of magnitude appropriate to each receptor is selected.

8.3.13 A hydrological constraints map is developed, to ensure that relevant constraints are incorporated into the design of the infrastructure layout for the development.

8.3.14 The assessment of impacts and effects on the hydrological baseline due to the development is then undertaken using the following process:

- examination of infrastructure design, construction and operational methodologies;
- potential impacts are identified, using the magnitude criteria presented in Table 8.5 combined with the sensitivity criteria presented in Table 8.4, differentiating between short term construction impacts and long term operational and design impacts for each receptor; and
- for each potentially significant impact, mitigation measures are identified to avoid, minimise or remedy any adverse impacts and enhance any beneficial impacts.

Table 8.4 Sensitivity Classification

Receptor Sensitivity / Value	Receptor	Examples of Sensitivity Classes based on Table 8.3 with Criteria Included
Very High	**Resilience Criteria**	Receptor is near or at capacity and will permanently change due to development. Shift in baseline conditions due to development will be ≥ 10%.
	Water Criteria	Nationally significant water body or nationally significant attribute of a water body. Designated water protection zones, providing a high quality yield of water and important baseflow (dry weather flow) to surface water bodies. Nitrate Sensitive Areas and Nutrient Neutrality Zones are included. Watercourses with a Q_{95} flow ≥ 1 m^3/s. Flood Zone 3. Groundwater Source Protection Zone (SPZ) 1 i.e. 50-day travel time, minimum radius 50 m. Above a Principal Aquifer. Land determined by the Local Authority under PartIIA of the Environmental Protection Act 1990 to be contaminated. Operational or historic licenced landfills. Land that if disturbed will cause water pollution and permanent harm via surface water and/or groundwater pathways.
	People Industry and Agriculture Criteria	Public and private water supply (PWS) abstractions, land in PWS Zone of Contribution (ZoC), land vulnerable to erosion (particularly coastal and estuarine areas), ground source heat pumps. Essential infrastructure and highly vulnerable land uses31. Agricultural land Grades 1 & 2. Licenced commercial, private and recreational fisheries. Designated bathing waters. Abstractions for PWS supplying more than 20 m^3/day for human consumption and/or serves more than 100 people. Land that if flooded would affect more than 100 residential, commercial and/or industrial properties[32]. Land within a zone of significant active coastal erosion.
	Ecology Criteria	Designated sites such as Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites, protected species. Habitats recognised nationally and internationally for their biodiversity and/or being good examples of their type.
	Mineral Extraction Criteria	Any mineral extraction or construction activity that involves consented off-site discharge and/or requires sub-water table water level controls.

Receptor Sensitivity / Value	Receptor	Examples of Sensitivity Classes based on Table 8.3 with Criteria Included
High	**Resilience Criteria**	Receptor is approaching capacity and once reached will permanently change due to development. Shift in baseline conditions due to development will be ≥ 10%.
	Water Criteria	Regionally significant water body or regionally significant attribute of a water body. Designated water protection zones, providing a high quality yield of water and important baseflow (dry weather flow) to surface water bodies. Nitrate Sensitive Areas and Nutrient Neutrality Zones are included. Watercourses with a Q_{95} flow ≤ 1 m^3/s. Flood Zone 2. Groundwater Source Protection Zone (SPZ) 2 i.e. 400-day travel time, minimum radius 250-500 m. Above a Principal Aquifer. Land where pollutants are present within soils due to previous use. Operational or historic licensed landfills. Land that if disturbed, will cause water pollution and permanent harm via surface water and/or groundwater pathways.
	People Industry and Agriculture Criteria	Public and private water supply (PWS) abstractions, land in PWS Zone of Contribution (ZoC), land vulnerable to erosion (particularly coastal and estuarine areas), ground source heat pumps. Highly vulnerable land uses31. Agricultural land downgrading towards or at Sub-Grade 3a. Private and recreational fisheries. Popular bathing water. Abstractions for PWS supplying more than 20 m^3/day for human consumption and/or serves more than 50 people. Land that if flooded would affect between 11 and 100 residential, commercial and/or industrial properties. Land within or adjacent to a zone of significant active coastal erosion.
	Ecology Criteria	Site of Special Scientific Interest (SSSI) and protected species. Habitats recognised locally and regionally for their biodiversity and/or being good examples of their type.
	Mineral Extraction Criteria	Any mineral extraction or construction activity that involves managing water from one location to another within a defined boundary via infiltration features (e.g. sumps, infiltration ditches and infiltration ponds) and requires water level controls.
Moderate	**Resilience Criteria**	Receptor is approaching capacity and once reached will temporarily change due to development. Shift in baseline conditions due to development will be ≥ 10%.

Receptor Sensitivity / Value	Receptor	Examples of Sensitivity Classes based on Table 8.3 with Criteria Included
	Water Criteria	Locally significant water body or locally significant attribute of a water body. Providing an important yield of water and baseflow (dry weather flow) to surface water bodies. Watercourses with a Q_{95} flow ≤ 0.1 m^3/s. Flood Zone 2. Groundwater Catchment Source Protection Zone (SPZ) 3. Above a Principal Aquifer. Land where pollutants are present within soils due to previous use. Small unlicenced landfills and spoil heaps, infilled borrow pits, waste disposal areas within historic sites. Land that if disturbed, will cause water pollution and temporary harm via surface water and/or groundwater pathways.
	People, Industry & Agriculture Criteria	Public and private water supply (PWS) abstractions, land in PWS Zone of Contribution (ZoC), ground source heat pumps. More vulnerable land uses[31]. Unclassified amenity and recreational water use. Abstractions for PWS supplying less than 20 m^3/day for human consumption and/or serves less than 50 people. Abstractions for agricultural use. Land that if flooded would affect 10 or fewer residential, commercial and/or industrial properties. Recreational private fishing.
	Ecology Criteria	Local Nature Reserve (LNR) and/or Site of Nature Conservation Interest (SNCI). Habitats recognised locally for their biodiversity.
	Mineral Extraction Criteria	Any mineral extraction or construction activity that involves managing water from one location to another within a defined boundary via infiltration features (e.g. sumps, infiltration ditches and infiltration ponds).
Low	**Resilience Criteria**	Receptor is largely unaffected by development, fluctuations in condition largely unaffected. Shift in baseline conditions due to development will be < 10%.
	Water Criteria	Unclassified water body or unclassified attributes of water body. Low yield of water and baseflow (dry weather flow) to surface water bodies and private water supplies only (no public water supplies). No permanent baseflow. Surface water sewers. Flood Zone 1. Above a Secondary Aquifer. No known land quality concerns or by reason of previous land use, no reason to indicate land quality concerns.

Receptor Sensitivity / Value	Receptor	Examples of Sensitivity Classes based on Table 8.3 with Criteria Included
	People, Industry & Agriculture	No public and private water supply (PWS) abstractions or ground source heat pumps. Water compatible land use, functional flood plain. Less vulnerable development[31].
	Ecology Criteria	No sites of designated ecological interests.
	Mineral Extraction Criteria	Mineral extraction and construction work above water table. Surface water drainage alone is adequate.

** Impacts that would occur in the absence of effective hydrological intervention / mitigation measures OR in light of embedded mitigation within the Project Design and/or applied as good practice during construction as part of a Construction and Environmental Management Plan (CEMP). The above impacts are independent of mitigation measures that may or may not be in place.*

Table 8.5 Magnitude Classification

Magnitude	Nature of change	Examples of Magnitude based on Table 8.3 with Criteria Included
Major	Adverse: loss of an attribute and/or significant decrease in the quality and integrity of an attribute Beneficial: creation of new attribute	**Resilience Criteria:** Adverse: the degree of change due to the project, significantly exceeds the present day natural variability within the receptor. E.g. variability in flow rates, storage volumes, water levels, water quality parameters (e.g. diurnal, lunar, seasonal, annual). Beneficial: the degree of change due to the project, restores the desired natural variability within the receptor. E.g. variability in flow rates, storage volumes, water levels, water quality parameters (e.g. diurnal, lunar, seasonal, annual). **Water Criteria:** Adverse: significant loss of flood storage; increase in peak flood level[33] (> 100 mm)**Error! Bookmark not defined.**; significant reduction in groundwater recharge to a Principal Aquifer; frequent and significant exceedance of water quality standards. Beneficial: creation of new additional flood storage; decrease in peak flood level33 (> 100 mm)**Error! Bookmark not defined.**; increase in groundwater recharge to a Principal Aquifer (e.g. SuDs or Artificial Storage and Recovery); regular compliance with water quality standards. **People, Industry and Agriculture**: Adverse: loss of a water supply (surface water or groundwater) (public or private) due to upstream abstraction or pollution; loss of agricultural land Grade 1 (Excellent) or Grade 2 (Good); loss of commercial fishery. Beneficial: sustainable introduction of a water supply (surface water or groundwater) (public or private); increase in agricultural land quality to Grade 1 (Excellent) or Grade 2 (Good); potential for new commercial fisheries. **Ecology Criteria**: Adverse: loss or significant derogation (including significant reduction in biodiversity) to designated sites such as SAC, SPA and Ramsar sites and/or to protected species population(s); significant decrease in WFD surface water ecological or chemical status or significant increase in time to achieve WFD 'Good' status; significant decrease in WFD groundwater qualitative or quantitative status or significant increase in time to achieve WFD 'Good' status. Beneficial: significant improvement in the nature and extent of qualifying criteria at SAC, SPA and Ramsar sites and/or of protected species population(s); significant increase in WFD surface water ecological or chemical status or significant decrease in time to achieve WFD 'Good' status; significant increase in WFD groundwater qualitative or quantitative status or significant decrease in time to achieve WFD 'Good' status. **Mineral Extraction Criteria**: Adverse: present day and/or future opportunities for mineral extraction are lost or significantly compromised (re: Local Authority Mineral Plans). Beneficial: present day and/or future opportunities for mineral extraction are created or significantly enhanced (re: Local Authority Mineral Plans).

Magnitude	Nature of change	Examples of Magnitude based on Table 8.3 with Criteria Included
Moderate	Adverse: partial loss of an attribute and/or a decrease in quality and integrity of an attribute Beneficial: significant improvement to an attribute and/or a significant increase in quality and integrity of an attribute	**Resilience Criteria:** Adverse: the degree of change due to the project, exceeds the present day natural variability within the receptor. E.g. variability in flow rates, storage volumes, water levels, water quality parameters (e.g. diurnal, lunar, seasonal, annual). Beneficial: the degree of change due to the project, improves upon the desired natural variability within the receptor. E.g. variability in flow rates, storage volumes, water levels, water quality parameters (e.g. diurnal, lunar, seasonal, annual). **Water Criteria:** Adverse: loss of flood storage; increase in peak flood level*33 (> 50 mm); reduction in groundwater recharge to a Principal Aquifer; exceedance of water quality standards. Beneficial: extension of existing flood storage; decrease in peak flood level*33 (> 50 mm); increase in groundwater recharge (e.g. SuDs); no requirement for routine water quality monitoring. **People, Industry and Agriculture**: Adverse: intermittent loss of a water supply (surface water or groundwater) (public or private) due to upstream abstraction; loss of agricultural land Grade 2 (Good); reduction in size or productivity of a commercial fishery. Beneficial: sustainable introduction of a water supply (surface water or groundwater) (public or private); increase in agricultural land quality to Grade 2 (Good); sustainable increase in size or productivity of commercial fishery. **Ecology Criteria**: Adverse: derogation (including reduction in biodiversity) to designated sites such as SAC, SPA and Ramsar sites and/or to protected species population(s); decrease in WFD surface water ecological or chemical status or increase in time to achieve WFD 'Good' status; decrease in WFD groundwater qualitative or quantitative status or increase in time to achieve WFD 'Good' status. Beneficial: improvement in the nature and extent of qualifying criteria at SAC, SPA and Ramsar sites and/or of protected species population(s); increase in WFD surface water ecological or chemical status or decrease in time to achieve WFD 'Good' status; increase in WFD groundwater qualitative or quantitative status or decrease in time to achieve WFD 'Good' status. **Mineral Extraction Criteria**: Adverse: present day and/or future opportunities for mineral extraction are compromised (re: Local Authority Mineral Plans). Beneficial: present day and/or future opportunities for mineral extraction are enhanced (re: Local Authority Mineral Plans).

Magnitude	Nature of change	Examples of Magnitude based on Table 8.3 with Criteria Included
Minor	Adverse: temporary loss of an attribute and/or a temporary decrease in quality and integrity of an attribute Beneficial: temporary improvement to an attribute and/or a temporary increase in quality and integrity of an attribute	**Resilience Criteria:** Adverse: the degree of change due to the project, occasionally exceeds the present day natural variability within the receptor. E.g. variability in flow rates, storage volumes, water levels, water quality parameters (e.g. diurnal, lunar, seasonal, annual). Beneficial: the degree of change due to the project, is within the desired natural variability of the receptor. E.g. variability in flow rates, storage volumes, water levels, water quality parameters (e.g. diurnal, lunar, seasonal, annual). **Water Criteria:** Adverse: flood storage unchanged; increase in peak flood level*,33 (> 10 mm); reduction in groundwater recharge to a Secondary Aquifer; occasional exceedance of water quality standards. Beneficial: flood storage unchanged; decrease in peak flood level*,33 (> 10 mm); potential increase in groundwater recharge (e.g. SuDs); water quality not relevant. **People, Industry and Agriculture**: Adverse: variable private water supply (surface water or groundwater) due to upstream abstraction; some loss of agricultural land Grade 2 (Good); reduced private or recreational fishing. Beneficial: reliable maintenance of private water supply (surface water or groundwater); increase in agricultural land quality to Grade 2 (Good); enhanced private or recreational fishing. **Ecology Criteria**: Adverse: derogation (including reduction in biodiversity) to designated sites such as SSSIs and/or to protected species population(s); potential for decrease in WFD surface water ecological or chemical status or potential for increase in time to achieve WFD 'Good' status; potential for decrease in WFD groundwater qualitative or quantitative status or potential increase in time to achieve WFD 'Good' status. Beneficial: improvement in the nature and extent of qualifying criteria at SSSIs and/or of protected species population(s); potential for increase in WFD surface water ecological or chemical status or potential for decrease in time to achieve WFD 'Good' status; potential for increase in WFD groundwater qualitative or quantitative status or potential decrease in time to achieve WFD 'Good' status. **Mineral Extraction Criteria**: Adverse: present day and/or future opportunities for mineral extraction are unaffected (refer to Local Authority Mineral Plans). Beneficial: present day and/or future opportunities for mineral extraction are unaffected (refer to Local Authority Mineral Plans).

Magnitude	Nature of change	Examples of Magnitude based on Table 8.3 with Criteria Included
Negligible	No measurable change to an attribute (i.e. any variability is within natural range) or its quality or integrity (adverse or beneficial)	**Resilience Criteria:** Adverse: the degree of change due to the project, does not exceed the present day natural variability within the receptor. E.g. variability in flow rates, storage volumes, water levels, water quality parameters (e.g. diurnal, lunar, seasonal, annual). Beneficial: the degree of change due to the project, is indistinguishable from the desired natural variability of the receptor. E.g. variability in flow rates, storage volumes, water levels, water quality parameters (e.g. diurnal, lunar, seasonal, annual). **Water Criteria:** Adverse: flood storage unchanged; increase in peak flood level*,33 (≤ 10 mm); no measurable reduction in groundwater recharge to a Secondary Aquifer; water quality not relevant. Beneficial: flood storage unchanged; decrease in peak flood level*,33 (≤ 10 mm); potential increase in groundwater recharge (e.g. SuDs); water quality not relevant. **People, Industry and Agriculture**: Adverse: no measurable change in private water supply (surface water or groundwater) due to upstream abstraction; no measurable loss of agricultural land quality; no change in private or recreational fishing. Beneficial: reliable maintenance of private water supply (surface water or groundwater); no change in agricultural land quality; no change in private or recreational fishing. **Ecology Criteria**: Adverse: no derogation (including no reduction in biodiversity) to Local Nature Reserves (LNR) or Sites of Nature Conservation Interest (SNCI); no decrease in WFD surface water ecological or chemical status or no potential for increase in time to achieve WFD 'Good' status; no potential for decrease in WFD groundwater qualitative or quantitative status or no potential increase in time to achieve WFD 'Good' status. Beneficial: small improvement in the nature and extent of qualifying criteria at LNR and/or SNCI; maintenance of WFD surface water ecological or chemical status or time to achieve WFD 'Good' status; maintenance of WFD groundwater qualitative or quantitative status or time to achieve WFD 'Good' status. **Mineral Extraction Criteria**: Adverse: present day and/or future opportunities for mineral extraction are unaffected (refer to Local Authority Mineral Plans). Beneficial: present day and/or future opportunities for mineral extraction are unaffected (refer to Local Authority Mineral Plans).

8.4 Assumptions and Limitations

8.4.1 The assessment has been undertaken using desk-based information. The assessment is therefore reliant on third party data which is assumed to be correct.

8.4.2 This Preliminary Environmental Impact Report (PEIR) provides preliminary information based on the design of the Scheme to date and the data gathered at this point in time. Some of the information gathered will be supplemented and provided in full and final form within the Environmental Statement (ES).

8.4.3 The PEIR is intended to inform statutory consultation responses. A more detailed assessment of the identified direct effects and potential indirect effects on identified sensitive receptors will be undertaken at the ES stage, drawing on the further assessment work of other disciplines.

8.4.4 Information gaps at the PEIR stage will be addressed as part of the ES. More specific mitigation measures will also be considered at the ES stage.

8.4.5 It is assumed that flood level data associated with fluvial flooding from the Duloe Brook and River Kym is sufficient to form an assessment of flood risk to the Site and that a qualitative assessment of third-party flooding impacts from the Scheme is acceptable, without the requirement for bespoke hydraulic modelling.

8.4.6 Private Water Supply data records have been provided by the relevant Councils; however this is reliant upon registration of supplies.

8.5 Stakeholder Engagement

8.5.1 A number of stakeholders have been consulted to gather baseline data and inform the assessment. The consultees and the reasons for consultation with them is described in the following sections.

Scoping

8.5.2 A Scoping Report was submitted to the Planning Inspectorate (PINS) in October 2023, and a Scoping Opinion was provided by PINS in December 2023, which included responses relating to hydrology and flood risk from consultees including the Environment Agency, Natural England and the Lead Local Flood Authority. These responses have been considered and included, where appropriate, in this chapter, and **Error! Reference source not found.** includes a summary of how this chapter of the PEIR, or else the ES, will respond to each Scoping Opinion comment.

Table 8.6 Response to the Scoping Opinion

ID	Consultee and Date	Topic	Issue Raised	Response/Action Taken
1.01	Planning Inspectorate 08/12/2023	Watercourse Crossings	The ES should identify which watercourses and/ or other features, such as roads, will be crossed and at what locations, with reference to an accompanying figure(s). The ES should describe the types of crossings that are required, their scale and dimensions and the nature of any associated construction works. Where this has not been determined, the ES should base assessments on the worst case scenario and justify why this scenario would lead to the greatest environmental impact. Sufficient details should be provided to inform a robust assessment of LSE on relevant aspects/ matters, including watercourse hydraulics and ecological receptors. Efforts should be made to agree the approach to watercourse and road crossings with the relevant consultation bodies.	A watercourse crossing assessment will be provided as part of the ES submission, which will include a description of the crossing location and a preliminary descriptions of the likely crossing structure employed along with typical section drawings. These will designed to accommodate storm flows of an appropriate return period, based upon a risk review of local receptors. Further details will be provided and agreed post-submission.
1.02	Planning Inspectorate 08/12/2023	Designated sites	**3.3.1 - Response to matters to scope out** - The ES should provide an assessment of the potential water effects of the Proposed Development on designated sites or provide evidence to demonstrate the absence of LSE including agreement with relevant consultation bodies.	Embedded Design and Applied Measures to protect water quality within the Site Boundary to be applied on location, where concerns may first arise. **Section 8.8** and **Section 8.10** discusses potential impacts to designated Sites.
1.03	Planning Inspectorate 08/12/2023	Water quality from increased siltation and pollution events - operation	**3.3.2 - Response to matters to scope out -** The Inspectorate considers that the presence of chemicals and soil disturbance during operation, including maintenance procedures, is unlikely to give rise to significant effects. The ES should explain why the operation of the Proposed Development would not give rise to routine emissions of chemicals (i.e. that panels are effectively inert) or sediment and how emergency releases would be managed within an Operation Environment Management Plan and/ or Soil Management Plan and	**Section 8.8 and Section 8.10** describes reasons for the conclusion that there will be no operational impact upon water quality.

ID	Consultee and Date	Topic	Issue Raised	Response/Action Taken
			Battery Safety Management Plan. The Inspectorate is content to scope this matter out of further assessment on this basis.	
1.04	Planning Inspectorate 08/12/2023	Decommissioning effects	**3.3.3 - Response to matters to scope out -** Provided a DEMP is produced and implemented to manage decommissioning activities and relevant measures are agreed with the Local Planning Authorities, the Inspectorate is content to scope this matter out of further assessment.	A DEMP will be produced prior to construction of the Site.
1.05	Planning Inspectorate 08/12/2023	Construction Compounds	**3.3.4 – Response to matters to scope out -** The Applicant should ensure that an assessment of the potential impacts from construction compounds on water environment receptors is included in the ES. The ES should also explain how the location of construction compounds, including the access, has been considered to reduce potential effects on the water environment and how any mitigation has been secured.	***PEIR Volume 2 Appendix 8-2*** (oSWMP) and the Outline Construction Environmental Management Plan (oCEMP) at ***PEIR Volume 2 Appendix 2-3*** describe measures to mitigate impacts on water quality during the construction phase, including from activities accessing and within the construction compound.
1.06	Planning Inspectorate 08/12/2023	Flood risk	**3.3.5 -** The ES should assess the potential flood risk to and from the Proposed Development and describe suitable mitigation measures and flood resilient construction techniques that will allow the development to remain operational throughout its 40-year lifespan.	An FRA has been provided which outlines flood risk to and from the development in ***PEIR Volume 2 Appendix 8-1***.
1.07	Planning Inspectorate 08/12/2023	Mitigation measures	**3.3.6 -** The Inspectorate notes the proposed use of mitigation measures, namely Sustainable Drainage Systems (SuDS). The design of such mitigation measures should be informed by relevant and up to date climate change allowances for the lifetime of the Proposed Development.	Drainage design criteria has been discussed in the oSWMP (***PEIR Volume 2 Appendix 8-2***) using appropriate climate change allowances according to the expected lifetime of the scheme.
1.08	Planning Inspectorate 08/12/2023	Assessment methodology	**3.3.7 -** The ES should explain how flood risk, drainage and surface water impacts have been identified and the methodology that will be used to determine the significance of effects. Any use of professional judgement to assess significance should be fully justified within the ES.	Methodology is described in **Section 8.3** of this Chapter. This same method is used within the FRA and oSWMP to ascribe

ID	Consultee and Date	Topic	Issue Raised	Response/Action Taken
				significance of effects, repeated here in **Sections 8.8 and 8.10**.
1.09	Planning Inspectorate 08/12/2023	Figures	**3.3.8 -** The Applicant should ensure that all features on the figures are clearly discernible, avoiding the use of coloured boundaries and features that are too similar or overlapping to be differentiated. This issue is particularly evident when reviewing the Water Framework Directive (WFD) river waterbodies and relevant local authority boundaries on Figure 9-1.	Figures using clear colouring are provided within this chapter.
1.10	Planning Inspectorate 08/12/2023	Water resources	**3.3.9 -** The ES should provide details relating to the water supply and demand requirements during the construction and operational phases of the Proposed Development (including in the context of managing BESS fire risk).	Demand requirements are set out in the oCEMP. Supply requirements for BESS fire water is given in ***PEIR Volume 1 Chapter 2***.
1.11	Planning Inspectorate 08/12/2023	Flood Risk	**3.3.10 -** Where relevant, the ES and FRA should differentiate between Flood Zones 3a and 3b in order to determine which parts of the site are located in areas considered as 'high probability of flooding' and 'functional floodplain'. The ES should include a figure to illustrate the extent of Flood Zones 3a and 3b.	Development is sited outside of Flood Zone 3 so no differentiation between Flood Zones 3a and 3b is required.
1.12	Environment Agency 28/11/2023	Fluvial flood risk scope	As shown in Table 2 of the Planning Practice Guidance (PPG) for flood risk and coastal change, development classified as Essential Infrastructure under Annex 3 of the National Planning Policy Framework (NPPF) is only appropriate in these areas if the exception test is passed alongside the sequential test.	Development has been sited outside of any fluvial flood zones, according to the latest flood maps (see Flood Risk Assessment (FRA) in ***PEIR Volume 2 Appendix 8-1***)
1.13	Environment Agency 28/11/2023	Fluvial flood risk scope	For the Flood Risk Assessment (FRA) we expect the applicant to ensure the flood risk impacts to and from the development are considered throughout all stages of construction. It is noted within the Scoping Report that there will be temporary roadways and storage of materials, so it will be necessary to ensure there is no loss of flood storage resulting from any temporary works, regardless of how long they are needed for.	A FRA is provided **in *PEIR Volume 2 Appendix 8-1*** which considers all forms of potential flood risk to the site. Both operationally and during the construction phase, no stockpiling of materials will occur in the fluvial floodplain.

ID	Consultee and Date	Topic	Issue Raised	Response/Action Taken
1.14	Environment Agency 28/11/2023	Fluvial flood risk scope	For the operation stage, if the solar panels are located within Flood Zone 3 there is the potential for a slight reduction in flood storage volume 2 due to the displacement of water by panels and any associated infrastructure/tracks. Therefore, the FRA should: - Demonstrate that development within the floodplain of the 1% annual exceedance probability (AEP) plus climate change has been avoided where possible - Ensure no increase in flood risk resulting from the proposed development There should be no net loss of floodplain storage and any deflection or construction of flood flow route should be safely managed within the site. Mitigation measures should make as much use as possible of natural flood management techniques. - Demonstrate how the site will remain operational during times of flooding - Consider how site users, e.g. staff needed for operational or maintenance, will be kept safe from any identified flood hazards and any damage minimised	All development of critical infrastructure has been sited outside of both Flood Zones 2 and 3 so there is no loss of floodplain storage as a result of the development. The FRA (***PEIR Volume 2 Appendix 8-1***) demonstrates how the Site will remain safe during the operational phase.
1.15	Environment Agency 28/11/2023	Water Resources	If dewatering is required, it will require an abstraction licence if it doesn't meet the criteria for exemption in The Water Abstraction and Impounding (Exemptions) Regulations 2017. It may also require a discharge permit if it falls outside of our regulatory position statement for de-watering discharges.	Dewatering is not anticipated as part of the construction or operation stage of this project (foundations expected to be uniformly shallow or piled). Should this however be required, all licencing will be obtained as necessary.
1.16	Historic England 28/11/2023	Groundwater Levels	The potential impact of the proposed Scheme on local groundwater levels should be considered. If waterlogged organic archaeological and paleoenvironmental remains are present on the site, any changes to the groundwater levels may alter the local preservation conditions, which in turn may lead to the degradation and/or loss of any vulnerable remains. The potential for waterlogged organic archaeological and paleoenvironmental remains within these sorts of features would need	Due to the nature of the development (piled foundations for the panels and relatively shallow foundations for other features), there is not expected to be any significant impact to groundwater levels. This is covered in **Section 8.8.**

ID	Consultee and Date	Topic	Issue Raised	Response/Action Taken
			to be established so that the impact of the proposed scheme can be determined and mitigated.	
1.17	Historic England 28/11/2023	Water Quality	The Flood risks, Drainage and Surface water chapter discusses the potential contamination through factors such as chemical spillages/leakages from construction activities or vehicles (Section 9.5.4). Contamination might have an effect on archaeological preservation and recovery and so would need to be assessed.	Potential water quality impacts during construction are discussed in **Section 8.8**. Measures outlined in ***PEIR Volume 2 Appendix 8-2*** (oSWMP) and the oCEMP would avoid impacts to archaeological preservation.
1.18	Bolnhurst & Keysoe Parish Council 28/11/2023	BESS fire water quality risks	It should be noted that there have been several incidents of battery failure in recent years. Should the batteries ignite there is a significant danger from water run off which will most certainly affect crops, wildlife and watercourses. Precise details of what is proposed in terms of these buildings as regards size and shape should be made clear.	Design details are provided in ***PEIR Volume 1 Chapter 2***. Best practice measures are outlined in the oCEMP in the event of a fire to minimise environmental harm. Provisions for capture of battery fire water is reference in ***PEIR Volume 2 Appendix 8-2*** (oSWMP).
1.19	Bolnhurst & Keysoe Parish Council 28/11/2023	Flood Risk	The area detailed as Site C, if covered with solar panels, may well not have the same ability to absorb rainwater as the current agricultural land. This could result in faster run off of water into the River	**Section 8.7** describes the topography and soils within the Site, indicating clayey soils which likely permit minimal infiltration during storm events. The SWMP shows how panels are unlikely to influence runoff rates at the Site, however provides SuDS measures for the developed areas, as a precautionary measure.
1.20	Environment Agency 28/11/2023	Flood risk modelling and data	It is up to the applicant to review the modelling and determine whether it appropriately represents flood risk on a site-specific basis or whether any updates or modifications need to be made to improve its usefulness in informing an FRA. The applicant should also provide	The latest flood model (at the time of drafting June 2024) has been obtained from the EA and has been assessed as being of appropriate

ID	Consultee and Date	Topic	Issue Raised	Response/Action Taken
			evidence of any modelling checks and subsequent updates carried out and document these in the FRA model reporting. It is also worth noting that there is new modelling including some changes to the extents on the River Kym due early in 2024, which we'd expect to be reviewed as part of the FRA.	detail for the purposes of assessing fluvial risk to this Site and to define areas outside of this as appropriate for development (see ***PEIR Volume 2 Appendix 8-1***).
1.21	Environment Agency 28/11/2023	Flood risk modelling and data	Where watercourses have not been modelled, we agree that EA surface water mapping may be a useful gauge of the risk, but the applicant will still need to determine its usefulness and decide whether additional modelling is required, particularly in relation to future flood risk.	See ***PEIR Volume 2 Appendix 8-1*** which assesses the risk from minor watercourses.
1.22	Environment Agency 28/11/2023	Climate Change	We're pleased to see that climate change is considered within the Scoping Report. However, in terms of flood risk, we feel that having separate flood risk and climate change chapters within the EIA creates a disjointed approach to assessing future flood risk and would recommend the flood risk chapter include its own climate change section so that future flood risk is sufficiently considered, with reference to 'Flood Risk Assessment: climate change allowances'. The site falls within the Upper and Bedford Ouse Management Catchment peak river flow allowances. Essential infrastructure in flood zone 3 should use the higher central climate change allowance. Given the 40-year lifespan of the proposed development, we would expect the 30% climate change allowance associated with the 2080s epoch to be assessed, given that the development's life span will fall outside of the 2050s epoch band.	***PEIR Volume 2 Appendix 8-1*** addresses the future impacts of climate change on flood risk to the development. ***PEIR Volume 2 Appendix 8-2*** considers appropriate climate change allowances in terms of surface water runoff.
1.23	Environment Agency 28/11/2023	Proximity to Waterbodies	There is suggestion throughout the Scoping Report that some works may take place near main river channels. Given that Site A lies either side of the Pertenhall Brook, and that the River Kym forms the northern boundary of Site C, we would recommend the flood risk implications associated with the proximity of the development to the main river channels be scoped into the EIA if works are going to be within 20 metres of a main river channel.	Works near to main river channels are limited to access track crossings for the development, which are to be documented within a watercourse crossing assessment (appended to the ES submission). Potential water quality and flood risk impacts relating to this work is outlined in **Section 8.8**.

ID	Consultee and Date	Topic	Issue Raised	Response/Action Taken
1.24	Environment Agency 28/11/2023	Sequential Test	In line with paragraph 161 of the NPPF, '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'.	See response to **1.12** above.
1.25	Environment Agency 28/11/2023	Opportunities	In accordance with paragraph 161 of the NPPF, all plans should make use of opportunities provided by the new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, making use of natural flood management techniques as part of an integrated approach to flood risk management. We believe that Natural Flood Management solutions would be possible and desirable within this area and recommend consideration of options that slow the flow of water and seek to hold water at source rather than exacerbate issues of surface water downstream. Opportunities that link in with Biodiversity Net Gain should be explored.	Landscaping and arboriculture proposals are shown on the Illustrative Environmental Masterplan on ***PEIR Volume 3 Figure 2-2*****,** along with the Outline Landscape and Ecological Management Plan (***PEIR Volume 2 Appendix 2-2***). Proposals for the use of swales and other SuDS features across the developed area are also outlined in the SWMP in ***PEIR Volume 2 Appendix 8-2***.
1.26	Environment Agency 28/11/2023	Flood Risk, Drainage and Surface Water	We note that a scheme or plan for managing any potential fire-water has not been mentioned within the report. As there is a battery storage element to the proposed scheme, with a potential fire risk, we would expect the CEMP to include a fire-water management plan to ensure that the groundwater beneath the site, and controlled waters in general, are not at risk from contamination from any fire-waters and fire-fighting additives.	Measures to store fire water on site are outlined in ***PEIR Volume 1 Chapter 2*** and the process for managing the containment of used fire water is outlined in the oSWMP (***PEIR Volume 2 Appendix 8-2***) and Paragraph **8.8.20.**
1.27	Environment Agency 28/11/2023	Water Resources	If dewatering is required, it will require an abstraction licence if it doesn't meet the criteria for exemption in The Water Abstraction and Impounding (Exemptions) Regulations 2017. It may also require a discharge permit if it falls outside of our regulatory position statement for de-watering discharges.	Dewatering is not anticipated as part of the construction or operation stage of this project (foundations expected to be uniformly shallow or piled). Should this however be required, all licencing will be obtained as necessary.

ID	Consultee and Date	Topic	Issue Raised	Response/Action Taken
1.28	Anglian Water 28/11/2023	Flood Risk, Drainage and Surface Water	We would advise that in accordance with the drainage hierarchy, surface water should first look to be managed by Sustainable Drainage Systems (SuDS). Only if the promoter could demonstrably prove that infiltration rates for example precluded SuDS in a specific location, would Anglian Water consider surface water connections to the public sewer. We consider that SuDS and the potential for rainwater harvesting to serve any non-potable water requirements, should be used at the BESS and East Park Substation compound. Anglian Water would currently resist a provision providing for a surface water connection to the public sewer in the draft DCO Order.	SuDS features have been prescribed according to the oSWMP in ***PEIR Volume 2 Appendix 8-2***. Use of Anglian Water assets to discharge surface water from the site is not proposed.
1.29	Anglian Water 28/11/2023	Water Resources	The site is within the Ruthamford South Water Resource Zone (WRZ) and Ruthamford North WRZ. We note that whilst the scoping considers water environment impacts it does not look at impacts on water resources. As the site is within an area designated by the Environment Agency as 'seriously water stressed' and water may be used in the project construction and operation, this indicates that water resources should be assessed in the EIA. Whilst it is stated that operationally the scheme does not have a significant water demand with water usage being purely for cleaning purposes (pg. 263 and 327) there is no reference to water demands through construction, or if connections to our network are required. The promoter will need to submit a water resources assessment setting out a daily demand for each stage of the project and whether this is for domestic or non-domestic uses. Anglian Water requests that these points are assessed early in the EIA to set out how the project will be supplied with water, its wastewater managed, how water assets serving residents and business will be protected and how design has been altered to reduce the need for new water infrastructure or the diversion of existing assets.	Water requirements during the construction phase will be drawn from a licenced and approved source.
1.30	Staploe Parish Council 27/11/2023	Water Quality, Flood Risk, Drainage and	Water quality from increased siltation should be scoped in during operation as the change in runoff patterns can affect water quality and siltation.	An Outline Surface Water Management Plan (oSWMP) is provided as ***PEIR Volume 2 Appendix 8-2***, which outlines how siltation and runoff will be controlled

ID	Consultee and Date	Topic	Issue Raised	Response/Action Taken
		Water Resources		during the construction and operational phase, accounting for the future impacts of climate change.
1.31	Planning Inspectorate 08/12/2023	Flood Risk	Increases in winter precipitation due to climate change should be scoped in during construction and decommissioning due to mud.	Development is sited outside of Flood Zone 3 so no differentiation between of Zones 3a and 3b is required.
1.32	Cambridgeshire County Council - No Date	Flood Risk and Drainage	The general principle is fine and the recognition of the existing flood risk is noted. However, this will need to be managed and designed out in a way that ensures that the development will not increase flood risk or pose a risk to the proposed scheme. The proposals to manage water through the construction and operation phases is noted in the report. General interception principles should be incorporated in the design of the surface water network, to reduce the risks around any generated overland flows.	FRA and SWMP (***PEIR Volume 2 Appendix 8-1 and 8-2***) have been developed to address flood risk and from the Scheme and describe how runoff will be controlled.
1.33	Bedford Borough Council 28/11/2023	Water Quality	BBC express concern regarding possible soil and groundwater pollution arising from the 40-year operational stage and possible effect on agriculturally arable soils; matter should be assessed (it is noted that mitigation measures to form part of a LEMP condition if consent granted).	Water quality during operation is discussed in **Section 8.8.**
1.34	Historic England 28/11/2023	Groundwater Levels	The potential impact of the proposed Scheme on local groundwater levels should be considered. If waterlogged organic archaeological and paleoenvironmental remains are present on the site, any changes to the groundwater levels may alter the local preservation conditions, which in turn may lead to the degradation and/or loss of any vulnerable remains. The potential for waterlogged organic archaeological and paleoenvironmental remains within these sorts of features would need to be established so that the impact of the proposed scheme can be determined and mitigated.	Due to the nature of the development (piled foundations for the panels and relatively shallow foundations for other features), there is not expected to be any significant impact to groundwater levels. This is covered in **Section 8.8.**

ID	Consultee and Date	Topic	Issue Raised	Response/Action Taken
1.35	Historic England 28/11/2023	Water Quality	The Flood risks, Drainage and Surface water chapter discusses the potential contamination through factors such as chemical spillages/leakages from construction activities or vehicles (Section 9.5.4). Contamination might have an effect on archaeological preservation and recovery and so would need to be assessed.	Potential water quality impacts during construction are discussed in **Section 8.8**. Measures outlined in ***PEIR Volume 2 Appendix 8-2*** (oSWMP) and the oCEMP in ***PEIR Volume 2 Appendix 2-3*** would avoid impacts to archaeological preservation.

The Following Consultees Provided no Comments Relevant to Hydrology, Flood Risk and Drainage:

- Northern Gas (31/10/2023)
- NATS (31/10/2023)
- East Cambridgeshire District Council (03/11/2023)
- North Northamptonshire Council (07/11/2023)
- Bedfordshire and River Ivel Internal Drainage Board (8/11/2023)
- National Grid (14/11/2023)
- National Highways (14/11/2023)
- National Gas Transmission (16/11/2023)
- Forestry Commission (16/11/2023)
- Pertenhall & Swineshead Parish Council (20/11/2023)
- Canals and Rivers Trust – (27/11/2023)
- UK Health and Security Agency (28/11/2023)
- Huntingdonshire District Council (28/11/2023)

8.6 Baseline Conditions

8.6.1 The baseline hydrology, hydrogeology and geology relating to the Scheme have been assessed through a combination of desk-based studies, site walkovers, surveys and consultation. The future baseline is also discussed. This describes the likely future baseline conditions based on likely changes in climate and through future development.

8.6.2 Detailed descriptions of the baseline conditions are reported in the technical appendices to this chapter. These comprise:

- ***PEIR Volume 2 Appendix 8-1***: Flood Risk Assessment (FRA);
- ***PEIR Volume 2 Appendix 8-2***: Outline Surface Water Management Plan (oSWMP); and
- ***PEIR Volume 2 Appendix 8-3***: Preliminary Water Framework Directive Assessment (WFD).

8.6.3 A Watercourse Crossings Assessment will be provided as an appendix to the ES chapter. Following receipt of further information on local unregistered private water supplies, a private water supply risk assessment may also be provided, dependent upon a review of supply locations.

8.6.4 This section summarises the key findings of the Appendices and carries them forward to the impact assessment reported in Section 8.8.

Study Area

8.6.5 The Site extends to approximately 769ha and for ease of reference has been subdivided into East Park Sites A to D in which all the proposed above ground infrastructure as part of the operational scheme will be located, see ***PEIR Volume 3 Figure 1-2***.

8.6.6 Impacts upon water quality will be considered on a catchment basis. The watercourses draining the Site are presented in ***PEIR Volume 3 Figure 8-1***.

8.6.7 Flood risk will be considered within the Site and to third parties outside of the Site using flood modelling results provided by the Environment Agency (EA). Information on flood risk is provided by EA models and online mapping. (see ***PEIR Volume 2 Appendix 8-1*** for more detailed summary of model data).

Desk Study

8.6.8 The data sources used to complete the baseline assessment are listed in Table 8.7 below.

Table 8.7 Sources of Information

Topic	Source of Information
Topography	OS Terrain 50 contour mapping[34] 1m LiDAR[35]
Local Mapped Features	OS 1:25000 raster mapping[36] OS MasterMap[37]
Designated Nature and Conservation Sites	DEFRA Magic Maps[38]
Hydrogeology- Bedrock and Superficial Deposits	British Geological Survey (BGS) 1:50,000 Web Map Services online mapping[39]
Hydrogeology- Soils	Cranfield Soil and Agrifood Institute Soilscapes map[40.]
Flood Risk	EA Long term flood risk maps[41]
Water Quality	The Ouse Upper and Bedford Management Catchment Summary[42]
Water Resources	Data requests to the Environment Agency, Huntingdonshire and Bedfordshire Councils.

Surveys

8.6.9 A site walkover survey to ground truth the baseline data relating to hydrological aspects is planned to take place before submission of the ES. This will also include a review of proposed watercourse crossing locations.

8.6.10 The baseline conditions for the Scheme at the time of issuing this PEIR chapter (i.e. July 2024) are presented below:

Topography, Soils and Land Use

Topography

8.6.11 Topographically the Site is relatively flat, gently sloping in a north-easterly direction, as shown in ***PEIR Volume 3 Figure 8-7***, towards the Pertenhall Brook and the River Kym. There is a local topographic high within the west of Site (within Site A) near to the town of Riseley, with elevations exceeding 75m AOD.

Bedrock Geology

8.6.12 As shown on ***PEIR Volume 3 Figure 8-5***, Oxford Clay underlies the entirety of the Site and outcrops at or near to the ground surface over much of the site area.

Superficial Geology

8.6.13 BGS mapping of superficial geology shows a diversity of sedimentary deposits. This includes terrace deposits of sand and gravel near to the River Kym, covering the northern areas of East Park Site A, B and C. The southern areas of East Park Site B and D and the grid connection to Eaton Socon Substation are located on diamicton outcrop. Online mapping indicates no peat is present at the Site. The BGS superficial deposits mapping for the Site is shown in ***PEIR Volume 3 Figure 8-6***.

Land Use and Designated Sites

8.6.14 The Site is located within arable farmland.

8.6.15 There are no statutory nature conservation designations within the site boundary (see ***PEIR Volume 3 Figure 8-8***). The closest is the Swineshead Wood Site of Special Scientific Interest (SSSI) some 950m north-west of East Park Site A, located on the north side of the Pertenhall Brook, and at a higher elevation than the Site.

8.6.16 Perry Woods SSSI is located circa 1.8km north of East Park Site C, significantly above the level of the River Kym (at least 12m above) and on the opposite side of the watercourse from the Site boundary.

8.6.17 Grafham Water SSSI is located circa 2.8km north of East Park Site C. This is within the Diddington Brook catchment area (and so is north of the watershed of the River Kym catchment).

8.6.18 Little Paxton Wood SSSI is located 1.6km to the east of Site D. It is to the north of the River Kym and land elevations within this site are at least 10m above the watercourse at this location, on the opposite river bank to the Scheme.

8.6.19 Little Paxton Pits Nature Reserve is located 4km to the east of Site D. The Pits are hydraulically connected to the River Great Ouse, though this is some significant distance downstream of the Site.

Surface Hydrology, Site Drainage and Flooding

Surface Hydrology and Site Drainage

8.6.20 The Site is located to the west of St. Neots and sits within the wider catchment of the River Great Ouse. Several tributaries drain the Site, including the Pertenhall Brook, Duloe Brook, South Brook and the River Kym (see ***PEIR Volume 3 Figure 8-1***).

Flood Risks

8.6.21 The Environment Agency (EA) fluvial flood map is shown in ***PEIR Volume 3 Figure 8-2***. The Pertenhall Brook intersects Site A to the north, however the area around the river channel is relatively steep in this region, such that the flood plain is relatively constrained, with only a small land area affected by Flood Zones 2 and 3. The Keysoe Brook and one other minor watercourse (tributary of the Pertenhall Brook) pass through Site B, flowing south to north. These have very small flood extents, covering only a small fraction of the Site area. The floodplain for the River Kym is relatively more extensive near to Site

C, however this land parcel is offset from this watercourse to the north and the floodplain on the northern bank is far larger than to the south. Only the northern periphery of Site C is thus affected by fluvial flooding, which again only constitutes a small fraction of the total land area. The grid connection crosses the Duloe Brook at one location, with flood extents at this location being confined to a 10m corridor.

8.6.22 A detailed assessment of the fluvial flood risks was carried out using the existing 1D/2D Lower Ouse River Kym Catchment Model received from the EA in January 2024. The model data confirmed the fluvial flood risks to sections of the Site and that the critical infrastructure is located outside Flood Zones 2 and 3, see ***PEIR Volume 3 Figure 8-3***.

8.6.23 There exist many drainage channels within the Site which do not have a catchment large enough to be captured within the fluvial mapping. The flood risk from these is therefore captured by the EA surface water flood maps (pluvial flood maps), which indicate large areas of the Site are expected to experience surface water flooding. It is noted that due to the relatively flat topography at the Site, flood extents from the channels are relatively extensive for events down to the 1 in 30yr return period, see ***PEIR Volume 3 Figure 8-4***.

8.6.24 A review of the EA reservoir flood risk map shows the area is not at risk of reservoir flooding.

8.6.25 A review of available BGS Borehole Records[43] and the bedrock geology of the Site indicate the risk of groundwater flooding is low across the Site.

Geology and Hydrogeology

Bedrock geology

8.6.26 Bedrock geological mapping provided by the British Geological Survey (BGS) for the Site indicates it is underlain entirely by the Oxford Clay Formation as shown in ***PEIR Volume 3 Figure 8-5***.

Hydrogeology

8.6.27 BGS hydrogeological mapping suggests no significant groundwater aquifers are present at the Site (a product of clay bedrock underlying the Site).

Water Quality and Water Use

Water Quality

8.6.28 The area lies within the Ouse Upper and Bedford Management Catchment (within the Anglian River Basin District). Within this, the Site straddles four river water body catchments. The water bodies and their Cycle 3 WFD status are outlined below:

- The Kym waterbody catchment covers East Park Site C and much of East Park Site B and D. It has a moderate ecological status, though failed in chemical indicators in 2019 (due to polybrominated diphenyl ethers).
- The Duloe Brook straddles the upper section of the grid connection and southern area of East Park Site D. It has a moderate ecological status, though failed in chemical indicators in 2019 (due to perfluorooctane sulphonate and polybrominated diphenyl ethers).
- The Pertenhall Brook covers East Park Site A and much of Site B. It has a moderate ecological status, though failed in chemical indicators in 2019 (due to polybrominated diphenyl ethers).
- The Colmworth Brook covers the southern tip of the grid connection at the Eaton Socon Substation and has been assigned a moderate ecological status, though failed in chemical indicators in 2019 (due to polybrominated diphenyl ethers).

8.6.29 These tributaries ultimately drain to the Ouse (Roxton to Earith) WFD waterbody (ID: GB105033047921) to the east of the Site.

8.6.30 The area lies within a Nitrate Vulnerable Zone (Great Ouse and Huntingdon River Gravels), which is an area designated as being at risk from agricultural nitrate pollution.

Water Resources

8.6.31 The Site Boundary is outside of any Source Protection Zones (designated as such under the Water Framework Directive). It is however within a Drinking Water Safeguard Zone, which is a wider designation that is given to the contributing catchments of Drinking Water Protected Areas, where these are at risk of failing drinking water protection objectives. These include a surface water safeguard zone for the River Great Ouse (Roxton to Earith), which includes the Site area and is associated with an abstraction from the River Great Ouse at Offord, which is approximately 7km north-east of the Site boundary (downstream in the River Great Ouse catchment). The reason for being 'at risk' is because of total pesticides and individual pesticides (such as metaldehyde, propyzamide, carbetamide and quinmerac), as a result of agricultural activities within the contributing catchment. The Scheme will have no impact on such risks as there will be no use of pesticides within the Site.

8.6.32 Several small farmhouses have been identified close to and within the Site, which may be using private water supplies. Private water supplies abstracting less than 20 m^3/day do not require an abstraction licence and are regulated by local authorities. Contact has been made with Huntingdonshire and Bedford Councils to obtain private water supply (PWS) data records. Bedfordshire responded on the 20th September 2023 confirming three properties with a PWS within the given search radius of the Site. Huntingdonshire responded on the 18th September 2023 to confirm no properties within their area. The PWS records provided by Bedfordshire Council have been assessed for likely impact from the development in Section 8.8, based on potential contamination pathways from the Site.

8.6.33 Information on licenced water abstractions was given by the Environment Agency in July 2024 within a 5km radius of the Site. This data showed there to be a number of licenced surface water abstractions near to and downstream of watercourses within the Site boundary (see ***PEIR Volume 3 Figure 8-9***). The abstractions downstream of the Site were all licenced for either spray irrigation (agricultural use) or electricity generation (hydropower).

Future Baseline

8.6.34 The climate is likely to become more variable, with observed historical and predicted future changes in global climate. In general terms, climate change will lead to more intense and extreme rainfall events. This will increase flows in rivers whilst more extreme periods of dry weather will reduce low flows. The area is largely within Flood Zone 1, with areas of Flood Zones 2 and 3 along the northern boundaries, it is possible that these areas will become prone to more frequent and severe flooding events. Critical infrastructure is to be located outside Flood Zones 2 and 3. Consideration to the impact of climate change on flood risk to the Site is detailed in ***PEIR Volume 2 Appendix 8-1*** (Flood Risk Assessment). Allowances have been made for climate change impacts on rainfall, runoff and water management as detailed in the oSWMP (***PEIR Volume 2 Appendix 8-2***). Periods of dry weather or drought will also be likely to increase, however, water requirements during operation of the Scheme are minor.

Baseline Summary and Sensitivity

8.6.35 Table 8 provides a preliminary summary of the sensitivity of baseline features within the Site. The sensitivity of the features within the baseline are based upon the criteria presented in Table 8.4.

Table 8.8 Baseline Sensitivity

Receptor	Sensitivity	Criteria Applied
Surface Water		
River Kym (WFD Waterbody objectives) Colmworth Brook (WFD Waterbody objectives) Duloe Brook (WFD Waterbody objectives) Pertenhall Brook (WFD Waterbody objectives)	Moderate	Regionally significant water bodies. Designated water protection zones, providing a high quality yield of water and important baseflow (dry weather flow) to surface water bodies.
Streams and drainage ditches	Moderate	Streams and ditches across the Site considered cumulatively, contribute an important baseflow to the River Kym, which is a WFD Waterbody.
Designated Sites		

Receptor	Sensitivity	Criteria Applied
Grafham Water SSSI Little Paxton Wood SSSI Perry Woods SSSI Swineshead Wood SSSI	High	SSSIs and protected species. Habitats recognised locally and regionally for their biodiversity and/or being good examples of their type.
Little Paxton Pits LNR	Moderate	Local nature reserve. Habitats recognised locally for their biodiversity.
Groundwater		
Kellaways and Oxford Clay (Rocks with essentially no groundwater)	Low	Geology formation with low to no groundwater yield.
NVZ (Great Ouse and Huntingdon River Gravels)	High	Area at risk of nitrate pollution.
Water Supplies		
Unlicensed Private water supplies (where present and deemed to be at risk)	Moderate	Private water supply (PWS) abstractions, each supplying less than 20 m^3/day for human consumption and/or serving less than 50 people.
Licensed Private Water Supplies (Spray irrigation for agricultural use)	Moderate	Abstractions for agricultural use.
Public Water Supplies (Offord abstraction)	Very High	Public water supply abstractions.
Flood Risk		
Residential properties	Moderate	Relatively rural land up and downstream of the Site on the Pertenhall Brook, with only individual properties (rather than clusters) within the existing 1000yr flood extent. Dwellings designated 'more vulnerable' according to NPPF.

8.7 Design, Embedded Mitigation and Enhancement Measures

Design

Illustrative Environmental Masterplan

8.7.1 The Illustrative Environmental Masterplan accompanying this PEIR is provided on ***PEIR Volume 3 Figure 2-2*** and illustrates the likely Scheme

masterplan along with environmental constraints and illustrative landscape proposals.

8.7.2 The Illustrative Environmental Masterplan on ***PEIR Volume 3 Figure 2-2*** is annotated to set out the purpose of the proposals to meet the design objectives and mitigate for the impacts of the Scheme, these include:

- Siting of all infrastructure outside of Fluvial Flood Zones 2 and 3;
- Retention of ditches and watercourses across the Site; and
- Enhancement of waterside meadows along the Pertenhall Brook and a brook through Site B by creating riparian woodland blocks, meadows, hedgerows and intermittent riparian tree groups for ecosystem benefits, habitat connectivity, and to reduce visual impact on public rights of way alongside watercourses.

Embedded Mitigation

8.7.3 The design of the project (embedded mitigation) has involved an iterative process between the engineering and environmental teams, to ensure that potential impacts upon the baseline environment have been avoided or minimised wherever possible (prior to considering mitigation). Where significant effects are still likely, further mitigation, in addition to embedded mitigation, is applied in the form of best practice in accordance with the regulations and relevant guidance. The embedded mitigation measures within the design of the Development are presented below.

8.7.4 A buffer has been set at a minimum of 8m around field ditches and watercourses across the Site in order to protect the water environment during construction and operation.

Flood Risk

8.7.5 The current, pre-development, risk of flooding across the site is predominantly low, with areas of flood risk limited to areas close by watercourses, as detailed in ***PEIR Volume 2 Appendix 8-1***. The construction of the East Park

Substation and Battery Energy Storage System (BESS) will increase impermeable area during operation. The overall increase in impermeable area, relative to catchment areas, will however be small and the impact on flood risk due to new hardstanding would be negligible. Panels will be designed to be set above the pluvial flood level. SuDS features have been incorporated into the design to control surface water runoff from these features to greenfield rates. The oSWMP (***PEIR Volume 2 Appendix 8-2***) details the principles of runoff control for the Scheme. Similarly, perimeter SuDS features around solar arrays have been outlined, as has drainage alongside access tracks.

8.7.6 Temporary land take areas (construction compound with car parking, temporary storage areas, welfare facilities etc.) will be fully reinstated following the construction period to reduce areas of semi-impermeable surfaces. Temporary land take areas will be re-graded with soil to a natural profile (where required) and re-vegetated.

8.7.7 Design of watercourse crossings will be discussed within a watercourse crossings assessment, which will be appended to the Hydrology and Flood Risk ES Chapter. The cross-sectional area of crossings (whether culverts or open-span structures) will be sized according to appropriately modelled storm flows for the upstream catchments, selected based upon the vulnerability of potential receptors.

Water Quality, Control of Pollution and Emergency Response

8.7.8 The potential impact on the water quality of the sub catchments draining the construction area, will be mitigated through the implementation of the oSWMP presented in ***PEIR Volume 2 Appendix 8-2***. The oSWMP includes sections dealing with pollution prevention measures, water quality monitoring and procedures in the event of an accidental spillage.

Enhancement

8.7.9 As outlined in Paragraph 8.6.30, the Site is currently situated in a Nitrate Vulnerable Zone. Transition from current agricultural land practices (which may involve use of fertilisers and therefore nitrate loading to waterbodies) would potentially provide enhancement to local waterbodies.

8.8 Assessment of Likely Significant Effects

Construction Phase

Watercourse Crossings Impacts upon Water Quality and Flood Risk

8.8.1 The construction of track crossings over watercourses has the potential to impact upon flood risk. These crossings include one upgraded crossing over the Pertenhall Brook (Main Watercourse) and several others over more minor watercourses (Ordinary Watercourses) which include a combination of existing, temporary, permanent and upgraded crossings. Full details of these crossings will be provided within a Watercourse Crossing Assessment, as an appendix to the Hydrology and Flood Risk ES Chapter.

8.8.2 Surface water runoff may accumulate around construction work, causing the works to become locally inundated and temporarily risk further disturbance of the surrounding environment. Storage of equipment or materials near to the channel, may serve to reduce conveyance and/or flood plain storage, thereby potentially impacting upon baseline flood risk up or downstream of the works.

8.8.3 As works to construct or upgrade the crossings would take place in contact with watercourses, potential effects in relation to water quality may also occur. Surface water, entrained with elevated sediment load, has the potential to enter the watercourses with very little area to allow overland flow to act as a natural filter. In addition, pollution from accidental spillage/loss of fuels, chemicals or other construction materials from the construction activity could also enter a watercourse.

8.8.4 Construction activity, including mitigation measures, around watercourse crossings has the potential to cause effects that are of **Minor Adverse magnitude**, as defined in Table 8.5. This is by reason of flood risk mitigation measures described in the FRA and oSWMP, temporary exceedance of water quality standards and limited temporary negative impact on progress towards WFD objectives. Local waterbodies are considered to be of **Moderate** sensitivity, using criteria defined in Table 8.4 and presented in Table 8.8 Baseline Sensitivity. The significance of the predicted effects, using Table 8.1, would therefore be **Minor Adverse**. This is not considered to be significant in terms of the EIA regulations. Similarly, local properties are considered to be of **Moderate** sensitivity (Table 8.8 Baseline Sensitivity) and therefore the significance of the predicted effects upon local properties is also **Minor Adverse** (since the magnitude of flood risk arises from the same source). This is also not considered to be significant in terms of the EIA regulations.

General Construction Impacts on Water Quality and Flood Risk

Water Quality

8.8.5 Due to the presence of thick clay soils throughout the Site and no groundwater bodies indicated by hydrogeological mapping, impacts to groundwater bodies are considered to be not significant either during construction or operation. The focus instead is on the management of water quality risks to surface water.

8.8.6 During construction, concerns regarding water quality relate to the potential for impacts to occur through sedimentation and changes to in-stream hydrochemistry. These potential impacts arise from the required ground disturbance during construction, potentially resulting in an increase in sediment supply via the mobilisation of sediment and subsequent wash off into existing streams. This would lead to an increase in in-stream sediment concentrations, as well as dissolved and particulate pollution. The majority of the development involves solar panels, for which the foundations would be

piled, rather than excavated. Only the tracks and substation/BESS along with the construction compounds and cable laying (within solar areas and grid connection) will require excavated areas, thereby reducing the areas where there are likely to be any significant impacts. The accidental spillage of fuel and oils is also a concern due to the consequent risk of pollution to the water environment. SuDS features are considered an embedded part of the scheme and are discussed in ***PEIR Volume 2 Appendix 8-2***. These work to prevent unregulated runoff to watercourses and provide treatment to runoff from working areas.

8.8.7 Construction activity has the potential to cause effects that are of **Moderate Adverse magnitude**, as defined in Table 8.5. This is by reason of disturbed ground, for the limited areas causing temporary exceedance of water quality standards and a temporary / negative impact on progress towards WFD objectives. Local water bodies are considered to be of **Moderate sensitivity**, as described in Table 8.4. The significance of the predicted effects, using Table 8.1 Significance Criteria, would therefore be up to and including **Moderate**. This is considered to be significant in terms of the EIA regulations. Additional measures to reduce the effects of construction activity are discussed in Section 8.9 (by reason of reducing the magnitude of impact to **Minor Adverse**).

Flood Risk

8.8.8 Since all infrastructure (temporary and permanent) apart from the access tracks will be sited in Flood Zone 1, as well as construction activity and associated materials/machinery, the impacts upon fluvial flood risk are likely to be of **Negligible** magnitude relative to the existing level of risk. Flood Zone 1 is considered to be of Negligible sensitivity in terms of flood risk and therefore the significance of the predicted effects, using Table 8.1, would therefore also be **Negligible**. This is considered to be not significant in terms of the EIA regulations.

General Construction Impacts on Water Resources

Unlicensed Private Water Supplies

8.8.9 A data request was made to Huntingdonshire District Council and Bedford Borough Council in September 2023. The three Private Water Supplies identified by Bedford are all sited a large distance from the development, the nearest being over 7km away and all within a different river catchment. Based upon this information, there is considered to be no linkage between construction activities at the Site and these locations and therefore no impact..

Licenced Private Water Abstractions

8.8.10 Licenced water abstractions near to and hydraulically connected to the Site are all associated with agricultural use (spray irrigation) drawn from surface waterbodies. Given these abstractions are drawn from the same surface water bodies, they share the same potential impacts in terms of water quality as described in paragraph 8.8.6 i.e. **Moderate Adverse** magnitude.. Licenced abstractions of this nature (for agricultural use) are considered to be of **Moderate** sensitivity, as described in Table 8.4. In the absence of mitigation, the significance of the predicted effects, using Table 8.1, would therefore be **Moderate**. This is considered to be significant in terms of the EIA regulations. Additional measures to mitigate this potential impact are described in Section 8.9.

Public Water Abstractions

8.8.11 The public water abstraction at Offord is a considerable distance downstream in the Great Ouse catchment from the Site, as discussed in Paragraph 8.6.31. By reason of the proposed embedded and applied mitigation measures and the benefit that this distance from the Site provides, in terms of attenuation of any residual constituents, the potential impact upon this receptor is considered to be **Negligible**. Public Water Supply abstractions are considered to be of **Very High** sensitivity, as described in Table 8.4. However since the impact is Negligible, the significance of the predicted effects, using

Table 8.1, would also be **Negligible**. This is considered not to be significant in terms of the EIA regulations.

Designated Sites

8.8.12 As summarised in paragraphs 8.6.14 to 8.6.19, there are no designated sites hydraulically connected to the Site boundary and for this reason there are considered to be no impacts to these from the Scheme.

Operational Phase

Flood Risk

8.8.13 Watercourse crossings are to be sized based upon estimated storm flows for the upstream catchments, which will be agreed with the consenting authority based upon an assessment of potential receptors in the context of flood risk (in the event of surcharge of the structure). Watercourse crossings are by definition, in close proximity to watercourses, therefore they are considered to be of **Moderate** sensitivity. The magnitude of risk due to the Scheme will be no greater than naturally already exists at each location and will be taken into account as part of their design, and is therefore considered **Negligible**, the effect of crossings upon flood risk will therefore be **Negligible**. This is considered not to be significant in terms of the EIA regulations.

8.8.14 All other above-ground infrastructure has been designed to be within Flood Zone 1, i.e. to stand outside of the 1 in 1000yr fluvial flood extents and therefore will have no additional impact in terms of fluvial flood risk. Internal tracks will be constructed at grade and solar panels will be designed to sit above the highest pluvial flood levels. The magnitude of impact upon flood risk, during operation of all other above ground infrastructure, is therefore **Negligible** and the sensitivity of receptors in Flood Zone 1 are (as per construction) considered to be **Moderate**. The effect on flood risk due to operation of the Scheme is therefore considered to be **Negligible** in accordance with Table 8.1 Significance Criteria. This is considered not to be significant in terms of the EIA regulations

8.8.15 There will be an increase in impermeable areas during operation from the East Park BESS and Substation units, which could lead to increased runoff rates and volumes. Embedded measures to protect the operational site from flooding include: the provision of attenuation storage with outlet controls around areas of hardstanding, to control and store runoff of surface water during storm events. These measures are included in the preceding assessment.

8.8.16 Further details concerning these measures are provided in the FRA and oSWMP (***PEIR Volume 2 Appendix 8-1 and 8-2***). On the basis of these embedded measures there is not expected to be any change to runoff rates from the Site.

Water Quality

8.8.17 Drainage measures embedded within the design around tracks and hardstanding areas will ensure that natural drainage pathways within the Site are maintained and that new flow pathways will not form (which may otherwise encourage scouring and entrainment of sediment). On this basis, there is expected to be no change on water quality as a result of the Scheme.

8.8.18 During operation of the Site, potential impacts to water quality may arise from the use of water used to douse the BESS in the event of a fire. Chemicals that may arise from the BESS will be controlled and captured in accordance with the oSWMP, preventing them entering the water environment and rendering the magnitude of any impact **Negligible**. Given the sensitivity of the receptors in this case being moderate, the significance of the predicted effects, using Table 8.1, would be Negligible. This is considered not to be significant in terms of the EIA regulations.

8.8.19 There will be movement of vehicles as part of the routine maintenance of the Site during operation, though this will be of a substantially decreased frequency when compared to construction activity. With mitigation, pollutants from accidental spillages of fuel, oil and lubricants will be prevented from entering the water environment and therefore the magnitude of any impact

arising from the use of vehicles on the Site will be **Negligible**. Given the sensitivity of the receptors in this case being **Moderate**, the significance of the predicted effects, using Table 8.1Error! Reference source not found., would be **Negligible**. This is considered not to be significant in terms of the EIA regulations.

Water Resources

Water Usage

8.8.20 The water resource requirements during operation would include storage for battery fire water, water for the periodic washing of solar panels, and welfare facilities at the East Park Substation. Fire water requirements are outlined in ***PEIR Volume 1 Chapter 2***. Water requirements will be met during operation from an appropriately licenced and approved source. Potential impacts will be assessed by the appropriate regulator at that time.

Unlicensed Private Water Supplies

8.8.21 As in Section 8.8.10, there is determined to be no linkage between the Site and the PWS identified in the Council records, therefore there is no change.

Licenced Private Water Abstractions

8.8.22 As discussed in paragraph 8.8.17 there is considered to be a **Negligible** magnitude of impact during the operational phase upon water quality in surface water bodies, from which local abstractions for agricultural use are taken (spray irrigation). Given the sensitivity of the receptors in this case being **Moderate**, the significance of the predicted effects, using Table 8.1Error! Reference source not found., would be **Negligible**. This is considered not to be significant in terms of the EIA regulations.

Public Water Abstractions

8.8.23 The public water abstraction at Offord is a considerable distance downstream in the Great Ouse catchment from the Site, as discussed in Paragraph 8.6.31. By reason of this distance from the Site and therefore dilution factors involved,

there is considered to be negligible impacts upon this receptor. The conversion to solar farm from agricultural land would also remove the potential for pesticides to enter the watercourses from the Site area, which was cited as a reason for the supply being at risk (see paragraph 8.6.31) Public Water Supply abstractions are considered to be of **Very High** sensitivity, as described in Table 8.4. However since the magnitude of potential impacts are **Negligible**, the significance of the predicted effects, using Table 8.1, would also be Negligible. This is considered not to be significant in terms of the EIA regulations.

Decommissioning

8.8.24 Impacts during decommissioning are assumed to be no worse than during construction and are therefore not assessed separately. It is assumed the decommissioning effects of the Scheme would essentially mirror the Construction Phase. An outline Decommissioning Environmental Management Plan has been prepared at PEIR Volume 2 Appendix 2-5, and this will be secured as a requirement of the DCO to be approved by the LPAs prior to decommissioning.

8.9 Additional Mitigation and Monitoring

Construction

Surface Water Management

8.9.1 Measures to protect the construction works and other receptors from flooding during construction are outlined within the oSWMP (***PEIR Volume 2 Appendix 8-2***) and oCEMP. The oSWMP and oCEMP will be included within the Application Documents and appropriate planning conditions regarding measures included within them are anticipated and include:

- Perimeter ditches, silt fencing and hay bales will serve the dual purpose of diverting flood flows to control points, as well as providing a means of filtering out entrained sediment from working areas.

- Crossings will be designed to ensure they would not disconnect the watercourses at times of low flow and would have appropriate flood capacity. The bed profile would remain unchanged to prevent a change in geomorphology at each crossing point.
- At all crossings silt fences and/or hay bales (or similar) will be erected along watercourse banks, adjacent to, upstream and downstream of crossing locations in order to intercept, settle and attenuate sediment entrained runoff during construction and trafficking.
- Other than when constructing watercourse crossings (where short-term storage of materials may be required), stockpiling of materials and machinery during construction will not be carried out within the fluvial floodplain.

8.9.2 In protecting water quality during construction, a number of key activities will be carefully controlled and monitored, as described in the above documentation. In summary these include:

- Control of ground disturbance, both in relation to areas where ground will be disturbed and where stockpiled soils will be managed. Control measures such as perimeter bunds and covering soil stockpiles to limit exposure to rainfall, are commonly applied mitigation measures.
- Control of water levels in excavations for substation, BESS and construction compounds, to ensure the excavations do not fill with water, either by the use of cut-off drains or dewatering (removing free water). Any direct or pumped runoff from the excavation works is likely to contain high sediment concentrations. This potential impact is minimised due to the implementation of buffers around watercourses, and further reduced by control measures to prevent water ingress in the first place and/or measures that encourage high sediment loads to settle and disperse within the construction area.
- Regular monitoring, recording and reporting of stream water quality at key locations to be agreed with EA and as described in the oCEMP.

Operation

Surface Water management

8.9.3 Provisions within the designed drainage system for the Site have reduced flood risks to negligible, as described in paragraphs 8.8.1 to 8.8.4 (construction and decommissioning phases) and paragraphs 8.8.13 to 8.8.16 (operational phase).

8.9.4 In terms of water quality, regular monitoring, recording and reporting of stream water quality at key locations will be agreed with the EA and carried out for a period following construction.

8.9.5 Provisions have been made within the drainage system around the BESS to mitigate the potential adverse effects of battery fire water. These arrangements are detailed within ***PEIR Volume 1 Chapter 2*** and ***PEIR Volume 2 Appendix 8-2***, making use of SuDS features to ensure any fire water is intercepted and directed to an attenuation pond which will employ a cutoff sluice to isolate collected fire water and prevent onward migration to surface water bodies. A Battery Safety Management Plan will be provided prior to construction to further manage contamination risks from this feature.

8.10 Residual Effects

Construction

8.10.1 Residual effects during the Construction Phase are tabulated for each sub-topic in Table 8.9.

8.10.2 Overall accounting for both embedded and applied mitigation measures, there are found to be no residual construction effects above minor level.

Table 8.9 Residual effects during construction

Receptor	Potential Impact	Mitigation	Implementation	Residual Effect
River Kym Colmworth Brook Duloe Brook	Moderate Adverse	Embedded SuDS design to replicate natural drainage pathways and provide appropriate level of treatment	SWMP & CEMP	Minor Adverse

Pertenhall Brook		of runoff at source before entering watercourses.		
Streams and drainage ditches	Moderate Adverse	Embedded mitigation minimises exposure to rivers and streams. Applied measures include temporary flood controls, perimeter ditches, silt fences and hay bales (particularly around watercourse crossings), sizing of watercourse crossings, arch culverts, keep clean and dirty water separate.	SWMP & CEMP	Minor Adverse
Grafham Water SSSI Little Paxton Wood SSSI Perry Woods SSSI Swineshead Wood SSSI	None	Not required. Not hydraulically connected to the Site.	Not Required	None
Little Paxton Pits LNR	None	Not required. Not hydraulically connected to the Site.	Not Required	None
Kellaways and Oxford Clay (Rocks with essentially no groundwater)	None	Not required. No groundwater bodies underlying the Site and capping clay layer.	Not Required	None
NVZ (Great Ouse and Huntingdon River Gravels)	None	Not required. Nitrates not used in solar farm construction activities.	Not Required	None
Private water supplies (unlicensed)	None	Not required. Not hydraulically connected to the Site.	Not Required	None
Private water supplies (licensed)	Moderate Adverse	Embedded mitigation minimises exposure to rivers and streams. Applied measures include temporary flood controls, perimeter ditches, silt fences and hay bales (particularly around watercourse crossings), sizing of watercourse crossings, arch culverts, keep clean and dirty water separate.	SWMP & CEMP	Minor Adverse
Public Water Supplies	Negligible	Not required.	Not Required	Negligible
Residential properties (flood risk)	Moderate Adverse	Embedded SuDS design to replicate natural drainage pathways and provide appropriate level of treatment	SWMP & CEMP	Minor Adverse

		of runoff at source before entering watercourses.		

Operation

8.10.3 Residual effects during the Operational Phase are tabulated for each sub-topic in Table 8.10.

8.10.4 Overall accounting for both embedded and applied mitigation measures, there are found to be no residual operational effects above negligible level.

Table 8.10 Residual effects during operation

Receptor	Potential Impact	Mitigation	Implementation	Residual Effect
River Kym Colmworth Brook Duloe Brook Pertenhall Brook	Moderate	Embedded SuDS design to replicate natural drainage pathways and provide appropriate level of treatment of runoff at source before entering watercourses. Additional assurances for BESS facility in case of contaminated fire water.	SWMP	Negligible
Streams and drainage ditches	Moderate	Embedded SuDS design to replicate natural drainage pathways and provide appropriate level of treatment of runoff at source before entering watercourses. Additional assurances for BESS facility in case of contaminated fire water.	SWMP	Negligible
Grafham Water SSSI Little Paxton Wood SSSI Perry Woods SSSI Swineshead Wood SSSI	None	Not required. Not hydraulically connected to the Site.	Not Required	None
Little Paxton Pits LNR	None	Not required. Not hydraulically connected to the Site.	Not Required	None
Kellaways and Oxford Clay (Rocks with essentially no groundwater)	None	Not required. No groundwater bodies underlying the Site and capping clay layer.	Not Required	None

NVZ (Great Ouse and Huntingdon River Gravels)	None	Not required. Not hydraulically connected to the Site.	Not Required	None
Private water supplies (unlicensed)	No change	Not required. Not hydraulically connected to the Site.	Not Required	None
Private water supplies (licensed)	Negligible	Embedded SuDS design to replicate natural drainage pathways and provide appropriate level of treatment of runoff at source before entering watercourses. Additional assurances for BESS facility in case of contaminated fire water.	SWMP	Negligible
Public water supplies	Negligible	Not required.	Not Required	Negligible
Residential properties (flood risk)	No change	Embedded SuDS design to replicate natural drainage pathways	SWMP	None

8.11 Conclusion

8.11.1 This chapter has considered the following:

- Water quality changes to watercourses draining the Site Area
- Water quality changes to Designated Sites that are hydrologically linked to the Site Area
- Water quality changes to groundwater bodies within the Site Area
- Water quality changes to water Supplies within the vicinity of the Site Area
- Altered Flood Risk as a result of the Scheme within the Site Area

8.11.2 Accounting for embedded and additional mitigations, it has been assessed that there would be no significant effects during either the construction, operational or decommissioning stages of the project.

Further Work

8.11.3 This chapter presents preliminary environmental information on the assessment of the Scheme's impacts on Hydrology and Flood Risk. Further

assessment will be completed prior to submission of the application for development consent, and will include:

- Cumulative assessment of any proposed or permitted development in the area around the Site;
- Modelling may be required to confirm flood depths and extents to ensure that the solar panels are placed above the predicted surface water flood levels;
- A Watercourse Crossing Assessment will be completed to assess the proposed locations for track crossings and to review the most appropriate crossing types; and
- Following receipt of further information on local unregistered private water supplies, a private water supply risk assessment may also be provided, dependent upon a review of supply locations.

8.12 References

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