POWER FOR GOOD

Steeple Renewables Project

Chapter 8: Hydrology, Hydrogeology, Flood Risk and Drainage

Environmental Statement – Volume 1

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Chapter 8: Hydrology, Hydrogeology, Flood Risk and Drainage

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8.1 Introduction

8.1.1 This chapter presents an assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning phases of the Proposed Development in the context of the surface water and groundwater environment. It should be read in conjunction with the following figures **[EN010163/APP/6.4.8]:**

- **Figure 8.1 Watercourses;**
- **Figure 8.2 Environment Agency Flood Zones;**
- **Figure 8.3 Environment Agency Surface Water Flood Extents; and**
- **Figure 8.4 Groundwater and Surface Water Abstractions.**

8.1.2 This assessment has considered potential impacts in relation to:

- Hydrology including Main Rivers and Ordinary Watercourses;
- Surface water and groundwater quality, including consideration of the Water Framework Directive (WFD);
- Hydrogeology, including impacts on groundwater abstractions and Groundwater Dependant Terrestrial Ecosystems (GWDTEs);
- Water resources with regard to water usage; and
- Flood risk from all sources.

8.1.3 Impacts on aquatic flora and fauna, including the potential effects related to the release of pollution and sediment to watercourses and the impact of culverting of watercourses on habitats and species, are addressed in **Chapter 7 Ecology and Biodiversity [EN010163/APP/6.2.7]**.

8.1.4 A **Flood Risk Assessment (FRA) Appendix 8.1 [EN010163/APP/6.3.8]** has been prepared in consultation with the Environment Agency (EA), Nottinghamshire County Council in their role as Lead Local Flood Authority (LLFA), Trent Valley Internal Drainage Board (IDB), the Canal and River Trust (CRT) and Severn Trent Water (water authority). The FRA assesses the risk of flooding to and from the Proposed Development from all potential sources, taking into account climate

change over the lifetime of the Proposed Development and the vulnerability of the proposed use. It details the mitigation measures proposed to mitigate the flood risk to the Proposed Development and the measures taken to ensure there is no associated increase in flood risk off-site. The **FRA** is appended as **Appendix 8.1 [EN010163/APP/6.3.8].**

8.1.5 A Surface Water Drainage Strategy has been prepared in consultation with the EA, the LLFA and Trent Valley IDB. It describes proposals for the management of surface water runoff from the Proposed Development, detailing the proposed measures to control both the quantity and quality of runoff. The **Surface Water Drainage Strategy** is appended as **Appendix 8.2 [EN010163/APP/6.3.8].**

8.1.6 A WFD assessment has been prepared to establish whether the Proposed Development could result in detriment or benefit to the achievement of WFD objectives as set out within the local River Basin Management Plan (RBMP). It considers whether the WFD status of surface water or groundwater bodies could be reduced as a result of the Proposed Development. The **WFD Assessment** is included as **Appendix 8.3 [EN010163/APP/6.3.8].**

8.1.7 This assessment includes an appraisal of the effects of the Proposed Development in combination with other developments within the zone of influence of the Proposed Development and an assessment of in-combination effects.

8.1.8 Details of the lead author of this Chapter are set out in **Appendix 1.4 - EIA Statement of Competence [EN010163/APP/6.3.1].**

8.2 Legislation and Planning Policy

Legislation

8.2.1 Key national legislation of relevance to the water environment is set out below.

The Environment Act 2021

8.2.2 The Environment Act 2021 includes laws that relate to environmental protection including nature protection, water quality and clean air. It offers new powers to set new binding targets, including for air quality, water, biodiversity, and waste reduction.

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

8.2.3 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 implemented the Water Framework Directive 2000/60/EC. The Regulations were retained in UK law after EU Exit via the EU Withdrawal Act 2018. They aim to achieve good qualitative and quantitative health for water bodies by reducing and removing pollution and by ensuring that there is enough water to support wildlife at the same time as human needs. The WFD requires a 6-yearly cycle of river basin management, with the next comprehensive update of classifications for all water bodies due in 2025. England aims to reach 'good' chemical and ecological status in inland and coastal waters by 2027 at the latest.

Environmental Permitting (England and Wales) Regulations 2016

8.2.4 The Environmental Permitting (England and Wales) Regulations 2016 establish a permitting structure for those activities which have the potential to cause harm to human health or the environment. Environmental permits are required from the EA for certain industrial and waste installations, as well as for the discharge or abstraction of surface water or groundwater, and for activities on or near a Main River or flood defence that could have flood risk impacts.

Nitrate Pollution Prevention Regulations 2015

8.2.5 These Regulations allow for the designation of land as nitrate vulnerable zones and impose annual limits on the amount of nitrogen from organic manure that may be applied to a crop in a nitrate vulnerable zone.

Flood and Water Management Act 2010

8.2.6 The Flood and Water Management Act 2010 aims to improve flood risk management in England and Wales and ensures that flood risk responsibilities are better defined. It encourages more sustainable forms of drainage in new developments and allows for the creation of LLFAs who have responsibilities for co-ordinating the management of flood risk from local sources.

Flood Risk Regulations 2009

8.2.7 The Flood Risk Regulations 2009 implement the EU Floods Directive 2007/60/EC. The Regulations require the LLFAs to prepare Preliminary Flood Risk Assessments, flood hazard and flood maps, and Flood Risk Management Plans.

The Groundwater (England and Wales) Regulations 2009

8.2.8 These regulations make it an offence to cause or knowingly permit the discharge of hazardous substances or non-hazardous pollutants to groundwater unless carried out in accordance with a permit granted by the EA under these regulations.

Control of Pollution (Oil Storage) (England) Regulations 2001

8.2.9 These regulations make requirements for the safe above ground storage of oil, including requirements for secondary containment and drip trays. Further obligations relate to pipework, fittings and pumps serving fixed and mobile oil bowsers.

Water Resources Act 1991

8.2.10 The Water Resources Act 1991 focuses on the management of water resources, water quality and flood defence. The Act includes a definition of 'Main Rivers' and requires prior written EA consent for any works or structures in, over, under or within 8m of any watercourse designated as a Main River.

Land Drainage Act 1991

8.2.11 The Land Drainage Act 1991 sets out the responsibilities of Local Authorities and Drainage Boards in relation to land drainage. It requires that a watercourse is maintained by its owner in such a condition that the free flow of water is not impeded.

Water Industry Act 1991

8.2.12 This Act sets out the main powers and duties of the water and sewerage companies. The Water Act 2003 and the Water Act 2024 have modified the framework set out under the Water Industry Act 1991, including making changes to abstraction licensing, enabling greater competition within the water industry and making provisions relating to flood insurance and drainage boards.

National Policy

National Policy Statements

8.2.13 The National Policy Statements (NPS) comprise the Government's objectives for the development of nationally significant infrastructure in a particular sector and state. The NPSs of relevance to the project with specific reference to water-related requirements are as follows.

Overarching NPS for Energy (NPS EN-1)

8.2.14 In relation to flood risk, this NPS sets out the requirements for the application of the Sequential and Exception Tests (paragraphs 5.89 to 5.8.10 and paragraphs 5.8.21 to 5.8.23), as well as a sequential approach within the application boundary (paragraph 5.8.29). It describes policy aims to make development safe for its lifetime without increasing flood risk elsewhere (taking account of climate change) and, where possible, reducing flood risk overall (paragraph 5.8.36). Specifically, there should be no net loss of floodplain storage and any deflection or constriction of flood flow routes should be safely managed within the site (paragraph 5.8.12). The NPS sets out the minimum requirements for FRAs (paragraph 5.8.15).

8.2.15 In relation to climate change, paragraph 4.10.11 of this NPS states that *"applicants should demonstrate that proposals have a high level of climate resilience built-in from the outset and should also demonstrate how proposals can be adapted over their predicted lifetimes to remain resilient to a credible maximum climate change scenario".* However, it goes on to state in paragraph 4.10.12 that the credible maximum climate change scenario should be applied *"where energy infrastructure has safety critical elements"*. The NPS advises that the resilience of the Proposed Development to climate change should be assessed in the EIA, for example, the impact of increased risk of drought as a result of higher temperatures should be covered in the water quality and resources section of the EIA.

8.2.16 In relation to water quality and resources, paragraph 5.16.3 of the NPS states that "*where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment, and how this might change due to the impact of climate change on rainfall patterns and consequently water availability across the water environment*". It sets out how existing water resources, and impacts on those resources, should be described within the EIA (paragraph 5.16.7).

8.2.17 The requirements of NPS EN-1 relating to flood risk are addressed within **Appendix 8.1 FRA [EN010163/APP/6.3.8]** and within a separate **Sequential and Exception Test assessment [EN010163/APP/7.5**]. The FRA describes the measures taken to ensure the Proposed Development will be safe without increasing flood risk elsewhere. The applicable climate change allowances are considered within the FRA. The potential impacts of the Proposed Development on water quality and

water resources, taking account of climate change, are considered within Section 8.7 of this ES.

NPS for Renewable Energy Infrastructure (NPS EN-3)

8.2.18 Paragraph 2.10.84 of this NPS states that an FRA "*will need to consider the impact of drainage, but that as solar PV panels will drain to the existing ground, the impact will not, in general, be significant*". Paragraph 2.10.85 states that permeable access tracks should be used, as well as localised sustainable drainage systems (SuDS) such as swales and infiltration trenches, to control any runoff where recommended.

8.2.19 Paragraph 2.10.86 of the NPS states that "*sites should be configured or selected to avoid the need to impact on existing drainage systems and watercourses*". Paragraphs 2.10.87 to 2.10.88 state that culverting existing watercourses or drainage ditches should be avoided but where culverting is necessary for access, "*applicants should demonstrate that no reasonable alternatives exist and where necessary will only be in place for the construction period*".

8.2.20 Paragraph 2.10.154 of the NPS states that "*where previous management of the site has involved intensive agricultural practice, solar sites can deliver significant ecosystem services value in the form of drainage, flood attenuation, natural wetland habitat, and water quality management*".

8.2.21 The **Surface Water Drainage Strategy, Appendix 8.2 [EN010163/APP/6.3.8]** assesses the impacts of the Proposed Development on drainage. It describes how permeable access tracks are proposed, and SuDS are used within the Proposed Development to control runoff. The **FRA, Appendix 8.1 [EN010163/APP/6.3.8**] describes how consideration has been given to existing watercourses in the layout of the Proposed Development, with appropriate easements provided for these watercourses and culverting used only where necessary for access.

NPS for Electricity Networks Infrastructure (NPS EN-5)

8.2.22 In relation to climate change, paragraph 2.3.2 of this NPS requires applicants to set out how development has been designed to be resilient to flooding, "*particularly for substations that are vital to the network, and especially in light of changes to groundwater levels as a result of climate change*". Paragraph 2.9.19 of the NPS states that applicants should protect as far as reasonably practicable surface and ground waters.

8.2.23 Although the proposed substation is not considered vital to the network, the **FRA, Appendix 8.1 [EN010163/APP/6.3.8]** demonstrates the resilience of the Proposed Development to the effects of climate change in relation to all forms of flooding. This ES describes how surface water and groundwater resources will be protected through the use of suitable mitigation.

Local Policy

Bassetlaw Local Plan

8.2.24 The Bassetlaw Local Plan was adopted on the 29th May 2024. It contains the following key policies of relevance to this chapter:

- Policy ST50: Flood Risk and Drainage - requires developments to be supported by a FRA which demonstrates that the development will be safe for its lifetime, without increasing flood risk elsewhere and where possible will reduce flood risk overall. Where relevant, proposals must pass the Sequential Test and where appropriate the Exceptions Test. All development where practicable should incorporate SuDS in line with national standards; and
- Policy ST51: Protecting Water Quality and Management - seeks to "*minimise the impact of development on the quality of surface water and the Sherwood Sandstone Principal Aquifer and its ground source protection zones. Surface water flows from areas like car parks or service yards should have appropriate pollution prevention measures built in to protect groundwater and watercourses from pollutants. Proposals that improve or enhance existing waterbodies will be supported. All proposals must ensure that appropriate infrastructure for water supply, sewerage and sewage treatment, is available or can be made available at the right time to meet the needs of the development*".

8.3 Assessment Methodology

8.3.1 The following key stages of assessment have been undertaken as part of the ES:

- Identifying the hydrological, hydrogeological and flood risk baseline for the Site;
- Assessing the potential effect of the Proposed Development on the identified baseline environment;

- Proposing suitable mitigation for the reduction of any significant effects;
- Presenting the predicted residual effects; and
- Identifying any cumulative and in-combination effects.

8.3.2 The zone of influence for impacts on surface water and groundwater is considered to be 1km due to the significant reduction in magnitude of impacts beyond this distance due to dilution / dispersion of contaminants and deposition of silts. Similarly for flood risk, significant effects are unlikely to be observed more than 1km from the cause of increased risk, due to the effect of floodwater spreading out across a flood envelope, with the impacts quickly reducing in magnitude towards the edge of the flood extent. This approach is consistent with the advice in the Department of Transport's Design Manual for Roads and Bridges which states "*for assessment of impacts associated with soluble pollutants, outfalls within 1km (measured along the watercourse) shall be aggregated for purposes of cumulative assessment*" (paragraph 3.11, document LA113[1]). This is a generalised approach, however more specific assessment of potential pathways may indicate a much-reduced zone of influence, for example when considering areas up-gradient of the Site, within separate hydrological catchments, or from a hydrogeological perspective when located on low permeability geology.

8.3.3 The baseline assessment includes a review of the following data:

- EA flood mapping datasets, including fluvial / tidal Flood Map for Planning, Surface Water Flood Risk mapping and Reservoir flood risk mapping;
- Ordnance Survey (OS) mapping;
- Defra's Catchment Data Explorer platform;
- British Geological Survey (BGS) mapping of geology and hydrogeology;
- Defra's MAGIC maps;
- Modelled flood data from the EA (fluvial / tidal sources);
- Mapping and data relating to surface water flood risk, reservoir flood risk, groundwater flood risk and other sources of flooding from the LLFA and IDB;
- Details of any historical flood events obtained from the EA, LLFA and IDB;

[1] Highways England, Design Manual for Roads and Bridges, LA113: road drainage and the water environment, March 2020

- Details of nearby surface water abstractions (public and private) obtained from the EA, the LLFA and a third party data provider (contained within the **Phase 1 Geoenvironmental Desk Study Report – Appendix 2.2) [EN010163/APP/6.3.2];** and
- Local Authority Surface Water Management Plan and Strategic Flood Risk Assessment.

8.3.4 A targeted visual inspection of key hydrological features was undertaken in July 2024 focussing on the main watercourses within the study area, existing flood defences, areas where historical flooding has been reported and locations with infrastructure proposed within the flood zones.

8.3.5 An FRA has been undertaken and is included as **Appendix 8.1 [EN010163/APP/6.3.8].** The FRA has been prepared in accordance with the requirements of the relevant NPSs. The FRA includes a review of the above data sources, an assessment of the flood risk to the Proposed Development from all flooding sources (including consideration of climate change), and identification of any mitigation measures required to ensure the Proposed Development will be safe, will remain operational during a design flood event, and will not result in an increase in flood risk elsewhere.

8.3.6 Following consultation with the EA, the FRA includes consideration of a breach of the flood defences, an assessment of the flood risk from the Ordinary Watercourses crossing the Site (these watercourses are not included in the EA flood models) and a high-level assessment of any displacement of floodwater resulting from development within the Flood Zones.

8.3.7 **A Surface Water Drainage Strategy, Appendix 8.2 [EN010163/APP/6.3.8]** has also been prepared, demonstrating how surface water runoff from the Proposed Development will be managed through the use of SuDS, following the drainage hierarchy and including measures to ensure the no detriment in the quality of surface water runoff leaving the Site. The Surface Water Drainage Strategy has been prepared in accordance with Defra's National Standards for Sustainable Drainage Systems[2] and the NPSs.

8.3.8 Assessing the environmental impacts of an NSIP requires consideration of how a site was selected for development and how any alternatives to the Proposed

[2] Defra, National Standards for Sustainable Drainage Systems, December 2011

Development were reviewed. National policy on NSIPs also requires an explanation of alternatives considered when a proposal involves development of a site in a flood zone. These are both processes that continue through the life of an application culminating in a final body of assessment material upon which a recommendation is made by the Examining Authority and a decision is made by the Secretary of State. This ES demonstrates how a wide range of factors, including flood risk, were considered by the Applicant in identifying a site for development and then how through an iterative design process the Proposed Development has been formulated and assessment made of how the likely significant impacts, including on site flood risks, can be minimised and mitigated.

8.3.9 The **Sequential and Exception Tests [EN010163/APP/7.5]** have been undertaken in accordance with NPS EN-1. The full assessment of the flood risk Sequential and Exception Tests can be found in the submitted **Sequential Test [EN010163/APP/7.5].** This document concludes that there are no reasonably available sites at a lower risk of flooding that would be suitable for the Proposed Development, when considering wider sustainable development objectives. It describes how the Proposed Development will be made safe for its lifetime, whilst providing a reduction in flood risk overall, and demonstrates the wider sustainability benefits of the Proposed Development.

8.3.10 A WFD Assessment has been prepared in consultation with the EA, in accordance with the guidance in Nationally Significant Infrastructure Projects - Advice Note Eighteen: the Water Framework Directive. This is included as **Appendix 8.3 [EN010163/APP/6.3.8].** The **WFD Assessment** identifies any WFD waterbodies (surface water or groundwater) that could be impacted by the Proposed Development and assesses whether any activities associated with the various phases of the Proposed Development could cause a deterioration in status of WFD water bodies or prevent RBMP objectives being met.

8.3.11 Consultation has been undertaken with the EA for details of the modelled flood levels and floodplain extents within the Site, for data regarding flood risk from non-fluvial sources (e.g. surface water, reservoir flooding) and regarding the scope of the FRA and WFD Assessment. The LLFA has been consulted for details of any Ordinary Watercourses within the study area, details of flood risk from surface water and groundwater, details of any historical flood events and records of any surface water abstractions. Trent Valley IDB has been consulted regarding any issues or

constraints associated with the Ordinary Watercourses within their control. Anglian Water has been consulted regarding their assets within the Site and with respect to water usage associated with the Proposed Development. Consultation responses received throughout the EIA process are summarised in Table 8.4.

8.3.12 The assessment of impacts and identification of appropriate mitigation is based on experience of similar projects and professional judgement. Reference is made to the following guidance / best practice:

- Department of Transport's Design Manual for Roads and Bridges Volume 11, Section 3, Part 10[3];
- The CIRIA SuDS Manual C753[4];
- Defra's Non-Statutory National Standards for Sustainable Drainage Systems[5];
- Planning Practice Guidance – Flood Risk and Coastal Change[6];
- EA 'Flood risk assessments: climate change allowances' guidance[7]; and
- EA 'Flood risk assessment: flood zones 1, 2, 3 and 3b' guidance[8];
- EA and Defra 'Oil Storage Regulations for Businesses' guidance[9]; and
- EA Pollution Prevention Guidance Notes[10] (withdrawn from use in 2015 but still considered to contain useful advice on best practice in the absence of any replacement 'good practice' guidance);
- EA Land Contamination Risk Management (LCRM)[11];
- EA Groundwater Protection Position Statements[12]

[3] Department of Transport, Design Manual for Roads and Bridges (available online)
[4] CIRIA, The SuDS Manual (C753), December 2015
[5] Department for Environment, Food and Rural Affairs, Sustainable Drainage Systems – Non-Statutory technical standards for sustainable drainage systems, March 2015
[6] Communities and Local Government, 'Planning Practice Guidance - Flood Risk and Coastal Change, ID 7', published March 2014 and last updated August 2022
[7] Environment Agency, 'Flood risk assessments: climate change allowances', published February 2016 and last updated May 2022
[8] Environment Agency, Flood risk assessment: flood zones 1, 2, 3 and 3b', published May 2024, last updated July 2024
[9] Environment Agency and Defra, 'Oil storage regulations for businesses', published May 2015 and last updated May 2023
[10] Environment Agency, Pollution Prevention Guidance Notes (available online), withdrawn 2015
[11] Environment Agency, Land Contamination Risk Management, October 2020 (available online)
[12] Environment Agency, Groundwater Protection Position Statements, March 2017 (available online)

8.3.13 The assessment of effects assumes that the relevant embedded mitigation and standard good practice measures and any applicable consents / permits are in place before assessing the potential effects of the Proposed Development. The assessment is based on a source-pathway-receptor methodology, where the sensitivity of the receptors and the magnitude of change upon those receptors is identified within the study area. The significance of the likely effects of the Proposed Development has been classified by taking into account the sensitivity of receptors and the magnitude of the effect on them.

8.3.14 Likely significant effects within this chapter pertain to those effects identified as comprising moderate or major significance.

8.3.15 The assessment uses standard criteria to describe the sensitivity/importance of the existing receptor that may be impacted (Table 8.1) and definitions of the magnitude of envisaged effects (Table 8.2). The significance matrix is set out in Table 8.3.

Table 8.1- Sensitivity / importance of the water environment

Receptor Sensitivity / Importance	Description
High	• Area of international designations i.e. Ramsar site, Special Protection Areas (SPAs) and Special Areas of Conservation (SACs). • Area of national and regional importance i.e. Site of Special Scientific Interest (SSSI) and National Nature Reserves (NNR). • A waterbody which is of high or good ecological status and highly sensitive to change. • EA designated Main Rivers. • Areas of high surface water flood risk or critical drainage areas. • EA groundwater Source Protection Zone 1 – inner protection zone and EA defined highly vulnerable Principal Aquifers. • Areas of Flood Zone 3a and 3b (high fluvial flood risk and the functional floodplain). • Water sensitive and 'highly vulnerable' developments in the area. • Local flood defences/flood storage areas/major schemes necessary to protect highly vulnerable development in the area.
Medium	• Non-statutory sites of regional importance designated for water dependent ecosystems. • A waterbody of moderate ecological status and moderately sensitive to change. • EA designated Ordinary Watercourses. • Areas of medium surface water flood risk. • EA Groundwater Source Protection Zone 2 – outer protection zone and EA defined Secondary Aquifers. • Areas of Flood Zone 2 (medium fluvial flood risk). • 'More vulnerable' developments in the area. • Local flood defences/flood storage areas/schemes necessary to protect 'more vulnerable' development in the area.
Low	• Areas of local importance which are not formally designated.

Receptor Sensitivity / Importance	Description
	• A waterbody of poor ecological status with little sensitivity to change. • Minor local drainage networks or land drains. • Areas of low surface water flood risk. • EA groundwater Source Protection Zone 3 – total catchment protection zone and EA defined Unproductive Strata. • Areas of Flood Zone 1 (low fluvial flood risk). • 'Less vulnerable' and 'water compatible' development. • Local embankments for minor drains.
Negligible	• A water resource with little or no interest or value.

8.3.16 Once the sensitivity of the identified receptor has been established, the magnitude of the impact is determined. The nature and characteristics of impacts are described to enable their magnitude to be determined. The nature of the impacts is expressed as:

- Adverse: detrimental or negative impacts on an environmental resource or receptor;
- Beneficial: advantageous or positive impact on an environmental resource or receptor; or
- Neutral: an impact on a resource/receptor of insufficient magnitude to affect the use/integrity.

8.3.17 The magnitude of any identified adverse or beneficial impacts is assessed using the criteria described in Table 8.2.

Table 8.2 – Magnitude of Impact

Magnitude	Definition
High	Total loss or major alteration to key elements of features of the baseline conditions to the extent that post-development character or composition of baseline conditions will be fundamentally changed.

Magnitude	Definition
Medium	Loss or alteration to one or more key elements/features of the baseline conditions to the extent that post-development character or composition of the baseline conditions will be materially changed.
Low	Minor shift away from baseline conditions. Changes arising will be detectable but not material; the underlying character or composition of the baseline conditions will be similar to the pre-development situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation.

8.3.18 Table 8.3 illustrates the Significance of Effect. The shaded boxes indicate effects considered significant in current EIA regulations. Those effects identified as 'Major' or 'Moderate' are considered significant.

Table 8.3 – Significance of Effect

Magnitude	Sensitivity / Importance			
	High	Medium	Low	Negligible
High	Major	Moderate	Minor	Minor
Medium	Moderate	Moderate	Minor	Negligible
Low	Minor	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

8.4 Assessment Assumptions and Limitations

8.4.1 Analysis of flood extents for the River Trent is dependent on the accuracy of the EA Flood Map and the flood model outputs provided by the EA. The EA has confirmed (on 11th December 2024 via email and via the statutory consultation response on 14th March 2025 – see Table 8.4 below) that their modelling represents the best available data and is appropriate to support the assessment of flood risk from the River Trent.

8.5 Stakeholder Engagement

8.5.1 Table 8.4 details the stakeholder engagement undertaken, key points raised and how these have been addressed.

Table 8.4 - Stakeholder engagement

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
Planning Inspectorate **03.06.24 Scoping Opinion**	Potential for drilling fluid break out to impact watercourses noted. ES should include details of location of bridge / culvert structures and include sufficient detail to assess effects on watercourse hydraulics. Impacts on surface water and groundwater resources through abstraction at the construction phase can be scoped out subject to confirmation of the need for and scale of any abstraction. Hydrology impacts on Clarborough Tunnel SSSI can be scoped out if supported by sufficient baseline evidence. Pollutant release to groundwater during construction / decommissioning can be scoped out if evidence (e.g. Phase 1 Contaminated Land Report) is provided showing that there is an absence of contaminated land and no likelihood of any pathway being created. Impact of construction works on groundwater flow can be scoped out, subject to further information being provided in the ES. Impacts on surface water and groundwater resources through abstraction at the operational phase can be scoped out.	The Applicant notes the need to consider the impact of drilling fluid break out on watercourses. This will be addressed in the final CEMP to be secured post-consent (**Appendix 4.1** comprises **Outline CEMP [EN010163/APP/6.3.4]**). The Applicant notes the need to provide details of bridge / culvert structures and to consider the effects on watercourse hydraulics. **Appendix 8.1 FRA [EN010163/APP/6.3.8]** considers the effect on hydrology of watercourses through culvert / bridge creation. The Applicant notes the need for confirmation of abstraction requirements. The need for abstraction during construction and the likely volumes required are discussed in Section 8.7 of this ES. The Applicant notes the need for baseline evidence regarding Clarborough Tunnel SSSI. Evidence in relation to hydrology impacts on Clarborough Tunnel SSSI is detailed in Section 8.7 of this ES. The Applicant notes the need for evidence regarding potential for contaminated land and associated pathways. **Appendix 2.2 Phase 1 Geoenvironmental Desk Study Report [EN010163/APP/6.3.2**] addresses potential pollutant linkages. Potential for release of contaminants to groundwater during construction is discussed in Section 8.7 of this ES. The Applicant notes the need for further evidence regarding the impact of

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
	Impact on groundwater quality during the operational phase can be scoped out. Impact of subsurface structures on groundwater flow can be scoped out, subject to provision of evidence that foundations, piles or underground pipes will not impact on groundwater flow. ES should include assessment of impacts from construction compounds on the water environment and how any mitigation will be secured. ES should consider how the steel poles supporting the solar panels could impact drainage patterns within the Site, in addition to any changes in surface water runoff from the panels. ES should differentiate between Flood Zones 3a and 3b. ES should include assessment of the potential impact of the Proposed Development on WFD waterbodies from construction and decommissioning. ES should clearly define the study area based on the zone of influence, hydrology and potential for significant effects, following consultation with relevant consultation bodies. Design of SuDS to be informed by relevant current climate change	construction works on groundwater flow. The impact of construction works on groundwater flow is discussed in Section 8.7 of this ES. The Applicant acknowledges that PINS have agreed to scope out the impacts of operational phase abstractions on surface water and groundwater. However, further information is provided in Section 8.7 of this ES due to concerns raised by AW and the EA. The Applicant acknowledges that impact on groundwater quality during the operational phase can be scoped out. The Applicant notes the need for further evidence regarding the impact of subsurface structures on groundwater flow. This is discussed in Section 8.7 of this ES. The Applicant notes the need for consideration of the impact of construction compounds on the water environment. This is discussed Section 8.7 in this ES. The Applicant notes the need to consider the impacts of the steel poles supporting the solar panels on drainage patterns and runoff. This is addressed in **Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8]** and Section 8.7 of this ES. The Applicant notes the need to differentiate between Flood Zones 3a and 3b. This is addressed in **Appendix 8.1 FRA [EN010163/APP/6.3.8].**

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
	allowances for the lifetime of the development. ES should assess impacts from trenchless HDD, drilling fluid breakout plan should be submitted. Assessment of floodplain loss and floodplain compensation required, including consideration of solar panel mountings. Any 'essential infrastructure' should be designed to remain operational and safe in times of flood and throughout the lifetime of the development, taking account of climate change. Possibility for enhancement by providing SuDS features to reduce the known risk of flooding in Sturton le Steeple is noted. ES should explain why operational phase would not result in routine emissions of chemicals or sediment and how emergency releases would be managed within an Operation Environment Management Plan (OEMP) and/or Soil Management Plan and Battery Safety Management Plan. Mitigation measures relating to land management should be contained in the OEMP or equivalent plan and the drainage strategy. A Decommissioning Environmental Management Plan (DEMP) should	The Applicant notes the need to assess the impact on WFD waterbodies during construction and decommissioning. This is addressed in **Appendix 8.3 WFD Assessment [EN010163/APP/6.3.8].** The Applicant notes the requirement to clearly define the study area. As described in Section 8.3 of this ES the study area is defined as 1km radius from Order Limits. The Applicant notes that the design of SuDS should take into account relevant climate change allowances for the lifetime of the Proposed Development. This is discussed in **Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8].** The Applicant notes the need to assess impacts from HDD and the requirement for a drilling fluid breakout plan. Impacts from trenchless HDD are discussed in Section 8.7 of this ES and further details will be provided in a drilling fluid breakout plan as part of the final CEMP, secured via DCO requirement. The Applicant notes the need to assess floodplain loss, floodplain compensation and flood mitigation. This is addressed in **Appendix 8.1 FRA EN010163/APP/6.3.8].** The Applicant notes the requirement for Essential Infrastructure to remain operational and safe in times of flood throughout its lifetime. This is demonstrated in **Appendix 8.1 FRA EN010163/APP/6.3.8].**

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
	be produced and implemented to manage decommissioning activities. Design and mitigation measures for flood risk should be agreed with the EA, LLFA and IDB and cross-reference should be made to relevant information in the FRA.	The possibility of providing flood reduction to Sturton le Steeple is discussed in Section 8.7 of this ES, **Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8]** and **Appendix 8.1 FRA [EN010163/APP/6.3.8].** The Applicant notes the need to show how the release of routine emissions and accidental releases will be managed during operational phase. This is detailed in **Appendix 4.4 Outline Operational Management Plan [EN010163/APP/6.3.4], Appendix 15.2 Outline Soil Management Plan [EN010163/APP/6.3.15]** and **Appendix 4.3 Outline Fire Risk Management Plan [EN010163/APP/6.3.4**] and discussed in Section 8.7 of this ES. The Applicant notes the need to consider mitigation through land management. This is discussed in **Appendix 4.4 Outline Operational Management Plan [EN010163/APP/6.3.4]** and **Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8].** The Applicant notes the requirement for a Decommissioning Environmental Management Plan. **Appendix 4.2** contains the **Outline Decommissioning Plan [EN010163/APP/6.3.4]** submitted with application, the final DP version will be secured post-consent. The Applicant notes the need to agree flood mitigation measures with the EA,

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
		LLFA and IDB. Flood mitigation measures have been agreed with these consultees and are detailed in **Appendix 8.1 FRA [EN010163/APP/6.3.8].**
Anglian Water (AW) **03.06.24 Scoping Opinion**	Location and nature of existing water supply infrastructure to be identified and protected. Diversions to be avoided if possible. Need to set out in detail how the project will be supplied with water and if new connections to network required. Consider impacts of climate change on water availability. AW would advise whether new supplies (if required) are feasible. Applicant to submit water resources assessment setting out daily demand and nature of use for each stage of the project. AW would welcome the use of SuDS or rainwater harvesting for non-potable uses (construction and operation). CEMP to include steps to remove risk of damage to AW assets.	The Applicant notes the needs to protect existing infrastructure. The Proposed Development layout takes account of existing infrastructure, no requirements for diversions are anticipated. The Applicant notes the need to identify how the Development will be supplied with water and the impacts of climate change on availability. Section 8.7 of this ES details likely water usage and identifies options for water sources for all stages of Proposed Development. The Applicant acknowledges that AW will advise whether new supplies are feasible. A Pre-Planning Assessment Report (06.05.25) from AW confirms the availability of up to 20m^3 per day via an existing main on Gainsborough Road. The Applicant notes that the use of SuDS or rainwater harvesting would be welcomed. **Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8**] includes the use of SuDS and rainwater harvesting. The Applicant notes the requirement for the CEMP to include steps to remove risk of damage to AW assets. **Appendix 4.1 Outline CEMP [EN010163/APP/6.3.4]** includes measures to avoid damage to AW assets, final CEMP to be secured post-consent.

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
Nottinghamshire Fire and Rescue Service **03.06.24 Scoping Opinion**	Require details of fire suppression system. Calculations for sufficient water supply to be undertaken by competent person taking account of risk and duration of fire. As a minimum, hydrant supplies should be capable of delivering no less than 1,900 litres per minute for at least 2 hours. This may be increased dependent on location of facility and ability of fire and rescue services to bring supplementary supplies in a timely fashion. Storage and management of runoff to be considered. Sites in flood zones to have details of flood protection or mitigation measures.	The Applicant notes the requirement for details of the fire suppression system, supported by calculations. Fire safety arrangements are detailed in **Appendix 4.3 Outline Fire Risk Management Plan [EN010163/APP/6.3.4]**. An allowance has been made within the BESS area for fire water storage, where required, taking account of risk and duration of fire. The Applicant notes the requirement for storage and management of runoff to be considered. This is detailed in **Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8]** (taking account of the possibility of contaminated fire water runoff in the event of a fire). The Applicant notes the requirement for details of flood protection and mitigation measures. These are detailed within **Appendix 8.1 FRA [EN010163/APP/6.3.8]**.
Nottinghamshire County Council **03.06.24 Scoping Opinion**	LLFA support the preparation of an FRA and Surface Water Drainage Strategy for the operation phase and the scoping in of flood risk during the construction phase.	The Applicant notes the LLFA's support for the preparation of an FRA and Surface Water Drainage Strategy. The **FRA** can be found at **Appendix 8.1 [EN010163/APP/6.3.8**], and the **Surface Water Drainage Strategy at Appendix 8.2 [EN010163/APP/6.3.8]**, each appended to this Chapter.
Canal and River Trust (CRT) **03.06.24 Scoping Opinion**	Consideration to be given to any changes in drainage to the River Trent. Consider impact of any increase in discharge to the river / new outfalls on passing boat traffic.	The Applicant notes the requirement for consideration of changes in drainage to the River Trent or the impact of any increase in discharge or new outfalls. Drainage arrangements are detailed in **Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8].** No

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
		increase in runoff or new outfalls are proposed to the River Trent.
Environment Agency National Infrastructure Team **22.07.24** **Meeting (online video conference call)**	The EA was advised that solar infrastructure was proposed within fluvial Flood Zone 3. The EA was in acceptance of this in principle, subject to further details of flood risk assessment and mitigation. The EA requested that sensitive equipment be raised 300mm above the 'design' 1 in 100 year plus climate change flood level and that consideration be given to sensitivity testing for greater climate change and breach flooding scenarios. The EA requested that a high-level assessment is undertaken of the flood risk from the Catchwater Drain and Mother Drain as these are not included in the EA's River Trent flood model. The EA requested a high-level assessment of any displacement of floodwater.	The Applicant notes the requirement for further details of flood risk assessment and mitigation. A full assessment of flood risk and details of flood mitigation are included in **Appendix 8.1 FRA [EN010163/APP/6.3.8].** The Applicant notes the requirement for raising of sensitive equipment above the design flood level and for consideration of sensitivity testing for greater climate change and breach flooding scenarios. Consideration of relevant climate change scenarios and breach events are discussed in **Appendix 8.1 FRA [EN010163/APP/6.3.8].** The Applicant notes the request for a high level assessment of flood risk from Catchwater Drain and Mother Drain. This is included in **Appendix 8.1 FRA [EN010163/APP/6.3.8**]. A 1D hydraulic modelling exercise has been undertaken for these watercourses. The Applicant notes the request for a high level assessment of displacement of floodwater. This is included in **Appendix 8.1 FRA [EN010163/APP/6.3.8].**
Environment Agency National Infrastructure Team **06.08.24**	WFD assessment should include potential impacts to on-site watercourses from e.g. sediment pollution and potential to impact hydrologically linked watercourses. River crossings (bridges, culverts and buried cables) should have	The Applicant notes the requirement for the WFD assessment to assess the impact to on-site and hydrologically linked watercourses. This is addressed in **Appendix 8.3 WFD Assessment [EN010163/APP/6.3.8].** The Applicant notes the requirement for crossings to have geomorphologically

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
Scoping Opinion	geomorphologically robust designs that will have minimal impacts on natural fluvial processes operating in the river / floodplain. Any development on the River Trent or its floodplain should be designed to have minimal impact on natural river dynamics and should not restrict future river restoration projects. Infrastructure developments should take account of the likelihood for increased lateral and vertical river dynamics resulting from continued hydro-climatic intensification (i.e. flood-proofed designs that are not just based on present-day baseline geomorphological configuration / behaviour). The Sequential Test will need to be passed and a Sequential Approach taken within the boundary with critical infrastructure positioned in Flood Zone 1. If solar panels are positioned in Flood Zones 2 / 3, the Exception Test will need to be applied. Built development within the floodplain should be quantified to establish the need for compensatory flood storage. Consideration should be given to the flood risk from the Ordinary Watercourses crossing the Site.	robust designs that will have minimal impact on natural fluvial processes. This is discussed in **Appendix 8.1 FRA [EN010163/APP/6.3.8]** and in Section 8.7 of this ES. The Applicant notes the requirement for the Proposed Development to have minimal impact on natural river dynamics and future river restoration works. Consideration should be given to the likelihood of increased lateral and vertical river dynamics over the lifetime of the Development. This is discussed in **Appendix 8.1 FRA [EN010163/APP/6.3.8]** and in Section 8.7 of this ES. The Applicant notes the requirement for the Sequential Test to be passed and the Sequential Approach to be taken. The Applicant acknowledges that the Exception Test would is required as infrastructure is proposed within Flood Zones 2 and 3. A **Sequential and Exception Test [EN010163/APP/7.5]** has been submitted, and the sequential approach is detailed in **Appendix 8.1 FRA [EN010163/APP/6.3.8]**. The Applicant notes the need to quantify the need for compensatory floodplain storage. Floodplain compensation requirements are assessed within **Appendix 8.1 FRA [EN010163/APP/6.3.8]**. The Applicant notes the requirement for flood risk from Ordinary Watercourses to

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
	A 1 in 100 year fluvial flood event using the 2080s epoch higher central climate change allowance (39%) should be used as the design flood event, with panels and equipment raised 300mm above this level. A Credible Maximum scenario should also be considered, with proposals able to be adapted over their lifetime to this level (62%) climate change. Confirmation required of whether the Site will remain operational and staff will remain on Site during a flood event. Consideration should be given to access and egress during a flood event. The FRA should include a comparison of the published flood zones with the undefended 1 in 100 year and 1 in 1000 year model outputs. Defended scenarios with appropriate climate change allowances can then be used in further detailed assessment. The EA hold records of historical flooding in this location in 1932, 1947, 1977 and 2000. It would be sensible to consider the residual risk to the development in the event of a breach of the Trent embankments. This would not be used as a design scenario but would help to understand the	be assessed. This is included in **Appendix 8.1 FRA [EN010163/APP/6.3.8]**. The Applicant notes the requirement for consideration of appropriate climate change scenarios. This is discussed in **Appendix 8.1 FRA [EN010163/APP/6.3.8]** (subsequent EA consultation via email 11.12.24 (outlined below) confirmed agreement that the 2050s epoch was applicable for the operation phase and that the Credible Maximum climate change scenario did not require assessment). The Applicant notes the requirement for confirmation of whether the Site will remain operational during a flood. **Appendix 8.1 FRA [EN010163/APP/6.3.8]** details that the site will remain operational during a flood and discusses access / egress arrangements. The Applicant notes the requirement to provide a comparison of undefended and defended flooding scenarios. **Appendix 8.1 FRA [EN010163/APP/6.3.8]** considers undefended, defended and breach flooding scenarios. The Applicant notes the historical records of flooding at the Site, these are detailed in **Appendix 8.1 FRA [EN010163/APP/6.3.8].** The Applicant notes the suggestion to consider the breach flooding scenario in relation to the resilience of the Development. The breach flooding

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
	resilience of the development in a breach scenario. Evidence should be provided of historical site uses and the potential for ground contamination. The potential for shallow groundwater beneath the Site is noted. The baseline assessment should include details of private groundwater abstractions. CEMP should include risk assessment for use of drilling muds during HDD and any risk to controlled waters. Drilling fluid breakout plan also required for HDD. Consideration should be given to the impacts on groundwater and surface water from the escape of firewater / foam in the BESS area and the measures required for containing and managing runoff (multiple layers of protection recommended). Consumptive uses of surface water during construction and operation to be scoped into the EIA. There is water available for abstraction in the Lower Trent catchment however access to water may be prevented during low flows.	scenario is discussed in **Appendix 8.1 FRA [EN010163/APP/6.3.8].** The Applicant notes the requirement for evidence of historical site uses and the potential for ground contamination. This is addressed in **Appendix 2.2 Phase 1 Geoenvironmental Desk Study [EN010163/APP/6.3.2].** The Applicant acknowledges the potential for shallow groundwater. The Applicant notes the requirement for details of private abstractions to form part of the baseline. These are included in this ES in Section 8.6. The Applicant notes the requirement for assessment of risks associated with drilling muds during HDD. HDD impacts are detailed in Section 8.7 of this ES, and a drilling fluid breakout plan will be provided in the final CEMP, to be secured via DCO requirement. The Applicant notes the requirement for consideration of impacts of an escape of firewater / foam in the BESS area on controlled waters. Measures for controlling runoff, including fire fighting water, are detailed in **Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8].** The Applicant notes the requirement for water usage during construction and operation to be scoped in. Surface water usage during construction and operation phases is discussed in Section 8.7 of this ES.

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
Sturton le Steeple Parish Council **02.08.24** **Email correspondence**	The Applicant approached the Parish Council to consult it on any records of flooding, proposed drainage improvements in Sturton le Steeple, ownership of watercourses in Sturton le Steeple and abstraction records. A response was not received.	The statutory consultation response (28.02.25) does not include any comments relating to the water environment. Details of abstractions have been provided by the EA and Bassetlaw District Council and are included in Section 8.6 of this ES.
Environment Agency National Infrastructure Team **11.12.24** **Email correspondence**	The EA confirmed that the operation phase falls within the 2050s epoch and therefore the 1 in 100 year plus 23% climate change event (represented conservatively by the 1 in 100 year plus 29% climate change event, in the absence of specific data for the 23% climate change scenario) is an appropriate design flood event. For the decommissioning phase, any works beyond 2070 will require reference and assessment of the Higher Central climate change allowance for the 2080s epoch as a sensitivity test rather than a design event. The EA confirmed that the Credible Maximum climate change scenario did not need to be applied. Breach flood data for Breach Location 29 should be considered with regard to the residual risk to the Proposed Development.	The Applicant concurs that the operation phase falls within the 2050s epoch. **Appendix 8.1 FRA [EN010163/APP/6.3.8]** takes into account the EA's comments regarding appropriate climate change allowances and consideration of the breach flood event.
Anglian Water **11.02.25**	Queried whether appropriate easements provided for Station Road water booster station.	The Applicant notes the need to agree appropriate easements for AW assets. The Station Road water booster station has been taken into consideration in the

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
Meeting (online video conference call)	Further discussions to be held regarding easements and water usage.	proposed layout, nearby works comprise access tracks only. AW consultation is ongoing.
Nottinghamshire County Council Lead Local Flood Authority **13.02.25** **Meeting (online video conference call)**	5m easements for Ordinary Watercourses within LLFA control appear appropriate, but access requirements to be considered. Key requirement for crossings is to maintain existing flows, Land Drainage Consent required post-planning. Culverts acceptable. Potential for development within surface water flood risk areas to deflect flows to be discussed within FRA. Principles of drainage strategy for BESS and Substation agreed. Requested linear drainage features for access track and at lower edge of fields containing solar panels.	The Applicant notes the need for appropriate easements, these have been provided within layout for Ordinary Watercourses and take account of access requirements. The Applicant notes the requirement for flows to be maintained beneath crossings and for Land Drainage Consent to be obtained. All crossings will ensure flow capacity retained as detailed in **Appendix 8.1 FRA [EN010163/APP/6.3.8].** The Applicant notes the need to consider possible deflection of surface water flows. This is discussed within **Appendix 8.1 FRA [EN010163/APP/6.3.8].** The Applicant notes the LLFA's agreement to the principles of the drainage strategy and the request for linear drainage features for access tracks and field edges. **Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8]** describes the proposed drainage strategy and includes linear drainage features for access tracks and at lower edges of fields.
North Leverton Parish Council **03.03.25**	Eastern part of the Site falls within a Drinking Water Protected Area. Information required on how drinking water will be protected. Further information required regarding potential impacts of release of hazardous substances to	The Applicant notes the request for information regarding protection of drinking water and surface water. This is discussed in Section 8.7 of this ES. The Applicant notes the request for assurance regarding impacts on drainage and flood risk. These are discussed within

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
Statutory Consultation	watercourses. Noted that the site visit was undertaken during dry weather, require assurance the build will not cause drainage and flood risks. Considered there was potential for construction works to result in release of chemicals to the ground and underlying aquifers. Notes there could be a loss of land drainage.	**Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8]** and **Appendix 8.1 FRA [EN010163/APP/6.3.8].** The Applicant notes concerns raised regarding the potential for release of chemicals to the ground / groundwater during construction. This is discussed within Section 8.7 of this ES. The Applicant notes concerns raised regarding potential loss of land drainage. This is discussed within Section 8.7 of this ES.
Anglian Water **03.03.25** **Statutory Consultation**	Require information on the interactions of the Scheme with the water booster station on Station Road. Further information regarding source of water to supply Development and any connections required. Further details of proposals for rainwater harvesting / re-use required.	The Applicant notes the requirement for further information on the interactions of the scheme with the water booster station on Station Road. Discussions with AW regarding this point are ongoing, but it is noted that the only proposed infrastructure in the vicinity of the booster station is an existing access track (to be retained). The Applicant notes the requirement for further information regarding water supply and any connections required. Sources of water supply are discussed within Section 8.7 of this ES. A Pre-Planning Assessment Report from AW (06.05.25) confirms the availability of up to 20m^3 per day of water from an existing water main on Gainsborough Road. The Applicant notes the requirement for further details of proposals for rainwater harvesting / re-use. Rainwater harvesting is discussed within **Appendix 8.2 Surface Water Drainage Strategy**

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
		[EN010163/APP/6.3.8] and in Section 8.7 of this ES.
Severn Trent Water **03.03.25** **Statutory Consultation**	Severn Trent Water assets are located within the Site. Appropriate easements should be provided. For sewers up to and including 225mm diameter, a protective strip 6m wide should be placed centrally over the pipe.	The Applicant notes the requirement for appropriate easements for STW assets. Existing sewer assets have been taken into account, with appropriate easements provided.
North and South Wheatley Parish Council **03.03.25** **Statutory Consultation**	Commented that the land is likely to become very hard affecting its ability to absorb water and likely to exacerbate existing flooding in Sturton le Steeple and South Wheatley.	**Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8]** discusses the impact of the Proposed Development on flood risk, including measures to help reduce the flood risk to Sturton le Steeple. It is not considered that the Development will adversely affect the ability of the land to absorb water or cause the ground to become hard.
Canal and River Trust **03.03.25** **Statutory Consultation**	Note that the CRT are the Navigation Authority for the River Trent. They note that the PEIR confirmed no increase in runoff or outfalls to the River Trent.	**Appendix 8.1 FRA [EN010163/APP/6.3.8]** acknowledges role of CRT as Navigation Authority. The Applicant notes CRT has confirmed there is no increase in runoff or outfalls to the River Trent. No further action is required.
Trent Valley Internal Drainage Board **05.03.25** **Meeting (online video conference call)**	Principles of drainage strategy for BESS and Substation agreed. IDB consent required for crossings over IDB assets, any new culverts or bridges to maintain existing flows. All cable crossings beneath IDB assets should be via HDD and will require IDB consent. 9m easements appropriate for IDB watercourses.	The Applicant notes that the IDB have agreed the principles of the drainage strategy and that IDB consent is required for new crossings. **Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8]** includes details of drainage proposals. IDB consent will be sought prior to any works affecting IDB assets. The Applicant notes the requirement for appropriate easements from IDB assets.

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
		9m easements have been observed within the proposed layout.
Environment Agency National Infrastructure Team **14.03.25** **Statutory Consultation**	FRA to include assessment of increase in flood risk due to loss of floodplain storage. Additional modelling and assessment may be required for Ordinary Watercourses. Updated Risk of Flooding from Surface Water mapping to be assessed. Bridges to be designed with soffit levels above the 1 in 100 year plus climate change flood level. Detailed hydraulic modelling is recommended for the Catchwater Drain and is tributaries to assess flood risk to BESS and Substation. Required updates to Phase 1 Geoenvironmental Desk Study, targeted intrusive investigation of soils and groundwater monitoring recommended. Consideration to be given to impact of any cables left in situ post-decommissioning; use of any fluid-filled cables; risk of HDD operations to soil and groundwater; and potential heating of groundwater by HV cables. Risk of firewater runoff to groundwater to be considered in drainage strategy.	The Applicant notes the requirement to consider the potential loss of floodplain storage. This is discussed in **Appendix 8.1 FRA [EN010163/APP/6.3.8].** The Applicant notes that additional assessment of flood risk from Ordinary Watercourses may be required. **Appendix 8.1 FRA [EN010163/APP/6.3.8**] includes 1D hydraulic modelling of the Catchwater Drain, Mother Drain and New Ings Drain. The Applicant notes the requirement to assess the updated Risk of Flooding from Surface Water mapping. This is included in **Appendix 8.1 FRA [EN010163/APP/6.3.8]** (additionally the updated Flood Map for Planning, released 25.03.25, is included in the FRA). The Applicant notes the request for bridges to be designed with soffit levels above the 1 in 100 year plus climate change flood level. The ability of bridges and culverts to convey existing flows is discussed in **Appendix 8.1 FRA [EN010163/APP/6.3.8].** Bridges will be designed in consultation with the relevant authority (LLFA or IDB). The Applicant notes the request for hydraulic modelling of the Catchwater Drain and its tributaries. 1D hydraulic modelling is included within **Appendix 8.1 FRA [EN010163/APP/6.3.8]**. The Applicant notes requirements to update the Phase 1 Geoenvironmental Desk Study. **Appendix 2.2 Phase 1**

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
	Additional guidance documents recommended to be reviewed (EA Land Contamination Risk Management (LCRM), EA Groundwater Protection Position Statements, Department of Environment Industry Profiles). WFD classification of groundwater bodies noted. Sensitivity of aquifers to be assessed as 'medium'. The presence of shallow groundwater cannot be ruled out. Permit may be required for any dewatering. Decommissioning effects to be added to summary table. CEMP, OEMP and DEMP to include measures should unexpected contamination be identified, should a new pollution incident occur, and specification for storage and handling of fuels, oils and other similar materials. Water demands to be carefully considered.	**Geoenvironmental Desk Study [EN010163/APP/6.3.2]** has been updated and a targeted intrusive investigation proposed prior to commencement of construction. The Applicant notes the request to consider the impact of cables left in-situ, the use of any fluid-filled cables, the risk of HDD operations to soil and groundwater, and potential heating of groundwater by HV cables. These issues are considered within Section 8.7 of this ES. The Applicant notes that the risk of firewater runoff to groundwater should be assessed. This is discussed in **Appendix 8.2 Surface Water Drainage Strategy [EN010163/APP/6.3.8]** and in Section 8.7 of this ES. The Applicant notes the additional guidance documents suggested for review. The EA LCRM and DoE Industry Profiles are referenced in **Appendix 2.2 Phase 1 Geoenvironmental Desk Study [EN010163/APP/6.3.2]**. The Groundwater Protection Position Statements and EA LCRM have been reviewed as part of this ES. The Applicant acknowledges the WFD status of underlying groundwater bodies. The WFD classification of groundwater bodies is included in **Appendix 8.3 WFD Assessment [EN010163/APP/6.3.8**] and in Section 8.6 of this ES. The Applicant notes the requirement for aquifers to be assessed as 'medium'

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
		sensitivity, this has been amended in Table 8.6 of this ES. The Applicant notes the possible requirement for dewatering, this is considered in Section 8.7 of this ES. The Applicant notes the request for decommissioning effects to be added to summary Table 8.7. This has been undertaken. The Applicant notes the requirement for Management Plans to include measures should unexpected contamination be identified, should a new pollution incident occur, and specification for storage and handling of fuels, oils and other similar materials. Measures for materials storage, dealing with unexpected contamination and actions in the event of a pollution incident have been added to **Appendix 4.1 Outline CEMP [EN010163/APP/6.3.4] / Appendix 4.2 Outline Decommissioning Plan [EN010163/APP/6.3.4] / Appendix 4.4 Outline Operational Management Plan [EN010163/APP/6.3.4]**. The Applicant notes the requirement for water demands to be carefully considered. Likely water demands are discussed within Section 8.7 this ES.
Environment Agency National Infrastructure Team **10.04.25**	The EA undertook a review of a draft submission of the Flood Risk Assessment and Water Framework Directive Assessment supporting this ES. A number of comments were made regarding the sources of information referenced within	The Applicant has taken full account of the comments made by the EA on the two technical reports. The FRA **Appendix 8.1 [EN010163/APP/6.3.8]** and WFD Assessment **Appendix 8.3 [EN010163/APP/6.3.8**] have been

Stakeholder, Date & Method	Summary of Consultation Response	How is this addressed in the ES
Draft Report Review	these reports, the analysis of this information and the assessment of effects.	updated in response to the comments received.

8.6 Baseline Conditions

Scope

8.6.1 A baseline assessment has been undertaken for the Site including a chosen buffer of 1km based on the likely zone of influence for hydrological, hydrogeological and flood risk impacts as discussed in the Assessment Methodology.

Topography

8.6.2 Reference to Ordnance Survey (OS) mapping and the topographic survey **(Figure 3.2 – Topographic Survey [EN010163/APP/6.4.3]**) confirms that the Site generally slopes from west to east, towards the River Trent. Levels along the eastern Order Limits are at approximately 3m AOD, rising gradually westwards towards the village of Sturton le Steeple at approximately 10m AOD, then rising more steeply to high ground at approximately 75m AOD along the western Order Limits. A vegetated earth bund (flood defence) runs along the eastern Order Limits with a crest level of approximately 7m AOD and a height 3-4m above adjacent land.

Hydrology

8.6.3 OS mapping and the EA's web-based mapping indicates that the nearest EA Main River is the River Trent which runs along the eastern Order Limits. It flows in a northerly direction, eventually discharging into the Humber Estuary at Blacktoft Sands approximately 38km north of the Site. A large flood storage area is located on land adjoining the River Trent approximately 3km north (downstream) of the Site, to the west of Gainsborough.

8.6.4 OS mapping also identifies a number of Ordinary Watercourses crossing the Site, as shown in **Figure 8.1 Watercourses [EN010163/APP/6.4.8].** The EA categorise these watercourses as primary, secondary and tertiary rivers. Primary watercourses consist of Main Rivers and major Ordinary Watercourses, secondary watercourses consist of smaller Ordinary Watercourses, and tertiary watercourses comprise drainage ditches and Ordinary Watercourses receiving limited flows. Two primary

rivers are shown within the Site. The first is the Catchwater Drain which flows from south to north through the eastern part of the Site, discharging to the River Trent via a pumped outfall approximately 1km to the northeast of the Site. The second is the Mother Drain which flows from south to north just within the southeastern Order Limits, also discharging into the River Trent to the northeast of the Site. A significant number of unnamed secondary and tertiary watercourses pass through the Site, generally flowing from west to east, and discharging into the Catchwater Drain or the Mother Drain. Many of these were noted as dry during the site visit, which was undertaken on a dry sunny day.

8.6.5 The Ordinary Watercourses in the eastern half of the Site, including and to the east of the Catchwater Drain, are managed by the Trent Valley IDB. Those Ordinary Watercourses that do not fall under the IDB's jurisdiction are the responsibility of Nottinghamshire County Council, the LLFA. The River Trent (Main River) falls within the EA's control although the CRT is the Navigation Authority for the Trent and has freehold landowner interests with respect to the riverbed.

Geology

8.6.6 Based on published geological records for the area (BGS online mapping), the eastern part of the Site between the Catchment Drain and the River Trent is underlain by Alluvium (clay, silt, sand and gravel) and Holme Pierrepont Sand and Gravel Member. A small, isolated area of Till is located in the northeast of the Site. The western part of the Site has limited linear areas of Head deposits in the vicinity of Springs Lane and along Oswald Beck. The bedrock geology for the whole Site is recorded as Mercia Mudstone Group (mudstone, siltstone and sandstone).

8.6.7 BGS borehole logs within the Site have been included in Table 8.5. This table includes all available logs within the Site with the exception of any marked as 'confidential' or any that are not legible due to their age / scale of scanning. The table also includes any off-site records within 100m of the Order Limits, and selected boreholes within 1km of the Site – these are focussed to the west and south of the Site where there are limited records within the Order Limits.

Table 8.5 - BGS Borehole Records

BGS Borehole Ref	Location in relation to Site	Geology Recorded	Groundwater Recorded
SK78SE12	Within Order Limits, on Gainsborough Road to the north of Sturton le Steeple	Keuper Marl to at least 10.06m bgl	Yes – rest level 4.9m bgl
SK78SE28	Within Order Limits, immediately west of Leverton Road to the west of Fenton	Keuper Marl to 148m bgl	No
SK78SE27	Within Order Limits, between Northfield Road and Fenton Lane in the east of the Site	River Terrace Deposits to 1.4m bgl, Keuper Marl to at least 3m bgl	No
SK78SE26	Within eastern Order Limits, along existing overhead cable route	River Terrace Deposits to 3.4m bgl, Keuper Marl to at least 5m bgl	No
SK88SW39	Within eastern Order Limits, along existing overhead cable route	Clay, sand and gravel to 8.8m bgl, Keuper Marl to at least 9.75m bgl	Yes – 1.2m bgl
SK88SW38	Within eastern Order Limits, along existing overhead cable route	Sand and gravel to 5.94m bgl, Marl to at least 9.14m bgl	Yes – 1.98m bgl
SK88SW37	Within eastern Order Limits, along existing overhead cable route	Sand and Gravel to 5.49m bgl, Keuper Marl to at least 7.62m bgl	Yes – 1.07m bgl
SK88SW12	Within eastern Order Limits, along existing overhead cable route	Sand, silty sand and clay to 4.5m bgl, Calcareous Mudstone to at least 6m bgl	Yes – 1m bgl
SK88SW36	Within eastern Order Limits, along existing overhead cable route	Sand to 4.88m bgl, Marl to at least 6.71m bgl	Yes – 1.2m bgl
SK88SW4	Within Order Limits, in far east of Site 325m west of the River Trent	Alluvium to 7m bgl, River Terrace Deposits to 10m bgl, Keuper	Yes - “H2O shot to ground level as soon as

BGS Borehole Ref	Location in relation to Site	Geology Recorded	Groundwater Recorded
		Marl to at least 11.5m bgl.	broke through clay"
SK78NE35	250m north of the Site within West Burton Power Station	Sand and gravel to 7m bgl, Mercia Mudstone Group to a depth of 164m bgl and Sherwood Sandstone to 395m bgl	Yes – 80m bgl
SK78SE53	20m north of Site, on Gainsborough Road	Keuper Marl to at least 10.06m bgl	Yes – 4.9m bgl
SK78NE57	50m north of the Site on Wheatley Road	Keuper Marl to at least 6.4m bgl	Yes – "nearly full of water"
SK78SE13	70m north of the Site on Wheatley Road	Keuper Marl to at least 6.4m bgl	Yes – "nearly full of water"
SK78SE50	450m west of the Site	Keuper Marl to at least 100m bgl	Yes – 37.4m bgl
SK78SW44	800m west of the Site	Keuper Marl to 50.2m bgl	No
SK78SE42	95m south of the Site	Keuper Marl (no measurements given)	No
SK88SW42	70m east of the Site at Toll Bar Cottage	River Terrace sand and gravels to 15m bgl, Keuper Marl to at least 210m bgl	No

8.6.8 The BGS borehole logs confirm the presence of Alluvium and Holme Pierrepont sands and gravels in the eastern part of the Site. No superficial deposits are recorded for the remainder of the Site, including for the boreholes closest to the proposed BESS and substation locations in the north of the Site. All boreholes record a bedrock of "Keuper Marl", now known as Mercia Mudstone.

Hydrogeology

8.6.9 Hydrogeological information was obtained from the online Magic Maps service. These maps indicate that the Alluvium and Holme Pierrepont Sand and Gravels are classified as a Secondary A superficial aquifer. The pockets of Till and Head deposits are classified as a Secondary (Undifferentiated) aquifer. The bedrock geology is classified as a Secondary B aquifer beneath the majority of the Site and a Secondary (undifferentiated) Aquifer beneath the western-most part of the Site.

8.6.10 Defra's MAGIC maps confirm that the Site is not located within 1km of a groundwater Source Protection Zone or within 1km of a Drinking Water Safeguard Zone (surface water or groundwater). However, the eastern part of the Site (land lying east of the Catchwater Drain) falls within a Drinking Water Protected Area relating to surface water. These are defined as locations where raw water is abstracted for human consumption providing, on average, more than 10 cubic metres per day, or serving more than 50 persons, or is intended for such future use.

8.6.11 The publicly available BGS borehole records in Table 8.5 show that groundwater levels vary significantly across the Site. Groundwater is absent (or not recorded) in three of the on-site boreholes. Shallow groundwater (<5m bgl) generally correlates with the presence of Alluvium or Holme Pierrepont Sand and Gravel Member (sand and gravels), although shallow groundwater is also recorded within the Mercia Mudstone in some locations. Deeper groundwater (37m bgl and 80m bgl) is also recorded in the Mercia Mudstone at two locations.

8.6.12 The BGS borehole logs suggest isolated pockets of groundwater beneath the Site within bands of permeable deposits (superficial sands and gravels and / or permeable bands within the Mercia Mudstone) rather than a continuous shallow groundwater body. Where present, shallow groundwater is likely to flow locally towards the Ordinary Watercourses crossing the Site, and regionally in an easterly direction towards the River Trent. This is supported by the BGS Hydrogeological Map of the Northern East Midlands which indicates a general west to east direction of groundwater flow.

Statutory Designations

8.6.13 Defra's MAGIC maps show there are no SSSIs, SACs, SPAs or Ramsar sites within the Order Limits. The Clarborough Tunnel SSSI is located adjacent to the western Order Limits. It is an area of calcareous grassland designated due to its biological interest.

No other statutory designations for nature conservation and ecology are identified within 1km of the Site. EA mapping confirms that no GWDTEs are located within, or within 1km of, the Site.

Flood Risk

Fluvial / Tidal Flood Risk

8.6.14 The latest EA published Flood Zone map included as **Figure 8.2 Environment Agency Flood Zones [EN010163/APP/6.4.8]** shows that the western c.50% of the Site lies within Flood Zone 1, representing a less than 1 in 1000 annual probability of fluvial or tidal flooding. A central band of the Site (affecting approximately 5% of the Site) lies within Flood Zone 2, representing a 1 in 100 to 1 in 1000 annual probability of fluvial flooding or a 1 in 200 to 1 in 1000 annual probability of tidal flooding. The eastern part of the Site (approximately 45% of the Site) falls within Flood Zone 3 with a greater than 1 in 100 annual probability of fluvial flooding or a greater than 1 in 200 annual probability of tidal flooding. The flood risk in this area is primarily fluvial but there is a degree of tidal influence on the River Trent. Flood defences are present along the River Trent.

8.6.15 The EA has provided outputs from its latest flood model undertaken by Jacobs in 2023. These show a significant reduction in flood extents when the flood defences are taken into account. A full analysis of flood risk is provided in the **FRA** (**Appendix 8.1 [EN010163/APP/6.3.8]**). In summary, the 'design' defended 1 in 100 year plus climate change event (i.e. taking account of the defences on the River Trent) affects only the eastern biodiversity mitigation area. The developable area of the Site is only affected in the unlikely event of a breach (failure) of the defences. The FRA confirms that Flood Zone 3b for the River Trent only affects the area to the east of the River Trent defences, therefore the Proposed Development falls wholly within Flood Zone 3a associated with the River Trent.

8.6.16 The **FRA in Appendix 8.1 [EN010163/APP/6.3.8]** also assesses the fluvial flood risk from the Catchwater Drain, Mother Drain and New Ings Drain as they have not been modelled as part of the EA flood modelling exercise. The assessment demonstrates a low risk of flooding from these IDB watercourses. Similarly, the risk of flooding associated with the smaller Ordinary Watercourses is also assessed as low. The FRA confirms that there are no areas of Flood Zone 3b associated with the Ordinary Watercourses within the area of Proposed Development.

Surface Water Flood Risk

8.6.17 Areas of surface water flood risk are shown on the EA's mapping, most notably along the channels of the Ordinary Watercourses in the western part of the Site and within the fields to the east of the Catchwater Drain. The majority of the Site is at 'very low' risk of surface water flooding, with areas of 'low', 'medium' and 'high' surface water risk identified at various locations across the site. Where areas of flood risk are indicated, these are in the most part shown to have a 'very low' likelihood of reaching depths of up to 300mm, with exceptions being limited areas immediately upstream of railway and road culverts where localised areas of greater depth are shown.

8.6.18 The village of Sturton le Steeple has an identified area of 'high' surface water flood risk at the crossroads at the southern end of Cross Street which corresponds to an area of reported flooding as discussed below. The EA's Surface Water Flood Risk Mapping is included as **Figure 8.3 EA Risk of Surface Water Flooding [EN010163/APP/6.4.8]**.

Other Sources of Flooding

8.6.19 EA mapping shows that the eastern part of the Site, to the east of Catchwater Drain, has a risk of reservoir flooding when there is also flooding from rivers, but no part of the Site has a risk of reservoir flooding when river levels are normal.

8.6.20 As shown by the BGS borehole records in Table 8.5, groundwater levels appear to vary significantly across the Site. The risk of groundwater flooding is considered to be low for central and western areas of the Site. There is the potential for shallow groundwater to be encountered during groundworks particularly in the eastern part of the Site where superficial deposits are present and where BGS borehole records have recorded groundwater close to the surface.

Flooding Records

8.6.21 The EA holds records of flood events in 1932, 1947, 1977 and 2000 which affected the eastern part of the Site to varying extents. Local residents have advised of recent incidents of surface water flooding in the centre of Sturton le Steeple following heavy rainfall due to runoff being conveyed from the land higher in the catchment and being funnelled along the roads running into the village and ponding at a low point at the bottom end of Springs Lane.

Existing Drainage

8.6.22 Given the rural setting of the Proposed Development, runoff is likely to be conveyed across undeveloped areas via overland (and subsurface) flow at greenfield rates towards the existing surface watercourses and field drains, or infiltrate directly into the ground should ground conditions permit.

Surface water quality and WFD designation

8.6.23 The Catchwater Drain (located on the Site) and the River Trent (Carlton-on-Trent to Laughton Drain) (located adjacent to the eastern Order Limits) were both classified as of 'moderate' ecological status under Cycle 3 of the WFD. Chemical quality for both watercourses had been 'fail' under previous Cycles but 'does not require assessment' under Cycle 3. Wheatley Beck, which lies approximately 750m north of the Site at its closest point, also has the same Cycle 3 WFD ecological and chemical classifications. In the baseline situation, it is likely that the watercourses within the Site would be subject to limited inputs of pollutants, particularly nutrients and metals, associated with farming activities, urban runoff and sewer company discharges. A full assessment of the WFD status of local watercourses is provided in the **WFD Assessment** in **Appendix 8.3 [EN010163/APP/6.3.8].**

Groundwater quality and WFD designation

8.6.24 The majority of the Site is underlain by the Lower Trent Erewash Secondary Combined Water Body. This was classified as 'good' for both quantitative and chemical status under the 2019 WFD classifications. The westernmost extent of the Site is underlain by the Idle Torne Secondary Mudrocks Water Body. This was also classified as 'good' for both quantitative and chemical status under the 2019 WFD classifications. Shallow groundwater within the superficial deposits may have been impacted to a degree by the historical power generation and agricultural activities within the area.

Abstractions

8.6.25 The EA has provided a list of live water abstraction licences within a 2km radius of the Site, all of which are from surface water (no groundwater abstractions recorded). None are within the Order Limits. Within the surrounding area, a total of 26 current surface water abstractions are recorded, 19 of which are from the River Trent, one from Seymour Drain, 4 from Wheatley Beck and its tributaries and 2 from Marton Drain. Of these, 19 are for agricultural use (licenced to farms) and 6 are for

uses related to power generation (licenced to West Burton B and EDF Energy). Abstractions of less than 20m^3/day would not be licenced by the EA. The location of the recorded abstractions is shown on **Figure 8.4 Groundwater and Surface Water Abstractions [EN010163/APP/6.4.8].**

8.6.26 Bassetlaw District Council hold records of one private water supply within a 2km radius of the Site. This is at Caddow Wood Farm, Mill Lane, North Leverton, Nottinghamshire, DN22 0BA. This is approximately 430m south of the Site. The abstraction is from groundwater and is for potable use. The location of this abstraction is shown on **Figure 8.4 Groundwater and Surface Water Abstractions [EN010163/APP/6.4.8].**

8.6.27 A 'well' is noted to be present on Ordnance Survey mapping in the west of the Site within the parcels that are not proposed for built development. Given its location within agricultural fields and away from any buildings, it is likely to be used for agricultural purposes (if still in operation).

Water Resource Availability

8.6.28 Anglian Water has advised that supply for domestic use is prioritised by them and that any requests for new connections for non-domestic use will need to be assessed for viability. A Pre-Planning Assessment Report provided by Anglian Water (06.05.25) confirms the availability of up to 20m^3 of water per day from an existing water main on Gainsborough Road. The EA has advised that there is water available for abstraction within the Lower Trent catchment although access to water may be limited during times of low flows. The Trent Valley IDB has also advised that it may be possible to abstract water from watercourses within their jurisdiction as long as a freeboard is maintained within the watercourse.

Ground Contamination

8.6.29 A **Phase 1 Geoenvironmental Desk Study** has been completed and is included as **Appendix 2.2 [EN010163/APP/6.3.2].** The report concludes that no potential significant contaminative uses have operated on the majority of the Site, but that contaminants may be anticipated locally associated with farm buildings, railway lines and West Burton Power Station.

Receptors Summary

8.6.30 Table 8.1 provides criteria for defining the sensitivity or importance of receptors. Using these criteria, the key receptors to impacts associated with the Proposed Development and their sensitivity / importance are identified in Table 8.6.

Table 8.6 - Key receptors for Proposed Development

Receptor	Sensitivity / Importance	Reason
River Trent	Medium	Main River, 'moderate' ecological status and 'does not require assessment' for chemical status under the WFD, no associated statutory designations and no nearby sensitive (potable) abstractions, a number of abstractions for agricultural use outside the Order Limits.
Ordinary Watercourses crossing site including Catchwater Drain and Mother Drain	Medium	Ordinary Watercourses, 'moderate' ecological status and 'does not require assessment' for chemical status under the WFD. No abstractions recorded within or downstream of the Site.
Clarborough Tunnel SSSI	High	SSSI designation due to biological interest.
Areas of high fluvial and surface water risk	Medium	Existing areas of fluvial and surface water flood risk on the Site and known areas of flooding off-site, may be sensitive to changes in flood risk resulting from the Proposed Development.
Underlying aquifer	Medium	Groundwater bodies beneath Site have 'good' WFD status. Shallow groundwater recorded beneath parts of Site. One local groundwater abstraction for potable use 430m south of the Site, likely to be drawn from the sandstone at depth. Site not within groundwater Source Protection Zone, no nearby GWDTEs.
Water resources (for water supply)	Medium	Local surface water resources noted by EA to be depleted during dry periods. Mains water supply is prioritised for domestic use, this could be jeopardised by any large-scale abstraction for non-domestic use.

Future Baseline

8.6.31 Climate change is likely to result in wetter winters and longer drier summers. This could potentially result in increased risk of flooding from all sources but particularly from surface water flooding as 'flash' flooding becomes more frequent. It will also place greater pressure on water supply, with reduced availability and increased demand particularly during the summer months with droughts becoming more frequent.

8.6.32 Geomorphological processes including erosion and sediment deposition will over time affect the vertical and lateral morphology of watercourses and their floodplains although changes are unlikely to be significant over the lifetime of the Proposed Development.

8.6.33 The impacts of the Proposed Development in the context of future flood risk and water availability, taking account of potential future geomorphology, are assessed in this ES.

8.7 Assessment of Likely Significant Effects

Construction Phase

Hydrology

8.7.1 Construction activities have the potential to result in the release of chemicals, concrete washout and silt laden runoff which could be conveyed via overland flow or local drainage features into nearby watercourses. Open cut trenching for cable laying could also result in the release of sediment if not undertaken with appropriate control measures. The Proposed Development includes measures to reduce this risk, for example construction compounds will be located at least 10m from existing watercourses as shown on the **Indicative Site Layout** at **Figure 2.1 [EN010163/APP/6.4.2].** However, there remains the potential for release of hazardous materials and fine sediment which could impact on local watercourses.

8.7.2 There is also the potential for construction works to result in physical changes to the existing watercourse channels for example through the creation of road crossings and works to lay cables beneath riverbeds. However, the Proposed Development includes measures to mitigate this. Trenchless HDD methods will be used for laying cables beneath the majority of existing watercourses, with any open

cut trenching undertaken using appropriate methods, to be agreed with the relevant authority and secured via conditions attached to the associated consents. Similarly, any works to create road crossings will be subject to the relevant consents from the watercourse authority and will be undertaken in accordance with any conditions placed on those consents. These consents will be secured via DCO requirement.

8.7.3 Taking account of the measures proposed as part of the Proposed Development, the sensitivity of the River Trent and Ordinary Watercourses crossing the Site to water quality and hydrological impacts during the construction phase is medium and the magnitude of impact is low, resulting in an effect of **minor adverse significance (not significant)**. The effect would be temporary, direct and of local importance.

8.7.4 Further assessment of impacts on water quality for the WFD classified watercourses is included in the **WFD Assessment in Appendix 8.3 [EN010163/APP/6.3.8].** The WFD Assessment establishes the baseline status of WFD classified waterbodies within or hydraulically linked to the Site. It considers whether activities associated with the Proposed Development have the potential to cause a deterioration in status of those waterbodies. The **WFD Assessment** concludes that the Proposed Development does not present a risk of deterioration of status of WFD waterbodies or jeopardise the attainment of 'good' overall status of WFD waterbodies.

Water Resources

8.7.5 Limited water usage will be required during the construction phase for potable and welfare use, and for construction activity uses including dust suppression and wheel washing. A peak daily demand of approximately 20m^3 per day has been estimated. It is proposed that rainwater harvesting will be used, where possible, to collect rainwater for construction uses. Water for potable / welfare uses and for additional construction demand (where not met via rainwater harvesting) will be provided by AW who have advised that up to 20m^3 per day is available via an existing water main. Exceptionally, should demand exceed the water available via rainwater harvesting and the AW connection, additional water would be sourced via an abstraction from the River Trent / on-site watercourses or by bringing water onto Site using a bowser.

8.7.6 Water use demand will be minimised through the use of rainwater harvesting, and any additional connections or abstractions will have consumption limits imposed, either by AW for new connections or by the EA in relation to any licenced or

unlicensed abstraction. For any surface water abstractions, these will only be permitted when there is sufficient flow within the watercourse. These limits will be set for the protection of the water environment, and by adhering to these limits it will be ensured that there is **no significant adverse** impact on water resources as a result of construction activities.

8.7.7 The sensitivity of the receptor (water resources) is considered to be medium and the magnitude of impact negligible, giving rise to an effect on surface water reserves (including existing surface water abstractions) and public water supply of **negligible significance (not significant)**. The effect would be temporary, direct and of local importance.

Hydrogeology

8.7.8 Construction activities have the potential to result in the release of chemicals to the ground which could infiltrate into any underlying aquifers. Construction activities could also mobilise any historical ground contamination beneath the Site. Shallow groundwater may be in hydraulic continuity with local watercourses, potentially allowing lateral migration of any contaminants. A targeted ground investigation will be undertaken prior to construction to identify any areas requiring remediation prior to construction works commencing.

8.7.9 Shallow groundwater may be encountered during groundworks with a resulting need for dewatering. This will be undertaken in accordance with best practice, with testing undertaken of any water suspected to be contaminated (e.g. unusual colour, smell or oily sheen) prior to discharge. Any consents required for discharge of water will be obtained and any associated requirements adhered to.

8.7.10 The impact on hydrogeology is considered to be of low magnitude, with groundwater considered to be of medium sensitivity resulting in an effect of **minor adverse significance (not significant)**. The effect would be temporary, direct and of local importance.

8.7.11 There are no anticipated impacts on GWDTEs in the absence of any such designations within the zone of influence of the Proposed Development.

Flood Risk

8.7.12 During the construction phase, there is the potential for increased surface water runoff from temporary hardstanding areas or areas of compacted ground which could result in increased flows in local watercourses and a resulting increase in flood risk from those watercourses to nearby residential receptors.

8.7.13 There is also the potential for a reduction in channel capacity due to creation of new crossings or culverts. However, as part of the Proposed Development, existing watercourse crossings have been utilised where possible. Any new bridges / culverts will be designed to ensure flow capacity is retained and access to watercourse for maintenance is maintained.

8.7.14 Any land drainage systems damaged as part of the Proposed Development (through piling or other construction methods) will be reinstated or diverted where possible.

8.7.15 Taking account of the measures proposed as part of the Proposed Development, the impact on flood risk during construction is considered to be of low magnitude, with flood risk considered to be of medium sensitivity, resulting in an effect of **minor adverse significance (not significant).** The effect would be temporary, direct and of local importance.

Operational Phase

Hydrology

8.7.16 During the operational phase, without mitigation there is the potential for water quality impacts to local watercourses due to accidental releases of chemicals or contaminated runoff, for example associated with chemical use within the BESS and substation areas and the release of contaminated runoff in the event of a fire (considered a possibility particularly for the BESS area). However, as part of the Proposed Development, a leak detection system and alarm will be fitted to the cooling system, and the drainage strategy for the BESS area includes provision for the automatic retention of any contaminated fire-fighting runoff in the event of a fire.

8.7.17 Taking account of these embedded mitigation measures, the sensitivity of the River Trent and Ordinary Watercourses within the Site to water quality impacts during the operational phase is medium and the magnitude of impact is negligible, resulting in an effect of **negligible significance (not significant)**. The effect would be temporary, direct and of local importance.

8.7.18 Further assessment of impacts on WFD watercourses is provided in the **WFD Assessment** (**Appendix 8.3**) **[EN010163/APP/6.3.8].** The WFD Assessment concludes that the Proposed Development does not present a risk of deterioration of status of WFD waterbodies or jeopardise the attainment of 'good' overall status of WFD waterbodies.

8.7.19 The area of the Site closest to the River Trent is proposed for biodiversity mitigation only. The nearest proposed infrastructure to the River Trent is approximately 950m from the watercourse. Given the separating distance of these works from the River Trent, they are considered to have negligible magnitude impact on natural fluvial processes (taking account of the potential for lateral geomorphological changes over the lifetime of the Proposed Development) and are not considered to restrict future river restoration projects. Review of historical mapping within the **Phase 1 Geoenvironmental Report** (**Appendix 2.2**) **[EN010163/APP/6.3.2]** reveals no deviation of the course of the River Trent since at least 1885, and no significant future deviation is anticipated over the maximum 40-year lifespan of the Proposed Development. Although the sensitivity of the receptor (River Trent) is medium, the effect of the works on the hydrology of the River Trent would have negligible magnitude of impact and is therefore classed as **negligible significance (not significant)**. The effect would be temporary, direct and of local importance.

8.7.20 The creation of the proposed access road / haulage road will require a number of new watercourse crossings over Ordinary Watercourses. Additionally, buried cables are proposed beneath and in close proximity to the Ordinary Watercourses. As part of the Proposed Development, a minimum 9m development-free easement has been allowed for either side of the IDB watercourses, and a minimum 5m easement either side of the LLFA Ordinary Watercourses, as stipulated by the IDB and LLFA. Watercourse crossings will be via clear span bridges or culverts with crossings designed to ensure existing channel flows are maintained as agreed with the LLFA and IDB. Cable crossing depths will take account of potential deepening of watercourse channels over the lifetime of the Proposed Development. The sensitivity of the Ordinary Watercourses is medium and the magnitude of impact is negligible, resulting in an effect on the hydrology of Ordinary Watercourses of **negligible significance (not significant)**. The effect would be temporary, direct and of local importance.

8.7.21 The Clarborough Tunnel SSSI is located adjacent to the west of the Site, the nearest area of infrastructure associated with the Proposed Development is approximately 370m from the SSSI. Due to the location of the SSSI, it is topographically up-gradient of the Site and above an area of low permeability mudstone geology; therefore, the potential for mobilisation of sediment or pollutants to this area is considered to be low.

8.7.22 There will be no increases in runoff to, or new outfalls created in the River Trent, therefore there will be no impact on passing boat traffic.

8.7.23 During the operational life of the Proposed Development, maintenance operations will ensure that there is no damage to panels which would result in the release of any contaminants under the action of rainwater, wind or other factors. Any damaged panels would be removed and replaced. Panels that are correctly maintained will not result in any release of chemicals or heavy metals to the environment.

Water Resources

8.7.24 The Proposed Development will require minimal water resource during the operational phase (limited process water for BESS cooling, firefighting water, water for cleaning solar panels and limited welfare requirements). Peak demand has been estimated as approximately 20m^3 per day. It is proposed that rainwater harvesting will be used, where possible, to collect rainwater for operational uses such as cleaning solar panels. Water for welfare use and for additional operational demand (where not met via rainwater harvesting) will be provided by AW who have advised that up to 20m^3 per day is available via an existing water main. Exceptionally, should demand exceed the water available via rainwater harvesting and the AW connection, additional water would be sourced via an abstraction from the River Trent / on-site watercourses or by bringing water onto Site using a bowser.

8.7.25 Water use demand will be minimised through the use of rainwater harvesting, and any additional connections or abstractions will have consumption limits imposed, either by AW for new connections or by the EA in relation to any licenced or unlicensed abstraction. For any surface water abstractions, these will only be permitted when there is sufficient flow within the watercourse. These limits will be set for the protection of the water environment, and by adhering to these limits it will be ensured that there is **no significant adverse** impact on water resources as a result of operational activities.

8.7.26 The sensitivity of the receptor (water resources) is considered to be medium and the magnitude of impact negligible, giving rise to an effect on surface water and groundwater reserves (including existing surface water and groundwater abstractions) and public water supply of **negligible significance (not significant)**. The effect would be temporary, direct and of local importance.

Hydrogeology

8.7.27 BGS borehole logs indicate the presence of shallow groundwater beneath parts of the Site although this does not appear to be continuous across the Site. The installation of underground foundations, piles, cables and underground pipes has the potential for minor impact on localised groundwater flow, although given the small massing of underground features and the discontinuous nature of shallow groundwater this is considered **not significant**. The effect of sub-surface elements of the Proposed Development on groundwater flow patterns is considered to be of negligible magnitude, with groundwater (underlying aquifer) considered to be of medium sensitivity resulting in an effect of **negligible significance (not significant)**. The effect would be temporary, direct and of local importance.

8.7.28 During the operational phase, without mitigation there is the potential for water quality impacts to groundwater due to accidental releases of chemicals or contaminated runoff, for example associated with chemical use within the BESS and substation areas and the release of contaminated runoff in the event of a fire (considered a possibility particularly for the BESS area). However, as part of the Proposed Development, a leak detection system and alarm will be fitted to the cooling system, and the drainage strategy for the BESS area includes provision for the automatic retention of any contaminated fire-fighting runoff in the event of a fire. The attenuation basins in the BESS and substation areas will be lined to prevent infiltration.

8.7.29 Taking account of these embedded mitigation measures, the sensitivity of the receptor (underlying aquifer) to water quality impacts during the operational phase is medium and the magnitude of impact is negligible, resulting in an effect of **negligible significance (not significant)**. The effect would be temporary, direct and of local importance.

8.7.30 There is the minor potential for limited localised heating of the ground and any groundwater present in the immediate vicinity of the HV cables. However, no sensitive abstractions or protected habitats have been identified that could be affected by this impact. The sensitivity of groundwater is medium, and any impacts are considered to be of negligible magnitude resulting in an effect of **negligible significance (not significant)**. The effect would be temporary, direct and of local importance.

8.7.31 No fluid-filled cables are proposed therefore assessment of associated risks is not required.

8.7.32 Further assessment of impacts on WFD groundwater bodies is provided in the **WFD Assessment (Appendix 8.3) [EN010163/APP/6.3.8].** The WFD Assessment concludes that the Proposed Development does not present a risk of deterioration of status of WFD waterbodies or jeopardise the attainment of 'good' overall status of WFD waterbodies.

8.7.33 There are no anticipated impacts on GWDTEs in the absence of any such designations within the zone of influence of the Proposed Development.

Flood Risk

8.7.34 The eastern part of the Site is within fluvial Flood Zones 2 and 3. However, the 'design' flood event takes account of the effect of the flood defences along the River Trent. During this event, only the eastern-most part of the Site (biodiversity mitigation area) is impacted. As there will be no built development within the design flood extent for the River Trent, there will be no displacement of floodwater from this source.

8.7.35 A limited localised flood risk has been identified associated with surface water and fluvial flooding in the immediate vicinity of the Ordinary Watercourses, particularly in areas immediately upstream of road and railway culverts. Infrastructure within the limited 'medium' and 'high' risk areas is limited to solar arrays, the supporting poles have minimal cross sectional areas and therefore will have negligible impact on local flows or displacement of floodwater.

8.7.36 Sensitive equipment is inherently raised above ground levels through its design and will be raised sufficiently so as to be above anticipated surface water flood levels. This will also provide protection against other forms of flooding during extreme scenarios.

8.7.37 During the design flood event, safe access and egress is available for personnel, although the Proposed Development will be unmanned apart from maintenance visits. Maintenance visits will be timed to ensure there is no staff presence at times of increased flood risk.

8.7.38 In the residual breach flooding scenario associated with a failure of the River Trent defences, floodwater could inundate equipment in the eastern part of the Site. Forewarning of such an event is likely to be available via the EA's Flood Warning service and monitoring of the Site can be undertaken remotely via CCTV. If flooding is anticipated, personnel will be notified to leave the Site, and parts of the Proposed Development can be shut down remotely without requiring a personnel presence. The Proposed Development will not form part of the National Grid (its function is to

generate rather than distribute electricity) and therefore there will be no disruption to supply to the wider public in this situation.

8.7.39 The **Surface Water Drainage Strategy** (**Appendix 8.2**) **[EN010163/APP/6.3.8]** describes how attenuation basins have been designed to capture runoff from the BESS and substation areas, with storage provided for the 1 in 100 year plus climate change event (plus an additional volume for firefighting water for the BESS area). Runoff would be released to local drainage ditches at a controlled greenfield rate, with the option to shut off the outlet for the BESS in the event of a fire or other pollution incident. Linear SuDS features have also been proposed for the areas of solar panels and for the access tracks, although these areas are considered to remain permeable and will continue to drain in a similar way to the pre-development scenario. The Surface Water Drainage Strategy demonstrates that there will be no increase in surface water runoff associated with the Proposed Development. The principles of the Surface Water Drainage Strategy have been agreed with the LLFA and the IDB.

8.7.40 Overall, the Proposed Development will be safe from a flooding perspective and will not result in any increase in flood risk either on or off the Site, taking account of the embedded mitigation. Given the medium sensitivity of the setting with respect to flood risk, the overall significance of effect with regard to flood risk is **negligible** (**not significant)**. The effect would be temporary, direct and of local importance.

Decommissioning Phase

8.7.41 During the decommissioning phase, works will be subject to similar mitigation measures to those during construction. Impacts are therefore considered to be no greater than for the construction phase i.e. no greater than **negligible** or **minor adverse significance** of effect **(not significant).**

8.7.42 An **Outline Decommissioning Plan (Appendix 4.2, [EN010163/APP/6.3.4])** has been prepared to accompany the DCO application to secure mitigation measures during the decommissioning phases. Following decommissioning, it is possible that cables will be left in-situ although decommissioning arrangements would be confirmed via a final Decommissioning Plan to be compiled prior to decommissioning works commencing. The EA has raised the possibility of cables and cable ducting deteriorating over time and releasing substances (e.g. PFAS) to controlled waters. Likely decommissioning treatment will be considered when choosing the type of cable for installation. Dependent on the types of cables installed, measures will be included in the final Decommissioning Plan to either

ensure they are appropriately treated and sealed (if left in-situ) or removed as part of the decommissioning process. The impact on groundwater quality is considered to be of negligible magnitude, with groundwater considered to be of medium sensitivity resulting in an effect of **negligible significance (not significant)**. The effect would be temporary, direct and of local importance.

8.8 Mitigation and Enhancement

Mitigation

8.8.1 The following mitigation measures are committed to as part of the Proposed Development and its construction, operation, and decommissioning phases. These will be secured via DCO requirement.

Construction Phase

- An **Outline Construction Environmental Management Plan (OCEMP), Appendix 4.1 [EN010163/APP/6.3.4]** has been prepared for the construction phase to ensure best practice is followed to minimise the risk of release of pollution or sediment (final CEMP to be secured post-planning). The Outline CEMP includes:
    - a procedure for actions to be taken if unexpected contamination is identified on Site;
    - a procedure in the case of a new pollution incident occurring;
    - best practice measures for the storage of oils, fuels and chemicals during the construction phase, including requirements for bunding and spill kits;
    - measures for the prevention of release of silt laden sediment; and
    - procedures in relation to any required dewatering activities.
- Trenchless HDD methods will be supported by a drilling fluid breakout plan (forming part of the final CEMP);
- A Flood Management Plan will be prepared for the construction and decommissioning phases to ensure the works are scheduled to avoid periods of increased flood risk; and
- A temporary drainage strategy will be implemented during construction works to control runoff rates and sediment mobilisation.

Operational Phase

- An **Outline Operational Management Plan (Appendix 4.4, [EN010163/APP/6.3.4]**), **Outline Soil Management Plan (Appendix 15.2,**

[EN010163/APP/6.3.15]) and **Outline Fire Risk Management Plan (Appendix 4.3, [EN010163/APP/6.3.4])** will be prepared detailing how potentially harmful materials will be controlled and how emergency releases will be managed.

Decommissioning Phase

- An **Outline Decommissioning Plan** has been prepared **(Appendix 4.2 [EN010163/APP/6.3.4])** and a detailed version will be prepared prior to the decommissioning phase to ensure the latest best practice is followed to minimise the risk of release of pollution or sediment; and
- Other mitigation measures will to a large extent replicate those proposed for the construction phase.

Enhancement

8.8.2 An opportunity for enhancement has been identified through the design and installation of SuDS basins solely for the retention of runoff derived up-gradient of the Site, with the aim of alleviating the reported flooding issues within Sturton le Steeple. This is not a policy requirement and is not required to mitigate the effects of the Proposed Development. Instead, an opportunity has been identified to set aside part of the Proposed Development's area to attenuate surface water flows that pass over the Site in an attempt to alleviate flooding off-site within Sturton le Steeple.

8.8.3 This SuDS basin is additional to and separate from the SuDS measures that are required for incorporation into the scheme to manage runoff and ensure no increase in runoff from the Proposed Development. Further details of these retention basins are provided in the **Surface Water Drainage Strategy (Appendix 8.2) [EN010163/APP/6.3.8].**

8.9 Residual Effects

8.9.1 During the construction phase, the implementation of a CEMP, temporary drainage strategy and drilling fluid breakout plan will ensure the magnitude of impact on surface water and groundwater quality will be reduced to negligible, meaning the overall of water quality effect is reduced from minor adverse to **negligible significance**. The effect would be temporary, direct and of local importance.

8.9.2 The implementation of the construction phase surface water drainage strategy and Flood Management Plan for the duration of the construction works will also reduce the magnitude of impact on flood risk during the construction phase to negligible, meaning the overall flood risk effect is reduced from minor adverse to **negligible significance**. The effect would be temporary, direct and of local importance.

8.9.3 Implementation of a Decommissioning Plan and preparation of a Flood Management Plan will reduce decommissioning phase water quality and flood risk effects to negligible significance.

8.9.4 Taking into account the effect of the proposed mitigation measures, all identified adverse effects during the construction, operational and decommissioning phase are of no greater than **negligible significance**.

8.9.5 The proposed flood risk enhancement works aim to provide a reduction in flood risk to Sturton le Steeple during the operational phase of the Proposed Development. A low magnitude reduction in flood risk is anticipated, with the sensitivity classed as medium, resulting in a **minor beneficial significance** effect on flood risk.

8.10 Cumulative and In-combination Effects

Cumulative Effects

8.10.1 The long list of developments considered in the assessment of cumulative effects are identified in **Appendix 2.3- Cumulative Sites Long List and Short List [EN010163/APP/6.3.2]** and **Figure 2.2 - Cumulative Schemes Plan [EN010163/APP/6.4.2])** Shortlisted schemes are identified in Table 2.9 of **Chapter 2: EIA Methodology and Public Consultation [EN010163/APP/6.2.2]**. Of these schemes, the following are within the zone of influence for water effects and would include activities or elements with potential effects on the water environment:

- ID 1 Gate Burton Energy Park – solar energy generating scheme 300m to the east;
- ID 8 Wood Lane Solar Farm – solar energy generating scheme adjacent to the west;
- ID 9 West Burton C Battery Storage BESS development adjacent to the north; and
- ID 11 Sturton le Steeple Quarry ref: V/4386 – sand and gravel extraction adjacent to the southeast.

8.10.2 It is assumed that the other proposals considered will be subject to the same policy and regulatory requirements as the Proposed Development (or equivalents at the time of submission). On this basis, appropriate mitigation will need to be incorporated in all schemes to ensure there is no increase in flood risk and to control any releases of pollutants / sediment to the water environment. The relevant consents will need to be obtained for work affecting watercourses and for any abstraction of water or connection to the mains water supply. On this basis, the cumulative effect is considered to be **negligible significance**

In- Combination Effects

8.10.3 No in-combination effects have been identified in relation to hydrological, hydrogeological, flood risk and drainage receptors taking into account the proposed mitigation.

8.11 Summary

Introduction

8.11.1 This chapter considers the likely significant effects of the construction, operation and decommissioning phases of the Proposed Development with respect to hydrology, surface water and groundwater quality, hydrogeology, water resources and flood risk. It should be read in conjunction with **Appendix 8.1 [EN010163/APP/6.3.8] (Flood Risk Assessment), Appendix 8.2 [EN010163/APP/6.3.8] (Surface Water Drainage Strategy)** and **Appendix 8.3 [EN010163/APP/6.3.8] (Water Framework Directive Assessment)**. Consultation has been undertaken with the relevant statutory consultees throughout the assessment process, with all comments received considered in the overall assessment of effects.

Baseline Conditions

8.11.2 The assessment establishes national and local policy requirements with respect to protection of the water environment and mitigation of flood risk impacts. The environmental baseline is described through review of published mapping and data, site inspection and regulatory consultation. Potential receptors to impacts associated with the Proposed Development are assigned a sensitivity rating based on criteria agreed with the statutory consultees. Key potential receptors identified within the assessment include the River Trent to the east and the Ordinary

Watercourses crossing the Site; underlying groundwater; existing areas of flood risk; and local water supplies.

Likely Significant Effects

8.11.3 An assessment is made of the potential impacts on the identified receptors for each phase of the Proposed Development taking into account the proposed mitigation measures. With respect to the water environment, the measures proposed to reduce impacts associated with the Proposed Development include siting of construction compounds away from watercourses; all works near watercourses to be undertaken in accordance with the relevant consents; use of rainwater harvesting where possible to minimise water demand; a targeted ground investigation to identify and mitigate areas of contamination; design of watercourse crossings to maintain existing flows; and inclusion of a Surface Water Drainage Strategy to ensure there is no increase in the rate of runoff from the Proposed Development whilst ensuring the quality of runoff discharged from the Site.

8.11.4 A combination of the magnitude of impact and the sensitivity of the receptor affected has been used to determine the overall significance of effect. During the construction and decommissioning phases, effects of negligible and minor adverse significance have been identified in relation to hydrology, water resources, hydrogeology, flood risk. During the operational phase, all identified effects are shown to be of negligible significance.

Mitigation and Enhancement

8.11.5 Additional mitigation measures have been proposed to reduce the significance of identified effects. Additional mitigation proposed to reduce construction, operational and decommissioning phase impacts include the provision of an **Outline Construction Environmental Management Plan (CEMP) (Appendix 4.1 [EN010163/APP/6.3.4])** / **Outline Operational Management Plan (Appendix 4.4, [EN010163/APP/6.3.4])** / **Outline Soil Management Plan (Appendix 15.2, [EN010163/APP/6.3.15]** / **Fire Risk Management Plan (Appendix 4.3, [EN010163/APP/6.3.4])** / **Outline Decommissioning Plan (Appendix 4.2 [EN010163/APP/6.3.4])** (including procedures for appropriate storage of materials, actions to be taken in the event of a pollution incident or discovery of historical contamination and best practice measures for dewatering, if required); preparation of a temporary drainage strategy; provision of a drilling fluid breakout plan and

preparation of a Flood Management Plan. As an enhancement measure, two surface water detention basins have been proposed to the west of Sturton le Steeple to help reduce the known flooding issues within the village.

8.11.6 Taking into account the proposed mitigation, overall adverse effects are assessed to have no greater than negligible significance for all phases of the Proposed Development. An effect of minor beneficial significance has been identified relating to the proposed creation of surface water detention basins that will provide a reduction in flood risk to Sturton le Steeple village.

Cumulative and Combination Effects

8.11.7 Potential cumulative effects have been assessed in relation to other schemes within the identified zone of influence for water impacts. The cumulative effect of the schemes considered together with the Proposed Development has been assessed as of negligible significance. No in-combination effects are identified in relation to hydrological, hydrogeological, flood risk and drainage receptors.

Conclusion

8.11.8 Overall, no significant effects have been identified in relation to hydrology, hydrogeology, flood risk or drainage.

Table 8.7 - Summary and Residual Effects

Receptor/ Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation/ Enhancement Measures	Residual Effects
Construction								
Hydrology	Water quality reduction and physical impacts to local watercourses	Temporary direct	Medium	Low	Local	Minor adverse (Not Significant)	Implementation of CEMP Drilling fluid breakout plan Temporary drainage strategy during construction to ensure treatment of runoff	Negligible (Not Significant)
Water resources	Depletion of water reserves and impact on existing abstractions	Temporary direct	Medium	Negligible	Local	Negligible (Not significant)	Water demand minimised through rainwater harvesting. Additional water supply to be	Negligible (Not Significant)

Receptor/ Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation/ Enhancement Measures	Residual Effects
							within any limits set by relevant authority (AW / EA / IDB)	
Hydrogeology	Water quality reduction to aquifers	Temporary direct	Medium	Low	Local	Minor adverse (Not Significant)	Implementation of CEMP Targeted ground investigation and procedure for unexpected contamination to ensure any historical contamination is not mobilised Any dewatering to follow best practice and any required permits	Negligible (Not Significant)

Receptor/ Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation/ Enhancement Measures	Residual Effects
Flood risk	Increase in flood risk due to increased runoff from temporary hardstanding or compacted areas	Temporary direct	Medium	Low	Local	Minor adverse (Not Significant)	Temporary drainage strategy implemented to control runoff rates Flood management plan to ensure works are scheduled to avoid periods of increased flood risk	Negligible (Not Significant)
Operation								
Hydrology	Water quality impacts to local watercourses	Temporary direct	Medium	Negligible	Local	Negligible (Not Significant)	Outline Operational Management Plan / Outline Soil Management Plan / Outline Fire	Negligible (Not Significant)

Receptor/ Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation/ Enhancement Measures	Residual Effects
							Risk Management Plan	
Hydrology	Impacts on natural fluvial processes	Temporary direct	Medium	Negligible	Local	Negligible (Not Significant)	None required	Negligible (Not Significant)
Hydrology	Impact on flows within Ordinary Watercourses	Temporary direct	Medium	Negligible	Local	Negligible (Not Significant)	None required	Negligible (Not Significant)
Water resources	Depletion of water reserves and impact on existing abstractions	Temporary direct	Medium	Negligible	Local	Negligible (Not Significant)	Water demand minimised through rainwater harvesting. Additional water supply to be within any limits set by relevant authority (AW / EA / IDB)	Negligible (Not Significant)

Receptor/ Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation/ Enhancement Measures	Residual Effects
Hydrogeology	Impact of substructures on shallow groundwater flow	Temporary direct	Medium	Negligible	Local	Negligible (Not Significant)	None required	Negligible (Not Significant)
Hydrogeology	Water quality impact to groundwater through routine emissions, accidental releases and contaminated runoff	Temporary direct	Medium	Negligible	Local	Negligible (Not Significant)	Outline Operational Management Plan / Outline Soil Management Plan / Outline Fire Risk Management Plan. The Surface Water Drainage Strategy includes measures to contain contaminated runoff and prevent infiltration.	Negligible (Not Significant)

Receptor/ Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation/ Enhancement Measures	Residual Effects
Hydrogeology	Heating of groundwater by HV cables	Temporary direct	Medium	Negligible	Local	Negligible (Not Significant)	N/A	Negligible (Not Significant)
Flood risk	Increase in flood risk due to displacement of floodwater or increased runoff	Temporary direct	Medium	Negligible	Local	Negligible (Not Significant)	Attenuation basins to provide flood risk reduction to Sturton le Steeple	Minor beneficial (Not Significant)
Decommissioning								
Hydrology	Water quality reduction and physical impacts to local watercourses	Temporary direct	Medium	Low	Local	Minor adverse (Not Significant)	Implementation of Decommissioning Plan	Negligible (Not Significant)
Water resources	Depletion of water reserves and impact on	Temporary direct	Medium	Negligible	Local	Negligible	Water demand minimised through	Negligible (Not Significant)

Receptor/ Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation/ Enhancement Measures	Residual Effects
	existing abstractions					(Not Significant)	rainwater harvesting. Additional water supply to be within any limits set by relevant authority (AW / EA / IDB)	
Hydrogeology	Water quality reduction to aquifers	Temporary direct	Medium	Low	Local	Minor Adverse (Not Significant)	Implementation of Decommissioning Plan	Negligible (Not Significant)
Flood risk	Flood risk to construction workers	Temporary direct	Medium	Low	Local	Minor adverse (Not Significant)	Flood management plan to ensure works are scheduled to avoid periods of increased flood risk	Negligible (Not Significant)

Receptor/ Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation/ Enhancement Measures	Residual Effects
Cumulative and In Combination								
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a