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Yorkshire Green Energy Enablement (GREEN) Project

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Contents

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9. Hydrology

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9. Hydrology

9.1 Introduction

9.1.1 This chapter presents the assessment of the likely significant effects of the Project with respect to hydrology, including the aquatic environment, surface water resources and flood risk. It should be read in conjunction with the Project description provided in **Chapter 3: Description of the Project, Volume 5, Document 5.2.3** and with respect to relevant parts of the following chapters:

- **Chapter 8: Biodiversity, Volume 5, Document 5.2.8** which considers the potential effects to aquatic invertebrates and fish;
- **Chapter 10: Geology and Hydrogeology, Volume 5, Document 5.2.10** which considers the potential effects to groundwater; and
- **Chapter 11: Agriculture and Soils, Volume 5, Document 5.2.11** which will identify areas of contaminated land.

9.1.2 This chapter describes:

- the legislation, policy and technical guidance that has informed the assessment (**Section 9.2**);
- consultation and engagement activities that have been undertaken and how comments from consultees relating to hydrology have been addressed (**Section 9.3**);
- the methods used for baseline data gathering (**Section 9.4**);
- the overall baseline hydrology description (**Section 9.5**);
- embedded environmental measures relevant to hydrology (**Section 9.6**);
- the scope of the assessment for hydrology (**Section 9.7**);
- the methods used for the assessment (**Section 9.8**);
- an assessment of hydrology effects (**Section 9.9, 9.10, 9.11**);
- an assessment of cumulative effects (**Section 9.12**);
- a summary of the significance conclusions (**Section 9.13**); and
- an integrated Water Framework Direct (WFD) compliance assessment (**Section 9.14**).

Project overview

9.1.3 The Project is divided into six sections for ease of reference as indicated in **Figure 1.2, Volume 5, Document 5.4.1**. In summary Yorkshire Green Energy Enablement (GREEN) Project (referred to as the Project or Yorkshire GREEN in the Environmental Statement (ES)) comprises the following new infrastructure within the Order Limits:

- Section B (North-west of York Area):

  - Shipton North and South 400kV cable sealing end compounds (CSECs) and 230m of cabling;
  - the 2.8km YN 400kV overhead line (north of proposed Overton Substation);
  - Overton 400/275kV Substation; and
  - two new sections of 275kV overhead line south of Overton Substation: the XC 275 kV overhead line to the south-west (2.1km) and the SP 275kV overhead line to the south-east (1.5km);
- Section D: Tadcaster Tee West and East 275kV CSECs; and 350m of cabling; and
- Section F: Monk Fryston 400kV Substation (adjacent to the existing substation).

9.1.4 Works to existing infrastructure within the Order Limits would comprise:

- Section A (Osbaldwick Substation): Minor works at Osbaldwick Substation comprising the installation of a new circuit breaker and isolator along with associated cabling, removal and replacement of one gantry and works to one existing pylon. All substation works would be within existing operational land.
- Section B (North-west of York Area): Reconductoring of 2.4km of the 2TW/YR 400kV overhead line and replacement of one pylon. A mixture of decommissioning, replacement and realignment of 5km of the existing XCP 275kV Poppleton to Monk Fryston overhead line between Moor Monkton and Skelton. To the south and south-east of Moor Monkton the existing overhead line would be realigned up to 230m south from the current overhead line and the closest pylon to Moor Monkton (340m south-east) would be permanently removed. A 2.35km section of this existing overhead line permanently removed between the East Coast Mainline (ECML) Railway and Woodhouse Farm to the north of Overton.
- Section C (Moor Monkton to Tadcaster): Works proposed to the existing 275kV Poppleton to Monk Fryston (XC) overhead line comprise replacing existing overhead line conductors, replacement of pylon fittings, strengthening of steelwork and works to pylon foundations.
- Section D (Tadcaster Area): Replacement of one pylon on the Tadcaster Tee to Knaresborough (XD) 275kV overhead line route.
- Section E (Tadcaster to Monk Fryston). Works proposed to the existing 275kV Poppleton to Monk Fryston (XC) overhead line comprise replacing existing overhead line conductors, replacement of pylon fittings, strengthening of steelwork and works to pylon foundations.
- Section F (Monk Fryston Area): Reconfiguration of the existing XC Poppleton to Monk Fryston overhead line at its southern end to connect into the new substation at Monk Fryston; Reconfiguration of the Monk Fryston to Eggborough 400kV 4YS overhead line to connect into the new substation at Monk Fryston.

9.1.5 Please refer to **Chapter 3: Description of the Project, Volume 5, Document 5.2.3** for more information on the different components of the Project

Limitations and assumptions

9.1.6 There are no limitations relating to data and assessment that affect the robustness of the assessment of the potential likely significant effects of the Project.

9.2 Relevant legislation, planning policy and technical guidance

9.2.1 This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect to hydrology. Further information on policies relevant to the Project is provided in **Chapter 5: Legislation and Policy Overview, Volume 5, Document 5.2.5**.

9.2.2 In the vicinity of the Project, there are two key groups of regulators (see **Figure 9.1, Volume 5, Document 5.4.9**):

- the Environment Agency (EA) (comprised of individual operational areas) - regulate flood risk with regards to main rivers as well as water quality and Water Framework Directive compliance for all waterbodies; and
- Lead Local Flood Authorities (LLFAs) and Internal Drainage Boards (IDBs) – regulate land drainage as well as flood risk from Ordinary Watercourses and groundwater.

9.2.3 LLFAs are county councils and unitary authorities whereas IDBs are independent public bodies within their district. The Project interfaces with:

- one Environment Agency Area – Yorkshire and north-east;
- three LLFAs – North Yorkshire County, City of York and Leeds City; and
- three IDBs – Ainsty, Foss, and Kyle and Upper Ouse.

Legislation

9.2.4 A summary of the relevant legislation is given in **Table 9.1**.

Table 9.1 – Legislation relevant to the hydrology assessment

Legislation	Legislative Context
Control of Pollution Act 1974[1]	An Act to make further provision with respect to waste disposal, water pollution, noise, atmospheric pollution and public health.
Reservoirs Act 1975[2]	Reservoirs present a potential flood risk to the Project. The Reservoirs Act 1975 provides regulation for the operation and maintenance of reservoirs to ensure the design is fit for purpose, and that maintenance (including frequent inspections of reservoir embankments) ensures the condition of the embankments. As a consequence, the chance of them failing and giving rise to flooding problems is remote.

[1] UK Government. Control of Pollution Act 1974. 1974. (Online) Available from: https://www.legislation.gov.uk/ukpga/1974/40 (Accessed July 2021).
[2] UK Government. Reservoirs Act 1975. 1975. (Online) Available from: https://www.legislation.gov.uk/ukpga/1975/23 (Accessed July 2021)

Legislation	Legislative Context
Environmental Protection Act 1990[3]	The Environmental Protection Act 1990 makes provision for the improved control of pollution arising from certain industrial and other processes. It re-enacts the provisions of the Control of Pollution Act 1974 relating to waste on land, including modifications to the functions of the regulatory and other authorities concerned in the collection and disposal of waste and makes further provision in relation to such waste.
Land Drainage Act 1991[4] and 1994[5]	The Land Drainage Act (as amended), in combination with the Water Resources Act, stipulates that before work on or near an 'Ordinary Watercourse[6]' is carried out, an Ordinary Watercourse Consent (OWC, sometimes referred to as a Land Drainage Consent) is required. The Flood Defence consenting regime for 'Main Rivers[7]', which used to be part of this Act, was replaced by flood risk activities permits under the Environmental Permitting Regulations 2016[8].
The Water Resources Act 1991[9]	The Water Resources Act 1991 states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter 'Controlled Waters[12]'.
Water Act 2003[10]	The Water Resources Act 1991 was revised by the Water Act 2003, which sets out regulatory controls for water abstraction, water impoundment and protection of water resources. Important for the Project is the potential requirement to obtain a licence for dewatering of engineering works and to ensure that any impact on the environment can be mitigated. Provisions for the

[3] UK Government. Environmental Protection Act 1990. 1990. (Online) Available from: https://www.legislation.gov.uk/ukpga/1990/43/contents (Accessed July 2021).
[4] UK Government. Land Drainage Act 1991. 1991. (Online) Available from: https://www.legislation.gov.uk/ukpga/1991/59/contents (Accessed12 July 2022).
[5] UK Government. Land Drainage Act 1994. 1994. (Online) Available from: https://www.legislation.gov.uk/ukpga/1994/25/contents (Accessed 12 July 2022).
[6] An Ordinary Watercourse is any river, stream, brook, ditch, drain, culvert, pipe and any other passage through which water may flow which is not designated as Main River
[7] Main rivers are usually larger rivers and streams. They are designated as such and shown on the Main River Map. The Environment Agency carries out maintenance, improvement and construction work on main rivers to manage flood risk.
[8] UK Government. The Environmental Permitting (England and Wales) Regulations 2016. (Online). Available from: https://www.legislation.gov.uk/uksi/2016/1154/contents (Accessed 12 July 2022).
[9] UK Government. (1991). The Water Resource Act 1991. (Online) Available at: https://www.legislation.gov.uk/ukpga/1991/57/contents (Accessed 12 July 2022)
[10] UK Government. Water Act 2003. 2003. (Online) Available from: https://www.legislation.gov.uk/ukpga/2003/37/contents (Accessed 12 July 2022).
[12] This includes territorial waters, coastal waters, inland freshwaters and groundwaters (Section 104, Water Resources Act 1991).

Legislation	Legislative Context
	regulation of water discharges to Controlled Waters are set out in the Environmental Permitting (England and Wales) Regulations 2016. These have replaced provisions in the earlier Acts.
The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009[11]	The amendment (2009) of the Water Resource Act 1991 made adjustments to the controls on activities that could cause harm or pollute controlled waters; as well as adjusting the powers to designate Water Protection Zones. The amendment also enables the Environment Agency to carry out works to improve the hydromorphological elements of waterbodies. The purpose of the 2009 amendment was to ensure compliance with the Water Framework Directive (EU Directive 2000/60/EC).
Water Act 2014[13]	This Act reformed legislation concerning the water industry and management and conservation of water resources and related environmental matters in the UK. The purpose of the Act is to: reform the water industry to make it more innovative and responsive to customers and to increase the resilience of water supplies to natural hazards such as drought and floods.
Environment Act 1995[14]	The Environment Act 1995 established the Environment Agency and gave it responsibility for environmental protection and flood defence.
Priority Substances Directive (2008/105/EC) Revision of the Priority Substances Directive (2013/39/EU)[15]	Sets out environmental quality standards in the field of water policy for Europe, with the aim of minimising the threat to the aquatic environment and effects such as acute and chronic toxicity to aquatic organisms, accumulation in the ecosystem and losses of habitats and biodiversity, as well as a threat to human health.
The European Union (EU) Water Framework Directive (2000/60/EC) (WFD)[16] as enacted into domestic	The EU WFD is enacted into domestic law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. A fundamental requirement of

[11] UK Government. The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009. 2009. (Online) Available from: https://www.legislation.gov.uk/uksi/2009/3104/contents/made (Accessed 12 July 2022).
[13] UK Government. Wate Act 2014. 2014. (Online) Available from: https://www.legislation.gov.uk/ukpga/2014/21/contents/enacted (Accessed 12 July 2022)
[14] UK Government. Environment Act 2021. 2021. (Online) Available from: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted (Accessed 12 July 2022).
[15] European Parliament. Directive 2013/39/EU of the European Parliament and of the Council amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy. 2013. (Online)
[16] European Parliament. Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy. 2000. (Online)

Legislation	Legislative Context
law by the Water Environment WFD (England and Wales) (Amendment) Regulations 2017[17]	the WFD is to attain Good Ecological Status, or Good Ecological Potential within each defined waterbody, by December 2027 at the latest and to ensure that any deterioration in status is prevented.
The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015[18]	Sets out the environmental standards to be used for the second cycle of river basin plans, covering the period 2016-21. Along with the updated Water Environment (WFD) (England and Wales) Regulations 2003[19], they transpose Directive 2013/39/EC on environmental quality standards for priority substances.
The EU Floods Directive (2007/60/EC[20]), as enacted into domestic law by the Flood Risk Regulations 2009	The EU Floods Directive is enacted into domestic law by the Flood Risk Regulations 2009. It requires that in accordance with flood risk management plans, there should be a focus on the prevention of flooding, through avoidance of planned development in present and future flood prone areas, and protection by taking measures to reduce the likelihood of flooding.
Flood and Water Management Act 2010[21]	The Flood and Water Management Act sets out the Government's proposals to improve flood risk management, water quality and ensure water supplies are more secure. This Act includes consideration and responsibilities for managing flood risk and consideration of drainage including the use of Sustainable Drainage Systems (SuDS).
Private Water Supplies (England) Regulations 2018 (Amendment)[22]	The Regulations place a duty on local authorities to regulate private water supplies within their area and to undertake monitoring to determine compliance with drinking water standards. A private water supply is any water supply which supplies one or more properties that is not provided by a water company.

[17] UK Government. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. 2017. (Online) Available from: https://www.legislation.gov.uk/uksi/2017/407/contents/made (Accessed 12 July 2022).
[18] UK Government. The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015. 2015. (Online) Available at: https://www.legislation.gov.uk/uksi/2015/1623/made (Accessed 12/07/2022)
[19] UK Government. Water Environment (WFD) (England and Wales) Regulations 2003. 2003. (Online) Available at: https://www.legislation.gov.uk/uksi/2003/3242/contents/made (Accessed 12 July 2022)
[20] European Parliament. Directive 2007/60/EC of the European Parliament and of the Council on the assessment and management of flood risks. 2007. (Online)
[21] UK Government. Flood and Water Management Act 2018. 2018. (Online) Available from: https://www.legislation.gov.uk/ukpga/2010/29/contents (Accessed 12 July 2022).
[22] UK Government. The Private Water Supplies (England) Regulations 2016. 2016. (Online) Available from: https://www.legislation.gov.uk/uksi/2018/707/contents/made (Accessed 12 July 2022).

Legislation	Legislative Context
Water Supply (Water Quality) Regulations 2016[23]	These Regulations are primarily concerned with the quality of water supplied in England by water undertakers and licensed water suppliers for domestic or food production purposes and with arrangements for the publication of information about water quality. These regulations repeal the Water Supply (Water Quality) Regulations 2000 and 2010.
Environmental Permitting (England and Wales) Regulations (EPR), 2016 (as amended)[24]	The 2016 Environmental Permitting (England and Wales) (Amendment) (No. 2) Regulations replace the previous 2010 regulations. It provides a consolidated framework for environmental permits and exemptions for waste operations and water discharge activities (previously consented under the Water Resources Act 1991, and the Control of Pollution Act 1974), and groundwater activities. It also sets out the powers, functions and duties of the regulators.
Environment Act 2021[25]	The Environment Act 2021 makes amendments to the Environmental Protection Act 1990, relating to the Sections 170, 173 and 175. In particular, this Act introduces the Environmental Improvement Plans and a target-based approach for waterbodies, in line with the WFD targets.

Planning policy

9.2.5 A summary of the relevant adopted national and local planning policy is given in **Table 9.2**.

Table 9.2 – Adopted Planning policy relevant to the hydrology assessment

Policy	Policy Context	Section Addressed
Overarching National Policy Statement for Energy (EN-1)[26]	**Section 4.8: Climate change adaptation** Sets out how the effects of climate change should be considered. **Section 5.7: Flood risk**	The Flood Management Measures presented in **Section 6** of **Appendix 5.3.9D: FRA (Volume 5, Document 5.3.9)**

[23] UK Government. Water Quality (Water Supply) Regulations 2016. 2016. (Online) Available from: https://www.legislation.gov.uk/uksi/2016/614 (Accessed 12 July 2022).
[24] UK Government. The Environmental Permitting (England and Wales) Regulations 2016. 2016. (Online) Available from: https://www.legislation.gov.uk/uksi/2016/1154/contents (Accessed 12 July 2022).
[25] UK Government (2021). Environment Act 2021. (Online) Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted (Accessed 07 October 2022)
[26] Department of Energy and Climate Change. Overarching National Policy Statement for Energy (EN-1) 2011. (Online) Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed 12 July 2022).

Policy	Policy Context	Section Addressed
	To ensure that flood risk from all sources is considered at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. **Section 5.15: Water quality and resources** To ensure that all potential adverse effects on water quantity and quality including the ecological effects resulting from physical modifications are considered at all stages of the development.	consider the recommended climate change scenarios, with mitigation including raised finished floor levels and Emergency Flood Response Plans. The proposed design of the Project, which is outlined in **Chapter 3, Volume 5, Document 5.2.3** describes the Project elements including the substations and overhead lines which have been addressed in the following assessment. A Flood Risk Assessment has been prepared in association with this ES Chapter and is presented in **Appendix 5.3.9D: FRA (Volume 5, Document 5.3.9)**. The likely significant effects associated with flood risk are also addressed in **Section 9.6** and **Section 9.9.** The Project has the potential to interact with WFD reportable waterbodies which are identified in **Section 9.5**. The following assessment has considered the potential impacts on current and future water quality and hydromorphology using an integrated WFD approach (see **Section 9.8**).

Policy	Policy Context	Section Addressed
National Policy Statement for Electricity Networks Infrastructure (EN-5)[27]	**Section 2.4 Climate change adaptation**: Sets out how the effects of climate change should be considered.	Climate change adaptation is considered in the Flood Risk Assessment (**Appendix 5.3.9D, Volume 5, Document 5.3.9**) and embedded environmental measures (**Section 9.7**).
National Planning Policy Framework (NPPF)[28]	**Sequential Test** To steer new development to areas with the lowest probability of flooding from any source. **Exception Test** The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available. **Climate Change** To ensure the impact of climate change is considered for the expected lifetime of development. **Sustainable Drainage Systems (SuDS)** A requirement that SuDS will be incorporated into new major developments and development in areas at risk of flooding to minimise the impacts of development from any increase in surface runoff, unless there is clear evidence that this would be inappropriate.	The Sequential and Exception Tests have been undertaken and presented in the Flood Risk Assessment (**Appendix 5.3.9D, Volume 5, Document 5.3.9**). The approach to siting of CSECs and substations is compliant with Section 5.7 of the National Policy Statement for Energy (EN-1)[26] and the NPPF[28], in that the sequential approach has been taken to identify potential locations for the new infrastructure, which are preferentially located within Flood Zone 1. Climate change adaptation and SuDS are considered in **Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9** and **Section 9.7**.
Nutrient Pollution: reducing the	The Policy Paper sets out the aims to '*reduce nitrogen, phosphorus and sediment contribution*	The assessment undertaken in **Section**

[27] Department of Energy and Climate Change. National Policy Statement for Electricity Networks Infrastructure (EN-5) 2011. (Online) Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37050/1942-national-policy-statement-electricity-networks.pdf (Accessed 12/07/2022).
[28] Ministry of Housing, Communities and Local Government. National Planning Policy Framework (NPPF) (2019). (Online) Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf (Accessed 10/07/2022).

Policy	Policy Context	Section Addressed
impact on protected sites, 2022[29]	*from agriculture in the water environment by at least 40% by 2037 (against a 2018 baseline)*' and *'…phosphorus loadings from treated wastewater by 80% by 2037 (against a 2020 baseline)*'. This aligns with the commitments made in the 25 Year Environment Plan to restore 75% of terrestrial and freshwater protected sites to favourable condition by 2042.	**9.9**, **Section 9.10** and **Section 9.11** considers the likely significant effects to the surface water receptors. These likely significant effects include (but are not limited to) impacts to surface water quality and geomorphology; which could indirectly impact the nutrient status of protected sites. The assessment demonstrates that the risks to the surface water receptors that arise are minor and suitably controlled by the embedded measures outlined in **Section 9.6** and as such does not cause significant effects.
Local planning policy		
Hambleton Local Development Framework: Core Strategy Development Plan Document, 2007[30] (not current planning policy as replaced by the 2022 Local Plan set out below)	**Policy CP1: Sustainable development.** Provides support for proposals where they promote, encourage, protect or enhance the quality of natural resources including water, and the natural drainage of surface water. **Policy CP21: Safe response to natural and other forces.** Seeks to protect communities and the environment. Proposals must take particular account of the need to ensure protection from, and not worsen the potential for flooding and mitigate development from the consequences of pollution.	The assessment that follows in **Section 9.9**, **Section 9.10**, **Section 9.11 and Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9** demonstrate that the Project does not cause significant effects to surface water or flood risk receptors.
Hambleton Development Policies	**Policy DP2: Securing developer contributions.**	**Section 9.9**, **Section 9.10**, **Section 9.11, and Appendix 5.3.9D: FRA,**

[29] Department for Environment, Food and Rural Affairs. (2022). (Online) Available from: Nutrient pollution: reducing the impact on protected sites - GOV.UK (www.gov.uk) (Accessed 12 July 2022)

[30] Hambleton District Council. Hambleton Local Development Framework: Core Strategy Development Plan Document, 2007. (Online) Available from: https://www.hambleton.gov.uk/planning-policy/adopted-local-development-framework/2?documentId=213&categoryId=20061 (Accessed 10 July 2022).

Policy	Policy Context	Section Addressed
Development Plan Document, 2008[31] (not current planning policy as replaced by the 2022 Local Plan set out below)	Commits developers to the provision of additional infrastructure whenever there is a need generated by the new development. This could include provision of flood protection measures and SuDS. **Policy DP6: Utilities and infrastructure.** Covers the provision of additional infrastructure in a sustainable manner, minimising environmental consequences and preventing degradation of services (including surface water and flood risk defences) currently benefiting the community. **Policy DP32 xii: General design.** Sets out the expectation for new development to be sustainable. This includes, where possible, the inclusion of SuDS. **Policy DP33 ii: Landscaping.** Describes the approach to landscaping as an integrated part of the design and seeks a sustainable solution', incorporating the potential implications of climate change. **Policy DP43: Flooding and floodplains.** States "*development proposals will not be permitted where they would have an adverse effect on watercourses or increase the risk of flooding elsewhere*" and goes on to set out further requirements where there is a risk of flooding.	**Volume 5, Document 5.3.9** demonstrate that the Project does not cause significant effects to surface water or flood risk receptors.
Hambleton Local Plan – Publication Adopted, 2022[32]	**Policy S1: Sustainable Development Principles** Sets out the Councils requirements for developments to improve the local environment and use available opportunities to mitigate and adapt to the effects of climate change. **Policy E2: Amenity** Requires all proposed developments provide and maintain a high amenity standard, via the management and mitigation of adverse effects; including those from water pollution and contamination.	As set out in **Section 9.9**, **9.10**, **9.11** and the Flood Risk Assessment (**Appendix 5.3.9D, Volume 5, Document 5.3.9**); it is demonstrated that there are no significant effects to surface water or flood risk receptors.

[31] Hambleton District Council. Hambleton Development Policies Development Plan Document, 2008. (Online) Available from: https://www.hambleton.gov.uk/planning-policy/adopted-local-development-framework/3?documentId=213&categoryId=20061 (12/07/2022).
[32] Hambleton District Council (2022), Hambleton Local Plan – Adopted February 2022. Available at: https://www.hambleton.gov.uk/downloads/file/2745/hambleton-local-plan-final-february-2022 (Accessed 12/07/2022).

Policy	Policy Context	Section Addressed
	Policy E4: Green Infrastructure The Council sets out that green infrastructure should be incorporated into development designs where possible, to meet the challenges of climate change and conserving the natural environment. **Policy RM1: Water Quality, Supply and Foul Drainage** The policy highlights that developments with potential to impact water quality, geomorphology, and ecology of value to the water environment, is required to demonstrate there are no adverse effects to water resources (quality or quantity), supports WFD objectives and the Habitats Directive. **Policy RM2: Flood Risk** Sets out how the Council will manage and mitigate flood risk including; avoiding development in flood risk areas and protecting the functional floodplain, by applying the sequential approach and (where this is not possible) by mitigating measures in line with national policy. The policy also sets out that opportunities to reduce the overall flood risk should be taken where possible, such as removing existing culverts, managing rapid inundation and flood velocities, and support alleviation schemes. **Policy RM3: Surface Water and Drainage Management** Sets out the Council's approach with regards ensuring that surface water and drainage are managed in a sustainable manner, promoting the use of SUDS. The policy also requires that culverting of watercourses should be avoided, and on-site flood storage opportunities should be utilised where possible.	
Harrogate District Local Plan, 2014 – 2035[33]	**Policy CC1: Flood Risk and Sustainable Development.** Sets out the requirements for compliance with national policy. Part D states "*all proposals will be expected to include flood mitigation measures to be identified through a site-specific FRA including consideration of the*	**Section 9.9**, **Section 9.10**, **Section 9.11, and Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9** demonstrate that the Project does not cause significant effects

[33] Harrogate Borough Council (2020). Harrogate District Local Plan 2014 – 2035. (Online) Available from: https://www.harrogate.gov.uk/planning-policy-guidance/harrogate-district-local-plan-2014-2035 (Accessed 12 July 2022).

Policy	Policy Context	Section Addressed
	creation of additional sustainable flood storage areas". The policy also requires that alternatives to culverts be utilised, unless it can be suitably demonstrated that these are in the interest of safety or are essential infrastructure. The policy also requests that all developments seek opportunities to reduce the cause/impacts of flooding. **Policy NE4a: Landscape Character.** Provisions for the protection and enhancement of the landscape, specifically requiring development to maintain the aesthetic and biodiversity qualities of watercourses, ponds, reservoirs and lakes.	to surface water or flood risk receptors.
Selby District Core Strategy Local Plan, 2013[34]	**Policy SP2: Spatial Development Strategy.** Sets out the requirement to follow a sequential approach to the assessment of sites, directing development to areas with the lowest flood risk. **Policy SP15: Sustainable Development and Climate Change.** Requires that developments ensure that the areas of flood risk are avoid, use available land efficiently and apply a sustainable approach to flood management measures, design (including SuDS) and construction. **Policy SP18: Protecting and Enhancing the Environment.** Provides for the safeguarding and, where possible, enhancement of the natural and manmade environment. **Policy SP19: Design Quality.** Seeks to protect against risk or adverse effect from pollution or land instability.	**Section 9.11** and **Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9** of this document demonstrates that there will be no significant effects to flood risk receptors as a result of the Project. Whereas **Section 9.6** details the relevant mitigation to be implemented to manage the potential significant risks to the water environment. It is therefore concluded in **Section 9.9** and **Section 9.10** that there would be no significant effects to the hydrology receptors.
Selby District Local Plan, 2005[35]	**Policy ENV2a: Environmental Pollution and Contaminated Land.** Proposals giving rise to unacceptable levels of environmental pollution (including groundwater pollution) will not be permitted unless satisfactory remedial or preventative measures	The embedded measures set out in **Section 9.6** detail the pollution prevention mitigation to be implemented. Meanwhile, **Section 9.9**,

[34] Selby District Council (2013). Selby District Core Strategy Local Plan. (Online) Available from: https://www.selby.gov.uk/sites/default/files/Documents/CS_Adoption_Ver_OCT_2013_REDUCED.pdf (Accessed 12 July 2022).
[35] Selby District Council (2005). Selby District Local Plan. (Online) Available from: https://www.selby.gov.uk/selby-district-local-plan-sdlp-2005 (Accessed 25 June 2021)

Policy	Policy Context	Section Addressed
	are incorporated as an integral element in the Project. **Policy ENV5 Flood Risk** The policy states that developments in areas of high flood risk will not be permitted, unless it can be demonstrated that it is essential infrastructure and can remain operational in times of flooding. The policy also requires that developments are supported by suitable flood management, which incorporates SuDS and flood resilience.	**Section 9.10**, **Section 9.11** and **Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9** that there will be no significant effects to aquatic environment, water resource or flood risk receptors as a result of the Project.
City of York draft Local Plan – Publication Draft, 2018[36]	**Policy DP1 ix: York Sub Area.** States "*development within the City of York area will not lead to environmental problems including flood risk*" **Policy DP2 iii: York Sub Area and ENV5: Sustainable Drainage.** DP2 iii sets out the principles around sustainability all development should align with (including themes such as flood risk, water quality, land remediation, protection of groundwater, sustainable design and low carbon energy resources). ENV5 sets out further specifics for SuDS. **Policy DP3 xii: Sustainable Communities, SS1: Delivering Sustainable Growth for York, and ENV4: Flood Risk.** Manages flood risk by ensuring development does not contribute to or is not subject to flooding and ensuring flood risk is appropriately managed. **Policy ENV5** The policy targets require that all developments incorporate SuDS into their surface water management plans and disallows discharges to public sewers. **Policy GI2: Biodiversity and Access to Nature** Provisions for conservation and enhancement of York's biodiversity, cultural and historic landmarks through maintaining and enhancing all aspects of the water environment.	**Section 9.9**, **Section 9.10**, **Section 9.11, and Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9** demonstrate that the Project does not cause significant effects to surface water or flood risk receptors.

[36] City of York Council (2018). Local Plan – Consultation Draft. (Online) Available from: https://www.york.gov.uk/downloads/file/2110/local-plan-publication-draft-2018 (Accessed July 2021).

Policy	Policy Context	Section Addressed
	Policy CC1: Renewable and Low Carbon Energy Generation and Storage. Applications need to consider the impact of the Project on local communities, residential amenity and the environment (including local protected sites and other sites of conservation importance) throughout the lifespan of the development.	
Upper Poppleton and Nether Poppleton Neighbourhood Plan, 2016-2036[37]	**Policy PNP11: Green Belt.** Encourages developers to consider the provision of porous surfaces wherever appropriate.	This policy is considered in the substation Drainage Strategies (included as **Appendix 5.3.9D, Annexes 9D.5 and 9D.6, Volume 5, Document 5.3.9**) which have been used to inform this document (see **Section 9.6**) and the FRA (**Appendix 5.3.9D**), **Volume 5, Document 5.3.9**.
Saved Policies of the York Local Plan, 2005[38]	**Policy GP1: Design.** Development proposals will avoid the loss of water features that contribute to the quality of the local environment. **Policy GP4a: Sustainability and GP4b: Air Quality** Sets out the principles around sustainability all proposals for development should align with. **Policy GP15a: Development and Flood Risk.** Sets out the expectation regarding development within areas at risk of flooding, the use of SuDS to reduce surface water runoff, discharges from new developments and provision of flood mitigation and defences. **Policy NE2: River and Stream Corridors, Ponds and Wetland Habitats and NE3: Water Protection**	**Section 9.9**, **Section 9.10**, **Section 9.11, and Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9** demonstrate that the Project does not cause significant effects to surface water or flood risk receptors.

[37] Nether Poppleton Parish Council and Upper Poppleton Parish Council (2017). Upper Poppleton and Nether Poppleton Neighbourhood Plan, 2016-2036. (Online) Available from: https://www.york.gov.uk/planning-policy/upper-nether-poppleton-neighbourhood-plan (Accessed 25 June 2021).

[38] City of York Council (2005). Draft Local Plan incorporating the 4th set of changes. (Online) Available from: https://www.york.gov.uk/downloads/file/2808/the-local-plan-2005-main-document (Accessed 25 June 2021).

Policy	Policy Context	Section Addressed
	Considers protection of the water environment. Developments likely to have a detrimental impact will not be permitted. The policy also notes the detrimental nature of culverts and requests careful consideration be given to alternatives or mitigation to reduce impacts.	
Leeds City Council Saved Unitary Development Plan (UDP), 2001 and Unitary , 2006[39]	**Policy N9:** All development proposals should respect and where possible enhance the intrinsic value of land in fulfilling a corridor function in terms of access, recreation, nature conservation and visual amenity. States all development proposals should respect and where possible enhance the natural environment. **Policy N38a:** Development, including changes of use, will not be permitted in the functional floodplain including all washland areas as identified on the proposals map unless it is for: i. appropriate open recreation, sport, amenity and conservation uses, and ii. essential transport and utilities infrastructure which cannot practicably be located elsewhere. development in the indicative flood plain will be assessed in accordance with the sequential test. All development should ensure that it does not increase the risk of flooding both on-site and elsewhere, catchment-wide. in all cases early developer consultation with the environment agency is encouraged. **Policy N38b:** Planning applications must be accompanied by a flood risk assessment where consultations with the council or the environment agency have identified a need for such assessment, or where there is other clear evidence that a proposal is likely to be affected by flooding or could increase the risk of flooding elsewhere. where a development is to be delivered in phases planning permission will only be granted for an individual phase where an overall flood risk assessment has been conducted that takes account of the cumulative flood risk and drainage impacts of both current and future phases.	**Section 9.9**, **Section 9.10**, **Section 9.11, and Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9** demonstrate that the Project does not cause significant effects to surface water or flood risk receptors.

[39] Leeds City Council (2006). Leeds Unitary Development Plan. (Online) Available from: https://www.leeds.gov.uk/planning/planning-policy/adopted-local-plan/unitary-development-plan (Accessed 25 June 2021).

Policy	Policy Context	Section Addressed
	Policy N39a: Applicants for planning permission for development likely to significantly increase runoff of surface water should demonstrate that they have explored the feasibility of incorporating sustainable drainage systems into their proposals. such systems should be implemented unless demonstrably impracticable or inappropriate, and provision should be made for their future maintenance. Sets out the expectation for the incorporation of SuDS into development proposals. **Policy LT6:** The tourism potential of the waterways corridor will continue to be recognised. appropriate leisure developments will be promoted, and priority given for environmental improvements. in considering development proposals in the waterway's corridor, the likely impact on tourism potential will be an important consideration. Considers the importance of waterways for tourism potential and necessary consideration of the likely impact of any Project. **Policy N39b** Culverting or Canalisation of watercourses The policy states that culverting should be avoided and will not be permitted unless there are public safety concerns or if the development could not be completed without these features. The policy also promotes that removal of culverts be used to restore watercourses to a more natural state. **Policy GP5:** Development proposals should resolve detailed planning considerations (including access, drainage, contamination, stability, landscaping and design). proposals should seek to avoid problems of environmental intrusion, loss of amenity, pollution, danger to health or life, and highway congestion, to maximise highway safety, and to promote energy conservation and the prevention of crime. proposals should have regard to the guidance contained in any framework or planning brief prepared for the site or area. States development proposals should resolve detailed planning considerations (including drainage). Proposals should seek to avoid environmental intrusion or pollution.	

Policy	Policy Context	Section Addressed
Leeds City Council Natural Resources and Waste Local Plan, 2015[40]	**Water 1: Water efficiency and Water 7: Surface water runoff** Promotes better management of water, encouraging a reduction in water waste through the use of SuDS, amongst other measures. Water 7 provides further detail specific to SuDS. **Water 2: Protection of water quality** Provides for the protection of water quality during the lifetime of the development, including construction. **Water 3: Functional flood plain to Water 6: Flood risk assessments** Ensures flood risk is appropriately managed, taking into account the effects of climate change.	**Section 9.9**, **Section 9.10**, **Section 9.11, and Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9** demonstrate that the Project does not cause significant effects to surface water or flood risk receptors.
Leeds Core Strategy, 2019[41]	**Policy EN5: Manging flood risk** Sets out the council's commitments for the management of flood risk. Which include protecting the functional floodplain and improving flood resilience for new developments; via flood risk assessments, surface water management, the removal of culverts and flood alleviation schemes.	**Section 9.11** and **Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9** of this document demonstrates that there will be no significant effects to flood risk receptors as a result of the Project.

9.2.6 As discussed in **Section 5.3** of **Chapter 5: Legislative and Policy Overview, Volume 5, Document 5.2.5,** the energy NPS are currently being reviewed to reflect the policies and broader strategic approach set out in the Energy White Paper and ensure a planning framework was in place to support the infrastructure requirement for the transition to net zero. The proposed changes to the hydrology and flood risk elements within the draft Energy National Policy Statements, which are considered to be relevant to the Project are listed in **Table 9.3.**

[40] Leeds City Council (2015). Adopted Natural Resources and Waste Local Plan. (Online) Available from: https://www.leeds.gov.uk/docs/Adopted%20Consolidated%20NRWLP%20Inc%20Policies%20Mins%2013-14.pdf (Accessed 25 June 2021).
[41] Leeds City Council (2019). Leeds Core Strategy: Leeds Local Plan. (Online) Available from: https://www.leeds.gov.uk/planning/planning-policy/adopted-local-plan (Accessed 12 July 2022).

Table 9.3 – Draft National Planning Policy Statement relevant to the hydrology assessment

Policy reference	Implications	Section addressed
Draft Overarching National Policy Statement for Energy (EN-1)[42]	Section 4.9 which discusses climate change adaptation. The amended policy includes reference to new renewable energy infrastructure, reduced greenhouse gas emissions and the inclusion of coastal change considerations; Section 4.10 which discusses the environmental issues likely to arise from a Grid Connection. The amended policy states that projects must support the government objectives of transitioning to net zero in the UK; Section 5.8 which discusses flood risk, setting out the minimum requirements of a flood risk assessment as well as information on the application of the Sequential and Exception tests. The amended policy states that projects should aim for climate resilient infrastructure and improve the sustainability of existing infrastructure where possible; and Section 5.16 which discusses adverse effects on the water quality and resources. The amended policy sets out the responsibility of the applicant to demonstrate appropriate surface water management and pollution control.	This document was used to inform the assessment methodology (**Section 9.8**), embedded environmental measures (**Section 9.6**) and environmental assessments of Hydrology effects (**Section 9.9** and **Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9**).
Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)[43]	Section 2.6 which provides clarification on climate change adaptation. Paragraph 2.6.1 of EN-5 advises that as climate change is likely to increase risks to the resilience of electricity network infrastructure, applicants should set out to what extent the Proposed Development is expected to be vulnerable to flooding and, as appropriate, how it would be resilient to flooding, particularly for substations that are vital for the electricity transmission and distribution network. The amended NPS EN-5 also includes that Grid	This document was used to inform the assessment methodology (**Section 9.8**), embedded environmental measures (**Section 9.6**) and environmental assessments of Hydrology effects (**Section 9.9** and **Appendix 5.3.9D: FRA,**

[42] Dept for Business Energy and Industrial Strategy (2021). Draft Overarching National Policy Statement for Energy (EN-1). (Online) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf (Accessed 25 October 2022).
[43] Dept for Business Energy and Industrial Strategy (2021). Draft National Policy Statement for Electricity Networks Infrastructure (EN-5). (Online) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015238/en-5-draft-for-consultation.pdf (Accessed 25 October 2022).

Policy reference	Implications	Section addressed
	Connections must be resilient to coastal erosion where necessary.	**Volume 5, Document 5.3.9**).

Technical guidance

9.2.7 A summary of technical guidance relevant to the hydrology topic is given in **Table 9.4**.

Table 9.4 – Technical guidance relevant to the hydrology assessment

Technical Guidance Document	Context
Ministry of Housing, Communities and Local Government (2014): Flood risk and coastal change guidance[44]	Planning practice guidance on Flood Risk and Coastal Change.
Environment Agency (2016) - Flood risk assessments: climate change allowances[45]	Guidance regarding uplifts to be applied to hydrological modelling inputs to be used to help minimise vulnerability and provide resilience to the impacts of climate change.
Planning Inspectorate Advice Note 18 (2017): The Water Framework Directive[46]	This non-statutory advice note provides guidance on the assessment of compliance of NSIPs with the requirements of the WFD. It sets out the legal context and responsibilities of the applicant and decision maker under the WFD legislation; and also provides details of the connection between environmental impact assessments, habitat regulation assessments and WFD assessments. The advice note also provides guidance on the relevant bodies who should be consulted when preparing a Development Consent Order (DCO) application, as well as guidance on the application process.
Environment Agency and Department for Environment, Food, and Rural Affairs (2020) Environmental Permits guidance[47]	Guidance on the regulation of activities which could pollute air, water or land, increase flood risk, or impact land drainage. The guidance sets out the

[44] Ministry of Housing, Communities and Local Government (2014). Flood risk and coastal change. (Online) Available at: https://www.gov.uk/guidance/flood-risk-and-coastal-change (Accessed 12 July 2022).
[45] Environment Agency (2016). Flood risk assessments: climate change allowances. 2016. (Online) Available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances (Accessed 12 July 2022).
[46] The Planning Inspectorate (2017). Advice note eighteen: The Water Framework Directive. 2017. (Online) Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf (Accessed 12 July 2022).
[47] Environment Agency and Department for Environment, Food and Rural Affairs. (2020). Guidance: Environmental permits. (Online) Available at: https://www.gov.uk/guidance/check-if-you-need-an-environmental-permit (Accessed 22 July 2022).

Technical Guidance Document	Context
	Environment Agency's permitting requirements for discharges to Controlled Waters.
Environment Agency and Department for Environment, Food, and Rural Affairs (2019) Flood risk activities: environmental permits guidance[48]	The information provides guidance on the activities regulated under environmental permits, which would therefore require a Flood Risk Activity Permit (FRAP). The guidance also provides details on exemptions, standard rules permits and bespoke permits.
North Yorkshire County Council (2022) Making Changes to Waterways[49]	Guidance that sets out North Yorkshire County Council's (as LLFA) consenting requirements for works in and around non-IDB Ordinary Watercourses within their district.
York Consortium Drainage Boards (2008) Ainsty Internal Drainage Board Byelaws[50]	Guidance on the requirements of Land Drainage Consent permitting, previously referred to as Ordinary Watercourse Consent (OWC), for activities that may affect the flow within an IDB adopted or Ordinary Watercourse within the IDB's administrative district.
Shire Group of IDBs (2016) Kyle and Upper Ouse Planning and Consents[51]	Guidance on the planning and consenting requirements set out by the Kyle and Upper Ouse IDB; for works affecting IDB adopted and Ordinary Watercourses within the IDB district.
Construction Industry Research and Information Association (CIRIA) reports	
Report C532: Control of Water Pollution from Construction Sites (2001)[52]	Provides practical support for consultants and contractors on how to plan and manage construction projects to control water pollution.

[48] Environment Agency and Department for Environment, Food and Rural Affairs. (2019). Guidance: Flood risk activities: environmental permits (Online) Available at: https://www.gov.uk/guidance/flood-risk-activities-environmental-permits (Accessed 22 July 2022)

[49] North Yorkshire County Council. (2022). Making changes to waterways. (Online) Available at: https://www.northyorks.gov.uk/making-changes-waterways (Accessed 22 July 2022).

[50] York Consortium Drainage Boards. (2008). Ainsty Internal Drainage Board Byelaws. (Online) Available at: http://www.yorkconsort.gov.uk/documents/ainsty2008bylaw.pdf (Accessed 22 July 2022)

[51] Shire Group of IDBs. (2016). Kyle and Upper Ouse: Planning and Consents. (Online) Available at: https://www.shiregroup-idbs.gov.uk/idbs/kyle-upper-ouse/asset-management/planning-consents/ (Accessed 22 July 2022)

[52] Masters-Williams, H., Heap, A., Kitts, H., Greenshaw, L., Davis, S., Fisher, P., Hendrie, M. and Owens, D. (2001) Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors. C532. London: CIRIA.

Technical Guidance Document	Context
Report C624: Development and Flood Risk - Guidance for the Construction Industry (2004)[53]	Guidance for developers and the construction industry on the implementation of good practice in the assessment and management of flood risk as part of the development process and is intended to promote development that is sustainable in terms of flood risk.
Report C648: Control of Water Pollution from Linear Construction Projects (2006)[54]	Guidance for clients, consultants, designers, contractors and regulators on how to plan and manage water pollution from linear construction projects.
Report C649: Control of Water Pollution from Linear Construction Projects - Site Guidance (2006)[55]	Guidance specifically aimed at on-site construction personnel working on linear infrastructure construction projects.
Report C650: Environmental Good Practice on Site, second edition (2005)[56]	Provides practical guidance about managing construction on-site to control environmental impacts.
Report C651: Environmental Good Practice - Pocket Book (2005)[57]	Contains a series of good practice checklists to follow while working on a project, from design and planning through the construction phase on-site, to project completion.
Report C689: Culvert Design and Operation Guide (2010)[58]	Comprehensive guidance covering a range of issues pertinent to the management and design of culverts.
Report C692: Environmental Good Practice on Site (2010)[59]	General good practice guidance and practical advice for the management of construction sites to minimise environmental impacts.
Report C698: Site Handbook for the Construction of SuDS (2007)[60]	Guidance for site engineers and SuDS practitioners on the construction of SuDS to facilitate their effective implementation within developments.

53 Lancaster, J., Preene, M. and Marshall, C. (2004) Development and Flood Risk – Guidance for the Construction Industry. C624. London: CIRIA.
54 Murnane, E., Heap, A. and Swain, A. (2006) Control of Water Pollution from Linear Construction Projects – Technical Guidance. C648. London: CIRIA.
55 Murnane, E., Heap, A. and Swain, A. (2006) Control of water pollution from Linear Construction Projects – Site Guide. C649. London: CIRIA.
56 Charles, P. and Connely, S. (2005) Environmental Good Practice Site Guide (second edition). C650. London: CIRIA.
57 Chant-Hall, G., Charles, P. and Connolly, S. (2005) Environmental good practice on site – pocket book. C651. London: CIRIA.
58 Balkham, M., Fosbeary, C., Kitchen, A. and Rickard, C. (2010) *Culvert design and operation guide. C689.* London: CIRIA.
59 Audus, I., Charles, P. and Evans, S. (2010) Environmental good practice on site (third edition). C692. London: CIRIA.
60 Woods Ballard, B., Kellagher, R., Martin, P., Jefferies, C., Bray, R. and Shaffer, P. (2007) Site Handbook for the Construction of SUDS. C698. London: CIRIA.

Technical Guidance Document	Context
Report C753: The SuDS Manual (2015)[61]	Best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments.
Pollution Prevention Guidance Notes (PPGs) and Guidance for Pollution Prevention Notes (GPPs)[62] (both are maintained by NetRegs and provide environmental good practice guidance for the whole UK, and environmental regulatory guidance directly to Northern Ireland, Scotland and Wales only. For businesses in England, regulatory guidance is available from GOV.UK instead)	
GPP 1: A general guide to preventing pollution (October 2020)[63]	Guidance document based on relevant legislation and reflects current good practice.
GPP 2: Above ground oil storage tanks (January 2018)[64]	Guidance to support the safety of above ground oil storage tanks and minimise the risk of causing pollution.
GPP 3: Use and design of oil separators in surface water drainage systems (March 2022)[65]	Guidelines to support decision making on whether an oil separator is needed for a site, and if so what size and type of separator is appropriate.
GPP 5: Works and maintenance in or near water (February 2018)[66]	Guidance document based on relevant legislation and setting out current good practice for working in or near water.
PPG 6: Working at construction and demolition sites (2012)[67]	Practical advice and guidance to help prevent pollution from construction and demolition sites. Sets out legislative requirements and good practice measures to reduce the risk of a pollution incident.

[61] Woods Ballard, S., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R. and Kellagher, R. (2015) The SuDS Manual. C753. London: CIRIA.
[62] NetRegs (2021). Guidance for Pollution Prevention (GPPs) - Full list. 2021. (Online) (Accessed 12 July 2022).
[63] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environment Protection Agency (2020) GPP 1: A general guide to preventing pollution. (Online) (Accessed 12 July 2022).
[64] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environment Protection Agency (2018) Above ground oil storage tanks: GPP 2. (Online) (Accessed 12 July 2022).
[65] Northern Ireland Environment Agency and the Scottish Environment Protection Agency (2022) Use and design of oil separators in surface water drainage systems: GPP 3. (Online) (Accessed 12 July 2022).
[66] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018) Works and maintenance in or near water: GPP 5. Version 1.2.
[67] Environment Agency (2012) Working at construction and demolition sites: PPG6. Second edition. Environment Agency; Bristol.

Technical Guidance Document	Context
GPP 8: Safe storage and disposal of used oils (July 2017)[68]	Guidance based on relevant legislation and setting out current good practice for the safe storage and disposal of used oils.
GPP 20: Dewatering underground ducts and chambers (January 2018)[69]	Guidelines for dewatering underground ducts and chambers, based on relevant legislation and setting out current good practice.
GPP 21: Pollution incident response planning (June 2021)[70]	Guidelines setting out current best practice for producing an incident response plan.
GPP 22: Dealing with spills (October 2018)[71]	Guidance applicable to those responsible for storing and transporting materials that could cause pollution if they spill. It may also be useful for those who respond to spills, or those responsible for transporting or storing waste from spills.
GPP 26 Safe storage - drums and intermediate bulk containers (IBCs) (July 2018)[72]	Guidance aimed at site operators and those responsible for the storing and handling of drums and IBCs.

9.3 Consultation and engagement

Overview

9.3.1 The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Chapter 4: Approach to Preparing the ES, Volume 5, Document 5.2.4**.

Scoping Opinion

9.3.2 A Scoping Opinion was adopted by the Secretary of State, administered by the Planning Inspectorate, on 28 April 2021. A summary of the relevant responses received in the Scoping Opinion in relation to hydrology and confirmation of how these have been addressed within the assessment to date is presented in **Table 9.5**.

[68] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017) GPP 8 Safe storage and disposal of used oils. (Online) (Accessed 12 July 2022).
[69] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (n.d.) GPP 20 Dewatering underground ducts and chambers. (Online) (Accessed 12 July 2022).
[70] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2021) GPP 21: Pollution Incident Response Plans. (Online) (Accessed 12 July 2022).
[71] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018) Dealing with spills: GPP 22. Version 1. (Online) (Accessed 12 July 2022).
[72] Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018) *GPP 26: Safe storage of Drums and Intermediate Bulk Containers (IBCs).* (Online) (Accessed 12 July 2022).

Table 9.5 – Summary of Environmental Impact Assessment (EIA) Scoping Opinion responses for hydrology

Consultee	Response	How addressed in this ES
Planning Inspectorate	The Inspectorate also considers that there a number of waterbodies located within and in close proximity to the boundary of the Proposed Development with potential to be impacted (i.e., via water pollution events due to suspended solids and other pollutants entering Controlled Waters) during both the construction and operational (and maintenance) phases. Therefore, the Inspectorate does not consider that sufficient information has been provided within the Scoping Report to reasonably conclude that activities associated with the construction and operational phases of the Proposed Development would not give rise to significant water quality effects. This matter should be assessed within the ES, including consideration of impacts to ecological features e.g. designated sites and Habitats of Principal Importance (HPI) with freshwater habitats and species associated with freshwater habitats as part of the assessment of biodiversity, where significant effects are likely to occur.	For this Project, the Hydrological Study Area has been defined to include all Water Framework Directive (WFD) waterbody catchments intersected by the Order Limits of the Project **(Section 9.4). Section 9.14** of this assessment has considered the potential effects on the water quality and hydromorphology supporting elements of WFD ecological status and the potential for impacts on the supporting water quality and hydromorphology for freshwater dependent sites. Potential impacts on freshwater habitats and species are assessed in **Chapter 8: Biodiversity, Volume 5, Document 5.2.8**. Cross references have been made between the two chapters, where appropriate.
Planning Inspectorate	The Inspectorate considers that water quality has the potential to interface with health and wellbeing and appropriate cross-reference should be made within the ES.	Potential impacts on water resources which support human health arising from the Project have been considered in the assessment under **Section 9.10** and **Section 9.11**. Potential impacts on human health and wellbeing are assessed in **Chapter 15: Health and Wellbeing, Volume 5, Document 5.2.15**.
Planning Inspectorate	The Environment Agency (EA) has stated that it holds additional modelling for the area around the proposed York North Substation (now known as the Overton Substation) and existing Osbaldwick Substation. This information should be used within the assessment.	Noted. The York Detailed Model has been obtained from the Environment Agency and has been utilised in the assessment of future flood risk (**Appendix 5.3.9D: Flood Risk Assessment, Volume 5, Document 5.3.9**).

Consultee	Response	How addressed in this ES
Planning Inspectorate	The EA notes that some of the proposed 400kV overhead line around the North west of York site are close to a recent Natural Flood Management Scheme (Whitby Wood). The ES should describe any interaction between the Proposed Development and Whitby Wood.	Noted, flood defence schemes have been discussed as needed with the Environment Agency and the Whitby Wood project is considered in the assessment under **Section 9.10** and **Section 9.11**. The Project is considered to be negligibly impacted by the Project as it is outside of the Order Limits, on the opposite (east) side of the Hurns Gutter, downstream of the new pylons and Overton Substation.
Planning Inspectorate	Reference is made to known existing flood defences within, and up- and down-stream of, the Scoping red line boundary; the ES should include a description of the flood defences within the baseline where these could be impacted by the Proposed Development.	Noted, these are described in **Section 9.5**.
Planning Inspectorate	The ES should consider the loss of cable oil to ground and then to watercourse via groundwater.	Noted. Embedded measures have been included in the Project design to minimise the potential for harm to the water environment should this type of cabling be utilised as part of the Project (see **Section 9.6**).
Planning Inspectorate	The Inspectorate notes that there may be a requirement for temporary bridges and/or culverts during the construction period and that the EA expresses a presumption against culverts. The ES should include the location and description of any such temporary infrastructure and where significant effects are likely to occur, scope these matters into the EIA.	Noted. The ES provides the location of culverts and temporary bridges in **Figure 9.3 (A-F), Volume 5, Document 5.4.9**. **Section 9.6** sets out the embedded measures which will minimize effects from culverts and temporary bridges and this chapter includes assessment of the potential effects from this infrastructure.
Planning Inspectorate	The Inspectorate notes that the baseline conditions in the Scoping Report are presented by reference to a 500m buffer around the Scoping red line boundary, but there are various references within the text to simply the Scoping red line boundary. The ES should have a clearly defined study area, which includes the extent	Noted, the Study Area is described in **Section 9.4** and indicated on **Figure 9.2, Volume 5, Document 5.4.9.**

Consultee	Response	How addressed in this ES
	necessary to assess all receptors that have potential for likely significant effects in relation to hydrology as a result of the Proposed Development.	
Planning Inspectorate	It is not clear from the Scoping Report whether any underground cable will cross below or run close to a main river. This should be confirmed in the ES and, as relevant, the ES should include site- specific assessments for each location to inform cable crossing techniques where significant effects may occur (addressing risks associated with break out of drilling fluids through the watercourse bed).	Noted. One section of third party overhead line undergrounding crosses a watercourse. The impacts of this construction activity is assessed under **Section 9.10**, with embedded mitigation provided in **Section 9.6**.
Planning Inspectorate	The Inspectorate notes that the project-wide assessment methodology is cross-referenced at paragraph 9.6.1, but it is indicated this will be modified for application to hydrology. Chapter 9 does not provide alternative criteria, including for classifying sensitivity of receptors, magnitude of change or how significance of effect will be assessed. If a modified assessment methodology is to be applied for the is aspect, the ES should clearly explain what the assessment methodology is and how it is to be applied.	Details of the assessment methodology are provided in **Section 9.8**
Planning Inspectorate	It is not clear where waterbodies intercept with the Proposed Development based on the figures provided in the Scoping Report. The ES text and figures should clearly demonstrate this.	Noted, please refer to **Figure 9.3, Volume 5, Document 5.4.9** and **Section 9.5**.
Planning Inspectorate	On the basis of the baseline data, the fact that all permanent infrastructure (except pylons, which would result in minimal water displacement relative to overall volumes) will be located in Flood Zone 1, and incorporation of the stated embedded environmental measures, the Inspectorate agrees that operational matters in respect of flood risk would not give rise to likely significant effects and can therefore be scoped out of the ES.	Noted. On this basis, flood risk effects during the operational phase of the Project from the majority of the Project elements are not considered further within this assessment. The most significant element of the Project to be identified as being at future flood risk is Overton Substation. The Overton Substation would be located within present-day Flood Zone 1, however, the Environment Agency's flood modelling output indicates that in future scenarios the Substation is at risk of flooding, where the asset is

Consultee	Response	How addressed in this ES
		not suitably designed to incorporate flood resilience. This is considered further in the FRA (see **Appendix 5.3.9D, Volume 5, Document 5.3.9**) and **Section 9.11** of this report. In addition, drainage strategies for both Overton and Monk Fryston Substations have been developed to demonstrate how surface water runoff from these sites can be managed in a sustainable manner which meets all relevant policy requirements throughout the lifetime of the infrastructure. These are presented in **Annexes 9D.5 and 9D.6** of **Appendix 5.3.9D, Volume 5, Document 5.3.9**, respectively.
Environment Agency	We broadly support and agree with the findings of the preliminary FRA. In Section 3.2.9 it states the following: "*In the Environment Agency scoping opinion, it was noted that the H++ climate change allowance should be "treated as a 'sensitivity test'. It will help you assess how sensitive your proposal is to changes in the climate for different future scenarios. This will ensure your Project can be adapted to large-scale climate change over its lifetime. We are not proposing to undertake a H++ scenario, as we consider that application of the National Grid design criteria for flood resilience of a 1 in 1000 year flood event with an allowance for climate change (+34% to flood peaks) would yield a design standard for new infrastructure considerably in excess of H++ requirements when applied to the 1 in 100 event (+65% to flood peaks)."* If you are not proposing to undertake the H++ scenario as a sensitivity test, we strongly recommend that you undertake an interpolation to demonstrate/evidence that this is the case.	Noted. **Appendix 5.3.9D: FRA, Volume 5, Document 5.3.9** sets out the approach of the FRA and the climate change allowance considered in the assessment of future flood risk.
Environment Agency	We recommend early engagement in respect of any permits that may be required.	The permitting requirements are noted and will be adhered

Consultee	Response	How addressed in this ES
	We support that watercourse crossings will be designed and built to minimise impacts on flows and will take into account an appropriate allowance for climate change taking into account the lifetime of these temporary structures. We also support the use of a clear span bridge over the Cock Beck*. Whilst we note that (with the exception of access crossings) a minimum standoff of 9 metres will be provided from all watercourses, you should note that a requirement of an EPR flood risk activity permit requires a vertical and horizontal standoff of 15 metres where any works are being carried out in the vicinity of a main river or flood defence. This is to ensure that our Operations Team have sufficient clearance under health and safety requirements to carry out any future works or maintenance. The Environmental Permitting (England and Wales) Regulations 2016 require a permit or exemption to be obtained for any activities which will take place: • on or within 8 metres of a main river (16 metres if tidal) • on or within 8 metres of a flood defence structure or culverted main river (16 metres if tidal) • on or within 16 metres of a sea defence • involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert • in a floodplain more than8 metres from the river bank, culvert or flood defence structure (16 metres if it is a tidal main river) and you do not already have planning permission.	to following the granting of DCO approval.

* not taken forward as part of the final design

Statutory Consultation

9.3.3 Statutory Consultation took place between 28 October and 9 December 2021 in accordance with the Planning Act 2008 (the Act). Prescribed and non-prescribed consultees and members of the public were included in the consultation. Various methods of consultation and engagement were used in accordance with the Statement of Community Consultation (SoCC) including letters, website, public exhibitions, publicity and advertising in newspapers and webinar briefings.

9.3.4 National Grid prepared a Preliminary Environmental Information Report (PEIR) which was publicised at this consultation stage. National Grid sought feedback on the environmental information presented in that report. Feedback received during statutory consultation was considered by National Grid and incorporated where relevant into the design of the Project and its assessment and presentation in this ES.

9.3.5 A summary of the relevant responses received in response to statutory consultation, together with any subsequent discussions held in relation to hydrology and flood risk, and confirmation of how these have been considered within the assessment to date is presented in **Table 9.6**. Statutory consultation representations and National Grid's responses is provided in **Volume 6, Document 6.1 (Consultation Report)**.

9.3.6 Technical engagement with consultees in relation to hydrology and flood risk will continue throughout the DCO examination period.

Table 9.6 – Summary of statutory consultation responses and technical engagement received during consultation meetings

Consultee	Comments and consideration	How addressed in this ES
Environment Agency, North Yorkshire County Council (as an affected LLFA) and the York Consortium of IDBs** A pre-PEIR consultation meeting was held regarding the approach to the assessment and FRA.	A key consideration was the need for flood modelling for the proposed Overton Substation site.	Flood mitigation measures have been identified in this chapter, which are supported by a modelling study that has been undertaken for the proposed Overton Substation site. Details of the modelling study are set out in **Annex 9D.4** of the FRA (**Appendix 5.3.9D, Volume 5, Document 5.3.9**).
Environment Agency	A meeting was held to consider the flood modelling approach for the proposed Overton Substation, which included discussion around the appropriate model to use and the climate change uplifts to be applied.	The agreed modelling approach, including the climate change uplifts used is presented in the FRA (**Appendix 5.3.9D, Annex 9D.4, Volume 5, Document 5.3.9**)
Environment Agency, North Yorkshire County Council (as an affected LLFA) and the York Consortium of IDBs**	A pre-ES consultation meeting was held to: 1) present the Overton Substation flood modelling; 2) present the drainage strategies; 3) discuss the Project element locations and the potential consenting requirements; 4) discuss the approach to Statements of Common Ground.	The locations of Project elements have been reviewed and where possible have been relocated/redesigned to avoid being in proximity to watercourses or within the flood zones. The climate change uplifts used within the substation Drainage Strategies (included

Consultee	Comments and consideration	How addressed in this ES
	The updated EA climate change allowances were discussed in relation to the drainage strategies for the construction and operational phases of the Project.	as **Appendix 5.3.9D, Annexes 9D.5 and 6, Volume 5, Document 5.3.9**), have been updated, following the updates to the guidance.

**Leeds City Council, City of York Council, and the Shire Group of IDBs were invited as they are affected by the Project, but did not attend these meetings.

9.4 Data gathering methodology

Study Area

9.4.1 The Hydrological Study Area (HSA) identifies the spatial extent for which baseline characterisation, identification of potential receptors and the assessment of water quality, resources, and flood risk effects will be carried out.

9.4.2 For this Project, the HSA has been defined to include all WFD waterbody catchments intersected by the Order Limits for the Project. This is in recognition of the WFD being the most overarching applicable regulatory framework for these studies (management and monitoring of the hydrological environment is most commonly assessed at a waterbody scale). This approach also enables data gathering to be consistent with waterbody scale receptors and reporting to satisfy the requirements of the WFD. These WFD waterbodies are shown in **Figure 9.2, Volume 5, Document 5.4.9**.

9.4.3 Within the HSA, a hydrological Zone of Influence (ZoI) is used to identify potential receptors for effects arising from the Project including watercourses, abstractions and discharges and water-dependent conservation sites. This ZoI extends 0.5km upstream and downstream of the Order Limits. It is anticipated that any effects to receptors beyond these limits would be negligible (not significant) at such distances from the Project, due the inclusion of embedded mitigation and the dispersion and dilution effects of a relatively minor input to significantly larger waterbodies.

9.4.4 For the purposes of the EIA, the Order Limits have been divided into six Sections, designated as Sections A to F, which are defined in **Chapter 3: Description of the Project, Volume 5, Document 5.2.3**. The description of the baseline conditions in **Section 9.5** includes specific detail/focus on Sections A to F (see **Figure 9.2, Volume 5, Document 5.4.9**).

Desk study

9.4.5 A summary of the organisations that have supplied data to support this assessment, together with a description of the data provided, is outlined in **Table 9.7**.

Table 9.7 – Data sources used to inform the hydrology assessment

Organisation	Data Source	Data Provided
Met Office UK[73]	The Met Office website	Average climate figures for Linton on Ouse (1981-2010).
Bing maps[74]	Ordnance Survey mapping	OS mapping with topographical contours at 1:50,000 and 1:25,000 scales.
British Geological Survey (BGS)	BGS map viewer[75]	Baseline information on bedrock, superficial and borehole geology data for the Study Area.
Multi-Agency Geographic Information for the Countryside (Magic)	MAGIC natural environment map viewer[76] National Soil Research Institute Soilscapes map viewer[77]	Map providing baseline information on soil and land use characteristics for the Project.
National River Flow Archive	National River Flow Archive[78] website	River flow data.
Environment Agency	The Environment Agency's Flood Map for Planning[79]. The Environment Agency's Risk of Flooding from Surface Water (RoFSW)[80]	Map providing baseline information on the flood risk from rivers for the Project. Map providing baseline information on the flood risk from surface water for the Project.
	The Environment Agency's Catchment Data Explorer (CDE)[81]	Baseline information on WFD classification of waterbodies within HSA.

[73] Met Office (2021) UK climate averages at Linton on Ouse. (Online) Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcx57w9fb (Accessed: 04 February 2021).
[74] Microsoft (2022) Bing maps. Images courtesy of OS.
[75] British Geological Survey (2021) Geology of Britain viewer (classic).
[76] Defra (2022) MAGIC maps. (Online) Available at: https://magic.defra.gov.uk/magicmap.aspx (Accessed 25 October 2022).
[77] Cranfield Soil and AgriFood Institute (2021) Soilscapes map. (Online). (Accessed 12 July 2022).
[78] UK Centre for Ecology and Hydrology (2021) National River Flow Archive. (Online) (Accessed 12 July 2022).
[79] Environment Agency (2021) Flood map for planning. Available at: https://flood-map-for-planning.service.gov.uk/ (Accessed 12 July 2022).
[80] Environment Agency (2021) Long term flood risk. Available at: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map (Accessed 12 July 2022).
[81] Environment Agency (2022) Catchment Data Explorer. Available at: https://environment.data.gov.uk/catchment-planning/ (Accessed 12 July 2022).

Organisation	Data Source	Data Provided
	Data request made to the Environment Agency for relevant Main River hydraulic modelling.	The York Detailed Model, the 'Cock Beck flood model and Ouse and Wharfe Washlands Optimisation Study Hydraulic Modelling results.
	Data request made to the Environment Agency for all licensed abstractions within 500m of the Order Limits	Baseline data of registered licensed abstractions
	Data request made to the Environment Agency for all consented discharges within 500m of the Order Limits	Baseline data of registered licensed discharges, including location.
Leeds City Council	Private water supplies (PWS) information, including locations.	Leeds CC indicated that it does not hold any records regarding private water abstractions.
City of York Hambleton District Council Harrogate Borough Council	PWS information, including locations.	No information available for Hambleton District Council and Harrogate Borough Council. No responses have been received from the City of York.

Survey work

9.4.6 A hydrology and flood risk walkover survey was undertaken by two consultants from Wood, over two days, on 24 and 25 June 2021. The objective of this walkover was to visit sites identified from desk-based review as having the potential to impact the surface water environment or be at risk of flooding due to the proximity of certain construction and operational activities to watercourses and flood zones. The locations visited during the site visit included:

- the existing Osbaldwick Substation (see **Figure 9.3a, Volume 5, Document 5.4.9**) – visited to try and understand the flood risk at the site and what existing flood mitigation/resilience measures are in place;
- proposed Overton Substation (see **Figure 9.3b, Volume 5, Document 5.4.9**); and
- the proposed Monk Fryston Substation, adjacent to the existing substation (see **Figure 9.3f, Volume 5, Document 5.4.9**).

9.5 Overall baseline

Current baseline

9.5.1 The surface water quality, resources, and flood risk baseline has been developed on the basis of a desk-based assessment of existing data, as summarised in **Table 9.7**, supplemented by the walkover described above. The understanding obtained from the

baseline data is supplemented by subsequent consultation with relevant water and flood risk stakeholders.

9.5.2 The following sections provide a description of the baseline environment relevant to the Study Area. Baseline descriptions for Sections A to F are described later in this section, with an overall description provided initially to describe the baseline conditions for the entire Project.

Topography

9.5.3 Ordnance Survey (OS) mapping indicates the topography of the area north-west of York is relatively flat varying between 15 and 20m Above Ordnance Datum (AOD), with elevation falling towards the banks of the River Ouse (around 10mAOD).

9.5.4 OS mapping shows that the topography over the land within the Order Limits is relatively flat, with gentle changes in elevations varying between 10mAOD by the River Ouse crossing in the area north-west of York and approximately 60mAOD close to Hazelwood Castle, south-west of Tadcaster.

9.5.5 Further detail regarding the topography baseline is provided for Project Sections A-F in the relevant sub-sections below.

Hydrology

9.5.6 There are a number of larger, principal, watercourses that could be directly affected by the Project, in addition to a number of tributaries and drainage ditches which also interact with the Project (see **Figure 9.3, Volume 5, Document 5.4.9**). The tributaries and drainage ditches largely fall within the wider WFD river catchments and are tributaries of the River Ouse.

9.5.7 Direct impacts to watercourses at the point at which they are intersected by Project infrastructure have the potential to indirectly impact hydrological receptors upstream and downstream of the Project within the ZoI as defined in **Section 9.4**.

9.5.8 The furthest upstream flow gauge on the River Ouse is located at Skelton (NGR SE568553), adjacent to Nether Poppleton. There are also gauges on the River Nidd, River Kyle and River Wharfe in proximity to the Project. Summary data from these flow gauges are presented in **Table 9.8**, which demonstrates that the River Ouse drains a substantial catchment upstream of York and the River Wharfe drains a substantial area upstream of Tadcaster.

Table 9.8 – Summary of river flows

Gauge Ref.	Gauge Name	Watercourse	NGR	Catchment Area (km^2)	Mean Flow (m^3/s)	Q10[1] (m^3/s)	Q95[2] (m^3/s)	BFI[3]	Period of Record
27009	Ouse at Skelton	River Ouse	SE568553	3315	51.24	126.50	7.79	0.45	1969-2019
27062	Nidd at Skip Bridge	River Nidd	SE482560	516	8.49	19.56	1.64	0.49	1979-2019

Gauge Ref.	Gauge Name	Watercourse	NGR	Catchment Area (km^2)	Mean Flow (m^3/s)	Q10[1] (m^3/s)	Q95[2] (m^3/s)	BFI[3]	Period of Record
27060	Kyle at Newton on Ouse	River Kyle	SE509602	168	12.46	44.20	0.13	0.11	1979-2019
27089	Wharfe at Tadcaster	River Wharfe	SE477441	818	17.32	41.30	2.79	0.41	1991-2019

*Source: National River Flow Archive
1Q10: the flow that is equalled or exceeded 10% of the time – an index of high flow.
2Q95: the flow that is equalled or exceeded 95% of the time – an index of low flow.
3BFI: baseflow index, the proportion of the total river flow that is derived from gradual release from groundwater storage, as opposed to rapid surface or near-surface runoff.

9.5.9 An assessment of ponds within 500m of the Order Limits has been undertaken in **Chapter 8: Biodiversity, Volume 5, Document 5.2.8** of this ES. The findings of the biodiversity assessment have been used as the basis of the assessment in relation to potential hydrological effects on ponds.

9.5.10 The proximity assessment from **Chapter 8: Biodiversity, Volume 5, Document 5.2.8** found that there are over 300 ponds located within 500m of the Order Limits; however, due to the lack of sensitive habitat and limited hydrological connectivity between the ponds and the Project, it was concluded that the only potential significant hydrological effects would be to those ponds located within the Order Limits.

9.5.11 Overall, there are 26 ponds that fall within the Order Limits. Of these 26, only one is permanently lost (Overton Substation) and 20 ponds are within temporary working areas, with subsequent potential impacts to water availability and quality as a result of construction activities.

9.5.12 Further details and an assessment of potential significant effects to these receptors has been carried out in **Chapter 8: Biodiversity, Volume 5, Document 5.2.8**. The proposed embedded measures in **Section 9.6**, would be sufficient in mitigating any potential hydrology related effects to such receptors.

Conservation sites

9.5.13 The statutory and non-statutory nature conservation sites near the Project are described in detail in **Chapter 8: Biodiversity, Volume 5, Document 5.2.8**. There are no statutory nature conservation sites which coincide with the Order Limits (see **Figure 9.5, Volume 5, Document 5.4.9**). However, there are two non-statutory conservation sites which are intersected by the Order Limits. These are the Overton Borrow Pits, Site of Importance for Nature Conservation (SINC), and the River Ouse Local Wildlife Site (LWS; and candidate SINC).

9.5.14 There are 16 statutory and 17 non-statutory nature conservation sites identified within the HSA. A summary of these sites with a key water dependence and potential hydrological connectivity with the Project is presented in **Appendix 5.3.9A, Volume 5 Document 5.3.9**. Details on the conservation sites are also provided in **Chapter 8: Biodiversity, Document 5.2.8**.

9.5.15 Of the 16 statutory sites and 17 non-statutory nature conservation sites only two statutory and three non-statutory conservation sites have been scoped in for further assessment due to their location within the ZoI and hydrological connectivity to the Project. These are identified as:

- Clifton Ings and Rawcliffe Meadows Site of Scientific Interest (SSSI);
- Sherburn Willows SSSI and Yorkshire Wildlife Trust Site (YWT);
- Overton Borrow Pits SINC;
- Healaugh Marsh SINC; and
- River Ouse LWS and candidate SINC.

9.5.16 These conservation sites are summarised under the relevant Project Sections A-F baseline descriptions below.

9.5.17 The remaining conservation sites have been scoped out of the assessment, on the basis that they are beyond the ZoI and/or have no direct hydrological connection to the Order Limits.

Water resources, abstractions and discharges

9.5.18 A Drinking Water Protection Area (Surface Water) and a Drinking Water Safeguard Zone (Surface Water) are present to the north and west of York, intersecting the Project Order Limits. The water resources which are likely to interact with the Project are summarised in **Table 9.9**.

Table 9.9 – Water resources protection designations intersecting the ZoI

Name	Reference Number	Designation Type
Ouse from River Nidd to Stillingfleet Beck	GB104027069593	Drinking Water Protected Area (SW).
Humber_SWSGZ6007_Acomb Landing and Moor Monkton	SWSGZ6007	Drinking Water Safeguard Zone (SW).

9.5.19 Within the Order Limits, the Swale, Ure, Nidd and Upper Ouse Abstraction Licensing Strategy[82] shows the main channel of the River Ouse and tributaries, have water resource available at least 50% of the time. The Wharfe and Lower Ouse Abstraction Licensing Strategy[83] shows the main channel of the River Wharfe and tributaries, have water resource available at least 95% of the time. The main channel of the Lower Ouse and tributaries have water resource available at least 50% of the time.

[82] Environment Agency (2013) Swale, Ure, Nidd and Upper Ouse Abstraction Licensing Strategy, February 2013: A licensing strategy to manage water resources sustainably. Ref LIT 7868. Environment Agency; Bristol.
[83] Environment Agency (2013) Wharfe and Lower Ouse Abstraction Licensing Strategy, February 2013: A licensing strategy to manage water resources sustainably. Ref LIT 7869. Environment Agency; Bristol.

9.5.20 The Environment Agency have provided data for licensed abstractions and discharges within 500m of the Order Limits. These data show that there are no licensed abstractions within the Order Limits, but there are 14 licensed abstractions within 500m of the Project Order Limits (see **Figure 9.5, Volume 5, Document 5.4.9**).

9.5.21 Of these abstractions, 13 are from groundwater sources and one is a direct abstraction from the Newthorpe Beck. The licensed surface water abstraction is located within Section E of the Project. Further details of the groundwater abstractions are provided in **Chapter 10: Geology and Hydrogeology, Volume 5, Document 5.2.10**.

9.5.22 There are two licenced discharges within the Order Limits, according to Environment Agency data; which also shows there are a further 21 licenced discharges within a 500m distance of the Order Limits. The locations of these licenced discharges are presented in **Figure 9.5, Volume 5, Document 5.4.9** and summaries included in Section of the Project (A-F) below.

Water quality and Water Framework Directive status

9.5.23 River Basin Management Plans (RBMPs) have been drawn up (by the Environment Agency) for the 11 river basin districts in England and Wales as a requirement of the WFD. The plans for England have been developed by the Environment Agency through consultations with organisations and individuals. The plans are designed to protect and improve the quality of the water environment, by providing information on what needs to be done to address water issues, i.e., measures to improve water quality in rivers, lakes, estuaries, coasts and in groundwater. The Study Area is covered by the River Basin Management Plan (RBMP) Environment Agency's Humber River Basin District[84].

9.5.24 The Humber RBMP[84] divides surface water catchments into discrete waterbodies. A fundamental requirement of the WFD is to attain good ecological status (GES) within each defined waterbody and to ensure that deterioration in the status is prevented.

9.5.25 Where the physical characteristics of a waterbody have been substantially altered by human activity, the waterbody may be designated as a Heavily Modified Waterbody (HMWB). HMWBs are required to meet good ecological 'potential' (GEP) rather than 'status'. The ecological potential of a waterbody represents the degree to which the quality of the waterbody's aquatic ecosystem approaches the maximum it could achieve, given the heavily modified characteristics of the waterbody that are necessary for the use or for the protection of the wider environment.

9.5.26 Those WFD watercourses that may potentially be affected by the Project are captured in the HSA and are described by Project Section (Section A-F) below and in further detail in **Appendix 5.3.9B, Volume 5, Document 5.3.9**. These have been identified on the basis of their direct hydrological connectivity with the Order Limits, i.e., where any part of their catchment area coincides with the Project.

9.5.27 No WFD standing waterbodies have been identified within the Order Limits. The Moor Monkton Reservoir is the only WFD standing waterbody within the HSA. The waterbody achieved an overall status of 'Moderate' in the 2019 WFD classification (Cycle 2). The Moor Monkton Reservoir is located approximately 1.9km upstream of the Project on the banks of the River Ouse. At such a distance upstream from the Project any effects

[84] Defra and Environment Agency (2015). Water for life and livelihoods part 1: Humber river basin district River Basin Management Plan (Online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718328/Humber_RBD_Part_1_river_basin_management_plan.pdf (Accessed 12 July 2022).

would be negligible (not significant) and therefore no effects are predicted. On this basis the Moor Monkton Reservoir is not considered further in this assessment.

Flood risk

Fluvial flood risk

9.5.28 The Environment Agency's Flood Map for Planning[79] provides an indication of the likelihood of flooding from fluvial and tidal sources, with Flood Zones 1 to 3 indicating a Low, Medium and High[85] likelihood of flooding respectively. Flood Zone extents are shown on **Figure 9.6, Volume 5, Document 5.4.9**.

9.5.29 Much of the North west of York Area (**Figure 9.6, Volume 5, Document 5.4.9**, Section B), particularly the northern part, is located within Flood Zone 1. The Tadcaster Area (**Figure 9.6, Volume 5, Document 5.4.9**, Section D) is located entirely within Flood Zone 1.

9.5.30 Known flood defences associated with the River Ouse and River Wharfe are located within the Order Limits. In addition, flood defences associated with the River Ouse, River Nidd and River Wharfe are located upstream and downstream of the Order Limits.

9.5.31 Further detailed information on fluvial flood risk can be found in Project Sections A-F below.

Surface water flood risk

9.5.32 The Environment Agency's surface water flood risk mapping[80] indicates that the HSA crosses numerous areas classified as being at High, Medium, Low and Very Low[86] likelihood of surface water flooding (see **Figure 9.7, Volume 5, Document 5.4.9**). Generally, these are associated with low-lying areas, areas at risk of fluvial flooding or areas around minor watercourses.

9.5.33 Further detailed information on surface water flood risk can be found in Project Sections A-F below.

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[85] Flood Zone 1 (low probability) is defined as land having a less than 0.1% annual probability of river or sea flooding.
Flood Zone 2 (medium probability) is defined as land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding.
Flood Zone 3 (high probability) is defined as land having a 1% or greater annual probability of river flooding; or land having a 0.5% or greater annual probability of sea flooding.

[86] High risk means that each year this area has an annual probability of surface water flooding of greater than 3.3%.
Medium risk means that each year this area has an annual probability of surface water flooding of between 1% and 3.3%.
Low risk means that each year this area has an annual probability of surface water flooding of between 0.1% and 1%.
Very low risk means that each year this area has an annual probability of surface water flooding of less than 0.1%.

Groundwater flood risk

9.5.34 Information on flood risk from groundwater was sourced from a review of North Yorkshire County Council's (NYCC's) Strategic Flood Risk Assessment (SFRA)[87]. The SFRA includes the Environment Agency's Areas Susceptible to Groundwater Flooding mapping (Map 1 of the SFRA), which presents the risk of groundwater flooding to the majority of North Yorkshire, including the HSA. The majority of the HSA has a low susceptibility (<25%) to groundwater flooding, with minor areas increasing in susceptibility (medium (25 – 50%), high (50-75%) and very high (>75%)). These areas of higher risk are generally low-lying and/or are associated with the Main rivers.

9.5.35 NYCC reported there is no substantial evidence of direct groundwater flooding in the majority of North Yorkshire[88]. However, they are aware of specific circumstances where groundwater emergence may exacerbate surface water flooding. For example, it is known to be a cause of flooding to a small number of properties in some areas as a result of natural springs in the hillside next to properties, and, that both groundwater and surface water flooding both pond in the same nearby low-lying areas. However, affected areas are outside the Order Limits.

9.5.36 In the Flood Risk Assessment (PFRA)[89], City of York Council concluded there was no significant risk of flooding from groundwater, at present or in the future, and has no record of areas where groundwater emergence is known to be a cause of flooding[90].

9.5.37 NYCC hold no local information providing evidence on future groundwater flood risk; however, they do note that should groundwater flooding occur it is likely to be in low points and depressions where surface water flooding occurs. Leeds City Council identified groundwater flooding within a localised area of North Leeds[91]. This location is outside the Order Limits and is therefore not considered further.

Sewer flood risk

9.5.38 Risk of flooding from sewers is not considered as a significant source of flooding due to the predominantly rural setting of the Project, and HSA more widely.

Tidal flood risk

9.5.39 Tidal flooding does not pose a risk to the Project (or more widely within the HSA) due to the height of the land to which the Project relates (>10mAOD).

Artificial flood risk

9.5.40 The Environment Agency's long-term flood risk mapping[79] shows that the Main rivers could convey floodwater originating from the failure of upstream reservoirs. Generally, the risk of flooding from reservoir extents are smaller than the fluvial Flood Zones along

[87] North Yorkshire County Council, City of York Council and the North York Moors National Park Authority (2016). Sustainability Appraisal Strategic Flood Risk Assessment (Online). Available at: https://www.northyorks.gov.uk/strategic-flood-risk-assessment (Accessed 12 July 2022
[88] North Yorkshire County Council (2017) Preliminary Flood Risk Assessment (addendum)
[89] City of York Council (2011). Preliminary Flood Risk Assessment (Online). Available at: https://democracy.york.gov.uk/mgConvert2PDF.aspx?ID=50981 (Accessed 1 October 2021).
[90] City of York Council (2017) Preliminary Flood Risk Assessment (addendum)
[91] Leeds City Council (2017) Preliminary Flood Risk Assessment (addendum)

the same river reaches and no risk of flooding from reservoir failure is identified within any of the proposed locations for the CSEC or substations.

9.5.41 However, the long-term flood risk mapping also presents the scenario of a reservoir flood event occurring simultaneously with a fluvial flood event or 'Wet day'. This is considered to be a worst-case scenario, which the Environment Agency highlight is unlikely to take place; although there is no indication of likelihood or probability provided in the mapping. A 'wet-day' scenario assumes that just before reservoir failure[92]:

- *the water level in the reservoir is higher than the top water level and is consistent with the probable maximum precipitation*
- *there it is already an additional flow in the downstream watercourse that represents an extreme flood in the present day (not equivalent to Flood Zone 2 or 3).*

9.5.42 **Figure 9.10, Document 5.4.9** presents the extent of the 'Wet-day' scenario. Which indicates that the majority of the proposed Overton Substation site would be inundated in such an event, as well as any associated site infrastructure (such as new permanent access tracks).

9.5.43 Elsewhere, the modelled flood extent coincides with some construction related elements of the Project, primarily located within Sections B and C. This is due to the low-lying topography surrounding the River Ouse and the River Foss, which are to the north of the HSA. Meanwhile the combined flood extent found to the south of the HSA is mostly confined to the fluvial flood zones, due to the higher elevations of adjacent land areas.

Section A

9.5.44 Section A of the Project comprises the Order Limits around Osbaldwick Substation to the east of York. The construction activities comprise the refurbishment of existing pylons and works within the existing substation compound.

Topography

9.5.45 OS mapping indicates that the topography within Section A of the Order Limits is relatively flat, particularly to the north of and including Osbaldwick Substation, where the elevation is around 15mAOD. The topography rises to around 30mAOD to the southwest, towards Hull Road and Kimberlow Hill.

Hydrology

9.5.46 Section A is wholly located within the Tang Hall Beck/Old Foss Beck WFD catchment (GB104027063500), a tributary of the River Foss (see **Figure 9.2, Volume 5, Document 5.4.9**).

9.5.47 Section A is partially situated within an area served by an extensive network of artificial drainage channels (Ordinary Watercourses) under the control and management of the Foss Internal Drainage Board (FIDB) (**Figure 9.1, Volume 5, Document 5.4.9**). The IDB system provides a network of arterial watercourses that are used to manage water levels and reduce flood risk within its district.

[92] Environment Agency. (2021). Reservoir flood maps: when and how to use them (Online) Available at: https://www.gov.uk/guidance/reservoir-flood-maps-when-and-how-to-use-them (Accessed 15 July 2022)

9.5.48 The FIDB drains discharge into the Osbaldwick Beck approximately 1.4km downstream of the Order Limits.

9.5.49 An IDB adopted drain flows to the north of Osbaldwick Substation (F90 – Murton Station Dyke). The IDB drain is crossed by the Order Limits at two locations, one of which is an existing access road connecting to Murton Way and the other an existing section of the 400kV Norton to Osbaldwick (2TW/YR) overhead line.

9.5.50 There are no gauged watercourses within Section A.

Conservation sites

9.5.51 Following the screening assessment of conservation sites presented in **Appendix 5.3.9A, Volume 5, Document 5.3.9**, only conservation sites within the ZoI are considered further within this assessment. There are no designated conservation sites within the ZoI of Section A of the Project.

Water quality and Water Framework Directive status

9.5.52 Summary details of the current status for the Tang Hall Beck/Old Foss Beck WFD waterbody are provided in **Table 9.10** with further detail regarding the reasons for not achieving good status (RNAG) and WFD waterbody objectives provided in **Appendix 5.3.9B, Volume 5, Document 5.3.9.**

Table 9.10 – WFD waterbodies in direct connectivity with Section A

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody status (2019)[1]
Tang Hall Bk/Old Foss Bk catch, tributary of River Foss (GB104027063500)	Heavily modified	Moderate

[1] These are the latest (2019) status data as obtained from the Catchment Data Explorer

Flood risk

Fluvial flood risk

9.5.53 The existing Osbaldwick Substation is also located entirely within Flood Zone 1 (see **Figure 9.6, Volume 5, Document 5.4.9**). The substation access road crosses into Flood Zone 2 and 3, associated with the Osbaldwick Beck and located approximately 0.1km north-west of the substation.

Surface water flood risk

9.5.54 The majority of Section A is at very low risk of surface water flooding (**Figure 9.7a, Volume 5, Document 5.4.9**). However, the Environment Agency's surface water flood risk mapping[80] indicates that there is a small area of low risk surface water accumulation located within the Osbaldwick Substation boundary, to the north-west (see **Figure 9.6a, Volume 5, Document 5.4.9**); in addition to areas of High to Low surface water flood risk in close proximity to and in some areas overlapping the Order Limits. These are associated with the low-lying areas to the north/north-west and the nearby small watercourses.

Water resources

9.5.55 Based on the available data within the 500m buffer of the Order Limits, there are no identified licensed surface water abstractions or licenced discharges within or close to Section A of the Project.

Section B

9.5.56 The Order Limits for Section B of the Project are located to the north-west of York. Existing overhead lines falling within the Order Limits comprise the 400kV Norton to Osbaldwick (2TW/YR) overhead line which runs east-west to the north-east of Shipton by Beningbrough and the 275kV Poppleton to Monk Fryston (XCP) overhead line which runs broadly east-west in the south between Moor Monkton and Skelton. The Order Limits also include land between these two overhead lines where new infrastructure proposed as part of the Project (proposed Overton Substation, three new overhead lines and two CSECs).

9.5.57 The construction elements of the Project include Temporary Construction Compounds (TCCs), temporary and permanent access routes, pylon working areas, stringing areas, drainage mitigation areas, crossing protection, new temporary watercourse (bridge and culvert) crossings and upgrading of existing crossings.

9.5.58 Further information on the Project description is provided in **Chapter 3: Description of the Project, Volume 5, Document 5.2.3**.

Topography

9.5.59 The topography along both lengths of existing overhead line in this Section and the land in between is relatively flat and in keeping with the surrounding landscape to the north-west of York. According to OS mapping, elevations vary between 10mAOD and 17mAOD, with the lowest elevations being associated with the banks of the River Ouse (which bisects Section B) and the highest elevations located to the west at Overton Wood, near to Shipton.

Hydrology

9.5.60 Section B is located within the Ouse Upper Yorkshire, WFD Operational Catchment.

9.5.61 The existing 275kV Poppleton to Monk Fryston (XCP) overhead line route crosses the River Ouse in two locations and the Foss further to the south-southwest. The River Ouse is a Main River, which flows from the north-west to the south-east, towards York. The Foss in this location is an Ordinary Watercourse which flows towards the River Ouse. It should be noted that this Foss, to the north-west of York, is a completely separate watercourse to the River Foss mentioned in Section A, which flows from the north-east and joins with the River Ouse in York city centre. There is also another Ordinary Watercourse bearing the name Foss which flows towards the River Wharfe and is traversed by the Order Limits in Section C, as discussed further at para. 9.5.84. These two Ordinary Watercourses will henceforth be referred to as the Foss (tributary of Ouse) and the Foss (tributary of Wharfe) respectively.

9.5.62 The majority of Section B is located within the Kyle and Upper Ouse IDB (KUOIDB) administrative boundary. The KUOIDB covers a substantial area to the north-west of York. The KUOIDB network discharges to the River Ouse at a number of locations. However, Section B south of the River Ouse falls within the Ainsty IDB (AIDB) administrative boundary.

9.5.63 The Order Limits crosses 10 of the KUOIDB adopted watercourses (Drain IDs 32, 33, 34, 34A, 36, 37, 70, 75, 76 and 79). KUOIDB drain 70 is a tributary to the New Parks Beck, whilst KUOIDB drains 32, 33 and 34 are generally referred to as Hurns Gutter, both of which are WFD designated river waterbodies.

9.5.64 The Order Limits cross five of the AIDB adopted watercourses (Drain IDs MM050, MM051, MM052, MM053 and MM054. AIDB drain 53 is a designated WFD surface waterbody and corresponds to the main channel of the Foss (tributary of Ouse).

9.5.65 River flow statistics for the River Ouse and River Nidd are presented in **Table 9.8**.

Conservation sites

9.5.66 There is one statutory conservation site located within Section B of the Project, identified as the Clifton Ings and Rawcliffe Meadows SSSI (see **Figure 9.4, Volume 5, Document 5.4.9**). It is located on the River Ouse which connects it to the Project. Details of the conservation site are provided in **Appendix 5.3.9A, Volume 5, Document 5.3.9**; however, in summary, the Clifton Ings and Rawcliffe Meadows SSSI is a designated alluvial flood meadow, supporting species rich communities. The site is connected by the River Ouse and is located approximately 2.5km downstream of the Order Limits.

9.5.67 The Overton Borrow Pits SINC and River Ouse LWS (and candidate SINC) are also located within the Order Limits associated with Section B of the Project. These non-statutory conservation sites are associated with the water dependent wildlife found within the sites. Further information on these designated sites is provided within **Appendix 5.3.9A, Volume 5, Document 5.3.9**.

Water quality and Water Framework Directive status

9.5.68 The proposed Overton Substation is located entirely within the Hurns Gutter from Source to River Ouse WFD catchment. In addition to this, the rest of Section B intersects a further four river waterbody catchments, as summarised in **Table 9.11,** with further detail regarding RNAG and WFD waterbody objectives provided in **Appendix 5.3.9B, Volume 5, Document 5.3.9.**

Table 9.11 – WFD waterbodies in direct connectivity with Section B

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
New Parks Beck from Source to Huby Burn (GB104027063830)	Not designated artificial or heavily modified	Poor
Hurns Gutter from Source to River Ouse (GB104027063780)	Heavily modified	Moderate
Ouse from River Nidd to Stillingfleet Beck (GB104027069593)	Heavily modified	Moderate
Nidd from Crimple Beck to River Ouse (GB104027068292)	Heavily modified	Moderate
The Foss (trib of Ouse) (GB104027063730)	Not designated artificial or heavily modified	Bad

[1] These are the latest (2019) status data as obtained from the Catchment Data Explorer

Flood risk

Fluvial flood risk

9.5.69 The majority of Section B is within Flood Zone 1 (see **Figure 9.6b, Volume 5, Document 5.4.9**), however there is a significant area of Flood Zone 2, 3a and 3b, to the south-west, associated with the River Ouse, the Hurns Gutter and other minor watercourses. Stripe Lane, which provides access to the Order Limits, is known to experience regular flooding; this is attributed with the Hurns Gutter and is considered under the wider assessment of flood risk associated with the watercourse.

9.5.70 The proposed Overton Substation is located entirely within Flood Zone 1 (see **Figure 9.6b, Volume 5, Document 5.4.9**). The nearest areas of Flood Zones 2 and 3 are associated with the Hurns Gutter, which is situated less than 0.3km to the south-east boundary of the proposed Overton Substation. The Lower Ouse and Wharfe Washland flood model identifies the location of the proposed Overton Substation to be at risk of flooding, based on future climate change modelling for the 1% Annual Exceedance Probability (AEP) + 50% climate change (CC) event.

9.5.71 The Shipton North and South 400kV CSECs are located entirely within Flood Zone 1 (see **Figure 9.6b, Volume 5, Document 5.4.9**). The nearest areas of Flood Zones 2 and 3 are located 0.6km to the south-east of the Order Limits and is associated with the Hurns Gutter.

Surface water flood risk

9.5.72 The majority of Section B is classified as being at Very Low risk of surface water flooding (**Figure 9.7b, Volume 5, Document 5.4.9**), according to the Environment Agency's surface water flood risk mapping[80]. There are a number of areas classed as being at High to Low risk of surface water flooding within the Order Limits, these are generally associated with low-lying areas or floodplains of the River Ouse, the Hurns Gutter and other minor watercourses.

9.5.73 Much of the proposed Overton Substation is at Very Low risk of surface water flooding. A surface water flow path associated with Hurns Gutter is located approximately 40m from the south-west boundary of the proposed Overton Substation, running parallel to the ECML railway line. North-west of the proposed Overton Substation where the construction compounds will be located, to the north of the Overton Road railway bridge, an area of surface water accumulation is present. This area ranges from Low to High risk of surface water flooding. Within the rest of the proposed Overton Substation, some isolated areas are classified as being at Low, Medium or High risk of surface water flooding and are likely associated with localised topographic variations (see **Figure 9.7b, Volume 5, Document 5.4.9**).

9.5.74 There are no identified areas of surface water flood risk within the proposed Shipton North and South CSECs. However, there are several areas of High to Low surface water flood risk within close proximity to the compounds. These tend to be associated with areas of low-lying topography.

Water resources

9.5.75 Based on the available data within the 500m buffer of the Order Limits, there are no identified licensed surface water abstractions within or near Section B of the Project.

9.5.76 There are six licenced discharges within 500m of the Order Limits of Section B. Four of the licences relate to discharges from wastewater treatment works, whilst the remaining two are for domestic and agricultural related discharges. The data provided does not include details of the receiving waterbody.

Section C

9.5.77 The Order Limits in Section C run north-south between Moor Monkton in the north and to the west of Tadcaster in the south. The elements of the Project falling within this section comprises a section of the existing 275kV Poppleton to Monk Fryston XC overhead line.

9.5.78 The construction elements include temporary access routes, pylon working areas, stringing areas, crossing protection, new temporary watercourse (bridge and culvert) crossings and upgrading of existing crossings.

9.5.79 Further information on the Project description is provided in **Chapter 3: Description of the Project, Volume 5, Document 5.2.3**.

Topography

9.5.80 The OS mapping indicates that the topography of Section C rises from north to south. To the north the topography is comparatively flat, with elevations ranging between 14mAOD and 15mAOD. Tracking the existing 275kV Poppleton to Monk Fryston XC overhead line route south to Marston Field (SE495516) the topography steepens considerably to between 19mAOD and 49mAOD.

9.5.81 Further south is a valley that encompasses the River Wharfe, which bisects Section C. The lowest elevation within the valley, and subsequently Section C, is 9mAOD which is associated with the banks of the River Wharfe. The highest elevation of 54mAOD is located on the catchment divide between the Wharfe and Cock Beck to the south, near to the Roman Road and Leeds Road intersection (SE464427).

Hydrology

9.5.82 Section C is located across the Ouse Upper Yorkshire and Wharfe Lower, WFD Operational Catchments.

9.5.83 The River Wharfe is crossed by the 275kV Poppleton to Monk Fryston XC overhead line to the north-west of Tadcaster. The watercourse is a statutory Main River that flows in a south-easterly direction to its confluence with the River Ouse, approximately 15km downstream.

9.5.84 Section C crosses the Ainsty IDB (AIDB), located to the west of York. The northern part of the IDB network discharges to the River Ouse at numerous locations, whilst the southern part of the IDB discharges to the River Wharfe. As previously noted (para. 9.5.61), there are two Ordinary Watercourses (which are also WFD surface waterbodies) in this area bearing the name Foss, the northernmost of which drains towards the Ouse, whilst the other drains towards the Wharfe.

9.5.85 The Order Limits cross six of the AIDB adopted drains, within the Study Area. Five of the crossed watercourses fall within the Marston Moor district of the AIDB network and

are identified as MM025, MM038, MM056, MM059, and MM060. Most of these are within the catchment of the Foss (tributary of Ouse) WFD surface waterbody. However, AIDB drain MM038 is also referred to as the Sike Beck, which is a WFD surface waterbody and tributary to the River Nidd. The other drain is located within North Wharfe district; identified as NW01 and is also the main channel of the Foss (tributary of Wharfe) WFD surface waterbody.

9.5.86 River flow statistics for the River Ouse and River Wharfe are presented in **Table 9.8**.

Conservation sites

9.5.87 There are no statutory designated conservation sites within the ZoI of Section C of the Project. However, there is one non-statutory conservation site, identified as Healaugh Meadows SINC.

Water quality and Water Framework Directive status

9.5.88 Section C crosses six WFD surface waterbody catchments (see **Figure 9.2, Volume 5, Document 5.4.9**), provided in **Table 9.12** with further detail regarding the reasons for not achieving good status (RNAG) and WFD waterbody objectives provided in **Appendix 5.3.9B, Volume 5, Document 5.3.9**.

Table 9.12 – WFD waterbodies in direct connectivity with Section C

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
Hurns Gutter from Source to River Ouse (GB104027063780)	Heavily modified	Moderate
Nidd from Crimple Beck to River Ouse (GB104027068292)	Heavily modified	Moderate
The Foss (trib of Ouse) (GB104027063730)	Not designated artificial or heavily modified	Bad
The Foss (trib of Wharfe) (GB104027063980)	Not designated artificial or heavily modified	Bad
Wharfe from Collingham Beck to Tadcaster Weir (GB104027064255)	Heavily modified	Moderate
Cock Beck Catchment (trib of Wharfe) (GB104027063940)	Not designated artificial or heavily modified	Bad

[1] These are the latest (2019) status data as obtained from the Catchment Data Explorer

Flood risk

Fluvial flood risk

9.5.89 Within Section C, the most significant areas of Flood Zones 2 and 3 are located adjacent to the Foss (tributary of Ouse), Foss (tributary of Wharfe), the River Nidd and River Wharfe, indicating a Medium and High likelihood of fluvial flooding respectively. The existing 275kV Poppleton to Monk Fryston XC overhead line crosses over the Foss

watercourses and River Wharfe with a number of the pylons in the immediate vicinity of these watercourses located within the respective Flood Zones 2 and 3 (see **Figure 9.6c, Volume 5, Document 5.4.9**).

Surface water flood risk

9.5.90 The majority of Section C is classified as being at Very Low risk of surface water flooding (**Figure 9.7c, Volume 5, Document 5.4.9**). There are a number of areas that are classed between High to Low risk of surface water flooding, these tend to be associated with watercourse floodplains or low-lying topography.

Water resources

9.5.91 Based on the available data within the 500m buffer of the Order Limits, there are no identified licensed surface water abstractions within or close to Section C of the Project.

9.5.92 There are six licenced discharges within 500m of the Order Limits in Section C. Three of the licenced discharges relate to wastewater treatment works, one water company pumping station, one for food/dairy production and one from an office. The data provided by the Environment Agency does not include details of the receiving waterbody.

Section D

9.5.93 The Order Limits in Section D are located to the south-west of Tadcaster, south of Toulston Polo Ground and north-east of the A1(M)/A64 junction. The A64 and A659 run through the Order Limits and two existing overhead lines (the 275kV Tadcaster Tee to Knaresborough (XD/PHG) overhead line running east-west and 275kV Poppleton to Monk Fryston (XC) overhead line running north-south) fall within the Order Limits. The 275kV XC overhead line route continues southwards through Section D (between Section C to the north and Section E to the south), crossing the A64 and passing to the west of the village of Stutton. New infrastructure within this section comprises the Tadcaster Tee East and West 275kV CSECs and the replacement of a pylon (XD001).

9.5.94 The construction elements of the proposed Project include a Temporary Construction Compound (TCC), temporary and permanent access routes, pylon working areas, stringing areas, drainage mitigation areas and crossing protection.

9.5.95 Further information on the Project description is provided in **Chapter 3: Description of the Project, Volume 5, Document 5.2.3**.

Topography

9.5.96 Section D is located across an area of higher elevation, with gently undulating topography rising gradually to the south between 42mAOD and 59mAOD.

Hydrology

9.5.97 Section D is located across the Wharfe Lower, WFD Operational Catchment.

9.5.98 The 275kV XC/XD overhead line within Section D does not cross any statutory Main rivers or IDB adopted watercourses. The Cock Beck is the nearest watercourse, located approximately 1.6km to the east, which is an Ordinary Watercourse and tributary to the River Wharfe.

9.5.99 There are no gauged watercourses within Section D.

Conservation sites

9.5.100 There are no designated conservation sites within the ZoI of Section D of the Project.

Water quality and Water Framework Directive status

9.5.101 Section D lies across two WFD river waterbody catchments as shown in **Figure 9.2, Volume 5, Document 5.4.9** summarised in **Table 9.13** with further detail regarding RNAG and WFD waterbody objectives provided in **Appendix 5.3.9B, Volume 5, Document 5.3.9**.

Table 9.13 – WFD waterbodies in direct connectivity with Section D

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
Wharfe from Collingham Beck to Tadcaster Weir (GB104027064255)	Heavily modified	Moderate
Cock Beck Catchment (trib of Wharfe) (GB104027063940)	Not designated artificial or heavily modified	Bad

[1] These are the latest (2019) status data as obtained from the Catchment Data Explorer

Flood risk

Fluvial flood risk

9.5.102 Section D (including the Tadcaster Tee East and West 275kV CSECs) falls entirely within Flood Zone 1 and as such is not at risk of fluvial flooding (see **Figure 9.6d, Volume 5, Document 5.4.9**). The nearest areas of Flood Zones 2 and 3 lie 1.2km to the east and are associated with the Cock Beck.

Surface water flood risk

9.5.103 The majority of Section D is classed as being at Very Low risk of surface water flooding (see **Figure 9.7d, Volume 5, Document 5.4.9**). There are small areas of surface water accumulation mainly associated with the A64 and low-lying topography.

9.5.104 The Tadcaster Tee East and West compounds are at Very Low surface water flood risk.

Water resources

9.5.105 Based on the available data within the 500m buffer of the Order Limits, there are no identified licensed surface water abstractions within or near Section D of the Project.

9.5.106 Two licenced discharges are located within 500m of the Order Limits in Section D. One licenced discharge is associated with a wastewater treatment works and the other a domestic property. The data provided does not include details of the receiving waterbody.

Section E

9.5.107 The Order Limits in Section E run north-south between the A64 in the north and the A1(M)/A63 junction (junction 42) in the south. The elements of the Project falling within this section comprises a section of the existing 275kV Poppleton to Monk Fryston (XC),

with this overhead line running broadly parallel between the A1(M) to the west and A162 to the east.

9.5.108 The construction elements of the Project include temporary access routes, pylon working areas, stringing areas, drainage mitigation areas, crossing protection and upgrading of existing crossings.

9.5.109 Further information on the Project description is provided in **Chapter 3: Description of the Project, Volume 5, Document 5.2.3**.

Topography

9.5.110 The topography of Section E undulates along the existing 275kV Poppleton to Monk Fryston (XC) north to south overhead line route, comprising steeper slopes associated with the valleys of easterly flowing small watercourses between flatter hill tops. The elevations within Section E vary between 25mAOD and 60mAOD.

Hydrology

9.5.111 Section E is located across the Wharfe Lower, Ouse Lower Yorkshire and Aire Lower, WFD Operational Catchments.

9.5.112 Within Section E, the 275kV XC overhead line crosses three watercourses; Cock Beck, Bishop Dike and Mill Dike. The Cock Beck is a designated Main river, that flows in a north-easterly direction to its confluence with the River Wharfe, approximately 8km downstream of the Order Limits. The Bishop Dike and Mill Dike are Ordinary Watercourses and tributaries of the River Ouse, which they join approximately 14km downstream of the Order Limits.

9.5.113 There are no gauged watercourses within Section E.

Conservation sites

9.5.114 There is one statutory designated conservation site within the ZoI of Section E (**Figure 9.4, Volume 5, Document 5.4.9**). This conservation site is identified as Sherburn Willows SSSI (and YWT site). Swamp and wetlands within the SSSI conservation site are supported by the Mill Dike and are therefore water dependent. There are no non-statutory conservation sites in Section E of the Project.

Water quality and Water Framework Directive status

9.5.115 Section E crosses five WFD river waterbody catchments, as shown in **Figure 9.2, Volume 5, Document 5.4.9** and summarised in **Table 9.14** with further detail regarding RNAG and WFD waterbody objectives provided in **Appendix 9B, Volume 5, Document 5.3.9**.

Table 9.14 – WFD waterbodies in direct connectivity with Section E

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
Cock Beck Catchment (trib of Wharfe) (GB104027063940)	Not designated artificial or heavily modified	Bad

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
Dorts Dike Catchment (trib of Wharfe) (GB104027063930)	Heavily modified	Moderate
Bishop Dike (Trib of Ouse) (GB104027063660)	Not designated artificial or heavily modified	Poor
Mill Dike from Source to Bishop Dike (GB104027063640)	Not designated artificial or heavily modified	Poor
Selby Dam from Conf. Fox Dike and Carr Dike to Ouse (GB104027063620)	Heavily modified	Moderate

[1] These are the latest (2019) status data as obtained from the Catchment Data Explorer

Flood risk

Fluvial flood risk

9.5.116 The majority of Section E is located within Flood Zone 1 and therefore has a low likelihood of fluvial flooding (**Figure 9.6e, Volume 5, Document 5.4.9**). The most significant areas of Flood Zones 2 and 3 are located adjacent to the Bishops Dike, Mill Dike and Cock Beck. The Environment Agency flood map for planning indicates the Flood Zone 2 and 3 areas associated with these watercourses are contained within close proximity to the river channels, so the extent of fluvial flood risk is very limited within Section E.

Surface water flood risk

9.5.117 Most of Section E is at Very Low risk of surface water flooding (**Figure 9.7e, Volume 5, Document 5.4.9**). There are few small areas of Medium to Low surface water flood risk, that are associated with watercourse and roads. The minor areas classed as being at High risk of surface water are also associated with roads.

Water resources

9.5.118 There is one licenced surface water abstraction located within 500m of the Order Limits for Section E of the Project; which abstracts from the Newthorpe Beck. The maximum daily abstraction from the watercourse is 168m^3, which is used for spray irrigation purposes. There is one licenced discharge located within the Order Limits for Section E, which is associated with a wastewater treatment works. Meanwhile, there are a further six licenced discharges within 500m of the Order Limits for Section E. Of the discharges, two are associated with wastewater treatment works, one waste management site, one holiday site and two discharges are undefined. The data provided does not include details of the receiving waterbody.

Section F

9.5.119 The Order Limits in Section F are located east of the A1(M), south of the A63 and south-west of the village of Monk Fryston. Existing infrastructure within the Order Limits comprises the 275kV Poppleton to Monk Fryston (XC) overhead line, the 400kV Monk Fryston to Eggborough (4YS) overhead line and the existing Monk Fryston

Substation. The new infrastructure in Section F comprises a new substation adjacent to the existing substation at Monk Fryston and the realignment of the XC overhead line.

9.5.120 The construction elements of the Project include Temporary Construction Compounds (TCCs), temporary access routes, pylon working areas, stringing areas, drainage mitigation areas, crossing protection and new temporary watercourse (culvert) crossings.

9.5.121 Further information on the Project description is provided in **Chapter 3: Description of the Project, Volume 5, Document 5.2.3**.

Topography

9.5.122 The topography of Section F falls from north-west to south-east. Initially the slope is gradual, but towards the railway line (east of Rawfield Lane) the slope increases considerably. The lowest elevation is 20mAOD, located to the south-east, whilst the highest elevation is 50mAOD to the north-west.

Hydrology

9.5.123 Section F is located across the Aire Lower WFD Operational Catchment.

9.5.124 Section F does not cross any main or minor rivers, or IDB adopted watercourses. The Fleet is the nearest watercourse to the Order Limits, approximately 1.6km to the south-east. The Fleet is an Ordinary Watercourse and tributary of the River Aire, with which it confluences 14km downstream from its source.

9.5.125 There are no gauged watercourses within Section F.

Conservation sites

9.5.126 There are no designated conservation sites within the ZoI of Section F of the Project.

Water quality and Water Framework Directive status

9.5.127 Section F crosses two WFD river waterbody catchments, as shown in **Figure 9.2, Volume 5, Document 5.4.9** summarised in **Table 9.15**, with further detail regarding the RNAG and WFD waterbody objectives provided in **Appendix 5.3.9B, Volume 5, Document 5.3.9**.

Table 9.15 – WFD waterbodies in direct connectivity with Section F

Waterbody (ID)	Waterbody Type (Cycle 2)	Overall Waterbody Status (2019)[1]
Selby Dam from Conf. Fox Dike and Carr Dike to Ouse (GB104027063620)	Heavily modified	Moderate
Aire from River Calder to River Ouse (GB104027062760)	Heavily modified	Moderate

[1] These are the latest (2019) status data as obtained from the Catchment Data Explorer

Flood risk

Fluvial flood risk

9.5.128 Section F and notably the existing Monk Fryston Substation are located entirely within Flood Zone 1, indicating a low likelihood of fluvial flooding (see **Figure 9.6f, Volume 5, Document 5.4.9**). The nearest areas of Flood Zones 2 and 3 are located 1.6km to the south and are associated with ditches draining to the River Aire.

Surface water flood risk

9.5.129 The majority of Section F is at Very Low risk of surface water flooding. A small area of surface water accumulation/ponding is located within the existing Monk Fryston Substation area towards the south (see **Figure 9.6f, Volume 5, Document 5.4.9**), classified as High, Medium, and Low risk of surface water flooding.

9.5.130 A linear surface water flow path (at Low risk of flooding) runs from west of Pollums House Farm to the north on Main Street (A63) and west of Butt's Lane between the proposed Monk Fryston Substation and overhead line compound.

Water resources

9.5.131 Based on the available data within the 500m buffer of the Order Limits, there are no identified licensed surface water abstractions within or near Section F of the Project.

9.5.132 However, there is one licenced discharge within 500m of the Order Limits, which is associated with a domestic property. The data provided does not include details of the receiving waterbody.

Future baseline

9.5.133 Hydrological baseline conditions may change even if the Project does not proceed, for the following reasons:

- It is likely that climate change will result in increased rainfall seasonality, with generally wetter winters and drier summers, and that high-intensity rainfall events will become more common. This will lead to greater variation in river flows (low flows and high flows) and increases in flood risk. Current Environment Agency recommendations for climate change factors to be applied to extreme rainfall and river flows for the Project area are summarised in **Table 9.16** and **Table 9.17**.
- Land use change can affect the permeability of the ground, which can affect surface water runoff. Given that most of the land within the Order Limits is productive agricultural land outside of established settlement boundaries, it is unlikely that the runoff regime will change significantly within and in the area surrounding the Order Limits. The only exception to this could be Osbaldwick Substation in Section A, which is on the eastern edge of York, and where surrounding areas could be subject to further suburban development in the future. However, developers will be obliged by the requirements of the NPPF[28] to ensure that surface runoff is managed within developments so as not to increase flood risk to others.
- The location and rate of surface water abstractions in the area could vary over time and may result in changes to ALS water availability and WFD surface waterbody status.

- Given the current Ecological Status/Potential of all the WFD waterbodies within the Order Limits is less than Good, based on the 2019 status data from Catchment Data Explorer[93], it is anticipated the future status will improve, ultimately to one of Good Status/Potential, as required by the WFD. Improvements to WFD waterbody status associated with improvements to individual quality elements (i.e., phosphate reduction) would result in higher-quality, potentially more sensitive, aquatic environments in these waterbodies.

9.5.134 Current Environment Agency guidance will be used to determine appropriate climate change allowances to determine future flood hazard (as updated on 27 May 2022). The Environment Agency guidance provides climate change allowances for river flows, set by individual operational management catchment, for the following epochs:

- '2020s', covering the period 2015 to 2039;
- '2050s', covering the period 2040 to 2069; and
- '2080s', covering the period 2070 to 2115.

9.5.135 The Project crosses three Environment Agency Management Catchments which are listed below (from north to south), these are presented in **Figure 9.2, Volume 5, Document 5.4.9**. The climate change peak river flow allowances relevant to each of the epoch's listed above and the Management catchments listed below are set out in **Table 9.16**.

- Swale, Ure, Nidd and Upper Ouse;
- Wharfe and Lower Ouse; and
- Aire and Calder.

Table 9.16 – Climate change peak river flow allowances for the affected management catchments (source: Environment Agency, 2022)

Allowance Category	Total Potential Change Anticipated for the '2020s' (2015 to 2039)	Total Potential Change Anticipated for the '2050s' (2040 to 2069)	Total Potential Change Anticipated for the '2080s' (2070 to 2125)
Swale, Ure, Nidd and Upper Ouse Management Catchment			
Upper end	25%	33%	53%
Higher central	15%	20%	34%
Central	11%	14%	25%
Wharfe and Lower Ouse Management Catchment			
Upper end	22%	29%	48%
Higher central	14%	18%	31%
Central	11%	13%	23%
Aire and Calder Management Catchment			

[93] Environment Agency (2021). Catchment Data Explorer. (Online). Available at https://environment.data.gov.uk/catchment-planning (Accessed 06 September 2022)

Upper end	24%	31%	51%
Higher central	15%	18%	31%
Central	11%	13%	23%

9.5.136 The Environment Agency guidance also provides climate change allowances for extreme rainfall set by individual operational management catchment, for the following epochs:

- '2050s', covering developments with a lifespan up to 2060; and
- '2070s', covering the period 2061 to 2125.

9.5.137 **Table 9.17** sets out these climate change peak rainfall allowances, relevant to the management catchments.

Table 9.17 – Climate change peak rainfall allowances for the affected management catchments (source: Environment Agency, 2022)

	3.33% AEP		1% AEP	
Allowance Category	**Total Potential Change Anticipated for the '2050s' (up to 2060)**	**Total Potential Change Anticipated for the '2070s' (2061 to 2125)**	**Total Potential Change Anticipated for the '2050s' (up to 2060)**	**Total Potential Change Anticipated for the '2070s' (2061 to 2125)**
Swale, Ure, Nidd and Upper Ouse Management Catchment				
Upper end	35	40	40	45
Central	20	25	25	30
Wharfe and Lower Ouse Management Catchment				
Upper end	35	40	40	40
Central	20	25	25	30
Aire and Calder Management Catchment				
Upper end	35	40	40	45
Central	20	25	25	30

9.6 Embedded environmental measures

9.6.1 A range of environmental measures have been embedded into the Project as included in the **Embedded Measures Schedule, Appendix 5.3.3A, Volume 5, Document 5.3.3A. Table 9.18** outlines how these embedded measures have influenced the hydrology assessment.

Table 9.18 – Summary of the embedded environmental measures

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
Construction Phase (overhead lines and Substations)			
Aquatic environment receptors	Deterioration in the water quality of aquatic environment receptors via generation of sediment laden water and entrained nutrients (Nitrogen (N) and Phosphorous (P)) or as a result of construction activities, e.g., watercourse crossings and excavations.	HY1 – Inspection and monitoring Good working practices, consistent with best practice guidance summarised in **Table 9.4**, will be implemented during construction, with adherence to the **Code of Construction Practice (CoCP), Volume 5, Document 5.3.3B**, which will be secured through a DCO Requirement. An inspection and monitoring schedule will be implemented by the contractor to ensure that the measures taken to protect the surface water environment are effective.	**CoCP, Volume 5, Document 5.3.3B** via DCO Requirement 5.
		HY2 - Stand-off from watercourses Where possible, a stand-off distance from the top of bank of all watercourses/waterbodies will be established (with the exception of crossings and where existing field access roads are already located adjacent to watercourses are to be utilised). To align with Environment Agency and IDB consenting requirements, it is proposed that this will be 8m for non-tidal Main Rivers, 7m from adopted drains within the KUOIDB district and 9m from adopted watercourses within the AIDB district. These stand-off distances would also apply to flood defences. Appropriate stand-off distances should also be implemented where Project construction activities coincide with water supply and sewerage	**CoCP, Volume 5, Document 5.3.3B** via DCO Requirement 5; FRAP or OWC where necessary*.

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		infrastructure. These are to be agreed on a case-by-case basis. For any instances where the stand-off distances stated above cannot be achieved between construction works and watercourses, these works would be subject to the appropriate consent by the relevant drainage authority (FRAP for main rivers, OWC for ordinary watercourses*).	
		HY3 - Drainage Management Plan (construction) Appropriate control of runoff from working areas will be achieved through implementation of a Drainage Management Plan (DMP) for the construction phase. The DMP will use SuDS principles, promoting infiltration of runoff wherever possible and specifying appropriate treatment and attenuation storage to ensure any discharges to watercourses are uncontaminated and limited to greenfield rates. The DMP will cover all aspects of construction works and temporary infrastructure. It will be developed by the construction contractor post granting of the DCO and prior to commencement of works and will be secured through DCO Requirement 6. Drainage measures will be phased to be completed before the commencement of earthwork operations, in a specific area, and will be retained until the drainage system of the completed Project is fully operational, or site restoration works are completed. This will include the temporary diversion of existing agricultural drainage around working areas, if	DMP via DCO Requirement 6. Post works reinstatement via DCO Requirement 11.

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		required, followed by reinstatement on completion of works. Reinstatement will be secured through DCO Requirement 11.	
		HY4 - Water discharges off-site (construction) No silty water would be discharged directly into any watercourse. Runoff from access routes/haul road and working areas should be allowed to infiltrate wherever possible. Where practicable, groundwater dewatered from excavations (e.g. pylon foundation excavations) should be discharged to adjacent grassed/vegetated agricultural land, away from watercourses. Where there remains the potential for this silty water to runoff into nearby surface water features or agricultural land used for crops, additional control measures would be put in place as specified in the DMP. These may include surrounding the discharge area (grassed/vegetated agricultural land) with sediment fencing or passing the silt-laden water through a Siltbuster® or similar. Infiltration is the preferred option for any dewatering discharges. The discharge rate must match the rate of infiltration into the soil which will vary with the soil type, amount of vegetation cover and the gradient. In the unlikely scenario that in-channel works are needed to construct a discharge outfall, a consent (FRAP for main river; OWC for ordinary watercourses) would be required. Groundwater dewatering should cease if a Flood Alert or Flood Warning has been issued by the	**CoCP, Volume 5, Document 5.3.3B** via DCO Requirement 5, DMP and Flood Emergency Response Plan via DCO Requirement 6 and Environmental Permits*.

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		Environment Agency for a working area or an area downstream. Actions to be taken in the event of Flood Alerts or Warnings being issued will be detailed in the **Flood Emergency Response Plan (HY14)** (draft DCO Requirement 6). If the groundwater pumped from excavations is suspected to be contaminated, appropriate measures would be taken in accordance with Environment Agency guidance and the Environmental Permitting Regulations[8] to prevent uncontrolled or unauthorised releases of this water to ground or to the surface water environment.	
		<u>HY5 – Soil stockpiles</u> A Soil Management Plan will be prepared which will outline the management of soil stockpiles associated with the Project. This will ensure areas of exposed ground and stockpiles would be minimised where reasonably practicable to reduce silty runoff. Geotextiles would be used as necessary to shield stockpiles, and soil stockpiles to be left for more than three months would be seeded[94].	**CoCP, Volume 5, Document 5.3.3B, Outline Soil Management Plan, Volume 5, Document 5.3.3E** and Detailed soil management plans via DCO Requirements 5 and 6.
		<u>HY6 – Open trenching in watercourses and floodplains</u> Where it has been established that undergrounding of assets is required under a watercourse, it is assumed, as a worst-case scenario, that an open trenching approach will be used.	**CoCP, Volume 5, Document 5.3.3B** via DCO Requirement 5 and FRAP/OWC for watercourse crossings as appropriate*. Watercourse

[94] DEFRA (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. London: DEFRA.

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		All open trenching within the watercourse will be undertaken in an isolated, dry channel. The flows from the watercourse will be over-pumped and discharged to the channel downstream. Appropriate silt protection would be put in place, such as silt fencing and silty water would not be released to the watercourse. The works will only be performed during a dry period, when flows in the watercourse are low, and will be timed to be outside of fish spawning periods. All watercourse trenches will be infilled, with the channel bed and banks returned to pre-construction condition. Banks will be re-seeded and appropriate erosion protection provided (e.g. geotextiles) to allow vegetation to re-establish.	reinstatement via DCO Requirement 11.
Aquatic environment receptors	Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.	See measures HY1 (Inspection and monitoring), HY2 (Stand-off from watercourses), HY3 (DMP), HY4 (Water discharges off-site (construction)), HY5 (Soil stockpiles) and HY6 (Open trenching in watercourse) listed above to limit ingress of sediment-laden runoff into watercourses. <u>HY7 – Construction access watercourse crossing design</u> Where possible, existing watercourse crossings will be used. However, in some locations new temporary crossings may be required. Temporary bridges will be used in preference to culverts for main rivers and WFD reportable watercourses and designed to ensure an appropriate level of flood	**CoCP, Volume 5, Document 5.3.3B** via DCO Requirement 5 and FRAP/OWC as appropriate*. Watercourses reinstatement via DCO Requirement 13.

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		conveyance in the construction phase and to avoid the requirement for in-channel works. Culverts will be used for crossing of other watercourses. These will either be arch culverts, leaving the natural bed undisturbed, or they would be installed with the invert set below the natural bed level to allow for a semi natural bed to establish within the culvert. All construction related, temporary crossings will be designed to ensure that existing channel conveyance and floodplain storage are preserved. These design principles will be secured via the **CoCP, Volume 5, Document 5.3.3B** (DCO Requirement 5). Specific detailed designs for each watercourse crossing, consistent with these design principles, will be prepared by the construction contractor post-grant of the DCO. These will be subject to the appropriate consent by the relevant drainage authority (FRAP for main rivers, OWC for ordinary watercourses*). Temporary watercourse crossings will be removed within 12 months of completion of construction, and the bed and banks restored to their pre-construction condition, as far as possible. This would secured via DCO Requirement 13.	
Aquatic environment receptors	Potential change to surface water quality affected by chemical leaching of concrete footings (subsurface corrosion of concrete),	See measures HY1 (Inspection and monitoring), HY2 (Stand-off from watercourses), HY3 (DMP), HY4 (Water discharges off-site (construction phase)) and HY5 (Soil stockpiles) listed above, and HY10 (Soil Management Plan) listed below, which	

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
	or concrete or fuel spillages.	will generally serve to minimise the risk of contaminated runoff reaching watercourses.	
		HY8 – Pylon footings Corrosion and pH resistant concrete formulas will be utilised for pylon foundations to minimise the risk of leaching of harmful compounds into soil, groundwater and watercourses.	**CoCP, Volume 5, Document 5.3.3B** via DCO Requirement 5.
		HY9 – Fuel, oil and chemicals storage All fuels, chemicals and oils will be stored within bunded areas in accordance with good practice guidance such as Above Ground Oil Storage Tanks, GPP 2[64]; Use and Design of Oil Separators in Surface Water Drainage Systems, PPG 3[65]; and Safe Storage – Drums and Intermediate Bulk Containers, GPP 26[72] . Fuel and chemical storage would be located in Flood Zone 1 and a minimum of 10m away from any watercourse. Areas of construction compounds that are used for fuel storage, plant maintenance and refuelling would be surfaced with fully impermeable materials to prevent any infiltration of contaminated runoff and contain bunding. Where large, stationary, construction related plant require refuelling in situ, outside of construction compounds, adequate appropriate mitigation will be put in place. This will likely include the use of “plant	**CoCP, Volume 5, Document 5.3.3B** and PICP via DCO Requirements 5 and 6.

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		nappies" (impermeable sheets or absorbent pads) with spill kits available. All water runoff from designated refuelling areas would be channelled to an oil separator or an alternative treatment system prior to discharge. A Pollution Incident Control Plan (PICP) would be developed to ensure any spillages or potential pollution incidents are dealt with appropriately including the provision of containment for spills of contaminating liquids[70, 71]. Mobile plant would be maintained in good working order. Larger items of plant such as excavators would undergo recorded inspections by a competent person (usually the operator) for any defects. Where defects are evident, the item or plant shall be removed from the land within the proposed construction working area immediately and serviced or replaced as soon as possible. Leaking or empty oil drums would be removed from land within the proposed construction working area immediately and disposed of via an appropriately licensed waste disposal contractor. Plant and machinery used during the construction and operation phases would be maintained to minimise the risks of oil leaks or similar. Where practicable all stationary plant used would be fitted with measures such as drip trays to retain any leakage of oil or fuel.	

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
Aquatic environment receptors	Deterioration in the water quality of aquatic environment receptors affected by mobilisation of contaminants from contaminated soil, accidental spillage of pollutants (e.g. fuel or oil) or sewage effluent from worker welfare facilities and site offices.	See measures HY1 (Inspection and monitoring), HY3 (DMP), HY4 (Water discharges off-site), HY5 (Soil stockpiles) and HY9 (Fuel, oil, and chemicals storage) above. HY10 – Soil Management Plan Excavated materials during construction works would be segregated and stored/re-used on-site in accordance with a Soil Management Plan (in compliance with the CL:AIRE Definition of Waste: Code of Practice[95]). Any temporary on-site storage of excavated materials suspected or confirmed to be contaminated would be on impermeable sheeting, covered over and with adequate leachate/runoff drainage to prevent migration of contaminants from the stockpile. Materials would be segregated where possible to prevent cross-contamination occurring. Such materials would only be reused if they are confirmed as suitable for use in line with the requirements of the Soil Management Plan.	**CoCP, Volume 5, Document 5.3.3B, Outline Soil Management Plan, Volume 5, Document 5.3.3E** and Detailed soil management plans via DCO Requirements 5 and 6. Written scheme for management of ground conditions, including contaminated land and ground water via DCO Requirement 12.
		HY11 - Foul drainage from temporary compounds Appropriate treatment and disposal of sewage will be provided where no foul sewer is available to ensure protection of the water environment. Should discharge of treated effluent to watercourses or to land be required, this would be subject to an Environmental Permit*.	**CoCP, Volume 5, Document 5.3.3B** via DCO Requirement 5; Environmental Permit, if required*.

[95] CL:AIRE (2011). The Definition of Waste: Development Industry Code of Practice Version 2 (Online)..

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
Water resources receptor	Potential change to water quality of a water supply resource which may affect the viability of a surface water abstraction.	See measures HY1 (Inspection and monitoring), HY2 (Stand-off from watercourses), HY3 (DMP), HY4 (Water discharges off-site), HY5 (Soil stockpiles), HY9 (Fuel, oil and chemicals storage), HY10 (Soil Management Plan) and HY11 (Foul drainage from temporary compounds) listed above to limit sediment-laden water and accidental release of pollutants in the context of aquatic environment receptors.	
Aquatic environment/Water resources receptor	Potential adverse effect on surface runoff pathways through alteration of surface permeability via installation of access roads, construction compounds. Could affect water balance of small watercourses and yield of dependent surface water abstractions.	Mitigated via implementation of HY3 – Drainage Management Plan	DMP via DCO Requirement 6 (HY3).
Flood risk receptors (third party receptors)	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance	See measures HY3 (DMP) and HY4 (Water discharges off-site (construction)). HY12 – Reinstatement of working areas Once constructed, all temporary access route and temporary working area construction material will be	**CoCP, Volume 5, Document 5.3.3B** via DCO Requirement

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
	and creation of impermeable surfaces.	removed and the ground reinstated to its pre-construction state (or similar), with the soil stockpile material used to backfill any excavations (to a level slightly above natural ground level to allow for settlement).	5; Reinstatement Scheme via DCO Requirement 11.
Flood risk receptors (third party receptors)	Changes to watercourse flow conveyance as a result of new or modified permanent watercourse crossings (e.g., culvert or bridge).	Mitigation via implementation of HY7 – Construction access watercourse crossing design	**CoCP, Volume 5, Document 5.3.3B** via DCO Requirement 5 and FRAP/OWC as appropriate*. Watercourses reinstatement via DCO Requirement 13.
Flood risk receptors (third party receptors)	Volumetric displacement of flood water associated with the construction of temporary spoil mounds and raised access tracks and hardstanding in floodplain areas	HY13 – Preserve floodplain storage and conveyance Access roads and working areas in the floodplain are to be as close to ground level as possible (a slight raised surface, relative to the adjacent land, is often required to allow for drainage). This is to minimise the loss of floodplain storage volumes associated with raised structures. Cross drainage will be provided as necessary at topographic low points. Material stockpiles will be located outside of the floodplain wherever possible, although noting that it may not be possible to move soil between different fields/land holdings. Stockpile impacts in the floodplain, where unavoidable, will be mitigated through appropriate alignment, leaving gaps and cross-drainage.	**CoCP, Volume 5, Document 5.3.3B** and DMP via DCO Requirements 5 and 6**.**

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
		Approaches to bridges and culverts in Flood Zones will minimise ramping up to the bridge deck so to minimise loss of floodplain storage. Works will not be carried out during flood flows to avoid undue erosion of the riverbeds and/or banks, to protect construction personnel and plant, and to ensure that flood conveyance is not reduced.	
Flood risk receptors (construction personnel and plant, third-party receptors)	Direct flooding of works; displacement, conveyance or runoff effects for third parties.	HY14 –Emergency Response Plan for Flood Events An Emergency Response Plan for Flood Events (ERPFE) will be prepared for those construction activities which must take place in areas of higher flood risk. This will describe the flood hazard, assess the risk to infrastructure and personnel, specify roles and responsibilities, arrangements for receiving Flood Alerts and Warnings, responses to Flood Alerts and Warnings (including evacuation as required), and evacuation routes. In addition, the ERPFE will set out arrangements for cessation of excavation dewatering activities should a Flood Alert or Warning be received, to minimise any impacts on flood flow conveyance and to maintain access for watercourse maintenance. The ERPFE will be developed by the construction contractor post granting of the DCO and prior to commencement of works and will be secured via DCO Requirement 6.	ERPFE via DCO Requirement 6
Overhead line Operational Phase			

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
Flood risk receptors (third party receptors)	Volumetric displacement of flood water associated with the permanent infrastructure.	HY15 – Micro siting of infrastructure Earlier optioneering studies and design development subsequent to statutory and non-statutory consultation (**Chapter 2, Document 5.2.2, Volume 5**) has been undertaken to identify the preferred siting of the Project infrastructure to ensure that, amongst a number of other factors, none of the CSECs or substation siting areas are at risk of flooding from rivers.	Measures relating to the long-term design of the Project (work plans, Limits of Deviation and Order Limits) will be implemented via the DCO Requirement 3 and Article 5.
Substations and CSECs Operational Phase			
Flood risk receptors (third party receptors)	Changes to surface water flood risk due to changes in runoff rates resulting from creation of impermeable surfaces.	HY16 – Detailed surface water drainage design (operational) Detailed drainage design for permanent project infrastructure with new impermeable surfaces, comprising substations, CSECs and associated access roads, will be carried out post-grant of the DCO, and will be subject to approval from the relevant drainage authority. The detailed drainage design for the substations will be consistent with the drainage strategies produced to support the DCO application (**Appendix 5.3.9D, Annexes 9D.5 and 9D.6, Volume 5, Document 5.3.9D**). Detailed drainage design for the CSECs and access roads will be to the same standard, including the use of appropriate SuDS.	DCO Requirement 6(4)**.**

Receptor Type (as Defined in Table 9.19)	Potential Changes and Effects	Embedded Measures	Compliance Mechanism
Aquatic environment receptors	Deterioration in the water quality of aquatic environment receptors by accidental spillage of pollutants (e.g. fuel or oil) or sewage effluent from worker welfare facilities.	HY17 – Detailed design of surface water pollution control and foul drainage systems at substations Oil-filled transformers will be isolated from the wider site surface water drainage system and drained via Bund Water Control Units and Oil Separators to minimise the risk to receiving watercourses from accidental hydrocarbon spillage. Appropriate SuDS treatment features will be provided for wider site drainage systems (**Appendix 9D, Annexes 9D.5 and 9D.6, Volume 5, Document 5.3.9**) Appropriate treatment and disposal of sewage from welfare facilities will be provided where no foul sewer is available to ensure protection of the water environment. Should discharge of treated effluent to watercourses or to land be required, this would be subject to an Environmental Permit*.	DCO Requirement 6(4). Environmental Permit* for any treated sewage discharges to watercourses, or to land.
Decommissioning Phase (overhead line and substations)			
It is anticipated that similar environmental measures to those embedded into the Project design for the construction phase would be implemented at the decommissioning phase. The decommissioning phase would be subject to a written phase of decommissioning for approval by the local planning authority (DCO Requirement 16).			

*see the Other Consents and Licences document for more details (**Volume 7, Document 7.3**)

9.7 Scope of the assessment

9.7.1 The scope of the assessment is based on a review of baseline information and is confirmed through review of additional data sources, site visit and further consultation with relevant stakeholders.

Spatial scope

9.7.2 The spatial scope of the hydrology assessment covers the Order Limits, together with the HSA defined in **Section 9.4** and is presented in **Figure 9.2, Volume 5, Document 5.4.9**.

9.7.3 The spatial scope for flood risk receptors includes people, property, and infrastructure whose risk of flooding could be changed by the Project. It should be noted that only flood risk effects on third party receptors are reported in this chapter. Aspects of the Project itself that are at risk of flooding are assessed in the FRA (see **Appendix 5.3.9D, Volume 5, Document 5.3.9**).

Temporal scope

9.7.4 The temporal scope of the hydrology assessment is consistent with the period over which the Project will be carried out (details provided in **Chapter 3: Description of the Project, Volume 5, Document 5.2.3**). This has been achieved by applying the National Policy Statement for Energy (EN-1)[26] climate change emission scenarios to account of the effects of increased rainfall intensities and peak river flows (**Chapter 17: Climate Change, Volume 5, Document 5.2.17**). The assessment has taken into account potential impacts on current and future water quality and hydromorphology in a way which facilitates assessment of compliance with WFD objectives. The construction period extends over a 4.5 year period from 2024 to 2028, with some elements of the Project being operational from 2027.

9.7.5 The Project is expected to have a life span of more than 80 years. If decommissioning is required at the end of this life span, then activities and effects associated with the decommissioning phase are expected to be of a similar level to those during the construction phase works, albeit with a lesser duration (anticipated to be approximately one year). Therefore, the likely significance of effects relating to the construction phase assessment will be applicable to the decommissioning phase and decommissioning effects are not discussed further in this chapter.

9.7.6 As noted in **Section 9.3**, based on the Scoping Opinion, flood risk effects during the operational phase of the Project from the majority of the Project elements are not considered further within this assessment.

Potential receptors

9.7.7 The baseline characterisation identifies potential Hydrology and Flood Risk receptors within the following three broad receptor types:

- Aquatic environment receptors;
- Water resources receptors; and
- Flood risk receptors (people, property, and infrastructure at risk of flooding).

9.7.8 Each of these receptor types are discussed in this section.

Aquatic environment receptors

9.7.9 Aquatic environment receptors are defined within this assessment as either WFD surface waterbodies or water-dependent designated nature conservation sites.

9.7.10 The basic unit for identification of aquatic environment receptors is WFD surface waterbodies, as defined in the Environment Agency Cycle 2 RBMPs[96].

9.7.11 The assessment considers the potential effects on the water quality and hydromorphology supporting elements of WFD ecological status. The biological elements of ecological status for river waterbodies (macroinvertebrates and fish) are not assessed directly within the Hydrology and Flood Risk topic. However, the potential for indirect effects on biology elements which could occur as a direct result of changes to the water quality or the hydromorphology of a water feature have been identified within the Hydrology and Flood Risk topic and assessed **Chapter 8: Biodiversity, Volume 5, Document 5.2.8**. Direct effects on fish populations and other water dependent protected species (for example as a result of light, noise, or vibration) are also addressed within the biodiversity assessment.

9.7.12 WFD chemical status is considered as part of the Hydrology and Flood Risk topic. Whilst it is unlikely that the Project would result in new emissions of priority substances or priority hazardous substances into the environment, it is possible that construction works could lead to the disturbance of existing sources of pollution. The potential effects from such impacts are considered in **Chapter 11: Agriculture and Soils, Volume 5, Document 5.2.11** and **Chapter 10: Geology and Hydrogeology, Volume 5, Document 5.2.10**.

9.7.13 WFD monitoring and classification data are typically derived from the principal watercourses within the catchment. It should be noted however that within the assessment all watercourses within WFD catchments would be considered to ensure that any potential effects are captured and managed to an acceptable level for all catchment receptors.

9.7.14 The potential for impacts on the supporting water quality and hydromorphology for freshwater dependent sites are also considered. This includes all sites that are internationally and nationally designated for nature conservation purposes (i.e. SAC, SPA, Ramsar Sites, SSSI and National Nature Reserves (NNR)); and local nature conservation designations (i.e. Local Nature Reserves (LNR) and County Wildlife Sites (CWS)). In this context, the potential surface water dependence, and consequent impacts on water quality and hydromorphology arising from the Project are considered in respect of the condition and conservation objectives of each designated site.

9.7.15 The receptors identified for the aquatic environment receptors are listed in **Table 9.24** of **Section 9.9**.

Water resources receptors

9.7.16 Water resources receptors are defined within this assessment as surface water abstractions including their associated upstream catchment. The potential for impacts on water quality and water balance/flow regime in the catchments upstream of abstraction locations are assessed in order to determine potential effects on the abstractions themselves. The assessment of abstractions in the Hydrology and Flood

[96] Defra and Environment Agency (2021). River basin management plans: 2015 (Online) Available at: https://www.gov.uk/government/collections/river-basin-management-plans-2015 (Accessed 1 October 2021).

Risk topic are restricted to those from surface water sources. The potential for effects on groundwater abstractions are considered in the Hydrogeology and Land Quality topic.

9.7.17 Discharges to surface water are also considered although there is little scope for effects from the Project on discharges, apart from direct physical impingement, which would be avoided through imposition of suitable stand-off distances between working areas and discharge infrastructure (**HY2**).

9.7.18 The receptors identified for the water resource receptors are listed in **Table 9.25** of **Section 9.9**.

Flood risk receptors

9.7.19 Flood risk receptors are defined within this Chapter (**9**) as property and infrastructure that could be at risk of flooding. Their sensitivity is defined in terms of the flood risk vulnerability classification set out in NPPF Annex 3: Flood Risk Vulnerability Classification[97]. It is recognised that the primary purpose of the NPPF flood vulnerability classification is to guide flood risk assessment requirements for new development, but it is also considered to be a useful tool for assessing the relative sensitivity of external receptors for flood risk effects from new development. Further detail regarding the identification of flood risk receptors is set out in the FRA (see **Appendix 5.3.9D, Volume 5, Document 5.3.9D**).

Likely significant effects

9.7.20 The effects on hydrology receptors from the construction and operation of the Project which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 9.19**.

Table 9.19 – Hydrology receptors scoped in for further assessment

Receptor	Relevant Assessment Criteria	Likely Significant Effects without Embedded Measures
Construction Phase		
Aquatic environment receptors and water resource receptors	WFD and WFD (Standards and Classification) Directions (England and Wales) 2015[98]	• Deterioration in the water quality of aquatic environment receptors via generation of sediment laden runoff as a result of construction activities, e.g., watercourse crossings and excavations. • Potential effects on the hydromorphology and flow conveyance

[97] Department for Levelling Up, Housing and Communities (2012). National Planning Policy Framework Annex 3: Flood Risk Vulnerability Classification. (Online) Available at: https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification (Accessed 12 October 2022).

[98] UK Government (2015). The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015. (Online) Available at: https://www.legislation.gov.uk/uksi/2015/1623/contents (Accessed 1 October 2021).

Receptor	Relevant Assessment Criteria	Likely Significant Effects without Embedded Measures
		as a result of increased sediment inputs or direct watercourse disturbance (including from new watercourse crossings). • Deterioration in the water quality of aquatic environment receptors affected by mobilisation of contaminants from contaminated soil, or accidental spillage of pollutants (e.g., fuel or oil). • The potential effects noted above for surface water aquatic environment receptors could also have implications for surface water resource availability.
Flood risk receptors (third party receptors)	NPPF[28]	• Changes to fluvial flood risk associated with loss of floodplain storage and/or change in floodplain flow conveyance. • Changes to fluvial flood risk associated with compartmentalisation of the floodplain. • Changes to watercourse flow conveyance arising from the presence of new or modified temporary watercourse crossings. This has the potential not only to affect the morphology of aquatic environment receptors, but to increase the risk of flooding to flood risk receptors. • Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces.
Operational Phase		
Aquatic environment receptors and water resource receptors	WFD and WFD (Standards and Classification) Directions (England and Wales) 2015[98]	• Deterioration in the water quality of aquatic environment receptors due to a spill or leakage of fuels/chemicals during periodic maintenance and refurbishment activities. • The potential effects noted above for surface water aquatic environment receptors could also have implications for surface water resource availability.

Receptor	Relevant Assessment Criteria	Likely Significant Effects without Embedded Measures
Flood risk receptors (third party receptors)	NPPF[28]	• Changes to flood risk associated with loss of floodplain storage and/or change in floodplain flow conveyance. • Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces.

9.7.21 The receptors/effects detailed in **Table 9.20** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant.

Table 9.20 – Summary of effects scoped out of the hydrology assessment

Receptors	Potential Effects	Justification
Aquatic environment and water resource receptors	Potential effects on the water environment from steelwork delivery, pylon erection, construction, stringing and pulling operations and erection of lattice pylons following foundation installation during construction.	These specific activities would have no interaction with the water environment and are scoped out of further consideration.
Aquatic environment and water resource receptors	Potential effects on water quality receptors (aquatic ecosystem and water resources receptors) during the operational phase resulting from the presence of overhead line infrastructure.	There will be no potential for the water quality of surface water receptors to be affected by the operational phase of the Project. Suitable corrosion and pH resistant concrete formulas will be utilised for pylon footings and there will be no further ground disturbance during the operational phase. Standard procedures will be in place for the operational phase, including adherence to Environment Agency PPG notes[62] and best practice with regards any routine maintenance works required during the operational phase.
Aquatic environment and water resource receptors	Water quantity and hydromorphology effects arising from the presence of overhead line infrastructure, substations,	All new pylons will be located outside of the stand-off distances from the watercourses where possible

Receptors	Potential Effects	Justification
	CSECs and short sections of underground cable.	and agricultural underdrainage networks will have been diverted around foundations for pylons and substations and the short sections of underground cable. The impact arising from the presence of these infrastructure on water flows and levels, and watercourse morphology is therefore scoped out.
Flood risk receptors (third party receptors)	Effects arising from the presence of overhead line infrastructure on flood risk receptors.	The only potential operational effect of the Project on flood risk would be via the displacement effect that positioning pylons in the floodplain might have on flood levels and extents. However, since the volume of water displaced by these structures would be minimal in comparison with overall flood volumes, the potential effect on flood risk receptors is scoped out.

9.8 Assessment methodology

9.8.1 This section presents the methodology that will be used to undertake the assessment of effects on Hydrology and Flood Risk receptors (as defined in **Section 9.7**). It presents the criteria used to delineate the sensitivity of these receptors and the magnitude of change that they may experience as a result of the Project. Collectively, these sensitivity and magnitude of change criteria provide for an assessment of the significance of effects on Hydrology and Flood risk receptors.

Assessment criteria

9.8.2 **Table 9.21** provides a summary of the methodology used to classify the sensitivity of water receptors that may be subject to potential effects.

Table 9.21 – Summary of sensitivity of water features

Sensitivity	Criteria	Examples
Very High	Feature with a high quality and rarity at an international scale, with little potential for substitution.	Conditions supporting sites with international conservation designations (SAC, SPA, Ramsar

Sensitivity	Criteria	Examples
		sites), where the designation is based specifically on aquatic features.
		High status WFD waterbodies (main 'blue line' watercourse and all smaller tributary watercourses not on 'blue line').
	Water resources supporting human health and economic activity at a regional scale.	Regionally important public surface water supplies.
		Large-scale permitted discharges (e.g. city-scale waste water treatment works (WWTWs) treated effluent discharges).
	Features with a very high vulnerability to flooding.	Infrastructure classified in the NPPF Annex 3 Flood Risk Vulnerability Classification[97] as 'Essential Infrastructure' or the emergency service infrastructure categorised as 'Highly Vulnerable'. This includes electricity generating power stations and grid and primary substations as well as essential transport infrastructure. Emergency service infrastructure includes police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.
High	Feature with a high yield and/or quality and rarity at a national scale, with a limited potential for substitution.	Conditions supporting sites with national conservation designations (e.g. SSSI, NNR) where the designation is based specifically on aquatic features.
		Any designated WFD surface waterbody at less than High WFD Status (main 'blue line' feature within waterbody catchment).

Sensitivity	Criteria	Examples
	Water resources supporting human health and economic activity at a local scale.	Local public surface water supplies. Licensed non-public surface water supply abstraction which are large relative to available resource, or where raw water quality is a critical issue, e.g. industrial process water.
		Medium-scale permitted discharges (e.g. town-scale WWTW treated effluent discharges).
	Features with a high vulnerability to flooding.	Property and infrastructure classified in the NPPF Annex 3 Flood Risk Vulnerability Classification[97] as 'Highly Vulnerable' and 'More Vulnerable'. Includes all residential premises (including hotels and caravan parks) public buildings (e.g. hospitals, schools, libraries, leisure centres), industrial premises (e.g. power stations, chemical plants, incinerators) and waste disposal sites requiring hazardous substances consent.
Medium	Feature with a medium yield and/or quality at a regional scale, or good quality at a local scale, with some potential for substitution.	Sites with local conservation designations (e.g. LNRs, CWS and SINC's) where the designation is based specifically on aquatic features.
		Smaller tributary watercourses within the WFD waterbody not on main 'blue line' (for waterbodies at good status or below)
	Water resources supporting human health and economic activity at household/individual business scale.	Licensed non-public surface water supply abstractions which are small relative to available resource, or where raw water quality is not important, e.g., cooling water, spray irrigation. Unlicensed potable surface water abstractions, e.g., private domestic water supplies.

Sensitivity	Criteria	Examples
	Features with a moderate to low vulnerability to flooding.	Small-scale permitted discharges (e.g., village-scale WWTW discharges) Property and infrastructure classified in the NPPF Annex 3 Flood Risk Vulnerability Classification[97] as 'Less Vulnerable'. Includes general industrial, commercial, and retail premises, car parks, mineral extraction sites, and buildings used for forestry and agriculture.
Low	Feature with a low yield and/or quality at a local scale, with good potential for substitution.	Minor watercourses with low habitat potential. E.g., Agricultural, forestry or road-side drainage ditches.
	Water resources that do not support human health, and of only limited economic benefit.	Unlicensed non-potable surface water abstractions, (e.g., livestock supplies). Small discharges exempt from permitting subject to adherence to general binding rules (e.g., package plants from small residential developments or commercial premises in rural areas).
	Features that are resilient to flooding.	Infrastructure classified in the NPPF Annex 3 Flood Risk Vulnerability Classification[97] as 'Water Compatible'. This is infrastructure required in a fluvial, tidal, or coastal location and which is resilient to flooding (e.g., flood control infrastructure, water transmission infrastructure). Also, rural land such as forestry and agricultural land that does not contain any built development.

9.8.3 The magnitude of change acting on water environment receptors is independent of the sensitivity of the feature. This is a largely qualitative assessment, which relies on professional judgement, although it may be informed by quantitative information and analysis where data are available and where appropriate. **Table 9.22** provides examples of how various magnitudes of change will be determined with respect to water features.

Table 9.22 – Examples of water environment magnitude of change

Magnitude	Criteria	Examples of Negative Change
High	Results in major change (scale or duration) to feature, of sufficient magnitude to affect its use/integrity.	Deterioration in river flow regime, morphology, or water quality, leading to sustained, permanent, or long-term breach of relevant conservation objectives (CO), long-term downgrading of WFD status (including downgrading of individual WFD elements), or resulting in the inability of the waterbody to attain Good status in line with the measures identified in the RBMP. Long-term, complete loss of resource or severely reduced resource availability to water users. Change in flood risk resulting in potential loss of life or major structural damage to property and infrastructure.
Medium	Results in noticeable change to feature, of sufficient magnitude to affect its use/integrity in some circumstances.	Deterioration in river flow regime, morphology or water quality that may lead to periodic, short-term, and reversible breaches of relevant CO, or potential temporary downgrading of WFD status (including potential temporary downgrading of individual WFD elements) but would not affect the ability to achieve future WFD objectives). Moderate reduction in licensed water resource availability and/or quality, which may compromise the ability of water users to exercise licensed rights on a temporary basis or for limited periods with no longer–term impact on the purpose for which the water is used. Moderate reduction in non–licensed water resource availability and/or quality with no longer-term impact on associated users and no cessation

Magnitude	Criteria	Examples of Negative Change
		of drinking water supply to associated users.
		Change in flood risk resulting in potential for moderate/internal damage to property and infrastructure.
Low	Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances.	Measurable impact on river flow regime, morphology, or water quality, but remaining generally within CO, and with no change to WFD status (of overall status or element status).
		Minor reduction in resource availability and/or quality, but unlikely to affect the ability of water users to exercise licensed rights.
		Change in flood risk resulting in potential for minor/external damage to property and infrastructure.
Very Low	Results in little or no change to feature, with insufficient magnitude to affect its use/integrity.	No measurable impact on river flow regime, morphology or water quality and no consequences in terms of CO or WFD designations.
		No measurable change in licensed water resource availability or quality and no change in ability of water users to exercise licensed rights. No measurable change in licensed water resource availability or quality.
		Increased frequency of flood flows, but which does not pose an increased risk to people, property, and infrastructure.

9.8.4 The EIA Regulations require that a final judgement is made about whether or not each effect is likely to be significant. The significance of potential and residual effects is derived by considering both the sensitivity of the feature and the magnitude of change. In this assessment, effects are considered to be Significant or Not Significant according

to the matrix in **Table 9.23**. With 'Major' and 'Moderate' effects taken to be 'Significant' and 'Minor' and 'Negligible' taken to be 'Not Significant'.

Table 9.23 – Derivation of significance of potential effects

Magnitude of Change	Sensitivity of Receptor			
	Very High	**High**	**Medium**	**Low**
High	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not Significant)
Medium	Major (Significant)	Moderate (Potentially significant)	Minor (Not Significant)	Minor (Not Significant)
Low	Moderate (Potentially significant)	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)
Very Low	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)	Negligible (Not Significant)

Approach to assessment of WFD compliance

9.8.5 A standalone WFD assessment has not been undertaken. Rather, an integrated WFD assessment is completed within the following hydrological impact assessment. Within the following assessment the advice and guidance provided within the Environment Agency's 'Clearing the Waters for All[99]' and the Planning Inspectorate 'Advice Note 18[46]' are incorporated. In both guidance notes, the following three stage approach is recommended:

- Stage 1 – WFD screening – to determine if there are any activities associated with the Project that do not require further consideration, for example activities which have been ongoing since before the current RBMP plan cycle and which have thus formed part of the baseline.
- Stage 2 – WFD scoping – to identify risks of the Project's activities to receptors based on the relevant waterbodies and their water quality elements (including information on status, objectives, and the parameters for each waterbody).
- Stage 3 – WFD impact assessment – a detailed assessment of waterbodies and their quality elements that are considered likely to be affected by the Project, identification of any areas of non-compliance; consideration of mitigation measures, enhancements, and contributions to the RBMP objectives.

9.8.6 This approach aligns with the assessment undertaken within this Chapter, to assess the impacts to hydrology because of the Project. As a result, Stages 1 and 2 of the WFD assessment approach have been undertaken and are reported within this Chapter.

[99] Environment Agency (2017). Water Framework Directive assessment: estuarine and coastal waters (Online). Available at: https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters (Accessed 25 October 2022).

9.8.7 The hydrology baseline identifies the WFD waterbody catchments and associated WFD designated waterbodies that are potentially affected by the Project, these are screened through the use of the ZoI, defined in **Section 9.5**. Any WFD waterbody outside of the bounds of the ZoI is considered to have no or negligible potential effects and is therefore screened out of this assessment.

9.8.8 Stage 2 considers the Project activities that pose a potential risk to the WFD waterbodies. The assessment will consider the role of embedded measures in mitigating the potential risks from Project activities to the WFD waterbody receptors. Where the potential effects are not suitably mitigated and a significant residual risk remains to any of the WFD waterbodies, a standalone WFD assessment will be produced in which a more detailed, Stage 3, assessment would be undertaken. The potential WFD receptors are identified through the process of identifying the aquatic environment, water resource and flood risk receptors, as set out in **Section 9.7**. The receptor groups were specifically designed to encapsulate the WFD assessment approach without having to get into the detail of the specific WFD elements (Ecological and Chemical for surface waterbodies and Quantitative and Chemical for groundwater). The Assessment of effects is performed in **Section 9.9** and an overview of what this assessment concludes in terms of the WFD assessment is provided in **Section 9.14.**

9.9 Assessment of effects: aquatic environment receptors

9.9.1 This section provides an assessment of effects to aquatic environment receptors arising from the construction and operation of the Project.

9.9.2 The overhead lines are located across 13 WFD waterbody catchments. Overhead line construction and upgrading works will require 19 construction access watercourse crossings that fall within these wider WFD waterbody catchment boundaries. At seven of the locations existing crossings will be used; these crossings may require upgrading for use during the construction phase, however, this is not expected to require significant changes to the channel. A total of 12 new, temporary watercourse crossings will be required during the construction phase.

9.9.3 The majority of the new access crossings will require the installation of culverts, however, to ensure compliance with WFD objectives, the crossing of the Foss (tributary of Wharfe) and two crossings of the Hurns Gutter will involve the construction of a clear span bridge, with no need for in channel works (embedded measure **HY6**, **Section 9.6**), that would affect existing morphology and flow conveyance, as these channels are WFD ‘blue line’ watercourses. There is a fourth clear span bridge proposed on a small Ordinary Watercourse, a tributary of the River Wharfe, near Tadcaster; and a fifth to be located on a tributary to the Hurns Gutter, to the southwest of the proposed Overton Substation, which have been proposed for engineering requirements rather than protection of the water environment. The remaining crossings are associated with IDB adopted watercourses, or other small non-IDB watercourses or ditches that fall within the wider WFD waterbody catchments.

9.9.4 Overton Substation will be located within the Hurns Gutter (Source to River Ouse) WFD waterbody catchment and is less than 0.3km from the Hurns Gutter, which joins the River Ouse approximately 2.5km downstream of the substation.

9.9.5 The proposed Monk Fryston Substation will fall across two WFD waterbody catchments; the Selby Dam (from confluence with Fox Dike and Carr Dike to Ouse) and the Aire (from River Calder to River Ouse). The substation will be located 2.1km west of the Fleet watercourse and 2.1km east of a tributary to the River Aire, both of which are

beyond the ZoI. Neither of these watercourses are WFD blue line watercourses and with the combined effect of distance to the proposed Monk Fryston Substation and the incorporation of the embedded environmental measures the potential for effects on aquatic environment receptors during both construction and operations is assessed to be negligible without the need for further, detailed assessment.

9.9.6 **Table 9.24** summarises the aquatic environment receptors taken forward in this assessment. The sensitivity of each receptor has been determined in accordance with **Table 9.21**.

Table 9.24 – Identified potential receptors and associated sensitivity – aquatic environment receptors

Receptor ID	Receptor	Sensitivity	Rationale
WC1	River Ouse	High	A WFD designated surface waterbody, supporting Moderate status in the Cycle 2 classifications. Intersected by the Order Limits at three instances, near to Overton. Large Main River. Supports numerous nationally designated sites, the nearest (Clifton Ings and Rawcliffe Meadows SSSI) is located 2.1km downstream from the Project.
WC2	River Wharfe	High	A WFD designated surface waterbody, supporting Moderate status in the Cycle 2 classifications. Intersected by the Order Limits, near to Tadcaster. Large Main River. Supports numerous nationally designated sites, the nearest (Bolton Percy Ings SSSI) is located 8.2km downstream from the Order Limits. Supports licensed non-public surface water supply abstractions which are small relative to available resource.
WC3	River Nidd	High	A WFD designated surface waterbody, supporting Moderate status in the Cycle 2 classifications. 0.08km north of the Order Limits, near Moor Monkton. Large Main River. Supports a nationally designated site (Aubert Ings SSSI), located approximately 15km upstream from the Order Limits.
WC4	Cock Beck	High	A WFD designated surface waterbody, supporting Bad status in the Cycle 2 classifications. Intersected by the Order Limits, near to Saxton. Main River.

Receptor ID	Receptor	Sensitivity	Rationale
			Supports a nationally designated site (Sutton Ings SSSI) and a local nature conservation site (Aberford Osiers LWS). Supports licensed non-public surface water supply abstractions which are small relative to available resource.
WC5	Foss (tributary of Wharfe)	High	A WFD designated surface waterbody, supporting Bad status in the Cycle 2 classifications. Intersected by the Order Limits, near to Wighill. Ordinary Watercourses. Flows part Healaugh Marsh SINC approximately 1km downstream of the order limits
WC6	Bishop Dike	High	A WFD designated surface waterbody, supporting Poor status in the Cycle 2 classifications. Intersected by the Order Limits, near to Sherburn in Elmet. Ordinary Watercourses. Is not shown to support any nature conservation sites.
WC7	Mill Dike	High	A WFD designated surface waterbody, supporting Poor status in the Cycle 2 classifications. Intersected by the Order Limits, near to Newthorpe. Ordinary Watercourses. Supports a nationally designated site (Sherburn Willows SSSI), located 1.6km downstream; and a local nature conservation site (Hartley Wood and Castle Hill LWS), located 2km upstream. Supports licensed non-public surface water supply abstractions which are small relative to available resource.
WC8	Osbaldwick Beck	High	A WFD designated surface waterbody, supporting Moderate status in the Cycle 2 classifications. Intersected by the Order Limits, near Osbaldwick. Comprises a network of Ordinary Watercourses. Supports a local nature conservation site (St Nicholas Fields LNR), located 2.3km upstream.
WC9	AIDB adopted drains; MM025, MM038, MM050,	High	Extensive network of heavily modified or artificial drainage channels (Ordinary Watercourses) which discharge into the River Ouse and the River Wharfe. Includes WFD designated waterbody, the Foss (tributary of Ouse), which

Receptor ID	Receptor	Sensitivity	Rationale
	MM051, MM052, MM053 (The Foss), MM054, MM56.	Medium	supports Bad status under the Cycle 2 classifications. Ordinary Watercourses. Extensive network of artificial drainage channels mainly in the form of field drains along arable field boundaries under the control and management of the AIDB. The Moor Monkton network drains discharge into the River Ouse about 0.2km downstream of the Project.
WC10	KUOIDB adopted drains; 32, 33, and 34 (Hurns Gutter). 34A, 36, 37, 70 (New Parks Beck), 75, 76 and 79.	High Medium	Includes WFD designated waterbody, the New Parks Beck and Hurns Gutter, which support Poor and Moderate status (respectively) under the Cycle 2 classifications. Ordinary Watercourses. Extensive network of artificial drainage channels mainly in the form of field drains along arable field boundaries under the control and management of the KUOIDB. The New Parks Beck network drains discharge into the River Ouse about 10.8km downstream of the Order Limits. Whilst the Hurns Gutter discharges to the River Ouse approximately 0.1km downstream of the Order Limits.
WC11	FIDB adopted drain; 90 (Murton Station Dyke).	Medium Medium	Not designated as WFD surface waterbody. Ordinary Watercourses. Extensive network of artificial drainage channels mainly in the form of field drains along arable field boundaries under the control and management of the FIDB. The drains discharge into the River Ouse about 1.6km downstream of the Order Limits.
CS1	Clifton Ings and Rawcliffe Meadows SSSI	High	Site with a national nature conservation designation (SSSI), where the designation is based specifically on aquatic features.
CS2	Sherburn Willows SSSI	High	Site with a national nature conservation designation (SSSI), where the designation is based specifically on aquatic features. The Order Limits cross a watercourse (Mill Dyke) that flows through a swamp area of the site. There are no watercourse crossings on this channel.
CS3	Overton Borrow Pits SINC	Medium	A pylon would be dismantled within this SINC which comprises two linear borrow pits with a small area of fen-meadow.

Receptor ID	Receptor	Sensitivity	Rationale
CS4	Healaugh Marsh SINC	Medium	This site is downstream of the Order Limits and there is a hydrological connection between the Order Limits and the site via the Foss (tributary of Wharfe). There will be one new temporary watercourse crossings of the Foss (tributary of Wharfe).
CS5	River Ouse LWS and candidate SINC	Medium	The Order Limits cross the River Ouse itself. Though there are no new access track watercourse crossings over the Ouse, there will be two new temporary crossings on the Hurns Gutter, which is a tributary to the Ouse.
NFM1	Whitby Wood –	Low	This site is downstream of the Order Limits and there is a hydrological connection as it is located in the Hurns Gutter floodplain. A Natural Flood Management (NFM) project that '*aims to use land to store flash flood water, with woody debris and trees planted releasing it slowly from leaky Dams into Hurns Gutter and into the River Ouse*.'[100]

Construction Phase

Deterioration in water quality of aquatic environment receptors via generation of sediment laden runoff.

9.9.7 During the construction phase of the overhead line and substations there is potential to generate sediment laden runoff which could, in the absence of appropriate embedded measures, adversely affect the aquatic environment receptors (or water resources receptors). Activities that could potentially produce sediment-laden runoff include:

- construction and removal of access routes (including topsoil stripping) and other working areas;
- runoff from installed access routes, temporary construction compounds and working areas;
- foundation excavation for overhead line pylons and in the unlikely event required, dewatering activities;
- excavation works associated with substation foundations and subsequent dewatering activities. Across the substation sites, where the water table is shallow, there is likely to be some degree of excavation required below the water table. Therefore, it is anticipated that short-term excavation dewatering will be required. This water could contain elevated concentrations of suspended sediment;
- as a precautionary approach, it is assumed that an open trenching would be applied to install underground cabling between CSECs;

[100] Whitby Woodland 'Slow the flow' contribution to York's Flood Defence, part of the Treemendous York Project

- direct sediment disturbance by in-channel works for the construction of access crossings;
- the use and management of soil stockpiles; and
- the undergrounding, redirecting and protection of third-party assets, including a low voltage overhead line under the Cock Beck. As a precautionary approach, it is assumed that an open trenching approach would be applied for the undergrounding works, although alternatives would include Horizontal Directional Drilling (HDD) or other trenchless techniques for watercourse crossings.

9.9.8 The assignment of significance to suspended sediment-related effects is considered precautionary, given that the watercourses across the Study Area are likely to experience baseline variation in suspended sediment due to agricultural practice in the area.

9.9.9 The proposed embedded measures to limit sediment-laden runoff are set out in **Table 9.18.** These include implementation of an inspection and monitoring schedule to ensure compliance with CoCP requirements (**HY1**), maintaining minimum stand-off distance between the works and the edge of Main Rivers, Ordinary Watercourses and IDB adopted drains (**HY2**), development and implementation of the DMP (**HY3**) for the construction phase, design and construction of temporary watercourse (access) crossings, management of soil stockpiles (**HY5**) and for open trenching in watercourses and flood plains (**HY6**). These measures would be applied during the undergrounding, redirecting and protection works for third party assets and would suitably control the release of sediments.

9.9.10 Taking account of the proposed embedded measures, the magnitude of change from the potential effects of sediment-laden runoff on aquatic environment receptors is **Very Low** for the River Ouse, River Wharfe, River Nidd, and nature conservation sites, and **Low** for the IDB drains, Cock Beck, Bishops Dike, Mill Dike, Osbaldwick Beck, and the Foss (both catchments). The magnitude of change is higher for the IDB adopted drains and smaller watercourses because of the limited dilution available and proximity of the overhead lines (and associated access), compared to the Main Rivers, which have a large dilution capacity. The potential magnitude of change for the open trenching works in the Cock Beck are also considered to be **Low** on the basis that the measures would suitably manage sediment loading of the watercourse.

9.9.11 Consideration of the sensitivity of all aquatic environment receptors (**Low** to **High**) in combination with the potential magnitude of change acting upon them (**Very Low** to **Low**), derives that the significance of effects on aquatic environment receptors is, in this assessment, at most **Minor** and therefore **Not Significant**.

9.9.12 Increased sediment inputs to the watercourses, also have the potential to generate heightened levels of entrained nutrients, including Nitrogen (N) and Phosphorous (P) into the surface water. Increased nutrient loading of surface water can detrimentally impact the nutrient status of protected sites, as well as other surface water receptors downstream.

9.9.13 The proposed embedded measures to limit sediment-laden runoff as set out above (**HY1**, **HY2**, **HY3**, **HY4** and **HY5**), would be sufficient in controlling the potential releases of nutrients with silty runoff; thereby, mitigating the potential impacts increased nutrients would have on protected sites. Therefore, in this assessment, the risk of nutrients, entrained with sediment, being released to surface water as a result of the Project is considered to be **Not Significant**.

Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance during the installation of culverted crossings

9.9.14 Any potential increases in sediment-laden runoff could also result in increased silt deposition within the watercourse network affecting the hydromorphology of the watercourses, however, those measures described above limit the supply of sediment-laden runoff preventing deposition (**HY1, 2, 3** and **5**).

9.9.15 All works in and around the watercourses, where there is a requirement to install access crossings, will be kept to a minimum and ensure minimum change to existing morphology and flow conveyance by adhering to embedded environmental measures (**HY7**). Any disturbance related suspended sediment concentrations will likely be within the normal range that would be expected within these agricultural ditches. In terms of watercourse crossings, the potential effects would be local to the works and be negligible in scale when compared to the overall WFD waterbody scale.

9.9.16 Meanwhile, the open trenching works have the potential to impact hydromorphology due to the excavations works required in the channel of the Cock Beck; which could impact the hydromorphology of the watercourse at the location of the works but also downstream as sediments are conveyed by the watercourse. The relevant embedded measures set out for open trenching within a watercourse (**HY6**) are appropriate in managing the potential risks to channel morphology, at the location of the works and also downstream.

9.9.17 Taking account of the proposed embedded measures the changes to watercourse hydromorphology would be such that the magnitude of change on the hydromorphology and flow conveyance of the watercourses is **Very Low** for the River Ouse, River Wharfe, and River Nidd and, for the reasons mentioned above, **Low** for the IDB drains, Cock Beck, Bishops Dike, Mill Dike, Osbaldwick Beck, and the Foss (both catchments).

9.9.18 Additionally, on the basis that the embedded measures relating to the open trenching within the watercourse are suitably implemented, the magnitude of change to hydromorphology as a result of the third-party undergrounding works would be **Low** for the Cock Beck.

9.9.19 Consideration of the sensitivity of all aquatic environment receptors (**Low** to **High**) in combination with the potential magnitude of change acting upon them (**Very Low** to **Low**), derives that the significance of effects on aquatic environment receptors is, in this assessment, at most **Minor** and therefore **Not Significant**.

Deterioration in the water quality of aquatic environment receptors affected by mobilisation of contaminants from contaminated soil, accidental spillage of pollutants, and discharge of treated sewage effluent

9.9.20 The construction works have the potential to further affect water quality conditions and therefore aquatic environment receptors (and water resources receptors) within associated water features via:

- accidental spillage of fuel, oil or other chemicals used during construction;
- mobilisation/leaching of contaminants from historical soil contamination during excavation works;
- contaminated water pumped from excavations; and
- sewage effluent generated at welfare facilities.

9.9.21 The proposed embedded measures to prevent surface water pollution are set out in **Table 9.18** and include: inspection and monitoring of adherence to the CoCP (**HY1**); development and implementation of the DMP (**HY3**) for the construction phase; good practice in fuel and oil storage design, including a PICP (**HY9**); implementation of a Soil Management Plan (**HY10**) to manage potentially contaminated excavated material; and appropriate treatment and disposal of sewage (**HY11**).

9.9.22 The magnitude of change from all identified potential effects of accidental spillage of pollutants on aquatic environment receptors, taking account of embedded measures, is **Very Low** for the River Ouse, River Wharfe, River Nidd, nature conservation sites and ponds, and, following the reasoning set out above, **Low** for the IDB drains, Cock Beck, Bishops Dike, Mill Dike, Osbaldwick Beck, and the Foss (both catchments).

9.9.23 Consideration of the sensitivity of all aquatic environment receptors (**Low** to **High**) in combination with the potential magnitude of change acting upon them (**Very Low** to **Low**), derives that the significance of effects on aquatic environment receptors is, in this assessment, Minor and therefore **Not Significant**.

9.9.24 The issue of contaminated land and associated mobilisation of contaminants in groundwater and subsequently surface water is addressed in detail in **Chapter 10: Geology and Hydrogeology, Volume 5, Document 5.2.10**. In summary, the Chapter finds that given the specifics of the construction activities together with the nature of the previous land use, the risk of the Project causing significant contamination of groundwater and thereby surface water (e.g. by mobilising old contamination due to ground disturbance) is at most **Minor** and can be managed to **Negligible** through embedded measures. Therefore, in this assessment, the risk of mobilisation of ground contaminants is **Not Significant**.

Operational phase

Deterioration in the water quality by accidental spillage/release of pollutants, or release of treated sewage effluent.

9.9.25 The operation of the substations has the potential to affect water quality conditions and therefore aquatic environment receptors within associated water features via the discharge to watercourses of contaminants in surface runoff and of treated sewage effluent from welfare facilities.

9.9.26 The proposed embedded measure **HY17** to prevent surface water pollution from substations during the operational phase is summarised in **Table 9.18**. It will ensure that appropriate pollution control and treatment measures are incorporated into detailed drainage design and that appropriate treatment is provided for any treated sewage effluent to watercourses, as set out in the drainage strategies (**Appendix 5.3.9D, Annexes 9D.5 and 9D.6, Volume 5, Document 5.3.9**).

9.9.27 Runoff and any treated sewage effluent from the proposed Overton Substation would be discharged to the Hurns Gutter. Given the anticipated effectiveness of the embedded environmental measures, the magnitude of effect on the aquatic environment receptors with respect to release of contaminants is **Very Low** for the River Ouse and Clifton Ings and Rawcliffe Meadows SSSI and **Low** for the KUOIDB adopted drains including the Hurns Gutter. The magnitude of change is higher for the KUOIDB drains because of the limited dilution available and proximity to the proposed Overton Substation compared to the River Ouse which has a large dilution capacity and is located 2.5km downstream of the substation. Consideration of the sensitivity of the aquatic environment receptors

(**High** to **Medium**) in combination with the potential magnitude of change acting upon them, finds that the significance of effects on aquatic environment receptors is, in this preliminary assessment, **Minor** and therefore **Not Significant**.

9.9.28 Runoff and any treated sewage effluent from the proposed Monk Fryston Substation would be discharged to a nearby drainage ditch, which is located in the catchment of the Selby Dam (from confluence with Fox Dike and Carr Dike to Ouse) WFD waterbody. However, as noted in paragraph 9.9.5, this outfall location is distant from any WFD watercourses, so, given the implementation of embedded mitigation at the site, and the dilution effects that would occur between outfall and WFD watercourse, any water quality impacts would be **Negligible** and **Not Significant**.

9.9.29 Similarly, the potential for any water quality effects arising from surface runoff from CSECs at Tadcaster and Shipton is considered **Negligible** and **Not Significant,** given their negligible impermeable area, and a lack of sources of potentially polluting materials and activities on site.

9.10 Assessment of effects: water resource receptors

9.10.1 The Order Limits, which includes the proposed location of Overton Substation, north of Bilton in Ainsty, falls within a regionally important Drinking Water Safeguard Zone (Humber_ SWSGZ6007_ Acomb Landing and Moor Monkton) and intersects the Ouse from the River Nidd to Stillingfleet Beck WFD waterbody catchment, which is a regionally important Drinking Water Protection Area. The Order Limits are also within proximity of a downstream licensed surface water abstraction from the Cock Beck (1.5km downstream).

9.10.2 An assessment of groundwater abstractions is provided in **Chapter 10: Geology and Hydrogeology, Volume 5, Document 5.2.10**.

9.10.3 **Table 9.25** summarises the water resource receptors taken forward in this assessment. The sensitivity of each receptor has been determined in accordance with **Table 9.21**.

Table 9.25 – Identified potential receptors and associated sensitivity – water resource receptors

Receptor ID	Receptor	Sensitivity	Rationale
WR1	Ouse from River Nidd to Stillingfleet Beck	Very High	Regionally important designated surface water Drinking Water Protection Area.
WR2	Humber_SWSGZ6007_ Acomb Landing and Moor Monkton	Very High	Regionally important designated surface water Drinking Water Safeguard Zone.
WR3	Licensed abstractions from the Cock Beck	Medium	Local licensed abstraction, downstream of the Order Limits, which is minor compared to available water resources.

Construction phase

Potential change to water quality of a water supply resource which may affect the viability of an abstraction

9.10.4 Those activities with the potential to affect the water resources receptors via potential changes to the water quality of watercourses (potential for increases in sediment laden runoff for example), together with the embedded measures associated with these, are presented in the aquatic environment receptors section above. The potential for soil and groundwater contamination to affect surface water quality is also presented in the aquatic environment receptors section above. Suitable materials will be used during pylon construction (such as corrosion resistant concrete formulas for pylon foundations to ensure no water quality changes to receiving watercourses (**HY8**)). Groundwater dewatered from excavations (e.g., pylon foundation excavations) would be discharged to adjacent grassed/vegetated agricultural land, away from watercourses as far as possible.

9.10.5 All works in and around the watercourses, where there is a requirement to install access crossings, will be kept to a minimum and ensure minimum change to existing morphology and flow conveyance by adhering to embedded environmental measures (**HY7**). This includes works relating to the five proposed temporary bridge crossings (one to be located on the Foss (tributary of Wharfe), two on the Hurns Gutter and two on Ordinary Watercourses), which in adherence with the environmental measures (**HY7**) would be clear span bridges, in order to remain complaint with WFD regulations. The remaining watercourse crossings will likely be culverts, the design of which will be agreed with the LLFA via a consent application for the works. The magnitude of change for these effects would be **Very Low**, on account that there would be a limited flow pathway between the watercourse crossings and the water resources receptors. The magnitude of change relating to other effects for water resources is also considered to be **Very Low**.

9.10.6 Consideration of the sensitivity of all water resource receptors (**High** to **Medium**) in combination with the potential magnitude of change acting upon them (**Very Low**), derives that the significance of effects on water resource receptors is, in this assessment, at most Minor and therefore **Not Significant**.

Operational phase

Potential change to water quality of a water supply resource which may affect the viability of an abstraction

9.10.7 Those activities with the potential to affect the water resources receptor via potential changes to the water quality of watercourses upstream of the receptor (potential for change in water quality via accidental spillage of pollutants and routine discharge of surface runoff and treated sewage effluent), together with the embedded measures associated with these, are presented in the aquatic environment receptors section above.

9.10.8 The magnitude of change from all identified potential effects on the water resource receptor, taking account of embedded measures is **Very Low**. Consideration of the sensitivity of the water resource receptor (**High**) in combination with the potential magnitude of change acting upon it, concludes that the significance of effects on the water resource receptor from the operational phase of the substations, in this assessment, is Minor and therefore, **Not Significant**.

9.11 Assessment of effects: flood risk receptors

Assessment of effects on flood risk receptors

9.11.1 As already noted, this assessment concentrates only on the impacts of the Project on flood risk to external (third party) receptors. The risk of flooding to the Project itself is assessed in the FRA (see **Appendix 5.3.9D, Volume 5, Document 5.3.9D**). The sensitivity of these receptors has been identified in accordance with the criteria outlined in **Table 9.21** and range from '**Very High**' to '**Medium**' as listed below:

- **Very High** - Identified as 'Essential Infrastructure' with a higher vulnerability to flooding.
- **High** – Infrastructure designated as 'More' or 'Highly vulnerable'.
- **Medium** - Infrastructure designated as 'Less Vulnerable'.

9.11.2 The relevant flood risk receptors are summarised in **Table 9.26** below.

Table 9.26 – Identified potential receptors and associated sensitivity – flood risk receptors

Receptor ID	Receptor	Sensitivity	Justification
Various locations	Transport infrastructure inclusive of main roads (such as the A1079, A19, A59, A64, A650, A659, A1(M) and the A63) and railway lines (including the East Coast Main Line (ECML) and York to Castleford, York to Leeds and York to Knaresborough railway lines).	Very High	Land use type defined as 'Essential Infrastructure' in the NPPF flood risk vulnerability classification (essential transport infrastructure).
Various locations	Residential properties (for example properties at Monkton, Tadcaster, Stutton and Wighill).	High	Land use type defined as 'Highly Vulnerable' in the NPPF flood risk vulnerability classification (agricultural buildings).
Various locations	Farm buildings (for example White Syke Farm and Newlands Farm).	Medium	Land use type defined as 'Less Vulnerable' in the NPPF flood risk vulnerability classification (agricultural buildings).
Various locations	Substations at Monk Fryston and Osbaldwick.	Very High	Land use type defined as 'Essential Infrastructure' in the NPPF flood risk vulnerability classification (grid and primary substations).

Construction phase

9.11.3 There are 17 new overhead line pylons located within Flood Zones 2 and 3, in addition to the associated working areas, scaffolding areas, temporary access routes and 12 new temporary watercourse crossings. The overhead line also coincides with a number of minor areas of surface water accumulation and areas of high groundwater flooding susceptibility.

9.11.4 The following mechanisms which may have an effect on the flood risk to third party receptors during construction are discussed below:

- changes in flood storage and conveyance due to raised structures in the floodplain;
- change in watercourse flow conveyance due to new watercourse crossings; and
- changes in surface water runoff rates and flow pathways arising from ground disturbance and the creation of new, temporary impermeable surfaces.

9.11.5 The FRA (see **Appendix 5.3.9D, Volume 5, Document 5.3.9D**) concluded that the risks relating to loss of floodplain storage, compartmentalisation of the floodplain (by obstructing water flow), and changes in surface water runoff rates and flow pathways, as a result of the Project construction elements would be minimal. Any resultant flood displacement from these activities would be localised and temporary, but, if left unmitigated, could have the potential to impact third party receptors in the vicinity of the works.

9.11.6 Furthermore, the construction of watercourse crossings has the potential to impact fluvial flow conveyance. There are 12 new temporary watercourse crossings proposed within the Order Limits, seven culverts and five bridges; in addition to seven existing crossings that are assumed to require upgrading for the construction works. These have the potential to impact watercourse flows. If not mitigated for, crossings could impact flow conveyance which could cause a localised increase in flood risk upstream of the watercourse crossing, which has the potential to effect third party receptors.

9.11.7 Appropriate flood management measures have been set out in **Section 9.6**, which also correspond to flood management measures set out in the FRA (**Appendix 9D, Volume 5, Document 5.3.9**). The key features of the measures set out to address risks associated with increased surface water runoff include appropriate surface water management across the construction sites, by applying a suitable DMP (**HY3**) and controlling water discharges from the site (**HY4**); in addition to the implementation of appropriate surface water infiltration features, which will be set out in the DMP. It is also clarified that all temporary structures (including working areas and access tracks) will be removed once construction is complete and the ground re-instated to pre-construction conditions (**HY12**); which would remove all temporary impermeable surfaces in these areas.

9.11.8 Similarly, the **Section 9.6** set out suitable embedded measures for controlling the risks associated with impingement on watercourses, loss of floodplain storage and compartmentalisation of the floodplain (**HY2, HY13**). This includes micro-siting of infrastructure to avoid flood risk areas and conflicts with existing drainage networks where practicable (**HY15**), ensuring that where structures in Flood Zones 2 and 3 cannot be avoided, they are as close to ground level as possible (**HY13**).

9.11.9 The embedded measures (**Section 9.6**) also include relevant measures to control risks associated with the watercourse crossings, which must be appropriately sized and located to avoid restricting flows in the watercourse (**HY7**). These elements will also require consent, prior to construction, from the relevant drainage authority (EA, IDB or

LLFA). As such, further, detailed, site-specific arrangements for limiting the ingress of fine sediment into watercourses associated with the installation and removal of these structures will be required to accompany permit applications and demonstrate these features will not cause increased flood risk due to flow obstruction.

9.11.10 On the basis that the embedded mitigation measures will be effective in mitigating the potential flood risk effects the magnitude of impact is considered to be **Very Low**. This, combined with the receptor sensitivities (**Very High** to **Low**) derives that the significance of effects on flood risk receptors during the construction phase is, in this assessment, Minor and therefore **Not Significant**.

Operational Phase

9.11.11 Where possible permanent Project elements have been sited outside of Flood Zones 2 and 3, as such the substations, permanent access tracks and CSECs are located entirely within Flood Zone 1 and are not expected to impact fluvial flood risk throughout their phase of operation. Similarly, following the Scoping Opinion (see **Table 9.5**) operational flood impacts associated with the pylon structures were scoped out of the assessment, on the basis that impacts to flood risk would be negligible.

9.11.12 However, whilst the proposed site of Overton Substation is located entirely within Flood Zone 1, the York Detailed Model, flood model, identifies the southern boundary of the proposed Overton Substation is at risk of flooding, based on future climate change modelling in the 1% AEP + 50% climate change event, but not the 1% AEP + 30% climate change event (see **Figure 9.8, Volume 5, Document 5.4.9**). The National Grid design criteria[101] requires substations to be resilient to flooding up to and including a 1 in 1,000-year (0.1% AEP) flood event with an allowance for climate change (also to include a 300mm freeboard). To achieve this, proposals are set out in the in the FRA (see **Appendix 5.3.9D, Volume 5, Document 5.3.9**) to raise the substation on a platform.

9.11.13 As set out in **Section 9.5,** the climate change allowances for the 2080s epoch are +34% and +53% for the Higher Central and Upper End allowances, respectively. Based on the latest Environment Agency climate change guidance[45], compensatory flood storage would be required if there were displacement of flood water in the 1% AEP + 34% climate change event (Higher Central allowance). However, the current Environment Agency guidance[45] states that if the new climate change allowances are not significantly different from those previously modelled then no re-modelling is required. Through consultation, the Environment Agency clarified that their view of 'not significant' is within +/- 10%. Based on this information, and with agreement from the Environment Agency, the existing York Detailed Model 1% AEP +30% climate change event output has been used to determine that there will be no requirement for compensatory storage due to land raising, to achieve the National Grid design standard (0.1% AEP +34% CC) as no land raising will occur within the 1% AEP +30% climate change event extent.

9.11.14 The flood modelling undertaken, and detailed within the FRA (**Appendix 5.3.9D, Volume 5, Document 5.3.9**), provides a water elevation within the substation boundary for the 0.1% AEP flood + 34% CC event of 13.41 mAOD (**Figure 9.11, Volume 5, Document 5.4.9**). This means a final flood resilience level of 13.71 mAOD has been used for the design of the substation to include a 300mm freeboard.

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[101] National Grid (2016). General electricity and substation design manual for civil, structural and building engineering, Section No:13; Flood defences for electricity for substations (TS 2.10.13, Issue 2)

9.11.15 The substations and other associated permanent infrastructure such as CSECs and access tracks, have the potential to generate increased surface water runoff due to the increased area of impermeable surface. This increased generated surface water runoff could lead to an increase in risk to offsite flood risk receptors (**Table 9.26**) receptors, if left unmanaged. In response to this potential risk, drainage strategies have been developed for the proposed new substations at Overton and Monk Fryston, which would suitably control surface water runoff from the sites (**Appendix 5.3.9D, Annexes 9D.5 and 9D.6** respectively, **Volume 5, Document 5.3.9D**). The drainage strategies for these substations employ SuDS principles and attenuation of surface water runoff to mitigate potential risks; and demonstrate how discharges of surface water will be appropriately managed so as not to cause flooding downstream. Similar measures will also be incorporated into detailed drainage design for CSECs and permanent access roads (**HY16**).

9.11.16 The potential effects described above are discussed in further detail in the FRA (see **Appendix 9D, Volume 5, Document 5.3.9**), in addition to the appropriate flood mitigation measures (**HY16** and **HY17**) for the operational phase. On the basis that the embedded mitigation measures will be effective in mitigating the potential flood risk effects the magnitude of impact is considered to be **Very Low**. This, combined with the receptor sensitivities (**Very High** to **Low**) derives that the significance of effects on flood risk receptors during the operational phase is, in this assessment, **Minor** and therefore **Not Significant**.

9.12 Assessment of cumulative effects

Inter-project (combined with other development) cumulative effects

9.12.1 An assessment of the effects which could result from the Project in cumulation with other developments in the vicinity of the Project is provided in **Chapter 18: Cumulative Effects** (**Volume 5, Volume 5, Document 5.2.18**).

Intra-project (within the Project) cumulative effects

9.12.2 Intra-related effects have been considered in this assessment, i.e. where effects in one environmental area could give rise to effects in others. The greatest potential for hydrology effects that are inter-related with other aspects is considered to be with Geology and Hydrogeology, (**Chapter 10, Volume 5, Document 5.2.10**), Air Quality (**Chapter 13, Volume 5, Document 5.2.13**) and Biodiversity (**Chapter 8, Volume 5, Document 5.2.8**).

9.12.3 There are potential inter-related effects relating to hydrology, as follows:

- release of contaminated soils to surface water (either directly or via groundwater) during excavations or ground disturbance. This provides a potential inter-related effect with groundwater and surface water quality receptors that is discussed in **Chapter 10, Geology and Hydrogeology, Volume 5, Document 5.2.10**;
- changes to water quality, quantity and flood risk has the potential to impact sensitive habitats or species that may be dependent on specific water-related conditions; such as designated conservation sites, as identified in Section 9.5. This provides a potential inter-related affect between hydrology and biodiversity receptors, which is discussed in this Chapter, under **Section 9.9 and 9.10**, and in **Chapter 8: Biodiversity, Volume 5, Document 5.2.8**; and

- generation of dust and sediments from soil works in dry conditions, or wind erosion, leading to adverse effects on water quality. This provides a potential inter-related effect with receptors considered in **Air Quality, Chapter 13, Volume 5, Document 5.2.13**.

9.12.4 Further review of intra-project effects can be found in **Chapter 18: Cumulative Effects, Volume 5, Document 5.2.18.**

9.13 Significance conclusions

9.13.1 A summary of the results of the hydrology assessment is provided in **Table 9.27**.

Table 9.27 – Summary of significance of effects

Receptor and summary of Predicted Effects	Sensitivity of receptor[1]	Magnitude of Change[2]	Significance[3]	Summary Rationale
Construction Phase				
Aquatic environment receptors WC1-11, CS1-5 Water resource receptors WR1-3 Predicted effect: increase in sediment laden runoff	Low to High	Very Low to Low	Not significant (Negligible to Minor)	Embedded environmental measures would render effects on aquatic environment receptors and water resources receptors as **Not Significant**.
Aquatic environment receptors WC1-11, CS1-5, NFM1 Predicted effect: changes on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance	Low to High	Very Low to Low	Not significant (Negligible to Minor)	The implementation of the embedded measures designed to prevent silt-laden runoff would ensure the effect on hydromorphology and flow conveyance of aquatic environment receptors is **Not Significant.**
Aquatic environment receptors WC1-11, CS1-5 Water resource receptors WR1-4 Predicted effect: deterioration in the water quality due to mobilisation of contaminants from contaminated soil or accidental spillage of pollutants	Low to High	Very Low to Low	Not significant (Negligible to Minor)	The implementation of the embedded measures designed to prevent surface water pollution (for example implementation of good working practices with adherence to the CocP) would ensure the effect on aquatic environment receptors and water resources receptors is **Not Significant.**
Flood risk receptors External, third party receptors	Medium to High	Very Low	Not significant (Negligible to Minor)	A range of construction phase embedded environmental measures have been specified to

Receptor and summary of Predicted Effects	Sensitivity of receptor[1]	Magnitude of Change[2]	Significance[3]	Summary Rationale
Predicted effect: Changes to watercourse flow conveyance as a result of new or modified temporary watercourse crossings.				ensure any temporary watercourse crossings are appropriately sized and to control silt-laden runoff from working areas and minimise direct channel disturbance during installation and removal. With the specified embedded environmental measures in place, the effect of changes on watercourse flow conveyance on the flood risk receptors is **Not Significant**.
Flood risk receptors External, third party receptors Predicted effect: Change to surface water flood risk, due to temporary impermeable surfaces.	Medium to High	Very Low	Not significant (Negligible to Minor)	A DMP will be prepared for the construction phase, utilising SuDS principles. Consents will be obtained for any discharges to watercourses. With the specified embedded environmental measures in place, the effect of changes to surface water flood risk on the flood risk receptors is **Not Significant.**
Proposed Overton and Monk Fryston Substations and CSECs – Operational Phase				
Aquatic Environment Receptors Predicted effect: Deterioration in water quality due to contaminants in surface runoff and discharge of treated sewage effluent from welfare facilities (substations only)	Low to High	Very Low to Low	Not significant (Negligible to Minor)	All sites will incorporate drainage systems with SuDS treatment measures. Substation drainage systems will incorporate containment and oil separators for areas with oil-filled transformers. Substation welfare facilities will incorporate treatment for sewage effluent, if discharge to watercourses is required. Water quality effects considered **Not**

Receptor and summary of Predicted Effects	Sensitivity of receptor[1]	Magnitude of Change[2]	Significance[3]	Summary Rationale
				Significant as a consequence.
Flood risk receptors External, third party receptors Predicted effect: Change to surface water flood risk, due to permanent impermeable surfaces.	Medium to High	Very Low	Not significant (Negligible to Minor)	Drainage strategies incorporating SuDS have been prepared for the operational phase of the substations and any associated permanent impermeable surfaces. CSEC drainage will designed to equivalent standards. Consequently, the effect of changes to surface water flood risk on the flood risk receptors is **Not Significant.**
Flood risk receptors External, third party receptors Predicted effect: Change to fluvial flood risk due to displacement of flood storage caused by the construction of a platform to ensure the Overton Substation is resilient to flooding.	Medium to High	Very Low	Not significant (Negligible to Minor)	To ensure that the proposed Overton Substation is resilient to flooding over its lifetime a raised, earth, platform will be required to elevate the substation out of the 0.1% AEP +34% climate change event. The platform will be constructed completely outside of the 1%+30%CC climate change event extent, therefore, there will be no effect from ground raising to third party receptors. Flood displacement effect is therefore **Not Significant.**

1. The sensitivity of a receptor is defined using the criteria set out in **Section 9.8** and is defined as Low, Medium, High and Very High.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 9.8** and is defined as Very Low, Low, Medium and High.
3. The significance of the environmental effects is based on the combination of the sensitivity of a receptor and the magnitude of change and is expressed as Major (Significant), Moderate (Potentially Significant) or Minor/Negligible (Not Significant), subject to the evaluation methodology outlined in **Section 9.8**.

9.14 Integrated WFD Assessment

9.14.1 As was set out in **Section 9.8**, an approach has been adopted in which the WFD assessment has been integrated within the ES assessment, as such a standalone WFD assessment has not been produced alongside this document. The first two stages of the recommend WFD assessment process, are incorporated as follows:

- Stage 1: Screening of the activities, and their potential for effects to the water environment including surface water WFD elements, has been undertaken in **Table 9.19** and **Table 9.20** with the screening out of activities performed in **Table 9.20**. The WFD surface water catchments scoped into the study are summarised in **Appendix 9.B, Volume 5, Document 5.4.9B**, which includes the waterbodies status and objectives.
- Stage 2: The WFD scoping has been undertaken in the assessment in **Sections 9.9** to **9.10**, which considered the role of embedded measures in mitigating the potential risks from Project activities to the WFD waterbody receptors.

9.14.2 As determined in the assessment of hydrology effects (**Sections 9.9** to **9.11**), the impacts of the Project to the aquatic environment can be suitably mitigated by the effective implementation of embedded measures, thereby reducing the residual effects to water quality and hydrogeomorphology to **Not Significant**. Consequently, the embedded measures are effective in supporting the WFD waterbody objectives.

9.14.3 In **Table 8.15** of **Chapter 8: Biodiversity, Volume 5, Document 5.2.8**, it was concluded, that impacts of the Project to aquatic ecology can be suitably mitigated by the effective implementation of embedded measures and therefore the effect has been determined to be minor **(Not Significant)**. Thereby, reducing the potential effects to biological quality elements to **Not Significant**. On this basis, and as there are no significant residual effects, a standalone WFD assessment for individual WFD surface waterbodies has not been undertaken.

9.14.4 In **Chapter 10: Geology and Hydrogeology, Volume 5, Document 5.2.10**, it was concluded, that in relation to groundwater bodies, the Project has been determined to have no effects that are likely to cause deterioration in WFD status or prevent waterbodies from achieving their WFD objectives, provided that best practice and established guidance is adhered to, in accordance with the embedded measures in **Table 10.8** of **Chapter 10: Geology and Hydrogeology, Volume 5, Document 5.2.10** and the CocP. Following consideration of the specifics of the construction activities together with the nature of the previous land use, the risk of the Project causing significant contamination of groundwater (e.g., by mobilising old contamination due to ground disturbance) is determined to be Minor **(Not Significant)**. On this basis, it is concluded that the integrated WFD assessment is sufficient for assessing the potential effects to WFD designated groundwater bodies.

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

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