XLINKS MOROCCO-UK POWER PROJECT

Preliminary Environmental Information Report

Volume 2, Chapter 3: Hydrology and Flood Risk

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Glossary

Term	Meaning
Alverdiscott Substation	The existing National Grid Electricity Transmission substation at Alverdiscott, Devon, which comprises 400 kV and 132 kV electrical substation equipment.
Alverdiscott Substation Connection Development	The development required at the existing Alverdiscott Substation site, which is envisaged to include development of a new 400 kV substation, and other extension modification works to be confirmed by National Grid Electricity Transmission.
Alverdiscott Substation Site	The National Grid Electricity Transmission substation site within which the Alverdiscott Substation sits.
Applicant	Xlinks 1 Limited
Aquifer	A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater.
Baseline	The status of the environment without the Proposed Development in place.
Climate change	A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
Converter Site	The Converter Site is proposed to be located to the immediate west of the existing Alverdiscott Substation site in north Devon. The Converter Site would contain two converter stations (known as Bipole 1 and Bipole 2) and associated infrastructure, buildings and landscaping.
Converter station	Part of an electrical transmission and distribution system. Converter stations convert electricity from Direct Current (DC) to Alternating Current (AC), or vice versa.
Cumulative Effects	The combined effect of the Proposed Development in combination with the effects from other Proposed Developments, on the same receptor or resource.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a Proposed Development. This requires consideration of the likely changes to the environment, where these arise as a consequence of a Proposed Development, through comparison with the existing and Proposed projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Exception Test	The Exceptions Test ensures that development is permitted in flood risk areas only in exceptional circumstances and when strict qualifying conditions have been met. It is carried out if the Sequential Test demonstrates that a development cannot be located in areas of low flood risk.
Flood Defences	A structure that is used to reduce the probability of floodwater affecting a particular area.
Flood Risk Assessment	A flood risk assessment is an assessment of the risk of flooding from all flood mechanisms, including the identification of flood mitigation measures, in order to satisfy the requirements of the National Planning Policy Framework and Planning Practice Guidance.
Flood Zone 1	Low Probability having less than 1 in 1,000 annual probability of river or sea flooding.
Flood Zone 2	Medium Probability Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Flood Zone 3b	The Functional Floodplain. This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their

Term	Meaning
	Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency.
Groundwater	All water which is below the surface of the ground in the saturated zone and in direct contact with the ground or subsoil.
HVAC Cables	The High Voltage Alternating Current (HVAC) cables which would bring electricity from the converter stations to the new Alverdiscott Substation Connection Development.
HVDC Cables	The High Voltage Direct Current (HVDC) cables which would bring electricity to the UK converter stations from the Moroccan converter stations.
Hydrological catchment	Areas of land where rainfall runoff collects to a specific zone.
Hydrology	The study of the movement, distribution, and quality of water.
Internal Drainage Board (IDB)	Internal Drainage Boards are an integral part of water level management in the UK. Each Drainage Board is a local public authority established in areas of special drainage need in England and Wales. They have permissive powers to manage water levels within their respective drainage districts. They undertake works to reduce flood risk to people and property and manage water levels to meet local needs.
Intertidal area	The area between Mean High Water Springs and Mean Low Water Springs.
Landfall	The proposed area in which the offshore cables make landfall in the United Kingdom (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Cornborough Range, Devon, between Mean Low Water Springs and the Transition Joint Bay inclusive of all construction works, including the offshore and onshore cable routes, and landfall compound(s).
Lead Local Flood Authority (LLFA)	Lead Local Flood Authorities have responsibility for developing a Local Flood Risk Management Strategy for their area covering local sources of flooding. The local strategy produced must be consistent with the national strategy. It will set out the local organisations with responsibility for flood risk in the area, partnership arrangements to ensure co-ordination between these organisations, an assessment of the flood risk, and plans and actions for managing the risk.
Local Authority	A body empowered by law to exercise various statutory functions for a particular area of the United Kingdom. This includes County Councils, District Councils and County Borough Councils. The relevant Local Authority for the Proposed Development is Torridge District Council.
Maximum design scenario	The realistic worst case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the Proposed Development.
Mean High Water Springs	The height of mean high water during spring tides in a year.
National Policy Statement(s)	The current national policy statements published by the Department for Energy Security and Net Zero in 2023.
Onshore HVDC Cable Corridor	The proposed corridor within which the onshore High Voltage Direct Current cables will be located.
Onshore Infrastructure Area	The proposed area within the Proposed Development Draft Order Limits landward of the transition joint bays, which contains the onshore HVDC Cables, Converter Site, the Alverdiscott Substation Connection Development, highway works, utility diversions and onshore HVAC Cables.
Proposed Development Draft Order Limits	The area within which all offshore and onshore components of the Proposed Development are proposed to be located, including areas required on a temporary basis during construction (such as construction compounds).
Planning Inspectorate	The agency responsible for operating the planning process for applications for development consent under the Planning Act 2008.

Term	Meaning
Policy	A set of decisions by governments and other political actors to influence, change, or frame a problem or issue that has been recognized as in the political realm by policy makers and/or the wider public.
Preliminary Environmental Information Report	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a Proposed Development and which helps to inform consultation responses.
Principal Aquifer	A strategically important aquifer unit, which is designated by the Environment Agency.
Proposed Development	The element of the Xlinks Morocco-UK Power Project within the UK, which includes the offshore cables (from the UK Exclusive Economic Zone to landfall), landfall site, onshore Direct Current and Alternating Current cables, converter stations, road upgrade works and, based on current assumptions, the Alverdiscott Substation Connection Development.
Protected species	A species of animal or plant which it is forbidden by law to harm or destroy.
Ramsar sites	Wetlands of international importance that have been designated under the criteria of the Ramsar Convention. In combination with Special Protection Areas and Special Areas of Conservation, these sites contribute to the national site network.
River Basin Management Plan	A collection of documents prepared by DEFRA which describe how waters are managed within each river basin district.
Scoping Boundary	The term used to define the boundary used at the time the EIA Scoping Report was submitted.
Secondary Aquifer	A locally important aquifer unit.
Sequential Test	A Sequential Test aims to steer new development to areas with the lowest probability of flooding by recommending that development is not allocated if there are reasonably available Sites appropriate to the proposed development in areas with a lower probability of flooding.
Study area	This is an area which is defined for each environmental topic which includes the Proposed Development Draft Order Limits as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.
Sustainable Drainage Systems (SuDS)	A collection of water management practices that aim to manage stormwater locally as close its source as possible, to mimic natural drainage and encourage its infiltration, attenuation and passive treatment.
Tidal (Coastal) flooding	Tidal flooding is caused by extreme tidal conditions including high tides and storm surges, overtopping local flood defences or coastal features.
Transboundary effects	Effects from a Proposed Development within one state that affect the environment of another state(s).
Utility Diversions	Works required by statutory utility providers to re-route infrastructure around the Proposed Development.
Water Framework Directive	Directive 2000/60/EC establishing a framework for the Community action in the field of water policy. It aims to secure the ecological, quantitative and qualitative functions of water. It requires that all impacts on water will have to be analysed and actions will have to be taken within river basin management plans.
Water Quality	The physical, chemical and biological characteristics of water.
Xlinks Morocco UK Power Project	The overall scheme from Morocco to the national grid, including all onshore and offshore elements of the transmission network and the generation site in Morocco (referred to as the ‘Project’).

Acronyms

Acronym	Meaning
BGS	British Geological Survey
CEA	Cumulative Effects Assessment
Defra	Department for Environment, Food and Rural Affairs
DESNZ	The Department for Energy Security and Net Zero
DMRB	Design Manual for Roads and Bridges
EEZ	Exclusive Economic Zone
EA	Environment Agency
EIA	Environmental Impact Assessment
FRA	Flood Risk Assessment
HDD	Horizonal Directional Drilling
LLFA	Lead Local Flood Authority
MAGIC	Multi-Agency Geographic Information for the Countryside
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
NPPF	National Planning Policy Framework
NPS	National Policy Statement
On-CEMP	Onshore Construction Environmental Management Plan
OS	Ordnance Survey
SPZ	Source Protection Zones
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
TJB	Transition Joint Bay
TraC	Transitional and Coastal
UK	United Kingdom
WFD	Water Framework Directive

Units

Unit	Definition
ha	Hectare
km	Kilometre
m	Metre
m^2	Square metre
m^3	Cubic metre
nm	Nautical miles

3 HYDROLOGY AND FLOOD RISK

3.1 Introduction

3.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary findings of the Environmental Impact Assessment (EIA) work undertaken to date for the United Kingdom (UK) elements of the Xlinks Morocco-UK Power Project (the 'Project'). For ease of reference, the UK elements of the Project are referred to in this chapter as the 'Proposed Development'.

3.1.2 This chapter considers the potential impacts and effects of the Proposed Development on Hydrology and Flood Risk during the construction, operation and maintenance and decommissioning phases. Specifically, it relates to the onshore elements of the Proposed Development landward of Mean High Water Springs (MHWS).

3.1.3 In particular, this PEIR chapter:

- sets out the existing and future environmental baseline conditions, established from desk studies, surveys and consultation undertaken to date;
- presents the potential environmental impacts and effects on all aspects of Hydrology and Flood Risk arising from the Proposed Development, based on the information gathered and the analysis and assessments undertaken to date;
- identifies any assumptions and limitations encountered in compiling the environmental information; and
- highlights any necessary monitoring and/or mitigation measures that could prevent, minimise, reduce, or offset the possible environmental effects identified in the EIA process.

3.1.4 The assessment presented is informed by the following PEIR technical chapters:

- Volume 2 Chapter 1: Onshore Ecology and Nature Conservation;
- Volume 2, Chapter 4: Geology, Hydrogeology and Ground Conditions; and
- Volume 4, Chapter 1: Climate Change.

3.1.5 This chapter also draws upon information contained within

- Volume 2, Appendix 3.1: Flood Risk Assessment (FRA);
- Volume 2, Appendix 3.2: Preliminary Onshore Water Framework Directive (WFD) Assessment.
- Volume 2, Appendix 3.3: Surface Water Abstraction Licences, Discharge Consents and Pollution Incidents

3.1.6 The PEIR will inform pre-application consultation. Following consultation, comments on the PEIR and any refinements in design will be reviewed and taken into account, where appropriate, in preparation of the Environmental Statement that will accompany the application to the Planning Inspectorate for development consent.

3.2 Legislative and Policy Context

Legislation

Retained European Legislation

3.2.1 The Water Framework Directive (WFD) (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000) is a European Union Directive which committed member states to achieve good qualitative and quantitative status of all water bodies by 2015. Under the Directive, water bodies are defined as all ground and surface waters, including rivers, lakes, transitional waters, and coastal waters (up to one nautical mile (nm) from shore).

3.2.2 The regulations require the impacts of a project on biology, chemistry and hydromorphology to be considered in relation to WFD status classes, and are reported under a specific WFD section in any Environmental Statement or in a separate WFD compliance report (Environment Agency, 2010).

3.2.3 The WFD requires the prevention of deterioration and the protection enhancement, and restoration of all bodies of water. This means that new development should not adversely impact upon on the ability of a water body to achieve its environmental objectives.

3.2.4 The WFD is transposed into law in England and Wales by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the 2017 Regulations). Under Section 2 of the European Union (Withdrawal) Act 2018, the 2017 Regulations continue to have effect in domestic law following the UK's withdrawal from the European Union.

3.2.5 The European Floods Directive 2007 (2007/60/EC) relates to statutory body engagement with the preparation of flood risk assessments, flood maps and management plans.

3.2.6 The Drinking Water Directive 2015 (2015/1787) relates to the quality of water intended for human consumption. Its objective is to protect human health from adverse effects of any contamination of water intended for human consumption by ensuring that it is wholesome and clean.

National Legislation

3.2.7 The Water Resources Act 1991 principally relates to the protection of controlled waters (i.e., rivers, lakes, canals, and groundwater) from pollution. It sets out the responsibilities of the Environmental Agency (EA) in relation to water pollution, resource management, flood defence, fisheries, and in some areas, navigation. It also regulates discharges to controlled waters, namely rivers, estuaries, coastal waters, lakes, and groundwater.

3.2.8 The Land Drainage Act 1991 sets out the responsibilities of the EA, internal drainage boards, local authorities, navigation authorities and riparian owners in the mitigation of flooding.

3.2.9 The Environmental Protection Act 1990 makes provision for improved management of waste and pollution and establishes legal responsibilities for pollution control for land, air, and water.

3.2.10 The Environment Act 2021 is part of the new legal framework for environmental protection post Brexit. The Act brings in measures for improvement of the environment, including waste, resource efficiency, air quality, water, nature and biodiversity, and conservation.

3.2.11 The Water Act 2003 amends the Water Resources Act 1991 to improve the management of long-term water resources mainly through significant changes to how abstraction and impoundment of water is regulated. The Water Act 2003 aims for the sustainable use of water resources, strengthening the voice of consumers, a measured increase in competition, and the promotion of water conservation.

3.2.12 The Flood Risk Regulations 2009 transpose Directive 2007/60/EC on the assessment and management of flood risk for England and Wales. The regulations impose duties on the EA and local authorities to prepare preliminary assessment reports about past floods in each river basin district, and the possible harmful consequences of future floods. The EA is also under a duty to prepare a preliminary assessment map of each river basin district. Following these assessments, the authorities must identify areas which are at significant risk of flooding.

3.2.13 The Flood and Water Management Act 2010 aims to improve flood risk management. It designates Lead Local Flood Authorities (LLFAs), whose responsibilities include reviewing all proposed sustainable drainage systems for new applications.

3.2.14 The Water Act 2014 amends the Water Industry Act 1991 and improves regulation of the water industry through licensing, as well as increasing competition within the water and sewerage industries for the benefit of customers. It also details that the long-term resilience of water supply and sewerage systems should be secured. A single environmental permitting regime for the regulation of the water environment is set out, in addition to the mechanisms through which households can obtain flood insurance.

3.2.15 The Environmental Permitting (England and Wales) Regulations 2016 set out an environmental permitting and compliance regime that applies to various activities such as discharges to controlled waters.

3.2.16 The Reservoirs Act 1975 makes provision against the escape of water from large reservoirs or from lakes or lochs artificially created or enlarged.

Planning Policy Context

3.2.17 The Proposed Development will be located within the UK Exclusive Economic Zone (EEZ) offshore waters (beyond 12 nm from the English coast) and inshore waters, with the onshore infrastructure located wholly within Devon, England. As set out in Volume 1, Chapter 1: Introduction of the PEIR, the Secretary of State for the Department for Energy Security and Net Zero (DESNZ) has directed that elements of the Proposed Development are to be treated as development for

which a Development Consent Order (DCO) is required under the Planning Act 2008, as amended.

National Policy Statements

3.2.18 There are currently six energy National Policy Statements (NPSs), three of which contain policy relevant to the Proposed Development, specifically:

- Overarching NPS for Energy (NPS EN-1) which sets out the UK Government's policy for the delivery of major energy infrastructure (DESNZ 2023a);
- NPS for Renewable Energy Infrastructure (NPS EN-3) (DESNZ 2023b); and
- NPS for Electricity Networks Infrastructure (NPS EN-5) (DESNZ 2023c).

3.2.19 **Table 3.1** sets out key aspects from the NPSs relevant to the Proposed Development, with particular reference to the need for and approach to consenting such infrastructure.

Table 3.1: Summary of relevant NPS policy

Summary of NPS requirements	How and where considered in the PEIR
Climate change adaption	
'The Secretary of State should be satisfied that applicants for new energy infrastructure have taken into account the potential impacts of climate change using the latest UK Climate projections and associated research and expert guidance (such as the EA's Climate Change Allowances for Flood Risk Assessments or the Welsh Government's Climate change allowances and flood consequence assessments) available at the time the ES was prepared to ensure they have identified appropriate mitigation or adaptation measures. This should cover the estimated lifetime of the new infrastructure, including any decommissioning period. *Should a new set of UK Climate Proposed Projections or associated research become available after the preparation of the ES, the Secretary of State (or the Examining Authority during the examination stage) should consider whether they need to request further information from the applicant.* *The Secretary of State should be satisfied that there are not features of the design of new energy infrastructure critical to its operation which may be seriously affected by more radical changes to the climate beyond that projected in the latest set of UK climate projections, taking account of the latest credible scientific evidence on, for example, sea level rise (for example by referring to additional maximum credible scenarios – i.e. from the Intergovernmental Panel on Climate Change or EA) and that necessary action can be taken to ensure the operation of the infrastructure over its estimated lifetime.'* (paragraphs 4.10.13 – 4.10.15 NPS EN-1).	Climate change is considered in the FRA (see Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR) and Volume 4, Chapter 1: Climate Change of the PEIR. Climate change has been taken into account in the characterisation of the baseline and future baseline environment of Volume 2, Chapter 3: Hydrology and Flood Risk of the PEIR chapter (see **section 3.5**).
'Applicants should demonstrate that any necessary land-side infrastructure (such as cabling and onshore substations) will be appropriately resilient to climate-change induced weather phenomena. Similarly, applicants should particularly set out how the proposal would be resilient to storms.' (paragraph 2.4.8, NPS EN-3).	Resilience to storms is discussed in Volume 3, Chapter 8: Coastal Processes of the PEIR, in relation to the intertidal area. The resilience to flood risk of the onshore elements of the Proposed Development is set out within this chapter and Volume 2, Appendix 3.1: Flood Risk

Summary of NPS requirements	How and where considered in the PEIR
	Assessment of the PEIR and the climate change chapter (Volume 4, Chapter 1: Climate Change of the PEIR).
'As climate change is likely to increase risks to the resilience of some of this infrastructure, from flooding for example, or in situations where it is located near the coast or an estuary or is underground, applicants should in particular set out to what extent the project is expected to be vulnerable, and, as appropriate, how it has been designed to be resilient to: • *flooding, particularly for substations that are vital to the network; and especially in light of changes to groundwater levels resulting from climate change;* • *the effects of wind and storms on overhead lines;* • *higher average temperatures leading to increased transmission losses;* • *earth movement or subsidence caused by flooding or drought (for underground cables); and* • *coastal erosion – for the landfall of offshore transmission cables and their associated substations in the inshore and coastal locations respectively* (paragraph 2.3.2, NPS EN-5).'	Climate change is considered in Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR and Volume 4, Chapter 1: Climate Change of the PEIR. Climate change has been taken into account in the characterisation of the baseline and future baseline environment of the Volume 2, Chapter 3: Hydrology and Flood Risk of the PEIR (see **section 3.5**).
Flood risk	
'The minimum requirements for Flood Risk Assessments (FRA) are that they should • *be proportionate to the risk and appropriate to the scale, nature and location of the project;* • *consider the risk of flooding arising from the project in addition to the risk of flooding to the project;* • *take the impacts of climate change into account, across a range of climate scenarios, clearly stating the development lifetime over which the assessment has been made* • *be undertaken by competent people, as early as possible in the process of preparing the proposal;* • *consider both the potential adverse and beneficial effects of flood risk management infrastructure, including raised defences, flow channels, flood storage areas and other artificial features, together with the consequences of their failure and exceedance;* • *consider the vulnerability of those using the site, including arrangements for safe access and escape;* • *consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and include information on flood likelihood, speed-of-onset, depth, velocity, hazard and duration;* • *identify and secure opportunities to reduce the causes and impacts of flooding overall, making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management;*	An FRA has been prepared, (see Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR) which considers the flood risk associated the Onshore Infrastructure Area and demonstrates how flood risk will be managed, taking climate change into consideration. Conceptual drainage strategies for the Converter Site are provided within Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR. The conceptual drainage strategies have been developed in accordance with the 2024 NPS, NPPF, PPG ID7 the SuDS Manual and local council policy. With regards to the proposed Converter Site, surface water from the 1 in 100-year storm event plus an allowance for climate change is to be stored within basins, with flows to be discharged following the SuDS hierarchy. Further SuDS are to be determined at detailed design stage.

Summary of NPS requirements	How and where considered in the PEIR
• *consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes;* • *include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that these risks can be safely managed, ensuring people will not be exposed to hazardous flooding;* • *consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of the project may affect drainage systems. Information should include:* *i.* Describe the existing surface water drainage arrangements for the site *ii.* Set out (approximately) the existing rates and volumes of surface water run-off generated by the site. Detail the proposals for restricting discharge rates *iii.* Set out proposals for managing and discharging surface water from the site using sustainable drainage systems and accounting for the predicted impacts of climate change. If sustainable drainage systems have been rejected, present clear evidence of why their inclusion would be inappropriate *iv.* Demonstrate how the hierarchy of drainage options has been followed. *v.* Explain and justify why the types of Sustainble Drainage Systems (SuDS) and method of discharge have been selected and why they are considered appropriate. Where cost is a reason for not including SuDS, provide information to enable comparison with the lifetime costs of a conventional public sewer connection *vi.* Explain how sustainable drainage systems have been integrated with other aspects of the development such as open space or green infrastructure, so as to ensure an efficient use of the site *vii.* Describe the multifunctional benefits the sustainable drainage system will provide *viii.* Set out which opportunities to reduce the causes and impacts of flooding have been identified and included as part of the proposed sustainable drainage system *ix.* Explain how run-off from the completed development will be prevented from causing an impact elsewhere *x.* Explain how the sustainable drainage system been designed to facilitate maintenance and, where relevant, adoption. Set out plans for ensuring an acceptable standard of operation and maintenance throughout the lifetime of the development • *detail those measures that will be included to ensure the development will be safe and remain operational during a flooding event throughout the development's lifetime without increasing flood risk elsewhere;* • *identify and secure opportunities to reduce the causes and impacts of flooding overall during the period of construction; and*	

Summary of NPS requirements	How and where considered in the PEIR
• *be supported by appropriate data and information, including historical information on previous events.'* (paragraph 5.8.15, NPS-EN1)	
'Applicants for projects which may be affected by, or may add to, flood risk should arrange pre-application discussions before the official pre-application stage of the NSIP process with the EA, and, where relevant, other bodies such as Lead Local Flood Authorities, Internal Drainage Boards, sewerage undertakers, navigation authorities, highways authorities and reservoir owners and operators' (paragraph 5.8.18, NPS-EN1).	An FRA has been prepared, (see Volume 2, Appendix 3.1: Flood Risk Assessment) which details stakeholder consultation undertaken relating to flood risk and drainage as part of the Proposed Development. Consultations undertaken with stakeholders as part of the PEIR is presented within **Table 3.5**.
'To satisfactorily manage flood risk, arrangements are required to manage surface water and the impact of the natural water cycle on people and property. *In this NPS, the term SuDS refers to the whole range of sustainable approaches to surface water drainage management including, where appropriate:* • *source control measures including rainwater recycling and drainage* • *infiltration devices to allow water to soak into the ground, that can include individual soakaways and communal facilities* • *filter strips and swales, which are vegetated features that hold and drain water downhill mimicking natural drainage patterns* • *filter drains and porous pavements to allow rainwater and run-off to infiltrate into permeable material below ground and provide storage if needed* • *basins, ponds and tanks to hold excess water after rain and allow controlled discharge that avoids flooding* • *flood routes to carry and direct excess water through developments to minimise the impact of severe rainfall flooding* *Site layout and surface water drainage systems should cope with events that exceed the design capacity of the system, so that excess water can be safely stored on or conveyed from the site without adverse impacts.* *The surface water drainage arrangements for any project should, accounting for the predicted impacts of climate change throughout the development's lifetime, be such that the volumes and peak flow rates of surface water leaving the site are no greater than the rates prior to the proposed project, unless specific off-site arrangements are made and result in the same net effect.* *It may be necessary to provide surface water storage and infiltration to limit and reduce both the peak rate of discharge from the site and the total volume discharged from the site. There may be circumstances where it is appropriate for infiltration facilities or attenuation storage to be provided outside the project site, if necessary through the use of a planning obligation.* *The sequential approach should be applied to the layout and design of the project. Vulnerable aspects of the development should be located on parts of the site at lower risk and residual*	An FRA has been prepared, (see Volume 2, Appendix 3.1: Flood Risk Assessment) which considers the flood risk associated the Onshore Infrastructure Area and demonstrates how flood risk will be managed, taking climate change into consideration. Conceptual drainage strategies for the Converter Site is provided within Volume 2, Appendix 3.1: Flood Risk Assessment. The conceptual drainage strategies have been developed in accordance with the NPS, NPPF, PPG ID7 the SuDS Manual and local council policy. With regards to the proposed Converter Site, surface water from the 1 in 100-year storm event plus an allowance for climate change is to be stored within a basin, with flows to be discharged following the SuDS hierarchy. Further SuDS are to be determined at detailed design stage.

Summary of NPS requirements	How and where considered in the PEIR
risk of flooding. Applicants should seek opportunities to use open space for multiple purposes such as amenity, wildlife habitat and flood storage uses. Opportunities should be taken to lower flood risk by reducing the built footprint of previously developed sites and using SuDS. *Where a development may result in an increase in flood risk elsewhere through the loss of flood storage, on-site level-for-level compensatory storage, accounting for the predicted impacts of climate change over the lifetime of the development, should be provided.* *Where it is not possible to provide compensatory storage on site, it may be acceptable to provide it off-site if it is hydraulically and hydrologically linked. Where development may cause the deflection or constriction of flood flow routes, these will need to be safely managed within the site.* *Where development may contribute to a cumulative increase in flood risk elsewhere, the provision of multifunctional sustainable drainage systems, natural flood management and green infrastructure can also make a valuable contribution to mitigating this risk whilst providing wider benefits.* *The receipt of and response to warnings of floods is an essential element in the management of the residual risk of flooding. Flood Warning and evacuation plans should be in place for those areas at an identified risk of flooding.* *The applicant should take advice from the local authority emergency planning team, emergency services and, where appropriate, from the local resilience forum when producing an evacuation plan for a manned energy project as part of the FRA. Any emergency planning documents, flood warning and evacuation procedures that are required should be identified in the FRA.* *Flood resistant and resilient materials and design should be adopted to minimise damage and speed recovery in the event of a flood'* (paragraphs 5.8.24 – 5.8.35 NPS EN-1).	
'Energy project should not normally be consented within Flood Zone 3b, ... or on land expected to fall within these zones within its predicted lifetime. This may also apply where land is subject to other sources of flooding (for example surface water). However, where essential energy infrastructure has to be located in such areas, for operational reasons, they should only be consented if the development will not result in a net loss of floodplain storage, and will not impede water flows *Exceptionally, where an increase in flood risk elsewhere cannot be avoided or wholly mitigated, the Secretary of State may grant consent if they are satisfied that the increase in present and future flood risk can be mitigated to an acceptable and safe level and taking account of the benefits of, including the need for, nationally significant energy infrastructure as set out in Part 3 above. In any such case the Secretary of State should make clear how, in reaching their decision, they have weighed up the increased flood risk against the benefits of the project, taking account the nature and degree of the risk, the future impacts on climate change, and advice provided by the EA or NRW and other relevant bodies'* (paragraphs 5.8.41 - 5.8.42, NPS EN-1).	The approach to flood risk and the assessment is described in the FRA (see Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR). The permanent development associated with the Converter Site is located within Flood Zone 1. Due to its vulnerability classification and location within Flood Zone 1, 2, 3 and 3b, the landfall and Onshore HVDC Cable Corridor has been subject to and has passed the sequential test and exception test (see Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR).

Summary of NPS requirements	How and where considered in the PEIR
Water Quality Resources	
'Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment, and how this might change due to the impact of climate change on rainfall patterns and consequently water availability across the water environment, as part of the ES or equivalent' (paragraph 5.16.3, EN-1).	The assessment and the proposed mitigation measures have taken into account the requirements of the river basin management plan and WFD (see Volume 2, Appendix 3.2: Preliminary Onshore Water Framework Directive Assessment of the PEIR) to ensure all potential impacts on the water environment are mitigated to within acceptable levels. Mitigation measures are presented within **Table 3.25**.
'The ES should in particular describe: • *the existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges* • *existing water resources affected by the proposed project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and reference to Abstraction Licensing Strategies) and also demonstrate how proposals minimise the use of water resources and water consumption in the first instance* • *existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project and any impact of physical modifications to these characteristics* • *any impacts of the proposed project on water bodies or protected areas (including shellfish protected areas) under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 and source protection zones (SPZs) around potable groundwater abstractions* • *how climate change could impact any of the above in the future* • *any cumulative effects'* (paragraph 5.16.7, NPS EN-1).	The assessment and the proposed mitigation measures have taken into account the requirements of the river basin management plan and WFD to ensure all potential impacts on the water environment are mitigated to within acceptable levels (see Volume 2, Appendix 3.2: Preliminary Onshore Water Framework Directive Assessment of the PEIR). Impacts assessed are presented within **sections 3.8, 3.9** and **3.10**.

The National Planning Policy Framework

3.2.20 The National Planning Policy Framework (NPPF) was published in 2012 and updated in 2018, 2019, 2021 and December 2023 (Department for Levelling Up, Housing and Communities, 2021). The NPPF sets out the Government's planning policies for England.

3.2.21 The Planning Practice Guidance (PPG) (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government, 2021) supports the NPPF and provides guidance across a range of topic areas.

3.2.22 **Table 3.2** sets out a summary of the NPPF policies and PPG relevant to this chapter.

Table 3.2: Summary of NPPF requirements relevant to this chapter

Key provisions	How and where considered in the PEIR
National Planning Practice Framework	
A site-specific FRA is required for all proposals for new development in Flood Zones 2 and 3, and for any proposed development covering an area of 1 hectare (ha) or greater in Flood Zone 1 (paragraph 173 of the NPPF).	The approach to flood risk is presented in Volume 2, Appendix 3.1: Flood Risk Assessment, of the PEIR.
New development should take into account climate change and that appropriate mitigation should be provided. It states that inappropriate development should be located away from high risk areas and a sequential risk-based approach should be applied through the local planning system to the location of development (Paragraphs 165-167).	Sequential and exception tests are presented within Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR.
National Planning Practice Guidance	
PPG provides planning guidance on a range of topics including flood risk. PPG ID7 (March 2014, updated August 2022) for Flood Risk and Coastal Change provides additional guidance in the implementation of the NPPF in relation to development and flood risk.	The FRA has been undertaken in line with NPPF and PPG ID7 for the Converter Site, Alverdiscott Substation Connection Development and Onshore HVDC Cable Corridors and HVAC Cables (see Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR).

Local Planning Policy

3.2.23 The onshore elements of the Proposed Development are located within the administrative areas of Torridge District Council and Devon County Council. The relevant local planning policies applicable to Hydrology and Flood Risk based on the extent of the study areas for this assessment are summarised in **Table 3.3**.

Table 3.3: Summary of local planning policy relevant to this chapter

Policy	Key provisions	How and where considered in the PEIR
North Devon and Torridge Local Plan		
Policy ST03 Adapting to Climate Change and Strengthening Resilience	*'Development should be designed and constructed to take account of the impacts of climate change and minimise the risk to and vulnerability of people, land, infrastructure and property by* • *locating and designing development to minimise flood risk through:* • *avoiding the development of land for vulnerable uses which is or will be at risk from flooding, and* • *managing and reducing flood risk for development where that has wider sustainability or regeneration benefits to the community, or where there is no reasonable alternative Site;* • *reducing existing rates of surface water runoff within Critical Drainage Areas;* • *upgrading flood defences and protecting key transport routes from risks of flooding;* • *re-establishing functional flood plains in accordance with the Shoreline Management Plan,*	Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR has been undertaken in line with National Planning Policy NPPF and PPG ID7, and Local Planning Policy. A conceptual drainage strategy for the Converter Site and Alverdiscott Substation Connection Development includes SuDS features and allowances for climate change has been undertaken and provided within Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR.

Policy	Key provisions	How and where considered in the PEIR
	Flood Risk Management Plan and Catchment Action Plan; • *locating development to avoid risk from current and future coastal erosion;* • *adopting effective water management including Sustainable Drainage Systems, water quality improvements, water efficiency measures and the use of rainwater* • *ensuring development is resilient to the impacts of climate change through making effective use of renewable resources, passive heating and cooling, natural light and ventilation;* • *ensuring risks from potential climate change hazards, including pollutants (of air and land) are minimised to protect and promote healthy and safe environments;* • *conserving and enhancing landscapes and networks of habitats, including cross-boundary green infrastructure links, strengthening the resilience of biodiversity to climate change by facilitating migration of wildlife between habitats and improving their connectivity;* • *protecting and integrating green infrastructure into urban areas, improving access to natural and managed green space; and* • *promoting the potential contribution from ecosystem services that support adaptation to climate change.'*	
Policy ST09: Coast and Estuary Strategy	• *'The integrity of the coast and estuary as an important wildlife corridor will be protected and enhanced. The importance of the undeveloped coastal, estuarine and marine environments, including the North Devon Coast Areas of Outstanding Natural Beauty, will be recognised through supporting designations, plans and policies. The undeveloped character of the Heritage Coasts will be protected.* • *Water quality will be improved where it has been affected by human activity.* • *Development within the Undeveloped Coast and estuary will be supported where it does not detract from the unspoilt character, appearance and tranquillity of the area, nor the undeveloped character of the Heritage Coasts, and it is required because it cannot reasonably be located outside the Undeveloped Coast and estuary.'*	The assessment and the proposed mitigation measures have taken into account the requirements of the River Basin Management Plan and WFD to ensure all potential impacts on the water environment are mitigated to within acceptable levels (see Volume 2, Appendix 3.2: Preliminary Onshore Water Framework Directive Assessment of the PEIR).

3.3 Consultation and Engagement

3.3.1 In January 2024, the Applicant submitted a Scoping Report to the Planning Inspectorate, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction and operational phases of the Proposed Development. It also

described those topics or sub-topics which are proposed to be scoped out of the EIA process and provided justification as to why the Proposed Development would not have the potential to give rise to significant environmental effects in these areas.

3.3.2 Following consultation with the appropriate statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State) provided a Scoping Opinion on 7 March 2024. Key issues raised during the scoping process specific to Hydrology and Flood Risk are listed in **Table 3.4**, together with details of how these issues have been addressed within the PEIR.

Table 3.4: Summary of Scoping Responses

Comment	How and where considered in the PEIR
Planning Inspectorate	
'*No direct reference is made to the potential requirement for dewatering activities in Section 4 of the Scoping Report, although it is noted that dewatering is referenced as an example activity in Table 7.4.4 and at paragraph 7.5.54 in respect of potential inter-related effects between the hydrology and flood risk chapter and hydrogeology, geology and ground conditions chapter.* *The ES should provide a full description of any such activities and present an assessment of any resulting likely significant effects, where these could arise. The Applicant's attention is directed to the comments of the Environment Agency (EA) at Appendix 2 of this Opinion with regards to dewatering and permits*.'	Dewatering is discussed within Volume 2, Chapter 4: Hydrogeology, Geology and Ground Conditions of the PEIR. Mitigation measures relating to dewatering activities adopted as part of the Proposed Development are presented within **Table 3.25**
'*Several aspect chapters in the Scoping Report refer to fixed distance study areas with no explanation as to why these have been selected. The ES should ensure the study area for each aspect reflects the Proposed Development's ZoI and the impact assessment should be based on the ZoI from the Proposed Development with reference to potential effect pathways. Clear justification should be provided to support any distances applied*.'	The study area reflects the likely zone of influence by hydrological receptors. Justification for the buffer zones for hydrology and flood risk are provided within **section 3.4**.
'*It is unclear from the Scoping Report what potential effects on statutory designated sites are to be included in the impact assessment. The Inspectorate notes the statement that the Proposed Development would not directly affect the Torridge Estuary SSSI/LNR and would avoid its primary estuarine habitats by drilling under using HDD. At present there is no information in the Scoping Report to confirm the likely proximity of construction activity to the designated sites and their interest features, such as the likely location of HDD exit/entry points, compounds, and haul roads.* *The SSSI and LNR are designated for their important estuarine habitats, plants and bird species. The Inspectorate considers there is the*	The location of HDD sites and associated compounds are presented in Volume 1, Appendix 3.4: Onshore Crossing Schedule of the PEIR. These locations have been considered within the hydrology and flood risk assessment. The impact of contaminated runoff on the quality of surface water and groundwater receptors' is discussed within **sections 3.8** and **3.10**. Discussions relating to ground investigation of the River Torridge are currently being undertaken with the EA in preparation of a bespoke FRAP submission.

Comment	How and where considered in the PEIR
potential for likely significant effects during construction (and decommissioning) to these sites and their features from potential changes to air quality, including dust deposition, changes to water quality, including proximity of HDD and accidental release of drilling fluids such as bentonite, and disturbance to species. The ES should include an assessment of such impacts to designated sites and features, where likely effects could occur.'	
'*Contaminated runoff impact on the quality of ordinary watercourses, main rivers and ground receptors during operation and maintenance.* *Potential for contaminated runoff from operation and maintenance of the proposed converter station and/ or Alverdiscott Substation Connection Development is not referred to in Table 7.4.4 or Table 7.4.5. For the avoidance of doubt, the Inspectorate advises that this matter should be scoped into the impact assessment, or it should otherwise be explained in the ES, with evidence of agreement from relevant consultation bodies, why significant effects are not likely to occur. See also the Inspectorate's comment at ID 2.1.5 above in this regard*.'	This has been scoped out of the assessment. Activities associated with the operation and maintenance of the onshore elements of the Proposed Development are unlikely to generate contaminated run-off. Furthermore, the drainage strategy for the Converter Site and Alverdiscott Substation Connection Development would include measures to treat any pollution or contamination on-site. Further rationale for scoping out this impact during operation and maintenance phase is discussed in greater detail within **Table 3.7**.
'*Increased flood risk from damage to existing flood defences during operation. The Scoping Report proposes to scope this matter out but does not present any reasoning. The Inspectorate notes that there are formal flood defences along the banks of the River Torridge (Paragraph 7.4.22 of the Scoping Report), which the proposed onshore HVDC cable corridor would cross. However, it is unclear where the flood defences are located and whether the presence of the cable during operation could affect them. This matter should be scoped into the assessment, or it should otherwise be explained in the ES, with evidence of agreement from relevant consultation bodies, why significant effects are not likely to occur*.'	As detailed within **Table 3.7,** this impact during operation and maintenance phase has been scoped out. This is because it is unlikely that any operation and maintenance activities would impact the integrity (or efficacy) of existing flood defences.
'*Damage to existing field drainage and existing water pipelines during operation. The Scoping Report proposes to scope this matter out but does not present any reasoning. Given the nature of the Proposed Development and the limited operational maintenance requirements, as described in Chapter 4 of the Scoping Report, the Inspectorate considers it is unlikely that damage would be caused to field drainage and water pipelines during operation. This should be confirmed in the ES. Where significant effects are likely, these should be considered in the assessment*.'	As detailed within **Table 3.7**, it is unlikely that damage would be caused to field drainage during operation and maintenance. Therefore, this matter has been scoped out.
'*Flood risk assessment (FRA) climate change allowances. The Scoping Report states that the EA's FRA climate change allowances guidance from 2020 would be used to inform the assessment. The Inspectorate advises the most up-to-date iteration of the climate change*	The latest climate change guidance by the EA updated May 2022 has been used within Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR (https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances).

Comment	How and where considered in the PEIR
allowances (as relevant to the Proposed Development) should be used in the assessment, noting that updates have been made since 2020.'	
'*The Scoping Report states that the landfall area of the Proposed Development would be located within Flood Zone 3. It does not specify whether it is Flood Zone 3a or 3b. The ES should distinguish between Flood Zones 3a and 3b to determine which parts of the site are in areas of 'high probability of flooding' and 'functional floodplain'. This should be shown on a figure. It should specify what infrastructure will be in which flood risk zones. The ES should explain what mitigation is in place, including any requirement for compensatory flood storage, and how this would be secured through the DCO*.'	Extents of Flood Zone 3 at the landfall are considered to be tidal in nature. Further analysis of fluvial flood zones 2 and 3 is to be undertaken and included within the ES.
'*The Scoping Report contains limited information about the existing flood defences on the River Torridge, which could be affected by the Proposed Development. The ES should clearly include in the baseline, a description of existing (and where relevant, proposed) flood defences that could be impacted by the Proposed Development, together with figures showing their location. Effort should be made to agree the extent of baseline information required with relevant consultation bodies, including the EA*.'	Location and description of flood defences upon either bank of the River Torridge are provided within this chapter and Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR. An Expert Working Group (EWG) meeting was undertaken in April 2024 to discuss baseline information to be provided within the PEIR and ES. A technical note is to be submitted to the EA following the first EWG meeting to confirm the suitability of available flood risk data in relation to the Proposed Development.
'*The Scoping Report states that no water sampling or analysis of existing watercourses and ground receptors within the study area is proposed to inform the assessment of effects from contaminated runoff. It is proposed to rely on desk-based information. The Inspectorate advises that effort should be made to seek to agree the requirement for water sampling and analysis with relevant consultation bodies, including the EA*.'	Classification data for each WFD waterbody within the study area from 2019 and 2022 has been used to inform the water quality baseline within the study area. As such, additional surface water sampling is not expected to be required. Taking a precautionary approach in assuming surrounding water bodies have achieved/maintained 'good' status at the time when construction begins, the surface watercourses and groundwater bodies within the study area are to be assessed with a WFD status of 'good'. 'The impact of contaminated runoff on the quality of surface water and groundwater' which discusses how mitigation measures adopted as part of the Proposed Development will ensure no degradation to WFD waterbodies will occur. Mitigation measures are presented within **Table 3.25**. Consultation will be undertaken with the EA and LLFA in the form of EWGs to seek agreement that no sampling will be required due to the scale and nature of development.
'*In addition to potential for contaminated run-off during construction, the assessment should describe how sewage from construction welfare facilities would be discharged/ managed and assess any significant effects likely to occur*.'	This impact is discussed within **sections 3.8** and **3.10** 'the impact of contaminated runoff on the quality of surface water and groundwater'
'*For the avoidance of doubt, the assessment should also consider impacts from increased flood risk from additional surface water runoff arising at the existing Alverdiscott substation, if extension or*	The Alverdiscott Substation Connection Development is included within the DCO application and impacts relevant to hydrology and flood risk are assessed within this chapter.

Comment	How and where considered in the PEIR
upgrade works are proposed in the DCO, and for any highways' improvements, where significant effects are likely to occur (in addition to impacts at the converter station). The Inspectorate's comment at ID 2.1.5 with regards to the assessment approach, dependent on whether the Alverdiscott Substation Connection Development works are within the DCO or subject to a separate consenting process, also apply.'	
'*In addition to field drainage and water pipelines, the assessment should also identify any land drains and/ or utilities infrastructure (eg foul sewer or oil-insulated cables) that may be present and assess potential impacts from damage to this infrastructure, where significant effects are likely to occur*.'	This is covered within **section 3.8** and **section 3.10** 'the impact of damage to existing water supply and drainage infrastructure'.
'*The Scoping Report states that surface water attenuation modelling would be undertaken to inform the assessment where appropriate. Effort should be made to agree the scope of any modelling required to inform the assessment with relevant consultation bodies, eg the EA and lead local flood authority (LLFA). If desk-based analysis only is relied upon, the ES must clearly explain why this data is sufficient to establish the baseline from which to undertake an assessment*.'	Noted. A conceptual SuDS strategy for the converter sites and Alverdiscott Substation Connection Development in line with national and local policy guidance and technical standards is presented within Volume 2, Chapter 3: Hydrology and Flood Risk of the PEIR The strategy will be discussed with the LLFA as part of the Expert Working Group meetings.
'*The Inspectorate advises that an outline version of the proposed SFWMP should be submitted as part of the ES. It should include a description of any measures required to avoid impacts to surface water flow paths and how reinstatement works would be carried out to avoid impacts on surface water flooding*.'	A Construction Drainage Strategy is proposed, which would incorporate pollution prevention and flood response measures to ensure that the potential for any temporary effects on water quality or flood risk are reduced as far as practicable during the construction stage. An Outline Construction Drainage Strategy would be included as part of the Outline On-CEMP, which would be submitted as part of the ES. Mitigation measures adopted as part of the Proposed Development are presented within **Table 3.25**.
'*The Inspectorate advises that measures required to manage flood risk during construction, including to prevent sediment and debris flowing into surface watercourses/ drainage features, should also be described in the ES and demonstrably secured in the DCO. Such measures could be specified in the proposed onshore CEMP(s).*'	Measures required to manage flood risk during construction, including to prevent sediment and debris flowing into surface watercourses/drainage features are detailed within the Outline Onshore Construction Environmental Management Plan (see Volume 1, Appendix 3.2 of the PEIR). These measures would be secured as part of the DCO. Mitigation measures adopted as part of the Proposed Development are also presented within **Table 3.25** of this chapter.
'*The Inspectorate advises that the ES should include reference to how the sequential and exception tests have been applied in the FRA, as relevant*.'	The Sequential Test and Exception Test has been undertaken within the Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR for the Onshore HVDC Cable Corridor which passes through areas of Flood Zone 3. The Sequential Test and Exception Test have been deemed to be not relevant to the Converter Site and Alverdiscott National Grid Substation due to being within Flood Zone 1 and assessed to have a low risk of flooding from all sources.

Comment	How and where considered in the PEIR
'*Section 7.4 of the Scoping Report primarily focuses on risk from additional surface water runoff due to the Proposed Development but baseline information in the Scoping Report suggests that there is flood risk associated with other sources including coastal and reservoir. No reference is made to the potential for groundwater flood risk. Table 7.4.4 states that the FRA will assess flood risk from all sources. This should include figures showing relevant flood mapping for all sources. The FRA should inform the assessment in the ES, which should also consider all relevant forms of flood risk which the Proposed Development may be affected by or add to where these could give rise to likely significant effects*.'	Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR considers and assesses flood risk from all sources, including coastal, reservoir and groundwater.
'*The Scoping Report lists onshore and transitional WFD waterbodies at Table 7.4.2 but does not describe an approach to WFD assessment. The Inspectorate draws the Applicant's attention to Advice Note Eighteen: The Water Framework Directive, which provides a suggested outline methodology for WFD assessment. If the Proposed Development has potential to impact upon WFD waterbodies, then a WFD assessment should be submitted as part of the DCO application either as an appendix to the ES or as a separate WFD report. The findings of any WFD assessment should inform the ES. The location of WFD waterbodies should be shown on a figure. Where it is determined that a full WFD assessment is not required, a clear justification for this position with evidence of agreement with relevant consultation bodies should be provided*.'	Volume 2, Appendix 3.2: Preliminary Onshore Water Framework Directive Assessment has been undertaken as part of the Volume 2, Chapter 3: Hydrology and Flood Risk of the PEIR. The methodology for the preliminary WFD assessment is detailed in section 1.2 of Volume 2, Appendix 3.2. A screening assessment has been undertaken for submission within the PEIR, with further assessment to be undertaken for submission of the ES.
'*The Inspectorate advises that, in addition to the receptors identified in the Scoping Report, the ES should identify, describe and assess any likely significant effects to the following receptors:* • *Westward Ho! designated bathing water;* • *Permitted sites, discharges and/ or abstractions, reflecting data available from the EA's public register;* • *Jennetts Reservoir and Gammaton Lower Reservoir, in terms of their designated nitrate vulnerable zones; and* • *Torridge Estuary designated shellfish water (refer to the Inspectorate's comments at ID 3.10.7 of this Opinion). The Applicant's attention is drawn to the comments of the EA (Appendix 2 of this Scoping Opinion).*'	Receptors assessed within Volume 2 Chapter 3: Hydrology and Flood Risk of the PEIR are presented within **Table 3.23**. This includes permitted sites, discharges and/or abstractions, Jennetts Reservoir, and Gammaton Lower Reservoir. Westward Ho! Designated bathing waters and Torridge Estuary designated shellfish waters are located outside of the Zone of Influence and thus have not been assessed. However, please see 'The impact of contaminated runoff on the quality of surface water and groundwater' which discusses how mitigation measures adopted as part of the Proposed Development will ensure no degradation to WFD waterbodies will occur. Mitigation measures are presented within **Table 3.25**.
'*The Scoping Report suggests that crossings of sensitive watercourses may be required. The ES should describe the nature of any proposed works within or in proximity of sensitive watercourses (ie main rivers and Ordinary watercourses). Information should be provided regarding the location, scale, and dimensions of any proposed*	Details on crossing methodologies are presented within Volume 1, Appendix 3.4: Onshore Crossing Schedule of the PEIR. Mitigation measures adopted as part of the Proposed Development is presented within **Table 3.25**. 'The impact of contaminated runoff on the quality of surface water and groundwater' discusses potential

Comment	How and where considered in the PEIR
watercourse crossings/ instream structures, as well as the nature of any associated construction works (eg dewatering, trenching, and HDD). The ES should consider the potential of such works to negatively impact watercourses within the study area, including the ecological status of any watercourses protected under the WFD such as the Torridge Estuary designated shellfish water. The results of the WFD Assessment should inform the ES.'	impacts and how mitigation measures adopted as part of the Proposed Development will ensure no degradation to WFD waterbodies will occur.
'*Surface and Foul Water Drainage (sections 4.6.19 onwards) note that measures to control surface water runoff would be put in place. These need to be robust enough to cope with potential increases in rainfall, similar to those levels experienced during the current winter. We are not aware of any sewer system in the vicinity, and therefore any foul water would have to be collected by septic tank or waste treatment plant. We are assuming, rightly or wrongly, that foul water generation would be from human activity rather than the plant itself. However, if any oil filled electrical equipment is to be used, what provision will be made to handle leakage or spillage*.'	Surface water drainage systems associated with the converter stations and Alverdiscott Substation Connection Development have been designed to accommodate the 1 in 100-year critical rainfall event with a 45% uplift for climate change, as per latest climate change guidance by the EA updated May 2022 (https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances). Further information is presented within Volume 3, Appendix 3.1: Flood Risk Assessment of the PEIR. Foul water flows are to be addressed within the Operational Drainage Strategy which is to be set out within the Onshore Construction Environmental Management Plan (On-CEMP) and secured as a DCO requirement. As no South West Water sewers are located within the vicinity of the Converter Site and Alverdiscott Substation Connection development, it is expected foul flows will be collected via Septic tank located within the Converter Site boundary. The preferred method for controlling foul waste will be determined during detailed design and will depend on the availability and cost of a mains connection and the number of visiting hours staff will attend site.
Devon County Council	
'*The applicant has confirmed that they will produce surface water management proposals for the planning application (which they anticipate to be an outline for the converter stations). This surface water management design should be submitted with the Environmental Statement and will need to ensure that the cable route and other works, both during the construction and operational phases does not negatively impact on surface water flow paths. The applicant should also include details of how reinstatement works will be carried out to avoid additional impacts on surface water flooding*.'	Noted. Mitigation measures adopted as part of the Proposed Development are presented within **Table 3.25**. In order to manage impacts to field drainage, the Outline On-CEMP additional field drainage will be installed if required to ensure existing surface water flow paths are maintained during and after construction.
'*Whilst the applicant has confirmed that they will assess surface water management for the converter station, the Environmental Statement should also show that consideration has been given to how surface water might also need to be managed for the Transition Joint and any upgrades/ expansion needed for the existing Alverdiscott substation. In addition, it should also give consideration to how any highways improvements may impact on surface water*	Alverdiscott Substation Connection Development now included within the order limits. Assessment of Alverdiscott Substation Connection Development is included within Volume 2, Chapter 3: Hydrology and Flood Risk of the PEIR and Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR.

Comment	How and where considered in the PEIR
management particularly if there are known surface water drainage issues.'	
'We welcome reference to an assessment of field drainage within the Hydrology section of the report but would like to highlight that in addition to field ditches (which could be classed as Ordinary Watercourses), land drains may also be present. As a result and because land drains may not show up on survey's and might not be known about, we would ask that the Environmental Statement addresses how the applicant intends to assess the presence of land drains and sets out the process for reinstatement should they be damaged or impacted upon during constructions works.'	We anticipate a walkover of the proposed development will be undertaken post-PEIR stage to identify any ordinary watercourses not present within desk-based data. A mitigation measure regarding the reinstatement of watercourses should be proposed if the project is unable to commit to trenchless crossings at all ordinary watercourses. A mitigation measure regarding the reinstatement of field drainage post-construction should also be proposed.
'*The Environmental Statement should also acknowledge and assess the impacts during the construction phase on surface water management in order to prevent sediment and debris from flowing into drains and watercourses*.'	This will be addressed within 'The Impact of Contaminated Runoff on the Quality of Surface Water and Ground Receptors' which is to be presented within Volume 2, Chapter 3: Hydrology and Flood Risk of the PEIR.
'*The Environmental Statement shall ensure that temporary roads will include drainage features and outline where necessary if other features such silt fences, bunds, swales etc, have been considered or will be required. The management of any stockpiles and other materials and the requirement and location of any proposed site compounds, and associated cable laying during construction works will also need to be assessed to ascertain whether additional drainage features will be required*.'	A Construction Drainage Strategy and Pollution Prevention Plan are proposed as part of the Proposed Development. These would include measures to will incorporate pollution prevention and flood response measures to ensure that the potential for any temporary effects on water quality or flood risk are reduced as far as practicable during the construction stage. Mitigation measures adopted as part of the Proposed Development is presented within **Table 3.25**.
'*It would be useful for the applicant to highlight to readers that the operational phase of the cable route has been scoped out of the Environmental Statement and the reasons why*.'	Noted, rationale for scoping out this impact during operation and maintenance phase is discussed in greater detail within **Table 3.7**.
Environment Agency	
'*The River Basin Management Plan cites groundwater pollution as a concern; therefore the applicant should take particular care with regards to enacting pollution prevention measures*.'	As part of the Outline Onshore CEMP, an Outline Pollution Prevention Plan will be developed and submitted with the DCO. In terms of managing pollution during decommissioning, a draft Onshore Decommissioning Plan would be produced prior to construction and updated throughout the lifetime of the Proposed Development, as detailed within Volume 1, Appendix 3.1: Draft Mitigation Schedule.
'*The study area for onshore effects will focus on the area landward of Mean High Water Springs. Designated bathing waters tend to be located below this point and there does not appear to be reference to the potential impact of the project on designated bathing waters within the scoping report. "Westward Ho!" designated bathing water is located to the Northeast of the proposed landfall location. Both onshore and offshore works could have the potential to impact this protected site. Potential risks to designated bathing waters should be incorporated into further assessments for both onshore and offshore works. We also recommend*	Westward Ho! Designated bathing waters and Torridge Estuary designated shellfish waters are located outside of the Zone of Influence and thus have not been assessed. However, mitigation measures adopted as part of the Proposed Development will ensure no degradation to WFD waterbodies will occur. Mitigation measures are presented within **Table 3.25**.

Comment	How and where considered in the PEIR
recognising The Bathing Water Regulations 2013 within the list of relevant legislation.'	
'*Table 7.4.1 lists the data sources which will be used to form the baseline assessment for hydrology and flood risk. The data sources listed will not provide information on permitted sites, discharges or abstractions. Knowledge of permitted activities within the study area is required to accurately describe the baseline environment and subsequently understand the risks posed by the project. We recommend incorporating the Environment Agency's Public Register as a data source for regulated sites, permitted discharges and licenced abstractions within the study area*.'	Volume 2, Chapter 3: Hydrology and Flood Risk of the PEIR is supported by Volume 2, Appendix 3.3: Surface water abstraction licences, discharge consents and pollution incidents, with data sourced from the EA's public register.
'*Section 7.4.18 lists a few designated areas that may intersect with the project. However, there is currently no reference to the Jennetts Reservoir and Gammaton Lower Reservoir nitrate vulnerable zones that the project intersects with. There is also no mention of the Torridge Estuary designated shellfish water which is downstream of the proposed watercourse crossing. If these areas are not included in the baseline conditions, then impacts to the water environment may not be properly understood. Mobilisation of sediment into either lake waterbodies could have a more significant long term impacts than compared to discharges into a more dynamic watercourse such as the sea. These designations should be incorporated into the baseline conditions and subsequent assessment*.'	Nitrate Vulnerable Zones and Designated Shellfish Waters have been identified as receptors within **Table 3.23** and assessed within Volume 2, Chapter 3: Hydrology and Flood Risk of the PEIR. 'The impact of contaminated runoff on the quality of surface water and groundwater' discusses how mitigation measures adopted as part of the Proposed Development will ensure no degradation to WFD waterbodies including Jennetts Reservoir and Gammaton Reservoirs will occur. Mitigation measures are presented within **Table 3.25**.
'*The impact of damage to existing water pipelines during construction has been scoped in for further assessment. However, no mention has been made regarding the impact of damage to other utilities, such as foul sewer or oil-insulated cables. Damage to any utilities within the area could result in impacts on the water environment and the survey for water pipelines should be extended to include a survey on all utilities within the area*.'	Volume 2, Chapter 3: Hydrology and Flood Risk of the PEIR includes an assessment of the impact to water supply and drainage infrastructure, including clean water and sewers. It is expected a utilities survey will be undertaken at design stage to establish the location of below ground services including oil insulated cables prior to construction activities begin to reduce the impact of potential damage to underground services.
'*The impact of contaminated runoff during construction has been scoped in for further assessment but the fate of sewage produced from welfare facilities during construction is not currently clear and should be scoped in for further assessment*.'	The impact of contaminated runoff on the quality of surface water and groundwater is discussed within **sections 3.8** and **3.10.** This includes contamination from sewage.
'*The Environment Agency supports the proposal to secure the requirement to obtain regulatory consent for water discharge activities within the CEMP. We would like to provide the applicant with the following advice regarding water discharge activity permits:* • *Unless an exemption applies, a permit is required to carry out a water discharge activity. Examples of water discharge activities include*	This advice has been noted. Consents/permits will be obtained for any works (e.g. discharge of water, dewatering) that may impact surface water or groundwater. This will be set out within the Outline On-CEMP. Further information regarding mitigation measures relating to dewatering is detailed within **Table 3.25**.

Comment	How and where considered in the PEIR
discharges of trade effluent (ie from dewatering), sewage (during construction and operationally) and surface water run-off from areas of exposed soil. • *A permit may not be required for small-scale sewage discharges which can meet the general binding rules.* • *The timeframes to determine permit applications can be significant. To avoid the risk of delays to the project we would encourage the applicant to engage with the Environment Agency's pre-application service at the earliest opportunity*.'	
'The project description describes below ground work during construction phases for buried cables and for onshore infrastructure and converter site. There are no references to de-watering in the report however it can often be required for construction below ground. *Dewatering activities can extend to the removal of water from excavations or more significant pumping of groundwater to lower local water levels for an excavation. These activities were previously exempt from requiring an abstraction license. A permit may now be required for activities that don't meet the conditions specified within the regulatory position statement on temporary dewatering from excavations to surface water.'*	Noted. Mitigation measures relating to dewatering to be adopted as part of the Proposed Development is presented within **Table 3.25**.
'*The WFD is referenced throughout the report and water bodies are identified in the Hydrology and Flood Risk section (Table 7.4.2). However, the scoping report only refers to a more detailed WFD assessment in the context of the impact of suspended contaminated sediments (table 8.9.6).* *The potential to contribute toward the achievement of the aims and objectives established by the WFD should be considered more fully for biological and physicochemical WFD elements as well as hydromorphological. Planning Inspectorate (2017) guidance entitled Advice Note 18: The Water Framework Directive provides an outline methodology for WFD as part of the DCO process*.'	Volume 2 Appendix 3.2: Preliminary Onshore Water Framework Directive Assessment of the PEIR with a WFD scoping assessment has been produced which has screened in the following key impacts: • The impact of contaminated runoff on the quality of waterbodies during construction and decommissioning phases. • The impact of habitat disturbance during construction, operation and maintenance and decommissioning phases. • The impact to flows/quantity, physical processes and hydromorphology of waterbodies during construction, operation and maintenance and decommissioning phases.
'*In addition to the watercourse cable crossings, we would expect any element of the development to have at least an 8m setback from any watercourses*.'	Mitigation measures adopted as part of the Proposed Development are presented within **Table 3.25**. **Table 3.25** details the proposed easements between temporary working areas and watercourses, including 8 m from the banks of ordinary watercourses, EA Main Rivers and the landward toe of associated flood defences, and 16 m from tidal EA Main Rivers and associated flood defences.
'*The applicant must demonstrate that the proposals are safe and will not result in any damage to flood assets. For cable crossings this will require consideration of an appropriate depth below any watercourse or flood defences. Of*	As a form of primary mitigation, trenchless cable crossings would be installed at least 1.5 m beneath the hard bed of any watercourses. Further detail on this mitigation measure is provided within **Table 3.25**.

Comment	How and where considered in the PEIR
particular concern is the impact on the River Torridge and its associated flood defences. The depth of the cable crossing will depend on where the applicant determines the river bed level to be (accounting for the silt deposited as a result of the river's tidal influence). We would like to encourage early discussions on the location of any cable crossings for the River Torridge. We would recommend condition surveys and accurate location plans be produced for any flood defences within the vicinity of the proposed development.'	Regarding the potential impact on the River Torridge and associated flood defences, the impact of increased flood risk arising from damage to existing flood defences' is discussed within **sections 3.8** and **3.10** of this chapter. Discussions relating to ground investigation of the River Torridge are currently being undertaken with the EA in preparation of a bespoke FRAP submission.
'*The impact of construction and decommissioning vibrations on watercourses and flood defences should be considered for inclusion within the Environmental Statement, accompanied by an appropriate monitoring plan*.'	This impact is discussed within **sections 3.8** and **3.10** 'The impact of increased flood risk arising from damage to existing flood defences'.
'*The potential for increase in flood risk due to the displacement of fluvial flood waters (loss of floodplain storage and impact on floodplain flow routes) where infrastructure is placed within the 1 in 100 year (plus an allowance for climate change) flood extent during construction, operation and decommissioning phases. If no impact is expected, then the applicant should provide justification*.'	As assessed within Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR, no above ground permanent or temporary infrastructure is proposed within Flood Zone 3. Only below ground cables are proposed to be located within fluvial Flood Zone 3. As such, no floodplain displacement will occur as part of the Proposed Development.
'*Assessment as to how the proposed development will remain operational during tidal or fluvial flooding throughout its lifetime. Please note that in accordance with paragraph 5.8.11 of National Policy Statement EN-1, the Secretary of State should be satisfied that 'in flood risk areas the project is designed and constructed to remain safe and operational during its lifetime, without increasing flood risk elsewhere'. In addition, given that the proposed converter stations are likely to be operated 24/7 by staff on-site, it is important that 'the project includes safe access and escape routes where required, as part of an agreed emergency plan, and that any residual risk can be safely managed over the lifetime of the development'. If all elements of the proposed development, including any temporary works needed for construction and decommissioning, are to be located outside of the fluvial and tidal floodplain then this should be confirmed. If this is not the case, we would recommend the above be scoped into the assessment unless an appropriate justification can be provided as to why this will not be appropriate*.'	Permanent development includes the Converter Stations, Alverdiscott Substation Connection Development and their associated access and egresses. Proposed permanent development is located within Flood Zone 1. All temporary and permanent elements of the proposed development are located within Flood Zone 1 aside from cables which pass underneath extents of Flood Zones 2 and 3 via HDD. HDD compounds which include the entry and exit pits are all located within Flood Zone 1.
'*Assessment of the impact of climate change on fluvial and tidal flood risk, with specific reference to the climate change allowances for peak river flow and sea level rise referenced in the government guidance 'Flood risk assessments: climate change allowances'. Additionally, with reference to Scoping Report Section 8.9.17, page 380 and Section 8.9.35 page 388, please consider whether future wave conditions need to be assessed,*	Climate change allowances for peak river flow sea level rise are noted within **section 3.5** 'Future Baseline Conditions'. Climate change allowances are also discussed within Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR. Further consideration of wave conditions are to be addressed within the Environmental Statement.

Comment	How and where considered in the PEIR
particularly for the decommissioning phase of the development.'	
'*Table 7.4.4 Impacts proposed to be scoped into the assessment for hydrology and flood risk page 153 "Baseline flood risk within the hydrology and flood risk study area for the Proposed Development will be determined using desk based analysis of flood risk mapping data published by the EA". Please bear in mind that it is important to check that any data used is suitable for your requirements and is representative of current baseline conditions and guidance. Please refer to the guidance on Using Modelling for Flood Risk Assessments for further details available online at: Using modelling for flood risk assessments - GOV.UK (www.gov.uk).*'	Noted, a technical note is to be submitted to the EA following the first EWG meeting to confirm the suitability of available flood risk data in relation to the Proposed Development.
'*Avoiding flood risk through the sequential test is the most effective way of addressing flood risk because it places the least reliance on measures such as flood defences. In line with paragraph 161 of the NPPF, 'all plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property'. Paragraph 162 of the NPPF states that development 'should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The sequential approach should be used in areas known to be at risk now or in the future from flooding'.* *The Sequential Test is not required as part of the EIA scoping, however it should be adequately applied and evidenced within the flood risk chapter of the EIA*.'	The Sequential Test and Exception Test has been undertaken within the Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR for the Onshore HVDC Cable Corridor which passes underneath of Flood Zone 3. The Sequential Test and Exception Test have been deemed to be not relevant to the Converter Site and Alverdiscott Substation Connection Development due to being within Flood Zone 1 and assessed to have a low risk of flooding from all sources.
'*Flood Zone 3b has not been referred to in the scoping report, but would be important to consider in the EIA. The Local Authority's SFRA should define the extent of Flood Zone 3b. In accordance with paragraph 5.8.14 of NPS EN-1 Where essential energy infrastructure has to be located in Flood Zone 3b it should only be consented if the development will not result in a net loss of floodplain storage and will not impede water flows*.'	It is expected areas of Flood Zone 3b will be ascertained prior to the submission of the Environmental Statement.
'*Construction/Decommissioning Environment Management Plan We would expect to be consulted on the Construction Environment Management Plan and the Decommissioning Environment Management Plan which should include: - A flood emergency response plan - Plans for the storage of construction materials (outside of the flood zone) - Flood defence vibration monitoring - Surveys for any works close to a flood defence to better understand defence's geometry, condition, composition and structure -*	An Outline On-CEMP has been developed and is included within Volume 1, Appendix 3.2 of the PEIR.

Comment	How and where considered in the PEIR
Details of construction phasing to ensure there is no loss in flood storage at any point during construction.'	
'*Paragraph 4.6.19 states that an outline operational drainage strategy will be submitted with the application for DCO. It does not make reference to pollution prevention measures, although pollution prevention is mentioned in the construction drainage design. It is important that pollution prevention is considered in all relevant elements of the scheme, both during construction and operation*.'	An Outline Pollution Prevention Plan will be included as part of the Outline On-CEMP to be submitted with the ES. Furthermore, pollution prevention measures will be incorporated into the operational drainage strategy.. Mitigation measures to be adopted as part of the Proposed Development is presented within **Table 3.25**.
'*Horizontal directional drilling (HDD) may be used to aid installation of the cables. This could involve the use of drilling muds and their use may require risk assessment to ensure they do not pose a risk to controlled waters. This is important within the Secondary aquifer and any other groundwater receptors that may be identified during the next stage of assessment (for example, private water supplies). The proposed use of directional drilling techniques should therefore be included in the CEMP*.'	Mitigation measures relating to the proposed HDD (or other trenchless crossing) sites will be detailed within the Outline On-CEMP. This includes the development of a Bentonite Breakout Plan.
'*The development site is within or may impact on the following Sites of Special Scientific Interest:* • *Mermaid's Pool to Rowden Gut Site of Special Scientific Interest (SSSI)* • *Taw Torridge Estuary SSSI* • *Lundy SSSI* *The Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within the SSSI and identify appropriate mitigation measures to avoid, minimise or reduce any adverse significant effects*.'	Receptors assessed within Volume 2 Chapter 3: Hydrology and Flood Risk of the PEIR are presented within **Table 3.23**. Lundy SSSI is located outside of the Zone of Influence and thus have not been assessed. However, please see 'The impact of contaminated runoff on the quality of surface water and groundwater' which discusses how mitigation measures adopted as part of the Proposed Development will ensure no degradation to WFD watercourses will occur. Mitigation measures are presented within **Table 3.25**.

3.3.3 Following on from scoping both consultation, and engagement with interested parties specific to Hydrology and Flood Risk has continued and will continue to do so.

3.3.4 A summary of the key issues raised during consultation activities undertaken to date is presented in **Table 3.5**, together with how these issues have been considered in the production of this PEIR chapter.

Table 3.5: Summary of consultation relevant to this chapter

Date	Consultee and type of response	Issues raised	How and where considered in the PEIR
5 January 2024	South West Water email consultation	No public sewers located within proximity to the Converter Site and Alverdiscott Substation Connection Development.	Information has been incorporated within Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR.
5 January – 13 March 2024	EA freedom of information request	Product 4, 5 6 and 8 data requests for flood risk data within the study area.	Data was taken forward and presented within the first EWG meeting on the 8 April explaining data limitations and proposing ways forward.
5 January 2024	LLFA email consultation	Flood risk information request within proximity to the proposed permanent development associated with the converter site and Alverdiscott Substation Connection Development.	Information has been incorporated within Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR.
8 April 2024	EWG consultation meeting	Approach to Volume 2, Chapter 3: Hydrology and Flood Risk of the PEIR, including; • Identified receptors • impacts scoped in and out • mitigation measures currently proposed • Flood risk data limitations and discussions of ways forward	Initial comments have been incorporated within the PEIR and Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR. A technical note will be prepared outlining the approach to flood risk discussed within the meeting. It is expected outcomes from the technical note will be incorporated at the ES stage of the Proposed Development.

3.4 Methodology

Relevant Guidance

3.4.1 The baseline assessment is informed by best practice guidance set out within the Design Manual for Roads and Bridges (DMRB) Sustainability and Environment Appraisal; LA 113 road drainage and the water environment document (Highways England *et al*., 2020). Whilst this relates to road schemes, it is accepted that cable route projects can also follow the guidance due to their linear nature.

3.4.2 The hydrology and flood risk baseline environmental conditions that require definition in line with LA113 include the following:

- Surface water:
  - Water quality: informed by WFD status, number and details of abstractions, discharges, and pollution incidents.
  - Hydromorphology: informed by size and flows of water bodies.
- Groundwater:
  - Water quality: informed by WFD status, number and details of abstractions, discharges, pollution incidents, aquifer designations and vulnerability.
  - Levels and flow: informed by size and flows of groundwater bodies.
  - Dependant ecosystems: informed by details of downstream ecologically designated sites.
- Flood impacts (informed by the FRA (see Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR)).

Scope of the Assessment

3.4.3 The scope of this PEIR has been developed in consultation with relevant statutory and non-statutory consultees as detailed in **Table 3.4** and **Table 3.5**.

3.4.4 Taking into account the scoping and consultation process, **Table 3.6** summarises the issues considered as part of this assessment.

Table 3.6: Issues considered within this assessment

Activity	Potential effects scoped into the assessment
Construction Phase	
The impact of contaminated runoff on the quality of ordinary watercourses, Main Rivers and ground receptors arising from the construction of the onshore elements of the Proposed Development.	Activities required to facilitate the construction of the onshore elements of the Proposed Development (e.g. removal of surface vegetation, excavations, dewatering, stockpiling) may generate contaminated runoff. Accidental spills/contaminant release could also occur as a result of activities. These activities could impact the chemical and biological status of ordinary watercourses and Main Rivers and ground receptors.
The impact of increased flood risk arising from additional surface water runoff during construction of the	Activities required to facilitate the construction of the onshore elements of the Proposed Development (e.g. temporary construction compounds, removal of surface vegetation,

Activity	Potential effects scoped into the assessment
onshore elements of the Proposed Development.	compaction of soils, excavations, dewatering) may alter drainage patterns and surface water runoff rates onsite, increasing the risk of flooding posed to the surrounding area.
The impact of increased flood risk arising from damage to existing flood defences during the construction of the onshore elements of the Proposed Development.	If the onshore elements of the Proposed Development are located within or near existing formal and informal flood defences, activities required to facilitate construction of the onshore elements of the Proposed Development may impact the integrity (or efficacy) of flood defence infrastructure and therefore increase the risk of flooding within the site and surrounding area.
The impact of damage to existing field drainage during the construction of the onshore elements of the Proposed Development.	If the onshore elements of the Proposed Development are located on or near existing drainage infrastructure, activities required to facilitate the construction of the onshore elements of the Proposed Development may damage field drainage.
The impact of damage to existing water supply and drainage infrastructure during the construction and decommissioning of the onshore elements of the Proposed Development.	If the onshore elements of the Proposed Development are located on or near existing water supply and drainage infrastructure, activities required to facilitate the construction of the onshore elements of the Proposed Development may damage existing pipelines, interrupting the local water supply.
Operation and Maintenance	
The impact of increased flood risk arising from additional surface water runoff during operation of the Converter Site and Alverdiscott Substation Connection Development.	The installation of the Converter Site and Alverdiscott Substation Connection Development would result in additional impermeable land, which may alter drainage patterns and surface water runoff rates onsite, increasing the risk of flooding within the site and the surrounding area.
Decommissioning	
The impact of contaminated runoff on the quality of ordinary watercourses, Main Rivers and ground receptors arising from decommissioning of the onshore elements of the Proposed Development.	Activities requires to facilitate the decommissioning of the onshore elements of the Proposed Development (e.g. removal of surface vegetation, excavations, dewatering, stockpiling) may generate contaminated runoff. Accidental spills/contaminant release could also occur as a result of activities. These activities could impact the chemical and biological status of ordinary watercourses and Main Rivers and ground receptors.
The impact of increased flood risk arising from additional surface water runoff during decommissioning of the onshore elements of the Proposed Development.	Activities required to facilitate the decommissioning of the onshore elements of the Proposed Development (e.g. temporary construction compounds, removal of surface vegetation, compaction of soils, excavations, dewatering) may alter drainage patterns and surface water runoff rates onsite, increasing the risk of flooding posed to the surrounding area.
The impact of increased flood risk arising from damage to existing flood defences during decommissioning of the onshore elements of the Proposed Development.	If onshore elements of the Proposed Development are located within or near existing formal and informal flood defences, activities required to facilitate decommissioning of the Onshore Elements of the Proposed Development may impact the integrity (or efficacy) of flood defence infrastructure and increase the risk of flooding within the site and the surrounding area.
The impact of damage to existing field drainage during decommissioning of the onshore elements of the Proposed Development.	If onshore elements of the Proposed Development are located on or near existing drainage infrastructure, activities required to facilitate decommissioning of the Onshore Cable Corridor may damage field drainage.
The impact of damage to existing water supply and drainage infrastructure during decommissioning of onshore elements of the Proposed Development.	If onshore elements of the Proposed Development are located on or near existing water supply and drainage infrastructure, activities required to facilitate decommissioning may damage existing pipelines, interrupting the local water supply.

3.4.5 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out is presented in **Table 3.7**.

Table 3.7: Issues scoped out of the assessment

Activity	Potential effects scoped into the assessment
Operation and Maintenance Phase	
The impact of contaminated runoff on surface water and groundwater receptors during the operation and maintenance arising from the onshore elements of the Proposed Development.	Activities associated with the operation and maintenance of onshore elements of the Proposed Development are unlikely to generate contaminated runoff. The drainage strategy for the Converter Site and Alverdiscott Substation Connection Development will include measures such as a surface water treatment train in which to treat any pollution or contamination arising on-site. Therefore, the potential impact of contaminated runoff on the quality of surface water receptors during the operation and maintenance of the onshore elements of the Proposed Development is unlikely to be significant and is proposed to be scoped out of the assessment.
The impact of increased flood risk arising from additional surface water runoff during the operation and maintenance from the Onshore HVDC Cable Corridor and HVAC Cables	The installation of the Onshore HVDC Cable Corridor and HVAC Cables will result in a minor increase in the total area of impermeable land from new link boxes. However, the increase in impermeable land is unlikely to result in a notable change in drainage patterns and surface water runoff rates. Therefore, the potential impact of flood risk arising from additional surface water runoff during the operation and maintenance of the Onshore HVDC Cable Corridor and HVAC Cables is unlikely to be significant and is proposed to be scoped out of the assessment.
The impact of increased flood risk arising from damage to existing flood defences during the operation and maintenance of the onshore elements of the Proposed Development.	Activities required to facilitate the operation and maintenance of the onshore elements of the Proposed Development are unlikely to impact the integrity (or efficacy) of existing flood defences. Therefore, the potential impact of increased flood risk arising from damage to existing flood defence infrastructure during the operation and maintenance of the onshore elements of the Proposed Development is unlikely to result in significant effects and is proposed to be scoped out of the assessment for hydrology and flood risk.
The impact of damage to existing field drainage during the operation and maintenance of the onshore elements of the Proposed Development	Activities that could damage existing field drainage are to take place during construction and decommissioning phases only. As such it is unlikely that damage would be caused to field drainage during operation. Therefore, the potential impact of damage to field drainage during operation and maintenance of the onshore elements of the Proposed Development is unlikely to result in significant effects and is proposed to be scoped out of the assessment.
The impact of damage to existing water supply and drainage infrastructure during the operation and maintenance of the onshore elements of the Proposed Development	Activities that could damage existing water supply and drainage infrastructure are to take place during construction and decommissioning phases only. As such it is unlikely that damage would be caused water supply and drainage infrastructure during operation. Therefore, the potential impact of damage to water supply and drainage infrastructure during operation and maintenance of the onshore elements of the Proposed Development is unlikely to result in significant effects and is proposed to be scoped out of the assessment.

Study Area

3.4.6 The hydrology and flood risk study area (hereafter referred to as the 'study area') has been ascertained using professional judgement and focuses on where potential impacts are most likely to occur on hydrological and flood risk receptors.

3.4.7 The extent of the study area used for the assessment has been informed by the nature and scale of the Proposed Development, which predominantly consists of temporary construction activities associated with installation of below ground cables. The only permanent infrastructure associated with the Proposed Development are two converter stations, the Alverdiscott Substation Connection Development and associated access and egress.

3.4.8 The EA Catchment Data Explorer Mapping which provides information regarding hydrological catchments within the Onshore Infrastructure Area of the Proposed Development. Waterbodies located within the study area are located within the North Devon and South West Transitional and Coastal (TraC) Management Catchments which, alongside 10 additional Management Catchments, form the South West Basin District.

3.4.9 The study area takes into account the range of potential impacts arising from activities associated with the Proposed Development. The zone of influence is deemed appropriate by the impacts expected to arise from the Proposed Development. Based on the above, the study area is defined as:

- The area of land to be temporarily or permanently occupied during the construction, operation and maintenance and decommissioning of the Proposed Development (including those parts of the landfall situated landward of MHWS).
- Receptors located within 250 m of the landfall (above MHWS) and Onshore Infrastructure Area. The 250 m buffer is considered appropriate for data collection taking into account the likely zone of influence by hydrological receptors. The buffer has also been chosen to identify any existing receptors, assets or infrastructure that have the potential to be affected by temporary flood risk as a result of the Proposed Development.
- Receptors located within 1 km of the Converter Stations and Alverdiscott Substation Connection Development. The 1 km buffer was chosen primarily to identify any existing receptors, assets or infrastructure that have the potential to be affected by flood risk as a result of the Proposed Development. The Converter Stations and Alverdiscott Substation Connection Development have been assessed in Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR.

3.4.10 Due to the variety of nature and scale of the Proposed Development, the study area is appropriate for data collection taking into account the likely zone of influence by hydrological receptors. Beyond these buffer zones, the magnitude of effect will be unable to be accurately assessed as the dilution capacity becomes greater as the hydraulic catchment increases downstream of the Proposed Development. The buffers have also been chosen to identify any existing receptors, assets or infrastructure that have the potential to be affected by temporary flood risk as a result of the construction phase of the Proposed Development.

3.4.11 Where data was requested from third parties, the desk study requested data for an area of 1 km around the Onshore Infrastructure Area at the time of the data request. The 1 km buffer was included to take account of interests or constraints that may occur adjacent or close to the Onshore Infrastructure Area and to allow for evolution of the boundary.

3.4.12 As a result of the iterative site selection process, the Proposed Development Draft Order Limits used to inform this PEIR varies in some places from the previous boundary used to inform the desk study. All elements where construction, operation and maintenance, and decommissioning activity will occur (i.e., all parts of the Onshore Infrastructure Area, as described in Volume 1, Chapter 3: Project Description of the PEIR) fall within the area used for the desk study and, therefore, sufficient data has been collated to inform this PEIR.

3.4.13 The study area is presented within Volume 2, Figure 3.1 of the PEIR.

Methodology for Baseline Studies

Desk Studies

3.4.14 Information on hydrology and flood risk within the Onshore Infrastructure Area was collected through a detailed desktop review of existing studies and datasets. There are summarised below within **Table 3.8**.

Table 3.8: Summary of key desktop reports

Title	Source	Year	Author
1:25,000 mapping	https://www.bing.com/maps	2023	Ordnance Survey (OS)
Catchment Data Explorer	https://environment.data.gov.uk/catchment-planning/	2023	EA
Climate Change Allowances for Rainfall	https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall	2023	(Department for Environment Food and Rural Affairs) DEFRA
Climate Change Allowances for Peak River Flow	https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow	2023	DEFRA
Groundsure Insights digital reports	Document references GSIP-2022-12875-10942_1a GSIP-2022-12875-10942_1b GSIP-2022-12875-10942_1c	2022	Groundsure
Flood Estimation Handbook (FEH) Webservice	https://fehweb.ceh.ac.uk/GB/map	2023	FEH
Flood Map for Planning	https://flood-map-for-planning.service.gov.uk/	2023	EA

Title	Source	Year	Author
Geoindex Onshore Viewer	https://mapapps2.bgs.ac.uk/geoindex/home.html	2023	British Geological Survey (BGS)
Internal Drainage Boards Map	https://www.ada.org.uk/idb-map/	2023	Association of Drainage Authorities (ADA)
Long Term Flood Risk Mapping	https://check-long-term-flood-risk.service.gov.uk/map	2023	EA
Multi-Agency Geographic Information for the Countryside (MAGIC) mapping	https://magic.defra.gov.uk	2023	DEFRA
North Devon and Somerset Shoreline Management Plan	https://southwest.coastalmonitoring.org/ProposedDevelopments/shoreline-management-plans/ndascag-smp2/	2010	North Devon and Somerset Coastal Advisory Group
North Devon and Torridge Local Plan 2011 - 2031	https://consult.torridge.gov.uk/kse/event/33615/section/	2011	North Devon Council, Torridge District Council
NPPF	https://www.gov.uk/government/publications/national-planning-policy-framework--2	2023	Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government
NPS for Energy EN-1	https://www.gov.uk/government/collections/national-policy-statements-for-energy-infrastructure	2024	DESNZ
PPG	https://www.gov.uk/guidance/flood-risk-and-coastal-change	2023	Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government
Shoreline Management Plan Policy Designations	https://southwest.coastalmonitoring.org/ProposedDevelopments/shoreline-management-plans/	2023	South West Coastal Monitoring
Soilscapes Viewer	http://www.landis.org.uk/soilscapes/	2023	The National Soils Research Institute
Strategic Flood Risk Assessment (SFRA) – Level 1 and 2	https://www.torridge.gov.uk/article/11269/Strategic-Flood-Risk-Assessment-SFRA-Level-1-and-2	2009	Torridge District Council
Surface Water Management Plan	https://consult.torridge.gov.uk/file/3369625	2012	Devon County Council

Impact Assessment Methodology

Overview

3.4.15 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and magnitude of potential impacts. The terms used to define magnitude and sensitivity are based on and have been adapted from those used in the DMRB methodology (Highways England *et al*., 2020).

3.4.16 The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 5: EIA Methodology of the PEIR.

3.4.17 The hydrology and flood risk impact assessment has followed the methodology set out in Volume 1, Chapter 5: EIA Methodology of the PEIR. Specific to the hydrology and flood risk impact assessment, the following guidance documents have also been considered:

- National Highways *et al* (2020) Design Manual for Roads and Bridges (DMRB) LA113 Road drainage and the water environment; and
- National Highways *et al* (2020) Design Manual for Roads and Bridges (DMRB) LA104 Environmental assessment and monitoring.

Receptor Sensitivity/Value

3.4.18 The criteria for defining sensitivity in this chapter are outlined in **Table 3.9** below.

Table 3.9: Sensitivity criteria

Sensitivity	Definition
Very High	Receptor with little to no capacity to accommodate change, is high value or critical importance to the local, regional or national economy. Receptor is highly vulnerable to impacts that may arise from the development and recoverability is long term or not possible. **Surface Water**: WFD current overall status of high. The surface water body supports sensitive aquatic ecological receptors and is extensively used for public water supply and large-scale agricultural use. **Groundwater:** Groundwater body supports public and/or large-scale industrial water supply and is a very high productivity aquifer. **Flood Risk**: Land within Flood Zone 3 or more than one hundred residential properties protected from flooding by flood defence infrastructure or by natural floodplain storage.
High	Receptor with a low a capacity to accommodate change, is of moderate value with reasonable contribution to the local, regional or national economy. Receptor is generally vulnerable to impacts that may arise from the development and recoverability is low and/or costly. **Surface Water**: WFD current overall status of good. Surface water body may support sensitive aquatic ecological receptors and is used is used for public water supply/medium scale industrial or agricultural use.

Sensitivity	Definition
	Groundwater: Groundwater body supports public water and/or large-scale industrial water supply and is a high productivity aquifer. **Flood Risk**: Land within Flood Zone 3 and/or 2 or between one and one hundred residential properties or industrial premises protected from flooding by flood defence infrastructure or by natural floodplain storage.
Medium	Receptors with a moderate capacity to accommodate change, is of minor value with small levels of contribution to the local, regional and national economy. Receptor is somewhat vulnerable to impacts that may arise from the development and has moderate to high levels of recoverability. **Surface Water**: WFD current overall status of moderate. The surface water features may be locally important for spawning of salmonid species. Surface water body is used for private water supply or small scale industrial/agricultural use. **Groundwater**: Groundwater body supports private water supply or medium scale agricultural/industrial abstractions. **Flood Risk**: Flood plain within Flood Zone 2 and/or 1 or limited constraints and a low probability of flooding of residential and industrial properties.
Low	Receptor with a high capacity to accommodate change, is of low value with little contribution to the local, regional or national economy. Receptor is not generally vulnerable to impacts that may arise from the development and/or has high recoverability. **Surface Water**: WFD current overall status of poor. Surface water bodies are not significant in terms of sensitive ecological receptors or fish spawning. Small scale (single residential or commercial use) abstraction licences are present in close proximity. **Groundwater**: Low or very low productivity aquifer with no abstraction licences. **Flood Risk**: Flood plain within Flood Zone 2 and/or located outside floodplain within Flood Zone 1 or limited constraints and a very low probability of flooding of residential and industrial properties.
Negligible	Receptor with a very high capacity to accommodate change, is of negligible value with no contribution to local, regional or national economy. Receptor is not vulnerable to impacts that may arise from the development and/or has high recoverability. **Surface Water**: WFD current overall status of bad. No sensitive ecological receptors or fish spawning are present within the surface water bodies. No abstraction licences present within the area. **Groundwater**: Very low productivity aquifer with no abstraction licences. **Flood Risk**: Area outside flood plain (Flood Zone 1) or flood plain with very low probability of flooding industrial properties.

Magnitude of Impact

3.4.19 In determining impact magnitude, the impact duration and the nature of the impact has been taken into account. The following definitions from the DMRB (LA104 and LA113) have been used in the assessment:

- Temporal scale:
  - Short Term: A period of months, up to one year.
  - Medium Term: A period of more than one year, up to five years.
  - Long Term: A period of greater than five years.
- Geographical scale: whether the effect would be experienced at the local, regional, or national level.
- Adverse or Beneficial: whether the nature of the effect increases or decreases potential contamination risks to sensitive receptors.

- Temporary: effects that persist for a limited period only (due for example, to particular activities taking place for a short period of time).
- Permanent: effects that result from an irreversible change to the baseline environment (e.g., land-take) or which persist for the foreseeable future.
- Reversible/irreversible effect: effects can be reversed by mitigation measures or by natural environmental recovery within reasonable timescales (e.g., 5 to 10 years following cessation of construction).

3.4.20 The criteria for defining magnitude in this chapter are outlined in **Table 3.10** below.

Table 3.10: Impact magnitude criteria

Magnitude of impact		Definition
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features, or elements.
	Beneficial	Large scale or major improvement or resource quality; extensive restoration or enhancement; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features, or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features, or elements; improvement of attribute quality.
Low	Adverse	Some measurable change in attributes, quality or vulnerability, minor loss or, or alteration to, one (maybe more) key characteristics, features, or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features, or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features, or elements.
	Beneficial	Very minor benefit to, or positive addition of one or more characteristics, features, or elements.
No change		No loss or alteration of characteristics, features, or elements; no observable impact in either direction.

Significance of Effect

3.4.21 The significance of the effect upon hydrology and flood risk has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The method employed for this assessment is presented in **Table 3.11**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.

3.4.22 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

3.4.23 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 3.11: Assessment Matrix

Sensitivity of Receptor	Magnitude of Impact			
	Negligible	Low	Medium	High
Negligible	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Minor	Minor or Moderate	Moderate or Major	Major
Very High	Minor	Moderate or Major	Major	Major

3.4.24 Where the magnitude of impact is 'no change', no effect would arise.

3.4.25 The definitions for significance of effect levels are described as follows:

- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national, or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category. Effects upon human receptors may also be attributed to this level of significance.
- Moderate: These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.
- Minor: These beneficial or adverse effects are generally, but not exclusively, raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the Proposed Development.
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
- No change: No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Assumptions and Limitations of the Assessment

3.4.26 The assessment within this chapter is based on publicly available data obtained from the EA, Torridge District Council, Devon County Council, the Groundsure Insights report, as well as additional information supplied from stakeholders during the scoping and consultation stages.

3.4.27 The information has been supplemented with publicly available desktop reports as presented within **Table 3.8**, Groundsure searches and public consultation such that it is considered sufficient to characterise the baseline environment.

3.4.28 Whilst asset plans from South West Water have been obtained, discussions with South West Water and other service companies will be undertaken at the detailed design stage to confirm the location of local services.

3.4.29 It is also noted that the EA flood zone mapping does not take into account the impact of local flood defences or climate change upon flooding, and does not provide information on flood depth, speed, or volume of flow. The maps do not show flooding from other sources such as groundwater, direct runoff from fields or overflowing sewers. However, a description of these sources of flooding is provided in the FRA (see Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR), such that sufficient baseline information is available.

3.4.30 The assessment is limited by a lack of detailed information regarding:

- flow data for watercourses; and
- water quality data for specific locations.

3.4.31 Notwithstanding the above, overall a moderate to high level of certainty has been applied to the baseline and assessment presented in this chapter. Where available, catchment data regarding water quality has been used to inform the assessment. The information available is considered sufficient to establish the baseline within the study area, therefore, there are no data limitations that would affect the conclusions of this assessment.

3.4.32 Following the refinement of the study area, predominantly in relation to the Onshore HVDC Cable Corridor, a hydrological site walkover of the Main Rivers and ordinary watercourses to be crossed by the Onshore HVDC Cable Corridor will be undertaken. Relevant findings of the walkover will be considered within the ES.

3.5 Baseline Environment

Introduction

3.5.1 The onshore elements are located within the Proposed Development Draft Order Limits, which lies within the local authority area of Torridge District Council and Devon County Council. The Onshore Infrastructure Area comprises all permanent and temporary components in the onshore section of the Proposed Development Draft Order Limits. This includes:

- the Converter Site;
- the Alverdiscott Substation Connection Development;
- temporary and permanent utility diversions;
- long-term highways improvements and short term highways alterations during construction;
- Onshore HVDC Cable Corridor;
- HVAC Cables;
- temporary compounds and haul roads; and
- landfall.

3.5.2 The HVDC Cables are installed at the landfall, situated at Cornborough Range, via Horizontal Directional Drilling (HDD) (or other trenchless methodology). The Onshore HVDC Cable Corridor is routed in a general counter-clockwise direction

around the town of Bideford. The Onshore HVDC Cable Corridor is to pass underneath Kenwith Stream, the River Torridge and a tributary of Jennets Reservoir via HDD. Smaller, frequently dry watercourses are expected to be crossed via trenched techniques.

3.5.3 The Onshore HVDC Cable Corridor is to connect to two proposed converter stations, located within the Converter Site to the west of Alverdiscott Substation Site. From the converter stations, HVAC Cables would be routed eastwards to connect to the proposed Alverdiscott Substation Connection Development.

Topography

3.5.4 Using OS 1:25,000 mapping, the shingle bar at Cornborough Range is shown to rise above sea level to approximately 15 mAOD (meters Above Ordnance Datum) immediately landward of Mean High Water. Ground levels generally rise as the Onshore HVDC Cable Corridor routes around Bideford, reaching approximately 100 mAOD to the south of the A39. Levels fall in proximity to the River Torridge to approximately 5 mAOD and rise again to approximately 125 mAOD within the easternmost extents of the Onshore HVDC Cable Corridor. The proposed converter stations and HVAC Cables are located approximately between 144-120 mAOD.

Hydrological Setting

3.5.5 Main rivers designated by the EA are shown on the Main River Map. The EA undertakes maintenance and improvement activities on Main Rivers and also activities relating to managing flood risk. Non designated watercourses are referred to as ‘ordinary watercourses’ and LLFAs and Internal Drainage Boards (IDBs) carry out flood risk management work for these watercourses.

Sea

3.5.6 The landfall is located to the south west of Cornborough, at Cornborough Range. This location comprises a natural and wide, substantially dry valley with a natural shingle bar with Bideford Bay beyond.

Shoreline Management Plan

3.5.7 The study area is located within the Shoreline Management Plan 2 North Devon and Somerset (North Devon and Somerset Coastal Advisory Group 2010).

3.5.8 The landfall is located within sub cell 7c05 ‘Hartland Point to Westward Ho!’ and the Onshore HVDC Cable Corridor crosses sub cell 7c12 ‘Taw/Torridge Estuary’. Both subcells are classified to have no active intervention; a decision not to invest in providing or maintaining defences due to the lack of requirement to protect property and infrastructure.

Main Rivers

3.5.9 A review of published OS maps and EA data shows the River Torridge, a designated Main River bisects the central extent of the study area and is

presented within Figure 3.2 (see Volume 2, Figures). The river discharges to the Taw and Torridge Estuary prior to discharging to Barnstaple Bay, where the landfall site is located.

3.5.10 The River Torridge is considered tidally influenced, with the tidal limit located at Weare Gifford, upstream of the study area.

Ordinary Watercourses

3.5.11 OS Mapping indicates the following Ordinary watercourses are also present within the study area:

- River Yeo;
- Kenwith Stream;
- A small ordinary watercourse upon the cliffs at Cornborough Range at landfall, intermittently flowing directly to Bideford Bay; and
- Several tributaries of Jennetts Reservoir and its associated outflow.

3.5.12 OS Mapping indicates that there are two ordinary watercourses that commence immediately adjacent to the western boundary of the Converter Site. The watercourses are unnamed and converge upon the southern boundary of the Alverdiscott Substation Connection Development and flow in a southerly direction, towards Huntshaw Water, an ordinary watercourse which in turn outfalls to the River Torridge.

3.5.13 The majority of ordinary watercourses within the study area form tributaries of the River Torridge. Ordinary watercourses present in closest proximity to the coast outfall directly to Barnstaple Bay.

3.5.14 The location of ordinary watercourses are presented within Figure 3.2 (see Volume 2, Figures).

Other Hydrological Features

3.5.15 Jennetts Reservoir and the Gammaton Reservoirs are 195 m and 140 m to the north of the Onshore Infrastructure Area. Bideford and District Angling Club Lake is located 9 m to the north and west of the Onshore Infrastructure Area. An unnamed pond is also located 1.0 km south of the Onshore Infrastructure Area to the east of the River Torridge. These features are presented within Figure 3.2 (see Volume 2, Figures).

3.5.16 Jennetts Reservoirs discharges to the River Torridge. Gammaton Reservoirs discharge to Horwood Stream which in turn outfalls to the River Torridge.

Internal Drainage Board

3.5.17 The study area is not located within an Internal Drainage Board and therefore no further assessment is required.

Water Framework Directive Classification

3.5.18 The EA catchment data explorer mapping indicates water body catchments within the study area are located within wider North Devon and South West TraC Management Catchments. The majority of the Onshore Infrastructure Area is located within the Torridge Operational Catchment, and predominantly discharges to the River Torridge.

3.5.19 The Joint Nature Conservation Committee (JNCC) WFD guidance (JNCC, 2023) indicates that water bodies below 10 km^2 catchment area no longer need to be included in a water body's classification assessment. For watercourses that are too small to be classified as WFD water bodies, there is no further data available. Therefore, for these watercourses, a classification was derived from their associated downstream water bodies. In this instance, water bodies under 10 km^2 within proximity to the River Torridge are classified by the Taw/Torridge transitional water body, and catchments that outfall directly to Barnstaple Bay are classified by the Barnstaple Bay coastal water body.

3.5.20 For surface waters, the WFD objectives are based on the ecological and chemical status of the water body (i.e., the predicted overall objective if technically feasible measures are implemented). These measures are required to prevent deterioration in the current classification of the water body and produce more benefits than they cost to implement once they have been implemented. The date to achieve the predicted overall objective is determined by the type of measures which are needed in order to improve the status of the water body (i.e., the cost of the measures (are they affordable) and the time taken for the status to improve once the measures have been implemented).

3.5.21 The study area includes nine surface water WFD catchments and one groundwater WFD catchment, details of which are provided in **Table 3.12**. Catchments are presented within Figure 3.3 (see Volume 2, Figures).

Table 3.12: WFD water body classifications

Name of water body	Water body type	Classification (2022)	Overall objective
Kenwith Stream (ID: GB108050014500)	River (not designated artificial or heavily modified)	Ecological – Moderate Chemistry – Does not require assessment Overall – Moderate	Good by 2027
Horwood Stream (ID GB108050014510)	River (not designated artificial or heavily modified)	Ecological – Moderate Chemistry – Does not require assessment Overall – Moderate	Good by 2027
Upper River Yeo (Bideford)	River (not designated artificial or heavily modified)	Ecological – Poor Chemistry – Does not require assessment Overall – Poor	Good by 2027
Lower River Yeo (Bideford)	River (not designated artificial or heavily modified)	Ecological – Moderate Chemistry – Does not require assessment Overall – Moderate	Good by 2027

Name of water body	Water body type	Classification (2022)	Overall objective
Huntshaw Water (GB108050014440)	River (not designated artificial or heavily modified)	Ecological – Moderate Chemistry – Does not require assessment Overall – Moderate	Good by 2027
Gammaton Upper Reservoir (GB30844798)	Lake (heavily modified)	Ecological – Moderate Chemistry – Does not require assessment Overall – Moderate	Good by 2027
Gammaton Lower Reservoir (GB30844781)	Lake (heavily modified)	Ecological – Moderate Chemistry – Does not require assessment Overall – Moderate	Good by 2027
Taw / Torridge (GB540805015500)	Transitional Water (heavily modified)	Ecological – Moderate Chemistry – Does not require assessment Overall – Moderate	Good by 2027
Barnstaple Bay (GB610807680003)	Coastal Water (not designated artificial or heavily modified)	Ecological – Moderate Chemistry – Does not require assessment Overall – Moderate	Good by 2027
Torridge and Hartland Streams (ID GB40802G800600)	Groundwater (Natural)	Quant – Good Chemistry – Poor Overall – Poor	Good by 2027

Geological and Hydrogeological Setting

3.5.22 A full description of the geological and hydrogeological setting is presented within Volume 2, Chapter 4: Geology, Hydrogeology and Ground Conditions of the PEIR. A summary of the key elements relevant to this chapter are set out in the below.

Bedrock Geology

3.5.23 BGS Geoindex Onshore mapping (1:50,000 scale) indicates that the study area is situated on a variety of intermittent bedrock geology, consisting of the following:

- Bude Formation – Sandstone;
- Bude Formation – Mudstone and Siltstone;
- Crackington Formation – Mudstone and siltstone; and
- Bideford Formation – Sandstone.

3.5.24 The BGS borehole logs indicated that there were no boreholes records along the Onshore HVDC Cable Corridor.

3.5.25 Bedrock geology is presented within Figure 3.4 (see Volume 2, Figures).

Superficial Deposits

3.5.26 BGS Geoindex Onshore mapping (1:50,000 scale) indicates that the study area is underlain by Superficial Deposits – River Torridge Terrace Deposits, 1 member (gravel, sand and silt) is only present around the banks of the River Torridge, at the location where the Onshore HVDC Cable Corridor crosses this section.

3.5.27 Superficial deposits are presented within Figure 3.5 (see Volume 2, Figures).

Aquifer Designation

3.5.28 The EA's Aquifer Designation Mapping indicates the strata at the surface of the study area is classified as a Secondary A Aquifer. These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.

Source Protection Zones

3.5.29 EA online groundwater Source Protection Zone (SPZ) mapping indicates that the study area is not located within a groundwater SPZ.

Groundwater Body Status

3.5.30 **Table 3.13** lists the groundwater catchments within the study area, associated WFD classification grade and overall objectives.

Table 3.13: WFD Groundwater quality data

Name of water body	Water body type	Classification (2022)	Overall objective
Torridge and Hartland Streams (ID GB40802G800600)	Groundwater (Natural)	Quant – Good Chemistry – Poor Overall – Poor	Good by 2027

Designated Sites

Ecological Designations

3.5.31 A full description of the designated sites within the study area is presented within Volume 2, Chapter 1: Onshore Ecology and Nature Conservation of the PEIR. A summary of the key elements relevant to this chapter are set out in **Table 3.14** below and presented within Figure 3.6 (see Volume 2, Figures).

Table 3.14: Designated sites

Designated Site	Distance to the Proposed Development Site	Relevant Qualifying Interest
Mermaid's Pool to Rowden Gut Geological SSSI	The landfall of the Proposed Development crosses the designated site.	The designated coastal section exposes the only complete sequence available through the Bideford Formation – a localised development of fluvio-lacustrine 'Coal Measure' type deposits.

Designated Site	Distance to the Proposed Development Site	Relevant Qualifying Interest
Taw-Torridge Estuary SSSI 1,000 m impact zone	The 250 m buffer zone of the Onshore Infrastructure Area is located within the 1,000 m impact zone	The Taw-Torridge Estuary is of major importance for its overwintering and migratory populations of wading birds. In addition, rare plants grow along its shores.

Nitrate Vulnerable Zones

3.5.32 Nitrate Vulnerable Zones (NVZs) are areas designated as being at risk from agricultural nitrate pollution. The study area is located within two NVZs as presented within **Table 3.15** below and within Figure 3.6 (see Volume 2, Figures).

Table 3.15: Nitrate Vulnerable Zones

NVZ name	Type and status of NVZ	Reference
Jennetts reservoir Eutrophic lake	Eutrophic water (existing)	EL118
Gammaton Lower Reservoir Eutrophic lake	Eutrophic water (existing)	EL122

Drinking Water Protected Areas

3.5.33 Drinking Water Protected Areas (Surface Water) are defined by the Water Environment (Water Framework Directive) (England & Wales) Regulations 2017 as locations where over water is abstracted for human consumption (either over 10m^3 per day or serving more than 50 persons), or is intended for such future use. The study area is located within two Drinking Water Protected Areas (Surface Water), as presented within **Table 3.16** below and within Figure 3.6 (see Volume 2, Figures).

Table 3.16: Drinking Water Protected Areas (Surface Water)

Water body name	Risk Status
Gammaton Lower Reservoir (ID GB30844781)	Currently not at risk
Gammaton Upper Reservoir (ID GB30844798)	Currently not at risk

Flood Risk

EA Flood Zones

3.5.34 The EA Flood Zones refer to the probability of flooding from rivers and sea in a given year, assuming no defences are in place. The mapping does not account for climate change. Flood zone definitions are presented below within **Table 3.17**.

Table 3.17: Flood Map for Planning Flood Zones.

Flood zone	Flood zone definitions
Flood Zone 1	land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).
Flood Zone 2	land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.

Flood zone	Flood zone definitions
Flood Zone 3	land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

3.5.35 The Flood Map for Planning (EA, 2023) is presented within Figure 3.7 (see Volume 2, Figures) and indicates the Onshore Infrastructure Area is located within Flood Zones 1, 2 and 3. Flood Zones are discussed in greater detail within Flood Risk Assessment (Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR).

3.5.36 By virtue of ground elevation, the EA flood map for planning shows the landfall is located within Flood Zone 1.

3.5.37 The majority of the Onshore HVDC Cable Corridor is located within Flood Zone 1. Areas along the Onshore HVDC Cable Corridor where it is proposed to cross Main Rivers and ordinary watercourses are located within Flood Zones 2 and 3. These areas have been subjected to the Sequential Test and Exception Test and have deemed to be passed.

3.5.38 Temporary construction compounds, the Converter Site, Alverdiscott Substation Connection Development, associated access and egress and HVAC Cables are located wholly within Flood Zone 1.

Flood Defences

3.5.39 Flood defences in the form of naturally high ground and bridge abutments are present along the banks of the River Torridge within the study area. The majority of defences offer up to a 1 in 5-year standard of protection with one extent of naturally high ground offering a 1 in 100-year standard of protection which benefits East -the-Water.

3.5.40 The beach profile at Cornborough Range provides an informal flood defence inland against tidal flooding. There are no formal flood defences along this part of the coast, with much of the coast to either side being higher cliffs. Within the Shoreline Management Plan, the beach is noted to have no active intervention; a decision not to invest in providing or maintaining defences due to the lack of requirement to protect property and infrastructure.

3.5.41 Flood defences are listed within the Flood Risk Assessment (Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR) and their locations within the study area are presented within Figure 3.7 (see Volume 2, Figures).

Flood Alert and Flood Warnings

3.5.42 The EA defines Flood Warning Areas and Flood Alert Areas as where flooding is expected to occur, generally from rivers and sea but in some areas also groundwater and where a Flood Warning Service is provided.

3.5.43 Flood warning and flood alert areas located within the study area are presented below within **Table 3.18** and **Table 3.19** and additionally presented within Figure 3.8 (see Volume 2, Figures).

Table 3.18: Flood Warnings

Flood Warning Area Code	Description	Flood source
113FWT2T2A3	Tidal River Torridge from Weare Giffard to Bideford	River Torridge
113FWF2D0C	River Torridge (Lower) from Dolton to Bideford, including Taddiport and Weare Giffard	River Torridge

Table 3.19: Flood Alerts

Flood Alert Area Code	Description	Flood source
113WACT2A	North Devon coast from Hartland Point to Lynmouth	Bristol Channel
113WABTW02	Lower Torridge area	River Torridge, Kenwith Stream

Sewer Infrastructure, Water Supplies, Consents and Pollution Incidents

Sewer Infrastructure

3.5.44 Public sewer infrastructure assets within the study area are served by South West Water. Within a consultation email, received 8 January 2024, it was confirmed there are no sewers within proximity to the Converter Site and Alverdiscott Substation Connection Development.

3.5.45 The discharge pipe for treated sewage from the South West Water Cornborough Waste Water Treatment Plant is located within the study area at landfall. Southern Water sewage treatment works is also located at Whitehall Landcross within the study area.

Groundwater Abstractions

3.5.46 The abstraction licences taken from Groundsure data records identified no active groundwater abstraction within the study area. For further details refer to Volume 2, Appendix 4.1: Desk Top Study, Preliminary Risk Assessment and Site Reconnaissance of the PEIR.

Surface Water Abstractions

3.5.47 The abstraction licences taken from Groundsure data records identified one active surface water abstractions within the study area. for further details refer to Volume 2, Appendix 3.3: Surface Water Abstraction Licences, Discharge Consents and Pollution Incidents of the PEIR.

Private Water Supplies

3.5.48 Consultation regarding private water supplies is to be undertaken at the ES stage.

Discharge Consents

3.5.49 Discharges of liquid effluent or waste water into surface waters are regulated by the EA using discharge consents and environmental permits. A review of Groundsure data identified two active consented discharges to surface waters within the study area. The discharges relate to final/treated effluent from domestic properties. Although the volume and parameters of the discharges are regulated (via the discharge consents and permits), the quality of the receiving surface water may potentially be affected.

3.5.50 The details of the discharge consents and permits are provided within Volume 2, Appendix 3.3: Surface Water Abstraction Licences, Discharge Consents and Pollution Incidents of the PEIR.

Pollution Incidents

3.5.51 Pollution incident mapping has been used to identify if the quality of watercourses within the study area may have been affected by pollution. A review of Groundsure data identified no pollution incidents in the study area. For further details refer to Volume 2, Appendix 3.3: Surface Water Abstraction Licences, Discharge Consents and Pollution Incidents of the PEIR.

Future Baseline Conditions

3.5.52 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 require that '*an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge'* is included within the ES.

3.5.53 An assessment of the future baseline conditions in the absence of the Proposed Development has been carried out and is described within this section.

3.5.54 The main impact on the hydrology and flood risk future baseline is associated with the potential effects of climate change, which may impact on future peak river flow rates, rainfall intensity and sea levels. A summary of potential climate change allowances as outlined by the EA (2022) is presented within the following sections. Further details of climate change allowances can be found within Flood Risk Assessment: Climate Change Allowances (see Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR).

3.5.55 The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. The NPPF and supporting planning practice guidance on flood risk and coastal change explain when and how FRAs should be used. This includes demonstrating how flood risk will be managed now and over the Proposed Development's lifetime, taking climate change into account.

Peak River Flow

3.5.56 In May 2022, the EA released its latest climate change allowances, which update the 2020 and 2011 version of Adapting to Climate Change: Advice to Flood and

Coastal Risk Management (EA 2022). The EA has used the UKCP18 Projections to update the peak river flow allowances and have based them on management catchments instead of river basin districts.

3.5.57 **Table 3.20** below presents the anticipated increase in peak river flows for the North Devon Management Catchment over coming decades.

Table 3.20: Peak River Flow Allowances by River Basin District

Management Catchment	Allowance Category	Total Potential change anticipated for '2020s' (2015 – 2039)	Total Potential change anticipated for '2050s' (2040 – 2069)	Total potential change anticipated for the '2080s' (2070-2115)
North Devon Management Catchment	Central	13%	19%	38%
	Higher Central	18%	27%	45%
	Upper End	28%	45%	80%

3.5.58 The Proposed Development is expected to be fully commissioned by 2033 and the minimum operational lifetime of the development is currently anticipated to be 50 years. As such, for 'essential infrastructure' development within Flood Zone 2 and 3 and additional 28% uplift of river flows is calculated by the 2020's upper end epoch up until commissioning in 2033. An 80% uplift of river flows is calculated by the 2080's'upper end epoch for permanent infrastructure, however all permanent above ground infrastructure is limited to Flood Zone 1.

3.5.59 Less vulnerable development includes temporary construction compounds to be present up to 2033. For 'less vulnerable' development within Flood Zone 2 and 3 an additional 13% uplift of river flows is calculated by the 2020's central epoch will be applied.

Peak Rainfall Intensity

3.5.60 Increased rainfall affects surface water flood risk and how drainage systems need to be designed. In May 2022, the EA released revised peak rainfall climate change allowances, to also reflect the management catchment geography. The anticipated increases are provided in **Table 3.21** and demonstrate how peak rainfall allowances are projected to rise over coming decades.

Table 3.21: Change to Extreme Rainfall Intensity compared/annual exceedance events

North Devon Management Catchment	Total Potential change anticipated for '2050s' (up to 2060)	Total potential change anticipated for the '2070s' (2062-2125)
Central Estimate	25%	30%
Upper Estimate	45%	50%

3.5.61 Runoff and attenuation calculations should take into account the above allowance for climate change, which is determined by the lifetime of the development as follows.

- Developments with a lifetime beyond 2100 must assess the upper end allowance for the 2070s epoch. The development should be designed to that there is no increased flood risk elsewhere and the development is safe from surface water flooding for the upper end allowance in the 1% Annual Exceedance Probability (AEP) rainfall event.
- Developments with a lifetime between 2061 and 2100 should consider the central allowance for the 2070s epoch.
- Developments with a lifetime up to 2060 should consider for the central allowance for the 2050s epoch.

3.5.62 The only development anticipated to be affected by an increase in peak rainfall intensity due to climate change is permanent development associated with the Converter Site and Alverdiscott Substation Connection Development.

3.5.63 The Proposed Development is expected to be fully commissioned by 2033 and the minimum operational lifetime of the development is currently anticipated to be 50 years. it is anticipated that potential refurbishment and operational life extension of the Proposed Development may occur. Therefore, the 2070s upper estimate (for developments with a lifetime of between 2061 and 2125) of 50% is considered to be acceptable.

Sea Level Rise

3.5.64 The EA expect sea level rise to increase the rate of coastal erosion. **Table 3.22** presents the anticipated sea level rise for given timeframes associated with climate change for the South West River Basin District. There are a range of allowances for each river basin district and epoch for sea level rise.

Table 3.22: Sea level allowances for each epoch in mm for each year

River Basin District	Allowance category	2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2000 to 2125 (metres)
South West	Higher Central	5.8 (203)	8.8 (264)	11.7 (351)	13.1 (393)	1.21
	Upper End	7 (245)	11.4 (342)	16 (480)	18.4 (552)	1.62

Sea level allowances for each epoch (mm) for each year are based on a 1981 to 2000 baseline – the total sea level rise for each epoch is in brackets.

3.5.65 The landfall at Cornborough Range would be constructed using HDD under the seabed and shoreline, pulling the offshore cables (from the sea towards the land) through underground ducts and connecting to the onshore cables at Transition Joint Bays (TJBs). The landfall HDD crosses underneath extents of Flood Zone 2 and 3 associated with coastal flooding and the TJBs are to be located at the top of the Cornborough Range, at approximately 12 mAOD and within Flood Zone 1. It is understood the duration of works will be an initial 18 months, with a space before the second phase of works. The second phase of works at the landfall would continue for a further six months.

3.5.66 Using the 'Coastal Design Sea Levels - Coastal Flood Boundary Extreme Sea Levels (2018)' the T200 and T1,000 sea levels for chainage 216 closest to the landfall are 5.62 mAOD and 5.74 mAOD respectively. Based on the upper end allowance projected sea level rise between 2018 and 2033 of 68.4 mm, it has been assessed the area of construction and the temporary construction compound will not be affected by sea level rise during the 200 and 1,000-year tidal events.

Key Receptors

3.5.67 **Table 3.23** identifies the receptors taken forward into the assessment.

Table 3.23: Key receptors taken forward to assessment

Receptor	Description	Sensitivity / Value
Water bodies (Main rivers and ordinary watercourses).	Taking a precautionary approach in assuming surrounding water bodies (surface water and groundwater) have achieved/maintained 'Good' status at the time when construction begins, the surface watercourses within the study area have been assessed with a WFD status of 'Good'.	Water bodies are considered to have a high value, high vulnerability, and medium recoverability. The sensitivity of the receptor is therefore, considered to be **high**.
The beach at Cornborough Range	The landfall, located at the Cornborough Range, comprises a dry valley with shingle beach and is located within the geologically designated Mermaid's Pool to Rowden Gut SSSI. Landfall is located within EA Flood Zone 1 and 3.	The beach at Cornborough Range is considered to have a high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.
Mermaid's Pool to Rowden Gut SSSI	The designated coastal section at landfall exposes the only complete sequence available through the Bideford Formation – a localised development of fluvio-lacustrine 'Coal Measure' type deposits.	The SSSI is considered to have a high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.
Taw-Torridge Estuary SSSI	The 250 m buffer zone of the Onshore Infrastructure Area is located within the 1,000 m impact zone. The Taw-Torridge Estuary is of major importance for its overwintering and migratory populations of wading birds. In addition, rare plants grow along its shores.	The estuary is considered to have a high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.
NVZs	NVZs are areas designated as being at risk from agricultural nitrate pollution within the study area include Jennetts Reservoir and Gammaton Lower Reservoir	NVZs are considered to have a high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.
Drinking Water Protected Areas (Surface Water)	Locations where over water is abstracted for human consumption (either over $10m^3$ per day or serving more than 50 persons), or is intended for such future use. Within the study area, this includes Gammaton Lower Reservoir and Gammaton Upper Reservoir.	Drinking water protected areas are considered to have a high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.
Flood defences	Inland of the landfall within the study area, formal flood defences are present along the banks of the River Torridge, offering protection against flooding. The beach profile at landfall also provides an informal flood defence due to its elevation.	Flood defences are considered to have a high value, medium vulnerability, a medium recoverability. The sensitivity of the receptor is considered to be **high**.
Adjacent land	The majority of Onshore Infrastructure Area is situated within a mainly rural area, with limited	Adjacent land within the study area is considered to have a of high

Receptor	Description	Sensitivity / Value
	residential properties within the surrounding area. The settlement of Abbotsham close to landfall which comprises residential and commercial buildings. Main roads, Cornborough Sewage Treatment Works, Jennets Reservoir, power and utility connections are also located within the study area.	vulnerability, low recoverability, and high value. The sensitivity of the receptor is therefore, considered to be **high**.
Field drainage	Field drainage is located within agricultural fields.	Field drains are considered to have a of moderate vulnerability, moderate to high recoverability and low value. The sensitivity of the receptor is therefore considered to be **medium**.
Water supply and drainage infrastructure	Private water supplies and drainage infrastructure and water supply and drainage infrastructure operated by South West Water.	Drainage pipelines are considered to have a moderate value and contribute to the local and regional economy. It has high vulnerability due to high costs. The sensitivity of the receptor is therefore considered to be **high**.

3.6 Key Parameters for Assessment

Maximum Design Scenario

3.6.1 The maximum design scenarios identified in **Table 3.24** have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the maximum design scenario provided in Volume 1, Chapter 3: Project Description of the PEIR. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the maximum design scenario (e.g., different infrastructure layout), to that already assessed be taken forward in the final design scheme. Therefore, this comprises a conservative assessment of a worst case scenario.

Table 3.24: Maximum design scenario considered for the assessment of potential impacts

Potential Impact	Phase[1]			Maximum Design Scenario	Justification
	C	O	D		
The impact of contaminated runoff on the quality of surface water and ground receptors	✓	×	✓	**Construction phase: landfall** • Construction works at the landfall comprise an initial 18 months of works, with a space between the second phase of works. The second phase of works at the landfall would continue for a further six months. • The landfall Horizontal Directional Drilling (HDD) has an indicative length of 2,110 m with 4 entry pits and 4 exit pits. The volume of excavated material per exit pit will be 75 m^3. • The maximum number of TJBs will be two, with each TJB comprising 30 m by 5 m (150 m^2) and a cover depth of 2.5 m. Volume of excavated material per TJB is 1,875 m^3. • A 10,000 m^2 landfall compound is expected to be present for a duration of 24 months over two periods, (18 months plus an additional 6 month period) **Construction phase: Onshore Cable Corridors** • The temporary Onshore HVDC Cable Corridor width is 60 m with a length of up to 14.5 km. The temporary width of the HVAC cable corridor would be 65 m, with a length of up to 1.2 km. • The expected construction duration for the Onshore HVDC Cable Corridor is up to 36 months. The expected construction period for the Onshore HVAC Cable Corridor is a total of 24 months within two phases. • The maximum number of cable trenches for Onshore HVDC Cable Corridor will be 2 with an approximate trench depth of 1.4 m. The maximum number of cable trenches for the Onshore HVAC Cable Corridor will be 4 with an approximate trench depth of 1.4 m.	**Construction phase** Open cut trenching will result in largest compound footprint and largest area of disturbance (compared to HDD) at the landfall. This represents the maximum design scenario in terms of potential for runoff, spillage and direct disturbance to water bodies (where present). However, HDD or alternative trenchless techniques will be used to install the landfall and cross water bodies, major roads and an archaeological asset. In terms of areas affected by the onshore cable corridors and converter stations, the maximum design scenario is represented by the largest working areas and number of trenches, which arise from the construction of the Proposed Development. In terms of duration, the maximum design scenario is represented by the duration of the HVDC cable corridor construction. Where options remain for watercourse crossings, open cut trenching represents the maximum design scenario in terms of direct disturbance. HDD (or similar trenchless techniques) is committed for crossings of Main rivers and some ordinary watercourses, where possible. As flood risk to and from the construction of either cable corridor option is considered to be the same, the worst-case scenario is
The impact of increased flood risk arising from additional surface water runoff as a result of construction activities.	✓	×	×		
The impact of damage to existing field drainage	✓	×	✓		
The impact of damage to existing water supply and drainage infrastructure	✓	×	✓		
The impact of increased flood risk arising from damage to existing flood defences.	✓	×	✓		

Potential Impact	Phase[1]			Maximum Design Scenario	Justification
	C	O	D		
				• HDD: The maximum number of HDD locations will be 7 (excluding landfall) with two compounds per HDD, each with an area of 10,000 m^2. Duration of installation of up to 36 months. • Within the Onshore HVDC Cable Corridor, there will be up to 34 joint bays, each with an area of 100 m^2 and 140 m^3 of material to be excavated per joint bay. The distance between jointing bays would be between 800 and 1,100 m. • Within the Onshore HVDC Cable Corridor, there will be up to 34 link boxes each with an area of 2.25 m^2 and 3.15 m^3 of material to be excavated per link box. The distance between link boxes would be between 800 and 1,100 m. • The main construction compound at Gammaton Road is to have an area up to 63,000 m^2 and is expected to be present for a duration of 72 months. • A secondary construction compound (A39 compound) is to have an area up to 48,000 m^2 and is expected to be present for a duration of 36 months. • Road improvements to local highways and road networks including lane widening, new lanes and junctions. **Construction phase: Converter Site** • Two converter stations with a combined footprint of 130,000 m^2, with internal service roads each with a typical with of 11.5 m width. • A 20,000 m^2 converter compound is expected to be present for a duration of 72 months. • Road improvements to local highways and road networks including land widening, new lanes and junctions.	considered to be the construction of either of the two options. **Decommissioning phase** Decommissioning is likely to operate within the parameters identified for construction.

Potential Impact	Phase[1]			Maximum Design Scenario	Justification
	C	O	D		
				Construction phase: Alverdiscott Substation Connection Development • The substation will occupy 28,000 m^2 within a 38,000 m^2 site area. • The duration of works are expected to be up to 24 months. **Decommissioning: Onshore HVDC and HVAC cables** • Onshore HVDC and HVAC Cables may be recovered and removed by pulling the cables through the ducts (e.g., for recycling). Otherwise, HVDC and HVAC cables will be left in place in the ground with the cable ends cut, sealed and securely buried as a precautionary measure. Cable ducts, joint bays and link boxes would be left in-situ, to minimise environmental disturbance. **Decommissioning: Converter Stations** • If the operation of the converter stations does not continue beyond 50 years, they are to be decommissioned. • Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction).	
The impact of increased flood risk arising from additional surface water runoff as a result of operation of the Converter Site and Alverdiscott Substation Connection Development	×	✓	×	**Operation and maintenance phase: landfall** • TJBs: 300 m^2 (150 m^2 for two TJBs) **Operation and maintenance phase: onshore cable corridor** • 34 Joint bays: An area of 100 m^2 per joint bay. • 34 Link boxes: An area of 2.25 m^2 per link box.	**Operation and maintenance phase** The maximum design scenario is represented by the largest permanent areas of impermeable surface/hard standing, which represent the worst case in terms of changes in runoff rates and flood risk to the surrounding area.

Potential Impact	Phase[1]			Maximum Design Scenario	Justification
	C	O	D		
				Operation and maintenance phase: Converter Site • Permanent footprint of both converter stations are 130,000 m^2. **Operation and maintenance phase: Alverdiscott Substation Connection Development** • Permanent footprint of 28,000 m^2. **Decommissioning: Converter Stations** • If the operation of the Proposed Development does not continue beyond 50 years, the proposed converter stations would be decommissioned. • Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction).	

[1] C=construction, O=operational and maintenance, D=decommissioning

3.7 Mitigation Measures Adopted as Part of the Proposed Development

3.7.1 **Table 3.25** provides a summary of the mitigation measures that have been identified in relation to hydrology and flood risk. The mitigation measures proposed as part of the Proposed Development include the following types of mitigation:

- Primary (inherent) mitigation – measures included as part of the Proposed Development design. The Institute of Environmental Management and Assessment (IEMA) describes these as '*modifications to the location or design of the development made during the pre-application phase that are an inherent part of the Proposed Development and do not require additional action to be taken'*. This includes modifications arising through the iterative design process. These measures will be secured through the consent itself, through the description of the Proposed Development and the parameters secured in the DCO and/or marine licences. For example, a reduction in footprint or height.
- Secondary (foreseeable) mitigation. IEMA describes these as '*actions that will require further activity in order to achieve the anticipated outcome*'. These include measures required to reduce the significance of environmental effects (such as lighting limits) and may be secured through an environmental management plan.
- Tertiary (inexorable) mitigation. IEMA describes these as '*actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects'*. It may be helpful to secure such measures through a Construction Environmental Management Plan or similar.

Table 3.25: Mitigation measures adopted as part of the Proposed Development

Measure Adopted	How the Measure Will be Secured
Primary mitigation	
Horizontal Directional Drilling (HDD) (or other trenchless methodology) is to be used to cross Kenwith Stream, River Torridge and Jennets Reservoir Tributary. HDD (or other trenchless methodology) is also to be used to cross the shingle bar at Cornborough Range.	Onshore crossing schedule to be provided as part of the application and DCO.
HDD (or other trenchless methodology) entry and exit points will be located at least: • 8 m away from the banks of ordinary watercourses, • 8 m from banks of EA Main Rivers and the landward toe of associated formal and informal flood defences (non-tidal) and • 16 m from banks of tidal EA Main Rivers and the landward toe of associated formal and informal flood defences. Where a surface watercourse (ordinary watercourses and EA Main Rivers) is to be crossed by HDD (or other trenchless	Onshore crossing schedule to be provided as part of the application and DCO.

Measure Adopted	How the Measure Will be Secured
methodology), the Onshore HVDC Cable Corridor and HVAC Cables will be installed at least 1.5 m beneath the hard bed of any watercourses. Depths of construction to be confirmed via site investigations during detailed design and to be confirmed with the EA and LLFA. Where EA flood defences are present, a minimum 1.5 m vertical clearance will be maintained between the hard bed of the watercourse and the landward toe of those flood defences, and to be confirmed with EA and LLFA.	
The following easements will be maintained between watercourses and all temporary working areas for the Onshore HVDC Cable Corridor and HVAC Cables, temporary construction compounds and the converter stations. • 8 m away from the banks of ordinary watercourses, • 8 m from EA Main Rivers and the landward toe of associated formal and informal flood defences (non-tidal) and • 16 m from tidal EA Main Rivers and the landward toe of associated formal and informal flood defences. The same buffer will be maintained for the permanent Converter Stations and Alverdiscott Substation Connection Development.	These measures would be secured through a requirement of the DCO.
Secondary Mitigation	
Fences, walls, ditches and drainage outfalls will be retained at the landfall and along the Onshore HVDC Cable Corridor HVAC Cables, where reasonably practical. Where it is not reasonably practicable to retain them, any damage will be repaired and reinstated as soon as reasonably practical. The EA must be notified if damage occurs to any EA main river or related flood infrastructure.	These measures would be secured through a requirement of the DCO.
Tertiary Mitigation	
An Outline Onshore Construction Environmental Management Plan (On-CEMP) will be prepared and submitted with the application for development consent. An On-CEMP will be developed in accordance with the Outline On-CEMP. The On-CEMP would include industry good practice measures to ensure prevention of contaminated water run-off from all construction areas.	These measures would be secured through a requirement of the DCO.
An Outline Pollution Prevention Plan (PPP) will be prepared and submitted with the application for development consent. A PPP will be developed in accordance with the Outline PPP and will include details of emergency spill procedures. Good practice guidance detailed in the EA's Pollution Prevention Guidance notes (including Pollution Prevention Guidance notes 01, 05, 08 and 21) will be followed where appropriate, or the latest relevant available guidance.	Requirement for PPP to be set out in the Outline On-CEMP. Outline On-CEMP to be secured as a DCO requirement.
The Construction Drainage Strategy will incorporate pollution prevention and flood response measures to ensure that the potential for any temporary effects on water quality or flood risk are reduced as far as practicable during the construction stage. Such measures would be implemented through the CEMPs and associated Construction Method Statements, including but not limited to the following:	Requirement for Construction Drainage Strategy to be set out in the Outline On-CEMP. Outline On-CEMP to be secured as a DCO requirement

Measure Adopted	How the Measure Will be Secured
• installation of suitable facilities to remove material (e.g., mud and dust) from wheels; • use of sediment fences along existing watercourses/waterbodies when working nearby to reduce sediment load; • covers for lorries transporting materials to/from site to prevent releases of dust/sediment to watercourses/drains; • bulk storage areas to be secured and provided with secondary containment (in accordance with the Oil Storage Regulations and best practice); • storage of oils and chemicals away from existing watercourses, including drainage ditches or ponds; • concrete to be stored and handled appropriately to prevent release to drains; • treatment of any runoff water that gathers in the trenches would be pumped via settling tanks or ponds to remove any sediment; • obtain consent for any works (e.g., discharge of surface water) that may affect an existing watercourse. The conditions of the consent will be specified to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial risk; • use of a documented spill procedure and use of spill kits kept in the vicinity of chemical/oil storage; • storage of stockpiled materials on an impermeable surface to prevent leaching of contaminants and use of covers when not in use to prevent materials being dispersed and to protect from rain; and • stockpiles to be kept to minimum possible size with gaps to allow surface water runoff to pass through.	
An Operational Drainage Strategy is to include measures to ensure that existing land drainage is reinstated and/or maintained. This will include measures to limit discharge rates and attenuate flows to maintain greenfield runoff rates at the Converter Site. The Operational Drainage Scheme will be developed in line with the latest relevant drainage guidance notes in consultation.	Requirement for an Operational Drainage Strategy to be set out in the Outline On-CEMP. Outline On-CEMP to be secured as a DCO requirement
The provisions of the Flood Risk Activity Permits (FRAPs) and Land Drainage Consents will be disapplied and incorporated as protected provisions of the consent order. The design of the watercourse crossings will be agreed with the Environment Agency and/or Devon County Council	To be secured as protected provisions as a requirement of the DCO.
Consents/permits relating to dewatering activities that may affect surface water and / or groundwater are to be obtained as and when required during the construction phase of the Project. The conditions of the consent will be specified to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial risk.	Requirement to be set out in the Outline On-CEMP. Outline On-CEMP to be secured as a DCO requirement.
An Outline Onshore Decommissioning Strategy would be developed in a timely manner in consultation with the relevant stakeholders and prior to commencement of construction. The Onshore Decommissioning Plan(s) would be developed in accordance with the Outline Onshore Decommissioning Strategy prior to decommissioning. and in line with the latest available guidance. The Onshore Decommissioning Plan will	To be secured as protected provisions as a requirement of the DCO.

Measure Adopted	How the Measure Will be Secured
include provisions for the removal of onshore above ground infrastructure and the decommissioning of below ground infrastructure and details relevant to flood risk, pollution prevention and avoidance of ground disturbance.	
An Outline Flood Management Plan will be prepared for works taking place within a Flood Warning/Flood Alert area. During the construction phase the Principal Contractor will sign up to the Flood Warning Service and will be alerted by a phone call or text when a Flood Warning becomes active to enable site personnel to be evacuated from the site in a timely manner prior to a flood event occurring.	Requirement to be set out in the Outline On-CEMP. Outline On-CEMP to be secured as a DCO requirement.
An Outline Bentonite Breakout Plan will be prepared as part of the Outline On-CEMP.	Requirement to be set out in the Outline On-CEMP. Outline On-CEMP to be secured as a DCO requirement.
An Outline Dust Management Plan will be incorporated within the CEMP in line with the Guidance on the assessment of dust from demolition and construction (IAQM, 2023). A DMP assists in the appropriate management techniques to limit dust soiling from construction and decommissioning activities. An outline DMP would be provided as part of the Outline On-CEMP.	
During construction of piled foundations, mitigation measures as defined in the following guidance will be used: Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention (EA, 2001), or latest relevant available guidance.	
Where required, trenched techniques may be used for minor ditches or smaller watercourses that are frequently dry. In these cases, measures will be implemented to protect water quality and flow and these will be detailed within the Outline On-outline CEMP.	
In order to manage impacts to field drainage, the Outline On-CEMP will stipulate that the contractor will develop field drainage plans in consultation with the relevant landowners. If required, additional field drainage will be installed to ensure the existing drainage of the land is maintained during and after construction.	

3.8 Assessment of Construction Effects

3.8.1 The impacts of the construction of the Proposed Development have been assessed. The potential impacts arising from the construction phase of the Proposed Development are listed in **Table 3.27**, along with the maximum design scenario against which each impact has been assessed.

3.8.2 A description of the potential effect on receptors caused by each identified impact is given below.

The Impact of Contaminated Runoff on the Quality of Surface Water and Ground Receptors

3.8.3 During construction and decommissioning of Proposed Development within the Onshore Infrastructure Area, there is a potential risk of accidental discharges of

untreated runoff containing contaminants. It is anticipated that any untreated runoff will eventually outfall to Main rivers and ordinary watercourses located downstream. Untreated runoff also has the potential to infiltrate *in-situ* into groundwater confined within superficial deposits and solid geology underlying the study area.

3.8.4 There are a number of potential pollutants which could arise during construction and decommissioning, which may affect the water quality of receiving watercourses. These include:

- fine particulate materials (e.g., silts and clays);
- cement;
- oil and chemicals (from plant machinery and processes); and
- other wastes such as wood, plastics, sewage and rubble.

3.8.5 These pollutants may be present as a result of normal construction activities, such as excavation, dewatering, incorrect storage of oils and chemicals and/or accidental spillage.

3.8.6 Within this chapter, the focus is primarily on surface water receptors. Impacts on groundwater receptors are explored in Volume 2, Chapter 4: Hydrogeology, Geology and Ground Conditions of the PEIR.

Sensitivity of the Receptor

3.8.7 The majority of the Main Rivers and ordinary watercourses present within the study area discharge to the Taw and Torridge Estuary transitional water body. Several small ordinary watercourses close to the coast are shown to outfall to Barnstaple Bay which flows from the Taw and Torridge Estuary also ultimately discharges to. Watercourses are presented within Figure 3.2 (see Volume 2, Figures). Groundwater within the study area falls within the Torridge and Hartland Streams groundwater water body.

3.8.8 Taking a precautionary approach in assuming surrounding water bodies have achieved/maintained ‘good’ status at the time when construction begins, the surface watercourses and groundwater bodies within the study area will have been assessed with a WFD status of ‘good’. The watercourses and groundwater bodies are therefore considered to be highly vulnerable in relation to WFD classification status, but of moderate recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

3.8.9 The study area includes Mermaid’s Pool to Rowden Gut and Taw-Torridge Estuary SSSI which the majority of watercourses within the study area ultimately discharge to. Designated sites are nationally important and thus have a high value, high vulnerability, and a low recoverability. The sensitivity of the receptors is considered to be **high**.

3.8.10 NVZs covering Jennetts Reservoir and Gammaton Reservoirs also noted to have an existing risk of nitrate pollution, and Gammaton Reservoirs are also classified as Drinking Water Protected Areas. The designated sites are locally important and have a medium value, high vulnerability and medium recoverability. The sensitivity of the receptor is considered to be **high**.

Magnitude of Impact

3.8.11 In most cases, HDD (or equivalent trenchless technique) will be used to pass beneath the Main Rivers and ordinary watercourses, as outlined as primary mitigation within **Table 3.25** (also see Volume 1, Chapter 3: Project Description of the PEIR). The impacts on these watercourses from construction activities involving the use of trenchless techniques and associated machinery could lead to an increase in turbid runoff, high pH water runoff, bentonite breakouts during drilling and spillages/leaks of fuel, oil etc. affecting nearby watercourses. There is the potential for this to impact on water quality and therefore cause a reduction in the WFD classification.

3.8.12 Trenched techniques may be used where the HVDC or HVAC cables, within the Onshore Infrastructure Area, cross smaller watercourses (that are frequently dry) and drainage channels. Trenching could lead to damage to the banks along the watercourses, an increase in turbid runoff, spillages/leaks of fuel, oil etc. and an alteration in surface water flow pathways that could affect nearby watercourses.

3.8.13 To ensure no degradation to crossed watercourses, crossing methodologies are to be presented within an onshore crossing schedule (as set out in **Table 3.25**). Tertiary mitigation measures outlined in **Table 3.25,** including the implementation of the Outline On-CEMP which will include the Outline PPP, Outline Bentonite Breakout Plan and Outline Construction Drainage Strategy, are expected to intercept runoff and ensure that discharges are controlled in quality and volume causing no degradation in WFD classification.

3.8.14 The magnitude of the impact is predicted to be of local spatial extent and short term duration. The magnitude is therefore considered to be **negligible adverse**.

Significance of the Effect

3.8.15 Overall, the magnitude of the impact to watercourses and designated sites are deemed to be **negligible** and the sensitivity of the receptors is considered to be **high**. The effect will, therefore, be of minor adverse significance, which is **not significant** in EIA terms.

Further Mitigation

3.8.16 With implementation of mitigation measures effects are categorised as ‘not significant’ and no further mitigation will be required.

Future Monitoring

3.8.17 Following implementation of appropriate recommended mitigation measures set out in **Table 3.25**, effects are not expected to be significant and no future monitoring is proposed.

The Impact of Increased Flood Risk Arising From Additional Surface Water Runoff

3.8.18 During construction of the Proposed Development within the Onshore Infrastructure Area, there is a potential for increased surface water flood risk as a result of higher rates of surface water runoff from increased impermeable areas.

Sensitivity of Receptor

3.8.19 The landfall is situated at Cornborough Range which comprises a natural and wide, substantially dry valley with a natural shingle bar which by virtue of elevation, the beach acts as an informal flood defence. The beach is classified as a geologically designated SSSI and thus is nationally important and is located within EA Flood Zones 1, 2 and 3. As such, the landfall has high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.8.20 The majority of watercourses discharge to the River Torridge and Taw-Torridge Estuary, a biologically designated SSSI and the landfall crosses Mermaid's Pool to Rowden Gut SSSI. The designated site is nationally important and thus high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.8.21 The majority of Onshore Infrastructure Area (including the converter stations) is situated within a mainly rural area, with limited residential properties within the surrounding area. The study area includes the settlement of Abbotsham close to landfall which comprises residential and commercial buildings. Main roads, Cornborough Sewage Treatment Works, Jennets Reservoir, power and utility connections are also located within the study area. As such, land within the study area is of high vulnerability, low recoverability and high value. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of Impact

3.8.22 HDD (or a similar trenchless technique) will be used to pass beneath Main rivers and ordinary watercourses, as outlined as primary mitigation within **Table 3.25** (also see Volume 1, Chapter 3: Project Description of the PEIR). HDD (or a similar trenchless technique) is also to be used at landfall, with no intertidal excavations proposed. The offshore cables will be installed to the TJB located at the top of the cliffs at Cornborough Range via HDD.

3.8.23 Within areas inland of the landfall location, impacts on flood risk from the Onshore HVDC Cable Corridor would arise from any temporary change in runoff over the areas affected during construction, such as construction compounds, haul road and construction accesses.

3.8.24 Trenched techniques may be used, where appropriate, for minor ditches or smaller watercourses that are frequently dry. Measures put in place to protect water quality and flow are set out in **Table 3.25** and include an outline method statement for the proposed crossing methodologies will be included in the Outline On-CEMP that will accompany the DCO application. This method statement will

be developed further in consultation with the EA/LLFA during the detailed design stage.

3.8.25 The Onshore HVDC Cable Corridor and HVAC Cables could also act as a drainage channel, accumulating runoff from surrounding areas and locally increasing flood risk.

3.8.26 Tertiary mitigation measures outlined in **Table 3.25,** including the implementation of the Outline On-CEMP which will include the Outline PPP, Outline Bentonite Breakout Plan and Outline Construction Drainage Strategy, are expected to intercept runoff and ensure that discharges are controlled in quality and volume causing no degradation in WFD classification.

3.8.27 Construction activities within the Onshore Infrastructure Area are cross areas of Flood Zones 2 and 3. the Site Operator will sign up to the Flood Warning Service to enable site personnel to be evacuated from the site in a timely manner prior to a flood event occurring (as set out in **Table 3.25**).

3.8.28 The impacts on flood risk from the temporary change in runoff are only likely to affect the SSSI and adjacent land receptor and, assuming that designed in and construction measures (as set out in **Table 3.25**) are implemented, there is unlikely to be any observable degradation in flood risk. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.8.29 Overall, the magnitude of the impacts are deemed to be **negligible** and the sensitivity for the study area is considered to be **high**. Therefore, the effect will be of minor adverse significance, which is **not significant** in EIA terms.

Further Mitigation

3.8.30 With implementation of mitigation measures effects are categorised as ‘not significant’ and no further mitigation will be required.

Future Monitoring

3.8.31 Following implementation of appropriate recommended mitigation measures set out in **Table 3.25**, effects are not expected to be significant and no future monitoring is proposed.

The Impact of Increased Flood Risk Arising From Damage to Existing Flood Defences

3.8.32 During construction of Proposed Development within the Onshore Infrastructure Area, there is a potential risk of increased flood risk as a result of damage to the existing formal and informal flood defences by construction activities.

Sensitivity of Receptor

3.8.33 Cornborough Range comprises a natural and wide, substantially dry valley with a natural shingle bar which by virtue of elevation, acts as an informal flood defence against tidal flooding. The Cornborough Range also partially forms Mermaid's Pool to Rowden Gut geologically designated SSSI which is nationally important and thus high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.8.34 Flood defences are present along either bank of the River Torridge (Main River) within the study area and inland of the landfall, offering protection against flooding. Figure 3.7 (see Volume 2, Figures) shows the location of flood defences within the study area. Flood defences have a high value, medium vulnerability, a medium recoverability and therefore are considered to have **high** sensitivity.

Magnitude of Impact

3.8.35 Flood defences offering protection to the River Torridge are predominantly comprised of raised earthen embankments maintained by the EA. The elevation of the shingle bar at Cornborough Range which is designated as a SSSI provides an informal flood defence.

3.8.36 The shingle bar at landfall and the EA maintained flood defences present along the banks of the River Torridge are to be crossed using HDD techniques (or similar trenchless techniques). The impacts on these flood defences from construction activities involving the use of HDD techniques and associated machinery could lead to impacts on the structural stability of earthen embankments at the River Torridge and the shingle bar at the landfall. There is the potential for this to impact on the integrity of flood defences and lead to an increased risk of flooding to areas which benefit from flood defences.

3.8.37 Construction activities within the Onshore Infrastructure Area will cross areas within Flood Zones 2 and 3. The Site Operator will sign up to the EA's Flood Warning Service to enable site personnel to be evacuated from the site in a timely manner prior to a flood event occurring (as set out in **Table 3.25**).

3.8.38 To ensure no degradation to crossed flood defences, crossing methodologies are to be presented within an onshore crossing schedule (as set out in **Table 3.25**). Tertiary mitigation measures outlined in **Table 3.25,** including the implementation of the Outline On-CEMP which will include the Outline PPP, Outline Bentonite Breakout Plan and Outline Construction Drainage Strategy, are expected to intercept runoff and ensure that discharges are controlled in quality and volume and further prevent degradation to crossed flood defences. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.8.39 The shingle bar at Cornborough Range acts as an informal flood defence and formal flood defences are present along the banks of the River Torridge. Informal and formal flood defences are to be crossed using trenchless techniques to reduce the impact of increased flood risk arising from damage to flood defences.

Mitigation measures are expected to ensure there is no degradation to crossed flood defences during the construction phase. Overall, the magnitude of the impact is deemed to be **low**, while the sensitivity of the receptors is considered to be **high**. The effect will therefore be of minor adverse significance, which is **not significant** in EIA terms.

Further Mitigation

3.8.40 With implementation of mitigation measures effects are categorised as 'not significant' and no further mitigation will be required.

Future Monitoring

3.8.41 Following implementation of appropriate recommended mitigation measures set out in **Table 3.25**, effects are not expected to be significant and no future monitoring is proposed.

The Impact of Damage to Existing Field Drainage

3.8.42 During construction and decommissioning of the Proposed Development within the Onshore Infrastructure Area, there is a potential risk of damage to existing field drainage arising from construction activities.

Sensitivity of Receptor

3.8.43 Field drains constructed for field irrigation within the Onshore Infrastructure Area are of moderate value, moderate vulnerability, and moderate recoverability due to costs associated with reinstatement. The sensitivity of the receptor is therefore considered to be **medium**.

Magnitude of Impact

3.8.44 The impact on field drainage and irrigation from open cut techniques and the installation of link boxes and joint bays during the construction phase could temporarily affect surface water flow pathways. This could have an impact on water quality and potential flow rates.

3.8.45 The removal of field drains within the study area may cause a backup on surrounding field drains, in turn increasing the flood risk to receptors. Measures to manage surface water flows include the restoration of field drainage following additional installation either side of the Onshore HVDC Cable Corridor and techniques to avoid disruption of surface water runoff along the corridor. These measures, as set out in **Table 3.25**, will be detailed in the outline operational drainage strategy.

3.8.46 With the incorporation of appropriate construction mitigation techniques, the impact is predicted to be of local spatial extent with a minor shift away from existing hydrological environment of local receptors. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.8.47 Overall, the magnitude of impact is deemed to be negligible, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of minor adverse significance, which is **not significant** in EIA terms.

Further Mitigation

3.8.48 With implementation of mitigation measures effects are categorised as 'not significant' and no further mitigation will be required.

Future Monitoring

3.8.49 Following implementation of appropriate recommended mitigation measures set out in **Table 3.25**, effects are not expected to be significant and no future monitoring is proposed.

The Impact of Damage to Existing Water Supply and Drainage Infrastructure

3.8.50 During construction of the Proposed Development within the Onshore Infrastructure Area, there is a potential risk of damage to existing water supply and drainage infrastructure due to construction activities.

Sensitivity of Receptor

3.8.51 Private water supplies and drainage infrastructure and water supply and drainage infrastructure operated by South West Water (hereafter referred to as 'pipeline infrastructure') are considered to have a moderate value and contribute to the local and regional economy. They have high vulnerability to the construction impacts of the Onshore HVDC Cable Corridor, HVAC Cables and converter stations and low recoverability due to high costs. The sensitivity of the receptor is therefore considered to be **high**.

Magnitude of Impact

3.8.52 The impact on pipeline infrastructure from open cut and HDD techniques during the construction phase could temporarily disrupt local drainage infrastructure, impacting on water quality, potential flow rates and local water supply networks.

3.8.53 The site selection of the Onshore Infrastructure Area has taken into account the location of major services utilities (see Volume 1, Chapter 4: Need and Alternatives of the PEIR), however, the presence of local drainage cannot be discounted as it is not always mapped by regulators.

3.8.54 Discussions with South West Water and other service companies will be undertaken at the detailed design stage to confirm the location of local services. Micro-routing or appropriate construction techniques will be employed where required to avoid impact to local services and such measures will be detailed in the Outline On-CEMP (as set out in **Table 3.25**). Any works to be undertaken

within proximity to South West Water assets will be designed in accordance with the water authorities design standards and will require to be approved by South West Water prior to the commencement of any works.

3.8.55 Any impacts of construction which affect drainage supply infrastructure are likely to cause temporary disruption of water supply to residents/businesses in the local surrounding area. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.8.56 Overall, the magnitude of the impact is deemed to be **negligible** and the sensitivity of the setting is considered to be **high**. The effect will, therefore, be of minor adverse significance, which is **not significant** in EIA terms.

Further Mitigation

3.8.57 With implementation of mitigation measures effects are categorised as 'not significant' and no further mitigation will be required.

Future Monitoring

3.8.58 Following implementation of appropriate recommended mitigation measures set out in **Table 3.25**, effects are not expected to be significant and no future monitoring is proposed.

3.9 Assessment of Operational Effects

3.9.1 The impacts of the operation and maintenance phase of the Proposed Development have been assessed. The potential impacts arising from the operation and maintenance phase of the Proposed Development are listed in **Table 3.27**, along with the maximum design scenario against which each impact has been assessed.

3.9.2 A description of the potential effect on receptors caused by each identified impact is given below.

The Impact of Increased Flood Risk Arising From Additional Surface Water Runoff

3.9.3 During operation and maintenance of Proposed Development, within the Converter Stations, there is a potential for increased surface water flood risk as a result of higher rates of surface water runoff from increased impermeable areas.

Sensitivity of Receptor

3.9.4 The hydrological catchment the Converter Site and Alverdiscott Substation Connection Development is located within discharges to the River Torridge and Taw-Torridge Estuary.

3.9.5 Taking a precautionary approach in assuming surrounding water bodies have achieved/maintained 'good' status at the time when construction begins, the surface watercourses and groundwater bodies within the study area will have been assessed with a WFD status of 'good'. The watercourses and groundwater bodies are therefore considered to be highly vulnerable in relation to WFD classification status, but of moderate recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

3.9.6 The Taw Torridge Estuary is a biologically designated SSSI The designated site is nationally important and thus high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.9.7 The Converter Site and Alverdiscott Substation Connection Development are situated within a mainly rural area, with limited residential properties within the surrounding area. As such, land within the study area is of high vulnerability, low recoverability and moderate value. The sensitivity of the receptor is therefore, considered to be **medium**.

Magnitude of Impact

3.9.8 The Converter Site and Alverdiscott Substation Connection Development have been subject to an FRA (Volume 2, Appendix 3.1: Flood Risk Assessment of the PEIR) in order to meet the requirements of planning policy and best practice.

3.9.9 The Outline Operational Drainage Strategy (as set out in **Table 3.25**), is to be agreed with the LLFA and will determine that flows from impermeable areas within each converter station and Alverdiscott Substation Connection Development will be restricted to the greenfield runoff rate for up to the 1 in 100-year plus climate change event and thus slightly reduce the risk of flooding to areas downstream. When compared to the baseline, this reduction in flood risk to areas downstream introduces a slight beneficial impact. These measures will be detailed within the Outline Operational Drainage Strategy and agreed with relevant stakeholders.

3.9.10 Additionally, also to be detailed within the Outline Operational Drainage Strategy, the final proposed levels of the converter stations and Alverdiscott Substation Connection Development will be engineered to ensure flow pathway regimes are maintained to convey existing surface water flow pathways on-site to ensure existing flows to watercourses from the site are not altered.

3.9.11 The magnitude of impact is predicted to be of local spatial extent and long term duration. The impact magnitude is therefore predicted to be **negligible beneficial**.

Significance of Effect

3.9.12 Overall, the magnitude of the impact is deemed to be **negligible** and the sensitivity of the receptor is considered to be **high**. The risk of flooding will be minimised during the operational phase as flows from within each converter station will be restricted to the 1 in 1-year greenfield runoff rate for up to the 1 in 100-year plus climate change event and thus slightly reduce the risk of flooding to areas downstream of the Converter Site and Alverdiscott Substation Connection Development. The effect will, therefore, be of minor beneficial significance, which is **not significant** in EIA terms.

Further Mitigation

3.9.13 With implementation of mitigation measures effects are categorised as 'not significant' and no further mitigation will be required.

Future Monitoring

3.9.14 Following implementation of appropriate recommended mitigation measures set out in **Table 3.25**, effects are not expected to be significant and no future monitoring is proposed.

3.10 Assessment of Decommissioning Effects

3.10.1 The impacts of the decommissioning phase of the Proposed Development have been assessed. The potential impacts arising from the decommissioning phase of the Proposed Development are listed in **Table 3.27**, along with the maximum design scenario against which each impact has been assessed.

3.10.2 A description of the potential effect on receptors caused by each identified impact is given below.

The Impact of Contaminated Runoff on the Quality of Surface Water and Ground Receptors

3.10.3 During decommissioning of the Proposed Development within the Onshore Infrastructure Area, there is a potential risk of accidental discharges of untreated runoff containing contaminants. It is anticipated that any untreated runoff will eventually outfall to Main Rivers and ordinary watercourses located downstream. Untreated runoff also has the potential to infiltrate *in-situ* into groundwater confined within superficial deposits and solid geology underlying the study area.

Sensitivity of the Receptor

3.10.4 The majority of the Main Rivers and ordinary watercourses present within the study area discharge to the Taw and Torridge Estuary transitional water body. Several small ordinary watercourses close to the coast are shown to outfall to Barnstaple Bay which flows from the Taw and it has been shown that Torridge Estuary also discharges there. Watercourses are presented within Figure 3.2 (see Volume 2, Figures). Groundwater within the study area falls within the Torridge and Hartland Streams groundwater water body.

3.10.5 Taking a precautionary approach in assuming surrounding water bodies have achieved/maintained 'good' status at the time when construction begins, the surface watercourses and groundwater bodies within the study area will have been assessed with a WFD status of 'good'. The watercourses and groundwater bodies are therefore considered to be highly vulnerable in relation to WFD classification status, but of moderate recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

3.10.6 The study area includes Mermaid's Pool to Rowden Gut and Taw-Torridge Estuary SSSI which the majority of watercourses within the study area ultimately discharge to. Designated sites are nationally important and thus have a high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.10.7 NVZs covering Jennetts Reservoir and Gammaton Reservoirs also noted to have an existing risk of nitrate pollution, and Gammaton Reservoirs are also classified as Drinking Water Protected Areas. The designated sites are locally important and have a medium value, high vulnerability and medium recoverability. The sensitivity of the receptor is considered to be **high**.

Magnitude of Impact

3.10.8 During decommissioning, works will be more limited than during construction. Onshore HVDC and HVAC Cables may be recovered and removed by pulling the cables through the ducts (e.g., for recycling). Otherwise, they will be left in place in the ground with the cable ends cut, sealed, and securely buried as a precautionary measure. Cable ducts, joint bays and link boxes would be left *in-situ*, to minimise environmental disturbance.

3.10.9 Decommissioning of the Converter Site and Alverdiscott Substation Connection Development will be reviewed in consideration of any other existing or proposed future use of the converter stations. If complete decommissioning is required, then all the electrical infrastructure and buildings would be removed and any waste arising would be recycled or disposed of in accordance with the waste hierarchy and relevant regulations at the time of decommissioning. The proposed converter site may be re-purposed for an alternate use (separately agreed and consented) or would be reinstated to a suitable use, in accordance with the Onshore Decommissioning Plan.

3.10.10 An Outline Onshore Decommissioning Strategy (as set out in **Table 3.25**) would be developed in a timely manner in consultation with the relevant stakeholders and prior to commencement of construction. The Onshore Decommissioning Plan(s) would be developed in accordance with the Outline Onshore Decommissioning Strategy prior to decommissioning. and in line with the latest available guidance. The Onshore Decommissioning Plan will include details relevant to flood risk such as implementing an appropriate water proofing of exposed cable ducts (if required) and the continued maintenance of onsite drainage. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of the Effect

3.10.11 Overall, the magnitude of the impact to watercourses and designated sites are deemed to be negligible and the sensitivity of the receptors is considered to be high. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Further Mitigation

3.10.12 With implementation of mitigation measures effects are categorised as 'not significant' and no further mitigation will be required.

Future Monitoring

3.10.13 Following implementation of appropriate recommended mitigation measures set out in **Table 3.25**, effects are not expected to be significant and no future monitoring is proposed.

The Impact of Increased Flood Risk Arising From Additional Surface Water Runoff

3.10.14 During decommissioning of Proposed Development within the Onshore Infrastructure Area (including the Converter Site and Alverdiscott Substation Connection Development), decommissioning activities are likely to operate within the parameters identified for construction.

Sensitivity of Receptor

3.10.15 The landfall is situated at Cornborough Range which comprises a natural and wide, substantially dry valley with a natural shingle bar which by virtue of elevation, the beach acts as an informal flood defence. The beach is classified as a geologically designated SSSI and thus is nationally important and is located within EA Flood Zones 1, 2 and 3. As such, the landfall has high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.10.16 The majority of watercourses discharge to the River Torridge and Taw-Torridge Estuary, a biologically designated SSSI and the landfall crosses Mermaid's Pool to Rowden Gut SSSI. The designated site is nationally important and thus high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.10.17 The majority of Onshore Infrastructure Area (including the converter stations) is situated within a mainly rural area, with limited residential properties within the surrounding area. The study area includes the settlement of Abbotsham close to landfall which comprises residential and commercial buildings. Main roads, Cornborough Sewage Treatment Works, Jennets Reservoir, power and utility connections are also located within the study area. As such, land within the study area is of high vulnerability, low recoverability and high value. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of Impact

3.10.18 During decommissioning, works will be more limited and less intrusive and extensive than during construction. Onshore HVDC and HVAC Cables may be recovered and removed by pulling the cables through the ducts (e.g., for recycling). Otherwise, they will be left in place in the ground with the cable ends

cut, sealed, and securely buried as a precautionary measure. Cable ducts, joint bays and link boxes would be left *in-situ*, to minimise environmental disturbance.

3.10.19 If the operation of the converter stations does not continue beyond 50 years, they are to be decommissioned. Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction).

3.10.20 An Outline Onshore Decommissioning Strategy (as set out in **Table 3.25**) will be developed prior to construction and will include details relevant to flood risk. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.10.21 Overall, the magnitude of the impacts are deemed to be **negligible** and the sensitivity for the study area is considered to be **high**. Therefore, the effect will be of minor adverse significance, which is **not significant** in EIA terms.

Further Mitigation

3.10.22 With implementation of mitigation measures effects are categorised as 'not significant' and no further mitigation will be required.

Future Monitoring

3.10.23 Following implementation of appropriate recommended mitigation measures set out in **Table 3.25**, effects are not expected to be significant and no future monitoring is proposed.

The Impact of Increased Flood Risk Arising From Damage to Existing Flood Defences

3.10.24 During decommissioning of Proposed Development within the Onshore Infrastructure Area, there is a potential risk of increased flood risk as a result of damage to the existing formal and informal flood defences by decommissioning activities.

Sensitivity of Receptor

3.10.25 Cornborough Range comprises a natural and wide, substantially dry valley with a natural shingle bar which by virtue of elevation, acts as an informal flood defence against tidal flooding. The Cornborough Range also partially forms Mermaid's Pool to Rowden Gut geologically designated SSSI which is nationally important and thus high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.10.26 Flood defences are present along either bank of the River Torridge (Main River) within the study area and inland of the landfall, offering protection against flooding. Figure 3.7 (see Volume 2, Figures) shows the location of flood defences

within the study area. Flood defences have a high value, medium vulnerability, a medium recoverability and therefore are considered to have **high** sensitivity.

Magnitude of Impact

3.10.27 During decommissioning, works will be more limited and less intrusive and extensive than during construction. Onshore HVDC and HVAC Cables may be recovered and removed by pulling the cables through the ducts (e.g., for recycling). Otherwise, they will be left in place in the ground with the cable ends cut, sealed, and securely buried as a precautionary measure. Cable ducts, joint bays and link boxes would be left *in-situ*, to minimise environmental disturbance.

3.10.28 An Outline Onshore Decommissioning Strategy (as set out in **Table 3.25**) will be developed prior to construction and will include details relevant to flood risk. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.10.29 Overall, the magnitude of the impact is deemed to be **negligible**, the sensitivity of the receptor is considered to be **high**. As the magnitude of impact is **minor adverse** which is not significant in EIA terms.

Further Mitigation

3.10.30 With implementation of mitigation measures effects are categorised as ‘not significant’ and no further mitigation will be required.

Future Monitoring

3.10.31 Following implementation of appropriate recommended mitigation measures set out in **Table 3.25**, effects are not expected to be significant and no future monitoring is proposed.

The Impact of Damage to Existing Field Drainage

3.10.32 During construction and decommissioning of the Proposed Development within the Onshore Infrastructure Area, there is a potential risk of damage to existing field drainage arising from decommissioning activities.

Sensitivity of Receptor

3.10.33 Field drains constructed for field irrigation within the Onshore Infrastructure Area are of moderate value, moderate vulnerability, and moderate recoverability due to costs associated with reinstatement. The sensitivity of the receptor is therefore considered to be **medium**.

Magnitude of Impact

3.10.34 During decommissioning, works will be more limited than during construction. Onshore HVDC and HVAC Cables may be recovered and removed by pulling the

cables through the ducts (e.g., for recycling). Otherwise, they will be left in place in the ground with the cable ends cut, sealed, and securely buried as a precautionary measure. Cable ducts, joint bays and link boxes would be *left in-situ*, to minimise disturbance.

3.10.35 Decommissioning of the Converter Site and Alverdiscott Substation Connection Development will be reviewed in consideration of any other existing or proposed future use of the converter stations. If complete decommissioning is required, then all the electrical infrastructure and buildings would be removed and any waste arising would be recycled or disposed of in accordance with the waste hierarchy and relevant regulations at the time of decommissioning. The proposed converter site may be re-purposed for an alternate use (separately agreed and consented) or would be reinstated to a suitable use, in accordance with the Onshore Decommissioning Plan.

3.10.36 The impacts of decommissioning of the Onshore Infrastructure Area will be reduced through the incorporation of management measures (outlined in Table 3.25), including the implementation of an Outline Decommissioning Plan, implementing an appropriate water proofing of exposed cable ducts, if required, and the continued maintenance of onsite drainage. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.10.37 Overall, the magnitude of impact is deemed to be **negligible**, and the sensitivity of the receptor is considered to be **medium**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Further Mitigation

3.10.38 With implementation of mitigation measures effects are categorised as ‘not significant’ and no further mitigation will be required.

Future Monitoring

3.10.39 Following implementation of appropriate recommended mitigation measures set out in **Table 3.25**, effects are not expected to be significant and no future monitoring is proposed.

The Impact of Damage to Existing Water Supply and Drainage Infrastructure

3.10.40 During decommissioning of development within the Onshore Infrastructure Area, there is a potential risk of damage to existing water supply and drainage infrastructure due to decommissioning activities.

Sensitivity of Receptor

3.10.41 Private water supplies and drainage infrastructure and water supply and drainage infrastructure operated by South West Water (hereafter referred to as ‘pipeline

infrastructure') are considered to have a moderate value and contribute to the local and regional economy. They have high vulnerability to the construction impacts of the export cable and substations and low recoverability due to high costs. The sensitivity of the receptor is therefore considered to be **high**.

Magnitude of Impact

3.10.42 Water supply and drainage pipelines will already have been disturbed during the construction phase. During decommissioning, works will be more limited than during construction. Onshore HVDC and HVAC Cables may be recovered and removed by pulling the cables through the ducts (e.g., for recycling). Otherwise, they will be left in place in the ground with the cable ends cut, sealed and securely buried as a precautionary measure. Cable ducts, joint bays and link boxes would be left *in-situ*, to minimise disturbance.

3.10.43 Decommissioning of the Converter Site and Alverdiscott Substation Connection Development will be reviewed in consideration of any other existing or proposed future use of the converter stations. If complete decommissioning is required, then all the electrical infrastructure and buildings would be removed and any waste arising either recycled or disposed of in accordance with the waste hierarchy and relevant regulations at the time of decommissioning. The proposed converter site may be re-purposed for an alternate use (separately agreed and consented) or would be reinstated to a suitable use, in accordance with the Onshore Decommissioning Plan

3.10.44 The impacts of decommissioning of the Onshore Infrastructure Area will be reduced through the incorporation of management measures (outlined in Table 3.25), including the implementation of an Outline Decommissioning Plan, implementing an appropriate water proofing of exposed cable ducts (if required) and the continued maintenance of onsite drainage. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.10.45 Overall, the magnitude of the impact is deemed to be **negligible**, and the sensitivity of the receptor is considered to be **high**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Further Mitigation

3.10.46 With implementation of mitigation measures effects are categorised as 'not significant' and no further mitigation will be required.

Future Monitoring

3.10.47 Following implementation of appropriate recommended mitigation measures set out in **Table 3.25**, effects are not expected to be significant and no future monitoring is proposed.

3.11 Cumulative Environmental Assessment

3.11.1 The Cumulative Effects Assessment (CEA) takes into account the impact associated with the Proposed Development together with other proposed schemes and plans. The proposed schemes and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see Volume 1, Appendix 5.3: CEA Screening Matrix of the PEIR). Each Proposed Development has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

3.11.2 The Hydrology and Flood Risk CEA methodology has followed the methodology set out in Chapter 5: EIA Methodology of the PEIR. As part of the assessment, all proposed schemes and plans considered alongside the Proposed Development have been allocated into 'tiers' reflecting their current stage within the planning and development process.

- Tier 1
  - Under construction
  - Permitted application
  - Submitted application
  - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact
- Tier 2
  - Scoping report has been submitted
- Tier 3
  - Scoping report has not been submitted
  - Identified in the relevant Development Plan
  - Identified in other plans and programmes.

3.11.3 This tiered approach is adopted to provide a clear assessment of the Proposed Development alongside other Proposed Developments, plans and activities.

3.11.4 The specific Proposed Developments, plans and activities scoped into the CEA, are outlined in below **Table 3.26**.

3.11.5 It is noted only Tier 1 developments have been scoped into the CEA. There are no Tier 2 and Tier 3 developments within the CEA study area.

Table 3.26: List of cumulative developments considered within the CEA

Proposed Development	Status	Distance from Onshore Infrastructure Area (nearest point, km)	Description	Dates of Construction (if available)	Dates of Operation (if available)	Overlap with the Proposed Development?
Tier 1						
1/1133/2021/REMM	Permitted	Adjacent to the Order Limits	Reserved matters application for details of appearance, landscaping, layout and scale in respect of a proposal for 274 no. dwellings, associated infrastructure and open space pursuant outline planning permission 1/0039/2014/OUTM (Amended Plans)	Unknown	Unknown	Yes
1/1057/2021/FULM	Permitted	Partially within the Order Limits	Installation and operation of a solar farm together with all associated works, equipment and infrastructure (Further Information)	Unknown	Unknown	Yes
1/1256/2021/REMM	Permitted	0.2	Reserved matters application for details of appearance, landscaping, layout and scale in respect of a proposal for 276 no. dwellings, associated infrastructure and open space pursuant outline planning permission 1/0039/2014/OUTM (Amended Plans)	Unknown	Unknown	No
1/1266/2022/REMM	Pending	0.2	Reserved matters application for details of appearance, landscaping, layout and scale for 61 no. dwellings and associated works pursuant to application 1/1086/2017/OUTM	Unknown	Unknown	No
1/0252/2022/OUTM	Permitted	0.25	Outline application for the erection of up to 400 dwellings, amenity open space, footpath links, associated landscaping and infrastructure works with all matters reserved	Unknown	Unknown	No

Proposed Development	Status	Distance from Onshore Infrastructure Area (nearest point, km)	Description	Dates of Construction (if available)	Dates of Operation (if available)	Overlap with the Proposed Development?
			except access (Affecting a Public Right of Way)			
1/0523/2021/REMM	Permitted	0.3	Reserved matters application for access, appearance, landscaping, layout & scale pursuant to planning approval 1/0521/2021/FULM	Unknown	Unknown	No
1/0110/2023/REMM	Pending	0.35	Reserved matters application for appearance, landscaping, layout and scale for a proposal of 200 dwellings pursuant to outline planning permission 1/0947/2020/OUTM and associated infrastructure (Amended Plans)	Unknown	Unknown	No
1/0656/2020/OUTM	Permitted	0.5	Outline application for up to 211 dwellings, up to 4.27 hectares of commercial land (Use Classes B2, B8 and E(g)), public open space, and other associated infrastructure with all matters reserved except access.	Unknown	Unknown	No
1/0880/2021/FULM	Permitted	0.7	Erection of 117 dwellings and associated works including site access	Unknown	Unknown	No
1/0787/2018/FULM	Permitted	0.7	Proposed new business hub incorporating a conference centre, new offices, a gym, nursery, associated car parking and landscaping	Unknown	Unknown	No
1/0410/2022/FULM	Permitted	0.7	Extension of time of planning permission 1/0327/2008/FUL for the erection of 12 new dwellings with parking (Variation of conditions 2, 3, 12 & 13 of Planning Approval 1/0233/2012/EXTM (formerly 1/0327/2008/FUL).)	Unknown	Unknown	No

Proposed Development	Status	Distance from Onshore Infrastructure Area (nearest point, km)	Description	Dates of Construction (if available)	Dates of Operation (if available)	Overlap with the Proposed Development?
1/0682/2021/FULM	Under Construction	0.7	Reserved Matters (appearance, landscaping, layout and scale) application pursuant to 1/1084/2015/OUTM application for 145 dwellings, with associated public open space, play areas, landscaping and access from Cornborough Road following demolition of 2 existing dwelling. (Variation of Conditions 1 (plans schedule) and condition 2 (materials) pursuant to application 1/0363/2020/REMM	Unknown	Unknown	No
1/0926/2020/OUTM	Permitted	0.8	Outline planning application for the erection of up to 290 dwellings, including affordable housing with public open space, landscaping and sustainable drainage system (SuDS) and two vehicular access points from Abbotsham Road. All matters reserved except access	Unknown	Unknown	No
1/0894/2021/FULM	Permitted	0.9	Reserved matters application for appearance, access, landscaping, layout & scale pursuant to planning approval 1/0111/2016/OUTM for the erection of 26 residential dwellings, associated infrastructure and open space. (Variation of Condition 1 of application	Unknown	Unknown	No

3.11.6 A description of the significance of cumulative effects upon Hydrology and Flood Risk receptors arising from construction and operation for the identified Tier 1 projects is given below.

Assessment of Construction Effects

The Impact of Contaminated Runoff on the Quality of Surface Water and Ground Receptors

Sensitivity of the Receptor

3.11.7 The majority of the Main Rivers and ordinary watercourses present within the study area discharge to the Taw and Torridge Estuary transitional water body. Several small ordinary watercourses close to the coast are shown to outfall to Barnstaple Bay which flows from the Taw and Torridge Estuary also ultimately discharges to. Watercourses are presented within Figure 3.2 (see Volume 2, Figures). Groundwater within the study area falls within the Torridge and Hartland Streams groundwater water body.

3.11.8 Taking a precautionary approach in assuming surrounding water bodies have achieved/maintained ‘good’ status at the time when construction begins, the surface watercourses and groundwater bodies within the study area will have been assessed with a WFD status of ‘good’. The watercourses and groundwater bodies are therefore considered to be highly vulnerable in relation to WFD classification status, but of moderate recoverability. The sensitivity of the receptor is therefore, considered to be high.

3.11.9 The study area includes Mermaid’s Pool to Rowden Gut and Taw-Torridge Estuary SSSI which the majority of watercourses within the study area ultimately discharge to. Designated sites are nationally important and thus have a high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.11.10 NVZs covering Jennetts Reservoir and Gammaton Reservoirs also noted to have an existing risk of nitrate pollution, and Gammaton Reservoirs are also classified as Drinking Water Protected Areas. The designated sites are locally important and have a medium value, high vulnerability and medium recoverability. The sensitivity of the receptor is considered to be **high**.

Magnitude of Impact

3.11.11 Cumulative schemes are listed within **Table 3.26**. It is assumed, where relevant, in accordance with NPS, the NPPF and/or PPG, that new developments would be required to provide appropriate management techniques to treat potentially contaminated run-off prior to discharge into the surrounding surface water environment or local sewer network. The developments would also be required to implement a series of construction mitigation measures to limit potential sources of polluted runoff (including sediment-laden runoff) and mitigating pathways to prevent pollutants (should they arise) from entering the wider surface water network during construction.

3.11.12 The magnitude of the impact is predicted to be of local spatial extent and short term duration. The magnitude is therefore considered to be **negligible adverse**.

Significance of the Effect

3.11.13 Overall, the magnitude of the impact to watercourses and designated sites are deemed to be **negligible** and the sensitivity of the receptors is considered to be **high**. The effect will, therefore, be of minor adverse significance, which is **not significant** in EIA terms.

The Impact of Increased Flood Risk Arising From Additional Surface Water Runoff

Sensitivity of Receptor

3.11.14 The landfall is situated at Cornborough Range which comprises a natural and wide, substantially dry valley with a natural shingle bar which by virtue of elevation, the beach acts as an informal flood defence. The beach is classified as a geologically designated SSSI and thus is nationally important and is located within EA Flood Zones 1 and 3. As such, the landfall has high value, high vulnerability and a low recoverability. The sensitivity of the receptor is considered to be high.

3.11.15 The majority of watercourses discharge to the River Torridge and Taw-Torridge Estuary, a biologically designated SSSI and the landfall crosses Mermaid's Pool to Rowden Gut SSSI. The designated site is nationally important and thus high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be high.

3.11.16 The majority of Onshore Infrastructure Area (including the Converter Stations and Alverdiscott Substation Connection Development) is situated within a mainly rural area, with limited residential properties within the surrounding area. The study area includes the settlement of Abbotsham close to landfall which comprises residential and commercial buildings. Main roads, Cornborough Sewage Treatment Works, Jennets Reservoir, power and utility connections are also located within the study area. As such, land within the study area is of high vulnerability, low recoverability, and high value. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of Impact

3.11.17 Cumulative schemes are listed within **Table 3.26**. It is assumed, where relevant, in accordance with NPS, NPPF and/or PPG, that that new developments would be required to implement a series of construction mitigation measures to manage surface water drainage during construction.

3.11.18 The impacts on flood risk from the temporary change in runoff are only likely to affect the SSSI and adjacent land receptor and, assuming that designed in, and construction measures are implemented, there is unlikely to be any observable degradation in flood risk. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.11.19 Overall, the magnitude of the impacts are deemed to be **negligible** and the sensitivity for the study area is considered to be **high**. Therefore, the effect will be of minor adverse significance, which is **not significant** in EIA terms.

The Impact of Increased Flood Risk Arising From Damage to Existing Flood Defences

Sensitivity of Receptor

3.11.20 Cornborough Range comprises a natural and wide, substantially dry valley with a natural shingle bar which by virtue of elevation, acts as an informal flood defence against tidal flooding. The Cornborough Range also partially forms Mermaid's Pool to Rowden Gut geologically designated SSSI which is nationally important and thus high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.11.21 Flood defences are present along either bank of the River Torridge (Main River) within the study area and inland of the landfall, offering protection against flooding. Figure 3.7 (see Volume 2, Figures) shows the location of flood defences within the study area. Flood defences have a high value, medium vulnerability, a medium recoverability and therefore are considered to have **high** sensitivity.

Magnitude of Impact

3.11.22 None of the cumulative schemes listed within **Table 3.26** are located within proximity to formal or informal flood defences and therefore, no cumulative effects regarding flood risk arising from damage to flood defences will occur. The impact magnitude is therefore considered to be **no change.**

Significance of Effect

3.11.23 As no proposed development is to occur within proximity to formal and informal flood defences, no cumulative effects will occur. Overall, the magnitude of the impact is deemed to be **no change** and therefore **no effect** would arise which is not significant in EIA terms.

The Impact of Damage to Existing Field Drainage

Sensitivity of Receptor

3.11.24 Field drains constructed for field irrigation within the Onshore Infrastructure Area are of moderate value, moderate vulnerability, and moderate recoverability due to costs associated with reinstatement. The sensitivity of the receptor is therefore considered to be **medium**.

Magnitude of Impact

3.11.25 Cumulative impacts on field drainage would only occur where development limits associated with cumulative schemes listed within **Table 3.26** coincide with the

Proposed Development. Furthermore, there is a limited spatial overland between the Proposed Development and the cumulative schemes. In line with NPS, the NPPF and/or PPG, projects as a minimum, require a surface water management strategy and drainage scheme to limit any increase in surface water runoff from the site, and to mimic (as close as practicable) the current hydrological regime.

3.11.26 With the incorporation of appropriate construction mitigation techniques, the impact is predicted to be of local spatial extent with a minor shift away from existing hydrological environment of local receptors. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.11.27 Overall, the magnitude of impact is deemed to be **negligible**, and the sensitivity of the receptor is considered to be **medium**. The effect will, therefore, be of **minor adverse** significance, which is **not significant** in EIA terms.

The Impact of Damage to Existing Water Supply and Drainage Infrastructure

Sensitivity of Receptor

3.11.28 Pipeline infrastructure comprises water supply and wastewater drainage pipelines operated by South West Water and are considered to have a moderate value and contribute to the local and regional economy. They have high vulnerability to the construction impacts of the Onshore HVDC Cable Corridor and HVAC Cables, converter stations and Alverdiscott Substation Connection Development and low recoverability due to high costs. The sensitivity of the receptor is therefore considered to be **high**.

Magnitude of Impact

3.11.29 Cumulative impacts on field drainage would only occur where development limits associated with cumulative schemes listed within **Table 3.26** coincide with the Proposed Development. Furthermore, there is a limited spatial overland between the Proposed Development and Cumulative Schemes. In line with NPS, the NPPF and/or PPG, projects as a minimum, require a standoff from in situ utility assets to limit the risk of damage to the utility. It is assumed that all other proposed development will be constructed using industry best practice and therefore should limit any effect on water and sewer pipelines.

3.11.30 With the incorporation of appropriate construction mitigation techniques, the cumulative impact is predicted to be of local spatial extent with a minor shift away from existing hydrological environment of local receptors. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.11.31 Overall, the magnitude of the impact is deemed to be **negligible**, and the sensitivity of the setting is considered to be **high**. The effect will, therefore, be of **minor adverse** significance, which is **not significant** in EIA terms.

Assessment of Operational Effects

The Impact of Increased Flood Risk Arising From Additional Surface Water Runoff

Sensitivity of Receptor

3.11.32 The majority of watercourses discharge to the River Torridge and Taw-Torridge Estuary, a biologically designated SSSI and the landfall crosses Mermaid's Pool to Rowden Gut SSSI. The designated site is nationally important and thus high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.11.33 The majority of Onshore Infrastructure Area (including the converter stations and Alverdiscott Substation Connection Development) is situated within a mainly rural area, with limited residential properties within the surrounding area.

3.11.34 The study area includes the settlement of Abbotsham close to landfall which comprises residential and commercial buildings.

3.11.35 Main roads, Cornborough Sewage Treatment Works, Jennets Reservoir, power, and utility connections are also located within the study area. As such, land within the study area is of high vulnerability, low recoverability, and high value. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of Impact

3.11.36 Cumulative schemes are listed within **Table 3.26**. It is assumed, where relevant, in accordance with NPS, the NPPF and/or PPG, that new developments would be required to attenuate surface water run-off, where practicable, to the greenfield run-off rate and thus reduce the risk of flooding downstream.

3.11.37 For consent to be obtained for any of the other proposed developments, the developer is required to demonstrate that the risk of flooding during the lifetime of the development could be mitigated to a level acceptable to the EA, Torridge District Council and Devon County Council.

3.11.38 The magnitude of impact is predicted to be of local spatial extent and long term duration. The impact magnitude is therefore predicted to be **negligible beneficial**.

Significance of Effect

3.11.39 Overall, the magnitude of the impact is deemed to be **negligible**, and the sensitivity of the receptor is considered to be **high**. In line with national policy, surface water runoff during operation will be required to be attenuated and discharged where practicable to the greenfield runoff rate As such, a slight

reduction in flood risk downstream of the proposed developments will occur. The effect will, therefore, be of **minor beneficial** significance, which is **not significant** in EIA terms.

Assessment of Decommissioning Effects

The Impact of Contaminated Runoff on the Quality of Surface Water and Ground Receptors

Sensitivity of the Receptor

3.11.40 The majority of the Main Rivers and ordinary watercourses present within the study area discharge to the Taw and Torridge Estuary transitional water body. Several small ordinary watercourses close to the coast are shown to outfall to Barnstaple Bay which flows from the Taw and Torridge Estuary also ultimately discharges to. Watercourses are presented within Figure 3.2 (see Volume 2, Figures). Groundwater within the study area falls within the Torridge and Hartland Streams groundwater water body.

3.11.41 Taking a precautionary approach in assuming surrounding water bodies have achieved/maintained ‘good’ status at the time when construction begins, the surface watercourses and groundwater bodies within the study area will have been assessed with a WFD status of ‘good’. The watercourses and groundwater bodies are therefore considered to be highly vulnerable in relation to WFD classification status, but of moderate recoverability. The sensitivity of the receptor is therefore, considered to be high.

3.11.42 The study area includes Mermaid’s Pool to Rowden Gut and Taw-Torridge Estuary SSSI which the majority of watercourses within the study area ultimately discharge to. Designated sites are nationally important and thus have a high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.11.43 NVZs covering Jennetts Reservoir and Gammaton Reservoirs also noted to have an existing risk of nitrate pollution, and Gammaton Reservoirs are also classified as Drinking Water Protected Areas. The designated sites are locally important and have a medium value, high vulnerability and medium recoverability. The sensitivity of the receptor is considered to be **high**.

Magnitude of Impact

3.11.44 The impacts of decommissioning from cumulative schemes are listed within **Table 3.26**. will be reduced through the incorporation of management measures (such as those outlined within **Table 3.25** including the implementation of an onshore decommissioning plan, implementation of emergency spill response procedures including clean up and remediation of contaminated soils. These standard mitigation measures will be required as part of the permissions for each of the cumulative schemes. The magnitude of the impact is predicted to be of local spatial extent and short term duration. The magnitude is therefore considered to be **negligible adverse**.

Significance of the Effect

3.11.45 Overall, the magnitude of the impact to watercourses and designated sites are deemed to be negligible and the sensitivity of the receptors is considered to be high. The effect will, therefore, be of minor adverse significance, which is **not significant** in EIA terms.

The Impact of Increased Flood Risk Arising From Additional Surface Water Runoff

Sensitivity of Receptor

3.11.46 The landfall is situated at Cornborough Range which comprises a natural and wide, substantially dry valley with a natural shingle bar which by virtue of elevation, the beach acts as an informal flood defence. The beach is classified as a geologically designated SSSI and thus is nationally important and is located within EA Flood Zones 1 and 3. As such, the landfall has high value, high vulnerability and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.11.47 The majority of watercourses discharge to the River Torridge and Taw-Torridge Estuary, a biologically designated SSSI and the landfall crosses Mermaid's Pool to Rowden Gut SSSI. The designated site is nationally important and thus high value, high vulnerability, and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.11.48 The majority of Onshore Infrastructure Area (including the converter stations and Alverdiscott Substation Connection Development) is situated within a mainly rural area, with limited residential properties within the surrounding area. The study area includes the settlement of Abbotsham close to landfall which comprises residential and commercial buildings. Main roads, Cornborough Sewage Treatment Works, Jennets Reservoir, power and utility connections are also located within the study area. As such, land within the study area is of high vulnerability, low recoverability, and high value. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of Impact

3.11.49 Cumulative schemes are listed within **Table 3.26**. It is assumed, where relevant, in accordance with NPS, NPPF and/or PPG, that that new developments would be required to implement a series of mitigation measures to manage surface water drainage during decommissioning in the form of an onshore decommissioning plan.

3.11.50 The impacts on flood risk from the temporary change in runoff are only likely to affect the SSSI and adjacent land receptor and, assuming that designed in, and construction measures are implemented, there is unlikely to be any observable degradation in flood risk. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.11.51 Overall, the magnitude of the impacts are deemed to be **negligible** and the sensitivity for the study area is considered to be **high**. Therefore, the effect will be of minor adverse significance, which is **not significant** in EIA terms.

The Impact of Increased Flood Risk Arising From Damage to Existing Flood Defences

Sensitivity of Receptor

3.11.52 Cornborough Range comprises a natural and wide, substantially dry valley with a natural shingle bar which by virtue of elevation, acts as an informal flood defence against tidal flooding. The Cornborough Range also partially forms Mermaid's Pool to Rowden Gut geologically designated SSSI which is nationally important and thus high value, high vulnerability and a low recoverability. The sensitivity of the receptor is considered to be **high**.

3.11.53 Flood defences are present along either bank of the River Torridge (Main River) within the study area and inland of the landfall, offering protection against flooding. Figure 3.7 (see Volume 2, Figures) shows the location of flood defences within the study area. Flood defences have a high value, medium vulnerability, a medium recoverability and therefore are considered to have **high** sensitivity.

Magnitude of Impact

3.11.54 None of the proposed developments listed within **Table 3.26** are located within proximity to formal or informal flood defences and therefore, no cumulative effects regarding flood risk arising from damage to flood defences will occur. The impact magnitude is therefore considered to be **no change.**

Significance of Effect

3.11.55 As no proposed development is to occur within proximity to formal and informal flood defences, no cumulative effects will occur. Overall, the magnitude of the impact is deemed to be no change and therefore **no effect** would arise which is not significant in EIA terms.

The Impact of Damage to Existing Field Drainage

Sensitivity of Receptor

3.11.56 Field drains constructed for field irrigation within the Onshore Infrastructure Area are of moderate value, moderate vulnerability and moderate recoverability due to costs associated with reinstatement. The sensitivity of the receptor is therefore considered to be **medium**.

Magnitude of Impact

3.11.57 Cumulative impacts on field drainage would only occur where development limits associated with cumulative schemes listed within **Table 3.26** coincide with the

Proposed Development. The impacts of decommissioning activities within the cumulative schemes will be reduced through the incorporation of management measures (outlined in **Table 3.25**), including the implementation of a PPP and an Onshore Decommissioning Plan. These standard tertiary mitigation measures will be required as part of the permissions for each of the cumulative schemes. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.11.58 Overall, the magnitude of impact is deemed to be negligible, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of minor adverse significance, which is **not significant** in EIA terms.

The Impact Of Damage To Existing Water Supply And Drainage Infrastructure

Sensitivity of Receptor

3.11.59 Pipeline infrastructure comprises water supply and wastewater drainage pipelines operated by South West Water and are considered to have a moderate value and contribute to the local and regional economy. They have high vulnerability to the construction impacts of the export cable and substations and low recoverability due to high costs. The sensitivity of the receptor is therefore considered to be **high**.

Magnitude of Impact

3.11.60 Cumulative impacts on water supply and drainage infrastructure would only occur where development limits associated with cumulative schemes listed within **Table 3.26** coincide with the Proposed Development. The impacts of decommissioning activities within the cumulative schemes will be reduced through the incorporation of management measures (outlined in **Table 3.25**), including the implementation of a PPP and an Onshore Decommissioning Plan. These standard tertiary mitigation measures will be required as part of the permissions for each of the cumulative schemes. The magnitude of impact is predicted to be of local spatial extent and short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of Effect

3.11.61 Overall, the magnitude of the impact is deemed to be negligible and the sensitivity of the receptor is considered to be high. The effect will, therefore, be of **minor adverse** significance, which is **not significant** in EIA terms.

3.12 Transboundary Effects

3.12.1 A screening of transboundary impacts has been carried out and has identified that there was no potential for significant transboundary effects with regard to

Hydrology and Flood Risk from the Proposed Development upon the interests of other states.

3.13 Inter-Related Effects

3.13.1 Inter-relationships are the impacts and associated effects of different aspects of the Proposed Development on the same receptor. These are as follows.

- Proposed Development lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the Proposed Development (construction, operation and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three phases (e.g., construction noise effects from piling and operational substation noise).
- Receptor led effects: Assessment of the scope for all effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on Hydrology and Flood Risk, such as increased rates of surface water runoff may interact to produce a different, or greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects may be short term, temporary or transient effects, or incorporate longer term effects.

3.13.2 It is anticipated there may be an inter-related effect between possible groundwater contamination and surface water hydrology, especially in relation to watercourse crossings via HDD or other trenchless techniques. Additional information is presented within Volume 2, Chapter 4: Geology, Hydrogeology and Ground Conditions of the PEIR. Secondary mitigation is proposed to ensure that contamination of groundwater does not occur. That will in turn ensure that there will be no impact on surface water quality.

3.13.3 Further details of inter-related effects are provided in Volume 4, Chapter 5: Inter-related effects.

3.14 Summary of Impacts, Mitigation Measures and Monitoring

3.14.1 Information on Hydrology and Flood Risk within the study area was collected through desk review and a site-specific FRA (see Volume 2, Appendix 3.1 Flood Risk Assessment of the PEIR, including drainage strategies for the converter stations.

3.14.2 **Table 3.27** presents a summary of the impacts, measures adopted as part of the Proposed Development and residual effects in respect to hydrology and flood risk. The impacts assessed include:

- The impact of contaminated runoff on the quality of surface water and ground receptors;
- The impact of increased flood risk arising from additional surface water runoff;
- The impact of increased flood risk arising from damage to existing flood defences;

- The impact of damage to existing field drainage; and
- The impact of damage to existing water supply and drainage infrastructure.

3.14.3 Overall, it is concluded that there will be no significant effects arising from the Proposed Development during the construction, operation and maintenance or decommissioning phases.

3.14.4 **Table 3.28** presents a summary of the potential cumulative impacts, mitigation measures and residual effects. The cumulative impacts assessed include:

- the impact of contaminated runoff on the quality of surface water and ground receptors;
- the impact of increased flood risk arising from additional surface water runoff;
- the impact of increased flood risk arising from damage to existing flood defences;
- the impact of damage to existing field drainage; and
- the impact of damage to existing water supply and drainage infrastructure.

3.14.5 Overall, it is concluded that there will be no significant cumulative effects from the Proposed Development alongside other Proposed Developments/plans.

3.14.6 No potential transboundary impacts have been identified in regard to effects of the Proposed Development

Table 3.27: Summary of potential environmental effects

Receptor	Sensitivity of receptor	Description of impact	Short/medium /long term	Magnitude of impact	Significance of effect	Significant /Not significant	Notes
Construction phase							
The impact of contaminated runoff on the quality of surface water and ground receptors	High	Potential risk of accidental discharges of untreated runoff containing contaminants by construction activities	Short Term	Negligible adverse	Minor adverse	Not significant	
The impact of increased flood risk arising from additional surface water runoff	High	Potential for increased surface water flood risk as a result of higher rates of surface water runoff from increased impermeable areas	Short term	Negligible adverse	Minor adverse	Not significant	
The impact of increased flood risk arising from damage to existing flood defences	High	Potential risk of increased flood risk as a result of damage to the existing formal and informal flood defences by construction activities	Short term	Negligible adverse	Minor adverse	Not significant	
The impact of damage to existing field drainage	Medium	Potential risk of damage to existing field drainage arising	Short term	Negligible adverse	Minor adverse	Not significant	

Receptor	Sensitivity of receptor	Description of impact	Short/medium /long term	Magnitude of impact	Significance of effect	Significant /Not significant	Notes
		from construction activities					
The impact of damage to existing water supply and drainage infrastructure	High	Potential risk of damage to existing water supply and drainage infrastructure due to construction activities.	Short term	Negligible adverse	Minor adverse	Not significant	
Operational phase							
The impact of increased flood risk arising from additional surface water runoff	High	Potential for increased surface water flood risk as a result of higher rates of surface water runoff from increased impermeable areas	Long term	Negligible beneficial	Minor beneficial significance	Not significant	
Decommissioning phase							
The impact of contaminated runoff on the quality of surface water and ground receptors	High	Potential risk of accidental discharges of untreated runoff containing contaminants by decommissioning activities.	Short term	Negligible adverse	Minor adverse	Not significant	
The impact of increased flood risk arising from	High	Potential for increased surface water flood risk as a result of higher	Short term	Negligible adverse	Minor adverse	Not significant	

Receptor	Sensitivity of receptor	Description of impact	Short/medium /long term	Magnitude of impact	Significance of effect	Significant /Not significant	Notes
additional surface water runoff		rates of surface water runoff from increased impermeable areas					
The impact of increased flood risk arising from damage to existing flood defences	High	Potential risk of increased flood risk as a result of damage to the existing formal and informal flood defences by decommissioning activities.	Short term	Negligible adverse	Minor adverse	Not significant	
The impact of damage to existing field drainage	Medium	Potential risk of damage to existing field drainage arising from decommissioning activities	Short term	Negligible adverse	Minor adverse	Not significant	
The impact of damage to existing water supply and drainage infrastructure	High	Potential risk of damage to existing water supply and drainage infrastructure due to decommissioning activities.	Short term	Negligible adverse	Minor adverse	Not significant	

Table 3.28: Summary of potential cumulative environmental effects

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Construction phase							
The impact of contaminated runoff on the quality of surface water and ground receptors	High	Potential risk of accidental discharges of untreated runoff containing contaminants by construction activities	Short term	Negligible adverse	Minor adverse	Not significant	
The impact of increased flood risk arising from additional surface water runoff	High	Potential for increased surface water flood risk as a result of higher rates of surface water runoff from increased impermeable areas	Short term	Negligible adverse	Minor adverse	Not significant	
The impact of increased flood risk arising from damage to existing flood defences	High	Potential risk of increased flood risk as a result of damage to the existing formal and informal flood defences by construction activities	Short term	No change	No effect	Not significant	No cumulative schemes within proximity to informal and formal flood defences.
The impact of damage to existing field drainage	Medium	Potential risk of damage to existing field drainage arising	Short term	Negligible adverse	Minor adverse	Not significant	

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
		from construction activities					
The impact of damage to existing water supply and drainage infrastructure	High	Potential risk of damage to existing water supply and drainage infrastructure due to construction activities.	Short term	Negligible adverse	Minor adverse	Not significant	
Operational phase							
The impact of increased flood risk arising from additional surface water runoff	High	Potential for increased surface water flood risk as a result of higher rates of surface water runoff from increased impermeable areas	Long term	Negligible beneficial	Minor beneficial significance	Not significant	
Decommissioning phase							
The impact of contaminated runoff on the quality of surface water and ground receptors	High	Potential risk of accidental discharges of untreated runoff containing contaminants by decommissioning activities.	Short term	Negligible adverse	Minor adverse	Not significant	
The impact of increased flood risk arising from	High	Potential for increased surface water flood risk	Short term	Negligible adverse	Minor adverse	Not significant	

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
additional surface water runoff		as a result of higher rates of surface water runoff from increased impermeable areas					
The impact of increased flood risk arising from damage to existing flood defences	High	Potential risk of increased flood risk as a result of damage to the existing formal and informal flood defences by decommissioning activities.	Short term	No change	No effect	Not significant	No cumulative schemes within proximity to informal and formal flood defences.
The impact of damage to existing field drainage	Medium	Potential risk of damage to existing field drainage arising from decommissioning activities	Short term	Negligible adverse	Minor adverse	Not significant	
The impact of damage to existing water supply and drainage infrastructure	High	Potential risk of damage to existing water supply and drainage infrastructure due to decommissioning activities.	Short term	Negligible adverse	Minor adverse	Not significant	

3.15 Next Steps

3.15.1 Following a refinement of the Onshore Infrastructure Area, a hydrological survey will be undertaken of key watercourse crossings. The survey will comprise a walkover survey to provide baseline information on the watercourses including width of the channel, the degree of channel modification, obstacles in the channel etc.

3.15.2 Investigations will be undertaken at the Converter Site as part of engineering design to confirm the rate of infiltration. The results will be used to inform the drainage design that will be reported in the Onshore Infrastructure Drainage Strategy.

3.15.3 Further consultation will be undertaken with LLFAs and the EA regarding the management of surface water during construction and operation.

3.16 References

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