MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Environmental Statement

Volume 3, Chapter 2: Hydrology and flood risk

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Glossary

Term	Meaning
400 kV grid connection cable corridor	The corridor within which the 400 kV grid connection cables will be located.
400 kV grid connection cables	Cables that will connect the proposed onshore substations to the existing National Grid Penwortham substation.
Applicants	Morgan Offshore Wind Limited (Morgan OWL) and Morecambe Offshore Windfarm Ltd (Morecambe OWL).
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 Transmission Assets in place.
Catchments	An area of land drained by a watercourse and defined by a watershed
CIRIA	The Construction Industry Research and Information Association. It is an independent, not-for-profit, member-based research organisation that exists to champion performance improvement in construction.
Code Of Construction Practice	A document detailing the overarching principles of construction, contractor protocols, construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes.
Commitment	This term is used interchangeably with mitigation and enhancement measures. The purpose of commitments is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects. Primary and tertiary commitments are taken into account and embedded within the assessment set out in the ES.
Cumulative effects	The combined effect of the Transmission Assets in combination with the effects from other proposed developments, on the same receptor or resource.
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.
Effect	The term used to express the consequence of an impact. The significance of effect is determined by correlating magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
EIA Scoping Report	A report setting out the proposed scope of the Environmental Impact Assessment process. The Transmission Assets Scoping Report was submitted to The Planning Inspectorate (on behalf of the Secretary of State) for the Morgan and Morecambe Offshore Windfarms Transmission Assets in October 2022.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.

Term	Meaning
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Exception test	If it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. To pass the exception test it should be demonstrated that: (a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and (b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. Both elements of the exception test should be satisfied for development to be allocated or permitted.
Expert Working Group	A forum for targeted engagement with regulators and interested stakeholders through the Evidence Plan process.
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	Land having a less than 1 in 1,000 annual probability of river or sea flooding which is considered a low probability of flooding.
Flood Zone 2	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 which is considered a medium probability of flooding.
Flood Zone 3	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding which is considered a high probability of flooding.
Flood Zone 3b	This zone comprises land where water has to flow or be stored in times of flood (‘the Functional Floodplain’). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency.
Generation Assets	The generation assets associated with the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm include the offshore wind turbines, inter-array cables, offshore substation platforms and platform link (interconnector) cables to connect offshore substations.
Greenfield Runoff Rate	Rates of surface water runoff from a site that is undeveloped (greenfield).
Groundwater	All water which is below the surface of the ground in the saturated zone and in direct contact with the ground or subsoil.

Term	Meaning
Internal Drainage Board	Internal Drainage Boards are an integral part of water level management in the UK. Each Internal 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.
Inter-Related Effects	Inter-related effects arise where an impact acts on a receptor repeatedly over time to produce a potential additive effect or where a number of separate impacts, such as noise and habitat loss, affect a single receptor.
Intertidal Area	The area between Mean High Water Springs and Mean Low Water Springs.
Intertidal Infrastructure Area	The temporary and permanent areas between MLWS and MHWS.
Landfall	The area in which the offshore export cables make landfall (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Lytham St. Annes between Mean Low Water Springs and the transition joint bays inclusive of all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).
Lead Local Flood Authority	Authorities that have responsibility for developing a Local Flood Risk Management Strategy for their area identifying 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.
Main Rivers	The term used to describe a watercourse designated as a Main River under the Water Resources Act 1991 and shown on the Main River Map. These are usually larger rivers or streams and are managed by the Environment Agency.
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 Transmission Assets.
Mean High Water Springs	The height of mean high water during spring tides in a year.
Mean Low Water Springs	The height of mean low water during spring tides in a year.
Morecambe Offshore Windfarm: Transmission Assets	The offshore export cables, landfall and onshore infrastructure required to connect the Morecambe Offshore Windfarm to the National Grid.
Morgan And Morecambe Offshore Wind Farms: Transmission Assets	The offshore and onshore infrastructure connecting the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the national grid. This includes the offshore export cables, landfall site, onshore export cables, onshore substations, 400 kV grid connection cables and associated grid connection infrastructure such as circuit breaker compounds. Also referred to in this report as the Transmission Assets, for ease of reading.

Term	Meaning
Morgan Offshore Wind Project: Transmission Assets	The offshore export cables, landfall and onshore infrastructure required to connect the Morgan Offshore Wind Project to the National Grid.
National Policy Statement(s)	The current national policy statements published by the Department for Energy Security and Net Zero in 2023 and adopted in 2024.
Onshore Export Cable Corridor	The corridor within which the onshore export cables will be located.
Onshore Export Cables	The cables which would bring electricity from the landfall to the onshore substations.
Onshore Infrastructure Area	The area within the Transmission Assets Order Limits landward of Mean High Water Springs. Comprising the offshore export cables from Mean High Water Springs to the transition joint bays, onshore export cables, onshore substations and 400 kV grid connection cables , and associated temporary and permanent infrastructure including temporary and permanent compound areas and accesses. Those parts of the Transmission Assets Order Limits proposed only for ecological mitigation/biodiversity benefit are excluded from this area.
Ordinary Watercourse Consent	A permit required prior to works undertaken within or in proximity to an Ordinary Watercourse or associated flood defence.
Ordinary Watercourses	Watercourses (such as a river, stream, ditch, cut, sluice, dyke or non-public sewer) that are not designated a Main River under the Water Resources Act (1991). Responsibility for management lies with the Lead Local Flood Authority, or Internal Drainage Board for some watercourses where there is an Internal Drainage District.
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 project and which helps to inform consultation responses.
Principal Aquifer	A strategically important aquifer unit, which is designated by the Environment Agency.
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	Plans that describe the current state of the water environment in the river basin district. It sets out improvements that were to be possible by 2027 and how the actions will make a difference to the local environment - the catchments, estuaries, the coast and groundwater.
Scoping Opinion	Sets out the Planning Inspectorate's response (on behalf of the Secretary of State) to the Scoping Report prepared by the Applicants. The Scoping Opinion contains the range of issues that the Planning Inspectorate, in consultation with statutory stakeholders, has identified should be considered within the Environmental Impact Assessment process.
Secondary A aquifer	Secondary A Aquifers comprise permeable layers that can support local water supplies, and may form an important source of base flow to rivers.

Term	Meaning
Secondary B aquifer	Secondary B aquifers are mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.
Sequential test	The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. 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.
Shoreline Management Plan	A large-scale assessment of the risks associated with coastal processes and sets out a policy framework to address these risks to people and the developed, historic and natural environments. Coastal processes include tidal patterns, wave height, wave direction and the movement of beach and seabed materials.
Source Protection Zone	These zones identify areas of land through which water infiltrates into a groundwater borehole, well or spring that is used for public drinking water supply and provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water abstraction.
Special Protection Areas	A site designation specified in the Conservation of Habitats and Species Regulations 2017, classified for rare and vulnerable birds, and for regularly occurring migratory species. Special Protection Areas contribute to the national site network.
Strategic Flood Risk Assessment	An assessment that provides information on areas at risk from all sources of flooding.
Study Area	This is an area which is defined for each environmental topic which includes the Transmission Assets 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.
Substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of electrical transformers.
Surface Water Resources	Water on the surface of the land such as in a river, lake, wetland, or ocean.
Surface Water Runoff	Surface water runoff is flow of water that occurs when excess stormwater, meltwater, or other sources of water flows over a surface.
Sustainable Drainage Systems	A sequence of management practices and control measures designed to mimic natural drainage processes by allowing rainfall to infiltrate, and by attenuating and conveying surface water runoff slowly at peak times.
Tidal (Coastal) Flooding	Flooding caused by extreme tidal conditions including high tides and storm surges, overtopping local flood defences or coastal features.
Transmission Assets	See Morgan and Morecambe Offshore Wind Farms: Transmission Assets (above)
Transmission Assets Order Limits	The area within which all components of the Transmission Assets will be located, including areas required on a temporary basis during construction and/or decommissioning.

Term	Meaning
Treated Effluent	Water that has received primary, secondary or advanced treatment to reduce its pollution or health hazards and is subsequently released from a wastewater facility after treatment.
UK Climate Projections	Climate projections expressed in terms of absolute values. A projection of the response of the climate system to emission scenarios of greenhouse gases and aerosols, or radiative forcing scenarios based upon climate model simulations and past observations.
Undifferentiated or Unproductive aquifers	Undifferentiated or unproductive strata, reflecting the distribution of superficial deposits with low permeability
United Utilities	The water company which supplies drinking water, drainage and sewerage services for the north west region of England via a network of pipe and pump infrastructure.
Water Framework Directive	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. The Water Framework Directive promotes water management through river basin planning. It covers inland surface waters, estuarine waters, coastal waters and groundwater.
Water Quality	The physical, chemical and biological characteristics of water.
Zone of Influence	Water bodies that are within, intersect or which are hydrologically connected to the Transmission Assets Order Limits

Acronyms

Acronym	Meaning
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
CEA	Cumulative Effects Assessment
CIRIA	Construction Industry Research and Information Association
CoCP	Code of Construction Practice
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ES	Environmental Statement
EWG	Expert Working Group
FRA	Flood Risk Assessment

Acronym	Meaning
HDD	Horizontal Directional Drilling
LPA	Local Planning Authority
NPPF	National Planning Policy Framework
NPS	National Policy Statement
PEIR	Preliminary Environmental Information Report
PPG	Planning Practice Guidance
PPP	Pollution Prevention Plan
SPA	Special Protection Area
SPZ	Source Protection Zones
SSSI	Site of Special Scientific Interest
SuDS	Sustainable urban Drainage System
UK	United Kingdom
UKCP19	United Kingdom Climate Projections 2019
WFD	Water Framework Directive

Units

Unit	Description
%	Percentage
ha	Hectare
km	Kilometres
km^2	Kilometres Squared
kV	Kilovolt
m	Metre
mm	Millimetre
nm	Nautical mile

2 Hydrology and flood risk

2.1 Introduction

2.1.1 Overview

2.1.1.1 This chapter of the Environmental Statement (ES) presents the findings of the Environmental Impact Assessment (EIA) undertaken for the Morgan and Morecambe Offshore Wind Farms: Transmission Assets. For ease of reference, the Morgan and Morecambe Offshore Wind Farms Transmission Assets are referred to in this chapter as the 'Transmission Assets'. This ES accompanies the application to the Planning Inspectorate for development consent for the Transmission Assets.

2.1.1.2 The purpose of the Transmission Assets is to connect the Morgan Offshore Wind Project: Generation Assets and Morecambe Offshore Windfarm: Generation Assets (referred to collectively as the 'Generation Assets') to the National Grid. A description of the Transmission Assets can be found in Volume 3, Chapter 1: Project description of the ES.

2.1.1.3 This chapter considers the likely impacts and effects of the Transmission Assets on hydrology and flood risk during the construction, operation and maintenance, and decommissioning phases. Specifically, it relates to those elements of the Transmission Assets landward of Mean Low Water Springs (MLWS).

2.1.1.4 This ES chapter:

- identifies the key legislation, policy and guidance relevant to hydrology and flood risk;
- details the EIA scoping and consultation process undertaken to date for hydrology and flood risk;
- confirms the study area for the assessment, the methodology used to identify baseline environmental conditions and sets out the existing and future environmental baseline conditions, established from desk studies, surveys and consultation;
- identifies the scope of the assessment;
- details the mitigation and/or monitoring measures that are proposed to prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process;
- defines the project design parameters used to inform for the impact assessment;
- identifies the impact assessment methodology and presents an assessment of the likely impacts and effects in relation to the construction, operation and maintenance and decommissioning phases of the Transmission Assets on hydrology and flood risk (and, where relevant, the impacts and effects of hydrology and flood risk on the Transmission Assets); and

- identifies any cumulative, transboundary and/or inter-related effects in relation to the construction, operation and maintenance and decommissioning phases of the Transmission Assets on hydrology and flood risk.

2.1.1.5 The assessment presented is informed by the following technical chapters and should be read in conjunction with the following:

- Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES; and
- Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES.

2.1.1.6 This chapter also draws upon additional information to support the assessment contained within the following annexes:

- Volume 3, Annex 2.1: Water Framework Directive surface water and groundwater assessment of the ES;
- Volume 3, Annex 2.2: Surface water abstraction licences, discharge consents and pollution incidents of the ES; and
- Volume 3, Annex 2.3: Flood Risk Assessment of the ES.

2.1.1.7 Whilst receptors associated with groundwater (aquifers, private water supplies and Source Protection Zones (SPZs)) have been listed as 'key receptors' within this chapter due to linkages between groundwater and surface water (with the potential for surface waters to infiltrate to groundwater, and for groundwater to contribute to base river flows), the assessment of effects on groundwater is set out within Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.

2.2 Legislation, policy and guidance

2.2.1 Legislation

Retained European legislation

2.2.1.1 The WFD (Council Directive 2000/60/EC establishing a framework for community action in the field of water policy) was adopted by the European Commission in December 2000. The WFD was transposed into law in England and Wales by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (hereafter referred to as 'the 2017 WFD Regulations'). The WFD is retained EU legislation and is still applicable in England and Wales as set out in sections 2 and 3 of the European Union (Withdrawal) Act 2018 and the Floods and Water (Amendment etc.) (EU Exit) Regulations 2019.

2.2.1.2 The 2017 WFD Regulations require the Secretary of State (SoS), Welsh Ministers, the Environment Agency (EA) and Natural Resources Wales (NRW) to exercise their 'relevant functions' so as to secure compliance with the WFD (Regulation 3). Under the regulations the SoS, the Welsh Ministers, EA, NRW, and each public body have a specific duty to have regard to the relevant River Basin Management Plan (RBMP), and any supplementary

plans made under it, when exercising their functions. 'Having regard to' RBMP's includes taking account of and considering the environmental objectives and summary of measures contained within the plan when exercising any functions and the effects of those functions on the objectives and measures within the plan (Planning Inspectorate, 2018).

2.2.1.3 Regulation 5(2) (l) (iii) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) (the APFP Regulations) requires each Applicant (where applicable) to provide with their application 'a plan with accompanying information identifying water bodies in a river basin management plan, together with an assessment of any effects on such bodies likely to be caused by the proposed development'.

National legislation

2.2.1.4 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 Environment Agency 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.

2.2.1.5 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.

2.2.1.6 The Environmental Protection Act (1990) makes provision for the fundamental structure and authority for waste management and control of emissions into the environment.

2.2.1.7 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.

2.2.1.8 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 Environment Agency 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 Environment Agency 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.

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

2.2.1.10 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.

2.2.1.11 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.

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

2.2.2 Planning policy context

2.2.2.1 The Transmission Assets will be located in English offshore waters (beyond 12 nautical miles (nm) from the English coast) and inshore waters (within 12 nm from the English coast), with the onshore infrastructure located wholly within England. As set out in Volume 1, Chapter 1: Introduction of the ES, the Secretary of State for the Department for Business, Energy and Industrial Strategy (the department which preceded the Department for Energy Security and Net Zero) has directed that the Transmission Assets are to be treated as development for which development consent is required under the Planning Act 2008, as amended.

National Policy Statements

2.2.2.2 There are currently six energy National Policy Statements (NPSs), three of which contain policy relevant to offshore wind development and the Transmission Assets, specifically:

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

2.2.2.3 **Table 2.1** sets out a summary of the policies within the current NPSs, relevant to hydrology and flood risk.

2.2.2.4 The policies within the current NPSs relevant to all topics in the ES can be viewed in the National Policy Statement tracker (document reference J26) and Planning Statement (document reference J28), submitted with the Application.

Table 2.1: Summary of the NPS EN-1, NPS EN-3, NPS EN-5 requirements relevant to this chapter

Summary of NPS provision	How and where considered in the ES
Climate change adaption	
Climate change is already having an impact and is expected to have an increasing impact on the UK throughout this century. The UK Climate Projections 2018 show an increased chance of milder, wetter winters and hotter, drier summers in the UK, with more intensive rainfall causing flooding. Sea levels will continue to rise beyond the end of the century, increasing risks to vulnerable coastal communities. Within the lifetime of energy projects, these factors will lead to increased flood risks in areas susceptible to flooding, and to an increased risk of the occurrence of floods in some areas which are not currently thought of as being at risk. A robust approach to flood risk management is a vital element of climate change adaptation; the applicant and the Secretary of State should take account of the policy on climate change adaptation in Section 4.10. [Paragraph 5.8.5 NPS EN-1]	Climate change is considered in Volume 3, Annex 2.3: Flood risk assessment of the ES. An assessment of an increase of peak river flow, peak rainfall intensities and sea level rise driven by climate change has been made within the Flood Risk Assessment (FRA) to the end of the construction phase for the landfall, onshore export cable corridor and 400 kV grid connection cable corridor and the operation and maintenance phase for the onshore substations. Peak river flow and sea level rise are accounted for within fluvial flood risk sections (section 1.5.4, section 1.6.4 and section 1.7.4) of the FRA. Peak rainfall intensity is taken into account within surface water flooding sections as well as the Outline Operational Drainage Management Plan (document reference J10). Further details are provided in **section 2.8**.
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 Environmental Statement or equivalent. [Paragraph 5.16.3 of NPS EN-1].	The WFD assessment is presented within Volume 3, Annex 2.1: Water Framework Directive surface and groundwater assessment of the ES and includes a description of the baseline environment and an assessment of the impacts on water quality, resources and physical characteristics. Climate change is considered in **section 2.6.10** of this report and is also detailed within the FRA (Volume 3 Annex 2.3: Flood risk assessment of the ES) which takes into account increases in rainfall rates due to climate change to ensure the drainage design is able to accommodate increasing volumes of surface water runoff associated with the effects of climate change.
Whilst offshore wind farms will not be affected by flooding, 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 2.3.8 of NPS EN-3].	Climate change is considered in section 1.4.3 of Volume 3, Annex 2.3: Flood risk assessment of the ES and is referenced within **section 2.6.10** of this report. Climate change is also considered in Volume 4, Chapter 1: Climate change of the ES. An assessment of an increase of peak river flow, peak rainfall intensities and sea level rise driven by climate change has been made within the FRA to the end of the construction phase for the landfall and onshore cable corridor and the operational and maintenance phase for the onshore substations. Peak river flow and sea level rise are accounted for within fluvial flood risk sections (section 1.5.4, section 1.6.4 and section 1.7.4 of the FRA). Peak rainfall intensity is taken into account within surface water flooding sections as well as the Outline Operational Drainage Management Plan (document reference J10). Further details are provided in **section 2.8**.

Summary of NPS provision	How and where considered in the ES
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 proposed development 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 of NPS EN-5].	Climate change is considered in section 1.4.3 of Volume 3, Annex 2.3: Flood Risk Assessment of the ES and is referenced within **section 2.6.10** of this report. Climate change is also considered in Volume 4, Chapter 1: Climate change of the ES. An assessment of an increase of peak river flow, peak rainfall intensities and sea level rise driven by climate change has been made within the FRA to the end of the construction phase for the landfall and onshore cable corridor and the operational and maintenance phase for the onshore substations. In regard to coastal erosion, Volume 2, Chapter 1: Physical processes of the ES provides details relating to the intertidal area and coastal erosion. The resilience to flood risk of intertidal and onshore elements of the Transmission Assets is set out within this chapter and Volume 3, Annex 2.3: Flood risk assessment of the ES.
Flood risk	
If, following application of the Sequential Test, it is not possible, (taking into account wider sustainable development objectives), for the project to be located in areas of lower flood risk the Exception Test can be applied. The test provides a method of allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available. The Exception Test is only appropriate for use where the Sequential Test alone cannot deliver an acceptable site. It would only be appropriate to move onto the Exception Test when the Sequential Test has identified reasonably available, lower risk sites appropriate for the proposed development where, accounting for wider sustainable development objectives, application of relevant policies would provide a clear reason for refusing development in any alternative locations identified. Examples could include alternative site(s) that are subject to national designations such as landscape, heritage and nature conservation designations, for example Areas of Outstanding Natural Beauty (AONBs), Site of Special Scientific Interest (SSSIs) and World Heritage Sites (WHS) which would not usually be considered appropriate. Both elements of the Exception Test will have to be satisfied for development to be consented. To pass the Exception Test it should be demonstrated that:	The Transmission Assets is classified as 'essential infrastructure'. This definition, alongside the definitions for the sequential test and exception test are provided within Volume 3, Annex 2.3: Flood risk assessment of the ES. The site selection process is detailed within Volume 1, Chapter 4: Site selection and consideration of alternatives of the ES. Development has been steered towards areas of lowest flood risk, including Flood Zone 1, with onshore substation development platforms assessed to have a low risk of flooding. The Transmission Assets are partially located within Flood Zone 3 and have been subjected to and deemed to have passed the sequential test as presented within section 1.9.2 of Volume 3, Annex 2.3: Flood risk assessment of the ES. The exception test for the onshore elements of the Transmission Assets is presented within section 1.9.3 of Volume 3, Annex 2.3: Flood risk assessment of the ES. The exception test demonstrates the project will provide wider sustainability benefits that outweigh flood risk and the development will be safe for the development lifetime, taking into consideration the vulnerability of its users with the implementation of Flood Evacuation Plans and will not increase flood risk elsewhere.

Summary of NPS provision	How and where considered in the ES
• the project would provide wider sustainability benefits to the community that outweigh flood risk; and • the project will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible will reduce flood risk overall. Development should be designed to ensure there is no increase in flood risk elsewhere, accounting for the predicted impacts of climate change throughout the lifetime of the development. There should be no net loss of floodplain storage and any deflection or constriction of flood flow routes should be safely managed within the site. Mitigation measures should make as much use as possible of natural flood management techniques. [paragraphs 5.8.9 – 5.8.11 of NPS EN-1].	
Development should be designed to ensure there is no increase in flood risk elsewhere, accounting for the predicted impacts of climate change throughout the lifetime of the development. There should be no net loss of floodplain storage and any deflection or constriction of flood flow routes should be safely managed within the site. Mitigation measures should make as much use as possible of natural flood management techniques. [paragraph 5.8.12 of NPS EN-1].	Commitments have been proposed to reduce flood risk and vulnerability to flooding during the construction, operation and maintenance and decommissioning periods. Commitments are presented within **section 2.8** and **Table 2.19.** For aspects of the Transmission Assets which are located Flood Zone 2 and 3 during construction, the measures included in **Table 2.19** will be implemented to reduce vulnerability of site users. Negligible above ground development will occur as a result of the installation of the landfall, onshore export cable corridor and 400 kV grid connection cable corridor. As a result, no floodplain compensation is required as part of the Transmission Assets. Drainage strategies for the onshore substations are detailed in Outline Operational Drainage Management Plan (document reference J10). The drainage schemes will provide a minor beneficial benefit in regard to surface water flood risk with the restriction of surface water flows from the site to the 1 in 1-year greenfield runoff rate.
A site-specific flood risk assessment should be provided for all energy projects in Flood Zones 2 and 3 in England. In Flood Zone 1, an assessment should accompany all proposals involving: • sites of 1 hectare or more • land which has been identified by the Environment Agency as having critical drainage problems • land identified (for example in a local authority strategic flood risk assessment) as being at increased flood risk in future • land that may be subject to other sources of flooding (for example surface water)	Due to the scale of the Transmission Assets, an FRA has been undertaken to assess flood risk from fluvial, tidal, surface water (pluvial), groundwater, sewers, reservoirs and artificial sources to the landfall, onshore cable corridors (onshore export cable corridor and 400 kV grid connection cable corridor), Morgan onshore substation and Morecambe onshore substation. The FRA is presented within Volume 3, Annex 2.3: Flood risk assessment of the ES. Due to negligible above ground development associated with the operation and maintenance phase of the landfall, onshore export cable corridor and 400 kV grid connection cable corridor the FRA focuses on construction phase impacts. The FRA for the Morgan onshore

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• where the EA, LLFA, Internal Drainage Board or other body have indicated that there may be drainage problems. This assessment should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account. 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; • 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:	substation and Morecambe onshore substation also assesses flood risk to the development throughout its operation and maintenance phase. An assessment of an increase of peak river flow, peak rainfall intensities and sea level rise driven by climate change has been made within the FRA to the end of the construction phase for the landfall, onshore export cable corridor and 400 kV grid connection cable corridor and the operation and maintenance phase for the onshore substations. Peak river flow and sea level rise are accounted for within fluvial flood risk sections (section 1.5.4, section 1.6.4 and section 1.7.4 of Volume 3, Annex 2.3: Flood risk assessment of the ES). and peak rainfall intensity is taken into account within surface water flooding sections as well as the operational drainage strategies for the Morgan onshore substation and Morecambe onshore substation. In regard to an assessment of residual flood risk, whilst flood defences are present within the study area and provide a degree of protection against flooding, the undefended scenario has been used to assess residual fluvial and tidal flood risk throughout the development lifetime, taking into account the effects of climate change. Historical flood events recorded by the Environment Agency and Strategic Flood Risk Assessment reports are also noted. Commitments have been proposed to reduce flood risk and vulnerability to flooding during the construction, operation and maintenance and decommissioning periods. Commitments are presented within **section 2.8** and **Table 2.19.** For aspects of the Transmission Assets which are located Flood Zone 2 and 3 during construction, the measures included in **Table 2.19** will be implemented to reduce vulnerability of site users. Minimal above ground development (in the form of inspection covers) will occur as a result of the installation of the landfall, onshore export cable corridor and 400 kV grid connection cable corridor. As a result, no floodplain compensation is required in relation to these elements of the Transmission Assets. Drainage strategies for the onshore substations are detailed in Outline Operational Drainage Management Plan (document reference J10). The drainage schemes will provide a minor beneficial benefit in regards to surface water flood risk with the restriction of surface water flows from the site to the 1 in 1-year greenfield runoff rate. Surface water runoff is to be stored within attenuation basins and exceedance events of the drainage schemes are further considered within the Outline

Summary of NPS provision	How and where considered in the ES
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 SuDS and method of discharge have been selected and why they are considered appropriate. 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 • be supported by appropriate data and information, including historical information on previous events. Further guidance can be found in the Planning Practice Guidance Flood Risk and Coastal Change section which accompanies the National Planning Policy Framework (NPPF) or successor documents. [Paragraphs 5.8.13 – 5.8.16 of NPS EN-1].	Operational Drainage Management Plan (document reference J10). Cumulative effects are assessed within **section 2.13** of this chapter. With the implementation of the above, it is demonstrated flood risk will not be increased elsewhere, accounts for the predicted impacts of climate change and ensures no reduction in floodplain capacity.

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Development (including construction works) will need to account for any existing watercourses and flood and coastal erosion risk management structures or features, or any land likely to be needed for future structures or features so as to ensure: • Access, clearances and sufficient land are retained to enable their maintenance, repair, operation, and replacement, as necessary • Their standard of protection is not reduced • Their condition or structural integrity is not reduced [paragraph 5.8.17 of NPS EN-1]	'Horizontal Directional Drilling (HDD) (or other trenchless techniques) entry and exit points will be located at least 8 m away from Environment Agency main rivers at least 8 m from ordinary watercourses, surface watercourses or the landward toe of the surface watercourse flood defences.' This commitment is presented within **section 2.8** and **Table 2.19.** Commitments ensure watercourse easements are not reduced and the condition of flood defences will not be adversely impacted by construction activities.
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 Environment Agency and, where relevant, other bodies such as Lead Local Flood Authorities, Internal Drainage Boards, sewerage undertakers, navigation authorities, highways authorities and reservoir owner and operators. Such discussions should identify the likelihood and possible extent and nature of the flood risk, help scope the FRA, and identify the information that will be required by the Secretary of State to reach a decision on the application when it is submitted. The Secretary of State should advise applicants to undertake these steps where they appear necessary but have not yet been addressed. If the Environment Agency or another flood risk management authority has reasonable concerns about the proposal on flood risk grounds, the applicant should discuss these concerns with the Environment Agency and take all reasonable steps to agree ways in which the proposal might be amended, or additional information provided, which would satisfy the authority's concerns. [paragraphs 5.8.18 – 5.8.20 of NPS EN-1]	The Hydrology and Flood Risk Expert Working Group (EWG) met in May and August 2023 and January 2024. In attendance were representatives from stakeholders including the Environment Agency, Lead Local Flood Authority (LLFA) (Lancashire County Council), and local authorities. Discussion points raised by the Applicants and stakeholders have been noted and addressed within chapter and Volume 3, Annex 2.3: Flood risk assessment of the ES**.** A further meeting with the Environment Agency was held in August 2024. The purpose of the meeting was to discuss hydrology and flood risk matters and to discuss concerns from the Environment Agency and to reach a solution to concerns raised. Two technical notes were prepared to discuss flood risk matters in greater detail. The FRA was then updated in line with the Environment Agency response and a further meeting with the Environment Agency to discuss the approach. The Environment Agency were unable to confirm acceptability within the meeting and aimed to provide a formal response to the Technical Note detailing their stance prior to submission of the ES. For more information on consultation activities, please see **Table 2.4**.
The Sequential Test ensures that a sequential, risk-based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account. Where it is not possible to locate development in low-risk areas, the Sequential Test should go on to compare reasonably available sites with medium risk areas and then, only where there are no reasonably available sites in low and medium risk areas, within high-risk areas. The technology specific NPSs set out some exceptions to the application of the Sequential Test. However, when seeking development consent on a site allocated in a development plan through the application of the Sequential Test, informed by a	The Transmission Assets are classified as 'essential infrastructure', for more information please see Table 1.7 of Volume 3, Annex 2.3: Flood risk assessment of the ES**.** The site selection process is detailed within Volume 1, Chapter 4: Site selection and consideration of alternatives of the ES. Development has been steered towards areas of lowest flood risk, including Flood Zone 1, with onshore substation development platforms assessed to have a low risk of flooding. The Transmission Assets are partially located within Flood Zone 3 and have been subjected to the sequential test.

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strategic flood risk assessment, applicants need not apply the Sequential Test, provided the proposed development is consistent with the use for which the site was allocated and there is no new flood risk information that would have affected the outcome of the test. [paragraphs 5.8.21 – 5.8.22 of NPS EN-1].	The sequential test for the landfall and cable corridors (onshore export cable corridor and 400 kV grid connection cable corridor) is presented within section 1.9.2 of Volume 3, Annex 2.3: Flood risk assessment of the ES**.** These aspects of the transmission assets are required to connect to the national grid at Penwortham and there are no reasonably available routes available in which cables can traverse without crossing areas of Flood Zone 3. Furthermore, no permanent above ground development will occur as a result of associated construction activities and flood risk will only be temporarily increased during the construction period up to 2032. The sequential test for Morgan onshore substation is presented within section 1.9.2 of Volume 3, Annex 2.3: Flood risk assessment of the ES**.** The development platform, surface water attenuation and associated access/egress has been steered into lowest areas of flood risk. Due to the nature of temporary construction compounds there are no other reasonable available sites which provide access to the construction activities. The sequential test for Morecambe onshore substation is presented within section 1.9.2 of Volume 3, Annex 2.3: Flood risk assessment of the ES. The development platform and surface water attenuation has been steered into lowest areas of flood risk. The Morecambe onshore substation temporary track form the A584 is routed across Flood Zone 3. This track will also be retained for permanent use by heavy goods vehicles and abnormal loads deliveries only and therefore operational use would be rare. Due to existing development bounding the south, west and north and the Dow Brook located adjacent to the east, there are no other reasonable available sites which the temporary and permanent access tracks can be located to provide access between the onshore substation and public highway network. The Transmission Assets are considered to pass the sequential test.
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	The drainage strategies for the onshore substations are provided in Outline Operational Drainage Management Plan (document reference J10). The drainage strategies have been developed in accordance with the NPS, NPPF, Planning Practice Guidance (PPG) ID7 the SuDS Manual and local council policy. The drainage schemes will provide a minor beneficial benefit in regards to surface water flood risk with the restriction of surface water discharge from the site to the 1 in 1-year greenfield runoff rate. Surface water from impermeable areas will be attenuated up to the 1% Annual Exceedance Probability (AEP) storm event plus an allowance for

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• 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. [paragraphs 5.8.24 – 5.8.28 of NPS EN-1].	climate change. Flows are to be discharged following the SuDS hierarchy, with discharge to Dow Brook proposed if infiltration testing to be undertaken post-consent deem infiltration based methods of discharge to be unfeasible. Discharge of surface water flows to watercourse are subject to approval by the local planning authority (LPA). With the restricted discharge rate, the drainage strategies will provide a minor beneficial benefit in regards to surface water flood risk immediately downstream of the Morgan and Morecambe onshore substations. Exceedance events of the drainage schemes are further considered within the Outline Operational Drainage Management Plan (document reference J10). Infiltration testing has been undertaken for the Morgan onshore substation and Morecambe onshore substations.
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 risk of flooding. Applicants should seek opportunities to use open space for multiple purposes such as amenity, wildlife Overarching National Policy Statement for Energy (EN-1) 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-	The site selection process is detailed within Volume 1, Chapter 4: Site selection and consideration of alternatives of the ES. Development has been steered towards areas of lowest flood risk, including Flood Zone 1, with onshore substation development platforms assessed to have a low risk of flooding. The Transmission Assets are partially located within Flood Zone 3 and have been subjected to the sequential test. Sequential tests for the Morgan onshore substation, Morecambe onshore substation plus landfall and cable corridors are provided within section 1.9.2 of Volume 3, Annex 2.3: Flood risk assessment of the ES. With reference made to Volume 1, Chapter 4: Site selection and consideration of alternatives of the ES the sequential tests demonstrate a sequential approach has been undertaken regarding the

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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. [paragraphs 5.8.29 – 5.8.33 of NPS EN-1].	location of proposed development and each sequential test is considered to be passed. For aspects of the Transmission Assets which are located in Flood Zone 3, this will be managed through the and the Surface Water and Groundwater Management Plan and the Onshore Drainage Management Plan. An Outline Surface Water and Groundwater Management Plan (document reference J1.9) has been provided as part of the application for development consent. This will reduce vulnerability of site users during the construction phase.. Further details are provided in **section 2.8** and **Table 2.19.** These measures will ensure development is safe for its lifetime. No above ground development will occur as a result of the installation of the landfall, onshore export cable corridor and 400 kV grid connection cable corridor. As a result, no floodplain compensation is required as part of the Transmission Assets. The drainage strategies for the onshore substation are presented within the Outline Operational Drainage Management Plan (document reference J10). The drainage schemes will provide a minor beneficial benefit in regards to surface water flood risk with the restriction of surface water discharge from the site to the 1 in 1-year greenfield runoff rate.
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. [paragraph 5.8.34 if NPS EN-1]	The Applicants are committed to preparing flood warning and evacuation procedures as set out within Outline Code of Construction Practice (CoCP) (document reference J1) to ensure safe access and escape routes are safely maintained for the lifetime of the development. Further details are provided in **section 2.8** and **Table 2.19** of this chapter.
Flood resistant and resilient materials and design should be adopted to minimise damage and speed recovery in the event of a flood. [paragraph 5.8.35 if NPS EN-1]	Permanent above ground development at risk of flooding includes the Morecambe onshore substation access track. The access track will comprise flood resistant and resilient materials within its construction and will require minimal maintenance after a flood event. The permanent use would be for heavy goods vehicle and abnormal loads deliveries only and therefore operational use would be rare.
In determining an application for development consent, the Secretary of State should be satisfied that where relevant: • the application is supported by an appropriate FRA • the Sequential Test has been applied and satisfied as part of site selection	Details of the site selection process for the Transmission Assets, including the onshore substations, are provided in Volume 1, Chapter 4: Site selection and alternatives of the ES. The FRA is provided within of Volume 3, Annex 2.3: Flood risk assessment of the ES and has been developed in accordance with the NPS EN-1, NPPF, PPG ID7 and local council policy and

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• a sequential approach has been applied at the site level to minimise risk by directing the most vulnerable uses to areas of lowest flood risk • the proposal is in line with any relevant national and local flood risk management strategy • SuDS (as required in the next paragraph on National Standards) have been used unless there is clear evidence that their use would be inappropriate • in flood risk areas the project is designed and constructed to remain safe and operational during its lifetime, without increasing flood risk elsewhere (subject to the exceptions set out in paragraph 5.8.42) • 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 • land that is likely to be needed for present or future flood risk management infrastructure has been appropriately safeguarded from development to the extent that development would not prevent or hinder its construction, operation or maintenance. [paragraph 5.8.36 if NPS EN-1]	considers the flood risk associated with the onshore elements of the Transmission Assets. The site selection process is detailed within Volume 1, Chapter 4: Site selection and consideration of alternatives of the ES. Development has been steered towards Flood Zone 1, with Permanent substations located within Flood Zone 1. Temporary and permanent access tracks are located within Flood Zone 1, 2 and 3 and have been subjected to and are deemed to have passed the sequential test (section 1.9.2 of Volume 3, Annex 2.3: Flood risk assessment of the ES) and exception test (section 1.9.3 of Volume 3, Annex 2.3: Flood Risk Assessment of the ES). The Outline Operational Drainage Management Plan (document reference J10) has been developed in accordance with the NPS, NPPF, PPG ID7 the SuDS Manual, Sustainable drainage systems: non-statutory technical standards and local council policy. Appropriate mitigation measures in regard to flood risk, such as Flood Management Plans are presented within Volume 3, Annex 2.3: Flood risk assessment of the ES. The Applicants are committed to preparing flood warning and evacuation procedures as set out within Outline CoCP (document reference J1) to ensure safe access and escape routes are safely maintained for the lifetime of the development. Further details are provided in **section 2.8** and **Table 2.19.** 8m easements from the onshore substations and Dow Brook (Environment Agency Designated Main River) and associated flood defences have been maintained to ensure present day and future flood risk management activities can be undertaken unhindered by the Transmission Assets. Furthermore, the Environment Agency confirmed within EWG 1 that difference in phasing between the Transmission Assets and Penwortham Flood Defence Scheme makes interaction between the schemes unlikely.
For energy projects which have drainage implications, approval for the project's drainage system, including during the construction period, will form part of the development consent issued by the Secretary of State. The Secretary of State will therefore need to be satisfied that the proposed drainage system complies with any National Standards published by Ministers under paragraph 5(1) of Schedule 3 to the Flood and Water Management Act 2010. In addition, the Development Consent Order (DCO), or any associated planning obligations, will need to make provision for appropriate operation and maintenance of any SuDS throughout the project's lifetime. Where this is secured through the adoption of	The Outline CoCP (document reference J1) includes an Outline Pollution Prevention Plan (document reference J1.4), Outline Spillage and Emergency Response Plan (document reference J1.8) and Outline Surface Water and Groundwater Management Plan (document reference J1.9), which include information for managing surface water runoff during construction and protective measures to control the risk of pollution to groundwater throughout the development lifetime. The Outline Operational Drainage Management Plan (document reference J10) and has been developed in accordance with the NPS, NPPF, PPG ID7 the SuDS Manual, Sustainable drainage

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any SuDS features, any necessary access rights to property will need to be granted. Where relevant, the Secretary of State should be satisfied that the most appropriate body is being given the responsibility for maintaining any SuDS, taking into account the nature and security of the infrastructure on the proposed site. Responsible bodies could include, for example the landowner, the relevant lead local flood authority (LLFA) or water and sewerage company (through the Ofwat approved Sewerage Sector Guidance), or another body, such as an Internal Drainage Board. [Paragraphs 5.8.37 – 5.8.39 of NPS EN-1].	systems: non-statutory technical standards and local council policy. Surface water from impermeable areas will be attenuated up to the 1% AEP storm event plus an allowance for climate change. Flows are to be discharged following the SuDS hierarchy, with discharge to Dow Brook proposed if infiltration testing to be undertaken post-consent deem infiltration based methods of discharge to be unfeasible. Discharge of surface water flows to watercourse are subject to approval by the LPA. The drainage schemes will provide a minor beneficial benefit in regards to surface water flood risk to land downstream of the onshore substations with the restriction of surface water discharge from the site to the 1 in 1-year greenfield runoff rate. The Outline Operational Drainage Management Plan (document reference J10) provides information relating to exceedance events of the drainage schemes and also provides information regarding the management and maintenance of SuDS within the Morgan onshore substation and Morecambe onshore substation. Infiltration testing for the Morgan onshore substation and Morecambe onshore substation has been undertaken.
If the Environment Agency or another flood risk management authority continues to have concerns and objects to the grant of development consent on the grounds of flood risk, the Secretary of State can grant consent, but would need to be satisfied before deciding whether or not to do so that all reasonable steps have been taken by the applicant and the authority to try to resolve the concerns. [paragraph 5.8.40 if NPS EN-1]	The Applicants have engaged with the Environment Agency and LLFA with four EWG meetings to discuss issues relating to hydrology and flood risk. Two technical notes have also been written and a further meeting was held with the Environment Agency in August 2024 to ensure flood risk is deemed to be appropriately assessed by the Environment Agency. The Environment Agency have responded to the Applicants technical note on these matters. Key consultation summaries are presented within **Table 2.4** of this chapter.
Energy projects 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	Due to limitations in the Strategic Flood Risk Assessment data and of available Environment Agency data relating to fluvial flood risk of the Dow Brook, fluvial Flood Zone 3 is unable to be further divided into Flood Zone 3a and Flood Zone 3b. The site selection process is detailed within Volume 1, Chapter 4: Site selection and consideration of alternatives of the ES. Development has been steered towards Flood Zone 1, with onshore substations located within Flood Zone 1. The Transmission Assets (landfall, export cable corridor and 400 kV grid connection cable corridor, Morgan onshore substation and Morecambe onshore substation) are partially located within Flood Zone 3 and have been subject to and are deemed to have passed the sequential test (section 1.9.2 of Volume 3, Annex 2.3: Flood

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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 of the nature and degree of the risk, the future impacts on climate change, and advice provided by the Environment Agency and other relevant bodies. [paragraph 5.8.41 – 5.8.42 of NPS EN-1]	Risk Assessment of the ES) and exception test (section 1.9.3 of Volume 3, Annex 2.3: Flood Risk For aspects of the Transmission Assets which are located Flood Zone 2 and 3 during construction, the measures included in **Table 2.19** will be implemented to reduce vulnerability of site users. Negligible above ground development will occur as a result of the installation of the landfall, onshore export cable corridor and 400 kV grid connection cable corridor. As a result, no floodplain compensation is required as part of the Transmission Assets. Additional mitigation measures are presented within section 1.8 of the FRA to ensure flood risk is mitigated to an acceptable and safe level during the development lifetime.
Water quality and resources	
Where possible, applicants are encouraged to manage surface water during construction by treating surface water runoff from exposed topsoil prior to discharging and to limit the discharge of suspended solids e.g. from car parks or other areas of hard standing, during operation. Applicants are encouraged to consider protective measures to control the risk of pollution to groundwater beyond those outlined in River Basin Management Plans and Groundwater Protection Zones – this could include, for example, the use of protective barriers. [paragraph 5.16.5 – 5.16.6 of NPS EN-1].	The Outline CoCP (document reference J1) includes an Outline Surface Water and Groundwater Management Plan (document reference J1.9) and Outline Pollution Prevention Plan (document reference J1.4), which include information for managing surface water runoff during construction and protective measures to control the risk of pollution to groundwater during construction and operation. Details are provided in **section 2.8** and **Table 2.19.**
The Environmental Statement 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	The WFD Assessment (Volume 3, Annex 2.1: Water Framework Directive surface and groundwater assessment of the ES) has been undertaken in accordance with the Planning Inspectorate Advice Note 18 (Planning Inspectorate, 2017). The assessment considers the potential impact of the Transmission Assets within the intertidal infrastructure area and onshore infrastructure area during the construction, operation and maintenance, and decommissioning. The WFD assessment and the proposed measures adopted as part of the Transmission Assets have taken into account the requirements of the North Western RBMP and WFD to ensure all potential impacts on the water environment are mitigated to within acceptable levels including drinking water protected areas associated with public and private abstractions. Environment Agency, Fylde Council, Blackpool Council, South Ribble Borough Council and Preston City Council (and Lancashire County Council at the County level) have been consulted during the preparation of the WFD assessment.

Summary of NPS provision	How and where considered in the ES
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 of NPS EN-1].	The impact on hydromorphological supporting conditions to the biological elements of ecological status have been considered in the WFD assessment. The document has undertaken an assessment of the water bodies and associated protected areas including designated shellfish waters and drinking water protected areas. Impacts to peak river flow, peak rainfall intensity and sea level rise as a result of climate change has been described and taken into account within Volume 3, Annex 2.3: Flood risk assessment of the ES. Where appropriate, mitigation measures have been applied. A cumulative impact assessment of the water environment has been undertaken in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES and Chapter 2: Hydrology and flood risk of the ES.
The Secretary of State should consider whether mitigation measures are needed over and above any which may form part of the project application. A construction management plan may help codify mitigation at that stage. The risk of impacts on the water environment can be reduced through careful design to facilitate adherence to good pollution control practice. For example, designated areas for storage and unloading, with appropriate drainage facilities, should be clearly marked. The impact on local water resources can be minimised through planning and design for the efficient use of water, including water recycling. If a development needs new water infrastructure, significant supplies or impacts other water supplies, the applicant should consult with the local water company and the EA. [paragraphs 5.16.8 to 5.16.10, NPS EN-1].	Flood risk mitigation measures are presented within section 1.8 of the FRA (Volume 3, Annex 2.3: Flood Risk Assessment of the ES). An assessment of effects to hydrology and flood risk has been undertaken as part of this chapter, and commitments (mitigation measures) are detailed within **section 2.8** and **Table 2.19.** Appropriate mitigation measures to reduce the impacts on the water environment are set out in the Outline CoCP (document reference J1) which has been prepared as part of the application. This includes measures relating to control of impacts to the water environment during construction, as set out in **section 2.8** and **Table 2.19.**
Activities that discharge to the water environment are subject to pollution control. The considerations set out in Section 4.12 on the interface between planning and pollution control therefore apply. These considerations will also apply in an analogous way to the abstraction licensing regime regulating activities that take water from the water environment, and to the control regimes relating to works to, and structures in, on, or under controlled waters. [paragraph 5.16.11 of NPS EN-1].	Measures to ensure discharges to the water environment are subject to pollution control are detailed within the Outline Operational Drainage Management Plan (document reference J10) and Volume 1, Annex 3.1: Outline CoCP of the ES which includes an Outline Onshore Pollution Prevention Plan (document reference J1.4). Potential impacts from pollution and contamination are assessed within **section 2.11.2**
The Secretary of State must also consider duties under other legislation including duties under the Environment Act 2021 in relation to environmental targets and have regard to the policies set out in the Government's Environmental Improvement Plan 2023. [paragraph 5.16.13 of NPS EN-1].	The Environmental Improvement Plan (2023) sets targets to reduce pollution reduction. Pollution prevention and reduction is discussed further in the Outline CoCP (document reference J1), which includes an Outline Surface Water and Groundwater Management Plan (document

Summary of NPS provision	How and where considered in the ES
	reference J1.9) and Outline Pollution Prevention Plan (document reference J1.4).
The Secretary of State should be satisfied that a proposal has regard to current River Basin Management Plans and meets the requirements of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (including regulation 19). The specific objectives for particular river basins are set out in River Basin Management Plans. The Secretary of State must refuse development consent where a project is likely to cause deterioration of a water body or its failure to achieve good status or good potential, unless the requirements set out in Regulation 19 are met. A project may be approved in the absence of a qualifying Overriding Public Interest test only if there is sufficient certainty that it will not cause deterioration or compromise the achievement of good status or good potential. The Secretary of State should also consider the interactions of the proposed project with other plans such as Water Resources Management Plans and Shoreline Management Plans [Paragraph 5.16.14 – 5.6.15 of NPS EN-1].	The WFD assessment (Volume 3 Annex 2.1: Water Framework Directive Water Framework Directive surface and groundwater assessment of the ES) has considered the North Western RBMP 2022-2027. The WFD assessment has been undertaken to demonstrate that the Transmission Assets are compliant with the requirements of the WFD and the implementing legislation in England and Wales, i.e. Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The assessment and the proposed mitigation measures have taken into account the requirements of the RBMP, and in particular the environmental objectives of the water bodies affected, to ensure all potential impacts on the water environment are mitigated to within acceptable levels. Therefore, the achievement of the environmental objectives of the water bodies within the WFD study area will not be compromised as a result of the project activities associated with the Transmission Assets. The shoreline management plan is defined and discussed within the FRA Volume 3, Annex 2.3: Flood risk assessment of the ES and the potential impacts to Lytham St Annes dunes which are detailed within the shoreline management plan is discussed within **section 2.11.4** of this chapter.
The Secretary of State should consider proposals to mitigate adverse effects on the water environment and any enhancement measures put forward by the applicant and whether appropriate requirements should be attached to any development consent and/or planning obligations are necessary [Paragraph 5.16.16 NPS EN-1].	An assessment and the mitigation measures proposed as part of the WFD assessment (Volume 3 Annex 2.1: Water Framework Directive Water Framework Directive surface and groundwater assessment of the ES) has taken into account the requirements of the RBMP, and in particular the environmental objectives of the water bodies affected, to ensure all potential impacts on the water environment are mitigated to within acceptable levels. Therefore, the achievement of the environmental objectives of the water bodies within the WFD study area will not be compromised as a result of the project activities associated with the Transmission Assets.

The National Planning Policy Framework

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

2.2.2.6 The PPG (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government, 2023) supports the NPPF and provides guidance across a range of topic areas.

2.2.2.7 The Government has published proposed reforms to the NPPF for consultation on 30 July 2024, with the consultation period ending on 24 September 2024 (Ministry of Housing, Communities and Local Government, 2024). Following consultation, the NPPF will be updated.

2.2.2.8 **Table 2.2** sets out a summary of the NPPF and PPG policies relevant to this chapter.

Table 2.2: Summary of NPPF and PPG requirements and guidance relevant to this chapter

Key provisions	How and where considered in the ES
National Planning Policy 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 (footnote 59 of the NPPF).	Due to the scale and nature of development proposals, an FRA for the permanent and temporary inshore infrastructure has been undertaken and is presented within Volume 3, Annex 2.3: Flood risk assessment of the ES.
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 (Paragraph 158).	Climate change has been considered in the FRA in the form of impacts to peak river flow, peak rainfall intensity and sea level rise. This is considered within **section 2.6.10** of this chapter and applied and assessed within the FRA for each element of the Transmission Assets (Morgan onshore substation, Morecambe onshore substation and landfall, onshore export cables and 400 kV grid connection cables). Where appropriate, mitigation measures have been applied which mainly involves steering infrastructure towards areas of lowest flood risk and ensuring development is safe for its lifetime. As such, sequential and exception tests have been undertaken as part of the Flood Risk Assessment and are presented within section 1.9.2 and section 1.9.3 of Volume 3, Annex 2.3: Flood Risk Assessment of the ES.

2.2.2.9 The consultation draft includes similar provisions as the designated NPPF. The consultation draft NPPF has been reviewed and there are no material updates for hydrology and flood risk relevant to the Transmission Assets.

Local planning policy

2.2.2.10 The onshore and intertidal elements of the Transmission Assets are located within the Local Planning Authority administrative areas of Fylde Council, Blackpool Council, South Ribble Borough Council and Preston City Council (and Lancashire County Council at the County level).

2.2.2.11 Strategic FRA data from Fylde Borough Council (2011), Preston City Council, South Ribble Borough Council and Chorley Borough Council (Scott Wilson Group Plc., 2007) and Blackpool Council (2014) have been included within the assessment.

2.2.2.12 The relevant local planning policies applicable to hydrology and flood risk based on the extent of the study area for this assessment are summarised in **Table 2.3**.

Table 2.3: Summary of local planning policy relevant to this chapter

Policy	Key provisions	How and where considered in the ES
Adopted Fylde Local Plan to 2032 (incorporating Partial Review) (Adopted December 2021) (Fylde Council, 2021)		
Strategic Policy CL1 - Flood Alleviation, Water Quality and Water Efficiency.	Planning decisions should follow the sequential, risk-based approach to the location of development, as required by the NPPF. All new development is required to minimise flood risk impacts on the environment, retain water quality and water efficiency, and mitigate against the likely effects of climate change on present and future generations.	An FRA is presented within Volume 3, Annex 2.3: Flood risk assessment of the ES and has been undertaken in line with NPS EN-1, NPPF and PPG ID7. Assessment has been made to all sources of flood risk and includes an allowance for the impacts of climate change to peak river flow, sea level rise and peak rainfall intensities. Mitigation measures (commitments) have been proposed, where required, to ensure flood risk from all sources and vulnerability of site users during the development lifetime is managed. Details are provided in **section 2.8** and **Table 2.19.** The Outline Operational Drainage Management Plan (document reference J10) has been developed in accordance with the NPS, NPPF, PPG ID7 the SuDS Manual, Sustainable drainage systems: non-statutory technical standards and local council policy. Surface water from impermeable areas within the onshore substations will be attenuated within a basin on-site for up to the 1% AEP storm event plus an allowance for climate change. Flows are to be discharged following the SuDS hierarchy, with discharge to Dow Brook proposed if infiltration testing to be undertaken post-consent deem infiltration based methods of discharge to be unfeasible. Discharge of surface water flows to watercourse are subject to approval by the LPA. The Outline Operational Drainage Management Plan provides information relating to exceedance events of the drainage schemes and also provides information regarding the management and maintenance of SuDS within the onshore substations. The drainage schemes will provide a minor beneficial benefit in regards to surface water flood risk to land downstream of the onshore substations with the restriction of surface water discharge from the site to the 1 in 1-year greenfield runoff rate.
Strategic Policy CL2 - Surface Water Runoff and Sustainable Drainage.	Discharge rates should be agreed as part of any pre-application negotiations between the relevant parties. New development must incorporate the following sequential attenuation measures: • store rainwater for later use; or • the first 5 mm of rainfall should infiltrate. In areas where infiltration rates are slow, e.g. soils with a high proportion of clay, then permeable surfaces may be under-drained. This will have the effect of slowed surface water runoff rates; or • attenuate rainwater in ponds or open features for gradual release into the watercourse; or • attenuate rainwater by storing in tanks or sealed water features for gradual release into a watercourse.	

Policy	Key provisions	How and where considered in the ES
South Ribble Local Plan 2012-2026 (South Ribble Borough Council, 2015)		
Chapter J – Tackling Climate Change.	Core Strategy Objectives. • To reduce energy use and carbon dioxide emissions in new developments. • To encourage the use and generation of energy from renewable and low carbon sources. • To manage flood risk and the impacts of flooding especially adjoining the River Ribble. • To reduce water usage, protect and enhance water resources and minimise pollution of water, air and soil.	An FRA is presented within Volume 3, Annex 2.3: Flood risk assessment of the ES and has been undertaken in line with NPS EN-1, NPPF and PPG ID7. Assessment has been made to all sources of flood risk and includes an allowance for the impacts of climate change to peak river flow, sea level rise and peak rainfall intensities. Commitments have been proposed to reduce flood risk and vulnerability to flooding during the construction, operation and maintenance and decommissioning periods. Commitments are presented within **section 2.8** and **Table 2.19.** A WFD surface water and groundwater assessment has been undertaken and is presented within Volume 3, Annex 2.1: Water Framework Directive surface and groundwater assessment of the ES. The assessment takes 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.
Central Lancashire Adopted Core Strategy (South Ribble, Preston and Chorley LPAs) – adopted July 2012		
Policy 29 - Water Management.	Improve water quality, water management and reduce the risk of flooding by: • Minimising the use of potable mains water in new developments. • Working with the regional water company and other partners to promote investment in sewage water treatment works to reduce the risk of river pollution from sewage discharges. • Working with farmers to reduce runoff polluted with agricultural residues into watercourses. • Appraising, managing and reducing flood risk in all new developments, avoiding inappropriate development in flood risk areas particularly in Croston, Penwortham, Walton-le-Dale and south west Preston. • Pursuing opportunities to improve the sewer infrastructure, particularly in Grimsargh, Walton-le-Dale and Euxton, due to the risk of sewer flooding.	An FRA is presented within Volume 3, Annex 2.3: Flood risk assessment of the ES and has been undertaken in line with NPS EN-1, NPPF and PPG ID7. Assessment has been made to all sources of flood risk and includes an allowance for the impacts of climate change to peak river flow, sea level rise and peak rainfall intensities. Commitments have been proposed to reduce flood risk and vulnerability to flooding during the construction, operation and maintenance and decommissioning periods through requirements of the DCO. Commitments are presented within **section 2.8** and **Table 2.19.** For aspects of the Transmission Assets which are located Flood Zone 2 and 3 during construction, the measures included in **Table 2.19** will be

Policy	Key provisions	How and where considered in the ES
	• Managing the capacity and timing of development to avoid exceeding sewer infrastructure capacity. • Encouraging the adoption of Sustainable Drainage Systems. • Seeking to maximise the potential of Green Infrastructure to contribute to flood relief.	implemented to reduce vulnerability of site users. Negligible above ground development will occur as a result of the installation of the landfall, onshore export cable corridor and 400 kV grid connection cable corridor. As a result, no floodplain compensation is required as part of the Transmission Assets. Drainage strategies for the onshore substations are detailed in Outline Operational Drainage Management Plan (document reference J10) and include provisions for SuDS in the form of an attenuation basin to enable a 1 in 1-year surface water discharge rate from both onshore substations.
Blackpool Local Plan Core Strategy (2012 – 2027) Adopted January 2016		
Policy CS9: Water Management	To reduce flood risk, manage the impacts of flooding and mitigate the effects of climate change, all new development must: a) Be directed away from areas at risk of flooding, through the application of the Sequential Test and where necessary the Exception Test, taking account of all sources of flooding; b) Incorporate appropriate mitigation and resilience measures to minimise the risk and impact of flooding from all sources; c) Incorporate appropriate Sustainable Drainage Systems (SuDS) where surface water run-off will be generated; d) Where appropriate, not discharge surface water into the existing combined sewer network. If unavoidable, development must reduce the volume of surface water run-off discharging from the existing site in to the combined sewer system by as much as is reasonably practicable; e) Make efficient use of water resources; and f) Not cause a deterioration of water quality. Where appropriate, the retro-fitting of SuDS will be supported in locations that generate surface water run-off.	An FRA is presented within Volume 3, Annex 2.3: Flood Risk Assessment of the ES and has been undertaken in line with NPS EN-1, NPPF and PPG ID7. Assessment has been made to all sources of flood risk and includes an allowance for the impacts of climate change to peak river flow, sea level rise and peak rainfall intensities. The site selection process is detailed within Volume 1, Chapter 4: Site selection and consideration of alternatives of the ES. Development has been steered towards areas of lowest flood risk, including Flood Zone 1, with onshore substation development platforms assessed to have a low risk of flooding. The Transmission Assets are partially located within Flood Zone 3 and have been subjected to the sequential test (section 1.9.2 of Volume 3, Annex 2.3: Flood risk assessment of the ES) and the exception test (section 1.9.3 of Volume 3, Annex 2.3: Flood risk assessment of the ES). Commitments have been proposed to reduce flood risk and vulnerability to flooding during the construction, operation and maintenance and decommissioning periods, and are to be secured through requirements of the DCO. Commitments are presented within **section 2.8** and **Table 2.19.** For aspects of the Transmission Assets which are located Flood Zone 2 and 3

Policy	Key provisions	How and where considered in the ES
		during construction, the measures included in **Table 2.19** will be implemented to reduce vulnerability of site users. Negligible above ground development will occur as a result of the installation of the landfall, onshore export cable corridor and 400 kV grid connection cable corridor. As a result, no floodplain compensation is required as part of the Transmission Assets. Drainage strategies for the onshore substations are detailed in Outline Operational Drainage Management Plan (document reference J10) and include provisions for SuDS in the form of an attenuation basin to enable a 1 in 1-year surface water discharge rate from both onshore substations.
Policy D M31: Surface Water Management	Surface water from development sites will be discharged via the most sustainable drainage option available. The discharge of surface water should be in line with the following order of priority, in accordance with National Planning Practice Guidance: a) into the ground (infiltration); b) to a surface water body; c) to a surface water sewer, highway drain, or another drainage system; d) to a combined sewer. On greenfield sites applicants will be required to demonstrate that the current natural discharge rate is replicated as a minimum. The starting point for this will be a maximum greenfield run-off rate for greenfield sites. On previously developed sites applicants should target a reduction from pre-existing discharges of surface water to a target of greenfield rates and volumes so far as reasonably practicable, with a starting point of a maximum of a 30% reduction in run-off rates. In critical drainage areas the greenfield standard will be expected, with a minimum of a 50% reduction in run-off rates. All new development should: a) include the use of sustainable drainage systems, unless demonstrated to be inappropriate; and b) reduce areas of existing impermeable surfaces.	There is no permanent above ground development proposed within the Blackpool Council boundary and as such this policy is noted but not required to be adhered within the Transmission Assets FRA.

Policy	Key provisions	How and where considered in the ES
	Approved development proposals will be required to be supplemented by appropriate maintenance and management regimes for surface water drainage schemes	
Policy D M33: Coast and Foreshore	Development proposals will be supported which secure further improvements to bathing water quality or flood protection. Development proposals that would adversely affect the appearance, integrity or environmental quality of the beach and foreshore will be resisted.	The WFD coastal waters assessment has considered the different activities associated with the Transmission Assets in the context of the environmental objectives of any affected WFD surface water body. This has considered the potential impact on WFD transitional and coastal receptors (see Volume 2, Annex 2.2: Water Framework Directive coastal waters assessment of the ES).
Policy D M36: Controlling Pollution and Contamination	Development will be permitted where in isolation or in conjunction with other planned or committed developments it can be demonstrated that the development: a) Will be compatible with adjacent existing uses and would not lead to unacceptable adverse effects on health, amenity, safety and the operation of surrounding uses and for occupants, users of the development itself or designated sites of importance for biodiversity, with reference to noise, vibration, odour, light, dust, other pollution or nuisance. Applications will be required to be accompanied, where appropriate by relevant impact assessments and mitigation proposals; b) In the case of previously developed, other potentially contaminated or unstable land, a land remediation scheme can be secured which will ensure that the land is remediated to a standard which provides a safe environment for occupants and users and does not displace contamination; c) Will not give rise to a deterioration of air quality in the defined Air Quality Management Area in Blackpool Town Centre or result in the declaration of a new AQMA. Where appropriate an air quality impact assessment will be required to support development proposals; d) Where development will result in, or contribute to, a deterioration in air quality, permission will only be granted where any such harm caused is significantly and demonstrably outweighed by other planning considerations and appropriate	An FRA is presented within Volume 3, Annex 2.3: Flood risk assessment of the ES and has been undertaken in line with NPS EN-1, NPPF and PPG ID7. Assessment has been made to all sources of flood risk and includes an allowance for the impacts of climate change to peak river flow, sea level rise and peak rainfall intensities. Commitments have been proposed to reduce flood risk and vulnerability to flooding during the construction, operation and maintenance and decommissioning periods, and are to be secured through requirements of the DCO. Commitments are presented within **section 2.8** and **Table 2.19.** A WFD surface water and groundwater assessment has been undertaken and is presented within Volume 3, Annex 2.1: Water Framework Directive surface and groundwater assessment of the ES. The assessment takes 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. As part of the Outline CoCP (document reference J1), an Outline Pollution Prevention Plan (document reference J1.4) and Outline Spillage and Emergency Response Plan (document J1.8) have been prepared. The documents provide information regarding measures to be implemented to prevent pollution to waterbodies and emergency procedures to be taken if a spillage or contamination incident were to occur.

Policy	Key provisions	How and where considered in the ES
	mitigation measures are provided to minimise any such harm. e) Will not pose a risk of pollution to controlled waters (surface or ground water) and will, where required, include mitigation and/or remediation to prevent any unacceptable levels of water pollution. Proposals for the development of hazardous installations/pipelines, modifications to existing sites, or development in the vicinity of hazardous installations or pipelines, will be permitted where it has been demonstrated that the amount, type and location of hazardous substances would not pose unacceptable health and/or safety risks.	
Lancashire County Council		
OWC1: Application Validation Policy	An application for Ordinary Watercourse consent will be valid once the correct fee and the minimum information stated in the validation checklist (applicable at the time of application) for Ordinary Watercourse consent has been submitted in writing and considered valid by the Lead Local Flood Authority.	It should be noted that this development is exempt from applying for Ordinary Watercourse consent from the county council as the legislation that requires ordinary watercourse consents is being disapplied such that separate consents are not required. Instead, approvals will be managed through the protective provisions set out within the DCO. These are included in the draft DCO provided as part of the application (document reference C1) and will be updated post submission further to conversation with the LLFA. Notwithstanding, assessment of the impacts of contaminated runoff on the quality of surface waters and ground receptors is presented within **section 2.11.2**. The assessment of the impact of increased flood risk arising from additional surface water runoff is presented within **section 2.11.3**.
OWC2: Modification Hierarchy Policy	Applicants should avoid crossing, diverting and/or culverting an Ordinary Watercourse. Where, in the opinion of the Lead Local Flood Authority, this cannot be avoided consent applications must include evidence, as specified by the Lead Local Flood Authority, as to why any specific level of the hierarchy below cannot be met and why the level(s) higher up the hierarchy cannot be utilised. Without this your application may be refused. 1. Where an existing culverted Ordinary Watercourse exists, it is reopened (daylighted); 2. Installation of a clear span bridge over an open Ordinary Watercourse; 3. Installation of another type of bridge, or diversion of an open Ordinary Watercourse and habitat amenity approved, or installation of or alteration to an existing crossing; 4. Installation of a gravity culvert; 5. Installation of a siphon/sag culvert.	
OWC3: Culvert and Screen Policy	The Lead Local Flood Authority may refuse a consent application to culvert an open section of an Ordinary Watercourse if evidence fails to demonstrate that:	

Policy	Key provisions	How and where considered in the ES
	1. The modification hierarchy in policy OWC2 has been applied and a culvert is justified; and, 2. the size of the culvert is based on a hydraulic assessment of the contributing catchment and the culvert should be no smaller than 450mm diameter or 500mm wide x 450mm high box; and, 3. the necessity of any screen(s) as evidenced by an accepted Screen Risk Assessment; and, 4. mitigation measures are incorporated as necessary and conditioned by the Lead Local Flood Authority.	
OWC4: Water and Environmental Management Policy	The Lead Local Flood Authority will usually refuse a consent application if evidence fails to demonstrate that: 1. the proposed works will not increase the risk of flooding in the design standard, taking into account the effects of climate change, through the introduction of a new structure or modification of an existing structure; and, 2. any residual risk can be safely managed through overland flow routes and floodplain storage which minimises the risk of flooding in the event of a blockage or exceedance event; and, 3. the proposals will not increase the risk of scour to the bed and banks of the Ordinary Watercourse demonstrated through an accepted Scour Risk Assessment; and, 4. where necessary, proposals have been designed to include appropriate mitigation to avoid barriers to fish and/or mammal passage; and, 5. the proposals will preserve and where possible improve the water quality and ecological status of the Ordinary Watercourse, demonstrated through an accepted Water Framework Directive Assessment. Where applicable, Ordinary Watercourse consent applications must also be accompanied by an accepted Habitat Regulations Assessment to demonstrate compliance with the Conservation of Habitats and Species Regulations. Mitigation measures to satisfy this policy may be conditioned by the Lead Local Flood Authority.	
OWC5: Inspection, Operation and	The Lead Local Flood Authority will usually refuse a consent application if the applicant fails to demonstrate that appropriate inspection, operational and maintenance	

Policy	Key provisions	How and where considered in the ES
Maintenance Policy	arrangements are in place for the lifetime of each structure	
OWC6: Enforcement Prioritisation Policy	Lancashire County Council, upon notification of an issue in connection with an Ordinary Watercourse, may use its powers under Sections 21, 24 and 25 of the Land Drainage Act 1991 (as amended) to take enforcement action on Ordinary Watercourses where: 1. flood risk is increased AND 2. that failure to comply with an obligation*, prohibition* or impediment* may cause harm* to a receptor as defined in the policy document.	

2.2.3 Relevant guidance

2.2.3.1 Relevant guidance used to inform the hydrology and flood risk impact assessment has followed the methodology set out in Volume 1, Chapter 5: Environmental assessment methodology of the ES. Specific to the hydrology and flood risk impact assessment, the following guidance documents have also been considered:

- Highways England *et al.* (2020a) DMRB LA104 Environmental assessment and monitoring;
- Highways England *et al.* (2020b) Design Manual for Roads and Bridges (DMRB) LA113 Road drainage and the water environment;
- Department for Environment, Food and Rural Affairs (Defra), 2015 Non-statutory technical standards for sustainable drainage systems;
- The Construction Industry Research and Information Association (CIRIA) (CIRIA) (2015a) C753, 2015a SuDS Manual;
- CIRIA (2015b) C741 Environmental good practice on site guide; and
- CIRIA (2001) C532, Technical Guidance: Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors.

2.2.3.2 Whilst DMRB LA113 was originally designed for linear transport projects, it is accepted that cable route projects can also follow the guidance due to their linear nature. In line with LA 113, the relevant hydrology and flood risk baseline conditions that require definition include the following.

- Surface water:
  - water quality: informed by WFD status, number and details of abstractions, discharges and pollution incidents; and
  - 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; and
  - dependant ecosystems: informed by details of downstream ecologically designated sites.
- Flood impacts (informed by the FRA (see Volume 3, Annex 2.3: Flood risk assessment of the ES)).

2.3 Consultation

2.3.1 Scoping

2.3.1.1 On 28 October 2022, the Applicants 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, operation and maintenance and decommissioning phases of the Transmission Assets.

2.3.1.2 Following consultation with the appropriate statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State) provided a Scoping Opinion on 8 December 2022.

2.3.1.3 Key matters raised during the scoping process specific to hydrology and flood risk are listed in **Table 2.4**, together with details of how these matters have been addressed within the ES.

2.3.2 Evidence plan process

2.3.2.1 Following scoping, consultation and engagement with interested parties specific to hydrology and flood risk has continued. An Evidence Plan Process (EPP) has been developed for the Transmission Assets, seeking to ensure engagement with the relevant aspects of the EIA process throughout the pre-application phase. The development and monitoring of the Evidence Plan and its subsequent progress has been undertaken by the EPP Steering Group. The Steering Group comprises the Planning Inspectorate, the Applicants, the Marine Management Organisation, Natural England, Historic England, the Environment Agency and the Local Planning Authorities as the key regulatory and bodies.

2.3.2.2 As part of the EPP, EWGs were set up to discuss and agree topic specific matters with the relevant stakeholders.

Hydrology and Flood Risk Expert Working Group

2.3.2.3 The Hydrology and Flood Risk EWG met in May 2023, August 2023 and January 2024. In attendance were representatives from stakeholders including the Environment Agency, Lancashire County Council, the LLFA, and LPAs.

2.3.2.4 Matters discussed within the Hydrology and Flood Risk EWG are presented within **Table 2.4**.

Technical engagement meetings

2.3.2.5 An additional technical engagement meeting was undertaken in August 2024 with the Environment Agency to further discuss the assessment of flood risk and use of climate change allowances within the assessment.

2.3.3 Statutory consultation responses

2.3.3.1 The preliminary findings of the EIA process were published in the Preliminary Environmental Information Report (PEIR) in October 2023. The PEIR was prepared to provide the basis for formal consultation under the Planning Act 2008. This included consultation with statutory bodies under Section 42 of the Planning Act 2008.

2.3.4 Summary of consultation responses received

2.3.4.1 A summary of the key items raised specific to hydrology and flood risk is presented in **Table 2.4**, together with how these have been considered in the production of this chapter. It should however be noted that formal responses are provided for all consultation responses received and can be accessed in the Consultation Report (document reference E1).

Table 2.4: Summary of key consultation comments raised during consultation activities undertaken for the Transmission Assets relevant to hydrology and flood risk.

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
Climate change			
May 2023	EWG meeting.	Confirmation of climate change allowance to be used within Peak Rainfall Allowances to be provided once clarification on the available flood model data has been shared.	No objections to the peak rainfall intensity to be used within conceptual drainage calculations of the onshore substations were raised during PEIR consultation. The peak rainfall intensity is further considered within the Outline Operational Drainage Management Plan (document reference J10). All Product 5 and 6 data relevant to the site was obtained during the preparation of the ES.
May 2023	EWG meeting.	The Environment Agency to provide a direct contact in relation to Product 6 data and to confirm the climate change allowance used within the Environment Agency fluvial flood model.	Product 5 and 6 data of the Ribble Estuary (2014) model and the Ribble Douglas (2010) model was obtained during the preparation of the ES and incorporated within Volume 3, Annex 2.3: Flood risk assessment of the ES.
August 2023	EA, Lancashire County Council and Blackpool EWG Meeting	The Environment Agency to investigate the missing data (flood depths and tidal data), unusable data (.txt and .ascii files) and confirm climate change allowance used within the Environment Agency fluvial model.	
November 2023	National Infrastructure Team Environment Agency Section 42 response	Flood risk: We are generally satisfied with the scope and assessment of hydrology and flood risk and consider that the proposed development could be safe without exacerbating flood risk elsewhere if the proposed flood risk mitigation measures are further developed and implemented. A number of areas need to be addressed in order to make these proposals consistent with government policy. In particular the climate change guidance needs to be applied to any assumptions currently made that underpin the Flood Risk Assessment. This should inform the design flood events being considered. You should treat this as a 'sensitivity test'. It will help assess how sensitive the proposal is to changes in the climate for different future scenarios. This will help to ensure your development can be adapted to large-scale climate change over its	An assessment of an increase of peak river flow and sea level rise driven by climate change has been made within Volume 3, Annex 2.3: Flood risk assessment of the ES. to the end of the construction phase for the landfall, onshore export cable corridor and 400 kV grid connection cable corridor and the operation and maintenance phase for the Morgan onshore substation and Morecambe onshore substation and has been accounted for within fluvial flood risk sections of the FRA. Peak rainfall intensity is taken into account within

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		lifetime.	surface water flooding sections as well as the Outline Operational Drainage Management Plan (document reference J10).
November 2023	National Infrastructure Team Environment Agency Section 42 response	The FRA does not incorporate consideration of climate change allowances. It does not clearly state how the guidance has been followed and which peak river flow and sea level allowances are to be used in the assessment.	
November 2023	National Infrastructure Team Environment Agency Section 42 response	This section (2.5.8.5-2.5.8.10 of the PEIR) does not identify what peak river flow allowance considerations are applicable to the proposed development.	
November 2023	National Infrastructure Team Environment Agency Section 42 response	The section does not reference climate change driven Peak River flows and Sea Level Rise and how these my interact with the scheme.	
November 2023	National Infrastructure Team Environment Agency Section 42 response	This section (2.5.8.15-2.5.8.16 of the PEIR) does not identify what sea level rise allowance considerations are applicable to the proposed development.	
November 2023	Freckleton Parish council planning Section 42 response	A further example is the lack of forethought that relates to the predicted changes in sea levels that is the driver for the need for green energy. The Fylde and Ribble estuary are naturally low lying with the Environment Agency having provided forecasts of the changes in flood risk in the recent past. This does not appear to have been considered, to date.	
November 2023	Freckleton Parish council planning Section 42 response	A further example is the lack of forethought that relates to the predicted changes in sea levels that is the driver for the need for green energy. The Fylde and Ribble estuary are naturally low lying with the	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		Environment Agency having provided forecasts of the changes in flood risk in the recent past. This does not appear to have been considered, to date.	
November 2023	National Infrastructure Team Environment Agency Section 42 response	The current wording within 2.8.6.4 of the PEIR is misleading and implies that Environment Agency mapping should take account of the factors mentioned. Clarify that the Environment Agency does not produce hydraulic or tidal models for development planning purposes, and that it is the applicant's responsibility to satisfactorily assess flood risk. Provide an acknowledgement of the limitations of the model used, and the approach used to overcome these limitations (i.e. Sensitivity testing).	Noted, clarification has been added within Volume 3, Annex 2.3: Flood risk assessment of the ES.
Drainage scheme			
December 2022	United Utilities	We request that surface water is only managed via sustainable drainage systems which are multi-functional and at the surface level in preference to conventional underground piped and tanked storage systems. Wherever practicable, Sustainable Drainage Systems (SuDS) should be implemented in accordance with the CIRIA SuDS manual.	Increased rates of surface water runoff arising from additional impermeable areas during construction, operation and maintenance and decommissioning phases of the Transmission Assets are detailed within **section 2.11.3**. The Outline Operational Drainage Management Plan (document reference J10) for both surface water and foul water drainage has been developed in accordance with the NPS, NPPF, PPG ID7 the SuDS Manual, Sustainable drainage systems: non-statutory technical standards and local council policy and details drainage proposals of new impermeable areas. The document includes information regarding the following: • sustainable drainage systems; • SuDS at the onshore substations; • climate change allowances; and • greenfield runoff rates.
December 2022	United Utilities	Provide details of any drainage proposals in respect of both foul and surface water. No surface water will be allowed to discharge to the existing public sewerage system. Surface water should instead discharge to more sustainable alternatives as outlined in the surface water management hierarchy. If a discharge to a watercourse is proposed, it is to be fully identified within the limits of the DCO.	
December 2022	Planning Inspectorate, Scoping Opinion	Based on the information within the Scoping Report detailing that the increased area of impermeable land as a result of the construction of the Proposed Development is unlikely to have the potential to lead to a noticeable change in run off rates, the Inspectorate is in agreement that an assessment of flood risk due to additional surface water run off can	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		be scoped out for the operational stage only. The ES should however detail any operational controls on maintenance works, for example an Operational Management Plan.	Discussions with United Utilities and landowners will be undertaken at the detailed design stage to confirm the location of water supply pipelines and sewer infrastructure. Impacts to private water supplies are considered in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES. An Outline CoCP (document reference J1) has been submitted with the application for development consent. This includes an Outline Surface Water and Groundwater Management Plan (document reference J1.9), which relates to the construction phase.
November 2023	Lancashire County Council Local Flood Authority Section 42 response	Surface water flood risk should be identified, assessed, minimised and mitigated appropriately in accordance with the National Planning Policy Framework and the Planning Practice Guidance through a flood risk assessment. Findings of the flood risk assessment(s) should be used to inform the design of sustainable drainage systems which serve impermeable surfaces, whether permanent or temporary. Surface water flood risk should also be considered during each construction phase, as heavy machinery can compact ground leading to increased surface water runoff. This can have a negative impact on nearby watercourses, such as increased sedimentation which can lead to siltation, poor water quality and an adverse effect on habitats. Surface water runoff from development should not impact on infrastructure such as roads and other infrastructure. If there is any potential for the development to impact the highway, rail or other network, then the suitability of drainage proposals should be discussed with Network Rail and/or the Highway Authority, to ensure the stability of their assets is not negatively affected. The development should maximise the opportunities presented to reduce the causes and impacts of flooding on and off-site, wherever they would be effective, in line with paragraph 161 of the National Planning Policy Framework and paragraphs 062 to 067 of the Planning Practice Guidance. This should be achieved through the design of the sustainable drainage system and, where appropriate, the use of Natural Flood Management techniques. A comprehensive sustainable drainage approach can help to alleviate flood risk as well as managing the impacts where flooding does occur, for example by: • Maximising opportunities for infiltration of surface water through replacement of impermeable surfaces with permeable surfaces;	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		• Maximising opportunities for planting and vegetated areas, in preference to engineered surfaces, to increase evapotranspiration and provide improvements for biodiversity and wider natural capital benefits; and • Providing additional surface water storage over and above the minimum requirements e.g. an over-sized pond, to accommodate more extreme rainfall events (e.g. 0.5% annual exceedance probability) leading to a more flood/climate resilient electricity infrastructure network. Specifically, appropriate sustainable drainage systems should be incorporated to drain any new impermeable surfaces such as compounds, sub-stations, roads, parking areas etc. SuDS should be designed to be compliant with the requirements set out in the National Planning Policy Framework, the Planning Practice Guidance and the Defra Technical Standards for SuDS. A site-specific 'Operation and Maintenance Manual' for the lifetime of the development of each sustainable drainage component that makes up each sustainable drainage system should be compiled. Typically the Lead Local Flood Authority would expect this to include, as a minimum: • A timetable for its implementation; • Details of the maintenance, operational and access requirement for all SuDS components and connecting drainage structures, including all watercourses and their ownership; • Pro-forma to allow the recording of each inspection and maintenance activity, as • well as allowing any faults to be recorded and actions taken to rectify issues; • The arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme in perpetuity;	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		• Details of financial management including arrangements for the replacement of major components at the end of the manufacturer's recommended design life; • Details of whom to contact if pollution is seen in the system or if it is not working correctly; and • Means of access for maintenance and easements. Thereafter the sustainable drainage systems should be retained, managed, and maintained in accordance with the approved details. In Lancashire we provide general advice and support on SuDS design through the Lancashire SuDS Pro-forma and accompanying guidance which we recommend are used in finalising SuDS designs and for consistency in expectations in Lancashire.	
November 2023	United Utilities Section 42 response	We wish to highlight that consistent with the principles of the hierarchy for the management of surface water in national planning policy and the obligations of the Environment Act 2021, no surface water will be allowed to discharge to the existing public sewerage system. Surface water should instead discharge to more sustainable alternatives as outlined in the surface water management hierarchy. This will ensure the impact of development on public wastewater infrastructure, both in terms of the wastewater network and wastewater treatment works, is minimised. We adopt this position as surface water flows are very large when compared with foul flows. By ensuring that no surface water enters the public sewerage system, the impact on customers, watercourses and the environment will be minimised.	
November 2023	United Utilities Section 42 response	Given the importance of surface water discharging to an alternative to the public sewer, we request that all land that is necessary to facilitate a discharge to a watercourse is fully identified within the limits of the DCO. This will ensure the site benefits from the requisite rights to discharge to more sustainable alternatives than the public sewer for the management of surface water, e.g., a right to discharge to a watercourse or other water body. For clarity, the extent of land should be sufficient to facilitate a surface water discharge to a watercourse/water body for all elements	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		of your proposal. Ensuring that the extent of land within the site and the supporting Environmental Statement is sufficient for the purposes of the discharge of surface water is important as a sewerage company has limited powers to acquire the right to discharge surface water to a water body under the Water Industry Act.	
November 2023	United Utilities Section 42 response	We request that surface water is only managed via sustainable drainage systems which are multi-functional and at the surface level in preference to conventional underground piped and tanked storage systems. Wherever practicable, Sustainable Drainage Systems (SuDS) should be implemented in accordance with the CIRIA SuDS manual. Managing surface water through the use of SuDS can provide benefits in water quantity, water quality, amenity and biodiversity. If the applicant intends to offer wastewater assets forward for adoption by United Utilities, their proposed detailed design will be subject to a technical appraisal by our Developer Services team and must meet the requirements outlined in 'Sewers for Adoption and United Utilities' Asset Standards'. This is important as drainage design can be a key determining factor of site levels and layout.	
November 2023	United Utilities Section 42 response	We would be grateful if you can provide details of any drainage proposals in respect of both foul and surface water. This should include rates of discharge, volumes of discharge, points of connection, the nature and extent of any contaminants, and details of any necessary pre-treatment prior to connection to the public sewer. We request that you provide details of drainage during operation of the windfarm and during the construction period. We request further details of any approach for the storage and disposal of any hazardous fluids. We wish to understand whether there is any intention to connect such flows to our public sewerage network and to ensure any potential impact on water supply assets, including the groundwater environment, is fully considered and mitigated.	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
November 2023	United Utilities Section 42 response	Without effective management and maintenance, sustainable drainage systems can fail or become ineffective. As a provider of wastewater services, we believe we have a duty to advise the determining authority of this potential risk to ensure the longevity of the surface water drainage system and the service it provides to people. We also wish to minimise the risk of a sustainable drainage system having a detrimental impact on the public sewer network should the two systems interact. We therefore recommend that you include details of a management and maintenance regime for any sustainable drainage system that is included as part of the proposed development. Please note that United Utilities cannot provide comment on the management and maintenance of an asset that is owned by a third party management and maintenance company. We would not be involved in the approval of the management and maintenance arrangements in these circumstances.	
November 2023	United Utilities Section 42 response	Please note, United Utilities is not responsible for advising on rates of discharge to the local watercourse system. This is a matter for discussion with the Lead Local Flood Authority and/or the Environment Agency (if the watercourse is classified as Main River).	
November 2023	United Utilities Section 42 response	If considering a diversion, the applicant should contact United Utilities at their earliest opportunity as they may find that a diversion is not possible. In some circumstances, usually related to the size and nature of the assets impacted by proposals, developers may discover that the cost of a diversion is prohibitive in the context of their development scheme. Unless there is specific provision within the title of the property or an associated easement, any necessary disconnection or diversion of assets to accommodate development, will be at the applicant's/developer's expense.	
November 2023	Lancashire County Council Local Flood	It should be stated how the necessary maintenance and management will be secured for the lifetime of the anticipated planning obligations.	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
	Authority Section 42 response		
November 2023	National Infrastructure Team Environment Agency Section 42 response	Potential for risk of flooding of works compounds associated with HDD	
November 2023	National Infrastructure Team Environment Agency Section 42 response	There is no mention of how sewerage from toilets and welfare facilities in the temporary construction compounds will be handled.	
November 2023	United Utilities Section 42 response	The on-shore drainage from the proposed scheme should also be assessed within the Environmental Statement for the risk to groundwater abstractions (G11). G11 - Discharges from areas subject to contamination Discharges of surface water run-off to ground at sites affected by land contamination, or from sites used for the storage of potential pollutants are likely to require an environmental permit. This applies especially to sites where storage, handling or use of hazardous substances occurs (for example, garage forecourts, coach and lorry parks/turning areas and metal recycling/vehicle dismantling facilities). These sites will need to be subject to risk assessment with acceptable effluent treatment provided.'	
Field drainage / water supply and drainage infrastructure			
November 2023	National Farmers Union Section 42 response	Drainage: The PEIR Non-Technical Summary 8.3.4.2 notes that the CoCP will include measures to address drainage issues during the construction phase. NFU members have expressed concern that agricultural activities will be severely affected if drainage is not addressed comprehensively and with landowner/tenant engagement. It	The impact of damage to existing field drainage is assessed within **section 2.11.6**. Measures to manage impacts to field drainage are set out in the Outline CoCP (document reference J1) to ensure the existing drainage of the land is maintained during and after

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		is understood that the CoCP will include an Outline Operational [Onshore Substation] Drainage Management plan in consultation with the Environment Agency and local flood authorities. However, it is important that similar care is taken with field drainage alongside the cable corridor. The PEIR Volume 1 Chapter 3 highlights the Projects commitments to construction drainage in Table 3.38 and stipulates that the contractor will develop field drainage plans in consultation with landowners. It is essential that the Project appoints a local drainage consultant to help develop and design both pre and post construction drainage plans.	construction. Further details are provided in **section 2.8** and **Table 2.19**.
November 2023	National Farmers Union Section 42 response	The NFU would welcome the opportunity to engage with the Project on this and for the wording to be included within the Outline Code of Construction, so that it is taken forward and becomes binding on contractors under the Code of Construction. The NFU wording covers the following: a) Role of an Agricultural Liaison Officer b) Records of Condition c) Biosecurity d) Irrigation e) Agricultural Land Drainage f) Treatment of Soils g) Agricultural Water Supplies	
December 2022	Planning Inspectorate, Scoping Opinion	Whilst the Inspectorate is in agreement that localised damage to field drainage and water pipes is unlikely during maintenance and operational works as these are limited in duration, scope and the need for excavation, the ES should provide details of any construction or decommissioning control measures to ensure that any damage during these phases is repaired prior to the operational phase so as to ensure there are no impacts during operation.	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
Flood risk			
May 2023	EWG meeting	Discussion of available data for assessing flood risk and methodology to be used going forward.	Outcomes from discussions have been taken forward with the progression of the FRA.
August 2023	EWG meeting	Summary of preliminary outcomes of the PEIR FRA and discussion of data gaps surrounding Environment Agency Product 6 data and updated council data. Discussion of commitment to be made relating to hydrology and flood risk, including initial crossing methodologies for Main Rivers and ordinary watercourses.	Additional requests for Environment Agency data made to ensure the FRA was using the most complete and up to date data available.
January 2024	EWG meeting	Presentation of initial updates made to the location of the onshore substations and onshore cable routes. Request of clarification on Environment Agency Product 6 data and further discussion of commitments to be made relating to hydrology and flood risk, including crossing methodologies for both Main Rivers and ordinary watercourses.	Additional Product 6 data obtained from the Environment Agency which has since been used to update the assessment of flood risk to the Transmission Assets.
August 2024	Environment Agency meeting	Discussion of updated methodologies in which climate change and flood risk is assessed within the FRA.	Incorporation of updated assessment methodology to the Transmission Assets from the impacts of climate change to flood risk.
December 2022	Planning Inspectorate, Scoping Opinion	The Scoping Report proposes to scope out flood risk as a result of run off during the decommissioning stage. Based on the information within the Scoping Report detailing that the transmission cable is to be left in situ and therefore the decommissioning will involve the limited areas of above ground installations, the Inspectorate is in agreement that significant effects are unlikely and that this topic can be scoped out.	Noted.
December 2022	Environment Agency, Scoping Opinion	Impacts of increased flood risk arising from damage to existing flood defences. This should include formal constructed flood defences, but also consider impacts to natural flood defence mechanisms, notably the sand dunes at Lytham.	Impacts to formal and informal flood defences are assessed within **section 2.11.4** of this chapter. It is noted that the Applicants have committed to the use of trenchless techniques to pass beneath the dunes

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
December 2022	Planning Inspectorate, Scoping Opinion	Based on the information within the Scoping Report detailing that maintenance works are unlikely to interact with existing flood defences, the Inspectorate is in agreement that an assessment of flood risk due to damage to flood defences can be scoped out. The ES should however detail any operational controls on maintenance works, for example an Operational Management Plan.	(see **section 2.8** and **Table 2.19**), which will avoid damage to the dune system. Assessment of flood risk due to damage to flood defences has been scoped out for the operation and maintenance phase. The Outline Operational Drainage Management Plan (document reference J10) details operational controls on maintenance works. Embedded and secondary mitigation measures adopted as part of the project in relation to hydrology and flood risk are shown in **Table 2.19** of this chapter.
November 2023	National Infrastructure Team Environment Agency Section 42 response	Flood risk arising from damage to existing flood defences and because of additional surface water runoff during operation and maintenance have been scoped out of the assessment. This is subject to the ES detailing any operational controls in a management plan. We are satisfied with this approach. However details of such controls have not been considered in the Table of Commitments, CoT35 only considers the Outline CoCP.	
December 2022	United Utilities	Flood risk from all sources, including sewers, must be considered in the delivery of new development.	All forms of flooding including fluvial, tidal, pluvial (surface water), groundwater and artificial sources (reservoir, sewer, field drainage) are considered within Volume 3, Annex 2.3: Flood risk assessment of the ES.
November 2023	United Utilities Section 42 response	You should also consider the risk of flooding from reservoirs. You should seek to ensure that reservoir flood paths are avoided in the location of your development. United Utilities manages a large portfolio of statutory and non-statutory reservoirs in the north west of England. It is essential that the ES adequately presents the impact of the development upon dam breach flood inundation mapping, which may affect the statutory dam safety designation of our reservoir assets. UK reservoir safety is regulated by the EA/Department for Environment, Food & Rural Affairs (Defra), and consultation with the EA, our Dam safety management team, and any relevant local authorities is required to ensure that any changes to dam safety risk is fully understood, is appropriate and is approved by the regulator and ourselves as reservoir operator.	
November 2023	United Utilities Section 42 response	Existing drainage systems are often dominated by combined sewers. This method of sewer infrastructure is a result of the time it was constructed, with combined sewers taking both foul and surface water. If there is a consistent approach to surface water management, it will help	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		to manage and reduce surface water entering the sewer network, decreasing the likelihood of flooding from sewers, the impact on residents and businesses, and the impact on the environment. Whilst we do all that we can to reduce the risk of sewer flooding, there remains a residual risk, which is a source of flooding that should be considered in your Environmental Statement (ES). National policy is clear that flood risk from all sources, including sewers, must be considered in the delivery of new development. As such, it is important to ensure that the assessment of flood risk includes sewer flood risk. It should be ensured that your proposed development does not result in an increase in flood risk from the public sewer as a result of: i) any proposed new drainage connections to the public sewer. This is considered in further detail below; ii) by altering any existing exceedance flood paths of losses from the public sewer; iii) by locating any above ground elements of your proposal in areas where there is an existing risk of sewer flooding. There are a number of locations within the scoping boundary where our modelling data indicates flood water exceedance paths from the public sewer and we would need to liaise with you to assess your proposals in relation to this point and point ii); iv) as a result of any diversions/works to watercourses or existing sewers which could materially affect hydraulic performance and therefore change/increase any risk of flooding; v) as a result of any changes in ground levels which could materially change existing sewer flood risk; or vi) as a result of any changes to land or property currently affected by existing hydraulic sewer flooding incidents. We therefore request the Environmental Statement considers flood risk from the public sewerage system in liaison with United Utilities so that the above matters are fully considered.	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
November 2023	National Infrastructure Team Environment Agency Section 42 response	In areas where surface water flow paths may be encountered, there is potential to divert and concentrate flow routes of surface water as well as mobilising silt and sediment that could be transported elsewhere to undesirable effect.	
November 2023	United Utilities Section 42 response	You should also consider the risk of flooding from reservoirs. You should seek to ensure that reservoir flood paths are avoided in the location of your development. United Utilities manages a large portfolio of statutory and non-statutory reservoirs in the north west of England. It is essential that the ES adequately presents the impact of the development upon dam breach flood inundation mapping, which may affect the statutory dam safety designation of our reservoir assets. UK reservoir safety is regulated by the EA/Department for Environment, Food & Rural Affairs (Defra), and consultation with the EA, our Dam safety management team, and any relevant local authorities is required to ensure that any changes to dam safety risk is fully understood, is appropriate and is approved by the regulator and ourselves as reservoir operator.	
March 2023	Environment Agency Preston and South Ribble Flood Risk Management Scheme.	Potential for the construction of the Transmission Assets to coincide with the construction of Penwortham flood defence scheme	It has been confirmed at the March 2023 EWG that the difference in phasing between the Transmission Assets and Penwortham flood defence scheme makes interaction between the schemes unlikely and this is not therefore considered within the ES.
May 2023	EWG consultation meeting.	Applicants to liaise with Central Lancashire strategic Flood Risk Assessment to determine if more up to date data is available for the study area.	Consultation with councils was made during the PEIR and no further responses were received. Latest information provided within each relevant council's website as of August 2024 has been taken forward within Volume 3, Annex 2.3: Flood risk assessment of the ES and this chapter.
May 2023	EWG consultation meeting.	Lancashire County Council to confirm whether the flood risk management plan (FRMP) for North West and the PRFA for Preston is Penwortham specific.	
May 2023	EWG consultation meeting.	Blackpool Council to provide timescales for the strategic Flood Risk Assessment and whether this data can be shared with the Applicants.	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
August 2023	EA, Lancashire County Council and Blackpool EWG Consultation Meeting	Applicants to contact South Ribble Borough Council to request updated flood mapping from the Fylde 2011 Strategic Flood Risk Assessment.	
November 2023	National Infrastructure Team Environment Agency Section 42 response	The FRA is built on out-of-date data. The Environment Agency Flood Model data (Ribble Estuary Tidal model (2014) and the Ribble Douglas model (2010)) used to inform the FRA are at least 10 years old and do not take into account updated climate change requirements for peak river flow and Sea Level Rise (SLR). The FRA does not acknowledge that our product 6 information is supplied under the terms of our Conditional Licence. EA models may have been superseded by updated guidance and may not be suitable for site specific or scheme specific assessments.	The Environment Agency's response to the February 2024 Technical Note confirmed that no new flood risk data is available from the Environment Agency. The FRA has been updated to acknowledge that product 6 information is supplied under the terms of the conditional licence. Flood levels within mapping have been derived from the Environment Agency Product 6 data from the Ribble Douglas and Ribble Estuary hydraulic models. Additional mapping is presented within Volume 3, Annex 2.3: Flood risk assessment of the ES including spot flood levels overlain upon flood depth data across those elements of the Transmission Assets at risk of flooding.
November 2023	National Infrastructure Team Environment Agency Section 42 response	No information is included to explain how the flood levels on site are derived	
November 2023	National Infrastructure Team Environment Agency Section 42 response	Inconsistent approach in use of terminology. The FRA refers to 'The flood annual exceedance probability (AEP) events'… But then uses Return Periods (years) rather than AEP.	Noted, references have been updated to AEP % rather than return periods (years).
November 2023	National Infrastructure Team Environment Agency Section 42 response	The figure uses the opposite colouring convention to that used in Flood Map for Planning. The figure shows Flood Zone 3 as light blue and Flood Zone 2 as dark blue.	Noted, mapping has been updated and presented within Volume 3, Annex 2.3: Flood risk assessment of the ES.

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
November 2023	National Infrastructure Team Environment Agency Section 42 response	Flood alerts cover large areas and the described approach to responding to flood alerts/warnings does not allow for site specific considerations.	The Applicants are committed to preparing flood warning and evacuation procedures as set out within the Outline CoCP (document reference J1). Control measures are outlined in **section 2.8 a**nd **Table 2.19** of this chapter.
November 2023	National Infrastructure Team Environment Agency Section 42 response	CoT90 and 97 Flood Risk Management Plans have yet to be developed.	
November 2023	National Infrastructure Team Environment Agency Section 42 response	CoT39 Potential for damage to/loss of infrastructure associated with Main River or flood risk management	This commitment remains in place. Control measures are outlined in **section 2.8** and **Table 2.19** of this chapter.
November 2023	National Infrastructure Team Environment Agency Section 42 response	Incorrect text regarding the status of sand dunes as sea defences. Beach dunes are classed as a sea defences under the North West Regional Land Drainage Byelaws (redacted for EPR 2016). Prohibitions protect the natural sea defence(s) from damage.	Whilst not included within the Environment Agency spatial flood defences dataset, the Fylde sand dunes offer protection from tidal flooding to inland areas by virtue of elevation and also act to reduce wave action. As the beach is not listed within the Environment Agency spatial flood defences dataset and a standard of protection is not defined, the flood defences are categorised as informal flood defences.
Landfall crossing methodology			
November 2023	Natural England Section 42 response	One of the main justifications of having less significant impact on ecological receptors is the use of Horizontal Directional Drilling (HDD) or alternative trenchless techniques. However, no evidence is provided within the report as to why this approach is less intrusive and will have less impact. Further evidence should be provided regarding this approach, to set out	Crossing techniques are set out within Volume 1, Annex 3.2: Onshore crossing schedule of the ES. Further details regarding Lytham St Annes dunes are provided within Volume 3, Chapter 1: Geology, hydrogeology and ground conditions and Volume 3, Chapter 3: Onshore ecology and nature conservation

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		why using these techniques will have less of impact including description, predicted noise levels, operation and methodology.	of the ES.
November 2023	Natural England Section 42 response	One of the main justifications of having less significant impact on ecological receptors is the use of Horizontal Directional Drilling (HDD) or alternative trenchless techniques. However, no evidence is provided within the report as to why this approach is less intrusive and will have less impact. Further evidence should be provided regarding this approach, to set out why using these techniques will have less of impact including description, predicted noise levels, operation and methodology.	
November 2023	Natural England Section 42 response	As the proposed installation method for to avoid Lytham St. Anne's SSSI is HDD, it is felt that the developer has not fully considered the Maximum Design Scenario (MDS) for this designated site. Please see comment 6.12 for further detail. A full baseline assessment of Lytham St. Anne's Dunes SSSI should be undertaken, and presented within the submitted ES, so that should the worst-case scenario occur (i.e. HDD is not possible) sufficient ecological data is available to inform/develop suitable mitigation measures. In addition, it could be used as a baseline for post-construction monitoring (and a means to determine recovery)	
November 2023	National Infrastructure Team Environment Agency Section 42 response	Lack of clarity regarding the cabling method (HDD or open trench) across the intertidal area	
November 2023	Natural England Section 42 response	There is a lack of consideration of other impacts to Lytham St Annes Dunes SSSI, particularly with regards to changes to the water table. The SSSI citation highlights 'the series of exceptionally large and extensive dune slacks on either side of Clifton Drive North support a wide range of species which vary according to the depth of water and degree of moisture retention in relation to the water table'.	Whilst this impact is fully explored within Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES, due to linkages between surface water and groundwater, reference to discussions involving groundwater is made within this chapter (Volume 3, Chapter 2: Hydrology and flood risk) of the

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		Depending on the depth of cable installation the impacts of HDD on the dune water table (i.e., the cable resulting in the dune slacks becoming drier changing the species composition) should be considered.	ES The effects of surface water runoff during construction have been assessed within **section 2.11.3**.
November 2023	Natural England Section 42 response	There is a lack of consideration of other impacts to Lytham St Annes Dunes SSSI, particularly with regards to changes to the water table. Please see comment 6.27 for further detail.	
November 2023	National Infrastructure Team Environment Agency Section 42 response	Sand dune restoration. Applicant should engage with the Fylde Sand Dune Group which is responsible for sand dune restoration along this section of the coast. This work is part funded by the Environment Agency and is a long term ongoing project.	The Applicants have undertaken consultation with Fylde Sand Dune Project.
Watercourse crossing methodology			
December 2022	Fylde Council, Scoping Opinion	Whilst it is clear that there is a potential impact on the coastal margin of the borough around the landing site, where there is a fragile dune system that has important roles in sea defence, wildlife habitat and other environmental aspects, at least this is a known location. The document makes some reference to the relevant aspects that need to be considered in that location. However, the routeing from the landing point to where the cables will leave the borough to connect to Penwortham covers large swathes of the borough, and there is little in the Scoping Opinion report that sets out how that is likely to impact on the wide range of environmental and other infrastructure that the cable route will cross. These include infrastructure such as main roads, railway lines, key drainage ditches, other power and utility connections, etc. as well as various international and local level ecological designations and their associated IRZs. The scope of the EIA needs to be sufficient to ensure that all these are appropriately considered.	The site selection process for the landfall is detailed within Volume 1, Annex 4.3: Selection and refinement of onshore infrastructure and Volume 1, Chapter 3: Project description of the ES. Volume 1, Annex 3.2: Onshore crossing schedule of the ES sets out the proposed crossing techniques for features affected by the Transmission Assets. Trenchless techniques are proposed to be used to cross beneath main rivers. Mitigation measures are outlined in **section 2.8 a**nd **Table 2.19** of this chapter.
November 2023	National Infrastructure Team Environment	Ensure the use of trenchless techniques at vulnerable locations (Main Rivers)	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
	Agency Section 42 response		
November 2023	National Infrastructure Team Environment Agency Section 42 response	CoT90 Project route requires crossing the River Ribble, Crossing could have a detrimental environmental impact at this vulnerable location.	This commitment remains in place. Details of the measures proposed are set out in **section 2.8** (see CoT90).
November 2023	National Infrastructure Team Environment Agency Section 42 response	It is unclear how the choice of a minimum vertical clearance of 2m between the hard bed of watercourses and any flood defences has been derived and this may not be sufficient in some instances.	It is noted within the Defra document Exempt flood risk activities: environmental permits (Section 3) (Defra, 2020) that service crossings are to be at least 1.5 m below the riverbed along its whole length. We have used the guidance to inform the depth of trenchless techniques below the hard bed of watercourses and any flood defences.
November 2023	Canal and River Trust Section 42 response	Based on the consultation brochure the cables would appear to be being installed via HDD. The details describe that the corridor width will be 70m, with up to 18 cables. The trench depth would be 1.8m in depth (1.2m to top of the ducting). Given this suggested depth of 1.8m, this would not be suitable for the canal/brook crossings. In accordance with the Trust's Third Part\:) Works Code of Practice (CoP) Part 2 https://canalrivertrust.org.uk/business-and-trade/undertaking-works-on-our-property-and-our-code-of-practice we would expect any waterway crossing {pipes, cables etc) to be installed under the waterway and cross perpendicular to the waterway. We would normally expect such crossings to be constructed via trenchless techniques and the crown of the crossing would need to be at least 3.5m below hard bed level of the waterway to ensure any settlement does not impact the waterway. However, this could crossing require a greater depth, depending on the results of the borehole/geotechnical information provided. This would mean that the launch and reception pits would be set well away from the waterway to allow the HDD to achieve the required depth. The route and depth of any	Volume 1, Annex 3.2: Onshore crossing schedule of the ES sets out the proposed crossing techniques for features affected by the Transmission Assets. Trenchless techniques are proposed to be used to cross beneath main rivers. Mitigation measures are outlined in **section 2.8** and **Table 2.19** of this chapter.

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		such crossing, method statements, construction techniques and associated ground investigations will need to be approved by the Trust's geotechnical specialists, all via the CoP process. We would welcome further discussion in relation to this matter.	
December 2022	Canal and River Trust, Scoping Opinion	Our interest relates to the landfall elements of the scheme and how a connection would be made to Penwortham. Such a connection would require at least one crossing of our waterway that we have interests within and a number of assets. We would welcome further discussion with the Promoter of the scheme to establish where such a crossing (underground) of the waterways would be required. We would want to ensure that the structural integrity of our assets are safeguarded.	Any works that affect Canal and River Trust waterways or land will comply with the Canal & River Trust 'Code of Practice for Works affecting the Canal & River Trust'. Further details of all commitments are provided in **section 2.8**
November 2023	Lancashire County Council Local Flood Authority Section 42 response	Any impact on Ordinary Watercourses should be identified, assessed, minimised and mitigated appropriately irrespective of whether the works impacting an Ordinary Watercourse are temporary or permanent and according to site-specific circumstances. Existing watercourses should be protected and, where appropriate, enhanced through the site layout, for example, naturalization, de-culverting, and the creation of riparian habitats. The culverting of any Ordinary Watercourses should be avoided. When designing a site layout, it is critical to consider the future ownership of and access to any on-site watercourses. The site layout must provide safe access to all on-site watercourses for maintenance purposes. No development should occur within 8 metres from the bank top of any Ordinary Watercourse to achieve this. This includes the construction of structures such as walls and fences and any activity during the construction phases of development. Failure to provide appropriate access and maintenance arrangements for Ordinary Watercourses can increase flood risk over the lifetime of the development, contrary to the National Planning Policy Framework	Volume 1, Annex 3.2: Onshore crossing schedule of the ES sets out the proposed crossing techniques for features affected by the Transmission Assets. Trenchless techniques are proposed to be used to cross beneath main rivers. Mitigation measures are outlined in **section 2.8** and **Table 2.19** of this chapter. An Outline CoCP (document reference J1) has been submitted with the application for development consent. This includes an Outline Pollution Prevention Plan (document reference J1.4), which relates to the construction phase.
November 2023	Lancashire County Council Local Flood	Open trench watercourse crossings should be avoided wherever possible, with trenchless construction methods such as horizontal	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
	Authority Section 42 response	directional drilling prioritised to minimise any unwanted effects on the bed and banks of the watercourse, and any disruption to existing flora, fauna and/or habitats. Where open trench watercourse crossings cannot be avoided, then effective construction method statements should be produced to detail, in chronological order, how the works will be undertaken from start to finish. Typically the Lead Local Flood Authority would expect this to consider, as a minimum: • How the works will be arranged to ensure there is no increase in flood risk to third parties. All reasonable precautions should be taken during the undertaking of the works so as not to obstruct or impede the flow of the watercourse. If over pumping is used, then this should only be undertaken in a manner that minimises bed disturbance, avoids movement of silt and minimises scour. A suitable screen/strainer should also be provided to prevent fish and other material being drawn in. • How any pollution risks will be managed and dealt with should they occur, i.e. the release of fine sediments and other pollutants into the watercourse during the construction works. How the bed and banks of the watercourse will be restored once the works are complete. Material used for backfilling must be inert and not contain any material that could potentially leach out into the watercourse. Any landscaping of banks must be restricted to native species only, and invasive species such as Japanese Knotweed, if encountered, must be managed and controlled on site.	
November 2023	National Infrastructure Team Environment Agency Section 42 response	Information regarding fluvial and tidal watercourse standoff distances is incorrect.	Volume 1, Annex 3.2: Onshore crossing schedule of the ES sets out the proposed crossing techniques for features affected by the Transmission Assets. Trenchless techniques are proposed to be used to cross beneath main rivers and suitable stand off

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
November 2023	National Infrastructure Team Environment Agency Section 42 response	The wording in this commitment incorrectly refers to 'Environment Agency Ordinary Watercourses'. Watercourses are either designated statutory 'Main Rivers' under the regulatory control of the Environment Agency or 'Ordinary Watercourses' under the control and regulatory powers for the Lead Local Flood Authority. Incorrect designation of a watercourse may affect the required stand-off distance, and it is unclear where the current stated stand- off distance of 10m is derived from.	details are proposed. Mitigation measures are outlined in **section 2.8 a**nd **Table 2.19** of this chapter. Wording of 'Environment Agency Ordinary Watercourses' has been updated to 'Ordinary Watercourses'. This was a reference error within the PEIR and has been updated within the ES.
November 2023	National Infrastructure Team Environment Agency Section 42 response	CoT10 Incorrect use of terminology regarding classification of watercourses. Watercourses are either designated statutory 'Main Rivers' under the regulatory control of the Environment Agency or 'Ordinary Watercourses' under the control and regulatory powers for the Lead Local Flood Authority. Incorrect designation of a watercourse may affect the required stand- off distance, and it is unclear where the current stated stand-off distance of 10m is derived from.	
November 2023	Lancashire County Council Local Flood Authority Section 42 response	Natural flood management techniques work with natural processes to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast. They aim to manage the sources and pathways of flood waters whilst providing wider benefits to people, wildlife and the environment. Examples include: • Land management such as removing impermeable surfacing to maximise infiltration, planting trees to increase evapotranspiration, or making green space where flood waters are most likely to flow or collect, or where rivers and their meanders are likely to migrate; Watercourse restoration such as removing culverts and other capacity restrictions, reintroducing meanders to provide additional storage, or naturalising river beds and banks to slow the flow.	Ecology mitigation and enhancement is proposed within the onshore infrastructure area (see Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES). No watercourses will be diverted as part of the DCO application.

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
Water quality considerations			
December 2022	Canal and River Trust, Scoping Opinion	The Trust will require any works which interfere with our waterways/land to comply with the Canal & River Trust 'Code of Practice for Works affecting the Canal & River Trust'.	Any works that affect Canal and River Trust waterways or land will comply with the Canal & River Trust 'Code of Practice for Works affecting the Canal & River Trust'. Further details of all commitments are provided in **section 2.8.** Volume 1, Annex 3.2: Onshore crossing schedule of the ES presents crossing techniques of watercourses within the onshore infrastructure. The Outline CoCP (document reference J1) includes a number of outline plans: • Outline Pollution Prevention Plan (document reference J1.4) • Outline Spillage and Emergency Response Plan (document reference J1.8); • Outline Surface Water and Groundwater Management Plan (document reference J1.9); and • Outline Bentonite Breakout Plan (document reference J1.13). The Outline Operational Drainage Management Plan (document reference J10) details operational controls on maintenance works for the drainage networks serving the onshore substations to prevent pollution and contamination to waterbodies. The project is in discussion with United Utilities on an ongoing basis regarding interactions with United
December 2022	Planning Inspectorate, Scoping Opinion	Based on the information provided within the Scoping Report detailing that maintenance works would be limited in duration, and with limited potential for using polluting substances, the Inspectorate is in agreement that an assessment of contaminated run off into rivers during operation and maintenance works can be scoped out of the assessment. The ES should however detail any operational controls on maintenance works, for example an Operational Management Plan.	
December 2022	Planning Inspectorate, Scoping Opinion	Based on the information within the Scoping Report detailing that maintenance works are unlikely to lead to disturbance of surface water bodies or contribute fine sediment to water courses, the Inspectorate is in agreement that an assessment of these matters can be scoped out for the operational stage only. The ES should however detail any operational controls on maintenance works, for example an Operational Management Plan.	
December 2022	United Utilities	United Utilities requests that the assessment of potential environmental impact from contamination fully considers the impact on our assets, water resources and water quality as a result of construction of the proposed development.	
December 2022	United Utilities	The applicant should follow best practise in their use and storage of fuels, oils, chemicals and other wastes, to remove the risk of causing pollution during construction and operation of the scheme. This should be included in a Construction Environmental Management Plan (CEMP). This will need to be specific to the environmental setting of the area and should fully reflect the implications of a location within a SPZ.	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
December 2022	Natural England, Scoping Opinion	The ES should include information on the sediment quality and potential for any effects on water quality through suspension of contaminated sediments. The EIA should also consider whether increased SSC resulting are likely to impact upon the interest features and supporting habitats of the designated sites. The ES should consider whether there will be an increase in the pollution risk as a result of the construction or operation of the development.	Utilities' apparatus and any protections required in the form of protective provisions
December 2022	Natural Resource Wales	NRW recommend scoping in accidental pollution and suspended sediment concentrations during the construction phase. This impact pathway has been scoped out based on the Environmental Management Plan, Pollution Prevention Guidelines and Marine Pollution Contingency Plans. However, a contingency plan is not enough to rule out the potential likely effect, thus the impact pathway should be scoped into the EIA.	
November 2023	Canal and River Trust Section 42 response	Pollution prevention The canal/brook should be considered as a sensitive receptor as a watercourse. A robust and comprehensive Construction Environment Management Plan (CEMP) would be required to include aspects of how materials, fuels, chemicals and wastes will be stored and where; measures for the prevention of dust generation and windblown litter and debris; measures to prevent run off into the canal and culverts (e.g. of silt water, contaminated water, fuels and chemicals; pollution response emergency procedures and details of any planned water abstractions and/or discharges from or which may impact upon our waterways. Stockpiles must be kept away from the waterway and drainage Systems to reduce potential sediment ladened runoff entering the waterways. Silt curtains should also be used to stop surface water runoff. Where the works require stripping topsoil and removing vegetation, such as grass, silt curtains should be kept in place to protect against surface water runoff until sufficient vegetation has grown back on the reinstated topsoil to stabilise the soil and to act as a natural buffer. Site excavations will	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		likely need to be dewatered, these cannot be discharged to the canal/brook without our consent. Discharges to land will need to be kept away from waterways. We note that a pollution prevention plan is being drafted, this will need reviewing after it is issued.	
November 2023	National Infrastructure Team Environment Agency Section 42 response	1.5.1.14 of the PEIR describing HDD does not include clarity regarding which document will consider the management of effluent arising from HDD (potential contamination with soil conditioners etc), or from any subsequent dewatering activity.	
November 2023	National Infrastructure Team Environment Agency Section 42 response	CoT35 Measures required to manage environmental risks have yet to be fully addressed.	This commitment remains in place. Mitigation measures are outlined in **section 2.8** and **Table 2.19** of this chapter.
November 2023	National Infrastructure Team Environment Agency Section 42 response	CoT85 Measures to protect water quality and flow during trenched crossing of minor watercourses have yet to be fully developed.	This commitment remains in place. Control measures are outlined in **section 2.8** and **Table 2.19** of this chapter.
November 2023	National Infrastructure Team Environment Agency Section 42 response	CoT04 Pollution prevention risks have yet to be fully addressed	This commitment remains in place. Control measures are outlined in **section 2.8** and **Table 2.19** of this chapter.
November 2023	National Infrastructure Team Environment Agency Section 42 response	Section 1.5.1.8 of the PEIR states that there is lack of clarity regarding where details of permanent pollution measures (i.e. interceptors) at the substations will be included. The Outline Operational [Onshore Substation] Drainage Management Plans will consider drainage from a flood risk perspective but there is no mention as to whether these would also detail permanent pollution prevention at these sites.	Additional information regarding permanent pollution measures is provided within the Outline Operational Drainage Management Plan (document reference J10).

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
Hydrogeomorphology			
November 2023	National Infrastructure Team Environment Agency Section 42 response	CoT10 Geomorphologically active rivers, together with the impact of increased peak river flows can result in erosion and bed incision and subsequent exposure of infrastructure	This commitment remains in place. Control measures are outlined in **section 2.8** and **Table 2.19** of this chapter.
Water resources			
November 2023	National Infrastructure Team Environment Agency Section 42 response	The potential need for the regulation of discharges arising from dewatering of trenches has not been acknowledged. This activity is likely to be required over significant areas of trenching, resulting in numerous potential dewatering discharges. As a result of consideration of the potential for (temporary works) trench dewatering, and associated uncertainties we cannot currently agree with the statement that there will be a negligible impact to the existing hydrology and flood risk to the area	Dewatering is considered in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions. Any water from dewatering activities will be discharged in agreement with Lancashire County Council and/or the Environment Agency to a local drainage ditch or watercourse and/or spread over ground.
November 2023	United Utilities Section 42 response	We request that you provide details of any water supply requirements for both construction and during operation as soon as possible. This should include details on rates of water supply required in litres per second and anticipated points of connection to the public water supply network. The details of water supply required should include details for any fire response purposes that may be necessary. For temporary related activities, such as construction compounds and workers accommodation, early consideration of any water supply requirements will also be required. If reinforcement of the water network is required to meet potential demand, this could be a significant project and the design and construction period should be accounted for. You will need to ensure that your Environmental Statement fully considers any environmental impact of your water supply requirements.	Consultation will continue with United Utilities regarding any requirements during the pre-construction phase.
December 2022	United Utilities	The on-shore drainage from the proposed scheme should also be assessed within the Environmental Statement for the risk to groundwater abstractions.	Whilst impacts to groundwater abstractions for drinking water (including SPZs) are fully explored within Volume 3, Chapter 1: Geology, hydrogeology

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
November 2023	United Utilities Section 42 response	The application boundary for the transmission assets extends to include sandstone rock, designated as a groundwater source protection zone (SPZ 3). These are used for the abstraction of water for public water supply purposes. We request that the approach to the assessment of the impact on the groundwater environment is considered and agreed with United Utilities.	and ground conditions of the ES, due to linkages between surface water and groundwater, SPZs and groundwater abstractions within the study area have been included as a receptors within the assessment of the impact of 'contaminated runoff on the quality of surface water and ground receptors' within **section 2.11** of this chapter.
November 2023	United Utilities Section 42 response	As a nationally and regionally significant scheme, the applicant should follow 'The Environment Agency's approach to groundwater protection' 1 (hereafter referred to as 'the Environment Agency's approach') in relation to protection of drinking water supply from United Utilities' groundwater abstractions. At the current time we do not have sufficient information in order to be able to assess the impact of the proposed development and associated proposals where these lie within a groundwater source protection zone, or directly overlie an abstracted aquifer, to ensure the proposals 'do not have the potential to cause pollution or harmful disturbance to groundwater flow' and to ensure 'these risks can be reduced to an acceptable level'.	
General comments relating to HFR			
November 2023	Lancashire County Council Local Flood Authority Section 42 response	Monitoring measures should be sufficient to measure the success of mitigation and compensation measures, to inform the need for remedial measures and to inform establishment maintenance and long-term management.	Based on the predicted impacts on hydrology and flood risk, it is concluded that no specific monitoring to test the predictions made within the impact assessment is required.
December 2022	Planning Inspectorate, Scoping Opinion	The ES should consider whether a field (walkover) survey should be undertaken.	Field walkover surveys have been undertaken at the onshore substation sites in order to inform the hydrology and flood risk baseline for the ES (refer to **Section 2.6.9**).
November 2023	Lancashire County Council Local Flood Authority Section 42 response	Survey data submitted with the planning application should be current/up-to-date, in line with recognised guidelines (as summarised above). • The survey area should include:	

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		• The intended location of the development footprint; • Potential working areas, compounds, storage areas and access routes; • Any land that may be used within the mitigation, compensation or biodiversity net gain proposals (on or off-site); A suitable buffer distance, taking account of the likely zone of influence and relevant survey guidelines.	

2.4 Study area

2.4.1.1 The study area to be used for the assessment within this chapter has been ascertained using professional judgement and focuses on where potential impacts are most likely to occur to hydrological and flood risk receptors.

2.4.1.2 The study area used for the assessment is presented within Volume 3, Figure 2.1 (see Volume 3, Figures) and focuses on areas where potential impacts arising from activities associated with the Transmission Assets are most likely to occur on hydrological and flood risk receptors. As such, the study area is defined as the area of land within which temporary and permanent activities related to the onshore electrical infrastructure would occur during construction, operational and maintenance phase and decommissioning are to be undertaken. The associated buffers used to define the study area are as follows.

- Hydrology and flood risk receptors located within 250 m of the permanent and temporary development associated with the landfall, the onshore export cables and 400 kV grid connection cables located within the Intertidal Infrastructure Area and the Onshore Infrastructure Area. The majority of permanent development is to be buried under ground with only transition joint bays and link boxes to be located above ground which are to be flush with ground levels. The temporary works include access tracks and temporary construction compounds. These aspects of development are to be active until the end of the construction period.
  - The Onshore Infrastructure Area is an area within the Transmission Assets Order Limits landward of Mean High Water Springs (MHWS) that includes the offshore export cables from Mean High Water Springs to the transition joint bays, onshore export cables, onshore substations and 400 kV grid connection cables, and associated temporary and permanent infrastructure including temporary and permanent compound areas and accesses. Those parts of the Transmission Assets Order Limits proposed only for ecological mitigation/biodiversity benefit are excluded from this area.
  - The Intertidal Infrastructure Area represents the temporary and permanent areas between MLWS and MHWS.
- In addition, hydrology and flood risk receptors located within 1,000 m of the following.
  - Permanent development associated with the Morgan onshore substation and Morecambe onshore substation and associated access and egress for each onshore substation. These aspects of the Transmission Assets would give rise to greater extents of above ground development than other elements of the Transmission Assets described above and also pose hazards to receptors during their operation.
  - Temporary enabling works associated with the onshore substations including access tracks and temporary construction compounds.

These aspects of development are to be active until the end of the construction period.

2.4.1.3 The buffers are considered appropriate for data collection, taking into account the likely zone of influence by hydrological receptors. 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 Transmission Assets. Flood risk to and from the Transmission Assets has been addressed in Volume 3, Annex 2.3: Flood risk assessment of the ES.

2.4.1.4 The cumulative study area takes into account a 1 km buffer of the intertidal infrastructure area and onshore infrastructure area, including temporary and permanent elements of the Transmission Assets. The buffers are considered appropriate for data collection taking into account the likely zone of influence of other proposed developments to hydrological receptors.

2.4.1.5 Beyond these buffer zones, the magnitude of impact will be reduced as the dilution capacity becomes greater as the hydraulic catchment increases downstream of the 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 onshore and intertidal elements of the Transmission Assets.

2.4.1.6 Where data was requested from third parties, the desk study requested data for an area of 1 km around the onshore and intertidal elements of the red line boundary (presented in the PEIR) for the Transmission Assets 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 Transmission Assets and to allow for evolution of the boundary. Therefore, following the refinement of the Transmission Assets Order Limits (as considered in the ES), there is sufficient data coverage to inform the assessment.

2.5 Baseline methodology

2.5.1 Methodology for baseline studies

Desk studies

2.5.1.1 A comprehensive desk-based review was undertaken to inform the baseline for hydrology and flood risk. The existing studies and datasets referred to as part of the desk-based review are summarised in **Table 2.5** below.

Table 2.5: Summary of desk study sources

Title	Source	Date published	Author	Description of provided information
Advice Note 18: The Water Framework Directive.	https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice- note-18/ (Accessed 02/08/2024).	2018	Planning Inspectorate	-
Catchment Data Explorer.	https://environment.data.gov.uk/catchment-planning/ (Accessed 02/08/2024).	2024	EA.	Provides information regarding peak river flow and rainfall intensity climate change allowances to be used within the project.
Central Lancashire Adopted Core Strategy.	https://new.fylde.gov.uk/resident/planning/planning-policy-local-plan/adopted-fylde-local-plan-to-2032-incorporating-partial-review/ (Accessed: 02/08/2024).	2012	Preston City Council, South Ribble Borough Council and Chorley Borough Council.	The Core Strategy for Preston City Council, South Ribble Borough Council and Chorley Borough Council.
Climate change allowances for peak rainfall in England.	https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall (Accessed: 02/08/2024).	2022	EA.	Provides information regarding impacts to peak rainfall intensities arising from climate change.
Climate change allowances for peak river flow in England.	https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow (accessed 02/08/2024).	2022	EA.	Provides information regarding impacts to peak river flow arising from climate change.
Coastal Design Sea Levels - Coastal Flood Boundary Extreme Sea Levels	https://www.data.gov.uk/dataset/73834283-7dc4-488a-9583-a920072d9a9d/coastal-design-sea-levels-coastal-flood-boundary-extreme-sea-levels-2018	2018	EA	Provides information relating to tidal levels around the coast of the United Kingdom.
Enviro and Geo Insight digital reports.	Reference GSIP-2023-13424-13080_1 to _16 and GSIP-2023-13424-13081.	2023	Groundsure.	Provides information regarding baseline hydrological and hydrogeological conditions.
Flood Estimation Handbook Web Service.	https://fehweb.ceh.ac.uk/ (accessed 02/08/2024)	2023	Flood Estimation Handbook.	Provides information regarding hydrological conditions of the baseline environment.
Flood Map for Planning.	https://flood-map-for-planning.service.gov.uk/ (Accessed: 02/08/2024).	2024	EA.	Provides information regarding Environment Agency Flood Zones.

Title	Source	Date published	Author	Description of provided information
Flood Risk Assessments: Climate Change Allowances.	https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances (Accessed: 02/08/2024).	2022	UK Government.	Provides information regarding impacts to sea level rise arising from climate change.
Fylde Local Plan to 2032 (incorporating Partial Review).	https://new.fylde.gov.uk/fylde-local-plan-to-2032-incorporating-partial-review-updated/ (Accessed: 02/08/2024).	2021	Fylde Borough Council.	Fylde Borough Council's Local Plan
Geoindex Onshore Mapping	https://www.bgs.ac.uk/map-viewers/geoindex-onshore/	2023	British Geological Survey	Provides information regarding superficial deposits, bedrock geology and borehole log information.
Internal Drainage Boards Map.	https://www.ada.org.uk/member_type/idbs/ (Accessed 02/08/2024)	2024	Internal Drainage Board.	Provides information for Internal Drainage Board
Local Flood Risk Management Strategy for Lancashire 2021-2027.	https://www.lancashire.gov.uk/media/928565/lancashire-flood-risk-management-strategy-2021-2027-final-v2.pdf (Accessed: 02/08/2024).	2021	Blackburn with Darwen Council, Blackpool Council, Lancashire County Council.	Lancashire's strategy for Local Flood Risk Management
Long Term Flood Risk Map.	https://check-long-term-flood-risk.service.gov.uk/map (Accessed: 02/08/2024).	2024	EA	Provides details on surface water flooding and reservoir flooding.
Multi-Agency Geographic Information for the Countryside (MAGIC)	https://magic.defra.gov.uk/ (Accessed 02/08/2024)	2024	Defra	Provides information regarding the natural environment.
National LIDAR Programme	https://www.data.gov.uk/dataset/f0db0249-f17b-4036-9e65-309148c97ce4/national-lidar-programme (Accessed 01/08/2024)	2024	EA	Provides LIDAR data for the UK.
North west Shoreline Management Plan	https://www.mycoastline.org.uk/shoreline-management-plans	2011	Blackpool Council	North west Shoreline Management Plan
NPPF	https://www.gov.uk/government/publications/national-planning-policy-framework--2 (Accessed: 02/08/2024).	2023	UK Government (Ministry of Housing Communities and Local Government).	Sets out the Government's planning policies for England and how these should be applied

Title	Source	Date published	Author	Description of provided information
Ordnance Survey (OS) mapping 1:25 000.	https://explore.osmaps.com/ (Accessed 02/08/2024)	2024	OS.	Provides OS mapping data.
Lancashire County Council Ordinary Watercourse Regulation	https://www.lancashire.gov.uk/media/950248/ordinary-watercourse-regulation-policies-adopted-1-march-2024.pdf (accessed 02/08/2024)	2024	Lancashire County Council	Ordinary Watercourse regulations for Lancashire
North West River Basin Management Plan (RBMP) 2022 – 2027	https://www.gov.uk/guidance/north-west-river-basin-district-river-basin-management-plan-updated-2022 (accessed 02/08/2024)	2022	Environment Agency	Provides details regarding the North West RBMP.
Overarching National Policy Statement (NPS) for Energy EN-1.	https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1 (Accessed: 02/08/2024).	2024	Department for Energy Security and Net Zero	Sets out the government's policy for delivery of major energy infrastructure.
PPG Flood Risk and Coastal Change.	https://www.gov.uk/guidance/flood-risk-and-coastal-change (Accessed: 02/08/2024).	2022	UK Government (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government).	Advises how to take account of and address the risks associated with flooding and coastal change in the planning process
Shoreline Management Plans	https://environment.data.gov.uk/shoreline-planning (Accessed: 02/08/2024).	2024	EA	Provides information regarding Shoreline Management Plans.
Spatial Flood Defences (including standardised attributes)	https://environment.data.gov.uk/dataset/8e5be50f-d465-11e4-ba9a-f0def148f590	2020	EA	Provides information regarding Environment Agency maintained flood defences.
Soilscapes viewer.	https://www.landis.org.uk/soilscapes/ (Accessed 02/08/2024)	2024	The National Soils Research Institute.	Provides information regarding soil data.
Strategic Flood Risk Assessment.	https://www.blackpool.gov.uk/Residents/Planning-environment-and-community/Documents/EB027-SFRA.pdf (Accessed: 02/08/2024).	2014	Blackpool Council.	Strategic Flood Risk Information from Blackpool Council
Strategic Flood Risk Assessment.	https://southribble.gov.uk/downloads/file/655/central-lancashire-strategic-	2007	Scott Wilson Group PLC on behalf of	Strategic Flood Risk Information from Preston City Council,

Title	Source	Date published	Author	Description of provided information
	flood-assessment-2007 (Accessed: 02/08/2024).		Preston City Council, South Ribble Borough Council and Chorley Borough Council.	South Ribble Borough Council and Chorley Borough Council.
Strategic Flood Risk Assessment.	https://new.fylde.gov.uk/wp-content/uploads/2019/11/SFRA-2011.pdf (Accessed: 02/08/2024).	2011	Fylde Borough Council.	Strategic Flood Risk Information from Fylde Borough Council

Identification of designated sites

2.5.1.2 A review of desktop reports, publicly available information and information requests (as identified in **Table 2.5**) identified four ecologically designated sites within the study area: Lytham St Annes Dunes SSSI, Ribble and Alt Estuaries Special Protection Area (SPA) and Ramsar site, Ribble Estuary SSSI and Newton Marsh SSSI. Sites designated for their ecological interest are identified in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and Volume 3, Chapter 4: Onshore and intertidal ornithology of the ES.

Site-specific reports

Flood risk assessment

2.5.1.3 A site-specific FRA has been undertaken for the intertidal and onshore elements of the Transmission Assets. This is included in Volume 3, Annex 2.3: Flood risk assessment of the ES.

2.5.1.4 The key components of the FRA are:

- a review of publicly available Environment Agency data, local flood management plans and future flood management schemes;
- a review of relevant Strategic FRAs;
- an assessment of the flood risk in relation to the existing conditions and future baseline conditions; and
- a site-specific assessment of flood risk for the onshore and intertidal elements of the Transmission Assets.

Water Framework Directive assessment

2.5.1.5 A WFD assessment has been undertaken for the onshore elements of the Transmission Assets. This is included within Volume 3, Annex 2.1: Water Framework Directive surface and groundwater assessment of the ES.

2.5.1.6 The key component of the WFD assessment is:

- a staged assessment to ensure that components of the Transmission Assets and associated enabling works and construction activities do not result in a deterioration in the current WFD status based on the 2022 baseline as reported in the North West River Basin Management Plan 2022-2027.

2.6 Baseline environment

2.6.1 Desk study

2.6.1.1 Information on hydrology and flood risk within the study area was collected through a detailed review of walkover information, existing studies and datasets. These are summarised at **Table 2.5**.

2.6.2 Introduction

2.6.2.1 The Transmission Assets landfall is located at Lytham St. Annes. The study area includes the beach and crosses Blackpool Airport before running through predominantly agricultural land uses and wooded areas. There are several built-up areas and settlements within or adjacent to the study area, including Blackpool, Preston, Kirkham, Penwortham, Ashton-on-Ribble, Lytham St Annes, and Freckleton.

2.6.2.2 The A583 and A584 route broadly east to west and are located within the eastern part of the study area. Other infrastructure within the study area includes several major roads and the Blackpool South to Preston railway line which bisects the central part of the study area.

2.6.2.3 The study area crosses several watercourses across its length, including the River Ribble at a location to the east of Freckleton.

2.6.2.4 The study area is shown on Volume 3, Figure 2.1 (see Volume 3, Figures).

2.6.3 Topography

2.6.3.1 The OS Terrain 50 Digital Terrain Map indicates that the landfall for the Transmission Assets is located on the northern, coastal margin of the Ribble Estuary. Inland of the coast, the topography in the vicinity of the onshore export cable corridor crosses low-lying land (typically less than 15 m above Ordnance Datum (AOD)) that is flat or gently undulating. Land rises gently to the north east, reaching elevations of approximately 50 m AOD. A topographic divide runs east to west towards the north of the study area. This divide defines the boundary between the catchment of the River Ribble and the River Wyre to the north. Elevations generally fall in the southern extent of the study area in association with the location of the River Ribble.

2.6.4 Hydrological setting

2.6.4.1 Based on classifications as set out within the Environment Agency Catchment Data Explorer, the onshore and intertidal elements of the Transmission Assets are located within the North West River Basin District

which comprises fifteen Management Catchments, smaller subdivisions of the River Basin District.

2.6.4.2 The portion of the study area to the north of the River Ribble is located within the Ribble Management Catchment, whilst land to the south is located within the Douglas Management Catchment. Both management catchments are located within the wider north west river basin district. Management Catchments are presented within Volume 3, Figure 2.2 (see Volume 3, Figures).

There are multiple named watercourses located within the study area. The Environment Agency is responsible for the management of Main Rivers in England, while the LLFA, Lancashire County Council, manages Ordinary Watercourses. There are no Internal Drainage Boards located in the study area. Locations of watercourses are presented within Volume 3, Figure 2.3 (see Volume 3, Figures).

Main Rivers

2.6.4.3 The study area includes the following Main Rivers/designated watercourse features:

- Main Drain and associated tributaries, including Branch Drain;
- Moss Sluice (also known as Liggard Brook downstream of the study area) and associated tributaries;
- Dow Brook and associated tributary;
- Middle Pool;
- Wrea Brook;
- Ribble Link/Savick Brook;
- an unnamed Main River to the east of National Grid Penwortham substation;
- Mill Brook; and
- River Ribble.

2.6.4.4 It is noted the Canal and Rivers Trust lease Savick Brook to enable navigation and connectivity to the Lancaster Canal (commencing in Preston). The Canal and Rivers Trust own and manage several locks upon the watercourse to enable navigation and connectivity to the Lancaster Canal. The Canal and Rivers Trust also have a right of navigation over the Ribble Link (River Ribble) which provides connectivity to Savick Brook.

Ordinary watercourses

2.6.4.5 The study area includes the following Ordinary Watercourse features:

- Deepdale Brook;
- tributaries of Moss Sluice;
- tributaries of Branch Drain and Main Drain;

- tributaries of Wrea Brook;
- Pool Stream (designated as a Main River downstream of the hydrology and flood risk study area) and associated tributaries;
- tributaries of Middle Pool;
- tributaries of Mill Brook; and
- tributaries of Dow Brook.

2.6.4.6 Designated Main Rivers and Ordinary Watercourses are presented within Volume 3, Figure 2.3, and associated catchments within the study area are presented within Volume 3, Figure 2.2 (see Volume 3, Figures).

Sea: Shoreline management plans

2.6.4.7 The landfall is located within shoreline management plan (SMP) unit 11B2.1. The generic approach assigned to this unit is to maintain flood risk management performance of the natural features of sand dunes by reducing wave action via the Fylde Sand Dunes Project. The Fylde Sand Dunes Project is a partnership between Fylde Borough Council, Blackpool Council and The Wildlife Trust for Lancashire, Manchester and North Merseyside and is funded by the Environment Agency until 2027 (Lancashire Manchester and North Merseyside Wildlife Trust, 2024).

2.6.4.8 The 400 kV grid connection cable corridor (where the River Ribble crossing is located) is located within SMP unit 11B1.12 and 11B1.10. The generic approach assigned to these units is to retain a flood defence along the current alignment where protection is currently provided. During 2025 – 2055, a managed realignment of flood defence set back is intended for 11B1.10. A planned action for the establishment for funding plan by the Environment Agency is currently proposed (reference 11b_1_0.17).

Surface water body status

2.6.4.9 The Environment Agency catchment data explorer mapping indicates surface watercourse catchments within the study area discharge to the Ribble Estuary transitional water body.

2.6.4.10 The Joint Nature Conservation Committee WFD guidance (2023) indicates that water bodies below 10 km^2 catchment area no longer need to be included in a waterbody's classification assessment. For watercourses such as Pool Stream, Middle Pool and Mill Brook and the unnamed Main River to the east of National Grid Penwortham substation which 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 the Ribble Estuary transitional waterbody, downstream of the aforementioned watercourses.

2.6.4.11 For surface waters, the WFD objectives are based on the ecological and chemical status of the waterbody (i.e., the predicted future status if technically feasible measures are implemented). These measures are required to prevent deterioration in the current status of the waterbody and produce more benefits than they cost to implement once they have been implemented.

2.6.4.12 The date to achieve the objective status is determined by the type of measures which are needed in order to improve the status of the waterbody (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).

2.6.4.13 **Table 2.6** lists the watercourses with surface watercourse catchments within the study area, associated WFD classification grade and overall objectives. WFD catchments within the study area are presented within Volume 3, Figure 2.2 (see Volume 3, Figures). A full description of the WFD classification process and associated definitions are available in Volume 3, Annex 2.1: Water Framework Directive surface and groundwater assessment of the ES.

Table 2.6: WFD surface water quality data

Name (WFD ID)	Waterbody type	Classification (Cycle 3 2019)	Hydro-morphological Designation	Overall objective
Main Drain (Ribble) (ID: GB112071065651).	River (35.58 km^2 catchment area).	Ecological: Moderate. Chemical: Fail.	Heavily modified.	Good by 2027.
Liggard Brook (ID: GB112071065650).	River (16.594 km^2 catchment area).	Ecological: Moderate. Chemical: Fail.	Heavily modified.	Good by 2027.
Dow Brook (ID: GB112071065670).	River (22.876 km^2 catchment area).	Ecological: Moderate. Chemical: Fail.	Heavily modified.	Good by 2027.
Wrea Brook (ID: GB112071065680).	River (9.637 km^2 catchment area).	Ecological: Moderate. Chemical: Fail.	Heavily modified.	Good by 2027.
Mersey Mouth (ID GB641211630001).	Coastal Water (421.196 km^2 surface area).	Ecological: Moderate. Chemical: Fail.	Heavily modified.	Good by 2027.
Ribble Estuary (ID GB531207112400).	Transitional Water (40.773 km^2 surface area).	Ecological: Bad. Chemical: Fail.	Heavily modified.	Good by 2027.
Savick Brook (ID: GB112071065470).	River (38.783 km^2 catchment area).	Ecological: Moderate. Chemical: Fail.	Heavily modified.	Good by 2027.
Deepdale Brook (ID: GB112071065460).	River (3.936 km^2 catchment area).	Ecological: Moderate. Chemical: Fail.	Heavily modified.	Good by 2027.

Flood alert and flood warnings

2.6.4.14 Flood warning and flood alert areas located within the study area are presented below within **Table 2.7** and **Table 2.8** and are additionally presented within Volume 3, Figure 2.4 (see Volume 3, Figures).

Table 2.7: Flood warnings within the study area

Flood Warning Area Code	Description	Flood source
012FWCTL13A	Lancashire coastline at Lytham St. Annes, from Squires Gate to Warton Bank	Irish Sea
012FWCTL14B	Lancashire coastline at Clifton Marsh, between Freckleton and Savick Brook	Ribble Estuary
012FWCTL12A	Lancashire coastline at Blackpool, along the Promenade from Little Bispham to Squires Gate	Irish Sea
012FWCTL14A	Lancashire coastline at Clifton Marsh, adjacent to Freckleton Pool	Ribble Estuary
012FWCTL37A	Ribble Estuary at Hutton and Longton	Ribble Estuary

Table 2.8: Flood alerts within the study area

Flood Alert Area Code	Description	Flood source
012WACLS	Coast at Lytham St Annes	Irish Sea
012WACFB	Coast from Fleetwood to Blackpool	Irish Sea
012WAFLW	Lower River Wyre	River Wyre, Main Dyke, Dow Brook
012WAFLR	Lower River Ribble and Darwen	Ribble Estuary
012WATRE	Ribble estuary west of Preston	Ribble Estuary

2.6.5 Geological and hydrogeological setting

2.6.5.1 A full description of the geological and hydrogeological setting is presented within Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES. A summary of the key elements relevant to this chapter are set out in the below.

Bedrock geology

2.6.5.2 The majority of the study area is underlain by bedrock comprising the mudstones of the Singleton Mudstone Member and Mercia Mudstone Group. The eastern end of the study area is underlain by bedrock comprising sandstones of the Sherwood Sandstone Group.

2.6.5.3 The bedrock within the study area is presented within Volume 3, Figure 2.6 (see Volume 3, Figures) and discussed in further detail within Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.

Superficial deposits

2.6.5.4 A range of superficial deposits are located within the study area. These are listed within **Table 2.9** and presented within Volume 3, Figure 2.5 (see Volume 3, Figures).

Table 2.9: Superficial deposits within the hydrology and flood risk study area

Superficial deposits	Location within study area
Tidal Flat Deposits (clay and silt).	Intertidal zone.
Storm Beach Deposits (gravel).	Intertidal zone.
Blown Sand (sand).	From intertidal zone to the River Ribble to inland.
Tidal Flat Deposits (clay and silt).	Inland of sand deposits.
Peat (peat).	Localised inland areas.
Diamicton Till, Devensian.	Inland of Peat, alternating with Head.
Alluvium (clay, silt, sand and gravel).	Inland, across River Ribble tributary.
Head (clay, silt, sand and gravel).	Inland of Alluvium deposits, alternating with Till.
Tidal Flat Deposits, 1 (silt, clay and sand).	North and south of River Ribble.
Tidal River or Creek Deposits (clay, silt and sand).	Beneath River Ribble.
River Terrace Deposits, 1 (clay, silt, sand and gravel).	South of River Ribble.

Aquifer designation

2.6.5.5 In regard to bedrock deposits, mudstones of the Singleton mudstone member and Mercia mudstone group are designated as a Secondary B aquifer. These are predominantly lower permeability layers which may store and yield limited amounts of groundwater. Sherwood sandstone group (sandstone) is classified as a principal aquifer: permeable geology able to provide a high level of water storage and able to support water supply and/or river base flow on a strategic scale.

2.6.5.6 Superficial deposits form a continuous Secondary A aquifer at the west end of the study area, reflecting the extent of blown sand deposits. These are formations comprising permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers. The remainder of the study area comprises secondary undifferentiated or unproductive aquifers, reflecting the distribution of superficial deposits with low permeability such as glacial till and tidal flat deposits. Additional detail can be found within Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.

Source Protection Zones

2.6.5.7 These zones identify areas of land through which water infiltrates into a groundwater borehole, well or spring that is used for public drinking water supply and provide additional protection to safeguard drinking water quality

through constraining the proximity of an activity that may impact upon a drinking water abstraction.

2.6.5.8 An area of 220 hectares (ha) within the far eastern extent of the study area, to the north of the Ribble Estuary, is located within a Zone III: Total catchment Source Protection Zone (SPZ). This zone is defined as the total area needed to support the abstraction or discharge from the protected groundwater source.

2.6.5.9 The SPZ relates to multiple groundwater abstractions from the Sherwood Sandstone Group Principal Aquifer. SPZ mapping is presented within Volume 3, Figure 2.7 and is discussed in further detail within Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.

Groundwater body status

2.6.5.10 **Table 2.10** lists the groundwater catchments within the hydrology and flood risk study area, associated WFD classification grade and overall objectives.

Table 2.10: WFD groundwater quality data

Name (WFD ID)	Water body type	Classification (2019)	Overall objective
West Lancashire Quaternary Sand and Gravel Aquifers (ID: GB41202G912700).	Groundwater (approximately 566 km^2 in area).	Overall: Good.	Good.
Fylde Permo-Triassic Sandstone Aquifers (ID: GB41201G100500).	Groundwater (approximately 320 km^2 in area).	Overall: Poor.	Good by 2027.

2.6.6 Flood risk

EA Flood Zones

Permanent development

2.6.6.1 The Morgan onshore substation, including permanent access tracks and surface water attenuation are located within Flood Zone 1. The Morecambe onshore substation and associated surface water attenuation is located within Flood Zone 1 and permanent access tracks are located within Flood Zones 1, 2 and 3. The permanent use for the access from the A584 would be for heavy goods vehicle and abnormal loads deliveries only and therefore operational use would be rare.

2.6.6.2 The onshore export cable corridor and 400 kV grid connection cable corridor are located within Flood Zones 1, 2 and 3. The landfall transition joint bay is located within Flood Zone 1 and the landfall pop-out located is located within Flood Zone 3 on the beach.

Temporary development

2.6.6.3 Construction compounds associated with the landfall, onshore export cable corridor, 400 kV grid connection cable corridor, onshore substations and temporary access tracks / haul roads are located within Flood Zones 1, 2 and 3.

Flood defences

2.6.6.4 The study area comprises both formal flood defences and informal flood defences. Formal flood defence information has been taken from the Environment Agency spatial flood defences (including standardised attributes) dataset. These are present in the form of naturally high ground and embankments along banks of Main Rivers within the study area. The majority of defences offer up to a 1 in 50-year standard of protection and flood defences present within proximity to Savick Brook provide up to a 1 in 100-year standard of protection.

2.6.6.5 Whilst not included within the Environment Agency spatial flood defences dataset, the Fylde sand dunes offer protection from tidal flooding to inland areas by virtue of elevation and also act to reduce wave action. As the beach is not listed within the Environment Agency spatial flood defences dataset and a standard of protection is not defined, the flood defences are categorised as informal flood defences. The Fylde Sand Dunes project aims to improve the efficiency of the dunes as a soft sea defence, which feeds into the Environment Agency Shoreline Management Plan (SMP2): a non-statutory, high level policy document for coastal flooding and erosion risk management planning (Lancashire Manchester and North Merseyside Wildlife Trust 2024).

2.6.6.6 The Penwortham Flood Defence Scheme involves upgrading existing flood defences and the construction of new flood defences to better protect homes and businesses along the River Ribble. Areas closest to the study area to be subject to the scheme are Broadgate and Lower Penwortham. It has been confirmed that differences in phasing between the Transmission Assets and Penwortham Flood Defence Scheme makes interaction between the schemes unlikely.

2.6.6.7 Flood defences are listed within section 1.5 of the Flood Risk Assessment (see Volume 3, Annex 2.3: Flood risk assessment of the ES) and their locations within the study area are presented within Volume 3, Figure 2.3 (see Volume 3, Figures).

Historic flooding

2.6.6.8 The Environment Agency Historic Flood Map is presented within Volume 3, Figure 2.8 (see Volume 3, Figures) and records historical flooding has occurred within the study area on the land north of the River Ribble, and around Savick Brook.

Summary of assessed flood risk

2.6.6.9 A summary of flood risk to the onshore and intertidal elements of the Transmission Assets is presented below. For further information, and a breakdown of flood risk see Volume 3, Annex 2.3: Flood risk assessment of the ES.

Fluvial/tidal flood risk

2.6.6.10 An analysis of Environment Agency data indicates that a proportion of the Onshore Infrastructure Area is located at low risk of fluvial and tidal flooding. However, partial extents of the Onshore Infrastructure Area and Intertidal Infrastructure Area are located within areas assessed with a medium to high risk of fluvial and tidal flooding. The main source of flooding to the Onshore Infrastructure Area is the Ribble Estuary, while the Irish Sea is the main source of flooding to the Intertidal Infrastructure Area. The watercourses within the Onshore Infrastructure Area have been assessed to be primarily tidally influenced, with the majority of main rivers being bounded by Environment Agency flood defences which provide varying levels of protection to the development.

2.6.6.11 In summary:

- the landfall is assessed to partially be at risk of tidal flooding during construction;
- the onshore export cable corridor is at risk of tidal flooding during construction,
- the Morgan onshore substation is assessed to partially be at risk of fluvial flooding during construction;
- the Morecambe onshore substation is assessed at to partially be at risk of fluvial and tidal flooding during the construction and operation and maintenance phase; and
- 400 kV grid connection cable corridor is at risk from tidal and fluvial flooding during construction.

2.6.6.12 However, with mitigation measures presented within **Table 2.19** fluvial and/or tidal risk to the Transmission Assets is considered to be low (see **section 2.11** for the assessment of effects).

Ground water flood risk

2.6.6.13 Groundwater flood risk mapping included within the Groundsure Enviro and Geo Insight report shows the western part of the study area has a ‘low’ risk of groundwater flooding. The eastern part of the study area has a ‘moderate’ to ‘high’ risk of groundwater flooding, associated with the water table being located closer to the surface within proximity to the Ribble Estuary.

2.6.6.14 Considering the implementation of commitments presented in **Table 2.19**, the overall risk of flooding from groundwater has been assessed to be low for the onshore substation sites and very low for the landfall, onshore export cable corridor and 400 kV grid connection cable corridor.

Surface water flood risk

2.6.6.15 The Environment Agency Long Term Flood Risk from Surface Water mapping is presented within Volume 3, Figure 2.9 (see Volume 3, Figures). Flood risk to the Transmission Assets is shown to be low to high and is associated with out-of-bank flows from ordinary watercourses and surface water ponding.

2.6.6.16 During the construction phase of the onshore export cable corridor and 400 kV grid connection cable corridor, mitigation measures presented in **Table 2.19** will ensure surface water will not be adversely affected. As such, flood risk from surface water sources is considered to be low.

Reservoir flood risk

2.6.6.17 Environment Agency reservoir mapping (as presented within Figure 2.10 – see Volume 3, Figures) shows that during a wet scenario, a significant portion of the study area is expected to become inundated. Water is shown to extend north and south from the River Ribble and encompass approximately 460 ha of land. There are additional small portions of land around the Main Drain in the west of the study area that are also shown to be affected during the wet scenario.

2.6.6.18 Due to the regular inspection and maintenance regime in place on large reservoirs, the likelihood of catastrophic failure and therefore risk of flooding to the site from this source is unlikely to occur. For this reason, risk of flooding from reservoirs is considered to be very low.

Flood risk from sewers/water main failure

2.6.6.19 United Utilities operate public sewer assets and water supplies in the study area. However, the majority of the study area is predominantly located within agricultural land. With the implementation of mitigation measures presented in **Table 2.19**, flood risk from this source is assessed to be very low.

Flood risk from artificial sources

2.6.6.20 Field drainage is expected to be present within agricultural land within the study area and could pose localised sources of flooding if impacted during construction. The proposed mitigation measures (as presented within **Table** 2.19) are expected to prevent impacts to field drainage. The landfall and cable corridors will not be impacted by or cause any adverse effect on field drainage following installation. As such, the risk of flooding from artificial sources is assessed to be very low.

2.6.7 Sewer infrastructure, water supplies, consents and pollution incidents

Sewer infrastructure

2.6.7.1 Public sewer infrastructure assets within the study area are served by United Utilities. Public sewer infrastructure is presented within Volume 1, Annex 3.2: Onshore crossing schedule of the ES.

Groundwater abstractions

2.6.7.2 The abstraction licences taken from Groundsure data records identified one active groundwater abstraction within the study area (for further details refer to Volume 3, Annex 1.1: Geology, hydrogeology and ground conditions technical report of the ES).

Surface water abstractions

2.6.7.3 The abstraction licences taken from Groundsure data records identified no active surface water abstractions within the study area (for further details refer to Volume 3, Annex 1.1: Geology, hydrogeology and ground conditions technical report of the ES).

Private water supplies

2.6.7.4 One private water supply record has been identified. This is located outside the study area at The Bush, Pool Lane, Warton. No private water supplies have been identified within the study area, as reported in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.

Discharge consents

2.6.7.5 Discharges of liquid effluent or waste water into surface waters are regulated by the Environment Agency using discharge consents and environmental permits. A review of Groundsure data identified 21 active consented discharges to surface waters within the study area. The majority of the discharges related 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.

2.6.7.6 The details of the discharge consents and permits are provided within Volume 3, Annex 2.2: Surface water abstraction licences, discharge consents and pollution incidents of the ES.

Pollution incidents

2.6.7.7 Pollution incident mapping has been used to identify if the quality of watercourses within the study area that may have been affected by pollution. A review of Groundsure data identified 41 pollution incidents within the study area, however, only five of the incidents were reported as Category 2 (significant) to water, with the remainder of incidents classified as Category 3

(minor) and 4 (no impact). No incidents were classified as category 1 (major). see Volume 3, Annex 2.2: Surface water abstraction licences, discharge consents and pollution incidents of the ES.

2.6.8 Designated sites

2.6.8.1 The study area coincides with several sites designated for nature conservation including three SSSIs. There are no Special Areas of Conservation within the study area. All designated sites within the study area and qualifying interest features that could be affected by the construction, operation and maintenance, and decommissioning phases of the Transmission Assets are set out in **Table 2.11** and are presented within Volume 3, Figure 2.11(see Volume 3, Figures).

Table 2.11: Designated sites and relevant qualifying interests

Designated site	Distance to the Transmission Assets (nearest point)	Relevant qualifying interest
Ribble and Alt Estuaries SPA and Ramsar site	0 km	Designated for its estuaries, extensive sand and mudflats, saltmarsh and dunes. The tidal flats and saltmarsh support internationally important populations of wintering waterbirds. Internationally important vegetation communities and amphibian populations occur in the sand dunes.
Lytham Coastal Changes SSSI (geological)	0.15 km from Onshore Order Limits	Designated for its for separate sites that provide the basic stratigraphical record of coastline changes. The geological interest is preserved in sediments beneath the topsoil and sand dunes of the area and provides a record of sea-level changes which occurred during the Holocene.
Lytham St Annes SSSI (biological)	0 km	Designated for its calcareous dune system which support rich and varied dune plant communities and as such has a national importance.
Newton Marsh SSSI (biological)	0.02 km from Onshore Order Limits	Designated for its proximity to the Ribble Estuary and its position along a major migration route makes it an important site for overwintering and migrant birds.
Ribble Estuary SSSI (biological)	0 km	Designated due to its international importance for the passage and wintering waterfowl it supports. The site is a major link in a chain of estuaries present along the west coast of Britain used by birds on migration between breeding grounds in the far north and wintering grounds further south

2.6.9 Site-specific surveys

2.6.9.1 A hydrological site walkover of temporary and permanent development associated with the Morgan and Morecambe onshore substations was undertaken in May 2024 to assess the presence of watercourses within the location of the onshore substations.

2.6.9.2 During PEIR, the potential for watercourse diversions was assessed as part of the construction of the onshore substation sites. The walkover confirmed that as a result of the repositioning of the onshore substation sites since publication of the PEIR, there are no longer any watercourse diversion requirements, and this has been used to update the assessment of effects within this chapter.

2.6.10 Future baseline conditions

2.6.10.1 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. This section provides an outline of the likely future baseline conditions in the absence of the Transmission Assets.

2.6.10.2 The main future change to 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 Environment Agency (Environment Agency, 2022) is presented below.

2.6.10.3 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 PPG 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 development's lifetime, taking climate change into account.

Peak river flow

2.6.10.4 Peak river flow allowances show the anticipated changes to peak flows within rivers as a result of climate change. In May 2022, the Environment Agency released its latest climate change allowances, which update the 2020 and 2011 version (Environment Agency, 2022). The Environment Agency has used the UKCP18 projections to update the peak river flow allowances and have based them on management catchments instead of river basin districts.

2.6.10.5 The guidance on how to apply peak river flow allowances has also been changed. The following allowances must be used:

- the central allowance for all assessments except for essential infrastructure, where you use the higher central allowance;
- the upper end for 'credible maximum scenario' assessments; and
- the central allowance to calculate flood storage compensation, except for where essential infrastructure is affected, where you use the higher central allowance.

2.6.10.6 The document provides a central, higher and upper estimate for increases in river flow as a consequence of climate change. The onshore and intertidal elements of the Transmission Assets are located across the boundary of two

management catchments with differing climate change allowance. These are the Douglas Management Catchment and Ribble Management Catchment, both located within the North West River Basin District.

2.6.10.7 **Table 2.12** presents the anticipated increase in peak river flows for each management catchment.

Table 2.12: Peak river flow allowances by management catchment

Management Catchment	Allowance category	Total potential change anticipated for '2020s' (2015-39)	Total potential change anticipated for '2050s' (2040-2069)	Total potential change anticipated for the '2080s' (2070 - 2115)
Douglas	Upper estimate	24%	45%	79%
	Higher central estimate	15%	26%	47%
	Central estimate	12%	19%	35%
Ribble	Upper estimate	27%	44%	71%
	Higher central estimate	19%	29%	46%
	Central estimate	16%	23%	36%

2.6.10.8 The onshore substations are located within the Ribble Management Catchment. To the south of the River Ribble, the wider Onshore Order Limits cross into the Douglas Management Catchment.

2.6.10.9 The construction phase is expected to continue until 2032. The Transmission Assets are classified as 'essential infrastructure' and have been assessed to the 2020's epoch 'higher central' allowance (for developments with a lifetime of between 2040 and 2069) to evaluate uplifts to peak river flow within the study area to the end of the construction phase. This equates to 19% within the Ribble Management Catchment and 15% within the Douglas Management Catchment.

2.6.10.10 During the operational and maintenance phase, the Transmission Assets are to be assessed to the 2050's epoch 'higher central' allowance. This equates to 29% within the Ribble Management Catchment and 26% within the Douglas Management Catchment.

2.6.10.11 Several climate change uplift scenarios were provided alongside the Ribble Douglas Model (20%, 30%, 35% and 70%). The 20% uplift for climate change has been used to assess flood risk to the Transmission Assets during construction phase while the 30% uplift has been used to assess flood risk during the operational and maintenance phase.

Peak rainfall intensity

2.6.10.12 Increased rainfall affects surface water flood risk and how drainage systems need to be designed. The Environment Agency revised peak rainfall climate change allowances (Environment Agency, 2022) also reflect the management catchment geography. The anticipated increases are provided in **Table 2.13**.

Table 2.13: Peak rainfall intensity allowance by Management Catchments

Management catchment	Allowance category	Total potential change anticipated for 2050s (2022 to 2060)	Total potential change anticipated for 2070s (2061 to 2125)
Douglas	Upper estimate	40%	45%
	Central estimate	25%	35%
Ribble	Upper estimate	40%	50%
	Central estimate	25%	35%

2.6.10.13 The onshore export cable corridor, onshore substations and 400 kV grid connection cable corridor to the north of the River Ribble are located within the Ribble Management Catchment. The 400 kV grid connection cable corridor crosses into the Douglas Management Catchment to the south of the River Ribble.

2.6.10.14 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 so 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% AEP event (1 in 100-year 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.

2.6.10.15 The Transmission Assets are to be fully operational by 2032. For the purposes of this assessment, the Transmission Assets are expected to have a 35-year operating lifetime from commencement of operation by 2032.

2.6.10.16 The onshore substations are be located within the Ribble Management Catchment. Therefore, the 2070's 'central' allowance (for developments with a lifetime of between 2061 and 2125) of 35% has been confirmed to be considered to be acceptable by the LPAs.

Sea level rise

2.6.10.17 The Environment Agency expect sea level rise to increase over coming decades due to the impacts of climate change and in turn, increase the geographical extents at risk from tidal flooding. **Table 2.14** presents the

anticipated sea level rise for given timeframes associated with climate change for the North West River Basin District. There are a range of allowances for each river basin district and epoch for sea level rise.

Table 2.14: Sea level allowances for each epoch in mm for each year (based on a 1981 to 2000 baseline) – the total sea level rise for each epoch is in brackets

Area of England/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)
North West	Higher central	4.5 (158)	7.3 (219)	10 (300)	11.2 (336)	1.01
	Upper end	5.7 (200)	9.9 (297)	14.2 (426)	16.3 (489)	1.41

2.6.10.18 According to the NPPF, it is advised that flood risk assessments consider both the higher central and upper end allowances.

2.6.10.19 Based on **Table 2.14** and the upper end allowance, 108.3 mm of sea level rise is projected until 2032, the target year for the start of operation. During the construction of the Transmission Assets, 450.9 mm of sea level rise is projected by 2067.

2.6.10.20 Sea level rise projections have been calculated from 2014 for the Ribble Estuary model (2014) and 2017 by the Environment Agency Coastal Design Sea Levels - Coastal Flood Boundary Extreme Sea Levels (2018) dataset at chainage 1210. These are presented below within **Table 2.15.**

Table 2.15: Cumulative projected sea levels used for each dataset within the FRA

Cumulative sea level rise (mm)		
	2032	2067
Ribble Estuary (2014)	108.3	450.9
Coastal design sea levels (2017)	91.2	433.7

H++ Assessment

2.6.10.21 In line with NPS EN-1 guidance, applicants should demonstrate proposals can be adapted over the predicted lifetimes to remain resilient to a credible maximum climate change scenario. H++ is the credible maximum scenario to 2100 and is informed by UKCP18 to assess impacts from low probability, high impact climate change events including sea level rise.

2.6.10.22 Sea level rise projections for the H++ scenario has been informed by including a 1.9 m allowance onto the design flood level. Further discussion regarding the H++ assessment is presented sections 1.5.4, 1.6.4 and 1.7.4 within Volume 3, Annex 2.3: Flood risk assessment of the ES.

2.6.11 Key receptors

2.6.11.1 **Table 2.16** identifies the receptors taken forward into the assessment. The sensitivity of the receptor has been derived in line with the methodology detailed in **section 2.5**.

Table 2.16: Key receptors taken forward to assessment

Receptor	Description
Water bodies (including surface water bodies, ground water bodies, Main Rivers and Ordinary Watercourses)	Taking a precautionary approach in assuming surrounding water bodies have achieved/maintained 'Good' status at the time when construction begins, the surface water bodies and ground water bodies within the study area have been assessed with a WFD status of 'Good'.
Lytham St Annes beach and dunes	The landfall located at Lytham St Annes comprises a sand beach and is located within Environment Agency Flood Zone 1 and 3. Part of the beach itself is a biologically designated SSSI: Lytham St. Annes Dunes SSSI is designated for its calcareous dune system which support a rich and varied dune plant communities and as such has a national importance.
Newton Marsh	Designated biological SSSI downstream of the study area, receiving flows from Dow Brook/Middle Pool.
Ribble Estuary	Designated biological SSSI downstream of the study area, receiving flows from Langton Brook.
Ribble and Alt Estuaries	Designated Ramsar and SPA downstream of the study area, receiving flows from several Main Rivers including Langton Brook.
Private water supplies	Surface waters from the study area have potential to enter the groundwater and thus private water supplies.
Aquifers	Principal Aquifer associated with the Sherwood sandstone group, Secondary B aquifer associated with the Singleton mudstone member and Mercia mudstone group. Secondary A aquifer associated with blown sand superficial deposits. Surface waters from the study area have potential to enter the groundwater and thus private water supplies.
Zone III: Total catchment SPZ	The study area is partially located within a Zone III: Total catchment SPZ. Surface waters from the study area have potential to enter the groundwater and thus the SPZ.
Flood defences	The Onshore Infrastructure Area crosses numerous formal and informal flood defences that offer protection against flooding from Main Rivers and sea.
Adjacent land	The study area comprises of urban areas of Preston, Kirkham, Penwortham, Ashton-on-Ribble, Lytham St Annes, Blackpool and Freckleton. These areas predominantly comprise residential dwellings with some commercial and industrial land use. Blackpool airport is also located within the hydrology and flood risk study area. The remainder of the study area (including onshore substations) are situated within a mainly rural area, with limited residential properties within the surrounding area.
Field drainage	Field drainage located within agricultural fields within the study area
Drainage pipelines	Water supply and drainage infrastructure.

2.6.11.2 Lytham Coastal Changes is a SSSI designated for geological purposes and due to its nature is not considered to be a key hydrology and flood risk receptor.

2.7 Scope of the assessment

2.7.1.1 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees as detailed in **Table 2.4.** The scope of the assessment focuses upon construction and decommissioning phase

development within the Onshore Infrastructure Area and the Intertidal Infrastructure Area, at the landfall, onshore export cable corridor, 400 kV grid connection cable corridor, temporary compounds and the onshore substations. Focus is also given to permanent development associated with the onshore substations during the operation and maintenance phase.

2.7.1.2 Taking into account the scoping and consultation process, **Table 2.17** summarises the impacts considered as part of this assessment.

2.7.1.3 Within this chapter, the focus is primarily on surface water receptors. Impacts on groundwater receptors are explored in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.

Table 2.17: Impacts considered within this assessment

Activity	Impacts scoped into the assessment
Construction phase	
Construction of the transmission Assets within the Transmission Assets within the intertidal infrastructure area and onshore infrastructure area.	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 increased flood risk arising from watercourse crossings.
	The impact of damage to existing field drainage.
	The impact of damage to existing water pipelines.
Operation and maintenance	
Operation and maintenance of the Transmission Assets within the intertidal infrastructure area and onshore infrastructure area, including access for maintenance and permanent management of the drainage within the onshore substation sites.	The impact of increased flood risk arising from additional surface water runoff.
Decommissioning phase	
Decommissioning of the intertidal infrastructure area and onshore infrastructure area including removal and decommissioning activity.	The impact of contaminated runoff on the quality of surface water and ground receptors.
	The impact of increased flood risk arising from damage to existing flood defences.
	The impact of increased flood risk arising from watercourse crossings.
	The impact of damage to existing field drainage.
	The impact of damage to existing water pipelines.

2.7.1.4 Impacts that are not likely to result in significant effects have been scoped out of the assessment. A summary of the impacts scoped out, together with justification for scoping them out and whether the approach has been agreed with key stakeholders through either scoping or consultation, is presented in **Table 2.18**.

Table 2.18: Impacts scoped out of the assessment

Impacts	Justification
The impact of contaminated runoff on the chemical and biological status of surface water receptors arising from the operation and maintenance of the onshore elements of the Transmission Assets.	Activities associated with the operation and maintenance of the intertidal and onshore elements of the Transmission Assets are unlikely to generate contaminated runoff (see Volume 1, Chapter 3: Project description). 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 Transmission Assets is unlikely to result in significant effects and is proposed to be scoped out of the assessment for hydrology and flood risk. The Planning Inspectorate confirmed in their Scoping Opinion that this matter can be scoped out of the assessment, subject to the ES detailing any operational controls, such as through a management plan. Details of such controls are provided in **Table 2.19**.
The impact of accidental spillages/contaminant release on the quality of surface water and ground receptors during operation and maintenance of the onshore elements of the Transmission Assets.	Activities associated with the operation and maintenance of the intertidal and onshore elements of the Transmission Assets are not expected to require the transport or storage of harmful substances. Therefore, the potential impact of spills/contaminant releases on the quality of surface water receptors during operation and maintenance of the onshore elements of the Transmission Assets is unlikely to result in significant effects and is proposed to be scoped out of the assessment for hydrology and flood risk. The Planning Inspectorate confirmed in their Scoping Opinion that this matter can be scoped out of the assessment, subject to the ES detailing any operational controls, such as through a management plan. Details of such controls are provided in **Table 2.19**.
The impact of increased flood risk arising from damage to existing flood defences during the operation and maintenance of the onshore elements of the Transmission Assets.	Activities required to facilitate the operation and maintenance of the intertidal and onshore elements of the Transmission Assets are not expected 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 Transmission Assets is unlikely to result in significant effects and is proposed to be scoped out of the assessment for hydrology and flood risk. The Planning Inspectorate confirmed in their Scoping Opinion that this matter can be scoped out of the assessment, subject to the ES detailing any operational controls, such as through a management plan. Details of such controls are provided in **Table 2.19**.
The impact of increased flood risk arising from additional surface water runoff during the operation and maintenance of the onshore export cables and 400 kV grid connection cables.	The operation and maintenance of the onshore export cables and 400 kV grid connection cables may result in a minor increase in the total area of impermeable land. However, the increase in impermeable land arising from the installation of the onshore export cable 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 export cable is unlikely to result in significant effects and is proposed to be scoped out of the assessment. The Planning Inspectorate confirmed in their Scoping Opinion that this matter can be scoped out of the assessment, subject to the ES detailing any operational controls, such as through a management plan. Details of such controls are provided in **Table 2.19**.

Impacts	Justification
The impact of increased flood risk arising from watercourse crossings during the operation and maintenance of the onshore elements of the Transmission Assets.	Activities required to facilitate the operation and maintenance of the onshore elements of the Transmission Assets are not expected to impact the integrity (or efficacy) of watercourse crossings installed during the construction phase. Therefore, the potential impact of increased flood risk and hydro geomorphological regime of watercourses arising from watercourse crossings during the operation and maintenance of the onshore elements of the Transmission Assets is unlikely to result in significant effects and is proposed to be scoped out of the assessment for hydrology and flood risk.

2.8 Measures adopted as part of the Transmission Assets (Commitments)

2.8.1.1 For the purposes of the EIA process, the term 'measures adopted as part of the Transmission Assets' is used to include the following two types of mitigation measures (adapted from IEMA, 2016). These measures are set out in Volume 1, Appendix 5.3: Commitments Register of the ES.

- Embedded mitigation. This includes the following.
  - Primary (inherent) mitigation - measures included as part of the project design. 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 project 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 project and the parameters secured in the DCO and/or marine licences. For example, a reduction in footprint or height.
  - 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 CoCP or similar.
- 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.

2.8.1.2 In addition, where relevant, measures have been identified that may result in enhancement of environmental conditions. Such measures are clearly identified within Volume 1, Appendix 5.3: Commitments Register of the ES. The measures relevant to this chapter are summarised in **Table 2.19.**

2.8.1.3 Embedded measures that will form part of the final design (and/or are established legislative requirements/good practice) have been taken into account as part of the initial assessment presented in **section 2.11** below

(i.e., the initial determination of impact magnitude and significance of effects assumes implementation of these measures). This ensures that the measures to which the Applicants are committed are taken into account in the assessment of effects.

2.8.1.4 Where an assessment identifies likely significant adverse effects, further or secondary mitigation measures may be applied. These are measures that could further prevent, reduce and, where possible, offset these effects. They are defined by IEMA as actions that will require further activity in order to achieve the anticipated outcome and may be imposed as part of the planning consent, or through inclusion in the ES (referred to as secondary mitigation measures in IEMA, 2016). For further or secondary measures both pre-mitigation and residual effects are presented.

Table 2.19: Measures (commitments) adopted as part of the Transmission Assets

Commitment number	Measure adopted	How the measure will be secured
Embedded measures		
CoT02	The following features will be crossed by trenchless techniques, as set out in the Onshore Crossing Schedule submitted as part of the application for development consent: • A, B and Classified unnumbered roads (known as C roads) (including the Preston Western Distributor Road, A582 South Ribble Western Distributor Upgrade and M55 Heyhouses Link Road; excluding Leech Lane); • All Environment Agency Main Rivers, including: Moss Sluice, east of Midgeland Road along Pegs Lane; Savick Brook, south of A583; Wrea Brook southeast of Cartmell Lane; Dow Brook east of Lower Lane between the A584 and the A583; Middle Pool north of Lund Way; and • All Network Rail crossings, including along the line which runs between Blackpool North and Preston, south of Cartmell Lane; and at the Network Rail crossing along the line which runs to Blackpool North, south east of Squires Gate, parallel to the A584.	DCO Schedules 2A & 2B, Requirement 5(2) (Detailed design parameters onshore); DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT04	An Outline Pollution Prevention Plan (PPP) forms part of the Outline Code of Construction Practice submitted with the application for development consent. Detailed PPP(s) will be developed in accordance with the Outline PPP and includes details of emergency spill procedures. Good practice guidance detailed in the Environment Agency'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.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT08	Post-construction, the working area will be reinstated to pre-existing condition as far as reasonably practical in line with the DEFRA Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (PB13298), Institute of Quarrying (IQ) Good Practice Guide for Handling Soils in Mineral Workings (IQ, 2021) and British Society of Soil Science (BSSS) Working with Soil Guidance Note on Benefitting from Soil Management in Development and Construction (BSSS, 2022).	DCO Schedules 2A & 2B, Requirement 18 (Restoration of land temporarily used for construction); DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT09	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP includes information about drainage during construction.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)

Commitment number	Measure adopted	How the measure will be secured
CoT10	Where trenchless techniques are proposed for Environment Agency Main Rivers, the following distances will be used: • 8 m from the bank of the Environment Agency Main River or landward toe of any associated flood defence structure; • 16 m from tidal Environment Agency Main Rivers or the landward toe of any flood defences, where the Main River is a sea defence structure; and • a minimum of 2 m vertical clearance will be maintained below the hard bed of all Environment Agency Main Rivers, including the landward toe of any associated flood defences. Final vertical clearance depths beneath Environment Agency Main Rivers will be identified during detailed design stage, in consultation with the Environment Agency, to ensure the export cables remain buried for the operational lifetime of the project.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice); DCO Schedule 10, Part 9
CoT11	An Outline Operational Drainage Management Plan for the substation sites has been prepared and submitted with the application for development consent. The Plan will 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 onshore substations. It will also include measures to control surface water runoff, including measures to prevent flooding of the working areas or offsite and to ensure any runoff is treated appropriately. Detailed Operational Drainage Management Plan(s) will be developed in accordance with the Outline Operational Drainage Management Plan and in line with the latest relevant drainage guidance notes in consultation with the Environment Agency and the Lead Local Flood Authority (Lancashire County Council).	DCO Schedules 2A & 2B, Requirement 20 (Outline Operational Drainage Management Plan)
CoT27	All temporary compounds will be removed and sites will be reinstated when construction has been completed.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice) DCO Schedules 2A & 2B, Requirement 16 (Restoration of land used temporarily for construction)
CoT35	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the Outline CoCP. The Outline CoCP includes measures to maintain and address:	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)

Commitment number	Measure adopted	How the measure will be secured
	• flood protection and control measures; • water environment and drainage; • pollution prevention; • geology and ground conditions; • ecology and nature conservation (including protected species and invasive species); • historic environment; • soil management; • traffic and transport; • noise management measures; • air quality and dust management; • landscape and visual; • recreation; and • bentonite breakout.	
CoT36	Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)
CoT39	Fences, walls, ditches and drainage outfalls will be retained at the landfall and along the onshore export cable corridor and 400 kV grid connection cable corridor, where possible. Where it is not reasonably practicable to retain them, any damage will be repaired and reinstated as soon as reasonably practical. The Environment Agency must be notified if damage occurs to any Environment Agency main river or related flood infrastructure.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT44	The Project Description (Volume 1, Chapter 3 of the Environmental Statement) sets out that the installation of the offshore export cables under Lytham St Annes SSSI and the St Annes Old Links Golf Course will be undertaken by direct pipe trenchless installation technique. The exit pits associated with the direct pipe installation will be at least 100 m seaward of the western boundary of the SSSI.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)

Commitment number	Measure adopted	How the measure will be secured
CoT77	An Outline Bentonite Breakout Plan has been prepared as part of the Outline CoCP and submitted as part of the application for development consent. CoCP(s) will be developed in accordance with the outline CoCP.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT82	Where trenchless techniques are proposed for crossing ordinary watercourses, the entry and exit pits will be set back a minimum of 8 m from the bank of the watercourse. These crossings are detailed in the Onshore Crossing Schedule. Where required, geomorphological surveys will be undertaken on ordinary watercourses that may be crossed by trenched techniques. These will be used to inform detailed designs prior to construction.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice); DCO Schedule 10
CoT84	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the Outline CoCP. In order to manage impacts to field drainage, the Outline CoCP stipulates field drainage plans will be developed 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.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT85	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP. The Outline CoCP will include that temporary haul road(s) will be installed using permeable gravel aggregate with a geotextile or other type of protective matting, or plastic or metal plates or grating, where required.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT86	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the Outline CoCP. 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 CoCP.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT87	Any works that affect Canal and River Trust waterways or land will comply with the Canal & River Trust 'Code of Practice for Works affecting the Canal & River Trust'.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT90	The Project Description (Volume 1, Chapter 3 of the Environmental Statement) sets out that the installation of the 400kV Grid Connection Cable Corridor beneath the River Ribble will be undertaken by direct pipe or micro tunnel trenchless installation techniques.	DCO Schedules 2A & 2B, Requirement 5(3)(Detailed design parameters onshore); and

Commitment number	Measure adopted	How the measure will be secured
		Requirement 8 (Code of Construction Practice)
CoT95	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the Outline CoCP. The Outline CoCP includes that during the construction phase the Principal Contractor(s) will sign up to the Flood Warning Service and will be alerted by a phone call or text when a Flood Warning becomes active. The flood warning will be applied to the entire Onshore Infrastructure Area located within Flood Zones 2 and 3 to enable site personnel to be evacuated from the site in a timely manner prior to a flood event occurring, if appropriate.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT97	The Outline Code of Construction Practice (CoCP) has been submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the Outline CoCP. The Detailed CoCPs detail that where necessary at the compounds located within the landfall area, construction measures will be adopted to maintain the existing level of flood protection during construction. These measures will be discussed with the Environment Agency. If applicable, these measures could include scheduling work windows against tide times and briefing site personnel regarding weather conditions, tide times and heights. If a Flood Warning/Flood Alert is issued for the 'Lancashire coastline at Lytham St. Annes, along the coast from Squires Gate to Warton Bank' Flood Warning Area (reference 012FWCTL13A) and the 'Coast at Lytham St Annes' Flood Alert area (reference 012WACLS) works within the relevant areas within the landfall area would also be stopped whilst the Flood Warning/Flood Alert is active.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
Secondary measures		
CoT41	Where the onshore export cable corridor or 400 kV grid connection cable corridor crosses sites of particular sensitivity (e.g. embanked Environment Agency surface watercourses, Sites of Special Scientific Interest or groundwater inner Source Protection Zones) hydrogeological risk assessment(s) will be undertaken to inform a site-specific crossing method statement(s) where required. These will be agreed with the relevant stakeholders prior to construction.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)

2.9 Key parameters for assessment

2.9.1 Maximum design scenario

2.9.1.1 The maximum design scenarios identified in **Table 2.20** 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 Project Design Envelope provided in Volume 1, Chapter 3: Project description of the ES. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Design Envelope (e.g., different infrastructure layout), to that assessed here be taken forward in the final design.

Table 2.20: Maximum design scenario considered for the assessment of impacts

Impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
The impact of contaminated runoff on the quality of surface water and ground receptors	✓	×	✓	**Construction phase: landfall** The offshore export cables between the transition joint bay working area within Blackpool Airport and the beach will be installed using the direct pipe trenchless technique for a maximum length of 1,500 m. It is anticipated the direct pipe exit will be 100 m from the boundary of Lytham St Annes Dunes SSSI. • Entry pits for the direct pipe will be situated within the transition joint bay area within Blackpool Airport: The maximum number of entry pits will be six, with a maximum direct drill entry pit area of 450 m^2 per circuit with a depth of 6 m. • Exit pits on the beach: The maximum number of exit pits will be six, with a maximum area of drill exit pit of 875 m^2 per circuit, with a depth of 3 m. The maximum cofferdam area dimensions per pit is 75 m^2 (15 m x5 m). The total duration of exit pit works on the beach is 2 weeks per circuit. • For the offshore export cable installation between exit pits and MLWS, the burial at the of the offshore export cables seaward of the direct pipe exit pits will via open trenching. The maximum number of trenches will be six. The maximum width of the stepped trench is 10 m at the top and 3 m at the bottom and are each 3 m deep. The maximum length per trench is 300 m with a maximum working area each side of the trench of 25 m. • The open trench will transition to a beach trencher, this will be 3 m wide and up to 1,250 m long, the trench will be contained within a working corridor with a 50 m width. • Cable pull in and burial will take up to six weeks per circuit and the maximum total duration of cable pull in and burial is 36 weeks of active construction assuming a sequential construction scenario. • There will be up to four compounds required west of the transition joint bays to MLWS: – Compound 1 (welfare): 300 m^2 to be active for 36 weeks;	**Construction phase** Open cut trenching will result in largest area of disturbance (compared to trenchless techniques) at the landfall, onshore export cable corridor, 400 kV grid connection cable corridor and onshore substation sites. This represents the MDS in terms of potential for runoff, spillage and direct disturbance to water bodies (where present) as a result of construction activities. In terms of areas affected by the onshore cables and substations, the MDS is represented by the largest working areas and number of trenches, which arise from the construction of both the Morgan Offshore Wind Project: Transmission Assets and the Morecambe Offshore Windfarm: Transmission Assets. In terms of duration, the MDS is represented by sequential construction of the Morgan Offshore Wind Project Transmission Assets and the Morecambe Offshore Windfarm Transmission Assets (rather than concurrent construction). Where options remain for watercourse crossings, open cut trenching represents the MDS in terms of direct disturbance. Trenchless techniques are committed for crossings of Main Rivers and the majority of ordinary watercourses.
The impact of increased flood risk arising from additional surface water runoff	✓	×	×		
The impact of damage to existing field drainage	✓	×	✓		
The impact of damage to existing water pipelines	✓	×	✓		
The impact of increased flood risk arising from damage to existing flood defences.	✓	×	✓		
The impact of increased flood risk arising from watercourse crossings	✓	×	✓		

Impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				– Compound 2: 2,500 m^2 to be active for 48 weeks; – Compound 3: 510 m^2 to be active for 48 weeks; and – Compound 4: 600 m^2 to be active for 36 months (in a sequential construction scenario). • There will be two transition joint bay compounds (15,000 m2 for Morgan and 11,500 m^2 for Morecambe) within Blackpool Airport to facilitate construction works, to be active for up to 29 months over a 45 month period. – Maximum working area of the transition joint bay: 4,900 m^2 for Morgan and 2,800 m^2 for Morecambe **Construction phase: onshore export cable corridor** • The maximum number of trenches will be six, with a target trench depth of 1.8 m. • Onshore export cable construction corridors width 100 m, with a length of up to 17 km. Width will include two haul roads. There will be up to 110 joint bays and 110 link boxes, with 1,000 m^3 and 8 m^3 of material excavated for each joint bay and link box respectively. • There will be up to ten construction compounds along the onshore export cable corridor. During a sequential construction compounds will be present for 66 months with the following attributes: – 2 type A compounds, a maximum total area of 26,500 m^2; – 6 type B compounds a maximum total area of 79,500 m^2; and – 2 type C compounds a maximum total area of 17,500 m2. • The maximum number of HDD locations is 120. Each major HDD location will have a compound, measuring up to 100 m x 50 m. Drilling mud will be stored and used at these compounds.	At the River Ribble crossing, the MDS is direct pipe which requires the largest compound sizes. **Decommissioning phase** Decommissioning is likely to operate within the parameters identified for construction.

Impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				Construction phase: onshore substations • Permanent footprint of the Morgan onshore substation is 164,00 m^2, the substation platform is 80,000 m^2 of which 48,000 m^2 is anticipated to be impermeable There will be a 20 m wide access road, 15 m of which will be permanent. • Permanent footprint for the Morecambe onshore substation is 59,500 m^2, the substation platform is 29,700 m^2 of which 17,820 m^2 is anticipated to be impermeable. There will be a 20 m wide access road, 15 m of which will be permanent. • Temporary works associated with Morgan onshore substation (including temporary compounds, laydown areas and working areas) are 70,000 m^2. • Temporary works associated with Morecambe onshore substation (including temporary compounds, laydown areas and working areas) are 52,500 m^2. • Duration: enabling works 12 months, main construction 54 months, (sequential construction scenario). **Construction phase: onshore 400 kV grid connection cables** • Open cut trenching: The maximum number of trenches will be four, with a target trench depth of 1.8 m. The width of the permanent cable corridor is 50 m. There will be a total of 60 joint bays and 60 link boxes. • The working area will include a construction corridor width of 76 m (which includes two haul roads), with a length of up to 13 km. Duration of installation of up to 66 months (sequential construction scenario). • There will be a maximum of 46 HDD crossings (excluding the Ribble Estuary crossing) and the HDD compound locations will be 100 m x 50 m. • Trenchless technologies will be used to cross the River Ribble. Micro-tunnelling is considered to represent the MDS due to the depth of the entry/exit pits. The temporary compound at the launch/exit (two compounds) area would be a maximum of 75 m x 400 m. There will be a maximum of four tunnels/bores over a distance of up to 650 m. The depth of the launch and receiver pits would be a maximum of 45 m.	

Impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				• There will be up to eight construction compounds along the 400 kV grid connection cable corridor. During a sequential construction compounds will be present for 66 months with the following attributes: – 2 type A compounds, a maximum total area of 26,270 m2; – 4 type B compounds a maximum total area of 52,540 m2; and – 2 type C compounds a maximum total area of 17,500 m2. • Duration of installation is up to 66 months (sequential construction scenario). • At the River Ribble crossing, the MDS is direct pipe which requires the largest compound sizes. The direct pipe would be 650 m in length. • Each launch pit has an area of 450 m^2 and each exit pit has an area of 750 m^2. The maximum area of the launch compound is 60,000 m^2 and the maximum area of the reception compound is 10,500 m^2. **Decommissioning phase** • 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	×	✓	×	**Operation and maintenance phase: landfall** • The maximum number of transition joint bays will be six, each with a total maximum above ground permanent area of 4 m^2 per joint bay associated with ground level reinstatement. **Operation and maintenance phase: onshore export cables** • The maximum number of joint bays is 110 each with a total maximum permanent area of 4 m^2 per inspection cover associated with ground level reinstatement. • The maximum number of link boxes is 110 with a total maximum permanent area of 4 m^2 per link box associated with the ground level covers.	**Operation and maintenance phase** The MDS 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.

Impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				Operation and maintenance phase: onshore substations • Permanent footprint of Morgan substation is 164,000 m^2 with 80,000 m^2 of this comprising the substation footprint, exclusion attenuation and landscaping areas. The substation will include 19 permanent buildings and a 15 m wide permanent access road. • Permanent footprint for Morecambe substation is 59,500 m^2 with 29,700 m^2 of this comprising the substation footprint, excluding attenuation and landscaping areas. The substation will include nine permanent buildings and a 15 m wide permanent access road. **Operation and maintenance phase: 400 kV grid connection cables** • The maximum number of joint bays is 60 each with a total maximum permanent area of 4 m^2 per inspection cover associated with ground level reinstatement. • The maximum number of link boxes is 60 with a total maximum permanent area of 4 m^2 per link box associated with the ground level covers.	

[a] C = Construction, O = Operation and maintenance, D = Decommissioning

2.10 Assessment methodology

2.10.1 Overview

2.10.1.1 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 impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity are based on relevant guidance, including the DMRB methodology (Highways England *et al.,* 2020) where appropriate as described in further detail in Volume 1, Chapter 5: Environmental assessment methodology of the ES.

2.10.2 Receptor sensitivity/value

2.10.2.1 The criteria for defining sensitivity in this chapter are outlined in **Table 2.21** below.

Table 2.21: 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/or is a principal 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 slow 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. Groundwater: Groundwater body supports public water and/or large-scale industrial water supply and/or is a principal or secondary A 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.

Sensitivity	Definition
	Groundwater: Secondary A aquifer and/or a groundwater body which 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: Secondary undifferentiated strata 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: Unproductive strata with no abstraction licences. Flood Risk: Area outside flood plain (Flood Zone 1) or flood plain with very low probability of flooding industrial properties.

2.10.3 Magnitude of impact

2.10.3.1 The criteria for defining magnitude in this chapter are outlined in **Table 2.22** below.

2.10.3.2 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).

2.10.3.3 The criteria for defining magnitude in this chapter are outlined in **Table 2.22** below.

Table 2.22: Magnitude of impact 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.

2.10.4 Significance of effect

2.10.4.1 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 2.23**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.

2.10.4.2 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.

2.10.4.3 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 2.23: 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

2.10.4.4 Where the magnitude of impact is 'no change', no effect would arise. 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 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 project.
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

2.10.5 Assumptions and limitations of the assessment

2.10.5.1 The assessment within this chapter is based on publicly available data obtained from the Environment Agency, Fylde Borough Council, South Ribble Borough Council, the Groundsure reports (2023), as well as additional information supplied from stakeholders during the scoping and consultation stages.

2.10.5.2 The information has been supplemented with publicly available desktop reports as presented within **Table 2.5**, Groundsure reports, walkover surveys and public consultation such that it is considered sufficient to characterise the baseline environment.

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

2.10.5.4 Product 5 and 6 data for the Ribble Estuary (2014) model and the Ribble Douglas (2010) model were obtained from the Environment Agency in 2022 and 2024. It should be acknowledged that the Product 6 data is supplied under the terms of the Environment Agency Conditional License.

2.10.5.5 An Outline Operational Drainage Management Plan (document reference J10) provides additional information regarding the onshore substations drainage design (including the provision of SuDS and maintenance/management regime).

2.10.5.6 It is also noted that the Environment Agency 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 3, Annex 2.3: Flood risk assessment of the ES), such that sufficient baseline information is available.

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

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

2.10.5.8 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.

2.11 Assessment of effects

2.11.1 Introduction

2.11.1.1 The impacts of the construction, operation and maintenance, and decommissioning phases of the Transmission Assets have been assessed. The impacts are listed in **Table 2.17**, along with the maximum design scenario against which each impact has been assessed.

2.11.1.2 A description of the likely effect on receptors caused by each identified impact is given below. It is noted the impact 'of accidental spillages/contaminant release on the quality of surface water and ground receptors' and 'direct disturbance of surface water bodies and increased direct soil erosion and supply of fine sediment to surface watercourses during construction and decommissioning activities' have been taken into consideration within the impact 'of contaminated runoff on the quality of surface water and ground receptors', to avoid repetition within this chapter, as agreed with the hydrology and flood risk EWG (May 2023). This is due to

the sensitivity of watercourses being assessed via WFD status, which assesses water quality.

2.11.2 The impact of contaminated runoff on the quality of surface water receptors

2.11.2.1 During construction and decommissioning of the onshore and intertidal elements of the Transmission Assets (landfall, onshore export cables, onshore substations and 400 kV grid connection cables), there is a potential risk of accidental discharges of untreated runoff containing contaminants. It is anticipated that any untreated runoff will eventually outfall to surface water bodies (Main Rivers and Ordinary Watercourses) located downstream. Untreated runoff also has the potential to infiltrate in situ into ground water bodies confined within superficial deposits and solid geology underlying the study area.

2.11.2.2 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 or in-situ contamination.

2.11.2.3 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.

2.11.2.4 Within this chapter, the focus is primarily on surface water receptors. Impacts on groundwater receptors are explored in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.

Construction phase

Sensitivity of the receptor

Surface water body receptors

2.11.2.5 Main Rivers and Ordinary Watercourses present within the study area discharge to the Ribble Estuary and/or the North West Transitional Coastal Waters. 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’.

2.11.2.6 The Canal and River Trust lease Savick Brook, a designated Main River, to enable navigation and connectivity to the Lancaster Canal. The Canal and River Trust also have a right of navigation over the Ribble Link which is part of the River Ribble, a designated Main River which provides connectivity to Savick Brook. Main Rivers and Ordinary Watercourses are presented within

Volume 3, Figure 2.3 (see Volume 2, Figures). The vulnerability of Main Rivers and Ordinary Watercourses is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.2.7 Newton Marsh SSSI receives flows from Dow Brook/Middle Pool (designated Main Rivers). The Ribble Estuary SSSI and the Ribble and Alt Estuaries Ramsar site and SPA receive flow from all Main Rivers and Ordinary Watercourses within the study area that discharge to Ribble Estuary. The landfall is located within Lytham St Annes Dunes SSSI (although trenchless technology will be used to pass beneath this site). The sites are biologically designated, as discussed within **section 2.6.8** and are of national and European importance. The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore considered to be **high**.

Ground water body receptors

2.11.2.8 There is one groundwater abstraction location present within the study area. The study area encompasses a Principal Aquifer associated with the Sherwood sandstone group and a Secondary B aquifer associated with the Singleton mudstone member and Mercia mudstone group. A Secondary A aquifer associated with blown sand superficial deposits is also present within the study area. An area of 65 ha within the far eastern extent of the study area to the north of the Ribble Estuary is located within a Zone III: Total catchment SPZ. The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is considered to be **high**.

Magnitude of impact

2.11.2.9 During the construction phase, construction activities may give rise to increases in turbid runoff, an increase in the pH of runoff and remobilisation of contaminants within the ground. Leakages and spills may also occur from machinery use or refuelling of machinery. Within temporary construction compounds and construction areas the incorrect storage and handling of construction materials, oils and chemicals may result in spills and leaks. Leakages may also arise from welfare facilities within construction compounds. There is a potential for contaminants to impact any potential receiving water body quality and cause a reduction in water body WFD classification.

2.11.2.10 The onshore crossing schedule is presented within Volume 1, Annex 3.2: Onshore crossing schedule of the ES. In most cases, HDD (or equivalent trenchless technique), direct pipe or micro-tunnel will be used to pass beneath Main Rivers (CoT02 as set out in **Table 2.19**). Trenchless techniques are also proposed for the majority of Ordinary Watercourses. Construction works associated with this crossing technique have a risk of bentonite breakout during drilling, where bentonite clay drilling fluid escapes

the bore along the path of the drilling or breaks out where fissured ground overlies the bore. Bentonite breakout has the potential to contaminate water bodies if a continuous pathway is available.

2.11.2.11 Trenched techniques may be used to cross two Ordinary Watercourses that are frequently dry. Construction activities associated with 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.

2.11.2.12 Embedded mitigation measures outlined in **Table 2.19** and include the implementation of a CoCP and supporting management plans. An Outline CoCP (document reference J1) and the following outline plans provided as annexes to the CoCP are provided to support the application for development consent:

- an Outline Dust Management Plan (document reference J1.2);
- an Outline Pollution Prevention Plan (document reference J1.4);
- an Outline Spillage and Emergency Response Plan (document reference J1.8);
- an Outline Surface Water and Groundwater Management Plan (document reference J1.9);
- an Outline Bentonite Breakout Plan ((document reference J1.13); and

  an Outline Contaminated Land and Groundwater Discovery Strategy (document reference J1.14).

2.11.2.13 The Outline CoCP includes measures regarding surface water drainage during construction (CoT09 and CoT35, as set out in **Table 2.19**) to ensure surface water runoff is intercepted and attenuated on site, and that surface water discharges are controlled in quality and volume and cause no degradation in WFD classification.

2.11.2.14 Appropriate buffers will be maintained between the banks of watercourses and flood defence structures and all temporary working areas for the Transmission Assets where practically possible (see CoT10 as set out in **Table 2.19**).

2.11.2.15 The impact is predicted to be direct, of local spatial extent, intermittent and short term in duration. The magnitude is therefore considered to be **negligible adverse**.

Significance of the effect

2.11.2.16 Overall, the sensitivity of each of the receptors (Main Rivers and Ordinary Watercourses, designated sites, groundwater abstractions, source protection zones and aquifers) is considered to be **high** and the magnitude of the impact for each receptor is deemed to be **negligible adverse**. The effect will, therefore, be of **minor adverse** significance, which is not significant.

Further (secondary) mitigation and residual effects

2.11.2.17 Whilst the effects will not be significant, further mitigation is proposed. Where the onshore export cable corridor or 400 kV grid connection cable corridor crosses sites of particular sensitivity (e.g. embanked Environment Agency surface watercourses, Sites of Special Scientific Interest or groundwater inner Source Protection Zones) hydrogeological risk assessment(s) will be undertaken to inform a site-specific crossing method statement(s) where required. These will be agreed with the relevant stakeholders prior to construction (CoT41 as set out in **Table 2.19**). The residual effect would remain **minor adverse** and not significant.

Decommissioning phase

Sensitivity of the receptor

2.11.2.18 During decommissioning , it is expected receptors will remain as identified during construction, please refer to **paragraphs 2.11.2.5, 2.11.2.6, 2.11.2.7,** and **2.11.2.8**.

Magnitude of impact

2.11.2.19 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). To minimise the environmental disturbance during decommissioning the onshore export cables and 400 kV grid connection 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. Decommissioning of the onshore substations will be reviewed in consideration of any other existing or proposed future use of the onshore substations. If complete decommissioning is required, then all of the electrical infrastructure will be removed, and any waste arising disposed of in accordance with relevant regulations. Foundations will be broken up and the site reinstated to its original condition or for an alternative (separately agreed and consented) use.

2.11.2.20 An Onshore Decommissioning Plan will be developed prior to decommissioning and will be in line with the latest relevant available guidance (CoT36 as set out in **Table 2.19**). The Onshore Decommissioning Plan will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure and details relevant to pollution prevention and avoidance of ground disturbance.

2.11.2.21 The impact is predicted to be direct, of local spatial extent and short term in duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of the effect

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

2.11.3 The impact of increased flood risk arising from additional surface water runoff

2.11.3.1 During construction, operation and maintenance of the onshore elements of the Transmission Assets, there is a potential for increased surface water flood risk as a result of higher rates of surface water runoff from additional impermeable areas.

Construction phase

Sensitivity of the receptor

2.11.3.2 The beach at Lytham St Annes is located within the study area and comprises a sand beach and is located within Environment Agency Flood Zones 1 and 3. By virtue of elevation, the beach acts as an informal flood defence and land behind the beach is a biological designated SSSI, Lytham St. Annes Dunes, as discussed within **section 2.6.8**. The vulnerability of the receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.3.3 The study area includes Newton Marsh SSSI, which receives flows from Dow Brook/Middle Pool (Main Rivers) and the Ribble Estuary SSSI and the Ribble and Alt Estuaries Ramsar site and SPA. The majority of watercourses within the study area ultimately discharge to Ribble Estuary. The sites are biologically designated, as discussed within **section 2.6.8** and are of national and European importance The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.3.4 The study area is partially located within a Zone III: Total catchment SPZ and there is one groundwater abstraction licence within the study area. The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.3.5 The study area for the onshore export cable corridor and the 400 kV grid connection corridor include urban areas of Preston, Kirkham, Penwortham, Ashton-on-Ribble, Lytham St Annes, Blackpool and Freckleton. These areas predominantly comprise residential dwellings with some commercial and industrial land use. The remainder of the study area (including the onshore substation sites) is situated within a mainly rural area, with limited residential properties within the surrounding area. Main roads, railway lines, Main Rivers

and Ordinary Watercourses and power and utility connections are also located within this area. The vulnerability of the surrounding land receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.3.6 Areas of Flood Zone 2 and 3 are present across the intertidal infrastructure area and onshore infrastructure area is within proximity to the sea, Main Rivers, Ordinary Watercourses. Site users during this phase of the Transmission Assets will be construction workers who are assessed to be highly vulnerable with low recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of impact

Construction activities and enabling works

2.11.3.7 Impacts on flood risk within the Intertidal Infrastructure Area and Onshore Infrastructure Area from the construction of the Transmission Assets would arise from any temporary change in runoff. This is expected in areas such as the onshore substation sites, construction compounds, haul roads, and construction accesses where a lower permeability surfacing is proposed.

2.11.3.8 The Outline CoCP includes measures regarding surface water drainage during construction (CoT09 and CoT35 as set out in **Table 2.19**) to ensure surface water runoff is intercepted and attenuated on site, and that surface water discharges are controlled in quality and volume and cause no increase in flood risk. Permeable gravel aggregate with a geotextile or other type of protective matting, or plastic or metal plates or grating, would be used where possible within the temporary haul road to reduce the generation of surface water runoff arising from a change in surface permeability (CoT85 as set out in **Table 2.19**).

2.11.3.9 Furthermore, parts of the Intertidal Infrastructure Area and Onshore Infrastructure Area are located within Flood Zones 2 and 3. During construction, the site manager 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 (CoT95 as set out in **Table 2.19**). Additional measures include scheduling work windows against tide times and briefing site personnel regarding weather conditions, tide times and heights. Works within the landfall area would also be stopped whilst the Flood Warning/Flood Alert is active (as per CoT97 as set out in **Table 2.19)**.

Cable crossings

2.11.3.10 All Main Rivers and the majority of Ordinary Watercourses and associated flood defences within the Onshore Infrastructure Area are expected to be crossed using trenchless techniques as per CoT02 as set out in **Table 2.19** and the onshore crossing schedule (see Volume 1, Annex 3.2: Onshore crossing schedule of the ES for more information).

2.11.3.11 Trenchless techniques are proposed at landfall to install the offshore export cable between the transition joint bay entry compound at Blackpool Airport

and the exit pits on the beach as per as per CoT44 as set out in **Table 2.19**). It is expected that the exit pits may require the installation of cofferdams to stabilise the excavations if required. Trenched techniques will be required to install the offshore export cable between the exit pits within the intertidal area. The trench is expected to be a stepped side trench to maintain stability.

2.11.3.12 Measures to mitigate flood risk arising from surface water runoff to be implemented during the construction of crossings include stand-off distances from Main Rivers and associated flood defences (CoT10), the use of construction drainage (CoT09), flood protection and control measures (CoT35) and CoT90 as set out in **Table 2.19**. Discharge of dewatering will be undertaken in line with parameters set out in Volume 1, Chapter 3: Project description and agreement with Lancashire County Council and/or the Environment Agency.

Summary

2.11.3.13 With the designed in and construction measures in place (as set out in **Table 2.19**), there is unlikely to be any observable change in flood risk to receptors. The of impact magnitude is predicted to be of indirect local spatial extent, continuous and short term in duration and is therefore considered to be **negligible adverse**.

Significance of the effect

2.11.3.14 Overall, the magnitude of the impact is deemed to be **negligible adverse** and the sensitivity for the study area is considered to be **high**. The effect will, therefore, be of **minor adverse** significance, which is not significant.

Operation and maintenance phase

Sensitivity of the receptor

2.11.3.15 Newton Marsh SSSI, the Ribble Estuary SSSI and the Ribble and Alt Estuaries Ramsar site and SPA are located downstream of the Transmission Assets onshore substations and are nationally designated and of European importance. The vulnerability of receptors is considered to be high and the recoverability of receptors is considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is, therefore, considered to be **high**.

2.11.3.16 The study area is partially located within a Zone III: Total catchment SPZ and there is one groundwater abstraction licence within the study area. The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.3.17 The study area for the onshore substations includes urban areas of Kirkham and Freckleton. These areas predominantly comprise residential dwellings with some commercial and industrial land use. Main roads, railway lines, Main Rivers and Ordinary Watercourses and power and utility connections are also located within this area. The vulnerability of receptors is considered

to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of impact

2.11.3.18 The onshore substation sites have been subject to an FRA (Volume 3, Annex 2.3: Flood risk assessment of the ES) in order to meet the requirements of national planning policy and best practice guidance. The construction of both the Morgan onshore substation and Morecambe onshore substation would lead to an increase in impermeable areas.

2.11.3.19 With the adoption of the Outline Operational Drainage Management Plan (document reference J10) (CoT11 as set out in **Table 2.19**), to be agreed with the LPA and LLFA, it has been determined that flows from impermeable areas within each substation site will be restricted to the 1 in 1-year greenfield runoff rate. This will ensure that any changes to runoff rate are minimal and will result in an overall slight reduction to the risk of flooding to areas downstream of the onshore substations.

2.11.3.20 The Outline Operational Drainage Management Plan (document reference J10) details the final proposed levels to which the onshore substations 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.

2.11.3.21 Due to the negligible increases in impermeable area associated with the landfall, onshore export cable corridor and 400 kV grid connection cable (associated with transition joint bay and link box manhole covers) only negligible increases in surface water runoff will occur. As a result, new impermeable areas associated with these aspects of the Transmission Assets will not increase flood risk during the operational and maintenance phase and no drainage to mitigate surface water runoff will be required.

2.11.3.22 The impact is predicted to be direct, continuous, of local spatial extent and long term duration. The impact is likely to be slightly beneficial, due to the provision of suitable attenuation and control of runoff (compared to a currently uncontrolled situation). However, as a precautionary approach, the magnitude of impact has been assessed as **no change**.

Significance of the effect

2.11.3.23 Overall, the magnitude of the impact is deemed to be **no change** 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 the site will be restricted to the 1 in 1-year greenfield runoff rate. Therefore, there will be minimal change in runoff rate. There will, therefore, be **no effect**, which is not significant.

2.11.4 The impact of increased flood risk arising from damage to existing flood defences

2.11.4.1 During construction and decommissioning of the onshore elements of the Transmission Assets, there is a potential risk of increased flood risk as a result of damage to the existing flood defences by construction and decommissioning activities.

Construction phase

Sensitivity of the receptor

2.11.4.2 Lytham St Annes has a sand beach, which by virtue of elevation, acts as an informal flood defence against tidal flooding. The landfall is designated as a biological SSSI (Lytham St. Annes Dunes) as discussed within **section 2.6.** The site has national and European importance. The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.4.3 Formal flood defences are located in proximity to Main Rivers and are predominantly comprised of raised earthen embankments (see Volume 3, Annex 2.3: Flood Risk Assessment of the ES). Volume 3, Figure 2.3 shows the location of flood defences within the study area. The vulnerability of receptors is considered to be high and the recoverability is considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.4.4 Areas of Flood Zone 2 and 3 are present across the onshore infrastructure area, including landfall, onshore cable corridors and the temporary and permanent access tracks relating to Morecambe onshore substation. These noted areas are within proximity to the sea, Main Rivers, Ordinary Watercourses and associated flood defences. Site users during this phase of the Project will be construction workers who are assessed to be highly vulnerable with low recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.4.5 The study area for the Transmission Assets where flood defences are present predominantly comprise residential dwellings with some commercial and industrial land use. Main roads, railway lines and power and utility connections are also located within this area. The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of impact

Formal flood defences

2.11.4.6 Formal flood defences are located in proximity to Main Rivers and are predominantly comprised of raised earthen embankments (see Tables 3.2, 4.2 and 5.1 within Volume 3, Annex 2.3: Flood risk assessment of the ES).

2.11.4.7 All Main Rivers and the majority of Ordinary Watercourses and associated flood defences within the study area are expected to be crossed using trenchless techniques as per CoT02 as set out in **Table 2.19**. The impacts on flood defences from construction activities involving the use of trenchless techniques and associated machinery could lead to impacts on the structural stability of earth embankments. There is the potential for this to impact on the integrity of flood defences within the area and lead to an increased risk of flooding to areas which benefit from flood defences.

2.11.4.8 In order to avoid such impacts, minimum standoff distances for have been specified in CoT10, as set out in **Table 2.19**). This is designed to ensure that all works avoid the flood defences.

2.11.4.9 The CoCP (document reference J1), includes measures to ensure the risk of flooding during construction is not increased (CoT35, CoT97 and CoT09, as set out in **Table 2.19**). This includes within areas of Flood Zone 2 and 3, the site manager will sign up to the Flood Warning Service to enable work to be stopped and site personnel to be evacuated from the site in a timely manner prior to a flood event occurring (CoT95 as set out in **Table 2.19**).

Informal flood defences

2.11.4.10 Lytham St Annes Dunes (SSSI) comprises a sand beach which by nature of elevation provides an informal flood defence. Trenchless techniques are to be used underneath the dunes at landfall between the transition joint bay entry compound at Blackpool Airport and the exit pits within the intertidal area. To prevent damage to the toe of the sand dunes, a minimum offset distance between the boundary of the dunes and the trenchless technique exit pit installation area will be maintained (as per CoT44 as set out in **Table 2.19**).

2.11.4.11 It is expected that the exit pits may require the installation of cofferdams to stabilise the intertidal excavations and maintain the existing level of protection from tidal flood risk. if required. Additional measures include scheduling work windows against tide times and briefing site personnel regarding weather conditions, tide times and heights. The landfall is located within Flood Zone 3, and as such the site manager will sign up to the Flood Warning Service to enable work to be stopped and site personnel to be evacuated from the site in a timely manner prior to a flood event occurring (CoT95 as set out in **Table 2.19**).

Summary

2.11.4.12 Formal and informal flood defences are to be crossed by trenchless techniques, with measures to ensure their structural stability is not impacted

during construction. The magnitude of impact is predicted to be indirect, of local spatial extent, intermittent and of short term duration. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of the effect

2.11.4.13 Sand dunes at Lytham St Annes that act as informal flood defences and the majority of formal flood defences present along banks of Main Rivers 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 no degradation to crossed flood defences during construction. Overall, the magnitude of the impact is deemed to be **negligible adverse** and the sensitivity of the receptors is considered to be **high**. The effect will therefore be of **minor adverse** significance, which is not significant.

Further (secondary) mitigation and residual effect

2.11.4.14 Whilst the effect would not be significant, further mitigation is proposed comprising repair to any damage to flood defences (CoT39 as set out in **Table 2.19**) and the residual effect would remain **minor adverse** and not significant.

Decommissioning phase

Sensitivity of the receptor

2.11.4.15 During decommissioning , it is expected receptors will remain as identified during construction, please refer to **paragraphs 2.11.4.2, 2.11.4.3, 2.11.4.4** and **2.11.4.5**.

Magnitude of impact

2.11.4.16 To minimise the environmental disturbance during decommissioning the onshore export cables and 400 kV grid connection 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. It is assessed that whether the cables are pulled through or remain in place with ends cut, existing flood defences will not be affected.

2.11.4.17 An Onshore Decommissioning Plan will be developed prior to decommissioning in a timely manner and will be in line with the latest relevant available guidance (CoT36 as set out in **Table 2.19**). The Onshore Decommissioning Plan will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure and details relevant to pollution prevention and avoidance of ground disturbance.

2.11.4.18 The impact will be indirect, short term and intermittent and the magnitude is therefore considered to be **negligible**.

Significance of the effect

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

2.11.5 The impact of increased flood risk arising from watercourse crossings

2.11.5.1 Temporary haul roads serving the onshore export cable corridor and 400 kV grid connection cable corridor plus temporary and permanent access tracks as part of the onshore substations will require the construction of temporary and permanent crossings over both Environment Agency Main Rivers and Ordinary Watercourses. Inappropriate design of these crossings could increase flood risk and result in hydrogeomorphological changes to watercourses.

Construction phase

Sensitivity of the receptor

2.11.5.2 The study area includes Newton Marsh SSSI, which receives flows from Dow Brook/Middle Pool (Main Rivers) and the Ribble Estuary SSSI and the Ribble and Alt Estuaries Ramsar site and SPA. Watercourses to be crossed within the risk study area ultimately discharge to Ribble Estuary. The sites are biologically designated, as discussed within **section 2.6.8** and are of national and European importance. The vulnerability of receptors is considered to be high and the recoverability of receptors is considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.5.3 The study area for the onshore export cable corridor and the 400 kV grid connection includes urban areas of Preston, Kirkham, Penwortham, Ashton-on-Ribble, Lytham St Annes, Blackpool and Freckleton. These areas predominantly comprise residential dwellings with some commercial and industrial land use. Blackpool Airport is also located within the western part of the study area. The remainder of the study area (including the onshore substation sites) is situated within a mainly rural area, with limited residential properties within the surrounding area. Main roads, railway lines and power and utility connections are also located within this area. The vulnerability of the surrounding land receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of impact

2.11.5.4 Inappropriate design and construction of watercourse crossings could act to restrict flows, increase in flood risk upstream of the crossing and as a result lead to variations in flow rates and rates of erosion and sedimentation. To prevent these impacts, watercourse crossings will be appropriately designed

prior to construction to ensure current flow conveyance is maintained. The CoCP will implement measures to control risks to water quality and flooding during construction. An Outline Surface Water and Groundwater Management Plan is provided as part of the application (document reference J1.9).

2.11.5.5 As per the MDS presented within **Table 2.20**, dimensions of temporary culvert/bridge crossings for the haul road will be a maximum 3 m in diameter and 10 m in length. Detailed design of watercourse crossings will be undertaken post-consent in consultation with the Environment Agency and LLFA. Crossing design will take into consideration the flow rate and volume conveyed at each watercourse crossing location, in addition to the presence of any existing in-channel structures that can provide an existing constraint on watercourse flows within proximity to proposed crossing locations (distance to be ascertained at detailed design stage). This will be implemented through the Surface Water and Groundwater Management Plan, which forms part of the CoCP (CoT35).

2.11.5.6 Once installation of the Transmission Assets is complete, temporary crossings serving the haul road will be removed and land will be reinstated to its original condition (CoT08 as set out in **Table 2.19**) before the end of the construction phase. Permanent crossings will remain to provide access to the transmission Assets throughout the operational and maintenance phase. The magnitude is therefore considered to be **negligible adverse**.

Significance of the effect

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

Decommissioning phase

Sensitivity of the receptor

2.11.5.8 During decommissioning , it is expected receptors will remain as identified during construction, please refer to **paragraphs 2.11.5.2** and **2.11.5.3**.

Magnitude of impact

2.11.5.9 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). Decommissioning of the onshore substations will be reviewed in consideration of any other existing or proposed future use of the onshore substations. If complete decommissioning is required, then all of the electrical infrastructure will be removed, and any waste arising disposed of in accordance with relevant regulations.

2.11.5.10 An Onshore Decommissioning Plan will be developed prior to decommissioning in a timely manner and will be in line with the latest relevant available guidance (CoT36 as set out in **Table 2.19**). The Onshore Decommissioning Plan will include provisions for the removal of all onshore

above ground infrastructure and the decommissioning of below ground infrastructure and details relevant to pollution prevention and avoidance of ground disturbance.

2.11.5.11 The impact is predicted to be direct, of local spatial extent, intermittent and of short term duration. The impact magnitude is therefore predicted to be **negligible adverse**.

Significance of the effect

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

2.11.6 The impact of damage to existing field drainage

2.11.6.1 During construction and decommissioning of the onshore elements of the Transmission Assets, there is a potential risk of damage to existing field drainage arising from construction activities.

Construction phase

Sensitivity of the receptor

2.11.6.2 The study area includes agricultural fields with field drainage installed, with transport and power infrastructure (main roads, railway lines, power and utility connections) generally located beyond. Main Rivers and Ordinary Watercourses are also located adjacent to field drainage. The vulnerability of receptors within adjacent land is considered to be high and the recoverability of receptors are considered to be medium due to and time required for repair and remediation of damage to receptors from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.6.3 Field drains constructed for field drainage within the Onshore Infrastructure Area are considered to have medium vulnerability and high recoverability due to the time and cost of reinstatement. The sensitivity of the receptor is therefore considered to be **medium**.

Magnitude of impact

2.11.6.4 Field drains could be severed during construction, however measures set out in the Outline CoCP (document reference J1) including undertaking pre construction and post construction drainage surveys.

2.11.6.5 The CoCP will be implemented to ensure the risk of flooding is not increased (CoT35 and CoT09 as set out in **Table 2.19**).

2.11.6.6 With the incorporation of appropriate surveys, the impact is predicted to be of local spatial extent with a minor shift away from existing hydrological environment of local receptors. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of the effect

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

Decommissioning phase

Sensitivity of the receptor

2.11.6.8 During decommissioning , it is expected receptors will remain as identified during construction, please refer to **paragraphs 2.11.6.2** and **2.11.6.3**.

Magnitude of impact

2.11.6.9 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). To minimise the environmental disturbance during decommissioning the onshore export cables and 400 kV grid connection 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. Decommissioning of the onshore substations will be reviewed in consideration of any other existing or proposed future use of the onshore substations. If complete decommissioning is required, then all of the electrical infrastructure will be removed, and any waste arising disposed of in accordance with relevant regulations. Foundations will be broken up and the site reinstated to its original condition or for an alternative (separately agreed and consented) use.

2.11.6.10 An Onshore Decommissioning Plan will be developed prior to decommissioning in a timely manner and will be in line with the latest relevant available guidance (CoT36 as set out in **Table 2.19**). The Onshore Decommissioning Plan will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure and details relevant to pollution prevention and avoidance of ground disturbance.

2.11.6.11 The impact is predicted to be direct, of local spatial extent, intermittent and of short term duration. The impact magnitude is therefore predicted to be **negligible adverse**.

Significance of the effect

2.11.6.12 Overall, the magnitude of impact is deemed to be **negligible adverse** and the sensitivity of the receptors are considered to be **high** and **medium**. The effect will, therefore, be of **minor adverse** significance, which is not significant.

2.11.7 The impact of damage to existing water supply and drainage pipelines

2.11.7.1 During construction and decommissioning of the onshore elements of the Transmission Assets, there is a potential risk of damage to existing water pipelines due to construction activity.

Construction phase

Sensitivity of the receptor

2.11.7.2 The study area predominantly comprises residential dwellings with some commercial and industrial land use. Main roads, railway lines, Main Rivers and Ordinary Watercourses, power and utility connections are also located within the study area. The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.11.7.3 Drainage pipeline infrastructure comprises water supply pipelines and wastewater drainage. The pipeline infrastructure contributes to both the local and regional economy and have a high vulnerability to construction impacts of the onshore export cable, onshore substations and 400 kV grid connection cable and a moderate recoverability. The sensitivity of the receptor is therefore considered to be **high**.

Magnitude of impact

2.11.7.4 The site selection of the Transmission Assets has taken into account the location of major services utilities where possible (see Volume 1, Chapter 4: Site selection and consideration of alternatives of the ES), however, the presence of local drainage cannot be discounted as it is not always mapped by regulators.

2.11.7.5 Micro-siting or appropriate construction techniques will be employed where required to avoid impact to local services and such measures will be detailed in the Outline CoCP (document reference J1) (CoT35 as set out in **Table 2.19**).

2.11.7.6 With the measures in place, the impact is predicted to be of local spatial extent, direct, intermittent and of short term duration and the impact magnitude is therefore considered to be **negligible adverse**.

Significance of the effect

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

Decommissioning phase

Sensitivity of the receptor

2.11.7.8 During decommissioning , it is expected receptors will remain as identified during construction, please refer to **paragraphs 2.11.7.2** and **2.11.7.3.**

Magnitude of impact

2.11.7.9 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). To minimise the environmental disturbance during decommissioning the onshore export cables and 400 kV grid connection 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. Decommissioning of the onshore substations will be reviewed in consideration of any other existing or proposed future use of the onshore substations. If complete decommissioning is required, then all of the electrical infrastructure will be removed, and any waste arising disposed of in accordance with relevant regulations. Foundations will be broken up and the site reinstated to its original condition or for an alternative (separately agreed and consented) use.

2.11.7.10 An Onshore Decommissioning Plan will be developed prior to decommissioning in a timely manner and will be in line with the latest relevant available guidance (CoT36 as set out in **Table 2.19)**. The Onshore Decommissioning Plan will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure and details relevant to pollution prevention and avoidance of ground disturbance.

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

Significance of the effect

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

2.11.8 Future monitoring

2.11.8.1 The assessment of impacts on hydrology and flood risk as a result of the construction, operation and maintenance and decommissioning phases of the Transmission Assets are predicted to be not significant. Based on the predicted impacts it is concluded that no specific monitoring to test the predictions made within the impact assessment is required.

2.11.8.2 No monitoring to confirm the conclusions made within the impact assessment is considered necessary.

2.12 Cumulative effect assessment methodology

2.12.1 Introduction

2.12.1.1 The Cumulative Effects Assessment (CEA) takes into account the impact associated with the Transmission Assets together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see Volume 1, Annex 5.5: Cumulative effects screening matrix and location plan of the ES). Each project 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.

2.12.1.2 The CEA takes into account a 1 km buffer from the landfall, onshore cable corridors and onshore substation sites. The buffer are considered appropriate for data collection taking into account the likely zone of influence of other proposed developments to hydrological receptors.

2.12.1.3 The hydrology and flood risk CEA methodology has followed the methodology set out in Volume 1, Chapter 5: Environmental assessment methodology of the ES. As part of the assessment, all projects and plans considered alongside the Transmission Assets 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.
  - This does not include Morgan Generation Assets and Morecambe Generation Assets.
- Tier 2.
  - Scoping report has been submitted.
  - This does not include Morgan Generation Assets and Morecambe Generation Assets.
- Tier 3.
  - Scoping report has not been submitted.
  - Identified in the relevant Development Plan.
  - Identified in other plans and programmes.

2.12.1.4 This assessment is followed by all other relevant projects, identified by tier.

2.12.1.5 A total of 54 Tier 1 projects have been reviewed which are located within the 1 km buffer of the onshore substation sites, landfall and onshore cable

corridors and are outlined in **Table 2.24** and can be seen on Figure B of Volume 1, Annex 5.5: Cumulative screening matrix and location plan of the ES.

2.12.1.6 All 54 projects are Town and Country Planning Act (1990) applications and as such all developments are to be constructed and operated in accordance with national and local policy. Under these policies, the developments would be required to demonstrate that the construction and operational phases have a limited effect on water quality and would not increase flood risk elsewhere. This includes the production of an FRA where applicable and production of surface water management strategies. Without this, the above developments would not achieve planning permission and therefore never be in operation.

2.12.1.7 Out of the 54 within the shortlist, professional judgement has been used to bring 13 of the projects forward either due to their spatial scale or spatial overlap with the Transmission Assets, as these aspects can potentially give rise to the most cumulative effects with regards to hydrology and flood risk.

2.12.1.8 The cumulative assessment considers the Generation Assets and Transmission Assets together. The assessment for Morecambe Offshore Windfarm: Generation Assets encompasses this project cumulatively with the Transmission Assets. The assessment for Morgan Offshore Wind Project: Generation Assets encompasses this project cumulatively with the Transmission Assets.

2.12.1.9 A review of the potential cumulative impacts in the event that the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets (collectively referred to as the Generation Assets) are constructed concurrently has also been undertaken. The Generation Assets will be subject to the policy requirements detailed in the NPS, NPPF and PPG whereby impacts on offshore water quality will be managed and appropriate flood risk measures incorporated which will not impact land beyond the development boundaries. Therefore, no potential for significant cumulative effects has been identified for this topic.

Table 2.24: List of other projects, plans and activities considered within the CEA

Project/plan	Status	Distance from the Transmission Assets (nearest point, km)	Description of project/plan	Temporal overlap with construction phase	Temporal overlap with operation phase	Overlap with the Transmission Assets
06/2022/1177	Permitted	0.28	The Reserved matters application is seeking approval for 280 dwellings, suds, public open space and other landscaping.	Yes	Yes	No
20/0114	Under construction	0.00	This site is part of the Blackpool Airport Enterprise zone, which includes a wide range of businesses. This application is for 12 grass sports pitches with a small portion designated as public open space. This application follows a withdrawn application ref 19/0316 for a mixed use development, including new highway junction, 90,000sq m industrial floorspace, 7,725sq m of leisure floorspace, a nursey, up to 323sq m of retail floorspace, up to 300sq m of cafe floorspace, up to 57 houses and associated electricity sub-station, parking, landscaping and infrastructure. Withdrawn 26/06/2020.	Yes	Yes	Yes
19/0461	Pending	0.24	An outline planning application for a residential development of up to 155 dwellings with public open space, landscaping, SuDS and vehicular access point. All matters are reserved except for the access point so plans are indicative. The south of the site is bound by consented development of 333 homes, which is currently under construction (17/0129).	Yes	Yes	No
22/0267	Under construction	0.00	An outline planning application for a mixed-use development including for business, industrial and warehousing, with all matters reserved. The application site covers 13ha of land.	Yes	Yes	Yes

Project/plan	Status	Distance from the Transmission Assets (nearest point, km)	Description of project/plan	Temporal overlap with construction phase	Temporal overlap with operation phase	Overlap with the Transmission Assets
			It is located to the north, east and south of the consented 20/0014, which is for 12 grass sports pitches.			
15/0400 (reserved matters application)	Under construction	0.37	The development of 882 dwellings, as a component of approved outline application for 1150 dwellings	Yes	Yes	No
17/0862	Under construction	0.07	The development of 66 dwellings, as a component of approved outline application for 1150 dwellings	Yes	Yes	No
19/0815	Under construction	0.88	Development of approx. 160 residential dwellings	Yes	Yes	No
17/0957	Under construction	0.32	Development of approx. 170 residential dwellings	Yes	Yes	No
LCC/2019/0003	Permitted	0.70	Construction of new highway (completion of M55 to Heyhouses link), improvements to existing highways and associated infrastructure (including construction compound and working area).	Yes	Yes	No
06/2023/0245	Permitted	0.02	Erection of dry ski slope and mountain bike track, creation of leisure lake and siting of up to 13 lodges.	Yes	Yes	No
23/0589	Pending	0.22	Hybrid planning application comprising of; full planning application for the construction of new access roads, existing highways improvement works and drainage works and outline planning application for the construction of 5 no. Hangars, a commercial unit and car parking, alongside associated infrastructure works	Yes	Yes	No

2.12.2 Scope of cumulative effects assessment

2.12.2.1 The impacts identified in **Table 2.25** have been selected as those having the potential to result in the greatest cumulative effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been based on the Project Design Envelope set out in Volume 1, Chapter 3: Project description of the ES as well as the information available on other projects and plans.

Table 2.25: Maximum design scenario for the assessment of cumulative effects

Cumulative effect	Phase[a]			Project(s) considered	Justification
	C	O	D		
The impact of contaminated runoff on the quality of surface water receptors	✓	×	✓	MDS as described for the Transmission Assets assessed cumulatively with the following as shown within **Table 2.24**. **Tier 1** • Assumed that construction works to occur concurrently with the Transmission Assets. • The magnitude of operation and maintenance phase and decommissioning phase impacts on the Onshore Infrastructure Area will be smaller than construction phase impacts.	Outcome of the CEA will be greatest when the greatest number of other schemes are considered. For the CEA it is assumed that. • Baseline conditions will be shared for all projects. • Outcome of the CEA will be greatest when projects are constructed concurrently. • The magnitude of effects expected for the construction phase of the Tier 1 developments should not be significant given each respective planning permission will require the detailing and implementation of suitable drainage strategies and the consideration of flood risk, with suitable mitigation where required.
The impact of damage to existing field drainage.	✓	×	✓		
The impact of damage to existing water pipelines.	✓	×	✓		
The impact of increased flood risk arising from additional surface water runoff.	✓	✓	×	MDS as described for the Transmission Assets (**Table 2.20**) assessed cumulatively with the following as shown within **Table 2.24**. **Tier 1** • Assumed that construction works to occur concurrently with the Transmission Assets. • The magnitude of operation and maintenance phase and decommissioning phase impacts on the onshore infrastructure area will be smaller than construction phase impacts.	Outcome of the CEA will be greatest when the greatest number of other schemes are considered. For the CEA it is assumed that. • Baseline conditions will be shared for all projects. • Outcome of the CEA will be greatest when projects are constructed concurrently. • The magnitude of effects expected for the construction phase of the Tier 1 developments should not be significant given each respective planning permission will require the detailing and implementation of suitable drainage strategies and the consideration of flood risk, with suitable mitigation where required.

[a] C=construction, O=operation and maintenance, D=decommissioning

2.13 Cumulative effects assessment

2.13.1 Introduction

2.13.1.1 A description of the significance of cumulative effects upon hydrology and flood risk receptors arising from Tier 1 projects is given below.

2.13.1.2 The CEA takes into account a 1 km buffer from the onshore substation sites, landfall and onshore cable corridors. The buffers are considered appropriate for data collection taking into account the likely zone of influence of other proposed developments to hydrological receptors.

2.13.2 The impact of contaminated runoff on the quality of surface water and ground receptors

Construction phase

Sensitivity of the receptor

Surface water body receptors

2.13.2.1 Main Rivers and Ordinary Watercourses present within the study area discharge to the Ribble Estuary and/or the North West Transitional Coastal Waters. 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’.

2.13.2.2 The Canal and River Trust lease Savick Brook, a designated Main River, to enable navigation and connectivity to the Lancaster Canal. The Canal and River Trust also have a right of navigation over the Ribble Link which is part of the River Ribble, a designated Main River which provides connectivity to Savick Brook. Main Rivers and Ordinary Watercourses are presented within Volume 3, Figure 2.3. The vulnerability of Main Rivers and ordinary watercourses is considered to be high and the recoverability of receptors is considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.13.2.3 Newton Marsh SSSI which receives flows from Dow Brook/Middle Pool (designated Main Rivers). The Ribble Estuary SSSI and the Ribble and Alt Estuaries Ramsar site and SPA receives flow from all Main Rivers and Ordinary Watercourses within the study area that discharge to Ribble Estuary. The landfall is located within Lytham St Annes Dunes SSSI. The sites are biologically designated, as discussed within **section 2.6.8** and are of national and European importance. The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore considered to be **high**.

Ground water body receptors

2.13.2.4 There is one groundwater abstraction location present within the study area. The study area encompasses a Principal Aquifer associated with the Sherwood sandstone group and a Secondary B aquifer associated with the Singleton mudstone member and Mercia mudstone group. A Secondary A aquifer associated with blown sand superficial deposits is also present within the study area. The area to the north of the Ribble Estuary is located within a Zone III: Total catchment SPZ. The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is considered to be **high**.

Magnitude of impact

2.13.2.5 Due to the large spatial scale of Tier 1 projects highlighted within **Table 2.24**, it is anticipated the potential for runoff contamination and thus cumulative impacts is greatest from these projects during construction compared to smaller projects within the study area. The potential for cumulative impacts on the quality of surface water and ground receptors is also more likely to occur where development limits coincide. This includes several projects listed within **Table 2.24** including 06/2023/0245, 17/0862, 22/0267, 23/0589 and 20/0114.

2.13.2.6 It is understood all projects listed within **Table 2.24** are Town and Country Planning Act applications subject to planning approval by the LPA. This requires all projects to be undertaken in accordance with national and local policy. Under these policies, the developments would be required to demonstrate that the construction and operational phases have a limited effect on water quality and would not increase flood risk elsewhere. This includes the production of an FRA where applicable and production of surface water management strategies. Without this, the above developments would not achieve planning permission and therefore never be in operation, thus reducing the potential for cumulative impacts to occur.

2.13.2.7 In relation to the contribution from the Transmission Assets, mitigation measures are set out in **Table 2.19** (CoT02, CoT10, CoT90, CoT 82, CoT04, CoT77, CoT11, CoT09, CoT35, and CoT39).

2.13.2.8 Any cumulative impact will affect the receptors directly, is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. The magnitude is therefore, considered to be **negligible adverse**.

Significance of the effect

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

Decommissioning phase

Sensitivity of the receptor

2.13.2.10 During decommissioning , it is expected receptors will remain as identified during construction, please refer to **paragraphs 2.13.2.1 - 2.13.2.4.**

Magnitude of impact

2.13.2.11 Due to the large spatial scale of Tier 1 projects highlighted within **Table 2.24**, it is anticipated the potential for runoff contamination and thus cumulative impacts is greatest from this project during decommissioning compared to other smaller projects within the study area.

2.13.2.12 Decommissioning of all projects listed within **Table 2.24** and the Transmission Assets 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).

2.13.2.13 The impacts of decommissioning from other developments will be reduced through the incorporation of management measures (such as those outlined in **Table 2.19** (CoT36). These standard embedded mitigation measures will be required as part of the permissions for Tier 1 projects highlighted within **Table 2.25**. The magnitude of impact is predicted to be indirect, of local spatial extent, short term duration and intermittent. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of the effect

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

2.13.3 The impact of increased flood risk arising from additional surface water runoff

Construction phase

Sensitivity of the receptor

2.13.3.1 The beach at Lytham St Annes is located within the study area and comprises a sand beach and is located within Environment Agency Flood Zones 1 and 3. By virtue of elevation, the beach acts as an informal flood defence and land behind the beach is a biological designated SSSI, Lytham St. Annes Dunes SSSI, as discussed within **section 2.6.8**. The vulnerability of the receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is, therefore, considered to be **high**.

2.13.3.2 The study area includes Newton Marsh SSSI which receives flows from Dow Brook/Middle Pool (Main Rivers) and the Ribble Estuary SSSI and the Ribble

and Alt Estuaries Ramsar site and SPA. The majority of watercourses within the study area ultimately discharge to Ribble Estuary. The sites are biologically designated, as discussed within **section 2.6.8** and are of national and European importance The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.13.3.3 The study area is partially located within a Zone III: Total catchment SPZ and there is one groundwater abstraction licence within the study area. The vulnerability of receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.13.3.4 The study area for the onshore export cable corridor and the 400 kV grid connection cable corridor includes urban areas of Preston, Kirkham, Penwortham, Ashton-on-Ribble, Lytham St Annes, Blackpool and Freckleton. These areas predominantly comprise residential dwellings with some commercial and industrial land use. Blackpool Airport is also located within the western extent of the study area. The remainder of the study area (including the onshore substation sites) is situated within a mainly rural area, with limited residential properties within the surrounding area. Main roads, railway lines, Main Rivers and Ordinary Watercourses and power and utility connections are also located within this area. The vulnerability of the surrounding land receptors is considered to be high and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.13.3.5 Areas of Flood Zone 2 and 3 are present across the intertidal infrastructure area and onshore infrastructure area is within proximity to the sea, Main Rivers, Ordinary Watercourses. Site users during this phase of the Project will be construction workers who are assessed to be highly vulnerable with low recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of impact

2.13.3.6 Due to the large spatial scale of Tier 1 projects highlighted within **Table 2.24**, it is anticipated the potential for greater impermeable areas, higher rates of runoff and thus cumulative impacts is greatest from this project during construction compared to other smaller projects within the study area. The potential for cumulative impacts on increased flood risk arising from additional surface water runoff are also more likely to occur where development limits coincide. This includes several projects listed within **Table 2.24** including 06/2023/0245, 17/0862, 22/0267, 23/0589 and 20/0114.

2.13.3.7 It is understood all projects listed within **Table 2.24** are Town and Country Planning Act applications subject to planning approval by the LPA. This requires all projects to be undertaken in accordance with national and local policy. Under these policies, the developments would be required to

demonstrate that the construction and operational phases have a limited effect on water quality and would not increase flood risk elsewhere. This includes the production of an FRA where applicable and production of surface water management strategies. Without this, the above developments would not achieve planning permission and therefore never be in operation, thus reducing the potential for cumulative impacts to occur.

2.13.3.8 In relation to the contribution from the Transmission Assets. In relation to the contribution from the Transmission Assets, mitigation measures are set out in **Table 2.19** (CoT02, CoT10, CoT90, CoT86, CoT35, CoT97, CoT09 and CoT95). The magnitude is therefore, considered to be **negligible adverse**.

Significance of the effect

2.13.3.9 Overall, the magnitude of the impact is deemed to be **negligible adverse** the sensitivity for the study area is considered to be **high**. The effect will, therefore, be of **minor adverse** significance, which is not significant.

Operation and maintenance phase

Sensitivity of the receptor

2.13.3.10 During the operation and maintenance phase, it is expected receptors will remain as identified during construction, please refer to **paragraphs 2.13.3.1** to **2.13.3.5**.

Magnitude of impact

2.13.3.11 Due to the large spatial scale of Tier 1 projects highlighted within **Table 2.25**, it is anticipated the potential for greater impermeable areas, higher rates of runoff thus cumulative impacts is greatest from this project during construction compared to other smaller projects within the study area.

2.13.3.12 It is understood all projects listed within **Table 2.24** are Town and Country Planning Act applications subject to planning approval. This requires all projects to be undertaken in accordance with NPPF and PPG. In order to gain planning approval, planning policy within the NPPF and PPG requires that all new developments attenuate surface water runoff, where practicable, to the greenfield runoff rate and provide appropriate management techniques to treat potentially contaminated runoff prior to discharge into the local drainage network or surrounding surface water environment. In relation to the contribution from the Transmission Assets, mitigation measures are set out in **Table 2.19** (CoT11).

2.13.3.13 The cumulative impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. The magnitude is therefore, considered to be **negligible** beneficial.

Significance of the effect

2.13.3.14 Overall, the magnitude of the impact is deemed to be **negligible beneficial** and the sensitivity of the receptor is considered to be **high**. The effect will, therefore, be of **minor beneficial** significance, which is not significant.

2.13.4 The impact of damage to existing field drainage

Construction phase

Sensitivity of the receptor

2.13.4.1 It is expected field drainage may be located within agricultural land surrounding development listed within **Table 2.24** and have the potential to be damaged by activities associated with the construction phase of the project. Surrounding land receptors are considered to have a high vulnerability to the impacts of damage to existing field drainage and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.13.4.2 Field drains constructed for land drainage within the Onshore Infrastructure Area is considered to have medium vulnerability and high recoverability due to the time and cost of reinstatement. The sensitivity of the receptor is therefore considered to be **medium**.

Magnitude of impact

2.13.4.3 Due to the large spatial scale of Tier 1 projects highlighted within **Table 2.24**, this development has the greatest potential for impacts to field drainage during the construction phase. The removal of field drains associated with construction activities may cause a backup on surrounding field drains, in turn increasing the flood risk to surrounding land use receptors. The potential for cumulative impacts on field drainage and irrigation are more likely to occur where development limits coincide. This includes several projects listed within **Table 2.24** including 06/2023/0245, 17/0862, 22/0267 and 20/0114.

2.13.4.4 In line with national standards, all developments listed within **Table 2.24** would be constructed using industry best practice during construction and therefore should limit any impact on field drainage.

2.13.4.5 In relation to the contribution from the Transmission Assets, mitigation measures are set out in **Table 2.18** (CoT35 and CoT09).

2.13.4.6 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 the effect

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

Decommissioning phase

Sensitivity of the receptor

2.13.4.8 During decommissioning , it is expected receptors will remain as identified during construction, please refer to **paragraphs 2.13.4.1** and **2.13.4.2**.

Magnitude of impact

2.13.4.9 Due to the large spatial scale of Tier 1 projects highlighted within **Table 2.24**, this development has the greatest potential for impacts to field drainage during the decommissioning phase. 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).

2.13.4.10 The impacts of decommissioning from other developments will be reduced through the incorporation of management measures (such as those outlined in **Table 2.19** (CoT36). These standard embedded mitigation measures will be required as part of the permissions for all developments listed within **Table 2.24.** The magnitude of impact is predicted to be indirect, of local spatial extent, short term duration and intermittent. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of the effect

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

2.13.5 The impact of damage to existing water supply and drainage pipelines

Construction phase

Sensitivity of the receptor

2.13.5.1 It is expected water pipelines may be located within land surrounding projects listed within **Table 2.24** and have the potential to be damaged by activities within the construction phase. Surrounding land receptors are considered to have a high vulnerability to the impacts of damage to existing field drainage and the recoverability of receptors are considered to be low due to time required for receptors to recover from aforementioned impacts. The sensitivity of the receptor is therefore, considered to be **high**.

2.13.5.2 Drainage pipeline infrastructure comprises water supply pipelines and wastewater drainage. The pipeline infrastructure contribute to both the local and regional economy and have a high vulnerability to construction activities and a moderate recoverability. The sensitivity of the receptor is therefore considered to be **high**.

Magnitude of impact

2.13.5.3 Due to the large spatial scale of Tier 1 projects highlighted within **Table 2.24** , this development has the greatest potential for impacts to water pipelines during the construction phase.

2.13.5.4 The potential for cumulative impacts on drainage pipeline infrastructure is more likely to occur where water and sewer pipelines were located in proximity to the Transmission Assets and where development limits coincide. This includes several projects listed within **Table 2.24** including 06/2023/0245, 17/0862, 22/0267, 23/0589 and 20/0114.

2.13.5.5 In line with national standards, all developments listed within **Table 2.24** would be constructed using industry best practice during construction and in line with United Utilities standard guidance a minimum, require a standoff from in situ utility assets will be required to limit the risk of damage to the utility.

2.13.5.6 In relation to the contribution from the Transmission Assets, as set out in **section 2.11.7**, impacts would be avoided through the use of protective provisions set out in the draft DCO (document reference C1). 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

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

Decommissioning phase

Sensitivity of the receptor

2.13.5.8 During decommissioning , it is expected receptors will remain as identified during construction, please refer to **paragraphs 2.13.5.1** - **2.13.5.2**.

Magnitude of impact

2.13.5.9 Due to the large spatial scale of Tier 1 projects highlighted within **Table 2.24**, this development has the greatest potential for impacts to water supply and drainage pipelines during the decommissioning phase.

2.13.5.10 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).

2.13.5.11 The impacts of decommissioning from other developments will be reduced through the incorporation of management measures (such as those outlined in **Table 2.19** (CoT36). These standard embedded mitigation measures will be required as part of the permissions for all developments listed within **Table 2.24**. The magnitude of impact is predicted to be indirect, of local

spatial extent, short term duration and intermittent. The impact magnitude is therefore considered to be **negligible adverse**.

Significance of effect

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

2.13.6 Future monitoring

2.13.6.1 No monitoring to test the predictions made within the impact assessment is considered necessary and no residual effects are anticipated.

2.14 Transboundary effects

2.14.1.1 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 Transmission Assets upon the interests of other states.

2.15 Inter-related effects

2.15.1.1 Inter-relationships are the impacts and associated effects of different aspects of the Transmission Assets on the same receptor. These are as follows.

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the Transmission Assets (construction, operation and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor group than if just one phase were assessed in isolation.
- Receptor led effects: Assessment of the scope for all relevant effects across multiple topics to interact, spatially and temporally, to create inter-related effects on a receptor.

2.15.1.2 It is anticipated there may be an inter-related effect between possible groundwater contamination and surface water hydrology, especially in relation to the HDD proposed in proximity to the River Ribble and the known contamination adjacent. Additional information is presented within Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES. 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.

2.15.1.3 It is anticipated there may be an inter-related effect between possible surface water contamination of habitats downstream and detrimental effects to ecology. Additional information is presented within Volume 3 Chapter 3: Onshore ecology of the ES.

2.15.1.4 A description of the likely interactive effects arising from the Transmission Assets on hydrology and flood risk is provided in Volume 4, Chapter 3: Inter-relationships of the ES.

2.16 Summary of impacts, mitigation measures and monitoring

2.16.1.1 Information on hydrology and flood risk within the study area was collected through desk review, consultation, a hydrology walkover and a site-specific FRA (see Volume 3, Annex 2.3: Flood risk assessment of the ES), including conceptual drainage strategies for the onshore substation sites.

2.16.1.2 **Table 2.26** presents a summary of the impacts, measures adopted as part of the Transmission Assets and residual effects in respect to hydrology and flood risk. The impacts assessed include the following:

- the impact of contaminated runoff on the quality of surface water and ground receptors during construction and decommissioning;
- the impact of increased flood risk arising from watercourse crossings;
- the impact of increased flood risk arising from additional surface water runoff during construction and operation;
- the impact of increased flood risk arising from damage to existing flood defences during construction and decommissioning;
- the impact of damage to existing field drainage during construction and decommissioning; and
- the impact of damage to existing water pipelines during construction and decommissioning.

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

2.16.1.4 **Table 2.27** presents a summary of the potential cumulative impacts, mitigation measures and residual effects. The cumulative impacts assessed include the following:

- 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 during construction;
- the impact of damage to existing field drainage during construction and decommissioning; and
- the impact of damage to existing water pipelines during construction and decommissioning.

2.16.1.5 Overall, it is concluded that there will be no significant cumulative effects from the Transmission Assets due to no potential interactions given the nature of the projects and the nature of receptors relevant to this chapter.

2.16.1.6 No potential transboundary impacts have been identified in regard to effects of the Transmission Assets.

Table 2.26: Summary of environmental effects, mitigation and monitoring

Description of impact	Phase[a]			Commitment number	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
The impact of contaminated runoff on the quality of surface water receptors.	✓	×	✓	CoT02, CoT10, CoT90, CoT04, CoT11, CoT09, CoT35, CoT36, CoT77, CoT82, CoT41, CoT39.	C: negligible adverse D: negligible adverse	C: high D: high	C: minor adverse D: minor adverse	CoT39 and CoT41	C: minor adverse D: minor adverse	N/A
The impact of increased flood risk arising from watercourse crossings	✓	×	✓	CoT08, CoT09, CoT11 CoT35, CoT99, CoT86,	C: negligible adverse D: negligible adverse	C: high D: high	C: minor adverse D: minor adverse	N/A	C: minor adverse D: minor adverse	N/A
The impact of increased flood risk arising from additional surface water runoff.	✓	✓	×	CoT02, CoT10, CoT90, CoT86, CoT35, CoT97, CoT09, CoT95, CoT11.	C: negligible adverse O: no change	C: high O: high	C: minor adverse O: no effect	N/A	C: minor adverse O: no effect	N/A
The impact of increased flood risk arising from damage to existing flood defences.	✓	×	✓	CoT35, CoT02, CoT95, CoT09, CoT10, CoT97. CoT36	C: negligible adverse D: negligible adverse	C: high D: high	C: minor adverse D: minor adverse	CoT39	C: minor adverse D: minor adverse	N/A
The impact of damage to existing field drainage	✓	×	✓	CoT84, CoT35, CoT09, CoT36.	C: negligible adverse D: negligible adverse	C: high and medium D: high and medium	C: minor adverse D: minor adverse	N/A	C: minor adverse D: minor adverse	N/A
The impact of damage to existing water supply and drainage pipelines.	✓	×	✓	CoT35, CoT36.	C: negligible adverse D: negligible adverse	C: high D: high	C: minor adverse D: minor adverse	N/A	C: minor adverse D: minor adverse	N/A

[a] C=construction, O=operation and maintenance, D=decommissioning

Table 2.27: Summary of cumulative environmental effects, mitigation and monitoring

Description of impact	Phase[a]			Commitment number	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
Tier 1										
The impact of contaminated runoff on the quality of surface water and ground receptors.	✓	×	✓	CoT02, CoT10, CoT90, CoT04, CoT11, CoT09, CoT35, CoT36, CoT77, CoT82, CoT41, CoT39.	C: negligible adverse D: negligible adverse	C: high D: high	C: minor adverse D: minor adverse	CoT39 and CoT41	C: minor adverse D: minor adverse	N/A
The impact of damage to existing field drainage.	✓	×	✓	CoT84, CoT35, CoT09, CoT36.	C: negligible adverse D: negligible adverse	C: high and medium D: high and medium	C: minor adverse D: minor adverse	N/A	C: minor adverse D: minor adverse	N/A
The impact of damage to existing water pipelines.	✓	×	✓	CoT35, CoT36.	C: negligible adverse D: negligible adverse	C: high D: high	C: minor adverse D: minor adverse	N/A	C: minor adverse D: minor adverse	N/A
The impact of increased flood risk arising from additional surface water runoff.	✓	✓	×	CoT02, CoT10, CoT90, CoT86, CoT35, CoT97, CoT09, CoT95, CoT11.	C: negligible adverse O: negligible beneficial	C: high D: high	C: minor adverse O: minor beneficial	N/A	C: minor adverse O: minor beneficial	N/A

[a] C=construction, O=operation and maintenance, D=decommissioning

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