Outer Dowsing Offshore Wind

Preliminary Environmental Information Report

Volume 2, Appendix 8.1: Water Framework Directive Assessment

Date: June 2023

Document No: 6.2.8.1
Internal Reference: PP1-ODOW-DEV-CS-REP-0045

Rev: V1.0

OUTER DOWSING OFFSHORE WIND

Company:	**Outer Dowsing Offshore Wind**	Asset:	**Whole Asset**
Project:	**Whole Wind Farm**	Sub Project/Package:	Whole Asset
Document Title or Description:	Water Framework Directive Compliance Assessment		
Document Number:	6.2.8.1	3rd Party Doc No (If applicable):	N/A
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Rev No.	**Date**	**Status / Reason for Issue**	**Author**	**Checked by**	**Reviewed by**	**Approved by**
V1.0	June 2023	Final	GoBe/ SLR	GoBe	Shepherd and Wedderburn	Outer Dowsing Offshore Wind

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Abbreviations

Acronym	Expanded name
AEoI	Adverse Effect on Integrity
ANS	Artificial Nesting Structure
BEIS	Department for Business, Energy & Industrial Strategy (now the Department for Energy Security and Net Zero (DESNZ))
CEMP	Construction Environmental Management Plan
CSIP	Cable Specification and Installation Plan
CoCP	Code of Construction Practice
DCO	Development Consent Order
DECC	Department of Energy & Climate Change, now the Department for Energy Security and Net Zero (DESNZ)
DESNZ	Department for Energy Security and Net Zero, formerly Department of Business, Energy and Industrial Strategy (BEIS), which was previously Department of Energy & Climate Change (DECC)
dML	Deemed Marine Licence
EA	Environmental Agency
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
EMF	Electromagnetic fields
EMP	Environmental Management Plan
EQSD	Environmental Quality Standards Directive
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
GT R4 Ltd	The Applicant. The special project vehicle created in partnership between Corio Generation (a wholly owned Green Investment Group portfolio company), Gulf Energy Development and TotalEnergies
GWD	Groundwater Directive
HDD	Horizontal Directional Drilling
HMWB	Heavily Modified Water Body
HND	Holistic Network Design
HRA	Habitats Regulations Assessment
IDB	Internal Drainage Board
IMO	International Management Organisation
INNS	Invasive Non-native Species
LLFA	Lead Local Flood Authority

Acronym	Expanded name
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MPCP	Marine Pollution Contingency Plan
NIEA	Northern Ireland Environment Agency
NPS	National Policy Statement
NRW	Natural Resources Wales
NSIP	Nationally Significant Infrastructure Project
NVZ	Nitrate Vulnerable Zones
O&M	Operation and Maintenance
MW	Mega Watt
ODOW	Outer Dowsing Offshore Wind
OFTO	Offshore Transmission Owner
ORCP	Offshore Reactive Compensation Platform
OSPAR	Oslo and Paris Conventions
OSS	Offshore Substation
OTNR	Offshore Transmission Network Review
OWF	Offshore Wind Farm
PBDE	Polybrominated Diphenyl Ether
PEIR	Preliminary Environment Information Report
PEMP	Project Environmental Management Plan
PFOS	Perfluorooctane suphonate
PLONOR	Pose Little or No Risk to the Environment
PPEIRP	Pollution Prevention and Emergency Incident Response Plan
RBMP	River Basin Management Plan
rBWD	Revised Bathing Waters Directive
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SEPA	Scottish Environment Protection Agency
SoS	Secretary of State
SPA	Special Protection Area
SSC	suspended sediment concentration
TJB	Transition Joint Bay
WFD	Water Framework Directive
WTG	Wind Turbine Generator
ZoI	Zone of Influence

Terminology

Term	Definition
Array area	The area offshore within the PEIR Boundary within which the generating stations (including wind turbine generators (WTG) and inter array cables), offshore accommodation platforms, offshore transformer substations and associated cabling are positioned.
Baseline	The status of the environment at the time of assessment without the development in place.
Cumulative effects	The combined effect of the Project acting cumulatively with the effects of a number of different projects, on the same single receptor/resource.
Cumulative impact	Impacts that result from changes caused by other past, present or reasonably foreseeable actions together with the Project.
deemed Marine Licence (dML)	A licence administered under the Marine and Coastal Access Act 2009. The licence set out within a Schedule within the Development Consent Order (DCO).
Project Design envelope	A description of the range of possible elements that make up the Project's design options under consideration, as set out in detail in the project description. This envelope is used to define the Project for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the "Rochdale Envelope" approach.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP) from the Secretary of State (SoS) for Department for Energy Security and Net Zero (DESNZ).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of an impact with the sensitivity of a receptor, in accordance with defined significance criteria.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the Environmental Impact Assessment (EIA) Regulations, including the publication of an Environmental Statement (ES).
EIA Directive	European Union 2011/92/EU of 13 December 2011 (as amended in 2014 by Directive 2014/52/EU)
EIA Regulations	Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
Environmental Statement (ES)	The suite of documents that detail the processes and results of the Environmental Impact Assessment (EIA).
Evidence Plan	A voluntary process of stakeholder consultation with appropriate Expert Topic Groups (ETGs) that discusses and, where possible, agrees the detailed approach to the Environmental Impact Assessment (EIA) and information to support Habitats Regulations Assessment (HRA) for those relevant topics included in the process, undertaken during the pre-application period.
Impact	An impact to the receiving environment is defined as any change to its baseline condition, either adverse or beneficial.

Term	Definition
Inter-array cables	Cable which connects the wind turbines to each other and to the offshore substation(s).
Maximum Design Scenario	The maximum design parameters of the combined project assets that result in the greatest potential for change in relation to each impact assessed
Mitigation	Mitigation measures, or commitments, are commitments made by the Project to reduce and/or eliminate the potential for significant effects to arise as a result of the Project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts in the case of potentially significant effects.
National Policy Statement (NPS)	A document setting out national policy against which proposals for Nationally Significant Infrastructure Projects (NSIPs) will be assessed and decided upon
Outer Dowsing Offshore Wind	The Project.
Offshore Export Cable Corridor (ECC)	The Offshore Export Cable Corridor (Offshore ECC) is the area within the Preliminary Environmental Information Report (PEIR) Boundary within which the export cable running from the array to landfall will be situated.
Offshore Substation (OSS)	Platforms located within the array area which house electrical equipment and control and instrumentation systems. They also provide access facilities for work boats and helicopters.
Offshore Reactive Compensation Station (ORCP)	Platforms located outside the array area which house electrical equipment and control and instrumentation systems. They also provide access facilities for work boats.
Onshore Export Cable Corridor (ECC)	The Onshore Export Cable Corridor (Onshore ECC) is the area within which the export cable running from the landfall to the onshore substation will be situated.
Preliminary Environmental Information Report (PEIR)	The PEIR is written in the style of a draft Environmental Statement (ES) and provides information to support and inform the statutory consultation process in the pre-application phase. Following that consultation, the PEIR documentation will be updated to produce the Project's ES that will accompany the application for the Development Consent Order (DCO).
Receptor	A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of receptors include species (or groups) of animals or plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc.
PEIR Boundary	The PEIR Boundary is outlined in Figure 3.1 of Volume 1, Chapter 3: Project Description and comprises the extent of the land and/or seabed for which the PEIR assessments are based upon.
Statutory consultee	Organisations that are required to be consulted by the Applicant, the Local Planning Authorities and/or The Inspectorate during the pre-application and/or examination phases, and who also have a statutory responsibility in some form that may be relevant to the Project and the DCO application. This includes those bodies and interests prescribed under Section 42 of the Planning Act 2008.
The Planning Inspectorate	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).

Term	Definition
The Project	Outer Dowsing Offshore Wind including proposed onshore and offshore infrastructure
Transboundary impacts	Transboundary effects arise when impacts from the development within one European Economic Area (EEA) state affects the environment of another EEA state(s)
Trenchless technique	Trenchless technology is an underground construction method of installing, repairing and renewing underground pipes, ducts and cables using techniques which minimize or eliminate the need for excavation. Trenchless technologies involve methods of new pipe installation with minimum surface and environmental disruptions. These techniques may include Horizontal Directional Drilling (HDD), thrust boring, auger boring, and pipe ramming, which allow ducts to be installed under an obstruction without breaking open the ground and digging a trench.
Trenched technique	Trenching is a construction excavation technique that involves digging a narrow trench in the ground for the installation, maintenance, or inspection of pipelines, conduits, or cables.
Subsea	Subsea comprises everything existing or occurring below the surface of the sea.
Wind turbine generator (WTG)	All the components of a wind turbine, including the tower, nacelle, and rotor.

8 Introduction

8.1 Project Background

8.1.1 In September 2019, The Crown Estate, as manager of the seabed, initiated a new leasing round process, known as Leasing Round 4 in order to make new areas of the seabed available for offshore wind development. It aimed to identify at least 7GW of new offshore wind projects in English and Welsh waters, with the potential to deliver electricity for more than six million homes. The Offshore Wind Leasing Round 4 tender process concluded in February 2021, selecting six proposed new offshore wind projects in the waters around England and Wales.

8.1.2 GT R4 Limited (trading as Outer Dowsing Offshore Wind) hereafter referred to as the 'Applicant', was successful in the auction process securing Preferred Bidder status for an area in the southern North Sea. Known as Outer Dowsing Offshore Wind (hereafter referred to as 'the Project'), the Project was subject to a Plan-Level Habitats Regulations Assessment (HRA), carried out by The Crown Estate as the competent authority. The Applicant has entered into an Agreement for Lease (AfL) with The Crown Estate, formalising the seabed exclusivity and development rights for the Project.

8.1.3 The Project will be located approximately 54km from the Lincolnshire coastline in the southern North Sea. The Project will include both offshore and onshore infrastructure including an offshore generating station (windfarm), export cables to landfall, onshore cables, and connection to the electricity transmission network, and ancillary and associated development (Figure 8.1.1).

8.1.4 An onshore export cable corridor will run from landfall to the potential onshore substation (OnSS) location. At the time of preparing the PEIR, the Project does not have a confirmed grid connection point from National Grid. The provisional outcomes of the Offshore Transmission Network Review (OTNR) Holistic Network Design (HND) process d two possible grid connection options for the Project, both of which are considered in the PEIR; a location known as 'Lincolnshire Node' which is located close to the coast in Lincolnshire, and a connection at the junction of the existing overhead lines at Weston Marsh, to the south of Boston, Lincolnshire (see Figure 8.1.6). Further details are in Volume 1, Chapter 4: Site Selection and Consideration of Alternatives.

8.1.5 The Project qualifies as a Nationally Significant Infrastructure Project (NSIP), as defined by Section 15(3) of the Planning Act 2008 and as a result, an application for a Development Consent Order (DCO) will be submitted to the Secretary of State (SoS) for Business, Energy and Industrial Strategy (BEIS) (from February 2023 this is the Department for Energy Security and Net Zero), which will include deemed Marine Licences (dML). The DCO will be accompanied by an Environmental Statement (ES) prepared through an Environmental Impact Assessment (EIA) process in accordance with the Environmental Impact Assessment Infrastructure Planning Regulations 2017 (the EIA Regulations) (as amended in 2020 and hereafter will be referred to as 'the EIA Regulations'), the development falling under Schedule 2 of the EIA Regulations, alongside a variety of other supporting information in response to the legislative requirements summarised under Volume 1, Chapter 2: Need, Policy and Legislative Context of this report.

8.2 Document Purpose

8.2.1 This document has been prepared to present the findings of the compliance assessment of 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[1], commonly known as the Water Framework Directive (WFD), for the potential impacts of the Project. Hereafter, this document is referred to as the 'WFD compliance assessment'. The purpose of this assessment is to demonstrate the Project's compliance with the WFD. This is to ensure that the proposed activities associated with the Project do not result in a deterioration in a designated waterbody (or protected area) and do not jeopardise the attainment of overall good status in the future (or the potential to achieve good ecological status/potential and chemical status).

8.2.2 This document has been informed by the assessments presented within the Preliminary Environmental Information Report (PEIR) for the Project and provides a summary of the key findings. It seeks to draw from, and signpost to where relevant information is provided within, the PEIR and to demonstrate compliance with the WFD, rather than duplicate assessment. Therefore, this document should be read in conjunction with the following:

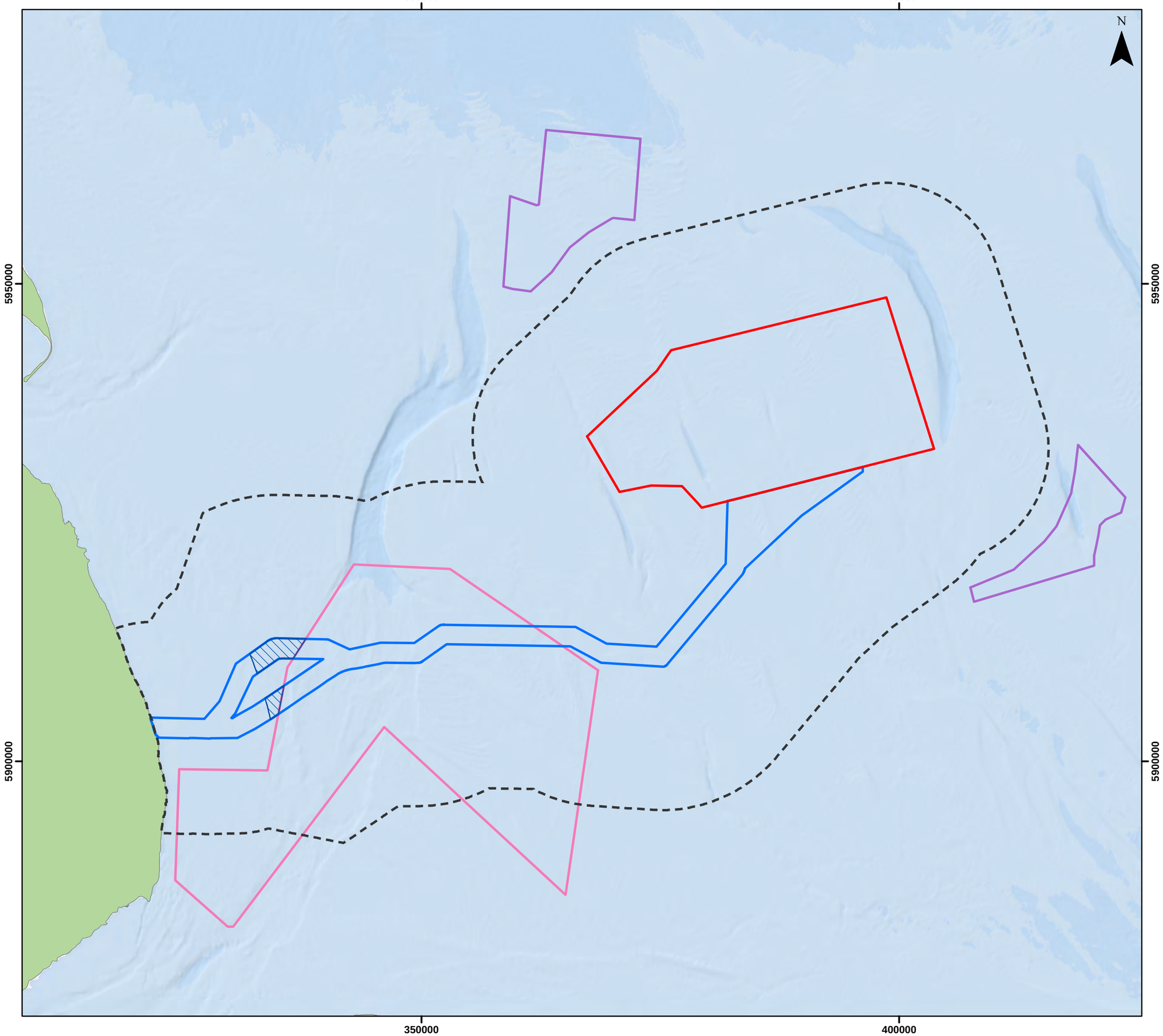
- Volume 1, Chapter 3: Project Description;
- Volume 1, Chapter 7: Marine Processes;
- Volume 2, Appendix 7.1: Physical Processes Technical Baseline;
- Volume 2, Appendix 7.2: Physical Processes Modelling Report;
- Volume 1, Chapter 8: Marine Water Quality;
- Volume 1, Chapter 9: Benthic and Intertidal Ecology;
- Volume 1, Chapter 10: Fish and Shellfish Ecology;
- Volume 1, Chapter 21: Onshore Ecology;
- Volume 1, Chapter 22: Onshore Ornithology;
- Volume 1, Chapter 23: Geology and Ground Conditions;
- Volume 1, Chapter 24: Hydrology , Hydrogeology and Flood;
- Volume 1, Chapter 25: Land Use;
- Document Reference 8.1.4: Outline Pollution Prevention and Emergency Incident Response Plan; and
- Document Reference 8.8: Outline Flood Risk Assessment.
- Document Reference 8.9: Provisional Flood Risk Assessment OnSS

[1] https://www.legislation.gov.uk/eudr/2000/60/contents#

8.3 Document Structure

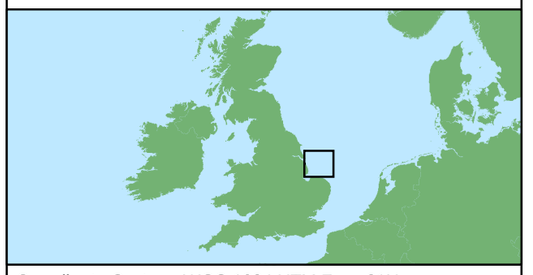
8.3.1 The remainder of this document has the following structure:

- Section 8.4: Provides an overview of the relevant policy and legislative context for the Project's WFD compliance assessment;
- Section 8.5: Details the proposed approach to consultation and consultation received to date for the Project's WFD compliance assessment;
- Section 8.6: Provides the proposed methodology for undertaking the WFD compliance assessment;
- Section 8.9: Reports the findings of the Project's WFD Screening exercise;
- Section 8.10: Presents the findings of the Project's WFD Scoping exercise;
- Section 0: Presents the detailed impact assessment for the scoped elements; and
- Section 8.13: Reports the summary of the impact assessment.



Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Search Area
- Artificial Nesting Structure Search Area
- Biogenic Reef Restoration Search Area
- WFD Zone of Influence



Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km

Scale: 1:375,000

Preliminary Environmental Information Report

The WFD Study Area

Figure 8.1.1

OUTER DOWSING OFFSHORE WIND

Date: 19/04/2023
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Legend

- Onshore PEIR Boundary
- Onshore Segment Break
- Lincolnshire Node OnSS Search Area
- Weston Marsh North OnSS Search Area
- Weston Marsh South OnSS Search Area

Sources:

Coordinate System: British National Grid

0 5 10 km

Scale: 1:200,000

Preliminary Environmental Information Report

Onshore PEIR Boundary Including Onshore ECC Options and Potential Onshore Substation Locations

Figure 8.1.2

OUTER DOWSING OFFSHORE WIND

Date: 01/06/2023
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Revision: 0.1

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8.4 Policy and Legislative Control

Introduction

8.4.1 The following section provides information regarding the legislative context surrounding the assessment of potential effects in relation to the WFD. The UK left the European Union (EU) on 31 January 2020 and entered a period of transition that ended on 31 December 2020. The transition period is defined in the European Union (Withdrawal) Act 2018 and the European Union (Withdrawal Agreement) Act 2020 which transposed EU law into UK domestic law. References to Directives mean the Directive as applied in UK law by the Withdrawal Acts.

Water Framework Directive

8.4.2 The WFD (2000/60/EC) was established in 2000 in order to provide a single framework for the protection of surface waterbodies, including rivers, lakes, coastal waterbodies (out to 1 nautical mile) and estuaries, and groundwater. The Environment Agency is the Competent Authority for the implementation of the WFD in England. Each surface waterbody has an ecological status which is assigned by considering biological, hydromorphological, physico-chemical and specific chemical parameters. The different ecological statuses for surface waterbodies are as follows:

- High;
- Good;
- Moderate;
- Poor; and
- Bad.

8.4.3 Each groundwater waterbody has a quantitative status which is assigned by considering groundwater abstractions, water balance interaction with surface waters, saline intrusion and aspects of Groundwater Dependent Terrestrial Ecosystems (GWDTE). The different quantitative statuses for groundwater waterbodies are ‘good’ or ‘poor’.

8.4.4 The WFD’s objective of 'good chemical status' is defined in terms of compliance with all the quality standards, within the waterbody, as established for chemical substances at a European level. The WFD also provides a process for renewing these standards and establishing new ones by means of a prioritisation mechanism for hazardous chemicals. This will ensure at least a minimum chemical quality, particularly in relation to very toxic substances.

8.4.5 The Directive’s objective of 'good ecological status' also requires certain chemical conditions. The chemical requirements include the achievement of environmental quality objectives for discharged priority substances. It also identifies any other substances liable to cause pollution or being discharged in significant quantities.

8.4.6 The Environmental Quality Standards Directive (EQSD) list (Environment Agency, 2016) identifies priority substances and polluting chemicals which should be considered in WFD compliance assessments for transitional and coastal waterbodies. The WFD and EQSD seek to reduce these substances entering into the marine environment, primarily from discharges and outfalls. Priority substances include, but are not limited to, benzene, nickel and lead.

8.4.7 The current WFD status, the pressures affecting the water environment, the objectives for protecting and improving it, and the programme of measures needed to achieve the statutory environmental objectives of the WFD for each waterbody were set out in the latest River Basin Management Plans (RBMPs)[2].

Water Framework Directive Regulations

8.4.8 The WFD (and Protected Areas) and aspects of the Groundwater Directive (2006/118/EC; GWD) were transposed into English and Welsh law by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (hereafter referred to as the WFD Regulations 2017).

Development Consent Order

8.4.9 The WFD Regulations 2017 assign responsibility to the SoS for BEIS (from February 2023 this is the Department for Energy Security and Net Zero) and the Environment Agency to secure compliance with the Directive in England by exercising their 'relevant functions'. As the Project is a NSIP, the SoS will need to be satisfied that the objectives of the Directive have been complied with when determining the DCO application.

Marine Licence

8.4.10 The DCO application will include an application for a deemed marine licence (dML). The WFD document to be submitted at ES will form part of the dML application. Prior to granting the Marine Licence under the Marine and Coastal Access Act 2009, the Inspectorate will consult with the Marine Management Organisation (MMO) and the Environment Agency to consider and will ensure that the Project is in compliance with the WFD.

Groundwater Directive

8.4.11 The GWD (2006/118/EC, including amendments to Annex II detailed under Directive 2014/80/EU) is designed to combat groundwater pollution and sets out procedures for assessing quality of groundwater. Aspects of the GWD are transposed and implemented through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 and the Environmental Permitting (England and Wales) Regulations 2016.

Protected Areas

8.4.12 Under the WFD, member states are required to establish a register of protected areas. Protected areas for the purposes of WFD include:

- Bathing Waters;
- Shellfish Water Protected Areas;

[2] https://www.gov.uk/guidance/river-basin-management-plans-updated-2022

- Nutrient-sensitive areas, including those identified as Sensitive Areas (e.g., Bathing Water, Eutrophic) and Nitrate Vulnerable Zones (NVZs);
- Relevant National Site Network sites; and
- Drinking Water Protected Areas.

Bathing Water Directive

8.4.13 The EU's revised Bathing Water Directive (rBWD; 2006/7/EC) came into force in March 2006. The rBWD has four different classifications of performance, these are:

- Excellent - the highest, cleanest class;
- Good - generally good water quality;
- Sufficient - the water meets minimum standards; and
- Poor - the water has not met the minimum required standards.

8.4.14 The Environment Agency measures, monitors and reports the number of certain types of bacteria which may indicate the presence of pollution, mainly from sewage or animal faeces, these are *Escherichia coli* and intestinal enterococci. An increase in the concentrations of these bacteria indicates a decrease in water quality.

8.4.15 The Environment Agency collects at least eight samples from each Bathing Water in England each year during the bathing season (15 May to 30 September). An overall classification for the Bathing Water is then determined by creating a distribution from the monitoring data for the last four years. A separate distribution is calculated for both *E. coli* and intestinal enterococci. This then enables the determination of the classification for each bacterium for the Bathing Water.

8.4.16 If the classification for both types of bacteria is different, then the overall compliance of the Bathing Water is the lowest classification achieved by either type. For example, if *E. coli* were performing at 'Good' but intestinal enterococci was performing at 'Sufficient', then the Bathing Water would be classified as performing at 'Sufficient'.

Shellfish Waters Directive

8.4.17 The Shellfish Waters Directive (2006/113/EC) was repealed in December 2013 and subsumed within the WFD. However, the Shellfish Water Protected Areas (England and Wales) Directions 2016 require the Environment Agency to endeavour to observe microbial standards in all 'Shellfish Water Protected Areas'. The microbial standard is 300 or fewer colony forming units of *E. coli* per 100 ml of shellfish flesh and intervalvular liquid. The Directions also requires the Environment Agency to assess compliance against this standard to monitor microbial pollution (75% of samples taken within any period of 12 months below the microbial standard and sampling/ analysis in accordance with the Directions).

Urban Waste Water Treatment Directive

8.4.18 The Urban Waste Water Treatment Directive (91/271/EEC) aims to protect the environment from the adverse effects of the collection, treatment and discharge of urban waste water. It sets treatment levels on the basis of sizes of sewage discharges and the sensitivity of waters receiving the discharges. In general, the Urban Waste Water Treatment Directive requires that collected waste water is treated to at least secondary treatment standards for significant discharges. Secondary treatment is a biological treatment process where bacteria are used to break down the biodegradable matter (already much reduced by primary treatment) in waste water. 'Sensitive Areas' under the Urban Waste Water Treatment Directive are water bodies affected by eutrophication due to elevated nitrate concentrations and act as an indication that action is required to prevent further pollution caused by nutrients.

Nitrates Directive

8.4.19 The Nitrates Directive (91/676/EEC) aims to reduce water pollution from agricultural sources and to prevent such pollution occurring in the future (nitrogen is one of the nutrients that can affect plant growth). Under the Nitrates Directive, surface waters are identified if too much nitrogen has caused a change in plant growth which affects existing plants and animals, and the use of the water body. NVZs are areas designated as being at risk from agricultural nitrate pollution.

Habitats/Birds Directives and Ramsar Convention

8.4.20 The Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the "Habitats Directive"), protects habitats and species of European nature conservation importance. Together with the Council Directive 2009/147/EC on the conservation of wild birds (the "Birds Directive"), the Habitats Directive establishes a network of internationally important sites, designated for their ecological status. Special Areas of Conservation (SACs) are designated under the Habitats Directive and promote the protection of flora, fauna and habitats. Special Protection Areas (SPAs) are designated under the Birds Directive in order to protect rare, vulnerable and migratory birds.

8.4.21 The Conservation of Habitats and Species Regulations 2017 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 transposed the Habitats and Birds Directives into English and Welsh law. However, since the UK left the EU, the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 has transferred functions from the European Commission to the appropriate authorities in England and Wales, with SACs and SPAs in the UK no longer forming part of the EU's Natura 2000 ecological network. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 has created a National Site Network on land and at sea, including both the inshore and offshore marine areas in the UK. This includes all existing SACs and SPAs, and new SACs and SPAs designated under the Conservation of Habitats and Species Regulations 2017 and the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

8.4.22 Under the 1971 Ramsar Convention on Wetlands of International Importance, it is a requirement of signatory states to protect wetland sites of international importance, including those that are important waterfowl habitats. These internationally designated nature conservation sites are referred to as Ramsar sites. Whilst the UK has now left the EU, all Ramsar sites remain protected in the same way as SACs and SPAs (although they do not form part of the National Site Network).

Drinking Water Protected Areas

8.4.23 Drinking Water Protected Areas (Surface Water) are defined by the Water Environment (Water Framework Directive) (England & Wales) Regulations 2017 as locations where raw water is abstracted to provide water for people to drink and includes water from reservoirs and rivers (surface waters) and the ground (groundwaters).

The Planning Act 2008

8.4.24 Consideration of the WFD is required for any DCO Application. Consideration is specifically required for NSIPs, under various National Policy Statements (NPSs) including EN-1 (Department of Energy and Climate Change, 2011), to assess and provide sufficient information on any potential impacts arising from the proposed development on the waterbodies or protected areas under the WFD. In addition to the current NPS, draft revised NPS were consulted upon in 2021 (consultation closed on 30 November 2021)[3], with further consultation being undertaken in 2023 (consultation closed on 23 May 2023)[4]. This includes the Draft revised NPS for Overarching Policy Statement for Energy EN-1 (DESNZ, 2023a), Draft revised NPS for Renewable Energy Infrastructure EN-3 (DESNZ, 2023b) and Draft revised NPS for Electricity Networks Infrastructure EN-5 (DESNZ, 2023c) of relevance to the Project.

8.4.25 The SoS, the Environment Agency and other public bodies have a specific duty to have regard to the relevant RBMPs in exercising their functions, including the determination of applications under the Planning Act 2008. This WFD compliance assessment, undertaken by the Applicant, has been prepared to provide information on the potential for the Project to cause deterioration within waterbodies (including the ecological and chemical status of waterbodies) or the potential to compromise improvements which might otherwise lead to a waterbody meeting its Directive objectives.

Marine Coastal and Access Act 2009

8.4.26 The Marine and Coastal Access Act 2009 provides the framework for a marine licensing system which, in England, is administered by the Marine Management Organisation (MMO) on behalf of the English Government, which is also a statutory consultee in the DCO application process. All Marine Licence applications (above Band 1) must be accompanied by a WFD compliance assessment, to demonstrate that the proposed development 'will not cause deterioration' in WFD waterbodies between mean high water spring (MHWS) and one nautical mile seaward.

[3] https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-review-of-energy-national-policy-statements

[4] https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-revisions-to-national-policy-statements

8.5 Consultation

Approach

8.5.1 As recommended by the Inspectorate's Advice Note Eighteen: The Water Framework Directive (The Inspectorate, 2017), the Applicant has sought the Environment Agency's views early in the application phase (along with other members of the Projects Evidence Plan as appropriate). The consultation process has informed the development of this WFD compliance assessment (developed for the PEIR) which supports the statutory consultation for the Project. As recommended by The Inspectorate (2017), the Applicant has sought to agree the following with the Environment Agency prior to the Applications being made:

- The need or otherwise for a specific WFD compliance assessment;
- The scope and methodology of any WFD compliance assessment;
- The potential impacts of the proposed Project on waterbodies within the relevant RBMP, and compliance with the objectives of the WFD;
- Any mitigation measured required to ensure compliance; and
- The information to be submitted as part of the DCO application to inform the tests if the WFD impact assessment concludes that derogation will be necessary.

8.5.2 As part of the early engagement, the Applicant sought to agree the need, scope, methodology and potential impacts of the proposed development with the Environment Agency. This consultation has informed the development of this WFD compliance assessment (see Section 0 below).

Consultation to Date

8.5.3 A summary of the consultation, undertaken to date, in relation to the Project's WFD compliance assessment is provided in Table 8.1.1.

Table 8.1.1: Summary of consultation relating to the Water Framework Directive

Date and consultation phase/ type	Consultation and Key Issues Raised	Location where Issue Addressed
Marine		
Scoping Opinion (Environment Agency, 19 August 2022) Comment ID: N/A	We have also reviewed the Scoping Report chapters regarding marine ecology and marine water and sediment quality, in so far as these issues/chapters relate to the Environment Agency's remit, and we can advise that we are satisfied with the methodologies etc proposed.	This is welcomed by the Applicant.
Scoping Opinion (Marine Management Organisation, 26 August 2022)	The MMO defers to the Environment Agency on the suitability of the scope of the assessment with regards to water quality.	This is noted by the Applicant and responses from the Environment Agency noted above.

Date and consultation phase/ type	Consultation and Key Issues Raised	Location where Issue Addressed
Comment ID: 3.11.1		
Scoping Opinion (Natural England, 30 August 2022) Comment ID: N/A	For activities in the marine environment up to 1 nautical mile out to sea, a Water Framework Directive (WFD) assessment is required as part of any application. The ES should draw upon and report on the WFD assessment considering the impact the proposed activity may have on the immediate water body and any linked water bodies. Further guidance on WFD assessment is available here: https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters	This document provides the WFD compliance assessment to accompany the PEIR.
Freshwater		
Scoping Opinion (Inspectorate, 9th September 2022) Comment ID: 3.17.2	Impact on Water Framework Directive (WFD) status for surface water or groundwater bodies – O&M. The Inspectorate agrees that once installed, the underground cabling elements of the proposed onshore development are unlikely to have significant effects on WFD waterbodies during the operational phase and this matter can be scoped out of the assessment.	Scoped out
Scoping Opinion (Inspectorate, 9th September 2022) Comment ID: 3.17.8	The Inspectorate recommends the sources of data and guidance listed in Table 7.2.1 (Marine Water Quality) of the Scoping Report also be considered for the WFD assessment identified for the onshore aspect chapter, where applicable. It is unclear if one WFD assessment is to be provided for the Proposed Development with the ES and DCO application. The Inspectorate recommends that one WFD assessment be provided, with the information used to inform both the Offshore: Marine Water Quality and Onshore: Hydrology, Hydrogeology and Flood Risk aspect assessments.	This document provides the WFD assessment for the offshore and onshore elements.

8.6 Assessment Methodology

8.7 Guidance

8.7.1 This WFD compliance assessment has been undertaken following the Environment Agency's 'Clearing the Waters for All' guidance (Environment Agency, 2017), used to assess the potential deterioration of transitional and coastal waterbodies. This assessment has also been undertaken in line with the Inspectorate's 'Advice Note Eighteen' (The Inspectorate, 2017).

8.8 Data Sources

8.8.1 The following key data sources have been collated and used to inform this WFD compliance assessment:

- Environment Agency Catchment Data Explorer;
- Environment Agency Bathing Water classifications from the Bathing Water Data explorer;
- RBMPs and interim freshwater classifications; and
- Coastal, transitional, rivers and ground water risk assessment excel files.

Process

8.8.2 A WFD compliance assessment can comprise of up to three key stages, with the requirement to undertake the latter stages dependent on the outcome of the preceding stages. The three key stages involved are:

- Screening: this step identifies the proposed activities which could impact WFD waterbodies (and protected areas), and determines if any activities associated with the development can be excluded from further consideration.
- Scoping: this step identifies the risks of development activities to environmental receptors, based on relevant waterbodies and their associated water quality elements (including the status, objectives and parameters of each waterbody); and
- Impact Assessment: this step involves a detailed assessment of the relevant waterbodies and their quality elements, and identifies potential areas of non-compliance, as well as potential mitigation measures and contributions to the RBMP objectives.

Screening

8.8.3 The Project is not strictly required to complete the screening stage (as under the 'Clearing the Waters for All' guidance, it is a new project). However, as this screening stage informs the scoping stage, it is often still completed regardless. It also provides an initial insight into which project activities pose a risk to WFD compliance. In addition to the consideration of scale, location and nature of activities associated with the proposed development (during construction, operation and maintenance (O&M) and decommissioning), this has included identifying whether there are any waterbodies or protected areas in the vicinity of the proposed development (see Section 0 and 0).

8.8.4 This screening methodology is also supported by Advice Note Eighteen: The Water Framework Directive (The Inspectorate, 2017) which details screening as the stage to detail the extent to which a proposed development is likely to affect waterbodies based on a Zone of Influence (ZoI; spatial extent of predicted effects for which an impact may be observed for a specific receptor) (see Section 0).

Scoping

8.8.5 Any WFD elements which are identified as being at risk of impact from the Project's activities are taken forward for a detailed impact assessment (see Section 0). Where robust justification can be provided, impacts on waterbodies may be scoped out from further assessment.

8.8.6 Regarding the coastal environment, the Applicant has assessed the potential for deterioration within coastal and transitional waterbodies only. Whilst the Applicant acknowledges that waters extending to 12 nautical miles are protected under the WFD (in terms of chemical status), it is difficult to assess a deterioration in chemical status in these waters. The approach adopted aligns with the Environment Agency's 'Clearing the Water for All' guidance, which focuses on surface water deterioration. The potential for changes in water quality and chemical status up to and beyond 12 nautical miles are assessed in Volume 1, Chapter 8. Therefore, the Applicant does not propose to explicitly assess water quality extending to 12 nautical miles in this WFD compliance assessment, but this has been included as part of the EIA.

8.8.7 Any protected areas within the Project's ZoI, which has been defined based on project-specific numerical modelling for sediment and tidal pathways (Section 0), have been scoped in for a detailed impact assessment. For the purposes of this assessment, protected areas are defined as:

- Bathing Waters;
- Shellfish Water Protected Areas;
- Sensitive Areas (Urban Waste Water Treatment Directive) and NVZ (Nitrates Directive);
- National Site Network (SACs and SPAs) and Ramsar sites; and
- Drinking Water Protected Areas (Surface and Ground).

8.8.8 The scoping stage identifies the receptors that are potentially at risk from the proposed activities and, therefore, may need to be subject to an impact assessment. At the scoping stage, it is necessary to identify all potential risks to each receptor associated with the proposed activity(ies). The receptors are:

- Marine waterbodies:
  - Hydromorphology;
  - Biology - habitats;
  - Biology - fish;
  - Water quality;
  - Invasive Non-Native Species (INNS); and
  - Protected areas.
- Fresh waterbodies:
  - Hydromorphology;

- Water quality;
- Fish and eels;
- Macrophytes, diatoms and invertebrates;
- INNS; and
- Protected areas.

- Groundwater:
  - Creation of pathways;
  - Changes to levels and associated consequences; and
  - Water quality.

8.8.9 The potential for in-combination and cumulative impacts are also considered in this WFD compliance assessment.

Marine

8.8.10 Hydromorphology in this WFD compliance assessment is defined as the physical characteristics of the waterbody including the size, shape, structure and (for marine bodies) the flow and quantity of water and sediment.

8.8.11 Biological habitats (both those designated as higher or lower sensitivity habitats) have been scoped in if the footprint (including sediment plumes and dredging areas) of activities is any of the following:

- 0.5km^2 or greater;
- 1% or more of the waterbody's area;
- Within 500m of any higher sensitivity habitat; or
- 1% or more of any lower sensitivity habitat.

8.8.12 Fish should be included in the WFD compliance assessment if the activity could impact on normal fish behaviour like movement, migration, spawning, or species composition and abundance. The presence of type-specific or disturbance-sensitive species and the age structure of fish communities should also be considered. The following impacts on fish have been scoped in if:

- The activity is in an estuary and could affect the fish in the estuary;
- The activity could delay or prevent fish from entering the estuary; or
- The activity could affect fish migrating through the estuary to freshwater.

8.8.13 The impacts resulting from the proposed activities on water quality have been scoped in on the basis of:

- Whether it could affect water clarity, temperature, salinity, oxygen levels, nutrients, or microbial patterns;
- Whether it is in a waterbody/ waterbodies with a phytoplankton status of moderate, poor or bad;

- Whether the waterbody(ies) has a history of harmful algae; and
- The water quality assessment has assessed the potential for the release of chemicals (on the EQSD list) and sediment bound contaminants (above Centre for Environment, Fisheries and Aquaculture Science (Cefas) Guideline Action Level 1) as a result of the proposed activities.

8.8.14 The impacts of the proposed activities on WFD protected areas have been scoped in on the basis of whether there are designated protected areas within the ZoI of the Project.

8.8.15 INNS should be included in the WFD compliance assessment, if the proposed activities have the potential to introduce or spread INNS to or within the area.

Freshwater

8.8.16 The receptors which have been considered for fresh waterbodies are:

- Hydromorphology – the physical characteristics and processes of the waterbody:
  - Physical habitat - the distribution and diversity of habitat including the physical processes that sustain and create new habitat. Physical habitat is essential for fish, macrophytes and invertebrates to live and thrive.
- Water quality:
  - The scoping stage considers if there is a risk to the alteration of the physio-chemical aspects of water quality, such as levels of dissolved oxygen, phosphorus and ammonia, or the introduction of specific pollutants or chemicals including priority (hazardous) substances.
- Fish and eels:
  - The scoping stage considers whether the proposed development could impact on normal fish and eel behaviours, such as movement, migration, spawning, and species composition and abundance.
- Macrophytes, diatoms and invertebrates:
  - The scoping stage considers these water plants (both visible and not) and invertebrates and whether there is a risk of water quality issues as an impact to these receptors from the proposed development.

Groundwater

8.8.17 The scoping stage considers the quantity and quality of the groundwater bodies and the potential for deterioration as a result of the Project.

Impact Assessment

8.8.18 The impact assessment considers what (if any) pressures the activity may create on the environment and specifically the receptors identified. The key aim of the impact assessment is to determine whether there is potential for deterioration in the status of the waterbody receptor. During the impact assessment, the requirement for additional mitigation measures (i.e., those not inherent to the Project's design) and impact monitoring has been considered. All impact assessments inherently consider embedded mitigation.

8.8.19 Deterioration is defined as when the status (ecological, chemical or in relation to groundwater parameters) of a quality element reduces by one class, for example, ecological quality elements move from 'good' to 'moderate' status. If a quality element is already at the lowest status (Bad), then any reduction in its condition also counts as deterioration. According to the Environment Agency (2017) guidance, temporary effects due to short-duration activities like construction and maintenance are not considered to cause deterioration if the waterbody would recover in a short time without any restoration measures. However, it is noted that works which are temporary in nature may have longer term effects in aspects such as ecology. Where relevant, mitigation measures have been included to avoid or minimise risks of deterioration. This assessment would be reliant upon identifying those effects that are non-temporary which, for the purposes of this WFD compliance assessment, is defined as 'a period of time that is greater than the recommended monitoring period interval as stated by the WFD (2000/60/EC)'.

8.8.20 If the activity may cause deterioration or hinder achievement of the waterbody's objective (or potential), either of the quality element or supporting habitat, an explanation must be provided of how this deterioration could occur, including consideration of whether the impact is:

- Direct and immediate - it will happen at the same time and place as the activity; or
- Indirect - it will happen later or further away, including in other linked waterbodies.

8.8.21 Where the activity may cause deterioration, alternatives should be considered to minimise the impact, including changes to the materials or substances used, the size, scale or timing of the activity or methods of working and/ or how equipment or services are used.

8.8.22 In addition to assessing the potential for deterioration of the current status of a waterbody, the impact assessment must consider the risk of jeopardising 'Good status'. Every waterbody has a target status that it is expected to achieve, with an expected date by when this should be achieved, as set out in the RBMPs. Where the status of a waterbody or quality element is less than 'Good', the impact assessment should consider whether the activity may jeopardise the waterbody achieving 'Good status' in the future. These may include activities which reduce the effectiveness of improvement activities taking place or prevent improvement activities taking place in the future. Details of these activities or measures are set out in the RBMPs.

8.8.23 Different monitoring periods are defined for different elements under the WFD. In this assessment, deterioration is measured against the potential to jeopardise the waterbody from attaining the same or better status in the subsequent RBMP (i.e., within six years) and the interim classification (i.e., within three years), thus a non-temporary deterioration.

8.8.24 The Applicant also notes that even though activities may be temporary in nature, the impacts to ecology may be longer lasting and have been considered accordingly. Therefore, the temporal nature of each potential impact on a receptor is considered within the impact assessment. This includes consideration of impacts to bacteria, specifically in terms of the monitoring which occurs for designated Bathing Waters. Should the monitoring identify elevated bacterial counts, those results could be incorporated (and will impact) the Bathing Water classification for four years (see Section 0).

Compensation Areas

8.8.25 There are three potential compensation areas considered for the Project, comprising of two artificial nesting structures (ANSs) and one biogenic reef restoration area. The search areas are presented in Figure 8.1.1. The compensation search areas will be assessed within the ES following refinement of the proposed areas and once details of the works to be undertaken have been finalised.

8.8.26 The compensation areas may overlap, or be located in the vicinity of, coastal and/or transitional waterbodies, but are unlikely to directly interact with designated sites such as shellfish water protected areas, bathing waters, or nitrate vulnerable zones.

Offshore Reactive Compensation Platforms (ORCPs)

8.8.27 The ORCPs (shown in the search areas in Figure 8.1.1) will house reactive compensation electrical equipment, control and instrument systems, and will provide access to facilities for work vessels. Within the Project design envelope presented for the Project there is potential for up to two ORCPs to be installed, which would be located within the boundaries of the offshore ECC. As the ORCP search area lies outside the boundaries of any coastal or transitional waterbodies, associated activities would be unlikely to result in indirect impacts at a waterbody scale (e.g., construction, O&M, and decommissioning), thus these offshore platforms are not included in further assessment.

8.9 Screening

General

8.9.1 The Project will comprise of an offshore array of Wind Turbine Generators (WTGs) and associated infrastructure to allow for transmission of power to the National Grid Network. The offshore export cable corridor (ECC) will make landfall at Wolla Bank with a final confirmation of the grid connection point, with two options still under consideration.. Onshore export cables will be installed underground to connect the landfall location to the grid connection. The minimum distance between the Project and the coastline is approximately 54km (approximately 29nm).

Proposed Offshore Activities

8.9.2 This section provides an overview of the proposed offshore activities of relevance to this WFD compliance assessment.

Construction

8.9.3 The minimum distance between the Project and the coastline is approximately 54km, therefore this WFD compliance assessment will be limited to the offshore export cables as there is no array infrastructure (i.e. foundations) located within 1nm of the coast. The array area will be sufficiently distanced from designated waterbodies (>1nm for ecological status), therefore these activities are not considered in this assessment. Up to four export circuits will be required for the Project.

8.9.4 The exact location and orientation of the offshore export cables, within the Order Limits, will be determined during an iterative route planning and site selection process, following the granting of the DCO.

8.9.5 The primary effects associated with the installation of the Project's offshore export cables that are considered to be relevant to the WFD compliance assessment are:

- Preparatory works (possibly including sandwave or boulder clearance);
- Installation of offshore cables (multiple possibilities for methodology, including mechanical trenching, dredging, jetting, ploughing, mass flow excavation, vertical injection, rock cutting);
- The export cable installation at landfall under the intertidal area via trenchless techniques such as, but not limited to, Horizontal Directional Drilling (HDD);
- Cable protection for cable crossings where cable burial is not achieved.

8.9.6 There is no intention to knowingly release any chemicals listed in the EQSD into the environment, during the construction, operation and maintenance, or decommissioning phase of the Project.

Operation and Maintenance

8.9.7 A number of different vessel types will be required for O&M activities. During the operational phase of the Project, there will be no planned maintenance or replacement of the subsea cables; however, repairs could be required should the cable fail or be damaged. Periodic surveys will be required to ensure the cables remain buried and, if they do become exposed, then corrective maintenance may be undertaken (such as deployment of cable protection or reburial).

Decommissioning

8.9.8 For the purposes of the WFD compliance assessment, at the end of the operational lifetime of the Project, it is assumed that the decommissioning sequence will generally be in the reverse of construction. Closer to the time of decommissioning, it may be decided that removal would lead to a greater environmental impact than leaving some components *in situ*, in which case certain components may be cut off at or below seabed level (e.g., in the case of piled foundations, although it is noted that there are no foundations located within 1nm of the coast) or left *in situ* (e.g., in the case of subsea cables and scour/cable protection).

8.9.9 A decommissioning plan will be required to be submitted prior to decommissioning in accordance with a requirement in the DCO. Under Section 106 of the Energy Act 2004, this is required to be signed off by the relevant authority prior to commencement of construction. This plan would be updated during the lifetime of the Project to take account of changing best practice and new technologies. A final decommissioning plan would also require approval from the Marine Licensing authority (i.e., the MMO), prior to the undertaking of decommissioning works.

Proposed Onshore Activities

8.9.10 This section provides an overview of the proposed onshore activities of relevance to this WFD compliance assessment.

Construction

Cable Installation

8.9.11 The onshore cable construction works are expected to take place for up to 36 months in total.

8.9.12 Cable installation is a well-established technique and incorporates environmental management and mitigation measures as standard practice. Precise installation methods will differ according to the nature of the environment through which the cable is being installed.

8.9.13 The cables will be buried in multiple separate trenches (up to four trenches, each containing one circuit of three cables). The onshore cable corridor will be up to 80km in length, with each trench up to 5m wide, and 3m deep. Joint pits will be required along the cable route to allow cable pulling and jointing of two sections of cable in addition to the Transition Joint Bay (TJB) at landfall and cable termination at the substation. A temporary haul road will be established from mobilisation areas to cable installation sites and could be up to 6.8m wide and along each open trenched section of the onshore ECC, with distinct access points to reduce construction traffic on local roads. Temporary bridges or flumes are proposed to be installed at most watercourse crossings.

8.9.14 Most of the cable route will be constructed using an open cut method of cable construction. Where an open trench approach is not possible, for example, due to significant obstructions (e.g. a major road or watercourse), trenchless techniques may be employed. During construction of the cable trenches the topsoil and subsoil will be stripped and stored on site within the temporary working corridor of the Project onshore ECC. The procedures followed will be in line with best practice and agreed through the Code of Construction Practice (CoCP) or an appropriate management plan. Several documents which will form part of the CoCP (to be submitted at DCO Application) have been submitted at part of the PEIR.

Crossings

8.9.15 The depth of each cable at every watercourse crossing will be determined through the development of the Crossing Schedule in consultation with the relevant consenting body on a case-by-case basis in collaboration with the respective owner/operator. The Project have prepared a draft ECC Crossing Schedule which documents the location and type of asset being crossed, along with identifying the relevant stakeholder with whom the crossing techniques to be deployed at crossing points will be agreed (Document Reference 8.1.8: Outline Preliminary Crossing Schedule – Onshore).

8.9.16 A pre-construction drainage plan will be developed and implemented to minimise water within the trench and ensure ongoing drainage of surrounding land. Where water enters the trenches during installation, this will be pumped via settling tanks or ponds to remove sediment, before being discharged into local ditches or drains via temporary interceptor drains. Trenchless techniques will be used at a number of locations, used as an alternative crossing methodology to open-cut trenching.

Substation

8.9.17 One onshore substation (OnSS) will be required for the Project, with the location to be confirmed (Weston Marsh or Lincolnshire Node). The substation will contain a number of elements including switchgear, busbars, transformers, capacitors, reactors, reactive power compensation equipment, filters, cooling equipment, control and welfare buildings, lightning protection rods (if required) and internal road access. A security fence will surround the compound. The indicative site area for the OnSS to the perimeter fence is 180,000m^2.

8.9.18 During construction of the OnSS, a temporary construction area will be established to support the works. The area will be formed of hard standing with appropriate access to allow the delivery and storage of large and heavy materials and assets, such as power transformers. The temporary construction area will be approximately 270,000m^2 and will accommodate construction management offices, welfare facilities, car parking, workshops and storage areas. Water, sewerage and electricity services will be required at the site and supplied either via mains connection or mobile supplies such as bowsers, septic tanks and generators. Operation and Maintenance

8.9.19 Onshore, the O&M requirements will be largely corrective, accompanied by infrequent on-site inspections of the onshore ECC. However, all onshore infrastructure will be constantly monitored remotely, and there may be O&M staff visiting the OnSS to undertake works when necessary (currently expected to be once per week).

8.9.20 The OnSS will not be manned; and security at the substation will be provided through the use of perimeter fencing and closed-circuit television (CCTV). Periodic access to joint bays may also be required for inspection.

8.9.21 Unplanned maintenance associated with the onshore ECC may involve the repair of onshore cable faults. This is extremely rare (indicatively 1-2 events per lifetime). Typically, this involves excavating the two adjacent joint pits, pulling the cable back through the ducting and pulling a new cable through. Alternatively, the area of the fault may be excavated (with an additional up to 40 m in both directions) and two new joints installed within this area. Methods for excavation and reburial will be similar to the original installation as described in the cable installation section.

Decommissioning

8.9.22 At the end of the operational lifetime of the offshore windfarm, it is anticipated that all of the offshore structures above the seabed level, together with all subsea cables, will be completely removed. Onshore, it is expected that cable would be left in-situ to avoid adverse effects on the environment and communities.

8.9.23 The decommissioning sequence will generally be the reverse of the construction sequence (reverse lay) and involve similar types and numbers of vessels and equipment.

8.9.24 Closer to the time of decommissioning, it may be decided that removal of infrastructure would lead to greater environmental impacts than leaving components in situ, in which case certain components may not be fully decommissioned. Any final decommissioning methodology will adhere to industry best practice, rules and regulations at the time of decommissioning.

Mitigation Measures

8.9.25 This section provides an overview of commitments that have been identified and adopted as part of the project design (embedded into the project design) and that are relevant to the WFD compliance assessment. The commitments include embedded measures, such as applied mitigation which is subject to further study or approval of details; these include avoidance measures that will be informed by pre-construction surveys.

8.9.26 The provision of the identified plans, as detailed below, will be secured in the DCO (or deemed Marine Licence). The subsequent scoping and impact assessment stages of the WFD compliance assessment are based on the 'mitigated' design, with any further mitigation added to reduce impacts in the case of potentially significant effects (in this case, potential to result in a deterioration of a WFD waterbody).

Offshore

Pollution Prevention

8.9.27 A Project Environmental Management Plan (PEMP) will be developed post-consent and adopted, which will cover the construction and O&M phases of the Project. This will be secured through a Condition in the deemed Marine Licence. This PEMP will include a Marine Pollution Contingency Plan (MPCP), which provides protocols to cover accidental spills and potential contaminant release, and provide key emergency contact details.

8.9.28 Typical measures will include:

- Storage of all chemicals in secure designated areas with impermeable bunding (generally 100% of the volume); and
- Double skinning of pipes and tanks containing hazardous materials.

8.9.29 The purpose of these measures is to ensure that potential for contaminant release is strictly controlled and provides protection to marine life across all phases of the life of the Project.

INNS

8.9.30 Relevant best practice guidelines will be followed and implemented throughout all phases of the development which will aim to minimise the introduction and spread of INNS. This will be secured as a condition of the deemed Marine Licence, confirming the requirement for a Biodiversity and Invasive Non-Native Species Method Statement.

Cable Specification and Installation Plan

8.9.31 The Cable Specification and Installation Plan (CSIP) will be developed post-consent and will set out appropriate cable burial depth (in accordance with industry best practice) to minimise the risk of cable exposure. The CSIP will be secured as a condition in the deemed Marine Licence.

Onshore

Code of Construction Practice (CoCP)

8.9.32 An onshore CoCP will set out the environmental measures to be applied on the Project, including details of any mitigation and how it will be managed through the construction phase. Several documents which will form part of the CoCP (to be submited at DCO Application) have been submitted at part of the PEIR (Document Reference: 8.1).

8.9.33 All construction work will be undertaken in accordance with the CoCP, and good practice guidance including but not limited to:

- Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532) (CIRIA, 2001);
- CIRIA – The SuDS Manual (C753) (CIRIA, 2015);
  - No discharge to main river watercourses will occur without permission from the EA;
  - Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants;
  - Regular cleaning of roads of any construction waste and dirt to be carried out; and
  - A construction method statement to be submitted for approval by the relevant LLFA or IDB.

Permits

8.9.34 Consent would be required for the works (e.g. drilling, crossing, culverting, discharging to, passing under and/or through) affecting the defence structures, Internal Drainage Board (IDB) maintained watercourses, main rivers, and ordinary watercourses in accordance with requirements of EA, IDBs and local councils. The conditions of the consents would be specified to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial or tidal risk.

Soil Management

8.9.35 The Pollution Prevention and Emergency Incident Response Plan (PPEIRP), an outline version of which is provided in Part 8, Document 1.4 (PEIR document reference number 8.1.4), includes measures to control runoff from the construction works. The soil will be carefully maintained during the storage process. This could include, for example, sediment fences when working in proximity to open watercourses, containment of storage areas and treatment of any runoff from work areas or water from dewatering of trenches. Such measures would prevent the potential reduction in water quality associated with increased sediment loading affecting nearby tidal waters, fluvial watercourses or drainage ditches during cable route construction works, especially during excavations or earthwork activities.

8.9.36 Further details are provided in Part 8, Document 1.3: Outline Soil Management Plan (PEIR document reference number 8.1.3).

Drainage and Dewatering

8.9.37 A pre-construction drainage plan will be developed and implemented to minimise water within the trench and ensure ongoing drainage of surrounding land. Where water enters the trenches during installation, this will be pumped via settling tanks or ponds to remove sediment, before being discharged (subject to consent) into local ditches or drains via temporary interceptor drains.

Pollution Prevention

8.9.38 The Construction practices will incorporate measures to prevent pollution. Areas at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils, drilling fluids and chemicals) will be bunded and carefully sited to minimise the risk of hazardous substances entering drainage systems or local watercourses. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. Bunds used to store fuel, oil etc. will have a 110% capacity. Further details are provided Part 8, Appendix 1.4: Outline Pollution Prevention and Emergency Incident Response Plan (PEIR document reference number 8.1.4). Furthermore, spill procedures and use of spill kits will be implemented (if required). These measures together with appropriate drainage systems and containment will minimise the potential for any reduction in water quality associated with spills or leaks of stored oils/ fuels/ chemicals or other polluting substances migrating into nearby water bodies.

Zone of Influence

8.9.39 The ZoI for the Project's offshore works has been defined based on project-specific numerical modelling for sediment and tidal pathways. The numerical modelling technical report is presented in Volume 2, Appendix 7.1. Volume 1, Chapter 7 provides detail on the tidal excursions and sediment transport pathways used to define the ZoI. Sections 0 and 0 provide details of the WFD waterbodies and protected areas within the Projects ZoI.

8.9.40 The ZoI for onshore works would typically be 2km from the draft Order Limits and would be where the onshore draft Order Limits overlap groundwaters. There is currently still some uncertainty around grid connection, however, the provisional outcomes from the HND process identified two possible grid connection options. The Project has identified several onshore ECC options corresponding to the two grid connection options, and will be finalised for the DCO application upon confirmation of the outcome of the HND process.

Waterbodies Screening

8.9.41 The ZoI has been considered alongside the location of waterbodies along the Lincolnshire coast and in conjunction with the relevant Project activities as described above. This allows for identification of the waterbodies likely to be affected, shown below in Table 8.1.2 and Figure 8.1.3. Further detail on these waterbodies is presented in Section 8.10 of this document.

Table 8.1.2: Waterbodies screened into the WFD compliance assessment

Name	Qualifying Reason for Inclusion in Screening
Transitional and coastal	
Lincolnshire coastal waterbody	Offshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Riverine	
Boygrift Drain	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Anderby Drain	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Willoughby High Drain	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Ingoldsmell Main Drain	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Cow Bank Main Drain	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Lymn/Steeping	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Cow Bank Drain	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
East & West Fen Drains	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Black Sluice IDB draining to the South Forty Foot Drain	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Kirton Marsh Drain	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Fosdyke Bridge Outfall	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Risegate Eau	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Whaplode River	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Moulton River	Onshore ECC overlaps with the waterbody and within the ZoI for the proposed activities.
Vernatt's Drain	Onshore ECC is within 2km of the waterbody and within ZoI for the proposed activites.
Groundwater	
South Lincolnshire Chalk Unit	Onshore ECC overlaps with the groundwater body and within the ZoI for the proposed activities.
Spilsby Sandstone Unit	Onshore ECC overlaps with the groundwater body and within the ZoI for the proposed activities.

Protected Areas Screening

8.9.42 Protected Areas within 2km of the Project are required to be screened in, under the 'Clearing the Waters for All' guidance. The following Protected Areas have been screened into this WFD compliance assessment (Figure 8.1.4):

- Bathing Waters:
  - Anderby;
  - Moggs Eye;
  - Chapel St Leonards;
  - Ingoldmells South;
  - Sutton-on-Sea; and
  - Mablethorpe Town.
- Shellfish Water Protected Areas:
  - There are no Shellfish Water Protected Areas within the Project ZoI. The closest Shellfish Water Protected Area is in The Wash (approximately 14.9km southwest of the offshore ECC).
- Sensitive Areas:
  - The Mablethorpe Town Bathing Water Sensitive Area is within the Project ZoI.
- NVZs:
  - Ingoldmells Main Drain NVZ; and
  - Willoughby High Drain NVZ
- National Site Network sites and Ramsar sites:
  - Greater Wash SPA;
  - North Norfolk Sandbanks and Saturn Reef SAC;
  - Inner Dowsing, Race Bank and North Ridge SAC;
  - Southern North Sea SAC; and
  - There are no Ramsar sites within the Project ZoI. The closest is the Humber Estuary Ramsar site (approximately 12.1km northwest of the offshore ECC).
- Drinking Water Protected Areas (Surface and Ground):
  - There are no Drinking Water Protection (DWP) or Drinking Water Safeguard Zones (SgZs) within the ZoI. The closest, is approximately, 6.1km from the onshore ECC.

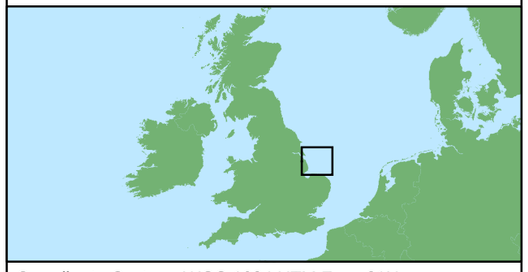
300000
350000
400000
5950000
5900000
N
Humber Lower
Lincolnshire

Legend

- Array Area
- Offshore Export Cable Corridor
- Onshore Export Cable Corridor
- 2km Buffer of Onshore Export Cable Corridor
- ORCP Search Area
- WFD Zone of Influence
- Benthic Survey Station

Waterbodies

- Coastal
- Transitional



Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km

Scale: 1:400,000

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Coastal and Transitional WFD Waterbodies of Relevance to Outer Dowsing

Figure 8.1.3

OUTER DOWSING OFFSHORE WIND

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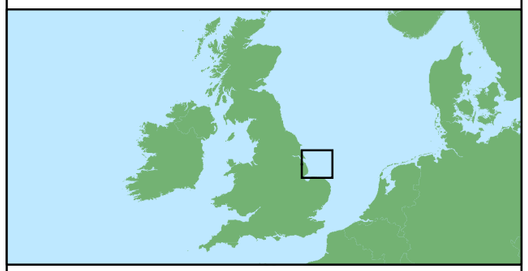
300000
350000
400000
5950000
5900000
N
Southern North Sea SAC
Humber Estuary
Lincs Coast Haile Sand Flat
Mablethorpe Town
Sutton-on-Sea
Moggs Eye
Anderby
Lincs Coast Chapel-St-Leonard 3.0 km O/S
Chapel St Leonards
Willoughby High Drain NVZ
Ingoldmells South
Ingoldmells Main Drain NVZ
Skegness
Gibraltar Point
Lincs Coast Outer Dogs Head 4.5 km O/S
Inner Dowsing, Race Bank and North Ridge SAC
Greater Wash SPA
North Norfolk Sandbanks and Saturn Reef SAC
The Wash
West Wash
North East Wash
South East Wash

Legend

- Array Area
- Offshore Export Cable Corridor
- Onshore Export Cable Corridor
- ORCP Search Area
- WFD Zone of Influence
- Bathing Water Sites
- Monitoring Stations/Points
- Nitrate Vulnerable Zone
- Shellfish Waters
- Special Area of Conservation
- Special Protection Area
- Ramsar Site



Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km

Scale: 1:400,000

Preliminary Environmental Information Report

Geographical Overview of Marine Protected Areas and WFD Waterbodies

Figure 8.1.4

OUTER DOWSING OFFSHORE WIND

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8.10 Scoping

Relevant Waterbodies

8.10.1 The status of those waterbodies which have been scoped into the WFD compliance assessment are presented in the following sections.

Coastal and Transitional Waterbodies

8.10.2 A detailed characterisation of the marine water quality baseline is provided in Volume 1, Chapter 8. The offshore ECC crosses the Lincolnshire coastal waterbody (ID: GB640402492000) (Figure 8.1.3). There are no other coastal or transitional waterbodies within the ZoI of the offshore ECC. A summary of relevant coastal and transitional waterbodies is presented in Table 8.1.3.

Table 8.1.3: Current status of scoped in coastal and transitional waterbodies

Waterbody Name	Lincolnshire
Waterbody ID	GB640402492000
Waterbody Type	Coastal
Distance from Project	0km (offshore ECC overlaps with waterbody)
Waterbody Surface Area	170.04km^2
Overall Current Status (2019)	Moderate
Current Ecological Status (2019)	Moderate (potential)
Current Chemical Status (2019)	Fail
Target	Moderate ecological status by 2015, Good chemical status by 2063
Parameters Currently Failing to Achieve Good (2019)	Angiosperms (Saltmarsh); Phytoplankton; Dissolved Inorganic Nitrogen; Mitigation Measures Assessment; Benzo(g-h-i)perylene; Mercury and Its Compounds; Polybrominated diphenyl ethers (PBDE)
Hydromorphological Designation	Heavily modified
Reasons for Heavily Modified Water Body (HMWB)	Flood protection
Lower Sensitivity Habitats	Cobbles, gravel and shingle (7.01km^2); Intertidal soft sediment (7.50k^2); Subtidal soft sediments (136.23km^2)
Higher Sensitivity Habitats	Chalk reef (35.60km^2); Saltmarsh (5.61km^2)
Phytoplankton Classification	Moderate
History of Harmful Algae	Not monitored

Biological Habitats

8.10.3 The proposed activities include the potential for sandwave clearance in the offshore ECC, and thus within the Lincolnshire coastal waterbody (although exact locations requiring sandwave clearance are currently unknown). The area where the offshore ECC intersects with the Lincolnshire coastal waterbody is estimated to be approximately 4.8km^2, which is approximately 2.8% of the waterbody's total area.

8.10.4 Within the offshore ECC, there are biogenic reefs formed from *Sabellaria spinulosa* (within the Inner Dowsing, Race Bank and North Ridge SAC). There are also saltmarsh habitats and chalk reefs in the vicinity of the offshore ECC (see Figure 8.1.5).

310000
320000
330000
5910000
5900000

N

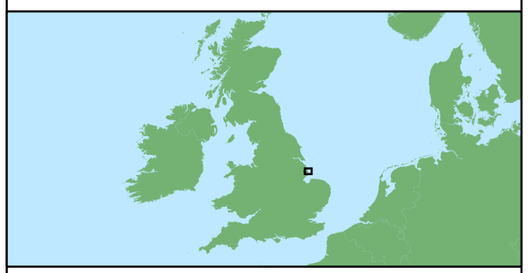
Will Row
Gayton le Marsh
Strubby
Withern
Maltby le Marsh
A1104
A157
A52
Sutton on Sea
Beesby
Hannah
A1111
Saleby
Thoresthorpe
Asserby Turn
Asserby
Ailby
Tothby
Alford
Bilsby
Huttoft
Anderby
Well
Mawthorpe
Bonthorpe
Cumberworth
Authorpe Row
Willoughby
Listoft
Hogsthorpe
Sloothby
Welton le Marsh
Habertoft
Boothby
Candlesby
A158
Orby
Bratoft
West End
Firsby
Irby in the Marsh
Skegness

Legend

- Offshore Export Cable Corridor
- Onshore Export Cable Corridor
- ORCP Search Area
- WFD Zone of Influence
- Lincolnshire Coastal Waterbody

WFD Habitats

- Chalk Reef (Higher Sensitivity)
- Polychaete Reef (Higher Sensitivity)
- Intertidal Soft Sediment (Lower Sensitivity)
- Subtidal Soft Sediment (Lower Sensitivity)



Coordinate System: WGS 1984 UTM Zone 31N

0 2.5 5 km

Scale: 1:85,000

Preliminary Environmental Information Report

Benthic Habitats within the Lincolnshire Coastal Waterbody

Figure 8.1.5

OUTER DOWSING OFFSHORE WIND

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Riverine Waterbodies

8.10.5 The list and status of relevant river waterbodies are presented in Table 8.1.4.

Table 8.1.4: Current status of scoped in riverine waterbodies in the Steeping and Eaus operational catchment

Name	Anderby Main Drain	Boygrift Drain	Cow Bank Drain	Ingoldsmell	Lymn/Steeping	Willoughby High Drain
ID	GB105029061730	GB105029061720	GB105030056442	GB105029061700	GB105030062430	GB105029061710
Type	River	River	River	River	River	River
Approx. distance from ODOW (km)	0 (the onshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)
Waterbody area (ha)	3528.734	2376.125	1376.34	2930.803	17029.521	6516.221
Overall current potential status	Good	Good	Good	Good	Good	Good
Current status (ecological)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Current status (chemical)	Fail	Fail	Fail	Fail	Fail	Fail
Driving ecological quality element	Phosphate; Mitigation Measures Assessment; Polybrominated diphenyl ethers (PBDE); Mercury and its compounds; Hydrological regime; Dissolved oxygen	Mitigation Measures Assessment; PBDE; Mercury and its compounds.	None given	Mitigation Measures Assessment; PBDE; Mercury and its compounds	Macrophytes and Phytobenthos combined; Dissolved oxygen; Fish; Mitigation Measures Assessment; Temperature; PBDE; Mercury and its compounds; Hydrological regime.	Mitigation Measures Assessment; Fish; PBDE; Mercury and its compounds.
Fish	Not assessed	Not assessed	Not assessed	Not assessed	Moderate	Poor

Name	Anderby Main Drain	Boygrift Drain	Cow Bank Drain	Ingoldsmell	Lymn/Steeping	Willoughby High Drain
Invertebrates	Good	High	Moderate	Good	High	Good
Macrophyte and phytobenthos	Not assessed	Not assessed	Macrophytes: Good Phytobenthos: Not assessed	Not assessed	Moderate	Macrophytes: Moderate Phytobenthos: Not assessed
Ammonia	High	High	Good	High	High	High
Dissolved oxygen	Good	Good	Bad	Good	Moderate	Poor
Phosphate	Good	High	Poor	Good	Good	High
Hydrological regime	Does not support good	High	Supports good	High	Does not support good	Supports good
Annex 8 chemicals	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
Priority hazardous substances	Fail	Fail	Fail	Fail	Fail	Fail

Table 8.5.5: Current status of scoped in riverine waterbodies in the Fens East and West and South Forty Foot Drain operational catchments

Name	East and West Fen Drain	Black Sluice IDB draining to the South Forty Foot Drain	Kirton Marsh Drain
ID	GB205030056405	GB205030051515	GB205031055545
Type	River	River	River
Approx. distance from ODOW (km)	0 (the onshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)
Waterbody area (ha)	37177.558	44722.132	1574.837
Overall current potential status	Good	Good	Good
Current status (ecological)	Bad	Moderate	Good
Current status (chemical)	Fail	Fail	Fail

Name	East and West Fen Drain	Black Sluice IDB draining to the South Forty Foot Drain	Kirton Marsh Drain
Driving ecological quality element	Perfluorooctane suphonate (PFOS); Fish; Mitigation Measure Asssessments; Polybrominated diphenyl ethers (PBDE); Mercury and its compounds; Hydrological regime	Phosphate; Dissolved Oxygen; Fish; Aldrin, Dieldrin, Endrin & Isodrin; Tributyltin Compounds; Mitigation Measures Assessment; Mercury and its compounds; PBDE.	PBDE; Mercury and its compounds; Invertebrates; Hydrological regime.
Fish	Bad	Poor	Not assessed
Invertebrates	Not assessed	Not assessed	Poor
Macrophyte and phytobenthos	Not assessed	Macrophytes: High Phytobenthos: Not assessed	Not assessed
Ammonia	Good	High	Not assessed
Dissolved oxygen	Good	Good	Not assessed
Phosphate	High	Moderate	Not assessed
Hydrological regime	Does not support good	Supports good	High
Annex 8 chemicals	Not assessed	Not assessed	Not assessed
Priority hazardous substances	Fail	Fail	Fail

Table 8.5.6: Current status of scoped in riverine waterbodies in the Glens and Welland Lower operational catchments

Name	Glen	Fosdyke Bridge Outfall Water Body	Risegate Eau Water Body	Whaplode River Water Body	Moulton River Water Body	Vernatt's Drain Water Body
ID	GB105031050720	GB205031055535	GB205031055525	GB205031055495	GB205031050755	GB205031050705
Type	River	River	River	River	River	River
Approx. distance from ODOW (km)	1.01	0 (the onshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)	0.7

Name	Glen	Fosdyke Bridge Outfall Water Body	Risegate Eau Water Body	Whaplode River Water Body	Moulton River Water Body	Vernatt's Drain Water Body
Waterbody area (ha)	5703.654	3545.622	3866.667	6876.18	2427.838	16071.445
Overall current potential status	Good	Good	Good	Good	Good	Good
Current status (ecological)	Moderate	Bad	Poor	Moderate	Moderate	Moderate
Current status (chemical)	Fail	Fail	Fail	Fail	Fail	Fail
Driving ecological quality element	Macrophyte and Phytobenthos combined; Fish; Mitigation Measures Assessment; PBDE; Mercury and its compounds; Dissolved Oxygen	Invertebrates; Phosphate; Ammonia (Phys-Chem); Polybrominated diphenyl ethers (PBDE); Mercury and its compounds; Hydrological regime; Temperature	Macrophytes and Phytobenthos Combined; Phosphate; Dissolved Oxygen; Invertebrates; Ammonia (Phys-Chem); Mercury and its compounds; Hydrological regime; Temperature; PBDE.	PBDE; Mercury and its compounds; Invertebrates; Phosphate; Dissolved oxygen; Ammonia (Phys-Chem)	Dissolved oxygen; PBDE; Mercury and its compounds; Ammonia (Phys-Chem)	PFOS; PBDE; Mercury and its compounds
Fish	Good	Not assessed	Not assessed	Not assessed	Not assessed	Good
Invertebrates	High	Bad	Poor	Bad	Not assessed	High
Macrophyte and Phytobenthos	Macrophytes: Moderate	High	Moderate	Macrophytes: Moderate	Not assessed	Macrophytes: Moderate

Name	Glen	Fosdyke Bridge Outfall Water Body	Risegate Eau Water Body	Whaplode River Water Body	Moulton River Water Body	Vernatt's Drain Water Body
	Phytobenthos: High			Phytobenthos: Not assessed		Phytobenthos: Not assessed
Ammonia	High	Moderate	Moderate	Moderate	Moderate	High
Dissolved oxygen	Moderate	Moderate	Moderate	Bad	Bad	Moderate
Phosphate	High	Poor	Poor	Bad	High	High
Hydrological regime	Not assessed	Does not support good	Does not support good	Supports good	High	Supports good
Annex 8 chemicals	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
Priority hazardous substances	Fail	Fail	Fail	Fail	Fail	Fail

Groundwater Waterbodies

8.10.6 The list and status of relevant groundwater bodies are presented in Table 8.1.5.

Table 8.1.5: Current status of scoped in groundwater waterbodies

Name	South Lincolnshire Chalk Unit	Spilsby Sandstone Unit
ID	GB40501G401600	GB40501G401700
Type	Groundwater Body	Groundwater Body
Distance from ODOW (km)	0 (the onshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)
Waterbody area (ha)	66133.36	8882.413
Overall current potential status	Poor	Poor
Groundwater quantitative status	Good	Poor
Groundwater chemical status	Poor	Good
Objective	Good	Good

Relevant Protected Areas

8.10.7 The current status of all the scoped-in Bathing Waters is presented below in Table 8.1.6. The offshore ECC ZoI overlaps with the Mablethorpe Town Bathing Water Sensitive Area, as designated under the Urban Waste Water Treatment Directive (Figure 8.1.4). Table 8.1.7 presents the designated features of the scoped-in SACs and SPAs (no Ramsar sites have been screened-in to further WFD assessment). There are no designated Shellfish Water Protected Areas within the ZoI for the Project, with the nearest being in The Wash.

Table 8.1.6: Bathing Water classification

Name	Classification				
	2022	2021	2019	2018	2017
Mablethorpe Town	Excellent	Excellent	Excellent	Excellent	Excellent
Sutton-on-Sea	Excellent	Excellent	Excellent	Excellent	Excellent
Moggs Eye	Excellent	Excellent	Excellent	Excellent	Excellent
Anderby	Excellent	Excellent	Excellent	Excellent	Excellent
Chapel St Leonards	Excellent	Excellent	Excellent	Excellent	Excellent
Ingoldmells South	Excellent	Excellent	Excellent	Excellent	Excellent
Skegness	Excellent	Excellent	Excellent	Excellent	Excellent

Data was not collected in 2020 due to COVID-19. The Anderby waterbody on located within the ECC boundaries, with the other waterbodies being located within the ZoI.

Table 8.1.7: Designated feature(s) of the identified SAC's and SPA's

Site	Designated feature(s)
Greater Wash SPA	▪ Red-throated diver *Gavia stellata* ▪ Little gull *Hydrocoloeus minutus* ▪ Common scoter *Melanitta nigra* ▪ Sandwich tern Sterna *sandvicencis* ▪ Little tern *Sternula albifrons* ▪ Common tern Sterna *hirundo*
Inner Dowsing, Race Bank and North Ridge SAC	▪ Annex 1 Reefs *Sabellaria spinulosa* ▪ Sandbanks which are slightly covered by sea water all the time
North Norfolk Sandbanks and Saturn Reef SAC	▪ Annex 1 Reefs *S. spinulosa* ▪ Sandbanks which are slightly covered by sea water all the time
Southern North Sea SAC	▪ Harbour porpoise *Phocoena phocoena*

Marine Waterbodies Scoping

8.10.8 Table 8.1.8 details the scoping assessment for the identified transitional and coastal WFD waterbodies. The scoping assessment has been undertaken on the basis of no additional measures (i.e., excluding those which are inherent or embedded into the Project) being applied.

Table 8.1.8: Scoping assessment of marine (transitional and coastal) waterbodies

Consideration of the activities	Key risk issues and justification	Scoped into assessment?
Hydromorphology		
Could impact on the Hydromorphology (for example morphology or tidal patterns) of a waterbody at high status	The Lincolnshire coastal waterbody is not currently at high status for hydromorphology.	No
Could significantly impact the Hydromorphology of any waterbody	Physical structures associated with the Project that have the potential to influence the hydromorphology of the Lincolnshire coastal waterbody include rock berms. These rock berms may be utilised to provide additional protection to the export cable beyond the protection offered by cable burial alone.	Yes
Waterbody is heavily modified for the same use as the proposed activity	The Lincolnshire coastal waterbody is classed as heavily modified for 'flood protection'. The proposed development activities should be considered for this waterbody as they are not covered by the existing hydromorphology designation for 'flood protection'. Mitigation measures for the Lincolnshire coastal waterbody will need to be taken into account to ensure the Project does not compromise the improvement in status of this waterbody.	Yes
Biology - habitats		
0.5 km^2 or greater	The footprint of the PEIR boundary within the Lincolnshire coastal waterbody (e.g., the area where the ZoI and Lincolnshire coastal waterbody intersect) is 4.8km^2 and is therefore above the 0.5km^2 threshold. The offshore ECC will be installed via trenchless techniques, therefore no direct interactions with habitats will occur out with the cable installation area.	Yes
1% or more of the waterbody's area	The footprint of the works within the Lincolnshire coastal waterbody totals 2.8%, so above the 1% threshold. The offshore ECC will be installed via trenchless techniques, therefore no direct interactions with habitats will occur out with the cable installation area.	Yes

Consideration of the activities	Key risk issues and justification	Scoped into assessment?
Within 500 m of any higher sensitivity habitat	Based on available data from MAGIC interactive map[5], the offshore ECC will traverse chalk reef habitat along the coastline between Trusthorpe and Chapel St Leonards.	Yes
1% or more of any lower sensitivity habitat	The footprint of the works within the Lincolnshire coastal waterbody is approximately 4.8km^{2,} 7.2% of the lower sensitivity habitat area within the Lincolnshire coastal waterbody. The offshore ECC will traverse an area of subtidal soft sediment, which is deemed a lower sensitivity habitat for WFD assessment purposes.	
Biology – fish		
Is in an estuary and could affect fish in the estuary, could delay or prevent fish entering it, or could affect fish migrating through the estuary	The activities associated with the offshore export cables for the Project will not take place where there is an estuary within the ZoI. Therefore, it is highly unlikely proposed works will prevent fish entering or affect fish migrating through an estuary. This is further supported by Volume 1, Chapter 10, which concluded that no significant impacts on fish populations (including migratory populations) were predicted as a result of the Project activities.	No
Could impact on sensitive species and normal fish behaviour and movement/ migration/ spawning or impact on species composition/ abundance/ population age structure	The proposed activities for the Project will not cause a physical barrier to prevent fish from entering the estuaries and their migration patterns. The presence of the export cable buried in the seabed will not affect current speeds, and at worst, will result in a minor reduction in terms of total water depth at cable crossings. Therefore, changes to water depth and changes in current are not considered to be significant and are not considered to impact on the normal fish behaviour, such as, movement, migration, and spawning. Volume 1, Chapter 10 presents the full details of noise modelling undertaken to determine the potential impacts of noise and vibration on fish receptors as a result of the proposed activities. No significant impacts were predicted on fish species and given the distance from the array from relevant waterbodies, there are no measurable impacts anticipated for fish species within the waterbodies. The proposed activities are not expected to cause a reduction in the dissolved oxygen in the water column. Therefore, the potential for chemical changes and the implications on fish species was not taken forward for further consideration. The consideration of impacts resulting from EMF production is presented	No

[5] https://magic.defra.gov.uk/MagicMap.aspx

Consideration of the activities	Key risk issues and justification	Scoped into assessment?
	in Volume 1, Chapter 10, which concluded there are no significant impacts predicted. As such, EMF was not taken forward for further consideration. No significant impacts are predicted on ecology resources for fish and shellfish, shown in Volume 1, Chapter 10.	
Could cause entrainment or impingement of fish, resulting in injury or death	No entrainment or impingement will occur as a result of the proposed Project activities.	No
Water quality		
Could affect water clarity, temperature, salinity, oxygen levels, nutrients, or microbial patterns	It is not anticipated that temperature or salinity would be affected as a result of export cable installation activities and, therefore, these parameters have been excluded from further assessment. The resuspension of sediments into the water column would result in short-term increases in suspended sediment concentration (SSC), resulting from construction activities such as sandwave clearance and cable installation. The methods used for cable installation would affect the amount of sediment disturbed, but impacts are considered to be localised, short-lived, and high SSC levels would disperse to background levels out with the footprint of the activity. The Project has committed to the punch out site for cable installation being outwith the intertidal zone. However, given the landfall is within the Lincolnshire coastal water body and the Mablethorpe Town Bathing Water Sensitive Area, the potential decrease in clarity and changes in microbial patterns are proposed to be scoped in for further consideration. This includes the potential release of bentonite (from trenchless techniques), which can also impact water clarity.	Yes
Is in a waterbody with a phytoplankton status of moderate, poor or bad	The Lincolnshire coastal waterbody has a phytoplankton classification of moderate, so will be taken forward for further assessment.	Yes
Release or use of chemicals which are on the EQSD list	The proposed activities do not include the direct discharge of any chemicals listed under the EQSD list. The only chemical which may be released into the environment as a result of the Project's proposed activities is bentonite (from trenchless techniques used for cable installation). Bentonite is a non-toxic, inert, natural clay mineral (<63µm diameter particle), and is not included on the EQSD list. It is included on the List of Notified	No

Consideration of the activities	Key risk issues and justification	Scoped into assessment?
	Chemicals approved for use and discharge into the marine environment, and is classed as a Group E substance under the Offshore Chemical Notification Scheme (OCNS). Substances assigned to Group E under the OCNS are defined as the least likely to cause environmental harm and are 'readily biodegradable and is non-bioaccumulative'. This is also supported by the inclusion of bentonite on the Oslo and Paris Conventions (OSPAR) List of Substances Used and Discharged Offshore which Are Considered to Pose Little or No Risk to the Environment (PLONOR) (OSPAR Commission, 2021). While bentonite is the only substance which may be released as part of the Project's proposed activities, there is potential for accidental spills and pollution events of other substances (such as fuel oil). In agreement with the Scoping Opinion, the Applicant proposes to exclude the potential for accidental spills and pollution events from further assessment.	
Disturbance of sediment with contaminants above Cefas Action Level 1	The composition and grain size of sediments within the ECC is generally sand dominated, with areas closer to coast corresponding to increased gravel and fines. The Project's site-specific surveys did identify sediment bound contaminants present in levels above their respective Cefas Guideline Action Level 1 (arsenic, chromium, nickel, and selected polycyclic aromatic hydrocarbons) in the vicinity of the Lincolnshire coastal waterbody. No sediment samples were taken within the limits of the Lincolnshire coastal waterbody, so the potential for disturbance of contaminated sediments has been scoped in.	Yes
If your activity has a mixing zone (like a discharge pipeline or outfall) consider if the chemicals released are on the EQSD list.	The proposed development does not have discharge pipe or outfall, and does not intend to release substances on the EQSD list. Hence, this parameter is not relevant for the Project.	No
WFD Protected Areas		
Any WFD protected area within the ZoI?	The following WFD protected areas have been identified within the Project ZoI: Bathing Waters: ▪ Mablethorpe Town; ▪ Sutton-on-Sea;	Yes

Consideration of the activities	Key risk issues and justification	Scoped into assessment?
	▪ Moggs Eye; ▪ Anderby; ▪ Chapel St Leonards; ▪ Ingoldmells South; and ▪ Skegness. Site within the National Site Network: ▪ Greater Wash SPA; ▪ North Norfolk Sandbanks and Saturn Reef SAC; ▪ Inner Dowsing, Race Bank and North Ridge SAC; and ▪ Southern North Sea SAC. NVZs: ▪ Ingoldmells Main Drain NVZ; and ▪ Willoughby High Drain NVZ.	
INNS		
Potential to introduce or spread INNS	It is likely that any man-made structures placed on the seabed will be colonised by a range of marine species. These structures have the potential to act as artificial reefs and could assist in spreading non-native species that are already present (but would not act as a vector for INNS in and of themselves). The vast majority of these structures will be located within the Project array area, so are not relevant for this assessment. Both construction and O&M vessels have the potential to introduce or spread INNS, through the discharge of ballast water. The potential impacts will be mitigated through in-built measures such as the Project Environmental Management Plan (PEMP), and compliance with the International Management Organisation (IMO) ballast water management guidelines. In addition, the materials and vessels are highly likely to be from within European/UK waters. There is currently little evidence from other UK offshore wind developments to suggest adverse effects on key species and habitats from INNS.	Yes

Freshwater Waterbodies Scoping

8.10.9 The scoping assessment for the identified freshwater (riverine) WFD waterbodies and non-reportable watercourses is provided in Table 8.1.9. The scoping assessment has been undertaken on the basis of no additional measures (i.e., excluding those which are inherent or embedded into the project) being applied.

Table 8.1.9: Scoping assessment of freshwater waterbodies and non-reportable watercourses

Receptor	Key risk issues and justification	Scoped into assessment?
Physical habitat	No alteration to the morphology or the hydromorphology of any of the rivers is anticipated due to the proposed activities. It is proposed that major watercourse crossings will be undertaken using trenchless techniques. The onshore ECC crosses main rivers, ordinary watercourses and drainage ditches along its route. At any watercourse crossing there will be potential for the construction works associated with the crossing to change surface water runoff patterns which could affect flood risk through altering existing hydrological regime.	Yes – impact assessment for non-trenchless crossing of watercourses only.
Water quality	There is no intention to knowingly release any chemicals listed in the EQSD into the environment during construction, operation or decommissioning of the Project. In line with the Scoping Opinion, the impact of accidental spillages and leakages of oils, fuel and other polluting substances which could potentially enter the water environment have been scoped out. The Applicant has considered impacts on water quality associated with generation of turbid runoff which could enter the water environment during works. As detailed within Volume 1, Chapter 24, appropriate embedded measures are proposed to store soil to prevent it being leached into watercourses which could result in turbid run-off into the rivers. The CoCP (to be submitted at DCO Application) also includes measures to control runoff from the construction works. This could include, for example, sediment fences when working in proximity to open watercourses, containment of storage areas and treatment of any runoff from work areas or water from dewatering of trenches. Such measures would prevent the potential reduction in water quality associated with increased sediment loading affecting nearby tidal waters, fluvial watercourses or drainage ditches during cable route construction works, especially during excavations or earthwork activities. Stockpiling of materials (including topsoil) during earthworks would be temporary and would only be permitted in designated areas. All designated stockpile areas would be a	Yes – impact assessment for generation of turbid runoff entering watercourses only.

Receptor	Key risk issues and justification	Scoped into assessment?
	minimum of 10 m from any open watercourse features. The potential for contaminants contained within the stockpiled materials to be leached into water bodies, resulting in a reduction in the quality of the receiving waters, would be reduced through the implementation of embedded mitigation. A CoCP will be submitted with the DCO application and will include a flood response plan to ensure that procedures are in place in the event of flooding during the construction phase. Through measures such as the ceasing of works, relocation or securing of materials and evacuation of workforce personnel the CoCP will reduce the likelihood of construction activities resulting in incidents detrimental to water quality occurring in the event of flooding and reduce the magnitude of the impact of any such incidents. No source-receptor-pathways, as a result of the proposed activities, have been identified which would result in a change to the nutrient (or dissolved oxygen levels) in the rivers.	
Fish and eels	*Trenchless crossings* During the crossing of watercourses using trenchless methods, during the laying of the onshore cables, there is the potential the drilling noise and vibration to create a temporary barrier effect. *Trenched crossings* For trenched crossings the potential effect on fish (and other biota) is the potential in the alteration of habitat associated with changes in hydromorphology and/ or water quality. The main potential effect habitats from water quality would be specifically related to the mobilisation of sediments from cable crossings and short-term soil stockpiling adjacent to the watercourses. This could result in a short-term pulse of sediments downstream, which could in turn harm the habitats of fish, macrophytes and phytobenthos, and invertebrates. As noted above, there will be sufficient controls detailed within the CoCP to be submitted with the DCO application to control runoff of sediments from the construction works. Therefore, the potential for this effect has been suitably mitigated to ensure that fish (and their habitats) would not be affected by a trenching crossing solution.	Yes – noise and vibration associated with trenchless crossings only
Macrophytes, diatoms and invertebrates	As noted above, no deterioration in water clarity, dissolved oxygen or nutrients are anticipated as a result of the proposed activities. Therefore, no source-receptor-pathway has been	No – impact assessment not required

Receptor	Key risk issues and justification	Scoped into assessment?
	identified which would result in a deterioration of plant life within the rivers. Consideration of indirect impacts on macrophytes, diatoms and invertebrates as a result of changes in hydromorphology and water quality are provided in Sections 8.11.49 and 8.11.52 respectively.	
Any WFD protected areas within the ZoI?	The following have been identified within the onshore ZoI: ▪ Ingoldmells Main Drain NVZ Willoughby High Drain NVZ	Yes
INNS	During all phases of the Project, there is the potential for the introduction and spread of INNS. The results of pre-construction surveys would inform the need for any mitigation measures. Stands of invasive non-native species, whether existing or identified during pre-construction surveys, will be avoided wherever possible. If avoidance is not possible a detailed mitigation plan will be produced and agreed as part of the CEMP to ensure compliance with the relevant legislation. Therefore, no significant effects are predicted in respect of invasive non-native species. The introduction/spread of INNS is not expected to pose a risk of deterioration of the WFD waterbodies or non-reportable watercourses.	No – impact assessment not required

Groundwater Scoping

8.10.10 The scoping assessment for the identified groundwater WFD is provided in Table 8.1.10. The scoping assessment has been undertaken on the basis of no additional measures (i.e., excluding those which are inherent or embedded into the project) being applied.

Table 8.1.10: Scoping assessment of groundwater WFD waterbodies

Consideration of the activities	Key risk issues and justification	Scoped into assessment?
Will the activities lead to the creation of pathways for ingress of contaminants?	During the construction phase of the project, techniques for cable laying have the potential to create pathways for ingress of contaminants into the groundwater bodies through cross contamination between shallow and deep aquifers, as well as exposure to pollutants in construction materials. No proposed activities during O&M or the decommissioning phases have been identified which could result in ingress of contaminants.	Yes – construction activities only

Consideration of the activities	Key risk issues and justification	Scoped into assessment?
Will the activity change groundwater levels, affecting Groundwater Dependent Terrestrial Ecosystems (s) or dependent surface water features?	The small-scale nature of the construction works in relation to the overall size of the water bodies means there is little potential for impact on groundwater levels. In addition, as noted in Volume 1, Chapter 24, there are no hydrologically designated sites within the hydrology, hydrogeology and flood risk study area. Watercourses designated for their ecological interest are identified in Volume 1, Chapter 21.	No
Will the activity lead to saline intrusion?	There is the potential for the use of trenchless techniques at landfall to result in saline intrusion within the groundwater. However, based on the geology (as presented in Volume 1, Chapter 23) the likelihood of a material potential impact is considered to be minimal as a result of the generally shallow profile of trenchless techniques to be adopted and the risk being localized and small.	No
Will the level of proposed groundwater abstraction (dewatering) exceed recharge at a water body scale?	The only extraction will be dewatering from the cable trench, which is likely to be re-infiltrated to groundwater. Therefore, no impacts on groundwater quantity will occur.	No
Will the activity lead to an additional surface water body that will become non-compliant and lead to failure of the Dependent Surface Water test?	No additional surface water bodies will be created as a result of the Project.	No
Will the activity result in additional abstraction that will exceed any groundwater body scale headroom between the fully licensed quantity and the limit imposed by the total recharge?	The only abstraction likely to occur will be dewatering from the cable trench, which is likely to be re-infiltrated to the groundwater. Therefore, no impacts on groundwater quantity will occur.	No

Cumulative Effects

8.10.11 For each of the scoped in receptors presented within this WFD compliance assessment, cumulative aspects have been considered in alignment with the cumulative effects assessment methodology, as described in Volume 2, Appendix 5.1: Offshore Cumulative Impact Assessment and Volume 2, Appendix 5.2 Onshore Cumulative Impact Assessment).

8.10.12 The PEIR process has identified potential projects, plans, and activities over wide distances. This ensures that potential wider impacts from the Project's activities on sensitive receptors were captured. However, this WFD compliance assessment has focused on potential cumulative effects at the waterbody scale, specifically assessing the same surface and groundwater waterbodies which were mentioned in previous sections.

8.10.13 The following projects, plans, and activities have been identified as relevant to the WFD waterbodies screened for the Project, presented below in Table 8.1.11 and Figure 8.1.6.

Table 8.1.11: Projects and activities considered for cumulative effects within the WFD compliance assessment

Development Type	Project/ Activity
Offshore Windfarms and Export Cables/ Pipelines	Race Bank
	Lynn
	Inner Dowsing
	Lincs
	Triton Knoll
	Sheringham Shoal Extension
	Dudgeon Extension
	Dudgeon
	Race Bank OFTO
	Lincs OFTO
	Hornsea 1 OFTO
	Hornsea Project 2 OFTO
Pipeline	Malory to Galahad Tee Gas Export
	Gas Barque PB to Clipper PT
	Excalibur to Lancelot Tee Gas Export
	Esmond to Bacton Gas Export Line
	Gas Barque PL to Clipper PM
	Meg Clipper PM to Barque PL
	Newsham to West Sole Gas Line
	West sole to Easington Gas Line
	Seven Seas to Newsham Gas Export
	Lancelot to Bacton Gas Export
	Hyde to West Sole Bravo Gas Line
	Babbage export top West Sole
	Waveney to Lancelot Gas Line
	Meg Clipper PR to Carrack QA
	Gas Export Carrack QA to Clipper PR
	Gas Clipper PT to Bacton
	Glycol Bacton to Clipper PT
Aggregate Production and Disposal Areas	Outer Dowsing Westminster Gravels (515/1)
	Outer Dowsing Westminster Gravel (515/2)
	Inner Dowsing Tarmac Marine Ltd (481/1)
	Inner Dowsing Tarmac Marine Ltd (481/2)
	Humber Estuary Hanson Aggregates Marine Ltd (106/1)

Development Type	Project/ Activity
	Humber Estuary Hanson Aggregates Marine Ltd (106/2)
	Humber Estuary Marine Aggregates Marine Ltd (106/3)
	Humber Estuary Hanson Aggregates Marine Ltd (400)
	Off Saltfleet Tarmac Marine Ltd (197)
	Humber Overfalls Tarmac Marine Ltd (493)
	Hanson Aggregates Marine Ltd (1805)
	Race Bank OWF Disposal Area
	Hornsea 1 Disposal Area
Oil and Gas	Galahad Tee (pipe junction)
	Galahad (platform)
	Malory (platform)
	Barque PB (platform)
	Excaliber EA (platform)
	Barque PL (platform)
	West Sole A (6 leg) (platform)
	West Sole A (8 leg) (platform)
	West Sole A PP (platform)
	West Sole A SP (platform)
	Amethyst B1D (platform)
	Seven Seas VCS (manifold)
	Lancelot A (platform)
	West Sole B (platform)
	Waveney StepOutTee (pipe junction)
	Clipper PH (platform)
	Clipper PW (platform)
	Clipper PT (platform)
	Clipper PC (platform)
	West Sole C (platform)
	Clipper PR (platform)
	Clipper PM (platform)
	Waveney
	Pickerill B (platform)
	Pickerill A (platform)
	Guinevere A (platform)
	Theddlethorpe Gas Terminal
Onshore Planning Applications	Outline application for the demolition of existing bungalow and erection of up to 6 no. residential dwellings, with all matters reserved (B/18/0227)
	Outline application for 46 residential dwellings and associated works with all matters reserved for later approval (B/20/0488)
	Proposed residential development of 20 affordable dwellings and associated works (B/20/0489)
	Approval of reserved matters (Access, appearance, landscaping, layout and scale) following outline approval of residential development of up to 42 dwellings (B/21/0196)

Development Type	Project/ Activity
	Outline Application with all Matters (Access, Appearance, Landscaping, Layout and Scale) reserved for later approval for a proposed residential development of 9no. self-build/custom-build homes and 2no. Almshouses (Resubmission of B/20/0295) (B/21/0419)
	Proposed construction and operation of a solar photovoltaic farm, battery storage and associated infrastructure, including inverters, batteries, substation compound, security cameras, fencing, access tracks and landscaping (B/21/0443)
	Detailed particulars relating to the erection of 89no. Dwellings, erection of a pumping station, construction of a vehicular access and construction of internal roads (Outline planning permission ref no. N/084/0809/19, granted 13th September 2019). (N/084/01712/22)
	102MWe gross (80MWe exportable) energy from waste facility with light weight aggregates facility, wharf, waste reception and storage facility and grid connection. (Boston Alternative Energy Facility (BAEF))
	The Proposed Development will comprise the construction, operation and decommissioning of a solar photovoltaic (PV) electricity generating facility exceeding 50-megawatt (MW) output capacity, together with associated energy storage. The installed capacity of the solar generation is expected to be in the order of 500MW. (Heckington Fen Solar Park)
	250MW Solar Farm, accompanied by 400MWh Battery Energy Storage System (Temple Oaks Renewable Energy Park)
	Construction of a temporary 49.9MW solar farm, to include the erection of ground mounted solar panels with transformers to the maximum height of 2.46 metres, a 132KV substation, a DNO control room, a customer substation, GRP communications cabin, erection of security fencing and provision of landscaping and other associated infrastructure. (Low Farm Solar Farm)

350000

400000

5950000

5900000

N

WEST SOLE TO EASINGTON 24IN GAS LINE

WEST SOLE TO EASINGTON 16IN GAS LINE

HYDE TO WEST SOLE BRAVO

BABBAGE EXPORT

NEWSHAM TO WEST SOLE

'SEVEN SEAS' - NEWSHAM GAS EXPORT

Hornsea Disposal Area 1

Hornsea 1 OFTO

Hornsea Project 2 OFTO

34 INCH GAS SHEARWATER - BACTON SEAL LINE

MALORY TO GALAHAD TEE

16" GAS BARQUE PB - CLIPPER PT

2" MEG CLIPPER PM - BARQUE PL

14" GAS BARQUE PL - CLIPPER PM

4" MEG CLIPPER PR TO CARRACK QA

20" GAS EXPORT CARRACK QA TO CLIPPER PR

ESMOND TO BACTON

EXCALIBUR TO LANCELOT TEE

WAVENEY TO LANCELOT

24" GAS CLIPPER PT - BACTON

Triton Knoll

Triton Knoll

493

106/1

106/2

197

106/3

400

515/2

515/1

1805

481/2

481/1

Race Bank OFTO

Race Bank

Race Bank OWF Disposal Area

Dudgeon Extension

Dudgeon

Dudgeon Extension

Inner Dowsing

Lincs

Lynn

Lincs OFTO

Sheringham Shoal

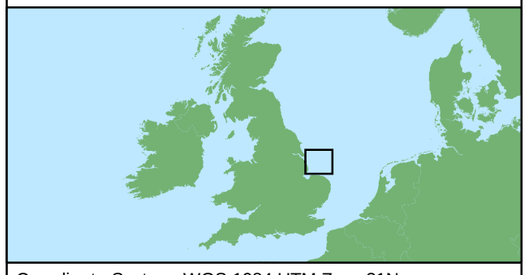
Sheringham Shoal

LANCELOT TO BACTON

3.5" GLYCOL BACTON - CLIPPER PT

Legend

- Array Area
- Offshore Export Cable Corridor
- ORCP Search Area
- WFD Zone of Influence
- Offshore Wind Farm Sites
- Offshore Wind Farm Cable Agreements
- Aggregate Area
- Provisional Aggregates Area (2103)
- Open Disposal Area
- Viking Link Interconnector
- Telecom Cables
- Subsea Pipeline



Coordinate System: WGS 1984 UTM Zone 31N

0 10 20 km

Scale: 1:350,000

Preliminary Environmental Information Report

Location of Cumulative Projects relative to the WFD Study Area

Figure 8.1.6

OUTER DOWSING OFFSHORE WIND

Date: 19/04/2023
Produced By: BPHB
Revision: 0.1

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Document Path: G:\GIS\GIS_Projects\0152 Outer Dowsing EIA\GIS\Figures\PEIR\WFD\ODOW_0152_WFD_Fig8.1.6_Cumulative_Projects.mxd

Scoping Conclusions

8.10.14 The conclusions from the Project's WFD scoping stage are presented in Table 8.1.12.

Table 8.1.12: WFD compliance assessment scoping conclusions

Waterbody/ Protected Area	Receptor	Potential Risk to Receptors?	Potential Impact Scoped In?
Protected Area(s)			
Bathing Waters: ▪ Mablethorpe Town; ▪ Sutton-on-Sea; ▪ Moggs Eye; ▪ Anderby; ▪ Chapel St Leonards; ▪ Ingoldmells South; and ▪ Skegness. Sensitive Areas: ▪ Mablethorpe Town Bathing Water Sensitive Area NVZs: ▪ Ingoldmells Main Drain NVZ; and ▪ Willoughby High Drain NVZ National Site Network sites: ▪ Greater Wash SPA; ▪ North Norfolk Sandbanks and Saturn Reef SAC ▪ Inner Dowsing, Race Bank and North Ridge SAC; and ▪ Southern North Sea SAC		N/A	Yes
Marine			
▪ Lincolnshire coastal waterbody	Hydromorphology	Yes- considered in Table 8.1.8.	Yes
	Biology – habitats	Yes- considered in Table 8.1.8.	Yes
	Biology – fish	Yes- considered in Table 8.1.8.	No
	Water quality	Yes- considered in Table 8.1.8.	Yes
	WFD Protected Areas	Yes- considered in Table 8.1.8	Yes
	INNS	Yes- considered in Table 8.1.8.	Yes
Freshwater			
	Physical habitat	Yes – considered in Table 8.1.9.	Yes

Waterbody/ Protected Area	Receptor	Potential Risk to Receptors?	Potential Impact Scoped In?
▪ Anderby Main Drain ▪ Boygrift Drain ▪ Cow Bank Drain ▪ Ingoldsmell ▪ Lymn/Steeping ▪ Willoughby High Drain ▪ East and West Fen Drain ▪ Black Sluice IDB draining to the South Forty Foot Drain ▪ Kirton Marsh Drain ▪ Glen ▪ Fosdyke Bridge Outfall Water Body ▪ Risegate Eau Water Body ▪ Whaplode River Water Body ▪ Moulton River Water Body ▪ Ingoldmells Main Drain NVZ ▪ Willoughby High Drain NVZ	Water quality	Yes – considered in Table 8.1.9.	Yes - generation of turbid runoff entering watercourses only.
	Fish and eels	Yes – considered in Table 8.1.9.	Yes – noise and vibration associated with trenchless crossings only
	Macrophytes, diatoms and invertebrates	Yes – considered in Table 8.1.9.	No
	INNS	Yes – considered in Table 8.1.9.	No
Groundwater			
▪ South Lincolnshire Chalk Unit ▪ Spilsby Sandstone Unit	Creation of pathways	Yes – considered in Table 8.1.9.	Yes – construction activities only
	Groundwater Dependent Terrestrial Ecosystems (s) or dependent surface water features	Yes – considered in Table 8.1.9.	No
	Saline intrusion	Yes – considered in Table 8.1.9.	No

Waterbody/ Protected Area	Receptor	Potential Risk to Receptors?	Potential Impact Scoped In?
	Groundwater abstraction (dewatering) exceed recharge	Yes – considered in Table 8.1.9.	No
	Non-compliant and lead to failure of the Dependent Surface Water test	Yes – considered in Table 8.1.9.	No

8.11 Impact Assessment

Marine Elements

Hydromorphology

8.11.1 The offshore ECC intersects with the Lincolnshire coastal waterbody, with no other transitional or coastal waterbodies within the ZoI of the proposed activities. Physical structures associated with the Project that have the potential to influence the hydromorphology of the Lincolnshire coastal waterbody may include mattresses or rock berms. These structures may be deployed if the protection afforded by cable burial is insufficient, with further details provided in Volume 1, Chapter 3.

8.11.2 The installation of any cable protection measures will have the potential to result in localised blockage of waves, tides and sediment transport. Theoretically, cable installation in shallow water should behave similarly to a submerged offshore breakwater, affecting wave transformation process in the nearshore area. Therefore, this has the potential to alter the wave approach to the shore, resulting in the wave focussing on coastal areas, causing beach lowering. The artificial structures themselves could also locally intercept the sediment being transported by wave and tidal currents. It can be reasonably expected that there will be some localised change to waves and hydrodynamics immediately within the vicinity of any structures, the potential for wider morphological change to the coastline and landfall is likely limited.

8.11.3 The protection measures of the (up to) four export cables which may influence the hydromorphology within the Lincolnshire coastal waterbody includes:

- Concrete mattressing; and
- Rock berms: crest height of 3m, crest width of 2m, side slopes 1:3 gradient and total width of 22m (including 1m buffer on either side).

8.11.4 It should be noted that the Applicant has committed to a subtidal punchout and to not install any cable protection within 350m seaward of MLWS, beyond this cable protection may be used, although cable burial remains preferable.

8.11.5 An assessment of the potential impacts upon the hydromorphology resulting from the presence of cable protection structures is presented in Volume 1, Chapter 7. The presence of cable protection is unlikely to affect the hydromorphology long-term. After the initial installation, sediment accumulation would occur, forming a wedge that the sediment could then flow freely over. Once this wedge has formed, and void spaces in the cable protection have been infilled, existing sediment transport processes will remain unaffected.

8.11.6 The exact location of cable protection is currently unknown, but it is likely where rock berms are required, they will be oriented perpendicular to the shore. This alignment would allow for the waves to pass more seamlessly over the berms. Although it can be reasonably expected that there will be some localised changes to waves and hydrodynamics in the immediate vicinity to the cable protection, the potential for wider morphological change is expected to be limited. This probable orientation of the rock-berms could potentially intercept the longshore movement of the sediment. However, a regular re-working by waves at lower tidal times is likely to mean this material will be rapidly dispersed, and pass over any cable installation. Therefore, the degree to which the rock berms will physically block the movement of sediment is expected to be very limited.

8.11.7 The PEIR concluded that there would be minor adverse (at worst) effects upon the hydromorphology resulting from the installation of export cable protection, shown in Volume 1, Chapter 7. In accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, and the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended), this is considered to be not significant. No changes to hydromorphology are anticipated through the O&M phase.

8.11.8 The Lincolnshire coastal waterbody is currently designated as a Heavily Modified Water Body (HMWB) for 'flood protection'. Based on the proposed Project design, the development activities could be considered as a new modification to the Lincolnshire coastal waterbody as they are not covered under the existing hydromorphological designation. It is noted that the 'Mitigation Measures Assessment' for the Lincolnshire coastal waterbody is currently (2019) at 'moderate or less' status; however, it is considered unlikely that the proposed works will compromise any existing mitigation measures working towards the achievement of good ecological potential.

8.11.9 Decommissioning activities may involve the removal of cable protection (such as rock berms) from shallow areas, although a commitment has been made not to install rock cable protection within 350m seaward of the MLWS mark. However, if rock berms are installed in shallow subtidal areas, removal would not be anticipated to result in widespread morphological changes. This is because the presence of the cable protection is not anticipated to result in widespread changes to the coastline in the first instance. It is anticipated that the working areas for removal will be restricted to the area used for installation; accordingly, any change would be no greater in magnitude than that of the construction phase (shown in Volume 1, Chapter 7).

8.11.10 Overall, there is not predicted to be a deterioration in the hydromorphology status of the Lincolnshire coastal waterbody. The proposed development is therefore considered to be compliant with the WFD and thus would not result in a deterioration of the current status of the Lincolnshire coastal waterbody, nor prevent the waterbody for achieving future objectives under the WFD.

Biological Habitats

8.11.11 The Project's offshore ECC transects the Lincolnshire coastal waterbody (Figure 8.1.3). As identified in Figure 8.1.5, there is one Higher Sensitivity habitat within the Lincolnshire coastal waterbody which will be within 500m of the proposed works. This habitat is characterised as Chalk reef, described in Volume 1, Chapter 9. The Lower Sensitivity habitats present within the Lincolnshire coastal waterbody include Intertidal soft sediment, Subtidal soft sediments and Gravel and cobbles.

8.11.12 Works associated with export cable installation within the Lincolnshire coastal waterbody includes seabed preparation and cable installation (likely to be trenchless techniques at landfall). O&M activities may also be conducted and allow for re-burial of export cables. Further details are provided in Volume 1, Chapter 3. Potential impacts to biological habitats include direct disturbance, damage or loss, as well as indirect effects from the increase in suspended sediment concentration (can cause smothering).

8.11.13 The activities associated with export cable installation may result in the temporary habitat loss/disturbance of up to 4.8km^2 within the Lincolnshire coastal waterbody during construction. This is equivalent to 2.8% of the total area of the Lincolnshire coastal waterbody.

8.11.14 A characterisation of the benthic and subtidal habitats which may be directly or indirectly impacted by the Project is provided in Volume 1, Chapter 9. With respect to installation activities, it is concluded that both flora and fauna populations will re-colonise and recover from recovering and/or un-impacted communities in adjacent habitats (in accordance with the Marine Evidence based Sensitivity Assessment (MarESA) assessments). The EIA concluded that there would be no significant adverse effects on benthic receptors from habitat disturbance due to activities associated with the proposed development.

8.11.15 The subtidal benthic habitats identified within the Project's PEIR boundary and wider region have been demonstrated to be common and widespread (Volume 1, Chapter 9). With respect to the Higher Sensitivity habitat (chalk reef), this was not recorded during the site-specific investigations. Therefore, a plan will be agreed with Natural England to determine and implement appropriate mitigation measures. Further, the fauna present in the Lincolnshire coastal waterbody is exposed to naturally high sediment movement, which infers an adaption to increased SSC and turbidity, and deposition events will be of a level comparable to those experienced during offshore cable installation.

8.11.16 The sensitivity of all biotopes that are present in the study area were assessed in accordance with the detailed MarESA sensitivity assessments (presented in Volume 1, Chapter 9). This assessment determined that all biotopes have a low to medium sensitivity to disturbance likely resulting from the Projects activities. None of the biotopes presented were noted as geographically restricted. As detailed within the baseline characterisation, comparable habitats are distributed within the wider region and North Sea. Therefore, given the relatively small spatial scales for the temporary habitat disturbance, the loss is not expected to undermine regional ecosystem functions or diminish biodiversity.

8.11.17 The impacts on benthic habitats is predicted to be localised, and of short temporal duration (as it is limited to the period of construction, O&M, and decommissioning), and is intermittent.

8.11.18 Overall, there is not predicted to be a deterioration in the ecological status of the Lincolnshire coastal waterbody in relation to benthic habitats. The proposed development is therefore considered to be compliant with the WFD and thus would not result in a deterioration of the current status of the Lincolnshire coastal waterbody, nor prevent the waterbody from achieving future objectives under the WFD.

Biology - Fish

8.11.19 This marine element was scoped out from further assessment, due to the proposed activities taking place outside an estuary, and there being no expected impacts on fish behaviours or population structures.

Water Quality

8.11.20 The offshore ECC transects the Lincolnshire coastal waterbody and, therefore, there is a requirement to consider the potential for deterioration of water quality within this waterbody. This deterioration could be characterised by an increase in suspended sediments, nutrients, oxygen or bacterial concentrations, and potential to detrimentally impact the current moderate phytoplankton status of the waterbody.

8.11.21 As well as the above-mentioned waterbody, consideration for reduction in water quality is also afforded to the relevant Bathing Waters within the Project ZoI (Figure 8.1.4; classification details for these Bathing Waters are provided in Table 8.1.6):

- Mablethorpe Town (including Mablethorpe Town Bathing Water sensitive area);
- Sutton-on-Sea;
- Moggs Eye;
- Anderby;
- Chapel St Leonards;
- Ingoldmells South; and
- Skegness.

8.11.22 The activities which are, generally, most associated with a reduction in water quality are those which involve some level of sediment disturbance/increase is SCC. This disturbance of the seabed may also result in the release of sediment-bound contaminants into the water column, which can be associated with cable installation and associated landfall works.

8.11.23 As described in Volume 1, Chapter 8, the sediment contaminant concentrations are low within both the array area and offshore ECC. It is noted that whilst a small proportion of sediment contaminants will enter the water column, the vast majority will remain adhered to the substrate. It is considered highly unlikely that the Maximum Allowable Concentration (MAC) EQS threshold will be exceeded by any of the substances, resulting from sediment disturbance activities. Moreover, given the short-term, highly localised nature of the works, and presence of sediment plumes, any small uplift in EQS concentrations would be expected to return to background levels very quickly. It is not anticipated that any disturbance of sediment-bound contaminants would affect the waterbodies performance (at a waterbody scale), as the potential impacts will be temporary and localised in nature. Therefore, it is considered unlikely that the proposed works would contribute to a deterioration in any chemical parameters for the Lincolnshire coastal waterbody.

8.11.24 An increase of suspended sediment (including bentonite) from cable installation and trenchless technique activities at landfall have the potential to result in an increase in bacterial counts within the water column. As described in Volume 1, Chapter 8, it is expected that any bacterial increase within the water column would be in the order of days (due to predicted dilution, the temporary nature of the works, and bentonite dispersion). Following plume dispersion and subsequent UV increases, the bacterial counts in the water column will return to normal, baseline levels. Therefore, these changes are expected to remain within the natural variation of the marine environment, analogous to storm events.

8.11.25 The biological quality element 'Dissolved oxygen' is currently (2019) at high status for the Lincolnshire coastal waterbody. Dissolved oxygen levels can also decrease as a reaction to nutrient inputs. When nutrient loading is elevated, phytoplankton can bloom and then die off. Decomposer organisms, such as bacteria, then use oxygen to break down the newly-available organic matter. However, no nutrients are anticipated to be released in significant concentrations from the seabed, beyond typical storm conditions. There are no outfalls or discharges associated with the Project, so there is not expected to be a reduction in dissolved oxygen in the water column.

8.11.26 The introduction of nutrients, such as inorganic nitrogen, can result in phytoplankton blooms. These blooms are capable of producing extremely toxic compounds, that can have harmful effects on the marine fauna, and potentially humans. While it is expected that sediment will be mobilised due to Project activities, it is considered unlikely that this will lead to a significant nutrient uplift in the surrounding waters. The majority of the proposed Project activities will take place in open-water, where dispersion is high, so effects will be temporary. Furthermore, there is no planned activities involving the release of nutrients. Therefore, it is considered unlikely that activities associated with the Project will result in phytoplankton blooms within the Lincolnshire coastal waterbody.

8.11.27 It is noted that the biological quality element 'Phytoplankton' is currently at moderate status for the Lincolnshire coastal waterbody. This designation suggests the algal biomass is substantially outside the range associated with type-specific reference conditions and that persistent blooms may occur in summer months. Nevertheless, it is considered unlikely that the proposed development will contribute to a significant change in phytoplankton abundance and composition, nor prevent the quality element from meeting future WFD objectives with regards to Phytoplankton.

8.11.28 There is also potential for accidental events to result in water quality deterioration, for example, through unplanned release of chemicals during planned Project activities. This risk is mitigated and managed through following the available best practice guidance, such as Guidance for Pollution Prevention (GPP 5: Works and maintenance in or near water) (NRW, 2017).

8.11.29 An assessment for the potential impacts of the Project activities on the water column is presented in Volume 1, Chapter 8, with detail also provided in Volume 1, Chapter 7. Both assessments conclude that effects are likely not significant in EIA terms. As such, this WFD compliance assessment concludes there is unlikely to be any significant adverse effects upon water quality from activities associated with the Project.

8.11.30 It is considered unlikely that O&M activities would result in significant impacts to water quality for the Lincolnshire coastal waterbody, and while the scale of decommissioning activities is currently unknown, impacts are likely to be no greater than those anticipated during construction.

8.11.31 Overall, there is not predicted to be a deterioration in the ecological or chemical status of the Lincolnshire coastal waterbody in relation to water quality. The proposed development is therefore considered to be compliant with the WFD and thus would not result in a deterioration of the current status of the Lincolnshire coastal waterbody, nor prevent the waterbody from achieving future objectives under the WFD.

Protected Areas

8.11.32 The Projects ZoI coincide with various sites designated as protected areas under the WFD, and therefore, could affect the features of interest of those sites. This includes the following:

- Mablethorpe Town Bathing Water (including Mablethorpe Town Bathing Water sensitive area);
- Sutton-on-Sea Bathing Water;
- Moggs Eye Bathing Water;
- Anderby Bathing Water;
- Chapel St Leonards Bathing Water;
- Ingoldmells South Bathing Water;
- Skegness Bathing Water;
- Ingoldmells Main Drain NVZ;
- Willoughby High Drain NVZ;
- Greater Wash SPA;
- North Norfolk Sandbanks and Saturn Reef SAC;
- Inner Dowsing, Race Bank and North Ridge SAC; and
- Southern North Sea SAC.

8.11.33 Resuspension of sediment resulting from the proposed Project activities could mobilise bacteria within the sediments into the water column, affecting the performance of the above-mentioned Bathing Waters. During periods of increased turbidity, a reduction in the amount of UV light within the water column could occur and reduce the mortality rate of bacteria within the water column.

8.11.34 Sediment plumes are expected to quickly dissipate after cessation of the activities, due to the settling and dispersion. Concentrations would be expected to reduce rapidly, and return to background levels. Sediment deposition will consist primarily of the coarser sediments deposited in the vicinity of the source of suspension, with fine material likely being more widely distributed. This widely dispersed particulate matter will form part of the background concentration of Suspended Particulate Matter (SPM) in the nearshore, therefore is unlikely to settle in measurable thickness. The impacts from increased SSCs and deposition from construction activities is expected to be short-term, intermittent and of localised extent.

8.11.35 The consistent 'Excellent' performance of nearby Bathing Waters (see Table 8.1.6) indicates that the levels of bacteria within the sediments, in close proximity to these Bathing Waters, do not result in a reduction in water quality during natural elevated suspension events. This suggests that elevated bacterial concentrations are unlikely to result from disturbance of seabed sediments in the vicinity of these Bathing Waters. Furthermore, given the short-term nature of the sediment plumes the relative increases in bacteria are considered to be negligible in terms of Bathing Waters compliance. No deterioration or non-compliances at the various Bathing Waters are anticipated to occur as a result of the proposed activities.

8.11.36 Consideration of the NVZs is provided in in Volume 1, Chapter 24: Hydrology, Hydrogeology and Flood Risk and has been used to inform the sensitivity of the waters. As the proposed development is not introducing additional nitrogen sources into the water environment, no pathway has been identified with could affect NVZs. The proposed development is therefore considered to be compliant with the WFD and would not result in a deterioration of the current status of these protected areas.

8.11.37 The identified nature conservation designated sites identified have been subjected to the Habitats Regulations Assessment (HRA) process (PEIR document reference 7.1).

8.11.38 Overall, there is not predicted to be a deterioration in status of the Lincolnshire coastal waterbody in relation to WFD protected areas. The proposed development is therefore considered to be compliant with the WFD and thus would not result in a deterioration of the current status of the Lincolnshire coastal waterbody, nor prevent the waterbody for achieving future objectives under the WFD.

Marine Invasive Non-Native Species

8.11.39 There is potential for the introduction and spread of INNS through the presence of subsea infrastructure and vessel movement in relation to the Projects activities. The installation of man-made structures within the Lincolnshire coastal waterbody provides an opportunity for colonisation by a range of marine species, some of which may not already be present within the ecosystem. Vessel movement throughout the Lincolnshire coastal waterbody also provides a potential vector for the introduction of INNS. The total number of vessel trips is dependent upon the infrastructure chosen, with the expectation that the impacts of decommissioning activities will not be any greater than construction activities.

8.11.40 The Project will adopt and follow available best practice guidance during all stages in development (construction, O&M and decommissioning) to minimise the introduction or spread of INNS, through the implementation of a Biosecurity Plan.

8.11.41 A characterisation of the benthic ecology and biodiversity which may be directly or indirectly impacted by the Project is provided in Volume 1, Chapter 9. The impact assessment concluded that the significance of the residual effect is minor adverse.

8.11.42 Overall, there is not predicted to be a deterioration in status of the Lincolnshire coastal waterbody in relation to INNS. The proposed development is therefore considered to be compliant with the WFD and thus would not result in a deterioration of the current status of the Lincolnshire coastal waterbody, nor prevent the waterbody for achieving future objectives under the WFD.

Cumulative

8.11.43 Consideration is supported by the following chapters for the potential of cumulative impacts upon the following scoped in WFD impacts:

- Marine Processes - Volume 1, Chapter 7 (hydromorphology, protected areas);
- Benthic and Intertidal Ecology - Volume 1, Chapter 9 (habitats, INNS); and
- Marine Water Quality - Volume 1, Chapter 8 (water quality, protected areas).

8.11.44 The scale of potential changes to hydromorphology within the Lincolnshire coastal waterbody as a result of the Project is small and highly localised (to areas where cable protection is required, where cable burial is insufficient). The potential for significant cumulative effects from the proposed development with other developments (particularly offshore export cables from other offshore windfarms), is considered unlikely to result in a deterioration of status within the Lincolnshire coastal waterbody.

8.11.45 Impact to benthic habitats as a result of the Project's ECC installation will be localised and temporary, except for any areas of cable protection installation. It is planned for trenchless techniques to be employed at landfall, and no cable protection within 350m landward of the MLWS mark. The potential significant cumulative effects from the Project with other nearby developments is considered unlikely to result in a deterioration in status of biological quality elements, or significant impacts to higher sensitivity habitats in the Lincolnshire coastal waterbody (at the waterbody scale).

8.11.46 There is potential for the introduction and spread of INNS as a result of the proposed Project activities. This includes the placement of cable protection, providing new habitats for marine INNS to colonise, and the movement of vessels transporting INNS via ballast water and attached to hulls/equipment. Relevant best practice guidelines will be followed and implemented through the development of a PEMP to minimise the introduction and spread of INNS. Therefore, the risk of cumulative effects to the Lincolnshire coastal waterbody with regards to INNS is considered minimal and unlikely to result in a deterioration in status.

8.11.47 Project activities which introduce the potential for a reduction in water quality are typically those which involve seabed disturbance and/or an increase in SSC. The impacts to water quality from the installation of the offshore ECC will be temporary and localised. This will be similar for any O&M activities for the other windfarm developments noted above, with these O&M activities possibly involving cable reburial or repair. There is also potential for accidents to occur, leading to the release of chemicals and hazardous substances into the environment. It is anticipated that other developments (listed above) would adopt similar pollution prevention measures, thus minimising the risk of such impacts. Therefore, the potential for significant cumulative effects to water quality from the Projects development (in conjunction with other nearby developments) is considered unlikely to result in the deterioration in status of the Lincolnshire coastal waterbody.

8.11.48 The cumulative assessments undertaken for each of the specialisms concluded that the potential effects are either negligible, minor, or moderate significance. These effects are considered not to be significant in terms of EIA (with the exception of moderate), but this assessment considered their potential impacts at a waterbody scale. The proposed development is considered to be compliant with the Directive's requirements and would not result in a deterioration of the current status of the Lincolnshire coastal waterbody or WFD Protected Areas.

Freshwater Elements

Physical Habitat

8.11.49 This section has summarised the information presented in the PEIR, further information is provided in Volume 1, Chapter 24.

8.11.50 Consent would be sought from the EA to undertake works crossing, or works within 8 m of main rivers or within 16 m if it is a tidal main river. Ordinary watercourse consent or IDB consent will be required for works crossing any other watercourse. Construction activities would be undertaken in accordance with the conditions of any consent which would be specified to ensure that construction does not result in a non-temporary change in flow rate or water level, i.e. will not result in a deterioration of hydromorphology. The consent will specify mitigation measures including emergency and contingency plans for flooding incidents which may affect the works. The consent would specify the need for a minimum cover depth between the cable and hard bed level of the watercourse being crossed. The assessment presented in this WFD assessment and associated PEIR chapters concludes that at this stage there is no impediment to the relevant permits being secured against the final design.

8.11.51 During the decommissioning phase, it is considered that the impacts on hydromorphology will be less than those assessed for the construction phase. Good practice measures (similar to those identified within the CoCP) would be employed during decommissioning and would be agreed with statutory authorities at the time of decommissioning through a decommissioning plan. With respect to the buried onshore cables, these would be left in place during decommissioning. Allowing the cables to remain in place is considered an acceptable option with minimal environmental impact. No impacts are predicted during the O&M phase of the development. Overall, it is predicted that the impact on hydromorphology from construction (and decommissioning) of the onshore ECC (including crossing of watercourses) would be direct and of an intermittent nature and of short duration. The significance of the potential change would, therefore, not result in a deterioration of the current status of hydromorphology for any WFD water bodies or non-reportable watercourses. No potential indirect impacts on ecological receptors, such as macrophytes, diatoms, invertebrates or fish, have been identified as a result of watercourse crossings.

Water Quality

8.11.52 This section has summarised the information presented in the PEIR, further information is provided in Volume 1, Chapter 24.

8.11.53 As confirmed in Volume 1, Chapter 23, there are no known sources of contamination within the onshore ECC study area, however, on a precautionary basis, there is the potential for limited contamination to exist as a result of previous land uses. Any contamination is likely to be localised in its extent given the sources of contaminants and the characteristics of the underlying geology.

Construction

Water Quality Embedded Mitigation

8.11.54 The embedded mitigation measures discussed in Section 0 includes the implementation of spill procedures and use of spill kits. These measures together with appropriate drainage systems and containment will minimise the potential for any reduction in water quality associated with spills or leaks of stored oils/ fuels/ chemicals or other polluting substances migrating into nearby water bodies. Together these measures will reduce the likelihood of construction activities resulting in incidents detrimental to water quality occurring and reduce the magnitude of the impact of any such incidents.

8.11.55 The implementation of the PPEIRP as part of the CoCP would control the storage and use of fuels and chemicals within the compound and therefore, reduce the likelihood of contamination occurring.

8.11.56 Controls will be in place (CoCP) to prevent the potential reduction in water quality associated with increased sediment loading (including potentially contaminated sediment) entering nearby fluvial and tidal waters during excavation works or trenchless techniques activities.

Landfall Activities

8.11.57 No potential sources of contamination have been identified from former land uses at landfall and therefore, the probability of mobilising existing contaminants in the vicinity is considered unlikely.

8.11.58 The onshore cable would be installed by trenchless technique under the sea defences and dunes. A temporary construction compound would be established at the TJB landfall site working area, which is likely to incorporate a storage area for fuels and chemicals. As a result, there is the potential for contaminants to be released as a result of accidental spillage or inappropriate storage. The embedded mitigation measures discussed at Section 0 includes the implementation of spill procedures and use of spill kits. These measures will minimise the potential for any reduction in water quality associated with spills or leaks migrating into fluvial or tidal waters.

8.11.59 Overall, it is predicted that any potential impact on water quality from use of trenchless techniques at landfall would be unlikely, direct and of an intermittent nature and of short duration with the identified mitigation measures in place. The significance of the potential change would, therefore, not result in a deterioration of the current status of water bodies for any WFD water bodies or non-reportable watercourses.

Trenchless Crossings

8.11.60 For crossings where trenchless techniques may be used, land use has primarily been agricultural, and no land uses with potential sources of contamination in the vicinity of trenchless crossing works have been identified. Notwithstanding this the potential for localised contaminants as a result of run-off from the adjacent road or work areas is considered.

8.11.61 Measures in the Outline PPEIRP (Document Reference: 8.1.4) provided as part of the Outline CoCP will be implemented to avoid accidental spillages and run-off from crossings using trenchless techniques. The proposed measures would include controls to prevent the potential reduction in water quality associated with spills or leaks of oils, fuels or drilling fluids used during the trenchless crossing works migrating into nearby fluvial watercourses or drainage ditches during construction works.

8.11.62 Overall, it is predicted that any potential impact on water quality from spills or mobilisation of contaminants from use of trenchless crossings would be direct and of an intermittent nature and of short duration with the identified mitigation measures in place. The significance of the potential change would, therefore, not result in a deterioration of the current status of water bodies for any WFD watercourses or non-reportable watercourses.

Trenching of Onshore Cables

8.11.63 For onshore watercourses, it is predicted that the impact on water quality from the ECC trenching works would be direct and of an intermittent nature and of short duration. The magnitude of impact with the controls in place is deemed to be low given the embedded mitigation in place and that any direct pollution from spills would be small. The significance of the potential change would, therefore, not result in a deterioration of the current chemical status of for any WFD water bodies or non-reportable watercourses. No potential indirect impacts on ecological receptors, such as macrophytes, diatoms invertebrates or fish, have been identified as a result of watercourse crossings.

Construction of Onshore Substation

8.11.64 The proposed substation sites are currently agricultural land. There is no record of any potentially contaminative land use on the site and therefore, the probability of contamination is considered to be low.

8.11.65 The magnitude of impact with the controls in place is deemed to be low given the embedded mitigation in place and that any direct pollution from spills would be small. The significance of the potential change would, therefore, not result in a deterioration of the current chemical status of for any WFD water bodies or non-reportable watercourses. No potential indirect impacts on ecological receptors, such as macrophytes, diatoms invertebrates or fish, have been identified as a result of construction of the OnSS.

O&M

8.11.66 The OnSS would contain potential pollutants which could include cooling oils, lubricants, fuels, greases, etc. The design, maintenance and operation of the facility would include routine inspection to prevent or contain leaks of any pollutants from the substation, thereby mitigating against the potential for these contaminants to migrate into the local drainage ditch network and/or groundwater and cause a reduction in water quality. In addition, the potential for the release of potentially polluting substances during operation of the substation will be mitigated through an appropriate Environment Management System (EMS).

8.11.67 The trenchless technique drilling for the onshore ECC would require working areas at either side of each trenchless technique crossing. Following construction, these areas would be restored, with the former land use retained. The only permanent features on the surface of the onshore ECC would be the link boxes, which would be located at ground level. Therefore, the only risk in terms of water quality would be any access routes required for inspection and maintenance of the joint bays. No additional pathways for accidental spills or pollution from onshore infrastructure during the O&M phase of the Project have been identified.

8.11.68 Overall, it is predicted that the impact on water quality would be direct and of a continuous nature and of medium to long duration. The magnitude of impact with the controls in place is deemed to be low given the embedded mitigation in place and that any direct pollution from spills would be small. The significance of the potential change would, therefore, not result in a deterioration of the current chemical status of for any WFD water bodies or non-reportable watercourses. No potential indirect impacts on ecological receptors, such as macrophytes, diatoms invertebrates or fish, have been identified as a result of O&M of the Project.

Decommissioning

8.11.69 It is anticipated that any buried onshore cables would be left in place during decommissioning. Allowing the cables to remain in place is considered by the Applicant as an acceptable option with minimal environmental impact. It is anticipated that the OnSS would be gradually dismantled on site with certain infrastructure removed for recycling or reuse. Following this, the area is likely to be remediated and restored.

8.11.70 This action would result in the surface water flood risk being returned to its pre-development state. Specific decommissioning requirements and potential concerns with regards to hydrology, hydrogeology and flood risk would be discussed with the relevant statutory consultees at the time.

8.11.71 Good practice measures (similar to those identified within the CoCP) would be employed during decommissioning and would be agreed with statutory authorities at the time of decommissioning through a decommissioning plan. The decommissioning works may involve removal of some or all of the impermeable hard-standing surfacing and restoration of the permeable greenfield land present prior to construction.

8.11.72 During decommissioning phase, the potential impacts on water quality are considered to be similar, or no greater than, those assessed for the construction phase.

8.11.73 It is predicted that the impact on water quality from the proposed decommissioning works would be direct and of an intermittent nature and of short duration. The magnitude of impact with the controls in place is deemed to be low given the embedded mitigation in place and that any direct pollution from spills or contaminants would be small.

8.11.74 The significance of the potential change would, therefore, not result in a deterioration of the current chemical status of for any WFD water bodies or non-reportable watercourses. No potential indirect impacts on ecological receptors, such as macrophytes, diatoms invertebrates or fish, have been identified as a result of the proposed decommissioning works.

Fish

Trenchless Crossings

8.11.75 Measurements of a generic trenchless techniques operation have been taken (Parvin *et al*., 2007) in shallow riverine conditions while drilling was being undertaken directly below the riverbed. Measurements of the trenchless technique operations gave maximum unweighted Sound Pressure Levels rms (SPLrms) of 129.5 dB re 1 µPa on the riverbed due to the minimal transfer of sound between the two mediums. There are a few limitations in using these riverine values, for example, the shallow water conditions result in a more rapid attenuation of sound, however, these measurements were taken directly above the underground drilling with no shipping noise present.

8.11.76 The sound levels emitted into the water from trenchless technique works are of a low intensity, with all values below those considered within Popper *et al*. (2014) sufficient to result in injurious effects to fish (from continuous noise sources). The shallow water will lead to very rapid attenuation, with sound levels reducing away from the substrate. The intermittent, short-term and temporary nature of the drilling works ensures that there will be no barrier impacts to fish from the trenchless technique works under watercourses.

8.11.77 There is not predicted to be a deterioration in the ecological status of any WFD water bodies or non-reportable watercourses, with respect to fish species. The proposed development is therefore considered to be compliant with the WFD requirements.

Cumulative

8.11.78 Volume 1, Chapter 24 assesses the potential for cumulative impacts of the Project on hydrology, hydrogeology and flood risk receptors in the onshore study area. Further details of the methodology of this assessment are provided in Volume 2, Appendix 5.2

8.11.79 It is anticipated that other projects of significance along the onshore ECC and in the vicinity of the OnSS would be constructed in accordance with a CoCP and would require an assessment of flood risk. Surface water drainage for any development proposals would also require approval from the LLFAs. Given the requirements to control potential detrimental effects of any development on flood risk or water quality, appropriate mitigation would be in place for these schemes to secure approval. Therefore, no significant cumulative hydrology effects arising during the construction phase of the proposed new developments are likely. Furthermore, it is not expected that the Project would have an impact on any of the measures that other developments within the vicinity of the onshore works would need to incorporate during the construction phase to prevent detrimental hydrology or flood risk effects elsewhere.

8.11.80 Overall, it is considered that the proposed development is compliant with the Directive's requirements and would not result in a deterioration of the current status of any riverine WFD waterbodies or non-reportable watercourses screened in for the Project alone, or cumulatively with other projects, plans or activities.

8.12 Groundwater Elements

Creation of Pathways

8.12.1 This section has summarised the information presented in the PEIR, further information is provided in Volume 1, Chapter 24.

Landfall

8.12.2 No potential sources of contamination have been identified from former land uses at landfall and therefore, the probability of mobilising existing contaminants in the vicinity is considered unlikely.

8.12.3 The onshore cable is proposed to be installed by trenchless techniques under the sea defences and dunes. A temporary construction compound would be established at the trenchless technique working area, which is likely to incorporate a storage area for fuels and chemicals. As a result, there is the potential for contaminants to be released as a result of accidental spillage or inappropriate storage and therefore, potentially affect the underlying groundwater.

8.12.4 Where groundwater is encountered it will be sensitive to accidental spillages and runoff from the trenchless crossings works. Measures in the Outline PPEIRP (Document Reference: 8.1.4) provided as part of the Outline CoCP will be implemented to avoid accidental spillages and run-off from the trenchless technique works. The proposed measures would include controls to prevent the potential reduction in water quality associated with spills or leaks of oils, fuels or drilling fluids used during the trenchless technique works migrating into nearby fluvial watercourses or drainage ditches during construction works. These measures would limit the magnitude of impact.

8.12.5 Overall, it is predicted that any potential impact on water quality from the ingress of pollutants from the use of trenchless techniques for the landfall would be unlikely, direct and of an intermittent nature and of short duration with the identified mitigation measures in place. The significance of the potential change would, therefore, not result in a deterioration of groundwater.

Trenching and Substation Construction

8.12.6 Across some areas of the onshore ECC, the underlying superficial deposits are unlikely to contain significant quantities of groundwater, particularly near the surface. As a result, groundwater is unlikely to be encountered during the construction of the cable trenches given their shallow depth. Similarly, groundwater is not anticipated to be encountered during the construction of the OnSS.

8.12.7 Any groundwater seepage is likely to be minor and it would be managed in accordance with procedures set out in the CoCP (to be submitted at DCO Application). Given the depth of the superficial deposits, groundwater in the bedrock is unlikely to be affected. Therefore, it is predicted that the any potential impact on water quality from ingress of pollutants from use of trenching will not result in a deterioration of groundwater.

Cumulative

8.12.8 Volume 1, Chapter 24 assesses the potential for cumulative impacts of the Project on hydrology, hydrogeology and flood risk receptors in the onshore study area. Further details of the methodology of this assessment are provided in Volume 2, Appendix 5.2.

8.12.9 It is anticipated that other projects of significance along the onshore ECC and in the vicinity of the OnSS would be constructed in accordance with a CoCP and would require an assessment of flood risk. Surface water drainage for any development proposals would also require approval from the LLFAs. Given the requirements to control potential detrimental effects of any development on flood risk or water quality, appropriate mitigation would be in place for these schemes to secure approval. Therefore, no significant cumulative hydrogeology effects arising during the construction phase of the proposed new developments are likely. Furthermore, it is not expected that the Project would have an impact on any of the measures that other developments within the vicinity of the onshore works would need to incorporate during the construction phase to prevent detrimental hydrogeology effects elsewhere.

8.12.10 Overall, it is considered that the proposed development is compliant with the Directive's requirements and would not result in a deterioration of the current status of any groundwater WFD waterbodies screened in for the Project alone, or cumulatively with other projects, plans or activities.

8.13 Summary

8.13.1 This document has been prepared to present the findings of the WFD compliance assessment for the potential impacts of the Project. The purpose of this WFD compliance assessment is to demonstrate that the proposed activities associated with the Project do not result in a deterioration in a designated water body (or protected area) and do not jeopardise the attainment of good status (or the potential to achieve good ecological and chemical status).

8.13.2 Table 8.1.12 presents the findings of the marine quality elements of this WFD compliance assessment. It has been informed and presents a summary of the information presented as part of the PEIR. Further information is presented in the related chapters and annexes of the PEIR.

Table 8.1.13: Summary of WFD compliance assessment conclusions

Waterbody/ Protected Area	Receptor	Conclusion
Bathing Waters: ▪ Mablethorpe Town; ▪ Sutton-on-Sea; ▪ Moggs Eye; ▪ Anderby; ▪ Chapel St Leonards; ▪ Ingoldmells South; and ▪ Skegness.	Protected area	No deterioration in the status of the Bathing Waters is predicted.
Sensitive Areas: ▪ Mablethorpe Town Bathing Water.	Protected area	No deterioration in the status of the Bathing Water Sensitive Areas is predicted.
National Network Sites: ▪ Greater Wash SPA; ▪ North Norfolk Sandbanks and Saturn Reef SAC; ▪ Inner Dowsing, Race Bank and North Ridge SAC; and ▪ Southern North Sea SAC.	Protected area	No Adverse Effect on Integrity (AEoI) is predicted from the proposed activities.
Lincolnshire coastal waterbody	Hydromorphology	No deterioration in the status of the waterbody element; the proposed activities will not jeopardise the attainment of good status.
	Biology - Habitats	No deterioration in the status of the waterbody element; the proposed activities will not jeopardise the attainment of good status.
	Biology - Fish	No deterioration in the status of the waterbody element; the proposed activities will not jeopardise the attainment of good status.
	Water Quality	No deterioration in the status of the waterbody element; the proposed activities will not jeopardise the attainment of good status.

Waterbody/ Protected Area	Receptor	Conclusion
	INNS	No deterioration in the status of the waterbody element; the proposed activities will not jeopardise the attainment of good status.
Freshwater	Physical Habitat	No deterioration of in the status of the water body element; the proposed activities do not jeopardise the attainment of good status as predicted.
	Water Quality	No deterioration of in the status of the water body element; the proposed activities do not jeopardise the attainment of good status as predicted.
	Fish and eels	No deterioration of in the status of the water body element; the proposed activities do not jeopardise the attainment of good status as predicted.
	Macrophytes, diatoms and invertebrates	No deterioration of in the status of the water body element; the proposed activities do not jeopardise the attainment of good status as predicted.
	INNS	No deterioration of in the status of the water body element; the proposed activities do not jeopardise the attainment of good status as predicted.
Groundwater	Creation of pathways	No deterioration of in the status of the water body element; the proposed activities do not jeopardise the attainment of good status as predicted.
	Groundwater Dependent Terrestrial Ecosystems (s) or dependent surface water features	No deterioration of in the status of the water body element; the proposed activities do not jeopardise the attainment of good status as predicted.
	Saline Intrusion	No deterioration of in the status of the water body element; the proposed activities do not

Waterbody/ Protected Area	Receptor	Conclusion
		jeopardise the attainment of good status as predicted.
	Groundwater abstraction (dewatering) exceed recharge	No deterioration of in the status of the water body element; the proposed activities do not jeopardise the attainment of good status as predicted.
	Non-compliant and lead to failure of the Dependent Surface Water test	No deterioration of in the status of the water body element; the proposed activities do not jeopardise the attainment of good status as predicted.

8.14 References

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