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Volume 7B Proposed Development (Offshore) Appendices

Appendix 3-1 Water Framework Directive (WFD) Regulatory Compliance Assessment

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Acronyms and Abbreviations

BW	Bathing Water	
DEFRA	Department for Environment, Food and Rural Affairs	
EIA	Environmental Impact Assessment	
EIAR	Environmental Impact Assessment Report	
ЕМР	Environment Management Plan	
EQSD	Environmental Quality Standards Directive	
EU	European Union	
HDD	Horizontal Directional Drilling	
ІМО	International Maritime Organization	
INNS	Invasive Non-Native Species	
MD-LOT Marine Directorate - Licensing Operations Te		
мнพร	Mean High Water Springs	
мрср	Marine Pollution Contingency Plan	
MSFD	Marine Strategy Framework Directive	
nm	Nautical Mile	
NMPi	National Marine Plan Interactive	
NVZ	Nitrate Vulnerable Zone	
OCNS	Offshore Chemical Notification Scheme	
ОСР	Organochlorine Pesticide	
OECC	Offshore Export Cable Corridor	
OSP	Offshore Substation Platform	
OSPAR	Oslo-Paris Convention	



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OWF	Offshore Windfarm
РЕМР	Project Environmental Monitoring Programme
PLONOR	Pose Little or No Risk to the Environment
RBMP	River Basin Management Plan
rBWD	Revised Bathing Water Directive
SAC	Special Area of Conservation
SEPA	Scottish Environment Protection Agency
SPA	Special Protection Area
SSC	Suspended Sediment Concentration
SWPA	Shellfish Water Protected Area
UK	United Kingdom
UWWTD	Urban Wastewater Treatment Directive
VMP	Vessel Management Plan
WFD	Water Framework Directive
WTG	Wind Turbine Generator

1 Introduction

1.1.1.1

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- The Caledonia Offshore Wind Farm (OWF) will be located within the NE4 Plan Option, approximately 423km², 35km off the north-east coast of Scotland in the outer Moray Firth. A full explanation of the Proposed Development (Offshore) is provided in Volume 1, Chapter 3: Proposed Development Description (Offshore). The Proposed Development (Offshore) consists of the Caledonia OWF (i.e., array area) and the Caledonia Offshore Export Cable Corridor (OECC), and will be divided into two similar sized areas, with separate consent applications being submitted for each area. These areas are referred to as:
 - Caledonia North: Caledonia North Site (i.e., array area) (which includes fixed foundation Wind Turbine Generators (WTGs), Inter-Array/Interconnector Cables and Offshore Substation Platforms (OSPs)) and the Caledonia North OECC; and
 - Caledonia South: Caledonia South Site (i.e., array area) (which includes both fixed and floating foundation WTGs or alternatively only fixed foundation WTGs, Inter-Array/Interconnector Cables and OSPs) and the Caledonia South OECC.
- 1.1.1.2 Caledonia North and Caledonia South are collectively referred to as the Proposed Development (Offshore) in this Water Framework Directive (WFD) Regulatory Compliance Assessment, hereafter referred to as WFD assessment (Figure 6-1). The Caledonia North OECC and Caledonia South OECC will make landfall at Stake Ness, approximately 1.5km west of Whitehills, Aberdeenshire. In this WFD Assessment, reference to the OECC considers both Caledonia North and Caledonia South OECCs.
- 1.1.1.3 The Proposed Development (Offshore) could be developed concurrently or sequentially (with a gap of up to five years between phases). This WFD assessment has been prepared to consider the Proposed Development (Offshore) (i.e., both Caledonia North and Caledonia South) and the construction of the two application areas in any sequence or simultaneously.
- 1.1.1.4 The purpose of this assessment is to determine if the Proposed Development (Offshore) is compliant with the objectives of the WFD (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; European Parliament and of the Council, 2000¹). This is to ensure that the planned activities associated with the Proposed Development (Offshore) do not result in a deterioration of designated waterbodies (or protected areas) and allowing future targets for waterbodies to be achieved.
- 1.1.1.5 This document has been informed by the assessments presented within the Environmental Impact Assessment Report (EIAR) for the Proposed Development (Offshore) and provides a summary of the key findings. It seeks to draw from, and signpost to where relevant information is provided within

the EIAR, and to demonstrate compliance with the WFD, rather than duplicate assessment.

- 1.1.1.6 This WFD assessment has drawn information from, and should be read in conjunction with, the following:
 - Volume 1, Chapter 3: Proposed Development Description (Offshore);
 - Volumes 2, 3 and 4, Chapter 2: Marine and Coastal Processes;
 - Volumes 2, 3 and 4, Chapter 3: Marine Water and Sediment Quality;
 - Volumes 2, 3 and 4, Chapter 4: Benthic Subtidal and Intertidal Ecology;
 - Volumes 2, 3 and 4, Chapter 5: Fish and Shellfish Ecology;
 - Volume 7B, Appendix 2-1: Marine and Coastal Processes Technical Report; and
 - Volume 7B, Appendix 4-5: Intertidal Survey Report.
- 1.1.1.7 This WFD assessment has been structured as follows:
 - Section 2: Legislation, Policy and Guidance;
 - Section 3: Stakeholder Engagement;
 - Section 4: Assessment Methodology;
 - Section 5: Screening;
 - Section 6: Scoping;
 - Section 7: Assessment of Effects; and
 - Section 8: Conclusions.

2 Legislation, Policy and Guidance

2.1 Overview

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- 2.1.1.1 This section provides information regarding the legislative context surrounding the assessment of potential effects in relation to the WFD. It discusses both Scottish and EU legislation. When the UK was a member of the European Union (EU), it adhered to environmental directives such as the WFD¹. Consequently, measures were established to protect Scotland's marine environment under these EU legislative frameworks. These measures, supported by EU laws and standards, remained in effect until the UK exited the EU and these measures have since been upheld and implemented through Scottish law.
- 2.1.1.2 Post EU-exit, legislation relevant to the Scottish marine environment remains in force but has been amended to ensure the law continues to be operable and effective, maintaining the standards of environmental protection. The Marine Environment (EU Exit) (Scotland) (Amendment) Regulations 2019 (Scottish Parliament, 2019²) details the amendments made to specific pieces of legislation and their practical implications, including the interpretation of existing guidance. Within this WFD assessment, references to EU Directives mean as applied in Scottish law by relevant Scottish legislation.
- 2.1.1.3 The most up to date version of legislation, policy and guidance that relate to the WFD assessment are identified in Table 2-1, and discussed in context below.

Table 2-1: Legislation, policy and guidance.

Relevant Legislation, Policy and Guidance

Scottish/UK Legislation

The Bathing Waters (Scotland) Regulations 2008 (Scottish Parliament, 2008³)

The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (Scottish Parliament, 2011⁴)

Water Environment and Water Services (Scotland) Act 2003 (Scottish Parliament, 2003⁵)

The Scotland River Basin District (Standards) Directions 2014 (Scottish Government, 2014a⁶)

The Scotland River Basin District (Status) Directions 2014 (Scottish Government, 2014b⁷)

The Water Environment (River Basin Management Planning: Further Provision) (Scotland) Regulations 2013 (Scottish Parliament, 2013⁸)

The Scotland River Basin District (Quality of Shellfish Water Protected Areas) (Scotland) Directions 2021 (Scottish Parliament 2021b⁹)

Relevant Legislation, Policy and Guidance

The Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008 (Scottish Parliament 2008¹⁰)

The Marine (Scotland) Act 2010 (Scottish Parliament, 2010¹¹)

The Marine Strategy Regulations 2010 (UK Parliament, 2010¹²)

The Urban Waste Water Treatment (Scotland) Regulations 1994 (Scottish Parliament, 1994¹³)

Contextual EU Legislation

Water Framework Directive (WFD) 2000/60/EC (European Parliament and of the Council, 2000^{1})

Environmental Quality Standards Directive (EQSD) 2008/105/EC (European Parliament and of the Council, 2008a¹⁴)

Marine Strategy Framework Directive (MSFD) 2008/56/EC (European Parliament and of the Council, 2008b¹⁵)

Bathing Waters Directive 2006/7/EC (European Parliament and of the Council, 2006a¹⁶)

Shellfish Waters Directive 2006/113/EC (European Parliament and of the Council, 2006b¹⁷)

Urban Waste Water Treatment Directive 91/271/EEC (The Council of the European Committees, 1991^{18})

Policy

Scotland's National Marine Plan (2015) – GEN 1: General planning principle (Scottish Government, 2015¹⁹)

Scotland's National Marine Plan (2015) – GEN 10: Invasive Non-Native Species (INNS) (Scottish Government, 2015¹⁹)

Scotland's National Marine Plan (2015) – GEN 12: Water quality and resource (Scottish Government, 2015¹⁹)

Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020²⁰)

The River Basin Management Plan (RBMP) for Scotland 2021 – 2027 (Scottish Environment Protection Agency, 2021²¹)

Guidance

WFD Assessment: Estuarine and Coastal Waters. "Clearing the Waters for All" (Environment Agency, 2023²²)

Relevant Legislation, Policy and Guidance

Ballast water management convention and guidelines (International Maritime Organization (IMO), 2004^{23})

2.2 Water Framework Directive

- 2.2.1.1 The WFD provided a single framework for the protection of surface waterbodies (including rivers, lakes, coastal waters and estuaries) and groundwaters. The WFD is transposed into Scottish law through the Water Environment and Water Services (Scotland) Act 2003 (Scottish Government, 2003⁵) and the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (Scottish Government, 2011⁴), more commonly known as the Controlled Activity Regulations. The key objectives are to prevent deterioration in status of waterbodies, to further protect and maintain good status and where necessary, set targets to restore all waterbodies to reach overall quantitative and qualitative 'good' status.
- 2.2.1.2 RBMPs have been developed for each River Basin District, detailing the current status classification of all waterbodies, as well as the objectives and actions required to maintain or improve their current status (Scottish Environment Protection Agency (SEPA), 2021²¹). All UK waterbodies are required to achieve good status by 2015 (original target), with subsequent interim targets set for 2021 and 2027. Waterbody classification is based on two categories: ecological and chemical status. For a waterbody to achieve an overall 'good' status, both ecological and chemical status of that waterbody must be at least 'good'.
- 2.2.1.3 Ecological status is determined by evaluating biological, hydromorphological, physico-chemical, and specific chemical parameters. The ecological status is classified as either high, good, moderate, poor or bad. 'High' denotes largely undisturbed conditions, while the other classes represent increasing deviations from this natural, or 'reference', condition
- 2.2.1.4 Good chemical status pertains to a set of priority substances, including priority hazardous substances, assessed based on compliance with environmental standards listed in the Environmental Quality Standards Directive (EQSD) (2008/105/EC) (2008a¹⁴). These substances include priority substances, priority hazardous substances, and additional pollutants from the Dangerous Substance Daughter Directives. Chemical status is recorded as 'good' or 'fail', with the classification determined by the lowest scoring chemical in the waterbody (i.e., if one, or more, chemical parameters is deemed to be failing to achieve good status, the chemical status is classified as 'fail').

2.3 Environmental Quality Standards Directive

2.3.1.1

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The EQSD (2008/105/EC) (European Parliament and of the Council, 2008a¹⁴) set out quality standards for waterbodies across the EU to protect aquatic environments and human health. These standards are in line with the strategy and objectives of the WFD¹. Within the EQSD, there are two key terms related to the assessment of pollutants in surface/coastal waters:

- Annual Average (AA):
 - Definition: The AA concentration refers to the average concentration of a particular pollutant over the course of a year.
 - Purpose: The AA standard is designed to protect the aquatic environment and human health from long-term exposure to pollutants. It ensures that the overall level of pollution remains within safe limits throughout the year.
 - Measurement: This value is typically calculated based on periodic sampling of water throughout the year, giving a mean concentration that should not be exceeded on average.
- Maximum Allowable Concentration (MAC):
 - Definition: The MAC concentration refers to the highest concentration of a particular pollutant that is allowed in surface water at any given time.
 - Purpose: The MAC standard is aimed at protecting aquatic life and human health from short-term, high-level exposures to pollutants, which could cause immediate or acute harm.
 - Measurement: This value represents a threshold that should not be exceeded in any individual sample, ensuring that short-term spikes in pollution are controlled.
- 2.3.1.2 In summary, the AA concentration standard focuses on controlling long-term average exposure to pollutants, while the MAC concentration standard addresses the prevention of harmful short-term exposure peaks. Both standards work together to ensure comprehensive protection of water quality under the EQS Directive. By setting and enforcing these standards, the EQSD aimed to reduce the levels of harmful pollutants in surface waters, thus safeguarding the environment and public health.

2.4 Bathing Waters Directive

2.4.1.1 The EU's revised Bathing Water Directive (rBWD) (2006/7/EC; European Parliament and of the Council, 2006²⁴) came into force in March 2006, replacing the previous Bathing Water Directive (76/160/EEC; Council of the European Committees, 1975²⁵). The rBWD established more stringent standards and placed an emphasis on providing information to the public. In Scotland, it is now implemented through the Bathing Waters Regulations (Scotland) 2008 (as amended)(Scottish Parliament, 2008³). The rBWD set limits on bacterial indicator concentrations at designated Bathing Waters (BWs) in Scotland.

- 2.4.1.2 The Bathing Waters Regulations (Scotland) 2008 (Scottish Parliament, 2008³) aim to protect human health at locations where large numbers of people make use of the beaches and bathe during the bathing season (1 June to 15 September). This requires that BWs are monitored every year by SEPA. The monitoring schedule requires at least four samples per bathing season, taken during the summer months from (15 May to 15 September), except in cases of very short seasons or special geographic constraints.
- 2.4.1.3 BW quality is grouped into four categories:
 - 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.
- 2.4.1.4 Most BW sites are sampled 18 times per season, with remote sites sampled ten times, and consistently excellent quality sites sampled five times. Water quality classifications are calculated at the end of the season and apply to each BW for the following season. In 2012, the bacterial parameters were updated based on World Health Organization recommendations to test for:
 - Escherichia coli;
 - Intestinal enterococci; and
 - Observations on phytoplankton growth, including cyanobacteria (bluegreen algae), and macroalgae (seaweed).

2.5 Shellfish Waters Directive

- 2.5.1.1 The Shellfish Waters Directive (2006/113/EC) (European Parliament and of the Council, 2006¹⁷) was repealed in 2013 and subsumed within the WFD. In Scotland, it has been replaced by the Water Environment (Shellfish Water Protected Areas: Designation) (Scotland) Order 2013 (as amended) (Scottish Government, 2013²⁶). The Order identifies 85 coastal areas as shellfish waters.
- 2.5.1.2 The Water Environment (Shellfish Water Protected Areas: Environmental Objectives etc.) (Scotland) Regulations 2013 (2013²⁶) set environmental objectives for Shellfish Water Protected Areas (SWPAs), while The Scotland River Basin District (Quality of Shellfish Water Protected Areas) (Scotland) Directions 2021 (Scottish Parliament, 2021²⁷) direct SEPA on how to assess and classify the quality of SWPAs for the Scotland River Basin District. The Directions enable SEPA to assess and classify SWPAs as either Excellent, Good or Insufficient based on thresholds for the `*most probable number of E. coli*

per 100g sample of shellfish flesh and intra-valvular liquid as a 90-percentile standard'.

2.5.1.3 These regulations aim to prevent the deterioration of water quality in SWPAs, improve their condition, and support the growth of healthy bivalve and gastropod molluscs, thereby ensuring good quality edible shellfish.

2.6 Urban Waste Water Treatment Directive

- 2.6.1.1 The Urban Waste Water Treatment Directive (UWWTD) (91/271/EEC; Council of the European Committees, 1991¹⁸), implemented in Scotland via the Urban Waste Water Treatment (Scotland) Regulations 1994 (as amended) (Scottish Parliament, 1994²⁸), 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 sizes of sewage discharges and the sensitivity of waters receiving the discharges. In general, the UWWTD 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.
- 2.6.1.2 Sensitive areas under the UWWTD are waterbodies affected by eutrophication or elevated nitrate concentrations and act as an indication that action is required to prevent further pollution caused by nutrients.

2.7 Nitrates Directive

- 2.7.1.1 The Nitrates Directive (91/676/EEC; Council of the European Committees, 1991b²⁹) is an EU directive aimed at protecting water quality across Europe by preventing nitrates from agricultural sources from polluting ground and surface waters. The Nitrates Directive is part of the broader WFD and focuses on promoting sustainable agricultural practices to reduce nitrate pollution.
- 2.7.1.2 The Nitrates Directive has been transposed into Scottish law through a number of regulations of which the Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008 (2008¹⁰) is the latest. These regulations cover the actions farmers should take to prevent, or at least minimise the loss of nitrate from the farm to the water environment. Under these regulations, Nitrate Vulnerable Zones (NVZs) must be identified where water is polluted or at risk of pollution by nitrates. The goal is to protect drinking water supplies, aquatic ecosystems, and human health by promoting sustainable agricultural practices and reducing nutrient runoff into waterbodies.

3 Stakeholder Engagement

The Offshore Scoping Report (Volume 7, Appendix 2) was submitted to Marine Directorate - Licensing Operations Team (MD-LOT)ⁱ in September 2022, who then circulated the report to relevant consultees. A Scoping Opinion (Volume 7, Appendix 3) was received from MD-LOT on 13 January 2023.

There were no direct responses received regarding the WFD assessment for the Proposed Development (Offshore). However, various comments related to aspects considered in this WFD assessment are considered by consultation responses on the following EIAR chapters:

- Volumes 2, 3 and 4, Chapter 2: Marine and Coastal Processes;
- Volumes 2, 3 and 4, Chapter 3: Marine Water and Sediment Quality;
- Volumes 2, 3 and 4, Chapter 4: Benthic Subtidal and Intertidal Ecology; and
- Volumes 2, 3 and 4, Chapter 5: Fish and Shellfish Ecology.

ⁱ In 2023, Marine Scotland was renamed Marine Directorate, and thus the marine licensing and consents team is now referred to as Marine Directorate - Licensing Operations Team (MD-LOT).

4 Assessment Methodology

4.1 Guidance

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4.1.1 Background

- 4.1.1.1 This WFD assessment has been undertaken following the Environment Agency's 'Clearing the Waters for All' guidance (Environment Agency, 2023²²), used to assess the potential deterioration of transitional and coastal waterbodies. SEPA does not issue specific guidance on the WFD assessment and although Environment Agency jurisdiction does not extend to Scottish waters, the guidance contained within 'Clearing the Waters for All' provides an appropriate outline for WFD assessment in Scotland. Moreover, the spatial contiguity of European Sites and Annex I habitats across English and Scottish boundaries, and the cross-jurisdiction habitat use by biological qualifying features, support the relevance of this guidance. Additionally, to ensure a thorough and standardised approach to this assessment, advice has also been drawn from the Planning Inspectorate's Advice Note Eighteen: The Water Framework Directive (Planning Inspectorate, 2017³⁰).
- 4.1.1.2 Proposed developments within coastal or transitional waterbodies must comply with the requirements of the WFD and a compliance assessment must be carried out demonstrating that the project will not lead to deterioration in waterbody status. This WFD assessment focuses on those elements of the Proposed Development (Offshore) relevant to the offshore/coastal areas which are required to be assessed against the objectives for each relevant WFD waterbody (i.e., extending out to 1 nautical mile (nm) from Mean High Water Springs (MHWS)). As such, activities of relevance relate to the installation of the offshore export cables within 1nm of the coast and at the landfall (i.e., rather than considering any of the offshore elements of the scheme seawards of 1nm from the coast).

4.1.1.3 A WFD assessment may be undertaken in three stages:

- Stage 1 (Screening) to determine if there are any activities associated with the Proposed Development (Offshore) that do not require further consideration, such as activities that are considered 'low risk'.
- Stage 2 (Scoping) to identify risks of activities associated with the Proposed Development (Offshore) to receptors based on the relevant waterbodies and their water quality elements (including information on status, objectives, and the parameters for each waterbody).
- Stage 3 (WFD Impact Assessment) an assessment of potential impacts of the Proposed Development (Offshore), which identifies ways to avoid or minimise impacts, and shows project activities may cause deterioration or jeopardise the waterbody achieving good status.

4.1.1.4 Where the potential for deterioration of waterbodies is identified in the impact assessment, and it is not possible to mitigate the impacts to a level where deterioration can be avoided, the Proposed Development (Offshore) would need to be assessed in the context of Regulations 8 and 9 of The Water Environment (River Basin Management Planning: Further Provision) (Scotland) Regulations 2013 (Scottish Parliament, 2013⁸).

4.1.2 Screening Summary

- 4.1.2.1 According to the Environment Agency 'Clearing the Waters for All' guidance (Environment Agency, 2023²²), scoping is required for the Proposed Development (Offshore) as it is not a low-risk activity, and it is not a fasttrack or accelerated marine licence activity. As such, the requirement for a WFD assessment cannot be screened out for the Proposed Development (Offshore).
- 4.1.2.2 Initial screening information is necessary as part of the scoping stage to inform the WFD assessment. Additionally, screening the construction and operational activities of projects enables a high-level initial assessment of those activities that could impact on compliance parameters within WFD waterbodies. The necessary screening information is provided in Section 5 of this assessment.

4.1.3 Scoping Summary

- 4.1.3.1 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 activities. The receptors are:
 - Hydromorphology;
 - Biology Habitats;
 - Biology fish;
 - Water quality; and
 - Protected areas.
- 4.1.3.2 In addition, Invasive and Non-Native Species (INNS) must be considered during the scoping stage.
- 4.1.3.3 The criteria for consideration of a receptor during the scoping stage is outlined in Table 4-1.

Table 4-1: Criteria for inclusion of designated receptors during the WFD scoping stage.

Receptor	Criteria
Hydromorphology	Hydromorphology in the context of the WFD assessment is defined and assessed as changes to the physical characteristics of the waterbody including the size, shape, structure and (for marine bodies) the flow and quantity of water and sediment.
Biology (Habitats)	 Biological habitats (both those designated as higher or lower sensitivity habitats) will be scoped in if the footprint (including sediment plumes and dredging areas) of activities is: 0.5km² or greater; Less than 1% of the waterbody's area Within 500m of any higher sensitivity habitat; or Less than 1% of any lower sensitivity habitat.
Biology (Fish)	 The following impacts on fish are considered during scoping: 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.
Water Quality	 The impacts resulting from the proposed activities on water quality will be assessed in terms of: Whether it could affect water clarity, temperature, salinity, oxygen levels, nutrients, or microbial patterns continuously or for longer than a spring/neap tidal cycle; Whether it is in a waterbody with a phytoplankton status of moderate, poor or bad; or Whether the waterbody has a history of harmful algae. The water quality assessment will assess the potential for release of chemicals (on the EQSD list) and sediment bound contaminants as a result of the Proposed Development (Offshore).
INNS	INNS should be included in the WFD assessment, if the proposed activities have the potential to introduce or spread INNS to or within the area.

4.1.4 Impact Assessment Summary

4.1.4.1 Following the scoping stage, if it is determined that the impact assessment stage is required (i.e., a receptor cannot be scoped out), the Environment Agency (2023²²) guidance sets out that an impact assessment should be undertaken for each receptor identified as being at risk from the activity. The impact assessment should consider what (if any) pressures the activity may create on the marine 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.

- 4.1.4.2 Deterioration is defined as when the status (ecological or chemical) 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 (2023²²) 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. Where relevant, mitigation measures should be included to avoid or minimise risks of deterioration (if predicted).
- 4.1.4.3 If the activity may cause deterioration, 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 adjacent waterbodies.
- 4.1.4.4 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.
- 4.1.4.5 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.

4.2 Data Sources

- 4.2.1 Desk Study
- 4.2.1.1 The data sources that have been used to inform this WFD assessment are outlined in Table 4-2.

Table 4-2: Summary of key publicly available dataset to inform the WFD assessment.

Title	Author	Year
Scotland's Bathing Waters	(SEPA, 2023 ³¹)	2023
Water Classification Hub	(SEPA, 2022 ³²)	2022
Urban Waste Water Treatment Directive Areas 2019	(SEPA, 2019 ³³)	2019
Shellfish Water Protected Area: Maps	(Scottish Government, 2019 ³⁴)	2019
Nitrate Vulnerable Zones: Maps	(Scottish Government, 2015 ³⁵)	2015

- 4.2.2 Site-specific Surveys
- 4.2.2.1 Site-specific surveys were carried out to collect data within and surrounding the receiving area of the Proposed Development (Offshore) to inform the assessment of WFD compliance. These site-specific surveys are described in the sections below.

Environmental Baseline Report

- 4.2.2.2 Between March and June 2023, Gardline conducted an integrated survey on behalf of Caledonia Offshore Windfarm Limited (the Applicant) across the Caledonia OWF (Volume 7B, Appendix 4-1: Environmental Baseline Report (Array Area)) and OECC (Volume 7B, Appendix 4-2: Environmental Baseline Report (Offshore export Cable Corridor) located in the outer region of the Moray Firth.
- 4.2.2.3 The offshore survey data acquisition included sediment sampling and imagery to establish a baseline for the habitats and faunal communities within the survey area. Stations were sampled using a 0.1m² mini-Hamon grab (for Particle Size Analysis and macrofauna samples) and a 0.1m² Day grab (for sedimentary environmental DNA and contaminant samples).
- 4.2.2.4 Water conductivity, temperature and depth profiles were acquired to characterise water column properties, where temperature, salinity, turbidity, dissolved oxygen and pH were recorded against depth on each deployment.

Geophysical Survey

- 4.2.2.5 Geophysical survey data were successfully acquired across the Caledonia OWF and Caledonia OECC (Volume 7B, Appendix 4-6: Reconnaissance Geophysical Survey Interpretation Report). Acquisition comprised data from:
 - Multibeam Echo Sounder;
 - Side-Scan Sonar;
 - Magnetometer;

- Hull-mounted pinger; and
- Ultra-short baseline (USBL) and 2D ultra-high resolution seismic equipment.

The output of this survey provided information on bathymetry, seabed and sub-seabed features (including ship wrecks, cables and Oil and Gas wells).

4.2.3 Modelling

Physical Processes

- 4.2.3.1 Numerical modelling was conducted to support the Marine and Coastal Processes Technical Report (Volume 7B, Appendix 2-1: Marine and Coastal Processes Baseline Technical Report) and EIAR Chapters (Volumes 2, 3 and 4: Chapter 2: Marine and Coastal Processes). The Marine and Coastal Processes modelling report is provided in Volume 7B, Appendix 2-2 (Marine and Coastal Processes Numerical Modelling Report). The numerical modelling report provides information on the following:
 - Hydrodynamic and spectral wave models covering the coastal and marine regions of the Moray Firth;
 - Existing environmental conditions in the study area based on the numerical modelling results;
 - The effects of installation (of structures and cables) on water quality (e.g. disturbance of sediment); and
 - An assessment of the operational effects of the offshore infrastructure on hydrodynamics and waves.

Underwater Noise

4.2.3.2 Noise modelling was conducted to evaluate the potential underwater noise and its impacts during the construction of the Proposed Development (Offshore). The modelling focused on sources anticipated during both construction and operation, including piling, cable laying, dredging, drilling, rock placement, vessel movements, operational WTG noise, and unexploded ordnance (UXO) clearance. The results were analysed using relevant noise metrics and criteria to assess the impact of piling and other noises on marine mammals and fish. These findings were utilised to support biological assessments. The underwater noise assessment is provided in Volume 7, Appendix 6: Underwater Noise Assessment.

4.3 Data Limitations and Assumptions

4.3.1.1

1.1 While many of the baseline characteristics are well understood, some data sources or assumptions for the study area are less thoroughly studied or quantified. This section aims to identify areas of uncertainty and potential data gaps. Where possible, the assessment has been based on conservative assumptions, including maximum design parameters and modelling options, to incorporate an additional level of precaution into its findings.

- 4.3.1.2 At the time of writing, the 2023 (or 2024) WFD classifications are not available, and as such the most recent available 2022 classifications are utilised for the purpose of this assessment. This presents a limitation due to the potential for a changed (yet unreported) overall classification of relevant coastal and transitional waterbodies. However, there is public access to the history of designated waterbody status, alongside performance in specific biological, chemical and physical parameters, so an informed assumption can be made on the likelihood of the classification maintaining, increasing, or decreasing from that shown. Moreover, the in-depth site-specific surveys collected data on various water parameters (i.e. temperature, salinity, dissolved oxygen, turbidity and pH) all indicate a stable healthy coastal environment. The most recent classification for designated BWs has been published from the 2023 bathing season, so there is an up-to-date data on levels of harmful bacteria currently present in the BWs included in the assessment.
- 4.3.1.3 The water quality, seabed morphology, sediment types and potential contaminants are well-studied and are considered sufficient to characterise the study (and wider) area. Data available on Department for Environment, Food and Rural Affairs (Defra) Magic Maps (i.e., designation of biological habitats of lower and higher sensitivity) is primarily tailored to English waters. Notably, higher sensitivity biological habitats in Scotland are not represented by this data presented on Magic Maps. The presence or absence of higher sensitivity habitats are available from multiple datasets, including Scotland's NMPi, site-specific surveys, and Environmental Impact Assessments (EIAs) from preceding OWFs. These datasets can be used to characterise the potential biological receptor habitats within the buffer zone.
- 4.3.1.4 Overall, the available evidence base is sufficiently robust to underpin the WFD assessment presented within this report.

5 Screening

CALEDONA

5.1 Proposed Development (Offshore) Activities

- 5.1.1.1 This WFD assessment focuses on those elements of the Proposed Development (Offshore) of relevance to the offshore/coastal areas designated for WFD consideration. As such, the construction, operation and maintenance (O&M) and decommissioning activities of relevance relate to the proposed activities below MHWS. An assessment of inland WFD waterbodies (i.e., above MHWS) is presented in Volume 5, Chapter 6: Hydrology and Hydrogeology.
- 5.1.1.2 Full details of the Proposed Development (Offshore) activities are presented in Volume 1, Chapter 3: Proposed Development Description (Offshore). As outlined in Section 1, the Proposed Development (Offshore) may be divided into two phases, with separate consent applications for each phase, referred to as Caledonia North and Caledonia South.
- 5.1.1.3 The Proposed Development (Offshore) will comprise of WTGs and associated infrastructure required to transmit the power generated by the WTGs to the National Grid network via the grid connection. The relatively shallower Caledonia North is proposed to contain bottom-fixed WTG technology only, while the relatively deeper Caledonia South is proposed to contain either bottom-fixed WTG technology only, or a combination of bottom-fixed and floating WTG technology. The total Caledonia OWF footprint is approximately 423km², which comprises Caledonia North Site with a footprint of approximately 218.5km² and Caledonia South Site with a footprint of approximately 204.5km².
- 5.1.1.4 The shortest distance from the Caledonia OWF to a coastal waterbody is approximately 18km to the northwest (Noss Head to Halberry Head) and approximately 29km to the south (Macduff to Rosehearty). These coastal waterbodies are considered sufficient distances away such that proposed activities within the Caledonia OWF are unlikely to result in any material impact with regards to WFD Legislation objectives. Therefore, activities within the Caledonia OWF are not considered in this WFD assessment.
- 5.1.1.5 The components and activities associated with the Proposed Development (Offshore) and relevant to this WFD assessment are limited to the offshore export cables which will export power from the OSPs to shore. Up to four export cables will be required for the Proposed Development (Offshore), located in separate trenches within the Caledonia OECC, which will make landfall at Stake Ness on the Aberdeenshire coast, located to the west of Whitehills. The exact location and orientation within the Caledonia OECC will be confirmed following further geophysical and geotechnical survey information. The Applicant has made a commitment to develop and adhere to a Cable Plan. The Cable Plan will confirm cable routing, burial and any

additional protection required and will set out methods for post-installation cable monitoring.

- 5.1.1.6 Chemicals listed in the EQSD (2008a¹⁴) are not anticipated to be released intentionally into the environment during construction, O&M or decommissioning phases of the Proposed Development (Offshore). The Applicant has made a commitment to develop and adhere to an Environmental Management Plan (EMP) and a Marine Pollution Contingency Plan (MPCP). The EMP includes mitigation measures relevant to chemical usage and pollution prevention of note. The MPCP will identify potential sources of pollution and associated spill response and reporting procedures.
- 5.1.1.7 As presented in Volume 1, Chapter 3: Proposed Development Description (Offshore), the primary activities associated with the installation of offshore export cables considered to be relevant in regard to the WFD assessment are:
 - Seabed preparation works, such as, sandwave clearance via Trailing Suction Hopper Dredger;
 - UXO clearance;
 - Offshore cable installation techniques (e.g., Jet trenching, mechanical trenching, ploughing and Horizontal Directional Drilling (HDD));
 - Cable protection (e.g., concrete mattresses, rock placement, grout bags, iron cast, engineered cable protection systems) where burial is not achieved; and
 - Vessel movements associated with the above activities.

6 Scoping

CALEDON A

6.1 Relevant Waterbodies

- 6.1.1.1 As required under the Environment Agency (2023²²) guidance, coastal and transitional waterbodies were identified within 2km of the Proposed Development (Offshore).
- 6.1.1.2 The Caledonia OECC directly transects sections of both Findochty to Knock Head and Banff and Macduff coastal waterbodies. There are no additional coastal or transitional waterbodies that fall within the 2km WFD guidance buffer. As illustrated in Figure 6-1, the Deveron Estuary falls just outside the 2km buffer zone, located 4.63km to the east of the Caledonia OECC and Landfall Site at Stake Ness.

6.1.1.3 A summary of the available (2022) classification status of these coastal waterbodies are presented in Table 6-1.

Table 6-1: Summary of latest classification status (2022) for WFD coastal waterbodies within 2km of the Proposed Development.

	WFD Waterbody		
Parameters	Findochty to Knock Head	Banff and Macduff	
Waterbody ID	200497	200498	
Waterbody type	Coastal	Coastal	
Waterbody size (surface area)	135.3km ²	41.3km ²	
Overall status	Good	Good	
Overall ecology	Good	Good	
Physico-chemical	High	High	
Dissolved oxygen	High	High	
Dissolved inorganic nitrogen	High	High	
Biological elements	Good	Good	
Invertebrate animals	Good	Good	
Imposex assessment	-	Good	
Benthic invertebrates (IQI)	Good	Good	
Macroalgae	High	High	



Code: UKCAL-CWF-CON-EIA-RPT-00007-7B03 Rev: Issued Date: 18 October

	WFD Waterbody		
Parameters	Findochty to Knock Head	Banff and Macduff	
Macroalgae (Full Species List)	High	High	
Macroalgae (Reduced Species List)	High	High	
Phytoplankton	High	High	
Specific pollutants	Pass	Pass	
Copper	-	-	
Zinc	-	-	
Unionised ammonia	Pass	Pass	
Hydromorphology	High	High	
Morphology	High	High	
Water quality	Good	Good	
Chemical status	Pass	Pass	
Distance from OECC (km)	0	0	

6.2 Protected Areas

6.2.1.1 As required under the Environmental Agency (2023²²) guidance, the following WFD protected areas have been considered:

- Special Areas of Conservation (SACs);
- Special Protection Areas (SPAs);
- BWs;
- SWPAs; and
- Nutrient Sensitive Waters.





6.2.2 Special Areas of Conservation

CALEDON A

6.2.2.1 There are no SACs located within the 2km buffer of the Proposed Development (Offshore). The closest is the Moray Firth SAC with qualifying features including: kelp beds, ocean quahog and burrowed mud. The Moray Firth SAC is located 57.67km and 37.76km from the Caledonia OWF and Caledonia OECC, respectively. Therefore, no SACs have been scoped into this WFD assessment.

6.2.3 Special Protection Areas

6.2.3.1 There are no SPAs located within the 2km buffer of the Proposed Development (Offshore). The closest is the Moray Firth SPA with qualifying features including: Great northern diver (*Gavia immer*); Red-throated diver (*Gavia stellata*) and Slavonian grebe (*Podiceps auratus*) and associated supporting habitat. The Moray Firth SPA is located 29.38km and 3.83km from the Caledonia OWF and Caledonia OECC, respectively. Therefore, no SPAs have been scoped into this WFD assessment.

6.2.4 Bathing Waters

6.2.4.1 There are no BWs located within the 2km buffer of the Proposed Development (Offshore). The nearest BW is Inverboyndie, located near the small town of Inverboyndie in Aberdeenshire. Inverboyndie BW is located 2.55km from the Caledonia OECC and 37.09km from the Caledonia OWF. The most recent, 2022/23, classification of Inverboyndie was reported as 'Excellent' with a history of increasing status. Therefore, no BWs have been scoped into this WFD assessment.

6.2.5 Shellfish Water Protected Areas

6.2.5.1 There are no SWPAs located within the 2km buffer of the Proposed Development (Offshore). Within the Moray Firth there are two SWPAs, namely Cromarty Bay and Dornoch Firth. However, both areas are located within the Inner Moray Firth, greater than 70km to the west of Caledonia North and subsequently beyond the 2km buffer of the Proposed Development (Offshore). Therefore, no SWPAs have been scoped into this WFD assessment.

6.2.6 Nutrient Sensitive Waters

6.2.6.1 Nutrient sensitive waters comprise NVZs and polluted waters designated under the Nitrates Directive (91/676/EEC) and areas designated as sensitive areas under the Urban Waste Water Treatment Directive (91/271/EEC). CALEDON A Offshore Wind Farm

- 6.2.6.2 Of the five NVZs in Scotland, one is located within 2km of Proposed Development (Offshore), referred to as the Moray, Aberdeenshire/Banff and Buchanan NVZ. This means that farms in the NVZ must comply with the Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008. To note, the coastal waterbodies within 2km of the Proposed Development (Offshore) are classified as 'Good' overall status, with a high classification in regard to dissolved inorganic nitrogen concentration. Since NVZs are designated as areas vulnerable to nitrate from agricultural practices, and the Proposed Development (Offshore) involves no use of nitrates or agricultural activities, this WFD protected area will be screened out of further assessment.
- 6.2.6.3 There are no other sensitive areas within 2km of the Proposed Development (Offshore). The closest sensitive area to the Caledonia OECC is Boyne Burn/Corncairn Burn which is a river (ID: 23054), in the Banff Coastal catchment of the Scotland River Basin District. The main stem is approximately 26.0km in length. Specifically, this waterbody is sensitive for eutrophication and freshwater fish, where it is designated as a heavily modified waterbody on account of physical alterations that cannot be addressed without a significant impact on the drainage of agricultural land. Boyne Burn experiences diffuse pollution with main concerns relating to sources from agricultural practices. As previously mentioned, it is not considered that the Proposed Development (Offshore) offshore works will result in the introduction, release, or disturbances of nitrates. Additionally, given that Boyne Burn is outside the 2km buffer zone, this WFD protected area is excluded for further assessment.
- 6.2.6.4 Therefore, no nutrient sensitive waters have been scoped into this WFD assessment.

6.3 WFD Habitats

6.3.1.1 The Environment Agency (2023²²) guidelines define certain habitats as higher or lower sensitivity resulting in different considerations based on the classification. Higher sensitivity habitats must be included in the WFD assessment if the Proposed Development (Offshore) is within 500m of such habitats, whereas lower sensitivity habitats are scoped in if the activity footprint effects more than 1% of that habitat. Table 6-2 describes the recognised higher and lower sensitivity habitats.



Table 6-2: Categorisation of higher and lower sensitivity biological habitats.

Higher Sensitivity	Lower Sensitivity		
 Chalk Reef Clam, cockle and oyster beds Intertidal seagrass Maerl Mussel beds, including blue and horse mussel Polychaete Reef Saltmarsh Subtidal kelp beds Subtidal seagrass 	 Cobbles, gravel and shingle Intertidal soft sediments like sand and mud Rocky shore Subtidal boulder fields Subtidal rocky reef Subtidal soft sediments like sand and mud 		
Source: Environment Agency (2023 ²²)			

- 6.3.1.2 The maximum footprint of the Proposed Development (Offshore) can be estimated using the parameters of the offshore export cable to determine the potential area of a waterbody that may be impacted by the installation. This represents a highly conservative approach to ensure all possible effects from cable installation are accounted for. By assuming the installation of cables across the entire length of the waterbody multiplied by the width required per cable then the number of cables, the maximum seabed footprint of the Proposed Development (Offshore) within respective WFD waterbodies can be calculated.
- 6.3.1.3 The maximum footprint of the proposed activities, from boulder clearance and seabed preparation in the section of the Caledonia OECC that lies across relevant coastal waterbodies is approximately 0.11km² (11.11ha). When a 1.5 multiplier is applied to the footprint to account for dredging activities, the footprint is 0.17km² (16.67ha) across coastal waterbodies, which equates to:
 - Equivalent of 0.1% of the Findochty to Knock Head waterbody's total area (i.e., 0.17km² of 135.3km²).
 - Equivalent of 0.4% of the Banff to Macduff waterbody's total area (i.e., 0.17km² of 41.3km²).

6.4 Scoping Assessment and Conclusions

6.4.1.1 The scoping assessment is provided in Table 6-3, for each of the WFD receptors. A summary of the scoping conclusions is outlined in Table 6-4, outlining the receptors and impacts scoped into the impact assessment.



Table 6-3: Scoping assessment.

Consideration of Proposed Activities	Explanation	Scoped In (Yes/No)
Hydromorphology		
Potential impact on the Hydromorphology (for example morphology or tidal patterns) of a waterbody at high status	Both Findochty to Knock Head and Banff to Macduff are classified as 'High' status waterbodies. Changes to hydromorphological regimes (tidal currents, wave climate, littoral currents and sediment transport) are modelled in Volume 7B, Appendix 2-2: Marine and Coastal Processes Numerical Modelling Report, and discussed in Volumes 2, 3 and 4, Chapter 2: Marine and Coastal Processes. Offshore export cables will be installed at landfall using trenchless techniques, specifically HDD. These cables will make landfall at Stake Ness, approximately 1.5km west of Whitehills, Aberdeenshire. HDD involves drilling a long borehole underground with a drilling rig located within the landfall compound. This technique avoids interaction with surface features and is used to install ducts through which cables can be pulled. The length of HDD can vary depending on ground conditions, with the maximum length proposed for the Proposed Development (Offshore) being 1.2km. Using trenchless techniques like HDD will cause minimal direct disturbance to the existing coastline because it does not interact directly with, or leave any infrastructure exposed in, the active parts of the beach (between the drill's entry and exit points). Consequently, it will not impact littoral processes in these areas. Provided the cable remains buried beyond the HDD exit point, there is no possibility of interaction with, or effect on, nearshore beach processes or morphology, including coastal erosion. The design of the HDD operation will take this into account. Hydromorphology at Findochty to Knock Head and Banff to Macduff coastal waterbodies is not expected to be influenced by changes of the magnitude of the Proposed Development. Therefore, the effect on hydromorphology at coastal and intertidal receptors is considered to be of negligible adverse significance.	No
Potential to significantly impact the Hydromorphology of any waterbody	Hydromorphology will not be significantly impacted at any of the relevant waterbodies. Changes to hydromorphological regimes (tidal currents, wave climate, littoral currents and sediment transport) are modelled in Volume 7B, Appendix 2-2:	No

Consideration of Proposed Activities	Explanation	Scoped In (Yes/No)
	Marine and Coastal Processes Numerical Modelling Report, and discussed in Volumes 2, 3 and 4, Chapter 2: Marine and Coastal Processes.	
	For the same reasoning outlined above, hydromorphology at Findochty to Knock Head and Banff to Macduff coastal waterbodies is not expected to be influenced by changes of the magnitude of the Proposed Development (Offshore), and the effect on hydromorphology at coastal and intertidal receptors is therefore of Negligible adverse significance.	
Is the development type of the Proposed Development (Offshore) the same as the reason given for the waterbodies heavily modified status	Findochty to Knock Head and Banff to Macduff coastal waterbodies are not classified as heavily modified waterbodies. Therefore, no assessment of effects is required.	No
WFD Protected Areas		
Is the Proposed Development (Offshore) within 2km of any WFD protected area	The Proposed Development (Offshore) is not located within 2km of any SWPAs, BWs, SPAs or SACs (as noted in Section 6.2). Therefore, no assessment of effects is required.	No
	The Moray, Aberdeenshire, Banff and Buchan NVZ is within 2km; however, as the Proposed Development (Offshore) involves no use of nitrates or agricultural activities this WFD protected area has been scoped out of further consideration.	
Biology (Habitats)		
Is the maximum footprint of the proposed activities exceeds 0.5km ² or larger	The maximum footprint of the proposed activities, from boulder clearance and seabed preparation in the section of the Caledonia OECC that lies across relevant coastal waterbodies is approximately 0.11km ² (11.11ha). When a 1.5 multiplier is applied to the footprint to account for dredging activities, the footprint is 0.17km ² .	No
	Due to the boundaries of both coastal waterbodies and the angle of the Caledonia OECC in relation to the coastline, the footprint of activity transects both the Findochty to Knock Head and the Banff and Macduff coastal waterbodies. However, it is still possible that all cables are laid within the one coastal waterbody (and therefore, has	

Consideration of Proposed Activities	Explanation	Scoped In (Yes/No)
	been calculated as such). Regardless, the footprint is well below the 0.5km ² threshold and less than 1% of the waterbodies area, and therefore, no further assessment of effects is required.	
Does the footprint of the proposed activities exceed 1% or more of a waterbody's area	When a 1.5 multiplier is applied to the footprint to account for dredging activities, the footprint is 0.17km ² (16.67ha) across coastal waterbody's, which equates to: Equivalent of 0.1% of the Findochty to Knock Head coastal waterbody's total area; or Equivalent of 0.4% of the Banff to Macduff coastal waterbody's total area.	No
Is the Proposed Development (Offshore) within 500m of any higher sensitivity habitat	Due to the limited spatial coverage of Scotland on Defra's Magic Maps, it could not be determined whether the Proposed Development (Offshore) is within 500 meters of any higher sensitivity habitats. Therefore, biological habitats have been included in the assessment, where investigations will be conducted using available information and professional judgement. Site-specific surveys across the Caledonia OECC reported kelp beds intertidally which progressed as dense beds into the subtidal (Volume 7B, Appendix 4-5: Intertidal Survey Report). Therefore, there is potential for subtidal kelp beds within 500m of the Proposed Development (Offshore) and will require an assessment based on a conservative assumption that this higher sensitivity habitat is present.	Yes – conservative assumption
Does the footprint of the Proposed Development (Offshore) encompass 1% or more of any lower sensitivity habitat	Due to the limited spatial coverage of Scotland on Defra's Magic Maps, it could not be determined whether the footprint of the Proposed Development (Offshore) would encompass 1% or more of any lower sensitivity habitat. Additionally, site-specific surveys observed the presence of rocky shore habitats which were not visible on Defra's Magic Maps. Therefore, potential impacts to lower sensitivity habitats have been included in this assessment, where investigations will be conducted using available information and professional judgement.	Yes- conservative assumption
Invasive Non Native Species		
Potential to introduce or spread INNS	The installation of offshore export cables for the Proposed Development (Offshore) is unlikely to increase the risk of introducing INNS. The Applicant is committed to including an EMP including mitigation and procedures relevant to INNS, pollution	Yes

Consideration of Proposed Activities	Explanation	Scoped In (Yes/No)
	prevention and waste management will ensure that the risk of potential introduction and spread of INNS will be minimised. Structures places on the seabed (i.e., cable protection) will likely be colonised by a range of marine species. Cable protection for the Proposed Development (Offshore) may include concrete mattresses, rock placement, grout bags, iron cast, engineered cable protection systems. Some of these structures have the potential to act as artificial reefs and therefore could facilitate the spread of non-native species already present in the area. As cable protection may be installed along the Caledonia OECC there is potential for these structures to be implemented in either of the identified WFD coastal waterbodies.	
Biology (Fish)		
Is in an estuary and could affect fish in the estuary, or is outside an estuary but could delay or prevent fish entering it or could affect fish migration through the estuary	The activities associated with the offshore export cables for the Proposed Development (Offshore) will not take place near or within 2km of an estuary and it is highly unlikely to prevent fish entering, or affect fish migrating, through an estuary. This is further supported by Volumes 2, 3 and 4, Chapter 5: Fish and Shellfish Ecology which concluded that no significant impacts on fish populations (including migratory populations) were predicted as a result of the Proposed Development (Offshore).	No
Could impact on normal fish behaviour like movement, migration or spawning (for example by creating a physical barrier, noise, chemical change or a change in depth or flow)	The proposed activities will not cause a physical barrier to prevent fish from entering the estuaries or their migration patterns. The presence of the export cable buried in the seabed will not affect current speeds and will, as a worst-case result in a minor reduction in terms of total water depth at cable crossings. Therefore, changes to water depth and changes in currents (both tidal and non-tidal) are not considered to be significant and are not considered to impact on normal fish behaviour, such as, movement, migration or spawning.	Yes – noise and vibrations associated with trenchless cable installations
	Volumes 2, 3 and 4, Chapter 5: Fish and Shellfish Ecology presents full details of the noise modelling undertaken to determine the potential impacts of noise and vibration on fish receptors as a result of the proposed activities for the Proposed Development (Offshore). The primary sources of underwater noise impacts are anticipated to be installations via piling in the Caledonia OWF. Consequently, Volume 7, Appendix 6: Underwater Noise Assessment presents the results of modelling for various noise	

Consideration of Proposed Activities	of Proposed Explanation				
	levels, representing worst-case design scenarios for the installation of both monopiles and pin piles in the Caledonia OWF. However, during the installation of export cables across either Findochty to Knock Head or Banff to Macduff coastal waterbodies using trenchless methods there is potential for seabed preparation, drilling noise and vibrations to create a temporary barrier effect on fish. This concern is amplified by the fact that the Proposed Development (Offshore) is located in the Moray Firth, an inlet off the North Sea. It is crucial that access for migrating fish species is not blocked. Therefore, this potential impact on fish behaviour will require assessment in compliance with the WFD.				
	There will not be any outfalls or discharges associated with the Proposed Development (Offshore) and so 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 its implication on fish species will not be taken forward as a consideration of the impact assessment.				
Could cause entrainment or impingement of fish	No entrainment or impingement of fish will occur as a result of the Proposed Development (Offshore).	No			
Water Quality					
Could affect water clarity, temperature, salinity, oxygen levels nutrients or microbial patterns continuously for longer than a spring-neap tidal cycle (approximately 14 days)	It is not anticipated that the temperature or salinity would be affected as a result of export cable installation activities and therefore these parameters have not been taken forward to the impact assessment.	No			
	Given the extensive rocky habitat and exposed bedrock features at Stake Ness (see Volumes 2, 3 and 4, Chapter 4: Benthic Subtidal and Intertidal Ecology and Volume 7B, Appendix 4-5: Intertidal Survey Report), it was not considered feasible or realistic to include trenching techniques at landfall, as these methods would need to bring the offshore export cables ashore through the intertidal zone. Instead, it is anticipated that the HDD punch-out location will be situated within the shallow subtidal (likely between 10m and 40m water depths). The Design Envelope includes up to four HDD pits, which will need to be excavated/dredged.				
	Cable installation will cause short-term increases in suspended sediment concentrations (SSC) due to sediment resuspension. These impacts will be localized,				

Consideration of Proposed Activities	Explanation	Scoped In (Yes/No)
	with high SSC levels not dispersing significantly outside the Order Limits. Increased SSC will temporarily reduce water clarity (increase turbidity) and could release sediment-bound nutrients. Model results indicate that SSC increases of 1 to 4mg/l may occur for about seven hours following HDD activities (Volumes 2, 3 and 4, Chapter 2: Marine and Coastal Processes). Therefore, the direct and indirect effects of sediment resuspension are not anticipated to last continuously for longer than 14 days. Further consideration of this impact is included in Volumes 2, 3 and 4, Chapter 3: Marine Water and Sediment Quality.	
Is in a waterbody with a phytoplankton status of moderate, poor or bad	Findochty to Knock Head and Banff to Macduff coastal waterbodies are currently classified as being of high phytoplankton status, and therefore this has not taken forward for the impact assessment.	No
Is in a waterbody with a history of harmful algae	Findochty to Knock Head and Banff to Macduff coastal waterbodies do not have a history of significant and persistent algal blooms or toxic algal blooms and consequently will not be taken forward for further assessment.	No
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 proposed activities is bentonite (HDD 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 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 ³⁶). While bentonite is the only substance which may be released as part of the proposed activities, there is potential for accidental spills and pollution events of other substances (such as fuel oil). The Scoping Opinion (Volume 7, Appendix 3) received previously approved the methodologies presented in the Offshore Scoping Report (Volume 7, Appendix 2), which concluded accidental spills and pollution events would	No



Consideration of Proposed Activities	Explanation	Scoped In (Yes/No)
	be scoped out on the basis of the in-built measures, such as the EMP, and that standard practice is implemented.	
Disturbance of sediment with contaminants	The composition and grain size identified within the Caledonia OECC is predominantly sand with limited proportions of fine sediments. The site-specific surveys indicated there are no contaminants that exceed the Cefas Action Level 1 (also compared against Marine Directorate Action Levels) in the nearshore environment (both within and adjacent to the WFD waterbodies). Therefore, potential for disturbance of contaminated sediments has not been considered further.	No
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 (Offshore) does not have a discharge pipe or outfall, nor is there the intend to release substances on the EQSD list. Therefore, the Proposed Development (Offshore) will not have a mixing zone for these chemicals.	No

Table 6-4: Summary of receptors and impacts scoped into the impact assessment.

Receptor	Potential Risk	Waterbody/ Protected Areas	Risk issues for Impact Assessment
Hydromorphology	No	N/A	N/A
Biology (Habitats)	Yes	Findochty to Knock Head and Banff to Macduff coastal waterbodies	Potential proximity to higher sensitivity habitats Potential for less than 1% footprint across lower sensitivity habitats
Biology (Fish)	Yes	Findochty to Knock Head and Banff to Macduff coastal waterbodies	Could impact on normal fish behaviour like movement, migration or spawning (for example by creating a physical barrier, noise, chemical change or a change in depth or flow)
Protected Areas	No	N/A	N/A
INNS	Yes	Findochty to Knock Head and Banff to Macduff coastal waterbodies	Potential to introduce or increase the spread of INNS
Water Quality	No	N/A	N/A

7 Assessment of Effects

7.1 Biology (Habitats)

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- 7.1.1.1 As identified in Section 6.3, cable installation may result in temporary habitat loss/disturbance of less than 0.17km² across the Findochty to Knock Head and/or Banff to Macduff coastal waterbodies during the construction phase. The footprint of the Proposed Development (Offshore), using data sources such as Defra's Magic Maps and site-specific surveys, has been shown to intersect with some lower sensitivity habitats, including gravel and cobbles, subtidal soft sediment habitats, subtidal rocky reefs, and rocky shore habitats within these coastal waterbodies. Additionally, there is potential for unidentified higher sensitivity subtidal kelp beds. While their exact locations cannot be confirmed and approximate distances to the Caledonia OECC are unavailable, this assessment conservatively assumes their presence. This precautionary approach ensures that no oversight occurs within this assessment of compliance with the WFD.
- 7.1.1.2 The works associated with cable installation within the Findochty to Knock Head or Banff to Macduff coastal waterbodies include seabed preparation, cable installation into the seabed, and the use of HDD at the landfall, details of which are outlined in Volume 1, Chapter 3: Proposed Development Description (Offshore).
- 7.1.1.3 A characterisation of the benthic intertidal and subtidal habitats in the vicinity of the Proposed Development (Offshore) is provided in Volumes 2, 3 and 4, Chapter 4: Benthic Subtidal and Intertidal Ecology. These chapters concluded that there would be no adverse significant residual effects on benthic receptors from the habitat disturbance caused by the proposed activities in the Caledonia OECC. Specifically, this assessment determined that all biotopes have between a low to medium sensitivity to disturbances associated with the installation of offshore export cables. None of the likely affected biotopes are rare or geographically restricted, with comparable habitats distributed within the wider region and the Northern North Sea. Given the relatively small spatial scale of the temporary habitat disturbance, this loss is not expected to undermine regional ecosystem functions or diminish biodiversity.
- 7.1.1.4 With respect to installation activities, given the limited spatial and temporal extent of the works, it has been concluded that both faunal and floral population re-colonisation and recovery will occur from recovering and/or un-impacted communities in adjacent habitats. Maintenance activities during the operational phase are expected to be less than that for construction and are therefore of a reduced magnitude.
- 7.1.1.5 The HDD installation method is likely to avoid areas of potential subtidal kelp, as kelp are likely to be attached to subtidal boulders and in more rocky areas.

The punch-out area will be in a sediment area and as such should avoid any direct impact on potential kelp areas.

7.1.1.6 The impact on biology (habitats) is predicted to be of local spatial extent (i.e., restricted to discrete areas within the Proposed Development (Offshore)), short-term in duration (limited to the duration of construction activities), intermittent, and highly reversible. Therefore, **no deterioration** in the ecological status of this waterbody receptor is predicted. The Proposed Development (Offshore) is considered **compliant with WFD Regulatory requirements**, ensuring no deterioration in the status of either the Findochty to Knock Head or Banff to Macduff coastal waterbodies, nor prevent the waterbody from achieving future objectives under the WFD.

7.2 Biology (Fish)

7.2.1.1

A full and detailed assessment of relevant activities during the construction, O&M and decommissioning phases of the Proposed Development (Offshore) upon fish receptors is provided in Volumes 2, 3 and 4, Chapter 5: Fish and Shellfish Ecology, with further detail provided in Volume 7, Appendix 6: Underwater Noise Assessment. However, in regard to this WFD assessment, consideration is made for fish receptors within Findochty to Knock Head or Banff to Macduff coastal waterbodies, or nearby areas, which have the potential to be affected by generation of noise and vibrations resulting from Proposed Development (Offshore) activities at the Landfall Site. The installation of infrastructure may act as a barrier to fish that would typically inhabit or traverse these waterbodies. Underwater noise has been demonstrated to cause a range of negative effects on fish and marine life. These impacts include behavioural changes, such as avoidance and disruption of feeding; physiological stress and hearing damage; reproductive impairments; and the masking of critical environmental sounds necessary for normal functioning, such as predator-prey interactions and navigational cues. Additionally, excessive underwater noise can lead to physical injuries, including barotrauma and tissue damage, and can alter community structures within marine ecosystems.

7.2.1.2 Activities which are likely to generate underwater noise are those associated with general seabed clearance, installation and vessel operations, cofferdam installation for HDD operations at Stake Ness only (though the use of a cofferdam here is not anticipated) and any UXO specific seabed clearance. Trenchless techniques will be used to install cables below the Findochty to Knock Head or Banff to Macduff coastal waterbodies, thereby minimising direct, and indirect impacts on marine life. HDD involves drilling through the ground from an onshore HDD site compound to a point offshore beyond the intertidal area, ideally with sufficient water depth for the cable laying vessel to access. It is anticipated that the HDD punch-out location will be situated within the shallow subtidal area (likely between 10m and 40m water depths). This installation technique therefore presents the least disturbance in terms of

public access/use as well as reducing any environmental impact (particularly to intertidal and subtidal habitats).

7.2.1.3 Fish receptors of relevance to the Proposed Development (Offshore) include Group 1 (least sensitive), Group 2, and Group 3 (most sensitive). Those fish receptors of relevance to the Proposed Development (Offshore) are provided in Table 7-1. Where published peer reviewed literature for fish species hearing sensitivity is not available then Group 3 has been assumed to ensure that assessment is precautionary.

Hearing Category	Fish Receptors Relevant to the Proposed Development (Offshore)
Group 1 (least sensitive)	Lemon sole, plaice, sandeel, anglerfish, mackerel, thornback ray, spotted ray, blonde ray, common skate, spurdog, tope shark (<i>Galeorhinus galeus</i>), basking shark, river lamprey and sea lamprey.
Group 2	Atlantic salmon and sea trout.
Group 3 (most sensitive)	Herring, Cod, Sprat, Whiting, blue whiting, ling, Norway pouting, European eel, twaite shad, allis shad, haddock and European hake.
Eggs and larvae	Species with spawning grounds in affected areas (cod, herring, plaice, sprat, whiting and sandeel).
Source: Popper et al. (20	14 ³⁷).

Table 7-1: Hearing categories of fish receptors relevant to the Proposed Development (Offshore).

- 7.2.1.4 The migratory fish presented in Table 7-1 that are of relevance to this WFD assessment are: river and sea lamprey (Group 1); Atlantic salmon and sea trout (Group 2) and, European eel (Group 3).
- 7.2.1.5 Fish are expected to be broadly capable of adapting to impacts from underwater noise, including that originating from UXO clearance. Mobile species may adapt to the impact by temporarily leaving the area. Those species which rely on specific substrates for spawning are expected to have a reduced sensitivity to noise effects during specific biologically important activities however, in the immediate proximity (e.g., during piling) to be less capable to adapt. All affected species will have some measure of mobility, rapidly recolonising the affected area from adjacent locations, with the wider population capable of replacing any lost individuals. Of note, it is not envisaged that cofferdams will be required at the HDD punch-out locations, reducing any impacts associated with piling (i.e., killing, injury or behavioural disturbances).
- 7.2.1.6 The assessment presented in Volumes 2, 3 and 4, Chapter 5: Fish and Shellfish Ecology concluded that there would be no adverse residual significant effects upon fish receptors, including any migratory species, within the 50km zone of influence for underwater noise impacts through the

construction, operation and decommissioning phases, including activities across both the Caledonia OWF and Caldonia OECC.

7.2.1.7 It should be noted that the assessment of fish is largely associated with transitional (estuarine) waterbodies rather than coastal waterbodies under the WFD. There is **not predicted to be a deterioration** in the ecological status of the identified waterbodies within the assessment, with respect to fish species. The Proposed Development (Offshore) is therefore considered to be **compliant with the WFD Regulatory requirements**. The Proposed Development (Offshore) will not result in a deterioration of ecological status of these waterbodies or jeopardise the attainment of good status.

7.3 Invasive Non-Native Species

- 7.3.1.1 An assessment of the increased risk of introducing or spreading marine INNS due to the presence of infrastructure and vessel movements associated with the Proposed Development (Offshore) is provided in Volumes 2, 3, and 4, Chapter 4: Benthic Subtidal and Intertidal Ecology and Volumes 2, 3, and 4, Chapter 5: Fish and Shellfish Ecology.
- 7.3.1.2 The introduction of hard substrates into a sedimentary habitat may enable the colonization of these substrates by invasive/non-indigenous species, which otherwise would not have suitable habitats, thereby enabling their spread. Additionally, vessel movements in and out of the Proposed Development (Offshore) has the potential to impact benthic ecology and biodiversity locally and regionally.
- 7.3.1.3 The introduction of such hard structures may act as 'stepping stones,' potentially extending the impact beyond a local scale. However, based on current scientific knowledge, it is not possible to predict whether such a spread will occur, to what extent, or which species may be involved. Notably, the impact is more significant in the Caledonia OWF of the offshore region compared to the Caledonia OECC in coastal waters, due to the reduced volume of artificial structures in the latter area.
- 7.3.1.4 Colonisation may result in increased biodiversity; however, it represents a change from the area's baseline conditions. This change can be seen as positive or negative. Positive effects could include an increase in commercially important invertebrate species, benefiting commercial fisheries. Negative effects could involve the establishment of non-native species that outcompete existing taxa for habitat and food or prey on existing species, potentially leading to biodiversity changes and the formation of new habitats, such as those created by reef-forming species.
- 7.3.1.5 During the construction phase, up to 3,992 vessel trips across the Proposed Development (Offshore) will contribute to the risk of introducing or spreading INNS through ballast water discharge. Embedded measures outlined in Table 7-2 will ensure this risk is minimised. There is little evidence from other OWF developments in the North Sea of non-indigenous species adversely affecting

key species and habitats. Moreover, materials and vessels are likely to come from within European and/or UK waters, thus minimizing impacts, which are expected to be minor.

- 7.3.1.6 It should be noted that there is a widespread presence of marine INNS across the North Sea. Marine INNS that are widespread and well established in Scottish seas include, but are not restricted to, wireweed *Sargassum muticum*, green sea-fingers *Codium fragile* subsp. *tomentosoides*, red algae *Dasysiphonia japonica*, acorn barnacle *Austrominius modestus*, Japanese skeleton shrimp *Caprella mutica*, leathery sea squirt *Styela clava*, orange tipped sea squirt *Corella eumyota* and orange ripple bryozoan *Schizoporella japonica* (NatureScot, 2023³⁸).
- 7.3.1.7 Of note, embedded mitigation measures, including an EMP with a marine biosecurity plan (Table 7-2) will ensure that the risk of potential introduction and spread of marine INNS will be minimised as far as practicable. These measures will be strictly adhered to and have been considered in the overall assessment of the potential spread of marine INNS.
- 7.3.1.8 The sensitivity of benthic receptors to an introduction and/or spread of marine INNS is considered in Volumes 2, 3 and 4, Chapter 4: Benthic Subtidal and Intertidal Ecology. Overall, the increased risk of introduction and/or spread of marine INNS was considered not significant.
- 7.3.1.9 Volumes 2, 3 and 4, Chapter 5: Fish and Shellfish Ecology considered the impact of an increased risk of introduction and/or spread of INNS against the sensitivities of pelagic and demersal spawning fish, shellfish, elasmobranchs and diadromous fish. It was concluded that there would be no significant impacts on fish and shellfish species.
- 7.3.1.10 Therefore, taking into account the existing hard substrate within the waterbody and the proposed management of INNS, there is **not predicted to be a deterioration** in the status of the waterbody receptor.



Table 7-2: Embedded mitigation that will aid in preventing the spread of marine INNS.

Code	Mitigation Measure	Securing Mechanism
M-6	Wind farm infrastructure will be micro-sited, where possible, around any sensitive seabed habitats including Annex I habitat (if present) to avoid any developmental impacts on these conservation features.	To be secured as a condition of the Generation Asset and Transmission Asset Marine Licences for both Caledonia North and Caledonia South.
M-8	Development of and adherence to an Offshore EMP. The EMP will set out mitigation measures and procedures relevant to environmental management, including but not limited to the following topics: chemical usage, invasive non-native marine species, dropped objects, pollution prevention and contingency planning, and waste management.	To be secured as a condition of the Generation Asset and Transmission Asset Marine Licences for both Caledonia North and Caledonia South.
M-9	Development of and adherence to a MPCP. The MPCP will identify potential sources of pollution and associated spill response and reporting procedures.	To be secured as a condition of the Generation Asset and Transmission Asset Marine Licences for both Caledonia North and Caledonia South.
M-12	Development of and adherence to a Project Environmental Monitoring Programme (PEMP). The PEMP will set out commitments to environmental monitoring in pre-, during and post-construction phases of the Proposed Development.	To be secured as a condition of the Generation Asset and Transmission Asset Marine Licences for both Caledonia North and Caledonia South.
M-13	Development of and adherence to a Vessel Management Plan (VMP). The VMP will confirm the types and numbers of vessels that will be engaged on the Proposed Development (Offshore) and consider vessel coordination including indicative transit route planning.	To be secured as a condition of the Generation Asset and Transmission Asset Marine Licences for both Caledonia North and Caledonia South.

8 Conclusions

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8.1.1.1 This WFD assessment has considered the potential effects of the Proposed Development (Offshore) to ensure that the associated activities will not result in (or contribute to) a deterioration in the status of designated waterbodies or jeopardise the attainment of 'Good' status in the future. The conclusions of the different elements of the WFD assessment are summarised in Table 8-1.

	Table	8-1:	Conclusions	of the	WFD	assessment
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Receptor	WFD Assessment Conclusion
Hydromorphology	No deterioration in the status of the waterbody receptor is predicted.
Protected Areas	No deterioration in the status of the waterbody receptor is predicted.
Biology (Habitats)	No deterioration in the status of the waterbody receptor is predicted.
Biology (Fish)	No deterioration in the status of the waterbody receptor is predicted.
Water Quality	No deterioration in the status of the waterbody receptor is predicted.
INNS	No deterioration in the status of the waterbody receptor is predicted.

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