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Volume 6 Intertidal and Combined Assessments

Chapter 5 Intertidal Assessment

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Acronyms and Abbreviations

CEMP	Construction Environment Management Plan
EIAR	Environmental Impact Assessment Report
HDD	Horizontal Directional Drilling
HVAC	High Voltage Alternating Current
km	Kilometre
kV	KiloVolt
MPA	Marine Protected Area
MHWS	Mean High Water Spring
MLWS	Mean Low Water Spring
NETS	National Electricity Transmission System
OECC	Offshore Export Cable Corridor
OEC	Offshore Export Cable
OfTI	Offshore Transmission Infrastructure
OnTI	Onshore Transmission Infrastructure
OWF	Offshore Wind Farm
RLB	Red Line Boundary
SSC	Suspended Sediment Concentration
WTG	Wind Turbine Generators

5 Intertidal Assessment

5.1 Introduction

5.1.1.1 This chapter of Volume 6 of the Environmental Impact Assessment Report (EIAR) outlines the potential Proposed Development effects where there is an overlap between Mean High Water Spring (MHWS) and Mean Low Water Spring (MLWS) (henceforth referred to as the 'intertidal zone') for the Proposed Development (Offshore) and the Proposed Development (Onshore). The intention of this assessment is to provide a holistic overview of the Proposed Development effects from both the Proposed Development (Offshore) and the Proposed Development (Onshore), thereby providing confidence that neither the Proposed Development (Offshore) nor the Proposed Development (Onshore) is considered in isolation and that the 'whole Proposed Development' effects are understood.

5.1.1.2 Detailed assessments are presented within the relevant topic chapters as outlined in Table 5-1.

5.1.1.3 An overview of the Proposed Development considered for this intertidal assessment is outlined in Section 5.2.

5.2 The Proposed Development

5.2.1.1 A summary of the Proposed Development (Offshore) and the Proposed Development (Onshore) used in this intertidal assessment to determine the potential effects of the Proposed Development is presented below.

5.2.2 Proposed Development (Offshore)

5.2.2.1 As outlined in Volume 1, Chapter 5: Proposed Development Phasing, the Proposed Development (Offshore) will be delivered in two phases; Caledonia North (including Caledonia North Site and Offshore Export Cable Corridor (OECC)) and Caledonia South (Caledonia South Site and OECC). Both phases make up the Caledonia Offshore Wind Farm and are referred to collectively as the Proposed Development (Offshore).

5.2.2.2 For the purpose of this intertidal assessment, given that OECC in the intertidal zone is the same for both Caledonia North and Caledonia South, the design parameters and assessment of effects for the Proposed Development (Offshore) have been used, as set out within Volume 2 of the EIAR.

5.2.2.3 A full detailed description of the design parameters of the Proposed Development (Offshore) is provided in Volume 1, Chapter 3: Proposed Development Description (Offshore).

5.2.3 Proposed Development (Onshore)

5.2.3.1 The purpose of the Onshore Transmission Infrastructure (OnTI) will be to supply power generated by the Caledonia OWF to the National Electricity Transmission System (NETS) onshore. The power will be transmitted as a High Voltage Alternating Current (HVAC). To enable this, the following infrastructure, collectively referred to as the Proposed Development (Onshore), is proposed:

- Landfall Site – the area from MLWS landward where the Offshore Export Cable (OEC) are connected to the Onshore Export Cable Circuits within Transition Jointing Bays;
- Onshore Export Cable Circuits – These will transmit power underground between the transition joint bays and the Onshore Substation(s);
- Onshore Substation(s) – These are required to transform the power before feeding it into the NETS at the Grid Connection Point; and
- The Onshore Grid Connection Cable Corridor - connecting the Onshore Substation to the Grid Connection Point at the existing New Deer Substation (owned by Scottish Southern Energy Network - Transmission), via two onshore cable circuits with a nominal voltage of 400 kiloVolt (kV). This connection relates to Phase 1 of the Proposed Development only. The Onshore Grid Connection Cable Corridor for Phase 2 will be subject to a separate planning application.

5.2.3.2 The approach to the consenting of the Proposed Development (Onshore) aligns with the phased Proposed Development (Offshore).

5.2.3.3 A full description of the OnTI is provided in Volume 1, Chapter 4: Proposed Development Description (Onshore).

5.3 Intertidal Assessment

5.3.1.1 The Proposed Development (Offshore) and potential combined effects with the Proposed Development (Onshore) are presented in Table 5-1.

5.3.1.2 Whilst there are two OECCs (Caledonia North and Caledonia South), and two Marine Licence applications for the Offshore Transmission Infrastructure (OfTI), spatially these are the same at the intertidal zone. Additionally, consideration of the Proposed Development (Offshore) effects in this intertidal assessment ensures that a worst case of Caledonia North and Caledonia South has been considered. On this basis, separate intertidal assessments have not been produced for Caledonia North and Caledonia South, and it is proposed that this assessment is applicable to both Marine Licence applications for the OfTI.

5.3.1.3 The following topics have no impact pathway for potential whole Proposed Development effects and are therefore not considered further:

- Commercial fisheries;
- Shipping and navigation;
- Military and aviation;
- Other human activities;
- Land use; and
- Traffic and transport.

5.3.1.4 It should also be noted that the assessment of the Proposed Development (combined onshore and offshore) effects on Socio-economics, Tourism and Recreation and on Climate and Carbon is already undertaken within Volume 6, Chapter 2: Socio-Economics, Tourism and Recreation, Volume 6, Chapter 3: Climate Change Resilience and Volume 6, Chapter 4: Greenhouse Gases and is not repeated here.

Table 5-1: Potential impacts and residual effects from the Proposed Development (Offshore) and Proposed Development (Onshore) combined

Proposed Development (Offshore) Environmental Topic	Intertidal Assessment	Relevant Volume 5: Proposed Development (Onshore) Chapter
Marine and Coastal Processes (Volume 2, 3 and 4, Chapter 2)		
Construction	The Proposed Development (Onshore) will undertake Horizontal Directional Drilling (HDD) works above MHWS, exiting past MLWS offshore. As a result, there are no impact pathways between The Proposed Development (Offshore) and the Proposed Development (Onshore).	None applicable
Operation	There are no impact pathways for the Proposed Development (Onshore) to impact the Proposed Development (Offshore) during the operation and maintenance phase.	None applicable
Decommissioning	Impacts arising from decommissioning activities are considered to be similar, or less, than those which occur during construction. As a result, no significant intertidal effects are anticipated.	None applicable
Marine Water and Sediment Quality (Volume 2, 3 and 4, Chapter 3)		
Construction	There is a potential impact pathway from the Proposed Development (Onshore) and the Proposed Development (Offshore) in regards the Findochty to Knock Head Water Framework Directive coastal waterbody which is currently listed in 'Good' overall status. Construction of the Proposed Development (Onshore) may affect the water quality of watercourses which drain into the Findochty to Knock Head and thus subsequently its water quality. The Proposed Development (Onshore) will undertake HDD works above MHWS, exiting past MLWS offshore. Embedded mitigation in the form of a Construction Environment Management Plan (CEMP) will also be implemented which will detail appropriate construction drainage and pollution prevention controls. No	Volume 5, Chapter 6: Hydrology and Hydrogeology

Proposed Development (Offshore) Environmental Topic	Intertidal Assessment	Relevant Volume 5: Proposed Development (Onshore) Chapter
	significant effects to as a result of Proposed Development (Onshore) activities are anticipated. No significant effects are identified as a result of the Proposed Development (Offshore) on this waterbody seaward of MHWS. Therefore no significant effects as a result of the Proposed Development are anticipated.	
Operation and Maintenance	There are no impact pathways for the Proposed Development (Onshore) to impact the Proposed Development (Offshore) during the operation and maintenance phase.	None applicable
Decommissioning	Impacts arising from decommissioning activities are considered to be similar, or less, than those which occur during construction. As a result, no significant effects are anticipated.	None applicable
Benthic, Subtidal and Intertidal Ecology (Volume 2, 3 and 4, Chapter 4)		
Construction	The Proposed Development (Offshore) OECC passes through the Southern Trench Marine Protected Area (MPA) which is located in the outer Moray Firth and is designated to protect marine mammals, burrowed mud, fronts and shelf deeps. Volume 2, Chapter 4: Benthic Subtidal and Intertidal Ecology outlines that temporary increases in Suspended Sediment Concentration (SSC) and associated sediment deposition in the intertidal area are expected from the cable installation works and the release of drill cuttings and drilling mud from the trenchless technique, during high water. However, intertidal biotopes are not expected to be directly affected by trenching operations or bedform clearance and no significant effects are anticipated on the Southern Trench MPA. The Proposed Development (Onshore) will undertake HDD works above MHWS, exiting past MLWS offshore. As a result, there is limited potential for any effects associated with the Proposed Development (Offshore) given no works will occur in the intertidal zone and cables will be routed underground, thereby limiting the potential for effects on intertidal ecology receptors. The Southern Trench	Volume 5, Chapter 3: Terrestrial Ecology and Biodiversity

Proposed Development (Offshore) Environmental Topic	Intertidal Assessment	Relevant Volume 5: Proposed Development (Onshore) Chapter
	MPA is approximately 300m north of the OnTI Red Line Boundary (RLB) and could be subject to indirect effects resulting from onshore construction activities. It is anticipated that due to the high energy nature of the environment, any such pollutants would likely be readily dispersed and diluted to background levels over the distance between the event and the Southern Trench MPA. This, coupled with the application of the embedded mitigation measures, specifically the implementation of a CEMP and related pollution avoidance measures, will result in a non-significant effect on the Southern Trench MPA. Therefore no significant effects as a result of the Proposed Development are anticipated.	
Operation and Maintenance	There are no impact pathways for the Proposed Development (Onshore) to impact the Proposed Development (Offshore) during the operation and maintenance phase.	None applicable
Decommissioning	Impacts arising from decommissioning activities are considered to be similar, or less, than those which occur during construction. As a result, no significant effects are anticipated.	None applicable
Fish and Shellfish Ecology (Volume 2, 3 and 4, Chapter 5)		
Construction	The Proposed Development (Onshore) works may potentially impact diadromous fish where damage to freshwater habitats or interruptions to fish passage occur. With the application of standard best practice mitigation such as pollution prevention measures secured through a CEMP there are no significant effects anticipated to arise. The Proposed Development (Onshore) will undertake HDD works above MHWS, exiting past MLWS offshore. The noise and vibration from HDD activities onshore above MHWS can enter the water, though it is noted that basking sharks do not have hearing capabilities like marine mammals and are less vulnerable to injury or behavioural effects from underwater noise. As a result,	Chapter 3: Terrestrial Ecology and Biodiversity

Proposed Development (Offshore) Environmental Topic	Intertidal Assessment	Relevant Volume 5: Proposed Development (Onshore) Chapter
	no significant effects on Basking shark as a result of onshore activities are anticipated. Impacts relating to the HDD exit pits offshore such as localised increase in SSCs and potential effects on fish and shellfish ecology are assessed in Volume 2, Chapter 5: Fish and Shellfish Ecology with no significant effects anticipated. Therefore no significant effects as a result of the Proposed Development are anticipated.	
Operation and Maintenance	There are no impact pathways for the Proposed Development (Onshore) to impact the Proposed Development (Offshore) during the operation and maintenance phase.	None applicable
Decommissioning	Impacts arising from decommissioning activities are considered to be similar, or less, than those which occur during construction. As a result, no significant effects are anticipated.	None applicable
Offshore Ornithology (Volume 2, 3 and 4, Chapter 6)		
Construction	As a result of the spatial overlap between the Proposed Development (Onshore) and Proposed Development (Offshore) application boundaries and noting the mobility of bird species to be present in this area, the potential effects on ornithology within the intertidal area have been assessed in both Volume 2, Chapter 6: Offshore Ornithology and Volume 5, Chapter 3: Terrestrial Ecology and Biodiversity with no significant effects reported in either assessment.	Volume 5, Chapter 3: Terrestrial; Ecology and Biodiversity
Operation and Maintenance	There are no impact pathways for the Proposed Development (Onshore) to impact the Proposed Development (Offshore) during the operation and maintenance phase.	None applicable
Decommissioning	Impacts arising from decommissioning activities are considered to be similar, or less, than those which occur during construction. As a result, no significant effects are anticipated.	None applicable

Proposed Development (Offshore) Environmental Topic	Intertidal Assessment	Relevant Volume 5: Proposed Development (Onshore) Chapter
Marine Mammals (Volume 2, 3 and 4, Chapter 7)		
Construction	The Proposed Development (Offshore) OECC passes through the Southern Trench MPA which is located in the outer Moray Firth and is designated to protect Minke Whale, burrowed mud, fronts and shelf deeps. Potential effects as a result of the Proposed Development (Offshore) such as changes in water quality due to HDD exit pits and disturbance have been assessed in Volume 2 Chapter 7: Marine Mammals. No significant effects are identified. The Proposed Development (Onshore) will undertake HDD works above MHWS, exiting past MLWS offshore. The noise and vibration from HDD activities onshore above MHWS can enter the water and as a result there may be potential impacts on marine mammals susceptible to disturbance / displacement as a result of onshore noise and vibration. The Southern Trench MPA is approximately 300m north of the OnTI RLB and could be subject to indirect effects. During HDD works at the Landfall Site, the predicted airborne noise levels 50m from the works is 56 decibels, decreasing with distance (Volume 7E, Appendix 8-5: Evaluation of construction phase noise levels). Although the exact location of the terrestrial HDD works is not yet known, they will be landward of MHWS and the noise levels generated are anticipated to be negligible. Furthermore, mitigation measures have been proposed to limit the noise generated at the landfall HDD. As a result, potential inter-related effects of the Proposed Development (Onshore) works to marine mammals is anticipated to be not significant. Therefore no significant effects as a result of the Proposed Development are anticipated.	Chapter 8: Airborne Noise and Vibration
Operation and Maintenance	There are no impact pathways for the Proposed Development (Onshore) to impact the Proposed Development (Offshore) during the operation and maintenance phase.	None applicable

Proposed Development (Offshore) Environmental Topic	Intertidal Assessment	Relevant Volume 5: Proposed Development (Onshore) Chapter
Decommissioning	Impacts arising from decommissioning activities are considered to be similar, or less, than those which occur during construction. As a result, no significant effects are anticipated.	None applicable
Marine Archaeology and Cultural Heritage (Volume 2, 3 and 4, Chapter 10)		
Construction	The Proposed Development (Onshore) will undertake HDD works landward of MHWS, with exit pits occurring past MLWS offshore. As a result, there is limited potential for inter-related effects on marine archaeology and cultural heritage receptors given that cables will be buried, with no open cut trenching required for landfall activities. Effects on marine archaeology and cultural heritage receptors as a result of Proposed Development (Offshore) works such as HDD works and exit pits are considered in Volume 2, Chapter 10: Marine Archaeology and Cultural Heritage. No significant effects are identified. Therefore no significant effects as a result of the Proposed Development are anticipated.	Chapter 5: Terrestrial Archaeology and Cultural Heritage,
Operation and Maintenance	With respect to setting impacts there are no potential Proposed Development (Onshore) setting effects as a result of the presence of the Onshore Substation(s) (as the only visible onshore infrastructure) and the Caledonia OWF. This is due to the distance of the Onshore Substation(s) from the coast (approximately 37 kilometres (km) from the Landfall Site). An assessment was undertaken in regards the potential impact of the Proposed Development (Offshore) on designated heritage assets along the Caithness coast. The assessment identified that while the Proposed Development (Offshore) would be visible in wider long distance views of Moray Firth and/or the North Sea depending on the location of the identified assets, it is not considered that such an addition would lead to harm to the cultural significance of any of onshore assets or adversely impact their setting. Therefore no significant effects as a result of the Proposed Development are anticipated.	Chapter 5: Terrestrial Archaeology and Cultural Heritage

Proposed Development (Offshore) Environmental Topic	Intertidal Assessment	Relevant Volume 5: Proposed Development (Onshore) Chapter
Decommissioning	Impacts arising from decommissioning activities are considered to be similar, or less, than those which occur during construction. As a result, no significant effects are anticipated.	None applicable
Seascape, Landscape and Visual Impact (Volume 2, 3 and 4, Chapter 12)		
Construction	The only receptors where there may be material effects as a result of both the Proposed Development (Onshore) and the Proposed Development (Offshore) are along the coast in the vicinity of the Proposed Development (Onshore) Landfall Site where it will be visible at close range during construction whilst there are also views out to sea where the Proposed Development (Offshore) will also be visible during construction (note that this relates to Caledonia South only). Effects during construction on receptors on NCR1, B9139, the NE250 which follows the B9139 and then the same minor road as the NCR1 and coastal core path are assessed in within Volume 5, Chapter 4: Landscape and Visual as not significant. Effects on residents at Whitehills are assessed as being of medium-high sensitivity to the construction of the Proposed Development (Onshore). The effect during construction is assessed as significant, adverse, short-term and reversible. The effect will extend across the western edges of the village, where there is potential visibility of the Proposed Development (Onshore) during construction, while no effect will occur within the village where buildings screen it from view from more distant parts of the village to the east. Effects on residents at Whitehills is assessed in as being of Medium-High sensitivity in regards the construction of the Proposed Development (Offshore). The effect during construction is assessed Significant (Borderline) due to size and scale of the Wind Turbine Generators (WTG) particularly in comparison to existing Offshore Wind Farms (OWF) visible along the horizon. Effects are identified as adverse, short to medium term and temporary. The indicative programme shows that the Proposed Development (Onshore) construction works (which may include the Landfall Site HDD) and the installation of the WTGs for the Proposed Development (Offshore), may occur during a period of six months of the overall construction period.	Volume 5, Chapter 4: Landscape and Visual

Proposed Development (Offshore) Environmental Topic	Intertidal Assessment	Relevant Volume 5: Proposed Development (Onshore) Chapter
	It is assessed that the magnitude of change on the residential receptors and users of NCR1 and the core path between Whitehills and Easter Whyntie would increase only slightly from the Medium magnitude of change assessed locally in relation to the Proposed Development (Onshore) construction alone and would remain at a Medium magnitude as a result of the effects of the Proposed Development. The effect is assessed as Moderate and Significant, adverse, short-term and temporary. No further significant effects are assessed as a result of the short-term effects of the Proposed Development at this location.	
Operation and Maintenance	With respect to visual amenity and landscape character impacts there are no potential Proposed Development (Onshore) effects as a result of the presence of the Onshore Substation(s) (as the only visible onshore infrastructure) and Proposed Development (Offshore). This is due to the distance of the Onshore Substation(s) from the coast (approximately 37km from the Landfall Site). No operational effects are anticipated as a result of the Proposed Development (Offshore) OEC given it will not be visible as part of seascape views and maintenance vessels will largely be associated as a common feature of the baseline environment. Therefore no significant effects as a result of the Proposed Development are anticipated.	Volume 5, Chapter 4: Landscape and Visual
Decommissioning	Impacts arising from decommissioning activities are considered to be similar, or less, than those which occur during construction. As a result, no significant effects are anticipated.	None applicable

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