Pentland Floating Offshore Wind Farm

Environmental Statement: Offshore Non-Technical Summary

GBPNTD-ENV-NPC-AA-00001

PENTLAND FLOATING OFFSHORE WIND FARM

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Introduction

Highland Wind Limited (HWL) is submitting an application for consent under Section 36 (S.36) of the Electricity Act 1989 for the construction and operation of the Pentland Floating Offshore Wind Farm (PFOWF) and for Marine Licences under the Marine (Scotland) Act 2010 for the 'PFOWF Array' (the area in which the turbines will be located) and associated offshore export cable(s) (together comprising the 'Offshore Development').

HWL is majority owned by a fund managed by Copenhagen Infrastructure Partners (90%) with HexiconAB as a minority shareholder (10%). Project development activities are being led by CIP's development partner, Copenhagen Offshore Partners.

The PFOWF comprises both offshore and onshore components:

- **The 'Offshore Development':** All offshore components of the PFOWF including up to seven floating wind turbines connected by inter-array cables and supported by floating structures, mooring lines and anchors. Up to two offshore export cables will carry the power generated by the turbines to a landfall location at the Dounreay coast; and
- **The 'Onshore Development':** All onshore components associated with the PFOWF). Buried onshore export cables will transmit the power from the turbines inland connecting to the grid at an existing substation adjacent to the Dounreay Nuclear Power Station.

The PFOWF will test and demonstrate floating offshore wind technology. It will have a generating capacity of around 100 megawatts (MW) and the floating turbines will be located within the 'PFOWF Array', which is approximately 7.5 kilometres (km) off the coast of Dounreay, Caithness, in Scotland (as shown in **Figure 1** below). Water depths within the PFOWF Array range from 66 metres (m) to 102 m. The associated offshore export cable(s), will be installed within the Offshore Export Cable Corridor (OECC) that extends south from the PFOWF Array to a landfall location to the west of Dounreay Nuclear Power Station. The area to contain the PFOWF Array and OECC together comprise the 'Offshore Site'.

A planning application for the onshore components of the PFOWF (the Onshore Development) will be submitted separately to The Highland Council (THC) and so the Onshore Development is not included within this application. However, the potential for cumulative impacts of the entire PFOWF project (i.e., the Offshore Development with the Onshore Development) are considered within the Offshore Environment Impact Assessment Report (Offshore EIAR) where required. An assessment of cumulative impacts which could occur from the Offshore Development and other offshore, coastal, and onshore developments has also been considered.

The purpose of this Non-Technical Summary (NTS) is to summarise the findings of the Environmental Impact Assessment (EIA) and other key information contained within the Offshore EIAR, which has been prepared to support these applications. Full technical details of the EIA and all the assessments summarised here can be found within the Offshore EIAR and supporting Appendices.

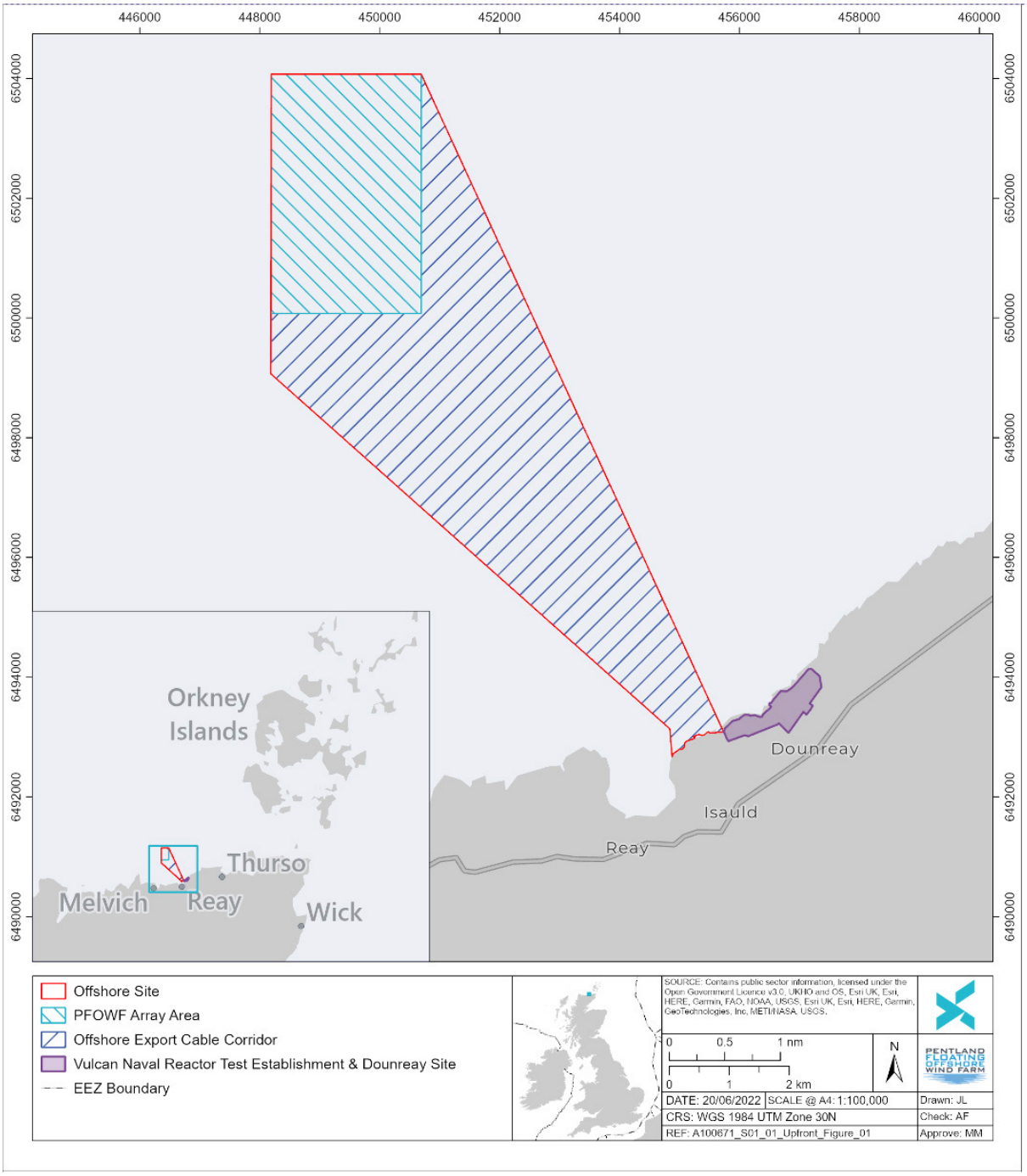


Figure 1 Offshore Site, including PFOWF Array and Offshore Export Cable Corridor

1 Background and Project Description

1.1. Project Background, Needs and Benefits

PFOWF is being developed by HWL, a Special Purpose Vehicle established to deliver the project, to test and demonstrate emerging floating offshore wind technologies in Scottish waters. HWL acquired the Dounreay Trì Floating Wind Demonstration Project (the 'Dounreay Trì Project'), previously owned by Dounreay Trì Limited (in administration), in 2021. The Dounreay Trì Project was granted onshore and offshore consents in 2017, which were assigned to HWL in March 2021. Due to developments in offshore wind farm technology in recent years, these previously granted consents are not being progressed and instead new S.36 Consent and Marine Licences are being sought for the Offshore Development. This Offshore EIAR accompanies the applications for these new consents. Whilst the Offshore Development is being developed at the same location (and instead of) the Dounreay Trì Project, it has a smaller footprint than the area that was previously consented.

The Scottish Government has set a new target for offshore wind capacity of 11 gigawatts by 2030, supporting the delivery of Scotland's 2019 Offshore Wind Policy Statement and the landmark Climate Change (Emissions Reductions Targets) (Scotland) Act (2019) (the 'Act'). The Act commits the Scottish Government to reaching net zero emissions of all greenhouse gases by 2045, five years ahead of the United Kingdom (UK). The Act also includes ambitious interim targets which require emission reductions of 75% by 2030 and 90% by 2040, compared to 1990 levels. The PFOWF will contribute towards meeting these targets by generating around 100 MW of renewable electricity whilst also helping to secure Scotland's reputation as a world leader in floating offshore wind technology. Critically, floating offshore wind has the potential for faster deployment than fixed-bottom offshore wind projects and can be used in deep-water sites, thereby enabling access to stronger and more consistent wind resources.

PFOWF will be capable of providing clean energy to approximately 70,000 homes, equivalent to around 65% of homes in the Highland Local Council Area (based on 2020 figures). It will also deliver economic benefits to the local community and Scotland by providing jobs and opportunities for the local supply chain.

1.2. Alternatives Considered

Throughout the development of the Project, a number of alternatives have been considered, culminating in the location and technology shown within the Project information below.

A Marine Scotland review carried out in 2014 of potential sites suitable for floating offshore wind technologies informed the starting point. From this, due to the other sites under consideration having greater technical complications and higher levels of fishing and environmental designations, the Dounreay location was selected as the most favourable.

Consent was granted for a floating offshore wind farm at this location in 2017, demonstrating the site's suitability for a floating wind farm project from an environmental perspective. Whilst a consent was granted, this was for a smaller project. Therefore, a review of the consented development's EIA and technical information was undertaken in consideration of the proposed PFOWF Project.

From this review the location was deemed suitable for the following reasons:

- Suitable water depths and location close to shore, thus reducing offshore export cable length,
- Low potential environmental impacts and costs compared with other sites;
- Good average wind speed, supporting reliable and efficient power generation;
- The site lies outwith more intensively fished areas;
- Comprehensive existing information on water depths and seabed conditions; and
- Proximity to suitable grid connection locations at Dounreay.

A number of different technologies were also considered. These technologies have been refined as the project team has gathered more information about the site and the technologies that will be suitable for the location. A summary of the technologies included in this application is shown in the following section.

1.3. The Project

PFOWF comprises offshore and onshore components and will have an installed capacity of around 100 MW. The Offshore Development, which includes the PFOWF Array and offshore export cable(s), is the focus of this application and NTS. The Onshore Development will include the onshore components that connect the wind farm to the grid at the existing Dounreay substation, including the onshore export cables, onshore substation and associated infrastructure. A separate application will be submitted to THC for the Onshore Development.

The Offshore Development's design is not final at this stage, and the EIA has been assessed using a 'Design Envelope' approach. The Design Envelope is flexible to accommodate innovations in turbine and floating substructure technologies as well as changes in environmental conditions and further understanding of site conditions.

Key components of the Offshore Development include:

- Up to seven wind turbines (up to 300-metre [m] to tip height);
- Up to seven associated floating substructures;
- Up to nine moorings for each floating substructure;
- Up to nine anchors or piles for each floating substructure;
- Dynamic (i.e. in the water column) and static (i.e. seabed laid) inter-array cables;
- Up to two offshore export cables (a continuation of the inter-array cables to bring power ashore); and
- Cable and scour protection, where necessary.

Figure 2 below provides an overview of the key offshore components of the PFOWF.

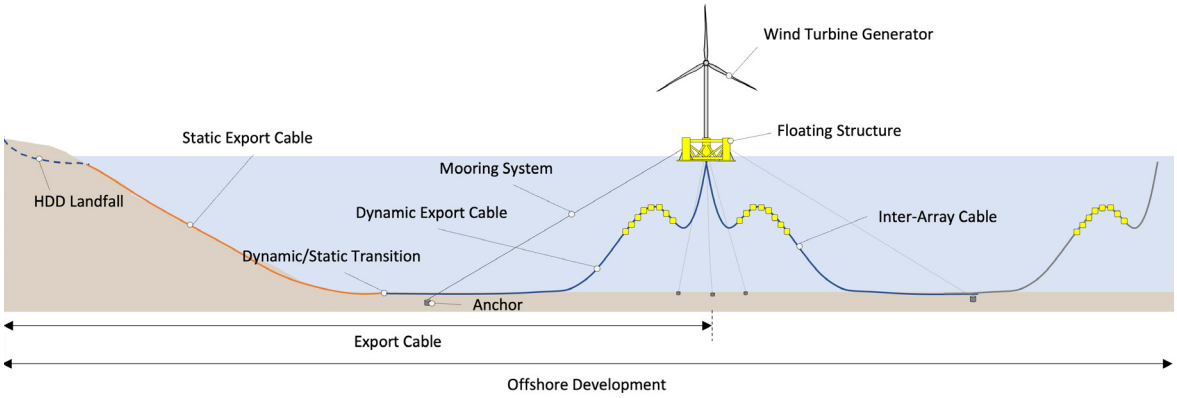


Figure 2 Key Project Components

A detailed construction programme will be developed as design and procurement activities progress. Construction of the Offshore Development is anticipated to begin in 2024 at the very earliest with limited construction works at the landfall horizontal directional drill (HDD) site. Construction of the turbines and installation of the offshore export cable(s) is then anticipated to take place in two stages with anchor installation taking place in the first year of construction (anticipated to be 2025 at the earliest) (Stage 1) and the offshore export cable(s) taking place during either Stage 1 or in the second year of construction (anticipated to be 2026 at the earliest) (Stage 2), but not both. The remaining offshore components are anticipated to be installed as part of Stage 2. A single wind turbine and associated floating foundation are likely to be installed during Stage 1, with the remaining turbines installed in Stage 2. Stages 1 and 2 are expected to take place over a total period of approximately 18 months. It is anticipated that the Offshore Development will be fully commissioned and operational by the end of 2026 at the earliest.

It should be noted that these are anticipated construction years only and it is possible that the construction programme may change. However, overall anticipated timescales for project works will remain the same.

1.3.1. Construction and Installation

In terms of installation works, the turbines and associated floating substructures are likely to be assembled at the quayside (assembly port is still to be determined) and towed to the PFOWF Array where they will be hooked up to a pre-installed mooring system. Installation of the mooring system and commissioning sequence of the turbines will vary, depending on the mooring design adopted. Seabed type and mooring design for the floating substructures will determine the type of anchors used (gravity, drag-embedded, vertical load or suction bucket) and type of pile (drilled or impact). The inter-array cables will be laid and hooked up to the turbines and then up to two offshore export cables will be laid to connect to the grid via the landfall. The turbines will then be commissioned.

1.3.2. Operation and Maintenance

Operation and maintenance activities are expected to be coordinated from an onshore harbour base located near the PFOWF. A variety of vessel types are likely to be required depending on the maintenance. The main access will be from crew transfer vessels, a hoist operation from a helicopter may be required during bad weather. The PFOWF Array is situated 7.5 km from the coast, in open waters where weather and sea state conditions can sometimes be extreme and access to the turbines may be limited. For repairs that cannot reasonably be completed at the PFOWF Array, the turbines may be towed to port or shallower water where a jack-up vessel can be used for repair.

1.3.3. Decommissioning

The Offshore Development's anticipated operational lifetime is up to 30 years from commissioning. As advances in technological capabilities for decommissioning and/or changes to legislation may occur over this time, best practices and legislation at the time of decommissioning will be applied. A Decommissioning Programme will be prepared based on industry best practices and submitted to Scottish Ministers for approval. It will be reviewed and updated every five years throughout the Offshore Development's life-cycle. HWL will seek to maximise the re-use of materials at the end of the Offshore Development's life-cycle and at the point of decommissioning.

1.4. EIA Methodology

The principal aim of undertaking an EIA is to ensure that the relevant competent authority determining an application for a particular development makes its decision in full knowledge of any potentially significant effects on the environment. The EIA methodology adopted and applied within the Offshore EIAR has been developed based upon the experience of technical experts with reference to industry best practice guidance and principles.

EIA is a process of systematically identifying the potential impacts and resultant effects (both beneficial and adverse) of a proposed development throughout all phases, including construction, operation and maintenance, and decommissioning. The potential impacts identified for each phase of a development are assessed for the development in isolation and cumulatively with other nearby developments.

For the Offshore Development, this process required a detailed understanding across all phases of the Offshore Development's life-cycle and the environment within which the Offshore Development will be located. Potential impacts were identified and then evaluated to determine whether the Offshore Development could have any effects on the environment and the significance of those effects. Where potential effects are likely to be significant, specific mitigation measures have been identified to manage, reduce, remove, or offset such effects where possible.

For all EIA topics assessed, the potential impacts of the Offshore Development were assessed based on the 'realistic worst case' parameters contained within the Design Envelope. These worst case parameters were discussed with consultees throughout the EIA process where appropriate. Worst case parameters, such as turbine height and number, mooring type, etc., necessarily differ from EIA topic to topic (e.g., the development design with the greatest potential to affect marine birds may not be the development design with the greatest potential to affect marine mammals). Within each chapter of the EIAR the worst case parameters for the receptors assessed are set out in full with clear justification as to why this is the case. Given that the worst case is based on the design option (or combination of options) that represents the greatest potential for change, confidence can be held that development of any alternative options within the design parameters will give rise to no effects greater or worse than those assessed within the EIAR.

1.5. Consultation

HWL have undertaken a range of consultation activities in advance of submission of the applications for the Offshore Development. Consultation has included:

- Virtual public engagement in the form of two online exhibitions held between 27th September and 31st October 2021 and in May 2022, including a series of question-and-answer sessions;
- In-person public engagement events involving drop-in events at the Reay Golf Course and the North Coast Visitor Centre in Thurso in May 2022;
- Engagement with consultees during the EIA Scoping phase and throughout the EIA process, to refine and inform the EIA approach and ensure that stakeholder concerns were considered; and
- Meeting with community councils and other community groups, such as fishing associations and sports councils.

In reviewing the stakeholder consultation responses associated with the original Dounreay Trì Project, HWL took a decision early in the design evolution of the Offshore Development to increase the distance between the PFOWF Array and the mainland coast by 1 km. The primary purpose of this setback was to reduce potential visual impacts by increasing the distance between the nearest turbines and the coast. Since that initial modification, the Offshore Development has been further refined following consultation responses and public engagement events. This refinement has decreased the size of the PFOWF Array area by 50% and substantially reduced the horizontal spread associated with the turbines, when viewed from the coast, further reducing potential visual impacts. Decreasing the size of the PFOWF Array area also minimises the overall footprint of the Offshore Development, which benefits several other receptors, including Commercial Fisheries, and Shipping and Navigation Users while decreasing direct impacts on the seabed.

Additionally, based on the Design Envelope presented in the EIA Scoping phase and during public engagement events, the maximum number of turbines to be deployed has decreased from 10 to seven, further reducing potential impacts, including visual impacts and impacts on birds, marine wildlife and the seabed.

2 Physical Environment

2.1. Marine Physical Processes

The PFOWF Array is located in relatively deep water, with a weak flow environment with a largely immobile seabed comprised mainly of sands and gravels, and a low content of finer sediment (clays and silts). The Offshore Site (including both the Array and OECC) is exposed to Atlantic storms and long-period swell waves, but due to the deep water, these waves have a minimal influence on the seabed until they reach shallower water. The coastline is formed of erosion-resilient, rocky intertidal areas and cliffs which are intersected by occasional small pocket beaches where wind and wave-driven sand has developed into a mature dune system.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development on Marine Physical Processes receptors were assessed. The impacts assessed included increases to suspended sediment, the loss / alteration of seabed type, changes to wave, tide, and sediment transport regime, the introduction of scour, and changes to stratification and fronts.

The worst case increases in suspended sediment were determined to occur in relation to construction activities for the gravity anchor solution. A sediment plume lasting up to six hours (but less than a full tidal cycle) could develop in relation to the construction activities and travel a total distance of about 5.5 km. Therefore, any potential impacts from increased suspended sediment during construction activities would be short term and localised. Construction activities were not considered to result in a permanent loss / alteration of seabed properties as the Offshore Development infrastructure would largely be removed at the end of the operation and maintenance phase and therefore any impacts on seabed properties would be temporary in nature. Overall, the construction impacts of the Offshore Development were assessed to be not significant.

The potential operational impacts of the Offshore Development were assessed as not significant in terms of changes to the wave, tide, or sediment transport regime. Although there was the potential for sediment transport to be interrupted due to infrastructure on the seabed, the properties of the infrastructure are such that there will be no discernible change to the flow conditions and therefore no long-term interruptions to sediment transport. With respect to the potential for scour, design mitigation measures for the Offshore Development include the installation of scour protection, if required, to remove the potential for development of scour. Overall, with consideration of embedded mitigation measures the operational impacts of the Offshore Development were assessed to be not significant. Decommissioning impacts were considered to be similar to, or less than those of construction activities and therefore not significant.

Cumulative effects of the Offshore Development with other projects in the area were also assessed. Cumulative effects were considered where projects had the potential to interact over the same area and/or on the same timeline as the Offshore Development. Due to the relatively limited spatial extent of effects from the Offshore Development all cumulative effects were assessed as not significant.

2.2. Water and Sediment Quality

Sediment across the Offshore Site is mainly smooth sand with some boulder fields occurring in the west, east and central areas. Sampling of sediments across the Offshore showed low to negligible occurrence of chemical contaminants and radioactive particles. Water quality assessments of two designated water bodies overlapping the Offshore Site define the water quality as either high or good condition.

Sampling and analysis for contaminants and radioactive particles were undertaken across the Offshore Site. The resulting information along with site-specific geophysical data were used to complete the assessment of potential impacts of the Offshore Development. Results from samples collected during the offshore surveys for contaminants and gamma spectrometry (for radioactivity) indicated a low occurrence of contamination across the Offshore Site.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development on Water and Sediment Quality receptors were assessed. The impacts assessed included the disturbance of contaminants or radioactive particles with onward effects to water and sediment quality, the potential for the introduction of Invasive Non-Native Species (INNS), and the potential for changes to water quality and status as a result of operational cleaning and painting. All effects were assessed as not significant. Decommissioning impacts were considered to be similar or less than those of construction activities and therefore not significant.

Cumulative effects of the Offshore Development with other plans and projects in the area were also assessed. Cumulative effects were considered where projects had the potential to interact over the same area and/or on the same timeline as the Offshore Development. Due to the relatively limited spatial extent of effects from the Offshore Development all cumulative effects were assessed as not significant.

3 Biological Environment

3.1. Benthic Ecology

The seabed within the PFOWF Array consists primarily of sand and gravels size with a number of larger boulders, whilst the seabed within the OECC consists primarily of sand and muddy sand. There are no Marine Protected Areas (MPAs), Special Area of Conservation (SACs), or protected habitats for benthic species within the Offshore Site. However, a number of protected species are known to utilise the Offshore Site, including ocean quahog, a bivalve mollusc that lives buried in sandy seabed all around the UK. Kelp beds are also present within the OECC at the landfall.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development on Benthic Ecology receptors were assessed. The impacts assessed included, damage from placement of infrastructure on the seabed, suspension of sediments from the installation of subsea infrastructure, including potentially contaminated sediments, temporary burial of seabed from drilled cuttings, introduction of INNS, colonisation of new subsea infrastructure and support structures, and impacts to benthic communities from any thermal load or electromagnetic fields (EMF) arising from the offshore cable(s) during operation.

The assessment concluded that the effects of the potential impacts assessed were not significant. During the construction phase, impacts will be temporary and localised, and embedded mitigation measures will be in place to manage interactions between potentially sensitive benthic habitats / species and construction activities. During the operation and maintenance phase, based on the localised spatial extent, any impacts are unlikely to affect the long-term functioning of the wider available habitat and therefore, the impacts were assessed as not significant. Decommissioning impacts were considered to be similar or less than those of construction activities and therefore not significant.

Cumulative effects of the Offshore Development with other plans and projects in the area were also assessed. Cumulative effects were considered where projects had the potential to interact over the same area and/or on the same timeline as the Offshore Development. Due to the relatively limited extent of effects from the Offshore Development all cumulative effects were assessed as not significant.

3.2. Fish and Shellfish Ecology

A number of protected species are known to utilise the Offshore Site and wider area, including monkfish, blue whiting, cod, common skate, European hake, haddock, herring, ling, mackerel, plaice, saithe, sandeel, spotted ray, spurdog, thornback ray, tope shark, and whiting. However, there are no MPAs or SACs for fish or shellfish within the immediate vicinity of the Offshore Site.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development on Fish and Shellfish Ecology receptors were assessed. The impacts assessed included disturbance or damage to sensitive species due to underwater noise generated from construction activities, direct habitat loss due to the disturbance of spawning and nursery grounds during the installation of cables and placement of anchors and mooring lines on the seabed, effects of increased sedimentation / smothering on fish and shellfish during construction activities, temporary burial of seabed from drilled cuttings, potential accidental release of pollutants, habitat loss of spawning and nursery grounds due to the presence of seabed infrastructure, effects of EMFs from cables on sensitive species, and fish aggregation around structures.

The assessment concluded that the effects of all impacts assessed were not significant. During the construction phase, impacts will be temporary and localised, and development design mitigation measures will be in place to manage interactions between potentially sensitive fish and shellfish species and construction activities. During the operation and maintenance phase, based on the localised spatial extent, any impacts are unlikely to affect the long-term functioning of the wider available spawning and nursery ground or migratory routes for fish and, therefore, the impacts were assessed as not significant. Decommissioning impacts were considered to be similar or less than those of construction activities and therefore not significant.

Cumulative effects of the Offshore Development with other plans and projects in the area were also assessed. Cumulative effects were considered where projects had the potential to interact over the same area and/or on the same timeline as the Offshore Development. Due to the relatively limited spatial extent of effects from the Offshore Development, combined with embedded mitigation measures in place, all cumulative effects were assessed as not significant.

3.3. Marine Mammals and Other Megafauna

A number of Marine mammal species (dolphins, whales and seals) and other marine megafauna (i.e., basking shark) are known to frequent the Pentland Firth area. These include bottlenose dolphin, common dolphin, harbour porpoise, Risso's dolphin, and white-beaked dolphin grey seal and harbour seal and minke whale. Sightings of basking sharks in the Pentland Firth are irregular and the Offshore Site does not appear to form a vital habitat for this species.

Site-specific aerial surveys were conducted across the Offshore Site, one in each month between January and December 2015 and between September 2020 and August 2021. This data was combined with desk-based sources to inform the assessment.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development on Marine Mammals and Other Megafauna receptors were assessed. The impacts assessed included underwater noise, collision and entanglement risk, barrier and displacement effects, long-term habitat change, and the presence of EMFs.

Underwater noise modelling indicated that no injury-related effects on marine mammals and other megafauna would occur with the implementation of embedded mitigation measures and any disturbance would be temporary and/or localised, and therefore, not significant. The effects of collision and entanglement risk, barrier and displacement effects, long-term habitat change (e.g., from changes in prey distribution or abundance) and EMF effects were also considered to be not significant.

The impact of collision and entanglement risk, long-term habitat change and EMF will be reduced through the implementation of embedded mitigation measures, such as monitoring of mooring lines for marine debris, checking and cleaning of the infrastructure to remove marine organisms and cable burial or protection wherever possible to reduce EMF emissions. Barrier and displacement effects were also limited as the infrastructure of the Offshore Development will not obstruct any important coastal areas and individuals will be able to move freely between locations by crossing the OECC or travelling through the PFOWF Array. Decommissioning impacts were considered to be similar or less than those of construction activities and therefore not significant.

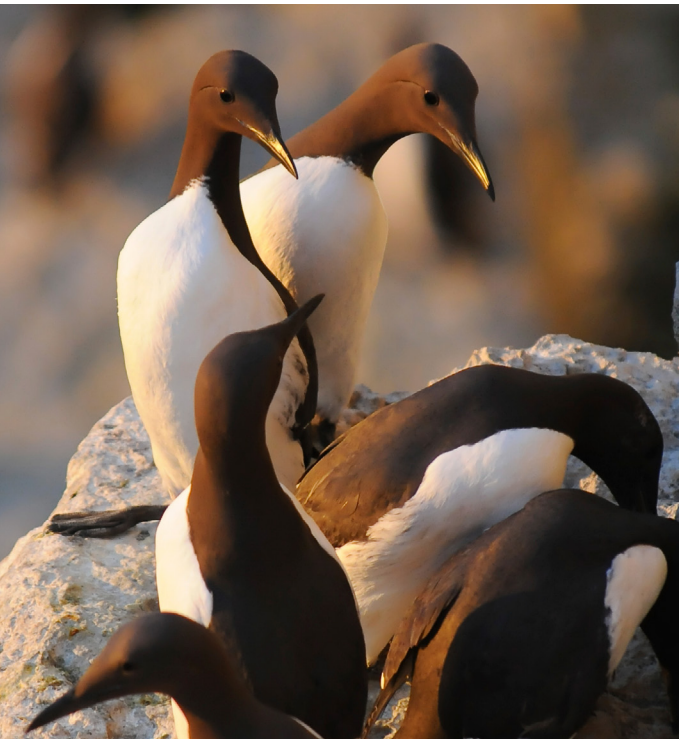
Cumulative effects of the Offshore Development with other plans and projects in the area were also assessed. Cumulative effects did not increase the magnitude of impact for the impacts assessed for the Offshore Development alone, and all cumulative effects were assessed as not significant. Effects on Marine Mammal and Other Megafauna receptors in other countries (i.e. transboundary impacts) were also considered to be not significant. Whilst several cetacean species have Management Units (Mus) with ranges which extend into international waters, and basking sharks are known to travel across the western European coastline, these populations will not be significantly impacted by any of the proposed activities during any phase of the Offshore Development.

3.4. Marine Ornithology

Situated to the west of Scapa Flow and to the north of Caithness, the Offshore Site is relatively sheltered from high tidal speed, wave heights and main shipping routes. The region is known to support multiple seabird species, with a number of important nearby breeding colonies, many protected through the designation of Special Protection Areas (SPAs).) Seabirds from these colonies are likely to forage in or transit through the area of the Pentland Firth where the Offshore Development is located.

In order to estimate the abundance and distribution of different seabird species at the Offshore Site, two years of aerial surveys were conducted, one in each month between January and December 2015 and between September 2020 and August 2021. The main seabird species found at the Offshore Development include, black-legged kittiwake, guillemot, razorbill, Atlantic puffin, northern fulmar, and northern gannet. These species are associated with nearby SPAs, with the greatest numbers of birds likely to be coming from the North Caithness Cliffs SPA as it is the closest SPA within foraging range.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development on Marine Ornithology receptors were assessed. The impacts assessed included possible collision with turbines, displacement from the PFOWF Development Array, barrier effects (where birds have to fly round the PFOWF Array), impacts on prey species, entanglement with debris caught on mooring lines, increase in suspended sediment affecting visibility, noise disturbance and creation of roosting habitat or foraging opportunities.



The assessment concluded that potential disturbance to all seabird species due to construction noise or physical presence of vessels, potential changes in habitat/prey availability during construction and potential increases in suspended sediment affecting visibility during construction were not significant. The assessment also concluded that impacts during the operation and maintenance of the Offshore Development were not significant.

Once operational, the main impacts on seabirds from the Offshore Development were considered to be potential collision with turbines and displacement or barrier effects. Collision risk modelling indicated that a low number of collision mortalities for some bird species may occur. However, no significant effects were determined. During decommissioning of the Offshore Development, seabirds may be exposed to the same impacts as during the construction phase. Decommissioning impacts were considered to be similar or less than those of construction activities and therefore all decommissioning impacts were assessed as not significant.

Cumulative impacts with other developments were also assessed; Beatrice, Moray East and Moray West offshore wind farms (all in the Moray Firth) are the projects most likely to be affecting the same seabird populations as the Offshore Development. The impacts potentially arising from the Offshore Development, including estimated collision and displacement mortalities were not predicted to add significantly to any cumulative effects with the other developments assessed.

4 Human Environment

4.1. Commercial Fisheries

The Offshore Site is in an area used by vessels operating a number of different fishing methods. The fishing effort within the PFOWF Array is predominantly by demersal trawlers and seine netters (i.e., vessels using conical nets towed along the seabed), and creelers (i.e., pots and traps set on the seabed), whilst the fishing effort within the OECC is predominantly by creelers and scallop dredgers. Key commercial fish and shellfish species in the Offshore Site include cod, crab, haddock, lobster, and scallops. Herring, mackerel, and squid are also key commercial fish species for the wider surrounding area.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development on Commercial Fisheries receptors were assessed. The impacts assessed included loss of access to fishing grounds, displacement of fishing effort, snagging and gear entanglement risks (in relation to subsea infrastructure and mooring lines in the water column), and the obstruction of fishing transit routes (e.g., due to vessels having to route around the Offshore Development).

The assessment concluded that the effects of all impacts assessed on creelers, demersal trawlers, seine netters, scallop dredgers, and non-UK fishing fleets were not significant. During the construction phase, impacts will be temporary and localised, and embedded mitigation measures will manage interactions between fishing vessels and construction activities. During the operation and maintenance phase, it is expected that vessels operating towed gear are unlikely to resume fishing within the PFOWF Array, due to the potential safety risks associated with the presence of mooring lines in the water column. However, given that the area of the PFOWF Array represents a small extent of the available fishing grounds in the area and the fact that it is anticipated that fishing along the offshore export cable route will be able to resume, the effect of loss of access to fishing grounds and displacement has been assessed as not significant. Gear entanglement and snagging risk associated with the mooring lines within the water and the presence of subsea infrastructure will be minimised by adequate charting of the Offshore Development infrastructure and the preparation of emergency response procedures in consultation with fisheries stakeholders. Given the localised and compact area of the Offshore Development, any obstruction of regular fishing transit routes is not likely to result in significant re-routing of transiting vessels, and therefore has been assessed as not significant. Impacts during the decommissioning phase were also assessed. Impacts associated with decommissioning activities were considered to be similar or less than those of construction activities and therefore not significant.

Cumulative impacts of the Offshore Development with other plans and projects in the area were also assessed. Cumulative impacts were considered where projects had the potential to interact over the same area and/or on the same timeline as the Offshore Development. Due to the localised extent of impacts from the Offshore Development, combined with embedded mitigation measures in place, all cumulative impacts were assessed as not significant.

4.2. Shipping and Navigation

Shipping and navigation activity within and in proximity to the Offshore Site was characterised by site-specific vessel traffic surveys, desk-based studies, a review of past accidents, and stakeholder consultation. Key navigational features were identified in proximity to the Offshore Site, including harbours, aids to navigation, subsea cables, and international ship routeing measures.

The main survey data comprised 28 days split equally between Summer and Winter 2021. During the summer survey, an average of 24 unique vessels per day were recorded within 10 nautical miles of the Offshore Site, with the main vessel types being cargo (37%) and fishing (25%) vessels. During the winter survey, an average of 17 unique vessels per day were recorded, with the main vessel types being cargo (41%) and fishing (31%) vessels. Additional data sources were analysed to assess the impact of the COVID-19 pandemic on the vessel traffic data collected during the 2021 surveys.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development on Shipping and Navigation receptors were assessed. These impacts included:

- Vessel displacement leading to increased vessel collision risk and/or reduced port access;
- Collison risk between Offshore Development vessels and third-party vessels;
- Vessel-to-structure allision risk (both vessels under power which are errant due to human error and vessels drifting not under command due to machinery failure);
- Anchor interaction with subsea infrastructure (i.e., cables and moorings);
- Fishing gear interaction with subsea infrastructure;
- Transiting vessel interaction with subsea infrastructure;
- Reduction in under keel clearance due to subsea infrastructure;
- Loss of station of a floating structure due to mooring failure; and
- Reduced emergency response capability.

With the relevant development design mitigation measures in place, all the risks / impacts were assessed to be broadly acceptable or tolerable with mitigation were therefore assessed as not significant. Decommissioning impacts were considered to be similar or less than those of construction activities and were therefore assessed as not significant.

All cumulative effects, including vessel displacement due to the presence of project vessels associated with the SHE Transmission Orkney-Caithness Project and the reduction in under keel clearance due to subsea cables / cable protection associated with the SHE Transmission Orkney-Caithness Project, were assessed as broadly acceptable and therefore assessed as not significant.

4.3. Aviation and Radar

Information on Aviation and Radar receptors was collected through a detailed desk-based review of existing studies and datasets. This review utilised comprehensive aviation documentation and charts to identify potential Aviation Receptors for all phases of the Offshore Development. It was assessed that the PFOWF Array is located in a relatively uncomplicated area of airspace outside the coverage of existing (Air Traffic Control and Air Defence) Primary Surveillance Radars.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development on obstacle collision risk to Aviation and Radar receptors were assessed. The desk-based review, coupled with consultation responses from the relevant aviation stakeholders, determined that only two aviation receptors could potentially be affected by the Offshore Development: Wick Airport Instrument Flight Procedures (IFPs); and military low-flying and UK Search and Rescue (SAR) helicopter operations.

For Wick Airport's IFPs, the assessment concluded that no IFPs would be affected by turbines within the PFOWF Array. However, if the turbines were to be assembled at a construction port within 55.5 km (30 nautical miles) of Wick or Kirkwall Airport, the construction port would also be subject to an IFP impact assessment. Beyond this distance, it is considered there would be no impact. Once the construction port is selected, should a potential impact be identified, HWL have agreed that a further IFP assessment would need to be carried out.

For military low-flying and UK SAR helicopter operations, pilots are ultimately responsible for seeing and avoiding obstructions. Turbines, however, can be difficult to see from the air, particularly in poor meteorological conditions, leading to a potential increase in obstacle collision risk. To mitigate this risk, the turbines at the PFOWF will be fitted with Ministry of Defence-accredited aviation safety lighting and the Offshore Development will be included on aviation charts. For UK SAR helicopter operations, the lighting and marking arrangements and turbine layout will be agreed upon with the Maritime and Coastguard Agency (MCA) to ensure compatibility with UK SAR helicopter operations. These and other development design mitigation measures identified will ensure that the overall effect on military low-flying and UK SAR helicopter operations is minor and not significant.

The predicted impacts from the Offshore Development on Aviation and Radar receptors are localised within the footprint of the PFOWF Array. As the turbines are not considered detectable by any radar system, the Offshore Development will not result in any cumulative effect on radar systems. In addition, given the distance of the Offshore Development from known offshore and onshore developments, the PFOW Array is also not considered to present any cumulative effect on military low-flying or UK SAR helicopter operations in the region.

4.4. Seascape, Landscape, and Visual Amenity

The SLVIA Study Area for the Offshore Development covers a radius of 50 km, in line with best practice and as agreed during consultation. Within and within this area, those receptors with the potential to be significantly affected were assessed in detail. This included five Landscape Character Types (LCTs) / eight Landscape Character Units (LCUs), ten Local Coastal Character Areas (LCCAs), four designated landscape areas, two Wild Land Areas (WLAs), 16 viewpoints and one route used by visual receptors.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development on Seascape, Landscape, and Visual Amenity receptors were assessed. The focus of the assessment has been the effects of the Offshore Development during the operational phase. The wind turbine generators (turbines) will be constructed off-site, such that the construction phase will be based around the installation of the turbines which will therefore have a similar effect to the operational phase. Similarly, the effects during the decommissioning phase, when the turbines and other infrastructure will be removed, will be no greater than the effects assessed in respect of the operational phase. Therefore, impacts assessed include operational effects on LCTs, LCCAs, landscape designations and WLAs, and representative viewpoints.

The Offshore Development will give rise to some significant effects on coastal and landscape character in the area between Strathy Point in the west and Crosskirk in the east, with the closest coastal edge at a minimum of approximately 7.5 km from the Offshore Development. The significant effects will extend inland to the south and south-west to cover an extent of up to 13 km. The Offshore Development will also give rise to significant effects on visual amenity on most viewpoints out to approximately 13 km and on sections of the A836 between Hill of Scrabster and Strathy Point. The only designated landscape that will undergo significant effects will be the regionally designated Farr Bay, Strathy and Portskerra Special Landscape Area (SLA). The effects are, therefore, found to be especially localised, within the 50 km SLVIA Study Area, affecting only a limited part of the coast and hinterland that currently has some development characteristics in the form of energy developments and onshore wind farms. The localised nature of these effects means that the majority of the Seascape, Landscape, and Visual Amenity receptors across the wider SLVIA Study Area will either undergo no significant effects or will not be affected.

Significant cumulative effects were also identified for several Seascape, Landscape and Visual Amenity receptors. However, such localised effects from the Development ensure that the cumulative effects with other developments are also not far-reaching, and therefore, for the majority of the Seascape, Landscape and Visual Amenity receptors, cumulative effects are not significant.

4.5. Marine Archaeology and Cultural Heritage

Desk-based and marine geophysical surveys were undertaken to inform the assessment and identify the likely presence of marine historic environment assets (e.g. environmental and prehistoric deposits, artefacts, shipwrecks, aviation crash sites, and debris associated with wreck or crash sites on the seabed and across the intertidal area). From the various surveys conducted no such assets were identified, and therefore, the assessment of impacts on known marine archaeology and cultural heritage was scoped out of further assessment. Marine historic environment assets sometimes go undiscovered, however, given the surveys conducted to date for the PFOWF, this is considered to be a low risk.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development from damage to or loss of Marine Archaeology and Cultural Heritage receptors were assessed. The impacts assessed included loss of or damage to unknown marine and intertidal historic environment assets and submerged prehistoric landscapes and adverse effects to the setting of onshore historic environment assets.

All effects on marine and intertidal archaeological features were assessed as not significant, as the likelihood of impact was considered to be very low. To minimise the risk of damage to, or loss of, marine archaeological and cultural heritage assets, HWL will set out specific mitigations that will minimise impacts on any such assets, including a Protocol for Archaeological Discoveries, which will be developed specifically to minimise the risk of damage to any previously unrecorded archaeological remains.

The potential adverse effects on the setting of onshore historic environment assets were assessed as moderately significant for some onshore receptors on a precautionary basis. However, there are no impacts that result in the total removal of, or fundamental and irreversible change to, the relationship between a heritage asset and its relevant setting.

Decommissioning impacts were considered to be similar or less than those of construction activities and therefore not significant. The removal of turbines would reverse any setting impacts. Therefore, no adverse effects on the setting of onshore historic assets during decommissioning were identified.

Cumulative effects of the Offshore Development with other plans and projects in the area were also assessed. Cumulative effects were considered where projects had the potential to interact over the same area and/or on the same timeline as the Offshore Development. Cumulative effects on unknown marine archaeological assets were assessed as not significant. However, cumulative impacts on the setting of some onshore historic receptors were assessed as moderately significant.

While significant cumulative effects were identified in some cases, in no case was it concluded that an effect was so significant as to affect a site's understanding, experience, appreciation, integrity, or sense of place to the extent that it may reduce its heritage value and therefore, such effects are considered acceptable.

4.6. Other Users of the Marine Environment

The assessment of other users of the marine environment considered the north coast of Scotland, within a 50 km radius of the Offshore Site, including other marine renewable energy developments, military activity, unexploded ordinance, subsea infrastructure, telecommunications, the Space Hub Sutherland project, and the Dounreay Nuclear Facility.

The potential impacts from the construction, operation and maintenance, and decommissioning of the Offshore Development on Other Users of the Marine Environment receptors were assessed. The impacts assessed included disturbance of the Scottish Hydro Electric (SHE) Transmission Orkney-Caithness project, disruption to the Dounreay Site Restoration Ltd (DSRL) remedial and monitoring activities, adverse impacts to the telecommunication services, and interference to the operations of the Space Hub Sutherland project. The SHE Transmission Orkney-Caithness project and the DSRL remedial and monitoring activities overlap with the OECC.

Disturbance or disruption to the SHE Transmission Orkney-Caithness Project and the DSRL remedial and monitoring activities during the construction or operation and maintenance phase was assessed as not significant. Any disturbance would be temporary and highly localised. However, HWL will continue to consult with SHE Transmission to minimise any disturbance, and any crossings will be installed in accordance with industry best practices. In addition, it is understood that most of the DSRL monitoring and remedial works are conducted onshore at the beaches at Dounreay Foreshore and Sandside Bay, and therefore, there is a limited potential for the Offshore Development to impact these activities.

Impacts to telecommunication services (e.g., radio links, cellular telephone communications, and television links) during the operation and maintenance phase may arise through the presence of turbine infrastructure interfering with telecommunication signals (e.g., signal blocking or reflecting). Feedback received during the EIA Scoping phase indicated that no impacts to telecommunication services were anticipated. Therefore, impacts to telecommunication services were assessed as not significant.

Based on the information available at the time of this writing, the launch exclusion zone for the Space Hub Sutherland Project is not expected to overlap with the Offshore Development, and therefore, no impacts are anticipated to be significant.

Decommissioning impacts were considered to be similar or less than those of construction activities and therefore were assessed as not significant. Cumulative effects are not expected to increase the magnitude of impact for the impacts assessed as other projects / activities are also expected to consult with relevant parties and put similar mitigations in place to avoid significant impacts. Therefore, all cumulative effects were assessed as not significant.

4.7. Socio-economics, Recreation, and Tourism

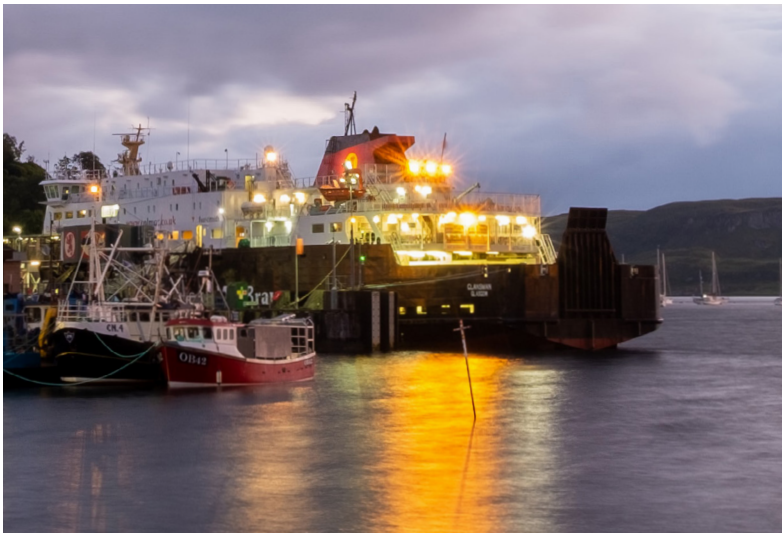
The assessment of socioeconomics, recreation and tourism considered effects in local (Caithness), regional (THC local authority area), and (where applicable) national (Scotland and the UK) areas relative to the PFOWF. A desk-based study and consultation with local authorities and stakeholders were undertaken to inform the assessment.

The potential impacts from the construction, operation and maintenance, and decommissioning of the PFOWF on employment, economic output, recreational and tourism activities, and demand for housing and services (i.e. Socio-economics, Recreation and Tourism receptors) were assessed. Impacts to Socioeconomics, Recreation and Tourism receptors are assessed on a 'whole' project basis, including both the Offshore and Onshore Developments. This is because project expenditure for the Onshore and Offshore Developments are intrinsically linked, and with regard to the type of impacts assessment, people have the potential to be affected by impacts from both Onshore and Offshore Developments.

The socio-economic impacts assessed included the potential effects on business activity in the PFOWF supply chain, the potential for the generation of additional economic output, the potential effects on employment, and the potential opportunities for the development of workforce skills and training. The recreation and tourism impacts assessed included possible disruption to or reduced access for activities, such as marine-based recreational activity (e.g. boating, recreational fishing, etc.), coastal recreational users, coastal tourism, land-based recreational activity, and businesses that cater to visitors. The potential impacts on housing and demand for local services considered the possible interaction between the PFOWF and the demand for and supply of housing, healthcare, education, public transport, and other local services.

Overall, the PFOWF is expected to support supply chain growth in local and regional areas and encourage the recruitment and training of a local workforce. This would create direct and indirect employment, including highly skilled roles. The assessment concluded that the PFOWF is likely to result in a significant beneficial effect to local and regional areas, during both the construction and operation and maintenance phases.

The assessment recognises the importance of recreation and tourism in local and regional areas. This includes nature-based and heritage-based tourism and recreational activity, walking and cycling routes, and coastal and marine activities. The assessment concluded that the PFOWF has the potential to result in beneficial and adverse effects on tourism. For example, whilst the PFWOF Project could generate additional demand for tourism accommodation, especially during the construction phase due to the need to accommodate visiting workers, it could also displace tourist visitors and their spending, particularly during the construction phase. However, with the implementation of embedded mitigation measures, the assessment concludes that any negative effects on tourism activity would be not significant.



The PFOWF also has the potential to generate additional demand for housing and local services. However, the local area was identified as an area of low housing demand, and the area has suffered a net loss of population over the past decade, particularly among the working-age population. With the implementation of embedded mitigation measures, any negative effects on local housing markets and demand for local services would be minor adverse and not significant.

Decommissioning impacts were considered to be similar or less than those of construction activities and therefore assessed as not significant.

Cumulative impacts of the PFOWF Project with other plans and projects in the area were also assessed. Cumulative impacts were considered where projects had the potential to interact over the same area and/or on the same timeline as the PFOWF Project. Cumulative effects are not expected to be significantly different to the effects of the PFOWF Project alone.

5 Climate Assessment

5. Climate Assessment

The assessment of potential impacts of the Offshore Development on climate and carbon considers the contribution the Offshore Development would make to reducing carbon emissions, how the Offshore Development would respond to climate change impacts as well any impacts the Offshore Development would have on the climate environment. Specifically, the assessment included the following:

- Climate change resilience review: Assesses the ability of the Offshore Development to withstand, respond to, and recover from changes in climate;
- In-combination climate impact assessment: Evaluates how any of the impacts predicted upon other topics could be exacerbated or reduced by climate change;
- Blue carbon assessment: Assesses the potential for direct loss of or disturbance to blue carbon habitats or sediments (i.e. ocean and coastal habitats and sediments that store carbon); and
- Carbon assessment: Estimates the carbon emissions associated with the Offshore Development and the period of time it might take before the Offshore Development has saved more carbon emissions (through the production of less carbon-intensive forms of electricity emissions) than were produced by its construction and operation. This assessment also considers the impact of the Offshore Development on the global climate.

Consideration of the predicted future environmental condition of physical, biological, and socio-economic factors informed the climate change resilience review and in-combination climate impact assessment. The climate change resilience review assessed that the climate change risk to the Offshore Development was not significant. The potential impact of the Offshore Development, in-combination with the impact of climate change, was also assessed as not significant.

Based on publicly available data, the potential for blue carbon habitats at the Offshore Site was found to be low. Organic and inorganic carbon density in the top layers of the sediment at the PFOWF Array are relatively low and the only blue carbon habitat likely to be present at the OECC are kelp beds. The blue carbon assessment, therefore, assessed the effect of the Offshore Development on habitat loss / disturbance to blue carbon habitats and sediments as not significant. Cumulative effects on blue carbon were also assessed as not significant.

The carbon assessment determined that over the life-cycle of the Offshore Development, the emissions avoided from more carbon-intensive energy sources will exceed those of the Offshore Development. Consequently, the Offshore Development will make a beneficial, contribution to UK carbon budgets, a proxy for the global climate.

6 Major Accidents and Disasters

6. Major Accidents and Disasters

The potential risks of major accidents and disasters that could result from or be associated with the construction, operation and maintenance and decommissioning of the Offshore Development were assessed.

The assessment considered a comprehensive review of the potential hazards that the Offshore Development could be vulnerable to, for example: lightning strikes, major industrial accidents at neighbouring developments, the effects of climate change and severe weather events, and natural disasters such as earthquakes. The assessment also considered potential hazards that the Offshore Development could cause such as accidents from interactions with unexploded ordnance, disturbance of radioactive particles, and system failure of the turbines during operation.

A risk assessment was then undertaken of the hazards identified which had a potential to cause a major accident or disaster that would result in significant adverse effects on the environment, human health or material assets. Overall, there were no risks identified for the Offshore Development that could result in a major accident and/ or disaster or of which the Offshore Development would be vulnerable to and as such, all risks were assessed as not significant.

These findings are generally as a result of the design of the Offshore Development, which will be built in line with standard development design mitigation measures and management plans which the Offshore Development is committed to implementing, to safeguard as far as practicable against these risks throughout the lifetime of the Offshore Development.

Nonetheless, if consent is awarded for the Offshore Development, risk reduction will continue to be refined during detailed engineering design, to ensure that a hierarchy of controls are in place through the various management plans and method statements.

7 Further Information

The Offshore EIAR has been submitted with an application to Marine Scotland for a S. 36 Consent and associated Marine Licences to construct and operate the Offshore Development. Once the application has been formally registered, Marine Scotland will undertake consultation and invite public representations on the proposals before reaching a decision.

The Offshore EIAR comprises four volumes:

- Volume 1: Non-Technical Summary (this document);
- Volume 2: Main Report;
- Volume 3: Technical Appendices; and
- Volume 4: Visual Materials.

The Offshore EIAR, including this NTS, all figures, technical appendices, and accompanying documents, are available to view and download on the project website at: **https://www.pentlandfloatingwind.com**

Anyone having difficulty accessing the application documents through this website can contact **Pentland-stakeholder@cop.dk** for assistance.

The application documents are also available via the Marine Scotland website at: **https://marine.gov.scot/marine-licence-applications**.

If you wish to comment on this Offshore EIAR or make representations to Marine Scotland, you must do so within 30 days from the last advert. Please email Marine Scotland at:

ms.marinerenewables@gov.scot, or write to Marine Scotland at:

Scottish Government

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