



MORAY WEST

OFFSHORE WINDFARM



Offshore EIA Report

Moray Offshore Windfarm (West) Limited

Volume 1: Non-Technical Summary



Introduction

This Non-Technical Summary (NTS) forms part of the Environmental Impact Assessment (EIA) of the Moray West Offshore Wind Farm and associated Offshore Transmission Infrastructure (OfTI), referred to as 'the Development'.

The purpose of this NTS is to provide a summary of the main findings from the EIA undertaken for the Development as presented in the Offshore EIA Report.

The Developer

Moray Offshore Windfarm (West) Limited (known as 'Moray West') is promoting the Development on behalf of Moray Offshore Renewable Power Limited (referred to as 'Moray Offshore').

Moray Offshore holds the Zone Development Agreement (ZDA) under which it has exclusive rights to investigate and develop offshore wind farms in the Moray Firth Round 3 Zone. EDPR UK Limited (EDPR UK) in turn owns 100% of Moray Offshore and, itself is 100% owned by EDP Renovaveis (EDPR).

EDPR is a leading global renewable energy company, with headquarters in Madrid, operating in markets around the globe and is continuously expanding its business to new regions making the commitment to lead in each market as well as create value for its stakeholders and shareholders. As of 2017, EDPR managed a global portfolio of 10.7 gigawatts (GW) spread over 11 countries.

Moray Firth Zone

In January 2010 Moray Offshore was awarded a ZDA by The Crown Estate to develop the Moray Firth Zone. The Moray Firth Zone is located on the Smith Bank in the outer Moray Firth and covers approximately 520 km² (151 nm²). An initial appraisal of the Moray Firth Zone and consultation with key stakeholders found that more constraints existed in the western part of the Moray Firth Zone than in the east. These constraints included existing oil and gas infrastructure associated with the Beatrice Oil Field, Beatrice Demonstrator Turbines, presence of Ministry of Defence (MoD) Practice Area D807 and closer proximity to European protected sites.

Consequently, the decision was taken to divide the Moray Firth Zone into two; an eastern and a western development area, and to develop the eastern area first. These areas are now referred to as the Moray East Site and Moray West Site respectively.

In 2012 an application to the Scottish Ministers was made for consent to construct and operate three offshore wind farms in the Moray East Site, the Telford, Stevenson and MacColl offshore wind farms.



Section 36 Consents for the three offshore wind farm projects, with a total combined capacity of 1,116 MW across the Moray East Site, were granted in March 2014 and associated Marine Licences were awarded in September 2014. In September 2017, Moray East was awarded a Contract for Difference (CfD) for development of 950 MW across the Moray East Site. The Moray East Site is now being developed as one single offshore wind farm, the Moray East Offshore Wind Farm.

By 2016 it had become apparent that a number of the key constraints limiting development within the Moray West Site were starting to reduce e.g. the MoD Practice Area had been removed and plans to decommission the Beatrice Oil Field and associated infrastructure had been announced. This prompted EDPR UK to undertake further investigation of the Moray West Site for offshore generation. These investigations are described in the Moray West Offshore Wind Farm Infrastructure EIA Scoping Report (May 2016) and Moray West OfTI Scoping Report (May 2017).

Development Overview

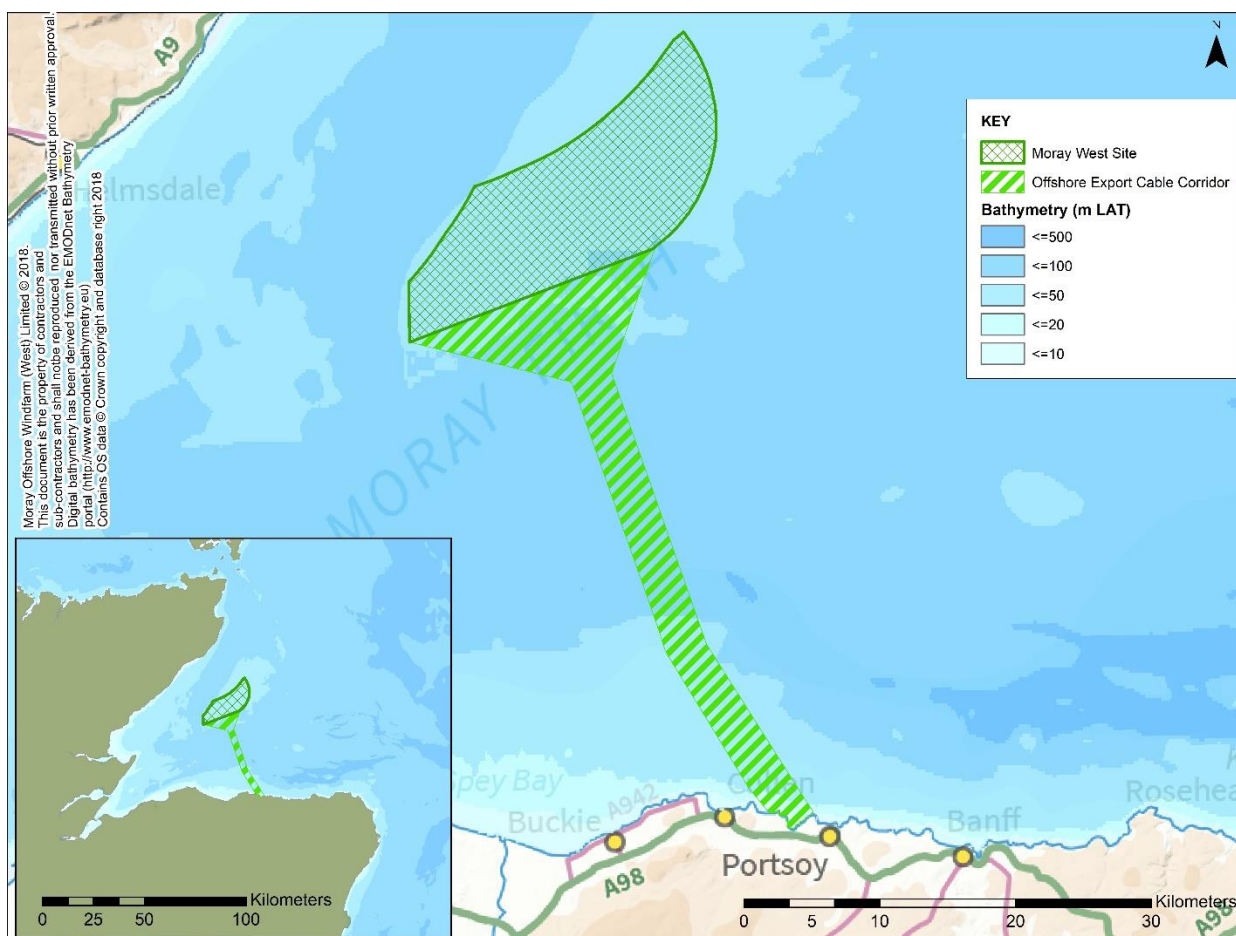
The Moray West Site covers an area of approximately 225 km² on the Smith Bank in the Outer Moray Firth, approximately 22.5 km from the Caithness coastline (Figure 1).

The Moray West Offshore Wind Farm will comprise up to 85 Wind Turbine Generators (WTGs), associated substructures and seabed foundations, inter-array cables and any scour protection around substructures or cable protection which will be located within the Moray West Site. The OfTI comprises up to two Offshore Substation Platforms (OSPs) which will be located within the Moray West Site, OSP interconnector cables and two offshore export cable circuits which will be located within the Offshore Export Cable Corridor and will be used to transmit the electricity generated by the offshore wind farm to shore.

The offshore export cable circuits will come ashore in the Landfall Area which is located on the Aberdeenshire Coast approximately 65 km south of the Moray West Site (Figure 1).



Figure 1: Moray West Site and Offshore Export Cable Corridor



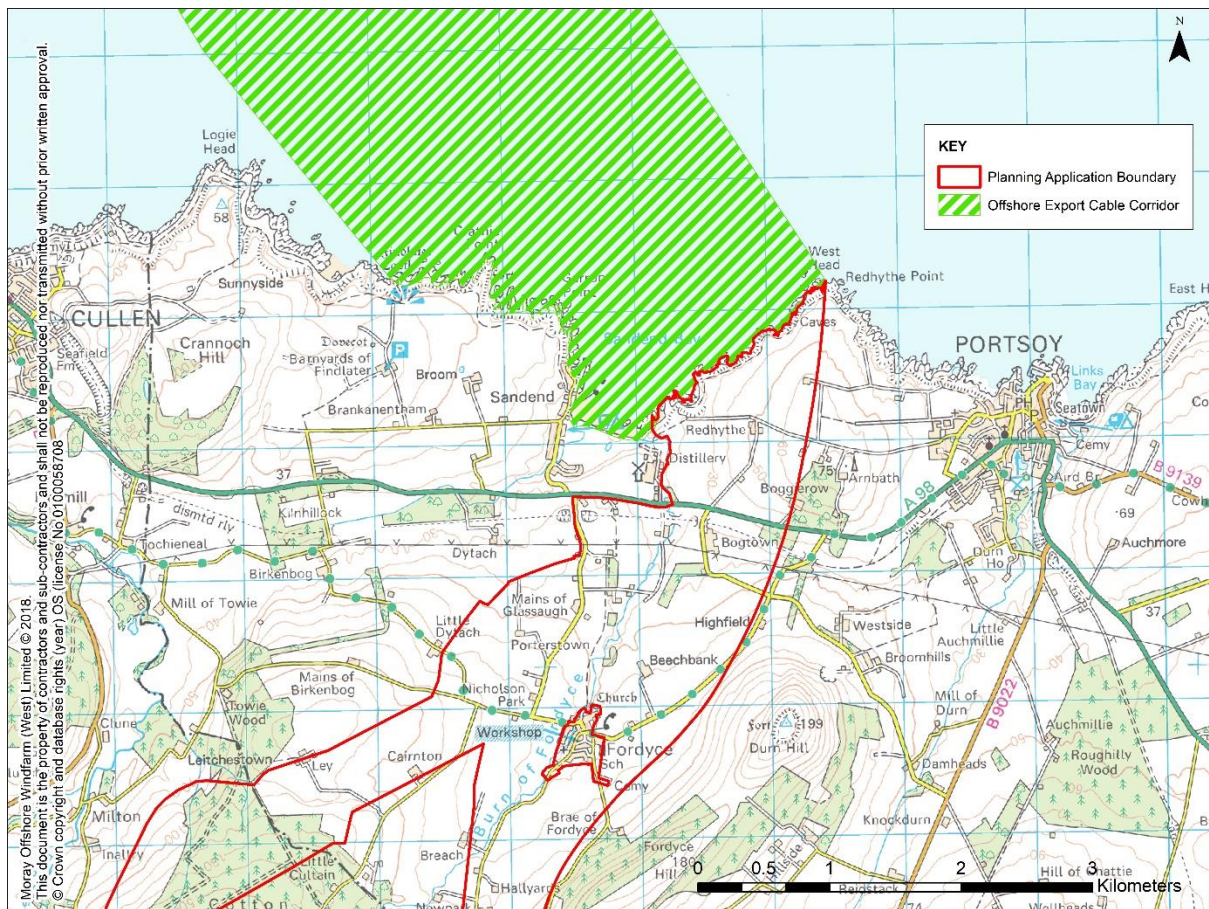
Amendments to the Onshore Planning Application Boundary (PAB)

As noted in the Offshore EIA Report, Moray West has made a decision to remove Sandend Beach and potential landfall locations along the coast to the west of Sandend Beach (towards Findlater Castle) from the Onshore Planning Application Boundary (PAB). This decision has been informed by work undertaken as part of the Onshore EIA, which has been carried out in parallel to the Offshore EIA, and feedback received through consultation with local communities and other key stakeholders.

The revised Onshore PAB at the landfall is illustrated in Figure 2.



Figure 2: Revised Onshore PAB Excluding Sandend Beach and Landfall Locations West of Sandend Beach to Findlater Castle



Although the Landfall Area for the offshore export cables illustrated in Figure 2 remains as has been assessed in the Offshore EIA Report, Moray West confirms that Sandend Beach, and sections of the coast located to the west of Sandend Beach towards Findlater Castle, will no longer be considered as a potential landfall location.



Once onshore, electricity will be transmitted from the coast via underground cables to a substation at Whitehillock near Keith, in Moray. Whitehillock substation will then be connected, via underground cables to the nearby existing Blackhillock substation and the National Electricity Transmission System (NETS). These onshore components of the Project (onshore underground cables and substation at Whitehillock) comprise the Moray West Onshore Transmission Infrastructure (OnTI). Potential effects of the OnTI are presented in the Moray West Onshore EIA Report. A whole project assessment has also been undertaken as part of the Offshore EIA Report.

Need for the Project

As the UK follows policies to meet its national and international commitments to greenhouse gas reduction, additional demands will be placed on domestic electricity supply as use of, for example, electric vehicles, increases.

This increasing demand comes against a background of a significant decline in the UK's ability to meet its peak electricity demand following recent closures of coal fired stations and the country's fleet of aging thermal power stations is being taken off line. The UK's eight remaining coal fired stations are due to close by 2025. Meanwhile, of the country's fleet of eight nuclear power stations currently in operation (providing a quarter of the nation's electricity), seven are programmed to close by 2030.

The UK therefore has an urgent need for new electricity generation capacity. Offshore wind provides the opportunity to deliver this new capacity, not only from a renewable, low carbon resource, but a resource which is indigenous and does not depend upon the geo-economic and geo-political risks attendant with importing fuels.

The neighbouring project, Moray East, has demonstrated that offshore wind is also highly competitive – 5.7p/kWhr compared with 9.2p/kWhr for new nuclear.

The UK has taken a global lead in offshore wind and with more than 5GW installed to date has demonstrated a proven technology which can be installed quickly with low risk.

Moray West therefore offers the deployment of a proven technology in a location with a recognised wind resource (based on current Beatrice and Moray West Offshore Wind Farm projects) and to deliver a low-cost, low-carbon supply of electricity for up to 640,000 homes, at a time when the UK urgently needs new generation capacity to maintain a secure, affordable supply of power.

Consent Requirements

In order to construct and operate the Development, Moray West the following consents are required:



- **Section 36 consent** as required under the Electricity Act 1989 for generating stations with capacity of > 50 Megawatts (MW). Applies to the WTGs, substructures and inter-array cables only. This does not apply to the OfTI; and
- **Marine Licences** as required under the Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010. Marine Licences are required to construct or deposit any object in or over the sea, or on or under the seabed. Marine Licence are therefore required for both the offshore wind farm and the OfTI.

These consents cover all activities associated with, and components of, the Development up to the coast (Mean High Water Springs (MHWS)). Consent (Planning Permission in Principle (PPP)) is also required for the OnTI (landward of Mean Low Water Spring (MLWS)) under the Town and Country Planning (Scotland) Act 1997.

Regulatory Requirements

The Offshore EIA Report, and this NTS, have been prepared by Moray West, in support the Section 36 consent and Marine Licence applications for the Development. Both the Offshore EIA Report (which presents the findings from the EIA) and this NTS have been prepared in accordance with the following:

- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017; and
- Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).

The purpose of these provisions is to ensure that, in considering whether to grant consents for developments that are likely to have significant environmental effects, the consenting authorities have all the necessary environmental information on which to base their decision. It is considered that due to the nature, scale and size of the Development, there is the potential for significant environmental effects and accordingly an EIA has been carried out.

A Habitats Regulations Appraisal (HRA) has also been undertaken for the Development in accordance with the following:

- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (the Habitats Regulations) for Scottish Territorial Waters (0 to 12 nautical miles (nm)); and
- The Conservation of Offshore Marine Habitats and Species Regulations 2017 (the Offshore Habitats Regulations) which apply to the offshore marine area (12 to 200 nm).



The findings from the HRA are presented in the Moray West Offshore Wind Farm Report to Inform an Appropriate Assessment (RIAA) (Moray West, 2018).

Under the 1994 Habitats Regulations and the 2017 Offshore Habitats Regulations, Moray West is also required to obtain a European Protected Species (EPS) Licence to carry out any activities that would potentially disturb any species protected under Annex IV of the European Habitats Directive (EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna).

Moray West is also required to submit a Decommissioning Programme under the Energy Act 2004 and prepare a Safety Zone Statement, also under the Energy Act 2004 and Electricity (Offshore Generating Stations) (Safety Zones) (Application Procedures and Control of Access) Regulations 2007 in the event that there is a requirement to implement a safety zone for construction and/or maintenance activities.

Site Selection and Alternatives

Having made a decision to progress development of the Moray West Site, further work was required to determine the following:

- Options for development of the site in terms of numbers, sizes, layouts of WTGs and construction methods; and
- Identification of a location (onshore) to connection to the grid (substation location), Onshore Cable Route Corridor, location to bring the offshore export cables ashore (Landfall Area) and an Offshore Export Cable Corridor between the landfall and the Moray West Site.

Site Development Options (Design Envelope)

Contracts for the manufacture and supply of WTGs, substructures, cables etc., and construction of the Development, can only be put in place once a project has secured a consent and, based on current UK Offshore Wind Policy, has successfully secured a Contract for Difference (CfD). Consequently it is not possible to define a detailed development design at the consent application stage as key parameters required to finalise the development design are not known. Within the offshore wind industry, there is also an additional requirement to retain a much flexibility as is reasonable possible at the consent application stage in order to ensure that any future improvements in technology (such as larger and / or more efficient WTGs) or construction methods can also be accommodated in the final development design.



This is referred to as the Design Envelope (formerly the Rochdale Envelope) approach to consenting whereby the development for which consent is sought comprises a range of design parameters which are considered to be the 'realistic worst case' for any given development option. This approach provides flexibility in the design of the Development, while ensuring all potentially significant effects (positive or adverse) are assessed within the EIA process and reported in the EIA Report. This approach also gives regulators and stakeholders necessary assurance that once finalised, the potential effects of the Development on the environment will be no worse than those that have already been assessed and subsequently consented. Key design parameters for this Development are presented below and described in detail in the EIA Report (Volume 2) Chapter 4: Description of Development.

Grid Connection

Moray West began discussions with National Grid Electricity Transmission Limited (NGET) and Scottish Hydro Electric Transmission (SHE-T) (the Transmission Operator in this part of Scotland) in 2016, with the objective of identifying potential onshore grid interface points with sufficient capacity for the Development.

NGET identified a number of potentially suitable grid interface points based on an understanding of the grid infrastructure capacity in relation to the location of Development, the potential capacity of Development and its target connection timescale. An assessment was then undertaken to identify the most suitable location for grid connection. This concluded that Blackhillock, near Keith in Moray was the most suitable grid connection option. In April 2017, Moray West was formally offered a grid connection at Blackhillock allowing landfall and Offshore Export Cable Corridor optioneering to commence.

Landfall / Offshore Export Cable Corridor Option Development

On receipt of the grid connection offer, a desk-based assessment of potential landfall options along the Moray / Aberdeenshire coast was undertaken. This initially focused on an area of search which extended from Portnockie on the Moray Coast, west to Portsoy on the Aberdeenshire Coast.

Much of the coastline between Portnockie and Portsoy is dominated by steep, high cliffs, interspersed with shallow bays and small beaches and is considered to be technically unsuitable as potential landfall locations. There are also a number of environmental designations in the area including a Site of Special Scientific Interest (SSSI) which extends along a large section of the coast between Cullen and Portsoy.



Other factors requiring consideration in the identification of potential landfall locations include other features of environmental or built heritage importance, access to the foreshore for construction and installation of the cables, local land uses, proximity to residential property and other amenity facilities and potential for third party interactions.

Options for bringing the cables ashore at the same location where other cables (e.g. associated with the Beatrice Offshore Wind Farm and Moray East Offshore Wind Farm) are also being brought ashore were also considered. However, it was concluded that there would not be enough space at these existing landfall locations to accommodate the additional cables required for this Development. These locations therefore had to be discounted from the wider area of search.

As noted previously, although the final landfall location is still to be determined (this is dependent on the outcome from detailed engineering investigations) the area under consideration for the landfall has been reduced further following a decision by Moray West to exclude Sandend Beach and potential landfall locations to the west of Sandend Beach (to Findlater Castle) from the Onshore PAB. The revised Onshore PAB and revised Landfall Area is shown in Figure 2.

Appraisal of Offshore Export Cable Corridor Options

Having identified a stretch of coastline within which the landfall could be located, a desk-based assessment was undertaken to identify an Offshore Export Cable Corridor. An initial appraisal of the area between the Moray West Site and Landfall Area was undertaken to identify any constraints such as, important commercial fishing grounds, shipping routes, presence of cables or pipelines, or environmental constraints such as protected or sensitive habitats. Potential corridors were then assessed for suitability by the Moray West engineering team. Following the OfTI Scoping exercise further refinements were made and the preferred Offshore Export Cable Corridor was determined as pictured in Figure 1.

Description of Development

Wind Turbine Generators (WTGs)

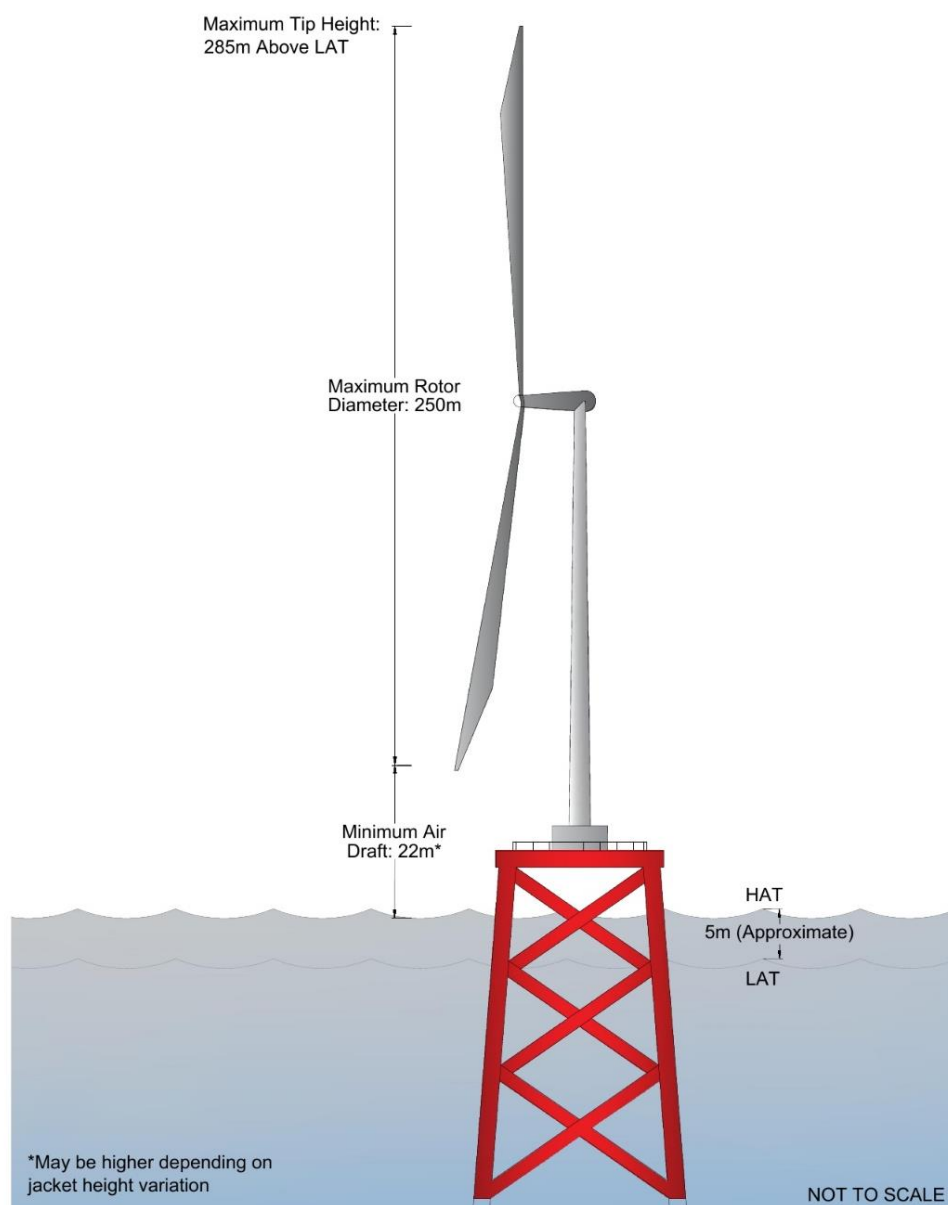
For the purpose of the EIA, and to retain flexibility in the Development design, the Design Envelope for the Moray West Offshore Wind Farm considers four different sizes of WTG. These are referred as Model 1 (smallest), Model 2, Model 3 and Model 4 (largest). The total number of WTGs installed within the Moray West Site will vary depending on the size of the selected WTG Model. In general, the number of WTGs required will decrease as the size of the WTG Model increases (Table 1 below).



Table 1: WTG Parameters				
Parameter	Model 1 WTGs	Model 2 WTGs	Model 3 WTGs	Model 4 WTGs
Maximum number of WTGs	85	85	72	62
Minimum height of lowest blade tip above HAT (m)	22	22	22	22
Maximum blade tip height above HAT (m)	199	230	265	285
Maximum rotor blade diameter (m)	164	195	230	250

Each WTG Model is based on the conventional offshore wind turbine design with three blades and a horizontal rotor axis (Figure 3).

Figure 3: Illustration of WTG based on Model 4 WTG Parameters



The WTGs are designed to operate across a range of wind speeds (including light winds). At very high wind speeds the WTGs will gradually shut down to prevent the WTGs becoming damaged. The WTGs are also designed with a 'yaw' function which enables the rotor hub to rotate to face into the wind so that the turbine blades can maximise the amount of wind that they can capture. Each WTG will also have a minimum clearance between the Highest Astronomical Tide (HAT) sea level and the lowest point of the blade of 22 m.

Each of the WTGs will have their own control system and will contain oils and other fluids required for the operation of the gears and other components of the WTG. Each of the WTGs will have a heli-hoist platform on the nacelle to enable access to the WTGs by helicopter in the event of a breakdown.

The WTGs will be arranged within the Moray West Site in a grid layout, with at least 1 km gap between each WTG (crosswind and downwind). In addition to wind speed and prevailing wind direction, the final positioning of each WTG within the Moray West Site will be influenced by a number of other factors such as seabed conditions, water depth, tidal currents and wave conditions, environmental constraints, and any other seabed obstructions i.e. wrecks or other infrastructure such as the Beatrice Offshore Wind Farm Export Cables which run north south through the centre of the Moray West Site.

The offshore wind farm will be also be design and constructed to satisfy the requirements of the Civil Aviation Authority (CAA), Maritime and Coastguard Agency (MCA) and Northern Lighthouse Board (NLB) in terms of aviation and navigation lighting, markings and fog-horn specifications.

The layouts presented in the EIA Report have been developed specifically to represent the worst case design option for each of the different environmental receptors. Final layouts will be prepared post consent in consultation with key stakeholders once a WTG Model has been selected, and other design details have been finalised.

Substructure and Foundations

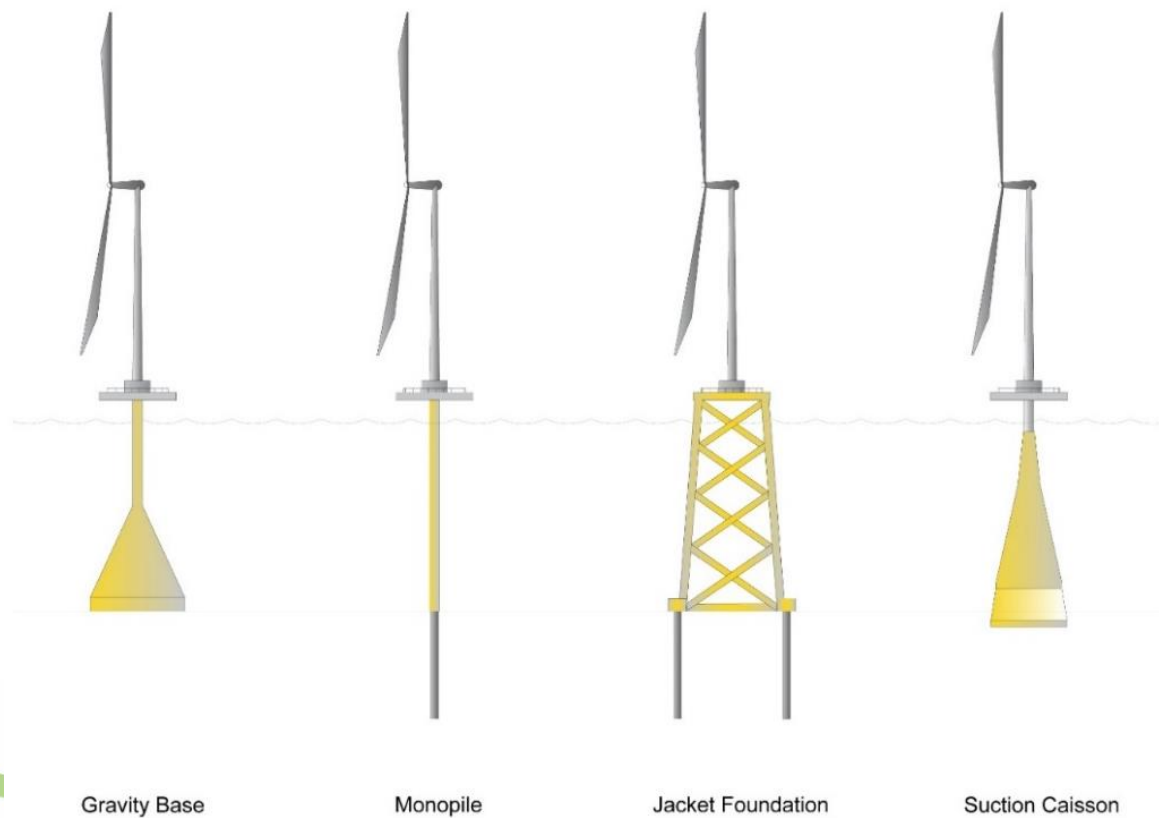
Substructures and foundations are required to support the WTGs and attach them securely to the seabed. A range of substructure and foundation types are being considered for this Development:

- **Piled monopile foundations ('monopiles'):** These comprise a single hollow steel tube (or pile), which penetrates the seabed. Monopiles are usually installed using a technique called percussive piling which involves knocking the pile into the seabed using a large hammer. In areas where the seabed is very hard (e.g. rock) the monopiles may need to be drilled into the seabed;



- **Pin-pile jacket foundations:** These comprise a steel lattice structure, anchored to the seabed with small pin-piles. Jackets are likely to be four-legged, although three-legged jackets are also being considered. The pin-piles are installed the same way as the monopiles;
- **Suction caisson foundations supporting either a monopile or jacket substructure:** A suction caisson is a bucket shaped structure that is attached to the seabed by 'suction' created when the caisson penetrates the seabed and water is then pumped out of the space between the caisson and the seabed. Suction caissons can be attached to either the legs of the steel lattice jacket substructures or the bottom of a monopile substructure; and
- **Gravity base foundations:** These comprise concrete structures, sometimes including additional ballast (typically sand, gravel, rock or dredged material) that sit on the seabed to support the turbine tower. Gravity bases vary in shape, but are significantly wider at the base (at seabed level) to provide support and stability to the structure. Conical or upside down T-shaped bases are being considered for the Development.

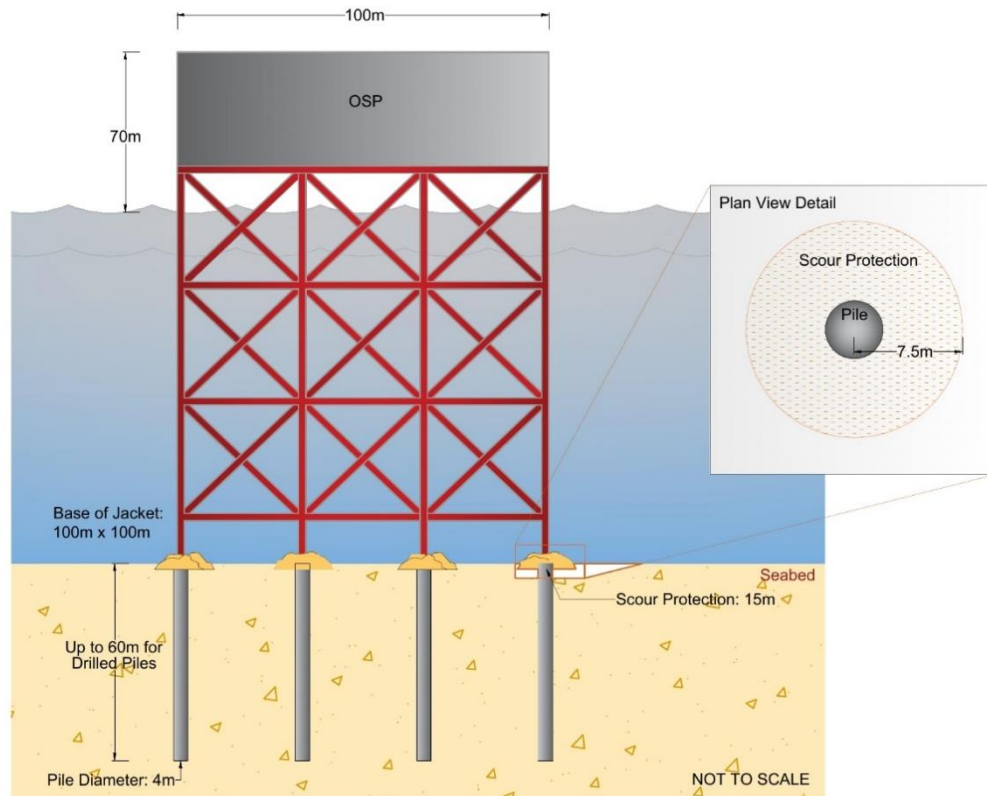
Figure 3 Illustration of WTG Substructures



Offshore Substation Platforms

The Development may include up to two OSPs (on substructures as outlined above, or alternatively a jack-up platform substructure). The OSPs contain the electrical equipment required to transform the voltage of electricity generated by the WTGs to a higher voltage that can be transported to shore ready for connection into the onshore national electricity grid network.

Figure 4 Illustration of OSP



Offshore Cables

In terms of offshore cabling, the Development will require inter-array cables to connect the WTGs to the OSPs, interconnector cabling to connect the OSPs (if required), and up to two export cable circuits to bring the electricity ashore.



The total length of subsea cabling required is dependent on the detailed WTG layout, the requirement for multiple OSPs, and the voltage of the cables selected. The cables will be buried where possible, and protected (e.g. rock placement or concrete mattresses) where burial is not feasible.

The offshore cables will be buried using one, or a combination of, methods including ploughing, jetting and cutting, whereby the cables are laid in a trench in the seabed. The final choice of cable installation method will depend on seabed conditions and will be determined during detailed design post consent. Where the offshore export cable circuits come ashore, they will be installed beneath the ground by either trenching or Horizontal Directional Drilling (HDD) methods.

Development Programme

It is currently planned that construction of the Development would commence in 2022 and end in 2024, spanning approximately 36 months. Site investigation and seabed preparation would take place prior to 2022. The Development will remain operational for the lifetime granted in offshore consents. Decommissioning of the Development following operation is anticipated to involve full removal of all infrastructure, although some elements may be cut at or below seabed level and left in situ if it is deemed more environmentally damaging to remove them.

	2022					2023					2024			
	Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4
Offshore Construction Commencement														
Piling (only applicable to piled foundation solution)														
Substructure Installation														
Inter Array Cable Installation														
OSP Installation														
Export Cable Installation														
WTG Installation														
1st Generation														



Pre-Application Consultation

In accordance with The Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013, Pre-Application Consultation (PAC) has been undertaken with local communities and other interested members of the public on components of the OfTI located within Scottish Territorial Waters (12 nm) e.g. the majority of the export cable circuits and the landfall.

The process provides opportunities to receive feedback from the public and third sector organisations that can then be addressed in the application and supporting EIA Report. MS-LOT require applicants to have undertaken pre-application consultation with stakeholders, consultees and the public in accordance with good practice.

A summary of consultation events carried out for the Offshore Wind Farm and PAC events carried out for the OfTI (within 12 nm) is provided in Table 2 below. Further information on consultation activities carried out for the OnTI is provide in Table 3.

Table 2: Offshore Wind Farm Consultations and PAC Events for the OfTI

Project Component	Date of Event	Location	Focus for the Consultation
Offshore Wind Farm	2 nd August 2016	Helmsdale Community Centre	Consultation event for the Offshore Wind Farm
	3 rd August 2016	Mackay's Hotel, Wick	Consultation event for the Offshore Wind Farm
	10 th August 2016	Marine Hotel, Buckie	Consultation event for the Offshore Wind Farm
	11 th August 2016	Fraserburgh Leisure Centre	Consultation event for the Offshore Wind Farm
Offshore Transmission Infrastructure (OfTI)	15 th January 2018	Station Hotel, 22 Seafiel St, Portsoy, Banff	PAC event for the OfTI



Table 3: Consultation on the OnTI

Project Component	Date of Event	Location	Focus for the Consultation
Onshore Transmission Infrastructure (OnTI)	27 th February 2018	Old Coach House Hotel, High Street, Buckie	PAC event for the OnTI with focus on onshore cable route
	28 th February 2018	Royal Hotel, Church St, Keith	PAC event for the OnTI with focus on proposed substation locations
	7 th March 2018	Sandend Village Hall, The Bents, Sandend, Banff	PAC event for the OnTI with focus on Landfall Area
	29 th March 2018	Station Hotel, 22 Seafiel St, Portsoy, Banff	PAC event for the OnTI with focus on Landfall Area

Attendance and Feedback from the PAC Events

The most well attended PAC Events were the OfTI PAC Event held on 15th January at Portsoy and the OnTI event held on 7th March 2018 at Sandend. The main points raised during both these PAC Events related to local concerns over the potential use of Sandend Beach as the landfall location for the offshore export cable circuits. In particular, concerns were raised in relation to the potential effects on surfers who regularly use the beach due to restricted access during cable installation at the landfall and long term effects on the quality of the waves due to the presence of the export cables within the bay.

Other concerns related to the potential temporary disruption to the local residents of Sandend Village and restricted access to Sandend Beach due to the physical presence of the landfall / works on the beach and other associated construction activities.

These concerns were also voiced to the Moray West Project team by the Sandend local community at a Local Community Council meeting held on 8th February 2018.

In light of the concerns raised during these events and based on the outcomes from on-going work on the Onshore EIA, a decision has been made by Moray West to remove Sandend Beach and the section of the coast to the west of Sandend Beach to Findlater Castle from the Onshore PAB. However, the Landfall Area presented in the Offshore EIA Report, and referred to in the impact assessment summary sections of this NTS remain as originally assessed in the Offshore EIA.



Further detail on the specific comments and concerns raised by individuals attending the PAC events at Portsoy and Sandend Village, and Moray West's consideration of these concerns, is provided in the PAC Reports prepared to support the Marine Licence application for the offshore export cable circuits and the application for Planning Permission in Principle (PPP) from Aberdeenshire Council and Moray Council for the OnTI works.

Consultation on the Consent Applications

Following submission of the Marine Licence and Section 36 Consent applications to MS-LOT and MS-LOTs subsequent acceptance of the applications, there will be a period of formal consultation where all advisors, stakeholders, organisations, local communities and individuals who live, work, or have an interest in the Moray Firth will be given the opportunity to comment on the Development.

Anyone wishing to comment on the applications for the Moray Offshore Wind Farm and associated OfTI can do so using the contact details provided at the end of this NTS. All responses to the consent applications must be provided within the specified representation period.

All formal responses received during the representation period(s) will be considered by Marine Scotland Licensing Operations Team (MS-LOT) in their determination of the consent applications.

Moray West will also continue its consultation with all interested parties, including local communities, during this period to keep them informed on progress of the Development.

Approach to the EIA

This Offshore EIA Report has been prepared in line with advice from Scottish Ministers on the scope of the assessment provided in (1) the Scoping Opinion for the Moray West Offshore Wind Farm in August 2016 and (2) the Scoping Opinion for the OfTI in August 2017. Additional advice provided as part of on-going consultations with statutory advisors and key stakeholders and responses received from PAC events has also been taken into account in the preparation of the Offshore EIA Report.

The EIA describes the likely significant effects arising from the construction, operation and maintenance (O&M), and decommissioning of the Development on the physical and biological environment and human receptors. The assessment of effect significance takes into account various measures that have been 'embedded' into the design, construction and operation of the Development specifically to minimise potential effects on sensitive physical, biological or human receptors.

Where significant effects are predicted (having taken into account embedded measures), additional mitigation has been identified to reduce or offset the significance of these effects (where practicable).



A full description of the EIA methodology used is described within the EIA Report (Volume 2, Chapter 5: EIA Methodology).

The assessment also considers the likely cumulative effects arising from the Development together with other plans and projects such as the neighbouring Beatrice Offshore Wind Farm which is currently under construction and the Moray East Offshore Wind Farm which is due to commence construction in 2019. The specific plans and projects included in the cumulative assessment varies from topic to topic, depending on impact types and the range over which cumulative effects will be experienced by different receptors.

Environmental Effects

Physical Processes and Water Quality

Effects on physical processes and water quality are described in terms of changes to physical processes pathways e.g. tidal currents, waves, sediment transport and seabed indentations and scour and effects of these changes on designated marine and coastal sites, surfing beaches and water quality.

Key features of importance in the study area (Moray West Site, Offshore Export Cable Corridor and Landfall Area) include the Smith Bank (up on which the wind farm will be located), designated sites such as the Moray Firth proposed Special Area of Protection (pSPA), the Southern Trench proposed Nature Conservation Marine Protected Area (pNCMPA) and the Cullen to Stake Ness SSSI and important surfing venues such as Sandend Beach.

The assessment, which is based on existing site data and physical processes modelling, concluded that any changes to physical processes pathways occurring during construction, operation and decommissioning of the Development would be limited and would not have any significant effects on any of the key features of importance. There will also be no significant effects on water quality.

Potential cumulative effects associated with the Moray East and Beatrice Offshore Wind Farms, the Caithness Moray Interconnector and decommissioning of the Beatrice Oil Field were also assessed as not significant.

Benthic & Intertidal Ecology

Benthic and intertidal ecology refers to plants and animals that live on the seabed, beaches and rocky shorelines respectively. The areas where these plants and animals live are referred to as benthic and intertidal habitats.



A benthic survey was carried out in 2017 to understand what types of benthic and intertidal habitats and associated plants and animals (species) are present in the study area (Moray West Site, Offshore Export Cable Corridor and Landfall Area). This survey concluded that, although some habitats and species of conservation importance (referred to as Priority Marine Features (PMFs)) were found in the study area such as seapens and burrowing megafauna, Arctic quahog, flameshell and sandeels, these were only present in low numbers and at single stations that can be avoided during the post consent detailed design process. Burrowing megafauna is also an interest feature of the Southern Trench pNCPA, part of which (western end) is crossed by the Offshore Export Cable Corridor. Other habitats and species are commonly occurring and representative of the wider area. These are considered to have low sensitivity to any potential effects from the Development.

The main potential effect on benthic and intertidal habitats and species is from construction activities that involve direct disturbance to, or removal of, the seabed, leading to habitat loss or disturbance. Construction activities (such as the installation of foundations and cables) can also cause sediment suspension and redeposition leading to the burial, and potential smothering of plants and animals, in particular animals with low mobility. In terms of effects on habitats and species present in the study area, the assessment concluded that, although there are some habitats and species of conservation importance, given the localised nature and short term duration of construction activities, and the limited number and distribution of important habitats and species, there would be no significant effects from these activities on benthic and intertidal ecology.

Other effects occurring during construction, operation and decommissioning of the Development such as noise and vibration, accidental release of hydrocarbons and chemicals, scouring and the risk of introduction of marine invasive non-native species (MINNS) are also considered to be not significant. Potential cumulative effects associated with the Moray East and Beatrice Offshore Wind Farms, the Caithness Moray Interconnector and decommissioning of the Beatrice Oil Field were also assessed as not significant.

Fish & Shellfish Ecology

Various types of fish and shellfish are present either within the Moray West Site and / or along the Offshore Export Cable Corridor. Some have high commercial value such as scallop, crab and lobster, Nephrops (Norway lobster), squid and haddock. Other species are of conservation importance due to declining populations such as Atlantic salmon, European eel, sea lamprey, sea trout, plaice, herring, cod and sandeel. Certain species, in particular sandeel, comprise important prey for marine mammals (whales, dolphins, porpoise and seals) and seabirds.



Shellfish live on, or in, the seabed and generally have limited mobility and are therefore considered to be sensitive to effects associated with direct seabed disturbance and habitat loss, and potential smothering from sediment suspension and re-deposition. However, given the limited spatial scale and localised nature any direct seabed disturbance, and the short duration of the construction activities, potential effects associated with these activities on shellfish are considered to be not significant.

Effects from seabed disturbance and smothering on sandeel and herring, which both spawn in/on the seabed, were also assessed as not significant. This is on the basis that studies and surveys undertaken for the Moray Firth Zone and the Moray East and Beatrice Offshore Wind Farms indicate that the Moray West Site is not important as spawning grounds for either species.

Other impacts on fish and shellfish include underwater noise and EMF. Results from underwater noise modelling carried out as part of the assessment concluded that, although herring, cod and Atlantic salmon are sensitive to sensitive to underwater noise, potential effects would not be significant.

Elasmobranchs (such as rays and skates) that use electrosensitive receptors to navigate and find prey and migratory species (such as Atlantic salmon), which are also considered to be electrosensitive, are potentially sensitivity to electromagnetic fields (EMFs) emitted from the subsea cables. Current research suggests that EMFs reduce rapidly with increasing distance (few metres) from the cable. Given that, with burial of the cables to a minimum of 1 m depth (trenched or protected), EMFs at the seabed will be below the earth's magnetic field, there will be no significant effects on fish and shellfish from EMFs.

Other operational effects associated with heat from subsea cables and introduction of new substrate (habitat change) were also assessed as not significant for fish and shellfish.

Given that there is limited potential for any overlap in constructions periods with the Moray East and Beatrice Offshore Wind Farms, Caithness Moray Interconnector and decommissioning of the Beatrice Oil Field, potential cumulative effects during construction are limited and not significant. Cumulative effects during operation and maintenance and decommissioning were also assessed as not significant.

Marine Mammal Ecology

Marine mammals include whales, dolphins, porpoises and seals. The most regularly occurring marine mammals in the study area (Moray Firth) include harbour porpoise; bottlenose dolphin; minke whale; harbour seal; and grey seal. All species of whale, dolphin and porpoise (collectively referred to as cetaceans) are protected under the Habitats Directive (transposed in Scotland through the Habitats Regulations 1994 and the Offshore Habitats Regulations 2017) either individually or through the



designation of Special Areas of Conservation (SACs). Potential effects on SACs including the Dornoch Firth and Morrich More SAC which is designated for harbour seals and the Moray Firth SAC which is designated for bottlenose dolphin have been assessed as part of the HRA, the results of which are presented in a separate report (the RIAA). Minke whale is also the primary interest feature associated with Southern Trench pNCMPA.

One of the main impacts of offshore wind farms on marine mammals is underwater noise produced during construction from the installation of monopile or pin-pile foundations (piling) and presence of vessels. This can lead to both physical injury and disturbance. Physical injury occurs as a result of very loud noises and can lead to fatal injury (mortality) of an animal or loss of hearing (referred to a Permanent Threshold Shift (PTS)). A loss of hearing can affect an animal's ability to detect prey and communicate with other animals. Disturbance can occur over larger distances as a result of an animal swimming away from the noise source and not return to an area until the noise has stopped. Where this leads to an animal avoiding their main feeding and breeding grounds this can have longer term effects the on health and breeding ability of that animal.

Underwater noise modelling was carried out to determine the distance from the Development at which different marine mammal species would a) potentially be injured by the noise (experience PTS) and b) be disturbed by the noise. These results were used to inform the assessment of effects of noise from piling on the five key species of marine mammal present in the study area.

The results from the underwater noise assessment concluded that, with the use of soft-start techniques for piling and preparation of a piling strategy, the risk of mortality and physical injury (PTS) for all species was negligible and not significant. In terms of disturbance, effects on harbour porpoise, minke whale, grey seal and harbour seal were all assessed as not significant. Results from additional population modelling undertaken for bottlenose dolphin concluded that, although there is potential for disturbance of a few bottlenose dolphins associated with the Moray Firth SAC, long term effects on the SAC population would not be significant (see the RIAA (Moray West, 2018) for more further information on effects on designated sites).

Other potential effects on marine mammals occurring during construction such as noise from vessels and vessel collision, availability of prey species and effects in foraging ability due to increased suspended sediment were all assessed as not significant. All effects during operation (noise from operational turbines, vessel collision and changes in prey species) and decommissioning were also assessed as not significant.



When assessing other offshore wind farms and other projects cumulatively with the Development, it was concluded that all potential effects, except underwater noise would be not significant. Although the Beatrice Offshore Wind Farm and Moray East Offshore Wind Farm will be constructed prior to construction commencing for this Development, there remains a potential for harbour seal and bottlenose dolphin to be affected as a result these projects all occurring one after the other, extending the time period over which noisy activities are occurring in the Moray Firth. This also applies to the Aberdeen Harbour Extension, where animals affected by blasting activities carried out for this project, could then also be affected by noise from this Development. However, long term cumulative effects on both the harbour seal and bottlenose dolphin populations will not be significant.

Ornithology

The Moray Firth supports a wide range of birds, including seabirds, waders and wildfowl. There are a number of important seabird breeding colonies located along the coastline of the Moray Firth. A number of these colonies are afforded protection through the designation of Special Protection Areas (SPAs) under the Birds Directive (Directive 2009/147/EC on the Conservation of Wild Birds). These include the East Caithness Cliffs SPA and North Caithness Cliff SPA, the Troup, Pennan and Lion's Head SPA located the south east of the Moray Firth near Fraserborough and the Buchan Ness and Collieston Coast SPA near Peterhead on the northeast Aberdeenshire Coast. A number of seabirds from these colonies feed on fish and other prey within the Moray Firth.

Information from a range of sources has been used to identify what type of birds are present within the Moray West Site. This includes aerial surveys carried out specifically for the Moray West Site and data from other surveys (aerial and boat based) carried out for the neighbouring Beatrice and Moray East offshore wind farms and zonal surveys carried out by The Crown Estate. A desk study was also carried out to identify which species of bird are present along the Offshore Export Cable Corridor.

The main species of seabird found at the Moray West Site include kittiwake, guillemot, razorbill, puffin, gannet, fulmar and herring gull. These species are also present along sections of the Offshore Export Cable Corridor along with a number of seaducks, divers and waterfowl such as scaup, eider, velvet scoter, common scoter, goldeneye, red-breasted merganser, red throated diver, great northern diver, long-tailed duck and Slovenian grebe. A number of these species are associated with the Moray Firth proposed SPA (pSPA) which was identified for protection by Scottish Ministers in 2016.

During construction of the Development birds could be affected by disturbance (due to the physical presence of vessels within the Moray West Site, underwater noise from piling and installation of the offshore export cables) habitat loss, and reduction in the availability of prey (due to impacts on fish as



discussed previously). Surveys indicate that guillemot, razorbill and puffin feed within the Moray West Site during the breeding season and therefore are considered most sensitive to these impacts along with species found along the Offshore Export Cable Corridor. However, given the temporary and short term nature of the construction activities (up to 36 months) and that no significant effects have been predicted for prey species potential effects on these species are not considered to be significant.

Once operational, presence of the offshore export cables will not have any impacts on birds (seabirds, waders or wildfowl). The main impacts on seabirds during operation of the Development include disturbance/displacement/barrier effects due to the physical presence of the Moray West Offshore Wind Farm and collision with rotating turbine blades. Displacement occurs where birds are no longer able to feed in the Moray West Site and have to find alternative feeding grounds. If alternative feeding grounds are further from their breeding colonies this can lead to birds having to use more energy to find food and reduce the amount of food available for chicks. Over time this can lead to bird mortality. As with construction impacts, species most sensitive to disturbance/displacement/barrier effects include guillemot, razorbill and puffin. However, using recognised assessment methods (displacement matrices) it is concluded that these impacts will not be significant.

Species at risk of collision are those observed to be 'in flight' during the surveys. These include kittiwake, herring gull and gannet. Collision Risk Modelling (CRM), which was carried out to determine how many birds are at risk of mortality due to collision with turbines, concluded that impacts due to collision will not be significant.

The cumulative impacts with the Beatrice and Moray East Offshore Wind Farms and other east coast Scotland and North Sea wind farms have also been assessed as not significant for both displacement and collision risk.

As with marine mammals, the effects of the Development on bird populations associated with the East Caithness Cliffs SPA, North Caithness Cliffs SPA, Buchan Ness and Collieston Coast SPA, Troup, Pennan and Lion's Head SPA and the Moray Firth pSPA have been assessed as part of the HRA. Results are presented in the RIAA (Moray West, 2018).



Commercial Fisheries

Fishermen can potentially be affected by the Development in a number of ways including; loss of, or damage to, fishing gear either as a result of the gear being caught on partially installed infrastructure or interactions with vessels involved in construction or maintenance activities; an increase in steaming times to fishing grounds (due to having to route around the Development) or through effects on the populations of the fish or shellfish they are fishing for (these effects are assessed as part of the fish and shellfish ecology assessment).

Fishermen will also potentially be affected by restricted access to fishing grounds where those grounds are located either within the Moray West Site (such as the local and nomadic (UK) scallop fleet and, to a lesser extent the whitefish (haddock) and squid trawlers) or along the Offshore Export Cable Corridor (e.g. Nephrops (Norwegian lobster) fleet, squid trawlers, mackerel jigging and creel fisheries). These access restrictions can also lead to the displacement of the affected fisheries into other areas.

Potential effects on the creel, mackerel jigging and demersal trawl fisheries (squid, Nephrops and whitefish) during construction were all assessed as not significant, reflecting the temporary and highly localised nature of construction activities along the Offshore Export Cable Corridor, low level of activity by these fisheries in the Moray West Site and implementation of measures to manage any potential interactions between fishing gear and construction vessels e.g. at the landfall or in holding locations in the event of bad weather.

Within the Moray West Site, there is potential for the scallop dredgers to experience temporary access restrictions and increased risk of snagging gear or interactions with partially installed infrastructure including cables. Due to the limited range over which the local scallop fleet (smaller vessels) operates, it is considered more sensitive to these access restrictions than the nomadic fleet which operates around the UK with larger vessels. However, due to the short duration of the access restrictions (36 months) potential effects are assessed as not significant.

Once operational, given the offshore export cables will be buried to a target depth of 1 m or protected where cable burial is not possible, all fleets will be able to resume fishing along the Offshore Export Cable Corridor limiting the potential for any significant effects. Given that all inter-array and OSP interconnector cables will also be buried and that the turbines will be spaced at least 1 km apart, it is expected that fishing activities will also be able to resume in the Moray West Site. Long term effects on both the local and nomadic scallop fleets and other demersal trawl fisheries are therefore also assessed as not significant. Potential effects during decommissioning will be similar to those assessed during construction and are also not significant.



In terms of cumulative effects, it was concluded that although there are no overlaps with construction schedules for the other Moray Firth offshore wind farm projects (Beatrice and Moray East) and the Caithness Moray Interconnector, there is potential for an extension in the period of time over which potential effects associated with each project will occur. However, given the short duration of the construction schedule for this Development and other projects, and localised nature of effects, it was concluded that these effects would not be significant.

Once all projects are operational it is expected that most fleets will be able to resume normal fishing activities. However, it is acknowledged that, for safety reasons (e.g. snag risks and manoeuvrability) individual demersal and nomadic scallop dredge vessel skippers may choose not to fish within the wind farms. However, the cumulative effects, are still considered to be not significant, even when considered in the context of restricted access and displacement of other Scottish and English wind farm sites.

Shipping & Navigation

A desk based study and maritime vessel traffic surveys were carried out to identify the shipping and navigation activities occurring within the Moray West Site and a 10 nautical mile (nm) buffer around the site and within the Offshore Export Cable Corridor and a 5 nm buffer along the corridor (study area). Results from the desk study and surveys were used to inform a Navigational Risk Assessment (NRA) which is required by the Maritime and Coastguard Agency (MCA) to identify shipping and navigation hazards and the likelihood of those hazards occurring. The assessment of effects presented in the EIA Report is based on the internationally recognised Formal Safety Assessment (FSA) procedure which requires potential effects to be considered in the context of navigational risk, with the assessment concluding either acceptable, tolerable or unacceptable levels of navigational risk. This differs from the standard approach to EIA applied to the assessment of effects on the other topics covered in this EIA Report.

The main vessels recorded passing through the study area include commercial vessels e.g. cargo ships and oil tankers, recreational vessels (cruise liners), fishing vessels and oil and gas support vessels (mainly associated with the Beatrice Oil Field). Recreational sailing boats (yachts) were also identified along the Offshore Export Cable Corridor and buffer. The Moray West Site and Export Cable Corridor are not located in any major shipping channels. The nearest shipping channels run east west along the north coast of the Moray Firth and north south through the outer Moray Firth used by vessels heading north and south along the east coast of Scotland.



During construction the main risks to shipping and navigation relate to the presence of construction vessels and partially installed infrastructure and cables within the Development area leading to vessel displacement (due to the presence of safety zones), increased risk of vessel to vessel collision risk due to increase presence of construction vessels and increased levels of traffic on alternative routes outside the Development area, vessel to structure allision risk and anchor interaction and snagging. Given the short duration of the construction period, and implementation of industry best practice measures to reduce these risk (embedded mitigation), it was concluded that potential effects would be acceptable to all sea users except oil and gas vessels, which was concluded to be tolerable with mitigation.

Long term it is expected that although larger vessels are expected to continue to use alternative routes to avoid passing through the operational wind farm, some smaller vessels (fishing and oil and gas support vessels) may start transiting through the Moray West Site. The main potential risks during O&M include vessel to vessel collision and vessel to structure allision with vessels routing both around and through the wind farm and diminishing emergency response capability (helicopter search and rescue response resources). However, with decommissioning of the Beatrice Oil field (and associated reduction in oil and gas support vessel traffic within and around the site) and the implementation of industry best practice safety measures it was determined that, for all sea users, the level of risk during O&M would be broadly acceptable. Risks to navigation and shipping during decommissioning will be similar to, or less than those identified during construction, in particular given the expected reduction in oil and gas support vessel traffic following decommissioning of the Beatrice Oil Field.

The cumulative assessment considered potential risks to shipping and navigation in the context of other projects in the Moray Firth including the Beatrice and Moray East offshore wind farms. It is expected that, over time a number of alternative routes will be identified that avoid all three offshore wind farm developments. The assessment concluded that for all sea users and all impacts during all phases of development the cumulative level of navigational risk would be broadly acceptable.

Aviation and MOD

The airspace above the Moray West Site forms part of a larger area of airspace that covers the entire Moray Firth. Key receptors using this airspace include the military Air Traffic Control (ATC) Primary Surveillance Radar (PSR) at RAF Lossiemouth; the civilian NATS (En Route) plc (NERL) PSR at Allanshill; and the Highlands and Islands Airport Ltd. (HIAL) airport at Wick, north-east of the Moray West Site.



The Moray West Site is also located in the vicinity of, and directly beneath, a Helicopter Main Route (HMR) X-RAY which used by helicopters transiting between Aberdeen, via Wick and North Sea offshore oil and gas installation, and the helicopter approaches to helidecks on platforms in the Beatrice and Jacky Oil Fields.

Given that aviation receptors provide a critical safety function, all potential effects (even if minor) are assessed as significant in the absence of suitable mitigation. Key embedded mitigation includes the addition of all structures that are more than 91.4 m in height to aeronautical charts and preparation of a Lighting and Marking Plan (LMP) in consultation with aviation stakeholders. This will be finalised post consent and will set out all lighting requirements for the Development (turbines and OSPs) in accordance with current aeronautical regulations.

Effects during construction include potential infringements from lifting and installation of turbine blades on the vertical separation distances (1,000 ft) required between obstacles and aircraft approaching Wick Airport; helicopters approaching the Beatrice and Jacky Oil Platforms; and the Minimum Safe Altitude for aircraft operations in poor weather the Moray Firth. These effects can be mitigated through changes to the Approach Procedures for Wick Airport and an increase in the Minimum Safe Altitude from raised from 1,500 ft to 2,000 ft. This mitigation will be implemented post consent once details of the Development (selected turbine model and layouts) have been finalised. There is not expected to be any radar interference until the turbines are operational (rotating), therefore there will be no effects on the RAF Lossiemouth and the NERL Allanshill PSRs during construction.

During operation, potential significant effects have been identified on RAF Lossiemouth and the Allanshill PSRs due to turbine interference. Mitigation required to prevent these significant effects will be agreed in consultation with the Ministry of Defence (MOD) and NERL post consent. Given that the Approach Procedures for Wick Airport and Minimum Safe Altitude for the Moray Firth will have already been changed to mitigate effects during construction, no further effects on these receptors are expected during operation. Potential effects on the HMR X-RAY were assessed as not significant on the basis that helicopters routinely operate at heights that are well above the maximum blade tip height for the largest turbine of 285 m (935 ft). In poor weather (low cloud level) helicopters use an overland route.

There are not expected to be any effects during decommissioning given mitigation put in place to prevent effects during construction and mitigation will also apply to decommissioning activities.



There is limited potential for any cumulative effects on aviation. This is on the basis that for any project, even if it is in close proximity to another project, there is a requirement to apply mitigation to the project to negate any significant effects. Consequently, given potential effects are assessed, and mitigated on a project by project basis only, there is limited potential for any cumulative or additive effects to occur.

Seascape, Landscape and Visual Impact Assessment

Seascape, Landscape and Visual Impact Assessment (SLVIA) considers the effects of the Development as a result of changes to the seascape/landscape as an environmental resource in its own right, as well as on people's views and visual amenity.

The assessment considers potential effects within a 50 km radius study area (the area that the tips of the WTGs are theoretically visible from), and uses a combination of landscape/ seascape character assessment, and computerised visual representations from a variety of sensitive viewpoints within the Zone of Theoretical Visibility (ZTV) through a site-specific survey to assess the potential effects.

In total, 24 viewpoints were identified through consultation with Scottish Natural Heritage (SNH), The Highland Council, Moray Council and Aberdeenshire Council for inclusion in the SLVIA. The assessment concluded that, there is potential for the presence of the Moray West Offshore Wind Farm to potentially have significant effects on ten of the 25 viewpoints. The majority of these viewpoints lie in the coastal area of Caithness and north east Sutherland between the A9 at Crakaig in the west of the study area and Wick in the north and include:

- Wick (path south of South Street)
- Sarclet (Sarclet Haven Info Board)
- Whaligoe Steps
- Minor Road, south east of Osclay
- Lybster (end of Main Street)
- Latheron
- Dunbeath (near the Heritage Centre)
- Dunbeath, by Harbour
- Berriedale
- Navidale

Potential significant night-time effects were also identified at Dunbeath and Navidale associated with the use of red aviation safety lighting.



These assessments are based on a worst case scenario involving the largest (Model 4) turbines arranged perpendicular to the coast and assumes very good or excellent visibility. The Development is also assessed in the context of the Beatrice offshore wind farm (which is under construction and therefore included in the baseline for SLVIA). The more south-westerly location of the Moray West Offshore Wind Farm and its longer length aligning with the coastline of Caithness and north east Sutherland means that it extends and increases the offshore wind farm influence rather than introducing new effects along this stretch of coast and also in many other parts of the study area.

Significant effects on landscape/seascape character receptors are less widespread and are concentrated along the coast between north-east of Helmsdale and Sarclet Head and between the A9/A99 and the coast. The affected area includes a small part of the area designated as the Flow Country and Berriedale Coast Special Landscape Area (SLA) as well as the Dunbeath Castle Gardens and Designed Landscapes (GDL). This is largely as a result of the change to their character through the increased extent of the open sea views that would be affected by offshore wind farms as a result of the introduction of the Development and the scale of the proposed turbines. It has been assessed that there would be no significant effects on the National Scenic Area (NSA), Wild Land Areas (WLAs) or other designated parts of the study area.

The Development was also considered cumulatively with the Moray East Offshore Wind Farm and 25 onshore wind farms (consented or in-application). Potential significant effects were identified from 14 of the 22 viewpoints assessed as part of the cumulative assessment, nine of which are the same as assessed as having potential significant effects in the Development alone assessment (Sarclet (Sarclet Haven Information Board), Whaligoe Steps, Minor Road (south east of Osclay), Lybster (end of Main Street), Latheron, Dunbeath (nr Heritage Centre), Dunbeath (by Harbour), Berridale (A9) and Navidale).

Of the remaining five viewpoints, a potential significant cumulative effect was identified at Morven due to the Development being seen in the context of the Golticlay, West Garty and Navidale onshore wind farms. There is potential for significant cumulative effects to arise from viewpoints along south coast of the Moray Firth (Buckie (Cliff Terrace), Portknockie, Cullen and Findlater Castle) as result of the Development being seen in the context of Moray East.

In terms of seascape and landscape character, there is potential for significant cumulative effects to arise on the following coastal seascape/landscape receptors in Highland when the Development is considered cumulatively with other consented and/or application offshore and onshore wind farms:



- The Dunbeath Castle GDL;
- Coastal areas of the Flow Country and Berriedale Coast, which includes a section of the High Cliffs and Sheltered Bays LCT and the Moorland Slopes and Hills LCT, along with a section of the Helmsdale to Berriedale Coastal Shelf RCCA;
- The RCCAs from the north of Helmsdale to the south of Sarclet Head including: part of the Helmsdale to Berriedale Coastal Shelf; Dunbeath Bay, Lybster Bay and Sarclet Head to the south west of Sarclet;
- The coastal LCTs including: Coastal High Cliffs and Sheltered Bays north east of Helmsdale; the Moorland Slopes and Hills in the vicinity of Badbea and the south east facing slopes of Cnoc na Croiche;
- The Coastal Shelf area of the Loch Fleet, Loch Brora and Glen Loth SLA; and
- the Small Farms and Crofts LCT between Berriedale and Sarclet Head to the south of the A9.

There will no significant cumulative seascape/landscape character effects would arise on the coast of Moray or Aberdeenshire.

Socio-Economics, Recreation and Tourism

Socio-economics

The socio-economic assessment considers the potential for the Moray West Offshore Wind Farm to create jobs and generate wealth (Gross Value Added (GVA)) in the local study area (the four local authority areas of Highlands, Moray, Aberdeenshire, and Aberdeen City) and across Scotland. The assessment also considers other factors such as changes in demand for local housing, accommodation and services.

In comparison to Aberdeen City (and some parts of Aberdeenshire) which is dominated by the oil and gas industry and associated support services, employment within much of the local study area comprises low paid, temporary jobs in agriculture, local services and tourism. Opportunities for the creation of employment and GVA generation within the local study area are therefore considered to be a beneficial effect of the Development.

The assessment considered two scenarios: low and high. The high scenario assumes the use of local ports for some of the construction activities and a certain level of supply of goods and services from the local study area during operation and decommissioning of the Development. The low scenario assumes there will be limited activity at local ports during construction and limited expenditure in the local study area during operation. Under the high scenario, it is predicted that there could be up to



150 jobs created in the local study area and 550 across Scotland. When considered in the context of existing employment opportunities in the local study area, the effect of 150 jobs and associated GVA is considered to be significant. During operation, the Development is predicted to generate a 2.7% uplift in jobs within the local study area, which is also considered to be significant in terms of longer term employment and GVA.

There will be no significant effects associated with an increased demand for local accommodation and services during construction and operation due to an influx of labour on the basis that there is sufficient existing supply of accommodation in the local study area to meet this increased demand.

In terms of cumulative socio-economic effects, there is potential for the simultaneous construction of offshore wind farms in the Moray Firth (Beatrice, Moray East and Moray West) to lead to an increased demand for workers and development of supply chain capabilities. Where this leads to an increased labour supply and development of the supply chain, there is an increased likelihood that the high scenario for the Development can be achieved.

Tourism and recreation

Information presented below is as originally assessed prior to removal of Sandend Beach from the Onshore PAB and is consistent with information presented in the EIA Report Volume 2.

There are a range marine tourism activities available within the local study area including wildlife watching, sailing, diving and watersports (kayaking and surfing). Most of these activities occur within nearshore areas (within 12 nm) and therefore will not be affected by the Moray West Offshore Wind Farm. However, there is potential for localised disruption to sailing and watersports during installation of the offshore export cables.

The greatest potential for disturbance is associated with activities near the coast, in particular within the Landfall Area. The Landfall Area encompasses Sandend Beach, which is one of only a few beaches located along the Moray and north Aberdeenshire coast and an important surfing location and is therefore recognised as being of local importance due to both its recreational and amenity value.

The assessment of potential effects on the quality of the waves for surfing and the surfing community and local surfing businesses concluded that, although the final location of the landfall is still to be determined, in the event the cables are brought ashore via the beach, any potential effects on the quality of the beach for surfing or surfers using the beach would be not significant. This is on the basis that, although the beach is used for surfing all year round, any disturbance or restricted access during



installation of the cables will be temporary and short term in nature. Potential long term effects on the quality of the surf due to the presence of the cables were assessed as negligible and not significant.

Due to the localised nature of the offshore export cable routes and landfall location, the potential for cumulative effects on local watersports along the Moray and north Aberdeenshire Coast, including surfing is limited and not significant.

Archaeology & Cultural Heritage

The marine archaeology and cultural heritage assessment considers likely significant effects of the Development on a range of features including seabed prehistory (palaeochannels and other features that contain palaeoenvironmental sediment sequences); early prehistoric sites and derived artefacts e.g. lithic, bone and wooden tools, ecofacts and other archaeological materials; ship wrecks; aviation sites (crash sites and associated debris); and buried land surfaces (intertidal).

Where marine archaeological and cultural heritage assets have been discovered (e.g. through previous surveys or other marine activities such as fishing) these are recorded and protected accordingly. For ship wrecks and aviation sites where wrecks have never been discovered or no longer remain (e.g. have been destroyed through natural processes), it is the site of the ship wreck or aviation crash site that is subject to protection. In addition to known marine archaeological and cultural heritage assets or sites, many other assets go undiscovered, either due to burial or location in an unexplored area of sea.

Impacts on known marine archaeological and cultural heritage assets or sites can be avoided by designing the Development to avoid or prevent any interactions with these assets or sites. The main risk posed by the Development is therefore inadvertent damage to undiscovered assets through disturbance of the seabed during installation of the substructures, inter-array, OSP interconnector and offshore export cables.

Once the detailed layout for the Development is known, in order to minimise the risk of damage to, or loss of, marine archaeological and cultural heritage assets, Moray West will prepare a Development specific Written Scheme of Investigation (WSI) which will set out specific mitigation to be implemented to minimise impacts on any marine archaeological and cultural heritage assets. The WSI will include a Protocol for Archaeological Discoveries (PAD) which will be developed specifically to minimise the risk of damage to any previously unrecorded archaeological remains.



In addition to potential loss of, or damage to, known and unknown marine archaeological and cultural heritage assets, there is potential for presence of the Moray West Offshore Wind Farm to affect the setting of the following onshore cultural heritage features: Scheduled Monuments (Dunbeath Inver Forth, Latheronwheel promontory fort and The Tulloch (Usshilly), Broch and field system); Category A Listed Buildings (Dunbeath Castle; Dunrobin Castle; and Covesea Skerries Lighthouse, Keeper's Cottage and Steading); and Gardens and Designated Landscapes (Dunbeath Castle and Dunrobin Castle). The assessment, which was informed by findings from the Landscape, Seascape and Visual (SLVIA), concluded for both the Development alone, and cumulatively, that potential effects on the setting of these onshore receptor would be minor and not significant.

Other Human Activities

The other human activities assessment considered the potential effects of the Development on other activities within the Moray Firth. These include: other offshore wind farm developments (the Moray East and Beatrice offshore wind farms and the Beatrice Demonstrator Turbines); subsea cables such as the Caithness Moray Interconnector and export cables associated with the Beatrice and Moray East offshore wind farms; existing oil and gas infrastructure in particular the platforms and wells associated with the Beatrice Oil Field and the Jacky Platform and planned decommissioning of this infrastructure (including the Beatrice Demonstrator Turbines); future exploration of other licenced oil and gas blocks in the Moray Firth; marine disposal activities at Buckie (2 km from the Offshore Export Cable Corridor); potential UXO and telecommunications associated with the operations on the Beatrice (Alpha, Bravo and Charlie Platforms) and Jacky Platforms.

The main source of a potential effect on other human activities is where construction activities or operation of the Moray West Offshore Wind Farm restricts access to, or interferes with the ongoing operation of the activities listed. Access restrictions are most likely to occur as a result of vessels engaged in other activities having to avoid or route around the Moray West Site during construction as well as interference with existing navigation routes due to increased vessel traffic within the wider Moray Firth and along the Offshore Export Cable Corridor. However, given that access restrictions / interference with activities will be short term and temporary potential effects are considered to be minor and not significant.

Long term, there is potential for the physical presence of the Moray West Offshore Wind Farm to place some restriction on the future exploration of licenced oil and gas blocks that interact with the Moray West Site and part of the Offshore Export Cable Corridor. However, it is not known at this time what exploration activities are likely to take place in the future. In the event that an operator wishes



to progress with oil and gas exploration activities in the area in the future, Moray West will engage with the relevant operators to determine the nature of the activities and identify potential interactions with the Moray West Offshore Wind Farm in order to reduce the potential for any significant effects.

There are not expected to be any long term effects on operations associated with the Beatrice Oil Field on the basis that the field is due to be decommissioned between 2024 and 2027. There will therefore be some overlap with these activities and the first few years of operation of the Moray West Offshore Wind Farm. However, any interactions are expected to be minimal and potential effects will not be significant.

There are no overlaps in the construction periods for the Beatrice, Moray East and Moray West Offshore Wind Farms. Potential cumulative effects on other human activities during construction are therefore limited. Long term, operation of the three wind farms is also not expected to have any significant cumulative effects in terms of restricted access to, or interference with other human activities in the Moray Firth.

Whole Project Assessment

The likely significant effects of the OnTI have been assessed in a separate Onshore EIA Report, which will be submitted to Moray and Aberdeenshire Councils as part of the applications for Planning Permission in Principle (PPP) under the Town and Country Planning (Scotland) Act 1997. These PPP applications will follow submission of the Section 36 consent and Marine Licence applications for this Development. The Project (Moray West Offshore Wind Farm, OfTI and the OnTI) extends across multiple jurisdictions and comprises multiple components. It is therefore necessary to provide information on the potential effects of the OnTI, and potential inter-relationships between the marine and terrestrial components of the Project, in the Offshore EIA Report in order to ensure Scottish Ministers have sufficient information available to enable them to consider the project, and associated environmental effects, as a whole, rather than the different components being considered in isolation.

OnTI Overview

The purpose of the OnTI is to supply electricity generated by the Moray West Offshore Wind Farm to the onshore National Electricity Transmission System (NETS). The electricity will be transmitted via two high voltage alternating current (HVAC) cable circuits with a transmission voltage of up to 400 kV.

The location of the revised Onshore Planning Application Boundary (PAB) (excluding Sandend Beach) in relation to the Development is illustrated in Figure 2.

Key components of the OnTI include:



- Landfall and Transition Joint Bays (JTBs) - the offshore export cable circuits will make landfall at a location within the Landfall Area, which extends between Findlater Castle and Redhythe Point on the Aberdeenshire coastline. The offshore and onshore export cable circuits will be connected in two buried Transition Joint Bays (TJBs). These will be located above Mean High Water Springs (MHWS) and as close to the landfall location as practicable;
- Onshore Cable Circuits - On exiting the TJBs, the onshore cable circuits will be routed inland towards the onshore substation site. The HVAC system will comprise two cable circuits, with each circuit comprising three separate cables. The voltage for the cables will be between 132 and 400 kV (most likely 220 kV). The cable circuits will be buried; and
- Onshore Substation - The onshore substation will be located in the vicinity of Whitehillock, nr Keith. The Design Envelope for the substation assumes a footprint of up to approximately 60,000 m² (including landscaping and parking) and a maximum height of up to 13 m, plus lightning rods of an additional 6 m height. The onshore substation will require a permanent access. This will be taken from the existing single-track road that provides access to the buildings of Whitehillock from the A96 trunk road, and borders the site to the east.

The substation will then be connected, via underground cables, to the transmission interface point at the Blackhillock Substation where the OnTI will connect to the NETS. The Blackhillock Substation is approximately 2.3 km to the north west of the onshore substation. Works required at Blackhillock substation to facilitate the connection of the OnTI will be completed by Scottish Hydro Electric Transmission Limited (the Transmission Network Owner [TNO]).

Construction of the OnTI will commence during Q1 2022 and continue until Q3 2024. First generation of the Moray West Offshore Wind Farm is planned for Q4 2024, with the completion of commissioning and handover of the Offshore Transmission Infrastructure (OfTI) and OnTI to the Offshore Transmission Owner (OfTO) occurring in Q4 2024.

Potential Inter-relationships Between the Development and the OnTI

Information presented below is as originally assessed prior to removal of Sandend Beach from the Onshore PAB and is consistent with information presented in the EIA Report Volume 2.

Information relating to the whole project assessment is presented in Chapter 18 of the EIA Report (Volume 2). This identifies that most interactions between the Development and the OnTI are likely to occur at the landfall where there is already an existing overlap in jurisdictions between the Mean High Water Spring (MHWS) and Mean Low Water Spring (MLWS) (intertidal area).



In terms of the physical and biological environment there is potential for construction activities at the landfall (both onshore and offshore) to affect coastal water quality and sensitive geological features (Cullen to Stake Ness Coast SSSI). However, with the implementation of appropriate mitigation, including a commitment to ensuring cable installation activities do not affect any exposed rock features, these potential effects, are considered to be not significant. There are also not expected to be any significant effects on sensitive intertidal habitats or species (including any birds, otters or seals).

In terms of impacts on SLVIA, neither the substation site (at Whitehillock, nr Keith) or the Moray West Offshore Wind Farm will be visible from the Landfall Area. All infrastructure at the landfall (once installed) will be buried beneath the ground and therefore will not be visible long term. Potential interactions at the landfall therefore relate to temporary visual and landscape/seascape effects due to the presence of cable laying vessels/HDD rigs offshore together with construction compounds onshore. However, given these effects will be temporary and short term they are not considered to be significant.

Impacts on cultural heritage assets in the intertidal area will be limited based on the inclusion of mitigation to minimise any potential impacts in both the Onshore and Offshore EIA Reports. Impacts on the setting of onshore cultural heritage sites will also be limited, given the limited potential for inter-related landscape and visual effects.

In terms of socio-economics, the Project as a whole, has the potential to provide a number of benefits to both Moray and Aberdeenshire, as well as the wider local study area, in terms of temporary and long term employment opportunities and wealth generation (GVA). In particular, given that the employment opportunities associated with the OnTI are completely different to those associated with the Development, these can be considered in addition to each other, rather than a duplication.

Potential effects on surfers and the quality of the surf have been assessed in the Offshore EIA Report and considered in the Onshore EIA Report. These are considered to be not significant both during construction and operation. In terms of effects on local recreation and amenity, there will be some short term, temporary disturbance at the landfall while the cables are brought to shore. However, in order to minimise disruption, where possible Moray West will aim to coordinate onshore and offshore activities, such that operations at the landfall are completed as one combined activity rather a series of separate activities.



Opportunity to Comment on the EIA Report

The EIA Report will be submitted with an application to MS-LOT for consent to construct and operate the Moray West Offshore Wind Farm and associated OfTI. Once the application has been formally registered, MS-LOT on behalf of the Scottish Ministers, will undertake consultation and invite public representations on the proposals before determining the application.

The EIA Report comprises:

- Volume 1 - Non-Technical Summary (this document);
- Volume 2 – EIA Report Main Text;
- Volume 3a – EIA Report Figures
- Volume 3b – SLVIA Visualisations; and
- Volume 4 – EIA Report Technical Appendices.

A copy of the consent applications, with their respective plans showing the areas to which they relate, together with a copy of this Offshore EIA Report, are available for inspection, free of charge, via the Project website (<http://www.morayoffshore.com/moray-west/document-library>) and during opening hours at:

- The Highland Council, Planning Office, Glenurquart Road, Inverness, IV3 5NX;
- Caithness Planning Office, Market Square, Wick, KW1 4AB;
- Helmsdale Library and Service Point, Dunrobin Street, Helmsdale, KW8 6JX;
- Buckie Library, Cluny place, Buckie, AB56 1HB;
- Golspie Service Point, Olsen House, Main Street, Golspie, KW10 6RA;
- Brora Library, Gower Street, Brora, Highland, KW9 6PD;
- Moray Council, Planning Office, High Street, Elgin, IV30 1BX; and
- Aberdeenshire Council, Banff Planning Office, Winston House, 39 Castle Street, Banff, AB45 1DQ.

Hard copies of the Offshore EIA Report can be purchased from Moray West for a fee of £300. Electronic versions can also be requested.

If you wish to comment on the EIA Report or make representations, please write to MS-LOT at the following address:

Marine Scotland, Marine Laboratory
PO Box 101, 375 Victoria Road, Aberdeen, AB11 9DB

