Bellrock
OFFSHORE WIND

Bellrock Offshore Wind Farm

Bellrock Wind Farm Development Area

Scoping Report

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Executive Summary

Through the ScotWind leasing round managed by Crown Estate Scotland (CES), Bellrock Offshore Wind Farm Limited (the **Applicant**) was successfully awarded exclusivity of the area of seabed shown in **Figure 1.1** and **Figure 1.2** (the latter shown on an admiralty chart background) in **Appendix 1** to develop the 1.2 gigawatt (GW)[1] Bellrock Offshore Wind Farm Project (the **Bellrock Project**).

For consenting purposes, the Bellrock Project will comprise a Wind Farm Development Area (WFDA) and an Offshore Transmission Development Area (OfTDA). Separate consents will be sought for each Development Area.

The Bellrock Project will deliver significant supply chain expenditure within Scotland, have the potential to power over 1.1 million homes[2] with renewable energy and will help achieve Scotland's net zero targets whilst improving energy security.

This **Bellrock WFDA Scoping Report** accompanies a request for a formal Scoping Opinion submitted to the Marine Directorate - Licensing Operations Team (MD-LOT), acting on behalf of the Scottish Ministers, relating to the Bellrock WFDA.

For clarity, Scottish and Southern Electricity Networks (SSEN) Transmission are responsible for consenting and developing the electrical infrastructure from the SSEN Transmission offshore substation to shore, as this forms part of the National Electricity Transmission System.

The Bellrock WFDA will comprise the following infrastructure:

- Between 42 and 80 wind turbine generators (WTGs)[3], with floating substructures (FSSs) and (if used) fixed bottom substructures (FBSSs);
- Station keeping systems (SKS) for each FSS, including mooring lines and anchors;
- Inter-array cables (IACs), subsea cable hub(s) and associated cable protection; and
- Scour protection for FSSs and anchoring points, and (if used) FBSSs.

The purpose of this Bellrock WFDA Scoping Report is to provide MD-LOT and stakeholders with information on the activities and infrastructure that will be associated with the Bellrock WFDA and allow for engagement with stakeholders on the key issues to be addressed within the Bellrock WFDA Environmental Impact Assessment (EIA) Report, the baseline data sources and the assessment methodologies to be used.

[1] Project capacities quoted throughout this Bellrock WFDA Scoping Report are approximate. The final capacity will be confirmed within the Bellrock WFDA EIA Report. Should a material increase in project capacity be proposed within the WFDA (shown in **Figure 1.1** and **Figure 1.2** in **Appendix 1**), the Applicant will liaise with MD-LOT to establish the validity of the Bellrock WFDA Scoping Opinion.

[2] www.bellrockwind.co.uk

[3] Additional capacity may also be developed within the Bellrock WFDA for overplanting purposes.

This Scoping Report therefore presents a broad project description, the baseline data sources and assessment methodologies to be used in the Bellrock WFDA EIA Report, and a summary of the existing environment for the following technical chapters:

- Marine Geology, Oceanography and Physical Processes;
- Benthic Ecology;
- Fish and Shellfish Ecology;
- Marine Mammals;
- Offshore Ornithology;
- Commercial Fisheries;
- Shipping and Navigation;
- Aviation and Radar;
- Marine Infrastructure and Other Users;
- Marine Archaeology and Cultural Heritage;
- Seascape, Landscape and Visual Impact;
- Socioeconomics, Tourism and Recreation;
- Climate Change;
- Offshore Air Quality; and
- Major Accidents and Disasters.

The Applicant invites consultees to consider the information provided in this Bellrock WFDA Scoping Report and the **Bellrock WFDA Habitats Regulations Appraisal (HRA) Screening Report**, and provide comments on the proposed approach and, in particular, whether they agree with the conclusions drawn.

Subsequent to obtaining a Scoping Opinion, a single Bellrock WFDA EIA Report will be produced in support of applications for Section 36 (s.36) consent (under the Electricity Act 1989) and a Marine Licence (under the Marine and Coastal Access Act 2009) for the Bellrock WFDA. Cumulative effects between the Bellrock WFDA and the Bellrock OfTDA will be considered within each respective EIA Report (including the Bellrock WFDA EIA Report) to ensure a full project assessment is undertaken. Cumulative effects will also be assessed for the Bellrock Project alongside other projects and plans in the wider area.

Contents

Appendices

Figures (Appendix 1)

Tables

Plates

Glossary of Terminology

Term	Definition
Allision	Contact between a moving object and a stationary object.
Applicant	Legal entity submitting the consent applications for Bellrock Offshore Wind Farm Limited.
Automatic Identification System	A system by which vessels automatically broadcast their identity, key statistics including location, destination, length, speed, and current status, e.g., under power. Most commercial vessels and United Kingdom (UK)/European Union (EU) fishing vessels over 15 metre (m) length are required to carry an Automatic Identification System.
Avoided emissions	Reductions in greenhouse gas emissions that are enabled by an activity by displacing a more greenhouse gas intensive alternative.
Bathymetry	Topography of the seabed.
Bedload	Sediment particles that travel near or on the bed
Bellrock Offshore Wind Farm	An offshore wind farm capable of exporting around 1.2 GW of renewable energy to the National Electricity Transmission System. Additional capacity may also be developed for overplanting purposes. The Wind Farm Development Area is located 120 km east of Stonehaven (116 km southeast from Peterhead), and the working assumption is that Bellrock Offshore Wind Farm will connect to the National Electricity Transmission System via an SSEN Transmission offshore substation located to the west of the Bellrock Wind Farm Development Area. The Bellrock Offshore Wind Farm comprises of the following development areas: • Wind Farm Development Area; and • Offshore Transmission Development Area.
Benthic/benthos	Refers to anything associated or occurring on the bottom of a body of water (the seabed).
Biodiversity	Refers to the variety of living species, including plants, animals, bacteria, and fungi.
Biologically defined minimum population scale	The estimated population size of a species within a defined biogeographic area during a biologically relevant season, as defined by Furness (2015). For many seabird species present in UK waters there are two defined biogeographic areas; UK Western waters and UK North Sea and Channel. However, some species have different defined Biologically defined minimum population scale (BDMPS) areas, dependent on the distribution and movements of the species population through the year. Furness (2015) defines the BDMPS for non-breeding seasons; the breeding season BDMPS is defined as the breeding population within foraging range from the Bellrock WFDA, plus non-breeders and immatures.
Biologically relevant seasons	Defined time periods during the year where a species population will predominantly be present in a certain biogeographic area and/or exhibits particular behaviours in relation to the species' life cycle. Biologically relevant seasons, as defined by Furness (2015), include breeding, non-breeding, spring migration, autumn migration and winter. In many cases seasons will overlap, and not all seasons are relevant to all species.
Blue carbon	Organic and inorganic carbon that is captured and stored by the marine and coastal ecosystems.

Term	Definition
BlueFloat Energy | Renantis Partnership	A strategic partnership between BlueFloat Energy and Renantis to jointly develop offshore wind farm projects in the UK, including Bellrock Offshore Wind Farm.
Breeding season	Furness (2015) defines breeding season as the period from modal return to the colony through to modal departure from the colony at the end of breeding, for birds at UK colonies.
Breeding season apportionment	A method to determine connectivity with breeding seabird SPA's, by which we can estimate how birds using marine renewables development sites can be 'apportioned' to multiple source colonies (NatureScot, 2018).
Cable protection	Protective measure to minimise the effects of scour and hazards along the inter-array cables and/or offshore export cables (e.g. cable exposure or snagging), as well as for protecting inter-array cables and/or offshore export cables at infrastructure crossing points.
Carbon budget	The cumulative amount of greenhouse gas emissions permitted over a defined period of time to achieve a certain climate target, which can be set at the national, regional, local or sectoral level.
Carbon dioxide equivalent (CO_2e)	Carbon dioxide equivalent is a term for describing different greenhouse gases in a common unit. The unit takes the different global warming potentials of greenhouses gases into account. CO_2e is signifies the amount of CO_2 which would have the equivalent global warming impact.
Chronic climatic change	Long-term, gradual changes to weather patterns and the climate, also known as chronic climate hazards.
Circalittoral	A subtidal zone where light penetration is limited and therefore communities are dominated by faunal species.
Climate	The general weather conditions prevailing over a long period of time, which include seasonal averages and extremes.
Climate change impact	An impact from a climate hazard which affects the ability of the receptor to maintain its functions or purpose.
Climate change projection	A possible climate outcome defined by the modelling of various climate variables.
Climate change resilience	The ability of a project and its receptors to prepare for, respond to, recover from and adapt to changes in the climate in a manner that ensures it retains much of its original function and purpose.
Climate hazard	A weather or climate-related event or trend in climate variable, which has potential to do harm to receptors such as increased precipitation or storms
Climate variable	A measurable, monitorable aspect of the weather or climate conditions such as temperature and wind speed
Collision	Contact between moving objects.
Connector	Joint between a dynamic inter-array cable and a static inter-array cable.
Controlled airspace	Defined airspace within which pilots must follow Air Traffic Control instructions implicitly. In the UK, Classes A, C, D, and E are areas of controlled airspace.

Term	Definition
Cradle-to-factory or cradle to (factory) gate	A term which includes the extraction, manufacture and production of materials to the point at which they leave the factory fate of the final processing location.
Creel	Pots and traps are generally rigid structures into which fish or shellfish are guided or enticed through funnels that make entry easy but from which escape is difficult. There are many different styles and designs, each one has been designed to suit the behaviour of its target species. Creel is typically a Scottish term for a pot or trap typically deployed by an inshore vessel.
Demersal	Living on or near the seabed.
Dynamic inter-array cable	The section of inter-array cable between the floating substructure and the connector to the static inter-array cable, which is designed to accommodate the dynamic movement of the floating substructure and minimise movement of the static inter-array cable.
eDNA	Environmental DNA that is collected from the environment, such as in seawater, rather than directly from an individual organism.
Embodied carbon	Embodied (or embedded) carbon or emissions are the greenhouse gas emission associated with the manufacturing of construction or infrastructure materials (i.e., material extraction, material processing, transport to manufacturer, manufacturing) and the transport of those materials to the project site.
Excursion limit	The maximum horizontal movement of a floating substructure from its design coordinates.
Extreme weather event	A weather event that is significantly different from the average or typical weather pattern, also known as acute or event-driven climate hazard.
Fish stock	Any natural population of fish which an isolated and self-perpetuating group of the same species.
Fishery	A group of vessel voyages which target the same species or use the same gear.
Fishing ground	An area of water or seabed targeted by fishing activity.
Fixed bottom substructure	A substructure, or foundation, that provides support for the wind turbine generator and provides a conduit for inter-array cables.
Fleet	A physical group of vessels sharing similar characteristics (e.g., nationality).
Flight Information Region	Airspace managed by a controlling authority with responsibility for ensuring air traffic services are provided to aircraft flying in it.
Floating offshore unit	The combined wind turbine generator and floating substructure.
Floating offshore substation	The combined offshore substation and floating substructure.
Floating substructure	A floating structure which provides buoyancy and, in conjunction with the station keeping system, supports a superstructure (e.g. wind turbine generator, offshore substation or similar), and maintaining verticality and movement within acceptable limits.

Term	Definition
Formal Safety Assessment	A structured and systematic process for assessing the risks and costs (if applicable) associated with shipping activity as defined by the International Maritime Organization (IMO).
Gear type	The method/equipment used for fishing.
Global warming potential	Global warming potential of a greenhouse gas is a measure of how much heat is trapped by a certain amount of gas in the atmosphere relative to carbon dioxide.
Greenhouse effect	The greenhouse effect is the way that some of the heat from the sun is trapped close to the earth's surface by greenhouse gases.
Greenhouse gas	A greenhouse gas is a gas that traps heat in the atmosphere and causes the greenhouse effect, also known by the collective shorthand "carbon".
Greenhouse gas intensity	The magnitude of greenhouse gas emissions per a unit of output or value, expressed as a ratio, also known as carbon intensity.
Gross Value Added	Measure of the value of goods and services produced in an area, industry or sector of an economy.
Highest astronomical tide	The highest level that can be expected to occur under average meteorological conditions and under any combination of astronomical conditions.
Highly Pathogenic Avian Influenza	Highly pathogenic avian influenza (HPAI) viruses cause severe disease and high mortality in infected birds.
Innovation and Targeted Oil & Gas	A Crown Estate Scotland leasing round for offshore wind projects, under which the Sinclair Offshore Wind Farm and the Scaraben Offshore Wind Farm were awarded Exclusivity Agreements for their respective Wind Farm Development Areas, under which early-stage development works can progress.
Inter-array cable	Armoured cable containing electrical and fibre optic cores, which link the wind turbines to each other and to the subsea cable hub(s) and / or the offshore substation(s) and include dynamic inter-array cable and static inter-array cable sections.
Interconnector cable	Armoured cable containing electrical and fibre optic cores which link two or more offshore substations.
International Council for the Exploration of the Seas statistical rectangles	International Council for the Exploration of the Seas (ICES) standardise the division of sea areas to enable statistical analysis of data. Each ICES statistical rectangle is '30 min latitude by 1 degree longitude' in size (approximately 30 x 30 nautical miles). A number of rectangles are amalgamated to create ICES statistical areas.
Landings	Quantitative description of the amount of fish returned to port for sale, in terms of value or weight.
Lowest astronomical tide	The lowest level that can be expected to occur under average meteorological conditions and under any combination of astronomical conditions.
Management Units	The Management Units provide an indication of the spatial scales at which impacts of plans and projects alone, cumulatively and in-combination, need to be assessed for the marine mammal species in UK waters, with consistency across the UK.

Term	Definition
Marine Guidance Note	A system of guidance notes issued by the UK Maritime and Coastguard Agency (MCA) which provide significant advice relating to the improvement of the safety of shipping at sea, and to prevent or minimise pollution from shipping.
Maritime archaeology	The remains of boats and ships and archaeological material associated with prehistoric and historic maritime activities.
Mean High Water Springs	The average over a year of the heights of two successive high waters during those periods of 24 hours (once every fortnight) when the range of the tide is greatest.
Mean Low Water Springs	The average over a year of the heights of two successive low waters during those periods of 24 hours (once every fortnight) when the range of the tide is greatest.
Mean maximum foraging range	The maximum range reported for each colony, averaged across all colonies.
Mean Sea Level	The average level of the sea taking account of all tidal effects but excluding surge events.
Megafaunal species	Any species with a body mass estimates of more than 45 kg.
National Electricity Transmission System	The high-voltage electricity power transmission network serving Great Britain which receives electricity from generators (such as offshore wind farms) and transmits that electricity to anywhere on the National Electricity Transmission System to satisfy demand.
Nature Conservation Marine Protected Area	A type of marine protected area that can be designated in Scottish territorial and offshore waters
Navigational Risk Assessment	Document required by the MCA under MGN 654 which assesses risk associated with on Offshore Renewable Energy Installation (OREI) to shipping and navigation users.
Non-breeding season	Furness (2015) defines non-breeding season as the remaining part of the year that is not a part of breeding season.
Numerical modelling	Refers to the analysis of coastal processes using computational models.
Offshore export cable	Armoured cable containing electrical and fibre optic cores between the offshore substation(s) and the transition bay(s).
Offshore export cable corridor	The Marine Licence application boundary within which the offshore export cable route will be located.
Offshore export cable route	The area within the offshore export cable corridor where construction and commissioning of the offshore export cable(s) will be undertaken and will involve (but not limited to) seabed preparation, trenching, installation and burial of offshore export cable(s), and cable protection.
Operational life	The expected operational life of the project from final commissioning to the cessation of commercial operations.

Term	Definition
OSPAR	OSPAR started in 1972 with the Oslo Convention against dumping and was broadened to cover land-based sources of marine pollution and the offshore industry by the Paris Convention of 1974. These two conventions were unified, up-dated and extended by the 1992 OSPAR Convention. OSPAR is so named because of the original Oslo and Paris Conventions ("OS" for Oslo and "PAR" for Paris).
Otter trawl	A net with large rectangular boards (otter boards) which are used to keep the mouth of the trawl net open. Otter boards are made of timber or steel and are positioned in such a way that the hydrodynamic forces, acting on them when the net is towed along the seabed, pushes them outwards and prevents the mouth of the net from closing.
Overplanting	The installation of additional capacity over and above that which the wind farm can export to the National Electricity Transmission System, to allow additional renewable energy to be generated and exported during times of lower wind speed or during wind turbine generator maintenance than would otherwise have been the case.
Pelagic	Of or relating to the open sea.
Pelagic trawl	A net used to target fish species in the mid water column.
Permanent threshold shift	A permanent total or partial loss of hearing sensitivity caused by acoustic trauma. PTS results in irreversible damage to the sensory hair cells of the ear, and thus a permanent reduction of hearing acuity.
Population viability analysis	Within both Environmental Impact Assessments (EIA) and Habitat Regulations Appraisals (HRA) the predicted collision and/or displacement and barrier effects of offshore wind developments need to be considered against the relevant marine bird populations. The primary method used for assessing the population consequences in these assessments is a population viability analysis (PVA) (NatureScot, 2023i).
Pre-construction works	Activities undertaken prior to formal commencement of construction. Examples include survey works such as geotechnical and geophysical surveys and seabed preparation activities.
Primary Surveillance Radar	A radar system that measures the bearing and distance of targets using the detected reflections of radio signals.
Quaternary	The last two million years of earth history.
Ramp-up	Ramp-up forms the second part of the soft-start procedure and follows on from the low-energy blows. It comprises a specified minimum period of piling (e.g. 10 minutes), starting at the low-energy blow level, and gradually increasing in hammer energy. The maximum hammer energy required (operational power for that specific pile) must not be reached within this agreed ramp-up period.
Reactive compensation station	An offshore platform containing equipment which maintains the voltage control of the offshore export cables and maintains the quality of electricity transmitted.
Regular Operator	A commercial operator associated with one or more vessels that transit an area on a regular basis.

Term	Definition
Safety Zone	An area of water around or adjacent to a floating offshore unit which is to be constructed, extended, operated or decommissioned, from which certain or all classes of vessels are excluded and within which activities can be regulated for the purpose of securing safety of the floating offshore unit or vessels in that vicinity, and individuals on both the floating offshore unit and vessel, in line with Section 95 of the Energy Act 2004.
Scallop dredge	A method to catch scallop using steel dredges with a leading bar fitted with a set of spring loaded, downward pointing teeth. Behind this toothed bar (sword), a mat of steel rings is fitted. A heavy net cover (back) is laced to the frame, sides and after end of the mat to form a bag.
Scottish seine	An encircling net shot in the open sea using very long ropes to lay out the net, and ropes on the seabed prior to towing the net closed and hauling from a boat under its own power.
ScotWind	A Crown Estate Scotland leasing round for offshore wind projects in which the process enabled developers to apply for seabed rights to plan and build wind farms in Scottish waters.
Scour protection	Protective material positioned around anchors and substructures to avoid sediment being eroded as a result of the flow of water.
Seabed features	Features seen on the seafloor in the sidescan sonar or multibeam bathymetry data which are interpreted to represent heritage assets, or potential heritage assets. Also includes magnetic anomalies which may represent shallow buried ferrous material of archaeological interest.
Secondary Surveillance Radar	A radar system that transmits interrogation pulses and receives transmitted responses from suitably equipped targets.
Sediment transport	The movement of a mass of sediment by the forces of currents and waves.
Soft-start	The procedure used to commence piling at a lower hammer energy. The soft-start procedure consists of low-energy blows for 10 minutes which are immediately followed by ramp-up for 10 minutes.
Sound exposure level	The constant sound level acting for one second, which has the same amount of acoustic energy, as indicated by the square of the sound pressure, as the original sound. It is the time-integrated, sound-pressure-squared level. SEL is typically used to compare transient sound events having different time durations, pressure levels, and temporal characteristics.
Sound pressure level	The sound pressure level or SPL is an expression of the sound pressure using the decibel (dB) scale, and the standard reference pressures of 1 μPa for water and 20 μPa for air.
SSEN Transmission offshore substation	An offshore substation to be developed by SSEN Transmission that will be part of the National Electricity Transmission System, connecting mainland Scotland to mainland England, and which will be Bellrock Offshore Wind Farm’s connection point to the National Electricity Transmission System.
Static inter-array cable	The section of inter-array cable between the connector from the dynamic inter-array cable to the subsea cable hub(s) and/or the offshore substation(s).
Station keeping system	The system (including mooring lines and anchors) used to hold a floating substructure within its excursion limit and maintain the intended orientation of the floating substructure.

Term	Definition
Stochastic Collision Risk Model	A programme used to assess the collision risk (estimated mortality) of seabirds to operational turbines of offshore wind farms. A Stochastic Collision Risk Model (sCRM) is used to account for uncertainty around input variables.
Stock assessment	An assessment of the biological stock of a species and its status in relation to defined references points for biomass and fishing mortality.
Strategic Environmental Assessment	In Scotland, public bodies and private companies operating in a public character, such as utility companies, are required to assess, consult on, and monitor the likely impacts their plans, programmes and strategies will have on the environment. This process is known as Strategic Environmental Assessment (SEA).
Stratification	Describes two distinct layers occupying the vertical water column in the sea with the near-surface layer less dense than the near-bed layer.
Subsea cable hub	A subsea device which allows the connection of multiple inter-array cables.
Substrate	An underlying substance or layer, such as the surface or material on or from which an organism lives, grows, or obtains it’s nourishment.
Supply Chain Development Statement	Required as part of ScotWind leasing, the Supply Chain Development Statement (SCDS) provides a structure for project specific supply chain information to be communicated with government and industry, through the initial stages of project development to deployment and into operations.
Suspended sediment	The sediment moving in suspension in a fluid kept up by the upward components of the turbulent currents or by the colloidal suspension.
Swept area ratio	Swept area ratio (derived from Vessel Monitoring System data) indicates the number of times in an annual period that a fishing gear makes contact with (or sweeps) the seabed surface. Surface swept area ratio provides a proxy for fishing intensity.
Tidal current	The alternating horizontal movement of water associated with the rise and fall of the tide.
Uncontrolled airspace	Defined airspace in which Air Traffic Control does not exercise exclusive authority but may provide basic information services to aircraft in radio contact. In the UK, class G is uncontrolled airspace.
Vessel Monitoring System	A system used in commercial fishing to allow environmental and fisheries regulatory organisations to monitor, minimally, the position, time at a position, and course and speed of fishing vessels.
Weighted sound level	A sound level which has been adjusted with respect to a ‘weighting envelope’ in the frequency domain, typically to make an unweighted level relevant to a particular species. Examples of this are the filters used by Southall et al. (2019) for marine mammals.
Wet storage	The temporary storage for floating substructures and/or floating offshore units prior to their transportation to the relevant Wind Farm Development Area.

Term	Definition
Wind Farm Development Area	The application boundary within which the following will be consented: wind turbine generators, floating and/or fixed bottom substructures and station keeping systems; inter-array cables; subsea cable hubs and associated cable protection; and scour protection. The Wind Farm Development Area refers to both the area and the infrastructure described above. Each Wind Farm Development Area is subject to a separate Section 36 consent and Marine Licence application.
Wind turbine generator	A wind turbine generator converts wind energy into electrical energy. The main components include rotor assembly (composed of three blades and a hub); nacelle (containing the generator, shaft and gearbox, power electronic converter and transformer); and a tower (containing lifting equipment and switchgear).

Glossary of Abbreviations

Term	Definition
AARA	Air to air refuelling area
ADBA	Archaeological Desk-based Assessment
ADD	Acoustic Deterrent Devices
AEoI	Adverse Effect on Integrity
AEZ	Archaeological Exclusion Zone
AHTS	Anchor handling tug supply
AIP	Aeronautical Information Publication
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
AMSL	Above Mean Sea Level
ANO	Air Navigation Order
ANSP	Air Navigation Service Provider
ASCOBANS	Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas
ATC	Air Traffic Control
ATS	Air Traffic Services
BDMPS	Biologically Defined Minimum Population Scale
BEIS	Department for Business, Energy and Industrial Strategy
BGS	British Geological Survey
BSI	British Standards Institute
BTO	British Trust for Ornithology
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CaP	Cable Plan
CBA	Cost Benefit Analysis
CBRA	Cable Burial Risk Assessment
CCC	Climate Change Committee
CCR	Climate Change Resilience

Term	Definition
CCRA	Climate Change Risk Assessment
CCS	Carbon Capture and Storage
CDG	Central Design Group
CEA	Cumulative effects assessment
CEF	Cumulative Effects Framework
Cefas	Centre for Environment Fisheries and Aquaculture Science
CES	Crown Estate Scotland
CfD	Contracts for Difference
CGNS	Celtic and Greater North Seas
CH_4	Methane
CIEEM	Chartered Institute of Ecology and Environmental Management
CO_2	Carbon dioxide
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea
COP	Conference of the Parties
COWRIE	Collaborative Offshore Wind Research Into the Environment
CPA	Coast Protection Act
CPGR	Counterfactual Ratio of Population Growth Rate
CPOD	Cetacean Porpoise Detectors
CPR	Continuous Plankton Recorder
CPS	Counterfactual Ratio of Final Population Size
CRM	Collision Risk Model
CTA	Control Area
CTR	Control Zone
CTV	Crew transfer vessel
dB	Decibels
DEA	Drag embedment anchors
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment Food and Rural Affairs

Term	Definition
DESNZ	Department for Energy Security and Net Zero (formally BEIS)
DSLP	Development Specification and Layout Plan
EcIA	Ecological Impact Assessment
ECOMMAS	East Coast Marine Mammal Acoustic Study
eDNA	Environmental deoxyribonucleic acid
EDR	Effective Deterrence Range
EEA	European Economic Area
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMEC	European Marine Energy Centre
EMF	Electromagnetic field
EMP	Environmental Management Plan
EMSA	European Maritime Safety Agency
EPS	European Protected Species
ERCoP	Emergency Response and Cooperation Plan
ESCA	European Subsea Cable Association
ESO	Electricity System Operator (formally National Grid ESO)
EU	European Union
EUMETNET	European Meteorological Network
EUNIS	European Nature Information System
FBSS	Fixed bottom substructures
FCS	Favourable Conservation Status
FeAST	Feature Activity Sensitivity Tool
FEPA	Food and Environmental Protection Act
FIR	Flight Information Region
FL	Flight Level
FLO	Fisheries Liaison Officer
FLOWW	Fisheries Liaison with Offshore Wind and Wet Renewables group

Term	Definition
FMMS	Fisheries Management and Mitigation Strategy
FOU	Floating offshore unit
FPSO	Floating production, storage and offloading
FSA	Formal Safety Assessment
FSS	Floating substructure
GBP	Great British Pound
GEN	General Policy
GES	Good Environmental Status
GHG	Greenhouse gas
GIS	Geographic Information System
GLVIA3	Guidelines for Landscape and Visual Impact Assessment (Third Edition)
GNS	Greater North Sea
GPS	Global Positioning System
GT	Gross Tonnage
GVA	Gross Value Added
GW	Gigawatt
GWP	Global warming potential
HabMoS	Habitat Map of Scotland
HCA	Helideck Certification Authority
HEPS	Historic Environment Policy for Scotland
HER	Historic Environmental Record
HES	Historic Environment Scotland
HF	High frequency
HFC	Hydrofluorocarbons
HiDef	HiDef Aerial Surveying Limited
HLV	Heavy lift vessel
HM	Her/His Majesty’s
HM Government	Her/His Majesty’s Government

Term	Definition
HMC	Her/His Majesty's Coastguard
HMCS	Harmonised Mandatory Control System
HMPA	Historic Marine Protected Areas
HMRI	Helicopter Main Routing Indicators
HND	Holistic Network Design
HND-FUE	Holistic Network Design – Follow-up Exercise
HPAI	Highly Pathogenic Avian Influenza
HRA	Habitats Regulations Appraisal
HSE	Health and Safety Executive
IAC	Inter-array cable
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IAMMWG	Inter-agency Marine Mammal Working Group
ICAO	International Civil Aviation Organisation
ICE	Inventory of Carbon and Energy
ICES	International Council for the Exploration of the Seas
IEF	Important Ecological Features
IEMA	Institute of Environmental Management and Assessment
IFP	Instrument Flight Procedure
IFR	Instrument Flight Rules
IMO	International Marine Organisation
INNS	Invasive non-native species
INNSMP	Invasive Non-native Species Management Plan
INTOG	Innovation and Targeted Oil and Gas
IPCC	Intergovernmental Panel on Climate Change
iPCoD	Interim Population Consequences of Disturbance
IROPI	Imperative Reasons of Overriding Public Interest
IUCN	International Union for Conservation of Nature

Term	Definition
JCP	Joint Cetacean Protocol
JNAPC	Joint Nautical Archaeology Policy Committee
JNCC	Joint Nature Conservation Committee
JUV	Jack-up vessel
kJ	Kilojoule
km	Kilometre
LAT	Low Astronomical Tide
LF	Low frequency
LiDAR	Light Detection and Ranging
LMP	Lighting and Marking Plan
LUC	Land Use Consultants Limited
m	Metre
MAIB	Marine Accident Investigation Branch
MALSF	Marine Aggregate Levy Sustainability Fund
MarESA	Marine Evidence based Sensitivity Assessment
MarLIN	Marine Life Information Network
MARPOL	International Convention for the Prevention of Pollution from Ships
MAU	Marine Analytical Unit
MBES	Multi beam echosounder
MCA	Maritime and Coastguard Agency
MCAA	Marine and Coastal Access Act
MCCIP	Marine Climate Change Impacts Partnership
MCEU	Marine Consents and Environment Unit
mCRM	Migration Collision Risk Modelling
MDA	Managed Danger Area
MD-LOT	Marine Directorate – Licensing Operations Team
MD-SEDD	Marine Directorate - Science, Evidence, Data and Digital
MetOcean	Meteorological and oceanographic

Term	Definition
MF	Moray Firth
MFRAG	Marine Mammals Monitoring Programme MF Regional Advice Group
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
ML	Marine Licence
MM	Mean maximum
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MoD	Ministry of Defence
MPA	Marine Protected Area
MPCP	Marine Pollution Contingency Plan
MPS	UK Marine Policy Statement
MRE	Marine Renewable Energy
MSA	Minimum Sector Altitude
MSL	Mean Sea Level
MSS	Marine Scotland Science
MU	Management Unit
MW	Megawatt
N_2O	Nitrous oxide
NAFC	North Atlantic Fisheries College
NAMMCO	North Atlantic Marine Mammal Commission
NAP	National Adaptation Programme
NATS	National Air Traffic Services
NBN	National Biodiversity Network
NCMPA	Nature Conservation Marine Protected Area
NDC	Nationally Determined Contribution
NEOG	North East Ornithology Group
NEQ	Net Explosive Quality

Term	Definition
NLB	Northern Lighthouse Board
nm	Nautical mile
NMP	National Marine Plan
NMPi	National Marine Plan Interactive
NNG	Neart Na Gaoithe
NPF	National Planning Framework
NPF4	National Planning Framework 4
NRA	Navigational Risk Assessment
NRW	Natural Resource Wales
NS MU	North Sea Management Unit
NSP	Navigational Safety Plan
NSTA	North Sea Transition Authority
NTS	Non-technical Summary
OFSS	Offshore substation(s)
OfTDA	Offshore Transmission Development Area
ONS	Office for National Statistics
OPERA	Operational Programme for the Exchange of Weather Radar Information
OREI	Offshore Renewable Energy Installation
OSPAR	Oslo and Paris Convention for the Protection of the Marine Environment
OTNR	Offshore Transmission Network Review
OWF	Offshore wind farm
OWIC	Offshore Wind Industry Council
PAC	Pre-application Consultation
PAD	Protocol of Archaeological Discoveries
PAH	Polyaromatic hydrocarbons
PAN	Planning Advice Note
PCB	Polychlorinated biphenyls
PCW	Phocid Carnivores in Water

Term	Definition
PEXA	Practice and Exercise Area
PFC	Perfluorocarbons
PLGR	Pre-lay grapnel run
PMF	Priority Marine Feature
POI	Point of interconnection
POSEIDON	Planning Offshore Wind Strategic Environmental Impact Decisions
PrePARED	Predators & Prey Around Renewable Energy Developments
PS	Piling Strategy
PSA	Particle Size Analysis
pSPAs	Proposed Special Protection Areas
PSR	Primary Surveillance Radar
PTS	Permanent threshold shift
PVA	Population viability analysis
QSR	Quality Status Report
Radar	Radio Detection and Ranging
RAF	Royal Air Force
RCP	Representative Concentration Pathways
REZ	Renewable Energy Zone
RIAA	Report to Inform Appropriate Assessment
RIFG	Regional Inshore Fisheries Group
RLoS	Radar Line of Sight
RMNC	Review of Marine Nature Conservation
RMP	Regional Marine Plan
RNLI	Royal National Lifeboat Institution
RoI	Republic of Ireland
RoPax	Roll-on/Roll-off Passenger
RoRo	Roll-on/Roll-off Cargo
ROV	Remotely operated vehicle

Term	Definition
RSPB	Royal Society for the Protection of Birds
RYA	Royal Yachting Association
s.36	Section 36
SAC	Special Area of Conservation
SAMS	Scottish Association for Marine Science
SAR	Search and Rescue
SBL	Scottish Biodiversity List
SBP	Sub bottom profiler
SCANS	Small Cetaceans in European Atlantic waters and the North Sea
ScARF	Scottish Archaeological Research Framework
SCCAP	Scottish Climate Change Adaptation Programme
SCDS	Supply Chain Development Statement
SCOS	Special Committee on Seals
ScotMER	Scottish Marine Energy Research group
sCRM	Stochastic Collision Risk Modelling
SD	Standard Deviation
SEA	Strategic Environmental Assessment
SEA4	Strategic Environment Assessment 4 (OESEA4)
SEIA	Socioeconomic Impact Assessment
SEL	Sound Exposure Level
SEL_{cum}	Cumulative weighted Sound Exposure Level
SEL_{ss}	Sound Exposure Level for single strike
SEPA	Scottish Environment Protection Agency
SEPLA	Suction embedded plate anchors
SES	South-east Scotland
SF_6	Sulphur hexafluoride
SFF	Scottish Fishermen’s Federation
SKS	Station keeping system

Term	Definition
SLVIA	Seascape, Landscape and Visual Impact Assessment
SMP	Sectoral Marine Plan
SMR	Scottish Marine Regions
SMRU	Sea Mammal Research Unit
SNCB	Statutory Nature Conservation Bodies
SNH	Scottish National Heritage
SNMP	Scottish National Marine Plan
SOLAS	International Convention for the Safety of Life at Sea
SOV	Service operation vessel
SOWEC	Scottish Offshore Wind Energy Council
SPA	Special Protection Area
SPFA	Scottish Pelagic Fishermen's Association
SPL	Sound Pressure Level
SPL_{peak}	Peak Sound Pressure Level
S-P-R	Source-Pathway-Receptor conceptual model
SSC	Suspended sediment concentrations
SSEN Transmission	Scottish and Southern Electricity Networks Transmission
SSR	Secondary Surveillance Radar
SSS	Side-scan sonar
SSSI	Site of Special Scientific Interest
STECF	Scientific, Technical and Economic Committee for Fisheries
STEM	Science, technology, engineering and maths
SWFPA	Scottish White Fish Producers Association
TCE	The Crown Estate
TLP	Tension leg platform
TMZ	Transponder Military Zone
TRA	Temporary Reserved Area
UCG	Underground coal gasification

Term	Definition
UHI	University of Highlands and Islands
UK	United Kingdom
UKCF	United Kingdom Continental Shelf
UKCP	UK Climate Projection
UKHO	United Kingdom Hydrography Office
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNFCCC	United Nations Framework Convention on Climate Change
USBL	Ultra-short Baseline
USV	Unmanned service vessel
UXO	Unexploded ordnance
VFR	Visual Flight Rules
VHF	Very high frequency
VLA	Vertical load anchors
VMP	Vessel Management Plan
VMS	Vessel Monitoring System
WFD	Water Framework Directive
WFDA	Wind Farm Development Area
WSI	Written Scheme of Investigation
WTG	Wind turbine generator
WWT	Wildfowl and Wetlands Trust
ZoI	Zone of Influence

1 Introduction

1.1 Project Overview

1. In January 2022, as part of the ScotWind leasing round managed by Crown Estate Scotland (CES), Bellrock Offshore Wind Farm Limited (the Applicant) was successfully awarded exclusivity of the area of seabed shown in **Figure 1.1** and **Figure 1.2** (the latter shown on an admiralty chart background) in **Appendix 1** to develop the 1.2 gigawatts (GW)[4] Bellrock Offshore Wind Farm Project (the Bellrock Project).

2. For consenting purposes, the Bellrock Project comprises two development areas for which separate consents will be sought by the Applicant:

   - The Wind Farm Development Area (WFDA), for the installation and operation of the offshore generating station; and
   - The Offshore Transmission Development Area (OfTDA), for the installation and operation of the offshore grid infrastructure required to export the electricity from the Bellrock WFDA to a Scottish and Southern Electricity Networks (SSEN) Transmission offshore substation. See **Section 1.5** below for details.

3. SSEN Transmission are responsible for consenting and developing the electrical infrastructure from the SSEN Transmission offshore substation to shore, as this forms part of the National Electricity Transmission System.

4. This Bellrock WFDA Scoping Report accompanies a request for a formal Scoping Opinion submitted to the Marine Directorate - Licensing Operations Team (MD-LOT), acting on behalf of the Scottish Ministers, relating to the Bellrock WFDA. Consents for the Bellrock OfTDA will be sought in due course by the Applicant.

5. The Bellrock Project will deliver significant supply chain expenditure within Scotland, has the potential to power over 1.1 million homes[5] with renewable energy and will help achieve Scotland's net zero targets whilst improving energy security.

1.2 Scoping Report Overview

6. The purpose of this Bellrock WFDA Scoping Report is to provide MD-LOT and stakeholders with information on the activities and infrastructure that will be associated with the Bellrock WFDA (see **Table 1.1**) and allow for engagement with stakeholders on the key issues to be addressed within

[4] Project capacities quoted throughout this Bellrock WFDA Scoping Report are approximate. The final capacity will be confirmed within the Bellrock WFDA EIA Report. Should a material increase in project capacity be proposed within the Bellrock WFDA (shown in **Figure 1.1** in **Appendix 1**), the Applicant will liaise with MD-LOT to establish the validity of the Bellrock WFDA Scoping Opinion.

[5] www.bellrockwind.co.uk

the Bellrock WFDA Environmental Impact Assessment (EIA) Report, the baseline data sources and the assessment methodologies to be used. As discussed with MD-LOT during the Scoping Workshop (see **Section 4.3.2**, **Chapter 4: Approach to Scoping and Environmental Impact Assessment** for further detail), the Scoping Report for the Bellrock OfTDA will be submitted separately.

1.3 Development Areas

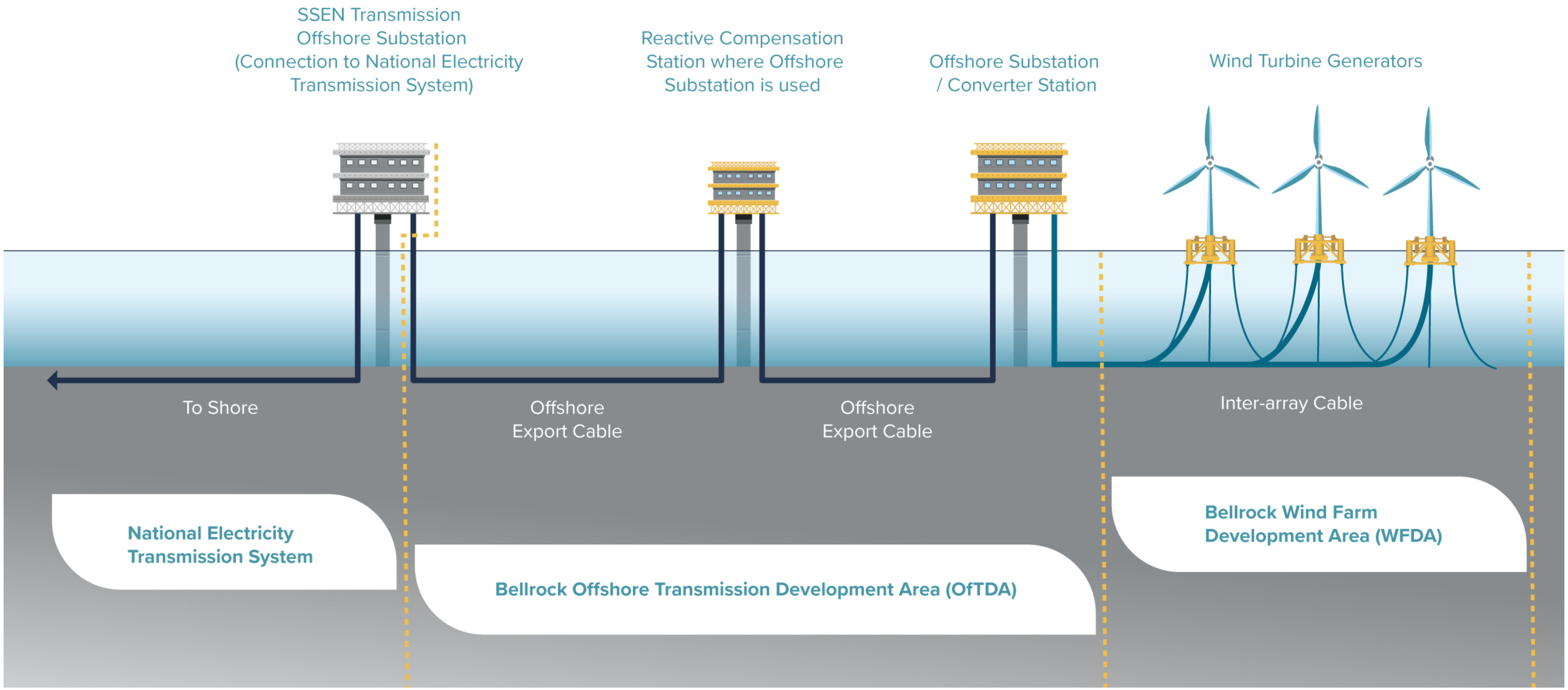
7. In addition to the WFDA, as discussed in **Section 1.1** above, the Bellrock Project will also comprise the OfTDA to allow for the generation of electricity from the wind turbine generators (WTGs) and its transmission to the SSEN Transmission offshore substation.

8. The two Development Areas are shown schematically in **Plate 1.1** and the key infrastructure associated with each Development Area is presented in **Table 1.1**.

Table 1.1: Key Infrastructure within each Development Area

Development Area	Key Infrastructure
Bellrock WFDA	Area as shown in **Figure 1.1** and **Figure 1.2** in **Appendix 1** within which the following will be consented: WTGs and associated substructures and station keeping systems (SKS) if applicable, inter-array cables (IACs), subsea cable hub(s) and associated cable protection, and scour protection.
Bellrock OfTDA	Area extending from the Bellrock WFDA to the SSEN Transmission offshore substation within which the following will be consented: offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection. The Bellrock OfTDA will be subject to a separate Scoping Report/consent application.

Plate 1.1: Overview of the Bellrock Project Development Areas



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1.4 Consents Strategy

9. The Applicant will seek the following consents from MD-LOT for the Bellrock WFDA:

- s.36 consent under the Electricity Act 1989; and
- Marine Licence under the Marine and Coastal Access Act 2009 (MCAA) (applicable to Scottish offshore waters between 12 nautical miles (nm) and 200 nm).

10. The consent application will be accompanied by the Bellrock WFDA EIA Report, which will present an assessment of likely significant effects on the environment for the construction, operation and maintenance, and decommissioning of the Bellrock WFDA. Further details on the Bellrock EIA Report structure are outlined in **Section 4.9, Chapter 4: Approach to Scoping and Environmental Impact Assessment**.

11. As noted in **Paragraph 2**, a separate consent application will be submitted for Bellrock OfTDA, in accordance with the relevant EIA regulations. Cumulative effects between the Bellrock WFDA and the Bellrock OfTDA will be considered within each respective EIA Report (including the Bellrock WFDA EIA Report) to ensure a full project assessment is undertaken. Cumulative effects will also be assessed for the Bellrock Project alongside other projects and plans in the wider area. Further details on the methodology for the EIA is discussed in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**.

12. The consent and licence requirements for each Development Area are summarised in **Table 1.2.** The subject of this Scoping Report is the Bellrock WFDA.

Table 1.2: Consent and Licence Applications Required for each Development Area

	WFDA		OfTDA
Bellrock Project	Section 36 Consent [1]	Marine Licence [2] (12 to 200 nm from MHWS)	Marine Licence [2] (12 to 200 nm from MHWS)
Supporting EIA	Bellrock WFDA EIA Report		Bellrock OfTDA EIA Report

[1] Consent under the Electricity Act 1989

[2] Licence under the MCAA 2009

1.5 Bellrock Project Overview

13. A summary of the Bellrock Project is briefly described below (refer to **Chapter 3: Project Description** for further details).

14. The Bellrock WFDA (shown in **Figure 1.1** and **Figure 1.2** (the latter shown on an admiralty chart background) in **Appendix 1**) is located 120 km east of Stonehaven (116 km southeast of Peterhead) and covers an area of 280 km^2. The Bellrock WFDA will have a seabed lease for up to 60 years and an anticipated design life of up to 50 years.

15. The Bellrock WFDA will comprise between 42 and 80 WTGs[6] (depending on the size of the WTGs) with floating substructures (FSSs) and (if used) fixed bottom substructures (FBSSs) and will be capable of exporting approximately 1.2 GW of renewable energy to the National Electricity Transmission System.

16. Within the WFDA (shown in **Figure 1.1** and **Figure 1.2** in **Appendix 1**) each WTG is supported by a FSS anchored to the seabed by a SKS or by a FBSS. The electricity generated by the WTGs will be conveyed through a series of IACs which connect each WTG to one or more offshore substations (possibly via one or more subsea cable hub(s)).

17. Within the Bellrock OfTDA, interconnector cables will connect multiple offshore substations (if more than one offshore substation is used). Electricity will be transmitted from the offshore substation(s) to a SSEN Transmission offshore substation via offshore export cables which are typically buried where ground conditions allow.

18. The SSEN Transmission offshore substation is part of a coordinated offshore network being developed by SSEN Transmission which will enable a coordinated connection between several offshore wind farms and the wider National Electricity Transmission System. This centralised and strategic approach aims to reduce seabed impacts, costs, and potential effects on the environment. Regular discussions are taking place between the Applicant and SSEN Transmission to determine the location and design of the SSEN Transmission offshore substation.

19. All stages of the lifespan of the Bellrock WFDA have been considered in this Bellrock WFDA Scoping Report, from construction to operation and maintenance to decommissioning. Refer to **Chapter 3: Project Description** for further detail on the Bellrock WFDA infrastructure and proposed activities.

20. It should be noted that the Bellrock WFDA EIA Report will confirm the maximum number of WTGs and their physical size (which will be dependent on the anticipated technology available on the market at the time of construction). Additional WTGs may also be developed within the WFDA for overplanting purposes.

21. The key ambition of the Bellrock Project is to successfully build and operate an offshore wind farm to help reach Scotland's net zero targets in the face of the climate emergency (see **Chapter 2:**

[6] Additional capacity may also be developed within the Bellrock WFDA for overplanting purposes.

Policy and Legislative Context) and realise the benefits of a sustainable energy source which improves Scotland's energy security and reduces costs to the consumer.

22. The Applicant is collaborating with local and national agencies to train and upskill the workforce by formulating specific enterprise and skill development programmes. Works are ongoing with the Energy Skills Partnership to upskill and re-skill the existing work force and also with Edinburgh Science to promote the industry via education programmes, STEM (science, technology, engineering and mathematics) projects and funding.

23. In relation to local supply chain, the Bellrock Project's ambition is to spend £2.7 billion within the Scottish supply chain during its development, construction and operation, with a commitment of £1.7 billion (Bellrock Offshore Wind Farm, 2023). The Applicant's approach to supply chain development is one of 'shared value' - a combination of project competitiveness and sustainable development of the Scottish offshore wind supply chain.

1.6 Purpose of this Scoping Report

24. This Bellrock WFDA Scoping Report has been prepared to support a request for a formal Scoping Opinion in relation to the WFDA for the Bellrock Project from MD-LOT, acting on behalf of the Scottish Ministers. Responses from statutory and non-statutory consultees to this Bellrock WFDA Scoping Report are expected to inform the Scoping Opinion, which will in turn, inform the Bellrock WFDA EIA Report.

25. The purpose of this Bellrock WFDA Scoping Report is to provide stakeholders with information on the activities and infrastructure that will be associated with the Bellrock WFDA and allow for engagement with stakeholders on the key issues to be addressed in the Bellrock WFDA EIA Report, as well as the baseline data sources and assessment methodologies to be used to inform the Bellrock WFDA EIA Report.

26. **Table 1.3** summarises the information requirements set out in the EIA Regulations[7] and where these can be found in this **Bellrock WFDA Scoping Report**.

Table 1.3: Scoping Requirements of the EIA Regulations and where the Information is Included in this Bellrock WFDA Scoping Report

EIA Regulation Topic Requirement	Location in this Bellrock WFDA Scoping Report
Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017	
A description of the location of the development, including a plan sufficient to identify the land.	**Chapter 3: Project Description** provides a description of the Bellrock WFDA and a plan of the Bellrock WFDA is provided in **Figure 1.1** and **Figure 1.2** in **Appendix 1**.

[7] In respect to the s.36 consent applications: The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017; and in respect to the Marine Licence(s) applications: The Marine Works (Environmental Impact Assessment) Regulations 2007.

EIA Regulation Topic Requirement	Location in this Bellrock WFDA Scoping Report
A brief description of the nature and purpose of the development and of its likely significant effects on the environment.	**Chapter 3: Project Description** includes a description of the nature of the Bellrock WFDA, and **Chapter 2: Policy and Legislative Context** provides a description of the purpose. A description of likely significant effects is provided in **Chapters 5 to 19**. Reference should also be made to **Appendix 2: NCMPA Screening Report** and the **Bellrock WFDA HRA Screening Report** (BlueFloat Energy | Renantis Partnership, 2024).
Any such other information or representations as the developer may wish to provide or make.	The proposed approach to EIA for the Bellrock WFDA is provided in **Chapters 5** to **19**.
Marine Works (Environmental Impact Assessment) Regulations 2007	
A chart, plan or map sufficient to identify the location of the regulated activity and of other activities to be carried out in the course of the project.	**Chapter 3: Project Description** provides a description of the Bellrock WFDA and a plan of the Bellrock WFDA is provided in **Figure 1.1** and **Figure 1.2** in **Appendix 1**.
A brief description of the specific characteristics of the regulated activity and the project, including their nature, purpose, location and technical capacity.	**Chapter 3: Project Description** includes a description of the nature of the Bellrock WFDA, and **Chapter 2: Policy and Legislative Context** provides a description of the purpose.
An explanation of the likely significant effects of the regulatory activity and the project on the environment.	A description of likely significant effects is provided in **Chapters 5 to 19**. Reference should also be made to **Appendix 2: NCMPA Screening Report** and the **Bellrock WFDA HRA Screening Report**.

27. Within this Bellrock WFDA Scoping Report, potential environmental impacts associated with the Bellrock WFDA are considered. These include impacts which are proposed to be scoped out of the Bellrock WFDA EIA Report due to no likely significant effect in EIA terms or no impact-receptor pathways identified. Agreement with stakeholders will be sought through this Bellrock WFDA Scoping Report to determine final impacts to be scoped in and scoped out of the Bellrock WFDA EIA Report (see **Chapter 4: Approach to Scoping and Environmental Impact Assessment**) and agree assessment methods and approaches to be used when undertaking the assessments. The potential impacts and mitigation proposed are based on the Bellrock WFDA boundary and should the boundary change, this will be reflected in the EIA. If any changes are considered which could change the context of the Scoping Opinion, this will be discussed with MD-LOT and highlighted in the Bellrock WFDA EIA Report.

28. Scoping occurs before the Bellrock WFDA is at an advanced or fixed stage of engineering design. This ensures that relevant stakeholder feedback obtained via the Scoping Opinion can be used to inform the ongoing design evolution of the Bellrock WFDA. The resultant Bellrock WFDA EIA Report will be based upon the Scoping Opinion received in response to the formal request.

29. Guidance on the approach to EIA has been provided to date through ongoing consultation with MD-LOT and NatureScot, including a Scoping Workshop held with stakeholders on 30th October 2023 (see **Table 4.1** in **Chapter 4: Approach to Scoping and Environmental Impact**

Assessment). Additional pre-scoping consultation has been undertaken with the Scottish Fishermen's Federation and Scottish White Fish Producers Association to inform this Bellrock WFDA Scoping Report. Consultee feedback received to date has been considered in drafting this Bellrock WFDA Scoping Report. The information presented in this Bellrock WFDA Scoping Report aims to inform stakeholders on the Bellrock WFDA and the approach to assessment to assist in undertaking a robust and proportionate EIA for the Bellrock WFDA.

30. The Applicant welcomes the opportunity for engagement with stakeholders and feedback on the approach and the scope of the Bellrock WFDA EIA Report as part of the formal Scoping Opinion and throughout the EIA process.

1.7 The Applicant and Environmental Impact Assessment Project Team

1.7.1 The Applicant

31. The Bellrock Project is being developed by Bellrock Offshore Wind Farm Limited, a joint venture between BlueFloat Energy and Renantis (together, the 'Partnership').

32. In addition to the Bellrock Project, the Partnership is also developing the 900 MW Broadshore Offshore Wind Farm, the 99.5 MW Sinclair Offshore Wind Farm, the 99.5 MW Scaraben Offshore Wind Farm (collectively referred to as the Broadshore Hub) and the 1 GW Stromar Offshore Wind Farm (in conjunction with Ørsted), all of which are located in the northern North Sea.

33. The Partnership aims to contribute to a world leading floating offshore wind industry in the United Kingdom (UK), combining innovative technology with a plan to attract and grow a skilled Scottish workforce and stimulate a thriving local supply chain. BlueFloat Energy's knowledge and experience in developing floating offshore wind projects combined with Renantis' track record in global project development and community engagement ensure the Partnership is well placed to deliver world class floating offshore projects.

1.7.2 Environmental Impact Assessment Project Team

34. Royal HaskoningDHV has been instructed by the Applicant to lead (through their Edinburgh office) the EIA for the Bellrock WFDA. This includes informing and preparing the initial review of the key environmental issues associated with the construction, operation and maintenance, and decommissioning of the Bellrock WFDA as part of the scoping process and reports.

35. Pursuant to the EIA Regulations, the Bellrock WFDA EIA Report will be prepared by competent experts and will outline the relevant expertise or qualifications of the experts.

36. Royal HaskoningDHV is registered with the Institute of Environmental Management and Assessment (IEMA) and its Environmental Impact Assessment Quality Mark scheme. The scheme allows organisations that lead the co-ordination of EIAs in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed.

37. A number of specialist consultancies have also provided expert input into this Bellrock WFDA Scoping Report and will do for the Bellrock WFDA EIA Report, as presented in **Table 1.4** in **Section 1.8** and below.

- **Chapter 10: Commercial Fisheries** - NiMa Consultants Limited, Scotland based marine environmental consultants specialising in commercial fisheries impact assessment.
- **Chapter 11: Shipping and Navigation** - Anatec Limited, Scotland based offshore marine consultants. The senior team members at Anatec, including those leading on the Bellrock Project, have over 25 years of experience in offshore marine risk. This includes undertaking Navigational Risk Assessments and EIA Reports for the vast majority of previous offshore wind farm projects in the UK, and are currently working on multiple ScotWind projects and wind farm extension projects.
- **Chapter 12: Aviation and Radar** - Cyrrus Limited has provided expert advice to many airports and aviation authorities since 1999. Working with airports and wind energy developers in the UK and Republic of Ireland, Cyrrus has extensive experience working on EIAs for offshore wind farm developers. Cyrrus is an approved procedure design organisation recognised by the UK Civil Aviation Authority, as such Cyrrus have the internal capacity to assess any applicable Instrument Flight Procedures that may be impacted by wind farms.
- **Chapter 15: Seascape, Landscape and Visual Impact** - Chartered Members of the Landscape Institute at LUC (Land Use Consultants Limited). LUC's landscape team has extensive experience of EIA for a wide range of development types. LUC is one of the UK's leading consultancies in the field of seascape, landscape and visual impact assessment for onshore and offshore wind development, with experience on projects across the UK over the last 15 years.
- **Chapter 16: Socioeconomics, Tourism and Recreation** - BiGGAR Economics Limited is an economic development consultancy based in Edinburgh, that has assessed the socioeconomic impact of over two hundred renewable energy projects across the UK and Ireland.

1.8 Structure of this Scoping Report

38. The structure of this Bellrock WFDA Scoping Report is set out in **Table 1.4** below.

39. Alongside the submission of this Bellrock WFDA Scoping Report, a HRA Screening Report is submitted for the Bellrock WFDA (**Bellrock WFDA HRA Screening Report**).

Table 1.4: Structure of this Bellrock WFDA Scoping Report

Chapter	Author	Overview
Chapter 1 – Introduction	Royal HaskoningDHV	This chapter introduces the Bellrock WFDA, the Applicant, and the EIA team, provides an overview of the Bellrock Project along with its objectives, and outlines the purpose of this Bellrock WFDA Scoping Report.

Chapter	Author	Overview
Chapter 2 – Policy and Legislative Context	Royal HaskoningDHV	This chapter sets out the need for the Bellrock WFDA and the relevant policy and legislative context.
Chapter 3 – Project Description	Royal HaskoningDHV	This chapter provides a description of the key components that comprise the Bellrock WFDA.
Chapter 4 – Approach to Scoping and Environmental Impact Assessment	Royal HaskoningDHV	This chapter describes the proposed EIA methodology and demonstrates the measures taken to progress a proportionate EIA. This chapter also details the approach to consultation.
Chapter 5 – Marine Geology, Oceanography and Physical Processes	Royal HaskoningDHV	Each technical chapter covers: ▪ An outline of the relevant legislation, policy and guidance; ▪ Consultation undertaken to date; ▪ The proposed assessment methodology; ▪ An outline of the baseline characterisation; ▪ Scoping of potential impacts and significant effects, including embedded mitigation measures; ▪ Identification of potential cumulative and transboundary effects; and ▪ Questions posed to consultees.
Chapter 6 – Benthic Ecology	Royal HaskoningDHV	
Chapter 7 – Fish and Shellfish Ecology	Royal HaskoningDHV	
Chapter 8 –Marine Mammals	Royal HaskoningDHV	
Chapter 9 –Offshore Ornithology	Royal HaskoningDHV	
Chapter 10 – Commercial Fisheries	NiMa Consultants	
Chapter 11 – Shipping and Navigation	Anatec	
Chapter 12 – Aviation and Radar	Cyrrus	
Chapter 13 – Marine Infrastructure and Other Users	Royal HaskoningDHV	
Chapter 14 – Marine Archaeology and Cultural Heritage	Royal HaskoningDHV	
Chapter 15 – Seascape and Landscape Visual Impact	LUC	
Chapter 16 – Socioeconomics, Tourism and Recreation	BiGGAR Economics	
Chapter 17 – Climate Change	Royal HaskoningDHV	
Chapter 18 – Offshore Air Quality	Royal HaskoningDHV	

Chapter	Author	Overview
Chapter 19 – Major Accidents and Disasters	Royal HaskoningDHV	
Chapter 20 – Summary and Next Steps	Royal HaskoningDHV	Provides a summary of the approach taken to scoping and the key findings of the Bellrock WFDA Scoping Report.
Appendix 1 - Figures	Royal HaskoningDHV	Contains supporting figures.
Appendix 2 – Nature Conservation Marine Protected Area Screening Report	Royal HaskoningDHV	Provides a screening of Nature Conservation Marine Protected Area sites.
Appendix 3 – Mitigation Register	Royal HaskoningDHV	Sets out the mitigation proposed for the Bellrock WFDA.
Appendix 4 – Marine Mammals Existing Environment	Royal HaskoningDHV	Outline of the baseline characterisation for marine mammals.
Appendix 5 – Approach to Marine Mammals and Underwater Noise	Royal HaskoningDHV	Proposed approach to assessment of underwater noise impacts on marine mammals.
Appendix 6 – Apportioning Breeding Season Impacts to SPA Seabird Populations	Royal HaskoningDHV	Apportions breeding season impacts associated with the Bellrock WFDA to the qualifying features of breeding seabird colony Special Protection Areas.

1.9 References

Bellrock Offshore Wind Farm (2023). Supply Chain Development Statement (SCDS) Outlook. SCDS as of April 2023. Document Number: BFR_BEL_SUP_GEN_0002, Rev 2.0. Available at: https://crownestatesd9.homeconnections.org.uk/sites/default/files/2023-07/bellrock-offshore-wind-farm-scds-outlook-july-2023-update.pdf

BlueFloat Energy | Renantis Partnership (2024). Bellrock WFDA HRA Screening Report.

2 Policy and Legislative Context

2.1 Introduction

40. This chapter provides an overview of the policy and legislative context for the Bellrock Wind Farm Development Area (WFDA) as it applies to the Environmental Impact Assessment (EIA) and consenting process. The Applicant adopts a policy-led approach to EIA and consenting by providing an overview of the applicable legislative framework, identifying this within the strategic policy context for the Bellrock WFDA, and outlining the applicable policy framework to guide proportionate assessment in the Bellrock WFDA EIA Report.

41. The purpose of this chapter is to explain the need for the Bellrock WFDA, to help inform the scope of the Bellrock WFDA EIA Report, and demonstrate compliance with all legislative and policy requirements.

42. This chapter sets out a summary of the policy and legislative context for the Bellrock WFDA, in relation to:

- Need for the Bellrock WFDA, in the context of Scottish, United Kingdom (UK) and international climate change policy, and energy security (**Section 2.2**);
- Scottish consenting legislation, including the legal basis for the consent applications required to construct, operate and maintain and decommission the Bellrock WFDA, and supporting EIA (**Section 2.4 and Section 2.5**);
- International obligations and policy relating to climate change and the role of reducing greenhouse gas emissions (**Table 2.1**);
- Scottish and UK climate change and energy policy and legislation (**Section 2.2.3**); and
- Other nature conservation legislation and consenting requirements relevant to the Bellrock WFDA (**Section 2.6 and Section 2.7**).

43. In addition to considering relevant legislation and policy, this Bellrock WFDA Scoping Report has been informed by the ‘Marine Scotland Consenting and Licensing Guidance for Offshore Wind, Wave and Tidal Energy Applications’ (2018). Any updates to this guidance will similarly be used to inform the Bellrock WFDA EIA Report. Please refer to **Chapter 4: Approach to Scoping and Environmental Impact Assessment** for further details on guidance.

44. Chapter-specific policy and legislation is provided in the relevant technical chapters within this Bellrock WFDA Scoping Report. Any updated guidance, policy and legislation will be considered within the Bellrock WFDA EIA Report as appropriate.

2.2 Need for the Project

2.2.1 Overview

45. The UK requires a range of energy generation infrastructure to ensure it has a secure and economical energy supply and can meet its binding commitments to address climate change and adopt renewable technologies as a significant proportion of its energy generation mix. Offshore wind, as a source of renewable energy, offers Scotland a wide range of benefits including reducing greenhouse gas emissions, supporting economic growth, and improving our energy security.

46. The emissions of greenhouse gases have been identified as a significant source of anthropogenic climate change (Intergovernmental Panel on Climate Change; IPCC, 2018). The burning of fossil fuels such as coal and gas for electricity production has been established as a significant greenhouse gas emission source. Development of renewable energy for electricity production is presented as a solution to reducing carbon dioxide (CO_2) emissions and the resulting anthropogenic climate change. To enable the development of renewable energy for electricity production, numerous climate change protocols and agreements and renewable energy policies and legislation have been implemented. These are discussed in **Section 2.2.3**, and include:

- The Kyoto Protocol, 1997;
- The Paris Agreement, 2015;
- The Climate Change (Scotland) Act 2009, amended by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019; and
- The Climate Change (Annual Targets) (Scotland) Order 2011.

47. The Scottish Government, along with many other governments across the world, declared a climate emergency in 2019, outlining the need for swift and decisive action to limit the warming of our planet by 1.5 degrees compared to 1990 levels. In Scotland, the net zero target is 2045 (the Climate Change (Scotland) Act 2009). This ambitious 2045 target reflects the Scottish Government's acknowledgement of the climate change emergency.

48. Acknowledging the available wind resource and offshore wind development opportunity, the Scottish and UK Governments have committed to ensuring that offshore wind is a leading contributing source of renewable electricity to the UK National Grid.

49. In October 2021, the UK Government published the Net Zero Strategy (Department for Business, Energy and Industrial Strategy; BEIS[8], 2021), which sets out its intended pathway for decarbonisation over the period until 2037, the end of the Sixth Carbon Budget (Climate Change Committee; CCC, 2020) period, on the way to Net Zero by 2050. The Net Zero Strategy sets a clear and credible range for emissions reduction in each sector of the economy.

50. The UK is one of the few countries with emissions targets in line with the long-term temperature goal of the Paris Agreement. The CCC's most recent progress report (CCC, 2023) records that emissions in 2021 bounced back to some extent after COVID-19 but remain 9% below 2019 levels,

[8] As of February 2023, BEIS is known as the Department for Energy Security and Net Zero (DESNZ)

and emissions in 2022 were 0.8% higher than 2021. The report also tracks progress and highlights risks to the delivery of the UK Net Zero Strategy.

51. The Bellrock Project will contribute towards Scottish and UK renewable energy demands and targets, providing enough renewable electricity to power over 1.1 homes[9] and avoid the production of over 1.8 million tonnes[10] of carbon dioxide equivalent per year from the equivalent generation from fossil fuels. The continued development of offshore wind within Scotland, including the advancement of floating wind farms in deeper waters further offshore is therefore critical to ensuring that Scotland and the UK can meet our binding energy and climate change targets.

52. **Sections 2.2.2** and **2.2.3** below, respectively set out the background to the Bellrock Project, as well as climate change and renewable energy policy relevant to Bellrock WFDA.

2.2.2 ScotWind Leasing

53. The ScotWind Offshore Wind leasing round (hereafter referred to as 'ScotWind') managed by Crown Estate Scotland (CES) is a major milestone in Scotland's journey towards Net Zero. ScotWind's objective was to help Scotland achieve its net-zero emissions target by 2045, by granting property rights for the seabed in Scottish waters for new commercial scale offshore wind project development in a way that was fair and transparent. In doing so, ScotWind facilitates and encourages development of the low-carbon energy generation needed to meet the world-leading targets committed to in The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019.

54. CES announced 17 ScotWind projects in January 2022 and entered seabed option to lease agreements with these projects (including Bellrock Offshore Wind Farm Limited[11]) in April 2022. In August 2022, the ScotWind clearing process led to a further three projects being offered option agreements. In total, there are now 20 ScotWind projects confirmed with a total capacity of up to 27.6 gigawatt (GW) and committing £28.8 billion expenditure in Scotland's supply chain, which will help create thousands of jobs and transform the Scottish economy (Crown Estate Scotland, 2023).

55. CES will offer a full seabed lease to each ScotWind project once developers have secured the necessary consents, grid connection and finance. The ScotWind process is 'plan-led', therefore all projects are sited in areas defined within the Sectoral Marine Plan (SMP) for Offshore Wind Energy (Scottish Government, 2020c), which was subject to plan-level Strategic Environmental Assessment (Scottish Government, 2019a), Habitats Regulations Appraisal (HRA) (Scottish Government, 2019b) and socioeconomic assessment (Scottish Government, 2019c) throughout its preparation.

56. The Bellrock WFDA seabed lease is up to 60 years, while the operational life is up to 50 years. At the end of operational life, any repowering will be subject to separate consents.

[9] Estimated values, for more details visit www.bellrockwind.co.uk
[10] Estimated values, for more details visit www.bellrockwind.co.uk
[11] Previously known as 'Gemini Offshore Wind Farm Limited'.

2.2.3 Climate Change and Renewable Energy Policy

57. **Table 2.1** sets out the relevant legislation, policy, guidance and directives at Scottish, UK, European and international level relevant to the Bellrock WFDA with respect to climate change and energy needs.

58. A climate change assessment will be provided as part of the Bellrock WFDA EIA Report, setting out the contribution the Bellrock WFDA will make to the aims and targets set out in the policy documents below. See **Chapter 17: Climate Change** for more details on the approach to climate change assessment.

Table 2.1: Summary of Relevant Legislation, Policy and Guidance for Bellrock WFDA

Legislation, Policies, and Directives	Summary
Scotland	
National Planning Framework 4 (Scottish Government, 2023b)	The National Planning Framework 4 (NPF4) sets out Scotland's spatial principles, regional priorities, national developments and national planning policy. NPF4 presents Sustainable Places, Liveable Places and Productive Places to achieve national outcomes including benefits to the environment, communities, and health. The NPF4 contains a notable focus on tackling both the climate and nature crises. There is a strong preference for developments which meet the Scottish Government's aims for net zero emissions by 2045, and halting biodiversity loss by 2030/restoring and regenerating biodiversity by 2045. Projects which evidence low and zero-carbon design and expansion of renewable energy generation will therefore be encouraged, such as the Bellrock WFDA. Strategic renewable electricity generation and transmission infrastructure is highlighted as a key national strategic development, required to support the delivery of 'sustainable places'. Renewable energy and transmission infrastructure (such as the Bellrock WFDA) is highlighted to improve energy security and reduce emissions, whilst providing employment and opportunities for local communities.
Draft Energy Strategy and Just Transition Plan (Scottish Government, 2023a)	The Draft Energy Strategy and Just Transition Plan sets out policy positions and key ambitions for Scotland's energy future, including more than 20 GW additional renewable electricity onshore and offshore by 2030. The Plan contains a route map of actions to deliver a net zero energy system to supply affordable, resilient and clean energy to Scotland by 2045 and benefit employment. The Plan aims to transform and expand the energy generation sector in Scotland by working with the UK Government.
The Climate Change Plan, Third Report on Proposals and Policies (2018-2032) (Scottish Government, 2020b)	The Climate Change Plan sets out the path to a low carbon economy while helping to deliver sustainable economic growth. It sets out how Scotland can achieve a 75% reduction in greenhouse gas emissions by 2030, and net-zero by 2045. The Climate Change Plan presents proposals and policies to meet Scotland's annual emissions targets to 2032, with decarbonisation related to pathways including the electricity system.
Scotland's Offshore Wind Policy Statement (Scottish Government, 2020a)	The Offshore Wind Policy Statement confirmed the Scottish Government's intent to see offshore wind play a key role in decarbonisation and Scotland's net zero commitment and suggests as much as 11 GW of offshore wind could be delivered by 2030 in Scottish waters alone.

Legislation, Policies, and Directives	Summary
Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020c)	The Sectoral Marine Plan for Offshore Wind Energy identifies sustainable areas for the future development of commercial-scale offshore wind energy in Scotland, including a spatial strategy to inform the seabed leasing process for the purposes of offshore wind energy. This built on the first Sectoral Marine Plan which was adopted in 2011, and the draft wind, wave and tidal plan in 2013, and was developed in accordance with the Scottish National Marine Plan (SNMP). The Plan is undergoing review to reflect the ScotWind and Innovation and Targeted Oil and Gas (INTOG) leasing rounds and is anticipated to be published in 2025.
Energy Strategy: Position Statement (Scottish Government, 2021b)	The Energy Strategy provides an overview of the key priorities of the Scottish Government for the short to medium-term in ensuring a green economic recovery from COVID-19. The key principles set out in Scotland's Energy Strategy are a whole system view, an inclusive energy transition and a smarter local energy model, and the Scottish Government continues to abide by this.
Climate Change (Scotland) Act 2009, amended by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019	The Climate Change (Scotland) Act 2009 was implemented to reduce the greenhouse gas emissions in Scotland (UK Government 2009). The Climate Change (Annual Targets) (Scotland) Order 2011 outlines the targets for 2023-2027. The Climate Change (Scotland) Act 2009 and The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 (Sections 1-3) include Scotland's commitments to reducing greenhouse gas emissions.
Scottish Energy Strategy (Scottish Government, 2017)	In 2017, the Scottish government published Scotland's Energy Strategy: The Future of Energy in Scotland which set a vision for how the energy system in Scotland would look in 2050. Since the publication, the Scottish Government has committed to achieving targets of net zero greenhouse gas emissions by 2045 and a 75% reduction by 2030. This involves supplying 50% of Scotland's energy requirements from renewable sources and increasing energy productivity by 30% across the Scottish economy by 2030.
Electricity Generation Policy Statement (Scottish Government, 2013)	The Electricity Generation Policy Statement 2013 examines the way in which Scotland generates electricity. The Scottish Government's policy states that Scotland's generation mix should deliver a secure source of electricity supply at an affordable cost which can be largely decarbonised by 2030 and achieves the greatest possible economic benefit and competitive advantage for Scotland.
United Kingdom	
British Energy Security Strategy and UK Energy Security Bill (BEIS, 2022a)	The British Energy Security Statement (published April 2022) outlines a plan for creating a resilient energy system in response to rising global energy prices partly attributed to geopolitical events such as the war in Ukraine. The statement outlined the UK Governments ambition to deliver up to 50 GW of offshore wind by 2030, including 5 GW of floating wind technology. The UK Government also presented amendments to the planning process for offshore wind projects to reduce the consenting process. Following this, the UK Energy Security Bill (published in July 2022) was presented to the UK Parliament to follow on from the commitments that had been outlined in the British Energy Security Statement. The UK Government is aiming to legislate the Offshore Wind Environmental Improvement Package Measures which outlines the efficiency measures presented in the British Energy Security Statement. This includes the UK Government's intent to agree a list of

Legislation, Policies, and Directives	Summary
	approved compensatory measures for use where required by offshore wind farm to compensate for environmental effects on the national site network. The Energy Security Bill (now known as the Energy Bill) is currently going through the final stages in the House of Commons.
UK Climate Change Strategy 2021 - 2024 (HM Government, 2021)	The UK Climate Change Strategy will support UK exporters and suppliers through the transition to net zero by increasing support to clean growth and climate adaptation, reducing greenhouse gas emissions and understanding and mitigating climate-related financial risks. The Strategy highlights the importance of transforming the financial system to boost innovation and transition away from high carbon sectors.
Offshore Wind Sector Deal, (BEIS, 2020a)	The Offshore Wind Sector Deal will drive the transformation of offshore wind generation, making it part of a low-cost, low-carbon, flexible grid system. Offshore wind may be able to contribute up to 30 GW of generating capacity by 2030.
Energy White Paper: Powering our Net Zero Future (BEIS, 2020b)	The Energy White Paper addresses the transformation of the energy system to promote clean, resilient economic growth and deliver net-zero emissions by 2050. The Energy White Paper puts in place a strategy for the wider energy system that transforms energy for a cleaner greener future, supports a green recovery and grows the economy, and creates a fair deal for consumers.
Climate Change Act 2008	The Climate Change Act 2008 sets legally binding targets for the UK to reduce carbon dioxide emissions by at least 80% by 2050, from 1990 levels. This was amended by the Climate Change Act 2008 (2050 Target Amendment) Order 2019 which introduced a target for at least 100% reduction in greenhouse gas emissions (compared to 1990 levels) in the UK by 2050.
Energy Act 2023	The Energy Act 2023 aims to transform the UK's energy system by strengthening energy security, supporting the delivery of net zero and ensuring household bills are affordable in the long-term. The Act will help the government deliver net zero by 2050 in a pragmatic, proportionate and realistic way.
Energy Act 2013	The Energy Act 2013 aims to facilitate investment in electricity generation contributing towards the legally binding emissions reduction targets, to meet statutory 2030 decarbonisation targets. The Act also aimed to reform the electricity market. The reformed electricity market aims to deliver the low carbon energy and reliable supplies that the UK needs, while minimising costs to consumers. This Act introduced the Contracts for Difference (CfD) funding mechanism and transition arrangement for investments under the Renewables Obligation scheme.
Energy Act 2004	The Energy Act 2004 (as amended by the Energy Act 2008 and the Scotland Act 2016) established a Renewable Energy Zone (REZ) adjacent to the UK's territorial waters to enable The Crown Estate to create designated leasing areas for developers to bid for the development of renewable energy. The Act additionally implemented statutory decommissioning requirements for offshore renewable energy installations and associated transmission infrastructure (described further in **Section 2.7.1**) and a Safety Zone scheme (described further in **Section 2.7.2**).
European Union	
European Union (EU) (Withdrawal) Act 2018	Following the UK's exit from the EU, the UK Government committed to implement international environmental obligations in accordance with the

Legislation, Policies, and Directives	Summary
	European Union (Withdrawal) Act 2018 and to maintain environmental commitments and legislation already made (UK Government, 2018). On this basis, the existing EU renewable energy targets for the UK, including the EU Renewable Energy Directive 2009/28/EC, will remain applicable
European Union Renewable Energy Directive (Revised), 2018	The Revised Renewable Energy Directive (2018/2001/EU) entered into force in 2018 set the target to achieve a minimum of 32% share of renewable energy consumption within the EU. Member States commit to the renewable energy consumption target as part of integrated national energy and climate plans, pursuant to Regulation (EU) 2018/1999 of the European Parliament and of the Council.
International	
Paris Agreement (Conference of Parties; COP 21), 2015	The Paris Agreement had an overarching goal to hold the increase in the global average temperature to below 2°C above pre-industrial levels, and binds all parties to prepare, communicate and maintain a Nationally Determined Contribution to this effect. From 2023 and every five years thereafter, a global stock-take will assess collective progress. The commitment to the Paris Agreement was reaffirmed at the Glasgow Climate Change Conference in 2021 (COP26) and at Sharm el-Sheikh Climate Change Conference (COP27) in 2022 and at COP28 in Dubai in 2023.
Kyoto Protocol, 1997	The Kyoto Protocol requires signatory countries to limit and reduce greenhouse gases in accordance with agreed individual targets. The Kyoto Protocol was formally adopted on 11th December 1997, first entering into force on 16th February 2005 (United Nations Framework Convention on Climate Change; UNFCCC, 2023). The UK Government adopted the commitments outlined in the Kyoto Protocol through the Climate Change Act 2008 and Climate Change (Scotland) Act 2009.
United Nations Framework Convention on Climate Change (UNFCCC), 1992	The UNFCCC aims to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, and is the foundation for later landmark agreements, including the Kyoto Protocol and Paris Agreement.

2.3 Marine Planning Policy

59. In Scotland, marine planning policy is used to inform decisions made under the relevant consenting legislation, e.g. for the purposes of obtaining a Marine Licence. A summary of marine planning policy relevant to the Bellrock WFDA is given in **Table 2.2**.

Table 2.2: Summary of Marine Planning Policy

Policy	Summary
Scotland's National Marine Plan, 2015	Scotland's National Marine Plan (SNMP) was published in March 2015. The purpose of the SNMP is to set out strategic policies for the sustainable development of Scotland's marine resources out to 200 nautical miles. It also provides a strategic framework for marine licensing decisions. The SNMP outlines objectives relating to offshore wind and marine renewable energy which intend to maximise the sustainable development of offshore wind by creating economic benefits through increasing a domestically competitive supply chain whilst contributing to decarbonisation targets. The Marine Directorate is currently directing ongoing work to update the SNMP.
Regional Marine Plans	A total of 11 Scottish Marine Regions have been created under the Scottish Marine Regions Order 2015 which cover sea areas extending out to 12 nautical miles. Regional Marine Plans for each Marine Region will be developed by Marine Planning Partnerships to allow more local ownership and decision making. The nearest Scottish Marine Region to the Bellrock WFDA is the North East Marine Region. No Regional Marine Plan is developed for the North East Marine Region at the time of writing.
UK Marine Policy Statement (HM Government, 2011)	In March 2011, the UK Marine Policy Statement (MPS) was published for the purposes of section 44 of the Marine and Coastal Access Act 2009 (MCAA) (UK Government, 2009). The MPS was established to partially facilitate and support the formulation of Marine Plans in accordance with the marine objectives (HM Government, 2011), including to promote sustainable economic development; enable the UK's move towards a low-carbon economy, to mitigate the causes of climate change and ocean acidification and adapt to their effects; ensure a sustainable marine environment which promotes healthy, functioning marine ecosystems and protects marine habitats, species and heritage assets; and contribute to the societal benefits of the marine area, including the sustainable use of marine resources to address local social and economic issues.
Marine Strategy Framework Directive	The EU Marine Strategy Framework Directive (Directive 2008/56/EC) was established to protect the marine environment by seeking to achieve Good Environmental Status (GES) in Europe's seas by 2020. This Directive was transposed into UK law by the Marine Strategy Regulations 2010 and remains applicable after EU Exit, under the Marine Environment (Amendment) (EU Exit) Regulations 2018.

2.4 Consenting Legislation

60. The following consents and licences are required for the Bellrock WFDA:

- Section 36 (s.36) consent under the Electricity Act 1989 (**Section 2.4.1**).
- Marine Licence for marine renewable energy projects under the Marine and Coastal Access Act 2009 (MCAA) (**Section 2.4.2**).

61. Where additional licences are required for pre-construction or operational works, these will be sought from the relevant consenting authority at the appropriate time.

2.4.1 Electricity Act 1989

62. The Electricity Act 1989 created the legal framework for privatising the electricity industry. The Act allowed the establishment of new electricity companies, required to 'develop and maintain an efficient, co-ordinated and economical system of electricity supply', and 'to facilitate competition in the supply and generation of electricity'. Under s.36, the Act establishes the licencing regime for the construction of generation stations.

63. For generating stations (such as the Bellrock WFDA), which are situated in Scottish offshore waters or the Scottish REZ (waters between 12 nm and 200 nm) with a proposed installed capacity of 50 MW and above, consent is required from Scottish Ministers (facilitated by Marine Directorate - Licensing Operations Team (MD-LOT)) under s.36 of the Electricity Act 1989.

64. The s.36 consent grants permission for the construction and operation of generation stations in the Scottish offshore region, including wind turbine generators (WTGs) and their substructures and station keeping systems (SKS) and auxiliary infrastructure (such as inter-array cables (IACs) and subsea cable hub(s)) which comprises the Bellrock WFDA.

2.4.2 Marine and Coastal Access Act 2009

65. A Marine Licence is also required under the MCAA 2009. The MCAA 2009 sets out the requirements for Marine Licencing in Scottish waters between 12 nm and 200 nm, to be obtained prior to construction, alteration or improvement of any works, deposit of any substance or objects in or over the sea, or on or under the seabed, or to carry out activities such as dredging. As such, a Marine Licence will be sought for activities listed under Part 4 (Marine Licencing) of the MCAA 2009 where required to construct the Bellrock WFDA.

66. In Scottish waters, Marine Licences are administered by MD-LOT.

2.5 Environmental Impact Assessment Regulations

67. The requirement to undertake EIA was originally established under the EIA Directive (2011/92/EU, as amended by Directive 2014/52/EU) (as transposed into UK law) and continues to be applicable through the Marine Environment (EU Exit) (Scotland) (Amendment) Regulations 2019, which came into force on EU Exit Day (31st January 2020). As such, the EIA Directive remains relevant to the EIA process in Scotland and is relevant to any s.36 or Marine Licence applications in Scottish waters if a project is likely to have a significant effect on the environment due to its size, nature or location.

68. The following legislation implements the EIA Directive into Scottish law:

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, which requires an EIA to support s.36 consent applications (**Section 2.5.1**).
- The Marine Works (Environmental Impact Assessment) Regulations 2007, which requires an EIA to support Marine Licence applications (**Section 2.5.2**).

69. The approach to Scoping and EIA for the Bellrock WFDA is set out in detail in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**.

2.5.1 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017

70. Under the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, an EIA is required to support electricity generation projects which must apply for consent under s.36 of the Electricity Act 1989. These regulations set out the statutory process and minimum requirements for EIA.

71. Schedule 2 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 sets out a list of development types for which an EIA may be required, including generating stations, which the Bellrock WFDA falls under. Where Schedule 2 developments are likely to have a significant effect on the environment due to factors such as its nature, size or location, an EIA Report is required to be prepared and submitted to support such applications.

72. Schedule 2 developments may apply for a screening opinion from the Scottish Ministers to determine whether any development is, or is not, EIA development, and therefore require preparation of an EIA Report. The Applicant has chosen to prepare and submit an EIA Report for the Bellrock WFDA without prior screening.

73. Reg. 12 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 also provide capacity for the Scottish Ministers (facilitated by MD-LOT) to provide a Scoping Opinion (an opinion on the scope of information proposed to be provided within the Bellrock WFDA EIA Report) if a written request for this is submitted by the Applicant. This document forms the Bellrock WFDA Scoping Report, which will set out the proposed scope of information to be provided within the Bellrock WFDA EIA Report and will form the basis of a Scoping Opinion from MD-LOT.

74. The Scoping Opinion provided by MD-LOT will be applicable to The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and The Marine Works (Environmental Impact Assessment) Regulations 2007 (**Section 2.5.2**).

2.5.2 The Marine Works (Environmental Impact Assessment) Regulations 2007

75. Under Schedule A2 of the Marine Works (Environmental Impact Assessment) Regulations 2007 (which applies in Scottish offshore waters beyond 12 nm), an EIA is required for wind farms (installations that harness wind power for energy production) if the project in question is likely, because of its size, nature or location to have significant effects on the environment. The Applicant acknowledges the potential for significant environmental effects and will therefore prepare an EIA Report in accordance with these regulations.

76. Similar to the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, the Marine Works (Environmental Impact Assessment) Regulations 2007 make provision for a written request for a Scoping Opinion to be provided by MD-LOT.

77. The Scoping Opinion provided by MD-LOT will be applicable to The Marine Works (Environmental Impact Assessment) Regulations 2007 and The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (**Section 2.5.1**).

2.6 Nature Conservation Legislation and Policy

2.6.1 Habitat Regulations Appraisal

78. In 1992, the EU Directive 92/43/EEC, known as the 'Habitats Directive', was adopted to enable EU member states to meet obligations set out under the Bern Convention. The purpose of the Habitats Directive is to maintain or restore natural habitats and wild species listed in the Annexes (Annex I, II) at Favourable Conservation Status (FCS). Protection to meet FCS is given through designation of European sites (Special Areas of Conservation (SAC)).

79. In addition, the EU Directive 2009/147/EC, known as the 'Birds Directive', was implemented to provide a framework for conservation and management of wild birds in the EU. Annex I of the Birds Directive provides a list of rare, vulnerable and migratory species, which are protected through the designation of Special Protected Areas (SPAs).

80. These directives are transposed into Scottish law by the Conservation of Offshore Marine Habitats and Species Regulations 2017 (which apply to Marine Licences within the Scottish Offshore region).

81. Together, with changes enacted by the Conservation of Habitats and Species Amendment (EU) Exit) Regulations 2019 (the 'EU Exit Regulations'), this regulation is known as the 'Habitats Regulations'. The Habitats Regulations require a HRA to be undertaken where a project could affect a designated site (SPAs, SACs, proposed or candidate SPAs and SACs or Ramsar sites), either individually or in combination with other plans or projects, in view of the site's conservation objectives. Please see **Chapter 4: Approach to Scoping and Environmental Impact Assessment** for further details on the HRA approach and process.

82. In accordance with the above-mentioned Habitats Regulations, the Applicant is undertaking the relevant assessments to inform an appropriate assessment undertaken by the Marine Directorate. A standalone **Bellrock WFDA HRA Screening Report** (BlueFloat Energy | Renantis Partnership, 2024) (Stage 1 of the HRA) for the Bellrock WFDA has been prepared and submitted for consideration alongside this Bellrock WFDA Scoping Report and a Report to Inform Appropriate Assessment (RIAA) will be submitted alongside the Bellrock WFDA EIA Report and application documentations for the Bellrock WFDA. A separate Screening Report and RIAA will also be submitted for the Bellrock Offshore Transmission Development Area (OfTDA).

2.6.2 Nature Conservation Marine Protected Area Assessment

83. Scotland designates Nature Conservation Marine Protected Areas (NCMPAs) in offshore waters between 12 nm and 200 nm under the MCAA 2009. NCMPAs are designated to protect biodiversity and heritage, with specific focus on protected features (species, habitats, large scale features or geomorphological features).

84. Under the MCAA 2009, provisions are made for the relevant public authority (in this instance, MD-LOT) to consider whether a licensable activity is capable of affecting (other than insignificantly) a protected feature in a NCMPA or any ecological or geomorphological process on which the conservation of any protected feature in a NCMPA is dependant.

85. In order to assess whether there is any significant risk of the licensable activity hindering the achievement of the conservation objectives of a given NCMPA, a NCMPA Assessment should be completed.

86. A NCMPA Screening Report, covering Stage 1, has been prepared and submitted for consideration in **Appendix 2** of this Bellrock WFDA Scoping Report. **Appendix 2: NCMPA Screening Report** has been prepared in line with the guidance provided in the Marine Scotland Nature Conservation Marine Protected Areas: Draft Management Handbook (2013). Further details on the methodology for the NCMPA assessment are also provided in **Chapter 4: Approach to Scoping and Environmental Impact Assessment** and **Appendix 2: NCMPA Screening Report**.

2.6.3 European Protected Species

87. Annex IV of the Habitats Directive sets out a list of animals and plants that are considered European Protected Species (EPS) and protected under the Habitats Regulations. Under the Habitats Regulations, it is unlawful to:

- Deliberately capture, injure or kill an EPS;
- Deliberately disturb an EPS; and
- Damage or destroy a breeding site or resting place of an EPS.

88. However, it may be lawful to carry out certain activities which are likely to cause disturbance or injury to EPS, if an EPS licence is sought. This process is detailed in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**.

89. As part of early project development, the Applicant provided EPS Risk Assessments to MD-LOT in relation to EPS licence applications to undertake geophysical surveys within the Bellrock WFDA. MD-LOT determined that no EPS licence was required for this purpose. The Applicant will apply for further EPS licences as appropriate should these be required in the future.

2.6.4 Basking Sharks

90. Basking sharks *Cetorhinus maximus* are a Priority Marine Feature (PMF) in Scotland's seas and are protected under Schedule 5 of the Wildlife and Countryside Act 1981, and under Part 3 and Schedule 6 of the Nature Conservation (Scotland) Act 2004. Under these protections, it is

prohibited to kill, injure or take by any method basking sharks and any other species listed in Schedule 5, or to disturb these species intentionally or recklessly.

91. For commercial survey activities (e.g., geophysical surveys), a licence to disturb basking sharks may be required. The Applicant will apply for a basking shark licence should this be required with MD-LOT as the relevant licensing authority.

92. Further information on basking sharks is provided in **Chapter 7: Fish and Shellfish Ecology**.

2.6.5 Priority Marine Features

93. Since 2014, 81 species and habitats present in the seas around Scotland have been identified as Priority Marine Features (PMFs). The list, which was developed by Marine Scotland (now Marine Directorate), the Joint Nature Conservation Committee and Scottish Natural Heritage (now NatureScot), covers species and habitats that are a priority for conservation in Scotland, including intertidal and continental shelf habitats, deep sea habitats, mammals, fish, shellfish and other invertebrates. Please refer to **Chapter 6: Benthic Ecology; Chapter 7 Fish and Shellfish Ecology;** and **Chapter 8: Marine Mammals**.

2.6.6 Biodiversity Enhancement

94. Scottish Government Policy, including the SNMP and NPF4 (Scottish Government, 2023), contain an emphasis on tackling the nature crises through developments making a contribution towards both halting biodiversity loss and supporting biodiversity and marine enhancement. The Bellrock Project as a whole will consider the impacts on biodiversity, and implement measures to quantify and restore affected habitats where possible. Engagement with local environmental groups and the appropriate authorities will be key to identifying key areas which could be subject to enhancement measures. With reference to guidance and policy in place at the time, nature-based solutions will be considered where appropriate.

2.7 Other Consenting Requirements

2.7.1 Decommissioning

95. Sections 105 to 114 of the Energy Act 2004 set out statutory requirements in relation to the decommissioning of Offshore Renewable Energy Installations (OREI) and associated electrical lines. The Scottish ministers may require a costed decommissioning programme for OREIs in Scottish waters to be submitted for approval. Scottish ministers further have the power to determine specific approaches to decommissioning, including stipulating the form, timing and size of financial securities required.

96. The document 'Decommissioning of Offshore Renewable Energy Installations in Scottish Waters or in the Scottish part of the REZ under The Energy Act 2004: Guidance Notes for Industry (in Scotland)' was published by Marine Scotland in July 2022 (Scottish Government, 2022). This guidance document sets out the policy and legislative framework; decommissioning requirements in Scotland; requirements for Decommissioning Programmes; environmental and safety considerations; and financial considerations. Decommissioning Programmes are expected to

contain information on decommissioning standards, financial security, residual liability and industrial cooperation and collaboration.

97. Section 5 of the Guidance Note states that "an indication of the decommissioning proposals should be included as part of the statutory consenting or licensing process so that the feasibility of removing the infrastructure can be assessed as part of the application process".

2.7.2 Safety Zone Applications

98. Section 95 of the Energy Act 2004 sets out that Safety Zones can be established for any phase of an offshore renewable energy project in designated areas, where it is appropriate for safety reasons. Safety Zones are intended to ensure the safety of the renewable energy installation or other installations in the vicinity during construction, operation, extension or decommissioning.

99. Safety Zones may exclude non-offshore wind farm vessels from navigating through a designated area for a specific period. The Bellrock WFDA EIA Report will include an assessment of the proposed approach to Safety Zones at the point of application. The total number of Safety Zones to be established at the same time has not been yet defined. It is anticipated that the following applications will be made:

- An application post-consent for Safety Zones including up to 500 m around each WTG and substructure during its construction;
- An application post-consent for Safety Zones including up to 50 m around each installed WTG and substructure during its pre-commissioning;
- An application post-consent for Safety Zones including up to 500 m around each WTG and substructure during major maintenance during operation; and
- An application prior to commencement of decommissioning for Safety Zones including up to 500 m around each WTG and substructure during its decommissioning.

2.8 Scoping Questions to Consultees

100. The following questions are posed to consultees to help them frame and focus their response to the policy and legislative context for the Bellrock WFDA, which will in turn inform the Scoping Opinion:

- Considering the Scottish Government consultation paper "Tackling the Nature Emergency – strategic framework for biodiversity", can any advice be provided around expected levels of biodiversity enhancement that might be expected for offshore works in addition to embedded and additional mitigation?
- The Bellrock WFDA is located in Scottish offshore waters (120 km east of Stonehaven, 116 km southeast of Peterhead) and therefore the Applicant intends to apply for a Marine Licence under the Marine and Coastal Access Act 2009 (MCAA) (applicable to Scottish offshore waters between 12 nautical miles (nm) and 200 nm). Could MD-LOT confirm whether the Applicant will need to apply for a Marine Licence under the Marine (Scotland) Act 2010 (applicable to

Scottish Territorial Waters, between 0 to 12 nm) (noting Section 21(1) of the Marine (Scotland) Act 2010 includes for the deposit of any substance or object anywhere in the sea if it was loaded onto a vessel in Scotland or in the Scottish marine area).

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3 Project Description

3.1 Introduction

101. This chapter provides an overview of the Bellrock Wind Farm Development Area (WFDA) and describes the main infrastructure to be included within the Bellrock WFDA Section 36 (s.36) and Marine Licence applications. It also provides an overview of the main activities that will be undertaken during construction, operation and maintenance, and decommissioning of the Bellrock WFDA under the s.36 consents and Marine Licences.

102. As discussed in **Chapter 1: Introduction**, a separate Scoping Report and consent application will be submitted for the Bellrock Offshore Transmission Development Area (OfTDA) in due course. Whilst there is a geographic overlap between the boundaries of the Bellrock WFDA and the Bellrock OfTDA, infrastructure within the Bellrock OfTDA (i.e. offshore substation(s), offshore export cables, and reactive compensation station (if required)) is outside of the scope of this Bellrock WFDA Scoping Report and subsequent consent applications. To ensure a comprehensive Environmental Impact Assessment (EIA) is undertaken, the Bellrock WFDA Cumulative Effects Assessment (CEA) will consider the Bellrock OfTDA (**Chapter 4: Approach to Scoping and Environmental Impact Assessment**) along with other projects and plans, including the Scottish and Southern Electricity Networks Transmission (SSEN Transmission) offshore substation to which the offshore export cables connect into.

3.2 Design Envelope Approach

103. A parameter-based design envelope approach will be adopted within the Bellrock WFDA EIA Report. The design envelope will set out a minimum and maximum design scenario for each design parameter. These parameters will be further refined once more detailed engineering studies have been undertaken (which includes site-specific data).

104. The design envelope will include all relevant technical, spatial and temporal elements of the Bellrock WFDA, and the proposed methodology to be employed for construction, operation and maintenance, and decommissioning.

105. In each of the technical chapters of the Bellrock WFDA EIA Report the receptor specific worst-case scenario will be determined from the design envelope parameters and then assessed. Further details of the use of a design envelope are provided in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**. This is considered a standard approach and is widely accepted by stakeholders and regulators, and is necessary to maintain design flexibility at this early stage of project development. Further details of the design envelope approach are provided in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**.

106. The information presented in this chapter outlines the options and flexibility required by the Applicant and the range of potential design, location and activity parameters upon which the scoping of impacts is based. The final detailed design will lie within the parameters of the design

envelope, enabling detailed design work to be undertaken post-consent whilst retaining the validity of the Bellrock WFDA EIA Report.

107. The need for flexibility in the consent is a key aspect of any large development but is particularly significant for offshore wind farm projects where technology is evolving. The design envelope must therefore provide sufficient flexibility to enable the Applicant and their supply chain to use the most up to date, efficient and economical technology and techniques in the construction, operation and maintenance, and decommissioning of the Bellrock WFDA, without affecting the surrounding environment to a greater extent than the worst-case scenarios assessed in the Bellrock WFDA EIA Report.

108. The design envelope has been refined in the preparation of this Bellrock WFDA Scoping Report. For instance, spar type floating substructures (FSSs) have been removed from the design envelope as their draught requirements are not suited to Scottish ports and the Bellrock WFDA site characteristics. The refinement of the design envelope will continue throughout the EIA process and will be described in the Bellrock WFDA EIA Report.

109. Guidance has been prepared by Marine Scotland (now Marine Directorate) and the Energy Consents Unit on using the design envelope approach for applications under s.36 of the Electricity Act 1989 where flexibility is required in applications (Scottish Government, 2022). This guidance will be referred to when refining the design envelope to inform the EIA.

3.3 Project Infrastructure

3.3.1 Bellrock Wind Farm Development Area

110. The Bellrock WFDA is located 120 km east of Stonehaven (116 km southeast of Peterhead), as shown in **Figure 1.1** and **Figure 1.2** in **Appendix 1**.

111. The Bellrock WFDA will comprise of:

- Wind turbine generators (WTGs) with FSSs and (if used) fixed bottom substructures (FBSSs) **(Section 3.4**);
- Station keeping systems (SKS) for each FSS, including mooring lines and anchoring systems (**Section 3.5**);
- Inter-array cables (IAC), subsea cable hub(s) and associated cable protection (**Section 3.7**); and
- Scour protection for FSS anchoring points and (if used) FBSSs (**Section 3.8**).

112. The Bellrock WFDA will connect to the National Electricity Transmission System via an SSEN Transmission offshore substation. Regular discussions are taking place between the Applicant and SSEN Transmission as part of the detailed network design to determine the location and design of the SSEN Transmission offshore substation.

113. Key site parameters for the Bellrock WFDA are presented in **Table 3.1.**

Table 3.1: Bellrock Wind Farm Development Area Parameters

Parameter/Unit	Bellrock WFDA
Distance from Stonehaven (km)	120 east
Distance from Peterhead (km)	116 southeast
Area (km^2)	280
Water depth (m from Mean Sea Level (MSL))	-60 to -105
Crown Estate Scotland Lease Period (years)	Up to 60
Operational life (years)	Up to 50

3.3.2 Wind Turbine Generators

114. The WTGs convert wind energy into electrical energy. Each WTG is a complex system composed of a high number of components. The main components are:

- Rotor assembly, composed of three blades and a hub;
- Nacelle, containing the generator, shaft and gearbox (if applicable), power electronic converter and transformer; and
- Tower containing lifting equipment and, if applicable, the switchgear.

115. Technology develops rapidly and the available sizes of turbines are expected to increase over the coming years. The WTG parameters are reflective both of today's technology and up to what the Applicant considers could be achievable by 2035. The final WTG model(s) that will be used for the Bellrock WFDA will be selected post-consent.

116. The EIA will be undertaken using a number of WTG parameters ensuring the worst-case is assessed for each receptor.

117. The key features are illustrated in **Plate 3.1** and the WTG design envelope for the Bellrock WFDA is outlined in **Table 3.2**.

Plate 3.1: Key Features of a Typical Floating Offshore Unit

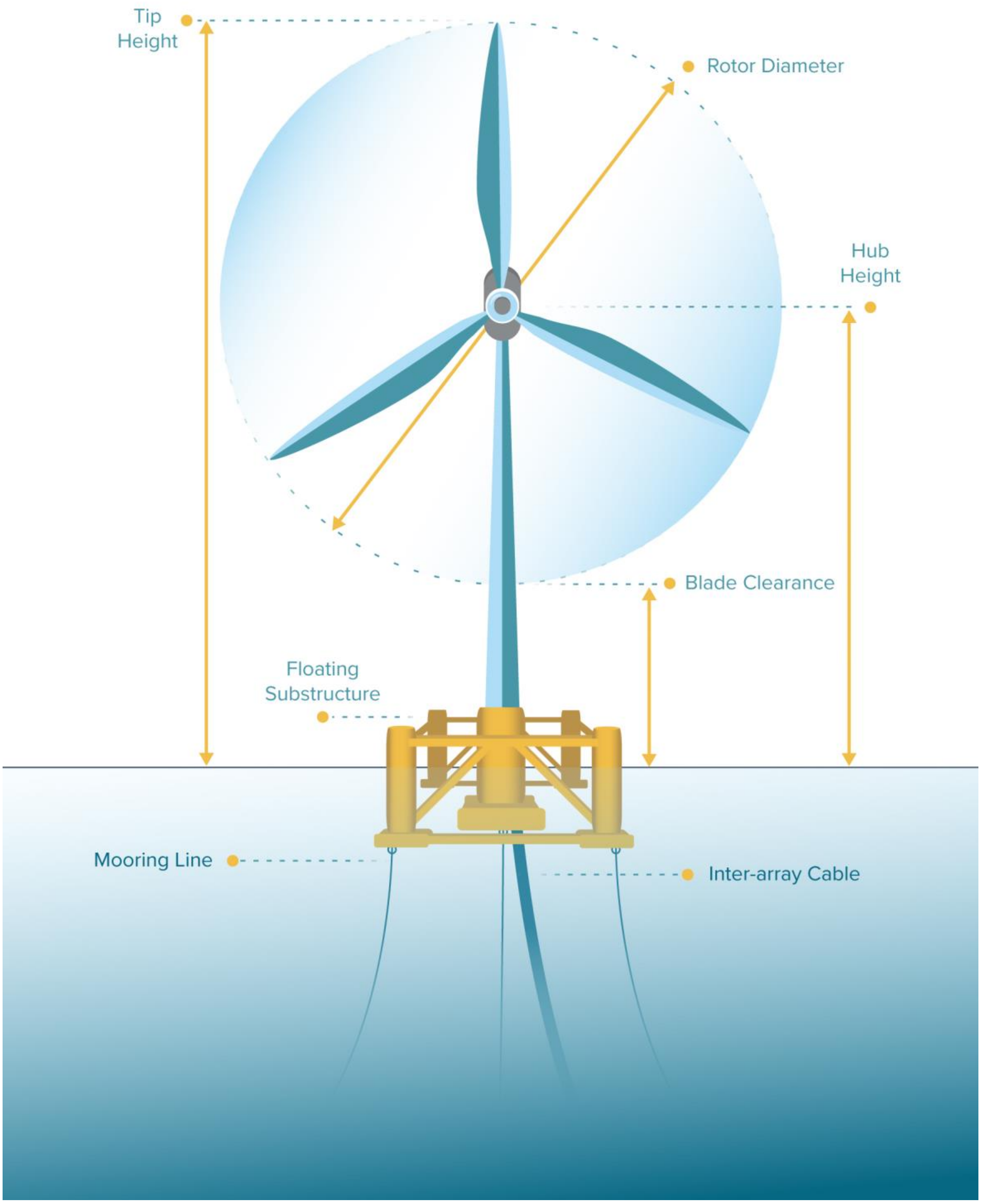

Table 3.2: Wind Turbine Generator Design Envelope

Parameter	Minimum	Maximum
WTG capacity (MW) [1]	15	28
Number of WTGs [2], [3]	42	80
WTG rotor diameter (m)	236	330
Minimum blade tip clearance above Mean High Water Springs (MHWS) (m) [4]	22	-
Maximum blade tip height (m) Lowest Astronomical Tide (LAT)	-	400
Minimum WTG spacing (m, approximate)	1,000 (all directions)	-
Safety Zone radius required around WTG (pre-commissioning) (m) [5]	50	50
Safety Zone radius required around WTG (active construction) (m) [5]	500	500
Safety Zone radius required around WTG (major maintenance) (m) [5]	500	500

[1] The minimum WTG capacity corresponds to the maximum number of WTGs and vice versa.

[2] Additional capacity may also be developed within the WFDA for overplanting purposes.

[3] The final capacity will be confirmed within the EIA Report. Should a material increase in project capacity be proposed within the WFDA (shown in **Figure 1.1** in **Appendix 1**), the Applicant will liaise with MD-LOT to establish the validity of the WFDA Scoping Opinion.

[4] As per Marine Guidance Note (MGN) 654. The minimum air gap for the Bellrock WFDA will be informed by technical studies and will be defined in the Bellrock WFDA EIA Report.

[5] The Bellrock WFDA EIA Report will include an assessment of the proposed approach to Safety Zones at the point of application. The total number of Safety Zones to be established at the same time has not been yet defined.

3.4 Wind Turbine Generator Substructures

118. The Bellrock WFDA will use WTGs installed upon FSSs and (if used) FBSSs. The final selection of substructure and associated SKS (discussed in **Section 3.5**) will depend on factors including but not limited to seabed conditions, water depth, wave, wind and tidal conditions, health and safety, economics and procurement approach. As site conditions vary across the Bellrock WFDA it is possible that more than one substructure or SKS type is used. A summary matrix of substructures and SKS options are provided in **Section 3.6**. Together, the WTG and FSS are referred to as 'floating offshore unit' (FOU).

119. The Bellrock WFDA EIA Report will consider different substructure and associated SKS based on the worst-case design parameters. **Sections 3.4.1** and **3.4.2** below discuss FSS and FBSS options in turn.

3.4.1 Floating Substructures

120. FSSs require an appropriate SKS, comprising of mooring lines and anchors which will attach the FSSs to the seabed, providing stability and maintaining the FSS within its excursion limit. SKS options are detailed in **Section 3.5. Table 3.3** outlines the key parameters required for scoping in relation to FSSs. The parameters presented are considered worst-case and will be further refined as detailed engineering studies are undertaken. To date, the only FSS option that has been scoped out is the traditional spar type FSS. **Plate 3.2** provides a schematic of each FSS under consideration.

Plate 3.2: Floating Substructure Options

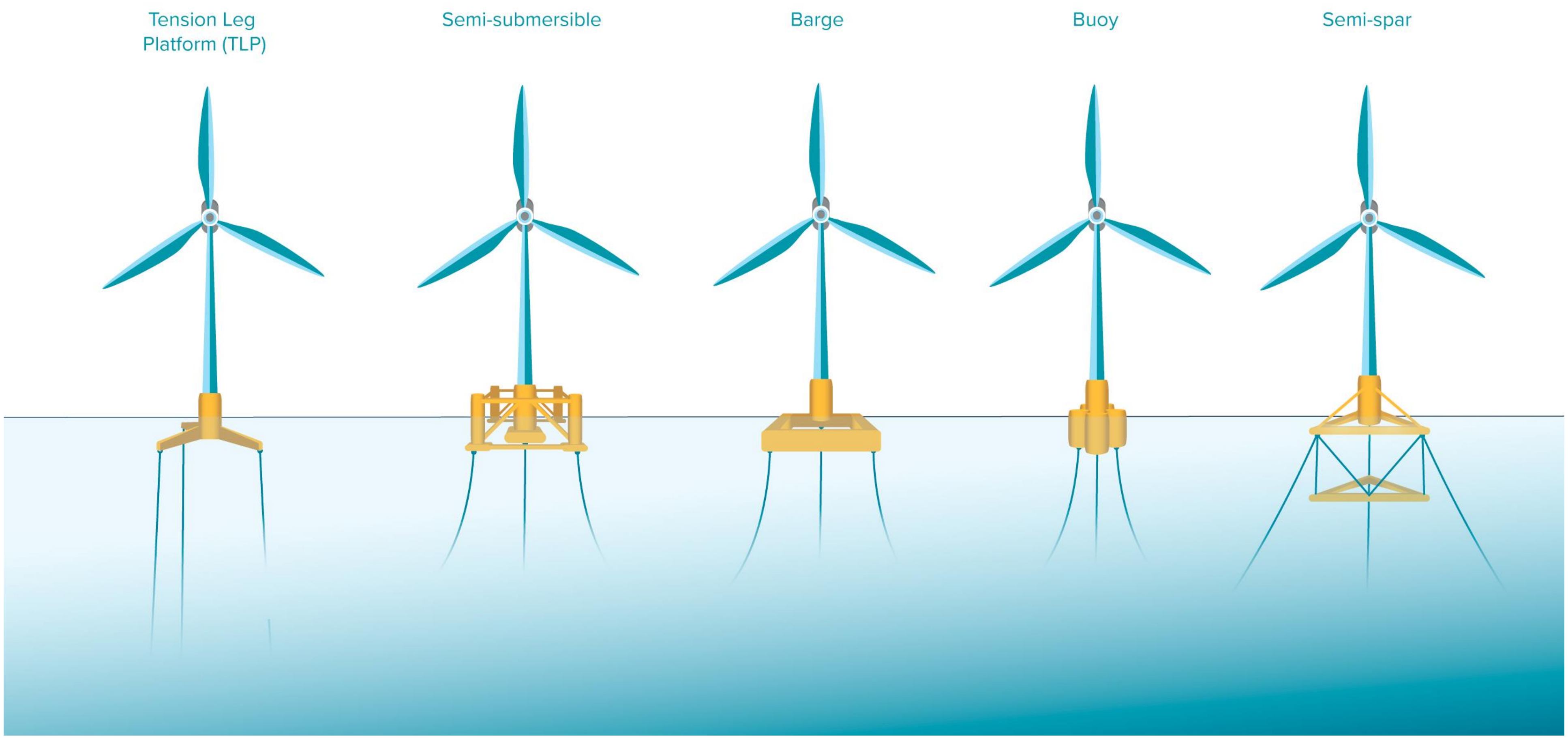

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Table 3.3: Floating Substructure Design Envelope

Parameter (per FOU)	Minimum	Maximum
Footprint at sea surface (m x m)	60 x 60	140 x 140
Height of FSS (m)	15	60
Excursion limit off substructure[1] (m)	-	140
[1] Extent to which the FSS may offset from the design coordinates due to external conditions (e.g. wind and metocean)		

3.4.1.1 Tension Leg Platform

121. A tension leg platform (TLP) is a highly buoyant semi-submerged structure, which maintains its position and stability through the opposite forces of excess buoyancy in the FSS and the highly tensioned tendons anchored to the seabed.

122. It is anticipated that the WTG installation on a TLP would take place at an assembly port but there are some FSS concepts which may not offer sufficient stability for an integrated FOU transportation operation to a WFDA. However, if WTG integration onto the FSS was expected to be performed at the Bellrock WFDA, this operation would require installation equipment and methodologies (e.g., a floating crane installing a WTG on a FSS within the Bellrock WFDA) which are yet to be fully developed and deployed for commercial scale floating wind projects. In addition, major component replacement during the operational and maintenance phase would be more challenging for this technology if the FOU required a tow back to port for repair. A TLP may however lend itself to floating maintenance operations given the concept's good stability characteristics.

3.4.1.2 Semi-submersible Platform

123. Semi-submersible platforms are buoyancy-stabilised structures which float semi-submerged and maintain position via a SKS. These structures usually consist of a set of three or more columns connected via bracings or pontoons with heave plates, however designs may vary. Semi-submersible platform designs can use a wide range of SKSs. WTG integration is likely to take place at an assembly port and subsequent transfer to and installation at the Bellrock WFDA is typically achieved using tugs and anchor handling vessels (AHVs).

3.4.1.3 Barge

124. Barge technology offers low draught but a very large water-plane area, which provides the distributed buoyancy by which the platform achieves stability.

125. Generally, barge substructures comprise of a single hull, but variations of barge FSSs exist such as twin hulled barge concepts. Barges tend to be more susceptible to wave loading than other technology types due to the large water-plane areas.

126. Like semi-submersible technology, barges can use a variety of SKS technology and are capable of WTG integration at an assembly port.

3.4.1.4 Buoy (Modified Spar-buoy)

127. This form of FSS is currently less developed in the market, although it has some unique benefits. These FSSs are a modified form of a traditional spar (typically a cylindrical shaped FSS with a large draft, incorporating ballast in the lower end) but have a much shallower draught and much larger water plane area than their traditional spar counterparts. They behave like semi-submersibles during transport and installation activities, operations, and WTG integration but they achieve stability, via a low centre of gravity and high centre of buoyancy, over a wider footprint than a traditional spar.

128. Unlike spars which typically require large draughts (both at the assembly port and in operation), buoys tend to have draughts comparable to semi-submersibles, which improves port access and other challenges associated with deep draughts. In addition, it also allows for WTG integration at an assembly port and the transport of a fully integrated FOU to the Bellrock WFDA.

3.4.1.5 Semi-spar Platform

129. This is a subset of traditional spar form of FSS also known as a hybrid spar. They are typically split into two structures, one highly buoyant structure supporting the WTG, and another structure/mass suspended below the support structure which acts to lower the centre of gravity. Coupled together they act like a traditional spar.

130. Semi-spars offer the advantages of traditional spars in terms of stability and reduced water plane area. However, also including the additional benefits of other FSS options like WTG integration at the assembly port and integrated transport and installation operations.

131. However, the use of a counterweight does provide challenges and complications regarding installation, tow to shore maintenance activities and decommissioning, as lowering and raising of the suspended structure/mass is a difficult marine operation to undertake.

3.4.2 Fixed Bottom Substructures

132. The FBSSs are installed into the seabed prior to the integration of the WTGs on the FBSS.

133. The following sections outline the different types of FBSSs that could be selected for the Bellrock WFDA. **Table 3.4** outlines the parameters for FBSSs, while **Plate 3.3** shows a diagram of each FBSS under consideration.

Plate 3.3: Fixed Bottom Substructure Options

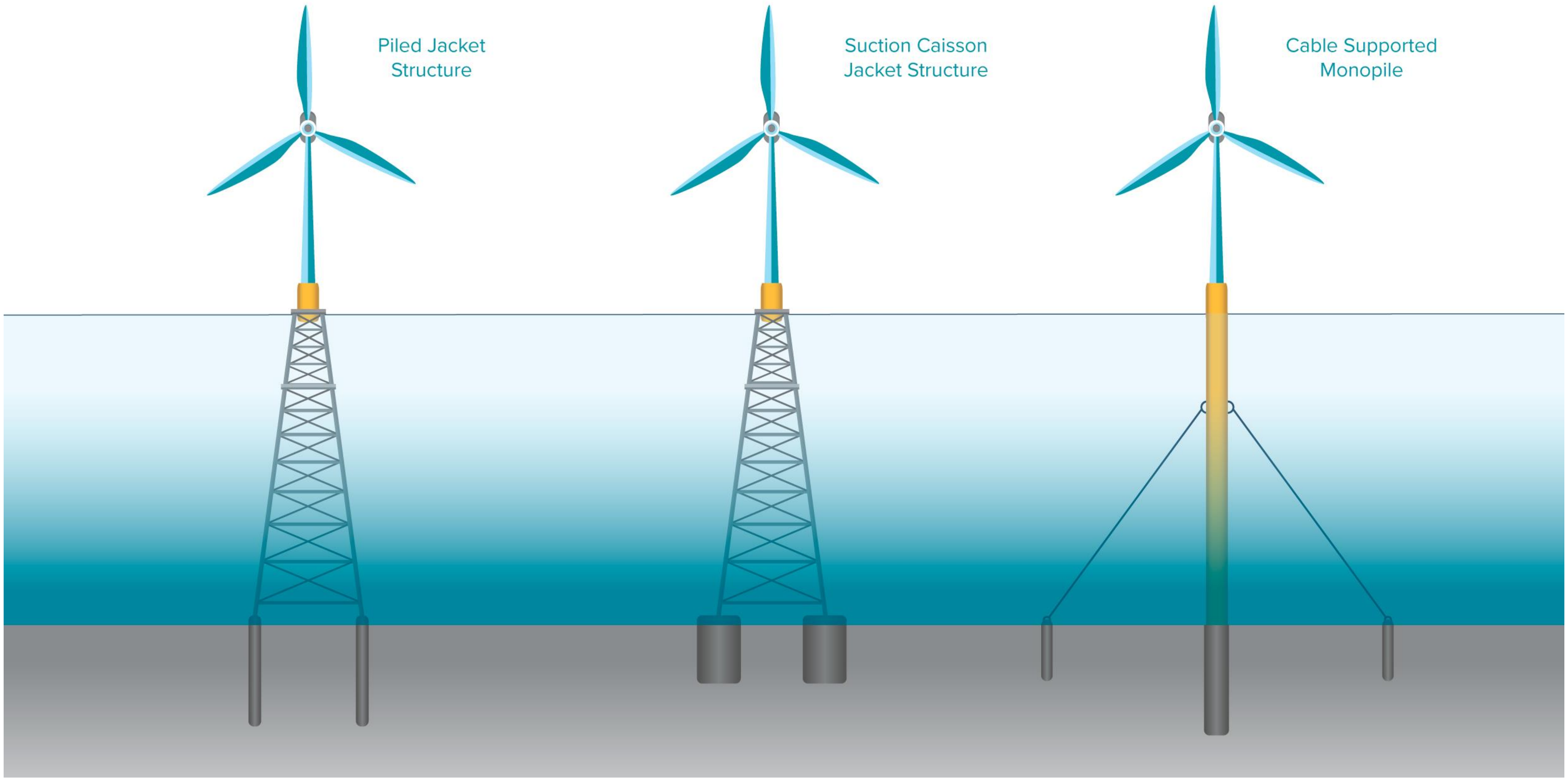

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Table 3.4: Fixed Bottom Substructures Design Envelope

Parameter (per WTG)	Minimum	Maximum
Maximum FBSS footprint (m x m)	-	60 x 60
Piled Jacket Structure		
Number of legs	3	4
Maximum footprint (m)	-	50 x 50
Number of pin piles	-	8
FBSS piled jacket – pin pile diameter (m)	-	4
FBSS piled Jacket – pile blow energy (kilojoules (kJ))	-	4,000
Suction Caisson Jackets		
Number of legs	3	4
Maximum footprint (m)	-	60 x 60
Cable Supported Monopiles		
Monopile diameter (m)	10	16
Monopile blow energy (kJ)	To be determined, subject to further design	

3.4.2.1 Piled Jacket Structure

134. Piled jacket structures are formed of a steel lattice construction, which comprises steel members (such as steel tubes) and welded joints. There is no separate transition piece with a jacket structure, with the whole jacket structure being constructed as an entirely integrated unit. The jacket structure is attached to the seabed by pin piles which are attached to the jacket feet and either driven and/or drilled into the seabed, depending on the geotechnical conditions of the seabed.

3.4.2.2 Suction Caisson Jacket Structure

135. The suction caisson jacket structure differs from the piled jacket structure by the method in which the jacket is attached to the seabed. Suction caissons are typically hollow steel canisters, capped at the top and open at the bottom and attached underneath the legs of the jacket. The structure is installed by lowering it onto the prepared seabed and a pipe running through each caisson unit begins to pump/suck water out of each unit. As this happen, and as a result of the generated suction force, the buckets get pressed/pulled down into the seabed.

136. Once the required penetration depth has been achieved the pump is switched off and grout is injected under the bucket to fill the remaining airgap and ensure contact between soil within the

bucket and the top of the bucket. Suction caisson jackets do not require to be drilled or hammered into the seabed.

3.4.2.3 Cable Supported Monopile

137. Monopiles consist of a pile typically fabricated from steel, typically driven into the seabed using methods such hammering or vibrating but could also be drilled and grouted. Given the Bellrock WFDA's water depths and potential scale of WTG to be installed, traditional monopile FBSSs are not considered a viable option for the Bellrock WFDA. Cable supported monopiles, also known as fully restrained platforms, include aspects of the monopile substructure design, and mooring and anchor systems to provide stability to the monopile. This enables the use of well-established monopile technology in deeper waters without significantly increasing the weight of the substructure (e.g. increasing the cost and complexity of construction, transport and installation).

138. The anchors for the additional restraining equipment would also be required to be attached to the seabed using a suitable solution dependant on the site characteristics (e.g. pin piles which are hammered or drilled).

3.5 Station Keeping System

139. To maintain the position of an FOU, it is necessary to connect the FSS to the seabed via a SKS. The SKS generally comprises mooring lines and anchors, which also provide stability to the FOU with various degrees of influence based on the system deployed. The mooring line and anchor design envelopes are outlined in **Table 3.5** and **Table 3.6** respectively**.**

140. There are several types of mooring configuration and anchoring solutions which are available for FSSs. **Section 3.5.1** outline the types of mooring configuration considered for the Bellrock WFDA and **Section 3.5.2** outlines the various types of anchors being considered.

141. In addition to the mooring lines and anchors there are several ancillary elements not described in detail here, which are deployed as part of the SKS. These include, but may not be limited to:

- Buoyancy elements;
- Clump weights;
- Shackles and connectors; and
- Tensioners.

142. The design of the SKS depends on the site characteristics and the technology being used. It is possible that different mooring and anchor solutions may be used across the Bellrock WFDA. This will be dependent on the site characteristics (i.e. ground conditions) and determined during the design development.

3.5.1 Mooring Lines

143. Mooring lines are connected to the FSS at various points or a single point (depending on the mooring system and/or the FSS concept).

144. Mooring lines for FSS purposes can be made of several different materials in various forms, for example:

- Steel (e.g. chain, sheathed spiral strand wire rope, steel pipe); and
- Synthetic rope (e.g. polyester, nylon, high modulus polyethylene).

145. The mooring types within the design envelope are illustrated in **Plate 3.4** below.

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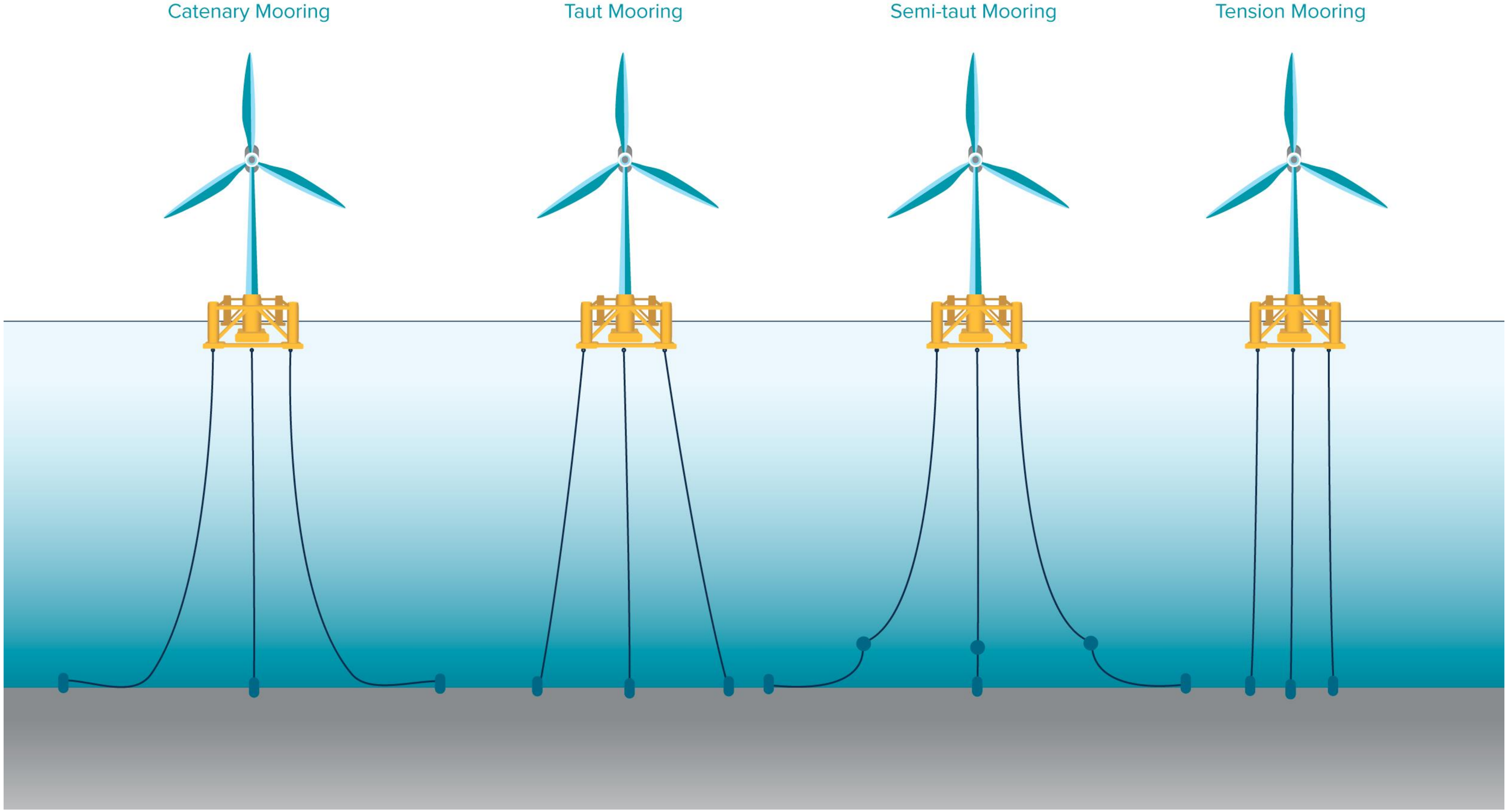
Plate 3.4: Examples of Mooring Configurations



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3.5.1.1 Catenary Mooring

146. This configuration uses free hanging chain, whereby the weight leads to the catenary shape through the water column between the FSS and the anchor. There is a section of chain resting on the seabed prior to termination at a suitable anchor, meaning the anchors will generally only experience horizontal loading. Generally, the weight of the chain resists excursions and provides stability.

147. The length of the catenary system is typically six to eight times the water depth. This system works well in water depths up to 300 m.

3.5.1.2 Taut Mooring

148. This configuration uses lines which are tensioned between the substructure and anchors until taut. The tension and flexibility in the lines are used to provide stability and control excursions. As the mooring is taut, the mooring line does not make contact with the seabed.

149. In this configuration the load on the anchor is both vertical and horizontal, therefore pile or suction anchors are most likely to be used. It typically has a shorter length than a catenary system, at approximately two times the water depth. This system works well in a wide range of water depths.

3.5.1.3 Semi-taut Mooring

150. This configuration uses chain at the top and bottom of the mooring line, and rope in the mid-section forming a combination of a taut and catenary system. Buoyancy modules are used to lift the rope off the seabed and prevent damage to these sections, however, there remains some seabed contact with this mooring option.

151. The semi-taut solution, being a mix of taut and catenary systems, mean the anchors suitable for catenary systems can be used.

3.5.1.4 Tension Mooring

152. This type of system is used by TLP. Due to the vertical loading and high tension on these systems, tendons with low strain and high strength are used, which can be synthetic ropes or steel tubulars for example.

3.5.1.5 Shared Mooring

153. A shared mooring system is a system where adjacent FSSs share anchor points. These systems are innovative and offer potential cost and environmental benefits given the reduced number of anchors. Unlike the other SKS forms, this system will most likely only have three lines per FSS, with each of those lines connected to a buoy, with a line running vertically down from the buoy to an anchor with vertical tension capacity (i.e. a suction or driven type pile).

Table 3.5: Moorings Design Envelope

Parameter (per WTG)	Minimum	Maximum
Number of mooring lines	-	12

154. Seabed footprints relating to the mooring system will be provided in the Bellrock WFDA EIA Report.

3.5.2 Anchors

155. The anchor is the connection point between the mooring system and the seabed. Consideration needs to be given to the mooring system and site-specific ground conditions and their associated properties. These are important considerations in selection of the anchor type used. A brief description of the anchor types considered for the WFDA is given in this section. **Plate 3.5** illustrates various types of anchors being considered for the Bellrock WFDA.

Plate 3.5: Different Anchor Types Being Considered for the Bellrock Wind Farm Development Area

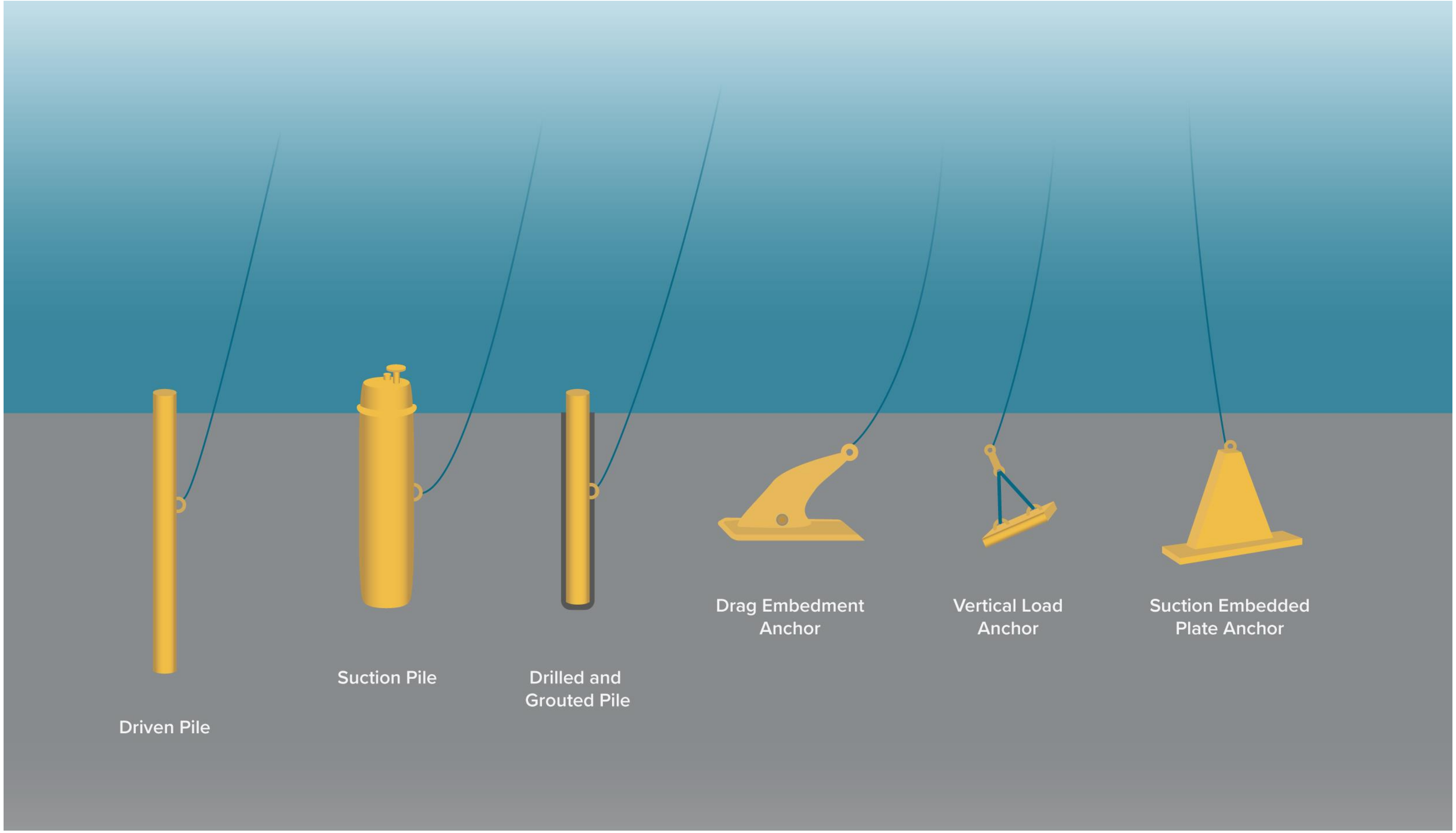

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Table 3.6: Anchor Design Envelope

Parameter (per WTG)	Minimum	Maximum
Number of anchors per FSS	-	12

Table 3.7: Pile Anchor Design Envelope

Parameter (per WTG)	Minimum	Maximum
Anchor driven pile diameter (m)	2	3.5
Anchor driven pile length (m)	20	35
Anchor driven pile hammer energy (kJ)	250	3,000

3.5.2.1 Driven Piles

156. Driven piles are steel tubes and are typically used for anchoring purposes in hard or challenging soil conditions. The pile is typically driven to the required penetration depth via an impact or vibratory hammer. These types of anchors can be used to support both vertical and horizontal loads.

3.5.2.2 Suction Piles

157. In suitable soil types (typically clays/sands) it may be possible to use suction piles (also known as suction caisson/buckets, suction cans). These use the same technique to embed into the seabed, as outlined in **Section 3.4.2.2**. As with the driven pile, these anchors are good for both horizontal and vertical load resistance.

3.5.2.3 Drilled and Grouted Piles

158. Drilled and grouted piles are similar to driven piles and are also typically used in hard soil conditions. However, these anchors (piles) are installed through drilling a void into the seabed to a target depth and then grouting in-situ to seal the connection between the pile and the surrounding ground.

3.5.2.4 Drag Embedment Anchors

159. Drag embedment anchors (DEA) work by being dragged across the seabed, embedding themselves to the required depth. They are best suited for use with catenary and semi-taut mooring systems due to the fact that they support horizontal loading. They work well in sediments which contain a significant proportion of clay and when fully submerged in the seabed.

3.5.2.5 Vertical Load Anchors

160. Vertical load anchors (VLAs) are similar to DEAs in that they are installed by dragging the anchor across the seabed. However, these anchors are capable of bearing both vertical and horizontal loads.

3.5.2.6 Suction Embedded Plate Anchors

161. Suction embedded plate anchors (SEPLA) are similar to VLAs but are installed using a suction embedment method similar to the suction pile.

3.6 Summary of Substructure, Mooring and Anchor Systems

162. A summary of the potential WTG types, detailing potential compatible configurations of associated substructure types, mooring, and anchor options is presented in **Table 3.8** and **Table 3.9** below. **Table 3.8** and **Table 3.9** also identify which options would require scour protection and/or piling activities.

Table 3.8: Summary Matrix of Floating Substructure Type and Associated Station Keeping System Infrastructure

Substructure Type	Mooring Options	FSS Anchor Options	Scour Protection	Impact Piling
Tension leg platform	Tension mooring	Driven piles	Yes	Yes
		Drilled and grouted piles	Yes	No
		Suction piles	Yes	No
Semi-submersible Barge Buoy (modified spar-buoy) Semi-spar	Taut mooring	Driven piles	Yes	Yes
		Drilled and grouted	Yes	No
		Suction piles	Yes	No
	Catenary Semi-taut	Driven piles	Yes	Yes
		Drilled and grouted	Yes	No
		Suction piles	Yes	No
		Drag embedment/vertical load/suction embedded plate	No	No
	Shared mooring	Driven piles	Yes	Yes
		Drilled and grouted	Yes	No
		Suction piles	Yes	No

Table 3.9: Summary Matrix of Fixed Bottom Substructure Type

Substructure Type	Mooring Options	FBSS Options	Scour Protection	Impact Piling
Piled jacket	N/A	Pin piles Driven Drilled and grouted	Yes	Yes, when driven
Suction caisson jacket	N/A	Suction caissons	Yes	No
Cable supported monopile	Taut lines between the monopile and anchor piles	Monopile Driven Drilled and grouted Anchor piles supporting the taut lines Driven Drilled and grouted	Yes	Yes, when driven (monopile and anchor piles)

3.7 Cables

163. Cables are a vital infrastructure, responsible for conducting the electricity generated by the WTGs to the offshore substation(s) (OFSS(s)) for export. The Bellrock WFDA will utilise IACs to conduct electricity from the WTGs to an OFSS or a subsea cable hub(s) if used. Other transmission infrastructure components, such as the OFSS(s), interconnector cables connecting two or more OFSSs with each other, and offshore export cables connecting the Bellrock OFSS to the SSEN Transmission offshore substation are within the scope of the Bellrock OfTDA, and therefore a separate consent application will consider these elements.

164. No cable crossings of third-party cables are anticipated within the Bellrock WFDA. Cables, subsea cable hubs, and proposed burial and protection methods are discussed in the following sections.

3.7.1 Inter-array Cables

165. The IACs are armoured cables containing electrical and fibre optic cores, which link the WTGs to each other and/or to the subsea cable hub(s) and/or the offshore substation(s) and include (for FSSs) dynamic IAC and static IAC sections and (for FBSSs) static IACs. It is typical for WTGs to be connected together via strings or loops of IACs, dependent on the electrical design selected.

166. Currently, the typical voltage rating of an IAC is 66 kV, however, due to the increasing WTG capacity, the supply chain is developing IACs with a voltage rating of 132 kV. These higher voltage IACs are therefore also being considered at this stage.

167. The IAC footprint, i.e., total length of cable to be installed multiplied by width of seabed to be affected during the installation, is not yet determined and will be specified within Bellrock WFDA EIA Report.

168. For FSSs, due to the nature (and movement) of the structure, static IAC (on the seabed) and dynamic IAC (moving within the water column) are required, joined together by a connector to form one continuous cable. The dynamic IAC section is designed to accommodate the dynamic movement of the FSS.

169. Dynamic IACs sections can be deployed in various configurations, depending on a number of factors such as water depth and on-site conditions. These configurations may include:

- Free hanging;
- Lazy “S” wave; and
- Steep wave.

170. The lazy “S” wave configuration is the configuration most commonly associated with floating wind applications. However, further detailed design is required to define the most suitable configuration for the Bellrock WFDA. **Plate 3.6** provides an overview of the potential IAC configuration options.

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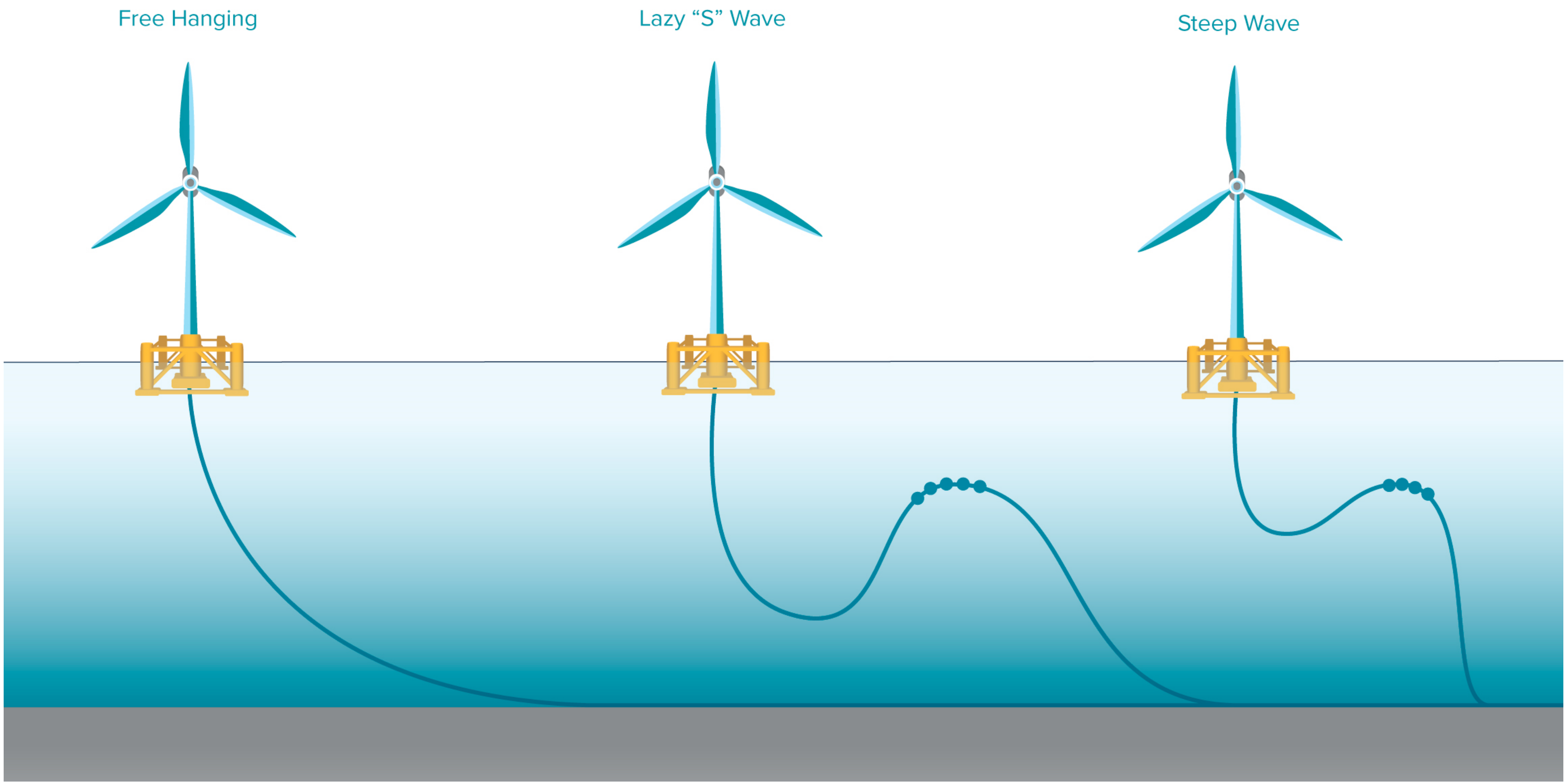
Plate 3.6: Dynamic Inter-array Cable Configuration Options



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171. Dynamic cable configurations require a number of auxiliary cable items, designed to help reduce fatigue and protect the cable, such as:

- Buoyancy modules;
- Bend stiffeners;
- Bend restrictors;
- Abrasion protection at the touchdown point; and
- Connector (joining the dynamic IAC to the static IAC).

172. At the point where the dynamic cable comes into contact with the seabed, the touchdown point, it essentially transitions to being a laid static cable, usually via a connector. Cable protection may be applied to the static IAC. In addition, clump weights/ballast and tethering anchors may be used to hold the cable in position.

173. Should the static section of the IACs require burying or protection this would be subject to further studies and a Cable Burial Risk Assessment (CBRA), particularly for the portion of cable that comes into contact with the seabed after the touchdown point (see **Section 3.7.2**).

174. Prior to any installation on the seabed, it is likely that seabed preparation activities will be required. This would involve activities such as boulder and sand wave clearance and management of Unexploded Ordnance (UXO). These are outlined in **Section 3.9.2**.

3.7.2 Cable Burial and Protection

175. The IAC static sections may be surface laid or buried. Where burial is undertaken, a detailed CBRA will be prepared to determine the target burial depth and methods to be used for the static IAC installation. The burial methods that may be used for the static IAC include jet trenching, mechanical trenching, cable ploughing and mass flow excavator. The burial depths may vary and will be dependent on risk and ground conditions. The CBRA will also highlight instances where adequate burial cannot be achieved, and alternative protection is needed. The maximum width of seabed affected by installation per cable and volume of material to be deployed for cable protection will be presented within the Bellrock WFDA EIA Report.

176. Where it is not possible to achieve the required burial depth, either due to seabed conditions or crossing of third party pipes/cables, then further external cable protection may be required. The type of cable protection selected will be dependent on various factors, for example seabed and sediment conditions, the physical processes present, and health and safety considerations associated with installation, maintenance and decommissioning. Cable protection may include concrete mattresses, rock placement/rock bags, grout bags and cast-iron shells (articulated pipes).

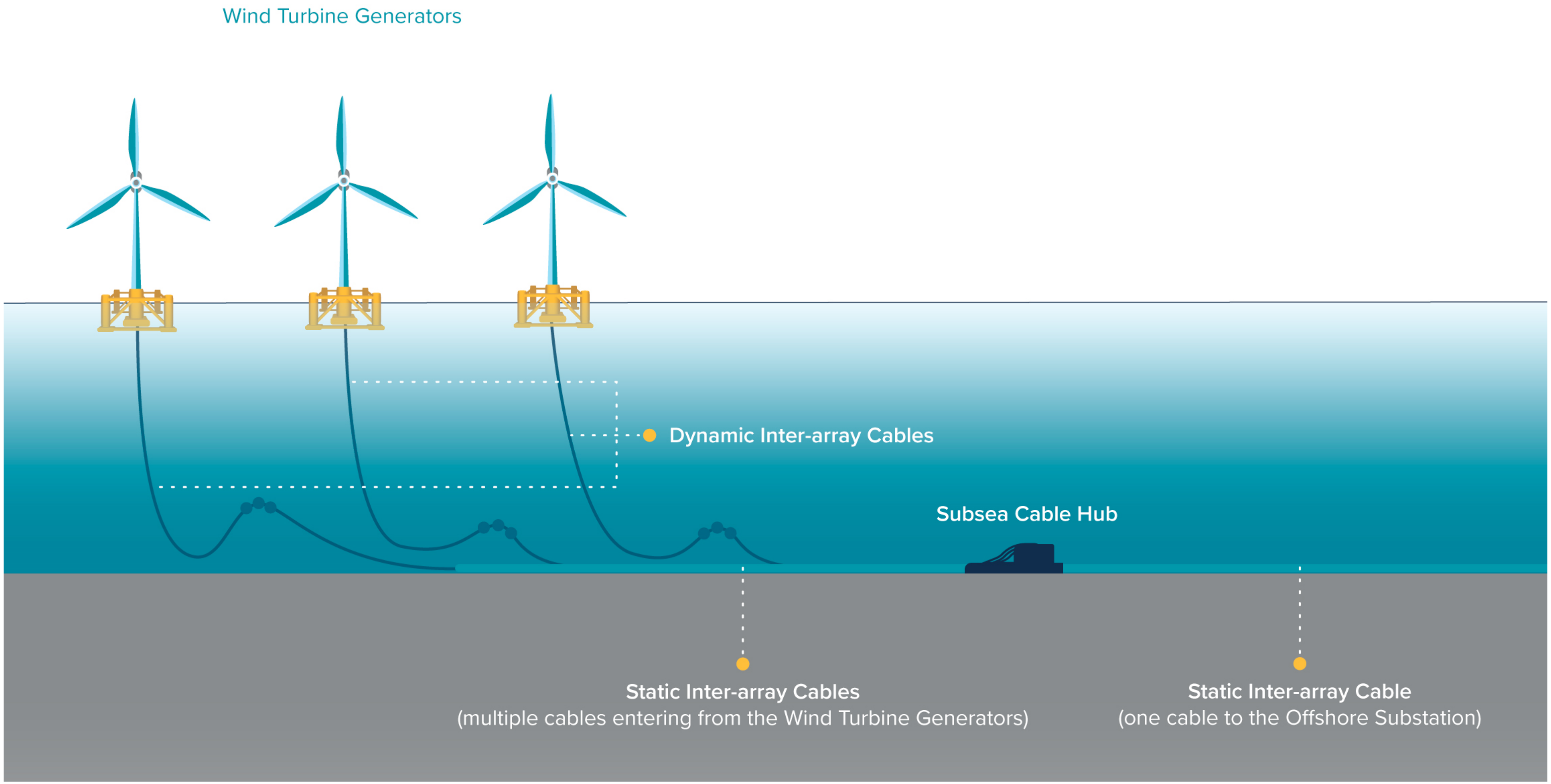
177. In addition to the cable protection methods described above, ancillary elements will also be considered for securing cable protection and limited movement. These may include touchdown protection (sleeves and anchoring), bend stiffeners and buoyancy modules.

3.7.3 Subsea Cable Hub

178. A subsea cable hub is designed to allow the connection of multiple WTGs into one subsea cable hub using IACs. It is a point where a number of the IACs gather together and transition to an IAC which then connects to the OFSS for onward export.

179. The aim of the subsea cable hub(s) is to increase the flexibility in design and construction, reduce cost, and increase power availability. Subsea cable hub(s) are included as a potentially innovative technology, and therefore it is considered prudent to make allowance for these innovative technologies. The number of subsea cable hub(s) and their footprints will be defined within the Bellrock WFDA EIA Report and is subject to further engineering studies. **Plate 3.7** provides a diagram of what a subsea cable hub system may look like.

Plate 3.7: Example of a Subsea Cable Hub



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3.8 Scour Protection

180. Where the seabed sediment is soft enough to be mobilised, sediment transport can lead to the formation of scour around infrastructure installed on or in the seabed (e.g., substructures, anchors, subsea equipment). The depth of scour is dependent on the shape of the infrastructure installed, the characteristics of the seabed sedimentology and metocean (e.g. waves and currents) conditions.

181. Scour created around infrastructure can, in turn, lead to additional fatigue, wear and tear to the installed infrastructure. In the worst-case, it can lead to failures and need for complex corrective maintenance campaigns. Therefore, the use of scour protection, both in terms of volume and material, is an important consideration for projects. Commonly used scour protection types and those which are under consideration for the Bellrock WFDA include concrete mattresses, graded rock placement/rock bags, grout bags, and artificial frond mats. **Table 3.10** outlines these main types of scour protection.

Table 3.10: Scour Protection Design Envelope

Parameter	Minimum	Maximum
Scour Protection (Concrete Mattresses, Graded Rock Placement/Rock Bags, Grout bags, and Artificial Frond Mats) [1]		
FSS anchor scour protection (m^2) – per driven pile	75	241
FSS anchor scour protection (m^2) – per suction pile	-	265
FBSS scour protection footprint (m^2) [2] – per WTG	-	8,500
Artificial Fronds		
FBSS scour protection footprint	Will be further evaluated as part of the design process	
[1] Type and volume of scour protection is subject to the infrastructure installed and site-specific conditions. [2] Accounts for a radial footprint of up to 20 m and assuming a jacket substructure.		

3.9 Project Timeline and Activities

3.9.1 Project Timeline

182. The Bellrock WFDA is at an early stage of development, therefore, the details provided below are indicative.

183. The timing and commencement of pre-construction and construction activities is subject to a number of variables including the availability of the proposed SSEN Transmission offshore

substation, grid connection dates, award of necessary consents, securing project financing, and supply chain and port availability, and procurement and contract award.

184. Due to the complexities in the development of offshore wind projects, construction works for the Bellrock WFDA could start up to seven years after consent award, with further details on the programme of works to be set out in the Bellrock WFDA EA Report. The Applicant will seek a suitable consent validity date from Scottish Ministers and Marine Directorate - Licensing Operations Team (MD-LOT) within the consent application in due course.

3.9.2 Pre-construction Works

185. Pre-construction works are activities undertaken prior to formal commencement of construction. For the Bellrock WFDA, pre-construction activities include:

- Geophysical, geotechnical and visual surveys, which are typically carried out to inform on the presence of UXO, bedform and mapping of boulders, bathymetry, topography and subsurface layers.
- Seabed preparation, including sand wave and boulder clearance, required prior to construction commencing to allow for the for successful laying of infrastructure on the seabed (e.g. cables, SKSs, FBSSs). This is particularly important for cable laying works where sand wave and boulder clearance may need to be undertaken to provide a flat seabed free from obstructions and mobile sediments. These seabed preparations also assist with minimising damage to cables and maintaining the required cable burial depths.

186. UXO on or in the seabed may exist as a result of previous conflict or munition dumping and, if present, poses a significant health and safety hazard. Therefore, UXO must be appropriately managed (e.g. identification of potential UXOs through undertaking desktop studies, geophysical surveys, and field investigations, avoiding potential UXOs through micro-siting, and ultimately relocation (if applicable and allowed as an option), or disposal in situ). If UXO clearance is considered necessary (including field investigation and disposal in situ), separate Marine Licence application(s) will be made prior to UXO clearance works, with an accompanying assessment of UXO clearance effects on relevant receptors.

187. Detailed layout design works need to be undertaken prior to conducting the detailed UXO survey prior to construction, to ensure the UXO survey is targeted in the areas where infrastructure is to be placed. A desktop UXO Threat and Risk Assessment for the Bellrock WFDA was undertaken by 6 Alpha Associates (2023) based only on historical records. This assessment resulted in an overall UXO risk rating of low, although there remains the potential for some UXO to be present. This will be confirmed as the understanding of the Bellrock WFDA evolves through geophysical surveys.

188. The hierarchy of UXO clearance techniques, in order of preference, are:

1. Avoid (through micro-siting of infrastructure);
2. Move UXO without clearing it (if applicable and accepted as an option);
3. Remove the UXO without clearing it (if applicable and accepted as an option);

4. Low-order deflagration if above options not suitable/unsafe; and
5. High-order clearance, if low-order deflagration not possible, or in the unlikely event that low-order deflagration was unsuccessful.

189. Pre-construction activities will be considered as appropriate within the technical chapters of the Bellrock WFDA EIA Report under construction phase impacts. While UXO clearance will be subject to a separate Marine Licence(s), an indicative assessment of potential impacts will be included for relevant receptors (e.g. benthic ecology, fish and shellfish ecology, and marine mammals).

3.9.3 Construction

190. To complete the construction of the Bellrock WFDA's infrastructure, a number of activities must be undertaken. An outline list (in no specific order) is provided below for both FSSs and FBSSs. This will be developed and defined as the Bellrock WFDA progresses.

191. The construction phase of the Bellrock WFDA is anticipated to take between two to four years. Note that this duration is indicative and the final durations will be subject to a number of factors, such as substructure construction methods, weather conditions, availability of resources and supply chain arrangements, among others factors.

3.9.3.1 Floating Substructure Construction

192. Following the pre-construction activities described in **Section 3.9.2**, general activities for installation of FSSs are as follows:

- Pre and post-installation surveys across all offshore activities during construction, to plan and confirm offshore site suitability and infrastructure positions;
- Installation of the SKS (transported to the site and pre-laid at the installation locations, prior to the installation of the FOU);
- Towing of FOU (i.e. WTG and FSS which have been previously integrated at the port/harbour), using an appropriate vessel, to the Bellrock WFDA from port/harbour or wet storage[12] location;
- If WTG and FSS integration does not take place at the assembly port, the FSSs will be towed to the Bellrock WFDA site and integrated with the WTG in-situ using a suitable crane vessel;
- FOU installation and commissioning, including the deployment of scour protection (i.e. hooking up the FOU to the pre-installed mooring system and IAC, then undertaking the necessary testing);
- IAC and subsea cable hub(s) (if adopted) installation, including seabed preparation, cable burial and protection (where required); and
- Commissioning and snagging.

[12] Temporary mooring of FSSs and/or FOUs (known as 'wet storage') will be undertaken at port(s) or dedicated mooring locations under Marine Licence(s) and other consents as required, secured by the relevant port(s)/storage locations. Therefore, wet storage of FOUs will be considered within the in-combination section along with other projects and plans.

3.9.3.2 Fixed Bottom Substructure Construction

193. Following pre-construction activities, general activities for installation of FBSSs are as follows:

- Pre and post-installation surveys across all offshore activities during construction, to plan and confirm offshore site suitability and infrastructure positions;
- FBSS installation, including the deployment of scour protection;
- IAC and subsea cable hub(s) (if adopted) installation, including seabed preparation, cable burial and protection (where required);
- WTG installation and commissioning: WTG components will be loaded onto an appropriate vessel and transported to the Bellrock WFDA for installation. The WTG tower is installed onto the FBSS first followed by the nacelle and blades. The WTGs will then undergo the required testing and commissioning; and
- Commissioning and snagging.

3.9.3.3 Construction Vessels

194. Typical vessels used during construction of the Bellrock WFDA include:

- Survey vessels;
- Anchor handling tug supply (AHTS) vessels;
- Tow tug vessels;
- Cable installation vessels (Pre-lay Grapnel Run (PLGR), lay and burial);
- Remotely operated vehicle (ROV) support vessels;
- Scour protection installation vessels;
- Heavy lift vessels (HLV);
- Jack-up vessels (JUV);
- Support vessels;
- Service and commissioning vessels;
- Guard vessels;
- Service operation vessels (SOV);
- Crew transfer vessel (CTV); and
- Accommodation vessels.

3.9.4 Operation and Maintenance

195. The operational phase is anticipated to be up to 50 years for the Bellrock WFDA[13].

196. At this stage of the development, the overall operation and maintenance strategy is not finalised. Details such as the equipment to be procured and the operation and maintenance base location are currently not known, as is to be expected at this early stage of development.

197. Operation and maintenance activities will comprise of preventative and corrective maintenance. Further details will be provided in the Bellrock WFDA EIA Report.

198. It is envisaged that that routine preventative and corrective maintenance activities will take place using the following vessels and transport:

- SOVs (potentially with daughter crafts);
- CTVs;
- Survey vessels;
- Helicopters (if required);
- Drones;
- Unmanned surface vessel (USV); and
- ROV support vessels.

199. Major repairs requiring large component replacements and extensive remedial works will require additional vessels and logistics. These may involve replacement of WTG components (e.g. generator, blades, gearbox) or entire WTGs or repairs to the FOU, cables or mooring systems.

200. Major component exchanges for floating wind projects may take place in situ at the Bellrock WFDA or at a suitable port/sheltered waters.

201. Specialist HLVs and/or JUVs may be used for major repairs that can be carried out in-situ. If the unit is to be repaired at shore, the activities may involve decoupling the FOU from its cable and mooring system and towing to a suitable port for the corrective maintenance to take place. For this purpose, AHTS, tow tugs, guard vessels, and other support vessels may be required.

3.9.5 Decommissioning

202. It is a requirement under Section 105 of the Energy Act 2004 that developers of offshore wind farm projects prepare a Decommissioning Programme for approval by Scottish Ministers.

203. The Decommissioning Programme must consider good industry practice, guidance and legislation for decommissioning works which includes anticipated costs and financial securities.

[13] The Bellrock WFDA seabed lease is up to 60 years, while the operational life is up to 50 years. At the end of operational life, any repowering will be subject to separate consents.

204. The Decommissioning Programme will be consulted on by stakeholders and is reviewed throughout the lifetime of the Bellrock WFDA. Further details will be provided in the Bellrock WFDA EIA Report.

3.10 Site Selection and Consideration of Alternatives

205. This section provides an overview of the site selection process and consideration of alternatives to date for the Bellrock WFDA. The Bellrock WFDA EIA Report will outline the stages of site selection and will set out any refinements to the project design envelope that have taken place as a result of the EIA process or in response to consultation and stakeholder feedback. The main alternatives that have been considered as part of this process will also be presented.

3.10.1 Bellrock Project

3.10.1.1 Bellrock Wind Farm Development Area

206. In November 2017, Crown Estate Scotland (CES) announced their intention to run a further leasing round for commercial scale offshore wind energy projects in Scottish Waters.

207. To inform the spatial development of this leasing round, Marine Scotland (now Marine Directorate) undertook a planning exercise from June 2018 to identity areas of search (AoS) (Marine Scotland Science, 2018b) for offshore wind development. The study considered various geospatial data layers to carry out a multi-criteria analysis depicting both opportunity (such as average wind speed or existing grid connections) and constraints (such as fishing activity, shipping traffic or environmental sensitivities). These AoS were subsequently refined through several iterations of Opportunity and Constraint Analysis, and consultation and engagement with sectoral stakeholders and Scottish Ministers.

208. This informed the draft Sectoral Marine Plan (SMP) for Offshore Wind (the draft SMP) which was published for consultation between December 2019 and March 2020 (Marine Scotland, 2018a). The draft SMP identified the seventeen most sustainable areas (known as Draft Plan Options) for the future development of commercial-scale offshore wind energy in Scotland.

209. The ScotWind Leasing Process was subsequently launched by CES in June 2020, allowing developers to apply for the rights to develop and operate offshore wind farms in Scottish waters within defined areas (known as Draft Plan Options) as defined by the draft SMP.

210. In October 2020, the final SMP for Offshore Wind Energy (Scottish Government, 2020) was published, providing the strategic framework for CES's ScotWind seabed leasing round. The SMP identified sustainable areas (known as Plan Options) for the development of commercial-scale offshore wind energy projects. The SMP was subject to a Sustainability Appraisal (SA) throughout its preparation, comprising the following key documents:

- Strategic Environmental Assessment (Scottish Government, 2019);
- Habitats Regulations Appraisal (Scottish Government, 2019);

- Social and Economic Impact Assessment (Scottish Government, 2019); and
- Draft SMP: Regional Locational Guidance (Scottish Government 2020).

211. During the ScotWind application period, the Applicant undertook comprehensive desktop studies to select the sites to bid on within the ScotWind leasing auctions, considering environmental, construction and commercial matters.

212. CES subsequently announced the outcome of its ScotWind Leasing process in January 2022 and awarded the Applicant seabed rights for the E1 Option Area for the development of the Bellrock Project.

213. Whilst the SMP and CES leasing process defined the boundary of the Bellrock WFDA shown in **Figure 1.1** in **Appendix 1**, the Applicant will continue to review development constraints during the EIA process and consider revisions to the Bellrock WFDA boundary where appropriate.

3.10.1.2 Grid Connection

214. As noted in **Chapter 1: Introduction**, the Applicant's working assumption is that the Bellrock Project will connect into the National Electricity Transmission System through the SSEN Transmission offshore substation.

215. The Department for Business, Energy and Industrial Strategy (BEIS) launched the Offshore Transmission Network Review (OTNR) in July 2020 to ensure that the transmission connections for offshore wind generation are delivered in the most appropriate way, considering the increased ambition to achieve net zero and the balance between environmental, social and economic costs' (BEIS, 2020). Three workstreams were created in the OTNR to cover offshore wind projects at different stages of development, namely Early Opportunities, Pathway to 2030 and Enduring Regime.

216. The HND was established under the OTNR 'Pathway to 2030' workstream published in July 2022 and built upon a previous study conducted in 2020 which confirmed there is a significant benefit in moving quickly towards an integrated network (National Grid Electricity System Operator, 2020; 2022).

217. The HND is led by the Electricity System Operator (ESO) in close consultation with the transmission owners (in this case, SSEN Transmission) through the Central Design Group (CDG) and aims to enable delivery of a network that simultaneously handles connection of offshore wind farms to shore as well as transporting the power to where it will be used. It provided recommended connection arrangements designs through holistically consideration across four objects: costs to consumer, deliverability and operability, impacts to environment and community (National Grid ESO, 2022).

218. The detailed network design and the location for the SSEN Transmission offshore substation is yet to be defined. The Bellrock OFTDA will be consented separately to the Bellrock WFDA.

3.10.2 Further Design Envelope Refinement

219. Refinement of the Bellrock WFDA boundary, design and consideration of alternatives is an iterative process throughout the scoping and EIA process. The project design envelope (including, where appropriate, the WFDA boundary) for the Bellrock WFDA will be refined as more detailed site-specific information becomes available, further stakeholder engagement is undertaken and the EIA progresses.

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4 Approach to Scoping and Environmental Impact Assessment

4.1 Overview of Environmental Impact Assessment

220. An Environmental Impact Assessment (EIA) is a process for identifying the likely significant environmental effects of the construction, operation and maintenance, and decommissioning of a proposed development and outlining how the severity of a potential significant effect will be reduced to an acceptable level. Effects can be positive or negative. An EIA Report will be submitted to the Marine Directorate - Licensing Operations Team (MD-LOT) setting out the Applicant's assessment of likely significant environmental effects, to support consent applications (see **Chapter 1: Introduction**) and acts to inform the decision-making process for determining Section 36 (s.36) consents and Marine Licences.

221. This chapter describes the principles of EIA and the approach being taken to identify and evaluate likely significant effects of the Bellrock Wind Farm Development Areas (WFDA) on the physical, biological and human environment. This chapter also details the stakeholder consultation and engagement that will be undertaken as part of the EIA process. Overviews of the proposed methodologies for Cumulative Effects Assessment (CEA), Habitats Regulations Appraisal (HRA) and Nature Conservation Marine Protected Areas (NCMPA) Assessment are also presented.

222. Where the assessment methodology for a receptor deviates from the assessment methodology presented in this chapter (due to guidance or legislation), the receptor specific methodology is presented within the receptor's technical chapter. This is relevant for:

- **Chapter 11: Shipping and Navigation;**
- **Chapter 15: Seascape, Landscape and Visual Impact;**
- **Chapter 16: Socioeconomics, Tourism and Recreation;**
- **Chapter 17: Climate change;** and
- **Chapter 19: Major Accidents and Disasters**.

4.1.1 Environmental Impact Assessment Process

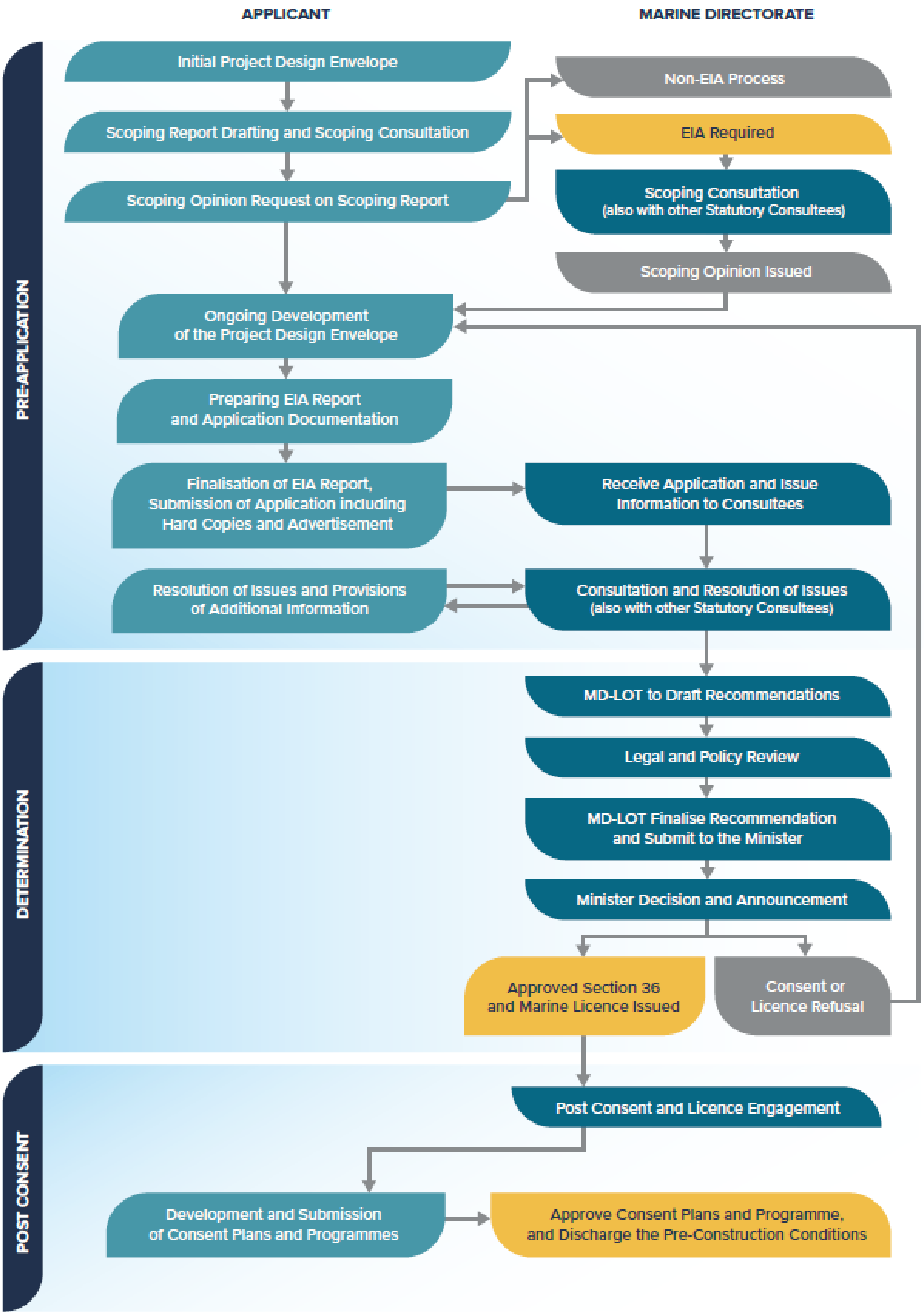
223. The overall EIA process is delivered through several clearly defined stages[14], namely scoping, consultation, environmental assessment and reporting, determination and post-consent monitoring:

- **Scoping** involves the production of a Scoping Report (this document; Bellrock WFDA Scoping Report) to request a formal Scoping Opinion from Scottish Ministers.
- **Consultation** will be undertaken in the pre-application phase to inform the design and assessment of the Bellrock WFDA.
- **EIA Report** will be prepared which considers the responses to consultation, and which includes the results of the EIA for each technical receptor.
- **Determination** involves the examination of the Bellrock WFDA EIA Report by the competent authority, after which they must reach their reasoned conclusion on the likely significant effects of the Bellrock WFDA on the environment. The competent authority must publish their ‘decision notice’.
- **Monitoring** may be undertaken during the pre-construction, construction and operational phases of the Bellrock WFDA. This may be a requirement as part of the decision notice.

224. **Plate 4.1** provides an overview of the stages involved in the s.36 and Marine License process and illustrates how the EIA Scoping stage fits within this process.

[14] Offshore Renewable Energy projects requiring s.36 consent fall under Schedule 2 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Schedule 2 developments may apply for a screening opinion from the Scottish Ministers to determine whether any development is, or is not, EIA development, and therefore require preparation of an EIA Report. The Applicant has chosen to prepare and submit and EIA Report for the Bellrock WFDA without prior screening.

Plate 4.1: Stages of the Licensing Process in Scottish Waters



225. The EIA process involves understanding the proposed construction, operation and maintenance, and decommissioning activities of the Bellrock WFDA, and the environment within which the Bellrock WFDA will be located. The potential impacts of the Bellrock WFDA are then evaluated to determine the resulting potential effects of the Bellrock WFDA upon the receiving environment/receptors and the significance of those effects.

226. For the purposes of this Bellrock WFDA Scoping Report and the Bellrock WFDA EIA Report, the term ‘impacts’ is used to describe the changes that arise as a result of the Bellrock WFDA (for example, underwater noise during piling or vessel activity) and the term ‘effects’ are the consequences of those changes (for example, disturbance of marine mammals).

227. Schedule 4 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and Schedule 3 of the Marine Works (Environmental Impact Assessment) Regulations 2007 (together referred to as the ‘EIA Regulations’) states that the description of the likely significant effects should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development. For receptors which are scoped in, these factors will be assessed in full in the EIA technical chapters listed in **Section 4.9**.

228. Where potential impacts are likely to result in significant effects, specific measures will need to be taken to reduce or remove such impacts (mitigation measures). Mitigation measures can either take the form of changes to the design of the Bellrock WFDA (embedded or design mitigation), or implementation of additional mitigation to avoid or reduce significant effects through the application of industry standard measures, specific controls implemented by environmental management or through additional survey or study programmes. The EIA process also regularly requires the identification of measures to monitor (and validate or otherwise) the predicted effects of the project in the long term.

4.1.2 Environmental Impact Assessment Scoping

229. This Bellrock WFDA Scoping Report has been prepared to support a request for a Scoping Opinion for the Bellrock WFDA from MD-LOT, on behalf of the Scottish Ministers. This Bellrock WFDA Scoping Report identifies which potential impacts and receptors will be assessed as part of the Bellrock WFDA EIA Report, based on an initial understanding of the Bellrock WFDA design and environmental baseline and identifies the receptors which can be scoped out of the EIA Report. It also reports the methodologies which will be used for the assessment, as per industry best practice and receptor-specific guidelines, as set out in **Chapters 5 – 19**.

230. Under the EIA Regulations, once a request for a Scoping Opinion has been issued to the Scottish Ministers for consideration, they are required to consult with the consultation bodies (as defined under Regulation 2(1) of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017; and Regulation 2(1) of the Marine Works (Environmental Impact Assessment) Regulations 2007).

231. Effective scoping enables agreement to be reached on the environmental effects and methodologies to be taken forward and reported in much greater detail in the Bellrock WFDA EIA Report. This Bellrock WFDA Scoping Report defines the scope of the assessment and focus on the key issues. It also provides an opportunity for early interaction with stakeholders, strengthening

the assessment evidence base and allowing active participation of interested parties in project development and decision-making. This can in turn improve project design, environmental performance and social acceptability.

4.1.2.1 Environmental Impact Assessment Scoping Boundary

232. The Scoping Boundary assessed within this Bellrock WFDA Scoping Report is shown within **Figure 1.1** in **Appendix 1** and incorporates the boundaries of the Bellrock WFDA.

233. It should be noted that a separate Scoping Report will be produced for the Bellrock Offshore Transmission Development Area (OfTDA) which will be subject to separate consent applications.

4.1.3 Design Evolution Process

234. The EIA process allows opportunities for environmental concerns to be addressed within the design of the Bellrock WFDA. Typically, a number of design iterations take place prior to the final design being submitted for approval to account for environmental constraints and engagement comments received. This iterative design process is a fundamental element of the EIA and for the Bellrock WFDA and will develop following feedback via the Scoping Opinion and other engagement with stakeholders, including local communities.

235. The iterative design process integrates the advice and experience of the environmental receptor experts that undertake the scoping and impact assessments for the Bellrock WFDA EIA Report in regular liaison with the Applicant's development team. This ensures that design evolution is informed by a project-wide understanding of environmental sensitivities such that the mitigation hierarchy is adhered to throughout the development of the Bellrock WFDA and the wider Bellrock Project.

236. Environmental and social considerations have been central to the evolution of the Bellrock WFDA to date, as informed by a combination of stakeholder engagement, EIA surveys and technical studies. The design evolution process undertaken to date is evidenced in **Chapter 3: Project Description**.

4.2 Guidance and Best Practice

237. The assessment of potential effects in the Bellrock WFDA EIA Report will use the below standard guidance to assist with the production of a robust and proportionate EIA, in particular:

- Scottish Government (2023). National Planning Framework 4 (NPF4);
- Scottish Government (2017a). Planning Circular 1/2017: Environmental Impact Assessment Regulations;
- Scottish Government (2013). Planning Advice Note (PAN) 1/2013 Environmental Impact Assessment;
- Scottish National Heritage (SNH) (2018). A Handbook on Environmental Impact Assessment;

- Marine Scotland (2018). Marine Scotland Consenting and Licensing Guidance: For Offshore Wind, Wave and Tidal Energy Applications[15];
- Marine Scotland (2022). Guidance for Applicants on using the Design Envelope for Applications under Section 36 of the Electricity Act 1989;
- Chartered Institute for Ecology and Environmental Management (CIEEM, 2018). Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine;
- Institute of Environmental Management and Assessment (Institute of Environmental Management and Assessment (IEMA), 2017). Delivering Proportionate EIA. A Collaborative Strategy for Enhancing UK EIA Practice;
- Centre for Environment, Fisheries and Aquaculture (Cefas) (2004). Offshore Wind Farms: Guidance Note for EIA in Respect of Food and Environmental Protection Act (FEPA) and Coast Protection Act (CPA) Requirements;
- RenewableUK (2013). Guiding Principles for Cumulative Impacts Assessment in Offshore Wind Farms;
- OSPAR (Convention for the Protection of the Marine Environment of the North-East Atlantic) (2009). Assessment of the Environmental Impacts of Cables;
- European Commission (2017). EIA of Projects – Guidance on the preparation of the Environmental Impact Assessment Report. (Office for Official Publications of the European Communities 2017);
- European Commission (1999). Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions;
- British Standards Institute (BSI) (2015). Environmental impact assessment for offshore renewable energy projects;
- Cefas (2012). Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects;
- Maclean et al. (2009). A Review of Assessment Methodologies for Offshore Windfarms (OWFs) (Collaborative Offshore Wind Research into The Environment (COWRIE) METH-08-08);
- IEMA (2015). IEMA Environmental Impact Assessment Guide to Shaping Quality Development;
- Planning Inspectorate (2019). Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Version 2); and
- The Cumulative Effects Framework, which is under development by MD-LOT and NatureScot will be considered for use in the Bellrock WFDA EIA Report (for relevant receptors) when available.

[15] Note the Applicant is aware that the Marine Directorate is currently consulting on updates to this guidance. Any updated guidance will be considered in the Bellrock WFDA EIA Report, as appropriate.

4.3 Consultation and Stakeholder Engagement

4.3.1 Introduction

238. Regular engagement with stakeholders is key to the delivery of the EIA for the Bellrock WFDA. In advance of the formal submission of the Bellrock WFDA EIA Report, statutory and non-statutory consultation and engagement will be carried out to allow stakeholders and local communities the opportunity to provide feedback on all aspects of the Bellrock WFDA, and inform the scope of studies, surveys and assessments being undertaken, and influence the project design. This is in accordance with relevant legislation, best practice and guidance, and will build on feedback provided by MD-LOT's consultees in the Scoping Opinion.

4.3.2 Engagement to Date

239. Stakeholder engagement undertaken to support early planning of the Bellrock WFDA and pre-scoping activities has been through virtual and in-person meetings, workshops, and wider industry events. The purpose of these meetings was to provide general Bellrock WFDA updates, including programme and survey updates; identify potential collaboration opportunities; identify and discuss potential constraints with environmental, social and economic stakeholders; and receive notification of any forthcoming regulatory guidance or updates.

240. In addition, the Applicant held a Bellrock WFDA Scoping Workshop with MD-LOT, Marine Directorate - Science Evidence Data Digital (MD-SEDD) and NatureScot in October 2023 to present the approach to scoping and impact assessment of the Bellrock WFDA and to gain feedback on key receptors and the key impact assessment methodologies to be adopted. Information packages for all technical receptors covered in this Bellrock WFDA Scoping Report were provided for the Bellrock WFDA Scoping Workshop, with a number of breakout sessions held for more detailed discussion. Topics discussed in the workshops included all receptors covered in this Bellrock WFDA Scoping Report.

241. CEA, NCMPA and HRA methodologies were also discussed in the Scoping Workshop (refer to **Table 4.1** for agreements from this Scoping Workshop).

242. Stakeholders engaged on environmental, consenting, policy and/or project update matters relating to the Bellrock WFDA to date are:

- Aberdeenshire Council;
- Crown Estate Scotland (CES);
- Fisheries associations (Scottish Fishermen's Federation, Scottish Whitefish Producers Organisation and the North and East Coast Regional Inshore Fisheries Group);
- Fishers in the Peterhead and Fraserburgh area;
- Maritime and Coastguard Agency (MCA);
- Local communities (Peterhead, Fraserburgh, Longside, Mintlaw and Crimond);
- MD-LOT (including MD-Marine Analytical Unit (MAU) and MD-SEDD);
- NatureScot;

- Eastern Ornithology Group (EOG) Developers Forum;
- Northern Lighthouse Board (NLB); and
- The Royal Society for the Protection of Birds (RSPB).

243. Agreements to date are summarised in **Table 4.1.** Receptor-specific consultation is provided in each technical chapter (**Chapters 5 to 19** of this **Bellrock WFDA Scoping Report**).

Table 4.1: Consultation to Date for the Bellrock WFDA

Stakeholder	Date/Document	Agreement/Discussion
Fishers (Peterhead and Fraserburgh area)	9th and 10th May 2023	Consultation events held in Peterhead and Fraserburgh respectively, to discuss fisher activity within and around the Bellrock WFDA.
MD-LOT	30th October 2023, Bellrock WFDA Scoping Workshop. Email Response 15th December 2023.	MD-LOT are currently considering acceptability of a six month cut off period for any other projects/plans considered quantitatively in the CEA, with the aim to provide consistent approach across all Scottish projects in progress. MD-LOT will respond on this separately. MD-LOT understands NatureScot will respond on guidance to be followed for the CEA.
MD-LOT	30th October 2023, Bellrock WFDA Scoping Workshop. Email Response 15th December 2023.	*Considering the Scottish Government consultation paper "Tackling the Nature Emergency – strategic framework for biodiversity" - can any advice be provided around expected levels of biodiversity enhancement that might be expected for offshore works in addition to embedded and additional mitigation?* For offshore wind, MD-LOT will be developing an approach to Scottish Biodiversity Strategy implementation as part of the process to develop an approach to implementation of the strategic compensation provisions in the Energy Bill over the next six months. There are currently no proposed statutory targets, or indicators to measure progress.
MD-LOT	30th October 2023, Bellrock WFDA Scoping Workshop. Email Response 15th December 2023.	MD-LOT would have no objection to the provision of 2 HRA Screening Reports; however, has a query around the split of the WFDA and OfTDA. The diagram on slide 15 appears to show that the OfTDA EIA overlaps with the WFDA EIA. Could the Applicant please provide some narrative around this and what this means for the respective EIAs. The OfTDA overlaps the WFDA as the offshore substation(s), interconnector cables and offshore export cables may be located within the WFDA but consented as part of the OfTDA.
MD-LOT	30th October 2023, Bellrock WFDA Scoping Workshop. Email Response 15th December 2023.	*Please confirm guidance to be followed for MPA Assessment – is the 'Nature Conservation Marine Protected Areas: Draft Management Handbook' in the process of being updated?* Regarding the draft MPA handbook, this was only published as a draft a number of years ago and has not been adopted. MD-LOT therefore suggest that this is used as guidance and would suggest contacting NatureScot to understand the approach to be adopted. There are no plans to update the MPA handbook. MD-LOT understands that a lot of relevant information is contained within

Stakeholder	Date/Document	Agreement/Discussion
		the Conservation Advice Documents on the JNCC website for each MPA and via NatureScot SiteLink which may be referred to as guidance. .
Local communities (Peterhead, Fraserburgh, Longside, Mintlaw and Crimond)	5th February 2024 – 9th February 2024	Public exhibition events held to provide local stakeholders with an opportunity to meet the Applicant, find out more about the Bellrock Project, discuss the proposed infrastructure and fisher activities within and around the WDFA and ask any questions.
NatureScot	Email, 18th March 2024	Connectivity to NCMPA's is determined if the proposed development has the potential to impact the qualifying feature within the NCMPA boundary only.

4.3.3 Future Engagement

244. In line with the EIA Regulations, MD-LOT will consult on this Bellrock WFDA Scoping Report once it has been received and accepted by the Scottish Ministers. This consultation is required to obtain advice and feedback from statutory consultees on the potential effects which should be scoped in or scoped out of the EIA and screened in or out of the NCMPA and HRA. This feedback will be presented in the Scoping Opinion.

245. In addition, the Applicant will make this Bellrock WFDA Scoping Report available on their website (www.bellrockwind.co.uk) to further promote the scoping consultation process. Whilst the Scoping consultation process is undertaken by MD-LOT, the Applicant will be actively consulting with the wider stakeholder base in parallel.

246. The Applicant will continue to engage with statutory stakeholders, non-statutory stakeholders and local communities throughout the development phase of the Bellrock WFDA, including during the EIA process. This includes continuing with the established recurring meetings with stakeholder groups detailed above, and local communities. The Bellrock WDFA EIA Report will provide further detail on consultation undertaken, including the outcomes of the community engagement events.

247. The Applicant will record all stakeholder feedback received during the development phase of the Bellrock WFDA. If requested by MD-LOT, a Gap Analysis will be submitted with each consent application and will log relevant stakeholder and environmental representations. The Gap Analysis will explain how these have been addressed in the Bellrock EIA Report, creating an audit trail of how each stakeholder representation has been considered in the development and design of the Bellrock WFDA.

248. Whilst the Bellrock WFDA falls outside 12 nm and therefore the Marine Licensing (Pre-application Consultation (PAC)) (Scotland) Regulations 2013 (the 'PAC Regulations') do not apply, the Applicant will generally adopt the principles of PAC for the Bellrock WFDA so that communities are aware of the Bellrock WFDA before consent applications are finalised and submitted.

249. The Applicant will hold a public exhibition event(s) (in person or virtually) where stakeholders and members of the public can engage with and provide comment on the Bellrock WFDA to the Applicant. Prior to the public exhibition(s), notifications will be provided to the relevant stakeholders, including delegates for a relevant marine region. Notices will also be published in local newspapers detailing information on the event and description of the Bellrock WFDA, thus following the principles of the PAC regulations.

4.4 Proportionate Environmental Impact Assessment

250. Scoping is intended to inform a proportional and robust approach to assessment through early-stage evaluation and reporting of identified likely significant effects in the EIA Report. This proactive Scoping process allows for a robust Bellrock WFDA EIA Report whilst focusing on environmental impacts which could give rise to likely significant effects.

251. Therefore, where appropriate, this Bellrock WFDA Scoping Report seeks to scope out environmental receptors and specific impacts under an aspect from further assessment with suitable justification and evidence provided. This will focus the assessment on key likely significant effects and ensure the EIA for the Bellrock WFDA is proportionate in accordance with PAN 1/2013 (Scottish Government, 2013) and IEMA's Delivering Proportionate EIA guidance document (IEMA, 2017).

252. The following key tools/approaches have been adopted at the Scoping stage for the Bellrock WFDA, to assist in the delivery of a proportionate EIA:

- Use of existing evidence base; and
- Inclusion of embedded environmental measures, informed by good and standard practices.

253. Only potentially significant impacts have been 'scoped in' to the EIA.

4.4.1 Design Envelope

254. A parameter-based design envelope approach will be adopted within the Bellrock WDFA EIA Report, as detailed in **Section 3.2**. The design envelope will set out a minimum and maximum design scenario for each design parameter. The design envelope will include all relevant technical, spatial and temporal elements of the Bellrock WFDA, and the proposed methodology to be employed for construction, operation and maintenance, and decommissioning. These parameters will enable technical specialists to accurately assess the Bellrock WFDA whilst retaining sufficient flexibility to accommodate further refinement during the detailed design stage once the Bellrock WFDA have been consented.

255. The design envelope approach allows the Bellrock WFDA to be assessed on a reasonable receptor-specific worst-case scenario basis. The reasonable worst-case scenario defined for any given parameter may vary by technical aspect, depending on how the parameter can be expected to interact with the receptor being considered. This is considered a standard approach and is widely

accepted by stakeholders and regulators, and is necessary to ensure the necessary design flexibility at this early stage of project development.

256. The information presented in **Chapter 3: Project Description** outlines the options and flexibility required by the Applicant and the range of potential design, location and activity parameters upon which the scoping of impacts is based. The final detailed design will lie within the parameters of the design envelope, pre-construction detailed design work to be undertaken post-consent whilst retaining the validity of the Bellrock WFDA EIA Report.

257. The need for flexibility in the consent is a key aspect of any large development but is particularly significant for offshore wind farm projects where technology is evolving. The design envelope must therefore provide sufficient flexibility to enable the Applicant and their supply chain to use the most up to date, efficient and economical technology and techniques in the construction, operation and maintenance, and decommissioning of the Bellrock WFDA, without affecting the surrounding environment to a greater extent than the worst-case scenarios assessed in the Bellrock WFDA EIA Report.

258. Guidance has been prepared by Marine Scotland and the Energy Consents Unit on using the design envelope approach for applications under s.36 of the Electricity Act 1989 where flexibility is required in applications (Scottish Government, 2022). This guidance will be referred to when refining the design envelope to inform the EIA.

259. The description of the Bellrock WFDA will be further refined as stakeholder engagement progresses and the design continues to evolve.

4.4.2 Human Health

260. The requirement to consider human health within the EIA process was made explicit in both The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and amendments to the Marine Works (Environmental Impact Assessment) Regulations 2007. ‘Health’, for the purposes of this document, follows the definition set by the World Health Organisation: “a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity” (World Health Organisation, 2020).

261. Whilst it is recognised that human health considerations are more prevalent for onshore works and the Bellrock Project only includes offshore (WFDA and OfTDA) works, this Bellrock WFDA Scoping Report includes the following chapters which will consider impacts to human health as appropriate:

- **Chapter 5: Marine Geology, Oceanography and Physical Processes;**
- **Chapter 11: Shipping and Navigation;**
- **Chapter 12: Aviation and Radar;**
- **Chapter 13: Marine Infrastructure and Other Users;**
- **Chapter 15: Seascape, Landscape and Visual Impact;**
- **Chapter 16: Socioeconomics, Tourism and Recreation;**
- **Chapter 17: Climate Change;**

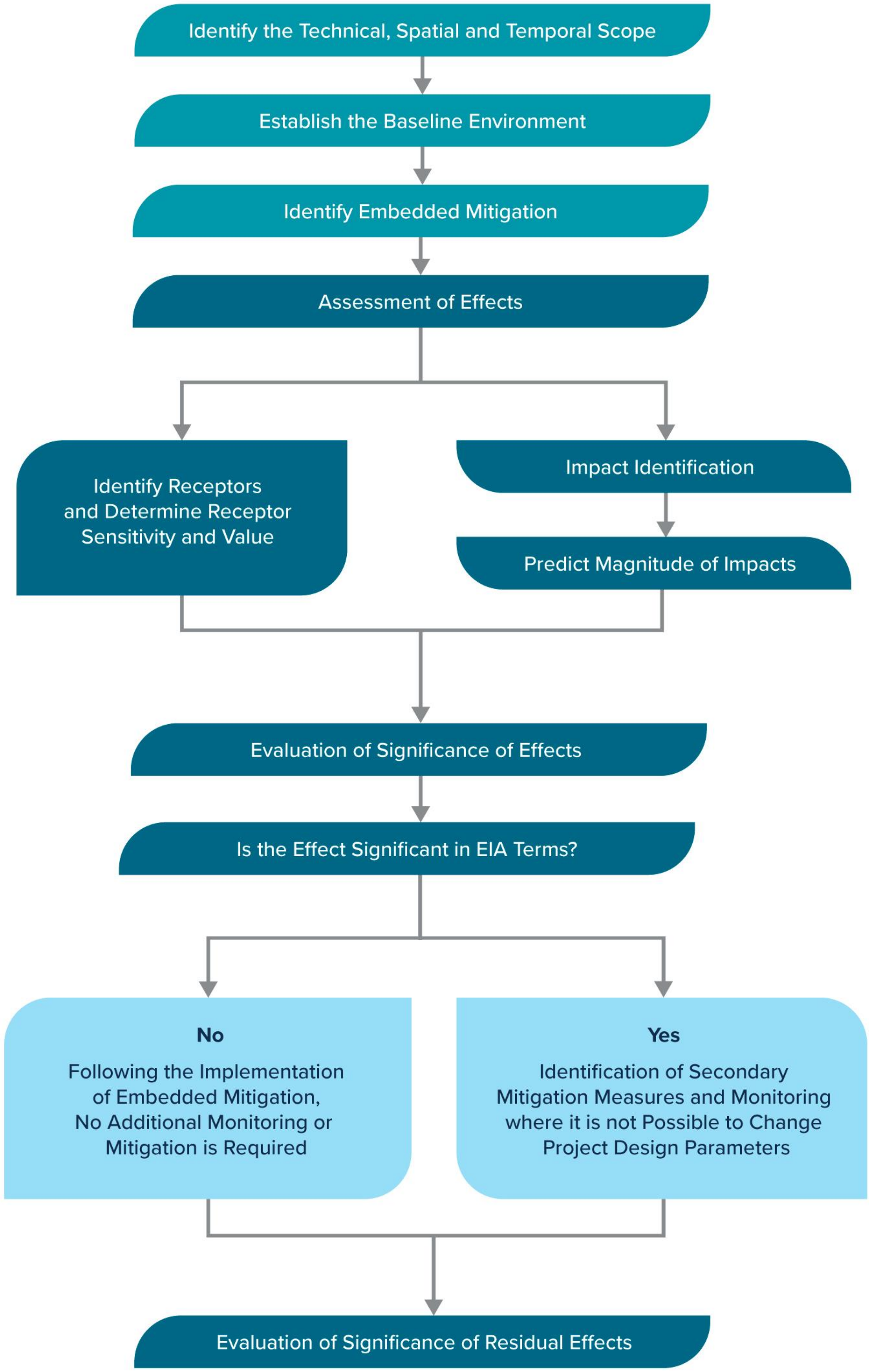
- **Chapter 18: Offshore Air Quality; and**
- **Chapter 19: Major Accidents and Disasters.**

262. Consequently, a stand-alone human health chapter within the Bellrock WFDA EIA Report is not proposed.

4.5 Assessment Methodology

263. This section provides an overview of the proposed methodology approach for EIA, in line with the approach set out in **Plate 4.2**.

Plate 4.2: Overview of EIA Methodology



4.5.1 Identify the Technical, Spatial and Temporal Scope

4.5.1.1 Technical Scope

264. The technical scope covered by this Bellrock WFDA Scoping Report is outlined in the respective chapters. Justification is provided for the individual approach and scoping of matters to be considered in the assessment for each environmental aspect. The technical scope also details the approach to baseline data collection and assessment methodologies. **Chapter 20: Summary and Next Steps** provides a summary table of impacts and effects to be scoped in and out of the Bellrock WFDA EIA Report.

4.5.1.2 Spatial Scope

265. The geographical context within which the Bellrock WFDA is located is shown in **Figure 1.1** in **Appendix 1**. The spatial scope for each technical assessment will depend on the nature of the potential effects and the location of receptors that could be affected by the Bellrock WFDA construction, operation and decommissioning. The study area relevant to each environmental receptor is described in each respective technical chapter where appropriate. The spatial scope of the technical assessments will therefore take account of:

- Relevant guidance;
- The physical area of the Bellrock WFDA;
- The nature of the baseline environment; and
- The manner and extent to which environmental effects may occur within the Bellrock WFDA or beyond its boundaries.

266. The study area for any given receptor may need to be refined in consultation with relevant consultees to ensure they still adequately reflect the area of potential influence for likely significant environmental effects.

4.5.1.3 Temporal Scope

267. The temporal scope refers to the time periods over which impacts and effects may be experienced by sensitive receptors, and this will be defined further for each aspect in discussion with relevant consultees. The EIA will assess potential impacts and effects during the construction, operation and maintenance, and decommissioning phases of the Bellrock WFDA.

268. While there is potential for impacts from the physical presence of operational infrastructure (i.e. wind turbine generators (WTGs)) during the construction phase of the Bellrock WFDA, these impacts will increase incrementally as the Bellrock WFDA construction progresses, until the final infrastructure is installed. It is proposed that these impacts are therefore scoped out from further consideration in relation to the construction and decommissioning phases to avoid double counting of potential impacts, but are included under the operation and maintenance phase, as appropriate.

269. Environmental effects will be compared to the current environmental baseline and will also take into consideration the projected future baseline (i.e., the theoretical situation that would exist in the absence of the Bellrock WFDA) where possible. For example, predictable changes such as climate change, or changes that can be expected based on reasonable assumptions and modelling

calculations, will be taken into account. Each environmental chapter of the Bellrock WFDA EIA Report will define the baseline (current and future where possible) against which the environmental effects of the Bellrock WFDA will be assessed. The baseline conditions which will be assessed for each environmental aspect are outlined in the technical chapters of this Bellrock WFDA Scoping Report.

4.5.2 Establish the Baseline Environment

270. To assess the potential impacts and effects of the Bellrock WFDA, it is necessary to determine the environmental conditions that currently exist within the Bellrock WFDA Scoping Boundary and in the wider study areas. These are known as the existing baseline conditions.

271. The study area and approach which will be used to establish baseline conditions for each environmental receptor will vary depending on the receptor and is set out within its respective technical chapter. Baseline conditions will be determined using the results of site-specific surveys and investigations or desk-based data searches, or a combination of these, as appropriate.

4.5.3 Assessment of Effects

272. This section sets out the framework methodology for the assessment with each technical chapter providing details of how the methodology has been applied for that receptor. To provide a consistent framework and system of common tools and terms, a matrix approach will be used to frame and present the judgements made. For each receptor considered in the EIA, the most relevant and latest guidance or best practice has been used and, therefore, definitions of sensitivity and magnitude are tailored to each receptor. These definitions are detailed fully in each technical chapter.

273. The impact assessment will consider the potential for impacts and effects during the construction, operation and maintenance, and decommissioning phases of the Bellrock WFDA. As required by the EIA Regulations, only effects that are likely to be significant require detailed assessment.

274. Impacts can be classified as follows:

- Direct impacts: occurring at the same time and place as the action or activity.
- Indirect impacts: experienced by a receptor that is removed (e.g., in space or time) from the direct impact (e.g., noise impacts upon fish which are a prey resource for fish or mammals).
- Inter-relationships between impacts (where different impacts interact to affect a single receptor, which may need to be brought together from assessments presented in separate chapters) and interactions between impacts (where impacts assessed in each chapter have the potential to interact with one another).
- Cumulative impacts: these may occur as a result of the Bellrock WFDA in conjunction with other existing or planned projects within the study area for each receptor, including other offshore wind farms.

275. Mitigation and/or monitoring to manage impacts will then be considered where required and commitments made by the Applicant as appropriate. The potential impacts and mitigation proposed

in this Bellrock WFDA Scoping Report are based on the Bellrock WFDA Scoping Boundary and should the boundary change, this will be reflected in the EIA. If any changes are considered to change the Scoping Opinion, this will be highlighted in the EIA Report.

4.5.3.1 Impact Identification

276. Where appropriate to do so, the assessment will use the conceptual 'source-pathway-receptor' model. The model identifies potential impacts resulting from the proposed activities on the environment and sensitive receptors within it. This process provides an easy-to-follow assessment route between impact sources and potentially sensitive receptors ensuring a transparent impact assessment. The aspects of this model are defined as follows:

- Source – the origin of a potential impact (i.e., an activity such as piling and a resultant effect e.g. noise resulting from the piling works);
- Pathway – the means by which the effect of the activity could impact a receptor (e.g., for the example above, disturbance/injury to nearby species); and
- Receptor – the element of the receiving environment that is impacted (this could either be a component of the physical, ecological or human environment, e.g., for the above example, species susceptible to noise impacts).

277. Where a different approach has been necessary to reflect the specific assessment requirements of a particular receptor, this is described in the corresponding technical chapter in this Bellrock WFDA Scoping Report.

4.5.3.2 Determine Receptor Sensitivity and Value

278. The characterisation of the existing environment helps to determine the receptor sensitivity in order to assess the potential impacts upon it.

279. The ability of a receptor to adapt to change, tolerate, and/or recover from potential effects will be key in assessing its sensitivity to the effect under consideration. For ecological receptors tolerance could relate to short term changes in the physical environment, for human environment receptors tolerance could relate to displacement effects and therefore effects upon economics or safety. It also follows that the capacity to recover will be a key consideration in determining receptor sensitivity.

280. Example definitions of the different sensitivity levels for a generic receptor are given in **Table 4.2**.

Table 4.2: Example Definition of Different Sensitivity Levels for a Generic Receptor

Sensitivity	Definition
High	Individual receptor has very limited or no capacity to avoid, adapt to, accommodate or recover from the anticipated impact.
Medium	Individual receptor has limited capacity to avoid, adapt to, accommodate or recover from the anticipated impact.
Low	Individual receptor has some tolerance to accommodate, adapt to or recover from the anticipated impact.
Negligible	Individual receptor is generally tolerant to and can accommodate or recover from the anticipated impact.

281. In addition, for some assessments the value of a receptor may also be an element to add to the assessment where relevant. Receptor value considers whether, for example, the receptor is rare, has protected or threatened status, importance at local, regional, national or international scale, and in the case of biological receptors whether the receptor has a key role in the ecosystem function.

282. Example definitions of the value levels for a generic receptor are given in **Table 4.3.**

Table 4.3: Example Definitions of the Value Levels for a Generic Receptor

Value	Definition
High	Internationally/nationally important (for example internationally or nationally protected site).
Medium	Regionally important/regionally protected site.
Low	Locally important/rare but with high potential for mitigation.
Negligible	Not considered to be important (for example common or widespread).

283. The overall receptor sensitivity is determined by considering a combination of value, adaptability, tolerance and recoverability. This is achieved through applying known research and information on the status and sensitivity of the feature under consideration coupled with professional judgement and past experience.

284. The terms ‘high value’ and ‘high sensitivity’ are not necessarily linked within a particular impact and it is important not to inflate impact significance specifically because a feature is valued. For example, a receptor could be of high value (e.g. an Annex I habitat) but have a low or negligible physical/ecological sensitivity to an impact. In this case, sensitivity should reflect the ecological robustness of the species and not necessarily default to its protected status.

4.5.3.3 Predicting Magnitude of Impact

285. The magnitude of change affecting a receptor that would result from the Bellrock WFDA will be identified on a scale from minor alterations or change, up to major changes or the total or substantial loss of the receptor. For certain environmental effects, the magnitude of change would be related to guidance on levels of acceptability (for example, for air quality or noise), and is therefore based on numerical parameters. For others it will be a matter of professional judgement to determine the magnitude of change, using descriptive terminology. The relevant guidance for each receptor is discussed in the technical chapters of this Bellrock WFDA Scoping Report.

286. The magnitude and probability of an impact occurring will be established through consideration of:

- Scale or spatial extent (small scale to large scale or a few individuals to most of the population);
- Duration (short term to long term);
- Likelihood of impact occurring;
- Frequency; and
- Nature of change relative to the baseline.

287. The categorisation of magnitude of impact will vary for specific pathways, receptors and technical assessments. Example definitions of the magnitude levels for a generic receptor are given in **Table 4.4.**

Table 4.4: Example Definitions of the Magnitude Levels for a Generic Receptor

Value	Definition
High	Fundamental, permanent/irreversible changes, over the whole receptor, and/or fundamental alteration to key characteristics or features of the particular receptor’s character or distinctiveness.
Medium	Considerable, permanent/irreversible changes, over the majority of the receptor, and/or discernible alteration to key characteristics or features of the particular receptor’s character or distinctiveness.
Low	Discernible, temporary (throughout project duration) change, over a minority of the receptor, and/or limited but discernible alteration to key characteristics or features of the particular receptor’s character or distinctiveness.
Negligible	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptor’s character or distinctiveness.

4.5.3.4 Evaluation of Significance of Effects

288. Once the technical chapters have defined the sensitivity of each receptor and the magnitude of potential impacts (based on expert judgement), the significance of effects matrix in **Table 4.5** is applied. This matrix will determine the significance of the adverse and positive effects. All technical chapters will apply the significance of effects matrix, unless otherwise specified in the technical chapters.

289. In EIA terms, major and moderate adverse effects are deemed to be significant, and as such, may require mitigation. Whilst minor effects are not significant in their own right, these may contribute to significant effects cumulatively or through interactions. Each technical chapter sets out receptor-specific guidance that will be used to assess the significance of effects. Definitions for each level of significance are presented in **Table 4.6**.

Table 4.5: Matrix for Evaluating the Significance of an Effect

Sensitivity	Magnitude				
	High	Medium	Low	Negligible	No Change
High	Major	Major	Moderate	Minor	No effect
Medium	Major	Moderate	Minor	Negligible	No effect
Low	Moderate	Minor	Minor	Negligible	No effect
Negligible	Minor	Negligible	Negligible	Negligible	No effect

Table 4.6: Definitions of Effect Significance

Effect Significance	Definition
Major	Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level.
Moderate	Intermediate change in receptor condition, which are likely to be important considerations at a local level.
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision-making process.
Negligible	No discernible change in receptor condition.
No Effect	No change in receptor condition; therefore, no effect.

4.5.3.5 Identify Mitigation Measures and Monitoring

290. For each environmental aspect, the EIA process will systematically identify and assess impacts and effects and take into consideration potential changes to the project design parameters to reduce the severity of an effect or, where that is not possible, environmental mitigation and monitoring measures that will be adopted in the development, operation and decommissioning of the Bellrock WFDA. These measures include avoidance, best practice and design commitments. IEMA issued 'Shaping Quality Development' in November 2015 and 'Delivering Quality Development' in July 2016. In accordance with these guidance documents, three types of mitigation will be identified and used within the EIA Report:

- **Primary mitigation:** modifications to the location or design made during the pre-application phase that are an inherent part of the Bellrock WFDA. These measures are treated as an inherent part of the Bellrock WFDA. This includes the adoption of methods and equipment for seabed preparation which have been designed to minimise the potential for sediment suspension and dispersal.

- **Secondary mitigation:** actions that will require further activity in order to achieve the anticipated outcome. The effectiveness of such measures will be assessed within the EIA Report and appropriate mitigation will be secured by a consent condition. This may include seasonal restrictions on certain construction activities being undertaken to minimise impacts on a migratory species.
- **Tertiary mitigation:** actions that would occur with or without input from the EIA. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are standard practices used to manage commonly occurring environmental effects. These measures are treated as an inherent part of the Bellrock WFDA. This includes development and adherence to management plans, such as a Marine Pollution Contingency Plan (MPCP) and Environmental Management Plan (EMP).

291. Primary and tertiary mitigation are considered to be 'embedded' mitigation. The assessment of the likely significant environmental effects for the pre-mitigation scenario will take such mitigation into account in determining the magnitude of change.

292. Following assessment of the likely significant effects of the Bellrock WFDA, any further mitigation measures (secondary mitigation) will be outlined within the individual chapters of the Bellrock WFDA EIA Report. These mitigation measures will further reduce a negative effect or enhance a positive effect.

293. The EIA Regulations require, where appropriate, the monitoring of potential significant adverse effects. Where monitoring arrangements are proposed as part of the mitigation set out, this will be detailed within each of the technical chapters of the Bellrock WFDA EIA Report, and the results of any monitoring will be shared with the relevant stakeholders as appropriate.

294. Environmental mitigation and monitoring measures will also be recorded in the Bellrock WFDA EIA Report and a Mitigation Register to enable them to be secured (where required) and implemented. Opportunities will be provided for stakeholders to provide feedback on the commitments as part of the planned stakeholder engagement exercises. **Appendix 3: Mitigation Register** sets out a range of embedded mitigation measures included in this Bellrock WFDA Scoping Report.

4.5.3.6 Assessment of Residual Effects

295. Following the application of any necessary secondary mitigation measures to reduce the severity of potential negative effects, the significance of residual effects will then be assessed for each potential impact following the guidance outlined above in **Section 4.5.3.4**.

4.5.4 Inter-related Effects

296. The Bellrock WFDA EIA Report will also consider the potential for:

- Inter-relationships between impacts – where different impacts interact to affect a single receptor, which may need to be brought together from assessments presented in separate chapters. The offshore assessments are largely receptor based (e.g., marine mammals, fish ecology) and as such inter-relationships are covered as an integral part of the assessment. There is the potential for these separate impacts to interact, spatially and temporally, to create inter-related effects on a receptor and where this is the case this is identified and assessed. For example, impacts on fish and shellfish ecology can lead to changes in prey resource for marine mammals and birds, and can also affect commercial fisheries through the disturbance of commercially important fish and shellfish resources and subsequent displacement or disruption of fishing activity.

- Interactions between impacts – where impacts assessed in each chapter have the potential to interact with one another. Impacts will be assessed relative to each development phase (a 'phase assessment' i.e., construction, operation or decommissioning) to see if (for example) multiple construction impacts affecting the same receptor could increase the level of effect upon that receptor. Following this, a 'lifetime assessment' will be undertaken where necessary which will consider the potential for impacts to affect receptors across all development phases.

297. It should be noted that the inter-related effects assessment only considers the effects from the Bellrock WFDA, with effects from other projects considered within the CEA.

4.6 Approach to Cumulative Effects Assessment

298. The Cumulative Effects Assessment (CEA) will consider the impacts arising from the Bellrock WFDA alone as well as cumulatively with other relevant plans, projects and activities. Following a screening exercise (**Section 4.6.2**), the CEA considers the effects of the Bellrock WFDA in combination with the effects from a number of different projects on the same receptor or resource.

299. The CEA is essential to identify foreseeable developments or activities with which the Bellrock WFDA may interact, resulting in cumulative impact. Cumulative impacts may arise from all phases (construction, operation and maintenance, and decommissioning) of the Bellrock WFDA.

300. Schedule 3 of the Marine Works (Environmental Impact Assessment) Regulations 2007 and Schedule 4 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 require that cumulative effects of the development should be described in the Bellrock WFDA EIA Report. Planning Circular 1/2017 (Scottish Government, 2017a) and PAN 1/2013 (Scottish Government, 2017b) also set out this requirement. There is currently no specific Scottish guidance on the methodological framework for assessing cumulative effects in general. PAN 1/2013 acknowledges that "*assessment methods for cumulative impacts and interactions vary"* and that it is a *"matter of professional judgement to ensure the relevant projects and activities – and their environmental effects – are identified, taking into account the circumstances of the individual proposal and its location*".

301. The CEA for the Bellrock WFDA will be undertaken in accordance with the relevant guidance set out in **Section 4.2,** specifically Planning Inspectorate (2019[16]), and will be updated with relevant

[16] This guidance is considered most robust and appropriate for the Bellrock WFDA, in the absence of the Cumulative Effects Framework

information from the Cumulative Effects Framework (relevant only to marine mammals and ornithology) when this is made publicly available (**Table 4.1**).

302. The Bellrock WFDA EIA Report will consider the potential effects which may arise from the construction, operation and maintenance and decommissioning of the Bellrock WFDA.

303. The CEA will be considered in two stages:

- **Stage 1:** CEA of the whole Bellrock Project (i.e., the Bellrock WFDA and the Bellrock OfTDA) (**Section 4.6.1**).
- **Stage 2:** CEA of the whole Bellrock Project (i.e., the Bellrock WFDA and the Bellrock OfTDA), alongside other plans or projects which fall into the criteria listed above, including the SSEN Transmission offshore substation. Stage 2 is separated into two separate steps; Stage 2a: Cumulative Effects Screening (**Section 4.6.2**), and Stage 2b: Cumulative Effects Assessment (**Section 4.6.3**).

4.6.1 Stage 1: Cumulative Effects Assessment of the Whole Bellrock Project

304. To inform the CEA, where available sufficient information concerning the Bellrock OfTDA will be included in the Bellrock WFDA EIA Report, to understand the cumulative effects of the whole Bellrock Project (both Bellrock WFDA and OfTDA collectively).

305. Temporary mooring of floating substructures (FSSs) and/or floating offshore units (FOUs) (known as ‘wet storage’) will be undertaken at port(s) or dedicated mooring locations under consents and Marine Licence(s) as required, of the relevant ports/storage locations. The port(s) where turbines will be assembled and the wet storge locations are yet to be confirmed and will depend on a number of factors including capacity and availability.

306. The Applicant’s position is that the Bellrock WFDA EIA Report will not include consideration of earlier manufacturing activities, port activities (e.g. WTG assembly), or ‘wet storage’ of the FOUs. Those do not form part of the Bellrock WFDA or activities for which consent is sought. Where those activities constitute development requiring a new planning permission, or requiring a Marine Licence, that would need to be applied for separately by the relevant party seeking such consent and would need to be accompanied by any appropriate environmental assessment required. Therefore, wet storage of FOUs will be considered within the CEA section along with other projects and plans in line with the methodology outlined below.

4.6.2 Stage 2a: Cumulative Effects Screening

307. In accordance with the above guidance documents, other plans or projects that are deemed likely to go ahead or are going ahead, and for which sufficient information is available, will be taken forward for consideration. For the purposes of the CEA, the criteria of other plans or projects that are proposed for consideration include:

- Already constructed;

- Under construction;
- Permitted application(s), but not yet implemented;
- Submitted application(s) not yet determined; and
- Plans and projects which are “reasonably foreseeable” including:
  - Projects in Scottish waters;
  - Projects in English waters, or other non-UK parts of the North Sea if considered to be relevant, have connectivity, or the potential of a cumulative effect;
  - Any proposed project that has submitted a Scoping Report up to six months prior to the Bellrock WFDA consent application date; and
  - Offshore wind and non-wind projects.

308. The initial ‘long list’ of plans or projects will be developed based on the above criteria, and will be screened for each potential impact-receptor pathway using the following process:

- **Conceptual overlap:** an impact-receptor pathway (in EIA terms) describes an impact which has the potential to directly or indirectly affect the receptor(s) in question.
- **Physical overlap:** ability for impacts arising from the Bellrock WFDA to overlap with those from other plans or projects on a receptor basis. An overlap of the physical extents of the impacts arising from the two (or more) projects/plans must be established for a cumulative effect to arise. There are exceptions to this for certain mobile receptors that are potentially subject to impacts from multiple plans or projects.
- **Temporal overlap:** for a cumulative effect to arise from two or more plans or projects, a temporal overlap of impacts arising from each must be established. Some impacts are active only during certain phases of development (e.g. piling noise during construction). However, the absence of a strict overlap may not necessarily mean there is no potential for cumulative effect, as receptors may become further affected by additional, non-temporally overlapping projects.

309. The cumulative effects screening stage will be undertaken by experienced specialists, using current guidance and best practice. After review of the long list, the remaining projects or plans are taken forward to the assessment stage. This refined short list of projects will be agreed with stakeholders and Scottish Ministers via MD-LOT as part of ongoing consultation in the post-scoping phase.

4.6.3 Stage 2b: Cumulative Effects Assessment

310. At the assessment stage, information is gathered on plans or projects taken forward from the screening stage. Where the likely significant effects (as defined by the EIA Regulations) for the Bellrock WFDA alone are assessed as negligible, or where an effect is predicted to be highly localised, these will not be considered within the Bellrock WFDA CEA, as it is considered that there would be no potential for cumulative effects with other plans or projects.

311. A tiered approach will be used when undertaking Stage 2b of the CEA of the Bellrock WFDA, which provides a framework for placing relative weight upon the potential for each plan or project to be included in the CEA, based upon the plans or project's current stage of maturity and certainty in the design or effects. Projects or plans will be assessed in Stage 2b using the following tiers:

- **Tier 1 assessment:** the Bellrock Project, plus projects which are operational, under construction, those with consent and submitted but not yet determined.
- **Tier 2 assessment:** all plans/projects assessed under Tier 1, plus those projects with a Scoping Report and/or Scoping Opinion.
- **Tier 3 assessment:** all plans/projects assessed under Tier 1 and Tier 2, plus those projects likely to come forward where a CES Option to Lease Agreement or equivalent has been granted.

312. All other relevant plans or projects that are in the public domain six months prior to submission of the Bellrock WFDA application will be considered in the CEA in line with the tier system.

313. The CEA methodology will follow the methodology described in **Section 4.5**, where possible, for consistency throughout the EIA. Where potential cumulative environmental effects have been identified, these will be considered further in the relevant environmental impact assessments in the Bellrock WFDA EIA Report.

314. It is expected that the following activity types will be considered in the CEA of the Bellrock WFDA based on maximum Zone of Influences (ZoIs) identified from the relevant technical assessments detailed within this Bellrock WFDA Scoping Report:

- Marine disposal and dredging sites;
- Energy (including offshore wind, wave and tidal projects (including the SSEN Transmission offshore substation), National Electricity Transmission Systems reinforcement works, Innovation and Targeted Oil and Gas (INTOG) projects, Carbon Capture and Storage (CCS) and Underground Coal Gasification (UCG));
- Oil and gas infrastructure;
- Cables and pipelines;
- Ports and harbours; and
- Military, aviation and radar.

315. The Applicant will seek agreement with MD-LOT on the list of projects and/or plans to be included in the CEA as part of ongoing post-Scoping consultation.

4.7 Transboundary Effects

316. Transboundary effects arise when impacts from a development within one European Economic Area (EEA) state's[17] territory significantly affects the environment or interests of another EEA state(s). The EIA Directive, and thus the relevant EIA Regulations, requires the assessment of transboundary effects. This Bellrock WFDA Scoping Report will therefore identify any relevant transboundary impacts that will need to be considered within the EIA.

317. The United Nations Economic Commission for Europe Convention on EIA in a Transboundary Context (the 'Espoo Convention') presents the need to consider transboundary effects and requires assessments to be extended across borders between Parties of the Convention when a planned activity may cause significant adverse transboundary impacts. The Espoo Convention has been transposed into Scottish EIA law by way of Regulation 29 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, and Regulation 18 of the Marine Works (Environmental Impact Assessment) Regulations 2007. These Regulations set out the processes for consultation and notification. In the event that a project is considered to cause significant transboundary effects, the EIA Regulations 2017 require Scottish Ministers to engage with the affected EEA State and invite them to participate in consultation.

318. The assessment of potential transboundary effects will consider the following elements:

- Characteristics of the Bellrock WFDA.
- Location of the Bellrock WFDA, including proximity to relevant EEA States.
- Environmental context/importance, for example any EEA protected areas which may be affected by the Bellrock WFDA.
- Potential pathways of effect.
- The extent of potential effects.
- The scale of the potential effect, to consider magnitude, probability, duration, frequency and recoverability.
- Cumulative impacts.

319. As detailed in the technical chapters**,** the following receptors groups may experience transboundary impacts from the Bellrock WFDA:

- **Chapter 8: Marine Mammals;**
- **Chapter 9: Offshore Ornithology;**
- **Chapter 10: Commercial Fisheries;**
- **Chapter 11: Shipping and Navigation;**
- **Chapter 16: Socioeconomics, Tourism and Recreation;** and
- **Chapter 17: Climate Change.**

[17] Following the exit of the UK from the European Union (EU) in December 2020, the UK is no longer an EEA state. However, for the purposes of assessing potential transboundary effects, the approach outlined above has been followed for the Bellrock WFDA.

320. Where applicable, consideration of transboundary effects will follow the standard approach to EIA with regards to sensitivity, magnitude, and significance. The assessment will be presented within each technical chapter of the Bellrock WFDA EIA Report where relevant.

4.8 Related Environmental Assessments

4.8.1 Habitats Regulations Appraisal

321. HRA is a precautionary, rigorous and legally binding procedure to protect Scotland's European sites. HRA considers the potential for likely significant effects to arise as a result of a plan or project, which may affect the integrity of the national site network and their associated qualifying features, and can involve up to nine stages (NatureScot, 2023):

- **Stage 1: What is the plan or project?** This stage requires the Applicant to provide the competent authority with sufficient information about the Bellrock WFDA to carry out an HRA.
- **Stage 2: Is the plan or project directly connected with or necessary to site management for nature conservation?** This test is to identify and remove from further assessment those proposals which are clearly necessary to, or of no value to, or inevitable as part of, management of the site for its qualifying interest. All qualifying interests should be considered. If the proposal does not meet these criteria then Stage 3 is considered.
- **Stage 3: Is the plan or project (either alone or in combination with other plans or projects) likely to have a significant effect on a European site?** This is essentially a screening stage to determine whether or not appropriate assessment is required. It is important to consider any connectivity between the proposal and each of the qualifying interests, i.e. are there processes or pathways by with the proposal may influence the site's interest directly or indirectly? If there is doubt or a lot of detail is required, a likely significant effect should be concluded and Stage 4 should be undertaken. The effects of the Bellrock WFDA should be considered 'in combination' with the effects of other projects and plans on the same European site. Stages 1, 2 and 3 are included in **the Bellrock WFDA HRA Screening Report** (BlueFloat Energy | Renantis Partnership, 2024). As per the EIA consenting strategy detailed in **Chapter 1: Introduction**, the HRA will also consider the Bellrock Project as a whole.
- **Stage 4: Inform an appropriate assessment of the implications for the site in view of its conservation objectives:** Where a plan or project is considered to have a likely significant effect on the qualifying interest(s) of a European site an appropriate assessment is required. The competent authority carries out the appropriate assessment with advice from NatureScot. A Report to Inform the Appropriate Assessment (RIAA) will be included with the Bellrock WFDA consent applications.
- **Stage 5: Can it be ascertained that the proposal will not adversely affect the integrity of the site?** For the Bellrock WFDA to be consented, the appropriate assessment must ascertain that they will not adversely affect the integrity of a European site alone or in-combination with other plans and projects. Conclusions must be based on there being no reasonable scientific doubt as to the absence of adverse effects. The integrity of the site only applies to the qualifying interests and is directly linked to the conservation objectives for the site.

322. Stages 6 to 9 are only considered in exceptional circumstances where it cannot be ascertained that the plan or project will not adversely affect the integrity of a European site.

- **Stage 6: Are there alternative solutions?** If it cannot be ascertained that the proposal will not adversely affect the integrity of a European site it can only proceed if there are no alternative solutions AND imperative reasons of overriding public interest (IROPI). This requirement is set out in regulation 29 of the Habitats Regulations. Guidance suggests alternative solutions could include alternative locations or routes; different scales or designs of development; alternative processes; or other different, practicable approaches which would have a lesser impact. If there are alternative solutions to the proposal consent cannot be given. There is then no need to move on to assess whether or not imperative reasons of overriding public interest apply. If alternatives are provided it may be necessary to repeat Stages 1-5. If there are no alternative solutions, stages 7 to 9 should be considered.
- **Stage 7: Would a priority habitat or species be adversely affected?** There are no priority species (as defined in the Habitats Directive) in Scotland's Special Areas of Conservation (SAC)s and the Birds Directive does not refer to 'priority' species. Priority habitats that are qualifying interests of SACs in Scotland are provided on NatureScot's website. These habitats are given a greater level of protection under regulation 29 of the Habitats Regulations. Consideration needs to be taken as to whether priority habitat in Scotland would be adversely affected.
- **Stages 8 and 9: Are there imperative reasons of overriding public interest?** Where it cannot be ascertained that a plan or project will not adversely affect the integrity of a European site, and there are no alternative solutions, a plan or project can only proceed if there are imperative reasons of overriding public interest for doing so (regulation 29 of the offshore Habitats Regulations). Scottish Ministers must be consulted. Where a priority habitat could be affected IROPI are limited to those reasons outlined in regulation 29. These must relate to human health, public safety, beneficial consequences of primary importance to the environment, or any other IROPI subject to the opinion of the Scottish Ministers. Where a plan or project is to proceed for IROPI, Scottish Ministers have a duty to secure any compensatory measures necessary to ensure the overall coherence of the UK site network is protected (regulation 36 of the Habitats Regulations).

4.8.2 Nature Conservation Marine Protected Area Assessment

323. As set out in **Chapter 2: Policy and Legislative Context**, Nature Conservation Marine Protected Areas (NCMPAs) in Scotland are designated under the Marine (Scotland) Act 2010 within 12 nm, and under the Marine and Coastal Access Act 2009 in offshore waters between 12 nm and 200 nm. NCMPAs are designated to protect biodiversity and heritage, with specific focus on protected features (species, habitats, large scale features or geomorphological features). A **NCMPA Screening Report** for the Bellrock WFDA is presented in **Appendix 2** of this Bellrock WFDA Scoping Report.

324. The Bellrock WFDA EIA Report will assess the potential for impacts on NCMPAs, informed by engagement with MD-LOT as the competent authority, and NatureScot, and any other relevant information deemed appropriate. Following the Scoping Workshop held 30th October 2023, MD-LOT provided feedback that the 'Nature Conservation Marine Protected Areas: Draft Management

Handbook' should used as guidance and would suggest contacting NatureScot to understand the approach to be adopted. MD-LOT confirmed that there are no plans to update the MPA handbook and advised to refer to Conservation Advice on the Joint Nature Conservation Committee website (see **Table 4.1**).

325. There are two stages to the NCMPA Assessment:

- **Stage 1: Initial Screening** – will first identify whether the activity is capable of affecting the protected features of a NCMPA. Subsequently, the initial screening will determine whether the activity is capable of affecting, other than insignificantly, the protected features of a NCMPA. Stage 1 is provided in **Appendix 2: NCMPA Screening Report.**
- **Stage 2: Main Assessment** – Where a project may have a significant risk of hindering the achievement of an NCMPA's conservation objectives, the EIA Report for the project will include the necessary information to inform a NCMPA assessment. The NCMPA assessment is undertaken by the Public Authority (Scottish Ministers for Marine Licenses and s.36 consents) in consultation with NatureScot/Joint Nature Conservation Committee (JNCC).

4.8.3 European Protected Species Risk Assessments

326. As described in **Chapter 2: Policy and Legislation**, under the Habitats Regulations, it is unlawful to:

- Deliberately capture, injure or kill a European Protected Species (EPS);
- Deliberately disturb an EPS; and
- Damage or destroy a breeding site or resting place of an EPS.

327. It may be lawful to carry out certain activities which are likely to cause disturbance or injury to EPS, if an EPS licence is obtained. EPS licences for licensable activities (e.g. geophysical surveys) will be granted by MD-LOT on behalf of Scottish Ministers, subject to three tests being met:

- **Test 1:** The reason for the licence must relate to one of the purposes specified in Conservation of Offshore Marine Habitats and Species Regulations 2017 (for activities within 12 – 200 nm).
- **Test 2:** There is no satisfactory alternative to undertaking the licensable activity.
- **Test 3:** the proposed licensable activity must not be detrimental to maintaining the species at 'favourable conservation status'.

328. As part of early project development, the Applicant has provided EPS Risk Assessments to MD-LOT in relation to EPS licence applications to undertake geophysical, geotechnical and environmental surveys within the Bellrock WFDA. MD-LOT and NatureScot determined that no EPS licence was required for this purpose. The Applicant will apply for further EPS licences, as appropriate, should these be required in the future.

4.9 Structure and Content of the Environmental Impact Assessment Report

329. As outlined in **Section 1.4**, consent will be sought for the Bellrock WFDA. The consent application will be accompanied by the Bellrock WFDA EIA Report, which will present an assessment of likely significant effects on the environment.

330. The Bellrock WFDA EIA Report will be submitted in a series of volumes as shown in **Plate 4.3**, and as described below:

- **Bellrock WFDA EIA Non-technical Summary (NTS)**: The consent application will be accompanied by a NTS, presenting the key findings of the EIA in a clear and concise format.
- **Bellrock WFDA EIA Volume 1: Technical Chapters**: A single document, presenting the introductory chapters and the impact assessment technical chapters of the Bellrock WFDA. The impact assessment chapters will be based on the maximum design envelope and therefore the worst-case scenario for each technical receptor.
  - Each impact assessment chapter will present the assessment of the Bellrock WFDA. Due to their nature, the greenhouse gas assessment in **Chapter 17: Climate Change** and the impact assessment in **Chapter 16: Socioeconomics, Tourism and Recreation** based on the whole Bellrock Project (i.e. Bellrock WFDA and Bellrock OfTDA).
  - The CEA will consider the impacts arising from the Bellrock WFDA and the Bellrock OfTDA collectively, to allow for a full project assessment, as well as cumulatively with other relevant plans, projects and activities (as set out in **Section 4.6**).
- **Bellrock WFDA EIA Volume 2: Figures**: A single document, presenting the figures supporting the Bellrock WFDA EIA.
- **Bellrock WFDA EIA Volume 3: Technical Appendices**: A single document, presenting technical appendices supporting the Bellrock WFDA EIA and summary.
- **Bellrock WFDA RIAA**: A single RIAA informing the second stage of the HRA for the Bellrock WFDA.
- **Other supporting documentation**: Presenting the MPA Assessment, Pre-application Consultation, and other documentation to support the Bellrock WFDA application.

Plate 4.3: Structure of the Bellrock WFDA EIA Report and Supporting Documentation to the Application

4.10 Scoping Questions to Consultees

331. The following questions are posed to consultees to help them frame and focus their response to the approach to scoping and EIA for the Bellrock WFDA, which will in turn inform the Scoping Opinion:

- Do consultees agree with the proposed methodology for identifying and assessing significant effects?
- Do consultees agree that a stand-alone human health chapter is not required within the EIA?
- Do consultees agree that the proposed methodology for assessing cumulative effects is appropriate for identifying significant effects?
- Do consultees agree with the inclusion criteria for the other plans or projects to be assessed in the CEA?
- Do you have any other matters or information sources that you wish to present?

4.11 References

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5 Marine Geology, Oceanography and Physical Processes

5.1 Introduction

332. This chapter of the Bellrock Wind Farm Development Area (WFDA) Scoping Report considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock WFDA on marine geology, oceanography and physical processes (including water quality). As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

333. This chapter provides an overview of the existing environment and sets out the proposed methodology and approach to assessing effects on marine geology, oceanography and physical processes (including water quality) receptors in the Bellrock WFDA Environmental Impact Assessment (EIA) Report. This chapter has been prepared by Royal HaskoningDHV.

334. This chapter should be read in conjunction with the following chapters of the Bellrock WFDA Scoping Report:

- **Chapter 6: Benthic Ecology;**
- **Chapter 7: Fish and Shellfish Ecology;**
- **Chapter 8: Marine Mammals;**
- **Chapter 10: Commercial Fisheries;**
- **Chapter 13: Marine Infrastructure and Other Users;**
- **Chapter 14: Marine Archaeology and Cultural Heritage; and**
- **Chapter 17: Climate Change.**

335. The marine geology, oceanography and physical processes assessment is likely to have key inter-relationships with the above receptors, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

5.2 Legislation, Policy and Guidance

336. **Table 5.1** describes the relevant policy and guidance which have been considered in the preparation of this chapter and will be considered within the Bellrock WFDA EIA Report where

appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

Table 5.1: Summary of Relevant Legislation, Policy and Guidance for Marine Geology, Oceanography and Physical Processes

Relevant Policy or Guidance	Relevance to the Assessment
Policy	
The Marine Policy Statement (HM Government, 2020) provides the high-level approach to marine planning and general principles for decision making that contribute to achieving this vision. It also sets out the framework for environmental, social, and economic factors that need to be considered in marine planning.	The key reference is in Section 2.6.8.6 which states: "…Marine plan authorities should not consider development which may affect areas at high risk and probability of coastal change unless the impacts upon it can be managed. Marine plan authorities should seek to minimise and mitigate any geomorphological changes that an activity or development will have on coastal processes, including sediment movement." For water quality, the key reference is Section 2.6.4.1 which states: Developments and other activities at the coast and at sea can have adverse effects on transitional waters, coastal waters and marine waters. During the construction, operation and decommissioning phases of developments, there can be increased demand for water, discharges to water and adverse ecological effects resulting from physical modifications to the water environment. There may also be an increased risk of spills and leaks of pollutants into the water environment and the likelihood of transmission of invasive non-native species, for example through construction equipment, and their impacts on ecological water quality need to be considered.
Scotland's National Marine Plan (Scottish Government, 2015) details strategic policies for the sustainable development of Scotland's marine resources out to 200 nautical miles.	Policy GEN 8 Coastal process and flooding states: Developments and activities in the marine environment should be resilient to coastal change and flooding, and not have unacceptable adverse impact on coastal processes or contribute to coastal flooding. Paragraph 4.36 states: Marine planners and decision makers should also be satisfied that activities and developments will be resilient to risks from coastal change and flooding over their lifetime and will not have an unacceptable impact on coastal change. They should seek to ensure that any geomorphological changes that an activity or development bring about in coastal processes, including sediment movement and wave patterns, are minimised, and mitigated, bearing in mind the potential impact on commercial interests such as fisheries and conservation of the natural environment and key coastal heritage sites. Developments which may affect areas at high risk and increase the probability of coastal change should not be permitted unless the impacts upon the area can be managed effectively. Policy GEN 12 Water quality and resource: Developments and activities should not result in a deterioration of the quality of waters to which the Water Framework Directive (WFD), Marine Strategy Framework Directive or other related Directives (as transposed into UK legislation) apply. Note that the WFD does not apply to the Bellrock WFDA given it is located offshore, 120 km east of Stonehaven (116 km southeast of Peterhead) and therefore outside of WFD jurisdiction. However, the Marine Strategy Framework Directive will apply – see below. Paragraph 4.67 states: The Marine Strategy Framework Directive introduces requirements for targets on contamination and eutrophication for marine waters out to 200 nautical miles.

Relevant Policy or Guidance	Relevance to the Assessment
	When published, Scotland's National Marine Plan 2 will also be considered and is assumed to supersede the existing National Marine Plan.
International Convention for Prevention of Marine Pollution by Ships (MARPOL)	MARPOL is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. It is a combination of two treaties adopted in 1973 and 1978 respectively and updated by amendments through the years. The Convention covers all the technical aspects of pollution from ships, except the disposal of waste into the sea by dumping, and applies to ships of all types, although it does not apply to pollution arising out of the exploration and exploitation of sea-bed mineral resources.
Guidance	
Centre for Environment Fisheries and Aquaculture Science (Cefas) (2004)	Offshore Wind Farms: Guidance Note for Environmental Impact Assessment in respect of Food and Environmental Protection Act (FEPA) and Coast Protection Act (CPA) requirements: Version 2
Department for Business, Enterprise and Regulatory Reform (BERR) (2008)	Review of Cabling Techniques and Environmental Effects applicable to the Offshore Windfarm Industry
Lambkin et al. (2009)	Coastal Process Modelling for Offshore Windfarm Environmental Impact Assessment
Cefas (2011)	Guidelines for Data Acquisition to Support Marine Environmental Assessments of Offshore Renewable Energy Projects
Marine Scotland (2017) Pre-disposal Sampling Guidance Version 2 – November 2017	Sampling and analysis relating to sea disposal of dredged material – the guidance includes Action Levels for contaminants to assist in assessing risk to the water environment

5.3 Consultation

337. Consultation undertaken to date for the Bellrock WFDA relevant to marine geology, oceanography and physical processes is provided in **Table 5.2** below.

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Table 5.2: Consultation Relevant to Marine Geology, Oceanography and Physical Processes

Consultee	Date/Document	Comment	How Comment is Addressed
Marine Directorate-Science, Evidence, Data Digital (MD-SEDD)	15th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	*Do you agree with the identified impacts?* MD-SEDD advise that the conceptual modelling approach is considered to be proportionate for the operational phase. A strong evidence base should be presented to describe the prevailing conditions and sediment transport pathways. A more rigorous quantitative consideration of changes to sediment transport and the fate of sediment plumes from dredging and bed preparations should be performed for the installation phase, including installation of structures (including anchors etc) on the seabed within the wind farm and the installation of cables along the length of the cable route, especially in the nearshore environment. The proposed wind farm is in a region of shelf sea that probably experiences seasonal (and intermittent) stratification (van Leeuwen et al. 2015). MD-SEDD advise an additional impact that should be investigated is the potential changes to water column structure including magnitude, timing and extent of seasonal stratification. MD-SEDD advise the prevailing baseline water column conditions should be described in the EIA. The baseline description should include details of stratification including what the water column structure is like through the year (e.g. seasonal temperature, salinity, density profiles) and when typically the region stratifies, and how key parameters change through the year (e.g. surface mixed layer depth and potential energy anomaly). The strength of stratification should be noted, as well as what additional mixing would be required to alter the timing and extent of stratification. Typical frontal positions in the region should also be noted. The link between stratification and fronts to primary productivity and higher trophic levels and ecosystem services should be noted. A wind farm could change water column mixing, by the structures generating turbulent wakes, and/or by altering the near sea surface wind speeds (Christiansen et al. 2022, Durrell et al. 2022). Qualitatively considering how the windfarm could alter these processes may be a pragmatic/proportional approach as long as sufficient evidence is provided, e.g. good baseline description, using data from 3D hydrodynamics models, and citing research evidence. If there are uncertainties as to how the wind	The potential impacts on stratification are included in **Section 5.6.2.3**.

Consultee	Date/Document	Comment	How Comment is Addressed
		farm may change stratification then 3D hydrodynamic modelling may be required. Changes to mixing have the potential to impact other receptors, such as productivity as well as higher trophic levels, and this should also be qualitatively considered in the EIA. Impact on Nature Conservation Marine Protected Areas where fronts are a designated feature should be considered. Cumulative impacts on mixing and stratification due to neighbouring wind farms should be considered. Given the current lack of methodologies and tools available to applicants, the proposed qualitative assessment approach is considered to be adequate and proportionate. References Christiansen, N., Daewel, U., Djath, B., & Schrum, C. (2022). Emergence of Large-Scale Hydrodynamic Structures Due to Atmospheric Offshore Wind Farm Wakes. Frontiers in Marine Science, 9. https://doi.org/10.3389/fmars.2022.818501 Dorrell, R. M., Lloyd, C. J., Lincoln, B. J., Rippeth, T. P., Taylor, J. R., Caulfield, C. P., Sharples, J., Polton, J. A., Scannell, B. D., Greaves, D. M., Hall, R. A., & Simpson, J. H. (2022). Anthropogenic Mixing in Seasonally Stratified Shelf Seas by Offshore Wind Farm Infrastructure. Frontiers in Marine Science, 9. https://doi.org/10.3389/fmars.2022.830927 van Leeuwen, S., P. Tett, D. Mills, and J. van der Molen (2015), Stratified and nonstratified areas in the North Sea: Long-term variability and biological and policy implications, J. Geophys. Res. Oceans, 120, 4670–4686, https://doi.org/10.1002/2014JC010485	
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	*Do you agree with the identified impacts?* In relation to the potential impact 'changes in sea-bed level due to foundation and array cable installation', we recommend that this should incorporate changes due to bedform levelling/clearance. Regarding, the potential impact 'changes to waves due to the presence of the foundation structures on the seabed' – we suspect that as the array area is likely to be in deep water any wave effects due to foundations could be insignificant. If	Changes in seabed level due to bedform levelling/clearance are included in **Section 5.6.1.1**. Scour and loss of seabed due to cable protection footprint are also included in **Section 5.6.1.1**.

Consultee	Date/Document	Comment	How Comment is Addressed
		any wave effects are to be assessed, it should be those associated with the WTGs, notwithstanding that they would be floating. In addition, we advise that scour should be included within the assessment and this could be incorporated within the 'changes in sediment transport…' impact. Finally, in relation to the 'loss of seabed area due to the foundations' footprints' potential impact – this should also incorporate the effects of other seabed infrastructure e.g. cable protection.	Noted with respect to wave impacts.
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	*Do you agree with the conceptual modelling approach?* We are content that no numerical modelling of physical processes is proposed. The suggested Source-Pathway-Receptor (S-P-R) is more of a concept modelling approach – what is most important is the assessment methods. Therefore, we agree that Expert Geomorphological Assessment will be required. The use of empirical formulae should also be anticipated and consideration should be given to applying results of assessment undertaken (if robust) for similar offshore wind farms in the vicinity. Please note that if a potential impact regarding waves to be assessed then this approach should include waves.	Noted.

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5.4 Existing Environment

5.4.1 Study Area

338. The marine geology, oceanography and physical processes study area is defined by the distance over which impacts from the Bellrock WFDA may occur and by the location of any receptors that may be affected by those potential impacts.

339. The study area for marine geology, oceanography and physical processes is shown in **Figure 5.1** in **Appendix 1**) and includes a tide-parallel 10 km wide buffer around the Bellrock WFDA Scoping Boundary. The marine geology, oceanography and physical processes study area accounts for the potential local and regional effects on physical and sedimentary processes.

5.4.2 Data and Information Sources

340. **Table 5.3** outlines the existing primary data that has been used to inform this chapter and will also be used to inform the Bellrock WFDA EIA Report.

Table 5.3: Summary of Key Data and Information Sources for Marine Geology, Oceanography and Physical Processes

Dataset	Year(s)	Description
EMODnet	2020	Bathymetry
BERR Atlas	2007	Tidal currents
BERR Atlas	2001-2008	Waves
British Geological Survey (BGS)	Pre-1985	Seabed sediments and Quaternary geology
Cefas	1998-2015	Suspended sediment concentrations
OSPAR Quality Status Reports (QSR)	Latest report 2023	Region II – Greater North Sea. Concentrations of contaminants in sediments/overall pollution status of each region

341. In addition to the data in **Table 5.3**, **Table 5.4** describes the surveys that will support the assessment in the Bellrock WFDA EIA Report. This data is not available to inform this Bellrock WFDA Scoping Report but will be available to support the EIA.

Table 5.4: Summary of Site-specific Surveys for Marine Geology, Oceanography and Physical Processes

Dataset	Description	Dates
Geophysical survey (bathymetry and shallow geology)	Bellrock WFDA Scoping Boundary	August and September 2023
Grab sampling and particle size analysis	Bellrock WFDA Scoping Boundary	July 2023
Sediment contaminant analysis	113 sample stations across the Bellrock WFDA Scoping Boundary	July 2023
Metocean survey (wave and currents)	Bellrock WFDA Scoping Boundary	April 2023 to April 2025

5.4.3 Bathymetry

342. The minimum and maximum water depths across the Bellrock WFDA are approximately 60 m below Lowest Astronomical Tide (LAT) 105 m below LAT, respectively (**Figure 5.2** in **Appendix 1**). The bathymetry was derived from the EMODnet dataset (2020).

5.4.4 Shallow Geology

343. The shallow (Quaternary) geology of the study area is mainly sand and gravel, greater than 50 m thick (BGS, 1985b, c) (**Figure 5.3** in **Appendix 1**).

5.4.5 Tidal Currents

344. BERR (2008) modelled peak flows for mean spring tides of between approximately 0.26 m/s and 0.50 m/s across the marine geology, oceanography and physical processes study area (**Figure 5.4** in **Appendix 1**).

5.4.6 Waves

345. The most frequent waves across the marine geology, oceanography and physical processes study area during summer are from between north-east to south-east and from a southerly direction in the winter (Scottish Government, 2020). BERR (2008) described annual mean significant wave heights of 2.01 m to 2.25 m (**Figure 5.5** in **Appendix 1**).

5.4.7 Bedload Sediment and Transport

346. BGS (1984, 1985a) mapped sand across most of the Bellrock WFDA Scoping Boundary with a small area of muddy sand in the east (**Figure 5.6** in **Appendix 1**).

5.4.8 Suspended Sediment Concentrations

347. Cefas (2016) mapped the spatial distribution of average annual suspended sediment concentrations across the UK continental shelf between 1998 and 2015. The Bellrock WFDA is characterised predominantly by values between 0.601 mg/l and 0.8 mg/l, with small areas of values between 0.801 mg/l to 1 mg/l (**Figure 5.7** in **Appendix 1**). Large areas of the northern North Sea are characterised by similar suspended sediment concentrations, with values becoming greater in shallower water towards the coast.

5.4.9 Sediment and Water Quality

348. OSPAR is the mechanism by which 15 Governments & the EU cooperate to protect the marine environment of the North-East Atlantic[18]. Recognising the importance of clean, healthy, and productive seas to this region and to the world, OSPAR has committed to systematic periodic assessments of the drivers of degradation, the multiple pressures exerted on marine systems including the monitoring of chemicals in sediments and nutrients in the water. These assessments are reported in QSR (OSPAR, 2023a). OSPAR has divided its Maritime Area into five regions; the Bellrock WFDA is located in Region II – Greater North Sea.

349. The QSR 2023 highlights that concentrations of many of the most serious hazardous substances, such as Polychlorinated biphenyls (PCBs), Polyaromatic hydrocarbons (PAHs) and organochlorine insecticides, have decreased substantially compared with the 1980s and 1990s (OSPAR, 2023b). The last four assessments have described a steady improvement in the eutrophication status of three OSPAR Regions including the Greater North Sea region. The first assessment covering the period 1990 – 2000 was characterised by poor conditions in much of the North Sea (QSR 2000). With respect to hazardous substances, in most cases, the trends for assessed hazardous organic substances are downward, and most OSPAR Regions are also seeing a decline in heavy metal pollution. In the last two decades the downward trends have been smaller than in former decades, when decreases were driven by the elimination of large industrial point sources of contamination. Most metals follow the same pattern, but in the more populated OSPAR Regions (Greater North Sea being one) upward trends are seen in some places for selected substances such as mercury.

5.4.10 Designated Sites

350. The closest designated site, the East of Gannet and Montrose Fields Marine Protected Area (MPA), is approximately 47 km to the north-east of the Bellrock WFDA Scoping Boundary. Therefore, there are no sensitive receptors identified within a 30 km conservative Zone of Influence (ZoI) based on the alignment of tidal axes (north/south). Therefore, there is no pathway for effects associated with marine geology, oceanography and physical processes on any designated sites.

[18] OSPAR started in 1972 with the Oslo Convention against dumping and was broadened to cover land-based sources of marine pollution and the offshore industry by the Paris Convention of 1974. These two conventions were unified, updated and extended by the 1992 OSPAR Convention.

5.5 Potential Impacts

351. During the construction phase of the Bellrock WFDA, there is the potential for the installation of the floating substructures (FSSs), fixed bottom substructures (FBSSs) (if used), station keeping systems (SKSs), subsea cable hub(s) and inter-array cables (IACs) to disturb sediment, potentially resulting in changes in suspended sediment concentrations and/or seabed levels.

352. During the operational phase of the Bellrock WFDA, there is potential for the presence of the FSSs, FBSSs (if used), SKSs, subsea cable hub(s) and IACs to cause changes to the tidal and wave regimes due to physical blockage effects. These changes could potentially affect the sediment regime and/or seabed morphology. In addition, there is potential for disturbance of the seabed during maintenance activities.

5.5.1 Embedded Mitigation Measures

353. The following embedded mitigation measures are proposed:

- Where seabed preparation is required (e.g. levelling) methods and equipment that have been designed to minimise potential for sediment suspension and dispersal will be adopted;
- Development of, and adherence to a Cable Plan (CaP) setting out detailed IAC installation methods and techniques (based on final project design);
- A detailed Cable Burial Risk Assessment (CBRA) will be prepared where IACs are proposed to be buried to determine the target burial depth. The burial depths may vary and will be dependent on risk and ground conditions. The CBRA will also highlight instances where adequate burial cannot be achieved and alternative protection is needed; and
- A Marine Pollution Contingency Plan (MPCP) will be developed outlining the approach for managing and reducing risk of pollution and procedures to protect personnel and to be followed in the event of a pollution incident.

354. With respect to accidental spills and pollution events from vessels required for the installation and operation of the Bellrock WFDA, the Applicant is committed to embedded mitigation to reduce the risks of these occurring as far as practicable i.e. undertaking construction works in adherence with all relevant best practice guidance and legislation. All vessels must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 for example. An outline Environmental Management Plan (EMP) or similar will be drafted and included within the application documents which commits the Applicant to ensuring that all works would be undertaken in line with best practice for working in the marine environment. Accidental spills and pollution events would therefore not be considered further within the Bellrock WFDA EIA Report.

5.6 Scoping of Potential Impacts

355. **Table 5.5** outlines the potential impacts which are proposed to be scoped in or out of the Bellrock WFDA EIA Report. This may be refined as additional information and data become available.

5.6.1 Potential Impacts Scoped In

5.6.1.1 Impacts on Bedload Sediment Transport and Seabed Morphological Change

356. Construction of the Bellrock WFDA will not change the shallow geology other than in the case of local effects associated with the FSS, FBSS and SKS and IAC installations. However, there is the potential for changes in seabed morphology due to offshore construction activities (e.g. seabed preparation/sandwave clearance). Hence, these potential impacts will be assessed as part of the Bellrock WFDA EIA Report and are therefore scoped in for the construction and decommissioning phases.

357. Minimal impacts can be expected on the prevailing bedload sediment transport conditions, both within WFDA as well as further afield, provided that the FSSs, FBSSs and SKSs are adequately spaced (which will vary depending on the details of the FSSs, FBSSs and SKSs and WFDA layout). Impacts on sediment transport are expected to be local to the areas immediately surrounding the individual FSSs, FBSSs and SKSs in the form of seabed scour where the sediment is soft enough to be mobilised. Scour at each FSS, FBSS and SKS will be assessed as part of the Bellrock WFDA EIA Report using well-established empirical methods applied to offshore wind farms elsewhere.

358. Should IACs be buried, there would be no impact on bedload sediments and sediment transport. However, it is possible that cable protection would be required at locations where the seabed is characterised by harder geology which prevents or restricts IAC burial. The impacts that cable protection may have primarily relate to the potential for interruption of sediment transport and the footprint presented on the seabed. These impacts will be assessed as part of the Bellrock WFDA EIA Report and are therefore also scoped in for operation.

5.6.1.2 Impacts on Suspended Sediment Concentrations and Transport

359. Potential impacts during construction include temporary disturbance of the seabed due to the installation activities for FSSs, FBSSs, SKSs, IACs and subsea cable hub(s) (including seabed preparation, and, if buried, ploughing/trenching, and cable burial) which release sediment into the water column resulting in increased suspended sediments and changes to seabed levels. These potential impacts will be assessed as part of the Bellrock WFDA EIA Report and are therefore scoped in for construction and decommissioning.

360. There is potential for sediments to be re-suspended by scouring. Consideration will be given to likely changes in suspended sediment concentrations due to scour during the operational phase within the Bellrock WFDA EIA Report and are therefore also scoped in for operation.

361. Depending on the SKS adopted, the seabed in the vicinity of the FSSs may be swept by the catenary action of the mooring lines. If there is sediment present on the seabed in these areas (rather than exposed bedrock) then this will be entrained into suspension in the water column.

These impacts will be assessed as part of the Bellrock WFDA EIA Report and are therefore scoped in during operation.

5.6.1.3 Impacts on Contaminant Concentrations due to Changes in Suspended Sediment Concentrations

362. Disturbance of bed sediments could give rise to increases in chemical contaminants within the water column if bound to bed sediment particles. Site-specific information will be collected to determine both particle size (muddier sediments are at higher risk of containing contaminants) and chemical contaminant concentrations. This data will be assessed as part of the Bellrock WFDA EIA Report and therefore this potential impact is scoped in for all phases.

5.6.1.4 Operational Impacts on Waves and Tidal Currents

363. Potential impacts during operation could occur due to the physical presence of infrastructure (i.e. FSSs, FBSSs, SKSs, subsea cable hub(s), and any IAC protection above the seabed), which may result in local changes to tidal currents and waves due to physical blockage effects. These changes could potentially affect the sediment transport regime and/or seabed morphology. These impacts will be assessed as part of the Bellrock WFDA EIA Report and are therefore scoped in during operation.

5.6.2 Potential Impacts Scoped Out

5.6.2.1 Construction Impacts on Wave and Tidal Currents

364. Whilst there is potential for the physical presence of construction plant and offshore infrastructure to impact upon the wave and tidal current regimes, these impacts would increase incrementally as the Bellrock WFDA infrastructure is constructed with the greatest potential impacts resulting from the completed Bellrock WFDA. These impacts are therefore considered under **Section 5.6.1.2** for the operational phase and are therefore scoped out from further consideration in relation to the construction phase and decommissioning phase to avoid double counting.

5.6.2.2 Impacts on Seabed Morphology due to Indentations on the Seabed from Installation Vessels

365. There is potential for certain vessels used during installation of the FSSs, FBSSs, SKSs, IACs and subsea cable hub(s) to directly impact the seabed. This applies for those vessels that utilise jack-up legs or anchors to hold station and to provide stability for a working platform. Where legs or anchors (and associated chains) have been placed on the seabed and then removed, there is potential for an indentation to remain, proportional to the dimensions and drag (if any) of the object. However, the disturbance footprint would be limited in scale and any impacts would be temporary in nature with indentations infilling through natural processes over the course of a few days to months. These potential effects are therefore scoped out from further consideration in the Bellrock WFDA EIA Report for all phases.

5.6.2.3 Impacts on Water Column Stratification Influencing Nutrient Fluxes and Primary Production

366. The main potential impact on stratification is changes to near-field mixing due to FSS, FBSS and SKS wake effects and the potential for destabilising local water column stratification (i.e. those

restricted to the area inside and immediately outside the Bellrock WFDA) driven by interaction of the tidal (hydrodynamic) processes with the FSSs, FBSSs and SKSs.

367. Research undertaken by SAMS Enterprise (2023) indicates the site is seasonally stratified between the months of May and October and is well-mixed during the winter months. When the water column in well mixed, any enhancement in mixing due to the presence of substructures will result in no change in the vertical distribution of nutrients.

368. As a thermocline develops in spring and the water becomes stratified, there is potential for turbulence around substructures to enhance mixing and increase nutrient availability (a proxy for primary productivity) within surface waters (>20 m depth). However, due to relatively little background flow, any enhancement in mixing will be concentrated and retained locally. Modelling results show that turbine-induced mixing during the summer months at Bellrock is two orders of magnitude smaller than mixing due to background bottom bed stresses (SAMS, 2023). Estimates of enhanced chlorophyll production are also small when compared to the spring bloom. Therefore, potential effects on water column stratification and primary productivity are scoped out from further consideration in relation to the operational phase.

5.6.3 Potential Cumulative Effects

369. The cumulative effect assessment (CEA) will be based on a ZoI identified during the Bellrock WFDA EIA, which will define the geographical extent within which effects of the Bellrock WFDA are expected to occur. The CEA will be considered in two stages; a CEA of the of the whole Bellrock Project (i.e., the Bellrock WFDA and the Bellrock OfTDA) followed by a CEA of the whole Bellrock Project alongside other plans or projects, as set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**.

5.6.4 Potential Transboundary Effects

370. It is proposed to scope out transboundary effects on marine geology, oceanography and physical processes, recognising that the Bellrock WFDA is approximately 125 km from the Exclusive Economic Zone (EEZ) of Norway. Given that the likely effects will be restricted to near-field change, coupled with their location at distance from the EEZ boundary, there would be no pathway for transboundary effects.

5.6.5 Summary of Potential Marine Geology, Oceanography and Physical Processes Impacts Scoped In and Out

371. **Table 5.5** outlines the marine geology, oceanography and physical processes impacts which are proposed to be scoped in or out of the Bellrock WFDA EIA Report.

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Table 5.5: Summary of Potential Impacts Scoped In (✓) or Out (x) for Marine Geology, Oceanography and Physical Processes

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Impacts on suspended sediment concentrations and transport	Non-designated sand banks and rock reefs	Disturbance of the seabed due to the installation activities for the substructures and buried IACs, could potentially release sediment into the water column resulting in increased suspended sediment concentrations and changes to seabed levels from deposition	✓	✓	✓	Mitigation as detailed in **Section 5.5.1**
Impacts on chemical contaminant concentrations associated with increases in suspended sediment	Water quality	Release of chemical contamination can occur as a result of suspended seabed sediments	✓	✓	✓	Mitigation as detailed in **Section 5.5.1**
Impacts on tidal currents and waves	Non-designated sand banks and rock reefs	The physical presence of the offshore infrastructure could result in changes to tidal currents and waves due to physical blockage effects	x	✓	x	N/A
Impacts on bedload sediment transport and seabed morphological change	Non-designated sand banks and rock reefs	The physical presence of infrastructure in the Bellrock WFDA could result in changes to bedload sediment transport due to changes in tidal currents and waves	✓	✓	✓	N/A
Indentations on the seabed due to installation and decommissioning vessels	Non-designated sand banks and rock reefs	Vessels that utilise jack-up legs or several anchors to hold station during installation could directly impact the seabed through creation of indentations	x	x	x	N/A

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Impacts on water column stratification influencing nutrient fluxes and primary production	Shelf sea stratification	The physical presence of infrastructure in the Bellrock WFDA could result in destabilisation of the local water column stratification	x	x	x	N/A

5.7 Proposed Approach to Impact Assessment

372. As part of the EIA process, the existing environment with respect to marine geology, oceanography and physical processes will be described, including, but not limited to the following:

- Bathymetry;
- Shallow geology;
- Tidal currents;
- Waves;
- Seabed sediment distribution;
- Bedload sediment transport;
- Suspended sediment transport;
- Seabed contaminant concentrations;
- Morphological change; and
- Anticipated trends in baseline conditions.

373. The assessment of effects on marine geology, oceanography and physical processes will be based on a S-P-R conceptual model, whereby the source is the initiator event, the pathway is the link between the source and the receptor impacted, and the receptor is the receiving entity. An example of this type of conceptual model is provided by seabed preparation which disturbs sediment on the seabed (source). This sediment is then transported by tidal currents until it settles back to the seabed (pathway). The deposited sediment could change the composition and elevation of the seabed (receptor).

374. For assessment of tidal currents, waves, sediment transport and stratification, the use of numerical modelling is disproportionate to the potential effect that would occur, and the S-P-R conceptual model approach is preferred. The assessment of sediment quality and the potential risk to water quality will be based on the use of recognised sediment quality guidelines.

375. The receptors proposed for inclusion in the assessment are geological and geomorphological features that are not currently protected under an environmental designation (e.g. sand banks). This is because there are no sensitive receptors identified within a 30 km conservative ZoI based on the alignment of tidal axes (north/south). The closest MPA is 47 km to the north-east (East of Gannet and Montrose Fields). The closest distance to the coast is 116 km at Peterhead.

376. The impact assessment will incorporate a combination of the sensitivity of the receptor, its value (if applicable) and the magnitude of the change to determine a significance of effect.

5.8 Scoping Questions to Consultees

377. The following questions are posed to consultees to help them frame and focus their response to the marine geology, oceanography and physical processes scoping exercise, which will in turn inform the Scoping Opinion:

- Do you agree with the sensitive receptor categories?
- Do you agree with conceptual evidence-based assessment of tidal currents, waves, sediment dispersion and stratification?
- Do you have any other matters or information sources that you wish to present?

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6 Benthic Ecology

6.1 Introduction

378. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on benthic ecology. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

379. This chapter provides an overview of the existing environment and further sets out the methodology and approach to assessing effects on benthic ecology in the Bellrock WFDA Environmental Impact Assessment (EIA) Report. Benthic ecology involves all habitats and species associated with the benthic environment, which includes shellfish. This chapter has been prepared by Royal HaskoningDHV.

380. The benthic ecology assessment is likely to have key inter-relationships with the following topics, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report:

- **Chapter 5: Marine Geology, Oceanography and Physical Processes**;
- **Chapter 7: Fish and Shellfish Ecology**;
- **Chapter 9: Offshore Ornithology;**
- **Chapter 10: Commercial Fisheries**;
- **Chapter 13: Marine Infrastructure and Other Users**; and
- **Chapter 19: Major Accidents and Disasters**.

381. The benthic ecology assessment is likely to have key inter-relationships with the above receptors, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

6.2 Legislation, Policy and Guidance

382. **Table 6.1** sets out the legislation, policy and guidance which have been considered in the preparation of this chapter and will be considered within the Bellrock WFDA EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

383. The UK Marine Policy Statement (Her Majesty's (HM) Government, 2011) represents a UK wide policy context within which Marine Plans will be developed. The Scottish Government has produced a National Marine Plan (Scottish Government, 2015) in accordance with these UK

policies. This plan provides a high-level approach to marine planning and general principles for decision making. The objective 'Living within environmental limits' covers points relevant to benthic ecology, and requires that:

- Biodiversity is protected, conserved and where appropriate recovered and loss has been halted;
- Healthy marine and coastal habitats occur across their natural range and are able to support strong, biodiverse biological communities and the functioning of healthy, resilient and adaptable marine ecosystems; and
- Our oceans support viable populations of representative, rare, vulnerable, and valued species.

384. Within Scotland's National Marine Plan are a range of strategic policies for which management decisions will be made across the main marine sectors. These policies include general overarching policies, and policies specific to offshore wind and marine renewable energy. The following general policies apply to this benthic ecology assessment:

- "*General Policy (GEN) 9 Natural heritage: Development and use of the marine environment must:*
  - *(a) Comply with legal requirements for protected areas and protected species.*
  - *(b) Not result in significant impact on the national status of Priority Marine Features.*
  - *(c) Protect and, where appropriate, enhance the health of the marine area.*
- *GEN 10 Invasive non-native species: Opportunities to reduce the introduction of invasive non-native species to a minimum or proactively improve the practice of existing activity should be taken when decisions are being made; and*
- *GEN 13 Noise: Development and use in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.*"

385. Scotland's National Marine Plan has identified a list of 81 Priority Marine Features (PMFs) (Tyler-Waters et al. 2016). These PMFs are species and habitats considered to be of greatest marine nature conservation importance in Scottish territorial waters and are considered under threat. Several of these PMFs include benthic habitats potentially present within the benthic study area (defined in **Section 6.4.1**).

Table 6.1: Summary of Relevant Legislation, Policy and Guidance for Benthic Ecology

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Legislation	
The Conservation of Offshore Marine Habitats and Species Regulations 2017 (referred to as the "Offshore Marine Regulations 2017")	Applies to Marine Licence and s.36 consent applications within Scottish waters beyond 12 nautical miles (nm).

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
The Wildlife and Countryside Act (1981)	Provides a list of threatened species for which killing, injuring or taking by any method is prohibited.
Nature Conservation (Scotland) Act 2004, Part 3 and Schedule 6	Makes amendments to the Wildlife and Countryside Act (1981), strengthening the legal protection for threatened species to include 'reckless' acts.
The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention; 1979)	Promotes national policies for the conservation of wild flora, wild fauna and natural habitats.
Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention') 1992	Provides a legal framework to protect and conserve maritime ecosystems through the prevention and elimination of pollution from offshore sources.
Convention on Biological Diversity 1992	Provides a legal framework to develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity.
Policy	
The Scottish Biodiversity Strategy (post-2020: statement of intent)	Reiterates the commitment (and desire to enhance) the 2020 Challenge for Scotland's Biodiversity (response to the Aichi Targets set by the United Nations Convention on Biological Diversity, and the EU's Biodiversity Strategy for 2020) and supplements Scotland's Biodiversity: It's in Your Hands (2004).
The Scottish Government National Marine Plan (2015)g	The following general policies apply to this benthic ecology assessment: • *"General Policy (GEN) 9 Natural heritage: Development and use of the marine environment must:* *a) Comply with legal requirements for protected areas and protected species.* *b) Not result in significant impact on the national status of Priority Marine Features.* *c) Protect and, where appropriate, enhance the health of the marine area."* • *"GEN 13 Noise: Development and use in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects."*
Guidance	
Joint Nature Conservation Committee (JNCC), Marine Monitoring Handbook, (JNCC, 2001)	These guidelines have been produced to promote good practice in marine monitoring.
Ware, S.J. & Kenny, A.J. (2011) Guidelines for the Conduct of Benthic Studies at Marine Aggregate Extraction Sites, 2nd ed. Marine Aggregate Levy Sustainability Fund (MALSF)	This guidance has been produced to accompany any dredging application and designed to promote a comprehensive and consistent approach to the assessment of the benthic environment (i.e. sediments and associated benthic fauna).

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Centre for Environment Fisheries and Aquaculture Science (Cefas), Guidelines for Data Acquisition to Support Marine Environmental Assessments for Offshore Renewable Energy Projects (Cefas, 2012)	These guidelines assist in the design, review and implementation of environmental data collection and analytical activities associated with all stages of offshore renewable energy developments.
Guidance and publications from Scottish Natural Heritage (SNH) and Marine Scotland on Priority Marine Features (PMF) and Marine Protected Area (MPA) search features (Tyler-Waters et al. 2016)	Provides guidance on the PMF and MPA features.
Chartered Institute for Ecology and Environmental Management (CIEEM), Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine. (CIEEM, 2018)	This guidance provides practical advice for all professionals involved with ecological evaluation and assessment for proposed developments in terrestrial, freshwater, marine and coastal environments.
NatureScot guidance on marine invasive non-native species (NatureScot, 2023)	Provides guidance on Invasive Non-native Species (INNS) known to threaten Scotland.
Guidance on Non-Native Species, approved by the Scottish Parliament (Scottish Government, 2012)	

6.3 Consultation

386. Consultation undertaken to date for the Bellrock WFDA relevant to benthic ecology is provided in **Table 6.2.**

Table 6.2: Consultation Relevant to Benthic Ecology

Consultee	Date/Document	Comment	How Comment is Addressed
NatureScot	30th March 2023, email response to benthic sampling plan for the Bellrock WFDA	In relation to the benthic sampling, we are content with the proposed plan, which follows standard approaches. The number and type of samples is appropriate for the site as is the sampling methodology. We would recommend that survey data is collected and stored in line with standard data protocols (e.g. MEDIN, where appropriate) so that they can be archived in a suitable data store.	Noted. Where possible, all data outputs will be compliant with the Marine Environmental Data and Information Network (MEDIN) data standards and therefore aligned to internationally recognised data standards.
NatureScot	30th March 2023, email response to benthic sampling plan for the Bellrock WFDA	It is noted that environmental DNA (eDNA) samples will be collected from the water column. We assume this will be for fish rather than benthic species. However, we note the intention to discuss further with stakeholders once the data is analysed and we would appreciate sight of any technical reports covering the eDNA sampling and analysis.	eDNA samples taken from the water column will be analysed for fish rather than benthic species. The results of the analysis of the eDNA samples are not going to be used to directly inform the benthic impact assessment in the Bellrock WFDA EIA Report, but instead to add context to the baseline and to derive insights if they exist. The Applicant will share any technical reports with NatureScot.
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	*Do you agree with the approach to the study area and baseline?* We are content with the study area and baseline proposed, which follows a standard approach.	The benthic study area is described in **Section 6.4.1**.
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	*Do you agree with the identified key receptors?* We note PMFs have been identified as the key features as well as the large-scale feature 'shelf deeps', which overlaps with a small area of the scoping boundary. We would also recommend that Annex 1 habitats should be considered, including *Sabellaria* reefs (if any have been identified during survey work). Please also refer to the following information notes from Marine Directorate: https://data.marine.gov.scot/dataset/status-sabellaria-	Noted, no Annex I habitats have currently been identified in or near the Bellrock WFDA. However, if the benthic surveys discover any, these will be assessed in the next stage of the Bellrock WFDA EIA.

Consultee	Date/Document	Comment	How Comment is Addressed
		spinulosa-reef-moray-firth-and-aberdeenshire-coasts-and-guidance	
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	*Do you agree with the proposed approach to EIA?* Based on the level of information provided at this stage, we are content in principle with the approach proposed to EIA – further advice can be provided as more detailed information on the proposal becomes available.	Noted.
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	*Do you agree with the proposed potential impacts?* We recommend that changes to physical processes are also included as these can impact benthic features. We also recommend that colonisation of hard structures and removal of hard structures (at decommissioning) is also included.	Noted, changes to physical processes will be assessed in the marine geology, oceanography and physical processes chapter of the Bellrock WFDA EIA Report. The outcome of the physical processes assessment will inform the impacts of increased suspended sediment concentrations (SSC) and remobilisation of existing contaminated sediments to be assessed in the benthic ecology chapter of the EIA Report. Colonisation of introduced substrates is discussed in **Section 6.6.1.2.5** and is screened into the Bellrock WFDA EIA Report. Removal of hard structures (at decommissioning) will also be assessed as part of colonisation of introduced substrates during the decommissioning phase.

Consultee	Date/Document	Comment	How Comment is Addressed
Marine Directorate- Science, Evidence, Data Digital (MD-SEDD)	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	*Do you agree with the identified key receptors?* One benthic receptor is listed (“shelf deeps”) and the map shows presence of this habitat within the site. However, it is likely that there will be other benthic species and habitats present. For example, the attached map shows a relatively high probability of *Arctica islandica* (ocean quahog – PMF) at the Bellrock site.	Noted, this has been discussed in **Section 6.4.4** and further information will be made available within the Bellrock WFDA EIA Report once the benthic surveys have been analysed.

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6.4 Existing Environment

6.4.1 Study Area

387. The benthic study area covers a total of 1413 km^2. It includes the Bellrock WFDA Scoping Boundary with a buffer of 10 km (**Figure 6.1** in **Appendix 1**). The buffer will be refined during the EIA process, with reference to the maximum distance of one tidal ellipse within the surrounding area of the Bellrock WFDA Scoping Boundary, using information from **Chapter 5: Marine Geology, Oceanography and Physical Processes** in the Bellrock WFDA EIA Report. Underwater noise modelling will also be taken into account when refining the benthic study area.

6.4.2 Data and Information Sources

388. Baseline data for the Bellrock WFDA EIA Report will be reviewed from the sources as detailed in **Table 6.3**. In addition to these sources, consultation with relevant stakeholders will be carried out and considered where appropriate in the Bellrock WFDA EIA Report (see **Section 6.3**).

Table 6.3: Summary of Key Data and Information Sources for Benthic Ecology

Dataset	Description
Marine Protected Areas	Marine Protected Area reports from NatureScot.
Priority Marine Habitats	Priority marine habitats information from NatureScot and JNCC.
North Sea benthic data	National Biodiversity Network (NBN) Atlas (https://nbnatlas.org/; accessed 10/07/2023).
North Sea benthic data	UKSeamap 2010 Interactive Map (https://jncc.gov.uk/our-work/marine-habitat-data-product-ukseamap/; accessed 10/07/2023).
North Sea habitats	European Marine Observation and Data Network (EMODnet) Seabed Habitats, data ranging from 2004 – 2014 (https://emodnet.ec.europa.eu/en/seabed-habitats; accessed 10/07/2023).
North Sea benthic data	Marine Life Information Network (MarLIN) (https://www.marlin.ac.uk/; accessed 10/07/2023).
North Sea habitats	NatureScot Habitat Map of Scotland (HabMoS) (https://www.environment.gov.scot/our-environment/habitats-and-species/habitat-map-of-scotland/; accessed 10/07/2023).
North Sea benthic and intertidal habitats	MAGIC interactive map (https://magic.defra.gov.uk/; accessed 10/07/2023).

6.4.2.1 Site-specific surveys

389. In addition to the data in **Table 6.3**, the following data has been collected and will be used to inform the baseline characterisation in the benthic ecology chapter in the Bellrock WFDA EIA Report (**Table 6.4**).

Table 6.4: Baseline Surveys for Benthic Ecology

Dataset	Spatial Coverage	Survey Year	Description
Bellrock WFDA geophysical survey, e.g. Side-Scan Sonar (SSS) and Multi-Beam Echosounder (MBES)	Bellrock WFDA Scoping Boundary	2023	The geophysical survey is used to help inform the broadscale habitat mapping and provide context to the benthic ecology baseline. MBES is used to obtain high resolution bathymetry data to map the seabed and it's features, whilst the SSS is used to provide information of the texture and nature of the seabed to identify bedforms and geological features.
Bellrock WFDA benthic survey, e.g. drop-down video and grab sampling	Bellrock WFDA Scoping Boundary	2023	Benthic survey data from the Bellrock WFDA will provide context on the habitat types present in the Bellrock WFDA, and this will provide context to the benthic ecology baseline. In addition, Particle Size Analysis (PSA) data will be gathered from grab samples to also inform the baseline. This will be discussed further in the **Bellrock WFDA EIA Report** and assessed against Cefas Action Levels.
Bellrock WFDA eDNA water samples	Bellrock WFDA Scoping Boundary	2023	eDNA samples have been collected from the Bellrock WFDA and it is anticipated these will be used to provide context to the baseline, but not intended to use this data to inform the EIA directly. Results will be provided to Marine Scotland Science (MSS) and NatureScot separately for information and future use, and eDNA sampling from sediment samples will be donated to the POSEIDON project. The eDNA survey methodology sent to NatureScot and the Marine Directorate (and MSS) for comment on the 8th March 2023.

6.4.3 Background

390. The Bellrock WFDA is located approximately 120 km east of Stonehaven (116 km southeast of Peterhead). The benthic species present within the area around the Bellrock WFDA are largely correlated with the substrate type and associated hydrodynamic conditions. This section provides information on the benthic species and habitats within the vicinity of the benthic study area.

6.4.4 Subtidal Ecology

391. Site-specific benthic surveys (**Table 6.4**) were undertaken in 2023 to characterise benthic ecology within the Bellrock WFDA. This data will inform the Bellrock WFDA EIA Report. Survey methods were agreed with MD-LOT and NatureScot prior to commencement (**Table 6.2**).

392. To inform this Bellrock WFDA Scoping Report, the predictive seabed habitats derived from EUSeaMap (EMODnet, 2023) have been used and will be ground-truthed against the outputs of the benthic surveys in the Bellrock WFDA EIA Report (see **Table 6.4**). The EUSeaMap (EMODnet, 2023) provides broad-scale modelling to predict habitats within the North Sea based on known environmental characteristics which are cross-checked with extant survey data.

393. The European Nature Information System (EUNIS) (EMODnet, 2023) habitat types show the majority of the benthic study area is predicted to comprise of offshore circalittoral sand (A5.27). There is also a small section at the South-East corner of the Bellrock WFDA predicted to be offshore circalittoral mud (A5.37). Within the benthic study area there is also a small area of offshore circalittoral coarse sediment (A5.15), located just to the north of the Bellrock WFDA (see **Figure 6.2** in **Appendix 1**).

394. The British Geological Survey (BGS) (2020) broadscale habitat map shows that the majority of the benthic study area is predicted to comprise of Sand (S) with a smaller section at the eastern side of the Bellrock WFDA being Muddy Sand (mS), both of which represent the EUNIS Broadscale Habitat (BSH) A5.2; Sand and Muddy Sand. Outside of the Bellrock WFDA but within the benthic study area there are patches of Slightly Gravelly Sand ((g)S) and Gravelly Sand (gS), representing EUNIS BSH A5.4; Mixed Sediment (**Figure 6.2** in **Appendix 1**). The BGS broadscale habitat map utilises the Folk (1954) sediment classification.

395. In summary, it is expected that the dominant subtidal benthic communities relating to the benthic study area are highlighted in **Table 6.5**.

Table 6.5: Summary of Benthic Habitats within the Benthic Study Area

Habitat	Source	Description
Offshore circalittoral sand (A5.27)	EMODnet (2023)	Offshore (deep) circalittoral habitats with fine sands or non-cohesive muddy sands. Very little data is available on this habitat. However, they are likely to be more stable than their shallower counterparts and characterised by a diverse range of polychaetes, amphipods, bivalves and echinoderms.
Offshore circalittoral mud (A5.37)	EMODnet (2023)	Sublittoral muds, occurring below moderate depths of 15-20 m, either on the open coast or in marine inlets such as sealochs. The seapens *Virgularia mirabilis* and *Pennatula phosphorea* are characteristic of this habitat type together with the burrowing anemone *Cerianthus lloydii* and the ophiuroid *Amphiura spp*. The relatively stable conditions often lead to the establishment of communities of burrowing megafaunal species, such as *Nephrops norvegicus*.
Offshore circalittoral coarse sediment (A5.15)	EMODnet (2023)	Offshore (deep) circalittoral habitats with coarse sands and gravel or shell. This habitat may cover large areas of the offshore continental shelf although there is relatively little quantitative data available. Such habitats are quite diverse compared to shallower versions of this habitat and generally characterised by robust infaunal polychaete and bivalve species.

Habitat	Source	Description
		Animal communities in this habitat are closely related to offshore mixed sediments and in some areas settlement of Modiolus modiolus larvae may occur and consequently these habitats may occasionally have large numbers of juvenile M. modiolus. In areas where the mussels reach maturity their byssus threads bind the sediment together, increasing stability and allowing an increased deposition of silt leading to the development of the biotope MC2-222.
Sand and muddy sand (A5.2)	BGS (2020)	Clean medium to fine sands or non-cohesive slightly muddy sands on open coasts, offshore or in estuaries and marine inlets. Such habitats are often subject to a degree of wave action or currents which restrict the silt and clay content to less than 15%. This habitat is characterised by a range of taxa including polychaetes, bivalve molluscs and amphipod crustacea.
Mixed sediment (A5.4)	BGS (2020)	Mixed (heterogeneous) sediments, fully marine and supporting various animal-dominated communities, with relatively low proportions of seaweeds. This habitat may include well mixed muddy gravelly sands or very poorly sorted mosaics of shell, cobbles and pebbles embedded in mud, sand or gravel. Due to the quite variable nature of the sediment type, a widely variable array of communities may be found, including those characterised by bivalves (MB4-233, MB4-231, and MB2-222), polychaetes (MB4-232) and file shells (MB2-221). This has resulted in many species being described as characteristic of this biotope complex all contributing only a small percentage to the overall similarity (see below).

396. The PMF dataset provided by Geodatabase for Marine Habitats and Species (GeMS) adjacent to Scotland which is built upon mapping presented in Baxter et al. (2011) notes the habitat of shelf deeps (tunnel valley) to be present on the east side of the Bellrock WFDA. This habitat is not listed as one of the 81 PMFs, although it is within the GeMS Large Scale Features dataset. If a potential tunnel valley is present this will be shown in the geophysical surveys and assessed in the benthic ecology chapter of the Bellrock WFDA EIA Report which will also make use of the marine geology, oceanography and physical processes assessment.

397. Marine Scotland (now Marine Directorate) has identified 11 of the 81 PMFs to have further management measures to protect the most vulnerable PMFs in Scottish inshore waters. As these 11 PMFs are all only found within 6 nautical miles (nm) of the shore there would not be any direct impacts and are unlikely to be indirect impacts from the Bellrock WFDA. However, the Bellrock WFDA EIA Report will review any future links identified through consultation and site-specific surveys (**Table 6.4**) during the EIA process and assess if required (see **Section 6.2**).

398. Weiner et al. (2016), produced a suitability habitat map for ocean quahog, *Artica islandica*, which is a PMF. The study showed the benthic study area to be within a habitat seen as having high suitability for ocean quahog (**Figure 6.4** in **Appendix 1**).

399. Currently, no PMFs have been identified within the Bellrock WFDA.

400. The site-specific surveys include sampling for potential contaminated sediments throughout the benthic study area. Samples will be analysed and assessed against the Cefas Action Levels. **Figure 6.3** in **Appendix 1** presents the sampling locations.

6.4.5 Designations

401. The benthic study area contains no designated areas protected for the benthic features. The nearest designated area to the benthic study area is the East of Gannet and Montrose Fields Nature Conservation Marine Protected Area (NCMPA), which is located 47 km away, outside any potential zone of influence for potential impacts to benthic ecology.

6.5 Potential Impacts

402. The potential effects from the Bellrock WFDA during construction, operation and maintenance, and decommissioning phases are outlined below and summarised in **Table 6.6** Sensitivities of the benthic habitats and communities will be judged for each of these phases on the basis of expert judgement and reference to Marine Evidence-Based Sensitivity Assessments (MarESA) (Tyler-Walters et al*.* 2018) available on the Marine Life Information Network (MarLIN) website and the Feature Activity Sensitivity Tool (FeAST, 2023).

403. In addition, the potential for cumulative and transboundary effects (see **Sections 6.6.3** and **6.6.4**), as well as inter-relationships and interactions between effects for the Bellrock WFDA, will also be determined and assessed.

6.5.1 Potential Impacts During Construction

404. Potential impacts during the construction phase of the Bellrock WFDA could arise from disturbance of the seabed during the installation of floating substructures (FSSs) and their station keeping systems (SKS) (i.e., anchors and moorings), fixed bottom substructures (FBSSs) (if used), subsea cable hub(s), inter-array cables (IACs) and associated cable protection and pre-construction works (including any seabed preparation, boulder clearance and unexploded ordnance (UXO) investigation/clearance[19]), and the use of vessels for any associated activities.

405. These impacts include:

- Physical disturbance and temporary loss of seabed habitat;
- Increased suspended sediment concentrations (SSC) and sediment re-deposition;
- Underwater noise and vibration;
- Accidental release of pollutants;
- Remobilisation of existing contaminated sediments;
- Introduction of INNS from marine traffic; and
- Potential impacts on designated sites.

[19] A separate Marine License application(s) will be made prior to UXO clearance works, with an accompanying assessment of UXO clearance effects on benthic ecology. The assessment included in the Bellrock WFDA EIA Report will be indicative only.

406. Effects which span the life of the Bellrock WFDA (e.g. permanent habitat loss) will be considered as part of the operational phase assessment and are therefore not considered in the construction phase assessment to avoid duplication.

6.5.2 Potential Impacts During Operation and Maintenance

407. Potential impacts during operation and maintenance will typically result from the physical presence of infrastructure on the seabed (i.e. SKSs, FBSSs, IACs and any cable protection, and subsea cable hub(s)) which will result in permanent habitat loss. Maintenance activities also have the potential to result in temporary impacts, similar to those occurring during construction, but smaller in extent and therefore of a lower magnitude.

408. These impacts include:

- Physical disturbance and temporary loss of seabed habitat;
- Permanent habitat loss;
- Increased suspended sediments and sediment re-deposition;
- Electromagnetic fields (EMF);
- Colonisation of introduced substrate;
- Re-mobilisation of contaminated sediment during intrusive works;
- Accidental release of pollutants;
- Introduction of INNS from marine traffic;
- Underwater noise and vibration; and
- Potential impacts on designated sites.

6.5.3 Potential Impacts During Decommissioning

409. It is anticipated that decommissioning impacts would be similar in nature to those of construction, as detailed in **Section 6.5.1**, although the magnitude of impact is likely to be lower. For example, where construction may require drilling of substructures piles and/or seabed preparation, decommissioning would likely require cutting of substructures piles to seabed level and may potentially result in less seabed disturbance than construction.

6.5.4 Embedded Mitigation Measures

410. The Applicant commits to undertaking construction works in adherence with all relevant best practice guidance and legislation and will prepare all necessary plans in advance of construction activities, including Cable Plan (CaP), Environmental Management Plan (EMP), Invasive Non-native Species Management Plan (INNSMP) and Marine Pollution Contingency Plan (MPCP).

411. All vessels must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78. The EMP will ensure all works are undertaken in line with best practice for working in the marine environment, and an INNSMP will be developed to include provisions for

INNS management. An MPCP will set out the provisions and response procedures in the event of pollution incidents (i.e. hydrocarbon release). These will be consulted with relevant stakeholders prior to the start of construction.

412. The potential risk of spreading or introducing INNS will be also mitigated by employing biosecurity measures in accordance with the following relevant regulations and guidance:

- MARPOL sets out appropriate vessel maintenance in terms of the prevention of pollution from ships caused by operational or accidental causes;
- Adherence by contractors to the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention, 2004), which provide global regulations to control the transfer of potentially invasive species; and
- Consideration of guidance from the International Maritime Organization (IMO, 2023) on the control and management of ships' biofouling to minimise the transfer of invasive aquatic species.

413. Where seabed preparation is required (e.g. seabed levelling), methods and equipment that have been designed to minimise potential for sediment suspension and dispersal will be adopted.

414. A CaP will be developed and adhered to. The CaP will confirm planned IAC routing, burial (if any), and any additional protection if required, and will set out methods for post-installation IAC monitoring. Selection of IAC (if buried) installation methods and equipment most suitable for seabed conditions designed to minimise sediment suspension into the water column.

6.6 Scoping of Potential Impacts

6.6.1 Potential Impacts Scoped In

6.6.1.1 Construction

415. The potential impacts on benthic ecology from activities carried out during the construction phase that are proposed to be scoped in for further assessment in the Bellrock WFDA EIA Report are set out in **Section 6.6.1.1.1** to **6.6.1.1.3**.

6.6.1.1.1 Physical Disturbance and Temporary Loss of Seabed Habitat

416. There is the potential for direct physical disturbance of the seabed and temporary habitat loss caused during the installation of the SKSs (i.e., anchors and moorings), FBSSs (if used), subsea cable hub(s), IACs and associated cable protection and ancillary equipment (including any seabed preparation, boulder clearance and UXO investigation/ clearance). Disturbance can potentially be caused by the following:

- Securing of FSSs and FBSSs to the seabed could include a selection of the following types of piles and anchors:

  - Driven piles, suction piles, drag embedment anchors, drilled and grouted anchors, vertical load anchors, or suction embedded plate anchors.
- Scour protection for SKS anchors, FBSSs (if used) and subsea cable hub(s) could include:
  - Graded rock placement/rock bags, concrete mattresses, grout bags or artificial (frond) mattresses.
- Installation of the IACs could include the following burial techniques (if buried):
  - Jet trenching, mechanical trenching, cable ploughing, and mass flow excavator.
- Cable protection for the IACs could include the following:
  - Cable burial, concrete mattresses, rock placement, grout bags, and cast iron shells.

417. Areas affected by piling, mooring and cable installation are likely to see some movement in terms of scour and mooring swing. Therefore, ongoing disturbance will be assessed as part of the operation phase, see **Section 6.6.1.2.1**. However, this will be assessed in depth once the design details are known.

418. The presence of mooring lines could provide protection to the seabed around each structure for the lifetime of the Bellrock WFDA (expected to be up to 50 years[20]), where the mooring line does not drag on the seabed. This is because fishing activities (which have the potential to disturb the seabed) and other marine traffic may be restricted within the Bellrock WFDA for safety reasons. However, as discussed above, the movement and ongoing disturbance from mooring lines may have an operational impact and is discussed in **Section 6.6.1.2.1**.

419. The magnitude of the potential impact will be assessed based upon the outcomes of the marine geology, oceanography and physical processes assessment (i.e., the footprint of impact from construction activities). The magnitude of the impact of physical disturbance and temporary loss of seabed habitat will be considered in terms of a worst-case scenario (i.e., maximum area affected) at any one location.

6.6.1.1.2 Increased Suspended Sediment Concentrations and Sediment Re-deposition

420. Construction activities have the potential to cause mobilisation of sediments in the water column and an increase in SSC. Such concentrations have the potential to affect benthos through blockage of filter feeders and/or smothering sessile species. Given that the substrate at the Bellrock WFDA is generally stable supporting a diverse benthic community (**Section 6.4.4**), it is likely that the benthic communities are not habituated to smothering from natural events and are therefore likely to have some sensitivity to such impacts.

421. The magnitude of the potential impact will be based upon the outcomes of the marine geology, oceanography and physical processes assessment. The magnitude of the impact of sediment plumes and smothering on benthic receptors will be considered in terms of a worst-case scenario (i.e., maximum area effected, the maximum concentrations of the plume/duration of smothering and the maximum thickness of deposited material) at any one location. Effects will be assessed in

[20] The Bellrock WFDA seabed lease is up to 60 years, while the operational life is up to 50 years. At the end of the operational life, any repowering will be subject to separate consents.

relation to background SSC levels and natural variations and seasonal changes. The nature, type and duration of potential construction activities will be considered to determine the magnitude of impacts.

6.6.1.1.3 Remobilisation of Existing Contaminated Sediments

422. Sediment disturbance could lead to the mobilisation of contaminants (if present) that could be harmful to benthic communities. Levels of sediment contamination will be determined through the benthic survey campaigns (see **Table 6.4**) and assessed against the Cefas Action Levels. Potential impacts related to the remobilisation of contaminants are currently scoped in for assessment. However, should the results of benthic sampling demonstrate low levels of sediment contamination, the Applicant would seek to scope these out of further assessment through agreement with stakeholders in future consultation.

423. Sensitivities will be informed by available literature, including the assessments available on MarLIN and peer-review publications, and will be assessed in relation to background contaminant levels collected from the site-specific surveys (**Table 6.4**).

6.6.1.2 Operation and Maintenance

424. The potential impacts on benthic ecology from activities carried out during the operation and maintenance phase that are scoped in for further assessment in the Bellrock WFDA EIA Report are set out in **Sections 6.6.1.2.1** to **6.6.1.2.6**.

6.6.1.2.1 Physical Disturbance and Temporary Loss of Seabed Habitat

425. There is potential for ongoing physical disturbance of the seabed during the operation phase from maintenance activities, such as indentations on the seabed from jack-up vessels required for IAC repairs or reburial. In general, the effects from planned maintenance should be temporary, localised and smaller in scale than during construction. Nevertheless, some habitats and species will show signs of recovery between construction and maintenance activities. However, it is proposed that temporary physical disturbance of the seabed due to operation and maintenance activities should be ‘scoped in' to the Bellrock WFDA EIA Report.

426. Note that physical disturbance and temporary loss of seabed habitat from substructure movement will also be included within the assessment of permanent habitat loss as the movements can be seen as a consistent occurrence and therefore permanent (see **Section 6.6.1.2.2**).

6.6.1.2.2 Permanent Habitat Loss

427. Permanent habitat loss will occur in the footprint of all anchors associated with SKSs, FBSSs, IACs and protection (where the rock protection is situated on a sediment habitat) and subsea cable hub(s). There may also be some loss over time associated with scour around the mooring and substructure footprints. During operation, some disturbance on the seabed may occur during movement and drag of mooring lines and dynamic IACs in response to physical conditions.

428. Data from the baseline environment would be used to assess what area of habitat loss would occur and what specific habitat type/species would be affected, see **Section 6.7** for the proposed EIA methodology that would be used. It is proposed to scope in permanent habitat loss during the operational phase into the Bellrock WFDA EIA Report for further consideration.

6.6.1.2.3 Increased Suspended Sediments and Sediment Re-deposition

429. It is anticipated that the effects from SSC from operation and maintenance activities such as IAC repairs and vessel movements will be small scale and temporary, and less than the same impact during construction.

430. There is also the possibility for catenary action of mooring lines and dynamic inter-array cables to entrain sediment into suspension in the water column. Therefore, any potential impacts related to the suspension of fine sediments during operation and maintenance have been scoped into the Bellrock WFDA EIA Report.

6.6.1.2.4 Electromagnetic Fields

431. Potential impacts of EMF from operational cables will be considered. A comparison of EMF field strength across 10 different cables (buried / unburied) and wind farms (Normandeau et al*.* 2011) suggests that EMF may be detectable above background levels up to 10 m from the vicinity of the cable. However, this decreases at lower voltages and where cable protection measures, including burial, are used. Any impacts are likely to be highly localised, as EMFs are strongly attenuated and decrease as an inverse square of distance from the cable (Gill and Barlett, 2010).

432. A more recent study by BOEM (2016), found that EMFs produced by cables have also been shown to reduce to background levels approx. 1 m from the cable. Additionally, Hutchison et al. (2021) found that the closer the DC cables bundled together are, the smaller the extent of the deviation from the geomagnetic field, indicating a degree of cancellation.

433. EMF generated by subsea cables and IACs has the potential to affect benthic receptors in close proximity to such infrastructure. However, there is limited information on the effects of EMF on benthic receptors, with the majority of research concentrated on fish. A recent study by Hutchinson et al. (2020) demonstrated behavioural changes in American lobster *Homarus americanus* in the presence of EMFs. However, this species is not currently found to be present within the benthic study area.

434. Similarly, other benthic invertebrates have been shown to use the earth's magnetic fields for navigation, such as the amphipods *Idotea baltica basteria* and *Gondogenia antarctica*, and the spiny lobster *Panulirus argus* (Herrnkind and McLean, 1971, Lohmann et al. 1995, Ugolini and Pezzani, 1995, Boles and Lohmann, 2003, Tomanová and Vácha, 2016). However, Bochert and Zettler (2006) studied the effects of EMF on the survival and physiology of various crustaceans, marine worms, and echinoderms in the context of a variety of cables associated with offshore wind farms in the Baltic Sea and demonstrated no significant effects for any species after three months of exposure.

435. Furthermore, there were no differences between benthic community assemblages observed in visual surveys of wind farm subsea cables and their peripheral areas (Wilhelmsson et al. 2010). Finally, the presence of diverse and seemingly healthy benthic communities on existing offshore wind farm structures indicates that EMF is unlikely to cause a long-term significant effect upon benthic receptors (Linley et al. 2007; Walker et al. 2009). In addition, a recent review of evidence of the effect of EMF on benthic receptors undertaken for Berwick Bank Wind Farm (SSER, 2022)

indicated that any effects, should any occur at all, would affect a very limited area (e.g. in the immediate vicinity of cables) and, therefore, would not lead to significant adverse effects.

436. There is currently potential for cables to be surface laid, surface laid with protection or buried. Therefore, on the basis of the information presented here, it is proposed to scope this impact in for further consideration within the Bellrock WFDA EIA Report.

6.6.1.2.5 Colonisation of Introduced Substrate

437. The subsea structures are expected to be colonised by a range of species leading to a localised increase in biodiversity. However, there is the potential for some of these species to appear from further afield that do not normally occur in the Bellrock WFDA and for these species to be INNS. The presence of the structures would also provide habitat for mobile species and serve as a refuge for fish. This is likely to represent a change from the baseline ecology (**Section 6.4.4**) which is unlikely to support hard surfaces for attachment. Overall, the area available for colonisation would be low and to date there is no evidence of significant changes of the seabed beyond the vicinity of the substructure or mooring structures due to the installation of windfarm infrastructure (Lindeboom et al*.* 2011).

438. However, given the change in habitat type from a soft sediment dominated area to small areas of hard substrate this effect will be scoped in to the Bellrock WFDA EIA Report for further consideration.

6.6.1.2.6 Remobilisation of Existing Contaminated Sediments

439. As discussed in **Section 6.4.2**, contamination data has been collected in the Bellrock WFDA (survey locations shown in **Figure 5.7** in **Appendix 1**). The surveys could indicate whether there are significant levels of chemicals within the sediments that could potentially be disturbed and have harmful effects on the benthic ecology. It is important to note that the sandy nature of the offshore sediments does reduce this risk.

440. Levels of sediment contamination will be determined through the benthic survey campaigns (see **Table 6.4**) and assessed against the Cefas Action Levels. Potential impacts related to the remobilisation of contaminants are currently scoped in for assessment. However, should the results of benthic sampling demonstrate low levels of sediment contamination, the Applicant would seek to scope these out of further assessment through agreement with stakeholders in future consultation.

6.6.1.3 Decommissioning

441. It is anticipated that the potential decommissioning impacts would be similar in nature to those of construction, although the magnitude of impact will vary. Even though no seabed preparation will be required, it is thought that infrastructure will have been colonised by benthic species and the removal of such infrastructure could have a larger effect than that seen at construction. It is important to note that given the timeframe of the Bellrock WFDA EIA Report (up to 50 years), the baseline environment is likely to have changed and therefore decommissioning cannot be fully assessed at this stage.

442. Note that the magnitude of impact for underwater noise would also be reduced in decommissioning due to the lack of piling.

443. The same potential topics identified for construction are therefore scoped in for decommissioning (as per **Section 6.6.1** and **6.6.1.2**). In addition, permanent habitat loss is proposed to be 'scoped in' to the Bellrock WFDA EIA Report for further assessment.

6.6.2 Potential Impacts Scoped Out

6.6.2.1 Construction

444. The potential impacts on benthic ecology from activities carried out during the construction phase that are proposed to be scoped out from further assessment in the Bellrock WFDA EIA Report are set out in **Section 6.6.2.1.1** to **6.6.2.1.4**.

6.6.2.1.1 Underwater Noise and Vibration

445. Research into the effects of underwater noise in relation to benthic ecology is ongoing. However, it is likely that there is habituation to noise created by the existing shipping in the area around the Bellrock WFDA (AIS, 2019). Vessel traffic noise is unlikely to cause significant effects on benthic receptors and will therefore be scoped out.

446. There may be reactions from some benthic species to episodic noise such as that from pile driving (Lovell et al*.* 2005; Heinisch and Weise, 1987). Any effect is likely to be localised and temporary. Dannheim et al. (2020) acknowledge that even though there is evidence to suggest a change in behaviour for some benthic species, the effects of underwater noise and vibration is a priority area for future research as we do not know if changes to population structure and distribution may be affected long term. The latest research will be considered and presented within the Bellrock WFDA EIA Report.

447. Any UXO clearance required ahead of construction would also have small spatial and temporal impacts due to the nature of the activity. An UXO survey will be completed prior to construction. The exact type, size and number of possible detonations and duration of UXO clearance operations is therefore not known at this stage. This means that any assessments for UXO clearance in the Bellrock WFDA EIA Report will be for information only and are not part of the application. A separate Marine License application(s) will be made prior to construction for UXO clearance works, with an accompanying assessment of UXO clearance effects on benthic ecology. The assessment included in the Bellrock WFDA EIA Report will be indicative only.

448. A desk-based UXO Threat and Risk Assessment for the Bellrock WFDA has been conducted which has assessed the likelihood of encountering a threat, in accordance with the risk assessment methodology, as low. Although, there is evidence of prospective UXO contamination at the benthic study area (6 Alpha Associates Ltd, 2023). A summary of this report is provided in **Section 8.6.1.1.1.1** of **Chapter 8: Marine Mammals**.

449. In conclusion, there is potential that piling may provide a source and pathway to benthic receptors. However, the effect of this is thought to be negligible and therefore it is proposed that potential underwater noise and vibration effects should be scoped out of the Bellrock WFDA EIA Report.

6.6.2.1.2 Accidental Release of Pollutants

450. Accidental spills and pollution events can occur from vessels and installation techniques required for the installation and operation of the windfarm.

451. As discussed in **Section 6.5.4**, all vessels must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78. An EMP or similar will also be put in place and implemented to ensure all works are undertaken in line with best practice for working in the marine environment. A Marine Pollution Contingency Plan (MPCP) will set out the provisions and response procedures in the event of pollution incidents (i.e. hydrocarbon release).

452. As a result of these embedded mitigation measures, it is considered that the risk to the marine environment resulting from a spill is low and with the appropriate management measures in place, should a spill occur, the vessel Shipboard Oil Pollution Emergency Plan (SOPEP) and the MPCP will be in place to mitigate any consequences. Therefore, it is considered that no significant effect would occur and as a result of these mitigation measures, it is proposed that this impact is scoped out of the Bellrock WFDA EIA Report.

6.6.2.1.3 Introduction of Invasive Non-native Species from Marine Traffic

453. The potential risk of spreading or introducing INNS will be mitigated by employing biosecurity measures in accordance with that discussed in **Section 6.5.4**. These commitments would be secured in the EMP via a condition in the Marine License application. The EMP will be agreed with relevant stakeholders prior to the start of construction. Additionally, an INNSMP will be developed to include provisions for INNS management.

454. With the appropriate mitigations in place, it is expected that the risk of INNS being introduced would be reduced. Therefore, it is proposed that with this embedded mitigation, introduction of INNS from marine traffic during the construction phase is scoped out[21] of the Bellrock WFDA EIA Report.

6.6.2.1.4 Potential Impacts on Designated Sites

455. The benthic study area does not directly overlap any designated sites (see **Section 6.4.5**). Secondary impacts on benthic habitats extends to an approximate distance of a tidal ellipse from the source, to ensure that all potential secondary effects are captured. As shown in **Chapter 5: Marine Geology, Oceanography and Physical Processes**, the extent of the tidal ellipse will be assessed during the next stage of the EIA process. As the closest distance of any protected site is 47 km away, it is expected that this distance falls outside of the secondary impact zone. Therefore, impacts on designated sites are proposed to be scoped out of the Bellrock WFDA EIA Report.

456. See the **Bellrock WFDA Habitat Regulations Appraisal** (**HRA) Screening Report** for further information on SACs and SPAs (BlueFloat Energy | Renantis Partnership, 2024), and **Appendix 2: NCMPA Screening** of this Bellrock WFDA Scoping Report for NCMPAs.

6.6.2.2 Operation and Maintenance

457. The potential impacts on benthic ecology from activities carried out during the operation and maintenance phase that are scoped out from further assessment in the Bellrock WFDA EIA Report are set out in **Section 6.6.2.2.1** to **6.6.2.2.4**.

[21] This does not include consideration of towing of FSSs from ports outside the UK – it is assumed that FOUs would be towed from a UK-based port.

6.6.2.2.1 Accidental Release of Pollutants

458. The potential impacts of pollution events from operational vessels are not considered to result in significant effects on benthic receptors. The potential impacts will be to a lesser degree than in the construction phase, due to fewer vessels required during operation. Embedded mitigation measures to reduce spillage risk and establish appropriate management measures described in **Section 6.6.2.1.1** will also cover the Bellrock WFDA operation phase. Therefore, it is proposed that this impact is scoped out of the Bellrock WFDA EIA Report.

6.6.2.2.2 Introduction of Invasive Non-native Species from Marine Traffic

459. The potential impacts from the introduction of INNS from operational vessels are not considered to result in significant effects on benthic receptors. The potential impacts will be to a lesser degree than in the construction phase, due to fewer vessels required during operation. Embedded mitigation measures related to biosecurity in the marine environment described in **Section 6.6.2.1.3** will also cover the Bellrock WFDA operation phase. Biosecurity commitments would be implemented through the EMP, to be consulted with relevant stakeholders prior to the start of construction. Additionally, an INNSMP will be developed to include provisions for INNS management Therefore, it is proposed that this impact is scoped out[22] of the Bellrock WFDA EIA Report.

6.6.2.2.3 Underwater Noise and Vibration

460. Noise and vibration generated by the operational wind turbines can be conducted through the tower and FSSs/FBSSs or moorings into the water. Monitoring studies of underwater noise from FBSS operational turbines have shown the noise levels from North Hoyle, Scroby Sands, Kentish Flats and Barrow offshore wind farms to be only marginally above ambient noise levels and therefore not significant (Walker et al. 2010).

461. Other underwater noise sources during operation (e.g. vessel traffic) are unlikely to cause significant effects on benthic receptors due to the limited spatial and temporal extent of impacts to the receptors. There is no evidence to suggest this low level of noise and vibration has a significant effect on benthic ecology.

462. As piling will be completed during the construction phase, any underwater noise and vibration impacts during the operation phase are unlikely to cause significant effects on benthic receptors and therefore are proposed to be scoped out of the Bellrock WFDA EIA Report for the operation phase.

6.6.2.2.4 Potential Impacts on Designated Sites

463. As outlined in **Section 6.6.2.1.4**, the designated site is far enough away to have no impacts, with the nearest being 47 km (see **Section 6.6.2.1.4**). Therefore, it is proposed to also scope out this impact during the operational phase for the Bellrock WFDA EIA Report.

6.6.2.3 Decommissioning

464. The same potential impacts identified for construction are expected to be scoped out for decommissioning (as per **Section 6.6.2.1** and **6.6.2.2**). Except for the following two impacts which

[22] This does not include consideration of towing of FSSs from abroad – it is assumed that FOUs would be towed from a UK-based port.

are proposed to be scoped in due to the lifetime of the Bellrock Project and its potential effects when removing infrastructure:

- Permanent habitat loss; and
- Colonisation of introduced substrate.

6.6.3 Potential Cumulative Effects

465. There is potential for cumulative effects to arise in which other projects or plans could act collectively with the Bellrock WFDA to affect benthic ecology receptors. Therefore, cumulative effects related to benthic ecology are scoped into the Bellrock WFDA EIA Report for all stages.

466. The cumulative effects assessment (CEA) will follow the standard approach outlined in **Chapter 4: Approach to Scoping and EIA.** The CEA will be considered in two stages; a CEA of the whole Bellrock Project (i.e., the Bellrock WFDA and the Bellrock Offshore Transmission Development Area; OfTDA), followed by a CEA of the whole Bellrock Project alongside other plans or projects. Offshore wind farm projects and other activities (such as oil and gas operations) relevant to the assessment of cumulative effects on benthic ecology will be identified through a screening exercise. The potential effects considered in the CEA will be in line with those described for the Bellrock WFDA-alone assessment.

467. The CEA for benthic ecology will specifically consider cumulative noise effects, habitat loss and changes to seabed habitat.

468. The types of plans and projects to be taken into consideration are:

- Marine Renewable Energy (MRE) developments;
- Licenced disposal sites;
- Planned construction sub-sea cables and pipelines;
- Oil and gas exploration and development;
- Carbon Capture Storage activities; and
- UXO clearance.

6.6.4 Potential Transboundary Effects

469. Due to the localised and small-scale nature of the impacts on benthic ecology means that significant transboundary effects are considered to be unlikely due to the nearest maritime boundary being approximately 125 km away. It is therefore proposed that transboundary benthic effects are scoped out from further consideration within the Bellrock WFDA EIA Report.

6.6.5 Summary of Benthic Ecology Impacts Scoped In or Out

470. **Table 6.6** outlines the impacts on benthic ecology which are proposed to be scoped in or out of the Bellrock WFDA EIA Report. These may be refined through consultation activities and as additional Bellrock WFDA information and site-specific data become available.

Table 6.6: Summary of Potential Impacts Scoped In (✓) or Out (x) for Benthic Ecology

Potential Impact	Receptor(s)	Description of Potential Effects	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Physical disturbance and temporary habitat loss of seabed habitat	All benthic ecology and habitats, as described in **Section 6.40**.	Physical direct disturbance of the seabed and temporary habitat loss from infrastructure in the Bellrock WFDA.	✓	✓	✓	Development of, and adherence to, a CaP, will ensure that best practice cable installation methods are used to minimise seabed unnecessary seabed disturbance and sediment suspension.
Permanent habitat loss		Permanent habitat loss from infrastructure in the Bellrock WFDA.	x	✓	✓	N/A
Increased SSC and sediment re-deposition		Mobilisation of sediments in the water column from Bellrock WFDA activities.	✓	✓	✓	Development of, and adherence to, an appropriate EMP and a CaP, will ensure that best practice cable installation methods are used to minimise seabed unnecessary seabed disturbance and sediment suspension.
Remobilisation of existing contaminated sediments		Sediment disturbance could lead to mobilisation of contaminants that are harmful to benthic communities.	✓*	✓*	✓*	Development of, and adherence to, an appropriate EMP and a CaP, will ensure that best practice cable installation methods are used to minimise seabed unnecessary seabed disturbance and sediment suspension.
Introduction of INNS from vessel traffic		Risk of spreading INNS through vessel traffic, i.e., from ballast water.	x	x	x	Biosecurity commitments would be implemented through the EMP. The EMP will be consulted with relevant stakeholders prior to the start of construction. An INNSMP will be developed to include provisions for INNS management.

Potential Impact	Receptor(s)	Description of Potential Effects	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Disturbance from underwater noise and vibration		Increased noise from Bellrock WFDA activities such as increased vessels, piling and potential UXO clearance.	x	x	x	N/A
Interactions with EMF		Operational cable emitting EMF which can be harmful to benthic communities.	x	✓	x	A CaP will be prepared where IACs are buried to confirm the extent to which cable burial can be achieved.
Colonisation of introduced substrate		Infrastructure in the Bellrock WFDA being colonised by benthic communities.	x	✓	✓	N/A
Potential impacts on designated sites		Bellrock WFDA activities effects on designated sites for benthic ecology.	x	x	x	N/A
Accidental release of pollutants		Accidental spills and pollution events occurring from vessels and installation techniques required.	x	x	x	Development and adherence to, an EMP, including a MPCP. In addition, adherence by contractors to OSPAR, IMO, and MARPOL guidelines for preventing pollution at sea.
*Remobilisation of contaminated sediments will be scoped out if site-specific sediment samples reveal low contaminant levels						

6.7 Proposed Approach to Impact Assessment

471. In combination with guidance from CIEEM (2018), the EIA Regulations provide a framework for the methodology to be adopted in the Bellrock WFDA EIA Report to assess the potential effects on benthic habitat receptors.

472. Due to the complexity of ecological system processes and the uncertainty of some impacts and efficacy of some mitigation measures, experienced professional judgement also plays a key role in the evaluation of features and in determining significance of effects. The impact assessment methodology for the benthic ecology chapter will follow that which is described in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**, as well as the guidance documents presented in **Section 6.5.4**.

473. Specific to marine ecology, the CIEEM (2019) guidelines will be followed in order to identify Important Ecological Features (IEFs). Assessments of the identified IEFs will be presented in the baseline characterisation of each relevant technical section. To reflect specific interests, the CIEEM (2019) guidelines will be used to produce criteria defining the value of each IEF and will include specific consideration of PMFs within the benthic study area.

474. The assessment of the potential effects upon the benthos will be cross-referenced, where relevant, to the assessments for the marine geology, oceanography and physical processes assessment and underwater noise modelling. The impact assessment, in common with other receptors, will consider the following:

- Magnitude/extent: the size or amount of impact – e.g. area of seabed directly or indirectly affected;
- Sensitivity of receptors;
- Duration: time for recovery (may vary with receptor sensitivity) and duration of activity causing an effect;
- Reversibility of the impact; and
- Timing and frequency.

475. Regarding the characterisation of the benthic subtidal ecology baseline, a combination of MarESA (Tyler-Walters et al. 2018) and FeAST (2023) will be utilised to inform the sensitivity of benthic receptors in the effects assessment section of the benthic ecology chapter. MarESA and FeAST (2023) determine sensitivity based on resistance (tolerance) and resilience (recoverability), which are defined as:

- Resistance: the likelihood of damage (termed intolerance or resistance) due to a pressure; and
- Resilience: the rate of (or time taken for) recovery (termed recoverability, or resilience) once the pressure has abated or been removed.

476. Site-specific surveys as set out in **Table 6.4** will also be carried out to inform vulnerability and sensitivity assessments.

477. There are no areas within the Bellrock WFDA where the presence of PMFs is predicted (further information in **Section 6.4.4**). However, if the site-specific surveys report any sensitive or protected habitats/species within the benthic study area, micro-siting where practicable may be an option as additional mitigation should they be vulnerable to potential significant effects.

478. The approach to CEA is detailed in **Sections 6.6.3** and **6.6.4** respectively, as well as **Chapter 4: Approach to Scoping and Environmental Impact Assessment**.

6.8 Scoping Questions to Consultees

479. The following questions are posed to consultees to help them frame and focus their response to the benthic ecology scoping exercise, which will in turn inform the Scoping Opinion:

- Do you agree that the information described will be suitable for characterisation of the existing environment?
- Have all benthic ecology impacts resulting from the Bellrock WFDA been identified in the Bellrock WFDA Scoping Report?
- Do you agree with the benthic ecology impacts that have been scoped in for/out from further consideration within the Bellrock WFDA EIA Report?
- Have all the relevant data sources been identified in the Bellrock WFDA Scoping Report?
- Do you agree with the proposed approach to assessment in the Bellrock WFDA EIA Report?
- Do you have any other matters or information sources that you wish to present?

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7 Fish and Shellfish Ecology

7.1 Introduction

480. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on fish and shellfish ecology. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

481. This chapter provides an overview of the existing environment and further sets out the methodology and approach to assessing effects on fish and shellfish ecology in the Bellrock WFDA Environmental Impact Assessment (EIA) Report. This chapter has been prepared by Royal HaskoningDHV.

482. This chapter should be read in conjunction with the following chapters of the Bellrock WFDA Scoping Report:

- **Chapter 6: Benthic Ecology;**
- **Chapter 8: Marine Mammals;** and
- **Chapter 10: Commercial Fisheries.**

483. The fish and shellfish ecology assessment are likely to have key inter-relationships with the above receptors, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

7.2 Legislation, Policy and Guidance

484. **Table 7.1** sets out the relevant legislation, policy and guidance for fish and shellfish ecology that informs this chapter and will inform the fish and shellfish ecology assessment in the Bellrock WFDA EIA Report, where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context.**

Table 7.1: Summary of Relevant Legislation, Policy and Guidance for Fish and Shellfish Ecology

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Legislation	
The Conservation of Offshore Marine Habitats and Species Regulations 2017	Applies to Marine Licences and Section 36 applications within the Scottish Offshore region. It

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
	applies EPS protections in waters beyond 12 nautical miles from shore.
The Wildlife and Countryside Act 1981	Provides a list of threatened species for which killing, injuring or taking by any method is prohibited. Basking sharks *Cetorhinus maximus* are protected from intentional or reckless disturbance or harassment. If a risk of disturbance or harassment that cannot be removed or sufficiently reduced by using alternatives or mitigation measures, then the activity may still go ahead under licence (Basking Shark Licence).
The Nature Conservation (Scotland) Act 2004, Part 3 and Schedule 6	Makes amendments to the Wildlife and Countryside Act 1981, strengthening the legal protection for threatened species to include 'reckless' acts.
Policy	
The Scottish Biodiversity Strategy (post-2020: statement of intent)	Reiterates the commitment (and desire to enhance) the 2020 Challenge for Scotland's Biodiversity (response to the Aichi Targets set by the United Nations Convention on Biological Diversity, and the European Union's (EU's) Biodiversity Strategy for 2020) and supplements Scotland's Biodiversity: It's in Your Hands (2004).
The Scottish Wild Salmon Strategy (2022)	Sets out the vision, objectives and priority themes to ensure the protection and recovery of Scottish Atlantic wild salmon populations.
The Scottish Government National Marine Plan (2015)	The following general policies apply to fish and shellfish ecology: *"General Policy (GEN) 9 Natural heritage: Development and use of the marine environment must:* *a) Comply with legal requirements for protected areas and protected species.* *b) Not result in significant impact on the national status of Priority Marine Features.* *c) Protect and, where appropriate, enhance the health of the marine area."* *"GEN 13 Noise: Development and use in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects."* Within the Wild Salmon and Diadromous Fish section of the National Marine Plan, there is a policy stating that: *"The impact of development and use of the marine environment on diadromous fish species should be considered in marine planning and decision-making processes."*. It is acknowledged however that *"there is uncertainty around the likelihood and severity"* of wind energy

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
	impacts and *"continued efforts to better understand potential impacts should be encouraged*".
Guidance	
Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (Chartered Institute for Ecology and Environmental Management; CIEEM, 2018) (latest update 2022)	These Guidelines have been produced to promote good practice in EcIA relating to terrestrial, freshwater, coastal and marine environments in the UK and Ireland.

7.3 Consultation

485. **Table 7.2** describes the consultation undertaken to date relevant to fish and shellfish ecology for the Bellrock WFDA**.**

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Table 7.2: Consultation Relevant to Fish and Shellfish Ecology

Consultee	Date/Document	Comment	How Comment is Addressed
NatureScot	30th March 2023, email	It is noted that eDNA samples will be collected from the water column. We assume this will be for fish rather than benthic species. However, we note the intention to discuss further with stakeholders once the data is analysed and we would appreciate sight of any technical reports covering the eDNA sampling and analysis.	Yes, eDNA samples taken from the water column will be analysed for fish rather than benthic species. The data is collected anticipated to be used to provide context to the baseline. The Applicant will share any technical reports with Marine Scotland Science (MSS) [now Marine Directorate Science, Evidence Data and Digital; MD-SEDD] and NatureScot.
Marine Scotland Science (MSS)	12th April 2023, email	MSS were consulted on a high-level overview of the proposed scope of work for site investigation works (with particular focus on the benthic survey). MSS did not provide a response for the Bellrock Offshore Wind Farm.	MSS provided a response for the Broadshore Hub. MSS advice provided for the Broadshore Hub (BlueFloat Energy | Renantis Partnership, 2024) was considered in the refinement of the survey methodology for the Bellrock WFDA and in this Bellrock WFDA Scoping Report, where appropriate.
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	The study area comprises the two International Council of the Exploration of the Seas (ICES) rectangles in which the site sits – we are content with this assuming that the northern boundary is beyond the maximum tidal excursion to take account of potential impacts from suspended sediments.	Noted. The fish and shellfish ecology study areas are described in **Section 7.4.1**.
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	We are also content with the approach to the baseline – all relevant desktop data has been identified.	Noted. Key data and information sources are set out in **Table 7.3**.
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	We agree with the proposed approach for the benthic grab samples to inform habitat/spawning sediment suitability. In relation to the eDNA sampling, ideally the results would be used to help inform the EIA, however this is currently not required. Therefore, we welcome the sharing of the data for information and to the POSEIDON project.	Noted.

Consultee	Date/Document	Comment	How Comment is Addressed
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	We are content with the proposed approach to underwater noise modelling in respect of fish and shellfish. We advise that particle motion should be scoped in for assessment qualitatively.	Noted. Information on the approach to particle motion is provided in **Section 7.7**.
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	Impacts from both export cables and floating cables should be modelled if possible. If it is not possible to model electromagnetic fields (EMF) impacts in relation to floating cables, an estimate should be provided along with a description of potential impacts to fish and shellfish at the estimated level.	Offshore export cables will be considered in the Bellrock OfTDA Scoping Report. An estimate of EMF from dynamic inter-array cables (IACs) will be provided in the Bellrock WFDA EIA Report, using existing literature, to inform the assessment of potential impacts to fish and shellfish at the estimated level
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	Based on the project information provided to date, we are content with the proposed assessment approach for diadromous fish.	Noted.

7.4 Existing Environment

7.4.1 Study Area

486. The distribution and abundance of fish and shellfish populations is spatially and temporally variable, therefore for the purposes of the fish and shellfish ecology baseline characterisation, two fish and shellfish study areas are defined. These are shown in **Figure 7.1** in **Appendix 1** and described here:

- The fish and shellfish study area is defined as the International Council for the Exploration of the Sea (ICES) statistical rectangles that overlaps with the Bellrock WFDA Scoping Boundary (ICES rectangles 42E9 and 42F0).
- The fish and shellfish Northern North Sea study area encompasses the fish and shellfish study area and a surrounding area defined by the boundary of the northern North biogeographic region (CP2), as identified in the Review of Marine Nature Conservation (RMNC) (2004). This also encompasses waters of the Forth and Tay, North-East, and Moray Firth Scottish Marine Regions (SMR). The Northern North Sea study area provides a wider context for the fish species and populations, and will be used specifically to inform assessments of those impacts affecting fish and shellfish receptors over long distances (e.g., underwater noise).

7.4.2 Data and Information Sources

487. **Table 7.3** sets out the information and data sources which have been considered during the production in the preparation of this chapter, and will be considered within the Bellrock WFDA EIA Report where relevant matters are scoped in.

Table 7.3: Summary of Key Data and Information Sources for Fish and Shellfish Ecology

Dataset	Year(s)	Description
Spatial patterns and trends in abundance of larval sandeels in the North Sea: 1950–2005 (Lynam et al., 2013).	1950-2005	Continuous Plankton Recorder (CPR) data on larval *Ammodytes marinus* (sandeel) abundance in the North Sea over the period 1950-2005, averaged over ICES rectangles.
A verified distribution model for the lesser sandeel *Ammodytes marinus* (Langton et al., 2021).	2021	A species distribution model (hurdle model) to predict the occurrence and density of sandeels in the North Sea.
International Herring Larvae Survey	2013-2023	The ICES programme of international herring larval surveys in the North Sea provides annual quantitative estimates of herring larval abundance in Scottish waters.
Updating Fisheries Sensitivity Maps in British Waters (Aires et al., 2014).	2014	Modelled probability of larvae presence for various fish species.

Dataset	Year(s)	Description
Mapping the spawning and nursery grounds of selected fish for spatial planning (Ellis et el., 2012).	2012	Mapped extents of spawning and nursery grounds of various fish species, using the original maps produced by Coull et al. (1998), updated with newer data on larvae, juvenile, and egg abundance.
Review of migratory routes and behaviour of Atlantic salmon, sea trout and European eel in Scotland's coastal environment: implications for the development of marine renewables (Malcolm et al., 2010).	2010	A review of migratory routes and behaviour of Atlantic salmon, sea trout and European eel in Scotland's coastal environment, and the implications for marine developments.
Fisheries sensitivity maps in British Waters (Coull et al., 1998).	1998	Mapped extents of the spawning and nursery grounds of various commercially important fish species and the relative intensity and duration of spawning.
Marlin fish and shellfish sensitivity reports. https://www.marlin.ac.uk/activity/pressures_report	N/A	Marlin's Marine Evidence Based Sensitivity Assessment (MarESA) sensitivity assessments examine the biology or ecology of a fish or shellfish species, compile the evidence of the effect of a given pressure on the species, assess the likely sensitivity of the species to the pressure against standard scales, documenting the evidence used.
Marine Scotland: Salmon fishery statistics, including rod catch data	2022	A summary of salmon rod and net catch data for the 2021 fishing season.
National Biodiversity Network (NBN) Atlas species assemblage data	2023	The NBN Atlas is a species occurrence data portal, combining 995 datasets from 165 data partners at the time of writing.
Consenting documents for nearby projects, including Buchan, Moray West, Moray East, and Beatrice Offshore Wind Farms (OWF).	Various	Impact assessment and site survey reports for relevant OWF projects.
Developing Essential Fish Habitat maps for fish and shellfish species in Scotland Report (Franco et al., 2022)	2022	Modelled extent of essential fish habitat in Scottish waters for 16 species in offshore waters.
River Wick Atlantic salmon smolt tracking (McIlvenny et al., 2021)	2016	Acoustic telemetry tracking of Atlantic salmon smolts in coastal waters surrounding the mouth of the River Wick.

7.4.2.1 Site-specific Surveys

488. In addition to the data listed in **Table 7.3** the following site-specific survey data will be used to inform the Bellrock WFDA EIA Report, as shown in **Table 7.4**.

Table 7.4: Overview of Site-specific Surveys

Site-specific Surveys	Year(s)	Description
Benthic survey e.g. drop-down video and grab sampling	2023	Benthic survey data will provide context on the habitat types present in the Bellrock WFDA, and this will provide context to the fish and shellfish baseline. In addition, the Particle Size Analysis (PSA) data from grab samples will be used to inform the baseline for herring spawning and sandeel habitat suitability. This will be discussed further in the Bellrock WFDA EIA Report and assessed against Cefas Action Levels for contaminants.
eDNA water samples	2023	eDNA samples have been collected and it is anticipated these will be used to provide context to the baseline. It is not intended to use this data to inform the EIA directly. Results will be provided to MSS and NatureScot separately for information and future use, and eDNA sampling from sediment samples will be donated to the POSEIDON project. The eDNA survey methodology was sent to NatureScot and MD-LOT (and MSS) for comment on the 8th March 2023.
Bellrock WFDA offshore aerial surveys	March 2022 – February 2024	Site-specific offshore aerial surveys have been undertaken across the Bellrock WFDA, ongoing until 2024.

489. In addition, noise modelling will be undertaken as part of the EIA process. Site-specific noise modelling will be undertaken to inform the assessment of underwater noise impacts on fish and shellfish receptors, using Popper et al. (2014) to define impact thresholds.

7.4.3 Fish Assemblage

490. The fish and shellfish ecology study area includes demersal, pelagic, diadromous, and elasmobranch fish species, including commercial and non-commercial species. Demersal species include cod *Gadus morhua*, haddock *Melanogrammus aeglefinus*, whiting *Merlangius merlangus*, plaice *Pleuronectes platessa*, lemon sole *Microstomus kitt,* common dab *Limanda limanda,* witch *Glyptocephalus cynoglossus,* grey gurnard *Eutriglia gurnadus,* and sandeel *Ammodytidae* spp. Pelagic species include herring *Clupea harengus*, mackerel *Scomber scrombus* and sprat *Sprattus sprattus*. Elasmobranch species, such as spotted ray *Raja montagui*, thornback ray *Raja clavata*, tope shark *Galeorhinus galeus*, small-spotted catshark *Scyliorhinus canicula*, spurdog *Squalas acanthias*, thorny skate *Amblyraja radiata* and cuckoo ray *Leucoraja naevus*, among others, have been observed in the fish and shellfish ecology study area (Coull, et al., 1998; Daan et al., 2005; Baxter et al., 2011; Ellis et al., 2012). Many of these species are of conservation importance either nationally or internationally; conservation designations are listed in **Table 7.7**.

491. In addition, many of these species form important prey resources for marine mammals and seabirds. For this reason, the findings of the fish and shellfish assessment will be considered by in the marine mammals and offshore ornithology chapters in the Bellrock WFDA EIA Report.

492. Basking sharks are listed as 'Endangered' on the International Union for Conservation of Nature (IUCN) Red List. There is a marked seasonality in basking shark sightings in UK waters, with almost all surface sightings occurring on the English and Scottish west coast over summer months. The NBN atlas collates basking shark sightings datasets, and in the period 2011-2021 in relation to the Bellrock WFDA, no sightings have been recorded within 75 km of the Bellrock WFDA Scoping Boundary (NBN, 2023).

493. The mean annual landings of key fish species landed by commercial vessels over the period 2018-2022 within the fish and shellfish ecology study area are listed in **Table 7.5**. These figures give an indication of the species present in the fish and shellfish ecology study area.

Table 7.5: Mean Annual Quantity (tonnes) and Value (GBP) of Species Landed from ICES Rectangle 42E9 and 42F0 (Study Area) for All Species where Landings were Greater Than or Equal to 3 tonnes Over the Period 2018-2022 (Marine Management Organisation (MMO), 2023)

ICES Rectangle	Species	Scientific	Quantity (tonnes)	Value (GBP)
42E9	Atlantic Herring	*Clupea harengus*	66	24,502
42E9	Haddock	*Melanogrammus aeglefinus*	56	63,683
42E9	European Plaice	*Pleuronectes platessa*	6	5,803
42E9	Common Dab	*Limanda limanda*	5	4,125
42E9	King Scallops	*Pecten maximus*	4	10,880
42E9	Whiting	*Merlangius merlangus*	4	5,981
42F0	Atlantic Herring	*Clupea harengus*	1,203	611,222
42F0	Nephrops (Norway Lobster)	*Nephrops norvegicus*	215	1,040,773
42F0	Haddock	*Melanogrammus aeglefinus*	73	69,377
42F0	Whiting	*Merlangius merlangus*	38	35,949
42F0	Monk and Anglers	*Lophiidae*	19	66,158
42F0	Lemon Sole	*Microstomus kitt*	9	10,566
42F0	Atlantic Mackerel	*Scomber scombrus*	9	4,197
42F0	Grey Gurnard	*Eutrigla gurnardus*	6	6,284
42F0	Witch	*Glyptocephalus cynoglossus*	4	10,493

ICES Rectangle	Species	Scientific	Quantity (tonnes)	Value (GBP)
42F0	Squid(s)	*Ommastrephidae/ Loliginidae*	4	13,004

7.4.3.1 Diadromous Species

7.4.3.1.1 Diadromous Fish Species

494. Fish species are diadromous if they migrate from saltwater to freshwater to spawn (anadromous migrants) or if they migrate from freshwater to saltwater to spawn (catadromous migrants). Relevant diadromous species that are likely to pass through the Northern North Sea study area during their spawning migrations, or during foraging and maturation stages of their life cycles are:

- Atlantic salmon *Salmo salar*;
- Sea trout *Salmo trutta*;
- Sea lamprey *Petromyzon marinus;*
- River lamprey *Lampetra fluviatilis*; and
- European eel *Anguilla anguilla*.

495. Atlantic salmon, sea trout, river lamprey and sea lamprey are all anadromous, and as such have predominantly marine adult life phases with spawning and nursery grounds located in freshwater rivers. The European eel is catadromous, so migrates from freshwater river systems to spawn in saltwater. All these species will be scoped in for further assessment.

496. Whilst protected sites designated for Annex II diadromous fish, and their distance to the Bellrock WFDA are set out in **Table 7.6**, other non-designated river systems have populations of diadromous fish that may pass through the Bellrock WFDA, for example the River Ugie which outflows at Peterhead has an active Atlantic salmon fishery.

497. Allis shad *Alosa alosa* and twaite shad *Alosa fallax* (which are also Annex II diadromous fish) have no known populations in north-east Scotland. Scottish shad are thought to have a spawning population in the Solway Firth, therefore there is no pathway for impacts occurring on the north-east coast of Scotland to be relevant to shad. Shad species are therefore scoped out of further assessment.

7.4.3.1.2 Freshwater Pearl Mussel

498. Freshwater pearl mussel is a designated feature of several SACs on the east coast of Scotland (see **Table 7.6**). Whilst not itself a diadromous fish species, the long-term survival of the freshwater pearl mussel depends ultimately upon diadromous fish host availability (Skinner et al., 2003). Juvenile Atlantic salmon and sea trout are host fish of the larval stage of freshwater mussels (called *glochidia*), which attach themselves to fish gill filaments in the fast-flowing sections of rivers over July to September. Therefore, healthy populations of juvenile salmonid (salmon and sea trout) fry

and parr are required to ensure pearl mussel survival over winter before they detach from the gills and settle on the substrate in May and early June.

499. Due to this potential for secondary impacts on freshwater pearl mussel from impacts on salmonid fish, it is scoped in for further assessment. If no significant impacts are found for salmonid species, then logically there can be no pathway for significant effect upon pearl mussel and this will be key to the assessment.

7.4.4 Shellfish Assemblage

500. Shellfish stock populations, and their structure, are not well understood across the UK (Scottish Government, 2020). Commercial landings data are a primary source of information regarding their distribution. Nephrops, squid, and king scallop have consistent landings within the fish and shellfish ecology study area (**Table 7.5**). The site-specific surveys for benthic characterisation undertaken in 2023 will also be used to further inform the baseline for shellfish.

7.4.5 Designated Sites

501. The fish and shellfish ecology study area does not overlap with any designated site for fish or shellfish features. Given that several riverine UK SACs are designated for diadromous fish species, which can undertake extensive marine migrations, those sites that fall within the fish and shellfish Northern North Sea study area are considered (**Table 7.6;** see **Figure 7.2** in **Appendix 1**). Also considered are those sites where individuals from the population may migrate past the Bellrock WFDA as part of their life cycle. Nature Conservation Marine Protected Areas (NCMPAs) which are designated for non-migratory fish and shellfish features are screened in if within 75 km from the Bellrock WFDA (to account for worst-case noise impact ranges). These sites are designated for protection from development and other activities that may affect their conservation objectives.

502. Given the distance to the designated sites from the Bellrock WFDA, there is no pathway for direct impacts upon them (i.e., to the habitat supporting the fish species). Therefore, only impacts upon the fish themselves outside the sites will be considered in the Bellrock WFDA EIA Report.

Table 7.6: Summary of Sites Designated for Fish and Shellfish Species Scoped in for Further Assessment

Designated Site Receptor	Fish and Shellfish Qualifying Features	Justification	Distance from Bellrock WFDA "as the fish swims" (i.e not moving over land)
River Dee SAC	Atlantic salmon Freshwater pearl mussel	An internationally designated site (SAC)	117 km west
River South Esk SAC	Atlantic salmon Freshwater pearl mussel	An internationally designated site (SAC)	139 km west
River Tay SAC	Atlantic salmon River lamprey Brook lamprey Sea lamprey	An internationally designated site (SAC)	159 km south-west

Designated Site Receptor	Fish and Shellfish Qualifying Features	Justification	Distance from Bellrock WFDA “as the fish swims” (i.e not moving over land)
River Teith SAC	Atlantic salmon River lamprey Brook lamprey Sea lamprey	An internationally designated site (SAC)	227 km south-west
River Tweed SAC	Atlantic salmon River lamprey Brook lamprey Sea lamprey	An internationally designated site (SAC)	160 km south-west
River Spey SAC	Atlantic salmon Freshwater pearl mussel Sea lamprey	An internationally designated site (SAC)	211 km north-west
River Oykel SAC	Atlantic salmon Freshwater pearl mussel	An internationally designated site (SAC)	259 km north-west
River Evelix SAC	Freshwater pearl mussel	An internationally designated site (SAC)	259 km north-west
Berriedale and Langwell Waters SAC	Atlantic salmon	An internationally designated site (SAC)	246 km north-west
River Thurso SAC	Atlantic salmon	An internationally designated site (SAC)	301 km north-west
River Naver SAC	Atlantic salmon Freshwater pearl mussel	An internationally designated site (SAC)	344 km north-west
River Borgie SAC	Atlantic salmon Freshwater pearl mussel	An internationally designated site (SAC)	345 km north-west
Little Gruinard River SAC	Atlantic salmon	An internationally designated site (SAC)	480 km anti-clockwise around coast east
River Kerry SAC	Freshwater pearl mussel	An internationally designated site (SAC)	533 km anti-clockwise around coast east
River Moriston SAC	Atlantic salmon Freshwater pearl mussel	An internationally designated site (SAC)	285 km north-east

Designated Site Receptor	Fish and Shellfish Qualifying Features	Justification	Distance from Bellrock WFDA "as the fish swims" (i.e not moving over land)
Firth of Tay and Eden Estuary SAC	Harbour seal *Phoca vitulina*,	An internationally designated site (SAC)	158 km south-west
Turbot Bank MPA	Sandeels	A nationally designated site (MPA)	60 km north-west
East of Gannet and Montrose Fields MPA[23]	Ocean quahog *Arctica islandica*	A nationally designated site (MPA)	47 km north-east
Firth of Forth Banks MPA[24]	Ocean quahog	A nationally designated site (MPA)	64 km west
Southern Trench MPA	Not designated for fish or shellfish, but these receptors are prey for designated minke whale features.	A nationally designated site (MPA)	78 km north-west

7.4.6 Spawning and Nursery Grounds

503. Spawning and nursery habitats for a variety of fish species are found within the North Sea. Species likely to be spawning in the vicinity of the fish and shellfish study area are listed in **Table 7.7**.

[23] East of Gannet and Montrose Fields MPA is screened out of the NCMPA assessment as ocean quahog have no capacity to detect sound pressure waves. Refer to **Appendix 2: NCMPA Screening Report** for further details.

[24] Firth of Forth Banks MPA is screened out of the NCMPA assessment as ocean quahog have no capacity to detect sound pressure waves. Refer to **Appendix 2: NCMPA Screening Report** for further details.

Table 7.7: Spawning Grounds, Nursery Grounds, and Conservation Designations, of Fish and Shellfish Species Overlapping the Fish and Shellfish Ecology Study Area

Species	Spawning	Nursery	Conservation Designations
Pelagic species			
Herring	No overlap	Low intensity (Ellis et al., 2012)	Priority Marine Feature (PMF), International Union for Conservation of Nature (IUCN) (vulnerable), Scottish Biodiversity List (SBL)
Mackerel	No overlap	Low intensity (Ellis et al., 2012)	PMF, IUCN (least concern), SBL
Demersal species			
Blue Whiting	No overlap	Low intensity (Ellis et al., 2012)	PMF, IUCN (least concern), SBL
Haddock	No overlap	Undetermined intensity (Coull et al., 1998))	IUCN (vulnerable)
Saithe	No overlap	No overlap	PMF
European Hake	No overlap	Low intensity (Ellis et al., 2012)	SBL
Anglerfish	No overlap	Low intensity (Ellis et al., 2012)	PMF, SBL
Plaice	No overlap	Low intensity (Ellis et al., 2012)	IUCN (least concern), SBL
Ling	No overlap	Low intensity (Ellis et al., 2012)	PMF, SBL
Lemon sole	Undetermined intensity (Coull et al., 1998))	Undetermined intensity (Coull et al., 1998))	N/A
Cod	Low intensity (Ellis et al., 2012)	No overlap	PMF, Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) species, IUCN (vulnerable), SBL

Species	Spawning	Nursery	Conservation Designations
Whiting	No overlap	Low intensity (Ellis et al., 2012)	PMF, SBL
Sandeel	No overlap	Low intensity (Ellis et al., 2012)	PMF, SBL
Norway Pout	Lower intensity (Coull et al., 1998))	Undetermined intensity (Coull et al., 1998)	PMF, SBL
Elasmobranchs			
Basking shark	No overlap	No overlap	SBL, OSPAR, PMF, IUCN Red List, Wildlife and Countryside Act, Bern Convention, Bonn Convention
Tope shark	No overlap	No overlap	IUCN (vulnerable), SBL
Common skate	No overlap	No overlap	Scottish Nature Conservation MPA search feature (marine life stages), OSPAR, PMF, SBL
Spotted Ray	No overlap	Low intensity (Ellis et al., 2012)	OSPAR, IUCN (Least concern)
Spurdog	No overlap	Low intensity (Ellis et al., 2012)	Scottish Nature Conservation MPA search feature (marine life stages), PMF, OSPAR, IUCN (Vulnerable), SBL
Shellfish			
Ocean quahog	Unknown, but present in the fish and shellfish Northern North Sea study area	Unknown, but present in the fish and shellfish Northern North Sea study area	OSPAR, PMF

7.5 Potential Impacts

504. A range of potential impacts on fish and shellfish ecology have been identified which may occur during the construction, operation and maintenance, and decommissioning phases of the Bellrock WFDA.

7.5.1 Potential Impacts During Construction

505. Potential impacts during the construction phase of the Bellrock WFDA could arise from disturbance of the seabed during the installation of substructures and/or station keeping systems (SKS) (i.e., anchors and moorings), subsea cable hub(s), inter-array cables (IACs) and any associated cable protection and ancillary equipment (including any seabed preparation, boulder clearance and UXO investigation/clearance[25]), and the use of vessels for any associated activities.

506. These impacts include:

- Physical disturbance and temporary loss of habitat;
- Increased suspended sediment concentrations (SSC) and sediment re-deposition;
- Remobilisation of existing contaminated sediments;
- Accidental release of pollutants;
- Introduction of invasive non-native species (INNS) from marine traffic;
- Underwater noise and vibration;
- Changes in fishing activity; and
- Vessel collision for basking shark.

507. Impacts which span the life of the Bellrock WFDA (e.g. long-term habitat loss) will be considered as part of the operation and maintenance phase assessment (see **Section 7.5.2**) and are therefore not considered in the construction phase assessment to avoid duplication. It will be flagged in the operation and maintenance section that impacts such as long-term habitat loss begin to occur in construction and potentially continue after decommissioning.

7.5.2 Potential Impacts During Operation and Maintenance

508. Potential impacts during operation will mostly result from loss of habitat and changes to seabed substrata from the physical presence of infrastructure (i.e. substructures and any IAC protection above the seabed). The presence of hard infrastructure introduces new hard substrate habitat to the seabed. The presence of SKSs in the water column may cause entanglement of fishing gear, which in turn may present a risk of secondary entanglement of fish species. Maintenance activities

[25] A separate Marine Licence application(s) will be made prior to UXO clearance works, with an accompanying assessment of UXO clearance effects on fish and shellfish ecology. The assessment included in the Bellrock WFDA EIA Report will be indicative only.

may result in disturbance to seabed habitats, these would be like those during construction but at a lower magnitude and frequency of occurrence. Impacts scoped in for further assessment are:

- Permanent habitat loss;
- Physical disturbance and temporary loss of habitat;
- Increased SSC and sediment re-deposition;
- Remobilisation of contaminated sediments;
- Accidental release of pollutants;
- Introduction of INNS from marine traffic;
- Underwater noise and vibration;
- Secondary entanglement with SKSs and/or dynamic IACs;
- EMFs;
- Introduction of hard substrate; and
- Changes in fishing activity.

7.5.3 Potential Impacts During Decommissioning

509. It is anticipated that the decommissioning impacts would be similar in nature to those of construction (**Section 7.5.1**), although the magnitude of impact is likely to be lower. For example, where construction may require drilling of piles and/or seabed preparation, decommissioning would likely require cutting of piles to seabed level and may potentially result in less seabed disturbance than construction.

7.5.4 Embedded Mitigation Measures

510. The following embedded mitigation measures proposed include:

- Implementation of soft-start and ramp-up measures for piling (which would reduce underwater noise effects), to be set out in a Piling Strategy (PS);
- Development of, and adherence to a Marine Pollution Contingency Plan (MPCP);
- A Fisheries Management and Mitigation Strategy (FMMS) will be developed to reduce fisheries displacement where possible. The FMMS will set out the means of ongoing fisheries liaison through construction and operational phases of the Bellrock WFDA and detail any mitigation measures to be put in place to limit effects on commercial fisheries activity. In turn, this may reduce the potential for increased fishing pressures to occur on fish and shellfish receptors outside the Bellrock WFDA;
- Where seabed preparation is required (e.g. levelling), methods and equipment that have been designed to minimise potential for sediment suspension and dispersal will be adopted;
- Development of, and adherence to, a Cable Plan (CaP). The CaP will confirm planned cable routing, burial, and any additional protection, and will set out methods for post-installation cable monitoring. Fish and shellfish receptors will be considered in the drafting of the CaP;

- Adherence by contractors to the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), and the International Convention for the Prevention of Pollution from Ships (MARPOL) guidelines for preventing pollution at sea;
- The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention, 2004) will be adhered to, which provides global regulations to control the transfer of potentially invasive species;
- Consideration of guidance from the International Maritime Organisation (IMO, 2023) on the control and management of ships' biofouling to minimise the transfer of invasive aquatic species;
- The Scottish Marine Wildlife Watching Code (Scottish Natural Heritage (SNH), 2017) approach will be followed (with respect to basking sharks);
- Development of Unexploded Ordnance (UXO) Threat and Risk Assessment, and preferred use of low noise UXO clearance techniques where possible; and
- An Invasive Non-native Species Management Plan (INNSMP) will be developed to include provisions for INNS management.

511. An Environmental Management Plan (EMP) or similar will also be implemented to ensure the above mitigations are captured and all works are undertaken in line with best practice for working in the marine environment (including provisions for marine INNS management). The EMP will be agreed with relevant stakeholders prior to the start of construction.

7.6 Scoping of Potential Impacts

7.6.1 Potential Impacts Scoped In

7.6.1.1 Construction

512. The impacts scoped in for further assessment during construction are:

- Physical disturbance and temporary loss of habitat;
- Increased SSC and sediment re-deposition;
- Remobilisation of existing contaminated sediments;
- Underwater noise and vibration;
- Changes in fishing activity; and
- Vessel collision for basking shark.

513. These impacts are further discussed in **Sections 7.6.1.1.1** to **7.6.1.1.6.**

7.6.1.1.1 Physical Disturbance and Temporary Loss of Habitat

514. Demersal fish and shellfish including the egg and larval stages of certain species, may be particularly sensitive to direct physical disturbance during the construction phase from the installation of the Bellrock WFDA infrastructure (substructures/SKSs, subsea cable hub(s), scour protection and IACs). This will especially be the case if disturbance coincides with key spawning or migration periods. The level of effect will be dependent upon the habitat in question, its distribution in the wider area and the presence of a species that is reliant on that habitat.

7.6.1.1.2 Increased Suspended Sediments Concentrations and Sediment Re-deposition

515. During construction activities there may be a temporary increase in suspended sediment concentrations and deposition. Suspended sediment has the potential to impair respiratory, filter feeding or reproductive functions, including the disruption of migration/spawning activity. Sediment deposition, especially if it changes the characteristics of the existing seabed sediments, could affect the quality of spawning and nursery habitats.

7.6.1.1.3 Remobilisation of Existing Contaminated Sediments

516. Sediment disturbance could lead to the mobilisation of contaminants (if present) that could be harmful to fish and shellfish communities. Potential impacts related to the resuspension of contaminants are currently scoped in for assessment. However, should the results of benthic sampling demonstrate low levels of sediment contamination, the Applicant would seek to scope these out of further assessment through agreement with stakeholders in future consultation.

7.6.1.1.4 Underwater Noise and Vibration

517. The Bellrock WFDA will use WTGs installed upon either fixed bottom substructures (FBSSs), floating substructures (FSSs) or a combination of both technologies. Regardless of the method chosen, it is possible that pile driving may be used to fix infrastructure to the seabed. See **Chapter 3: Project Description** for further detail of the design parameters under consideration. Underwater noise generated by pile driving and other construction activities such as seabed preparation, dredging, rock dumping, UXO clearance, geophysical surveys (specifically sub-bottom profilers; SBPs), cable installation, and vessel presence may result in disturbance and displacement of fish species and have the potential to affect spawning behaviour, nursery areas and migration patterns.

7.6.1.1.5 Changes in Fishing Activity

518. The construction of offshore infrastructure could result in changes to fishing activity within the Bellrock WFDA but also in the wider area due to displacement of fishing activity into other areas. This could in turn result in changes to commercially targeted fish stocks. Further discussion on impacts to the fishing industry is provided in **Chapter 10: Commercial Fisheries.**

7.6.1.1.6 Vessel Collision for Basking Shark

519. Given that unusually high numbers of basking shark have been anecdotally reported as sighted on the north-east coast of Scotland in 2023 (The Scotsman, 2023), the risk of project vessels colliding with this species warrants further exploration and assessment in the EIA. Given their large size, the fact they spend a high proportion of time at the surface feeding, and often do not to actively swim away from vessels, they have a high sensitivity to collision risk compared to other fish and shellfish species. Collision risk will be assessed for the construction phase as a worst-case, given

the higher number of vessels onsite at any one-time during construction. However, the finding of this assessment will also apply during the other phases of the Bellrock WFDA, as similar level of effects (considering lower ship passage frequency, but longer duration in operation and maintenance) is anticipated.

7.6.1.2 Operation and Maintenance

520. The impacts scoped in for further assessment during operation and maintenance are:

- Permanent habitat loss;
- Physical disturbance and temporary loss of habitat;
- Increased SSC and sediment re-deposition;
- Remobilisation of contaminated sediments;
- Underwater noise and vibration;
- Secondary entanglement with SKSs;
- EMFs;
- Introduction of hard substrate; and
- Changes in fishing activity.

521. These impacts are further discussed in **Sections 7.6.1.2.1** to **7.6.1.2.10.**

7.6.1.2.1 Permanent Habitat Loss

522. The presence of infrastructure on the seabed (including any IAC protection) would result in a relatively small footprint of lost habitat in the context of the habitat from the surrounding region (see **Section 6.4** in **Chapter 6: Benthic Ecology**). There may also be some loss over time associated with scour around the mooring and substructure footprints. During operation, some disturbance on the seabed may occur during movement and drag of mooring lines and dynamic IACs in response to physical conditions. Depending on whether the infrastructure is removed or left in-situ at the decommissioning stage this impact is either long term or permanent habitat loss. The level of effect will be dependent upon the habitat in question, its distribution in the wider area and the presence of a species that is reliant on that habitat. As a worst-case scenario, it is assumed it would be permanent habitat loss unless the infrastructure is removed during decommissioning.

7.6.1.2.2 Physical Disturbance and Temporary Loss of Habitat

523. Some operation and maintenance activities will cause physical disturbance of the seabed. These activities will include excavating and lifting buried cables for repair, and maintenance of cable rock protection through the addition of new rock. Whilst these activities are expected to result in localised impacts and be sporadic in nature, the impact is scoped in for further assessment to be addressed when the likely operation and maintenance activities and their schedules are more clearly known.

7.6.1.2.3 Increased Suspended Sediment Concentration and Sediment Re-deposition

524. Small volumes of sediment could be re-suspended during maintenance activities and the movement of mooring lines and dynamic IACs in interaction with the seabed; the volumes would be lower than for construction. It is not expected that there would be significant effects, however the impact is scoped in to allow for further justification with full baseline information.

7.6.1.2.4 Remobilisation of Existing Contaminated Sediments

525. Potential impacts related to the resuspension of contaminants are currently scoped in for assessment. However, should the results of benthic sampling demonstrate low levels of sediment contamination, the Applicant would seek to scope these out of further assessment in the Bellrock WFDA EIA Report through agreement with stakeholders in future consultation.

7.6.1.2.5 Underwater Noise and Vibration

526. The main source of noise during operation (in addition to ambient noise) originates form the WTG gearbox and generator, noise generated by WTG mooring systems and dynamic IACs (e.g., cable ‘snapping’), in addition to any surface vessels undertaking operation and maintenance activities. Operational noise impacts are considered highly unlikely to cause physical damage to fish or shellfish species (Nedwell et al., 2007a,b; MMO, 2014) and it follows that any significant behavioural disturbance would be limited to the area immediately surrounding the WTG and associated substructure, however the impact is scoped in to allow for further justification with full baseline information. Geophysical surveys may be required over the course of the operation and maintenance phase. It is currently unclear whether noisy survey equipment such as SBPs would be required during geophysical surveys. As per the construction phase, for the purpose of the Bellrock WFDA EIA Report, underwater noise modelling will be undertaken for the worst-case impact ranges from SBPs.

7.6.1.2.6 Secondary Entanglement with Station Keeping Systems

527. Whilst the mooring infrastructure itself is not anticipated to cause an entanglement risk for fish and shellfish species, there is a potential for snagged anthropogenic debris such as fishing gear to cause secondary entanglement. This will be assessed further in the Bellrock WFDA EIA Report.

528. During operation, periodic inspections, as part of the asset integrity campaign, will include visual surveys and identification of debris and gear entangled to the WFDA infrastructure. This will provide further understanding on the potential for the debris and ghost fishing gears to be caught in the WFDA infrastructure, increasing the risk for secondary entanglement. Note this is in the early stages of development and will be further refined during the EIA process.

7.6.1.2.7 Electromagnetic Fields

529. Subsea electrical cabling, and dynamic and static IACs in the water column produce EMFs which may affect fish and shellfish behaviours. This may be of particular relevance to electrosensitive species such as elasmobranchs, or species which use the earth’s geomagnetic field to orient themselves for migration.

7.6.1.2.8 Introduction of Hard Substrate

530. Concrete and steel structures may be colonised by a range of benthic invertebrate species, potentially increasing ecological diversity and with the potential to act as fish aggregating devices. This may have knock on effects on localised predator-prey dynamics. The potential effect on fish and shellfish species will be dependent on the substructure used, and the volume and type of scour protection used.

7.6.1.2.9 Changes in Fishing Activity

531. The operation and maintenance of the Bellrock WFDA infrastructure could result in changes to fishing activity within the fish and shellfish study area but also in the wider area due to displacement of fishing activity into other areas. This could result in changes in fish and shellfish populations in the fish and shellfish study area, both within and outside the Bellrock WFDA footprint.

7.6.1.2.10 Vessel Collision for Basking Shark

532. The worst case for collision risk will be for the construction phase, given the higher number of vessels onsite at any one-time during construction (see **Section 7.6.1.1.6**). The findings of construction phase assessment will be applied to the other phases of the Bellrock WFDA, as similar level of effects (considering lower ship passage frequency, but longer duration in operation and maintenance) is anticipated.

7.6.1.3 Decommissioning

533. It is anticipated that the decommissioning impacts would be similar in nature to those of construction. For this reason, all impacts scoped in for construction are also scoped in for decommissioning.

7.6.2 Potential Impacts Scoped Out

7.6.2.1 All Phases

7.6.2.1.1 Accidental Release of Pollutants

534. Pollution could be accidentally released from vessels, equipment, and machinery associated with any phase of the Bellrock WFDA. However, the potential risk of accidental release of pollutants is sufficiently minimised by designed in mitigation measures (**Section 7.5.4**) and is proposed to be scoped out of the assessment for all phases of the Bellrock WFDA. All vessels must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78. An EMP or similar will also be put in place and implemented alongside the Marine Pollution Contingency Plan (MPCP) which will be developed to outline the approach for managing and reducing risk of pollution and procedures to protect personnel and to be followed in the event of a pollution incident.

7.6.2.1.2 Introduction of Invasive Non-native Species from Marine Traffic

535. The potential risk of spreading or introducing INNS will be mitigated by employing biosecurity measures in accordance as discussed in **Section 7.5.4**. These commitments would be secured in the EMP. The EMP will be agreed with relevant stakeholders prior to the start of construction. Additionally, an INNSMP will be developed to include provisions for INNS management.

536. With the appropriate mitigations in place, it is expected that the risk of INNS being introduced would be reduced. Therefore, it is proposed that with this embedded mitigation measure, introduction of marine INNS from vessel traffic during the construction phase is scoped out of the Bellrock WFDA EIA Report.

7.6.2.2 Construction and Decommissioning

7.6.2.2.1 Electromagnetic Fields

537. For phases of the Bellrock WFDA where power is not being transmitted, no EMF will be produced by IACs. It is acknowledged that the impact of EMF begins with commissioning, which takes place during the construction phase – to avoid duplicating assessments, the full extent of this impacts will be assessed in the operation and maintenance section. EMF is therefore scoped out for construction and decommissioning.

7.6.2.2.2 Permanent Habitat Loss

538. It is acknowledged that the impact of permanent habitat loss begins in construction and continues through decommissioning – to avoid duplicating assessments the full extent of this impacts will assessed in the operation and maintenance section, with a clear acknowledgement that it spans the duration of the Bellrock WFDA.

7.6.2.2.3 Introduction of Hard Substrate

539. It is acknowledged that the impact of introduction of hard substrate begins in construction and continues through decommissioning – to avoid duplicating assessments the full extent of this impact will assessed in the operation and maintenance section, with a clear acknowledgement that they span the duration of the Bellrock WFDA.

7.6.2.2.4 Secondary Entanglement with SKSs

540. SKSs will not be present long enough during construction, and will not remain after decommissioning, to cause a risk of anthropogenic debris (i.e. fish net) entanglement to cause a secondary entanglement (or ‘ghost fishing’ impact). Secondary entanglement will be assessed for the operation and maintenance phase (**Section 7.6.1.2.6**).

7.6.3 Potential Cumulative Effects

541. There may be potential for cumulative impacts to occur on fish and shellfish ecology due to works associated with other projects/plans and activities. The general approach to assessment of potential cumulative impacts is set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**.

542. The effects of the Bellrock WFDA will firstly be considered cumulatively with the Bellrock OfTDA.

543. Secondly, the effects of the Bellrock Project (WFDA and OfTDA) as a whole will be assessed cumulatively with other plans and projects.

544. OWF projects and other activities (such as oil and gas operations) relevant to the assessment of cumulative impacts on fish and shellfish ecology will be identified through a screening exercise. Where potential impacts are highly localised (i.e. they occur only within the Bellrock WFDA) or

where management measures in place for the Bellrock WFDA and other projects will reduce the risk of impacts occurring, it is proposed that these impacts likely will not have potential interactions with Bellrock WFDA-alone impacts.

545. Details of the approach to screening other plans and projects is set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment.**

546. Noise propagation modelling for the Bellrock WFDA will be used to determine the ZoI for long range effects associated with loud noise sources such as piling, and UXO clearance. This ZoI will be used to determine whether other projects or plans have the potential to combine with Bellrock WFDA-alone noise impacts in a cumulative way.

547. The cumulative assessment for fish and shellfish will specifically consider cumulative noise impacts.

7.6.4 Potential Transboundary Effects

548. The distribution of fish and shellfish species is independent of national geographical boundaries. The Bellrock WFDA EIA Report will be undertaken taking account of the distribution of fish stocks and populations irrespective of national jurisdictions. As a result, it is considered that a fish and shellfish ecology specific assessment of transboundary effects is not required.

549. Whilst noise modelling for the Bellrock WFDA is not yet available, based on experience of previous recent OWF projects, the worst-case impact ranges for fish and shellfish receptors result from piling noise, with no OWF finding maximum impact ranges greater than 75 km. A 75 km worst-case impact range for underwater noise would not reach other jurisdictions.

7.6.5 Summary of Potential Fish and Shellfish Ecology Impacts Scoped In and Out

550. A summary of potential impacts scoped in and out from further assessment in the Bellrock WFDA EIA Report is provided in **Table 7.8** below.

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Table 7.8: Summary of Potential Impacts Scoped In (✓) or Out (x) for Fish and Shellfish Ecology

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Temporary habitat loss/physical disturbance	Fish (pelagic, demersal, diadromous, elasmobranch), shellfish, spawning and nursery grounds, designated sites	There is potential for temporary habitat loss and physical disturbance to the water column, seabed, and directly on fish and shellfish receptors during operations.	✓	✓	✓	Development of, and adherence to a CaP, will ensure that best practice cable installation methods if IACs are buried, to minimise unnecessary seabed disturbance and sediment suspension.
Permanent habitat loss	As above	The presence of FBSSs on the seabed, movement of mooring lines and dynamic IACs, and potential IAC and anchor point protection will result in a footprint of lost habitat from the pre-existing habitat type.	X*	✓	X*	N/A
Increased SSC and sediment re-deposition	As above	During Bellrock WFDA activities there may be a temporary increase in suspended sediment concentrations and deposition. Suspended sediment may impair the physiology and behaviour of receptors. Sediment deposition may bury or smother receptors.	✓	✓	✓	Development of, and adherence to a CaP, will allow for best practice cable installation methods if IACs are buried, to minimise unnecessary seabed disturbance and sediment suspension.

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Remobilisation of contaminated sediments	As above	If harmful contaminants are present within the seabed, then these may be released due to activities on the seabed.	✓**	✓**	✓**	Development of, and adherence to a CaP, will allow for best practice cable installation methods if IACs are buried, to minimise unnecessary seabed disturbance and sediment suspension.
Underwater noise and vibration	As above	Activities across all phases of the Bellrock WFDA will produce underwater noise. Impacts on sound sensitive receptors can range from temporary behavioural effects to mortality.	✓	✓	✓	Soft start and ramp up procedure may allow some sound sensitive fish to move away from the noise source.
EMFs	As above	Bellrock WFDA cables that carry electrical currents (IAC) will produce EMFs during power generation in the operation and maintenance phase. EMFs may affect fish and shellfish behaviour or physiology.	x	✓***	X	A CaP will be prepared where IACs are buried to confirm the extent to which the IAC burial can be achieved.
Secondary entanglement with SKSs	As above	Anthropogenic debris such as discarded or lost fishing gear may snag on SKSs. This snagged gear may in turn cause entanglement of fish and shellfish species.	X	✓	X	N/A
Introduction of hard substrate	As above	Infrastructure placed on the seabed (e.g. substructures) are expected to be colonised by a range of marine species during the operation and maintenance	X*	✓	X*	N/A

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
		phase. This could lead to localised increases in biodiversity and potential changes in prey/predator interactions.				
Changes in fishing activity	As above	The construction of offshore infrastructure could result in changes to fishing activity within the Bellrock WFDA but also in the wider area due to displacement of fishing activity into other areas. This could in turn result in changes to commercially targeted fish stocks.	✓	✓	✓	A FMMS will be developed to reduce displacement where possible.
Vessel collision for basking shark	As above	Basking shark in the fish and shellfish study area may collide with work vessels associated with the Bellrock WFDA, causing injury or mortality.	✓	✓	✓	N/A
Accidental release of pollutants	As above	Pollution could be accidentally released from vessels, equipment, and machinery associated with any phase of the Bellrock WFDA. However, the potential risk of accidental release of pollutants is minimised by designed in mitigation measures.	X	X	X	Development and adherence to an EMP, and a MPCP. In addition adherence by contractors to OSPAR and MARPOL guidelines for preventing pollution at sea.
Introduction of marine INNS from vessel traffic	As above	Vessels from other locations could transport and release INNS in the fish and shellfish study area.	X	X	X	Biosecurity commitments would be secured in the EMP via a condition in the Marine Licence application. The EMP

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
		However, the potential risk of INNS introduction is minimised by designed in mitigation measures.				will be agreed with relevant stakeholders prior to the start of construction. An INNSMP will be developed to include provisions INNS management.

* It is acknowledged that the impacts of permanent habitat loss and introduction of hard substrate begin in construction and continue through decommissioning – to avoid duplicating assessments the full extent of these impacts will assessed in the operation and maintenance section, with a clear acknowledgement that they span the duration of the Bellrock WFDA's lifetime.

** Remobilisation of contaminated sediments will be scoped out if site-specific sediment samples reveal low contaminant levels.

*** It is acknowledged that the impact of EMF begins with commissioning, which takes place during the construction phase – to avoid duplicating assessments, the full extent of this impacts will be assessed in the operation and maintenance section. EMF is therefore scoped out for construction and decommissioning.

7.7 Proposed Approach to Impact Assessment

551. The impact assessment methodology for the fish and shellfish ecology chapter will follow that which is described in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**, as well as the guidance documents presented in **Section 7.2**.

552. A key source of information will be fisheries landings data (see **Section 7.4.2**); these provide both large spatial and temporal coverage, allowing interannual trends to be observed, or for average landings over the previous years to be calculated, thereby minimising the potential for anomalous data collected in a single year to skew the baseline. Desk-based sources set out in **Section 7.4.2** will be complemented with site-specific benthic survey data, which will give information on benthic habitat types and sediment particle size.

553. Diadromous fish will be included in the fish and shellfish ecology impact assessment. A separate section covering sensitivity of and implications of the impact on diadromous fish in each impact assessment will be included in the Bellrock WFDA EIA Report. Discussion with stakeholders throughout the consultation process will be undertaken to finalise the approach and focus of these impact assessments.

554. Species will be assessed as groups based on shared life-history traits (resulting in broadly shared sensitivities). These groups are elasmobranchs, demersal fish, and pelagic fish. The different sensitivities of these groups arise from general differences in their life history traits (e.g., pelagic fish are less likely to encounter localised benthic impacts compared to demersal fish, and elasmobranch may have particular sensitivities to EMF). Sensitivities will be based on Marlin's MarESA database as a starting point. Expert judgement and review scientific literature will also influence determination of sensitivity for fish and shellfish receptors. For feature-pressure combinations that have been assessed by Scottish Government at the time of conducting the EIA, the Feature Activity Sensitivity Tool (FeAST) will be used to further inform receptor sensitivities.

555. Uncertainties around impact magnitudes and significance will be acknowledged where significant knowledge gaps exist in the literature. Scottish Marine Energy Research group (ScotMER) research gaps for fish and shellfish will inform this.

556. The vessel collision risk assessment for basking shark will be qualitative and based on expert judgement, in consideration of the latest available sightings data for the east coast of Scotland, and the worst-case number of vessel passages anticipated for the Bellrock WFDA over the construction phase (as a worst-case).

557. Herring and sandeel habitat suitability assessments will be informed by particle size analysis data collected as part of the benthic survey campaign. This assessment will be conducted in line with industry best practice techniques, and in consultation with stakeholders.

558. An estimate of EMF from dynamic IACs will be provided in the Bellrock WFDA EIA Report, using existing literature, to inform the assessment of potential impacts to fish and shellfish at the estimated level.

559. Site-specific underwater noise modelling will be undertaken for underwater noise sources from the Bellrock WFDA, including pile driving, vessel, and operational turbine sound. Further detail on noise modelling can be found in **Chapter 8: Marine Mammals**. Sound impacts for fish will be based on the thresholds developed by Popper et al. (2014). Receptors will be treated either as stationary or fleeing, depending on their behaviour and the level of precaution required:

- Sandeel, spawning herring, spawning cod, and eggs treated as stationary receptors; and
- Other species treated as fleeing receptors at 0.5 ms-1.

560. The Popper et al. (2014) sound impact thresholds are based on the pressure component of sound. It is acknowledged, however, that many fish and invertebrate species can detect the particle motion component of sound. The propagation of pressure waves through a medium (sound pressure) is the most studied in terms of impacts on marine fauna. In contrast, particle motion, which is the oscillation of individual water molecules that allows the pressure waves to propagate, is understudied and no reliable impact thresholds exist to apply in an EIA context (Popper and Hawkins, 2018). Particle motion will be considered in the Bellrock WFDA EIA Report qualitatively.

7.8 Scoping Questions to Consultees

561. The following questions are posed to consultees to help them frame and focus their response to this fish and shellfish ecology scoping exercise, which will in turn inform the Scoping Opinion:

- Do you agree that the existing data available to describe the fish and shellfish ecology baseline remains sufficient to describe the baseline environment in relation to the Bellrock WFDA?
- Are there any further desktop datasets which you would recommend are included?
- Do you agree that all potential impacts have been identified for fish and shellfish ecology?
- Do you agree with the potential impacts scoped in and out?
- Do you have any other matters or information sources that you wish to present?

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8 Marine Mammals

8.1 Introduction

562. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on marine mammals. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

563. This chapter provides an overview of the existing environment and further sets out the methodology and approach to assessing effects on marine mammals in the Bellrock WFDA Environmental Impact Assessment (EIA) Report. This chapter has been prepared by Royal HaskoningDHV.

564. The marine mammal assessment should be read in conjunction with the following chapters of the Bellrock WFDA Scoping Report:

- **Chapter 6: Benthic Ecology;**
- **Chapter 7: Fish and Shellfish Ecology;**
- **Chapter 9: Offshore Ornithology;** and
- **Chapter 10: Commercial Fisheries.**

565. The marine mammal assessment is likely to have key inter-relationships with the above receptors, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

8.2 Legislation, Policy and Guidance

566. Marine mammal species in the waters surrounding the Bellrock WFDA are protected by national and international legislation. **Table 8.1** sets out the legislation, policy and guidance which have been considered in the preparation of this chapter and will be considered within the Bellrock EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

Table 8.1: Summary of Relevant Legislation, Policy and Guidance for Marine Mammals

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Legislation	
Nature Conservation (Scotland) Act, 2004	The Nature Conservation (Scotland) Act 2004 sets out a series of measures designed to conserve biodiversity, and to protect and enhance the biological and geological natural heritage. This Act also provides amendments to the Wildlife and Countryside Act 1981 specifically for Scottish waters, adding that it is an offence to disturb cetacean species (either recklessly or intentionally). This Act also enacts requirements under the Bern Convention 1979.
Marine (Scotland) Act, 2010	This Act provides a framework for the sustainable management of Scotland's seas and one of its key aims is to streamline and simplify the licensing and consenting process for marine projects. Under the Marine (Scotland) Act, the Conservation of Seals Act 1970 have been re-enacted, providing designation of specific seal haul-out sites for protections from intentional or reckless harassment. Under Part 6 of the new act, it is an offence to kill, injure or take a seal at any time of year, except to alleviate suffering or where a licence has been issued to do so by MD-LOT.
The Conservation of Offshore Marine Habitats and Species Regulations, 2017	The Habitats Regulations place an obligation on 'competent authorities' to carry out an appropriate assessment of any proposal likely to have a significant effect on a European site, to seek advice from Statutory Nature Conservation Bodies (SNCBs) and to reject an application that would have an adverse effect on the integrity of a European site except under very tightly constrained conditions. Under the Habitats Regulations, all cetacean species are defined as European Protected Species (EPS). All seals are listed under Schedule 3 (animals which may not be captured or killed in certain ways).
Policy	
Scotland's National Marine Plan, 2015	The purpose of the National Marine Plan is to set out strategic policies for the sustainable development of Scotland's marine resources out to 200 nm. Of relevance to marine mammals is the strategic priority: "Biodiversity is protected, conserved and, where appropriate, recovered, and loss has been halted."
Guidance	
The Protection of Marine EPS From Injury and Disturbance – Guidance of Scottish Inshore Waters (Marine Scotland, 2020).	This guidance provides advice for marine users who are planning to carry out an activity in the marine environment which has the potential to deliberately or recklessly kill, injure or disturb a marine EPS. It also provides useful information on mitigation for marine mammals.
The Protection of Marine EPS From Injury and Disturbance – Guidance For The Marine Area In England And Wales And The UK Offshore Marine Area (Joint Nature Conservation Committee (JNCC) et al., 2010).	The guidance intends to provide a resource for marine users, regulators, advisors and the enforcement authorities when considering whether an offence of disturbing or injuring/killing a marine EPS is likely to occur or to have occurred as a result of an activity.

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
JNCC Guidelines for Minimising The Risk Of Disturbance And Injury To Marine Mammals Whilst Using Explosives (JNCC, 2010a).	These guidelines outline measures to minimise potential injury and disturbance from the use of explosives from activities such as harbour construction, well-head or platform decommissioning and unexploded ordinance clearance. The draft documents will be considered when developing the mitigation plans. However, as the documents are not yet finalised, the 2010 version is the most recent and current version and is referenced within the scoping document.
DRAFT JNCC Guidelines For Minimising The Risk Of Injury To Marine Mammals From Unexploded Ordnance Clearance In The Marine Environment (JNCC, 2023).	
Statutory Nature Conservation Agency Protocol for Minimising The Risk Of Injury To Marine Mammals From Piling Noise (JNCC, 2010b).	The JNCC guidelines for piling outline a protocol for the mitigation of potential underwater noise impacts arising from pile driving during offshore wind farm construction.
Scottish Marine Wildlife Watching Code (Scottish Natural Heritage (SNH) [now NatureScot], 2017).	The wildlife watching code provides guidelines as to the best practice measures for reducing disturbance to marine mammals by all marine users.
JNCC Guidelines For Minimising The Risk Of Injury To Marine Mammals From Geophysical Surveys (Seismic Survey Guidelines) (JNCC, 2017).	The JNCC guidelines for geophysical surveys outline a protocol for the mitigation of potential underwater noise impacts due to geophysical surveys.
Marine Environment: Unexploded Ordnance Clearance Joint Interim Position Statement (Department of Business, Energy and Industrial Strategy (BEIS) et al., 2021).	Outlines the preferred approach to UXO clearance.

8.3 Consultation

567. A Scoping Workshop for the Bellrock WFDA was held on the 30th October 2023 with Marine Directorate - Licensing Operation Team (MD-LOT) and NatureScot, which included a dedicated session on marine mammals. The session aimed to agree the relevance, appropriateness and sufficiency of baseline data, key issues for the Bellrock WFDA EIA Report, and the impact assessment approach. **Table 8.2** sets out consultation from this workshop.

568. Consultation with marine mammal stakeholders will be ongoing during the EIA process and will include discussion of the best available information to use, for example, to agree species density estimates and define reference populations for the assessments.

569. Stakeholders that will be consulted through the EIA process include:

- Marine Directorate;
- NatureScot;
- JNCC; and
- Relevant research organisations working in the region (e.g. Natural Environment Research Council Sea Mammal Research Unit (SMRU)).

Table 8.2: Consultation Relevant to Marine Mammals

Consultee	Date/Document	Comment	How Comment is Addressed
NatureScot	30th October 2023, Bellrock WFDA Scoping Workshop (email post-workshop 20th December 2023)	*Confirm relevant MU for fin whale is the North East Atlantic?* We would recommend for fin whale, due the lack of data to allow quantitative analysis, that they are assessed qualitatively. This is because, although the Small Cetaceans in European Atlantic waters and the North Sea (SCANS) IV data include a density estimate for fin whales within block NS-D, this was based on a single sighting in this region. Previously, none had been recorded within the equivalent Block R in SCANS III. Thus, we advise a Management Unit estimate of numbers is not required.	Noted, this is discussed further in **Section 1.4** of **Appendix 4: Marine Mammals Existing Environment**.
NatureScot	30th October 2023, Bellrock WFDA Scoping Workshop	Noted that the North Atlantic Marine Mammal Commission (NAMMCO) (2020) source is appropriate for use in considering fin whale reference populations.	Noted. As per feedback from NatureScot on the 20th December 2023, NAMMCO reference is not required for fin whale. Fin whale will be assessed qualitatively.
NatureScot	30th October 2023, Bellrock WFDA Scoping Workshop	Confirmed that the proposed approach to characterising the baseline for seal species and the study area was appropriate.	Noted, see **Section 8.4** and **Appendix 4** for further information.
NatureScot	30th October 2023, Bellrock WFDA Scoping Workshop	Agreed that for buried cables, direct effects from EMF can be scoped out but that indirect effects (e.g. on prey species) should be scoped in.	Noted, see **Section 8.6.1.2.5** for further information on electromagnetic fields (EMF) and scoping.
NatureScot	30th October 2023, Bellrock WFDA Scoping Workshop	Using Temporary Threshold Shift for disturbance proxy is only recommended for unexploded ordnance (UXO) clearance, but is not recommended for piling.	Noted, the assessment methodology for disturbance will use the dose response curves as described in **Section 8.6.1.1.1.3** and **Appendix 5**.
NatureScot	30th October 2023, Bellrock WFDA Scoping Workshop	Noted that NatureScot do not agree with the Effective Deterrent Range (EDR) approach as it is specific enough to account for differences in the location of different wind farms and was produced as guidance for harbour porpoise designated sites. NatureScot prefer the dose response curve to be used.	Noted, see above comment.

Consultee	Date/Document	Comment	How Comment is Addressed
NatureScot	30th October 2023, Bellrock WFDA Scoping Workshop	Advised that the harbour porpoise dose response curve should be used for minke whales and dolphins as a precautionary approach.	Noted, see above comment.
NatureScot	30th October 2023, Bellrock WFDA Scoping Workshop	*Is there an agreement on the reference populations used to determine the levels of magnitude for the impact assessment*? Asked for information on the basis of the percentage of the reference population each magnitude level to be provided in the Bellrock WFDA Scoping Report.	This is based on a scientific background (peer-reviewed literature) and is presented in **Section 8.7**.
NatureScot	30th October 2023, Bellrock WFDA Scoping Workshop	*Do you agree with the proposed approach to cumulative effects assessment?* Noted that this appeared to be a conventional approach and highlights that pre-construction activities should also be included (e.g. UXO clearance, sandwave levelling).	Noted, as for the WFDA-alone assessment, the impacts of UXO clearance will be indicative. Approach to the cumulative effects assessment (CEA) is described in **Section 8.7.6**.

8.4 Existing Environment

570. The existing relative environment for marine mammals is provided in **Appendix 4: Marine Mammals Existing Environment,** including information on the marine mammals study area and data sources used. A full assessment of the baseline conditions will be undertaken through the EIA process, and will inform, alongside the results of the site-specific aerial surveys, the species to be taken forward for further assessment in the Bellrock WFDA EIA Report. Following the initial characterisation in **Appendix 4** plus agreement in the Scoping Workshop held on the 30th October 2023, it is expected that the key species taken forward for assessment would be:

- Cetaceans:
  - Harbour porpoise, *Phocoena phocoena*;
  - Bottlenose dolphin, *Tursiops truncatus*;
  - White-beaked dolphin, *Lagenorhynchus albirostris*;
  - Common dolphin, *Delphinus delphis*;
  - Minke whale, *Balaenoptera acutorostrata*; and
  - Fin whale, *Balaenoptera physalus*.
- Pinnipeds:
  - Grey seal, *Halichoerus grypus*; and
  - Harbour seal, *Phoca vitulina*.

571. As stated in **Appendix 4**, other marine mammal species have been recorded in the region. These include Atlantic white-sided dolphin *Lagenorhynchus acutus*, Risso's dolphin *Grampus griseus*, killer whale *Orcinus orca*, humpback whale *Megaptera novaeangliae*, and long-finned pilot whale *Globicephala melas*. The Applicant intends to scope these species out. However, if the results of the second year of site-specific surveys confirm presence of these species within the Bellrock WFDA, these species will be later scoped in for assessment.

572. It should be noted that all marine mammals will be protected through the mitigations implemented for the Bellrock WFDA, regardless of whether they are scoped in for full assessment in the EIA. Regarding underwater noise impacts, all species' hearing groups (porpoise, dolphin, whale and seal) will be included within the underwater noise modelling, and therefore all mitigation will be designed with all species groups in mind, which will ensure the less common species would be mitigated for.

8.4.1 Key Marine Mammal Data for Assessments

573. **Appendix 4: Marine Mammals Existing Environment** provides an initial review of the marine mammal presence at the Bellrock WFDA.

574. Marine mammal density estimates will be based on the worst-case (highest and most precautionary) estimate for each species. Sources to be used to derive density estimates for

cetacean species include the SCANS-IV survey data (Gilles et al., 2023), or data from Waggitt et al., (2019) (**Table 1.3** in **Appendix 4**), or the site-specific surveys. Seal density estimates will be based on the worst-case densities from the Carter et al., (2022) density mapping (**Table 1.4** in **Appendix 4**), or the site-specific surveys if there is sufficient data. See **Section 1.4.1** of **Appendix 4** for more information on the proposed use of cetacean density data, **and Section 1.4.2** of **Appendix 4** for the proposed use of seal density data.

575. The reference populations for cetacean species will be based on the SCANS-IV North Sea Management Unit (NS MU) estimate for harbour porpoise (Gilles et al., 2023), or the Inter-Agency Marine Mammal Working Group (IAMMWG) (2023) estimates for other cetacean species. For seal species, the population estimates will be based on the latest counts from the Special Committee on Seals (SCOS) (2022); the latest estimates are provided in **Table 1.5** of **Appendix 4**. However, seal densities will be updated in line with updated SCOS reporting.

576. **Table 8.3** summarises the cetacean species, density estimates, and reference populations currently available to be used in the assessments. Density estimates are based on the highest for the Bellrock WFDA. Further information on how the worst-case densities will be derived is provided in **Appendix 4**.

577. These, and other data sources, will be kept under review, and if any appropriate data sources are available to inform the marine mammal EIA they will be incorporated within the assessment. A further review of other data sources will be undertaken within the marine mammals chapter of the Bellrock WFDA EIA Report, and the worst-case used to inform the assessments, which will include data from the site-specific surveys. If additional relevant information becomes available during the EIA process it will also be considered for use within the assessments.

578. In the case of fin whale, there is a paucity of data available, and therefore assessments would be qualitative rather than quantitative, based on a desk-based review of the species and relevant impacts, as well as the modelled underwater noise impact ranges for the low-frequency hearing group. If other species, that are currently considered to be rare in the area, are subsequently scoped in for assessment, it is likely the same approach would be taken.

Table 8.3: Summary of Marine Mammal Species, Density Estimates and Reference Populations to be used in the Impact Assessments (Based on Currently Available Information)

Species	Density Estimate	Reference Population
Harbour porpoise	0.728/km^2 [indicative; based on year one results only] (HiDef, 2023) 0.5985/km^2 [for wider area density estimate] (Gilles et al., 2023)	NS MU = 338,918 (Gilles et al., 2023)

Species	Density Estimate	Reference Population
Bottlenose dolphin	0.0024/km² (Waggitt et al., 2019)	Greater North Sea (GNS) MU = 2,022 (IAMMWG, 2023) Coastal East Scotland MU = 224 (IAMMWG, 2023; Arso Civil et al., 2021)
White-beaked dolphin	0.0799/km² (Gilles et al., 2023)	Celtic and Greater North Sea (CGNS) MU = 43,951 (IAMMWG, 2023)
Common dolphin	0.020/km² (Waggitt et al., 2019)	CGNS MU = 102,656 (IAMMWG, 2023)
Minke whale	0.0419/km² (Gilles et al., 2023)	CGNS MU = 20,118 (IAMMWG, 2023)
Grey seal	0.08/km² (Carter et al. 2022)	Moray Firth (MF) MU = 7,380 (SCOS, 2022)
		East Scotland (ES) MU = 10,783 (SCOS, 2022)
		North East England MU = 25,913 (SCOS, 2022)
		South East England MU = 30,592 (SCOS, 2022)
Harbour seal	<0.00001/km² (Carter et al. 2022)	ES MU = 364 (SCOS, 2022)

8.4.2 Protected Sites

579. Designated sites for marine mammals in the north-east Scotland region and east coast of Scotland include the following:

- Moray Firth Special Area of Conservation (SAC), designated for bottlenose dolphin;
- Isle of May SAC, designated for grey seal;
- Firth of Tay and Eden Estuary SAC, designated for harbour seal;
- Berwickshire and North Northumberland Coast SAC, designated for grey seal;
- Southern North Sea SAC, designated for harbour porpoise;
- Humber Estuary SAC, designated for grey seal; and
- Southern Trench Nature Conservation Marine Protection Area (NCMPA), designated for minke whale.

580. Information on species' movements, including seal tagging studies, will be reviewed to determine the potential for connectivity of marine mammals from designated sites and the Bellrock WFDA as part of the Habitats Regulations Appraisal (HRA) screening exercise (**Bellrock WFDA HRA Screening Report**; BlueFloat Energy | Renantis, 2024).

581. In addition, the Southern Trench NCMPA has been designated for minke whale, and will be considered and assessed as part of the EIA process. The Southern Trench NCMPA is also screened in **Appendix 2: NCMPA Screening Report**.

8.5 Potential Impacts

582. A range of potential impacts on marine mammals have been identified which may occur during the construction, operation and maintenance, and decommissioning phases of the Bellrock WFDA. These include:

- Underwater noise during UXO clearance[26];
- Underwater noise during geophysical surveys[27];
- Underwater noise during impact piling (hydraulic hammer or vibro-piling);
- Underwater noise during other substructure or mooring installation options (other than impact piling);
- Underwater noise from other installation activities at the seabed (for example rock placement and cable laying);
- Underwater noise resulting from the presence of vessels during construction and operation and maintenance;
- Underwater noise from operational wind turbines and associated structures (e.g. mooring systems);
- Risk of entanglement (direct and secondary);
- Collision risk with vessels;
- Disturbance at seal haul-out sites;
- Electromagnetic fields (EMF) – direct effects on marine mammals;
- Changes in water quality; and
- Changes to prey availability.

583. **Section 8.6** provides further detail on each and identifies which development phases apply and justifies whether these impacts have been scoped in or out from further assessment.

8.5.1 Embedded Mitigation Measures

584. **Table 8.4** sets out the embedded mitigation measures built into the design of the Bellrock WFDA, as well as potential additional mitigation measures that may be applied if required at EIA stage. Additional mitigation measures may be implemented where the assessment identifies that an

[26] A separate Marine License application(s) will be made prior to UXO clearance works, with an accompanying assessment of UXO clearance effects on marine mammals. The Bellrock WFDA EIA Report will include an indicative assessment only.

[27] An EPS licence will be applied for separately, if deemed necessary.

aspect of the Bellrock WFDA is likely to give rise to significant environmental effect in order to avoid, prevent or reduce effects to acceptable levels.

Table 8.4: Embedded Mitigation Measures for Marine Mammals

Parameter	Description of Mitigation Measure
Mitigation to reduce effects from underwater noise	The Piling Strategy (PS) would be developed post-consent, in the pre-construction period and based upon best available information, a detailed ground model, construction methodologies, industry best practice, latest scientific understanding, current guidance and detailed project design, which will include a Marine Mammal Mitigation Protocol (MMMP). • The PS will include details on the soft-start and ramp-up[28] requirements, which will be based on modelling results for a variety of soft-start and ramp-up options, as well as engineering constraints and final pile design. • The MMMP for piling would be developed in consultation with the relevant SNCBs and MD-LOT, detailing the proposed mitigation measures to reduce the risk of any physical effects or permanent threshold shift (PTS) to marine mammals during all piling operations. This will include details of any mitigation measure to be put in place, such as soft-start, ramp-up, use of Acoustic Deterrent Devices (ADD), pre- and during piling, to manage the effects of underwater noise to sensitive receptors.
Management of UXO clearance activities[29]	Development of a UXO threat and risk assessment and use of low noise UXO clearance techniques where possible and use of UXO hierarchy. The hierarchy of UXO clearance techniques, in order of preference, are: • Avoid (through micro-siting of infrastructure); • Move UXO without clearing it (if applicable and accepted as an option); • Remove the UXO without clearing it (if applicable and accepted as an option); • Low-order deflagration if above options not suitable/unsafe; and • High-order clearance, if low-order deflagration not possible, or in the unlikely event that low-order deflagration was unsuccessful.
Pollution prevention	As outlined in **Chapter 5: Marine Geology, Oceanography and Physical Processes** the Applicant is committed to the use of best practice techniques and due diligence regarding the potential for pollution throughout all construction, operation and maintenance, and decommissioning activities. This includes compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 and the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and the development of, and adherence to, an Environmental Management Plan (EMP) and Marine Pollution Contingency Plan (MPCP).
Vessel Best Practice Measures	The Scottish Marine Wildlife Watching Code (SNH [now NatureScot], 2017) approach will be followed to minimise the risk of disturbance, by reducing vessel transit speeds and by maintaining speed and course when in the presence of marine mammal species. This code will be followed for all vessels transiting to and from the Bellrock WFDA.

[28] Please refer to glossary for details on soft-start and ramp up.

[29] If UXO clearance is required, it will be subject to a separate and appropriate Marine Licence application(s).

Parameter	Description of Mitigation Measure
	A Vessel Management Plan (VMP) will be developed and implemented to confirm the types and numbers of vessels that will be engaged during the different phases of the Bellrock WFDA, including selection of preferred transit routes to minimise disturbance to protected seal haul-out sites and other sites of relevance to marine mammals, where applicable. In the event of a collision with a marine mammal, this will be reported, and full information of the incident, including the marine mammal species, will be recorded.

585. If required following assessment in the EIA, additional mitigation may be implemented as appropriate to reduce the potential for effects from underwater noise during geophysical surveys. If any geophysical surveys are required, adequate mitigation measures will be in place to minimise the risk of any injury or disturbance to marine mammals, using the standard mitigation procedures as provided in JNCC (2017).

586. Where knowledge gaps are identified, the Applicant will continue to engage with stakeholders and collaborate in appropriate strategic monitoring projects as agreed through ScotMER and other similar working groups.

8.6 Scoping of Potential Impacts

587. The potential impacts from the Bellrock WFDA during the construction, operation and decommissioning phases are outlined below and summarised in **Table 8.5**. All of the potential impacts screened in for further assessment will be related to the potential area of impact, using marine mammal density information (as discussed in **Section 8.4.1**) to determine the number of marine mammals that could potentially be impacted, and assessed in the context of the relevant reference populations in order to identify the potential for any population effects.

8.6.1 Potential Impacts Scoped In

8.6.1.1 Construction

588. The potential impacts for marine mammals during construction which are scoped in for further assessments in the Bellrock WFDA EIA Report are:

- Underwater noise impacts:
- Collision risk with vessels;
- Disturbance at seal haul-out sites; and
- Changes to prey availability (including from habitat loss and EMF).

589. Each of these impacts is discussed in further detail below.

8.6.1.1.1 Underwater Noise Impacts

590. Underwater noise can cause both physiological (e.g. lethal, physical injury and auditory injury) and behavioural (e.g. disturbance, behavioural response and masking of communication) impacts on marine mammals (e.g. Southall, 2021; Stöber & Thomsen, 2019).

591. The key potential impacts during construction for marine mammals are expected to be those from underwater noise. Activities that have the potential to generate underwater noise associated with the construction of the Bellrock WFDA are:

- Clearance of UXO, if required;
- Geophysical surveys;
- Piling for anchors of floating substructures (FSSs) and (if used) fixed bottom substructures (FBSSs); or
- Non-impact piling installation of station keeping systems (SKSs) and (if used) FBSSs;
- Other construction activities such as seabed preparation, cable laying and rock placement; and
- Use of vessels.

592. For all underwater noise impacts, where possible (i.e. where there are modelling PTS ranges for an activity, or where a quantitative approach to disturbance is undertaken), the number of each marine mammal species within the potential areas of effect will be determined. This would be based on the modelled/derived effect areas through the underwater noise modelling, and the marine mammal densities as outlined in **Section 8.4.1**. The number of marine mammals at risk would then be assessed as a proportion of the overall population numbers, and the magnitude level determined as set out in **Table 8.6**.

593. Where a quantitative approach is not possible, a qualitative assessment will be undertaken, based on a literature review of the potential effect (e.g. reports of marine mammal behavioural reactions to certain noisy activities).

8.6.1.1.1.1 Clearance of UXO

594. Prior to construction, there is the potential for UXO clearance to be required in line with the UXO clearance hierarchy presented in **Table 8.4**. If required, underwater deflagration or detonation could be undertaken.

595. The potential effects of underwater explosions on marine mammals include:

- Physical injury from direct or indirect blast wave effect of the high amplitude shock waves and sound wave produced by underwater detonation, which could result in immediate or eventual mortality;
- Auditory impairment (from exposure to the acoustic wave), resulting in a permanent hearing loss (PTS); or
- Behavioural change, such as disturbance to feeding, mating, breeding, and resting (Richardson et al., 1995; Ketten, 2004; von Benda-Beckmann et al., 2015).

596. The potential for underwater noise impacts from UXO clearance is therefore scoped in for further assessment. However, as noted below, this will be provided as an indicative assessment only.

597. A UXO Threat and Risk Assessment for the Bellrock WFDA was undertaken by 6 Alpha Associates (2023). This assessment resulted in an overall UXO risk rating of low, although there is the potential for some UXO be present. The UXO listed by the UXO Threat and Risk Assessment as being potentially present are:

- 53.3 cm G7e Torpedo (Net Explosive Quality (NEQ) = 364 kg);
- 50 cm G7 Torpedo (NEQ = 254 kg); and
- 8.8 cm Naval Projectile (NEQ = 1.42 kg).

598. If UXO clearance is required, a separate Marine License application(s) will be made prior to UXO clearance works, with an accompanying assessment of UXO clearance effects on marine mammals. This is to ensure that assessments are made on the best available information at the time, including the size of UXO expected to require clearing.

599. A detailed UXO survey will be completed prior to UXO clearance taking place (and in the post-consent/pre-construction phase). Therefore, the number of possible detonations and duration of UXO clearance operations that could be required will not be known at the time of the Bellrock WFDA EIA Report submission. For the Bellrock WFDA EIA Report, an indicative and conservative assessment will be undertaken, based on the best available information from contractors, other offshore wind farm UXO clearance operations and other published information.

600. Underwater noise modelling will be undertaken on a range of potential UXO devices that may be present in the area, in order to provide an indicative assessment of impacts. Further information on underwater noise modelling is provided in **Appendix 5: Approach to Marine Mammals and Underwater Noise**.

8.6.1.1.1.2 Geophysical Surveys

601. Prior to, during and post construction, there is likely to be the need for geophysical surveys to further investigate and monitor the seabed conditions within the Bellrock WFDA. The specific equipment and associated sound frequencies and pressure levels are currently unknown, although are expected to include a combination of the below:

- Multi-beam echo sounder (MBES);
- Ultra-short baseline (USBL);
- Side scan sonar (SSS); and
- Sub-bottom profiler (SBP).

602. If required, an EPS licence application will be submitted prior to the works. For the purpose of the Bellrock WFDA EIA, underwater noise modelling will be undertaken for worst-case impact ranges from SBP, as it is anticipated that sound frequencies from MBES and SSS will fall outside the

marine mammals hearing ranges, and sound pressure levels from USBL are expected to be low and therefore unlikely to injure or disturb marine mammal species.

603. It is likely that SBPs would require mitigation as per the JNCC (2017) guidelines. USBL would also likely require mitigation, while MBES and SSS are generally outside of marine mammal hearing ranges and therefore unlikely to injure or disturb marine mammal species and are unlikely to require mitigation. However, all potential sources will be further assessed within the Bellrock WFDA EIA Report.

8.6.1.1.1.3 Impact Piling for Floating and Fixed Bottom Substructures

604. A range of substructure options are being considered for the wind turbine generators (WTGs). Those that will require impact piling are[30]:

- FSSs (anchoring):
  - Anchor driven piles:
    - Up to 12 anchor driven piles per FSS;
    - Either impact driven or vibro-piled; and
    - Estimated at 3.5 m diameter, 20-35 m long, and requiring a hammer energy of up to 3,000 kJ.
- FBSSs:
  - Jacket:
    - Either three or four legs per FBSS, with up to two pin piles per leg (i.e., up to eight pin piles for each substructure);
    - Up to 4 m diameter pile, requiring a hammer energy of up to 4,000 kJ; and
    - Piles could be impact or drill piled.
  - Cable supported monopile:
    - Estimated pile diameter of 16 m.

605. Please refer to **Chapter 3: Project Description** (**Section 3.4.2** and **3.5.2**) for full details on piled substructure and anchoring options, respectively.

606. Impact piling has been established as a source of high-level underwater noise (Robinson et al., 2012; Kastelein et al., 2015; Kastelein et al., 2016). The potential for underwater noise impacts from piling is therefore scoped in for further assessment, although the number of piles and parameters will be confirmed at later date.

[30] Information to be refined prior to underwater noise modelling being undertaken.

607. Underwater noise modelling will be undertaken to determine the potential impacts on marine mammals during piling. The underwater noise modelling will include modelling for threshold shifts (PTS) using the Southall et al., (2021) thresholds for marine mammals. Further information on underwater noise modelling is provided in **Appendix 5: Approach to Marine Mammals and Underwater Noise**.

608. For the potential for disturbance effects on marine mammals due to impact piling:

- The dose response curve from Graham et al., (2017) would be used to determine the potential for disturbance for harbour porpoise, dolphin species and minke whale; and
- The dose response curve from Whyte et al., (2020) would be used to determine the potential for disturbance for grey seal and harbour seal.

609. Further information on the approach to disturbance assessments (from impact piling) is provided in **Section 3** of **Appendix 5: Approach to Marine Mammals and Underwater Noise**.

610. Population modelling may also be undertaken to determine the population level consequences of disturbance due to piling at the Bellrock WFDA. For any marine mammal species where it has been identified there is the potential for a significant disturbance impact following the disturbance assessments as outlined above, population modelling will be undertaken (where possible[31]). The population modelling would be used to determine whether the number of animals disturbed would cause a population level effect.

8.6.1.1.1.4 Non-impact Substructure Installation Techniques

611. A range of non-impact piled substructure options are being considered. This will be refined through the EIA process, but are currently expected to include (and therefore be included within the underwater noise modelling):

- FSS anchoring:
  - Suction piles;
  - Drilled and grouted piles;
  - Drag embedment anchors;
  - Vertical load anchors; and
  - Suction embedded plate anchors.
- FBSS:
  - Suction caisson jacket; with either three or four legs (i.e. up to four suction caissons per substructure).

612. Please refer to **Chapter 3: Project Description** (**Section 3.4** and **Section 3.6**) for full details on piled substructure and anchoring installation techniques, respectively.

[31] Population modelling is currently only possible for harbour porpoise, bottlenose dolphin, minke whale, grey seal and harbour seal.

613. Underwater noise modelling will be undertaken to determine the potential impacts on marine mammals during the above listed anchor/substructure installation options. The underwater noise modelling will include modelling for threshold shifts (PTS). Further information on underwater noise modelling is provided in **Appendix 5: Approach to Marine Mammals and Underwater Noise**.

614. A desk-based review of similar activities will be undertaken to inform the potential for disturbance in all marine mammal species, which will include the 4 km disturbance range from other offshore wind farm construction activities provided by Benhemma-Le Gall et al., (2021).

8.6.1.1.1.5 Other Construction Activities and Vessels

615. Other sources of underwater noise associated with offshore wind farm construction include seabed preparation, rock placement, inter-array cable (IAC) installation (including cable burial (if applicable) and protection), installation of mooring lines and vessel activity.

616. There are no clear indications that underwater noise caused by the installation of subsea cables poses a high risk of harming marine fauna (OSPAR, 2009). The potential risk of PTS in marine mammals as a result of cable installation (including cable burial and protection if required) activity is highly unlikely. However, the need for a quantitative assessment of auditory injury (PTS) will be reviewed after project specific underwater noise modelling has been conducted.

617. The potential for any disturbance from underwater noise during cable installation or other activities associated with offshore wind farm construction will be scoped in for further assessment.

618. During the construction phase, there will be an increase in the number of vessels associated with installation of the Bellrock WFDA (i.e., SKSs, substructures, IACs). Where possible, vessel movements to and from any port will be incorporated within existing vessel routes and therefore any increase in disturbance as a result of underwater noise from vessels during construction is likely to be focused within the Bellrock WFDA.

619. The types of vessels that could be on site during construction could include (see complete list in **Section 3.9.3.3** within **Chapter 3: Project Description**):

- Support vessels;
- Anchor handling tug supply (AHTS) vessels;
- Cable installation vessels (pre-lay grapnel run & burial);
- Scour protection installation vessels;
- Heavy lift vessels (HLV);
- Jack-up vessels (JUV);
- Service operation vessels (SOV);
- Crew transfer vessel (CTV);
- Guard vessel; and
- Accommodation vessels.

620. Noise levels reported by Malme et al., (1989) and Richardson et al., (1995) for large vessels, typically those being used during construction, indicate that any physical or auditory damage to marine mammals is unlikely. However, the noise levels could be sufficient to cause local disturbance of sensitive marine mammals in the immediate vicinity of the vessel, depending on ambient noise levels, or could cause a cessation in foraging activity (e.g. Pirotta et al., 2015). The need for a quantitative assessment will be reviewed after project specific underwater noise modelling has been conducted.

621. A determination of the type and number of vessels to be used during the construction period will be taken into account and the likely noise emissions from those vessels will be given consideration to determine the potential impact of vessel noise on marine mammals. In addition, consideration will also be given to existing vessel activity in and around the Bellrock WFDA. The increase in vessel movements during construction will be put into the context of current vessel movements in and around the Bellrock WFDA.

622. The number of marine mammals that could be potentially disturbed as a result of underwater noise during construction from activities, other than piling and vessel movements, will be assessed, based on the type of activity and potential area of disturbance.

8.6.1.1.2 Vessel Interaction (Collision Risk)

623. As noted in **Section 8.6.1.1.1.5**, there will be an increase in vessel presence during the construction phase, which could lead to a potential increase in the risk of vessel collision with marine mammals. The risk of vessel collision is associated with the vessels within the Bellrock WFDA, as well as those vessels in transit to and from the WFDA. Despite the potential for marine mammals to detect and avoid vessels, vessel strikes are known to occur (Wilson et al., 2007; Schoeman et al., 2020).

624. The increased risk of collision with marine mammals during construction has been scoped in and will be assessed in the EIA, taking into account the most recent and robust research, guidance and information available.

625. The assessment of the potential impact of vessel interaction will take into account the type and number of vessels anticipated to be used during the construction period and the potential collision risk associated with those vessels. A literature review will be undertaken to determine the sensitivity of each marine mammal species to vessel collisions (and their ability to avoid vessels), alongside a review of the risk of collision due to the type, size, and speed of vessels associated with the Bellrock WFDA.

626. The increase in vessel movements during construction will also be put into the context of current vessel movements in and around the Bellrock WFDA.

627. As noted in **Section 8.5.1**, vessel best practice measures will be followed, which will reduce the potential for any vessel collision with marine mammals.

8.6.1.1.3 Disturbance at Seal Haul-out Sites

628. Vessel transits to and from the Bellrock WFDA and the construction/integration port(s) have the potential to disturb seals at haul-out sites, depending on the route and proximity to the haul-out sites. This Bellrock WFDA Scoping Report is focused on the Bellrock WFDA only. Potential for disturbance to haul-out sites due to activity in the Bellrock OfTDA will be considered within the Bellrock OfTDA Scoping Report.

629. The potential for any disturbance of seals at or from seal haul-out sites during construction (due to vessel transits) has been scoped in and will be assessed in the EIA, taking into account the most recent and robust research, guidance and information available. The port(s) to be used for construction works will be identified post consent. Potential ports may be shortlisted within the Bellrock WFDA EIA Report.

630. The likelihood of increased vessels close to the locations of nearby seal haul-out sites will be used to determine the level of potential disruption and behavioural impact caused to the seals. A literature review of the latest research and evidence of disturbance at seal haul-out sites will be undertaken to determine the potential magnitude and sensitivity of effect.

631. The duration of the construction vessels movement to and from the site will be based on the worst-case scenario. The increase in vessel movements during construction will be put into the context of current vessel movements in and around the east coast of Scotland and offshore areas.

8.6.1.1.4 Changes to Prey Resource

632. **Chapter 7: Fish and Shellfish Ecology** outlines the potential impacts on fish species and therefore the prey resource for marine mammals during construction.

633. The potential for any changes to the prey resource for marine mammals during construction will be assessed further in the EIA. Impacts will be based on the assessments in the fish and shellfish ecology chapter of the Bellrock WFDA EIA Report.

634. The fish species present at the Bellrock WFDA that could potentially be affected during construction will be determined by reference to a number of existing data sources. The potential impacts on known prey species for each marine mammal receptor will be assessed based on the results of the fish and shellfish ecology impact assessment, including underwater noise modelling based on the appropriate realistic worst-case scenarios for these receptors. The assessment will consider the known dependence of each marine mammal species to those prey species and the potential impact on energy demands should prey species be displaced.

635. A literature review of the latest research and evidence of marine mammal sensitivities to changes in prey species will be undertaken, and will be considered alongside the results of the assessments to prey species to determine the potential magnitude and sensitivity of the impact.

8.6.1.2 Operation and Maintenance

636. The potential impacts for marine mammals during operation and maintenance, and scoped in for further assessments in the Bellrock WFDA EIA, are:

- Underwater noise impacts:

  - Due to operational WTGs and FBSSs and floating offshore unit (FOU) noise (including noise from cables and mooring lines);
  - Due to operation and maintenance activities; and
  - Due to presence of vessels.
- Entanglement with mooring lines and dynamic IACs;
- Collision risk with operation and maintenance vessels;
- Disturbance at seal haul-out sites;
- EMF effects; and
- Changes to prey availability (including from habitat loss and EMF).

637. Each of these impacts is discussed in further detail below.

8.6.1.2.1 Underwater Noise Impacts

638. Potential sources of underwater noise during the operation and maintenance phase include:

- Operational noise from WTGs and/or from movement of FSS SKSs on the seabed;
- Operation and maintenance activities underwater, such as underwater surveys, preventive and corrective maintenance to substructures and SKS, IAC repairs (including re-burial and any additional rock placement; and
- Operation and maintenance vessel activity.

8.6.1.2.1.1 Operational Floating Offshore Unit and Wind Turbine Generator and Fixed Bottom Substructure Noise

639. The low-level noise generated during operation is likely to be detected by marine mammals only at short distances over background noise levels and below levels which would elicit a response (Madsen et al., 2006; Thomsen et al., 2006). The overall effect of the operational noise and the ability of marine mammals to perceive this noise will be largely dependent on ambient noise levels and wind speed (Risch et al., 2023).

640. The main sources of sound generated during the operation of WTG are aerodynamic and mechanical. The mechanical noise is from the nacelle at the top of the WTG tower. As the WTG blades rotate, vibrations are generated that travel down the WTG and radiate into the surrounding water column and seabed (Tougaard, Henrikson and Miller, 2009; Tougaard et al. 2020; Nedwell et al. 2007). The resulting sound is described as continuous and non-impulsive and is characterised by one or more tonal components that are typically at frequencies below 1 kHz. The frequency content of the tonal signals is determined by the mechanical properties of the wind turbine and does not change with wind speed (Madsen et al., 2006). Noise levels generated above the water surface are low enough that no significant airborne sound will pass from the air to the water (Godin, 2008).

641. Tougaard et al. (2020), reviewed the available measurements of underwater noise from different WTG during operation and found that source levels were at least 10–20 dB lower than vessel noise in the same frequency range. A simple multi-turbine model indicated that cumulative noise levels could be elevated up to a few kilometres from a wind farm under very low ambient noise conditions. However, the noise levels were well below ambient levels unless very close to the individual turbines in locations with high ambient noise from shipping or high wind speeds (Tougaard et al., 2020).

642. There are few studies into the sound levels associated with floating wind farms, and whether they differ to the noise levels associated with fixed, ongoing research is currently being conducted. One study that will be used to inform the potential for marine mammal effects due to operational FOU noise (at floating wind farms) is the FORTUNE (Floating Offshore Wind Turbine Noise) project (Risch et al., 2023).

643. Noise emissions from floating offshore wind turbines at Kincardine and Hywind Scotland were concentrated in the frequencies below 200 Hz and showed distinct tonal features, likely related to rotational speed, between 50 and 80 Hz at Kincardine and 25 and 75 Hz at Hywind Scotland (Risch et al., 2023). The measured received levels are similar to those measured for operational noise from fixed offshore wind turbines at comparable distances. Emitted noise levels showed strong positive correlations with wind speed and slightly weaker positive correlations with wave height (Risch et al., 2023).

644. There is also the potential for a noise that has been associated with cable ‘thrums’ and/or cable ‘snaps’ to be present during the operation of the FOUs at floating offshore wind farms resulting from dynamic IAC suspended within the water column, and potentially also noise resulting from the movement of mooring lines (Risch et al., 2023). It should be noted that it is likely this cable snap noise is a feature of the particular environmental conditions of where it was recorded. However, as the source of this ‘cable snap’ noise is currently not well understood, it is not possible to rule out that it will occur during the operational phase of the Bellrock WFDA.

645. The potential for underwater noise impacts due to operational FOU noise will be scoped into the assessment.

646. Depending on the estimated sound source from an operational FOU, underwater noise modelling may be undertaken for the potential for PTS, using the non-impulsive thresholds as set out in **Table 2.1** in **Appendix 5.**

647. There is no indication of any disturbance or exclusion of small cetaceans or seals around fixed substructure wind farm sites during operation (Tougaard et al., 2005; Scheidat et al., 2011). Data collected suggests that behavioural responses for harbour porpoise and seals may only occur up to a few hundred metres away for fixed substructures (Tougaard, Henrikson and Miller, 2009; McConnell et al., 2012) and for FSS (Risch et al., 2023). Tagged harbour seals have been recorded within operational wind farm sites and the movements of several of the seals suggest foraging behaviour around fixed wind turbine structures (Russell et al., 2014). Harbour porpoise have also been reported to increase their foraging activity close to offshore structures (<200m) compared to further away (2,500m) (Fernandez-Betelu et al., 2022). A full review of the latest research will be undertaken as part of the EIA, including any reporting on harbour porpoise presence and foraging

at operational wind turbines as part of the Predators & Prey around Renewable Energy Developments (PrePARED) project.

648. Therefore, it is proposed that disturbance from the underwater noise of operational turbines at the Bellrock WFDA will be based on the latest evidence and research, using a desk-based approach to the assessment.

8.6.1.2.1.2 Geophysical Surveys

649. The potential for underwater noise impacts from geophysical surveys during the operation and maintenance phase will be based on the underwater noise modelling and assessment of similar activities for the construction phase (**Section 8.6.1.1.1.2**). If required, an EPS licence application will be submitted prior to such surveys.

650. For the purpose of the Bellrock WFDA EIA, underwater noise modelling will be undertaken for the worst-case impact ranges from SBP, as it is anticipated that sound frequencies from MBES and SSS will fall outside the marine mammals hearing ranges, and sound pressure levels from USBL are expected to be low and therefore unlikely to injure or disturb marine mammal species.

651. It is likely that SBPs would require mitigation as per the JNCC (2017) guidelines. USBL would also likely require mitigation, while MBES and SSS are generally outside of marine mammal hearing ranges and therefore unlikely to injure or disturb marine mammal species and are unlikely to require mitigation. However, all potential sources will be further assessed within the Bellrock WFDA EIA Report.

8.6.1.2.1.3 Operation and Maintenance Activities and Vessels

652. The Bellrock WFDA EIA Report will set out an indicative overview of requirements for any preventive and corrective maintenance work. However underwater noise impacts associated with any work required are expected to be lower than those during construction, although they would be undertaken periodically over a longer time frame (and during the lifetime of the Bellrock WFDA). Vessel presence within the Bellrock WFDA, as well as those vessels in transit to and from the Bellrock WFDA are anticipated during the operational period.

653. The potential for disturbance from underwater noise during the operation and maintenance phase will be based on the underwater noise modelling and assessment of similar activities for the construction phase (**Section 8.6.1.1.1.5**).

654. The potential impacts associated with underwater noise during operation and maintenance (including PTS, disturbance and behavioural effects and impacts on prey species) are scoped in and will be considered further in the EIA, taking into account the most recent and robust research, guidance and information available.

655. As outlined in **Section 8.6.1.1.1.5**, noise generated from activities such as cable laying is not expected to be sufficient to cause PTS or other injury to marine mammals. The need for a quantitative assessment will be reviewed after project specific underwater noise modelling has been conducted. Disturbance is likely to be the main potential noise impact from operation and maintenance activities.

8.6.1.2.2 Entanglement

656. Depending on the method used, there is the perceived potential for entanglement in the mooring lines of the SKSs for FSSs, as well as the dynamic IACs. To date, there have been no recorded instances of marine mammal entanglement from mooring systems of renewable devices (Sparling et al., 2013; Isaacman and Daborn, 2011), or for anchored floating production storage and offloading (FPSO) vessels in the oil and gas industry (Benjamins et al., 2014) with similar mooring lines as proposed for FSSs. However, entanglement in fishing gear is known to occur in Scottish waters, and therefore resulting in the potential for a risk of secondary entanglement (i.e., entanglement in ghost fishing gears entangled in the subsea infrastructure).

657. The options for the FSSs and mooring lines, if required, are;

- FSS systems:
  - Tension leg platform;
  - Semi-submersible;
  - Barge;
  - Buoy; and
  - Semi-spar.
- Mooring lines:
  - Catenary;
  - Taut;
  - Semi-taut;
  - Tension; and
  - Shared.

658. The mooring lines may be formed of chain, synthetic rope, or sheathed spiral strand wire-ropes. Please refer to **Chapter 3: Project Description** for full details on FSSs and mooring line options under consideration.

659. The level of risk to become entangled varies with species (Benjamins et al., 2014). The varying factors include body size, flexibility of movement, the ability to detect mooring lines, and the feeding ecology of the species.

660. Toothed whales have a lower risk than baleen whales, primarily due to their small size and manoeuvrability. Seal species have a similar risk level to small toothed cetaceans, with an increase in manoeuvrability.

661. The potential for primary entanglement is considered to be very low risk, given the design of the mooring lines and dynamic IACs. Therefore, the potential for primaryentanglement has been scoped out (see **Section 8.6.2**). However, there may be the potential for secondary entanglement, whereby anthropogenic debris, such as lost, abandoned or discarded fishing gear and other marine debris is caught in the mooring lines and poses a risk to transiting marine mammals. The potential

for secondary entanglement has been scoped in and will be considered within the EIA Report. The impact assessment for entanglement will be based on a qualitative assessment of the latest research and data on entanglement of marine mammals.

662. During operation and maintenance, periodic inspections, as part of the asset integrity campaign, will include visual surveys and identification of debris and gear entangled in the WFDA's infrastructure**.** This will provide further understanding on the potential for the debris and ghost fishing gears to be caught in the WFDA infrastructure, increasing the risk for secondary entanglement. Note this is in the early stages of development and will be further refined during the EIA process.

8.6.1.2.3 Vessel Interaction (Collision Risk)

663. As outlined for construction, the increased risk of collision with marine mammals will be given further consideration in the EIA. It is anticipated that the impacts associated with vessel activities at any one-time during operation and maintenance would be less than those during the construction phase, due to the lower number of vessels, although vessels would be in the area periodically for the full lifetime of the Bellrock WFDA which may pose a greater risk over time.

664. The increased risk of collision with marine mammals during operation has been scoped in and will be assessed in the EIA, taking into account the most recent and robust research, guidance and information available.

665. The operation and maintenance port(s) to be used for the Bellrock WFDA will not be known until post-consent. Vessel movements to and from any port will be incorporated within existing vessel routes where possible, however, there is an increased risk for any vessel interaction within the Bellrock WFDA as well as during transit to and from site.

666. The same assessment methodology as outlined in **Section 8.6.1.1.2** will be undertaken.

8.6.1.2.4 Disturbance at Seal Haul-out Sites

667. As outlined for construction (**Section 8.6.1.1.3**), depending on the vessel routes there is the potential for disturbance at seal haul-out sites. It is anticipated that the impacts associated with vessel activities at any one-time during operation and maintenance would be less than those during the construction phase, and the magnitude of impact (number of vessels) is likely to be lower and spatial extent may vary according to the ports(s) used.

668. There is no potential for any direct disturbance as a result of activities within the Bellrock WFDA, due to the distance to the nearest known seal haul-out sites. However, depending on the location of the operation and maintenance port(s) and potential transit routes for vessels there is the potential for associated disturbance.

669. The potential for any disturbance of seals at or from seal haul-out sites during operation has been scoped in and will be assessed in the EIA, taking into account the most recent and robust research, guidance and information available.

8.6.1.2.5 Impacts of EMF

670. Many marine organisms have evolved sensory abilities to use electric and magnetic cues in essential aspects of life history, such as prey detection, predatory behaviour, and navigation and these behaviours may be impacted by EMF emissions in the water column (Hutchison et al., 2020).

671. Subsea electrical cabling produces EMFs which have the potential to affect marine mammals both directly and indirectly through prey interaction pathways - in particular for non-buried IACs (either dynamic IACs at the water column, or static IACs on the seabed). A detailed Cable Burial Risk Assessment (CBRA) will be prepared where IACs are buried to confirm the extent to which cable burial can be achieved.

672. Studies indicate that magnetic fields decrease rapidly with vertical and horizontal distance from subsea cables, and that the reduction is greater the deeper cables are buried (Normandeau et al., 2011).

673. Although it is assumed that marine mammals are capable of detecting small differences in magnetic field strength, this is unproven and is based on circumstantial information. There is also, at present, no evidence to suggest that existing subsea cables influence cetacean movements, and there are no regulatory thresholds or guidelines that define acceptable levels of EMF emissions into the marine environment (Copping et al., 2020).

674. Harbour porpoise are known to move in and out of the Baltic Sea, over several buried subsea HVDC cables in the Skagerrak and western Baltic Sea with no apparent effect to their migratory movements. There is also no evidence to suggest that seal species respond to EMF (Gill et al., 2005).

675. As a precautionary approach the potential for EMF to impact on marine mammal and their prey species is scoped in for further assessment in the EIA. The impact assessment will be based on a desk-based review of the potential effects of EMF, and the estimated EMF emissions for the Bellrock WFDA.

8.6.1.2.6 Changes to Prey Resource

676. **Chapter 7: Fish and Shellfish Ecology** outlines the potential impacts on fish species and therefore the prey resource for marine mammals during operation and maintenance.

677. The potential for any changes to the prey resource for marine mammals during operation and maintenance has been scoped in and will be assessed further in the EIA. Impacts will be based on the assessments in the fish and shellfish ecology chapter of the Bellrock WFDA EIA Report.

678. The proposed approach for the assessment of changes to prey resources during operation and maintenance will be the same as for construction (as outlined in **Section 8.6.1.1.4**). Key research papers to be used to inform this assessment could include the Physics-to-Ecosystem Level Assessment of Impacts of Offshore Wind Farms Project as part of the Offshore Wind Evidence and Change Programme (if available); one aim of which is to study the predator-prey interactions within operational wind farms.

8.6.1.3 Decommissioning

679. During decommissioning the potential impacts are anticipated to be similar to those for the construction phase, depending on the methods used.

680. Potential impacts on marine mammals associated with the decommissioning stage(s) will be assessed, based on the potential impacts associated with construction; however, a further assessment will be carried out ahead of any decommissioning works to be undertaken taking account of known information at that time, including all relevant guidelines and requirements.

681. The potential impacts during decommissioning the Bellrock WFDA that will be assessed for marine mammals are:

- Underwater noise impacts:
  - Resulting from the noise associated with substructure and SKS removal (e.g. cutting);
  - Geophysical surveys; and
  - Due to presence of vessels.
- Collision risk with vessels;
- Disturbance at seal haul-out sites; and
- Changes to prey availability.

682. The proposed approach for the assessment of potential impacts during decommissioning will follow the same proposed methodology outlined for similar activities during construction (as outlined in **Section 8.6.1.1**).

8.6.2 Potential Impacts Scoped Out

8.6.2.1 Construction

683. Prior to the operation and maintenance phase, there is limited pathway of effect for underwater noise from operational WTGs and FBSSs and FOUs, entanglement (both direct and secondary), and impacts of EMF. While there exists the potential for these impacts to affect marine mammals during construction, these impacts will increase incrementally as the Bellrock WFDA is constructed and commissioned with the greatest potential impacts resulting from the completed Bellrock WFDA. These impacts are therefore scoped out from further consideration in relation to the construction and decommissioning phases to avoid double counting but is assessed under operation and maintenance (see **Section 8.6.1.2**).

684. With regard to changes to water quality, the increases in suspended sediments and for the accidental release of contamination during construction has the potential to impact marine mammals, and their prey. The potential for water quality changes will be determined in the marine geology, oceanography and physical processes chapter of the Bellrock WFDA EIA Report, including the best practice and management measures that would be put in place. Any changes to water quality would be localised and short lived, and the potential for any impacts from changes in water quality on marine mammals is not expected to be significant. Potential impacts on marine

mammals related to changes in water quality during construction are therefore scoped out from assessment in the EIA.

8.6.2.2 Operation and Maintenance

685. No UXO clearance, piling or other substructure installation options will be required during the operation and maintenance phase, and therefore, there is no pathway of effect. The key potential construction impacts of underwater noise during UXO clearance, geophysical surveys and piling are not considered be relevant to the operation and maintenance phases, therefore they have been scoped out of the assessment for operation of the Bellrock WFDA. The potential for primary entanglement is considered to be very low risk, given the design of the mooring lines and dynamic cables. Therefore, the potential for primary entanglement has been scoped out.

686. Potential impacts to marine mammals related to changes in water quality during operation are scoped out for assessment. As with construction, any changes to water quality would be localised and short lived and best practice and management measures would be put in place.

8.6.2.3 Decommissioning

687. No UXO clearance, piling or other substructure installation options will be required during the decommissioning phase, and therefore, there is no pathway for effect for underwater noise. Similarly, at decommissioning, there will be no pathway of effect for underwater noise from operational WTGs as turbines will not be operational. At decommissioning, dynamic cables/cables in the water column will be removed, removing the pathway of effect for entanglement (both direct and secondary) and impacts of EMF. Therefore, these impacts are scoped out from further assessment for the decommissioning phase.

688. Potential impacts to marine mammals related to changes in water quality during decommissioning are scoped out for assessment. As with construction, any changes to water quality would be localised and short lived and best practice and management measures would be put in place.

8.6.3 Potential Cumulative Effects

689. The CEA will identify where the predicted effects of the construction, operation and maintenance and decommissioning Bellrock WFDA could interact with effects from different plans or projects within the same region, and have the potential for generate a cumulative effect on marine mammals.

690. The CEA will be considered in two stages; a CEA of the of the whole Bellrock Project (i.e., the Bellrock WFDA and the Bellrock Offshore Transmission Development Area; OfTDA), followed by a CEA of the whole Bellrock Project alongside other plans or projects. Please see **Chapter 4: Approach to Scoping and Environmental Impact Assessment** for full details.

691. The potential cumulative effects that will be assessed further in the Bellrock WFDA EIA are those that are assessed as having a minor adverse significance or higher, and the key impacts to be considered are expected to be:

- Underwater noise;
- Vessel interaction; and
- Secondary entanglement.

8.6.4 Potential Transboundary Effects

692. There is a significant level of marine development being undertaken or planned by EU Member States and others (i.e. Norway, Denmark, Germany, Belgium and the Netherlands) in the North Sea. Populations of marine mammals are highly mobile and there is potential for transboundary effects, especially when considering noise effects. Transboundary effects are scoped into the EIA.

693. Transboundary effects will be assessed, where possible, in consultation with developers and other stakeholders in other countries to obtain up to date project information to feed into the assessment.

694. Transboundary effects will be assessed, as with the other cumulative effects, for the relevant cetacean MUs. For seal species, the potential for connectivity with other countries will be based on existing tagging studies for each species and will include a review of tagging studies undertaken in the UK as well in European countries. The potential for transboundary effects will be addressed by considering the reference populations and potential linkages to international designated sites as identified through telemetry studies for seals and ranges and movements of cetacean species.

695. The assessment of the effect on the integrity of the transboundary European sites as a result of effects on the designated marine mammal populations will be undertaken and presented in the information for the HRA.

8.6.5 Summary of Potential Marine Mammals Impacts Scoped In or Out

696. **Table 8.5** presents a summary of the impacts to be scoped in and out for each phase of the Bellrock WFDA.

Table 8.5: Summary of Potential Impacts Scoped In (✓) or Out (x) for Marine Mammals

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Underwater noise during UXO clearance	All marine mammal species	The potential effects of underwater explosions on marine mammals include: (1) physical injury from direct or indirect blast wave effect of the high amplitude shock waves and sound wave produced by underwater detonation, which could result in immediate or eventual mortality; (2) auditory impairment (from exposure to the acoustic wave), resulting in a permanent hearing loss (PTS); or (3) behavioural change, such as disturbance to feeding, mating, breeding, and resting.	✓	x	x	UXO mitigation hierarchy.
Underwater noise during geophysical surveys	All marine mammal species	Underwater noise can cause both physiological (e.g. lethal, physical injury and PTS) and behavioural (e.g. disturbance, behavioural response impacts on marine mammals.	✓	✓	✓	N/A
Underwater noise during piling	All marine mammal species	Underwater noise can cause both physiological (e.g. lethal, physical injury and PTS) and behavioural (e.g. disturbance, behavioural response impacts on marine mammals.	✓	x	x	MMMP for piling.
Underwater noise during other substructure installation activities (other than impact piling)	All marine mammal species	Underwater noise can cause both physiological (e.g. lethal, physical injury and PTS) and behavioural (e.g. disturbance, behavioural response impacts on marine mammals.	✓	x	x	None expected to be required.

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Underwater noise from other activities (for example rock placement and IAC laying)	All marine mammal species	Underwater noise can cause both physiological (e.g. lethal, physical injury and PTS) and behavioural (e.g. disturbance, behavioural response) impacts on marine mammals.	✓	✓	✓	None expected to be required.
Underwater noise and presence of vessels	All marine mammal species	Underwater noise can cause both physiological (e.g. lethal, physical injury and PTS) and behavioural (e.g. disturbance, behavioural response) impacts on marine mammals.	✓	✓	✓	Vessel best practice measures.
Underwater noise from operational WTGs and FOU moorings on the seabed	All marine mammal species	Underwater noise can cause both physiological (e.g. lethal, physical injury and PTS) and behavioural (e.g. disturbance, behavioural response) impacts on marine mammals.	X	✓	X	None expected to be required.
Primary entanglement	All marine mammal species	The potential for primary entanglement is considered to be very low risk, given the design of the mooring lines and dynamic cables.	X	X	X	N/A
Secondary entanglement	All marine mammal species	Risk to marine mammals due to secondary entanglement (where fishing gear is caught in floating structures and mooring lines or dynamic cables, and marine mammals become entangled in that fishing gear).	X	✓	X	N/A
Collision risk with vessels	All marine mammal species	Increased vessel collision risk due to increased presence of vessels.	✓	✓	✓	Vessel best practice measures.

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Disturbance at seal haul-out sites	Grey seal and harbour seal	Increased activity near seal haul-out sites as a result of transiting vessels could have the potential to disturb seals. Potential for disturbance from vessels transiting to and from the Bellrock WFDA only.	✓	✓	✓	Vessel best practice measures.
EMF – direct effects on marine mammals	All marine mammal species	IACs may cause impacts to marine mammals through the emission of EMF into the environment.	X	✓	X	None expected to be required.
Changes in water quality	All marine mammal species	Accidental release of contaminants, increased suspended sediment, or mobilisation of sediment contaminants if contained in those sediments could have potential to impact on marine mammals directly or indirectly through effects on prey.	X	X	X	EMP and MPCP.
Changes to prey availability	All marine mammal species	Potential impacts on fish could affect prey availability for marine mammals. Potential pathways of impact include physical disturbance and temporary loss of seabed habitat; increased suspended sediment concentrations and sediment re-deposition; changes in water quality and underwater noise.	✓	✓	✓	None expected to be required.

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8.7 Proposed Approach to Impact Assessment

697. The impact assessment for marine mammals will follow the approach set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**. The sections below set out further details around the approach to impact assessments specific to marine mammals.

698. **Appendix 5: Approach to Marine Mammals and Underwater Noise** sets out the proposed approach to assessment for disturbance from underwater noise.

8.7.1 Data to be used in Impact Assessments

699. The key baseline data sources to be utilised in the assessments would be the density estimate for each species and the reference population for each species (see **Table 8.3** for summary of data sources). See **Appendix 4: Marine Mammals Existing Environment** for the initial review of density data sources and reference populations.

700. Following the full baseline review and the full site-specific aerial data being available, all density estimates would be collated, and as a precautionary approach, the worst-case (highest) estimate for each species would be used to inform the assessment.

701. The density and reference population estimates currently available are provided in each species section, as well as a summary of the proposed data to be used in the impact assessments. This is indicative only, as a full baseline review is yet to be undertaken, and the full site-specific aerial survey data is not yet available.

8.7.2 Sensitivity

702. The sensitivity of a receptor is determined through its ability to accommodate change and on its ability to recover if it is affected. The sensitivity level of marine mammals to each type of effect is justified within the effect assessment and is dependent on the following factors:

- Adaptability – The degree to which a receptor can avoid or adapt to an effect;
- Tolerance – The ability of a receptor to accommodate temporary or permanent change without a significant adverse effect;
- Recoverability – The temporal scale over and extent to which a receptor will recover following an effect; and
- Value – A measure of the receptor importance, rarity and worth (as outlined below).

703. Definitions of sensitivity levels for marine mammals will follow those set out in **Table 4.2** in **Chapter 4: Approach to Scoping and Environmental Impact Assessment.**

8.7.3 Ecological Value

704. The 'value' of the receptor forms an important element within the marine mammals assessment, for instance, if the receptor is a protected species, or habitat, or has an economic value. It is

important to understand that high value and high sensitivity are not necessarily linked within a particular effect. A receptor could be of high value but have a low or negligible physical/ecological sensitivity to an effect. Similarly, low value does not equate to low sensitivity and is judged on a receptor-by-receptor basis.

705. In the case of marine mammals, most species are protected by a number of international commitments as well as European and UK law and policy. All cetaceans in UK waters are EPS and, therefore, are internationally important. Harbour porpoise, bottlenose dolphin, grey seal and harbour seals are also afforded international protection through the designation of Natura 2000 sites. As such, all species of marine mammal can be considered to be of high value. The value will be considered, where relevant, as a modifier for the sensitivity assigned to the receptor, based on expert judgement. The definitions of value will follow those set out in **Table 4.3** in **Chapter 4: Approach to Scoping and Environmental Impact Assessment.**

8.7.4 Magnitude

706. The thresholds for defining the potential magnitude of impact that could occur from a particular effect will be determined using expert judgement, current scientific understanding of marine mammal population biology, and JNCC et al. (2010) guidance on disturbance to EPS species. The JNCC et al. (2010) EPS guidance suggests definitions for a ‘significant group’ of individuals or proportion of the population for EPS species. As such this guidance has been considered in defining the thresholds for magnitude of impacts (Table 8.6).

707. The JNCC et al. (2010) guidance provides some indication on how many animals may be removed from a population without causing detrimental effects to the population at Favourable Conservation Status (FCS). The JNCC et al. (2010) guidance also provides limited consideration of temporary effects, with guidance reflecting consideration of permanent displacement.

708. Temporary effects are considered to be of medium magnitude at greater than 5% of the reference population. JNCC et al. (2010) guidance considered 4% as the maximum potential growth rate in harbour porpoise, and the ‘default’ rate for cetaceans. Therefore, beyond natural mortality, up to 4% of the population could theoretically be permanently removed before population growth could be halted. In assigning 5% to a temporary effect in this assessment, consideration is given to uncertainty of the individual consequences of temporary disturbance.

709. Permanent effects with a greater than 1% of the reference population being affected within a single year will be considered to be high in magnitude in this assessment. This is based on Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS) and Defra advice (Defra, 2003; ASCOBANS, 2015) relating to effects from fisheries by-catch (i.e. a permanent effect) on harbour porpoise. A threshold of 1.7% of the relevant harbour porpoise population above which a population decline is inevitable has been agreed with Parties to ASCOBANS, with an intermediate precautionary objective of reducing the effect to less than 1% of the population (Defra, 2003; ASCOBANS, 2015).

710. For population modelling there are currently no specific potential biological removal limits in place, therefore there are currently no specific thresholds to determine whether a population level effect would be significant in EIA terms. See **Appendix 5: Approach to Marine Mammals and**

Underwater Noise for the proposed approach and further information on how the potential for significant population level effects has been defined for the Bellrock WFDA.

Table 8.6: Definitions of Levels of Magnitude for Marine Mammals

Magnitude	Definition
High	Permanent irreversible change to exposed receptors or feature(s) of the habitat which are of particular importance to the receptor. Assessment indicates that more than 1% of the reference population are anticipated to be exposed to the effect. OR Long-term effect for 10 years or more, but not permanent (e.g. limited to operational phase of the projects). Assessment indicates that more than 5% of the reference population are anticipated to be exposed to the effect. OR Temporary effect (e.g. limited to the construction phase of development) to the exposed receptors or feature(s) of the habitat which are of particular importance to the receptor. Assessment indicates that more than 10% of the reference population are anticipated to be exposed to the effect.
Medium	Permanent irreversible change to exposed receptors or feature(s) of the habitat of particular importance to the receptor. Assessment indicates that between 0.01% and 1% of the reference population anticipated to be exposed to effect. OR Long-term effect for 10 years or more, but not permanent (e.g. limited to operational phase of the projects). Assessment indicates that between 1% and 5% of the reference population are anticipated to be exposed to the effect. OR Temporary effect (e.g. limited to the construction phase of development) to the exposed receptors or feature(s) of the habitat which are of particular importance to the receptor. Assessment indicates that between 5% and 10% of the reference population anticipated to be exposed to effect.
Low	Permanent irreversible change to exposed receptors or feature(s) of the habitat of particular importance to the receptor. Assessment indicates that between 0.001% and 0.01% of the reference population anticipated to be exposed to effect. OR Long-term effect for 10 years or more, but not permanent (e.g. limited to operational phase of the projects). Assessment indicates that between 0.01% and 1% of the reference population are anticipated to be exposed to the effect. OR

Magnitude	Definition
	Intermittent and temporary effect (e.g. limited to the construction phase of development) to the exposed receptors or feature(s) of the habitat which are of particular importance to the receptor. Assessment indicates that between 1% and 5% of the reference population anticipated to be exposed to effect.
Negligible	Permanent irreversible change to exposed receptors or feature(s) of the habitat of particular importance to the receptor. Assessment indicates that less than 0.001% of the reference population anticipated to be exposed to effect. OR Long-term effect for 10 years or more (but not permanent, e.g. limited to lifetime of the projects). Assessment indicates that less than 0.01% of the reference population are anticipated to be exposed to the effect. OR Intermittent and temporary effect (limited to the construction phase of development or project timeframe) to the exposed receptors or feature(s) of the habitat which are of particular importance to the receptor. Assessment indicates that less than 1% of the reference population anticipated to be exposed to effect.

8.7.5 Assessment of Significance

711. The definitions of effect significance to be used for the marine mammals impact assessment are provided in **Table 8.7**.

Table 8.7: Effect Significance Definitions

Significance	Definition
Major	Very large or large change in receptor, either adverse or beneficial, which are important at a population (national or international) level because they contribute to achieving national or regional objectives, or, expected to result in exceedance of statutory objectives and/or breaches of legislation.
Moderate	Intermediate or large change in receptor, which may to be important considerations at national or regional population level. Potential to result in exceedance of statutory objectives and/or breaches of legislation.
Minor	Small change in receptor, which may be raised as local issues but are unlikely to be important at a regional population level.
Negligible	No discernible change in receptor.

8.7.6 Approach to Cumulative Effects Assessment

8.7.6.1 Screening Area

712. The CEA screening areas for marine mammals are based on their respective MUs, as discussed in **Section 1.5** in **Appendix 4.** For the marine mammal species considered through Bellrock WFDA Scoping Report, the following MUs will be used as the CEA screening area:

- Harbour porpoise within the NS MU;
- Bottlenose dolphin within the GNS and Coastal East Scotland MUs;
- Common dolphin, white-beaked dolphin, minke whale and fin whale within the CGNS MU:
  - Note that, due to the large size of this MU, projects and plans will be considered only if they are located within the NS MU or GNS area, in order to provide a more realistic while still precautionary list of projects that may have an impact on the same population as the Bellrock WFDA;
- Grey seal within the ES, North-East England and Moray Firth MUs; and
- Harbour seal within the ES MU.

8.7.6.2 Screening for Cumulative Effects Assessment

713. The methodology set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment** will be followed with respect to the CEA for marine mammals.

714. The plans and projects that will be considered in the CEA are those that are:

- Located in the relevant marine mammal MUs (as described in **Section 8.4.1**); and
- If there is the potential for cumulative impacts during the construction, operation or decommissioning of the proposed project.

715. The marine mammal CEA will consider projects, plans and activities which have sufficient information available to undertake the assessment, in line with the approach set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**

716. With the final list of projects that will be used for the CEA assessment, project specific data will be collected from EIA Report and HRA, such as:

- Densities of marine mammals used;
- Impact ranges used for assessments;
- The number of individuals expected to be disturbed from the projects as well as the Bellrock WFDA; and
- The number of individuals expected to be at risk of PTS prior to mitigation, and the number at risk of vessel collision.

717. For the potential for disturbance from piling, the data collected from other projects and the assessments for the Bellrock WFDA will be totalled for the assessment, and the magnitude of impact (and potential for significance) will be determined based on the methods as set out in Sections 8.7.1 to 8.7.5 (e.g. more than 5% of the population disturbed is significant). For any species where the magnitude is medium or high for significant disturbance, population modelling using Interim Population Consequences of Disturbance (iPCoD) will be undertaken, as set out in **Section 3.2** in **Appendix 5**.

718. Where project specific data is not available, a generalised approach would be used to determine the number of marine mammals potentially at risk of disturbance. This will be based on wider density estimates (e.g. SCANS-IV (Gilles et al., 2023)) for cetaceans, and Carter et al., (2022) for seal species. Generalised disturbance ranges (such as the reported 25 km potential disturbance range for seals (Russell et al., 2016)) will be used to determine the number of individuals at risk of disturbance.

8.8 Scoping Questions to Consultees

719. The following questions are posed to consultees to help them frame and focus their response to the marine mammals scoping exercise, which will in turn inform the Scoping Opinion:

- Do you agree with the proposed data sources? Are there any further data sources to be aware of?
- Do you agree with the marine mammal species to be scoped in, the reference populations, and the densities to be used for assessments, as presented in **Table 8.3**?
- Do you agree with the impacts to be scoped in during construction?
- Do you agree with the impacts to be scoped in during operation and maintenance?
- Do you agree with the impacts to scoped in during decommissioning?
- Do you agree with the approach to underwater noise modelling, and the thresholds to be used?
- Do you agree with the proposed approaches to assess the potential for disturbance due to underwater noise?
- Do you agree with the approach to cumulative assessments, and the use of population modelling?
- Do you have any other matters or information sources that you wish to present?

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9 Offshore Ornithology

9.1 Introduction

720. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on offshore ornithology. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

721. This chapter provides an overview of the existing environment and sets out the proposed methodology and approach to assessing effects on offshore ornithology in the Bellrock WFDA Environmental Impact Assessment (EIA) Report.

722. This chapter has been prepared by Royal HaskoningDHV.

723. Offshore ornithology is a key potential constraint for offshore wind farms (OWFs) due to the potential for collisions with operating turbines, displacement of seabirds from offshore waters (which, for example, may be important for foraging) and barrier effects to migration and commuting routes. While individual developments may have relatively small predicted effects, as more OWFs are taken forward, the cumulative impacts of multiple projects may have the potential to lead to population-level effects on seabirds.

724. The offshore ornithology assessment will consider potential impacts on seabirds and other bird (migratory) species from the Bellrock WFDA. This will be informed by analysis of site-specific survey data and detailed understanding of the seasonal distribution and movements of seabirds and migratory birds in the Forth and Tay region and the North Sea. Consideration will be given to the potential impacts on seabirds and migratory bird species in the context of their regional populations, as well as the potential for connectivity and potential impact of the Bellrock WFDA to statutory designated nature conservation sites which have birds listed as qualifying features, including Special Protection Areas (SPAs), proposed SPAs (pSPAs) and Ramsar sites.

725. The offshore ornithology assessment should be read in conjunction with the following chapters of the Bellrock WFDA Scoping Report:

- **Chapter 5: Marine Geology, Oceanography and Physical Processes;**
- **Chapter 6: Benthic Ecology;** and
- **Chapter 7: Fish and Shellfish Ecology.**

726. This offshore ornithology chapter is likely to have key inter-relationships with the above receptors, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

9.2 Legislation, Policy and Guidance

727. **Table 9.1** sets out the legislation, policy and guidance which have been considered in the preparation of this chapter, and will be considered within the Bellrock WFDA EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

Table 9.1: Summary of Relevant Legislation and Guidance for Offshore Ornithology

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Legislation	
The Conservation of Habitats and Species Regulation 2017	Known as the 'Habitats Regulations', this legislation transposes Council Directive 92/43/EEC (the Habitats Directive) and the European Directive (2009/147/EC) on the conservation of wild birds (The Birds Directive) into UK law. The Habitats Regulations provides for the designation and protection of 'European Sites', including SPAs for birds listed under Annex I of the Birds Directive. The Habitats Regulations convey a statutory requirement for local planning authorities to undertake a 'Habitats Regulations Appraisal' (HRA) of the potential impacts of plans and projects, including development proposals, on European Sites. The UK has no direct obligations under the Habitats Directive following the UK's Exit from the EU, however, The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) Regulations 2019 (effective from 1st January 2021) provides that Scotland has legal obligations to continue to maintain the standards required by the EU Habitats and Wild Birds Directives, subject to minor changes.
Ramsar sites	Under Scottish Government policy, Ramsar sites are also protected under the same statutory regimes, although there is no need to consider Ramsar sites separately if they overlap with SPAs. Ramsar sites are wetlands of international importance designated under the Ramsar convention (adopted in 1971 and came into force in 1975), providing a framework for the conservation and wise use of wetlands and their resource.
Wildlife and Countryside Act 1981	This legislation provides for the legal protection of all wild birds in Great Britain, special protection measures for Schedule 1 bird species during the breeding season, and also for the protection of Sites of Special Scientific Interest (SSSIs).
Guidance	
Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidance for Ecological Impact Assessment (EcIA) in the UK and Ireland – Terrestrial, Freshwater, Coastal and Marine.	Standard good practice guidance for ecological evaluation and assessment for proposed developments in terrestrial, freshwater, marine and coastal environments.
Joint Nature Conservation Committee (JNCC) (2017) Joint SNCB Interim Displacement Advice Note.	Guidance on how to present assessment information on the extent and potential consequences of seabird displacement from offshore wind developments.

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
JNCC (2014) Joint SNCB Response to the Marine Scotland Science Avoidance Rate Review.	Recommended Collision Risk Modelling (CRM) avoidance rates from the Marine Scotland Science (MSS) avoidance rate report.
NatureScot Guidance Notes to Support Offshore Wind Applications: Marine Ornithology (with those available at the time of writing being NatureScot, 2023a – 2023i) *The Cumulative Effects Framework (CEF) will be adopted when published.*	Core resource to inform offshore wind development proposals in Scotland. Includes guidance notes on CRM, displacement assessment, apportioning and Population Viability Analysis (PVA).

9.3 Consultation

728. A Scoping Workshop for the Bellrock WFDA was held on the 30th October 2023 with Marine Directorate - Licensing Operation Team (MD-LOT) and NatureScot, and included discussion on offshore ornithology. The discussion aimed to agree the relevance, appropriateness and sufficiency of baseline data, key issues for inclusion in the Bellrock WFDA EIA Report, and the impact assessment and cumulative effects approach. **Table 9.2** sets out consultation from this workshop.

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Table 9.2: Consultation Relevant to Offshore Ornithology

Consultee	Date/Document	Comment	How Comment is Addressed
NatureScot and MD-LOT (MS-LOT at the time)	February to March 2022, consultation on Method Statements for offshore aerial surveys	Advice was given on the focal species and alignment of survey approaches with those for adjacent lease option awards to facilitate future cumulative effects assessment (CEA).	Comments from NatureScot and MD-LOT have been considered in the scope of works for the offshore aerial survey. The methodology adopted is described in **Section 9.4.1.**
NatureScot and MD-LOT	30th October 2023, Bellrock WFDA Scoping Workshop	In relation to non-breeding period connectivity and apportioning, the Applicant queried whether guillemot, puffin and herring gull reference populations are to follow the Biologically Defined Minimum Population Scales (BDMPS) (Furness, 2015). NatureScot advised following the Berwick Bank Wind Farm approach and using the breeding season foraging range to determine non-breeding period connectivity for guillemot and herring gull. NatureScot will check and confirm the approach for puffin.	The proposed approach to determining seabird populations, foraging ranges and connectivity is outlined in **Section 9.7.3**. The proposed approach to apportioning is outlined in **Section 9.7.4**.
NatureScot and MD-LOT	30th October 2023, Bellrock WFDA Scoping Workshop	The Applicant queried whether the advised displacement rates in the NatureScot guidance are the correct ones to be used in the SeabORD modelling tool. NatureScot confirmed this is the case.	The proposed approach to assessing displacement and barrier effects is outlined in **Section 9.7.5**.
NatureScot and MD-LOT	30th October 2023, Bellrock WFDA Scoping Workshop	NatureScot advised that the collision risk guidance (Guidance Note 7; NatureScot, 2023g) will be updated and is due to be issued by the end of 2023. NatureScot recommended use of the updated (2022) sCRM Shiny App for collision risk modelling. NatureScot confirmed that the updated guidance would include updates to the advised avoidance rates which would be in line with the findings of the Ozsanlav-Harris et al (2023) publication. NatureScot also confirmed that reference in the current version of the guidance note on requiring the inclusion of option three outputs (in addition to the option two outputs) within assessments is erroneous and will be corrected in the revised version. On gannet macro-avoidance, NatureScot confirmed that they will accept the application of a macro-avoidance rate in the non-breeding season but do not yet accept that the evidence is sufficient to justify its use in the breeding season.	The proposed approach to assessing collision risk is outlined in **Section 9.7.6**.

Consultee	Date/Document	Comment	How Comment is Addressed
		On the presentation of both stochastic and deterministic outputs, NatureScot confirmed that both should be presented but would not indicate which of these would be afforded greater weight (instead indicating that both would be considered 'in the round').	
NatureScot and MD-LOT	30th October 2023, Bellrock WFDA Scoping Workshop	NatureScot indicated that they will accept a gannet macro-avoidance rate during the non-breeding season, but this will not be taken into account during the breeding season.	The proposed approach to assessing collision risk is outlined in **Section 9.7.6**.
NatureScot and MD-LOT	30th October 2023, Bellrock WFDA Scoping Workshop	In relation to HRA screening and connectivity, NatureScot advocated taking all baseline data into account, rather than screening out SPAs based on infrequent occurrence of species during first year (otherwise risks need to screen features back in following year two surveys)	The proposed approach to determining connectivity with SPAs and Ramsar sites is outlined in **Section 9.4.6** and the **Bellrock WFDA HRA Screening Report** (BlueFloat Energy | Renantis Partnership, 2024).
NatureScot and MD-LOT	30th October 2023, Bellrock WFDA Scoping Workshop	NatureScot requested that any departures from previous or roadmap agreed approaches are clear and transparent, and discussed with them.	The proposed approach to impact assessment is outlined in **Section 9.7.**
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	*Confirm approach to determining connectivity and estimating apportioning for puffin in the non-breeding season?* We are currently reviewing our position on undertaking non-breeding season assessments for puffin and will provide further advice in due course and / or will keep you updated on the progress of this advice.	Noted.
NatureScot	20th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	*Update on publication of collision risk guidance note 7?* Guidance Note 7 is still in the process of being updated and will be complete Q1 2024.	Noted.

9.4 Existing Environment

729. This section provides a summary of general baseline characteristics of seabirds in the vicinity of the Bellrock WFDA during their respective breeding and non-breeding periods (the periods as defined by NatureScot (2020a). For the purposes of this scoping exercise, the baseline has been informed by available data from the Bellrock WFDA's year one aerial survey programme (i.e. for the period between March 2022 and February 2023 inclusive) (as detailed in **Section 9.4.1** below) and the locations and qualifying features of nearby terrestrial and marine SPAs. Due to the availability of only a single year of baseline survey data from the two-year programme, this is not intended to be a comprehensive review of the baseline conditions of the offshore aerial survey area. Instead, this information should be viewed as a broad-level summary of the survey findings to date, which aids the process of identifying the likely key issues for the Bellrock WFDA in relation to offshore ornithology. The baseline conditions of the offshore aerial survey area presented within the Bellrock WFDA EIA Report and Bellrock WFDA Report to Inform Appropriate Assessment (RIAA) will be based on two years of aerial survey data.

730. The Bellrock WFDA lies within the North Sea, 120 km east of Stonehaven (116 km southeast of Peterhead) on the east coast of the Scottish mainland. The North Sea is important for seabirds throughout the year, providing foraging grounds for seabirds breeding in adjoining coastal areas during the breeding season, from colonies further afield in the non-breeding season and for the sub-adult birds throughout the year. Overall, at least 20 seabird species breed on coastal areas around the North Sea (International Council for the Exploration of the Sea (ICES), 2021). Coastal areas of the Firth of Forth and Firth of Tay also form an integral unit that is important for populations of wintering and passage wildfowl (BirdLife International, 2024a,b). This is reflected by multiple terrestrial and marine SPA designations, the largest of which is the Outer Firth of Forth and St Andrews Bay Complex SPA (NatureScot 2020b). Further SPAs are also found along the coastlines of eastern Scotland and North-East England including Forth Islands SPA (Scottish Natural Heritage (SNH), 2018), Fowlsheugh SPA (SNH, 2009a) and Northumberland Marine SPA (Natural England, 2017a) which support a number of internationally important breeding and non-breeding sites for seabird species, some of which will occur within the Bellrock WFDA.

731. Baseline data collected from the offshore aerial survey area during the first years of surveys are summarised below for the breeding and non-breeding seasons respectively.

9.4.1 Study Areas

9.4.1.1 Offshore Regional Study Area

732. The offshore regional study area is defined by the area within which breeding and non-breeding seabirds could be impacted by the Bellrock WFDA.

733. During the breeding season, many seabird species have large foraging ranges which extend several hundred kilometres from their colonies. Therefore, some seabird colonies may have connectivity with the Bellrock WFDA despite being located a significant distance away. Screening of European designated sites with qualifying seabird colonies (SPAs, pSPAs and Ramsar sites) for potential connectivity to the Bellrock WFDA has been undertaken and is detailed within the **Bellrock WFDA HRA Screening Report** (BlueFloat Energy | Renantis Partnership, 2024).

Published foraging ranges were obtained from Woodward et al (2019), in accordance with NatureScot Guidance (2023c), to determine the offshore regional study area for breeding seabirds. These will be used in both the WFDA-alone EIA and cumulative assessments to identify SPA populations and other seabird breeding colonies whose foraging ranges may overlap with the Bellrock WFDA.

734. Outside of the breeding season, seabirds are not constrained by colony location and can range widely within UK seas and beyond, depending on the species involved. For seabirds from SPA colonies, during the non-breeding season Furness (2015) has been used to determine which colonies have connectivity to the Bellrock WFDA using BDMPS, as advised by NatureScot (2023d) (e.g. see the **Bellrock WFDA HRA Screening Report** for those colony populations associated with SPAs). The exceptions to this are guillemot and herring gull, which are considered to remain in the broad vicinity of breeding colonies during the non-breeding season (Buckingham et al., 2022; Wernham et al., 2002) and therefore the offshore regional study areas for these species are considered to be the same as for the breeding season (Woodward et al., 2019).

9.4.1.2 Offshore Aerial Survey Area

735. The offshore aerial survey area comprises the Bellrock WFDA (280 km^2) plus a 4 km buffer, totalling 658 km^2 (see **Figure 9.1** in **Appendix 1**). Aerial surveys commenced in March 2022 and were completed in February 2024 (i.e. a total of 24 monthly surveys encompassing two full breeding periods and two full non-breeding periods). The aerial surveys comprise 15 transects spaced 2.5 km apart, providing approximately 12.5% coverage of the WFDA and buffer. The complete dataset will be used to characterise the baseline in the Bellrock WFDA EIA Report and inform the likely offshore ornithology assessment pathways (including collision risk, displacement and barrier effects, habitat loss and indirect effects on prey), as identified in the recently published series of NatureScot guidance notes on undertaking ornithological assessment for OWFs[32].

736. The 4 km buffer is an appropriate size to provide a robust ornithological baseline for the assessment, and is predicted to encompass areas in and beyond which construction, operation and maintenance, and decommissioning effects are expected to occur for key bird species recorded during offshore aerial surveys. Species which are known to be subject to displacement and barrier effects over distances greater than 4 km, most notably red-throated diver *Gavia stellata*, have not been recorded during aerial surveys so far and are not predicted to occur in significant numbers during the remaining surveys on the basis of known habitat associations (e.g. red-throated diver is strongly associated with shallow inshore waters (O'Brien et al*.*, 2008; Furness, 2015)).

737. The proposed offshore export cable corridor beyond the 4 km buffer is not included in the offshore aerial survey area and will be considered in a separate scoping report (the Bellrock OfTDA Scoping Report).

[32] Available at: www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/renewable-energy/marine-renewables/advice-marine-renewables-development

9.4.2 Data and Information Sources

738. **Table 9.3** sets out the information and data sources which have been considered in the preparation of this chapter and will be considered within the Bellrock WFDA EIA Report assessment where appropriate.

Table 9.3: Summary of Key Data and Information Sources for the Offshore Ornithology Assessment

Dataset	Year(s)	Description
British Trust for Ornithology (BTO) Seabird Monitoring Programme (https://app.bto.org/seabirds/public/index.jsp)	2023	Breeding seabird colony numbers and breeding success rates.
Defra MAGIC website (https://magic.defra.gov.uk/magicmap)	2023	Locations of statutory designated sites (SPAs, SSSIs, Ramsar sites).
Furness (2015) Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS)	2015	Key information source for biogeographic population estimates for non-breeding seabirds in UK waters.
Garthe, S. and Hüppop, O. (2004) Scaling Possible Adverse Effects of Marine Wind Farms on Seabirds: Developing and Applying a Vulnerability Index	2004	Used to inform likely vulnerability of species to different potential effects of OWFs, including susceptibility to disturbance and provision of nocturnal activity factor scores for use in the Stochastic Collision Risk Model (sCRM).
Furness, R. W., Wade, H. M., and Masden, E. A. (2013) Assessing vulnerability of marine bird populations to offshore wind farms. Journal of Environmental Management, 119, 56-66.	2013	Used to inform likely vulnerability of species to different potential effects of OWFs, including susceptibility to disturbance and provision of nocturnal activity factor scores for use in the sCRM.
Horswill and Robinson (2015) Review of Seabird Demographic Rates and Density Dependence	2015	Provides survival and productivity rates for assessment of impacts on seabird populations.
Johnston et al (2014a) Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines. Johnston, A., Cook, A.S.C.P., Wright, L.J., Humphreys, E.M. and Burton, N.H.K. (2014b) Corrigendum. Journal of Applied Ecology, 51, doi: 10.1111/1365-2664.12260	2014	Recommended reference for generic seabird flight heights within the sCRM tool.
MacGregor et al. (2018) A Stochastic Collision Risk Model for Seabirds in Flight.	2018	Recommended model for undertaking CRM.
NatureScot SiteLink (https://sitelink.nature.scot/home)	2023	Information on SPAs and other designated sites in Scotland.
NatureScot. (2018) Interim Guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs. NatureScot. [Online]. www.nature.scot/doc/interim-guidance-	2018	Estimation of apportioning of breeding season impacts to SPA colony populations for seabird species. To be used on some species at least.

Dataset	Year(s)	Description
apportioning-impacts-marine-renewable-developments-breeding-seabird-populations.		
NatureScot (2020a) Guidance Note 9: Guidance to support Offshore Wind Applications: Seasonal periods for Birds in the Scottish Marine Environment.	2020	Recommended seasonal periods when waterfowl and seabird species should be considered in relation to offshore wind developments.
NatureScot (2023a) Guidance Note 1: Guidance to support Offshore Wind Applications: Marine Ornithology - Overview	2023	Overview of NatureScot guidance to inform assessment of offshore wind development proposals on marine ornithology in Scotland.
NatureScot (2023b) Guidance Note 2: Guidance to support Offshore Wind Applications: Advice for Marine Ornithology Baseline Characterisation Surveys and Reporting.	2023	Guidance on expectations for the collection, analysis and presentation of data, and baseline reporting.
NatureScot (2023c) Guidance Note 3: Guidance to support Offshore Wind Applications: Marine Birds – Identifying theoretical connectivity with breeding site Special Protection Areas using breeding season foraging ranges	2023	Recommended matrices and reference sources for determining theoretical connectivity with breeding seabird European designated sites.
NatureScot (2023d) Guidance Note 4: Guidance to Support Offshore Wind Applications: Ornithology – Determining Connectivity of Marine Birds with Marine Special Protection Areas and Breeding Seabirds from Colony SPAs in the Non-Breeding Season.	2023	Guidance for determining theoretical connectivity with European designated sites during the non-breeding season for wintering waterfowl and seabirds.
NatureScot (2023e) Guidance Note 5: Guidance to support Offshore Wind Applications: Recommendations for marine bird population estimates.	2023	Advice for estimating marine bird populations at breeding colonies and marine SPAs.
NatureScot (2023f) Guidance Note 6: Guidance to support Offshore Wind Applications – Marine Ornithology Impact Pathways for Offshore Wind Developments.	2023	Key impact pathways that should be considered as part of the EIA and HRA of offshore wind development proposals.
NatureScot (2023g) Guidance Note 7: Guidance to support Offshore Wind Applications: Marine Ornithology – Advice for assessing collision risk of marine birds.	2023	Recommended approach to CRM including advised biological parameters, avoidance rates and presentation of results.
NatureScot (2023h) Guidance Note 8: Guidance to support Offshore Wind Applications: Marine Ornithology Advice for assessing the distributional responses, displacement and barrier effects of Marine birds.	2023	Guidance on assessing displacement and barrier effects on seabirds, recommended species and approaches.
NatureScot (2023i) Guidance Note 11: Guidance to support Offshore Wind Applications: Marine Ornithology –	2023	Advice on thresholds for undertaking PVA, recommended time periods and

Dataset	Year(s)	Description
Recommendations for Seabird Population Viability Analysis (PVA).		parameters, and metrics to be presented in EIA and HRA.
Ozsanlav-Harris et al (2022) Review of data used to calculate avoidance rates for collision risk modelling of seabirds	2022	Review and re-calculation of seabird avoidance rates recommended by Cook (2021).
Searle, K.R., Mobbs, D.C., Butler, A., Furness, R.W., Trinder, M.N., Daunt, F. (2018) Finding out the fate of displaced birds. Scottish Marine and Freshwater Science. 9(8): 149	2018	User guide for SeaBORD, a tool to help estimate the cost to individual seabirds due to displacement and barrier effects from offshore wind developments.
Searle et al (2019) A Population Viability Analysis Modelling Tool for Seabird Species.	2019	Recommended tool to model potential effects of collision and displacement mortality on populations of key seabird species from relevant breeding colonies.
SNCBs (2022). Joint SNCB Interim Displacement Advice Note. Joint SNCB Interim Displacement Advice Note (jncc.gov.uk)	2022	Advice on use of matrix approach in predicting displacement effects on seabird species from OWFs during the operational period.
Woodward et al (2019) Desk-based revision of seabird foraging ranges used for HRA screening	2019	Key reference for representative foraging range statistics for seabirds around breeding colonies.
Wildfowl and Wetlands Trust (WWT) (2014) Strategic Assessment of Collision Risk of Scottish Offshore Wind Farms to Migrating Birds.	2014	Standard reference for migratory bird collision risk assessments.

9.4.3 Breeding Season

739. Baseline data collected from the offshore aerial survey area during the first year of surveys indicate that, overall, the most abundant species during months associated with their respective breeding periods (as defined by NatureScot, 2020a) are, in descending order of abundance:

- Guillemot *Uria aalge*;
- Razorbill *Alca torda*;
- Gannet *Morus bassanus*;
- Atlantic puffin *Fratercula arctica* (hereafter 'puffin');
- Black-legged kittiwake *Rissa tridactyla* (hereafter 'kittiwake') and;
- Northern fulmar *Fulmarus glacialis* (hereafter 'fulmar').

740. Guillemot was the most abundant species recorded and was present throughout the breeding season, with a greater proportion recorded in the west of the offshore aerial survey area in May, July and August. There was a marked peak in guillemot abundance in July which is likely to be

coincident with post-breeding dispersal (although the breeding season for this species can extend to mid-August (NatureScot, 2020a)). The high abundance during July, relative to other months in the breeding season, may indicate that the offshore aerial survey area is used as a moult site during post-breeding dispersal when birds are flightless, whilst the guillemot records from the July survey also comprised a relatively high number of single adult-chick pairs (i.e. 225 from a total of 1600 individuals) (HiDef, 2023). In this regard it is also relevant to note that the Bellrock WFDA is beyond the likely breeding season foraging range of guillemots from any breeding colonies (based upon the foraging range as advised by NatureScot (2023c)).

741. Razorbill was the second most abundant species in terms of the overall mean abundance recorded across the breeding season, although it was only recorded in two of the breeding season months (June and July). The absence of razorbill observations in May is coincidental with the egg-laying period when birds may be more constrained to breeding colonies, noting that the Bellrock WFDA is close to the extremity of (or beyond) the likely breeding season foraging range of this species from any breeding colonies (based upon the foraging range as advised by NatureScot (2023c)). Similar to guillemot, the highest numbers of razorbills were recorded during July, when a large proportion of birds were recorded sitting on the water; this corresponds to the post-breeding flightless period when birds are no longer associated with colonies (although the breeding season for this species can also extend to mid-August (NatureScot, 2020a)). As with guillemot, the razorbill records from the July survey also comprised a relatively high number of single adult-chick pairs (i.e. over 20 from a total of 261 individuals) (HiDef, 2023). The absence of razorbill records from the August survey suggests the offshore aerial survey area may only be used for a limited time during the post-breeding dispersal period.

742. Puffin was the least abundant auk species within the offshore aerial survey area but was recorded across all months of the breeding season. The highest numbers were recorded in May; puffin has a greater foraging range around breeding colonies than guillemot or razorbill (Woodward et al, 2019; NatureScot, 2023c) and therefore there is a greater likelihood that this species may use the offshore aerial survey area for foraging during the breeding season (HiDef, 2023). Unlike guillemot and razorbill, there was no marked peak in puffin abundance during July, but (in common with these two species) there were very few records in August. All puffins were recorded as sitting on the water.

743. The higher abundance of kittiwake during the breeding season than non-breeding season was largely attributable to the marked peak in numbers that occurred during the June survey for which the estimated densities were at least five times greater than other months (HiDef, 2023). Typically, kittiwake will be strongly associated with colonies between May and June (Coulson, 2011), therefore the June peak could be due to utilisation of the offshore aerial survey area for foraging by adult birds during the chick-rearing phase, or conceivably it could be a consequence of early colony desertion due to high breeding failure rates, possibly caused by HPAI (noting that no juveniles were recorded during the July and August surveys). Overall, the breeding season densities were low, with the mean densities estimated to be below 0.5 individuals per km^2 in all months except June (for which they were estimated as 1.69 individuals per km^2) (HiDef, 2023).

744. Gannet was widespread throughout the offshore aerial survey area during the breeding season but with large numbers of dead birds also recorded (possibly due to HPAI) (including the vast majority of gannets recorded in the July survey (HiDef, 2023)). The gannet breeding season extends to September (NatureScot, 2020a) and over 99% of aged birds were adults (HiDef, 2023). As with

kittiwake, overall, the breeding season densities of gannet on the offshore aerial survey area were low, with the mean estimates less than, or close to, 0.5 individuals per km^2 during each survey.

745. Fulmar was present throughout the breeding season, with the highest numbers occurring in June and September. Records of this species were widely but thinly distributed throughout the offshore aerial survey area.

746. As detailed above, the overall breeding season densities and abundance of the auk species, gannet, kittiwake and fulmar during the first year of baseline surveys appear to be low overall but, despite these low densities, they remain the most abundant seabird species within the offshore aerial survey area, which is consistent with the presence of internationally important breeding seabird colonies on the coast of eastern Scotland which support these species, including the Forth Islands SPA, Fowlsheugh SPA, Buchan Ness to Collieston Coast SPA (SNH 2009b), Troup, Pennan and Lion’s Heads SPA (SNH 2009c) and East Caithness Cliffs SPA (SNH 2017).

747. Modelled at-sea utilisation distribution for SPA populations during the late incubation and chick-rearing periods, as based on GPS tracking data, show that for kittiwake, the offshore aerial survey area lies outside areas predicted to be heavily used by kittiwakes, as defined by the top 5% of the Getis-Ord hotspot analyses, with areas of any predicted usage only encroaching on the western parts of the offshore aerial survey area (Cleasby et al., 2018; Cleasby et al., 2020). Visual inspection of the modelled at-sea distribution hotspots which occur to the west of the offshore aerial survey area suggests that these core predicted foraging areas are most likely to be associated with birds from Buchan Ness to Collieston Coast SPA, Fowlsheugh SPA and, to a lesser extent, Troup, Pennan and Lion’s Heads SPA. Thus, it is possible that a proportion of kittiwakes in the offshore aerial survey area during the late incubation/chick-rearing period may be breeding adults from these SPAs (**Figure 9.2** in **Appendix 1)**.

748. Modelled at-sea utilisation distributions for guillemot and razorbill show the offshore aerial survey area falls outside of the predicted foraging ranges of these species during the late incubation/ chick-rearing period, as defined by the Maximum-Curvature (Cleasby et al., 2018; Cleasby et al., 2020). This is consistent with the fact that the Bellrock WFDA is beyond the likely breeding season foraging range of guillemots from any breeding colonies and is either beyond or at the extremity of the foraging range of razorbill (based upon the foraging ranges as advised by NatureScot (2023c)). As such, the Bellrock WFDA (and offshore aerial survey area) is unlikely to have any substantial degree of connectivity with SPA breeding colony populations of these species during the breeding season (see the **Bellrock WFDA HRA Screening Report**). Compared with kittiwake, the modelled utilisation distributions show that guillemot and razorbill favour areas closer to the coast during the late incubation and chick-rearing periods; this is consistent with their published foraging ranges being smaller than for kittiwake (Woodward et al., 2019). This also suggests that, during the breeding season, waters closer to the coast will hold higher densities of breeding adult guillemots and razorbills, whilst a higher proportion of individuals recorded within the offshore aerial survey area may be non-breeding birds. The modelled foraging distributions also support the contention that the marked July peak in guillemot and razorbill abundance in the offshore aerial survey area is associated with post-breeding dispersal, as opposed to foraging adults which are still attending the colony.

749. Based on the foraging range of puffin (Woodward et al., 2019), the offshore aerial survey area falls within the distance that may be travelled by puffins from breeding colonies in the Firth of Forth and

elsewhere on the east coast of Scotland and northern England. This includes a number of SPAs for which puffin is a qualifying feature or part of the breeding seabird assemblage feature, including Forth Islands SPA, Farne Islands SPA (Natural England, 2017b) and Coquet Island SPA (Natural England, 2017c). However, at a distance of 154 km, the nearest of these SPAs (the Farne Islands) remains a considerable distance from the WFDA, and beyond the Mean Maximum (MM) breeding season foraging range of puffin (see the **Bellrock WFDA HRA Screening Report**).

750. Based on published generic and site-specific foraging ranges for gannet (Woodward et al., 2019; NatureScot, 2023c), the offshore aerial survey area lies within the distance regularly travelled by foraging adult gannets from a number of UK breeding colonies, including the Bass Rock (part of Forth Islands SPA) which supports the world's largest gannet colony (Murray et al 2014). Tracking data indicate that the offshore aerial survey area falls within the main foraging range of gannets from the Bass Rock, although outside some of the most heavily utilised areas (Lane et al., 2020). The foraging ranges used by gannets breeding at different colonies are, to a large extent, mutually exclusive (Wakefield et al., 2013), suggesting that the vast majority of breeding adults recorded within the offshore aerial survey area during the breeding season will be from the Bass Rock.

751. Other seabird species recorded occasionally or in small numbers (monthly counts of 20 or fewer, but noting there are a maximum of 72 possible records of Arctic tern *Sterna paradisaea*) within the offshore aerial survey area during their respective breeding seasons (as defined by NatureScot (2020a)) were, in descending order of abundance:

- Arctic tern;
- Herring gull *Larus argentatus*; and
- Arctic skua *Stercoarius parasiticus*.

752. During the breeding season, Arctic tern was recorded during the July and August surveys only (when including records of Arctic/common tern), with a possible total of 66 birds in July and six in August being recorded within the offshore aerial survey area (HiDef, 2023). The timing of these records and published MM (+1 Standard Deviation (SD)) foraging range of Arctic tern (Woodward et al., 2019; NatureScot, 2023c) indicates that these were highly likely to be birds on passage or possibly failed breeders, rather than actively breeding adult birds on a foraging trip or 'in-transit' from a colony. Individual herring gull and Arctic skua were recorded in August and June respectively; these are also likely to have been passage birds or failed (or non) breeders.

9.4.4 Non-breeding Season

753. Baseline data collected from the offshore aerial survey area during the first year of surveys indicate that, overall, the most abundant species during months associated with their respective non-breeding seasons were, in descending order of abundance:

- Guillemot;
- Puffin;
- Fulmar;
- Kittiwake;

- Gannet; and
- Razorbill.

754. As for the breeding season, guillemot was the most abundant species within the offshore aerial survey area during the non-breeding season and was present in every month, with the greatest numbers recorded in November and March. Puffin was the second most abundant species overall, with numbers peaking in March (immediately prior to the breeding season). Razorbill was significantly less abundant than both guillemot and puffin, and was absent for the first part of the non-breeding season, with records from the offshore aerial survey area occurring in February and March only.

755. Fulmar was present in all surveys, and at levels of overall abundance that were similar to those recorded during the breeding season (although there was greater between-month variability in the non-breeding season, with numbers peaking in January and February (HiDef, 2023)). Kittiwake and gannet were recorded in all months of the non-breeding season, although numbers of both species were markedly lower than during the breeding season. Kittiwake numbers peaked in March which is likely to coincide with spring passage movements through the offshore aerial survey area.

756. No divers, grebes or sea ducks, such as common eider *Somateria mollissima*, velvet scoter *Melanitta fusca* or red-throated diver were recorded in the offshore aerial survey area during the first year of surveys. These species winter in internationally important numbers close to the Firth of Forth (the three species mentioned are qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA) where they forage for fish, crustaceans and other prey on or close to the seabed. Sea depth and distance from the coast account for the absence of divers, grebes and sea ducks from the offshore aerial survey area.

9.4.5 Summary of First Year Survey Data

757. Based upon the currently available data from the first year of baseline offshore aerial surveys, the six most frequently recorded species in the offshore aerial survey area were guillemot, razorbill, gannet, puffin, kittiwake and fulmar. Subject to the findings from the second year of the offshore aerial surveys, this suggests that these are likely to be the key species scoped in for detailed assessment in the Bellrock WFDA EIA report.

758. A summary of the occurrence and estimated abundance of seabird species recorded in the offshore aerial survey area during the first year of surveys is presented in **Table 9.4**.

Table 9.4: Occurrence and Abundance of Seabird Species Recorded in the Offshore Aerial Survey Area during the First Year of Baseline Surveys *

Species	Breeding Season		Non-Breeding Season **	
	No. Surveys Where Species Was Recorded	Mean Abundance Estimate (with 95% Confidence Interval) ***	No. Surveys Where Species Was Recorded	Mean Abundance Estimate (with 95% Confidence Interval)
Arctic skua	1	3 (0-7)	0	0 (0-0)
Arctic tern	1	160 (21-395)	1	1 (0-4)
Common gull	0	0 (0-0)	1	1 (0-4)
Fulmar	6	145 (78-222)	6	198 (106-308)
Gannet	7	359 (176-604)	5	34 (9-69)
Great black-backed gull	0	0 (0-0)	3	13 (1-29)
Guillemot	5	5,328 (3,836-6,943)	7	2,150 (1,601-2,800)
Herring gull	1	2 (0-6)	2	3 (0-8)
Kittiwake	5	290 (164-443)	7	81 (20-159)
Puffin	5	300 (200-409)	5	235 (165-312)
Razorbill	2	727 (559-887)	2	33 (11-62)

* Data are presented as apportioned estimates and are inclusive of records identified to a broad group level only which are then apportioned to relevant species. Guillemot, razorbill and puffin abundance estimates have been corrected for availability bias.

** The non-breeding season covers the migration period, flightless moult period, winter period, pre-breeding attendance, and the period when species are not present in significant numbers, as defined by NatureScot (2020a).

*** For the purpose of this preliminary presentation of the aerial survey data, values for the mean abundance and confidence intervals are derived by taking the average of these as calculated for the estimate from each individual monthly survey

9.4.6 European Designated Sites

759. Screening of European designated sites with qualifying bird species (SPAs, pSPAs and Ramsar sites) for potential connectivity to the to the Bellrock WFDA has been undertaken and is detailed within the **Bellrock WFDA HRA Screening Report**. There is potential for connectivity with a wide range of the breeding seabird colonies in the UK, particularly those on the east coast of Scotland, and it is recognised that there will be many colonies within European designated sites that could be impacted by both WFDA-alone effects and in-combination effects with other developments. The **Bellrock WFDA HRA Screening Report** provides full details of the relevant designated sites and features which are considered to have connectivity with the Bellrock WFDA and identifies the potential effect pathways, so enabling the determination of sites and features for which a likely

significant effect cannot be excluded. The subsequent RIAA will undertake the assessment for those sites and features for which a likely significant effect cannot be excluded.

760. Theoretical breeding season connectivity with qualifying features of seabird colony SPAs will be defined by species' breeding season theoretical foraging ranges, using the MM +1 SD as defined by Woodward et al. (2019) in most instances (but noting that alternative measures are used for a few species lacking adequate data to estimate the MM +1SD, whilst exceptions for guillemot, razorbill and gannet are also highlighted in NatureScot Guidance Note 3 (NatureScot, 2023c). Outside the breeding season, most seabirds disperse from their breeding colonies, and there is potential for connectivity with a greater range of qualifying features from seabird colony SPAs than during the breeding season. Consideration of the potential for non-breeding season effects associated with the WFDA will be based upon BDMPS presented in Furness (2015), as advised in NatureScot Guidance Note 4 (NatureScot, 2023d). As noted above in **Section 9.4.1,** the exceptions to this will be guillemot and herring gull, which have been shown to remain in the broad vicinity of breeding colonies during the non-breeding season (Buckingham et al., 2022; Wernham et al., 2002) and therefore the colonies with connectivity to the Bellrock WFDA for these species are the same as for the breeding season (Woodward et al., 2019).

9.4.6.1 Apportioning to Special Protection Area Breeding Colonies

761. As part of the Applicant's scoping[33] approach for the Bellrock WFDA, breeding season apportioning of key species to SPA breeding colonies has been undertaken using the approach detailed in the NatureScot Interim Guidance (NatureScot, 2018) (**Appendix 6: Apportioning Breeding Season Impacts to SPA Seabird Populations**). This provides an estimate of the relative importance of different SPA populations in contributing to the populations of the key species in the Bellrock WFDA during the breeding season, and hence the basis for apportioning the breeding season impacts to these SPA populations. The breeding season apportioning undertaken as part of scoping was focused on the following four species:

- Gannet;
- Kittiwake;
- Razorbill; and
- Puffin.

762. This was on the basis that the above species are frequently those of main concern in the assessment of OWF projects in Scottish (and UK) North Sea waters, there are important SPA populations of each of these species with connectivity to the Bellrock WFDA (as detailed in the **Bellrock WFDA HRA Screening Report**) and they also encompass the species which were recorded in greatest abundance during the first breeding season of the offshore aerial surveys. In this regard, it is important to note that the substantial distance of the Bellrock WFDA from the coast means that it is beyond the breeding season foraging range from SPA colonies of both guillemot and herring gull (see **Table 7.1** and **Table 7.2** in the **Bellrock WFDA HRA Screening Report**).

[33] The Applicant has adopted an 'enhanced scoping' approach within certain Bellrock WFDA Scoping Report chapters reflecting a wider breath of knowledge or data availability on these technical chapters. More detailed information has been presented within these chapters than would typically be expected within a scoping report.

The detailed outputs from the apportioning exercise (as well as approach and methods) are presented in **Appendix 6: Apportioning Breeding Season Impacts to SPA Seabird Populations**, with the main findings for each species summarised below.

763. The apportioning exercise estimated that 94.0% of adult gannets present in the WFDA during the breeding season originated from SPA populations. Forth Islands SPA was identified as making the single greatest contribution, with approximately 75.5% of adult gannets during the breeding season originating from this SPA. Seven other SPAs designated for this species, including Flamborough and Filey Coast and Hermaness, Saxa Vord and Valla Field SPA, each contributed less than 7% (**Table 3.1** in **Appendix 6: Apportioning Breeding Season Impacts to SPA Seabird Populations)**.

764. Approximately 75% of adult kittiwakes present in the Bellrock WFDA during the breeding season were estimated to originate from SPA colonies designated for this species. Fowlsheugh SPA contributed the greatest proportion (20.6%), followed by Buchan Ness to Collieston Coast SPA (16.8%) and Troup, Pennan and Lions Heads SPA (11.2%). Seven other SPAs designated for this species were each estimated to contribute less than 9% of the adult kittiwakes, with two each contributing less than 0.5% (**Table 3.2** in **Appendix 6: Apportioning Breeding Season Impacts to SPA Seabird Populations)**.

765. Over 98% of adult puffins recorded in the Bellrock WFDA during the breeding season were attributed to SPA populations from three colonies – Farne Islands SPA (42.3%), Forth Islands SPA (37.4%) and Coquet Island SPA (18.8%). The individual contributions of the non-SPA populations were each less than 1% (**Table 3.3** in **Appendix 6: Apportioning Breeding Season Impacts to SPA Seabird Populations)**.

766. Approximately 72.4% of adult razorbills present in the Bellrock WFDA during the breeding season were estimated to originate from the Fowlsheugh SPA, with the remaining birds considered to originate from non-SPA colonies (**Table 3.4** in **Appendix 6: Apportioning Breeding Season Impacts to SPA Seabird Populations)**.

767. Overall, the apportioning calculations suggest that a relatively small number of SPAs (primarily, but not exclusively, on the east coast of Scotland) make substantive contributions to the populations of the key seabird species occurring on the Bellrock WFDA (although kittiwake is, to some extent at least, an exception in this regard). For gannet, puffin and razorbill, a very high proportion of the adult birds occurring on the Bellrock WFDA are estimated to derive from just one or two SPA populations. Thus, for these species, it is likely that the Bellrock WFDA-alone effects will be concentrated on these populations.

768. For several of the SPA populations associated with high apportionment estimates, the predicted in-combination effects from existing projects have been identified as being of sufficient scale to prevent a conclusion of no adverse effect on integrity. Thus, the ScotWind plan-level HRA considered that this is potentially the case for kittiwake at the East Caithness Cliffs SPA and Fowlsheugh SPA, for gannet at the Forth Islands SPA and for razorbill at the Fowlsheugh SPA (ABPmer, 2019). More recently, the assessment for the Berwick Bank Wind Farm (RPS and Royal HaskoningDHV, 2022) concluded that there was a potential adverse effect on integrity for in-combination effects (under at least some of the impact scenarios considered) for:

- Kittiwake at the East Caithness Cliffs SPA, Troup, Pennan and Lion's Head SPA, Buchan Ness to Collieston Coast SPA and Fowlsheugh SPA;
- Razorbill at the Fowlsheugh SPA; and
- Puffin at the Forth Islands SPA and Farne Islands SPA.

9.5 Potential Impacts

769. A range of potential impacts on offshore ornithology receptors have been identified which may occur during the construction, operation and maintenance, and decommissioning phases of the Bellrock WFDA:

- Temporary disturbance and displacement associated with construction, operation and maintenance and decommissioning activities, including vessel traffic;
- Indirect impacts, such as changes in prey distribution, availability or abundance caused by sea/seabed disturbance, increase in subsea noise levels;
- Indirect impacts from unexploded ordnance (UXO) clearance;
- Disturbance and displacement from the physical presence of wind turbine generators (WTGs) and associated maintenance activities;
- Barriers to movement;
- Collision with the rotor blades of WTGs; and
- Entanglement with subsea mooring lines for floating substructures (FSSs) and any associated debris and ghost nets that may become attached to these mooring lines.

770. **Section 9.6** below sets out the reasons for scoping these impacts in and out from further assessment in the Bellrock WFDA EIA Report.

9.5.1 Embedded Mitigation Measures

771. Embedded mitigation measures committed to at this time include:

- There will be a minimum blade tip clearance of at least 22 m Above Mean Sea Level;
- Development of and adherence to a Marine Pollution Contingency Plan (MPCP) outlining the approach for managing and reducing risk of pollution and procedures to protect personnel and to be followed in the event of a pollution incident; and
- Adherence to the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR).

772. Full consideration will be given to the potential to minimise any impacts via the adoption of appropriate additional mitigation measures, where required. At this stage it is not possible to

identify the full range of mitigation measures that may be adopted, but examples of measures that could be considered (depending on predicted impacts and feasibility) include:

- Incorporation of an increased air gap into WTG design to reduce collision rates between seabirds and operational WTGs. Since most seabirds fly close to the sea surface, increasing the air gap between the lower blade tip and the sea surface reduces collision risk (flight height is a key input parameter to collision risk models). Technical, economic and project delivery constraints will also influence the extent of this air gap;
- Reducing the footprint of the Bellrock WFDA to reduce the area of potential displacement and barrier effects; and
- Reducing the boundary or amending the WTG layout of the Bellrock WFDA (for example, avoiding areas of particular importance for foraging seabirds).

773. The options for adopting such mitigation measures will be kept under review during the assessment process.

9.6 Scoping of Potential Impacts

9.6.1 Potential Impacts Scoped In

774. The key construction, operation and maintenance and decommissioning impacts that have been scoped into the assessment are outlined below and in **Table 9.5** together with a description of any additional supporting analyses (e.g. modelling) that will be required to enable a full assessment of the impacts.

9.6.1.1 Construction Impacts

775. The key potential impact during construction is likely to come from disturbance and consequent displacement of birds due to construction activities. There is the potential for noise and visual disturbance to birds from the presence, movements and lighting of vessels, helicopters (if required), and other vehicles during the installations of offshore infrastructure within the Bellrock WFDA. Disturbance and displacement from non-operational WTGs could also occur during construction. Construction disturbance and displacement will be temporary and localised around areas that are the focus of construction activity at a given time. Such effects would arise from either of the two installation options set out in **Section 3.9.3.1** of **Chapter 3: Project Description** (towing of integrated FOUs to the Bellrock WFDA or assembly of the FSSs and WTGs at the Bellrock WFDA). Other impacts to be assessed include potential changes to prey distribution and abundance (including prey-supporting benthic habitats) and impacts associated with cable installation, in accordance with NatureScot Guidance Note 6 (NatureScot, 2023f). The potential risk posed by UXO clearance will also be considered.

776. The exact type, size and number of possible detonations and duration of UXO clearance operations, if required, are not known at this stage. This means that any assessments for UXO clearance in the Bellrock WFDA EIA Report will be indicative and for information only and are not part of the application. Separate Marine Licence application(s) will be made prior to UXO clearance works, with an accompanying assessment of UXO clearance effects on ornithology.

9.6.1.2 Operation and Maintenance Impacts

777. The key potential operation and maintenance impacts are considered to be collision risk, disturbance and displacement, and barrier effects. These effects are likely to be greater for some species than others; for example, in reviewing studies of seabird avoidance responses to OWFs, Dierschke et al. (2016) identified species which strongly or almost completely avoid OWF (divers and gannets), species showing less consistent displacement (auks, Manx shearwater, little gull *Hydrocoloeus minutus* and sandwich tern *Sterna sandvicensis*), and species weakly (red-breasted merganser *Mergus serrator*, several gulls) or strongly (cormorant *Phalacrocorax carbo* and shag *Gulosus aristotelis*) attracted to OWFs. For birds which regularly encounter the Bellrock WFDA, for example breeding seabirds making foraging trips from nearby colonies, displacement may affect survival rates through reduced energy intake from foraging if birds are displaced from preferred feeding areas, and/or increased energy expenditure due to avoidance of the Bellrock WFDA, causing increased flight distances and time during regular commuting flights to and from the colony.

778. Birds which are not displaced and fly through the Bellrock WFDA at a height equivalent to that of the rotating blades will be at risk of collision with operational WTGs. Collisions are likely to result in direct mortality. The risk of collision is likely to be greater for some species than others, although studies indicate collisions are generally rare events (e.g. Skov et al. (2018)), hence assessment involves modelling the risk of collision for individual species.

779. There is also the potential risk of secondary entanglement associated with mooring lines and any associated debris and ghost nets that may get attached to those. This is of particular concern for deep-diving species such as auks. During operation, periodic inspections, as part of the asset integrity campaign, will include visual surveys and identification of debris and gear entangled to the Bellrock WFDA infrastructure. This will provide further understanding on the potential for the debris and ghost fishing gears to be caught in the WFDA infrastructure, increasing the risk for entanglement. Note this is in the early stages of development and will be further refined during the EIA process.

780. Displacement and disturbance associated with vessels and maintenance activity and indirect impacts on seabirds via any changes to prey availability and prey-supporting benthic habitats will also be considered.

9.6.1.3 Decommissioning Impacts

781. During decommissioning the potential impacts are anticipated to be similar to those described above for the construction phase.

9.6.2 Potential Impacts Scoped Out

782. The key potential operation impacts of collision risk, disturbance and displacement from operational WTGs and maintenance vessels, barrier effects and direct or secondary entanglement are not considered to be relevant to the construction and decommissioning phases, therefore they have been scoped out of the assessment for these stages of the Bellrock WFDA. The risk from UXO clearance is considered to be a construction impact only, therefore this potential impact has been scoped out of the operation and decommissioning phase assessments.

9.6.3 Potential Cumulative Effects

783. The cumulative effects assessment (CEA) for offshore ornithology will follow the general methodology set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**. The CEA will be considered in two stages; a CEA of the of the whole Bellrock Project (i.e., the Bellrock WFDA and the Bellrock Offshore Transmission Development Area; OfTDA), followed by a CEA of the whole Bellrock Project alongside other plans or projects.

784. For each impact screened in for the cumulative assessment, the plans/projects with potential to contribute to the impact will be identified and assessed as per the impact assessment methodology for Bellrock WFDA-alone impacts. Based on experience from other OWF projects, it is expected that the cumulative assessment will focus on cumulative displacement/barrier effects and cumulative collision risk due to the presence of offshore infrastructure when considered alongside other OWF projects, during the operational phase only.

785. The cumulative impact assessment will focus (as a minimum) on the cumulative effects with existing and consented OWFs in the region including Seagreen, Inch Cape, Neart na Gaoithe and Kincardine – Phase 2, as well as other proposed wind farms in the outer Firth of Forth and western North Sea including Berwick Bank Wind Farm, Ossian Offshore Wind Farm and Morven Offshore Wind Farm to the west, Green Volt Offshore Wind Farm, Muir Mhor Offshore Wind Farm and CampionWind Offshore Wind Farm to the north and Cedar Offshore Wind Farm to the east (see **Figure 13.3** in **Appendix 1**). Additional projects located in Scottish and English waters will be scoped into the cumulative assessment for breeding seabirds based on the mean-maximum foraging ranges (+1 SD) from Woodward et al (2019), as advised by NatureScot (2023f), between colonies and the relevant developments. When considering the predicted collision and displacement impacts from other developments, the most recent assessments or consented design variations will be used, rather than designs for the original consented OWFs.

786. The non-breeding season cumulative assessment, for species that migrate or disperse from their breeding colonies, will include relevant developments within the BDMPS region (Furness, 2015). However, for guillemot and herring gull which do not disperse as widely in the non-breeding season (Buckingham et al., 2022; Wernham et al., 2002), the assessment will be based on other developments within these species' MM foraging ranges (+1 SD) from the WFDA. Should the proposed CEF be published the Marine Directorate within a timeframe that aligns with the Bellrock WFDA programme, the methods recommended by the CEF will be considered for use within the cumulative assessment for offshore ornithology.

9.6.4 Potential Transboundary Effects

787. The Bellrock WFDA EIA report will consider whether there are any non-UK seabird colonies with potential connectivity to Bellrock WFDA during the breeding season (within MM foraging range +1 SD) and non-breeding season. Any potential impacts on birds from non-UK seabird colonies will be addressed in the EIA.

9.6.5 Summary of Potential Offshore Ornithology Impacts Scoped In and Out

788. **Table 9.5** outlines the offshore ornithology impacts which are proposed to be scoped in or out of the Bellrock WFDA EIA Report.

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Table 9.5: Summary of Potential Impacts Scoped In (✓) or Scoped Out (x) for Offshore Ornithology

Potential Impact	Scoped In or Scoped Out? (✓ or x)			Justification	Data Collection and Analysis Required to Characterise the Baseline Environment	Summary of Proposed Approach to Assessment
	C	O	D			
Temporary disturbance and displacement	✓	✓	✓	The presence of vessels associated with construction, operation/maintenance and/or decommissioning works may temporarily disturb and/or displace seabirds present in the vicinity of works. This has the potential to affect productivity and/or survival.	Offshore ornithology abundance estimates from offshore aerial surveys will be used to estimate the numbers of birds potentially disturbed/displaced.	Potential impacts will be assessed using best practice methodologies and with reference to the latest published information.
Indirect impacts	✓	✓	✓	Indirect impacts on seabirds may occur as a result of changes in prey distribution, availability or abundance, caused by construction, operation/maintenance and decommissioning activities that disturb the sea/seabed or increase subsea noise levels.	The use of site-specific baseline data is not proposed.	Potential impacts will be assessed using best practice methodologies and with reference to the latest published information.
Indirect impacts from UXO clearance	✓	x	x	The potential for physical injury and death to diving seabirds below water at time of detonation. The reduction or disruption of prey availability due to detonations may cause reduced energy intake affecting seabird productivity and/or survival. This may be mitigated by the use of deflagration methods and low-order clearance.	The use of site-specific baseline data is not proposed.	Potential impacts will be assessed using best practice methodologies and with reference to the latest published information.
Disturbance and displacement from the physical presence of WTGs and associated maintenance activities	x	✓	x	The presence of operational WTGs and maintenance activities associated with their operation may disturb seabirds and displace them from their foraging or resting areas. This has the potential to affect productivity and/or survival.	Offshore ornithology abundance estimates from offshore aerial surveys will be used to estimate the numbers of birds potentially impacted.	Potential impacts will be assessed using best practice methodologies and with reference to the latest published information. For any population for which it is required, PVA will be used to assess the

Potential Impact	Scoped In or Scoped Out? (✓ or x)			Justification	Data Collection and Analysis Required to Characterise the Baseline Environment	Summary of Proposed Approach to Assessment
	C	O	D			
						consequences of predicted impacts at the population level.
Barrier to movement	x	✓	x	The presence of operational WTGs may result in additional energy and/or time expenditure as migrating or commuting seabirds fly longer distances either over, under, or around the Bellrock WFDA. This has the potential to affect productivity and/or survival.	Offshore ornithology abundance estimates from offshore aerial surveys will be used to estimate the numbers of birds potentially impacted.	Potential impacts will be assessed using best practice methodologies and with reference to the latest published information. For any population for which it is required, PVA will be used to assess the consequences of predicted impacts at the population level.
Collision with WTGs	x	✓	x	Collisions between seabirds and operational WTGs will result in direct mortality. This will result in reductions in seabird numbers and potentially affect population breeding success. This will be mitigated by the selection of an appropriate air gap between the sea surface and the lowest part of the rotor swept area. This air gap has not yet been selected but will be informed by the results of the preliminary CRM and considering technical and economic constraints.	Offshore ornithology abundance estimates from offshore aerial surveys will be used to estimate the numbers of birds potentially impacted.	Potential impacts will be estimated using best practice methodology (e.g. sCRM). For any population for which it is required, PVA will be used to assess the consequences of predicted impacts at the population level
Secondary entanglement with subsea infrastructure, specifically debris that may become attached to the mooring lines of FSSs	x	✓	x	With the advent of floating offshore wind, the potential for secondary entanglement of diving seabirds with associated subsea infrastructure during the operation and maintenance period has been raised.	Offshore ornithology abundance estimates from offshore aerial surveys will be used to estimate the numbers of birds potentially impacted.	Potential impacts will be assessed using best practice methodologies and with reference to the latest published information.

9.7 Proposed Approach to Impact Assessment

789. The impact assessment for offshore ornithology will be undertaken in accordance with industry standard guidance (e.g., CIEEM, 2018) and based on the methodology described in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**. The EIA baseline will identify the seasonal use of the offshore aerial survey area by the bird species recorded during the full 24 months of surveys (completed in April). Detailed analyses of survey data will provide density and abundance estimates (with associated confidence intervals and levels of precision) for key ornithological receptors within the Bellrock WFDA.

790. The offshore ornithology EIA chapter will be supported by a technical report which will provide full details of the approaches that underpin key areas of the assessment. These will include density estimation, apportioning, approach to displacement and barrier effects, CRM and PVA. The following sections provide an overview of key considerations which are relevant to each of the key assessment subjects.

9.7.1 Density Estimation

791. It is considered that design-based methods are likely to provide abundance and density estimates of seabirds within the Bellrock WFDA and buffers which are suitable for the purposes of characterising the baseline. NatureScot (2023b) recommends that a list of species for which model-based population estimates (using the MRSea package) would be generated should be agreed through scoping (as informed by the survey reports). However as discussed in the Ossian Offshore Wind Farm Array EIA Scoping Report (Ossian Offshore Wind Farm Limited, 2023), recent experience in applying model-based approaches to the estimation of seabird densities using offshore survey data appears to demonstrate no advantages over design-based approaches, and work undertaken for the Berwick Bank Wind Farm demonstrated that the monthly density estimates for a range of the key seabird species, as derived by design-based and model-based approaches, were generally very similar (Harker et al., 2022). However, it was noted that some of the model-based estimates were unrealistic due to spatial and temporal gaps in survey coverage, and stochasticity within the modelling process meant that markedly different outputs could be generated from different model runs based on identical inputs and parameters. Consequently, the Berwick Bank Wind Farm application relied upon the outputs from the design-based density estimates.

792. Furthermore, the baseline survey data for the Berwick Bank Wind Farm are, in many ways, considerably better suited to producing model-based density estimates than are those from the offshore aerial survey area. This is because density estimates for the Berwick Bank Wind Farm were derived from an area which (at almost 4,000 km^2) is more than six times greater than the offshore aerial survey area, with overall bird abundance across the relevant area also being substantially greater (e.g. the estimated abundance of guillemot (the most abundant species in the offshore aerial survey area) in the case of the Berwick Bank Wind Farm is an order of magnitude greater than that estimated from the first year of surveys within the WFDA – **Table 9.4**). Thus, sample size, the potential for spatial variation in bird densities and the potential for variation in possible environmental co-variates are all greater in the case of the Berwick Bank Wind Farm survey data. In addition, the fact that the Berwick Bank Wind Farm survey area is considerably closer to the coast than the offshore aerial survey area also means that environmental gradients

that might correlate with variation in bird densities are more likely to occur within the Berwick Bank Wind Farm survey area.

793. It is also noted that the recently submitted assessment for the West of Orkney Offshore Wind Farm relies on design-based methods for generating the density and abundance estimates on which the assessment is based (Offshore Wind Power Limited, 2023). Density surface modelling (DSM) using the MRSea package was carried out for key species (kittiwake, guillemot, razorbill, puffin, fulmar and gannet) allowing for the production of density surface maps displaying their distribution within the West of Orkney Offshore Wind Farm survey area. However, there were often insufficient numbers of birds during surveys to support DSM; where density surface maps have been generated, essentially these are used as peripheral information only, with the main function of the DSM apparently limited to illustrating spatial variation in the densities of the key species across the West of Orkney Offshore Wind Farm survey area (Offshore Wind Power Limited, 2023). This latter objective could be achieved via the adoption of simpler and considerably less resource-intensive analytical processes.

794. Given the above, there appears to be little evidence or indications from previous experience to suggest that model-based density estimation will offer any benefits over design-based density estimation (and may in fact increase risk of erroneous estimation) in the case of the offshore aerial survey area.

795. However, given the NatureScot guidance (and assuming that there are no changes to this guidance ahead of undertaking the work to derive baseline bird densities), it is proposed to use model-based approaches for the most abundant species, subject to suitable model-performance. Based on the first year of the aerial survey data, this is expected to be guillemot and (possibly) razorbill (with the latter likely to be limited to the breeding season months only). Design-based density estimates would also be generated for these species, as well as for all other species for which sample sizes are deemed adequate. Density estimates will be derived for each of birds in flight, birds on the water and all birds for the appropriate spatial areas (e.g. WFDA alone, WFDA plus 2 km buffer).

9.7.2 Seasonality

796. The length of the breeding and non-breeding periods varies between seabird species. For seabird species potentially sensitive to the impacts of the WFDA, the breeding and non-breeding periods that will be used in the assessment will follow the seasonal definitions provided by NatureScot Guidance Note 9 (2020a). These are provided in **Table 9.6** for species recorded during the first year of aerial baseline surveys.

Table 9.6: Seasonal Definitions of Seabirds Recorded during the First Year of Surveys (NatureScot, 2020a)

Species	Breeding	Post-breeding	Winter	Pre-breeding
Arctic skua	May to August	-	-	-
Arctic tern	May to August	-	-	-
Common gull	April to August	-	September to February	March

Species	Breeding	Post-breeding	Winter	Pre-breeding
Fulmar	April to mid-September	-	Mid-September to March	
Gannet	Mid-March to September	-	October to mid-February	Mid-February to mid-March
Great black-backed gull	April to August	-	September to February	March
Guillemot	April to mid-August	Late August; flightless moult August to mid-October	September to January	February to March
Herring gull	April to August	-	September to February	March
Kittiwake	Mid-April to August	-	September to March	Early April
Puffin	April to mid-August	Late August	September to mid-March	Late March; flightless moult February to mid-March
Razorbill	April to mid-August	Late August; flightless moult mid-August to November	September to February	March

9.7.3 Seabird Populations, Foraging Ranges and Connectivity

797. Estimates of breeding seabird population sizes will be obtained from the Seabird Monitoring Programme online database (BTO, 2023) and non-breeding seabird population sizes will be taken from Furness (2015). Where species that require assessment are not included in the Furness report, other appropriate sources will be referenced. For guillemot and razorbill, the population size estimates in the Seabird Monitoring Programme are presented as the number of individuals counted at the colony, however this is considered to represent an underestimate of the number of breeding birds at each colony. It is therefore proposed that a conversion factor of 1.34 will be used to 'correct' the counts as presented in the Seabird Monitoring Programme, subject to agreement with NatureScot.

798. The recommended foraging ranges for seabirds around breeding colonies (Woodward et al., 2019; NatureScot, 2023c) will be used to determine potential connectivity between SPA and non-SPA colonies and the WFDA. These are presented in **Table 9.7** for species recorded during the first year of baseline surveys along with the metric to be used in the assessment. For most species, the metric recommended by NatureScot is the MM foraging range +1 SD (MM + SD); where there is insufficient data to calculate this, then the maximum will be used followed in preference by the mean. For gannet, the site-specific maximum foraging range will be used to assess impacts on Forth Islands SPA and St Kilda SPA, as advised by NatureScot (2h023c), and for guillemot and

razorbill colonies south of the Pentland Firth, the MM + SD will be used discounting Fair Isle values, as presented in Woodward et al. (2019).

Table 9.7: Foraging Ranges and Recommended Assessment Metrics for Seabird Species Recorded During the First Year of Baseline Surveys (Woodward et al., 2019; NatureScot, 2023c)

Species	Foraging range (km)	Metric
Arctic skua	2.7	Mean + SD
Arctic tern	25.7 (±14.8)	MM + SD
Common gull	50	Max/MM
Fulmar	542.3 (±657.9)	MM + SD
Gannet	315.2 (±194.2)[34]	MM + SD
Great black-backed gull	73	Max/MM
Guillemot	55.5 (±39.7)[35]	MM + SD
Herring gull	58.8 (±26.8)	MM + SD
Kittiwake	156.1 (±144.5)	MM + SD
Puffin	137.1 (±128.3)	MM + SD
Razorbill	73.8 (±48.4)[3]	MM + SD

9.7.4 Apportioning

799. For the assessment of impacts on different seabird breeding colonies (particularly SPA populations) it is necessary to apportion the potential impact predicted for the development between colonies and across age classes and seasons. In the breeding season, age class apportioning will be based on the proportions of adults and immatures derived from site-specific survey data where this is feasible (e.g. gull species and gannet) and from the estimated stable age structure as derived from population models for other species (notably the auks).

800. As part of an enhanced scoping approach for the Bellrock WFDA, breeding season apportioning of key species to SPA breeding colonies has been undertaken using the approach detailed in the NatureScot Interim Guidance (NatureScot, 2018); refer to **Section 9.4.6.1**. It is understood that NatureScot Guidance Note 10, when published, will set out NatureScot's advice for apportioning the breeding season impacts to the seabird colonies identified as having potential connectivity to the Bellrock WFDA. It is anticipated that the advice in Guidance Note 10 is likely to recommend the use of the NatureScot Interim Guidance (NatureScot, 2018) and also the Marine Directorate's

[34] Site-specific maximum values to be used in relation to Forth Islands SPA and St Kilda SPA.

[35] Excludes Fair Isle data. For colonies in the Northern Isles the MM + SD including the Fair Isle data will be used (i.e. 153.7 km and 164.6 km for guillemot and razorbill, respectively).

Apportioning Tool (Butler et al., 2020) for this purpose (noting that the latter can only be used for kittiwake, guillemot, razorbill and shag). The Marine Directorate's Apportioning Tool also relies on the estimates of colony population sizes derived from the Seabird 2000 census (Mitchell et al., 2004). It is unclear whether changes in the relative sizes of colony populations since 2000 may render the Marine Directorate Apportioning Tool obsolete (particularly given the potential for differential effects of HPAI on colony population sizes). Recent consultation with NatureScot has confirmed that the Marine Directorate Apportioning Tool is currently unavailable and is unlikely to become readily available until the CEF is published[36].

801. Subject to there being no evidence for marked differential trends in seabird colony population sizes since the Seabird 2000 census, and assuming availability of the Marine Directorate Apportioning Tool, it is considered likely that breeding season apportioning for the assessment will be undertaken using the Marine Directorate Apportioning Tool for kittiwake, guillemot and razorbill, and the NatureScot Interim Guidance for other species.

802. Apportioning during the non-breeding season will use the information presented in Furness (2015) on BDMPS, with the exception of guillemot and herring gull. Estimates of the numbers of birds within the relevant BDMPS from different colony populations are provided for both adult and immature age classes. Guillemot and herring gull are considered to disperse less widely from the breeding area during the non-breeding season in comparison to other species. For this reason, guillemot and herring gull apportioning during the non-breeding season will follow the same approach used for these species during the breeding season.

9.7.5 Displacement and Barrier Effects

803. It is proposed that displacement and barrier effects will be assessed using the Statutory Nature Conservation Bodies (SNCB)-recommended matrix-based approach (SNCBs, 2022) for all relevant species during each of the defined species-specific seasonal periods, potentially in conjunction with the SeabORD tool (Searle et al., 2018) for the relevant species (see below).

804. The matrix-based approach has been used to assess displacement and barrier effects in all recent UK OWF applications (including the Moray Firth projects, the revised designs of the Forth and Tay projects, the Berwick Bank Wind Farm , the Green Volt Offshore Wind Farm and the (recently submitted) West of Orkney OWF in Scottish waters (noting that West of Orkney OWF also presented an 'alternative approach' which did not make use of all available data). For each species, the matrix-based approach provides estimates of effects based on an assumed species-specific displacement rate and an assumed rate(s) of mortality amongst the displaced birds. The approach does not distinguish between the impacts from displacement and barrier effects, with it being assumed that effects from both pathways are incorporated within the estimates that are derived.

805. Recently published NatureScot guidance on assessing displacement and barrier effects on seabirds (Guidance Note 8; NatureScot 2023h) recommends use of both the matrix method and the SeabORD modelling tool (Searle et al., 2018). However, SeaBORD can only be used to assess puffin, guillemot, razorbill and kittiwake during the chick-rearing (breeding) season; all other seasons and species require the matrix approach. Work undertaken for the Berwick Bank Wind Farm application investigated the use of the SeabORD model and concluded that due to high levels

[36] NatureScot email of 27th June 2023 re Apportioning question for NatureScot for Bellrock and Broadshore Offshore Wind Farms

of uncertainty (in terms of key assumptions) and sensitivity of outputs to key input parameters, it is not a suitable tool for deriving the concise, transparent and comparable predictions required for general use for impact assessments (Vallejo et al., 2022). Thus, there appears to be serious concerns over the potential value of the SeabORD tool for the purposes of undertaking assessments and over the reliability of the outputs.

806. However, given the NatureScot guidance (and subject to further experience relating to the suitability of the SeabORD tool which may emerge in the interim period, noting that it has not been used in the recently submitted West of Orkney OWF assessment (with the exception of guillemot and puffin in the West of Orkney OWF RIAA)), it is proposed to consider use of SeabORD to assess breeding season impacts from displacement and barrier effects for puffin, guillemot, razorbill and kittiwake. The matrix-based approach will be used for the other seasonal periods relevant to these species and for the other species for which assessment of displacement effects is required.

807. Based on the first year of survey data, the species that will be scoped into the displacement and barrier effects assessment are gannet, kittiwake, guillemot, razorbill and puffin. Displacement rates and mortality rate ranges for use with matrix-based approach presented in NatureScot Guidance Note 8 (NatureScot, 2023h) will be used unless this advice changes in the interim period. Consideration will also be given to the use of alternative rates based upon the findings from recent reviews of the evidence-base on displacement rates and the findings from recent post-consent monitoring undertaken at the Beatrice Wind Farm in the Moray Firth region (APEM, 2020, Trinder, 2023). Should the second year of survey data indicate there are other species that require assessment, proposed displacement and mortality rates for these species will be discussed and agreed with relevant consultees.

Table 9.8: Displacement Rates and Mortality Rate Ranges to be used with the Matrix-Based Approach (NatureScot, 2023h)

Species	Displacement Rate	Mortality Rate (Breeding Season)	Mortality Rate (Non-Breeding Season)
Auks – guillemot, razorbill and puffin	60%	3% and 5%	1% and 3%
Gannet	70%	1% and 3%	1% and 3%
Kittiwake	30%	1% and 3%	1% and 3%

808. To inform the displacement assessment, seabird densities will be based on estimates derived from the full two years of aerial survey data. The mean peak population abundances of each species within the site boundary and an appropriate buffer (i.e. 2 km for those species currently scoped in) for each seasonal period will be derived from these estimated densities. In relation to the seasonal periods for guillemot and razorbill, consideration will be given to whether there is justification for taking into account likely post-breeding dispersal when defining these periods for the purposes of estimating displacement effects, as well as deriving these estimates in strict accordance with the seasonal periods as defined in the NatureScot (2023h) guidance. Seasonal estimates will be combined to assess impacts over the whole year.

9.7.6 Collision Risk Modelling

809. The sCRM model (MacGregor et al., 2018) will be used to estimate the potential collision risk to key species due to the operation of the WTGs, as recommended in NatureScot Guidance Note 7 (NatureScot, 2023g). Specifically, the 2022 update of the sCRM (Caneco, 2022) will be used to produce both stochastic and deterministic predictions of collision mortality (as outlined in the NatureScot guidance).

810. Due to the difficulties in estimating bird flight height from aerial imagery, it is anticipated that generic flight data (Johnston et al. 2014) will be used. The sCRM will be run using Option 2 (Basic model) (and possibly also Option 3 (Extended model))[37], which (as for Option 3) is reliant on generic published flight height distributions. The CRMs will model a range of turbine scenarios, including realistic worst-case and most likely scenario for each CRM species, as advised by NatureScot. Based on discussions with NatureScot at the Bellrock WFDA Scoping Workshop, it is anticipated that Guidance Note 7 will be updated in early 2024 to reflect new advice on the recommended avoidance rates, taking account of the findings of Ozsanlev-Harris et al. (2023). It is expected that these avoidance rates will be used for the Bellrock WFDA assessment. Based on consultation with NatureScot, it is also anticipated that a macro-avoidance rate will be applied to gannet flight densities in the non-breeding season prior to estimating collision mortality (**Table 9.2**). NatureScot advise that macro-avoidance should not be included for gannet in the breeding season months, but it is likely that the sCRM outputs will be presented both with and without breeding season macro-avoidance on the basis that its inclusion is considered to be justified (Pavat et al., 2023).

811. Based on the results of the first year of baseline surveys, the species proposed for inclusion in the assessment of collision risk are gannet and kittiwake. Further species may be included depending on the results of the second year of surveys; this could include Arctic tern, herring gull, great black-backed gull and lesser black-backed gull. Morphological and behavioural parameters to be used in the sCRM, including bird length, wing span, flight speed/type and nocturnal activity, have been derived from the current version of NatureScot Guidance Note 7 (NatureScot 2023g) and are provided in **Table 9.9.** Flight speeds and nocturnal activity scores were obtained from Alerstam (2007) and Garthe and Hüppop (2004) respectively except for gannet, for which these parameters were obtained from Pennycuick (1997) and Furness et al. (2018) respectively. The values presented in **Table 9.9** will be reviewed following publication of the revised version of NatureScot Guidance Note 7.

Table 9.9: Species Biological Parameters to be used in the Stochastic Collision Risk Modelling

Species	Flight Speed (m/s)	Nocturnal Activity Factor	Body Length (m)	Wingspan (m)	Flight Type	% Flights Upwind
Gannet	14.9 (±0)	0.08 (±0.10)	0.94 (±0.0325)	1.72 (±0.0375)	Gliding	50
Kittiwake	13.1 (±0.40)	NatureScot to be consulted	0.39 (±0.005)	1.08 (±0.0625)	Flapping	50

[37] Option three will only be run if such instruction is included in the revised guidance and for those species for which there is an advised avoidance rate for use with this option, noting the relevant consultation details on this in **Table 9.2**.

812. Potential collision mortality for migratory non-seabird species (including ducks, geese and raptors) will also be assessed. It is understood that an updated review of migratory routes and vulnerabilities across the UK is currently being prepared on behalf of Marine Directorate and Crown Estate Scotland, which includes the development of a stochastic migration CRM tool (known as mCRM) to enable quantitative assessment of risks to migratory species. It is proposed that the mCRM tool is used, subject to review and whether it becomes available in sufficient time within the EIA programme of works. Should this tool not become available, then it is anticipated that the approach would be to rely on the existing report on strategic assessment of collision risk of Scottish OWFs to migrating birds (WWT, 2014) supplemented with qualitative assessment for any relevant species which are not included.

9.7.7 Population Viability Analysis

813. It is proposed that the Natural England PVA tool (Searle et al., 2019) will be used to model the potential effects of collision and displacement mortality on populations of key seabird species from relevant breeding colonies. In accordance with NatureScot guidance (NatureScot, 2023k), PVAs will focus on birds where the assessed mortality exceeds a 0.02 percentage point change to adult annual survival rates, with PVAs run over 25-year and 50-year periods. However, the 0.02 percentage point change in adult mortality may not be appropriate for all species due to interspecific variation in annual survival, therefore, further consideration and consultation on this with stakeholders is deemed necessary (e.g. in view of the outcomes from recent submissions which have relied on this threshold).

814. No recovery period will be applied within the PVAs, and impacts will be applied to all age-classes in agreement with the age apportioning approach, with sabbatical rates of adult birds also being included[38]. The two-ratio metrics, which are generally termed ‘Counterfactual (ratio) of Final Population Size’ (CPS) and ‘Counterfactual (ratio) of Population Growth Rate’ (CPGR) will be presented and used to draw conclusions on the model outputs.

815. The most up to date population data from the Seabird Monitoring Programme database (BTO, 2023) will be used to provide baseline colony population sizes in the PVA, and species demographic data for use in the PVAs will be obtained from Horswill and Robinson (2015) except where other sources are deemed more appropriate (e.g. population-specific studies and as used for the PVAs undertaken for the Berwick Bank Wind Farm (DMP Stats; HiDef, 2022)).

9.7.8 Highly Pathogenic Avian Influenza (HPAI)

816. The ongoing HPAI outbreak has the potential to result in significant impacts on seabird populations and increases the level of uncertainty within the ornithological assessment of the Bellrock WFDA. At present, it is unclear how the impacts of HPAI will be addressed in the assessment; in the absence of specific NatureScot guidance on the matter, recent advice provided by Marine Directorate and NatureScot to Ossian Offshore Wind Farm Limited recommends a precautionary assessment is undertaken in light of HPAI, taking into account Natural England interim guidance

[38] It is proposed to use sabbatical rates of 35% for large gull species, 10% for gannet and kittiwake, and 7% for guillemot, razorbill and puffin, in accordance with recent OWF assessments in Scottish waters (e.g. RPS and Royal HaskoningDHV, 2022).

(Marine Scotland, 2023). This is likely to require consultation with NatureScot to aid consideration of how the species and colonies of concern, and their density at sea during certain seasonal periods, may have been affected with HPAI.

817. It is likely that a significant proportion of the assessment in relation to HPAI will be qualitative, although some quantitative assessment may be possible if up to date (post-2022) seabird colony numbers become available in sufficient time to enable their consideration within the assessment, and particularly how they relate to baseline survey data. Consultation will be undertaken with NatureScot and other stakeholders to seek an agreed approach.

9.8 Scoping Questions to Consultees

818. The following questions are posed to consultees to help them frame and focus their response to the offshore ornithology scoping exercise, which will in turn inform the Scoping Opinion:

- Do you agree that the site-specific data that will be available following completion of the two years of offshore aerial surveys will be sufficient to describe the baseline for offshore ornithology?
- Do you agree that the scope of the offshore aerial surveys (including coverage of the aerial survey areas and transect separation) is acceptable?
- Do you agree with the buffer and transects used for the offshore aerial surveys?
- Do you agree with the potential impacts that have been scoped in for the construction, operation and maintenance, and decommissioning phases of the Bellrock WFDA in relation to offshore ornithology?
- Do you agree that the examples of potential mitigation measures are appropriate and suitably encapsulate the means to mitigate potential impacts from the Bellrock WFDA on seabird populations?
- Do you agree with the sources suggested for defining seabird seasons, estimating populations and foraging ranges, and apportioning?
- Do you agree with the approach outlined for density estimation (recognising the potential issues outlined above with the model-based approach) and the list of seabird species expected to be included for model-based density estimates as based upon the currently available baseline data?
- Do you agree with the approach outlined for CRM and with the sources suggested for deriving the seabird parameters to be used in the sCRM (as detailed in **Table 9.9**)?
- Specifically, in relation to use of the sCRM, can consultees confirm whether clarification will be provided on the following points in the updated version of NatureScot Guidance Note 7:
  - Should the same mean avoidance rate be applied to the outputs from the stochastic and deterministic runs of the sCRM for a given species and model option (noting that the values given in Table 1 of Appendix 1 of the existing NatureScot Guidance Note 7 are for use with Band (2012) as opposed to deterministic runs of the sCRM)?

  - Should the parameters values identified in **Table 9.9** for use with the sCRM be used for both the stochastic and deterministic model runs (noting that the values given in Table 1 of Appendix 1 of the existing NatureScot Guidance Note 7 are for use with Band (2012) as opposed to deterministic runs of the sCRM)?
  - Will the same parameter values identified in Table 2 of Appendix 1 of the existing NatureScot Guidance Note 7 as requiring consultation with NatureScot (e.g. nocturnal activity values for several of the key species) continue to require consultation?
- Do you consider the species-specific displacement rates presented in NatureScot guidance for matrix-based assessments are also appropriate for SeabORD?
- Do you agree with the sources suggested for deriving demographic rates for species populations to be used in PVA, including the use of colony-specific information (as derived for the Berwick Bank Wind Farm) when considered more appropriate?
- Do consultees agree the need for further discussion on the implications of the ongoing HPAI outbreak and to agree an approach to incorporate HPAI impacts into the assessment?
- Do you have any other matters or information sources that you wish to present?

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10 Commercial Fisheries

10.1 Introduction

819. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on commercial fisheries. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

820. This chapter provides an overview of the existing environment and sets out the proposed methodology and approach to assessing effects on commercial fisheries receptors in the Bellrock WFDA Environmental Impact Assessment (EIA) Report. This chapter has been prepared by NiMa Consultants Limited.

821. For the purpose of this Bellrock WFDA Scoping Report, 'commercial fishing' is defined as any form of fishing activity legally undertaken where the catch is sold for taxable profit.

822. This commercial fisheries chapter should be read in conjunction with the following chapters in the Bellrock WFDA Scoping Report:

- **Chapter 7: Fish and Shellfish Ecology;**
- **Chapter 11: Shipping and Navigation; and**
- **Chapter 19: Major Accidents and Disasters.**

823. This commercial fisheries chapter is likely to have key inter-relationships with the above receptors, which will be considered where relevant in the Bellrock WFDA EIA Report.

10.2 Legislation, Policy and Guidance

824. **Table 10.1** sets out the legislation, policy and guidance which have been considered in the preparation of this chapter, and will be considered within the Bellrock WFDA EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

Table 10.1: Summary of Relevant Legislation, Policy and Guidance for Commercial Fisheries

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Legislation	
Sandeel (Prohibition of Fishing) (Scotland) Order 2024	Prohibition of sandeel fishing in Scottish waters out to 200 nm.
Policy	
National Marine Plan (NMP) (Scottish Government, 2015)	Contains sector-specific policies relevant to offshore wind and commercial fisheries.
Sectoral Marine Plan (SMP) (Scottish Government, 2020)	Identifies plan option areas for offshore wind farm development and identifies key consenting issues associated with development.
Regional Marine Plan (RMP) (in progress)	Will focus on regional marine planning and conservation issues and will be developed in line with the NMP and SMP.
Guidance	
Good Practice Guidance for Assessing Fisheries Displacement by Other Licensed Marine Activities (Xodus, 2022)	In addition to the general approach and guidance outlined in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**, the assessment of potential impacts on commercial fisheries receptors will also comply with the listed guidance documents where they are relevant to this chapter.
Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments (United Kingdom Fisheries Economic Network and Seafish, 2012)	
Fisheries Liaison with Offshore Wind and Wet Renewables group (FLOWW) Recommendations for Fisheries Liaison: Best Practice guidance for offshore renewable developers (FLOWW, 2014 and noted to be currently in the process of being updated; Department for Business, Enterprise and Regulatory Reform (BERR), 2008)	
FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW, 2015)	
Options and Opportunities for Marine Fisheries Mitigation Associated with Wind Farms (Blyth-Skyrme, 2010a)	
Developing Guidance on Fisheries Cumulative Impact Assessment for Wind Farm Developers (Blyth-Skyrme, 2010b)	
Guidelines for Data Acquisition to Support Marine Environmental Assessments of Offshore Renewable Energy Projects. Contract report: ME5403 (Cefas, 2012)	

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Fisheries Liaison Guidelines - Issue 6 (UK Oil and Gas, 2015)	
Fishing and Submarine Cables - Working Together (International Cable Protection Committee, 2009)	
Offshore Wind Farms - Guidance Note for Environmental Impact Assessment in respect of Food and Environmental Protection Act (FEPA) and Coast Protection Act (CPA) requirements (Cefas), Marine Consents and Environment Unit (MCEU), Department for Environment Food and Rural Affairs (DEFRA) and Department of Trade and Industry (DTI), 2004)	

10.3 Consultation

825. Consultation undertaken to date for the Bellrock WFDA relevant to commercial fisheries is provided in **Table 10.2** below.

Table 10.2: Consultation Relevant to Commercial Fisheries

Consultee	Date/Document	Comment	How Comment is Addressed
Scottish Fishermen's Federation (SFF) and Scottish White Fish Producers Association (SWFPA)	20th March 2023 1st August 2023 26th September 2023 16th January 2024	Request for early consultation with local Fishers. Scoping Report methodology for commercial fisheries was discussed on 16th January 2024, and presentation forwarded post meeting, for comment. Noted that data for pelagic fleets could be provided by the Scottish Pelagic Fishermen's Association.	Early consultation held with local fishers on 9th and 10 May 2023. Noted. Contact has been made with Scottish Pelagic Fishermen's Association and the data received. This will be used to inform the commercial fisheries baseline in the Bellrock WFDA EIA Report where appropriate.
Local fishers	9th May 2023 10th May 2023	Consultation events held in Peterhead and Fraserburgh respectively, to discuss fisher activity within and around the Bellrock WFDA.	Fishers in attendance provided information on their activities around the Bellrock WFDA
Marine Directorate – Licensing Operations Team (MD-LOT) & Marine	15th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	MD-SEDD are content with the data sources listed in the presentation however advise that the following data is also used:	Noted. The data sources listed will be referred to where applicable to inform the Bellrock WFDA EIA Report, and are included in **Table 5.3** setting out key data and information

Consultee	Date/Document	Comment	How Comment is Addressed
Directorate - – Science, Evidence, Data and Digital (MD-SEDD)		To get a more detailed picture of the inshore fisheries, especially for vessels 12m of length and under use the gridded fisheries data layers available at NMPi: Fishing - Scottish Under 12m vessels - Annual average value (2017-2021) of Pots and Traps (£) Fishing - Scottish Under 12m vessels - Annual average value (2017-2021) of Bottom Trawls (£) Fishing - Scottish Under 12m vessels - Annual average value (2017-2021) of Dredges (£) Fishing - Scottish Under 12m vessels - Annual average value (2017-2021) of Rod and Lines (£) Fishing - Scottish Under 12m vessels - Annual average value (2017-2021) of Other gears (£) MD-SEDD also advise that a commercial fisheries displacement assessment is carried out following the guidance in the 'Good practice guidance for assessing fisheries displacement by other licensed marine activities' (Xodus, 2022)	sources for commercial fisheries. 'Good practice guidance for assessing fisheries displacement by other licensed marine activities' (Xodus, 2022) is listed in **Table 5.1** and will be followed as appropriate.

10.4 Existing Environment

10.4.1 Study Areas

826. The Bellrock WFDA is located within the northern portion of the International Council for the Exploration of the Seas (ICES) Division 4b (central North Sea) statistical area; within UK exclusive economic zone (EEZ) waters. For the purpose of recording commercial fisheries landings, ICES Division 4b is divided into statistical rectangles, of which the Bellrock WFDA overlaps with 42E9

and 42F0. For the purposes of this Bellrock WFDA Scoping Report, the commercial fisheries local study area comprises ICES rectangles 42E9 and 42F0.

827. While the commercial fisheries local study area illustrated in **Figure 10.1 of Appendix 1** focuses on the Bellrock WFDA overlap with ICES rectangles, a wider regional area will be considered for consideration of displacement impacts within the Bellrock WFDA EIA Report. It is proposed that the commercial fisheries regional study area will also include those ICES rectangles immediately adjacent to the commercial fisheries local study area, as indicated in **Figure 10.1 of Appendix 1**.

10.4.2 Data and Information Sources

828. **Table 5.3** sets out the information and data sources which have been considered in the preparation of this chapter, and will be considered within the Bellrock WFDA EIA Report assessment where relevant matters are scoped in.

Table 10.3: Summary of Key Data and Information Sources for Commercial Fisheries

Dataset	Year(s)	Description
UK annual fisheries landings statistics Marine Management Organisation (MMO), 2018 to 2022 (MMO, 2023a) and 2011 to 2017 (MMO, 2018).	2018 to 2022 2011 to 2017	Fisheries landings data for registered fishing vessels landing to their home nation ports. Note that the most recent data has been presented in this Bellrock WFDA Scoping Report, but that longer term datasets will be analysed within the Bellrock WFDA EIA Report.
UK Vessel Monitoring System (VMS) data MMO, 2020 (MMO, 2023b)	2020	VMS data for fishing vessels greater than 15 m in length. Note that UK vessels ≥12 m in length have VMS on board, however, to date, the MMO provide amalgamated VMS datasets for ≥15 m vessels only. VMS data sourced from MMO displays the first sales value (£) of catches. Note that the most recent data has been presented in this Bellrock WFDA Scoping Report, but that longer term datasets will be analysed within the Bellrock WFDA EIA Report.
EU annual fisheries landings statistics Scientific, Technical and Economic Committee for Fisheries (STECF), 2004 to 2016 (EU Data Collection Framework, 2020)	2004 to 2016	Fisheries landings data for registered fishing vessels landing to their home nation ports.
European Union (EU) VMS data ICES, 2016 to 2020 (ICES, 2022)	2016 to 2020	VMS data for fishing vessels greater than 12 m in length. VMS data sourced from ICES displays the surface swept area ratio of catches by different gear types and covers EU (including UK) registered vessels 12 m and over in length. Surface swept area ratio indicates the number of times in an annual period that a demersal fishing gear makes contact with (or sweeps) the seabed surface. Surface swept area ratio provides a proxy for fishing intensity.

Dataset	Year(s)	Description
Fisheries datasets Marine Scotland National Marine Plan Interactive (NMPi), various publication dates (Marine Scotland MAPS NMPi, 2023)	Various temporal coverage	Fisheries datasets available from the Marine Scotland MAPS NMPi, including ScotMap data and heatmaps for activity by small fishing boats (<12m in length).
Fishing vessel route density data European Maritime Safety Agency (EMSA, 2023)	2019 to 2022	Fishing vessel route density, based on vessel Automatic Identification System (AIS) positional data. AIS is required to be fitted on fishing vessels ≥15 m length. Note that the most recent data has been presented in this Bellrock WFDA Scoping Report, but that longer term datasets will be analysed within the Bellrock WFDA EIA Report.
Sectoral Marine Plan (Scottish Government, 2020)	Various temporal coverage	Description of regional commercial fisheries activity.
Fisheries activity mapping in the North and East Coast Regional Inshore Fisheries Group (RIFG) area (North Atlantic Fisheries College (NAFC) Marine Centre University of Highlands and Islands (UHI), 2021)	Various temporal coverage	Mapping of fishing activity and critical habitats of key species within 12 nautical miles (nm) of the coast in the North and East Coast RIFG area.

829. It should be noted that the quantitative datasets identified in **Table 10.3** may not capture all commercial fisheries activity in the commercial fisheries study areas. For instance, the VMS datasets only covers vessels ≥12 m (ICES data) or ≥15 m (MMO data) in length. Note that UK vessels ≥12 m in length have VMS on board, however, to date, the MMO provide amalgamated VMS datasets for ≥15 m vessels only.

830. However, in addition to VMS data, other published data does provide a useful insight into commercial fisheries activity undertaken in inshore areas and by smaller vessels not captured by VMS data (e.g., ScotMap inshore fisheries mapping and heatmaps for small fishing boats, <12m in length) and will be utilised where appropriate. Consultation with fisheries stakeholders and industry is expected to further inform assessment in the Bellrock WFDA EIA Report.

831. Consultation with representatives of fishermen’s associations and organisations will be undertaken to seek to corroborate the findings of desk-based baseline data analysis and to provide insight into specific fishing grounds and activity of any vessels active in the commercial fisheries study areas. Consultation will also be important to inform gear specifications for vessels active in the commercial fisheries study areas, which will allow a full understanding of how different vessels and different gear configurations may be affected.

832. Variations and trends in commercial fisheries activity are an important aspect of the baseline assessment and is the principal reason for considering up to five years of key baseline data, and longer timeseries where possible. Available landings data spans the period of the COVID-19 pandemic, which is understood to have temporarily affected market demand and supply chains. Furthermore, changes in fishing patterns resulting from the withdrawal of the UK from the EU would also be reflected in data sets for 2021 onwards. Long term environmental and climatic changes may be expected to be detectable within the five-year time series but may benefit from longer-term analysis dependant on the target species. Inclusion of such longer-term analysis will be informed by stakeholder consultation.

10.4.3 Commercial Fisheries in the Local and Regional Study Areas

833. An understanding of the commercial fisheries baseline environment within the commercial fisheries study areas has been developed from utilisation of the available literature and data sources presented in **Section 10.4.2**. This section includes a description of the commercial fish targeted by vessels registered in UK, Norway, Sweden, Denmark and Ireland and landed into UK ports (for all vessels) and non-UK ports (for UK vessels only).

10.4.3.1 Local Study Area

834. Landings from the commercial fisheries local study area had an annual average landings value of approximately £1.7 million across the years 2018 to 2022 (MMO, 2023a), with landings values peaking in 2019 at £2.4 million and being at their lowest in 2021 at £1.1 million (likely due to a combination of COVID-19 restrictions and the UK EU-exit). Over the same time period, the annual average weight of landings from the commercial fisheries local study area was 970 tonnes, peaking at approximately 2,600 tonnes in 2018.

835. Landings of shellfish species dominated the catch from the commercial fisheries local study area, accounting for 65% of the total landed value and 23% of landed weight (based on 2018-2022 data from MMO, 2023a). Landings of pelagic fish species accounted for 15% of the total landed value (and 52% of the weight), and demersal species for 20% of the total landed value (and 25% of the weight). Scottish vessels were responsible for the majority (83%) of landings, with landings also being made by vessels registered in England and to a much lesser extent vessels registered in Denmark, Norway and Northern Ireland. The main landing ports local to the Bellrock WFDA includes (but are not limited to) Fraserburgh and Peterhead.

836. **Plate 10.1** and **Plate 10.2** show the top 12 species landed from the commercial fisheries local study area by value and weight respectively, from 2018 to 2022 (MMO, 2023a). **Plate 10.3** shows the landed value over the same period from the commercial fisheries local study area by nation of vessel registration and gear type. The key species landed are nephrops *Nephrops norvegicus,* haddock *Melanogrammus aeglefinus,* monkfish *Lophius budegassa* and *L. piscatorius,* whiting *Merlangius merlangus* and herring *Clupea harengus.*

837. Over the five-year period analysed, herring landings were only recorded in significant quantities in 2018. The significant annual variation in landings of herring represent patterns typical for pelagic species that swim in fast moving shoals and may not be specifically linked to areas or habitats when caught in the water column.

838. First sales value and weight of nephrops landings have fluctuated over the 2018 to 2022 period, with an annual landed value of £360,000 in 2018 and of £1.9 million in 2019. Landings of nephrops are almost exclusively from ICES rectangle 42F0. Landed values and weights of haddock and monkfish have also been variable across the time period, with five-year averages of £133,000 and £69,000 respectively.

839. Landing statistics indicate that almost all landings by value from the commercial fisheries local study area are made by vessels over 15 m in length, with the majority of landings by value being made by vessels between 18 m and 24 m length.

840. Landing trends per month will be analysed within the Bellrock WFDA EIA Report for individual species at both an ICES rectangle level, and by port of landing to identify which fleet and fishery operate at specific times of the year.

Plate 10.1: Top 12 Species by Value (First Sales in Great British Pound (GBP)) from 2018 to 2022 Landed from the Commercial Fisheries Local Study Area for Vessels Registered in UK, Norway, Sweden, Denmark and Ireland, Landing into UK Ports (Data Source: MMO, 2023a)

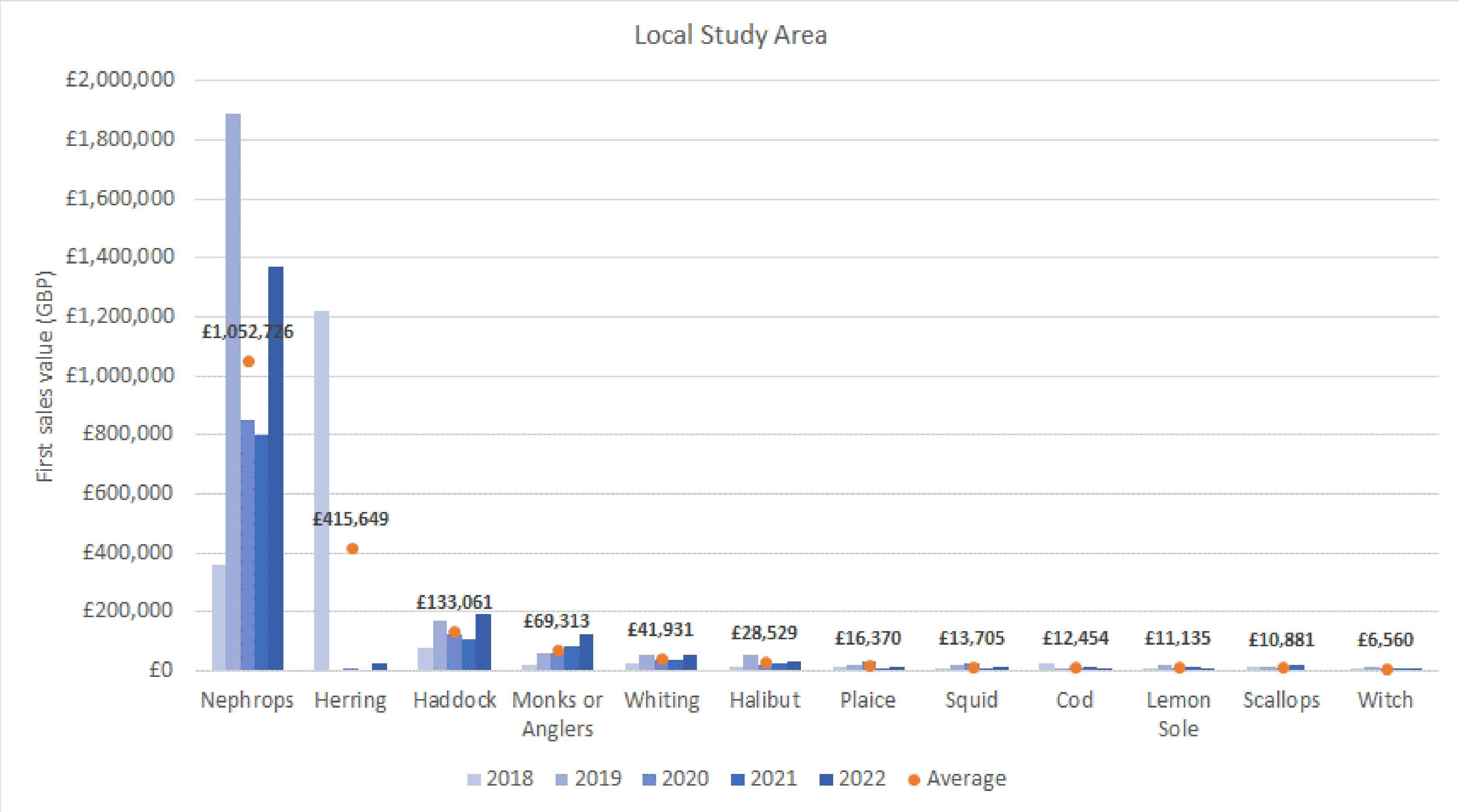


Plate 10.2: Top 12 Species by Weight (Tonnes) from 2018 to 2022 Landed from the Commercial Fisheries Local Study Area for Vessels Registered in UK, Norway, Sweden, Denmark and Ireland, Landing into UK Ports (Data Source: MMO, 2023a)

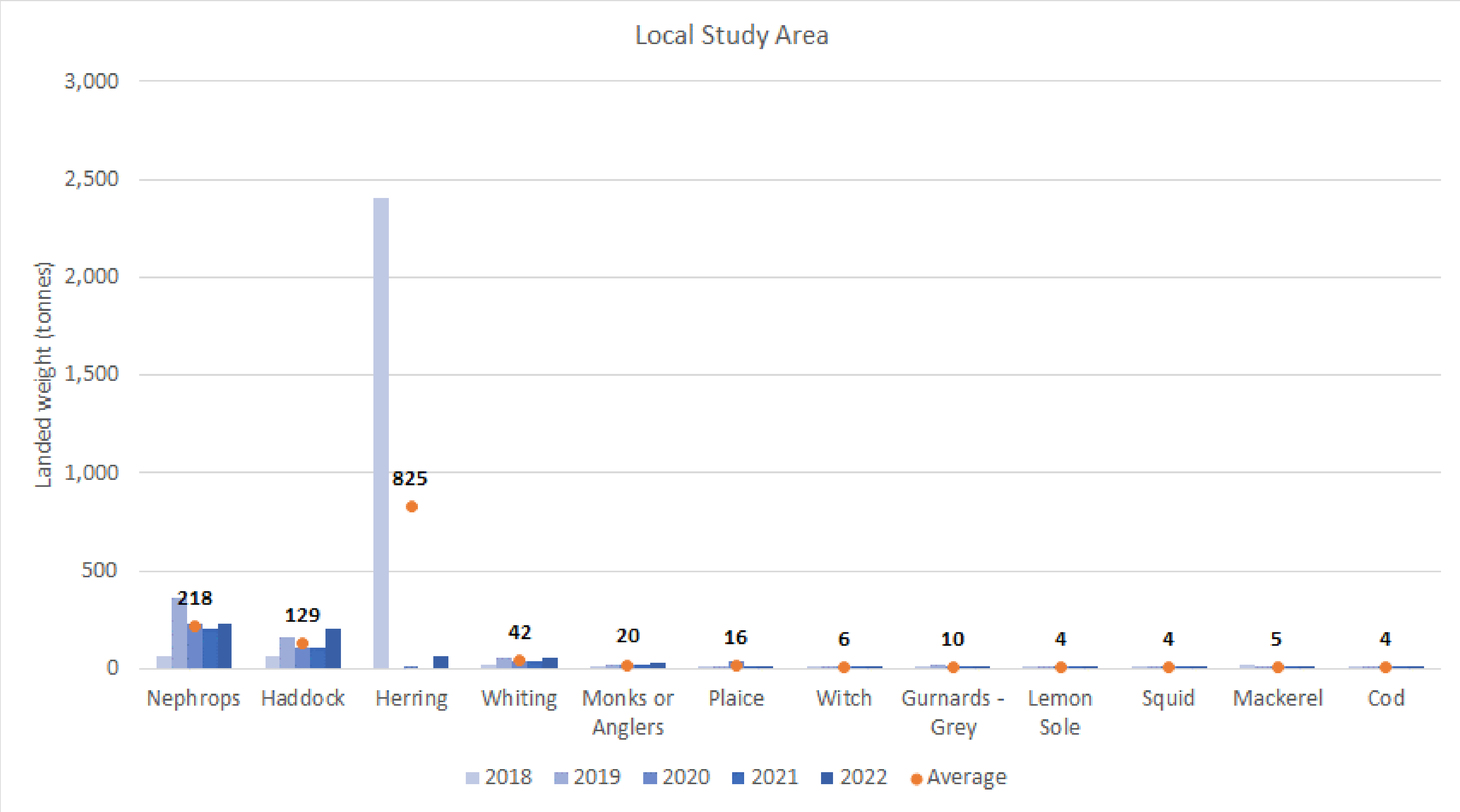
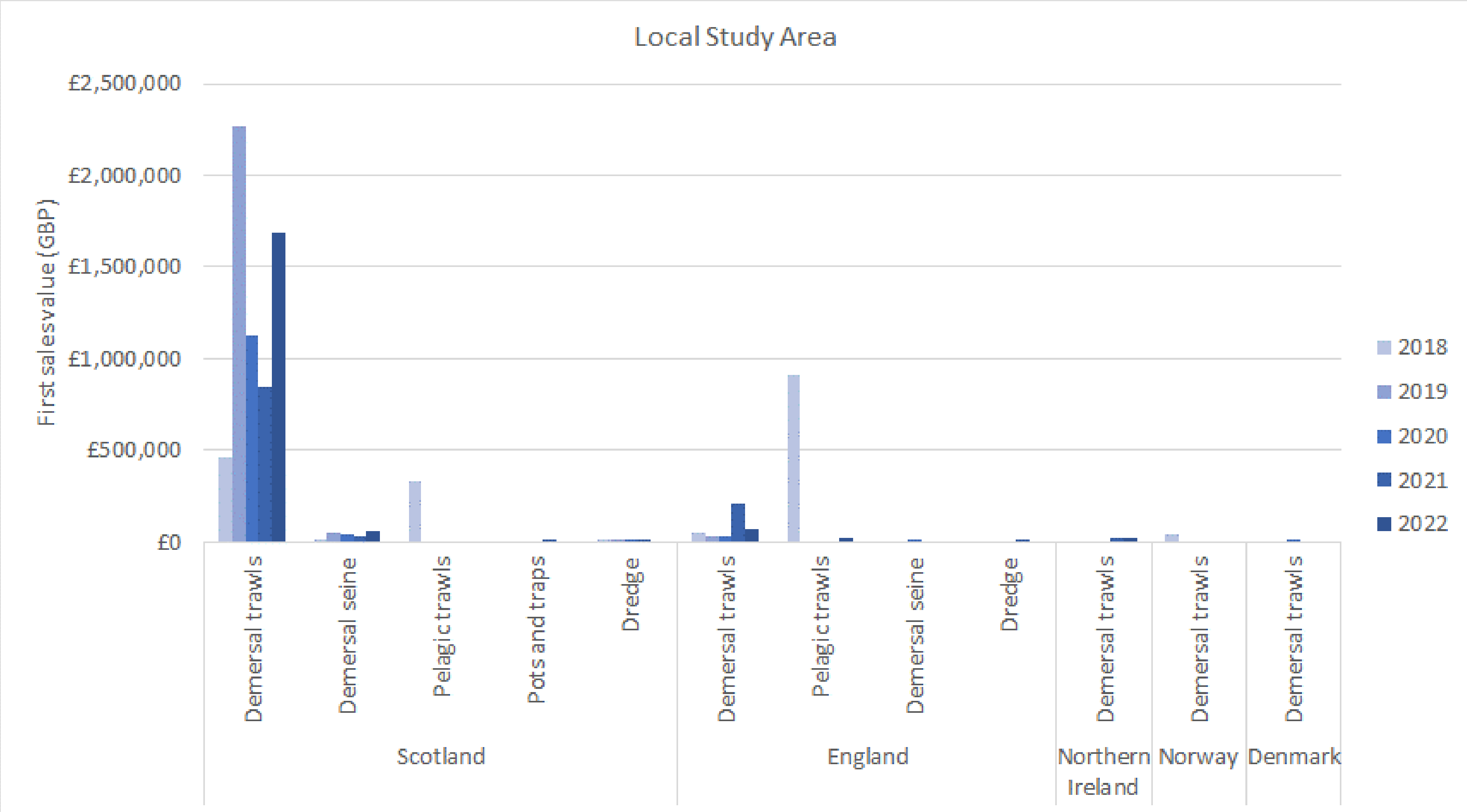


Plate 10.3: Average Landed Value from (2018 To 2022 (First Sales in GBP) from the Commercial Fisheries Local Study Area by Nation and Gear Type for Vessels Registered in UK, Norway, Sweden, Denmark and Ireland, Landing into UK Ports (Data Source: MMO, 2023a)



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10.4.3.2 Regional Study Area

841. **Plate 10.4** and **Plate 10.5** show the top 12 species landed from the commercial fisheries regional study area by value and weight respectively, from 2018 to 2022 (MMO, 2023a). **Plate 10.6** shows the landed value over the same period from the commercial fisheries regional study area by vessel nationality and gear type. Key target species and active gear types are broadly aligned with those in the commercial fisheries local study area, with landings dominated by demersal trawls used to target nephrops, haddock and mixed demersal fish species and landings attributed to pelagic trawl gear used to target herring. Within the commercial fisheries regional study area, landings data additionally indicates the presence of vessels deploying pots and traps to target lobsters *Homarus gammarus* and brown crabs *Cancer pagurus*, and dredge gear to target king scallop *Pecten maximus*.

842. Landings data for non-UK vessels catching in the commercial fisheries regional study area and landing into UK ports indicates the potential for fishing activity by Danish and Norwegian vessels deploying demersal trawls to target mixed demersal species including cod and haddock. Landings data indicates Danish pelagic trawl activity in 2018 only, associated with a landing of sandeels *Ammodytes marinus*. It is noted that the Sandeel (Prohibition of Fishing) (Scotland) Order will take force from the 26th March 2024, which will prohibit fishing for sandeel within Scottish seas out to 200 nm.

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Plate 10.4: Top 12 Species by Value (First Sales in GBP) from 2018 to 2022 Landed from the Commercial Fisheries Regional Study Area for Vessels Registered in UK, Norway, Sweden, Denmark and Ireland, Landing into UK Ports (Data Source: MMO, 2023a)

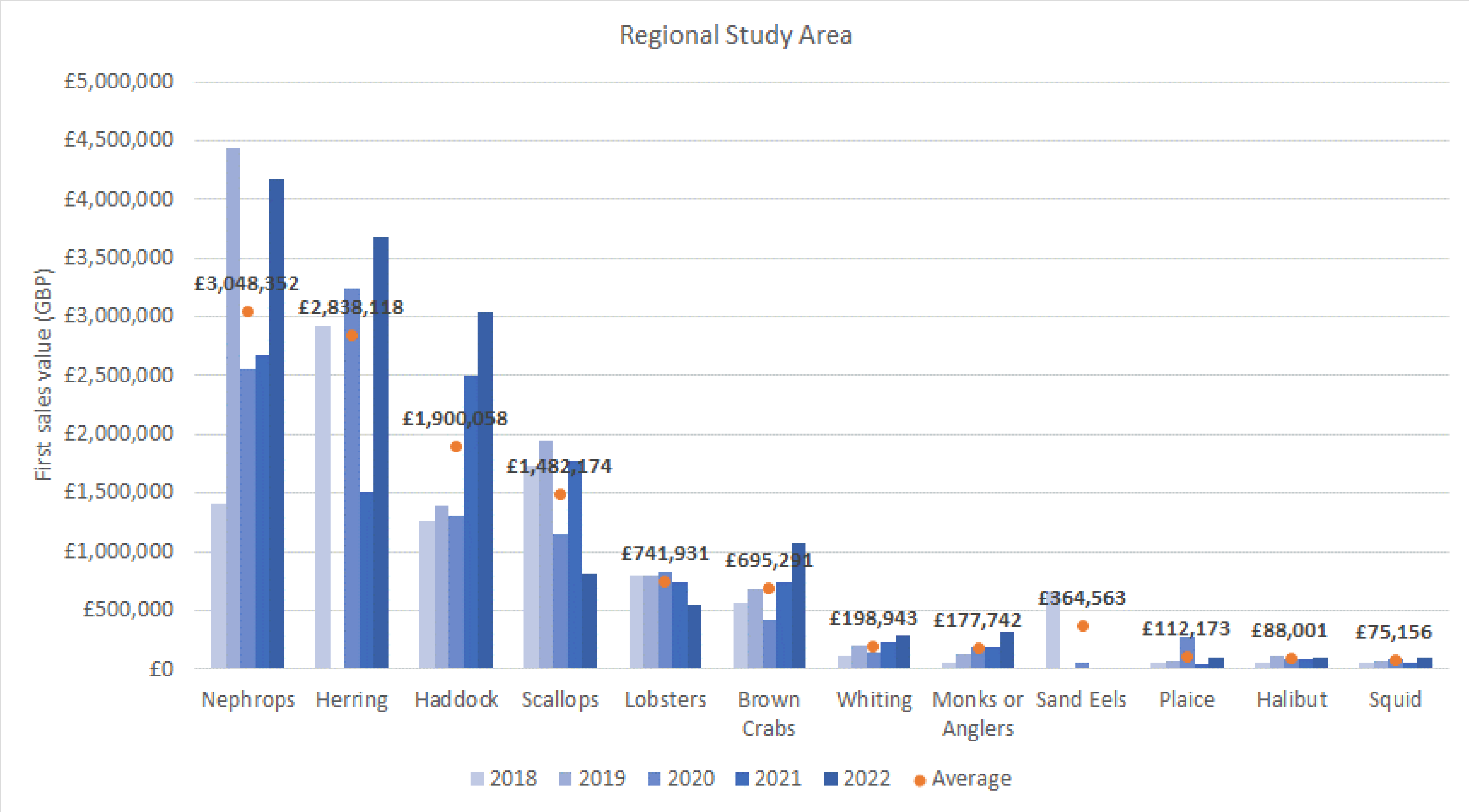


Plate 10.5: Top 12 Species by Weight (Tonnes) from 2018 to 2022 Landed from the Commercial Fisheries Regional Study Area for Vessels Registered in UK, Norway, Sweden, Denmark and Ireland, Landing into UK Ports (Data Source: MMO, 2023a)

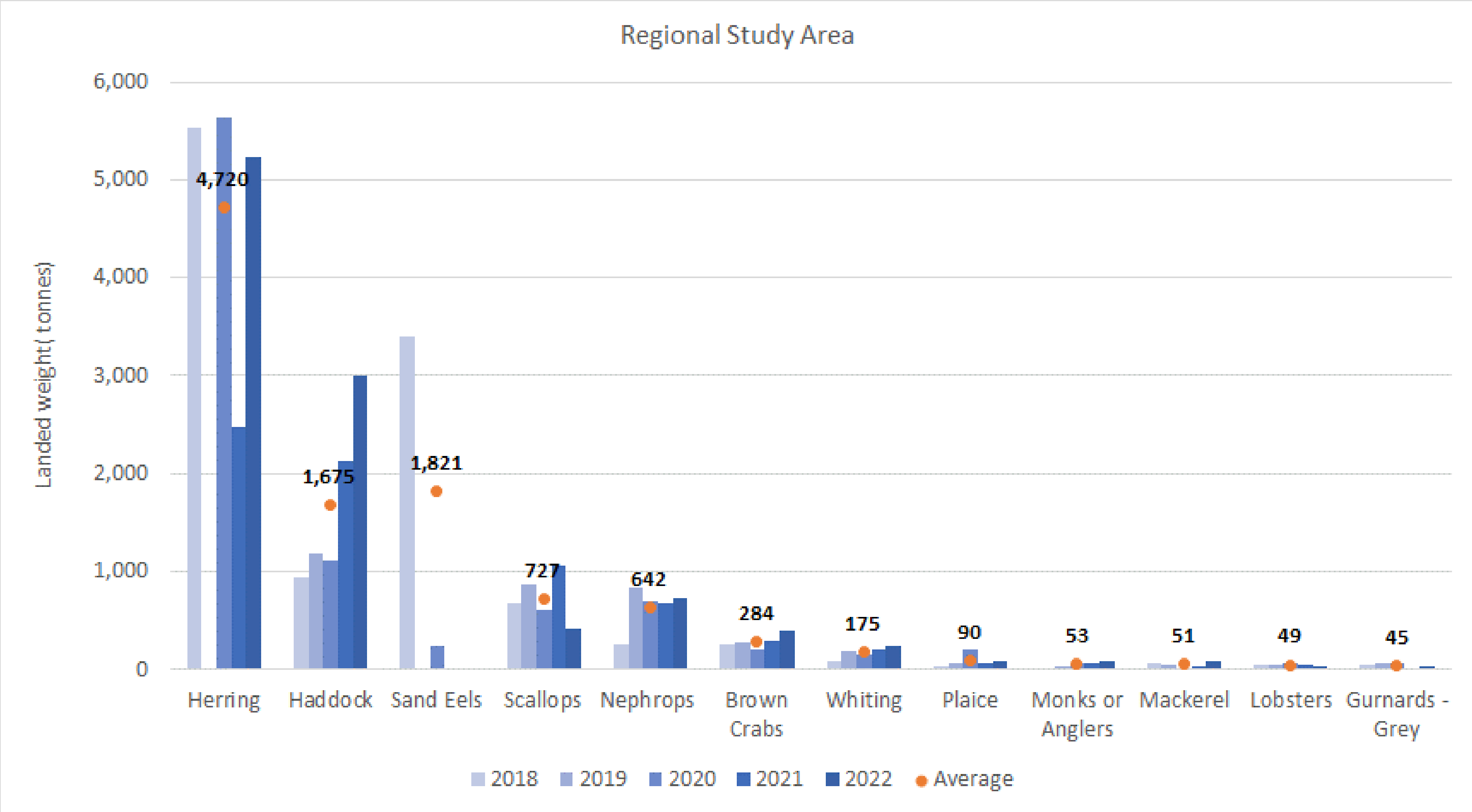
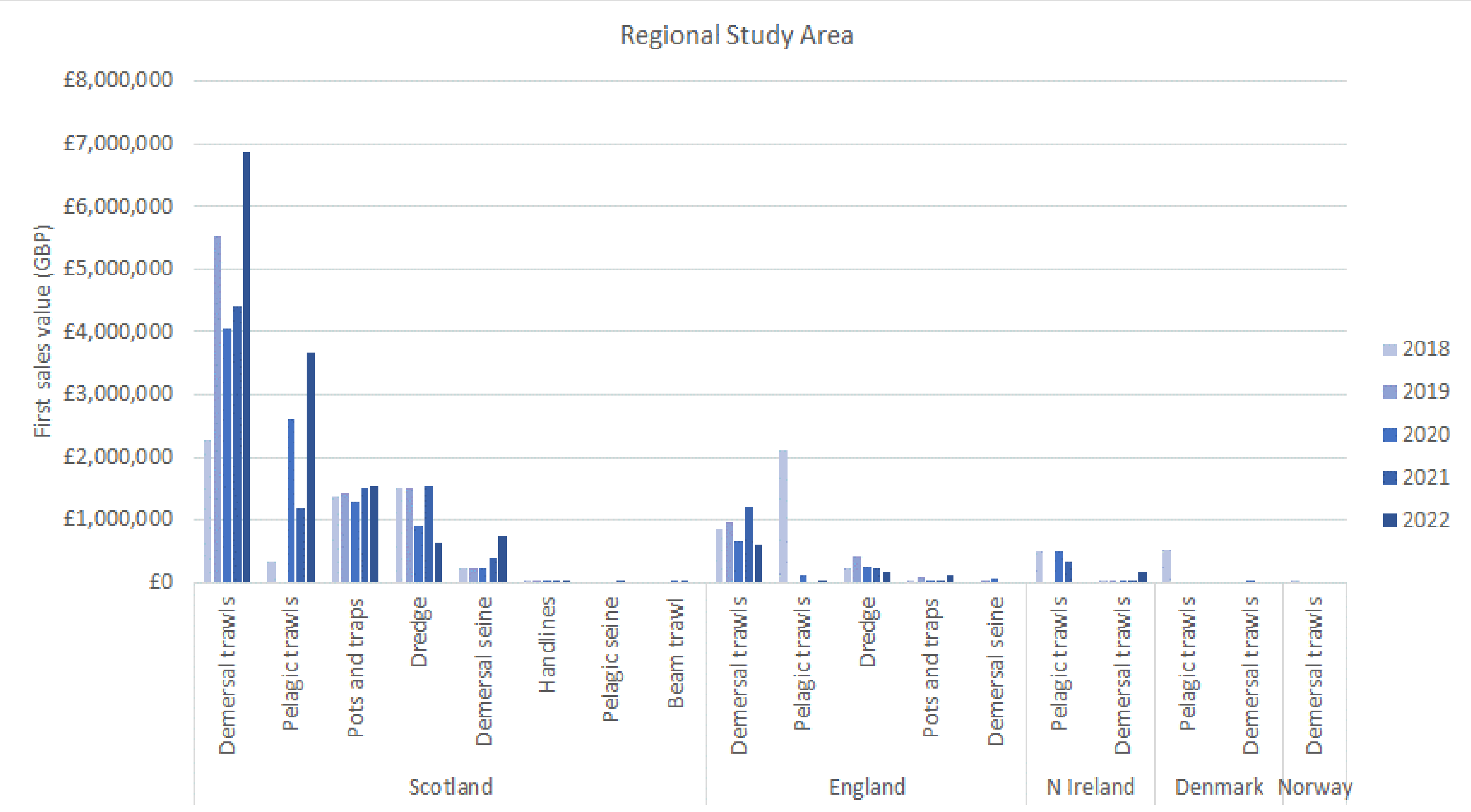


Plate 10.6: Average Landed Value (2018-2022) from the Commercial Fisheries Regional Study Area by Nation and Gear Type for Vessels Registered in UK, Norway, Sweden, Denmark and Ireland, Landing into UK Ports (Data Source: MMO, 2023a)



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843. In addition to landings data, spatial data describing fishing activity is available, including AIS fishing vessel route density data. AIS is required to be fitted on fishing vessels ≥15 m length. The data presented in **Figure 10.2** in **Appendix 1** is specific to fishing vessels and indicates the route density per square kilometre during 2022. This data does not distinguish between transiting vessels and active fishing but does provide a useful source to corroborate fishing grounds. Data indicates fishing vessel presence within the commercial fisheries local and regional study areas, but no activity (transiting or active fishing) within the Bellrock WFDA Scoping Boundary. Fishing activity is noted within ICES rectangle 42F0, in what appear to be fishing grounds running north to south. One of these routes touches the south-east boundary of Bellrock WFDA, the others are located east of the Bellrock WFDA Scoping Boundary.

844. VMS and spatial data to map fishing activity is available for UK and EU fleets. VMS data sourced from ICES displays the surface swept area ratio of catches by different gear types and covers EU (including UK) registered vessels 12 m and over in length. Surface swept area ratio indicates the number of times in an annual period that a demersal fishing gear makes contact with (or sweeps) the seabed surface. Surface swept area ratio provides a proxy for fishing intensity and has been analysed to determine an average annual swept area ratio based on data from 2016 to 2020. **Figure 10.3** in **Appendix 1** presents demersal otter trawl fishing activity within the commercial fisheries regional study area. The fishing ground identified within AIS data immediately east of the Bellrock WFDA is also evidenced within the VMS data for demersal otter trawl. This is understood to be a nephrops ground that is routinely targeted as part of the Devil's Hole functional unit fishery.

845. VMS data from the MMO is presented in **Figure 10.4** in **Appendix 1** for UK demersal otter trawl vessels 15m and over in length. This data corroborates the ICES VMS dataset, indicating an active fishery to the south and east of Bellrock WFDA. The UK 2020 VMS dataset indicates presence of this fishery within the Bellrock WFDA Scoping Boundary, in the south-east corner.

846. VMS data for the dredge fishery is presented in **Figure 10.5** and **Figure 10.6** in **Appendix 1** from the ICES and MMO datasets respectively. The MMO data is presented for the annual period of 2016, because this represents the highest level of activity in the 2016 to 2020 timeseries. Dredge activity is low within the commercial fisheries local study area, with no records within the Bellrock WFDA. Dredge activity is noted to occur north and west of the commercial fisheries local study area, with a hot-spot of activity within ICES rectangle 42E8 and approximately 80 km from the Bellrock WFDA Scoping Boundary.

847. VMS data is presented for the pelagic trawl fleet (**Figure 10.7** in **Appendix 1**), with data presented for the annual period of 2018, because this represents the highest level of activity in the 2016 to 2020 timeseries. Pelagic trawl activity is noted within the commercial fisheries local study area, specifically to the east of the Bellrock WFDA Scoping Boundary.

848. VMS data is presented for the potting fleet (**Figure 10.8** in **Appendix 1**), which shows limited activity due to the majority of potting vessels not being represented within this dataset.

849. The mapped spatial data presented in **Appendix 1** is aligned with that presented in the UHI study, which mapped fisheries and habitats in the North and East Coast RIFG area (Shelmerdine and Mouat, 2021) located inshore of the Bellrock WFDA and with which the commercial fisheries regional study area overlaps.

10.4.4 Commercial Fisheries Receptors

850. The key commercial fisheries receptors within the commercial fisheries study areas are identified as follows:

- UK demersal otter trawlers targeting nephrops, haddock, monkfish, squid and mixed demersal fish species;
- UK pelagic trawlers targeting herring;
- UK demersal seine targeting haddock, whiting and mixed demersal fish species.
- UK potters targeting lobster and brown crab;
- UK dredgers targeting king scallop; and
- Non-UK (Norwegian and Danish) demersal trawlers targeting mixed demersal fish species.

10.5 Potential Impacts

851. The following potential impacts on commercial fisheries are considered in this scoping exercise:

- Reduction in access to, or exclusion from established fishing grounds during construction, operation and maintenance, and decommissioning;
- Displacement leading to gear conflict and increased fishing pressure on adjacent grounds during construction, operation and maintenance, and decommissioning;
- Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity during construction, operation and maintenance, and decommissioning;
- Increased vessel traffic associated with the Bellrock WFDA within fishing grounds leading to interference with fishing activity during construction, operation and maintenance, and decommissioning;
- Additional steaming to alternative fishing grounds for vessels that would otherwise cross through the Bellrock WFDA during construction, operation and maintenance, and decommissioning; and
- Physical presence of infrastructure and potential exposure of that infrastructure leading to gear snagging during the operation and maintenance phase.

852. **Chapter 7: Fish and Shellfish Ecology** considers impacts on the ecology of fish and shellfish, including species of commercial interest.

853. **Chapter 11: Shipping and Navigation** considers impacts on the navigational safety aspects of fishing activity.

10.5.1 Embedded Mitigation Measures

854. As part of the design process for the Bellrock WFDA, a number of designed-in measures have been proposed to reduce the potential for impacts on environmental and socio-economic receptors. These are presented below and in **Appendix 3: Mitigation Register** and will likely evolve over the development process as the EIA progresses and in response to stakeholder consultation.

- Development of and adherence to a Cable Plan (CaP). The CaP will confirm planned cable routing, burial (if applicable) and any additional protection and will set out methods for post-installation cable monitoring.
- A detailed Cable Burial Risk Assessment (CBRA) will be prepared where inter-array cables (IACs) are proposed to be buried to determine the target burial depth. The burial depths may vary and will be dependant on risk and ground conditions. The CBRA will also highlight instances where adequate burial cannot be achieved and alternative protection is needed.
- Development of and adherence to a Fisheries Management and Mitigation Strategy (FMMS). The FMMS will set out the means of ongoing fisheries liaison through construction and operational phases of the Bellrock WFDA and detail any mitigation measures to be put in place to limit effects on commercial fisheries activity.
- Development of, and adherence to, a Marine Pollution Contingency Plan (MPCP) outlining the approach for managing and reducing risk of pollution and procedures to protect personnel and to be followed in the event of a pollution incident.
- Appointment of a Fisheries Liaison Officer (FLO). The FLO will support ongoing liaison and ensure clear communication between the Applicant and commercial fisheries during the construction phase.
- Development of and adherence to a Navigational Safety Plan (NSP). The NSP will describe measures put in place by the Bellrock WFDA related to navigational safety, including information on Safety Zones, charting, construction buoyage, temporary lighting and marking, and means of notification of Bellrock WFDA activity to other sea users (e.g., via Notice to Mariners). Where appropriate, guard vessels will be used to ensure adherence with Safety Zones or advisory passing distances.
- Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins.
- All offshore infrastructure associated with the Bellrock WFDA will be appropriately marked on UK Hydrographic Office Admiralty charts.
- Development of and adherence to a Lighting and Marking Plan (LMP). The LMP will confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting. Failures of the lighting and marking in the Bellrock WFDA will be appropriately reported and rectified as soon as practicable. Interim hazard warnings will be put in place as required.
- Adherence to best practice guidance with regards to fisheries liaison and procedures in the event of interactions between the Bellrock WFDA and fishing activities (e.g., FLOWW, 2014; 2015).
- Development and adherence to a Development Specification and Layout Plan (DSLP).

- Participation in any fisheries working group to assist with liaison between the Applicant and the fishing community.
- Application for and use of Safety Zones during construction and major repairs. Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, operation and maintenance, and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards. The Bellrock WFDA EIA Report will include an assessment of the proposed approach to Safety Zones at the point of application. The total number of safety zones to be established at the same time has not been yet defined.
- Any objects dropped on the seabed during works associated with the Bellrock WFDA will be reported in line with MD-LOT procedures (Marine Scotland, 2020) and objects will be recovered where they pose a hazard to other marine users and where recovery is possible.
- Development of, and adherence to, a Vessel Management Plan (VMP). The VMP will set out the numbers, types and specifications of vessels to be used during construction, as well as how vessel management will be coordinated.
- Development of a Navigational Risk Assessment (NRA) (see **Chapter 11: Shipping and Navigation** for details).
- Development of, and adherence to, an Emergency Response Cooperation Plan (ERCoP).
- The Applicant will ensure compliance with the Regulatory Expectations on Moorings for Floating Wind and Marine Devices (Maritime and Coastguard Agency and Health and Safety Executive, 2017).
- Marine coordination will be implemented to manage project vessels throughout construction, maintenance, and decommissioning periods.
- Bellrock WFDA vessels will ensure compliance with international marine regulations as adopted by the Flag State, including the COLREGs (Convention on the International Regulations for Preventing Collisions at Sea) (International Maritime Organisation; IMO, 1972/77) and SOLAS (International Convention for the Safety of Life at Sea) (IMO, 1974).

855. As a result of the commitment to implement these measures, and to align the Bellrock WFDA with various standard sectoral practices and procedures, the embedded mitigations are considered inherently part of the design of the Bellrock WFDA and have, therefore, been included in the assessment of potential impacts presented in **Section 10.7**.

856. The requirement and feasibility of any additional mitigation measures will be dependent on the significance of the effects upon commercial fisheries and will be consulted upon with statutory consultees throughout the EIA process.

10.6 Scoping of Potential Impacts

857. The sections below set out an initial assessment of the likelihood of effects on commercial fisheries due to Bellrock WFDA activities for the scoping stage of the EIA process. The assessment is based

on a combination of the following: the definition of the Bellrock WFDA at the scoping stage; embedded mitigation (as set out in **Section 10.5.1**) the level of understanding of the baseline at the scoping stage; the existing evidence base for commercial fisheries effects due to Bellrock WFDA activities; relevant policy; and the professional judgement of qualified commercial fisheries specialists.

10.6.1 Potential Impacts Scoped In

858. **Table 10.4** sets out those impacts on commercial fisheries that are proposed to be scoped in to the Bellrock WFDA EIA Report, accompanied by a justification for this.

Table 10.4: Impacts 'Scoped In' to the Commercial Fisheries Chapter in the Bellrock WFDA EIA Report

Impact	Justification
Construction (and Decommissioning)	
Temporary reduction in access to, or exclusion from established fishing grounds	Installation and decommissioning activities have potential to create loss of fishing opportunities. This effect is expected to be localised and short term; furthermore, the operational range of relevant fleets will not typically be limited to the Bellrock WFDA.
Temporary displacement of fishing activity leading to gear conflict and increased fishing pressure on adjacent grounds	Any reduced access to fishing grounds creates the potential for displacement of fishing activity. This effect is expected to be short-term and the operational range of relevant fleets will not typically be limited to the Bellrock WFDA.
Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	Installation and decommissioning activities may lead to disturbance of commercially important fish and shellfish resources, which in turn may result to displace or disrupt a range of fishing activity. Assessment will be informed by the outcomes of the fish and shellfish ecology impact assessment, and it will be assumed that commercial fisheries will be affected as a result of any loss of resources.
Increased vessel traffic associated with the Bellrock WFDA within fishing grounds leading to interference with fishing activity	Movement of vessels associated with the Bellrock WFDA adding to the existing volume of marine traffic in the area, may lead to interference of fishing activity. Assessment will be informed by the outcomes of the shipping and navigation impact assessment and NRA.
Physical presence of infrastructure and potential exposure of that infrastructure leading to gear snagging	The presence of partially constructed infrastructure (e.g. IAC/scour protection, subsea cable hub(s)) and other seabed obstacles, may pose a snagging risk to fishing vessels, which could result in loss or damage to fishing gear.
Operation and Maintenance	
Long term reduction in access to, or exclusion from established fishing grounds	The presence of offshore infrastructure within the Bellrock WFDA may result in a loss or restricted access to fishing grounds during the operation and maintenance phase. As floating offshore wind is a relatively new technology, there is limited information available on the scale of this impact. Access to fishing grounds within the Bellrock WFDA will be dependent on turbine spacing, turbine layout, floating substructure (FSS) type and station keeping system (SKS) design. In particular, the mooring associated with

Impact	Justification
	the SKS and the dynamic IAC design may affect the ability of commercial fishing fleets in deploying fishing gear.
Displacement leading to gear conflict and increased fishing pressure on adjacent grounds	Any reduced access to fishing grounds creates the potential for displacement of fishing activity. This effect is expected to be medium-long term and the operational range of relevant fleets will not typically be limited to the Bellrock WFDA.
Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	Operation and maintenance of the Bellrock WFDA may lead to disturbance of commercially important fish and shellfish resources, including electromagnetic fields from IACs, and changes to habitat, and therefore displace or disrupt a range of fishing activity. Assessment will be informed by the outcomes of the fish and shellfish ecology impact assessment, and it will be assumed that commercial fisheries will be affected as a result of any loss of resources.
Increased vessel traffic associated with the Bellrock WFDA within fishing grounds leading to interference with fishing activity	Movement of vessels associated with operation and maintenance of the Bellrock WFDA adding to the existing volume of marine traffic in the area, may lead to interference of fishing activity. Assessment will be informed by the outcomes of the shipping and navigation impact assessment and NRA.
Physical presence of infrastructure and potential exposure of that infrastructure leading to gear snagging	The presence of infrastructure associated with operation and maintenance (e.g. IAC/scour protection, subsea cable hub(s)) and other seabed obstacles, may pose a snagging risk to fishing vessels, which could result in loss or damage to fishing gear. The extent of impact may vary depending upon the project design. Standard industry practice and protocol (e.g., seabed infrastructure will be buried and/or marked on nautical charts) will minimise the risk of gear snagging, but it remains likely to be an area of industry concern. Safety aspects associated with this impact, including damage to property and vessel stability, will be considered within the shipping and navigation impact assessment.

10.6.2 Potential Impacts Scoped Out

859. **Table 10.5** sets out those impacts on commercial fisheries that are proposed to be scoped out of the Bellrock WFDA EIA Report, accompanied by a justification for this.

Table 10.5: Impacts Scoped out of the Commercial Fisheries Chapter in the Bellrock WFDA EIA Report

Impact	Justification
Construction (and Decommissioning)	
Additional steaming to alternative fishing grounds for vessels that would otherwise cross through the Bellrock WFDA	This effect will be localised to Safety Zones and therefore limited deviations to steaming routes are expected. Given adequate notification, it is expected that vessels, which typically have an operational range beyond that of the Bellrock WFDA (as indicated by VMS data presented above), will be in a position to avoid temporary construction/decommissioning areas with no or minimal impact on their steaming times. As such, the impact has been scoped out of the Bellrock WFDA EIA Report.

Operation and Maintenance	
Additional steaming to alternative fishing grounds for vessels that would otherwise cross through the Bellrock WFDA	This effect will be localised to Safety Zones associated with temporary maintenance works on installed structures and advisory safe distances from infrastructure and therefore limited deviations to steaming routes are expected. Given adequate notification, it is expected that vessels, which typically have an operational range beyond that of the Bellrock WFDA (as indicated by VMS and ScotMap data presented above), will be in a position to avoid temporary maintenance areas around installed infrastructure with no or minimal impact on their steaming times. As such the impact has been scoped out of the Bellrock WFDA EIA Report.

10.6.3 Potential Cumulative Effects

860. The cumulative effects assessment (CEA) will follow the methodology set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**. The CEA will be considered in two stages; a CEA of the of the whole Bellrock Project (i.e., the Bellrock WFDA and the Bellrock OfTDA), followed by a CEA of the whole Bellrock Project alongside other plans or projects.

861. Offshore wind projects and other activities, such as subsea cables and pipelines, relevant to the assessment of cumulative impacts on commercial fisheries will be identified through a screening exercise. The potential impacts considered in the cumulative assessment as part of the Bellrock WFDA EIA Report will be in line with those described for the Bellrock WFDA-alone assessment, though it is possible that some will be screened out on the basis that the impacts are highly localised (i.e., they occur only within Bellrock WFDA boundaries) or where management measures in place for the Bellrock WFDA and other projects will reduce the risk of impacts occurring. Key potential cumulative impacts are expected to result from a loss of or restricted access to established fishing grounds and displacement of fishing activity.

862. A number of ScotWind projects will be included within the CEA, as well as the Bellrock OfTDA. The latest information available for each of the projects scoped into the CEA will be reviewed, including scoping reports, to understand the potential impact of these projects cumulatively with the Bellrock WFDA.

863. The CEA for commercial fisheries will consider the maximum adverse design scenario for each of the projects, plans and activities in line with the methodology outlined in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**. A study area incorporating sections of the northern North Sea (ICES division 4a) and central North Sea (division 4b) is proposed for the commercial fisheries CEA.

10.6.4 Potential Transboundary Effects

864. Transboundary impacts are ‘scoped in’ to the assessment and will be considered based on any potential displacement of fishing activity into the Norwegian EEZ, which is expected to be highly unlikely based on data reviewed within this Bellrock WFDA Scoping Report.

10.6.5 Summary of Potential Commercial Fisheries Impacts Scoped In or Out

865. **Table 10.6** outlines the commercial fisheries impacts which are proposed to be scoped in and scoped out from the Bellrock WFDA EIA Report.

Table 10.6: Summary of Potential Impacts Scoped In (✓) or Out (x) of for Commercial Fisheries

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Reduction in access to, or exclusion from established fishing grounds	Commercial fishing fleets identified in **Section 10.5**	Bellrock WFDA activities have potential to create loss of fishing opportunities	✓	✓	✓	Mitigation measures as set out in **Section 10.5.1.**
Displacement leading to gear conflict and increased fishing pressure on adjacent grounds	Commercial fishing fleets identified in **Section 10.5**	Any reduced access to fishing grounds creates the potential for displacement of fishing activity	✓	✓	✓	
Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	Commercial fishing fleets identified in **Section 10.5**	Bellrock WFDA activities may lead to disturbance of commercially important fish and shellfish resources and therefore displace or disrupt a range of fishing activity	✓	✓	✓	
Increased vessel traffic associated with the Bellrock WFDA within fishing grounds leading to interference with fishing activity	Commercial fishing fleets identified in **Section 10.5**	Movement of vessels associated with the Bellrock WFDA adding to the existing volume of marine traffic in the area, may lead to interference of fishing activity	✓	✓	✓	
Additional steaming to alternative fishing grounds for vessels that would otherwise cross through the Bellrock WFDA	Commercial fishing fleets identified in **Section 10.5**	This effect will be localised to Safety Zones associated with temporary maintenance works on installed structures and therefore limited deviations to steaming routes are expected	X	x	x	
Physical presence of infrastructure and potential	Commercial fishing fleets	Standard industry practice and protocol (e.g., seabed infrastructure will be	x	✓	x	

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
exposure of that infrastructure leading to gear snagging	identified in **Section 10.5**	buried and/or marked on nautical charts) will minimise the risk of gear snagging, but it remains likely to be an area of industry concern				

10.7 Proposed Approach to Impact Assessment

10.7.1 Guidance

866. In addition to the general approach and guidance outlined in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**, the assessment of potential impacts on commercial fisheries receptors will also comply with the guidance documents presented in **Table 10.1**.

10.7.2 Data Sources

867. Detailed analysis of baseline datasets will be undertaken within the Bellrock WFDA EIA Report to characterise long-term (i.e., over several years) patterns in commercial fisheries activity across the commercial fisheries study areas and predict potential impacts upon future commercial fishing activities. Data sources include those set out within **Table 10.3**.

868. Consultation with the commercial fishing industry will be undertaken in order to ground-truth available baseline data and gain further understanding of commercial fisheries activity by smaller vessels across the inshore portion of the commercial fisheries study areas. Consultation will be undertaken with a number of relevant stakeholders, including the following:

- Scottish Fishermen’s Federation;
- Scottish White Fish Producers Association;
- Scottish Pelagic Fishermen’s Association (SPFA);
- North and East Coast RIFG;
- Other local fishermen’s associations and existing commercial fisheries working groups;
- Individual fishermen as identified by the FLO/other means; and
- Any Norwegian and EU Member State representative organisations as identified during baseline data analysis.

869. Analysis of data and the results of consultation will provide an extended baseline characterisation of the commercial fisheries study areas, which will underpin and inform the impact assessment.

870. No site-specific surveys are proposed to inform the commercial fisheries Bellrock WFDA EIA Report chapter.

10.7.3 Assessment Methodology

871. The EIA will follow the general approach outlined in **Chapter 4: Approach to Scoping and Environmental Impact Assessment** of this Bellrock WFDA Scoping Report. Definitions specific to commercial fisheries in relation to assessing the sensitivity of the receptor and magnitude of an impact will be provided to frame the assessment.

872. Definitions specific to commercial fisheries in relation to assessing the sensitivity of the receptor and magnitude of an impact will be provided to frame the assessment.

873. Where relevant, the impact assessment will be informed by the outcomes of the fish and shellfish ecology and shipping and navigation assessments.

874. Impacts will be assessed for each relevant fleet/fishery scoped into the Bellrock WFDA EIA Report.

10.8 Scoping Questions to Consultees

875. The following questions are posed to consultees to help them frame and focus their response to the commercial fisheries scoping exercise, which will in turn inform the Scoping Opinion:

- Do you agree with the study areas defined for commercial fisheries?
- Do you agree with the data sources to be used to characterise the commercial fisheries baseline within the Bellrock WFDA EIA Report?
- Are there any additional data sources or guidance documents that should be considered?
- Do you agree that the embedded mitigation measures described provide a suitable means for managing and mitigating the potential effects of the Bellrock WFDA on commercial fisheries receptors?
- Do you agree with the scoping in and out of impact pathways in relation to commercial fisheries?
- Do you agree with the proposed assessment methodology for commercial fisheries?
- Do you have any other matters or information sources that you wish to present?

10.9 References

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11 Shipping and Navigation

11.1 Introduction

876. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on shipping and navigation. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

877. This chapter provides an overview of the existing environment and sets out the proposed methodology and approach to assessing effects on shipping and navigation receptors in the Bellrock WFDA Environmental Impact Assessment (EIA) Report. This chapter has been prepared by Anatec Limited.

878. This chapter should be read in conjunction with the following chapters of the Bellrock WFDA Scoping Report:

- **Chapter 10: Commercial Fisheries; and**
- **Chapter 19: Major Accidents and Disasters.**

879. This shipping and navigation chapter is likely to have key inter-relationships with the above receptors, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

11.2 Legislation, Policy and Guidance

880. **Table 11.2** sets out the legislation, policy and guidance which have been considered in the preparation of this chapter and will be considered within the Bellrock WFDA EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

Table 11.1: Summary of Relevant Legislation, Policy and Guidance for Shipping and Navigation

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Legislation	
United Nations Convention on the Law of the Sea (UNCLOS) (United Nations (UN), 1982)	Lays down a comprehensive regime of law and order in the world's oceans and seas establishing rules governing all uses of the oceans and their resources.
Convention on the International Regulations for Preventing Collisions at Sea (COLREGs)	Establish the navigation rules which must be followed by vessels at sea to prevent a collision incident.

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
(International Maritime Organization (IMO), 1972/77)	
International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974)	Specifies the minimum standards for the construction, equipment and operation of vessels, compatible with their safety.
Policy	
UK Marine Policy Statement (His Majesty's Government (HM Government), 2011)	Provides a framework for preparing Marine Plans and taking decisions affecting the marine environment.
Guidance	
Marine Guidance Note (MGN) 654 Offshore Renewable Energy Installations (OREI): Guidance on UK Navigational Practice, Safety and Emergency Response (Maritime and Coastguard Agency (MCA), 2021)	Highlights issues that shall be considered when assessing the effect on navigational safety from offshore renewable energy developments, proposed in UK internal waters, UK territorial sea, or the UK Exclusive Economic Zone (EEZ).
Revised Guidelines for Formal Safety Assessment (FSA) (IMO, 2018)	A structured and systematic methodology based upon risk analysis and Cost Benefit Analysis (CBA) (if applicable) to reduce impacts to As Low as Reasonably Practicable (ALARP).
International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Guidance G1162 on the Marking of Man-Made Offshore Structures (IALA, 2021 (a)) and IALA Recommendation O-139 on the Marking of Man-Made Offshore Structures (IALA, 2021 (b))	Describes lighting and marking requirements for offshore installations to increase safety for passing vessels.
The Royal Yachting Association's (RYA) Position on Offshore Renewable Energy Developments: Paper 1 (of 4) – Wind Energy (RYA, 2019)	Sets out the RYA position in relation to the development of offshore renewable wind energy.

11.3 Consultation

881. Consultation undertaken to date for the Bellrock WFDA relevant to shipping and navigation is provided in **Table 9.2** below.

882. The Bellrock WFDA Scoping Report (and subsequent Scoping Opinion) will serve as the start of consultation for the Bellrock WFDA EIA Report, with dedicated meetings anticipated with key shipping and navigation stakeholders throughout the assessment process, including a Hazard Workshop. An initial list of organisations considered relevant to shipping and navigation consultation is provided in **Section 11.7.**

Table 11.2: Consultation Relevant to Shipping and Navigation

Consultee	Date/Document	Comment	How Comment is Addressed
MCA and Northern Lighthouse Board (NLB)	6th December 2023	The use of an AIS only dataset (i.e. no dedicated vessel traffic survey) for the winter period has been accepted by the MCA. This decision has been made on the basis of the results of the summer survey, the distance offshore and the use of VMS data.	Advice regarding the winter survey is noted and discussed further in **Section 11.4.2**.

11.4 Existing Environment

883. This section establishes the baseline environment in terms of key navigational features, vessel traffic, and marine incidents, for the purpose of identifying potential impacts which should be 'scoped in' to the Bellrock WFDA EIA Report.

11.4.1 Study Area

884. The baseline information presented within this chapter has been compiled with reference to a study area defined as a 10 nautical mile (nm) buffer around the WFDA as presented in **Figure 11.1** in **Appendix 1**, hereafter referred to as the shipping and navigation study area. This is an industry standard buffer used for shipping and navigation assessments as it captures relevant routeing in the area that may be affected, whilst remaining site-specific to the wind turbine generators (WTGs) and associated substructures, station keeping systems (SKSs), and inter-array cables (IACs) associated with the Bellrock WFDA[39].

885. Where appropriate, features outside of the shipping and navigation study area such as navigational features, other future offshore developments, and international ports will be considered in the Navigational Risk Assessment (NRA).

11.4.2 Data and Information Sources

886. The data sources that have been used to inform the shipping and navigation chapter of the Bellrock WFDA Scoping Report are presented in **Table 11.3**.

[39] This will include the offshore substation(s) (OFSSs) and reactive compensation station as part of the cumulative assessment. OFSSs and reactive compensation station do not form part of the Bellrock WFDA, and corresponding consent applications, and will be included in the scope of the Bellrock OfTDA. The Applicant plans to model the OFSSs and reactive compensation station in the NRA for the Bellrock WFDA in ongoing consultation with the MCA.

Table 11.3: Summary of Key Data and Information Sources for Shipping and Navigation

Dataset	Year(s)	Description
Automatic Identification System (AIS) data for the period 1st February – 14th February 2023	2023	Characterising vessel traffic movements within and in proximity to the WFDA.
Vessel traffic survey data consisting of AIS, Radio detection and ranging (Radar), and visual observation data for the period 17th August – 31st August 2023	2023	
United Kingdom Hydrography Office (UKHO) Admiralty Charts 273, 278, 1407, and 1409	2023	Characterising other navigational features in proximity to the WFDA.
Admiralty Sailing Directions North Sea (West) Pilot NP54, 12th Edition	2021	
Marine Accident Investigation Branch (MAIB) incident data	2012-2021	Review of marine incidents within and in proximity to the WFDA.
Royal National Lifeboat Institution (RNLI) incident data	2013-2022	

887. It is noted that AIS carriage and broadcast is not compulsory for fishing vessels less than 15 m in length, or vessels of less than 300 gross tonnage (GT). Therefore, such traffic is likely to be underrepresented within the characterisation of the baseline. However, it is noted that smaller vessels are increasingly observed to utilise AIS voluntarily, given the associated safety benefits. On this basis and noting that AIS is accepted as being comprehensive for other larger vessel types, the available data are considered fit for the purposes of providing the baseline assessment presented in this Bellrock WFDA Scoping Report.

888. The results of combined vessel traffic datasets will be used to characterise vessel traffic movements in the NRA. A summer survey (14 days in August 2023) has been undertaken and includes the capture of AIS, Radar, and visual observations in compliance with the requirements of MGN 654. The summer survey is used to assist with informing the baseline in this Bellrock WFDA Scoping Report. On the basis of the distance offshore, low volume of small craft recorded within the dedicated summer survey, and the use of VMS data, it was agreed with the MCA (**Table 11.2**) that a dedicated winter survey is not required. Instead, a 14-day AIS dataset will be used.

889. Additionally, these datasets will also be supported by a 12-month AIS analysis.

11.4.3 Key Navigational Features

890. Navigational charts and Sailing Directions pertinent to the Bellrock WFDA were studied to define charted features or key navigational practices. The key navigational features charted in proximity to the Bellrock WFDA are presented in **Figure 11.2** in **Appendix 1**. The only features present within 10 nm of the Bellrock WFDA are a charted wreck approximately 7 nm north, and a Light Detection and Ranging (LiDAR) buoy used for gathering meteorological and oceanographic (MetOcean) data, which is within the Bellrock WFDA itself, and is associated with the Bellrock WFDA. This LiDAR buoy was deployed in April 2023 and will be positioned for a minimum of 12 months. The geophysical survey undertaken in the Bellrock WFDA detected three wrecks – see **Section 14.4.3**.

891. To the east of the Bellrock WFDA, at approximately 10.5 nm, is an oil and gas development area. Included in this oil and gas development area is a floating production storage and offloading (FPSO) vessel, *BW Catcher*, relating to the Catcher oil field. In addition, a FPSO relating to the Triton oil field is located approximately 22 nm to the north-east of the Bellrock WFDA with this field also incorporating templates, wells, and manifolds.

892. The closest ports to the Bellrock WFDA are Aberdeen and Peterhead, both on the east coast of Scotland and both approximately 64 nm to the west of the Bellrock WFDA.

893. Operational wind farms including Hywind Scotland and Kincardine are located 52 nm north-west and 54 nm west, respectively. Aberdeen wind farm is also located 62 nm to the west.

11.4.4 Vessel Traffic

894. A total of 28 days vessel traffic data was collected; 14 days of AIS data was collected from terrestrial and offshore receivers from 1st February to 14th February 2023, and 14 days of AIS, Radar, and visual observation data was collected via a dedicated vessel traffic survey from 17th August to 31st August 2023. It has been agreed with MCA, as per **Table 11.2**, that a dedicated winter vessel traffic survey is not required to align with MGN 654 requirements and an additional period of 14-day AIS data collected from terrestrial and offshore receivers for a period in winter 2023/24 will supplement the summer vessel traffic data within the Bellrock WFDA EIA Report (see **Section 11.4.2**).

895. The vessel traffic data collected within the shipping and navigation study area is colour-coded by vessel type and presented in **Figure 11.3** in **Appendix 1**. Vessels deemed as constituting temporary traffic (e.g., vessels involved in surveys or guard work) have been removed on the basis that these are neither representative of the baseline, nor likely to feature in a future case scenario.

896. An average of four unique vessels per day were recorded within the shipping and navigation study area during the 2023 winter survey period, with an average of one unique vessel per day intersecting the Bellrock WFDA. An average of eight to nine unique vessels per day were recorded within the shipping and navigation study area during the summer survey period, with an average of three to four unique vessels per day intersecting the Bellrock WFDA. The most frequently recorded vessel types within the shipping and navigation study area during the combined 28 days of vessel traffic were oil and gas vessels (49%), cargo vessels (19%), and tankers (14%). Of the vessels intersecting the Bellrock WFDA, the most commonly recorded were cargo vessels (31%), oil and gas vessels (24%), and fishing vessels (21%).

897. The majority of oil and gas vessels were recorded making an east-west transit between Aberdeen and offshore installations in the North Sea, largely passing north of the Bellrock WFDA. A small number of cases of east-west transits to/from Montrose, UK were also recorded.

898. The majority of cargo vessels were recorded making northwest-southeast transits through the eastern extent of the Bellrock WFDA on a distinctive route. These cargo vessels were frequently recorded transiting between Dutch and Icelandic ports. Cargo vessels were also noted on a north-south route at the western extent of the Bellrock WFDA between various locations including Iceland, UK, and the Netherlands.

899. The majority of tanker transits were recorded on north-south routes to/from Rotterdam (the Netherlands) and ports in the Faroe Islands as well as to offshore locations within the North Sea. No distinct routes were identified. Passenger vessels were only recorded during the summer survey period with the majority recorded undertaking northwest-southeast transits through the eastern extent of the Bellrock WFDA on a distinct route, similarly to cargo vessels.

900. No regular commercial ferries including Roll-on/Roll-off cargo (RoRo) or Roll-on/Roll-off passenger (RoPax) were recorded routeing within the shipping and navigation study area.

901. Fishing vessels were primarily in transit as opposed to being engaged in fishing activity with transits through the Bellrock WFDA on a northwest-southeast bearing. One instance of two pair trawling vessels likely engaged in active fishing was noted intersecting the Bellrock WFDA during the summer survey period.

902. Two unique recreational vessels were recorded within the shipping and navigation study area during the summer survey period, one intersecting the Bellrock WFDA. This low level of recreational activity is expected given the distance of the Bellrock WFDA offshore.

11.4.5 Marine Incidents

903. The marine incident data assessed indicates that incident rates within the shipping and navigation study area are generally low. The RNLI data was assessed and indicated no incidents occurred within the shipping and navigation study area over the ten-year period (2013-2022).

904. The MAIB data from 2012-2021 indicates that no incidents occurred within the shipping and navigation study area. Looking at the previous ten-year period (2002-2011), only two incidents were recorded within the shipping and navigation study area. Both incidents featured fishing vessels, one a hazardous incident and the other an accident to person, with the latter occurring within the Bellrock WFDA.

11.5 Potential Impacts

905. There are a number of potential direct and indirect impacts of the Bellrock WFDA on shipping and navigation during the construction, operation and maintenance, and decommissioning stages.

906. The presence of the Bellrock WFDA could increase the risk of vessel-to-vessel collision risk (including third party to third party vessel, and third party to project vessel). Vessels may be displaced due to the presence of the Bellrock WFDA or buoyed construction/decommissioning area and, as such, collision risk between third-party vessels may increase. Also, the increased levels of vessel traffic in the area associated with the construction, operation and maintenance, and decommissioning of the Bellrock WFDA may lead to increased collision risk between a third party and project vessels. The presence of the Bellrock WFDA and associated activities may also reduce access to local ports and harbours through increased traffic, deviated routes or impacts on auxiliary services.

907. During operation, the presence of surface structures could create new allision risk for powered vessels, drifting vessels and any vessels navigating internally within the WFDA. In addition, should a mooring system failure occur, a floating structure may lose station and become a floating hazard to passing vessels.

908. The presence of subsea infrastructure including SKS, subsea cable hub(s), dynamic IACs, or cable protection, if required, may increase under-keel interaction risk, and an increase in the risk of anchor interaction.

909. The Bellrock WFDA infrastructure (e.g., WTGs or IACs) may impact equipment onboard vessels, including potential effects of electromagnetic interference from cables.

910. The Bellrock WFDA infrastructure and associated activities may reduce emergency response capability due to an increased number of incidents and/or access constraints, including in relation to Search and Rescue (SAR).

911. It is anticipated that decommissioning impacts would be similar in nature to those of construction**.**

11.5.1 Embedded Mitigation Measures

912. As part of the Bellrock WFDA design process, a number of embedded mitigation measures will reduce the potential for impacts on shipping and navigation receptors described in **Section 11.5** As there is a commitment to implement these measures, they are considered inherent to the design of the Bellrock WFDA. The determination of the significance of risk for each impact will assume the implementation of such measures. Embedded mitigation measures considered for the Bellrock WFDA are as follows:

- An application will be made post-consent for Safety Zones including up to 500 m around each WTG and substructure during its construction;
- An application will be made post-consent for Safety Zones including up to 50 m around each installed WTG and substructure during its pre-commissioning;
- An application will be made post-consent for Safety Zones including up to 500 m around each WTG and substructure during major maintenance during operation;
- An application will be made prior to commencement of decommissioning for Safety Zones including up to 500 m around each WTG and substructure during its decommissioning;
- A detailed Cable Burial Risk Assessment (CBRA) will be prepared where IACs are proposed to be buried to determine the target burial depth. The burial depths may vary and will be dependent on risk and ground conditions. The CBRA will also highlight instances where adequate burial cannot be achieved, and alternative protection is needed. Any damage, destruction, or decay of cables will be notified to MCA, NLB, Kingfisher, and UKHO;
- All offshore infrastructure associated with the Bellrock WFDA will be appropriately marked on UKHO Admiralty charts;
- The Applicant will ensure compliance with MGN 654 and its annexes, where applicable, including the completion post-consent of an Emergency Response Cooperation Plan (ERCoP) and SAR Checklist in consultation with the MCA;
- The Applicant will ensure compliance with the Regulatory Expectations on Moorings for Floating Wind and Marine Devices (MCA and Health and Safety Executive (HSE), 2017);
- A Decommissioning Plan will be developed prior to decommissioning;
- A Development Specification and Layout Plan will be developed post-consent to finalise the array layout in consultation with the MCA and NLB;
- Ongoing liaison with fishing fleets will be maintained during construction, maintenance, and decommissioning operations via an appointed Fisheries Liaison Officer (FLO);
- Where appropriate, guard vessels will be used to ensure adherence with Safety Zones or advisory passing distances;
- Lights, marks, sounds, signals, and other aids to navigation will be exhibited as required by NLB, MCA, and Civil Aviation Authority (CAA) including the buoyed construction/ decommissioning areas;

- Marine coordination will be implemented to manage project vessels throughout construction, maintenance, and decommissioning periods;
- Development of and adherence to a Marine Pollution Contingency Plan (MPCP) outlining the approach for managing and reducing risk of pollution and procedures to protect personnel and to be followed in the event of a pollution incident;
- A Navigation Safety Plan (NSP) will be developed post-consent to describe measures put in place relating to navigational safety;
- There will be a minimum blade tip clearance of at least 22 m Above Mean Sea Level (AMSL);
- Bellrock WFDA vessels will ensure compliance with international marine regulations as adopted by the Flag State, including the COLREGs (IMO, 1972/77) and SOLAS (IMO, 1974);
- Advance warning and accurate location details of construction, maintenance, and decommissioning operations associated Safety Zones and advisory passing distances will be given via notifications to mariners and Kingfisher Bulletins;
- A Vessel Management Plan (VMP) will be developed post-consent to confirm the types and numbers of vessels that will be engaged in activities associated with the Bellrock WFDA and to consider vessel coordination including indicative transit route planning;
- Dropped objects during works associated with the Bellrock WFDA which may pose a hazard to navigation will be reported in line with Marine Directorate - Licensing Operations Team procedures; and
- Development of a NRA.

913. The requirement for any additional mitigation measures will be dependent on the significance of risk associated with assessed hazards. The requirement for, and feasibility of, any mitigation measures will be consulted upon with statutory consultees throughout the EIA process.

11.6 Scoping of Potential Impacts

914. A range of potential impacts on shipping and navigation have been identified, which may occur during the construction, operation and maintenance, and decommissioning phases of the Bellrock WFDA as described in **Section 11.5.**

915. The impacts that have been 'scoped in' to the assessment at this stage are outlined in **Table 11.4** (below). In line with MGN 654, no impacts are fully scoped out of the assessment at this stage, although some are not considered relevant for particular phases given the mitigation measures which are expected to be in place.

11.6.1 Potential Cumulative Effects

916. The CEA for shipping and navigation will follow the general methodology set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment.** The CEA will be considered in two stages; a CEA of the whole Bellrock Project (i.e., the Bellrock WFDA and the Bellrock OfTDA), followed by a CEA of the whole Bellrock Project alongside other plans or projects (including the Scottish and Southern Electricity Networks Transmission offshore substation).

917. All impacts identified on an in-isolation basis will be considered within the NRA for the potential for cumulative effects. Cumulative developments will be assessed based on the most recent publicly available information at the time with a screening exercise undertaken to determine which cumulative developments should be considered and to what degree (through use of a tiering system). Factors which will be considered in the screening exercise include:

- Distance from the Bellrock WFDA;
- Development status;
- Level of interaction with main commercial routes passing in proximity to the Bellrock WFDA;
- Consultation feedback; and
- Data confidence level.

918. This method will take international vessel operators and ports into consideration. To sufficiently capture effects, both base-case and future-case scenarios will be applied in terms of deviations for main commercial routes on a cumulative level.

919. **Figure 11.4** in **Appendix 1** presents an overview of offshore wind farms in the region which include other ScotWind developments as well as INTOG, Round 3/Scottish Territorial Waters developments, and demonstration sites. Developments are colour coded by current status (as of February 2024), noting that there is a mix of operational, under construction and future sites.

11.6.2 Potential Transboundary Effects

920. Given the international nature of shipping, the in-isolation impact assessment and the cumulative impact assessment will consider vessel routeing to and from international ports by international operators. Therefore, impacts listed in **Section 11.5** may be relevant at a transboundary level.

11.6.3 Summary of Potential Shipping and Navigation Impacts Scoped In and Out

921. A summary of potential impacts scoped in and out from further assessment in the Bellrock WFDA EIA Report is provided in **Table 11.4** below.

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Table 11.4: Summary of Potential Impacts Scoped In (✓) or Out (x) for Shipping and Navigation

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Increased vessel to vessel collision risk (third party to third party)	All vessels	Vessels may be displaced due to the presence of the Bellrock WFDA or buoyed construction/ decommissioning area and, as such, collision risk between third-party vessels may increase.	✓	✓	✓	Charting of infrastructure, decommissioning plan, fishing liaison, guard vessel(s), lighting and marking, promulgation of information.
Increased vessel to vessel collision risk (third party to project vessel)	All vessels	The increased levels of vessel traffic in the area associated with the construction, operation and maintenance, and decommissioning of the Bellrock WFDA may lead to increased collision risk between a third party and project vessel (including during towage operations).	✓	✓	✓	Application for Safety Zones, charting of infrastructure, decommissioning plan, fishing liaison, guard vessel(s), lighting and marking, marine coordination for project vessels, NSP, project vessel compliance with international regulations, promulgation of information, VMP.
Creation of vessel to structure allision risk	All vessels	The presence of surface structures will create new allision risk for powered vessels, drifting vessels and any vessels navigating internally within the Bellrock WFDA.	x	✓	x	Application for Safety Zones, charting of infrastructure, fishing liaison, lighting and marking, marine coordination for project vessels, minimum blade tip clearance, project vessel compliance with international regulations, promulgation of information.
Loss of station	All vessels	Should a SKS failure occur, a floating structure may lose station and become a floating hazard to passing vessels.	x	✓	x	Charting of infrastructure, compliance with MGN 654, compliance with FSS guidance, lighting and marking, promulgation of information.

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Reduction in under-keel clearance	All vessels	The presence of subsea infrastructure including SKSs, dynamic IACs, or cable protection may increase under-keel interaction risk.	x	✓	x	Cable burial risk assessment, charting of infrastructure, compliance with MGN 654, fishing liaison, promulgation of information.
Anchor interaction with SKS or IACs	All vessels	The presence of mooring lines and subsea cables may lead to an increase in the risk of anchor interaction.	x	✓	x	Cable burial risk assessment, charting of infrastructure, compliance with MGN 654, promulgation of information.
Interference with navigation, communications, and position-fixing equipment	All vessels	The Bellrock WFDA infrastructure (e.g., WTGs, IACs) may impact equipment onboard vessels, including potential effects of electromagnetic interference from cables.	x	✓	x	Compliance with MGN 654.
Reduction of emergency response capability including SAR	All vessels and emergency responders	The Bellrock WFDA infrastructure and associated activities may reduce emergency response capability due to an increased number of incidents and/or access constraints, including in relation to SAR.	x	✓	x	Compliance with MGN 654; Development Specification and Layout Plan (DSLP), guard vessel(s), lighting and marking, marine coordination; project vessel compliance with international marine regulations.

11.7 Proposed Approach to Impact Assessment

922. As required under the MCA methodology (Annex 1 to MGN 654) (MCA, 2021) and in line with international marine risk assessment standards, the IMO FSA (IMO, 2018) approach will be applied to the assessment of effects.

923. The FSA methodology is centred on risk control. The method assesses each hazard (impact) in terms of its frequency of occurrence and the severity of its consequence, to determine its significance as either 'broadly acceptable', 'tolerable' or 'unacceptable.' The FSA methodology risk matrix is shown in **Table 11.5**. Any impact assessed as 'unacceptable' will require additional mitigation measures implemented beyond those considered designed-in to reduce the impact to within 'tolerable with mitigation' or 'broadly acceptable' parameters.

Table 11.5: IMO FSA Risks

Frequency of Occurrence	Frequent	Tolerable with Mitigation	Tolerable with Mitigation	Unacceptable	Unacceptable	Unacceptable
	Reasonably Probably	Broadly Acceptable	Tolerable with Mitigation	Tolerable with Mitigation	Unacceptable	Unacceptable
	Remote	Broadly Acceptable	Broadly Acceptable	Tolerable with Mitigation	Tolerable with Mitigation	Unacceptable
	Extremely Unlikely	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable with Mitigation	Tolerable with Mitigation
	Negligible	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable with Mitigation
		Negligible	Minor	Moderate	Serious	Major
		Severity of Consequence				

924. The frequency and consequence rankings per hazard will be determined using a number of inputs, notably:

- Quantitative modelling undertaken in the NRA (Anatec's COLLRISK software);
- Outputs of the characterisation of the baseline including vessel traffic surveys;
- Consideration of proposed mitigation measures;
- Lessons learned from other offshore wind farm developments;
- Level of stakeholder concern determined though the hazard log;
- Consultation output; and
- Expert opinion.

925. The following statutory and non-statutory organisations deemed relevant to shipping and navigation will be included in consultation, noting that additional organisations may be included if identified during the NRA process:

- MCA;
- NLB;
- UK Chamber of Shipping;
- RYA Scotland;
- Cruising Association;
- Scottish Fishermen's Federation (SFF);
- Local ports and harbours;
- Local marinas and yacht clubs; and
- Regular commercial operators (identified from the vessel traffic survey data).

11.8 Scoping Questions to Consultees

926. The following questions are posed to consultees to help them frame and focus their response to the shipping and navigation scoping exercise, which will in turn inform the Scoping Opinion:

- Is the legislation, policy and guidance proposed for consideration as part of the Bellrock WFDA EIA Report (including the NRA) suitable and sufficient?
- Is the shipping and navigation study area defined, data sources considered, and proposed data sources to inform the NRA suitable and sufficient?
- Is the methodology outlined for undertaking the risk assessment suitable, including on a cumulative level?
- Have all potential hazards (impacts) due to the presence of the Bellrock WFDA been identified for shipping and navigation users?
- Are the mitigation measures described suitable and sufficient for managing and mitigating risk associated with the potential hazards?
- Do you have any other matters or information sources that you wish to present?

11.9 References

HM Government (2011). UK Marine Policy Statement. London: The Stationary Office.

IALA (2021a). 'Recommendation O-139 on the Marking of Man-Made Offshore Structures'. Saine Germaine en Laye, France: IALA.

IALA (2021b). ‘Guidance G1162 on the Marking of Man-Made Offshore Structures’. Saint Germaine en Laye, France: IALA.

IMO (1972/77). Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) – Annex 3. London: IMO.

IMO (1974). International Convention for the Safety of Life at Sea. London: IMO.

IMO (2018). ‘Revised Guidelines for Formal Safety Assessment’. London: IMO.

MCA (2021). ‘MGN 654 (Merchant and Fishing) Offshore Renewable Energy Installations (OREI) – Guidance on UK Navigational Practice, Safety and Emergency Response’. Southampton: MCA.

MCA and HSE (2017) Regulatory Expectations on Moorings For Floating Wind And Marine Devices. Southampton: MCA

RYA (2019). ‘The RYA’s Position on Offshore Energy Developments: Paper 1 – Wind Energy’. Southampton: MCA.

Scottish Government (2015). Scotland’s National Marine Plan. Edinburgh: Scottish Government.

UKHO (2021). ‘Admiralty Sailing Directions North Sea (West) Pilot, 12th Edition NP54’. Taunton: UKHO.

UN (1982). United Nations Convention on the Law of the Sea.

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12 Aviation and Radar

12.1 Introduction

927. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on aviation and radar. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

928. This chapter provides an overview of the existing environment and sets out the proposed methodology and approach to assessing effects on aviation and radar receptors in the Bellrock WFDA Environmental Impact Assessment (EIA) Report. This chapter has been prepared by Cyrrus Ltd.

929. Wind turbine generators (WTGs) have the potential to cause a variety of adverse effects on aviation and radar receptors. WTGs can impact radars used by civilian and military air traffic controllers because the characteristics of moving turbine blades are similar to the characteristics of aircraft. This leads to spurious returns, or clutter on radar displays. This can affect the safe provision of air traffic services or interfere with tracking of aircraft by the military. WTGs can also have the potential to present a physical obstruction for aviation activities such as military low flying or helicopter Search and Rescue (SAR) operations.

930. Aviation stakeholders potentially affected include the UK Civil Aviation Authority (CAA), the Ministry of Defence (MoD), National Air Traffic Services (NATS), Aberdeen International Airport, and offshore helicopter operators such as Bristow Group, who currently deliver the UK SAR contract on behalf of His Majesty's Coastguard (HMC).

931. This chapter should be read in conjunction with the following chapters of the Bellrock WFDA Scoping Report:

- **Chapter 13: Marine Infrastructure and Other Users;** and
- **Chapter 19: Major Accidents and Disasters.**

932. This aviation and radar chapter is likely to have key inter-relationships with the above receptors, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

12.2 Legislation, Policy and Guidance

933. **Table 12.1** below sets out the legislation, policy and guidance which have been considered in the preparation of this chapter, and will be considered within the Bellrock EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

Table 12.1: Summary of Relevant Legislation, Policy and Guidance for Aviation and Radar

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
International Civil Aviation Organisation (ICAO) (2022). The convention of International Civil Aviation: Aerodrome Design and Operations, Annex 14.	Includes recommendations for the marking and lighting of WTGs.
Maritime and Coastguard Agency (MCA) (2021). Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety, and Emergency Response. Marine Guidance Note (MGN) 654.	Highlights issues to consider when assessing navigational safety and emergency response, caused by OREI.
CAA (2023a) Aeronautical Information Publication (AIP). Civil Aviation Publication (CAP) 032.	Contains information on facilities, services, rules, regulations and restrictions in UK airspace.
CAA (2022). Air Navigation Order (ANO) 2016.	Aerodromes and Lighting, articles 222 and 223 contain information on the lighting of en route obstacles and offshore wind turbines in UK territorial waters.
CAA (2020). Safeguarding of Aerodromes. CAP 738.	Document offers guidance to those responsible for the safe operation of an aerodrome or a technical site, to help them assess what impact a proposed development or construction might have on that operation.
CAA (2019) Air Traffic Services Safety Requirements. CAP 670.	Highlights the requirements to be met by providers of civil Air Traffic Services (ATS) and other services in the UK in order to ensure that those services are safe for use by aircraft.
CAA (2022). Licensing of Aerodromes. CAP 168.	Sets out the standards required at UK licensed aerodromes relating to management systems, operational procedures, physical characteristics assessment and treatment of obstacles.
CAA (2023b). Standards for offshore helicopter landing areas. CAP 437.	Provides the criteria applied by the CAA in assessing offshore helicopter landing areas for worldwide use by helicopters registered in the UK and includes winching area 'best practice' design criteria for WTGs.
CAA (2021b). UK Flight Information Services. CAP 774.	Details the suite of ATS which (excluding aerodrome services) are the only services provided in class G airspace within the UK Flight Information Region (FIR) and where notified, elements of which are also provided to Visual Flight Rules (VFR) flights operating in class E airspace.

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
CAA (2016). CAA Policy and Guidelines on Wind Turbines. CAP 764.	Details CAA policy and guidelines associated with WTG impacts on aviation that aviation stakeholders and wind energy developers need to consider when assessing a development's viability.
CAA (2021a) Airspace Change. CAP 1616.	Explains the CAAs regulatory process for changes to airspace.

12.3 Consultation

934. As part of the Bellrock WFDA Scoping Workshop (30th October 2023), an information package was provided to Marine Directorate – Licensing Operations Team (MD-LOT) including on the proposed approach to aviation and radar. No other consultation relevant to aviation and radar has taken place to date although consultation will be undertaken as part of the EIA, following the Scoping Opinion. This will be with relevant stakeholders including the UK CAA, the MoD, Maritime and Coastguard Agency (MCA), NATS, Aberdeen International Airport, and offshore helicopter operators such as Bristow Group.

12.4 Existing Environment

12.4.1 Study Area

12.4.1.1 Overview

935. In considering the spatial extent of the aviation and radar study area, the overriding factor is the potential for WTGs within the Bellrock WFDA to have an impact on civil and military radars, when taking into account the required radar operational ranges. In general, Primary Surveillance Radars (PSRs) installed on civil and military airfields have an operational range of between 40 and 60 nautical miles (nm). There are no radar-equipped airfields within 60 nm of the Bellrock WFDA. En route radars operated by NATS and military air defence (AD) radars are required to provide coverage at ranges in excess of 60 nm. All such radars with potential Radar Line of Sight (RLoS) of WTGs in the WFDA are included in the aviation and radar study area.

936. The aviation and radar study area is defined by the Bellrock WFDA footprint, plus an appropriate buffer. This ensures that all airspace within the vicinity of the Bellrock WFDA is considered within this Bellrock WFDA Scoping Report. This includes the airspace between the Bellrock WFDA and UK mainland, extending from Royal Air Force (RAF) Lossiemouth to the north-west to the Brizlee Wood AD radar located to the south-west of the Bellrock WFDA. Airports and radars within the aviation and radar study area that are under consideration as part of this Bellrock WFDA Scoping Report are shown in **Figure 12.1** in **Appendix 1**.

937. The following criteria have been used to identify receptors within the aviation and radar study area (and are discussed further below):

- Civil aerodromes;
- MoD;
- NATS facilities;
- Meteorological radio facilities; and
- Other aviation activities.

12.4.1.2 Civil Aerodromes

938. CAP 764 Policy and Guidelines on Wind Turbines (CAA, 2016) states the distances from various aerodromes where consultation is necessary. These distances include:

- Aerodromes with a surveillance radar, within 30 km;
- Non-radar equipped licensed aerodromes with a runway of more than 1,100 m, within 17 km;
- Licensed aerodromes where the WTGs will lie within the airspace coincidental with a published Instrument Flight Procedures (IFPs);
- Unlicensed aerodromes with runways of more than 800 m, within 4 km;
- Unlicensed aerodromes with runways of less than 800 m, within 3 km;
- Gliding sites, within 10 km; and
- Other aviation activities such as parachute sites and microlite sites, within 3 km.

939. CAP 764 states that these distances are for guidance purposes only and do not represent ranges beyond which all WTG developments will be approved or within which they will be objected to. For example, aerodromes may utilise their radars at ranges in excess of 30 km. These ranges are intended as a prompt for discussion between aviation stakeholders and developers.

940. As well as examining the technical impact of WTGs on Air Traffic Control (ATC) facilities, it is necessary to consider the physical safeguarding of ATC operations using the criteria laid down in CAP 168 Licensing of Aerodromes (CAA, 2022) to determine whether the WTGs in the Bellrock WFDA will breach obstacle clearance criteria.

12.4.1.3 Ministry of Defence

941. It is necessary to consider the aviation, AD and other activities of the MoD. This includes:

- MoD airfields, both radar and non-radar equipped;
- MoD AD radars; and
- MoD Practice and Exercise Areas (PEXAs) for both aviation and non-aviation activities.

12.4.1.4 National Air Traffic (En Route) plc Facilities

942. It is necessary to consider the possible effects of WTGs upon the NATS radar systems; a network of primary and secondary radar facilities around the country.

12.4.1.5 Meteorological Radio Facilities

943. WTGs have the potential to adversely impact meteorological facilities such as weather radars. The Met Office must be consulted by developers for WTG proposals within a 20 km radius zone of any of their UK weather radar sites.

12.4.1.6 Other Aviation Activities

944. Other aviation activities of relevance could include:

- General military low flying operations;
- Military and civilian 'off-route' fixed-wing and helicopter operations including SAR missions and offshore helicopter operations in support of the oil and gas industry; and
- Other aviation activity.

12.4.2 Data and Information Sources

945. For the purposes of this Bellrock WFDA Scoping Report, a desk-based review of existing and known activities was undertaken using relevant spatial and scientific data sources.

946. The data sources that have been used to inform this aviation and radar chapter are presented in **Table 12.2**. The primary sources of aviation data are UK civil and military AIPs. The AIPs contain details on airspace and en route procedures as well as charts and other air navigation information. These identified data sources will be taken forward and used to inform the subsequent EIA.

Table 12.2: Summary of Key Data and Information Sources for Aviation and Radar

Dataset	Year(s)	Description
CAP 032 UK AIP, CAA	2023	Contains information on facilities, services, rules, regulations, and restrictions in UK airspace. Provides full coverage of the aviation and radar study area.
UK Military AIP, MoD	2023	The main resource for information on flight procedures at all military aerodromes. Provides full coverage of the aviation and radar study area.
Wind Farm self-assessment maps, NATS	2012	Maps provided by NATS to ascertain potential impacts of WTGs on their enroute electronic infrastructure. Provides full coverage of the aviation and radar study area.
Offshore infrastructure data, North Sea Transition Authority (NSTA)	2023	Regularly updated NSTA offshore oil and gas platform shapefiles. Provides full coverage of the aviation and radar study area.

Dataset	Year(s)	Description
Helideck Certificates, Helideck Certification Authority (HCA).	2023	Regularly updated offshore helideck certifications. Provides full coverage of the aviation and radar study area.
European Meteorological Network (EUMETNET), Operational Programme for the Exchange of Weather Radar Information (OPERA) Database 2023	2023	Contains information for weather station radars throughout the UK. Provides full coverage of the aviation and radar study area.

12.4.3 Civil Aviation

947. The airspace above the Bellrock WFDA is used by both civil and military aircraft and lies within the Scottish FIR for ATC. This airspace is regulated by the UK CAA. The Scottish FIR is adjacent to the Polaris FIR, regulated by CAA Norway. The boundary of the Polaris FIR is approximately 224 km north-east of the Bellrock WFDA at its closest point.

948. Airspace is classified as either controlled or uncontrolled and is divided into a number of classes depending on what kind of ATS is provided and under what conditions. In the UK there are five classes of airspace: specifically; A, C, D, E and G. The first four are controlled airspace while class G is uncontrolled. Within controlled airspace, aircraft are monitored and instructed by ATC. Aircraft within uncontrolled airspace, are not subject to ATC instruction but rather operate according to a simple set of regulations. ATC may still provide information, if requested, to ensure flight safety.

949. Aircraft operate under one of two flight rules: Visual Flight Rules (VFR) or Instrument Flight Rules (IFR). VFR is conducted with visual reference to the natural horizon whereas IFR flight requires reference solely to aircraft instrumentation.

950. From sea level to Flight Level (FL) 195 (approximately 19,500 ft Above Mean Sea Level (AMSL)), the airspace above the Bellrock WFDA is Class G uncontrolled airspace. The airspace within this area is predominately used by low level flight operations and generally by aircraft flying under VFR. Under VFR the pilot is responsible for maintaining a safe distance from terrain, obstacles and other aircraft.

951. As any potential towage routes for floating offshore units (FOUs) between their assembly port or wet storage location have not yet been defined, the nearest civil airspace between the Bellrock WFDA and Scottish coast that towage operations may impact is Aberdeen Control Zone (CTR), located 109 km to the west of the Bellrock WFDA at its closest extent. This airspace is class D controlled airspace, from surface level to FL115 (approximately 11,500ft AMSL).

952. There are two Transponder Mandatory Zones (TMZs) within the vicinity of the Bellrock WFDA. Located approximately 82 km and 125 km to the west-south-west of the Bellrock WFDA, are the Seagreen (Phase one) TMZ and Neart Na Gaoithe (NNG) TMZ respectively as shown in **Figure 12.2** in **Appendix 1**. Within a TMZ the carriage and operation of aircraft transponder equipment is mandatory. This enables such aircraft to be detected and tracked by Secondary Surveillance Radar (SSR) systems. The Seagreen (Phase one) TMZ surrounds the Seagreen Offshore Wind Farm (OWF) and NNG TMZ surrounds both NNG and Inch Cape OWFs. These TMZs are used to

mitigate the impact the associated WTGs have on PSR. Both of these TMZs are active from sea level to FL100 (approximately 10,000 ft AMSL). Subject to the predicted impacts of the Bellrock WFDA, establishment of a TMZ over the Bellrock WFDA is a potential mitigation measure to be considered during the design process.

953. Above the Bellrock WFDA from FL195 to FL245 (approximately 19,500 to 24,500 ft AMSL respectively), is the Temporary Reserved Area (TRA) 007B which is class C airspace. This airspace is available for both military and civil aircraft, though its main use is to accommodate VFR military flying activity. Above TRA 007B the upper limit of class C airspace is FL660 (approximately 66,000 ft AMSL). Laterally the closest controlled airspace is the Moray Control Area (CTA) which is divided into CTAs 1 to 17. Of these elements, the closest to the Bellrock WFDA is Moray CTA 2, approximately 87 km to the north-west. Moray CTA 2 is class E airspace with a lower limit of FL105 (approximately 10,500 ft AMSL), and an upper limit of FL195 (approximately 19,500 ft AMSL). Above CTA 2 is Moray CTA 15, class C airspace with an upper limit of FL245 (approximately 24,500 ft AMSL). All airspace within the vicinity of the Bellrock WFDA is presented in **Figure 12.2** in **Appendix 1**.

954. The nearest UK civil airport to the Bellrock WFDA is Aberdeen International Airport, situated 127.8 km to the west-north-west of the Bellrock WFDA as shown in **Figure 12.1** in **Appendix 1**. Aberdeen International Airport is Scotland’s third busiest airport, the 16th busiest in the UK, and is the main heliport for the offshore North Sea oil and gas industry.

955. Airports with associated IFPs have associated Minimum Sector Altitudes (MSAs). These areas define the minimum safe altitude an aircraft can descend within a sector defined by a 25 nm (approximately 46 km) radius, with the addition of a 5 nm (approximately 9.3 km) buffer zone. MSAs provide obstacle clearance protection for at least 1,000 ft to aircraft within that area. This provides pilots flying under IFR the reassurance of properly designated obstacle and terrain clearance protection whilst making an approach and landing at an airport in poor visibility. The closest MSA boundary for Aberdeen International Airport to the Bellrock WFDA is located approximately 64 km to the west. WTGs within the Bellrock WFDA will therefore have no impact on IPFs at Aberdeen International Airport.

956. Aberdeen International Airport IPFs may be impacted by the towing of FOUs if any part of the towage route is located within approximately 40 nm (70.08 km) of the airport. Other civil airports may be impacted if the towing route is coincidental with published IFPs. The towing of FOUs will consider the consultation ranges as highlighted in **Section 12.4.1.2**.

957. NATS provides en route civil air traffic services within the Scottish FIR and operates on a network of radar facilities providing information for ATC on both civil and military aircraft. The nearest NATS facilities to the Bellrock WFDA are Perwinnes and Allanshill, situated 124 km to the west-north-west and 146 km to the north-west of the Bellrock WFDA respectively.

958. Preliminary RLoS analysis indicates that WTGs with a maximum tip height of 400 m AMSL within the north-west corner of the Bellrock WFDA will be visible to Perwinnes PSR, but not visible to Allanshill PSR as displayed in **Figure 12.3** in **Appendix 1**. NATS facilities are combined with SSR systems. WTGs have less impact on SSRs than PSRs provided they are more than 10 km away from the SSR. Perwinnes is located 124 km to the west of the Bellrock WFDA, therefore WTGs within the Bellrock WFDA are unlikely to impact the SSR system at Perwinnes.

959. The towing of the FOUs will pose a negligible effect on civil PSR systems. This is providing that no more than two none-rotating turbines are towed together at once and do not exceed a velocity of 10 knots which is well below the PSR velocity gates designed to remove low speed clutter.

960. In summary, there is potential for WTGs within a small area (in the north-east corner) of the Bellrock WFDA to impact the NATS Perwinnes PSR. The towing of FOUs may impact IFPs of Aberdeen International Airport and other airports, and consideration will be given to the consultation ranges highlighted in **Section 12.4.1.2**

12.4.4 Military Aviation

961. The Bellrock WFDA is situated within the Central Managed Danger Area (MDA), one of four MDA complexes within UK airspace that, when activated, provide segregated airspace for military flying training. The Bellrock WFDA is positioned across the border of EG D613B and EG D613C that both have lower and upper airspace limits of FL100 and FL660 respectively (approximately 10,000 to 66,000 ft AMSL). Ordinance, munitions and explosives and high energy manoeuvre activities take place within these danger areas.

962. The Bellrock WFDA is within the vicinity of air to air refuelling areas (AARAs) 03, 04, and 05. Area 03 is located 76.5 km to the east-north-east of the Bellrock WFDA and has vertical limits of FL100 to FL290 (approximately 10,000 to 29,000 ft AMSL respectively). AARA Area 04 is situated 100.5 km to the north-west-north of the Bellrock WFDA and Area 05 is located 80.8 km to the south and both occupy a vertical limit of FL70 to FL240 (approximately 7,000 to 24,000 ft AMSL respectively). All three mentioned AARAs are permanently available to military air traffic.

963. Dependant on the towing route of the FOUs, the MoD will need to be consulted on the time and location of the towing operations if the route is to penetrate low lying military PEXAs. The nearest low lying PEXA to the Bellrock WFDA is Moray Firth (South), EG D809S, located 150 km to the northwest. This airspace is active from sea level to 55,000 ft AMSL, activities within this airspace include ordnance, munitions and explosives/unmanned aircraft system and high energy manoeuvres.

964. The PEXAs EG D613B, EG D613C, EG D809S, and AARAs 03, 04, and 05 are depicted in **Figure 12.4** in **Appendix 1.** There are no known further PEXAs within the aviation and radar study area, including PEXAs associated with non-aviation activities.

965. The nearest PSR equipped military airfields are RAF Leuchars, located 171.8 km to the west-south-west of the Bellrock WFDA and RAF Lossiemouth, located 211.1 km to the north-west. Preliminary RLoS analysis indicates WTGs with a maximum tip height of 400 m AMSL within the Bellrock WFDA will not be visible to Leuchars and Lossiemouth PSRs as shown in **Figure 12.5** in **Appendix 1**.

966. The towing of the FOUs will pose a negligible effect on military ATC PSR systems. This is providing that no more than two none-rotating turbines are towed together at once and do not exceed a velocity of 10 knots which is well below the PSR velocity gates designed to remove low speed clutter.

967. IFPs may be impacted by the towing of integrated FOUs if the route is coincidental with any published IFPs.

968. The closest MoD AD radar is based at Remote Radar Head Buchan, 117.4 km to the north-west of the Bellrock WFDA. Another AD radar within the aviation and radar study area is Brizlee Wood, located 181.5 km to the south-west-south of the Bellrock WFDA. Preliminary RLoS analysis indicates that WTGs with a maximum tip height of 400 m AMSL will be visible across the north-west corner of the Bellrock WFDA to Buchan AD, but not visible to Brizlee Wood. The RLoS for both Buchan and Brizlee Wood is shown in **Figure 12.6** in **Appendix 1**.

969. In summary, WTGs within the north-west Bellrock WFDA may impact the Buchan AD radar.

12.4.5 Meteorological Radio Facilities

970. The closest Met Office weather radar to the Bellrock WFDA is the Hill of Dudwick, approximately 128 km to the west-north-west of the Bellrock WFDA. Preliminary RLoS analysis indicates that WTGs with a maximum tip height of 400 m AMSL will be visible across the western section of the Bellrock WFDA to the Hill of Dudwick weather radar. However, the Bellrock WFDA is located beyond the 20 km safeguarded zone established around weather radars. The RLoS for the Hill of Dudwick is presented in **Figure 12.7** in **Appendix 1**.

12.4.6 Helicopter Main Routing Indicators

971. Helicopter Main Routing Indicators (HMRIs) are a network of offshore routes used by civilian helicopters to navigate over the North Sea in support of oil and gas facilities. Whilst these routes have no lateral dimensions, there must be no obstacles within a 2 nm buffer of the route centreline. The Bellrock WFDA is overlapped by the centrelines of HMRIs 113 and 116. Furthermore, the northern extent of the Bellrock WFDA infringes the 2 nm buffer zone of HMRI 110. These HMRI routes may be used to access oil and gas platforms such as BW Catcher, AUK Alpha and Clyde. If any obstacle is planned within 2 nm of the centreline then consultation is required between the developer, helicopter operators and the Air Navigation Service Provider (ANSP). Helicopters flying these routes may be required to fly extended routes around the Bellrock WFDA. All HMRIs within the vicinity of the Bellrock WFDA are depicted in **Figure 12.8** in **Appendix 1**.

12.4.7 Helidecks

972. There are many offshore helidecks within the vicinity of the Bellrock WFDA. To achieve a safe operating environment under low visibility, a consultation zone with a 9 nm radius is present around each offshore helideck. This means obstacles such as WTGs within this radius must be consulted on with the helideck operators to maintain safe offshore helicopter operations. The nearest active oil and gas helideck located 13.2 nm (24.5 km) to the east of the Bellrock WFDA, is BW Catcher operated by BW Offshore. The Bellrock WFDA is therefore located outside of the consultation zone for the nearest offshore helideck, BW Catcher. Despite this, consultation may be required with the relevant oil and gas operators due to the overlapping of HMRI centrelines highlighted in **Section 12.4.6**. Impact on HMRIs may indirectly impact offshore oil and gas platforms. Offshore oil and gas helidecks are presented in **Figure 12.9** in **Appendix 1**.

12.4.8 Search and Rescue

973. Bristow Group currently operate Search and Rescue operations in the vicinity of the Bellrock WFDA. For SAR operations to be carried out safely and efficiently, they require developers to fulfil WTGs spacing, marking and lighting requirements set out by the MCA and Northern Lighthouse Board (NLB). The nearest SAR helicopter facility to the Bellrock WFDA is Inverness Airport, located 245 km to the west-north-west of the Bellrock WFDA as shown in **Figure 12.1** in **Appendix 1**.

12.5 Potential Impacts

974. A range of potential impacts on aviation and radar have been identified which may occur during the construction, operation and maintenance and decommissioning phases of the Bellrock WFDA.

975. WTGs have the potential to affect aviation and radar (fixed-wing and helicopters), either through their physical dimensions limiting access and affecting safe passage, or through their effects on PSR systems which can impact the safe provision of an ATS.

976. The towing of FOUs from port(s)/wet storage may impact on civil and military airfields with associated IFPs, consultation may be required with other airfields if the route infringes the ranges highlighted in **Section 12.4.1.2**.

977. PSR impacts are caused by the characteristics of rotating WTG blades being similar to aircraft leading to spurious clutter on ATC radar displays.

978. The creation of a new obstacle environment increases the risk of collision for military low flying aircraft, helicopters in support of the oil and gas industry and SAR operations.

979. Helicopter activities (if any) in support of the Bellrock WFDA may raise the overall level of traffic in the area and increase the likelihood of aircraft-to-aircraft collision.

12.5.1 Embedded Mitigation Measures

980. Mitigation measures will be considered throughout the design process of the Bellrock WFDA. These measures will be included with the design of the Bellrock WFDA with the objective to reduce the potential for impact upon the environment. The measures will evolve throughout the development process as the EIA progresses and in response to consultation. The Applicant is committed to the implementation of appropriate embedded mitigation measures as well as standard sectoral practices and procedures.

981. Included below are those specific embedded mitigation measures considered relevant to aviation and radar receptors. Additional mitigation measures will be considered as necessary as part of the EIA process:

- Development and adherence to a Lighting and Marking Plan (LMP). The LMP will confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting;

- Development and adherence to an Emergency Response and Cooperation Plan (ERCoP). The ERCoP will be prepared in line with MCA guidance and confirms what measures the Bellrock WFDA has in place to support any emergency response;
- The Applicant will ensure compliance with Marine Guidance Note 654 and its annexes, where applicable, including completion post consent of Search and Rescue (SAR) Checklist in consultation with the MCA;
- Appropriate marking of the Bellrock WFDA on aeronautical charts. This will include provision of the positions and heights of structures to CAA, MOD, and Defence Geographics Centre;
- Notification of the towing of FOUs will made to the CAA in accordance with article 225a of the UK ANO 2016;
- No more than two none-rotating turbines will be towed together at once and will not exceed a velocity of 10 knots;
- Aviation lighting and marking, as described in the LMP, will be installed in accordance with Article 223 of the UK ANO 2016 which sets out the mandatory requirements to be followed for lighting of offshore WTGs;
- The layout of the WTGs in the Bellrock WFDA, will be finalised in discussion with the MCA and NLB in order to ensure the specific WTG layout is compatible with potential SAR activity; and
- Failures of the lighting and marking in the Bellrock WFDA will be appropriately reported and rectified as soon as practicable. Interim hazard warnings will be put in place as required.

12.6 Scoping of Potential Impacts

12.6.1 Potential Impacts Scoped in

982. The creation of an obstacle environment is an impact that is scoped in for the construction, operation and maintenance, and decommissioning phases of the Bellrock WFDA. The construction and decommissioning of the Bellrock WFDA may involve tall crane vessels creating a physical obstruction. The presence of WTGs could also pose a physical obstruction to low flying aircraft (including SAR operations and helicopters involved in offshore oil and gas activities), increasing the risk of collision or requiring aircraft to fly extended routes to avoid obstructions. Furthermore, the towing of FOUs from port(s)/wet storage may impact on civil and military airfields and their associated IFPs.

983. Increased air traffic in the area related to activities within the Bellrock WFDA is an impact scoped in for the construction, operation and maintenance and decommissioning phases of the Bellrock WFDA. Helicopters involved in all stages of the Bellrock WFDA may impact on existing traffic in the area, increasing the risk of aircraft-to-aircraft collision. Air traffic potentially impacted includes helicopters engaged in offshore oil and gas activities, and SAR operations.

984. The effect on civil and military PSR systems is only scoped in at the operation and maintenance phase of the Bellrock WFDA. To discriminate wanted aircraft targets from unwanted clutter, PSRs

ignore static objects and only display moving targets. PSRs with visibility of rotating WTG blades can mistake them for aircraft and so present them on ATC radar displays as clutter. Controllers may not be able to distinguish aircraft from clutter. The only phases in which the WTGs should be fully operational, therefore generating clutter, is the operation and maintenance phase. While turbines may be commissioned during the construction phase, to avoid double counting of potential impacts, this is considered in the operation and maintenance phase, with a clear acknowledgement that this impact begins in construction and spans until end of life.

12.6.2 Potential Impacts Scoped Out

985. The impact on SSR systems is scoped out at for stages of Bellrock WFDA due to the significant distance of the Bellrock WFDA to the nearest active SSR facility. NATS have released guidance for wind farm developers which indicates that NATS do not consider the impacts on SSR to be material or relevant for WTGs that are beyond approximately 28 km from their SSR facilities (NATS, 2024). The nearest SSR facility is located at Perwinnes, 124 km to the west of the Bellrock WFDA.

986. The impact to Military ATC radars has been scoped out for all stages of the Bellrock WFDA because preliminary RLoS analysis indicates that with a maximum turbine tip height of 400 AMSL, WTGs will not be visible to the nearest military ATC radar at RAF Leuchars. The nearest extent of this viewshed to the Bellrock WFDA is approximately 63 km away.

987. The impact to MET Office radars has been scoped out for all stages of Bellrock WFDA. The nearest MET Office radar is the Hill of Dudwick, located 127.6 km to the north-west of the Bellrock WFDA, significantly beyond the 20 km safeguarded zone established around weather radars.

988. The towing of the FOUs is likely to pose a negligible effect on civil and military PSR systems, with the consideration of embedded mitigation. This mitigation provides that no more than two none-rotating turbines are towed together at once and do not exceed a velocity of 10 knots which is well below the PSR velocity gates designed to remove low speed clutter.

12.6.3 Potential Cumulative Effects

989. The Cumulative Effects Assessment (CEA) will be considered in two stages; a CEA of the of the whole Bellrock Project (i.e., the Bellrock WFDA and the Bellrock Offshore Transmission Development Area; OfTDA), followed by a CEA of the whole Bellrock Project alongside other plans or projects. The CEA for aviation and radar will follow the general methodology set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**.

990. The CEA will consider the impacts in combination with other existing and future offshore wind farms and associated aviation activities, including increased collision risk and cumulative impacts on radar. The wind farms and other activities relevant to the CEA will be identified through a screening exercise. Consultation with other offshore wind farm project developers in the area will be undertaken to understand what mitigations exist or are planned and how these may impact or harmonise with potential mitigations for the Bellrock WFDA. Furthermore, wet storage of FOUs for the Bellrock WFDA will also be considered within the CEA.

991. The aviation and radar CEA for the Bellrock WFDA will consider the maximum design scenario for each adjacent project and any associated activities in line with the methodology set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**.

12.6.4 Potential Transboundary Effects

992. The potential impacts of WTGs on aviation are localised and the Bellrock WFDA is completely within UK airspace, with the nearest Norwegian operated airspace, Polaris FIR located approximately 224 km to the north-east of the Bellrock WFDA. Furthermore, the Bellrock WFDA is significantly beyond the expected radar coverage of the nearest non-UK airport.

993. Due to the localised nature of any potential impacts, transboundary impacts are unlikely to occur and therefore it is proposed that this impact will be scoped out from further consideration within the EIA.

12.6.5 Summary of Potential Impacts

994. Taking account of the embedded mitigation measures detailed in **Section 12.5.1**, the impacts have been scoped into the EIA are outlined in **Table 12.3**.

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Table 12.3: Summary of Potential Impacts Scoped In (✓) or Out (x) for Aviation and Radar

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Creation of an aviation obstacle environment	Low flying aircraft SAR Operations (Bristow Group, HM Coastguard and MCA) Offshore Oil and Gas industry (HMRIs) Military and Civil Aerodromes. Low lying Military and Civil airspace.	Construction and decommissioning of the wind farm may involve tall crane vessels creating a physical obstruction. The presence of WTGs could pose a physical obstruction to low flying aircraft (including SAR operations and helicopters involved in offshore oil and gas facilities), increasing the risk of collision by requiring aircraft to fly extended routes to avoid obstructions. Furthermore, the towing of FOUs may impact on civil and military airfields and their associated IFPs throughout the route.	✓	✓	✓	**Section 12.5.1**
Increased air traffic in the area related to wind farm activities	SAR Operations (Bristow Group, HM Coastguard and MCA) Offshore Oil and Gas industry (HMRIs) Low flying aircraft	Helicopter traffic involved in all stages of the Bellrock WFDA could impact on existing traffic in the area, increasing the risk of offshore aircraft-to-aircraft collision. Air traffic potentially impacted by this includes helicopters engaged in offshore oil and gas activities.	✓	✓	✓	**Section 12.5.1**
Impact on civil PSRs.	NATS Perwinnes	To discriminate wanted aircraft targets from unwanted clutter, PSRs ignore static objects and only display moving targets. PSRs that can see rotating blades of WTGs can mistake them for aircraft and so present them on ATC radar displays as clutter. Controllers may not be able to distinguish aircraft from clutter. This is only applicable when WTGs begin rotation. Tall construction vessels and FOUs under tow that are in RLoS will not be moving fast enough to generate PSR clutter.	x	✓	x	See **Section 12.5.1**. Mitigation measures for operational WTGs to be determined through

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
		WTGs will be gradually commissioned during the construction phase of the Bellrock WFDA. Effects on civil PSR systems is scoped out of the construction period to avoid duplication of the impact in the assessment.				consultation with NATS.
Impact on military ATC PSRs	N/A	With a maximum tip height of 400m AMSL, preliminary RLoS analysis indicates that WTGs within the Bellrock WFDA will not be visible to the nearest radar equipped military airfield, RAF Leuchars.	x	x	x	N/A
Impact on military air defence PSRs	Buchan air defence	To discriminate wanted aircraft targets from unwanted clutter, PSRs ignore static objects and only display moving targets. PSRs that can see rotating blades of WTGs can mistake them for aircraft and so present them on radar displays as clutter. Controllers may not be able to distinguish aircraft from clutter. This is only applicable when WTGs begin rotation. Tall construction vessels or FOUs under tow that are in RLoS will not be moving fast enough to generate PSR clutter. WTGs will be gradually commissioned during the construction phase of the Bellrock WFDA. Effects on military PSR systems is scoped out of the construction period to avoid duplication of the impact in the assessment.	x	✓	x	See **Section 12.5.1** Mitigation measures for operational WTGs to be discussed with the MoD.
Impact on civil and military SSR systems	N/A	NATS do not consider the impacts on SSR to be material or relevant for WTGs that are beyond approximately 28 km from their SSR facilities. Furthermore, CAP 764 states that the effects on SSR "…are typically only a consideration when the turbines are located very close to the SSR i.e. less than 10 km". The nearest SSR facility is	x	x	x	N/A

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
		located at Perwinnes, 124.1 km to the west of the Bellrock WFDA.				
Impact on weather radars	N/A	The nearest MET Office radar is the Hill of Dudwick, located 127.6 km to the north-west of the Bellrock WFDA is significantly beyond the 20 km safeguarded zone established around weather radars and therefore unlikely to have a significant impact despite having visibility of WTGs within the west section of the Bellrock WFDA.	x	x	x	N/A

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12.7 Proposed Approach to Impact Assessment

995. A thorough, desk-based collation and review of the relevant data will be undertaken to inform the subsequent EIA. The EIA process will be informed by further desk-based studies, including RLoS modelling, which will identify and examine in greater detail sensitive aviation and radar receptors. RLoS is determined using radar propagation modelling software and 3D terrain data. Studies will be undertaken in parallel with consultation with relevant stakeholders to provide a detailed understanding of potential impacts. It is expected that the consultation stage will be an iterative process, allowing for any concerns to be addressed during the pre-application phase and in finalising the Bellrock WFDA EIA Report. The aviation and radar assessment will comply with the guidance laid out in documents listed in **Section 12.2**.

996. In respect of impacts to Buchan and Brizlee Wood AD PSRs, an Air Defence and Offshore Wind Windfarm Mitigation Task Force (the Task Force) has been established as a collaborative initiative between MoD, the Department for Energy Security and Net Zero, the Offshore Wind Industry Council, The Crown Estate and Crown Estate Scotland. The aim of the Task Force is to enable the co-existence of UK air defence and offshore wind to contribute towards meeting the UK Government's Net Zero target without degrading the nation's air defence surveillance capability.

12.8 Scoping Questions to Consultees

997. The following questions are posed to consultees to help them frame and focus their response to the aviation and radar scoping exercise, which will in turn inform the Scoping Opinion:

- Do you agree with the aviation and radar study area defined in **Section 12.4.1**?
- Do you agree with the list of data sources listed in **Table 12.2**?
- Do you agree the embedded mitigation measures are suitable?
- Do you agree that all receptors related to aviation and radar have been identified?
- Do you agree with the scoping in and out of the impact pathways in relation to aviation and radar?
- Do you agree with the assessment of transboundary effects in relation to aviation and radar?
- Do you agree with the assessment of cumulative effects in relation to aviation and radar?
- Do you have any other matters or information sources that you wish to present?

12.9 References

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13 Marine Infrastructure and Other Users

13.1 Introduction

998. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on marine infrastructure and other users. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

999. This chapter provides an overview of the existing environment and sets out the proposed methodology and approach to assessing effects on marine infrastructure and other users receptors in the Bellrock WFDA Environmental Impact Assessment (EIA) Report. This chapter has been prepared by Royal HaskoningDHV.

1000. This chapter should be read in conjunction with the following chapters of the Bellrock WFDA Scoping Report:

- **Chapter 11: Shipping and Navigation**;
- **Chapter 12: Aviation and Radar**; and
- **Chapter 19: Major Accidents and Disasters**.

1001. This marine infrastructure and other users chapter is likely to have key inter-relationships with the above receptors, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

13.2 Legislation, Policy and Guidance

1002. **Table 13.1** sets out the legislation, policy and guidance which have been considered in the preparation of this chapter and will be considered within the Bellrock WFDA EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

Table 13.1: Summary of Relevant Legislation, Policy and Guidance for Marine Infrastructure and Other Users

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Policy	
National Planning Framework 4 (NPF4) 2023	The NPF4 2023 policies of relevance to marine infrastructure and other users are: Part 2 – National Planning Policy: • Policy 11 (Energy) - Mentions the development of offshore wind farms and other technologies. Part 3 - Annex B, Policy 3 - Strategic Renewable Electricity Generation and Transmission Infrastructure. Part 3 – Annex B, Policy 15 - Industrial Green Transition Zones – Comments on other technologies such as Carbon Storage and hydrogen developments. Annex C – Spatial Planning Priorities.
Scotland's National Marine Plan (2015) (Scottish Government, 2015)	Scotland's National Marine Plan sets out strategic policies for the sustainable development of Scotland's marine resources out to 200 nautical miles (nm). The Plan highlights Marine planning policies applicable to infrastructure and other marine users, including interactions with other users: Development: Energy developments can displace fishing. The cabling arrays associated with energy and telecoms developments, and other physical infrastructure associated with development, have the potential for short-term displacement of fishing activity during the installation phase. Gen 4 Co-existence: Proposals which enable coexistence with other development sectors and activities within the Scottish marine area are encouraged in planning and decision making processes, when consistent with policies and objectives of this Plan. Fisheries 2: The following key factors should be taken into account when deciding on uses of the marine environment and the potential impact on fishing: *"The potential effect of displacement on: fish stocks; the wider environment; use of fuel; socio-economic costs to fishers and their communities and other marine users."*
UK Marine Policy Statement (2011)	The UK Marine Policy Statement is the framework for preparing Marine Plans and taking decisions affecting the marine environment. It informs the standard approach to planning and decision making regarding Marine Plans. Many sections are of note to infrastructure and marine users, including: *"The evidence base will be developed from a wide range of sources including existing plans, the plan area community, science advisors, statutory and other advisors, industry and other marine users".*
Sectoral Marine Plan – Offshore Wind Energy (October 2020)	The Sectoral Marine Plan has been developed in accordance with the National Marine Plan (2015) to address interactions between renewable development and other marine users. Highlights the need to ensure compatibility with other projects and marine users in Scotland, but also for this strategy to minimise the

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
	potential adverse effect on other marine users, economic sectors, and the environment.
Guidance	
European Subsea Cable Association (ESCA) guidelines	ESCA guideline no.6 *"The Proximity of Offshore Renewable Energy Installations & Submarine Cable Infrastructure in UK Waters"* provides a framework for collaborative working between the offshore wind farms and subsea cable developments.

13.3 Consultation

1003. As part of the Bellrock WFDA Scoping Workshop (30th October 2023), an information package was provided to Marine Directorate - Licensing Operations Team (MD-LOT), including on the proposed approach to marine infrastructure and other users. No other consultation relevant to marine infrastructure and other users has taken place to date.

1004. Consultees will include relevant offshore wind energy lease holders and oil and gas well operators (North Sea Natural Resources, Harbour Energy and Orcadian Energy) in the marine infrastructure and other users study area.

13.4 Existing Environment

13.4.1 Study Area

1005. The marine infrastructure and other users study area is shown in **Figure 13.1** in **Appendix 1** of this Bellrock WFDA Scoping Report and is defined by the Bellrock WFDA plus a 10 nm buffer to align with the shipping and navigation study area presented in **Chapter 11: Shipping and Navigation**. The same study area is used to capture relevant routeing of vessels associated with other projects/infrastructure in the area that may be affected around the Bellrock WFDA.

13.4.2 Data and Information Sources

1006. **Table 13.2** sets out the information and data sources which have been considered in the preparation of this chapter, and will be considered within the Bellrock WFDA EIA Report where relevant matters are scoped in.

Table 13.2: Summary of Key Data and Information Sources for Marine Infrastructure and Other Users

Dataset	Year(s)	Description
Disposal site location data, Marine Scotland National Marine Plan Interactive (Marine Scotland NMPi 2022).	2022	Contains information on disposal site locations.

Dataset	Year(s)	Description
Historic aggregate site data (Marine Scotland NMPi, 2021; Marine Scotland, 2020).	2013	The interactive map provides visual data on the historic locations of aggregate sites and sand gravel resources around the marine infrastructure and other users study area.
Offshore oil and gas activity data (North Sea Transition Authority; NSTA, 2024).	2024	Spatial information on gas and oil infrastructure (gas and oil wells, fields, pipelines, and licence blocks).
Offshore wind lease areas (Crown Estate Scotland, CES, 2024).	2021	Represents all current offshore wind farm sites in pre-planning, planning, construction, and operational phases in Scottish waters.
Innovation and Targeted Oil and Gas (INTOG) application areas (CES, 2023).	2023	Represents the successful application areas of the INTOG leasing round.
Wave lease sites and suitable areas for development (Marine Scotland NMPi, 2023).	2023	Spatial information on wave lease sites granted by CES and areas identified as suitable for development under the Sectoral Marine Plan.
Tidal lease sites and suitable areas for development (Marine Scotland NMPi, 2023).	2023	Spatial information on tidal lease sites granted by CES and areas identified as suitable for development under the Sectoral Marine Plan.
Subsea cables (Marine Scotland NMPi, 2023)	2024	Marine cables digital data.

1007. No site-specific surveys have been undertaken to inform this chapter. The marine infrastructure and other users baseline characterisation in the Bellrock WFDA EIA Report will be informed by publicly available data with no further studies or surveys required. However, results from the summer (2023) vessel traffic surveys will be included and referred to in the baseline characterisation, where appropriate. Further details on these surveys are provided in **Chapter 11: Shipping and Navigation**.

13.4.3 Oil and Gas Infrastructure

1008. Within the marine infrastructure and other users study area, there are 23 oil and gas license block areas, however, no oil or gas fields are present within these blocks. Eleven are licensed (blocks 27/3, 27/4, 27/5, 27/9, 27/10, 28/1, 28/6 licensed to North Sea Natural Resources (NSNR), blocks 28/2a, 28/3a 21/27a to Orcadian Energy and blocks 28/9f and 28/9a to Harbour Energy) and 13 blocks currently have unlicensed status (20/29, 20/30, 21/26, 21/27b, 21/28, 27/8, 27/15, 27/14, 28/2b, 28/3b, 28/4b, 28/7, and 28/8). Refer to **Figure 13.2** in **Appendix 1.**

1009. A single decommissioned (Abandoned Phase 3) appraisal well (well registration number 27/05-1) is located approximately 1 km north of the Bellrock WFDA. A total of six other decommissioned wells (Abandoned Phase 3) wells are located within the 10 nm marine infrastructure and other users study area.

1010. The Catcher development area lies approximately 19.5 km to the east of the Bellrock WFDA outside the marine infrastructure and other users study area, and includes three producing fields known as Varadero, Burgman and the Catcher (located approximately 23 km, 22 km and 26 km east respectively of the Bellrock WFDA Scoping Boundary, see **Figure 13.2** in **Appendix 1**). Harbour Energy operates the area, producing from 20 subsea wells on Catcher, Varadero and Burgman, through a combination of water injection well and productions tied to a newly built and leased floating, production, storage, and offloading vessel (FPSO). As part of the Catcher development area, the Laverda oil and gas field (approximately 22 km east of the Bellrock WFDA), operated by Harbour Energy, is expected to start production in 2024.

1011. No pipelines are recorded within the marine infrastructure and other users study area.

13.4.4 Offshore Wind Farm Developments

1012. **Figure 13.3** in **Appendix 1** shows the surrounding ScotWind offshore wind farm developments. Only the Ossian Offshore Wind Farm is within the marine infrastructure and other users study area, located approximately 8 km south-west of the Bellrock WFDA Scoping Boundary.

1013. Outside the marine infrastructure and other users study area, the surrounding ScotWind offshore wind farms are:

- CampionWind Offshore Wind Farm, approximately 24 km north of the Bellrock WFDA Scoping Boundary;
- Morven Offshore Wind Farm, approximately 35 km south-west of the Bellrock WFDA Scoping Boundary;
- Muir Mhòr Offshore Wind Farm, approximately 53 km north of the Bellrock WFDA Scoping Boundary; and
- Bowdun Offshore Wind Farm, approximately 63 km north-west of the Bellrock WFDA Scoping Boundary.

1014. **Figure 13.3** in **Appendix 1** also shows INTOG projects. No INTOG projects fall within the marine infrastructure and other users study area. The closest INTOG project is the proposed Cedar Offshore Wind Farm, located approximately 20 km east of the Bellrock WFDA Scoping Boundary. Cenos Offshore Wind Farm is located approximately 70 km east of the Bellrock WFDA Scoping Boundary.

13.4.5 Carbon Capture Storage

1015. There are no Carbon Capture Storage (CCS) licenced areas identified within the marine infrastructure and other users study area. The closest CCS facility in the vicinity is the Acorn CCS licence area, which is located approximately 139 km north from the Bellrock WFDA Scoping Boundary.

13.4.6 Ministry of Defence

1016. No practice and exercise areas (PEXAs) related to maritime activities or other Ministry of Defence (MoD) maritime navigational interests (highly surveyed areas) are identified in the marine infrastructure and other users study area. Information on MoD aviation activity in the vicinity of the Bellrock WFDA is provided in **Chapter 12: Aviation and Radar**. This includes aviation activity and designated danger areas and/or PEXAs related to aviation activities (see **Figure 12.4** in **Appendix 1**).

13.4.7 Other Infrastructure

13.4.7.1 Dredging and Disposal Sites

1017. There are no active offshore dredging or disposal sites identified within the marine infrastructure and other users study area (see **Figure 13.4** in **Appendix 1**). The closest open disposal site is located 117 km south of the Bellrock WFDA.

13.4.7.2 Subsea Cables (Utilities)

1018. There are no subsea cables identified within the marine infrastructure and other users study area (see **Figure 13.4** in **Appendix 1**). The closest subsea cable, the North Sea Link telecommunications cable, is located approximately 52 km to the south-east of the Bellrock WFDA and travels from Blyth in England to Kvilldal in Norway. To the north is the Tampnet superfast subsea fibre optic network cable, located approximately 88 km from the Bellrock WFDA at the closest point. To the east is the Eastern Green Link 2 and proposed Eastern Green Link 3 transmission cables at 63 km and 30 km respectively.

13.4.7.3 Marine Aggregates and Mining

1019. There are no licences for marine aggregate extraction identified within the marine infrastructure and other users study area (See **Figure 13.4** in **Appendix 1**) or within the wider east Scotland region (Marine Scotland, 2020).

13.4.7.4 Wave and Tidal

1020. There are no wave or tidal projects identified within the marine infrastructure and other users study area (see **Figure 13.4** in **Appendix 1**). The closest wave/tidal project is the operational Mocean Energy Ltd wave power energy converter project approximately 270 km north (East of Deerness) of the Bellrock WFDA.

13.4.7.5 Aquaculture

1021. There are no aquaculture sites identified within the marine infrastructure and other users study area (see **Figure 13.4** in **Appendix 1**). The Northern Scottish coastline is identified as an area where the development of new aquaculture sites is restricted, and where existing aquaculture sites can only be extended (Marine Scotland, 2022). The closest aquaculture site identified is found below Newtonhill, a seaweed harvesting farm located approximately 123 km away from the Bellrock WFDA.

13.5 Potential Impacts

1022. Works associated with the installation/construction and maintenance of wind turbine generators (WTGs), floating offshore units (FOU) and/or fixed bottom substructures (FBSSs), inter-array cables (IACs) and subsea cable hub(s) have the potential to result in temporary impacts on marine infrastructure and other users. For instance, the increase in maritime traffic and implementation of Safety Zones may affect or restrict access to other infrastructure/projects and displace activity by other marine users, either temporarily or long-term.

1023. During decommissioning, it is anticipated that the impacts would be similar to those during construction. The detail and scope of the decommissioning works will be determined by the relevant legislation, guidance, and authorities at the time of decommissioning and agreed with the relevant regulator.

13.5.1 Embedded Mitigation Measures

1024. Mitigation measures will be considered throughout the design process of the Bellrock WFDA and will be included with the objective to reduce the potential impacts associated with the Bellrock WFDA on the environment.

1025. The following embedded mitigation measures are proposed for marine infrastructure and other users:

- Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins;
- All offshore infrastructure associated with the Bellrock WFDA will be appropriately marked on UK Hydrographic Office Admiralty charts;
- An application will be made post-consent for Safety Zones including up to 500 m around each WTG and substructure during its construction;
- An application will be made post-consent for Safety Zones including up to 50 m around each installed WTG and substructure during its pre-commissioning;
- An application will be made post-consent for Safety Zones including up to 500 m around each WTG and substructure during major maintenance during operation;
- An application will be made prior to commencement of decommissioning for Safety Zones including up to 500 m around each WTG and substructure during its decommissioning;
- Development of and adherence to a Navigational Safety Plan (NSP) and Vessel Management Plan (VMP) which will detail measures implemented to facilitate safe navigation;
- Development of and adherence to a Cable Plan (CaP);
- Early engagement with any other offshore operators or developers active within the marine infrastructure and other users study area, to facilitate coexistence by coordinating activities;
- Dropped objects on the seabed during works associated with the Bellrock WFDA which may pose a hazard will be reported in line with Marine Directorate – Licensing Operations Team procedures;

- Development of, and adherence to, a Lighting and Marking Plan (LMP);
- Development of Unexploded Ordnance (UXO) Threat and Risk Assessment;
- Development of, and adherence to, an Emergency Response Cooperation Plan (ERCoP);
- The Applicant will ensure compliance with the Regulatory Expectations on Moorings for Floating Wind and Marine Devices (MCA and Health and Safety Executive, 2017);
- Development of, and adherence to, a Development Specification and Layout Plan (DSLP);
- Where appropriate, guard vessels will be used to ensure adherence with Safety Zones or advisory passing distances;
- Marine coordination will be implemented to manage project vessels throughout construction, maintenance, and decommissioning periods;
- Bellrock WFDA vessels will ensure compliance with international marine regulations as adopted by the Flag State, including the COLREGs (International Maritime Organisation; IMO, 1972/77) and SOLAS (IMO, 1974);
- The layout of the WTGs in the Bellrock WFDA, will be finalised in discussion with the MCA and NLB in order to ensure the specific WTG layout is compatible with potential SAR activity; and
- Failures of the lighting and marking in the Bellrock WFDA will be appropriately reported and rectified as soon as practicable. Interim hazard warnings (i.e. Notice to Mariners) will be put in place as required.

13.6 Scoping of Potential Impacts

13.6.1 Potential Impacts Scoped In

1026. Impacts have been scoped in for assessment in the Bellrock WFDA EIA Report where there is an identified impact pathway on a marine infrastructure and/or other user receptor resulting from any of the phases of the Bellrock WFDA; construction, operation and maintenance, and decommissioning.

1027. The following impacts have been scoped in for assessment in the Bellrock WFDA EIA Report for all development phases, as infrastructure is present within the marine infrastructure and other users study area:

- Impacts on oil and gas fields and associated activities; and
- Impacts to other offshore wind farms (Ossian Offshore Wind Farm) and/or disruption to associated activities.

13.6.2 Potential Impacts Scoped Out

1028. The following impacts have been scoped out of assessment in the Bellrock WFDA EIA Report for all phases of the Bellrock WFDA, due to no infrastructure/sites being present within the marine infrastructure and other users study area:

- Impacts on subsea cables (utilities);
- Impacts on CCS developments and associated activities;
- Impacts on dredging and disposal sites;
- Impacts on MoD maritime navigational interests; and
- Impacts on other infrastructure (marine aggregate and mining sites, aquaculture, and wave and tidal projects).

13.6.3 Potential Cumulative Effects

1029. The cumulative effects assessment (CEA) will follow the methodology set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**. The CEA will be considered in two stages; a CEA of the of the whole Bellrock Project (i.e., the Bellrock WFDA and the Bellrock OfTDA), followed by a CEA of the whole Bellrock Project alongside other plans or projects.

13.6.4 Potential Transboundary Effects

1030. There are no marine infrastructure and other users receptors associated with European Economic Area (EEA) states within the marine infrastructure and other users study area. Therefore, there is no potential for impacts on transboundary receptors, and transboundary effects are scoped out from further consideration in the Bellrock WFDA EIA Report.

13.6.5 Summary of Potential Marine Infrastructure and Other Users Impacts Scoped In and Out

1031. A summary of potential impacts scoped in and out from further assessment in the Bellrock WFDA EIA Report is provided in **Table 13.3** below.

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Table 13.3: Summary of Potential Impacts Scoped In (✓) or Out (x) for Marine Infrastructure and Other Users

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ Or X)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Impacts on other offshore wind farms.	Ossian Offshore Wind Farm.	The presence of vessels during construction, maintenance and decommissioning, and the presence of the operational Bellrock WFDA may restrict or disrupt the Ossian Offshore Wind Farm and associated activities.	✓	✓	✓	Mitigation measures as proposed in **Section 13.5.1**
Impacts on offshore oil and gas operations.	Oil and gas fields/operations.	There is no current oil and gas activity within the licenced blocks that overlap with the marine infrastructure and other users study area and therefore no current pathway for effect. However, due to the overlap of the Bellrock WFDA with licenced blocks, this impact has been scoped in for all phases, subject to consultation with the relevant licence holders (North Sea Natural Resources, Harbour Energy and Orcadian Energy) around future operations.	✓	✓	✓	Mitigation measures as proposed in **Section 13.5.1**
Impacts on CCS sites.	Acorn CCS project.	No pathway for effect – there are no CCS sites in the marine infrastructure and other users study area. The closest being the Acorn CCS project, located 139 km north from the Bellrock WFDA.	X	X	X	N/A
Impacts on subsea cables (utilities).	Telecommunications and other utilities cables.	No pathway for effect – the closest subsea cable is the North Sea Link telecommunications cable is located approximately 52 km to the east of the Bellrock WFDA.	X	X	X	N/A

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ Or X)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Impacts on dredging and disposal sites.	Disposal sites located on the east coast.	No pathway for effect – the closest dredging and disposal site is the Fraserburgh disposal site, which is found 117 km from the Bellrock WFDA.	X	X	X	N/A
Impacts on marine aggregate sites.	Mining and aggregate sources.	No pathway for effect – there are no aggregate sites in the wider region.	X	X	X	N/A
Impacts on MoD maritime navigational interests.	MoD highly surveyed areas and maritime PEXAs.	No pathway for effect – no MoD navigational interests or maritime PEXAs are identified within the marine infrastructure and other users study area.	X	X	X	N/A

13.7 Proposed Approach to Impact Assessment

1032. The methodology set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment** will be followed when preparing the marine infrastructure and other users chapter for the Bellrock WFDA EIA Report. Stakeholders set out in **Section 13.3** will be consulted. Alongside consultation with relevant stakeholders and owners/operators of identified projects/infrastructure, the 'The Crown Estate (TCE) and CES Agreements and Oil and Gas Licences' (NSTA, 2023) will be considered.

13.8 Scoping Questions to Consultees

1033. The following questions are posed to consultees to help frame and focus their response to this scoping exercise for marine infrastructure and other users, which will in turn inform the Scoping Opinion:

- Do you agree with the data sources used to characterise the marine infrastructure and other users baseline?
- Are there any further desktop datasets which you would recommend are included?
- Have all the potential impacts on marine infrastructure and other users resulting from the Bellrock WFDA been identified in the Bellrock WFDA Scoping Report?
- Do you agree with the impacts that have been scoped in (and scoped out) for further assessment in the Bellrock WFDA EIA Report?
- Do you have any other matters or information sources that you wish to present?

13.9 References

Crown Estate Scotland (2023). INTOG application areas. Available at: https://crown-estate-scotland-spatial-hub-coregis.hub.arcgis.com/datasets/b9c7d514362f40ceb3fe299b47aeb8b3_0/explore

Crown Estate Scotland (2024). Offshore Wind. Available at: https://crown-estate-scotland-spatial-hub-coregis.hub.arcgis.com/datasets/b9c7d514362f40ceb3fe299b47aeb8b3_0/explore

NSTA (2024). Offshore Oil and Gas Activity. Available at: https://www.arcgis.com/apps/webappviewer/index.html?id=f4b1ea5802944a55aa4a9df0184205a5.

Marine Scotland NMPi (2020). Aggregates. Available at: https://marine.gov.scot/sma/assessment/aggregates

Marine Scotland NMPi (2021). Historic Aggregate Areas. Available at: https://marine.gov.scot/maps/333

Marine Scotland NMPi (2022). Dredge Spoil Deposit Sites. Available at: https://marine.gov.scot/maps/1884

Marine Scotland NMPi (2023). Tidal Lease Sites. Available at: https://marine.gov.scot/maps/1556

Marine Scotland NMPi (2023). Wave Lease Sites. Available at: https://marine.gov.scot/maps/1557

Marine Scotland NMPi (2024). Subsea Power Cables. Available at: https://marine.gov.scot/maps/443

European Subsea Cables Association (ESCAEU) Guidelines: Guideline 06- Proximity of wind Farms. Available at: https://www.escaeu.org/guidelines/.

14 Marine Archaeology and Cultural Heritage

14.1 Introduction

1034. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on marine archaeology and cultural heritage. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

1035. This chapter provides an overview of the existing environment and sets out the methodology and approach to assessing effects on marine archaeology and cultural heritage receptors in the Bellrock WFDA Environmental Impact Assessment (EIA) Report. This chapter has been prepared by Royal HaskoningDHV.

1036. This chapter should be read in conjunction with the following chapters of the Bellrock Hub WFDA Scoping Report:

- **Chapter 5: Marine Geology, Oceanography and Physical Processes**; and
- **Chapter 15: Seascape, Landscape and Visual Impact**.

1037. The marine archaeology and cultural heritage assessment is likely to have key inter-relationships with the above receptors, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

14.2 Legislation, Policy and Guidance

1038. **Table 14.1** sets out the legislation, policy and guidance which have been considered in the preparation of this chapter and will be considered within the Bellrock WFDA EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

Table 14.1: Summary of Relevant Legislation, Policy and Guidance for Marine Archaeology and Cultural Heritage

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Legislation	
Merchant Shipping Act 1995	This Act sets out the procedures for determining the ownership of underwater finds classified as a 'wreck' (flotsam, jetsam, derelict and lagan) found in or on the shores of the sea or any tidal water. It includes ship, aircraft, hovercraft, parts of these, their cargo or equipment. The Receiver of Wreck is responsible for processing incoming reports of wreck and cargo. The Bellrock WFDA has the potential to impact items associated with wrecks, which fall within the definition of 'wreck'.
The Protection of Military Remains Act 1986	Provides protection for the wreckage of military aircraft and certain military wrecks. Designations can be either as a Controlled Site or Protected Place where access may be permitted but any operations that may disturb the site are illegal unless licenced by the Ministry of Defence (MoD). All military aircraft are automatically protected under this legislation; however, vessels must be designated individually.
Policy	
National Planning Framework 4 (NPF4) (Scottish Government, 2023)	Policies of relevance to this area of technical assessment are: • Policy 1: Tackling the Climate and Nature Crisis; and • Policy 7: Historic Assets and Places.
Scotland's National Marine Plan (Scottish Government, 2015)	The purpose of Scotland's National Marine Plan is to set out strategic policies for the sustainable development of Scotland's marine resources out to 200 nm. GEN 6 Historic environment: Development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance.
Historic Environment Policy for Scotland (HEPS) (2019)	The document is designed to support and enable good decision-making about changes to the historic environment. HEPS sets out a series of principles and policies for the recognition, care and sustainable management of the historic environment which have informed development of the proposed scope and methodology of the assessment.
Guidance	
Historic Environment Guidance for the Offshore Renewable Energy Sector (Collaborative Offshore Wind Research into the Environment; COWRIE, 2007)	Guidance note on the survey, appraisal and monitoring of the historic environment during the development of offshore renewable energy projects in the UK. The guidance is applicable to the marine environment and the coastal environment adjacent to any development, encompassing the inter-tidal area, coastal margin and those areas further inland likely to be affected by offshore renewable energy developments.

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Historic Environment Scotland (HES) (2019-updated May 2021) Scotland's Historic Marine Protected Areas	Explains what historic marine protected areas are and HES' role in advising the Scottish Government in designating these areas.
Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects (The Crown Estate, 2021)	High level guidance on a range of archaeological methodologies that may be required in the production of Written Schemes of Investigation (WSIs) and Method Statements.
Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (Oxford Archaeology, 2008)	Guidance on cumulative impacts on the historic environment arising from offshore renewable energy projects. The guidance identifies issues relating to the assessment of cumulative and synergistic effects at each stage of the Strategic Environmental Assessment /EIA process from screening and scoping to decision-making and implementation.
Institute of Environmental Management and Assessment (IEMA) Principles of Cultural Heritage Impact Assessment (2021)	This publication sets out guiding principles to supplement existing guidance and give a consistent framework for cultural heritage in a variety of settings.
Joint Nautical Archaeology Policy Committee (JNAPC) Code of Practice for Seabed Development (JNAPC and The Crown Estate 2006	This code builds on the principles set out in the original Code (JNAPC 1995) and offers guidance to developers on issues such as risk management and legislative implications. A list of contacts for further advice is also provided. The code also highlights the responsibility of developers in protecting the UK's marine heritage.

14.3 Consultation

1039. As part of the Bellrock WFDA Scoping Workshop (30th October 2023), an information package was provided to Marine Directorate - Licensing Operations Team (MD-LOT), including on the proposed approach to marine archaeology and cultural heritage. No other consultation relevant to marine archaeology and cultural heritage has taken place to date.

14.4 Existing Environment

14.4.1 Study Area

1040. The marine archaeology study area encompasses the Bellrock WFDA Scoping Boundary shown in **Figure 14.1** in **Appendix 1**. Given the distance the Bellrock WFDA is offshore (approximately 120 km from Stonehaven, 116 km southeast from Peterhead) there is no study area proposed for considering setting impacts to onshore designated heritage assets (see **Section 14.6.4**).

14.4.2 Data and Information Sources

1041. **Table 14.2** sets out the information and data sources which have been considered in the preparation of this chapter, and will be considered within the Bellrock WFDA EIA Report where relevant matters are scoped in.

Table 14.2: Summary of Key Data and Information Sources for Marine Archaeology and Cultural Heritage

Dataset	Description
United Kingdom Hydrographic Office (UKHO)	Records of wrecks and obstructions data including ‘dead’ and salvaged wrecks that are no longer charted as navigational hazards.
Maritime records maintained by CANMORE (National Record of the Historic Environment)	Maritime records, including documented losses of vessels, and records of terrestrial monuments and findspots, including the archaeological excavation index.
Historic Environment Scotland (HES)	Records of designated heritage assets within Scotland, maintained by Historic Environment Scotland. GIS data for all Protected Wrecks, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens and Registered Battlefields.
Aberdeenshire Historic Environment Record (HER)	Contains data on all recorded non-designated heritage assets, held by Aberdeenshire Council. The data includes archaeological, historic landscape and historic building information. Information on previous events (archaeological surveys and investigations) will also be obtained.
British Geological Survey (BGS)	Historic borehole logs and the wider geological background for the region.
Regional Seascape Assessments	Character texts for seascape character of coastal and marine areas around Scotland.
Scottish Archaeological Research Framework (ScARF)	The primary resource for Scottish archaeology, one which provides an overview of the subject and also a set of relevant research questions to guide assessment.
Existing archaeological studies and published sources	Background information on the archaeology of the area, including the results of previous archaeological assessments in the North Sea area.
Geophysical and geotechnical survey (August to September 2023) data from within the Bellrock WFDA Scoping Boundary	All geophysical and geotechnical data acquired by the Applicant as part of offshore survey campaign within the Bellrock WFDA will be reviewed by an archaeological specialist to inform the Bellrock WFDA EIA Report.

14.4.3 Baseline Environment

1042. An initial high-level desk-based review of existing literature and data sources was undertaken to support this scoping exercise.

1043. The marine archaeology study area is located approximately 120 km east of Stonehaven (116 km southeast of Peterhead), Aberdeenshire, Scotland in the eastern Long Forties area of the North Sea. Water depths within the marine archaeology study area range between -60 m and -105 m.

1044. No prehistoric archaeological artefacts or landscapes have been recorded within the marine archaeology study area. Generally, it is accepted that the potential for prehistoric archaeology and landscapes across wide areas of the United Kingdom Continental Shelf (UKCF) is high (Wessex Archaeology, 2009, p.9), however the potential for site preservation in the UKCF deeper than 80 m is low (Flemming, 2003).

1045. There has been limited published assessment work carried out in the immediate area with the adjacent CampionWind Offshore Wind Farm (approximately 24 km north) and Ossian Offshore Wind Farm (approximately 8 km south-west), both of which are in the pre-application stage.

1046. While the presence of prehistoric archaeology and landscapes is currently unknown within the marine archaeology study area, a more thorough evaluation of archaeological information will be incorporated into the Archaeological Desk-based Assessment (ADBA), which will be generated to guide a comprehensive mitigation plan.

1047. Within the marine archaeology study area, there are no nationally important wrecks designated as Historic Marine Protected Areas under the Marine (Scotland) Act (2010). Similarly, there are no sites protected under the Protection of Military Remains Act 1986. Should military remains be identified during the lifetime of the Bellrock WFDA, these could be protected under this act.

1048. There is moderate potential for other wreck, wreck remains, aircraft and aircraft remains to be present within the marine archaeology study area. The UK Hydrographic Office (UKHO) records one wreck the Karen (UKHO ID: 3029) which sank in 1978.The Bellrock WFDA geophysical survey (magnetometer, side-scan sonar (SSS), sub bottom profiler (SBP) and multi beam echosounder (MBES)) was carried out across the marine archaeology study area between August and September 2023. The Karen was not detected at its recorded location within the UKHO dataset during this geophysical survey. As this vessel is modern, it is not of archaeological significance. The Bellrock WFDA geophysical survey identified an additional three (unrecorded) shipwreck within the marine archaeology study area, the archaeological significance of which is currently unknown. These comprise:

- Wreck BR-S0260 measuring approximately 30m in length and 4m in width at a depth of approximately 76m.
- Wreck BR-S0272 measuring approximately 35m in length and 7m in width at a depth of approximately 76m.
- Wreck BR—S0260 measuring approximately 48m in length and 10m in width at a depth of approximately 79m.

1049. The potential receptors that may be present within the marine archaeology study area are summarised as:

- Palaeolandscape features and sub-seabed deposits of palaeoenvironmental interest;
- Prehistoric occupation sites; and
- Wreck and aviation remains.

14.5 Potential Impacts

1050. Potential impacts to marine archaeology and cultural heritage assets include both direct and indirect impacts. Impacts can also occur from changes (both temporary and permanent) to the setting of heritage assets, which could affect heritage significance.

1051. Direct impacts to heritage assets present on the seafloor or buried under the seabed, may result in damage to, or the destruction of any archaeological material, or the relationship between that material and the wider environment (stratigraphic context or setting). Relationships between archaeological material and the wider environment are crucial to developing a full understanding of such material. These impacts may occur if heritage assets or material are present within the footprint of the Bellrock WFDA (i.e., station keeping systems (SKSs) and FBSSs, inter-array cables (IACs) and associated cable and/or scour protection, and subsea cable hub(s)) or from construction related activities (i.e., seabed clearance and anchoring).

1052. There is also the potential for the Bellrock WFDA to directly and indirectly change the local and regional hydrodynamic and sedimentary process regimes. Changes in tidal currents may affect the stability of nearby morphological and archaeological features. Indirect impacts to heritage assets may occur if buried heritage assets become exposed to increased wave/tidal action, as these will deteriorate farther than assets protected by sediment. Conversely, if increased sedimentation results in an exposed site becoming buried, it may add some protection and be considered a beneficial impact. This will be considered based on the results of the assessment of local and regional hydrodynamic and sedimentary process regimes undertaken for the marine physical processes (refer to **Chapter 5: Marine Geology, Oceanography and Physical Processes**).

1053. Heritage assets may be affected by direct physical changes or by changes to their setting (HES, 2020). Impacts to the significance of a heritage asset may also occur if a development changes the setting of the asset (the surrounding in which the heritage assets is located, experienced and appreciated).

14.5.1 Embedded Mitigation Measures

1054. The following designed in measures which can reduce potential for significant effects have been considered in the identification of potential impacts associated with the Bellrock WFDA:

- The implementation of Archaeological Exclusion Zones (AEZs) around sites identified as having a known important archaeological potential to mitigate the potential impacts from offshore infrastructure.

- Archaeological input into specifications for and analysis of future pre-construction geophysical surveys within the Bellrock WFDA.
- Archaeologists to be consulted in the preparation of any pre-construction Remotely Operated Vehicle (ROV) or diver surveys and in monitoring/checking of data, if appropriate based upon the findings of the archaeological assessment of geophysical survey data.
- All anomalies of possible archaeological potential will be reviewed against the final layout and design. If they are likely to be impacted, these anomalies would undergo further archaeological investigation. Should these anomalies prove to be of archaeological importance then future AEZs may be implemented following consultation with HES.
- Archaeological input into specifications for and analysis of future pre-construction geotechnical surveys, including a provision for sampling, analysis and reporting of recovered cores, if appropriate. The results of all geoarchaeological investigations to be compiled in a final report which includes a sediment deposit model.
- Commitment to preparation and agreement on an Offshore Written Scheme of Investigation (WSI) and Protocol of Archaeological Discoveries (PAD).
- Micro-siting of SKSs, FBSSs, IACs and subsea cable hub(s) to avoid known heritage assets (AEZs) where possible.
- Development and adherence to a Cable Plan (CaP).
- Development of Unexploded Ordnance (UXO) Threat and Risk Assessment.

14.6 Scoping of Potential Impacts

1055. All potential impacts for the construction, operation and maintenance and decommissioning phases of the Bellrock WFDA are provided in **Sections 14.6.1**, **14.6.2** and **14.6.3** below. The impacts proposed to be scoped out from further assessment in the Bellrock WFDA EIA Report are detailed in **Section 14.6.4**. A summary of potential impacts scoped in is provided in **Table 14.3**.

14.6.1 Potential Impacts During Construction

1056. Direct impacts may occur if archaeological material is present within the footprint of the Bellrock WFDA (i.e., from the installation of SKSs, FBSSs, IACs, subsea cable hub(s), and from seabed contact by legs of jack-up vessels).

1057. There is the potential for temporary impacts to onshore heritage assets as a result of construction activities including the towing of integrated FOU's to the Bellrock WFDA from the assembly port or wet storage location. Changes in setting to terrestrial coastal heritage assets due to construction activities, will be temporary and of sufficiently short duration that they are not anticipated to give rise to material harm.

1058. Indirect impacts to heritage assets may occur if the physical presence of construction vessels and offshore infrastructure impacts the hydrodynamic regime. Similarly, if seabed preparation associated with the installation of the SKSs, FBSSs, subsea cable hub(s), and IACs leads to localised effects upon sedimentary processes this could lead to indirect impacts to heritage assets.

1059. Based on the above, all construction-related impacts are scoped in for further assessment in the Bellrock WFDA EIA Report.

14.6.2 Potential Impacts During Operation and Maintenance

1060. Direct impacts may occur if archaeological material is present within the footprint of works required for routine maintenance activities which disturb the seabed (i.e., from seabed contact by legs of jack-up vessels and/or vessel anchors). Similarly, this can occur in exceptional circumstances such as the repairs or reburial of IACs.

1061. However, given the areas where such activities would be undertaken would already have been disturbed during construction, there would be limited further impact during operation and maintenance.

1062. Indirect impacts to heritage assets may occur if the physical presence of the installed infrastructure impact the hydrodynamic or sedimentary regime. This includes the potential for increased scour around SKSs and FBSSs.

1063. Based on the above all impacts that may occur during operation and maintenance are scoped in for further assessment in the Bellrock WFDA EIA Report.

14.6.3 Potential Impacts During Decommissioning

1064. The scope of the decommissioning works would most likely involve removal of the accessible installed infrastructure. Within the Bellrock WFDA, this will likely include removal of all WTGs and associated substructures (FSSs and (if used) FBSSs), subsea cable hub(s), and the removal of some or all of the IACs and elements of the SKSs.

1065. If IACs and elements of the SKS are left in place there would be no potential for direct impact. Direct impacts to heritage assets may occur if the accessible infrastructure is removed. This is not anticipated as any remains at the locations of the installed infrastructure in relation to areas used for jack-up vessels and/or vessel anchors during construction will already have been impacted/mitigated during the construction phase assuming the same locations for jack-ups or vessel anchors are used.

1066. If archaeological material is present within areas (not previously used for construction) of jack-up vessels and/or vessel anchors deployed during decommissioning activities, direct impacts may also occur.

1067. Based on the above all impacts at decommissioning are scoped in for further assessment in the Bellrock WFDA EIA Report.

14.6.4 Potential Impacts Scoped Out

1068. Given the distance from the coast (120 km east of Stonehaven and 116 km southeast of Peterhead), the Bellrock WFDA would not be visible from shore therefore there would be no pathway for permanent impacts to the setting of onshore heritage assets, which could affect heritage significance. Therefore, it is proposed to scope out permanent impacts to the significance of onshore heritage assets through a change in setting of the asset (the surrounding in which the heritage assets are located, experienced, and appreciated) for the operation and maintenance stages.

1069. This includes towing of fully assembled floating offshore units (FOU), each comprising a WTG on a FSS, from a port location or wet storage area to the Bellrock WFDA. The port location and wet storage location are unknown at this time. While being towed from port/wet storage, the FOUs are likely to be visible from nearby coastal locations. They would be moving away from shore and this visibility would only last for a short period of time. Due to the transient nature of these views, the towing of FOUs outside the Bellrock WFDA is not proposed to be considered further. Refer to **Section 15.6** for further details.

14.6.5 Potential Cumulative Effects

1070. The CEA for marine archaeology and cultural heritage will follow the general methodology set out in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**. The CEA will be considered in two stages; a CEA of the whole Bellrock Project (i.e., the Bellrock WFDA and the Bellrock OfTDA), followed by a CEA of the whole Bellrock Project alongside other plans or projects.

1071. Individual heritage assets would not be subject to cumulative direct impacts from other known plans or projects as they are discrete and there would be no physical overlap of different infrastructure. However, although individual assets are discrete, taken together they could have collective heritage significance. Therefore, multiple impacts upon similar assets could occur cumulatively.

1072. In addition, there is potential for multiple developments to affect the larger-scale archaeological features such as palaeolandscapes.

1073. There is also the potential for cumulative indirect impacts associated with changes to marine physical processes. There is, therefore, the potential for cumulative impacts and these are scoped in for further assessment in the Bellrock WFDA EIA Report for each phase (construction, operation and maintenance, and decommissioning).

14.6.6 Potential Transboundary Effects

1074. Direct transboundary impacts may occur during construction if wrecks or aircraft of non-British nationality are subject to impacts from the Bellrock WFDA. Such wrecks may fall within the jurisdiction of another country, and may include, for example, foreign warships lost in UK waters. Similarly, where palaeolandscapes within the North Sea cross international boundaries, direct transboundary impacts may occur.

1075. There is, therefore, the potential for transboundary impacts and these are scoped in for further assessment in the Bellrock WFDA EIA Report for all project phases (construction, operation and maintenance, and decommissioning).

1076. Indirect transboundary impacts, associated with changes to marine physical processes, where those changes cross an international boundary, are not expected to occur and are therefore scoped out.

14.6.7 Summary of Potential Marine Archaeology and Cultural Heritage Impacts Scoped In and Out

1077. A summary of potential impacts scoped in and out from further assessment in the Bellrock WFDA EIA Report is provided in **Table 14.3** below.

Table 14.3: Summary of Potential Impacts Scoped In (✓) or Out (x) for Marine Archaeology and Cultural Heritage

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Direct impacts to heritage assets	Maritime archaeology receptors such as wrecks, debris, submerged prehistoric receptors palaeolandscapes and associated archaeological receptors.	Site preparation and construction activities causing direct impacts to heritage assets.	✓	✓	✓	See **Section 14.5.1**
Indirect impacts to heritage assets associated with changes to marine physical processes	Maritime archaeology receptors such as wrecks, debris, submerged prehistoric receptors palaeolandscapes and associated archaeological receptors.	Physical presence of construction vessels and offshore infrastructure impacts the hydrodynamic regime or has localised effects upon sedimentary processes.	✓	✓	✓	
Change to the setting of heritage assets	Onshore heritage receptors.	Due to the distance of the Bellrock WFDA offshore (120 km from Stonehaven and 116 km southeast from Peterhead), no change to the setting of onshore heritage assets is foreseen. This includes consideration of towing of FOUs from port(s)/wet storage to the Bellrock WFDA as this is considered to be of a transitory nature only.	x	x	x	N/A

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14.7 Proposed Approach to Impact Assessment

1078. The marine archaeology assessment in the Bellrock WFDA EIA Report will be informed by the interpretation of the geophysical survey data collected by the Applicant (namely the bathymetry and side scan sonar (SSS) data to identify seabed features, such as wrecks, magnetometry data to identify magnetic anomalies and sub-bottom profile data to identify palaeolandscape features).

1079. All geophysical and geotechnical data acquired by the Applicant as part of the offshore survey campaign within the Bellrock WFDA will be reviewed by an archaeological specialist to inform the Bellrock WFDA EIA Report.

1080. An ADBA will be undertaken to establish the baseline for both known and potential heritage assets within the defined areas based upon the desk-based sources listed in **Table 14.2.**

1081. The ADBA and assessment of geophysical data will be used to identify a strategy for mitigation including the avoidance of identified heritage assets through the application AEZs where appropriate. This mitigation strategy will be set out in the Outline WSI which will be submitted alongside the Bellrock WFDA EIA Report. The Outline WSI will cover the Bellrock WFDA boundary to ensure that a commitment to archaeological investigation and mitigation, as relevant to both known and potential heritage assets, is captured across the extents of the Bellrock WFDA.

1082. The methodology of the assessment will also take account of guidance listed in **Table 14.1**.

1083. Technical consultation with HES will be undertaken. This will help to identify and agree the primary methodologies, present initial findings and ensure potential historic environment issues and risk are identified and considered in the Bellrock WFDA EIA Report.

14.8 Scoping Questions to Consultees

1084. The following questions are posed to consultees to help them frame and focus their response to the marine archaeology and cultural heritage scoping exercise, which will in turn inform the Scoping Opinion:

- Do you agree with the characterisation of the existing environment?
- Have all the marine archaeology and cultural heritage impacts resulting from the Bellrock WFDA been identified in the Bellrock WFDA Scoping Report?
- Do you agree with the marine archaeology and cultural heritage impacts that have been scoped in for/out from further consideration within the Bellrock WFDA EIA Report?
- Have all the relevant data sources been identified in the Bellrock WFDA Scoping Report?
- Do you agree with the proposed approach to assessment in the Bellrock WFDA EIA Report?
- Do you have any other matters or information sources that you wish to present?

14.9 References

The Crown Estate (2021). Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects. Available at: https://www.thecrownestate.co.uk/media/3917/guide-to-archaeological-requirements-for-offshore-wind.pdf

Flemming, N. C. (2003). The scope of Strategic Environmental Assessment of Continental Shelf Area SEA 4 in regard to prehistoric archaeological remains. Prepared for the Dept. of Trade & Industry. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197361/SEA4_TR_Archaeology_NFC.pdf

Scottish Government (2015). Scotland's National Marine Plan. Available at: https://www.gov.scot/publications/scotlands-national-marine-plan/

Scottish Government (2023). National Panning Framework 4. Available at: https://www.gov.scot/publications/national-planning-framework-4/

15 Seascape, Landscape and Visual Impact

15.1 Introduction

1085. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on the seascape, landscape and visual environment. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

1086. This chapter provides an overview of the existing environment and sets out the proposed methodology and approach to assessing effects on seascape, landscape and visual receptors in the Bellrock WFDA Environmental Impact Assessment (EIA) Report. This chapter has been prepared by Chartered Members of the Landscape Institute at LUC (Land Use Consultants Ltd.).

1087. Seascape, Landscape and Visual Impact Assessment (SLVIA) considers effects on:

- Seascape/landscape as a resource in its own right (caused by changes to its constituent elements, its specific aesthetic or perceptual qualities and/or its character); and
- Views and visual amenity as experienced by people (caused by changes in the appearance of the seascape/landscape).

1088. This chapter should be read in conjunction with the following chapter of the Bellrock WFDA Scoping Report:

- **Chapter 16: Socioeconomics, Tourism and Recreation.**

1089. This SLVIA chapter is likely to have key inter-relationships with the above receptor, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

15.2 Legislation, Policy and Guidance

1090. **Table 15.1** sets out the policy and guidance documents which have been considered in the preparation of this chapter, and which will inform the SLVIA chapter in the Bellrock WFDA EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

Table 15.1: Summary of Relevant Legislation, Policy and Guidance for SLVIA

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Policy	
Scottish Government (2015) Scotland's National Marine Plan.	Sets out policies that apply to the marine environment, including policies relating to effects on seascape, landscape and visual receptors.
Guidance	
Landscape Institute and Institute of Environmental Management and Assessment. (2013) Guidelines for Landscape and Visual Impact Assessment. Third Edition. ('GLVIA3')	Industry standard guidance on approach to undertaking assessment of effects of development on landscape and visual receptors.
Landscape Institute (2019) Visual Representation of Development Proposals. Technical Guidance Note 06/19.	Provides guidance on preparing and presenting visualisations, such as photomontages, which are used to support SLVIA.
Landscape Institute (2021) Assessing landscape value outside national designations. Technical Guidance Note 02/21.	Provides guidance on how to assess the value of landscape receptors, which GLVIA3 states is a component of their sensitivity.
NatureScot (2021) Assessing the Cumulative Impact of Onshore Wind Energy Developments.	Provides guidance on assessing cumulative landscape and visual effects, which is applicable to offshore as well as onshore projects.
Scottish Natural Heritage (2017) Visual Representation of Windfarms. Version 2.2.	Provides wind-farm-specific guidance on preparing and presenting visualisations, such as photomontages, which are used to support SLVIA.
Scottish Natural Heritage (2012) Offshore Renewables – guidance on assessing the impact on coastal landscape and seascape.	Provides guidance on scoping for marine renewables projects, including offshore wind farms.

15.3 Consultation

1091. Consultation undertaken to date for the Bellrock WFDA relevant to SLVIA is provided in **Table 15.2** below.

Table 15.2: Consultation Relevant to SLVIA

Consultee	Date/Document	Comment	How comment is Addressed
NatureScot	20th December 2023, email response to the Bellrock WFDA Scoping Workshop held 30th October 2023	*Do you agree with the proposal to scope out SLVIA?* Due to the location of the proposal, the distance to shore, as well as the advice we provided during the Sectoral Marine Plan consultation, we advise that SLVIA for the offshore elements located within the array area [the Bellrock WFDA] is not required and can be scoped out of the assessment. The exception to this would be if there was any planned infrastructure outside the array area [the Bellrock WFDA] that may be visible from shore – if this is the case then we advise further consultation.	Reflected in **Section 15.4.1.**

15.4 Existing Environment

15.4.1 Study Area

1092. The SLVIA study area is defined as a radius around the Bellrock WFDA. Published guidance suggests a study area of 45 km radius for wind turbines over 150 m in overall height (Scottish Natural Heritage, 2017). A 'Ready Reckoner' of potential visual effects related to offshore turbine size (White et al., 2019) suggests a very approximate ratio of 1:133 between turbine height and distance at which low magnitude of impact might be detected. For a proposed maximum blade tip height of 400 m, this would indicate a SLVIA study area radius of 53.2 km.

1093. For recent offshore wind proposals, a SLVIA study area of 60 km has been advised by stakeholders in recognition of the increasing heights of wind turbines. For example, 60 km was recommended for Berwick Bank Wind Farm, where 355 m turbines were proposed (Marine Scotland, 2021), and for Caledonia Offshore Wind Farm, which is proposing a maximum 350 m blade tip height (Marine Scotland, 2023a).

1094. This chapter therefore considers a SLVIA study area of 60 km radius. **Figure 15.1 in Appendix 1** shows the Bellrock WFDA in the context of a 60 km SLVIA study area. There is no permanent above-water infrastructure outside of the Bellrock WFDA which forms part of the Bellrock WFDA that would require separate consideration.

1095. The Bellrock WFDA is approximately 120 km east of Stonehaven (116 km southeast of Peterhead). The entirety of the SLVIA study area therefore comprises open waters within the North Sea. The SLVIA study area includes areas within Scottish and English waters.

15.4.2 Data and Information Sources

1096. **Table 15.3** sets out the information and data sources which have been considered in the preparation of this chapter, and will be considered within the Bellrock WFDA EIA Report assessment where relevant matters are scoped in.

Table 15.3: Summary of Key Data and Information Sources for SLVIA

Dataset	Year(s)	Description
National Marine Plan Interactive (Marine Scotland, 2023b)	Up to 2023	Compilation of various datasets relevant to the understanding of baseline seascape character and potential visual receptors, in Scottish waters.
Explore Marine Plans (Marine Management Organisation, 2021)	2021	Compilation of various datasets relevant to the understanding of baseline seascape character and potential visual receptors, in English waters.
Seascape Character Assessment for the North East (Marine Management Organisation, 2018)	2018	Provides detail of offshore seascape character assessment.

15.4.3 Offshore Seascape Baseline

1097. The SLVIA study area comprises waters in the North Sea. The area includes oil and gas infrastructure in the east, and some areas experience shipping and fishing activity.

1098. A number of future offshore wind farm proposals are located within the SLVIA study area, as shown in **Figure 15.1**. To the west, the proposed Ossian Offshore Wind Farm and Morven Offshore Wind Farm (both ScotWind sites) are around 8 km and 35 km from the Bellrock WFDA, respectively. The Campion Offshore Wind Farm (ScotWind site) is around 24 km to the north, and the Muir Mhòr Offshore Wind Farm (ScotWind site) is around 53 km to the north-west. There is also Cedar Offshore Wind Farm, an Innovation and Targeted Oil and Gas (INTOG) site, some 20 km to the east. The closest operational turbines are at the recently completed Seagreen Offshore Wind Farm[40], around 85 km to the west.

1099. There is no published characterisation of offshore seascape character in Scotland. As such there are no key characteristics for the northern part of the SLVIA study area.

1100. The southern part of the SLVIA study area extends into English waters and is covered by a seascape character assessment published by the Marine Management Organisation (MMO)[41]. The

[40] Seagreen Offshore Wind Farm has been operational since October 2023, but remains ‘under construction’ due to commissioning works necessitating the use of a buoyed construction area (at the time of writing).

[41] The MMO will be consulted with respect to potential impacts on the identified Marine Character Areas (MCAs).

SLVIA study area overlaps with two Marine Character Areas (MCAs). Key characteristics for these MCAs are set out in MMO (2018) and are summarised below.

- MCA 26 Berwick Bank: shallower waters associated with Berwick Bank, which extends into Scottish waters. A remote area with limited shipping activity, though with fishing activity closer to the shore; and
- MCA 28 Swallow Hole Plain: an extensive distant offshore area of open waters over a deep plain with deeper troughs. Busy shipping routes and large numbers of fishing boats, as well as recreational sailing yachts.

1101. There are no designations within any part of the SLVIA study area that are relevant to SLVIA. The value of the offshore seascape is therefore considered to be low.

15.4.4 Visual Amenity Baseline

1102. Visual receptors within the SLVIA study area, that is, within the offshore environment, are limited to those passing through the area on vessels, most of whom will be working in the fishing, transport and oil and gas industries.

1103. Automatic Identification System (AIS) ship traffic data has been used to identify potential receptors crossing the SLVIA study area (Marine Scotland, 2023b). Shipping activity includes cargo vessels, many of which travel out from Aberdeen, heading east towards offshore infrastructure, or south across the SLVIA study area. Fishing activity is concentrated in areas to the west and south-west of the Bellrock WFDA. Movements of recreational craft are limited within the SLVIA study area, though the data indicates some passenger vessels moving between north-east Scotland and northern Germany. There is no indication that any particular value is placed on views within the marine environment.

1104. Receptors on land will not experience views of the Bellrock WFDA due to the distance offshore (approximately 116 km).

15.5 Potential Impacts

1105. This section considers the impacts of the permanent above-water infrastructure within the Bellrock WFDA, comprising wind turbine generators (WTGs) with a maximum tip height of 400 m, mounted on floating substructures (FSSs) and (if used) fixed bottom substructures (FBSSs).

1106. The Bellrock Project could also require the towing of fully assembled floating offshore units (FOU), each comprising a WTG on an FSS, from a port location or wet storage area to the Bellrock WFDA. The port location and wet storage location are unknown at this time. While being towed from port/wet storage, the FOUs are likely to be visible from nearby coastal locations. They would be moving away from shore and this visibility would only last for a short period of time. Due to the transient nature of these views, the towing of FOUs outside the Bellrock WFDA is not considered further in this chapter.

1107. Full details of the Bellrock WFDA are presented in **Chapter 3: Project Description**.

15.5.1 Offshore Seascape Receptors

1108. The offshore seascape is unlikely to be sensitive to changes arising from the infrastructure and activities associated with the Bellrock WFDA. Changes will arise from the presence of cranes, lighting and vessel movements during construction, and the presence of WTGs during operation and maintenance. Sensitivity, for the purposes of SLVIA, is judged with consideration of the susceptibility of the receptor to change, and the value placed on the seascape, landscape or visual resource. The baseline offshore seascape, including existing infrastructure and activity, is considered unlikely to be highly susceptible to changes of the type that would arise from introduction of the Bellrock WFDA. There are no designations or other indications that the area is a valued seascape. Both susceptibility and value, and therefore sensitivity, are likely to be low. While the scale of change in seascape character may be high in the vicinity of the Bellrock WFDA, significant effects are unlikely to arise due to the low sensitivity.

15.5.2 Visual Receptors

1109. People within the SLVIA study area will be either passing through or working within the marine environment. For the most part these receptors are unlikely to be susceptible to changes in their outlook as they move around the sea. People on passenger vessels may be more susceptible to changes in the view, though these receptors are likely to be few in number and would be travelling through the area. There is no indication that any particular value is placed on views within the marine environment. Both susceptibility and value, and therefore sensitivity, are likely to be low, although the sensitivity of people on passenger vessels may be higher.

1110. While the scale of change in views may be high for receptors close to the Bellrock WFDA, arising from views of the WTGs with marker lighting, or of cranes and lighting during construction, significant effects are unlikely to arise due to the generally low sensitivity of receptors, and the small numbers and transient nature of potentially higher sensitivity receptors.

15.5.3 Embedded Mitigation Measures

1111. The effects of the Bellrock WFDA on sensitive seascape and visual receptors will be limited due to its location. No embedded mitigation measures are therefore proposed.

15.6 Scoping of Potential Impacts

1112. The following sections describe the impacts scoped out of the Bellrock WFDA EIA Report, including consideration of cumulative and transboundary impacts. These are summarised in **Table 15.4**.

15.6.1 Potential Impacts Scoped Out

1113. Significant effects on offshore seascape character receptors are unlikely to arise due to their low sensitivity, and therefore these impacts will be scoped out of the Bellrock WFDA EIA Report.

1114. Significant effects on offshore visual receptors are unlikely to arise due to their generally low sensitivity, and/or their transient nature within the SLVIA study area. Impacts on these receptors will be scoped out of the Bellrock WFDA EIA Report.

1115. Due to distance (approximately 116 km), significant effects on coastal and onshore landscape character, or on visual receptors located on land, are unlikely to arise, and impacts on these receptors will be scoped out of the Bellrock WFDA EIA Report.

1116. Therefore, on the basis of the analysis presented in this chapter, it is proposed that all potential impacts to the seascape, landscape and visual environment arising from construction, operation and maintenance, and decommissioning of the Bellrock WFDA, will be scoped out of the Bellrock WFDA EIA Report.

15.6.2 Potential Cumulative Effects

1117. Cumulative seascape, landscape and visual effects may arise from the presence of multiple developments, usually other wind farms, affecting the same receptors. As shown in **Figure 15.1** in **Appendix 1**, a number of other planned offshore wind farms are located within the SLVIA study area. It is likely that the Bellrock WFDA would be seen by receptors in the SLVIA study area in combination with these proposed offshore wind farms, should they be constructed. This includes the Scottish and Southern Electricity Networks (SSEN) Transmission offshore substation.

1118. Cumulative effects may also arise from the presence of the Bellrock OfTDA which includes above-sea infrastructure such as offshore substation(s) and, if required, a reactive compensation station. These features would be present in the seascape and would be seen by receptors in the SLVIA study area, in combination with the Bellrock WFDA.

1119. For the reasons detailed in **Section 15.6.1** above, significant effects on seascape, landscape and visual receptors within or beyond the SLVIA study area are not anticipated. On the same basis, an assessment of cumulative effects on these receptors will also be scoped out of the Bellrock WFDA EIA Report.

15.6.3 Potential Transboundary Effects

1120. Due to the distance of the Bellrock WFDA from other European Economic Area Member States (approx. 125 km from the limit of UK waters), there is no potential for transboundary effects in relation to seascape, landscape and visual receptors from impacts caused by the construction, operational and maintenance, and decommissioning of the Bellrock WFDA.

15.6.4 Summary of Potential Seascape, Landscape and Visual Impacts Scoped In and Out

1121. A summary of potential impacts scoped in and out from further assessment in the Bellrock WFDA EIA Report is provided in **Table 15.4** below.

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Table 15.4: Summary of Potential Impacts Scoped In (✓) or Out (x) for SLVIA

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Presence of FOUs being towed.	Offshore and onshore visual receptors	Temporary change in view	x	x	x	N/A
Presence of offshore construction activity, including vessel movements, cranes and lighting in the seascape.	Offshore seascape character	Potential change in offshore character.	x	x	x	N/A
	Offshore visual receptors	Change in view experienced by people in the offshore environment.	x	x	x	N/A
Presence of the WTGs in the seascape.	Offshore seascape character	Potential change in offshore character.	x	x	x	N/A
	Offshore visual receptors	Change in view experienced by people in the offshore environment.	x	x	x	N/A

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15.7 Proposed Approach to Impact Assessment

1122. Since there are no likely significant effects on seascape, landscape or visual receptors, it is proposed that this topic will be scoped out entirely from the Bellrock WFDA EIA Report.

15.8 Scoping Questions to Consultees

1123. The following questions are posed to consultees to help them frame and focus their response to the SLVIA scoping exercise, which will in turn inform the Scoping Opinion:

- With reference to the guidance noted in **Section 15.4.1**, and the recent Scoping Opinions issued for Caledonia Offshore Wind Farm and others, do you agree that a 60 km radius from the site boundary is a sufficient study area for the SLVIA, and that receptors beyond this distance (including all onshore receptors) do not need to be considered?
- Do you agree that offshore seascape character is of low sensitivity to the type of change proposed, and that offshore seascape receptors can be scoped out as no likely significant effects would arise?
- Do you agree that offshore visual receptors are of generally low sensitivity to the type of change proposed, and/or would be transient receptors passing through the study area, and that visual receptors can be scoped out as no likely significant effects would arise?
- Do you agree that cumulative effects on seascape and visual receptors can be scoped out of the SLVIA?
- Do you have any other matters or information sources that you wish to present?

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16 Socioeconomics, Tourism and Recreation

16.1 Introduction

1124. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on socioeconomics, tourism and recreation receptors. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

1125. This chapter provides an overview of the existing environment and sets out the methodology and approach to assessing effects on socioeconomics, tourism and recreation receptors in the Bellrock WFDA Environmental Impact Assessment (EIA) Report.

1126. As discussed in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**, the assessment of the Bellrock OfTDA will be included in a separate planning application, and therefore a separate EIA Report. The Socioeconomic Impact Assessment (SEIA) for the whole Bellrock Project will be presented in a standalone report appended to the Bellrock WFDA EIA Report. The Bellrock Project SEIA will be updated with the subsequent submission of the Bellrock OfTDA EIA Report. Although the assessments presented in each EIA Report will remain valid, this iterative approach will be undertaken allowing for up-to-date information (if required) to be incorporated within each submission.

1127. The key impacts that will be covered in this chapter include:

- Increase in employment and Gross Value Added (GVA);
- Demographic changes;
- Changes to housing demand;
- Changes to other local public and private services;
- Socio-cultural impacts;
- Changes to commercial fisheries;
- Changes to shipping; and
- Changes to marine recreation.

1128. This chapter should be read alongside the following other chapters of the Bellrock WFDA Scoping Report:

- **Chapter 10: Commercial Fisheries;**
- **Chapter 11: Shipping and Navigation;**
- **Chapter 13: Marine Infrastructure and Other Users;** and
- **Chapter 15: Seascape, Landscape and Visual Impact.**

1129. This socioeconomics, tourism and recreation chapter is likely to have key inter-relationships with the above receptors, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

1130. This chapter has been prepared by BiGGAR Economics Ltd.

16.2 Legislation, Policy and Guidance

1131. **Table 16.1** sets out the legislation, policy and guidance which have been considered in the preparation of this chapter, and will be considered within the Bellrock WFDA EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

1132. In addition to the guidance documents listed, the Scottish Government is in the process of developing guidance on the assessment of the socioeconomic impacts of offshore wind energy projects. It is expected that this shall be published prior to the submission of the Bellrock WFDA EIA Report. Where appropriate, this will be considered within the EIA. The Applicant will engage with the Marine Analytical Unit (MAU) throughout the pre-application phase so that any methodologies applied are in line with developing guidance.

Table 16.1: Summary of Relevant Legislation, Policy and Guidance for Socioeconomics, Tourism and Recreation

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Policy	
Scottish Government (2023), National Planning Framework 4 (NPF4)	Establishes a framework for spatial priorities in Scotland.
Scottish Government (2020), Offshore Wind Policy Statement	Sets out the Scottish Government’s ambitions for the future of offshore wind in Scotland.
Scottish Government (2022a), National Strategy for Economic Transformation	Sets out the priorities for the Scottish economy, as well as how to achieve a wellbeing economy.
Scottish Government (2018), National Performance Framework	Sets out a framework for what a successful country would look like, providing a range of measures to assess a proposed project against.

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Department for Business, Energy & Industrial Strategy (BEIS) (2020), The Offshore Wind Sector Deal	Sets out the economic opportunities associated with offshore wind, including UK Government targets on the share of UK content.
Scottish Government (2015) National Marine Plan	Covers the management of both Scottish inshore and offshore waters.
Guidance	
Marine Scotland (2022a) Defining 'Local Areas' for assessing impacts of offshore renewables and other marine developments: Guidance Principles	Outlines the approach that should be taken when considering what the geographic scope of socioeconomic receptors should be.
Marine Scotland (2022b) General Advice for Socioeconomic Impact Assessment, MAU	Outlines the methodology that should be applied for economic impact assessments and the scope of social impacts that should be considered.
HM Treasury (2022), Green Book: Appraisal and Evaluation in Central Government	Provides guidance on economic impact assessments, including the consideration of additionality and discounting.

16.3 Consultation

1133. As part of the Bellrock WFDA Scoping Workshop (30th October 2023), an information package was provided to Marine Directorate - Licensing Operations Team (MD-LOT) (including MAU) and NatureScot, including on the proposed approach to socioeconomics, tourism and recreation. Relevant observations from MD-LOT/MAU are noted in **Table 16.2**.

Table 16.2: Consultation Relevant to Socioeconomics, Tourism and Recreation

Consultee	Date/Document	Comment	How Comment is Addressed
MD-LOT / MAU	15th December 2023, email response to Bellrock WFDA Scoping Workshop held 30th October 2023	The Marine Directorate directed the Applicant towards the General Advice for Assessing the Socio-economics of Offshore Wind Farms. This included requests to conduct primary social research around the most likely port locations.	The scope of the assessment is outlined in **Section 16.6** in relation to the General Advice from the Marine Directorate. Port locations will not be determined until after the submission of the application for consent. The implications of this are outlined in **Section 16.6**.

1134. The Applicant will continue to engage with stakeholders during the pre-application phase, following the publication of the Scoping Opinion and supporting consultation responses. It is anticipated that further engagement will be required with the Marine Directorate and Aberdeenshire Council. The scope of the topics to be discussed will be dependent on the content of the Scoping Opinion but is likely to broadly include:

- Further discussion and agreements about socioeconomic study areas;
- Assessment methodologies for socioeconomic impacts; and
- Approach to community and stakeholder engagement.

16.4 Existing Environment

16.4.1 Study Area

1135. The relevant study areas for the socioeconomic assessment are onshore. This is because the organisations, individuals and communities that might be impacted by the Bellrock WFDA activities are based in onshore communities, including coastal communities.

1136. The socioeconomic study areas for the assessment of effects on employment and economy will be defined in line with the guidance on the identification of 'local areas' for offshore developments published by Marine Scotland (Marine Scotland, 2022a). This guidance identified six principles for identifying local study areas for offshore developments:

- **Principle 1 (Dual Geographies)**: The local area for the supply chain and investment impacts should be separate from the local area(s) for wider socioeconomic impacts, including tourism and recreation;
- **Principle 2 (Appropriate Impacts)**: The appropriate impacts to be considered for assessments should be identified before defining the local areas;
- **Principle 3 (Epicentres)**: The local areas should include all the epicentres of the appropriate impacts;
- **Principle 4 (Accountability)**: The local areas used in the assessment should comprise of pre-existing economic or political geographies (community councils, local authorities, development agencies) to enhance accountability;
- **Principle 5 (Understandable)**: The local areas should be defined in such a way that they are understandable to the communities they describe; and
- **Principle 6 (Connected Geography)**: The local area for the supply chain and investment impacts should consist of connected (including coastal) pre-existing economic or political geographies.

1137. The epicentres of impact associated with the infrastructure and activities for the Bellrock WFDA will include the locations of the key construction and operations and maintenance ports, the location of any large manufacturing facilities and any locations on land with visibility of the offshore infrastructure. However, the Bellrock WFDA will be located approximately 120 km east of Stonehaven (116 km southeast of Peterhead), Aberdeenshire and this is beyond the range of normal visibility (White Consultants, 2020)[42]. Therefore, the visibility of the offshore infrastructure is not anticipated to be considered an epicentre of impacts. At this stage the port locations or supply

[42] For further information on visibility of the offshore infrastructure, please refer to **Chapter 15: Seascape, Landscape and Visual Impact**.

chain companies have not been defined and therefore a 'local area' has not been defined in this Bellrock WFDA Scoping Report. A 'local area' for the SEIA will be defined within the Bellrock WFDA EIA Report if more details on the potential port locations are known.

1138. The socioeconomic effects will be also assessed at the level of Scottish and UK economies.

1139. For tourism and recreation, the primary focus will also be onshore activity that is affected by the development, construction, operation and maintenance, and decommissioning of the Bellrock WFDA. Given the distance of the Bellrock WFDA from shore (120 km), it is anticipated that there will be no effects associated with visibility and therefore any potential changes to visitor behaviour would be expected to arise due to increased activity at ports and harbours. These impacts have been scoped out of the assessment as it is not expected that ports will be identified prior to the EIA assessment.

1140. In addition, there will also be the potential for marine recreation to be affected by the construction and decommissioning of the OfTDA. These could occur if the vessels used during the construction impede the ability of marine recreation users to pursue these activities, including recreational sailing or sea angling.

16.4.2 Data and Information Sources

1141. **Table 16.3** sets out the information and data sources which have been considered in the preparation of this chapter, and will be considered within the Bellrock WFDA EIA Report assessment where relevant matters are scoped in.

Table 16.3: Summary of Key Data and Information Sources for Socioeconomics, Tourism and Recreation

Dataset	Year(s)	Description
National Records of Scotland (2022), Mid-2021 Population Estimates Scotland	2022	Population estimates, broken down by age.
National Records of Scotland (2022), 2012-based Principal Population Projections	2022	Population projections for Scotland.
National Records of Scotland (2020), 2018-based Principal Population Projections	2020	Population projections for Scotland and each of its 32 local authorities, broken down by age.
Office for National Statistics (ONS) (2020), Principal Populations 2018-Based	2020	Population projections for the UK as a whole, broken down by age.
ONS (2023) Annual Survey of Hours and Earnings 2022	2023	Provides average and median residential and workplace earnings.
ONS (2022), Business Register and Employment Survey 2021	2022	Provides a breakdown of employment by sector.
ONS (2023), Annual Population Survey 2022	2023	Provides statistics on characteristics of populations, including economic activity rate and unemployment rate.

Dataset	Year(s)	Description
Offshore Wind Industry Council (OWIC) (2023), Offshore Wind Skills Intelligence Report	2023	Provides information on the existing offshore wind labour force across the UK as well as the skills that are expected to be needed up to 2030.
Offshore Renewable Energy Catapult (2020), The Offshore Wind Operation and Maintenance Opportunity	2020	Discusses the potential opportunities in offshore wind by 2030, with a detailed breakdown of annual spending and associated opportunities in the UK.
BEIS (2020), The Offshore Wind Sector Deal	2020	Sets out the economic opportunities associated with offshore wind, including UK Government targets on the share of UK content.
Scottish Government (2018), National Performance Framework	2018	Sets out a framework for what a successful country would look like, providing a range of measures to assess a proposed project against.
Scottish Government (2022a), National Strategy for Economic Transformation	2022	Sets out the priorities for the Scottish economy, as well as how to achieve a wellbeing economy.
Scottish Government (2023), NPF4	2023	Establishes a framework for spatial priorities in Scotland.
Scottish Government (2020), Offshore Wind Policy Statement	2020	Sets out the Scottish Government's ambitions for the future of offshore wind in Scotland.
Kantar TNS (2020), GB Tourism Survey 2019	2020	Annual publication of domestic overnight tourism visits and nights by number, value and purpose, with 2019 as the latest year not affected by Covid-19. May be updated before drafting the EIA.
ONS (2020), International Passenger Survey	2020	Annual publication of international overnight tourism visits and nights by number, value and purpose, with 2019 as the latest year not affected by Covid-19. May be updated before drafting the EIA.
Scottish Government (2022), Annual Growth Sector Statistics	2022	Provides economic statistics, such as employment and GVA, on growth sectors identified by the Scottish Government, including sustainable tourism.

16.4.3 Socioeconomic Baseline

1142. The focus of the socioeconomic baseline will be analysis of the key indicators that will determine the sensitivity of the receptors and the potential magnitude of any change. It will therefore cover:

- Population and demographics;
- Labour market indicators, including employment levels, skills and salaries;
- Industrial structure;

- Housing market indicators; and
- Productivity and economic output indicators.

1143. The geographic scope of the baseline will consider the study areas that have been identified in **Section 16.4.1**. This will include Scotland and the UK.

1144. The working age population in Scotland is projected (National Records of Scotland, 2022) to decrease over time and so the Scottish economy requires new drivers of growth. The offshore renewables sector represents an opportunity of substantial scale for the Scottish, and wider UK, economies and this is highlighted in the strategic objectives of both the Scottish and UK Governments.

16.4.4 Tourism and Recreation Baseline

1145. Sustainable tourism is identified as one of Scotland's growth sectors, accounting for 209,000 jobs in 2022. In 2022, total visitor spending was £10.4 billion, this included international visitors (VisitScotland, 2023a), overnight domestic visitors (VisitScotland, 2023b) and day visitors (VisitScotland, 2023c). The tourism baseline will be augmented with local visitor attractions and other data if more information is known about the construction and operation port(s).

16.4.5 Strategic Overview

1146. The strategic baseline is provided in the sections below. This will be updated in the EIA to reflect revisions to existing strategies or any local strategies if a local study area has been identified. Please see **Chapter 2: Policy and Legislative Context** for the wider policy context.

16.4.5.1 National Performance Framework

1147. Scotland's National Performance Framework (Scottish Government, 2018), first published in 2018, sets out the ambitions of the Scottish Government across a range of economic, social and environmental factors. The framework includes 'increased wellbeing' as part of its purpose and combined measurement of how well Scotland is doing in economic terms with a broader range of wellbeing measures. The NPF is designed to give a more rounded view of economic performance and progress towards achieving sustainable and inclusive economic growth and wellbeing across Scotland.

1148. The aims for Scotland set out in the National Performance Framework are:

- Create a more successful country;
- Give opportunities to all people living in Scotland;
- Increase the wellbeing of people living in Scotland;
- Create sustainable and inclusive growth; and
- Reduce inequalities and give equal importance to economic, environmental and social progress".

16.4.5.2 National Planning Framework 4

1149. In 2023, the Scottish Government published NPF4 (Scottish Government, 2023), which set out Scotland's spatial strategy to 2045. It affirms the importance of Scotland's transition to a net zero economy through green investment and green jobs, with wind energy highlighted as playing a significant role in the coming years. It states that renewable energy developments will only be supported where they maximise net economic impact, including local and community socioeconomic benefits, such as employment, associated business and supply chain opportunities.

16.4.5.3 National Strategy for Economic Transformation

1150. In March 2022, the Scottish Government released the National Strategy for Economic Transformation (Scottish Government, 2022a), which set out its ambition for Scotland's economy over the next 10 years. The Scottish Government's vision is to create a wellbeing economy where society thrives across economic, social and environment dimensions, which delivers prosperity for all Scotland's people and places. Of particular importance is the ambition to be greener, with a just transition to net zero, a nature-positive economy and a rebuilding of natural capital.

1151. A key longer-term challenge identified in the strategy is to address deep-seated regional inequality, which includes rural and island areas that face problems such as a declining labour supply, poorer access to infrastructure and housing. The transition to net zero presents a further challenge of delivering positive employment, revenue and community benefits.

1152. To deliver its vision and address the economy's challenges, five programmes of action have been identified (with a sixth priority of creating a culture of delivery), including:

- Establishing Scotland as a world-class entrepreneurial nation;
- Strengthening Scotland's position in new markets and industries, generating new, well-paid jobs from a just transition to net zero;
- Making Scotland's businesses, industries, regions, communities and public services more productive and innovative;
- Ensuring that people have the skills they need to meet the demands of the economy, and that employers invest in their skilled employees; and
- Reorienting the economy towards wellbeing and fair work.

1153. The strategy notes that Scotland has substantial energy potential, with a quarter of Europe's wind potential, and that it has developed a growing green industrial base. This provides a strong foundation for securing new market opportunities arising from the transition to net zero, for example in the hydrogen economy and in the decarbonisation of heating systems, where Scotland may be able to secure first-mover advantage and will need continuing investment and support. Renewable energy also has a role to play in supporting productive businesses and regions across Scotland.

16.4.5.4 Offshore Wind Policy Statement

1154. The Scottish Government's 2020 Offshore Wind Policy Statement (Scottish Government, 2020) highlights the substantial potential of Scotland's waters for offshore wind and the importance of the sector in the transition to net zero.

1155. When the policy statement was published in October 2020 the ScotWind leasing round was expected to lead to an additional 11 GW of offshore wind capacity by 2030, generating substantial economic impacts in Scotland's offshore wind supply chain. In contrast, the ScotWind leasing round is now expected to lead to an additional 25 GW of offshore wind capacity (Crown Estate Scotland, 2022), with economic opportunities related to floating offshore.

16.4.5.5 UK Government Offshore Wind Sector Deal

1156. The UK Government's Offshore Wind Sector Deal (BEIS, 2020) aims to ensure that UK companies can benefit from the opportunities presented by the expansion of the offshore wind sector, enhancing the competitiveness of UK firms internationally and sustaining the UK's role as a global leader in offshore wind generation, as outlined in the offshore wind sector deal. Offshore wind is also expected to play a significant role in the transition to net zero, creating green jobs as part of the net zero, build back greener agenda.

16.5 Potential Impacts

1157. The socioeconomics, tourism and recreation impacts that are considered are those defined in the general advice published by the MAU in 2022 (Marine Scotland, 2022), which highlights some commonly identified socioeconomic impacts which could occur as a result of the development of an offshore wind farm. These include:

- Economic impacts;
  - GVA;
  - Employment, including characteristics of employment;
  - Direct, indirect and induced impacts;
- Impacts on other sectors;
  - Tourism;
  - Commercial fisheries;
- Demographic impacts;
- Housing impacts;
- Other local public and private services; and
- Socio-cultural effects.

16.5.1 Embedded Mitigation and Enhancement Measures

1158. As part of the development and design process, the Applicant has identified measures to mitigate against adverse socioeconomics, tourism and recreation effects and to enhance any beneficial effects, in particular those associated with the supply chain. These are outlined below.

1159. To enhance the beneficial effects associated with the supply chain the Applicant places a strong focus on supply chain engagement and skills development to build the capacity. The Applicant is mapping the current Scottish supply chain capabilities and holding introductory meetings with potential suppliers and stakeholders.

1160. As part of the ScotWind bidding process, the Applicant provided a Supply Chain Development Statement (SCDS) (Bellrock Offshore Wind Farm, 2023), which outlines a 'commitment' scenario and an 'ambition' scenario for the level of supply chain content to be secured within Scotland and the UK.

1161. The key ambition of the Bellrock Project is to successfully build and operate an offshore wind farm to help reach Scotland's net zero targets in the face of the climate emergency (see **Chapter 2: Policy and Legislative Context**), and realise the benefits of a sustainable energy source which improves Scotland's energy security and reduces costs to the consumer.

1162. The Applicant is collaborating with local and national agencies to train and upskill the workforce by formulating specific enterprise and skill development programmes. Works are ongoing with the Energy Skills Partnership to upskill and re-skill the existing work force and also with Edinburgh Science to promote the industry via education programmes, STEM (science, technology, engineering and mathematics) projects and funding.

1163. In relation to local supply chain, the Bellrock Project's ambition is to spend £2.7 billion within the Scottish supply chain during its development, construction and operation, with a commitment of £1.7 billion (Bellrock Offshore Wind Farm, 2023). The Applicant's approach to supply chain development is one of 'shared value' - a combination of project competitiveness and sustainable development of the Scottish offshore wind supply chain.

16.6 Scoping of Potential Impacts

1164. **Table 16.5** sets out the initial assessment of potential impacts on socioeconomics, recreation and tourism due to the construction, operation and decommissioning of the Bellrock WFDA. The assessment is based on a combination of:

- The definition of the Bellrock WFDA at the scoping stage;
- Embedded mitigation, as set out in **Section 16.5.1**;
- The level of understanding of the baseline at the scoping stage;
- The existing evidence base for socioeconomics, tourism and recreation effects due to the Bellrock WFDA;
- Relevant policy; and
- The professional judgement of qualified economists and social researchers.

1165. The social impacts that are considered in this section are those defined in the general advice published by the MAU in 2022 (Marine Scotland, 2022), as described in **Section 16.5.** At the time of writing, the construction and operation port(s), which are expected to be the main epicentres of impact, are not yet known and will not be known until post-consent. At the time of the assessment it will however be possible to identify hypothetical areas of impact and undertake scenario planning for impact at potential locations for the construction base and operation and maintenance base. It will not therefore be possible to be definitive about the nature and scale of the impacts affecting communities but information on impacts for a number of potential scenarios will be presented, including an overview of:

- What impacts may occur and at what scale;
- The sensitivity of the communities that these impacts may occur in; and
- How these impacts may be felt across these communities.

1166. Consideration has been given to taking a proportionate approach to undertaking social research required for the socioeconomic assessment, and how it will complement the wider community engagement activities that the Applicant wishes to undertake.

16.6.1 Potential Impacts Scoped In

1167. The impacts 'scoped in' to the assessment include:

- Increase in employment and GVA;
- Demographic changes;
- Changes to housing demand;
- Changes to other local public and private services;
- Changes to commercial fisheries;
- Changes to shipping; and
- Changes to marine recreation.

1168. Descriptions of the impacts scoped in are provided in **Table 16.5.**

16.6.2 Potential Impacts Scoped Out

1169. The socio-cultural effects are identified in the General Advice (Marine Scotland, 2022) as a potential type of impact:

- Lifestyles/quality of life;
- Gender issues; family structure;
- Social problems (e.g. crime, ill-health, deprivation);
- Human rights;
- Community stress and conflict; integration, cohesion and alienation; and
- Community character or image.

1170. Impacts scoped out of the Bellrock WFDA EIA Report are those which do not have the potential for significant effects. It is therefore proposed that socio-cultural effects are scoped out of the assessment for the Bellrock WFDA EIA Report because:

- The socio-cultural effects are generally neither adverse nor significant; and
- The communities that will experience these socio-cultural effects cannot be definitively identified at the time of assessment. Therefore, it is not considered proportionate to conduct primary social research in all areas that may have the potential to host activities associated with the Bellrock WFDA regarding:
  - Perceptions of impact;
  - Sensitivities of communities to any of the changes; and
  - The relative magnitude in any change that would be required to identify significant adverse effects.

1171. There will be a collaborative approach, led by Scottish Offshore Wind Energy Council (SOWEC) that will consider socio-cultural impacts on communities across the offshore wind sector. The Applicant will support this approach.

1172. In 2022, the Scottish Government published social research by the Diffley Partnership (Scottish Government, 2022b) that considered the social impacts that coastal communities with experience of offshore wind farms have had. While this research found that the perception of these communities was that the offshore wind farms have had a minor net positive impact on their quality of life, community relations and community character, the majority of respondents felt that the offshore wind farm projects have had no impact on these socio-cultural attributes. This is shown in **Table 16.4**, which shows that 63% of respondents felt the development of offshore wind projects had no impact on their quality of life, 59% felt it had no impact on community relations and 55% felt it had no impact on community character.

Table 16.4: Responses from Coastal Communities to Questions Regarding Socio-cultural Impacts of Offshore Wind Farms

What impact, if any, do you think that offshore wind farms in your area have had on …	Total Positive Impact	No Impact	Total Negative Impact	Net Positive/ Negative
…quality of life?	25%	63%	4%	+ 21%
…community relations?	16%	59%	7%	+ 9%
…community character?	21%	55%	9%	+ 12%

1173. The general effect of offshore wind developments on these socio-cultural attributes of coastal communities is therefore neither adverse nor significant.

1174. The assessment of these effects for the Bellrock WFDA would require primary social research within the communities that will be impacted, in particular those that will experience the greatest demographic or employment effects. However, at the time of the assessment the locations of these communities will not be known as the primary construction and operational port(s) will not have been identified.

1175. While there may be issues that are specific to the communities around the epicentres of impact that could result in significant or adverse effects, at the time of the assessment these locations are not likely to be known. Unlike the potential effects on demographics, housing and other services the socio-cultural effects are not so directly linked to the scale of the employment opportunities in each of the communities. As the location of the construction base and operation and maintenance port(s) will not be made until post-consent, it will not be possible to discuss the potential socio-cultural effects beyond the general effect of offshore wind on coastal communities.

16.6.3 Potential Cumulative Effects

1176. The process by which potential cumulative effects will be assessed through the cumulative effects assessment (CEA) is described in **Chapter 4: Approach to Scoping and EIA**.

1177. There is the potential for the potential impacts identified in **Table 16.5**: to interact with other projects particularly other offshore wind farms being developed as part of the ScotWind and Innovation and Targeted Oil & Gas (INTOG) leasing rounds, and other significant capital projects in the area. Cumulatively, the development of the ScotWind projects is expected to represent a substantial increase in demand at the Scottish level for the industries that will be involved in the construction of these projects.

1178. As one of potentially many offshore wind projects, the Bellrock WFDA will contribute to the cumulative case for potential local or inward investment by making it more financially attractive to set up new manufacturing and fabrication facilities in Scotland, as opposed to relying on overseas facilities that may have higher transportation costs. Consideration will also be given to the cumulative effects on port facilities during both construction and operation and maintenance phases. As the port location(s) for the Bellrock WFDA and other offshore wind projects will not be known at the time of the assessment, this impact will be discussed qualitatively.

1179. The decommissioning timetable of other capital projects, particularly offshore wind projects, is not known at this stage, and the main constraint on this activity will be the port infrastructure. The baseline assessment of port capabilities and constraints is likely to change over time as ports invest in new facilities to feed the decommissioning demand. Therefore, the CEA will not consider decommissioning impacts.

1180. The CEA will consider the Bellrock OfTDA based on details available at the time of assessment. A full SEIA for the Bellrock OfTDA will be included in the Bellrock OfTDA EIA Report.

16.6.4 Potential Transboundary Effects

1181. The following transboundary effects have been identified as potential occurrences resulting from activities associated with the Bellrock WFDA construction, operation and maintenance, and decommissioning:

- Socioeconomic effects taking place outside of the UK, relating to non-UK supply chain during the construction, operation and decommissioning phases. These will be imports from outside of the UK, and are expected to be positive; and
- Effects on commercial fisheries and other marine users based outside of the UK during construction, operation and maintenance, and decommissioning.

16.6.5 Summary of Potential Socioeconomics, Tourism and Recreation Impacts Scoped In and Out

1182. Potential impact pathways relevant to socioeconomics, tourism and recreation which may occur during the construction, operation and maintenance, or decommissioning phases of Bellrock WFDA have been summarised in **Table 16.5.**

Table 16.5: Summary of Potential Impacts Scoped In (✓) or Out (x) for Socioeconomics, Tourism and Recreation

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Increase in employment and GVA	Economies of Scotland and the UK	Economic impacts associated with the expenditure of the Bellrock WFDA and supply chain requirements.	✓	✓	✓	SCDS and stakeholder engagement.
Demographic changes	Potential range of communities around epicentres of impact	Change in population and characteristics of population as a result of the Bellrock WFDA.	✓	✓	✓	N/A
Changes to housing demand	Potential range of communities around epicentres of impact	Change in level of demand for accommodation as a result of the Bellrock WFDA and its demographic impacts.	✓	✓	✓	Stakeholder engagement, including with local authorities and sector bodies.
Changes to other local public and private services	Potential range of communities around epicentres of impact	Change in level of demand for services as a result of the Bellrock WFDA and its demographic impacts.	✓	✓	✓	Stakeholder engagement, including with local authorities and sector bodies.
Socio-cultural effects	Communities local to epicentres of impact	Changes in perceptions of communities wellbeing, including quality of life and community cohesion.	x	x	x	N/A

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Changes to commercial fisheries	Commercial fishing sector and associated supply chains	Potential disruption to the commercial fishing sector leading to changes in economic activity in the sector.	✓	✓	✓	Proposed embedded mitigation measures are outlined in **Chapter 10: Commercial Fisheries**.
Changes to shipping	Shipping and navigation sector	Changes to economic activity as a result of the Bellrock WFDA potentially affecting activity in the shipping sector.	✓	✓	✓	Proposed embedded mitigation measures are outlined in **Chapter 11: Shipping and Navigation**.
Changes to marine recreation	Marine recreation users in affected communities	Changes to recreational amenity as a result of the Bellrock WFDA potentially affecting marine recreation activity.	✓	✓	✓	Proposed embedded mitigation measures are outlined in **Chapter 11: Shipping and Navigation**.

16.7 Proposed Approach to Impact Assessment

1183. The assessment of socioeconomic, tourism and recreation receptors will comply with the general approach set out in **Chapter 4: Approach to Scoping and EIA** and the guidance listed **in Section 16.2**. Further detail on the specific approach to assessment for this topic is provided below.

16.7.1 Economic Impact Methodology

1184. To assess the socioeconomic effects of the Bellrock WFDA the focus will be on the direct and indirect (supply chain) effects, in line with the UK Offshore Wind Sector Deal (BEIS, 2020). In addition to this, the assessment will also consider the effects of staff spending and the economic impact that this subsequent increase in demand stimulates (the induced effect).

1185. The economic impacts will be considered for each study area and will be reported in terms of:

- **GVA**: this is a measure of economic value added by an organisation, industry or region and is typically estimated by subtracting the non-staff operational costs from the turnover of an organisation;
- **Years of Employment**: this is a measure of employment which is equivalent to one person being employed for a year and is typically used when considering short to medium term employment impacts, such as those associated with the construction phase of the Bellrock WFDA; and
- **Jobs**: this is a measure of employment which considers the headcount employment in an organisation or industry. This measure is used when considering long term impacts such as the jobs supported during the operation and maintenance phase of the Bellrock WFDA.

1186. The socioeconomic assessment will consider the lowest, realistic levels of expenditure associated with the Bellrock WFDA, since that would represent the 'worst-case' scenario in terms of the expected positive socioeconomic effects. This will take account of the 'Commitment' scenario in the SCDS submitted as part of the ScotWind leasing process, though may be revised to reflect subsequent revisions of the SCDS which will take account of any changes or developments in the local supply chain.

1187. The impact assessment will take account of deadweight, leakage, displacement and substitution. Sensitivity analysis will also be undertaken to account for risk, uncertainty and optimism bias, where they could have implications for the economic impacts. The sensitivity analysis will be presented in the stand alone reports because the assessment will focus on the worst-case scenario within the chapter.

1188. The assessment will include elements of the Bellrock WFDA. Full details, specific to the WFDA, are discussed in **Chapter 3: Project Description.**

1189. The analysis for the Bellrock WFDA will cover three phases:

- Construction (including development);
- Operation and maintenance; and
- Decommissioning.

1190. The impacts during the construction phase will be based on the actual expenditure that has occurred to date as well as the planned expenditure associated with this phase. In addition to the total impact over the period, the assessment will also consider the timings of impacts during this phase to understand the peaks and troughs of this activity.

1191. The impacts during the operation and maintenance phase for the Bellrock WFDA will be based on projected operational (including maintenance) expenditure.

1192. In instances where impacts are expected to occur over several years, such as the operation and maintenance phase or the decommissioning phase, a discount rate will be applied. This allows impacts that occur sooner to be valued more highly than impacts that occur in the future, a concept known as time preference. In this instance a discount rate of 3.5% will be chosen, which is in line with the UK Government's Green Book (HM Treasury, 2022). On this basis it is expected that the decommissioning phase impacts will be substantially lower than for the construction phase.

16.7.2 Social Impact Assessment Methodology

1193. To avoid negative impacts of the SEIA process itself, consultation will be limited to stakeholders (such as local authorities). The methodology aims to minimise disruption to communities through over-consultation, and ultimately seeks to avoid reputational damage to the Bellrock WFDA, it's Applicant, the offshore sector in general, and the Scottish Government's consenting processes.

1194. More details on why location is particularly important in understanding how impacts are felt across communities are provided in this section, particularly around the factors that influence the sensitivity of the communities that will be affected.

1195. This section outlines the methodology that will be applied to potential impacts that have been scoped into the assessment.

16.7.2.1 Demographics

1196. The employment that will be created as a result of the Bellrock WFDA will have demographic impacts if this employment helps to retain or attract people to the communities where this activity occurs. The potential impacts of demographic change will be assessed as far as possible, including the scale of any impact and its potential to be significant.

1197. As location(s) for activities associated with the Bellrock WFDA will not have been determined at the time of drafting the Bellrock WFDA EIA Report, the assessment will consider the potential scale of employment opportunities at hypothetical locations of the construction base and the operation and maintenance base.

1198. The sensitivity of each of the demographic receptors will be determined by the trends in demographics in the potential host communities and projections estimated for how these demographics will change over time, and how the demographics of the workforce would relate to different communities. The magnitude of any demographic change will be determined by the change relative to the current population.

16.7.2.2 Housing

1199. The potential impacts on housing are one of the key topics that coastal communities are concerned about (Scottish Government, 2022b). The demographic changes that result from the employment opportunities have the potential to change the level of demand for housing.

1200. As with the demographic impacts, potential effects on housing will vary considerably between communities. The sensitivity of any housing market to changes in demand as a result of the Bellrock WFDA will be determined by factors including:

- The population of the community, including the wider travel to work area;
- The availability of housing or other accommodation within the community;
- The scale of the overnight tourism sector in the community;
- The ability of the housing market to adjust supply to respond to changes in demand; and
- The relative level of housing affordability in the area.

1201. Similarly, the magnitude of any change will be determined by the peak level of additional accommodation demand in each area, relative to the baseline accommodation provision. The magnitude of any change in housing demand would also be determined by the demographic changes as a result of the Bellrock WFDA. This would be determined by the baseline labour supply in each of the potential areas and the relative size of any transient labour population.

1202. As location(s) for activities associated with the Bellrock WFDA will not have been determined at the time of drafting the EIA Report, the assessment will consider the potential scale of additional demand on housing that will occur during the peak periods of employment in different host area scenarios, for example either a rural or urban location, for activities associated with the Bellrock WFDA.

16.7.2.3 Other Local Service

1203. As with the housing market, the demographic changes that could result from the employment opportunities, could result in changes to the level of demand for other services. This will include:

- Public and private sector services;
- Educational services;
- Health services and social support;
- Police, fire, recreation, transport; and
- Local authority finances.

1204. The assessment of the effect on these services will also be determined by factors of sensitivity that will be specific to the potentially impacted communities. This will include the capacity of each service in each of the potential areas and the ability of the service to adapt to changes in demand.

1205. The magnitude will also be determined by the relative demographic change in each potential area, which will vary based on the size of the population and the availability of labour in each of the study areas.

1206. As the location of the construction base and operation and maintenance base will not have been determined at the time of drafting the EIA Report, the assessment will consider the potential scale of additional demand on other services that will occur during the peak periods of employment based on the potential demographic effects for different host area scenarios, for example either a rural or urban location, and the propensity of each demographic group to use each of the services listed.

16.8 Scoping Questions to Consultees

1207. The following questions are posed to consultees to help them frame and focus their response to the socioeconomics, tourism and recreation scoping exercise, which will in turn inform the Scoping Opinion:

- Do you agree with the study areas defined for socioeconomics, tourism and recreation?
- Do you agree with the use of data listed in this chapter being used to inform the Bellrock WFDA EIA Report?
- Are there any further data sources or guidance documents that should be considered?
- Do you agree with the scoping in and scoping out of impact pathways in relation to socioeconomics, tourism and recreation (as presented in **Table 16.5**)?
- Do you agree with the assessment of transboundary effects in relation to socioeconomics, tourism and recreation?
- Do you agree with the assessment of cumulative effects in relation to socioeconomics, tourism and recreation?
- Do you agree with the proposed assessment methodology for socioeconomics, tourism and recreation?
- Do you agree on the suitability of the proposed embedded mitigation of relevance to socioeconomics, tourism and recreation that have been identified for the Bellrock WFDA?
- Do you have any other matters or information sources that you wish to present?

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17 Climate Change

17.1 Introduction

1208. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on climate change. It also considers Bellrock WFDA's vulnerability and resilience to climate change impacts. This chapter has been prepared by Royal HaskoningDHV. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

1209. With regards to Bellrock WFDA's impact on climate change, this chapter provides an overview of the existing environment and sets out the proposed methodology and approach to assessing effects on climate change in the Bellrock WFDA Environmental Impact Assessment (EIA) Report.

1210. One of the principle aims of the Bellrock Project is to make a contribution to tackling climate change by generating secure, low carbon and renewable electricity, helping decarbonise the power sector and other sectors in the United Kingdom (UK). Refer to **Chapter 2: Policy and Legislative Context** for background on the need for the Bellrock Project.

1211. Climate change must be considered within the Bellrock WFDA EIA Report as required by the EIA Directive 2014/52/EU, which was transposed into the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) Regulations in 2007.

1212. The climate change chapter of the Bellrock WFDA EIA Report will include consideration of both the Bellrock WFDA's impacts on climate change, and the impacts of climate change on the Bellrock WFDA. As discussed in **Chapter 4: Approach to Scoping and Environmental Impact Assessment**, the assessment of the Bellrock OfTDA will be included in a separate planning application and therefore a separate EIA Report.

1213. The climate change chapter will comprise two separate assessments, as follows:

- A whole-life greenhouse gas (GHG) assessment, which will comprise the following elements:
  - Overall GHG assessment for the Bellrock WFDA, which will be presented in the climate change chapter of the Bellrock WFDA EIA Report. This assessment will cover GHG emissions released over the Bellrock WFDA's lifecycle, and the avoided emissions from the provision of renewable electricity to the National Electricity Transmission System.
  - Whole project assessment for the Bellrock Project (i.e. the WFDA and OfTDA), which will be presented in a standalone report appended to the Bellrock WFDA EIA Report, and then subsequently, the Bellrock OfTDA EIA Report. This whole project assessment will evaluate the net contribution of the Bellrock Project as a whole to climate change, through consideration of GHG emissions arising from infrastructure associated with all component

parts (WFDA and OfTDA). Although the assessments presented in each EIA Report will remain valid, this iterative approach will be undertaken allowing for up-to-date information (if required) to be incorporated within each submission. Further details are discussed in **Section 17.7.1.2.**

- A climate change resilience (CCR) assessment, which will evaluate future trends in climate change impacts and the Bellrock WFDA's vulnerability and resilience to such changes. The CCR assessment will consider the Bellrock WFDA only, with the vulnerability and resilience to climate change impacts considered separately for the Bellrock OfTDA in its respective EIA Report.

1214. This approach to GHG assessments allows for assessments to be undertaken in support of the applications (separate applications for the Bellrock WFDA and OfTDA and also allows for a whole project assessment (consideration of the Bellrock Project as a whole).

1215. The climate change assessment is likely to have key inter-relationships with the other receptors considered in this Bellrock WFDA Scoping Report, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

17.2 Legislation, Policy and Guidance

1216. **Table 17.1** provides an overview of relevant legislation, policy and guidance which establishes requirements for the climate change chapter and the assessment methodology in the Bellrock WFDA EIA Report. Policy and legislation relevant to the Bellrock WFDA generally is provided in **Chapter 2: Policy and Legislative Context**.

Table 17.1: Summary of Relevant Legislation, Policy and Guidance for Climate Change

Relevant Legislation, Policy and Guidance	Relevance to the Assessment
GHG Assessment	
Legislation	
The United Nations Framework Convention on Climate Change (UNFCCC), 1992	The UNFCC is an international treaty which established a global climate governance framework and solidified climate change as an agenda item for future agreements and policies. The UNFCCC facilitated intergovernmental climate change negotiations such as the Conference of the Parties (COP).
The Kyoto Protocol, 1987	Following from the UNFCCC, the Kyoto Protocol committed industrialised countries to limit and reduce their GHG emissions in accordance with individual targets to reduce the rate and extent of global warming. Annex A of the Kyoto Protocol defined key GHGs as follows: • Carbon dioxide (CO_2); • Methane (CH_4);

Relevant Legislation, Policy and Guidance	Relevance to the Assessment
	• Nitrous oxide (N_2O); • Hydrofluorocarbons (HFC); • Perfluorocarbons (PFC); • Sulphur hexafluoride (SF_6); and • Nitrogen trifluoride (NF_3).
The Climate Change Act 2008 and Climate Change (Scotland) Act 2009	The Climate Change Act 2008 provides the legal basis for the UK's long-term response to tackling climate change. The 2050 Target Amendment Order introduced in 2019 revised the UK's target to net zero by 2050, with an interim target of 78% emission reduction by 2035 compared to 1990 levels. The Act requires the UK Government to set legally binding carbon budgets to limit GHG emissions in a given time period. These budgets are set by the Committee on Climate Change (CCC) in five-year periods. Scotland has its own distinct climate change legislation, the Climate Change (Scotland) Act 2009, which was amended by the Climate Change (Emissions Reduction Targets) (Scotland) Act in 2019. Scotland has committed to achieving net zero by 2045, with a series of interim and annual targets that are more ambitious than the UK's targets. Unlike the UK's five yearly carbon budgets, the Scottish Government sets budgets on a yearly basis.
The Paris Agreement, 2015	The Paris Agreement entered into force in 2016 and was ratified by the UK Government at COP22. It is a legally binding international treaty with an overarching goal of "*holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels*". The Paris Agreement requires countries to submit national climate action plans known as Nationally Determined Contributions (NDC), with each successive NDC reflecting increasing decarbonisation ambitions.
Policy	
National Planning Framework 4 (Scottish Government, 2023a)	Scotland's fourth National Planning Framework (NPF4) sets out the national spatial strategy up to 2045, which guides infrastructure projects on principles and priorities. NPF4 supports developments that enable decarbonisation through the provision of renewable, low-carbon and zero emission technologies (Policies 1 and 11). In addition, NPF4 requires developments to minimise their lifecycle GHG emissions as far as possible (Policy 2).
The Climate Change Plan, Third Report on Proposals and Policies (2018-2032) (Scottish Government, 2020a)	The Scottish Government publishes Climate Change Plans to set out the pathway to achieving its GHG emission reduction targets per the Climate Change (Scotland) Act 2009. The most recent version, the 2018-2032 Update, includes the Offshore Wind Policy Statement that supports the development of between 8 to 11 GW of offshore wind capacity by 2030.

Relevant Legislation, Policy and Guidance	Relevance to the Assessment
The UK Net Zero Strategy 2021 (BEIS, 2021) and British Energy Security Strategy, 2022 (BEIS, 2022)	The UK Net Zero Strategy and British Energy Security Strategy apply to Scotland and provide a national commitment to the provision of low-carbon, secure and affordable energy sources, including an ambition to deliver up to 50 GW of offshore wind capacity by 2030.
UK Climate Change Strategy 2021 – 2024 (HM Government, 2021)	The latest UK Climate Change Strategy aids UK exporters and suppliers through the transition to net zero by increasing support to clean growth and climate adaptation, reducing GHG emissions and understanding and mitigating climate-related financial risks. The Strategy highlights the importance of transforming the financial system to boost innovation and transition away from high carbon sectors.
Guidance	
Institute of Environmental Management and Assessment (IEMA): Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022)	The guidance document presents guidelines for undertaking GHG assessments, evaluating the significance of a development's GHG emissions in an EIA context, and approach to mitigation.
PAS2080: Carbon Management in Buildings and Infrastructure (2023)	The guidance document provides specifications for the management of whole-life carbon in built environment projects and best practice measures to enable further emission reductions.
The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2015)	The guidance document provides requirements for the preparation of GHG emission inventories and the consideration of direct and indirect GHG emissions (Scope 1, 2 and 3 emissions).
GloMEEP: Port Emissions Toolkit (2018)	The guidance document provides a methodology for calculating vessel emissions during various operating modes such as in transit and manoeuvring.
CCR Assessment	
Legislation	
The Climate Change Act 2008 and Climate Change (Scotland) Act 2009	The Climate Change Act 2008 requires the UK Government to undertake a Climate Change Risk Assessment (CCRA) every five years and identify key climate risks and opportunities to national communities and economic sectors. The Climate Change (Scotland) Act 2009 poses a similar requirement for the preparation of strategic programmes for climate change adaptation following the publication of each UK CCRA. The third UK CCRA was published in 2022, followed by the third National Adaptation Programme (NAP), which outlines priority adaptation actions to be taken. The Scottish Climate Change Adaptation Programme (SCCAP) 2019-2024 identifies specific actions for Scotland, including a need for resilient infrastructure systems.

Relevant Legislation, Policy and Guidance	Relevance to the Assessment
Policy	
National Planning Framework 4 (Scottish Government, 2023a)	As a long-term vision for spatial development, NPF4 supports the enhancement of the climate resilience of existing and future developments. NPF4 requires developments to be sited and designed to adapt to current and future risks from climate change (Policy 2).
Guidance	
IEMA: Environment Impact Assessment Guide to Climate Change Resilience and Adaptation (2020)	The guidance document provides a methodology for characterising the climate baseline and assessing a development's vulnerability and resilience to climate change in the EIA process.
European Commission: Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021 – 2027 (2021)	The guidance document outlines climate adaptation considerations for infrastructure projects and a risk assessment methodology for integration into impact assessments.
C40 Cities: Climate Change Risk Assessment Guidance (2018)	The guidance document includes a Climate Hazard Taxonomy based on the United Nations Disaster Risk Reduction classification, which provides the basis for identifying and screening climate hazards. Although geared towards cities, the approach is largely applicable to all built environment projects.

17.3 Consultation

1217. As part of the Bellrock WFDA Scoping Workshop (30th October 2023), an information package was provided to Marine Directorate Licensing Operations Team (MD-LOT), including on the proposed approach to climate change. No other consultation relevant to climate change has taken place to date.

17.4 Existing Environment

17.4.1 Study Area

17.4.1.1 Greenhouse Gas Assessment

1218. All GHG emissions will affect the same receptor, the global atmosphere, as opposed to directly affecting any specific local receptor. Emissions which are released or avoided due to project activities will have the same global effect on atmospheric GHG concentration, and its net effect on climate change regardless of where they occur, therefore the study area of the GHG assessment is not geographically defined (IEMA, 2022).

1219. The scope of the Bellrock WFDA GHG assessment will be limited to quantifying direct and indirect GHG emissions arising from the Bellrock WFDA over its full lifecycle: construction (including upstream embodied carbon from materials used to construct the offshore infrastructure such as floating offshore units (FOUs)), operation and maintenance, and decommissioning. As the Bellrock Project will supply renewable energy to the National Electricity Transmission System, the GHG assessment will also account for emission savings from the displacement of grid electricity which would have otherwise been generated using a more GHG intensive source. The study area for the Bellrock WFDA GHG assessment will encompass all associated GHG emitting activities, including carbon benefits beyond the infrastructure system such as avoided emissions from exported electricity. The proposed assessment boundary for the Bellrock WFDA GHG assessment is detailed under **Section 17.6.**

17.4.1.2 Climate Change Resilience Assessment

1220. The scope of the CCR assessment will be limited to evaluating the vulnerability and resilience of the Bellrock WFDA and its receptors to the effects of climate change. Therefore, the CCR assessment study area is geographically bounded and defined by the Bellrock WFDA (**Figure 1.1** in **Appendix 1**). The CCR assessment will be informed by historical observations and future projections of climate variables. The spatial resolution of the baseline data collected for the CCR assessment will provide representative coverage of the Bellrock WFDA and the wider region of Eastern Scotland (The Met Office, 2016a).

1221. The temporal boundary of the CCR assessment will be defined by the Bellrock WFDA project phases: construction, operation and maintenance and decommissioning:

- The construction period for the Bellrock WFDA is assumed to be two to four years.
- The operational lifetime is assumed to be up to 50 years for the Bellrock WFDA but the seabed lease will be for up to 60 years. The design life will be dictated by the major equipment suppliers, such as the wind turbine generators (WTG) suppliers, and will reflect market maturity and operational experience globally at the time of construction and during operations. At the end of the design life, any repowering will be subject to separate consents.
- The duration of the decommissioning period will depend on the Bellrock WFDA end-of-life strategy but, for EIA purposes, is assumed to be similar in timescales as the construction period.

1222. To characterise the future baseline climate, representative time slices will be identified in alignment with the Bellrock WFDA's project phases (construction, operation and maintenance and decommissioning), and climate change projection data will be presented for each time slice to reflect changes in climate change severity over time and capture the likely climate conditions at each project phase.

17.4.2 Data and Information Sources

1223. The desk-based sources which will be used to characterise the existing environment and inform the GHG assessment and CCR assessment will consist primarily of publicly available datasets and reports from government and industry sources. **Table 17.2** identifies potential desk-based sources, which will be updated throughout the EIA process.

Table 17.2: Summary of Key Data and Information Sources for Climate Change

Dataset	Year(s)	Description
GHG Assessment		
Department for Energy Security and Net Zero's (DESNZ) Greenhouse Gas Reporting Conversion Factors	2023 (or latest at time of assessment)	Emission factors suitable for UK-based operations for various activities such as fuel consumption.
DESNZ's Digest of UK Energy Statistics	2023 (or latest at time of assessment)	Up-to-date statistics for the UK power sector, including the operational GHG intensity of each fuel or generation source.
DESNZ's Treasury Green Book Supplementary Guidance: Valuation of Energy Use and Greenhouse Gas Emissions for Appraisal	2023 (or latest at time of assessment)	Current and projected operational GHG intensity of grid electricity.
CCC's UK Carbon Budgets	Various, most recent publication in 2020	National carbon budgets used to contextualise the Bellrock WFDA's GHG emissions[43].
CCC's Reducing the UK's Carbon Footprint Report	2013	Estimated lifecycle carbon intensity of various forms of electricity generation.
The Scottish Parliament and Scottish Natural Heritage's Blue Carbon Reports	Various	Research on the blue carbon potential of Scotland's coastal and marine environment, including the carbon sequestration rate by habitats.
Inventory of Carbon and Energy (ICE) Database v3.0	2019	Emission factors for embodied carbon in materials used during construction and replacement or repair activities.
Dolan and Heath, Life Cycle Greenhouse Gas Emissions of Utility Scale Wind Power	2012	GHG emission benchmarks for offshore wind projects to inform assumptions used in the GHG assessment regarding the likely contribution of emission sources to the Bellrock WFDA's GHG footprint.
Thompson and Harrison, Life Cycle Costs and Carbon Emissions of Offshore Wind Power	2015	
DESNZ's UK Territorial Greenhouse Gas Emissions National Statistics	2023 (or latest at time of assessment)	Estimates of annual GHG emissions from activities occurring within the UK's borders.
Scottish Greenhouse Gas and Energy Statistics (Scottish government, 2023b)	2023 (or latest at time of assessment)	Statistical publications relating to energy and GHG emissions in Scotland.

[43] The Scottish carbon budgets are published yearly, and to date, are only available from 2023 to 2024. To provide full coverage of the Bellrock WFDA project phases, the UK five-yearly carbon budgets are considered appropriate for contextualising the GHG assessment.

Dataset	Year(s)	Description
CCR Assessment		
The Met Office's UK Climate Projection (UKCP) Database and supporting reports	Various	Climate change projection data and summaries for the UK for various climate variables such as air temperature and precipitation. Note: UKCP data is most applicable to onshore and coastal areas.
The Met Office's UK Climate Averages and Regional Climate Summaries	Various	Historical climate observations and current climate conditions for the UK.
Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report	Various	Current state of knowledge on climate science and possible climate futures.
Marine Climate Change Impacts Partnership (MCCIP) Reports	Various	A collection of evidence reviews and summary reports on climate change effects in the marine environment.
Department for Business, Energy and Industrial Strategy's (BEIS) Offshore Energy Strategic Environment Assessment 4 (SEA4)	2022	Observed meteorological conditions at seas around the UK.
Weisenfeld et al., Offshore Wind Climate Adaptation and Resiliency Study	2021	Review of key climate factors to the offshore wind sector and opportunities for climate resilience.

1224. No baseline surveys are proposed for the GHG assessment and CCR assessment. However, cross-disciplinary engagement with the Applicant's development team and other relevant EIA chapters will help refine the assessment and identify suitable mitigation measures.

17.4.3 Greenhouse Gas Assessment

1225. A GHG assessment evaluates the effect significance of emissions released or avoided by a development based on its alignment with a science-based transition towards net zero and requirements set by international climate commitments, national policies and best industry practice. To contextualise the assessment, national carbon budgets and relevant existing and emerging net zero policies, targets and performance standards will be reviewed and compared against the predicted GHG impacts.

1226. Climate change is a devolved matter within the UK, and as such, the Scottish Government is committed to developing and implementing carbon reduction policies that are compatible with the UK's ambitions. Under the Climate Change (Scotland) Act 2009, the Scottish Government publishes its carbon budget annually, with the 2023 – 2024 budget set at 8.8 Mt CO_2e (Scottish Government, 2022). It should be noted that Scotland's net zero target is more ambitious than the

UK's target (discussed in **Paragraph 1228** and **1229**), with a commitment to achieving net zero by 2045. The following interim targets illustrate Scotland's planned decarbonisation trajectory:

- At least 56% emission reduction relative to 1990 levels by 2020;
- At least 75% emission reduction relative to 1990 levels by 2030; and
- At least 90% emission reduction relative to 1990 levels by 2040.

1227. In addition, the Scottish Government has its own offshore wind capacity ambitions in support of the UK's national target (discussed in **Paragraph 1226**), with the award of the ScotWind offshore wind leasing round in Scottish waters by the Crown Estate Scotland (CES) in 2022. The Bellrock Project falls within the ScotWind leasing round. ScotWind's objective was to help Scotland achieve its net-zero emissions target by 2045, by granting property rights for the seabed in Scottish waters for new commercial scale offshore wind projects in a way that was fair and transparent. In doing so, ScotWind facilitates and encourages development of the low-carbon energy generation needed to meet the world-leading targets committed to in The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019. The leasing context for the Bellrock Project is discussed further in **Chapter 2: Policy and Legislative Context**.

1228. The Offshore Wind Policy Statement (Scottish Government, 2020b) and the Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020c) include a target to deliver up to 11 GW of offshore wind capacity by 2030 to support Scotland's commitment to net zero by 2045. According to the Scottish Energy Statistics Hub, Scotland's operational offshore wind capacity measured around 2.6 GW in June 2023, with an additional 8.2 GW in planning, awaiting construction or under construction (Scottish Government, 2023c).

1229. On a broader scale, the Climate Change Act 2008 provides a framework for the UK, and Scotland via its devolved climate change policies, to decarbonise and meet its long-term goals of achieving net zero emissions. The UK Government sets a series of legally-binding carbon budgets, which establish a limit on the total amount of GHG emissions than can be emitted within the UK over five-year periods until 2050. Six carbon budgets have been approved so far, as shown in **Table 17.3** (CCC, 2020), which cover the time period between 2008 and 2036. The UK is currently in the fourth carbon budget period.

Table 17.3: UK Carbon Budgets (2008 to 2037)

Budget Period	Carbon Budget (Mt of carbon dioxide equivalents (CO_2e)	Reduction Relative to 1990 Levels
1st carbon budget (2008 to 2012)	3,018	26%
2nd carbon budget (2013 to 2017)	2,782	32%
3rd carbon budget (2018 to 2022)	2,544	38%
4th carbon budget (2023 to 2037)	1,950	52%
5th carbon budget (2028 to 2032)	1,725	58%

Budget Period	Carbon Budget (Mt of carbon dioxide equivalents (CO_2e)	Reduction Relative to 1990 Levels
6th carbon budget (2033 to 2037)	965	77%
7th carbon budget (2038 to 2042)	To be set in 2025	
Net zero target	At least 100% emission reduction by 2050	

1230. The UK Government has also set out its intention to decarbonise all sectors of the UK economy, including the power sector, within the Clean Growth Strategy (BEIS, 2017). Reaffirmation of this ambition was provided as a commitment within the Offshore Wind Sector Deal (BEIS, 2019), which reinforces the UK Government's aims to advance offshore wind generation as an integral part of a future low-cost, low-carbon and flexible grid system. In light of recent progress, the commitment to 30 GW offshore wind capacity within the Offshore Wind Sector Deal has been superseded by a 40 GW by 2030 target as set out in the Ten Point Plan for a Green Industrial Revolution (HM Government, 2020a) and the Net Zero Strategy: Build Back Greener (HM Government, 2021). The UK Government has since increased its offshore wind capacity target to 50 GW by 2030 in the British Energy Security Strategy (2022).

1231. The renewable electricity generated by the Bellrock WFDA would displace an equivalent amount of electricity which would have been generated using alternative energy sources. The focus of the GHG assessment will be to determine the Bellrock WFDA's contribution towards Scotland's and the UK's national emission reduction and long-term net zero targets. This will be achieved by comparing the 'Do Nothing' scenarios to the emissions avoided as a result of the Bellrock WFDA's operations.

1232. Two 'Do Nothing' scenarios will be established for the GHG assessment, which assume that the Bellrock WFDA is not constructed, and present different future baseline environments based on the energy and climate policies adopted:

- The first scenario assumes that the electricity generated by the Bellrock WFDA would have otherwise been generated using natural gas, which is an approach advocated for use by offshore wind farms by RenewableUK (2022) and will be adopted to account for the UK's transition from fossil fuel-based generation to renewables.
- The second scenario assumes that the electricity generated by the Bellrock WFDA would have otherwise been generated using all forms of generation sources considered as part of the future National Electricity Transmission System mix, including renewables such as offshore wind energy, represented by the long-run marginal emission factors (DESNZ, 2023). This approach is considered to be conservative, as the decline in GHG intensity of grid electricity evident under this scenario accounts for growth in renewables such as the Bellrock Project becoming operational.

1233. To contextualise the magnitude of GHG emissions reported in the assessment and the evaluation of their effects on climate change, the baseline review will cover the carbon budgets and targets relevant to each project phase (construction, operation and maintenance, and decommissioning) of the Bellrock WFDA, as well as recent national emission statistics for Scotland and the UK, the emission contribution of the power sector and the lifecycle GHG intensities of various forms of electricity generation.

17.4.4 Climate Change Resilience Assessment

1234. The current baseline for the CCR assessment will be defined using historical climate data and meteorological records maintained by the Met Office. Climate averages for the 1991 to 2020 time period will be obtained from the nearest onshore climate station to the Bellrock WFDA, which is Inverbervie No. 2 (56.852, -2.264), for temperature, precipitation and wind variables (The Met Office, 2023). This will be supplemented with regional climate characteristics (The Met Office, 2016b), based on observations recorded between 1981 and 2010, and baseline information from the Offshore Energy SEA4 (BEIS, 2022) which provides meteorological conditions at sea for various offshore regions surrounding the UK. The Bellrock WFDA lies closest to the Eastern Scotland climate region and sits within Regional Sea 1.

1235. Climate change projections will be used to characterise the future baseline climate within the CCR assessment study area, with changes to climate variables serving as indications of likely climate hazards. The Met Office's UKCP database provides probabilistic climate change projections for the UK at a spatial resolution of 25 km grid squares, covering the time period of 1961 to 2100. Probabilistic projections provide a broad range of possible climate outcomes and account for uncertainties present in climate models.

1236. UKCP data uses Representative Concentration Pathways (RCP) which depicts future atmospheric GHG concentration based on various emission reduction scenarios. For the CCR assessment, projection data will be obtained for RCP4.5 (intermediate scenario) and RCP8.5 (worst-case scenario) and presented at three probability levels where applicable: 10th percentile, 50th percentile (median) and 90th percentile. In line with best practice (IEMA, 2020), this approach would provide a robust overview of the future baseline climate.

1237. It should be noted that the majority of UKCP data is land-based and thus do not provide direct coverage of the offshore area in which the Bellrock WFDA is located. However, to describe projected changes in air temperature, precipitation and wind at the local scale, it is assumed that projections for the grid cell closest to the Bellrock WFDA would be broadly representative of the CCR assessment study area. Marine climate change projections such as changes in sea temperature, sea level, tides and storm surges will be obtained from the Met Office's UKCP Marine Projections and MCCIP reports. Where information gaps exist, these will be supplemented using other available literature sources.

1238. Climate change projections are commonly provided as time series data. For the CCR assessment, the data will be processed and presented as climate averages over the selected time slices. It is assumed that these time slices would provide sufficient temporal coverage of the CCR assessment study area. The Bellrock WFDA's construction, operation and maintenance and decommissioning phases will be segmented into multiyear time slices (typically 20 to 30 year periods), depending on data availability, to illustrate differences in short-term, medium-term and long-term climate change.

17.5 Potential Impacts

17.5.1 Greenhouse Gas Assessment

1239. Potential impacts considered in the GHG assessment include direct and indirect emissions released as a result of Bellrock WFDA's activities during construction, operation and maintenance and decommissioning. The Bellrock WFDA's provision of renewable energy, will also result in avoided emissions by displacing grid electricity which would have otherwise been generated using more GHG-intensive sources.

1240. It should be noted that GHG emissions released or avoided by the Bellrock WFDA may occur outside its spatial boundary and the UK's territorial boundary, such as upstream embodied carbon. However, given that GHG emissions affect the climate system wherever they occur, and the need to avoid 'carbon leakage' overseas when reducing UK emissions, such emissions will be included in the Bellrock WFDA GHG assessment. GHG emission sources in the assessment boundary are detailed under **Section 17.6.**

17.5.2 Climate Change Resilience Assessment

1241. Potential impacts considered in the CCR assessment include extreme weather events and chronic climatic changes with the potential to harm receptors and affect their ability to maintain their function or purpose. A high-level review of direct interdependencies with other critical infrastructure or activities, such as the National Electricity Transmission Network, will also be undertaken to identify the potential for cascading risks and their effects on the Bellrock WFDA's climate resilience. Receptor groups considered in the CCR assessment include:

1242. Infrastructure receptors such as FOUs and other built assets, equipment, helicopters (if required) and vessels, and temporary structures (refer to **Chapter 3: Project Description** for all assets and equipment);

- Human receptors such as site personnel; and
- Environmental receptors such as habitats and species associated with any ecological mitigation and enhancement measures.

17.5.3 Embedded Mitigation Measures

1243. As part of the design process, mitigation measures will be considered throughout to reduce the Bellrock WFDA's impact on climate change and vice versa, which will evolve as the EIA progresses and in response to consultation. These measures will include actions that have been identified through the design process (primary mitigation) and those that can be expected to occur in compliance with other regulatory requirements and good industry practice (tertiary mitigation), as detailed further in the following paragraphs.

1244. The IEMA guidance (2022) highlights the importance of embedded mitigation in minimising GHG emissions from a proposed development. The IEMA GHG Management Hierarchy sets out a structure to eliminate, reduce, substitute and compensate such emissions. The GHG assessment will consider mitigation measures which are designed into the Bellrock WFDA and will identify opportunities for further emission reduction where practicable, in line with the GHG Management Hierarchy, such as measures to minimise vessel traffic or embodied carbon through the efficient use of materials. In addition, the PAS2080 guidance document (2023) will be reviewed to outline best practice carbon management measures for further consideration.

1245. The design of offshore wind farms and occupational health and safety requirements provide an inherent degree of climate change readiness and resilience. The CCR assessment will account for the Bellrock WFDA's technical requirements, design specifications and operational strategy which are built upon best practice engineering codes and standards in the offshore wind sector, and standard health and safety procedures outlined in relevant management plans. Where likely significant effects are predicted, additional mitigation will be identified from available literature sources and in collaboration with the engineering team to ensure the Bellrock WFDA is resilient to impacts arising from current extreme weather events and climatic conditions. Accounting for uncertainties in longer-term climate change projections and their implications for the Bellrock WFDA, adaptive management measures will also be reviewed in line with IEMA's guidance (2020) to ensure mitigation is implemented where and when appropriate.

17.6 Scoping of Potential Impacts

1246. A summary of the potential impacts scoped in and out for the climate change chapter is provided in **Table 17.8.** The scope of each of the GHG and CCR assessments will be revisited in the Bellrock WFDA EIA Report to align with the most up-to-date design of the Bellrock WFDA and are subject to information availability.

17.6.1 Potential Impacts Scoped In

17.6.1.1 Greenhouse Gas Assessment

1247. The scoping exercise for the GHG assessment identifies emission sources which are included/excluded from the assessment boundary and is presented in accordance with the PAS2080 lifecycle modules.

1248. **Table 17.4** shows the GHG emission sources which are proposed to be 'scoped in' to the Bellrock WFDA EIA Report.

Table 17.4: Potential Greenhouse Gas Impacts 'Scoped In' to the Bellrock WFDA EIA Report

Phase	PAS2080 Lifecycle Module	Potential Emission Sources
Pre-construction (including Product Stage) and Construction	A0: Preliminary Studies, Design and Engineering	Emissions from design and engineering activities are not likely to be significant. It is anticipated that most works will be office-based. However, pre-construction surveys and activities such as geotechnical surveys and seabed preparation will be considered where possible. Further details on pre-construction

Phase	PAS2080 Lifecycle Module	Potential Emission Sources
		works are provided in **Chapter 3: Project Description.**
	A1: Raw Materials Supply A2: Transport to Manufacturing Site A3: Manufacturing	Embodied carbon in materials used during the construction of offshore infrastructure such as FOUs. Embodied carbon in materials in this assessment are emissions arising from the raw material extraction and manufacturing of materials used for the Bellrock WFDA infrastructure.
	A4: Transport to/from Construction Site	Fuel consumption from the movement of materials, equipment, offshore waste and personnel to/from the offshore construction site using road vehicles, marine vessels and helicopters (if required). This will include vessels travelling from their origin location to the port(s)/wet storage area(s) and between the port(s)/wet storage area(s) and the Bellrock WFDA.
	A5: Construction	Fuel and electricity consumption associated with plant and equipment use during offshore construction activities. Seabed/habitat disturbance or loss due to activities within the Bellrock WFDA's footprint such as piling, resulting in impacts to blue carbon, which is a term used to define carbon captured by marine and coastal ecosystems.
Operation and Maintenance	B2: Maintenance B3: Repair B4: Replacement B5: Refurbishment	Fuel and electricity consumption associated with transport (marine vessels and road vehicles if applicable) and plant and equipment use during offshore operation and maintenance activities. Embodied carbon in materials used in spare parts during repair and replacement events.
	B8: Other Operational Processes	Seabed/habitat disturbance or loss due to the presence of offshore infrastructure within the Bellrock WFDA's footprint over the operational lifetime, resulting in impacts to blue carbon.
Decommissioning (End-of-Life)	C1: Deconstruction C2: Transport to/from Site C3: Waste Processing for Recovery C4: Disposal	Emissions associated with the deinstallation of offshore infrastructure, transport to landfill or other end destination and the treatment and processing for reuse, recycling, recovery or disposal.
Whole Lifecycle	D: Benefits and Loads beyond the Infrastructure System	Avoided emissions from the provision of renewable energy to the National Electricity Transmission System.

17.6.1.2 Climate Change Resilience Assessment

1249. The scoping exercise for the CCR assessment identifies climate hazards, selected from the C40 Taxonomy, and potential climate change impacts which may result in likely significant effects to the Bellrock WFDA.

1250. **Table 17.5** outlines the climate hazards which are proposed to be 'scoped in' to the Bellrock WFDA EIA Report and their potential for climate change impacts to the Bellrock WFDA.

Table 17.5: Potential Climate Change Resilience Impacts 'Scoped In' to the Bellrock WFDA EIA Report

Climate Hazard	Type of Climate Hazard	Potential Climate Change Impacts to the Bellrock WFDA
Extreme precipitation (e.g., rain, snow, hail, fog)	Extreme weather event	Delays to programme such as inability to undertake offshore construction or maintenance activities. Physical damage to built assets, equipment and helicopters (if required) and vessels. Increased maintenance, repair and replacement requirements due to faster asset deterioration. Reduced wind farm efficiency and functioning from operational downtime. Occupational health and safety impacts to project personnel.
Storm and wind (e.g., gales, storm surge, thunderstorms)	Extreme weather event	
Extreme temperatures (e.g., cold and heat waves)	Extreme weather event	
Changes in marine climate and extreme weather events	Chronic climatic change	
Sea level rise	Chronic climatic change	
Changes in sea conditions (e.g., wave and currents, salinity)	Chronic climatic change	

17.6.2 Potential Impacts Scoped Out

17.6.2.1 Greenhouse Gas Assessment

1251. **Table 17.6** shows the GHG emission sources which are proposed to be scoped out of the Bellrock WFDA EIA Report and the rationale.

Table 17.6: Potential Greenhouse Gas Impacts Scoped Out of the Bellrock WFDA EIA Report

Phase	PAS2080 Lifecycle Module	Rationale
Operation and Maintenance	B1: Use	Direct emissions or removals from components and materials installed as part of the infrastructure, such as venting or flaring, are not relevant to the Bellrock WFDA. No process/fugitive emissions or carbon sequestration are anticipated.

Phase	PAS2080 Lifecycle Module	Rationale
		No onshore land use change due to the offshore location of the Bellrock WFDA.
	B6: Operational Energy Use	The Bellrock WFDA's operational energy requirements are assumed to be delivered entirely by its own electricity generation.
	B7: Operational Water Use	The Bellrock WFDA's operational water use is anticipated to be negligible and therefore emissions are not likely to be significant.
	B9: User's Utilisation of Infrastructure	Emissions from user's utilisation are not relevant to the Bellrock WFDA. End users will consume the electricity generated by the Bellrock WFDA but will not directly interact with the infrastructure.

17.6.2.2 Climate Change Resilience Assessment

1252. **Table 17.7** outlines the climate hazards which are proposed to be scoped out of the Bellrock WFDA EIA Report and the rationale.

Table 17.7: Potential Climate Change Resilience Impacts Scoped Out of the Bellrock WFDA EIA Report

Climate Hazard	Type of Climate Hazard	Rationale
Flooding (e.g., surface water, groundwater, coastal, river flooding)	Extreme weather event	These climate hazards only apply to onshore areas. As the Bellrock WFDA is located offshore, no climate change impacts associated with these climate hazards are expected to arise to the Bellrock WFDA. Although earthquakes can occur offshore, the UK Continental Shelf does not sit on a major fault line between tectonic plates and primarily experiences low magnitude earthquakes annually, with moderate earthquakes as rare occurrences. Furthermore, it is considered unlikely that climate change will exacerbate the frequency or severity of submarine earthquakes in the UK.
Wildfires	Extreme weather event	
Mass movements (e.g., earthquakes, landslides)	Extreme weather event	
Land changes (e.g., saltwater intrusion, subsidence)	Chronic climatic change	
Water stress (e.g., drought, desertification)	Chronic climatic change	
Ocean acidification	Chronic climatic change	Although acidification is a climate hazard specific to the marine environment in which the Bellrock WFDA is located, it is not likely to result in a climate change impact to the Bellrock WFDA.

17.6.3 Potential Cumulative Effects

17.6.3.1 Greenhouse Gas Assessment

1253. The only receptor for the GHG assessment is the global atmosphere. GHG emissions, wherever they occur, have the potential to contribute to climate change, and therefore their effects are global and cumulative by nature. The IEMA guidance (2022) states that the effects of GHG emissions from specific cumulative projects should not be individually assessed, as there is no basis for selecting which projects to assess cumulative over any other. As such, no additional consideration of cumulative effects is required for the GHG assessment.

17.6.3.2 Climate Change Resilience Assessment

1254. The CCR assessment considers the vulnerability and resilience of the Bellrock WFDA to climate change impacts. There is potential for other plans or projects to act collectively to exacerbate or reduce a project's climate vulnerability and risk. However, given its offshore location, there are no active developments immediately adjacent to the Bellrock WFDA, with considerable separation distances from other infrastructure. Refer to **Chapter 13: Marine Infrastructure and Other Users** for full details on existing assets and proposed projects surrounding the Bellrock WFDA. It is highly unlikely for the Bellrock WFDA's climate change resilience to be significantly affected by neighbouring developments. Therefore, cumulative effects are scoped out of the CCR assessment.

17.6.4 Potential Transboundary Effects

17.6.4.1 Greenhouse Gas Assessment

1255. As the receptor for the GHG assessment is the global atmosphere, GHG impacts are transboundary by nature. Emissions considered in the GHG assessment will be contextualised using the relevant UK carbon budgets and national net zero targets, which have been established in accordance with international climate commitments such as the UK's Nationally Determined Contribution (NDC) under the Paris Agreement (2015). As such, no additional consideration of transboundary effects is required for the GHG assessment.

17.6.4.2 Climate Change Resilience Assessment

1256. It is not relevant to assess transboundary effects relating to climate change resilience, as the assessment focusses on the effects of climate change on the Bellrock WFDA. Therefore, transboundary effects are scoped out of the CCR assessment.

17.6.5 Summary of Potential Climate Change Impacts Scoped In and Out

1257. A summary of potential impacts scoped in and out from further assessment in the Bellrock WFDA EIA Report is provided in **Table 17.8** below.

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Table 17.8: Summary of Potential Impacts Scoped In (✓) or Out (x) for Climate Change

Potential Impact	Receptor(s)	Description of Potential Effects	Scoped In or Scoped Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
GHG Assessment						
Whole lifecycle GHG impacts	Global atmosphere	• GHG emissions by project phase and the GHG footprint over the full lifecycle of the Bellrock WFDA. • Combined GHG emissions of the Bellrock Project in its entirety. • Avoided emissions from the provision of renewable electricity to the National Electricity Transmission System. • Net contribution to Scotland's and the UK's decarbonisation and net zero policies and targets.	✓	✓	✓	Implementation of IEMA Carbon Management Hierarchy and PAS2080 carbon management measures
CCR Assessment						
Vulnerability and resilience to climate change impacts	Infrastructure, human and ecological receptors associated with the Bellrock WFDA	• Physical damage or disruption to infrastructure receptors. • Risk of injuries or fatalities to human receptors. • Harm or decline in functioning of environmental receptors.	✓	✓	✓	Climate resilience measures embedded into the design and relevant management plans

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17.7 Proposed Approach to Impact Assessment

17.7.1 Greenhouse Gas Assessment

1258. The GHG assessment will be undertaken in accordance with the following guidance documents:

- Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA, 2022);
- The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (World Resources Institute and World Business Council for Sustainable Development, 2015);
- PAS 2080: Carbon Management in Buildings and Infrastructure (British Standards Institution, 2023); and
- Port Emissions Toolkit (GloMEEP, 2018).

1259. The GHG assessment for the Bellrock WFDA EIA Report will be structured as follows:

- Emissions from the construction of the Bellrock WFDA, including upstream embodied carbon emissions;
- Emissions from the operation and maintenance of the Bellrock WFDA;
- Avoided emissions from the provision of renewable energy into the National Electricity Transmission System during the Bellrock WFDA's operations;
- Emissions from decommissioning of the Bellrock WFDA;
- A summary of lifecycle emissions of the Bellrock WFDA across the construction, operation and maintenance and decommissioning phases; and
- Combined emissions of the Bellrock WFDA and Bellrock OfTDA to establish the net GHG emissions of the Bellrock Project as a whole.

1260. GHG emissions will be calculated using a standard calculation-based methodology, which involves multiplying activity data supplied by the Applicant's development team with the representative emission factors, and where applicable, calorific, load and global warming potential (GWP) factors. Industry benchmarks and assumptions based on professional judgment will be used where data gaps exist. Subject to data availability, end-of-life emissions during decommissioning and emissions from spare parts used during repair and replacement events will be estimated using industry benchmarks from the GHG footprinting of offshore wind projects (Thomson and Harrison, 2015).

17.7.1.1 Assessment Criteria

1261. The receptor for the GHG assessment is defined as the global atmosphere. The receptor's sensitivity will be characterised as high, given that any net reduction of GHG emissions will support decarbonisation efforts in line with national and international climate commitments.

1262. The magnitude of impact is not defined, as the significance of effect for the GHG assessment is not determined by the magnitude of emissions alone (IEMA, 2022). However, GHG emission values (both in terms of emissions released and avoided) will be calculated and expressed as tonnes of CO_2e to account for differences in GWP between GHGs. GWP factors will be obtained from the most recent IPCC's Assessment Report 100-year estimates. GHG emissions will be calculated using a lifecycle approach in alignment with the PAS 2080 modules and presented both by project phase and over the whole lifecycle.

1263. Significance criteria for the assessment will be adapted from IEMA's guidance (2022), which recognises that: '*when evaluating significance, all new GHG emissions contribute to a negative environmental effect. However, some projects will replace existing development or baseline activity that have higher GHG profiles. The significance of a project's emissions should therefore be based on its net impacts, which may be positive, negative or negligible'.*

1264. The IEMA guidance provides relative significance descriptions to assist assessments of GHG emissions in an EIA context. Section VI of the updated guidance (IEMA, 2022) describes five distinct levels of significance (major adverse, moderate adverse, minor adverse, negligible and beneficial), which are not based solely on whether a project emits GHG emissions, but on how the Project makes a relative contribution towards achieving a science-based transition towards net zero. For the purposes of the EIA, major adverse, moderate adverse and beneficial effects will be considered as significant.

1265. To assist in evaluating significance of the Bellrock WFDA's GHG impacts, comparisons to the UK carbon budgets and relevant existing and emerging net zero policies, targets and performance standards will be undertaken. The assessment will conclude whether and how the Bellrock WFDA contributes to or undermines the UK's emission reduction efforts and trajectory towards net zero. Additional parameters will be calculated to contextualise the predicted carbon benefits, including the GHG intensity of electricity generated and the GHG payback period (RenewableUK, 2022).

17.7.1.2 Assessment of the Bellrock Project as a Whole

1266. GHG emissions from the construction, operation and maintenance and decommissioning of infrastructure associated with the Bellrock WFDA and OfTDA (which are subject to separate consent applications and EIAs) will also be considered in a standalone report (referred to as the "whole project assessment") appended to Bellrock WFDA EIA Report. A whole project assessment will be undertaken to evaluate the net contribution of the Bellrock Project to climate change.

1267. The study area for the Bellrock Project assessment will encompass all GHG emitting activities, including avoided emissions, associated with the construction, operation and maintenance and decommissioning of the Bellrock WFDA and OfTDA infrastructure.

1268. Likely emission sources and lifecycle GHG emissions associated with the Bellrock OfTDA infrastructure will be estimated using project assumptions and industry benchmarks from literature such as the Royal Institution of Chartered Surveyors (RICS) Whole Life Carbon Assessment Standard for the Built Environment, 2nd edition (2023) and The Institution of Structural Engineers (IStructE) How to Calculate Embodied Carbon guidance, 2nd edition (2022). Their indicative emissions will be combined with the calculated lifecycle emissions for the Bellrock WFDA to determine the likely total emissions for the Bellrock Project. To evaluate the overall effect significance of the Bellrock Project, the assessment criteria presented in **Section 17.7.1.1** will also be used for the whole project assessment.

1269. The whole project assessment, as noted in **Section 17.1,** will be presented in a standalone report appended to the Bellrock WFDA EIA Report. The whole project assessment will be updated with the subsequent submission of the Bellrock OfTDA EIA Report. Although the assessments presented in each EIA Report will remain valid, this iterative approach will be undertaken allowing for up-to-date information (if required) to be incorporated within each submission. The overall GHG impacts of the Bellrock Project will therefore be confirmed in the EIA Report for the final Development Area consent application submitted and will include the emission footprints of all infrastructure associated with the Bellrock Project.

17.7.2 Climate Change Resilience Assessment

1270. A four-step methodology will be adopted for the CCR assessment based on IEMA's 'Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation' (2020) and the European Commission's 'Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021 – 2027' (2021). The initial stages of the assessment will involve a screening exercise of climate hazards which the Bellrock WFDA may be vulnerable to and are likely to result in climate change impacts. If deemed necessary, a detailed risk assessment will be undertaken on impacts which are material to the Bellrock WFDA to evaluate likely significant effects with respect to climate change resilience.

1271. For the purpose of the CCR assessment, the following key terms will be adopted, which are defined as follows:

- Climate variable: a measurable, monitorable aspect of the weather or climate such as temperature or wind speed;
- Climate hazard: a weather or climate-related event or trend in climate variable, such as storms or heat waves, which has potential to do harm to receptors; and
- Climate change impact: an impact from a climate hazard, such as asset damage or failure, which affects the ability of the receptor to maintain its functions or purpose.

1272. It is anticipated that the potential for likely significant effects from climate change impacts would be highest over the Bellrock WFDA's operational lifetime, given its duration and alignment with longer-term climate change. Therefore, the focus of the CCR assessment will be on the operation and maintenance phase. Given the short duration of the construction and decommissioning phases and low potential for likely significant effects, a high-level CCR assessment will be undertaken only. An overview of the step-by-step approach is provided below:

17.7.2.1 Step 1: Identifying Receptors, Climate Variables and Hazards

1273. Key climate hazards relevant to the CCR assessment study area and the receptors which they affect will be identified based on the design information and a review of the current and future climate baseline and other available literature sources. In addition, climate variables used to quantify or contextualise the hazards will also be selected.

17.7.2.2 Step 2: Climate Vulnerability Assessment

1274. Vulnerability is defined as the degree of response to a change in the environment and the capacity to accommodate or recover from change, and is considered to be a function of sensitivity and exposure. Climate change impacts only arise when receptors are vulnerable to climate hazards. A vulnerability assessment will be undertaken whereby only hazards categorised as medium or high vulnerability will be taken forward in the CCR assessment. Hazards with low vulnerability will be screened out, and a non-significant effect will be concluded.

17.7.2.3 Step 3: Climate Risk Assessment

1275. The magnitude of the climate change impact, or the climate risk, will then be evaluated based on its likelihood and consequence. For climate risks identified as medium, high or extreme, additional mitigation measures will be proposed proportionate to the degree of risk, and the residual risk will be reassessed.

17.7.2.4 Step 4: Resilience Rating

1276. The effect significance of the CCR assessment will be determined using a matrix-based approach by considering the residual risk identified in Step 3 and a resilience rating based on the Bellrock WFDA's preparedness and adaptive capacity to the climate change impact. The higher the resilience rating, the higher the Bellrock WFDA's capability to tolerate and manage the residual climate risk.

17.8 Scoping Questions to Consultees

1277. The following questions are posed to consultees to help them frame and focus their response to the climate change scoping exercise, which will in turn inform the Scoping Opinion:

- Do you agree with the study area definitions and the approach to characterising the existing environment?
- Do you agree that all relevant data sources have been identified in the Bellrock WFDA Scoping Report?
- Do you agree that all receptors and potential impacts have been identified in the Bellrock WFDA Scoping Report?
- Do you agree with the GHG emission sources that have been scoped in/out of the Bellrock WFDA EIA Report?
- Do you agree with the climate hazards and resulting climate change impacts that have been scoped in/out of the Bellrock WFDA EIA Report?
- Do you agree with the proposed methodology for the Bellrock WFDA GHG assessment, including the iterative approach to the whole project assessment?
- Do you agree with the proposed methodology for the Bellrock WFDA CCR assessment?
- Do you have any other matters or information sources that you wish to present?

17.9 References

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18 Offshore Air Quality

18.1 Introduction

1278. This chapter considers the scope of potential impacts of the construction, operation and maintenance, and decommissioning phases of the Bellrock Wind Farm Development Area (WFDA) on offshore air quality. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately.

1279. This chapter has been prepared by Royal HaskoningDHV.

1280. This chapter should be read in conjunction with the following chapters of the Bellrock WFDA Scoping Report:

- **Chapter 17: Climate Change**; and
- **Chapter 19: Major Accidents and Disasters.**

18.2 Legislation, Policy and Guidance

1281. **Table 18.1** sets out the legislation, policy and guidance which have been considered in the preparation of this chapter, and will be considered within the Bellrock WFDA EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

Table 18.1: Summary of Relevant Legislation, Policy and Guidance for Offshore Air Quality

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Legislation	
National Emission Ceilings Directive (NECD), revised 2016 (NECD 2016/2284/EU) (Official Journal of the European Union, 2016)	European Union legislation which delegates emission reduction commitments for nitrogen oxides (NO_x), sulphur dioxide (SO_2), non-methane volatile organic compounds (NMVOC), ammonia (NH_3), particulate matter $(PM)_{10}$ and $PM_{2.5}$ for 2020 and 2030.
Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL)	Sets up MARPOL regulations for the prevention of air pollution from ships
Merchant Shipping (Prevention of Air Pollution from Ships) Regulations 2008	The regulations transpose the IMO international air pollution standards into United Kingdom law.
Directive (EU) 2016/802 of the European Parliament relating to a reduction in the sulphur content of certain liquid fuels	The purpose of this Directive is to reduce the emissions of sulphur dioxide resulting from the combustion of certain types of liquid fuels and thereby to reduce the harmful effects of such emissions on man and the environment.
Policy	
Cleaner Air for Scotland 2. Towards to a Better Place for Everyone (Scottish Government, 2021)	Scottish legislation sets out how the Scottish Government proposes to reduce air pollution to protect human health between 2021 and 2026.

18.3 Consultation

1282. As part of the Bellrock WFDA Scoping Workshop (30th October 2023), an information package was provided to Marine Directorate - Licensing Operations Team (MD-LOT), including on the proposed approach to scope out offshore air quality. No other consultation relevant to offshore air quality has taken place to date.

18.4 Existing Environment

1283. The primary source of offshore atmospheric emissions is likely to be from vessels emitting NOx, PM and SO_2.

1284. The International Marine Organisation (IMO) has enacted regulations to reduce vessel emissions under MARPOL. The North Sea is a designated Emission Control Area under MARPOL, with sulphur content of fuel oil being limited to 0.5%. Furthermore, as of 1st January 2021, vessels operating within the North Sea must comply with the most stringent NOx emission limits to comply with the Emission Control Area requirements.

1285. Pollutant concentrations should only be compared to the relevant air quality objectives where there is representative exposure. There are no offshore human receptors which are sensitive to air quality, and marine-based ecological designations are unlikely to be sensitive to air pollution impacts (Centre for Ecology and Hydrology, 2023). Receptors may only be affected where there are isolated locations of relevant human exposure (e.g., residences) close to the shoreline, and land-based designated ecological sites.

18.5 Potential Impacts

1286. Impacts on offshore air quality could potentially occur during construction, operation and maintenance and decommissioning, due to vessel movements associated with the Bellrock WFDA and to a lesser extent use of helicopters (if required) and potentially generators (if required). The combustion of fuel used to power vessels may result in atmospheric emissions of pollutants such as SO_2 and NO_x which are comprised of NO_2 and NO, PM_{10}, and $PM_{2.5}$.

18.5.1 Embedded Mitigation Measures

1287. The Applicant will comply with relevant national and international maritime air quality standards and legislation, including the MARPOL Annex VI Regulations. The Applicant will also develop and adhere to an Environmental Management Plan (EMP) and a Vessel Management Plan (VMP).

18.6 Scoping of Potential Impacts

1288. Vessels utilised during construction, operation and maintenance, and decommissioning of the Bellrock WFDA may contribute to emissions offshore; however, in the context of the existing vessel traffic within the North Sea, the Bellrock WFDA's contributions would be small. Because the Bellrock WFDA is located 120 km from the coast at Stonehaven (116 km southeast of Peterhead), construction and operation and maintenance works would be carried out at a distance from the shore and therefore would not impact upon landside human or ecological receptors.

1289. As there would be a relatively low number of vessels utilised for works associated with the Bellrock WFDA, the considerable distances to sensitive receptors and the MARPOL emissions regulations that will be applied, it is considered that effects would not be significant. As such, it is proposed to scope offshore air quality impacts out of the Bellrock WFDA EIA Report. This is in line with other recent scoping opinions such as for Caledonia Offshore Wind Farm (Marine Scotland - Licensing Operations Team; MS-LOT, 2023) and for the Green Volt Offshore Wind Farm (MS-LOT, 2022).

18.6.1 Potential Cumulative Effects

1290. As described above, most offshore works will be undertaken at a significant distance from any sensitive receptors. As such, it is considered unlikely that any significant cumulative effects would occur with other offshore emission sources (i.e., vessels) used for any other plans or projects within the area.

18.6.2 Potential Transboundary Effects

1291. It is unlikely that exhaust emissions from vessels and helicopters (if required) associated with the Bellrock WFDA operating within the North Sea would give rise to any significant transboundary effects to the air quality of surrounding European Economic Area member states. It is therefore proposed that all transboundary offshore air quality effects should be scoped out of the Bellrock WFDA EIA Report.

18.6.3 Summary of Potential Offshore Air Quality Impacts Scoped In and Out

1292. **Table 18.2** outlines the offshore air quality impacts which are proposed to be scoped out of the Bellrock WFDA EIA Report.

Table 18.2: Summary of Potential Impacts Scoped In (✓) or Out (x) for Offshore Air Quality

Potential Impact	Receptor(s)	Description of Potential Effect	Scoped In or Out? (✓ or x)			Embedded Mitigation Measures
			Construction	Operation and Maintenance	Decommissioning	
Impacts of emissions from vessels and helicopters.	Human receptors.	No pathway for effect.	x	x	x	None required as all impacts scoped out, however, the Applicant commits to implementing an EMP and VMP, and ensuring compliance with relevant national and international maritime air quality standards, as detailed in **Section 18.5.1**.
Impacts of emissions from vessels and helicopters.	Ecological receptors.	No pathway for effect.	x	x	x	

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18.7 Proposed Approach to Impact Assessment

1293. As offshore air quality is proposed to be scoped out from further assessment in the Bellrock WFDA EIA Report, no proposed approach to EIA is presented.

18.8 Scoping Questions to Consultees

1294. The following questions are posed to consultees to help them frame and focus their response to the offshore air quality scoping exercise, which will in turn inform the Scoping Opinion:

- Do you agree with the characterisation of the existing environment?
- Have all the offshore air quality impacts resulting from the Bellrock WFDA been identified in the Scoping Report?
- Do you agree that all offshore air quality impacts should be scoped out of the Bellrock WFDA EIA Report?
- Do you have any other matters that you wish to present?

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19 Major Accidents and Disasters

19.1 Introduction

1295. This chapter considers the scope of potential impacts on the environment deriving from the vulnerability of the Bellrock Wind Farm Development Area (WFDA) to risks of relevant major accidents and disasters throughout the construction, operation and maintenance, and decommissioning phases of the Bellrock WFDA. As noted in **Chapter 1: Introduction**, the scope of the potential impacts of the Bellrock Offshore Transmission Development Area (OfTDA) (i.e. offshore substation(s), interconnector cables, reactive compensation station, offshore export cable(s) and associated cable protection) will be presented in the Bellrock OfTDA Scoping Report which will be submitted separately. This chapter has been prepared by Royal HaskoningDHV.

1296. This chapter sets out the proposed methodology and approach to be taken to assessing these potential impacts within the Bellrock WFDA Environmental Impact Assessment (EIA) Report.

1297. This major accidents and disasters chapter should be read in conjunction with the following chapters in the Bellrock WFDA Scoping Report:

- **Chapter 5: Marine Geology, Oceanography and Physical Processes;**
- **Chapter 6: Benthic Ecology;**
- **Chapter 7: Fish and Shellfish Ecology;**
- **Chapter 8: Marine Mammals;**
- **Chapter 9: Offshore Ornithology;**
- **Chapter 10: Commercial Fisheries;**
- **Chapter 11: Shipping and Navigation;**
- **Chapter 12: Aviation and Radar;**
- **Chapter 13: Marine Infrastructure and Other Users;**
- **Chapter 16: Socioeconomics, Tourism and Recreation;**
- **Chapter 17: Climate Change;** and
- **Chapter 18: Offshore Air Quality**.

1298. This major accidents and disasters chapter is likely to have key inter-relationships with the above receptors, which will be considered appropriately where relevant in the Bellrock WFDA EIA Report.

1299. The Bellrock WFDA EIA Report will include an assessment of the likelihood of the occurrence (risk) of major accidents and disasters and the vulnerability of the environment as a consequence of any such occurrence and will reference the appropriate chapters of the Bellrock WFDA EIA Report where appropriate. Consequently, this chapter does not follow the same approach as the other chapters in this Bellrock WFDA Scoping Report.

19.2 Legislation, Policy and Guidance

1300. The Marine Works (Environmental Impact Assessment) Regulations 2007 require significant risks to the receiving communities and environment, for example through major accidents or disasters, to be considered. Similarly, significant effects arising from the vulnerability of infrastructure within the Bellrock WFDA to major accidents or disasters should be considered.

1301. The following definitions are relevant to this chapter of the Bellrock WFDA Scoping Report (Institute of Environmental Management and Assessment (IEMA), 2020):

- 'Major accidents' are defined as 'events that threaten immediate or delayed serious environmental effects to human health, welfare and/or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events.' (IEMA, 2020).
- A 'disaster' is a sudden accident or natural catastrophe that causes great damage or loss of life. These can be natural or can be man-made hazards (e.g. caused by accidental loss of containment) or external hazards (e.g. act of terrorism) which result in consequences for people or the environment.
- For a 'risk' to arise there must be a hazard that consists of a 'source' (e.g. high rainfall); a 'receptor' (e.g. people, property, environment); and a pathway between the source and the receptor (e.g. flood routes).
- 'Vulnerability' describes the potential for harm as a result of an event, for example due to sensitivity or value of receptors. In the context of the EIA Directive, the term refers to the 'exposure and resilience' of the development to the risk of a major accident and disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact.
- A 'receptor' refers to the specific component of the environment that could be adversely affected if the source reaches it. Environmental receptor is specifically defined as: features of the environment that are subject to assessment under Part 1-4 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, namely 'population, human health, biodiversity (for example, fauna and flora), land (for example, land take), soil (for example, organic matter, erosion, compaction, sealing), water (for example, hydromorphological changes, quantity and quality), air, climate (for example, greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.' For the purposes of this assessment the receptors relevant to the Bellrock WFDA have been grouped into the following: population and human health, designated sites (International, National and Other), scarce habitats, widespread habitat, particular species, and the marine environment.
- 'Serious danger to human health' relates to the people present in the potentially affected areas, either permanently or for prolonged periods of time. This excludes workers operating at the facility.
- 'Serious damage to human populations' is harm which would be considered substantial e.g., deaths, multiple serious injuries or a substantial number requiring medical attention.

- 'Serious damage to the environment' is loss or significant detrimental impact on populations of species or organisms, harm or loss of valued sites (including designated sites), valued cultural heritage sites, contamination of drinking water supplies, ground or groundwater, or permanent or long-lasting harm to environmental receptors that cannot be restored through minor clean-up or restoration efforts.
- 'As Low As Reasonably Practicable' (ALARP) is used in assessment of major accidents and disasters and involves 'weighing a risk against the trouble, time and money needed to control it' noting that 'ALARP describes the level to which we expect to see risks controlled'.

1302. **Table 19.1** sets out the legislation, policy and guidance which have been considered in the preparation of this chapter, and will be considered within the Bellrock WFDA EIA Report where appropriate. The overarching policy and legislation relevant to the Bellrock WFDA is described in **Chapter 2: Policy and Legislative Context**.

Table 19.1: Summary of Relevant Legislation, Policy and Guidance for Major Accidents and Disasters

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Legislation	
Health and Safety at Work Act 1974	The Act defines the general duties of employers and employees for maintaining health and safety within most workplaces. It requires workplaces to provide adequate training of staff, adequate welfare provisions, a safe working environment and provision of relevant information and supervision.
The Management of Health and Safety at Work Regulations 1999	The Regulations outline what employers must do to manage health and safety and apply this to work activities. The main duty of the employer is to produce risk assessments.
Construction (Design and Management) Regulations 2015	The Regulations outline the actions required for the health, safety and welfare of construction projects to prevent injury and ill health, applying to all building and construction work.
Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015	The Regulations apply to oil and gas operations in external waters and aims to reduce risks from major accident hazards and the health and safety of the workforce.
The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017	The Regulation requires consideration of major accidents and disasters within EIA.
Policy	
The Civil Contingencies Act 2004 and the Civil Contingencies Act 2004 (Contingency Planning) (Scotland) Regulations 2005	The Civil Contingencies Act 2004 establishes a framework for civil protection, setting out roles and responsibilities on organisations who play a role in preparing for and responding to emergencies.

Relevant Legislation, Policy or Guidance	Relevance to the Assessment
Guidance	
The International Organisation of Standardisation (ISO) 31000: 2009. Risk Management – principles and guidelines	This provides principles and guidelines on risk management and can be applied to a range of activities and any type of risk.
IEMA, 2020. Major Accidents and Disasters in EIA: A Primer	This Primer aims to increase awareness of major accidents and disasters within EIA and its application, offering an assessment methodology.
Guidelines for Environmental Risk Assessment and Management Green Leaves III, 2011, Prepared by Defra and the Collaborative Centre of Excellence in 'Understanding and Managing Natural and Environmental Risks, Cranfield University'	This provides guidelines for the assessment and management of environmental risks.
Health and Safety Executive, 2015. Control of Major Accident Hazards (COMAH) Regulations[44]	These regulations aim to prevent and mitigate the effects of major accidents involving dangerous substances which can cause serious harm to people and/or the environment.
Offshore Major Accident Regulator (OMAR) Memorandum of Understanding between The Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) and The Health and Safety Executive	This aims to promote high levels of protection from major accidents for people and the environment.

19.3 Consultation

1303. As part of the Bellrock WFDA Scoping Workshop (30th October 2023), an information package was provided to Marine Directorate - Licensing Operations Team (MD-LOT), which included the proposed approach to major accidents and disasters. No other consultation relevant to major accidents and disasters has taken place to date.

1304. It is proposed that engagement with technical stakeholders will be progressed in the form of a series of meetings during the EIA process, up to the point of submission of the Section 36 consent and Marine Licence applications for the Bellrock WFDA. Risks will be identified using the National Risk Register, professional judgement, and a review of available literature. In relation to shipping and navigation (please refer to **Chapter 11: Shipping and Navigation** for further details), a Hazard Workshop will be held to enable discussion with stakeholders, including:

- Maritime and Coastguard Agency (MCA);
- Northern Lighthouse Board (NLB);
- UK Chamber of Shipping;

[44] The COMAH regulations apply to onshore facilities but provide applicable definitions to this major accidents and disasters chapter.

- Royal Yachting Association Scotland;
- Cruising Association;
- Scottish Fishermen's Federation;
- Local ports and harbours;
- Regular commercial operators (identified from the vessel traffic survey data); and
- Local marinas and yacht clubs.

19.4 Existing Environment

19.4.1 Study Area

1305. The major accidents and disasters study area for individual hazards will be determined in relation to the impact pathways, the distances to the receptors or from examination of the scale of impacts from examples of historic incidents where available. The geographic scope may reach beyond the Bellrock WFDA Scoping Boundary where there is potential for interaction. Professional judgement has informed the scope relating to the hazards with the potential for interaction with the Bellrock WFDA. The Bellrock WFDA Scoping Boundary is provided in **Figure 1.1** of **Appendix 1** of the Bellrock WFDA Scoping Report.

1306. The temporal scope relates to the lifespan of the Bellrock WFDA, through construction, operation and maintenance, and decommissioning, up to 50 years[45].

19.4.2 Potential Receptors

1307. The proposed potential receptors relevant to this scoping exercise and the assessment to be undertaken in the Bellrock WFDA EIA Report are provided with definitions in **Table 19.2**. The level of harm considered to represent a major accident or disaster is also presented. The thresholds have been determined using industry best practice based upon:

- Criteria for notification of a major accident to the European Commission under Article 18(1) of Seveso III Directive and Regulation 26 of the COMAH Regulations 2015 (cited in IEMA, 2020); and
- Department of the Environment, Transport and the Regions (DETR) (1999).

19.4.3 Data and Information Sources

1308. Information and parameters regarding the design, infrastructure, approach and methods for construction, operation and maintenance and decommissioning of the Bellrock WFDA will be required to undertake an assessment of major accidents and disasters. This will be developed as

[45] The Bellrock WFDA seabed lease is up to 60 years, while the operational life is up to 50 years. At the end of operational life, any repowering will be subject to separate consents.

the project design is refined and the EIA process progresses. Additionally, there will be a reliance of data collated for the chapters identified in **Section 19.1** to inform the assessment for this technical chapter in the Bellrock WFDA EIA Report.

1309. The major accidents and disasters assessment in the Bellrock WFDA EIA Report will be informed by further acquisition of spatial data as well as through further consultations with industry groups, governing bodies, interest groups and local communities.

1310. It is not considered that there is any additional baseline information required to inform the assessment of major accidents and disasters.

Table 19.2: Receptors Requiring Consideration for Major Accidents and Disasters for the Bellrock WFDA EIA Report

Receptor Group	Receptors Included	Major Accident or Disaster Threshold
Population and human health	Construction workers, operations and maintenance workers, and other sea users.	For the public and other sea users: • Substantial number (five or more) of people requiring medical attention or any serious/life-changing injuries. Events of this magnitude may also involve some damage to housing, with low numbers of people being displaced. Potential for localised interruption to utilities and damage to infrastructure. For workers: • Multiple life changing injuries or fatalities.
Designated Sites (International, National and Other)	Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Marine Protected Areas (MPAs).	For SACs, SPAs and MPAs, the thresholds are: • Greater than 0.5 ha or 5% of the area of the site adversely affected (whichever is the lesser), or greater than 5% of an associated linear feature adversely affected, or • Greater than 5% of a particular habitat or population of individual species adversely affected.
Particular species	Particular species covers all species, both flora and fauna, found in the UK and includes common species, red data book species and other protected or priority species, including rare species.	For common species, where reliable estimates of population numbers exist, the threshold is death of, or serious sub-lethal effects within 1% of any species. For common plant species, the threshold is the death of, or serious sub-lethal effects within, 5% of the ground cover. For species listed in the Habitats Directive annexes, the Annexes of the Birds Directive, the Schedules of the Wildlife and Countryside Act 1981 (and amendments), all Red Data Book species and priority species under the UK Biodiversity Action Plan, the threshold may be lower than 1% or 5%, and liaison with the appropriate statutory conservation organisation should be used to determine the appropriate threshold. Moreover, for all species, where reliable estimates of population numbers do not exist, liaison with the statutory authority will be necessary to determine appropriate thresholds. Any loss of a Red Data Book species (or a Red Data Book species site).

Receptor Group	Receptors Included	Major Accident or Disaster Threshold
Marine environment	Non-estuarine marine waters, sub-littoral zones, benthic community adjacent to the coast and fish spawning grounds.	Permanent or long-term damage to: • An area of two ha or more of the littoral or sub-littoral zone, or the coastal benthic community, or the benthic community of any fish spawning ground, or • An area of 100 ha or more of the open sea benthic community. Or a count of: • 100 or more dead sea birds (not gulls), or • 500 or more dead sea birds of any species, or • Five or more dead or significantly injured/impaired sea mammals of any species.

19.5 Existing Environment

1311. The existing environment has been characterised in the chapters of this Bellrock WFDA Scoping Report as listed in **Section 19.1**.

1312. The receiving environment for major accidents and disasters will vary depending on the type and scale of the event in question. The scope of the major accidents and disasters chapter is determined by the nature of the potential major accidents and disasters which could be associated with the Bellrock WFDA.

1313. The future baseline for the Bellrock WFDA relevant to major accidents and disasters will evolve relating to several likely factors over the lifecycle of the Bellrock WFDA. Climate change is likely to lead to changes in rainfall and temperature, increased occurrences of extreme weather, and rising sea levels. Predictions for changes in climate until the end of the 21st century are available from The UK Climate Projections (UKCP, 2021). The impacts of climate change are set out in more detail in **Chapter 17: Climate Change**.

1314. There are likely to be advances in technology over the lifecycle of the Bellrock WFDA, with potential for further reductions in risks to safety and the environment, or to introduce new hazards with the introduction of novel technology. Novel technologies would be implemented following appropriate risk assessment processes.

1315. In terms of shipping and navigation risks, a Navigational Risk Assessment will be undertaken as part of the EIA process and is discussed further in **Chapter 11: Shipping and Navigation**.

19.5.1 Embedded Mitigation Measures

1316. The Applicant will prepare and adhere to a series of management plans throughout the life span of the Bellrock WFDA, which form part of the embedded mitigation to manage risk. These will be developed in consultation with stakeholders and will include:

- Environmental Management Plan (EMP);
- Emergency Response and Cooperation Plan (ERCoP);
- Cable Plan (CaP);
- Construction Method Statement (CMS);
- Marine Pollution Contingency Plan (MPCP);
- Vessel Management Plan (VMP);
- Navigational Safety Plan (NSP);
- Lighting and Marking Plan (LMP);
- Development Specification and Layout Plan (DSLP); and
- Decommissioning Programme.

1317. Embedded mitigation with relevance for major accidents and disasters, as detailed within **Chapters 5 – 19**, are proposed below:

- A detailed Cable Burial Risk Assessment (CBRA) will be prepared where IACs are proposed to be buried to determine the target burial depth. The burial depths may vary and will be dependant on risk and ground conditions. The CBRA will also highlight instances where adequate burial cannot be achieved and alternative protection is needed;
- Compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78;
- Adherence to the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention, 2004);
- Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins;
- Application for and use of Safety Zones during construction, major repairs and decommissioning phases;
- Any objects dropped on the seabed during works associated with the Bellrock WFDA which may pose a hazard will be reported in line with MD-LOT procedures;
- Development of Unexploded Ordnance (UXO) Threat and Risk Assessment and preferred use of low noise UXO clearance techniques where possible and use of UXO mitigation hierarchy;
- Development of a Navigational Risk Assessment;
- All offshore infrastructure associated with the Bellrock WFDA will be appropriately marked on UKHO Admiralty charts;
- Where appropriate, guard vessels will be used to ensure adherence with Safety Zones or advisory passing distances;
- The Applicant will ensure compliance with Marine Guidance Note 654 and its annexes, where applicable, including completion post consent of Search and Rescue (SAR) Checklist in consultation with the MCA;
- The Applicant will ensure compliance with the Regulatory Expectations on Moorings for Floating Wind and Marine Devices (MCA and HSE, 2017);
- Lights, marks, sounds, signals, and other aids to navigation will be exhibited as required by NLB, MCA, and Civil Aviation Authority (CAA) including the buoyed construction/ decommissioning areas;
- Marine coordination will be implemented to manage project vessels throughout construction, maintenance, and decommissioning periods;
- A minimum blade tip clearance of at least 22 m Above Mean Sea Level (AMSL);
- Bellrock WFDA vessels will ensure compliance with international marine regulations as adopted by the Flag State, including the COLREGs (International Maritime Organisation (IMO), 1972/77) and SOLAS (IMO, 1974);

- Appropriate marking of the Bellrock WFDA on aeronautical charts. This will include provision of the positions and heights of structures to CAA, Ministry of Defence (MoD), and Defence Geographics Centre;
- Aviation lighting and marking, as described in the LMP, will be installed in accordance with Article 223 of the UK ANO 2016 which sets out the mandatory requirements to be followed for lighting of offshore wind turbine generators (WTGs);
- The layout of the WTGs in the Bellrock WFDA, will be finalised in discussion with the MCA and NLB in order to ensure the specific WTG layout is compatible with potential SAR activity; and
- Failures of the lighting and marking in the Bellrock WFDA will be appropriately reported and rectified as soon as practicable. Interim hazard warnings will be put in place as required.

19.6 Scoping of Potential Impacts

1318. Some of the risk types which will be considered within the Bellrock WFDA EIA Report include:

- Fire;
- Extreme temperature (heat wave, cold snaps)/high winds/storm;
- Electromagnetic fields (EMF);
- Extreme weather events;
- Electricity failure;
- Exposure to high voltage;
- Industrial accidents;
- Natural disasters (such as earthquakes);
- Building/structure collapse/design error;
- Vessel collision or allision;
- Helicopter collision;
- Exposed cables leading to vessel snagging;
- Vessel snagging with floating substructures (FSSs) and mooring systems;
- Disturbance of UXO within Bellrock WFDA;
- Floating offshore unit(s) (FOUs) breaking free during tow or from moorings; and
- Workplace accident.

1319. It should be noted that effects from accidental releases of pollution are proposed to be scoped out of the Bellrock WFDA EIA Report (see **Chapter 5: Marine Geology, Oceanography and Physical Processes**) due to implementation of mitigation measures to reduce risk of this as far as practicable.

19.7 Proposed Approach to Impact Assessment

1320. Whilst there is no standard methodology for the assessment of major accidents and disasters within Bellrock WFDA EIA Report, IEMA have prepared 'Major Accidents and Disasters in EIA: A Primer' (IEMA, 2020) which provides guidance on a risk-based approach. The Bellrock WFDA EIA Report will assess the likelihood of the significant threat or hazard occurring, and the mitigation embedded to ensure a risk is ALARP (or avoided completely). The risks will be identified in respect of the potential vulnerability of the project to disaster risks, and the potential of the Bellrock WFDA to cause major accidents or disasters.

1321. Where required, additional mitigation measures will be proposed to manage the identified risks to the environment.

1322. The following steps will be undertaken during the risk assessment:

- **Step 1:** Identify hazards in a long list of possible major accidents and events. Major accidents with little relevance to the Bellrock WFDA will not be included (e.g., volcanic eruptions). Sources will include the UK Government National Risk Register – 2020 edition and further relevant sources. This step will also involve identification of the receptors in the existing environment.
- **Step 2:** Screening exercise to determine which risks are relevant to the Bellrock WFDA and require further assessment.
- **Step 3:** Risk evaluation - definition of the potential impacts that may occur from the risks and classification of the likelihood that the events may occur. Identification and evaluation of prevention, minimisation and mitigation measures.
- **Step 4:** Determination of whether the risk has been mitigated ALARP and the identification of any residual risk, and the consequences upon the receptors in the event of a major accident or disaster.

1323. Where a pathway or linkage is established, an assessment will be carried out to determine whether embedded design measures or legal requirements, codes and standards adequately control the potential major accidents and disasters. Reference will be made to other technical chapters of the Bellrock WFDA EIA Report as appropriate where further studies have been carried out.

1324. The scope of the major accidents and disasters chapter of the Bellrock WFDA EIA Report will be determined by the nature of the potential major accidents which could be associated with the Bellrock WFDA, having regard to the potential impacts associated with relevant environmental disciplines in this Bellrock WFDA Scoping Report as set out in **Section 19.1**.

1325. The potential for significant adverse effects of the Bellrock WFDA on the environment deriving from its vulnerability to risks of relevant major accidents and disasters will be assessed in line with requirements set out under the EIA Directive.

19.8 Scoping Questions to Consultees

1326. The following questions are posed to consultees to help them frame and focus their response to the major accidents and disasters scoping exercise, which will in turn inform the Scoping Opinion:

- Are you satisfied with the scope proposed for the major accidents and disasters chapter of the Bellrock WFDA EIA Report?
- Is there any additional guidance and policy that the Applicant should have regard to in the preparation of the major accidents and disasters chapter of the Bellrock WFDA EIA Report?
- Are there any other potential risk or impacts you believe could result in significant effects which you wish to see assessed in the major accidents and disasters chapter of the Bellrock WFDA EIA Report?
- Do you have any other matters or information sources that you wish to present?

19.9 References

Defra (2011). Guidelines for Environmental Risk Assessment and Management. Green Leaves III. Available at: https://assets.publishing.service.gov.uk/media/5a79d20540f0b66d161ae5f9/pb13670-green-leaves-iii-1111071.pdf

Health and Safety Executive (2015a). Construction (Design and Management) Regulations 2015. Available at: https://www.hse.gov.uk/construction/cdm/2015/index.htm

Health and Safety Executive (2015b). Control Of Major Accident Hazards Regulations 2015 (COMAH). Available at: https://www.hse.gov.uk/comah/background/comah15.htm#:~:text=Resources%20Wales%20websites.-,The%20main%20aim%20of%20COMAH,seriously%20as%20those%20to%20people.

Health and Safety Executive (2015c). Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015. Available at: https://www.hse.gov.uk/pubns/books/l154.htm

Health and Safety Executive (1974). Health and Safety at Work etc. Act 1974. Available at: https://www.hse.gov.uk/legislation/hswa.htm

IEMA (2020). IEMA Major Accidents and Disasters in EIA Guide. Available at: https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer

ISO (2009). ISO 31000:2009. Risk management — Principles and guidelines. Available at: https://www.iso.org/standard/43170.html

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20 Summary and Next Steps

1327. This Bellrock Wind Farm Development Area (WFDA) Scoping Report accompanies a request for a formal Scoping Opinion from the Marine Directorate - Licensing Operations Team (MD-LOT), acting on behalf of the Scottish Ministers, in relation to the WFDA of the Bellrock Project. The purpose of this Bellrock WFDA Scoping Report is to provide stakeholders with sufficient information on the activities and infrastructure that will be associated with the Bellrock WFDA and allow for engagement with stakeholders on the key issues to be addressed in the Bellrock WFDA Environmental Impact Assessment (EIA) Report, as well as the baseline data sources and assessment methodologies to be used. This Scoping Report contains the information required under the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) Regulations 2007, as set out in **Table 1.3** in **Chapter 1: Introduction**.

1328. Within this Bellrock WFDA Scoping Report, potential environmental impacts have been considered. A summary of the technical chapters and potential impacts that are proposed to be scoped in and out of the Bellrock WFDA EIA Report are outlined in **Table 20.1** below. Impacts are proposed to be scoped out of the Bellrock WFDA EIA Report where there are no likely significant effects in EIA terms, or no effect-receptor pathways have been identified.

1329. Environmental mitigation measures included in this Bellrock WFDA Scoping Report are set out in **Appendix 3: Mitigation Register**. Environmental mitigation measures will also be recorded in the Bellrock WFDA EIA Report and in an updated Mitigation Register to enable them to be secured (where required) and implemented.

1330. The Applicant invites consultees to consider the information provided in this Bellrock WFDA Scoping Report and the **Bellrock WFDA Habitats Regulations Appraisal Screening Report** (BlueFloat Energy | Renantis Partnership, 2024), and provide comments on the proposed approach and, in particular, whether they agree with the conclusions drawn. Responses to this **Bellrock WFDA Scoping Report** submitted to MD-LOT from statutory and non-statutory consultees are expected to inform the Scoping Opinion. The Bellrock WFDA EIA Report produced by the Applicant will be based on the Scoping Opinion received.

1331. The **Bellrock WFDA Scoping Report** is available on the Bellrock Project's website: www.bellrockwind.co.uk

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Table 20.1: Summary of Potential Impacts Scoped In (✓) or Scoped Out (x) of the Bellrock WFDA EIA Report During Construction (C), Operation and Maintenance (O&M) and Decommissioning (D)

Technical Chapter	Potential Impacts	C	O&M	D
Chapter 5: Marine Geology, Oceanography and Physical Processes	Impacts on suspended sediment concentrations and transport	✓	✓	✓
	Impacts on chemical contaminant concentrations associated with increases in suspended sediment	✓	✓	✓
	Impacts on tidal currents and waves	x	✓	x
	Impacts on bedload sediment transport and seabed morphological change	✓	✓	✓
	Indentations on the seabed due to installation and decommissioning vessels	x	x	x
	Impacts on water column stratification influencing nutrient fluxes and primary production	x	x	x
Chapter 6: Benthic Ecology	Physical disturbance and temporary habitat loss of seabed habitat	✓	✓	✓
	Permanent habitat loss	x	✓	✓
	Increased suspended sediments and sediment re-deposition	✓	✓	✓
	Remobilisation of existing contaminated sediment [46]	✓	✓	✓
	Introduction of marine invasive non-native species (INNS) from vessel traffic	x	x	x
	Disturbance from underwater noise and vibration	x	x	x
	Interactions of electromagnetic fields (EMFs)	x	✓	x
	Colonisation of introduced substrate	x	✓	✓

[46] Remobilisation of contaminated sediments will be scoped out if site-specific sediment samples reveal low contaminant levels

Technical Chapter	Potential Impacts	C	O&M	D
	Potential impacts on designated sites	x	x	x
	Accidental release of pollutants	x	x	x
Chapter 7: Fish and Shellfish Ecology	Temporary habitat loss/physical disturbance	✓	✓	✓
	Permanent habitat loss[47]	x	✓	x
	Increased suspended sediment concentrations and sediment re-deposition	✓	✓	✓
	Remobilisation of contaminated sediments[48]	✓	✓	✓
	Underwater noise and vibration	✓	✓	✓
	EMFs[49]	x	✓	x
	Secondary entanglement with floating substructures (FSSs) and station keeping system (SKS)	x	✓	x
	Introduction of hard substrate[50]	x	✓	x
	Changes in fishing activity	✓	✓	✓

[47] It is acknowledged that the impact of EMF begins with commissioning, which takes place during the construction phase – to avoid duplicating assessments, the full extent of this impact will be assessed in the operation and maintenance section, with a clear acknowledgement that they span the duration of the Bellrock WFDA's lifetime.

[48] Remobilisation of contaminated sediments will be scoped out if site-specific sediment samples reveal low contaminant levels.

[49] It is acknowledged that the impact of EMF begins with commissioning, which takes place during the construction phase – to avoid duplicating assessments, the full extent of this impact will be assessed in the operation and maintenance section. EMF is therefore scoped out for construction and decommissioning.

[50] It is acknowledged that the impacts of permanent habitat loss and introduction of hard substrate begin in construction and continue through decommissioning – to avoid duplicating assessments the full extent of these impacts will assessed in the operation and maintenance section, with a clear acknowledgement that they span the duration of the Bellrock WFDA's lifetime.

Technical Chapter	Potential Impacts	C	O&M	D
	Vessel collision for basking shark	✓	✓	✓
	Accidental release of pollutants	x	x	x
	Introduction of marine INNS from vessel traffic	x	x	x
Chapter 8: Marine Mammals	Underwater noise during unexploded ordnance (UXO) clearance	✓	x	x
	Underwater noise during geophysical surveys	✓	✓	✓
	Underwater noise during piling	✓	x	x
	Underwater noise during other substructure installation activities (other than impact piling)	✓	x	x
	Underwater noise from other activities (for example rock placement and inter-array cable (IAC) laying)	✓	✓	✓
	Underwater noise and presence of vessels	✓	✓	✓
	Underwater noise from operational wind turbine generators (WTGs) and floating offshore unit (FOU) moorings on the seabed	x	✓	x
	Primary entanglement	x	x	x
	Secondary entanglement	x	✓	x
	Collision risk with vessels	✓	✓	✓
	Disturbance at seal haul-out sites	✓	✓	✓
	EMF – direct effects on marine mammals	x	✓	x
	Changes in water quality	x	x	x

Technical Chapter	Potential Impacts	C	O&M	D
	Changes to prey availability	✓	✓	✓
Chapter 9: Offshore Ornithology	Temporary disturbance and displacement	✓	✓	✓
	Indirect impacts	✓	✓	✓
	Indirect impacts from UXO clearance	✓	x	x
	Disturbance and displacement from the physical presence of WTGs and associated maintenance activities	x	✓	x
	Barrier to movement	x	✓	x
	Collision with WTGs	x	✓	x
	Secondary entanglement with subsea infrastructure, specifically debris that may become attached to the mooring lines of FSSs	x	✓	x
Chapter 10: Commercial Fisheries	Reduction in access to, or exclusion from established fishing grounds	✓	✓	✓
	Displacement leading to gear conflict and increased fishing pressure on adjacent grounds	✓	✓	✓
	Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	✓	✓	✓
	Increased vessel traffic associated with the Bellrock WFDA within fishing grounds leading to interference with fishing activity	✓	✓	✓
	Additional steaming to alternative fishing grounds for vessels that would otherwise cross through the Bellrock WFDA	x	x	x
	Physical presence of infrastructure and potential exposure of that infrastructure leading to gear snagging	x	✓	x
	Increased vessel to vessel collision risk (third party to third party)	✓	✓	✓

Technical Chapter	Potential Impacts	C	O&M	D
Chapter 11: Shipping and Navigation	Increased vessel to vessel collision risk (third party to project vessel)	✓	✓	✓
	Creation of vessel to structure allision risk	x	✓	x
	Loss of station	x	✓	x
	Reduction in under-keel clearance	x	✓	x
	Anchor interaction with SKS or IACs	x	✓	x
	Interference with navigation, communications, and position-fixing equipment	x	✓	x
	Reduction of emergency response capability including search and rescue (SAR)	x	✓	x
Chapter 12: Aviation and Radar	Creation of an aviation obstacle environment	✓	✓	✓
	Increased air traffic in the area related to wind farm activities	✓	✓	✓
	Impact on civil Primary Surveillance Radars (PSRs)	x	✓	x
	Impact on military Air Traffic Control PSRs	x	x	x
	Impact on military air defence PSRs	x	✓	x
	Impact on civil and military Secondary Surveillance Radar (SSR) systems	x	x	x
	Impact on weather radars	x	x	x
Chapter 13: Marine Infrastructure and Other Users	Impacts on other offshore wind farms	✓	✓	✓
	Impacts on offshore oil and gas operations	✓	✓	✓

<table>
<tr><th>Technical Chapter</th><th colspan="2">Potential Impacts</th><th>C</th><th>O&M</th><th>D</th></tr>
<tr><td rowspan="5"></td><td colspan="2">Impacts on carbon capture and storage (CCS) sites</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td colspan="2">Impacts on subsea cables (utilities)</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td colspan="2">Impacts on dredging and disposal sites</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td colspan="2">Impacts on marine aggregate sites</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td colspan="2">Impacts on MoD maritime navigational interests (maritime PEXAs or highly surveyed areas)</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td rowspan="3">Chapter 14: Marine Archaeology and Cultural Heritage</td><td colspan="2">Direct impacts to heritage assets</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td colspan="2">Indirect impacts to heritage assets associated with changes to marine physical processes</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td colspan="2">Change to the setting of heritage assets</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td rowspan="5">Chapter 15: Seascape, Landscape and Visual Impact Assessment (SLVIA)</td><td>Presence of FOUs being towed</td><td>Temporary change in view</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td rowspan="2">Presence of offshore construction activity, including vessel movements, cranes and lighting in the seascape</td><td>Potential change in offshore character</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td>Change in view experienced by people in the offshore environment</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td rowspan="2">Presence of WTGs in the seascape</td><td>Potential change in offshore character</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td>Change in view experienced by people in the offshore environment</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td rowspan="3">Chapter 16: Socioeconomics, Tourism and Recreation</td><td colspan="2">Increase in employment and Gross Value Added (GVA)</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td colspan="2">Demographic changes</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td colspan="2">Changes to housing demand</td><td>✓</td><td>✓</td><td>✓</td></tr>
</table>

Technical Chapter	Potential Impacts			C	O&M	D
	Changes to other local public and private services			✓	✓	✓
	Socio-cultural effects			x	x	x
	Changes to commercial fisheries			✓	✓	✓
	Changes to shipping			✓	✓	✓
	Changes to marine recreation			✓	✓	✓
Chapter 17: Climate Change	Whole lifecycle greenhouse gas (GHG) impacts			✓	✓	✓
	Vulnerability and resilience to climate change impacts			✓	✓	✓
Chapter 18: Offshore Air Quality	Impacts of emissions from vessels and helicopters on human receptors			x	x	x
	Impacts of emissions from vessels and helicopters on ecological receptors			x	x	x
Appendix 2: Nature Conservation Marine Protected Areas (NCMPAs) Screening	Southern Trench	Minke whale	Underwater noise during unexploded (UXO) clearance	✓	x	x
			Underwater noise during geophysical surveys	x	x	x
			Underwater noise during substructure installation	✓	x	x
			Underwater noise from other activities (for example rock placement and cable laying)	x	x	x
			Underwater noise and presence of vessels	✓	✓	✓
			Underwater noise from operational WTGs and floating turbine substructure moorings on the seabed	x	x	x

Technical Chapter	Potential Impacts			C	O&M	D
			Collision risk with vessels	✓	✓	✓
			Primary entanglement	x	x	x
			Secondary entanglement	x	x	x
			Changes in water quality	x	x	x
			Changes to prey availability	x	x	x
			EMF - direct effects	x	x	x